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[FF] 2 Charginos

$$C(\tilde{\chi}^+_{\text{c1}}, \tilde{\chi}^-_{\text{c2}}) = \begin{bmatrix} -\frac{\text{i}}{2}\left(\delta\bar{Z}^{\chi,L}_{\text{c1,c2}} + \delta Z^{\chi,L}_{\text{c1,c2}}\right) \\ \frac{\text{i}}{2}\left(\delta\bar{Z}^{\chi,R}_{\text{c1,c2}} + \delta Z^{\chi,R}_{\text{c1,c2}}\right) \\ -\frac{\text{i}}{2}\left(2\,\delta M^{\chi}_{\text{c1,c2}} + \delta Z^{\chi,L}_{\text{c1,c2}}\, m_{\tilde{\chi}^-_{\text{c1}}} + \delta\bar{Z}^{\chi,R}_{\text{c1,c2}}\, m_{\tilde{\chi}^-_{\text{c2}}}\right) \\ -\frac{\text{i}}{2}\left(2\,\delta M^{\chi *}_{\text{c2,c1}} + \delta Z^{\chi,R}_{\text{c1,c2}}\, m_{\tilde{\chi}^-_{\text{c1}}} + \delta\bar{Z}^{\chi,L}_{\text{c1,c2}}\, m_{\tilde{\chi}^-_{\text{c2}}}\right) \end{bmatrix}$$
443

[FF] 2 Gluinos

$$C(\tilde{g}, \tilde{g}) = \begin{bmatrix} -\frac{\text{i}\,\delta_{\text{g1,g2}}}{2}\left(\delta\bar{Z}^{L}_{\tilde{g}} + \delta Z^{L}_{\tilde{g}}\right) \\ \frac{\text{i}\,\delta_{\text{g1,g2}}}{2}\left(\delta\bar{Z}^{R}_{\tilde{g}} + \delta Z^{R}_{\tilde{g}}\right) \\ -\frac{\text{i}\,\delta_{\text{g1,g2}}}{2}\left(2\,\delta m_{\tilde{g}} + m_{\tilde{g}}\,\left(\delta\bar{Z}^{R}_{\tilde{g}} + \delta Z^{L}_{\tilde{g}}\right)\right) \\ -\frac{\text{i}\,\delta_{\text{g1,g2}}}{2}\left(2\,\delta m^{*}_{\tilde{g}} + m_{\tilde{g}}\,\left(\delta\bar{Z}^{L}_{\tilde{g}} + \delta Z^{R}_{\tilde{g}}\right)\right) \end{bmatrix}$$
475

[FF] 2 Leptons

$$C(\overline{\nu}_{\text{j1}}, \nu_{\text{j2}}) = \begin{bmatrix} -\frac{\text{i}\,\delta_{\text{j1,j2}}}{2}\left(\delta\bar{Z}^{\nu,L}_{\text{j1,j1}} + \delta Z^{\nu,L}_{\text{j1,j1}}\right) \\ \frac{\text{i}\,\delta_{\text{j1,j2}}}{2}\left(\delta\bar{Z}^{\nu,R}_{\text{j1,j1}} + \delta Z^{\nu,R}_{\text{j1,j1}}\right) \\ 0 \\ 0 \end{bmatrix}$$
418

$$C(\overline{e}_{\mathrm{j1}}, e_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\left(\delta\bar{Z}^{e,L}_{\mathrm{j1,j1}} + \delta Z^{e,L}_{\mathrm{j1,j1}}\right) \\ \frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\left(\delta\bar{Z}^{e,R}_{\mathrm{j1,j1}} + \delta Z^{e,R}_{\mathrm{j1,j1}}\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\left(2\,\delta m^{e}_{\mathrm{j1}} + m_{e_{\mathrm{j1}}}\left(\delta\bar{Z}^{e,R}_{\mathrm{j1,j1}} + \delta Z^{e,L}_{\mathrm{j1,j1}}\right)\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\left(2\,\delta m^{e}_{\mathrm{j1}} + m_{e_{\mathrm{j1}}}\left(\delta\bar{Z}^{e,L}_{\mathrm{j1,j1}} + \delta Z^{e,R}_{\mathrm{j1,j1}}\right)\right) \end{bmatrix}$$

[FF] 2 Neutralinos

$$C(\tilde{\chi}^{0}_{\mathrm{n1}}, \tilde{\chi}^{0}_{\mathrm{n2}}) = \begin{bmatrix} -\frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{\chi^{0},L}_{\mathrm{n1,n2}} + \delta Z^{\chi^{0},L}_{\mathrm{n1,n2}}\right) \\ \frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{\chi^{0},R}_{\mathrm{n1,n2}} + \delta Z^{\chi^{0},R}_{\mathrm{n1,n2}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta M^{\chi^{0}}_{\mathrm{n1,n2}} + \delta Z^{\chi^{0},L}_{\mathrm{n1,n2}}\, m_{\tilde{\chi}^{0}_{\mathrm{n1}}} + \delta\bar{Z}^{\chi^{0},R}_{\mathrm{n1,n2}}\, m_{\tilde{\chi}^{0}_{\mathrm{n2}}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta M^{\chi^{0}*}_{\mathrm{n2,n1}} + \delta Z^{\chi^{0},R}_{\mathrm{n1,n2}}\, m_{\tilde{\chi}^{0}_{\mathrm{n1}}} + \delta\bar{Z}^{\chi^{0},L}_{\mathrm{n1,n2}}\, m_{\tilde{\chi}^{0}_{\mathrm{n2}}}\right) \end{bmatrix}$$

[FF] 2 Quarks

$$C(\overline{u}_{\mathrm{j1}}, u_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{u,L}_{\mathrm{j2,j1}} + \delta Z^{u,L}_{\mathrm{j1,j2}}\right) \\ \frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{u,R}_{\mathrm{j2,j1}} + \delta Z^{u,R}_{\mathrm{j1,j2}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta_{\mathrm{j1,j2}}\,\delta m^{u}_{\mathrm{j1}} + \delta Z^{u,L}_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j1}}} + \delta\bar{Z}^{u,R}_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j2}}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta_{\mathrm{j1,j2}}\,\delta m^{u}_{\mathrm{j1}} + \delta Z^{u,R}_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j1}}} + \delta\bar{Z}^{u,L}_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j2}}}\right) \end{bmatrix}$$

$$
C(\underset{421}{\bar{d}_{\mathrm{j1}}}, d_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{d,L}_{\mathrm{j2,j1}} + \delta Z^{d,L}_{\mathrm{j1,j2}}\right) \\ \frac{\mathrm{i}}{2}\left(\delta\bar{Z}^{d,R}_{\mathrm{j2,j1}} + \delta Z^{d,R}_{\mathrm{j1,j2}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta_{\mathrm{j1,j2}}\,\delta m^{d}_{\mathrm{j1}} + \delta Z^{d,L}_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j1}}} + \delta\bar{Z}^{d,R}_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j2}}}\right) \\ -\frac{\mathrm{i}}{2}\left(2\,\delta_{\mathrm{j1,j2}}\,\delta m^{d}_{\mathrm{j1}} + \delta Z^{d,R}_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j1}}} + \delta\bar{Z}^{d,L}_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j2}}}\right) \end{bmatrix}
$$

[FFS] 2 Charginos – Higgs

$$
C(\underset{251}{\tilde{\chi}^{-}_{\mathrm{c1}}}, \tilde{\chi}^{+}_{\mathrm{c2}}, h^{0}) = \begin{bmatrix} \frac{\mathrm{i}\,e}{2\sqrt{2}\,s_W^2}\left\{\begin{array}{l} s_W\left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\left(s_\alpha\,U^{*}_{1,2}\,V^{*}_{\mathrm{c2},1} - c_\alpha\,U^{*}_{1,1}\,V^{*}_{\mathrm{c2},2}\right) + \delta Z^{\chi,L}_{2,\mathrm{c1}}\left(s_\alpha\,U^{*}_{2,2}\,V^{*}_{\mathrm{c2},1} - c_\alpha\,U^{*}_{2,1}\,V^{*}_{\mathrm{c2},2}\right)\right) - \\ U^{*}_{\mathrm{c1},2}\left(V^{*}_{\mathrm{c2},1}\left(c_\alpha\,\delta Z_{hH}\,s_W + s_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{hh}\right)\right)\right) - s_\alpha\,s_W\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c2},1}\,V^{*}_{1,1} + \delta\bar{Z}^{\chi,R}_{\mathrm{c2},2}\,V^{*}_{2,1}\right)\right) - \\ U^{*}_{\mathrm{c1},1}\left(V^{*}_{\mathrm{c2},2}\left(\delta Z_{hH}\,s_\alpha\,s_W - c_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{hh}\right)\right)\right) + c_\alpha\,s_W\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c2},1}\,V^{*}_{1,2} + \delta\bar{Z}^{\chi,R}_{\mathrm{c2},2}\,V^{*}_{2,2}\right)\right) \end{array}\right\} \\ \frac{\mathrm{i}\,e}{2\sqrt{2}\,s_W^2}\left\{\begin{array}{l} s_W\left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\left(s_\alpha\,U_{\mathrm{c2},2}\,V_{1,1} - c_\alpha\,U_{\mathrm{c2},1}\,V_{1,2}\right) + \delta Z^{\chi,R}_{2,\mathrm{c1}}\left(s_\alpha\,U_{\mathrm{c2},2}\,V_{2,1} - c_\alpha\,U_{\mathrm{c2},1}\,V_{2,2}\right)\right) - \\ V_{\mathrm{c1},1}\left(U_{\mathrm{c2},2}\left(c_\alpha\,\delta Z_{hH}\,s_W + s_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{hh}\right)\right)\right) - s_\alpha\,s_W\left(\delta\bar{Z}^{\chi,L}_{\mathrm{c2},1}\,U_{1,2} + \delta\bar{Z}^{\chi,L}_{\mathrm{c2},2}\,U_{2,2}\right)\right) - \\ V_{\mathrm{c1},2}\left(U_{\mathrm{c2},1}\left(\delta Z_{hH}\,s_\alpha\,s_W - c_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{hh}\right)\right)\right) + c_\alpha\,s_W\left(\delta\bar{Z}^{\chi,L}_{\mathrm{c2},1}\,U_{1,1} + \delta\bar{Z}^{\chi,L}_{\mathrm{c2},2}\,U_{2,1}\right)\right) \end{array}\right\} \end{bmatrix}
$$

$$
C(\underset{252}{\tilde{\chi}^{-}_{\mathrm{c1}}}, \tilde{\chi}^{+}_{\mathrm{c2}}, H^{0}) = \begin{bmatrix} -\frac{\mathrm{i}\,e}{2\sqrt{2}\,s_W^2}\left\{\begin{array}{l} s_W\left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\left(c_\alpha\,U^{*}_{1,2}\,V^{*}_{\mathrm{c2},1} + s_\alpha\,U^{*}_{1,1}\,V^{*}_{\mathrm{c2},2}\right) + \delta Z^{\chi,L}_{2,\mathrm{c1}}\left(c_\alpha\,U^{*}_{2,2}\,V^{*}_{\mathrm{c2},1} + s_\alpha\,U^{*}_{2,1}\,V^{*}_{\mathrm{c2},2}\right)\right) - \\ U^{*}_{\mathrm{c1},2}\left(V^{*}_{\mathrm{c2},1}\left(\delta Z_{hH}\,s_\alpha\,s_W + c_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right) - c_\alpha\,s_W\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c2},1}\,V^{*}_{1,1} + \delta\bar{Z}^{\chi,R}_{\mathrm{c2},2}\,V^{*}_{2,1}\right)\right) + \\ U^{*}_{\mathrm{c1},1}\left(V^{*}_{\mathrm{c2},2}\left(c_\alpha\,\delta Z_{hH}\,s_W - s_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right) + s_\alpha\,s_W\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c2},1}\,V^{*}_{1,2} + \delta\bar{Z}^{\chi,R}_{\mathrm{c2},2}\,V^{*}_{2,2}\right)\right) \end{array}\right\} \\ -\frac{\mathrm{i}\,e}{2\sqrt{2}\,s_W^2}\left\{\begin{array}{l} s_W\left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\left(c_\alpha\,U_{\mathrm{c2},2}\,V_{1,1} + s_\alpha\,U_{\mathrm{c2},1}\,V_{1,2}\right) + \delta Z^{\chi,R}_{2,\mathrm{c1}}\left(c_\alpha\,U_{\mathrm{c2},2}\,V_{2,1} + s_\alpha\,U_{\mathrm{c2},1}\,V_{2,2}\right)\right) - \\ V_{\mathrm{c1},1}\left(U_{\mathrm{c2},2}\left(\delta Z_{hH}\,s_\alpha\,s_W + c_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right) - c_\alpha\,s_W\left(\delta\bar{Z}^{\chi,L}_{\mathrm{c2},1}\,U_{1,2} + \delta\bar{Z}^{\chi,L}_{\mathrm{c2},2}\,U_{2,2}\right)\right) + \\ V_{\mathrm{c1},2}\left(U_{\mathrm{c2},1}\left(c_\alpha\,\delta Z_{hH}\,s_W - s_\alpha\left(2\,\delta s_W - s_W\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right) + s_\alpha\,s_W\left(\delta\bar{Z}^{\chi,L}_{\mathrm{c2},1}\,U_{1,1} + \delta\bar{Z}^{\chi,L}_{\mathrm{c2},2}\,U_{2,1}\right)\right) \end{array}\right\} \end{bmatrix}
$$

$$
C(\tilde{\chi}^-_{\rm c1}, \tilde{\chi}^+_{\rm c2}, A^0) = \left[\begin{array}{l} -\frac{e}{2\sqrt{2}\,s_W^2} \left\{ \begin{array}{l} s_W \left(\delta Z^{\chi,L}_{1,\rm c1} \left(s_\beta\, U^*_{1,2}\, V^*_{\rm c2,1} + c_\beta\, U^*_{1,1}\, V^*_{\rm c2,2} \right) + \delta Z^{\chi,L}_{2,\rm c1} \left(s_\beta\, U^*_{2,2}\, V^*_{\rm c2,1} + c_\beta\, U^*_{2,1}\, V^*_{\rm c2,2} \right) \right) - \\ U^*_{\rm c1,2} \left(V^*_{\rm c2,1} \left(c_\beta\, \delta Z_{AG}\, s_W + s_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{AA} \right) \right) \right) - s_\beta\, s_W \left(\delta \bar{Z}^{\chi,R}_{\rm c2,1}\, V^*_{1,1} + \delta \bar{Z}^{\chi,R}_{\rm c2,2}\, V^*_{2,1} \right) \right) + \\ U^*_{\rm c1,1} \left(V^*_{\rm c2,2} \left(\delta Z_{AG}\, s_\beta\, s_W - c_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{AA} \right) \right) \right) + c_\beta\, s_W \left(\delta \bar{Z}^{\chi,R}_{\rm c2,1}\, V^*_{1,2} + \delta \bar{Z}^{\chi,R}_{\rm c2,2}\, V^*_{2,2} \right) \right) \end{array} \right\} \\ \frac{e}{2\sqrt{2}\,s_W^2} \left\{ \begin{array}{l} s_W \left(\delta Z^{\chi,R}_{1,\rm c1} \left(s_\beta\, U_{\rm c2,2}\, V_{1,1} + c_\beta\, U_{\rm c2,1}\, V_{1,2} \right) + \delta Z^{\chi,R}_{2,\rm c1} \left(s_\beta\, U_{\rm c2,2}\, V_{2,1} + c_\beta\, U_{\rm c2,1}\, V_{2,2} \right) \right) - \\ V_{\rm c1,1} \left(U_{\rm c2,2} \left(c_\beta\, \delta Z_{AG}\, s_W + s_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{AA} \right) \right) \right) - s_\beta\, s_W \left(\delta \bar{Z}^{\chi,L}_{\rm c2,1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\rm c2,2}\, U_{2,2} \right) \right) + \\ V_{\rm c1,2} \left(U_{\rm c2,1} \left(\delta Z_{AG}\, s_\beta\, s_W - c_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{AA} \right) \right) \right) + c_\beta\, s_W \left(\delta \bar{Z}^{\chi,L}_{\rm c2,1}\, U_{1,1} + \delta \bar{Z}^{\chi,L}_{\rm c2,2}\, U_{2,1} \right) \right) \end{array} \right\} \end{array} \right]
$$
(253)

$$
C(\tilde{\chi}^-_{\rm c1}, \tilde{\chi}^+_{\rm c2}, G^0) = \left[\begin{array}{l} \frac{e}{2\sqrt{2}\,s_W^2} \left\{ \begin{array}{l} s_W \left(\delta Z^{\chi,L}_{1,\rm c1} \left(c_\beta\, U^*_{1,2}\, V^*_{\rm c2,1} - s_\beta\, U^*_{1,1}\, V^*_{\rm c2,2} \right) + \delta Z^{\chi,L}_{2,\rm c1} \left(c_\beta\, U^*_{2,2}\, V^*_{\rm c2,1} - s_\beta\, U^*_{2,1}\, V^*_{\rm c2,2} \right) \right) + \\ U^*_{\rm c1,1} \left(V^*_{\rm c2,2} \left(2\,\delta s_W\, s_\beta - s_W \left(c_\beta\, \delta Z_{AG} + s_\beta \left(2\,\delta Z_e + \delta Z_{GG} \right) \right) \right) - s_\beta\, s_W \left(\delta \bar{Z}^{\chi,R}_{\rm c2,1}\, V^*_{1,2} + \delta \bar{Z}^{\chi,R}_{\rm c2,2}\, V^*_{2,2} \right) \right) - \\ U^*_{\rm c1,2} \left(V^*_{\rm c2,1} \left(\delta Z_{AG}\, s_\beta\, s_W + c_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{GG} \right) \right) \right) - c_\beta\, s_W \left(\delta \bar{Z}^{\chi,R}_{\rm c2,1}\, V^*_{1,1} + \delta \bar{Z}^{\chi,R}_{\rm c2,2}\, V^*_{2,1} \right) \right) \end{array} \right\} \\ -\frac{e}{2\sqrt{2}\,s_W^2} \left\{ \begin{array}{l} s_W \left(\delta Z^{\chi,R}_{1,\rm c1} \left(c_\beta\, U_{\rm c2,2}\, V_{1,1} - s_\beta\, U_{\rm c2,1}\, V_{1,2} \right) + \delta Z^{\chi,R}_{2,\rm c1} \left(c_\beta\, U_{\rm c2,2}\, V_{2,1} - s_\beta\, U_{\rm c2,1}\, V_{2,2} \right) \right) - \\ V_{\rm c1,1} \left(U_{\rm c2,2} \left(\delta Z_{AG}\, s_\beta\, s_W + c_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{GG} \right) \right) \right) - c_\beta\, s_W \left(\delta \bar{Z}^{\chi,L}_{\rm c2,1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\rm c2,2}\, U_{2,2} \right) \right) - \\ V_{\rm c1,2} \left(U_{\rm c2,1} \left(c_\beta\, \delta Z_{AG}\, s_W - s_\beta \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{GG} \right) \right) \right) + s_\beta\, s_W \left(\delta \bar{Z}^{\chi,L}_{\rm c2,1}\, U_{1,1} + \delta \bar{Z}^{\chi,L}_{\rm c2,2}\, U_{2,1} \right) \right) \end{array} \right\} \end{array} \right]
$$
(254)

[FFS] 2 Leptons – Higgs

$$
C(e_{\rm j1}, \overline{e}_{\rm j2}, h^0) = \left[\begin{array}{l} \frac{{\rm i}\, e\, \delta_{\rm j1,j2}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{\rm j1}\, M_W^2\, s_\alpha\, s_W - \\ m_{e_{\rm j1}} \left\{ \begin{array}{l} s_\alpha \left(2\,\delta c_\beta\, M_W^2\, s_W + c_\beta \left(\delta M_W^2\, s_W + 2\, M_W^2 \left(\delta s_W - \delta Z_e\, s_W \right) \right) \right) + \\ c_\beta\, M_W^2\, s_W \left(c_\alpha\, \delta Z_{hH} - s_\alpha \left(\delta \bar{Z}^{e,R}_{\rm j2,j2} + \delta Z_{hh} + \delta Z^{e,L}_{\rm j1,j1} \right) \right) \end{array} \right. \end{array} \right\} \\ \frac{{\rm i}\, e\, \delta_{\rm j1,j2}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{\rm j1}\, M_W^2\, s_\alpha\, s_W - \\ m_{e_{\rm j1}} \left\{ \begin{array}{l} s_\alpha \left(2\,\delta c_\beta\, M_W^2\, s_W + c_\beta \left(\delta M_W^2\, s_W + 2\, M_W^2 \left(\delta s_W - \delta Z_e\, s_W \right) \right) \right) + \\ c_\beta\, M_W^2\, s_W \left(c_\alpha\, \delta Z_{hH} - s_\alpha \left(\delta \bar{Z}^{e,R}_{\rm j2,j2} + \delta Z_{hh} + \delta Z^{e,L}_{\rm j1,j1} \right) \right) \end{array} \right. \end{array} \right\} \end{array} \right]
$$
(183)

$$C(e_{\mathrm{j1}},\overline{e}_{\mathrm{j2}},A^0) = \left[\begin{array}{l} \dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}\delta m^e_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W - \\ m_{e_{\mathrm{j1}}}\left\{\begin{array}{l} M_W^2\,s_{2\beta}\,(\delta s_W - \delta Z_e\,s_W) + \\ s_W\,\left(s_\beta\,\left(c_\beta\,\delta M_W^2 + 2\,\delta c_\beta\,M_W^2\right) + c_\beta\,M_W^2\,\left(c_\beta\,\delta Z_{AG} - s_\beta\,\left(\delta\bar{Z}^{e,R}_{\mathrm{j2,j2}} + \delta Z_{AA} + \delta Z^{e,L}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\}\end{array}\right\} \\ -\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}\delta m^e_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W - \\ m_{e_{\mathrm{j1}}}\left\{\begin{array}{l} M_W^2\,s_{2\beta}\,(\delta s_W - \delta Z_e\,s_W) + \\ s_W\,\left(s_\beta\,\left(c_\beta\,\delta M_W^2 + 2\,\delta c_\beta\,M_W^2\right) + c_\beta\,M_W^2\,\left(c_\beta\,\delta Z_{AG} - s_\beta\,\left(\delta\bar{Z}^{e,L}_{\mathrm{j2,j2}} + \delta Z_{AA} + \delta Z^{e,R}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\}\end{array}\right\} \end{array}\right]$$

$$C(e_{\mathrm{j1}},\overline{e}_{\mathrm{j2}},G^0) = \left[\begin{array}{l} -\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta\,M_W^3\,s_W^2}\left\{\begin{array}{l} 2\,c_\beta\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\ m_{e_{\mathrm{j1}}}\left(c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right) + M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{AG}\,s_\beta - c_\beta\,\left(\delta\bar{Z}^{e,R}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z_{GG} + \delta Z^{e,L}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\} \\ \dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta\,M_W^3\,s_W^2}\left\{\begin{array}{l} 2\,c_\beta\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\ m_{e_{\mathrm{j1}}}\left(c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right) + M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{AG}\,s_\beta - c_\beta\,\left(\delta\bar{Z}^{e,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z_{GG} + \delta Z^{e,R}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\} \end{array}\right]$$

$$C(\nu_{\mathrm{j1}},\overline{e}_{\mathrm{j2}},H^-) = \left[\begin{array}{l} \dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{2\,\sqrt{2}\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}\delta m^e_{\mathrm{j2}}\,M_W^2\,s_{2\beta}\,s_W - \\ m_{e_{\mathrm{j2}}}\left\{\begin{array}{l} M_W^2\,s_{2\beta}\,(\delta s_W - \delta Z_e\,s_W) + \\ s_W\,\left(s_\beta\,\left(c_\beta\,\delta M_W^2 + 2\,\delta c_\beta\,M_W^2\right) + c_\beta\,M_W^2\,\left(c_\beta\,\delta Z_{H^-G^-} - s_\beta\,\left(\delta\bar{Z}^{e,R}_{\mathrm{j2,j2}} + \delta Z_{H^-H^-} + \delta Z^{\nu,L}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\}\end{array}\right\} \\ 0 \end{array}\right]$$

$$C(\nu_{\mathrm{j1}},\overline{e}_{\mathrm{j2}},G^-) = \left[\begin{array}{l} -\dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{2\,\sqrt{2}\,c_\beta\,M_W^3\,s_W^2}\left\{\begin{array}{l} 2\,c_\beta\,\delta m^e_{\mathrm{j2}}\,M_W^2\,s_W - \\ m_{e_{\mathrm{j2}}}\left(c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right) + M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{H^-G^-}\,s_\beta - c_\beta\,\left(\delta\bar{Z}^{e,R}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z_{G^-G^-} + \delta Z^{\nu,L}_{\mathrm{j1,j1}}\right)\right)\right)\end{array}\right\} \\ 0 \end{array}\right]$$

$$C(e_{\mathrm{j1}},\overline{\nu}_{\mathrm{j2}},H^+) = \left[\begin{array}{l} 0 \\ \dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{2\,\sqrt{2}\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}\delta m^e_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W - \\ m_{e_{\mathrm{j1}}}\left\{\begin{array}{l} c_\beta^2\,\delta Z^*_{H^-G^-}\,M_W^2\,s_W + \\ s_\beta\,\left(M_W^2\,s_W\,\left(2\,\delta c_\beta - c_\beta\,\left(\delta\bar{Z}_{H^-H^-} + \delta\bar{Z}^{\nu,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z^{e,R}_{\mathrm{j1,j1}}\right)\right) + c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right)\end{array}\right\}\end{array}\right\} \end{array}\right]$$

$$
C(e_{\mathrm{j1}}, \overline{\nu}_{\mathrm{j2}}, G^{+}) = \left[\begin{array}{c} 0 \\ -\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m_{\mathrm{j1}}^{e}\, M_W^2\, s_W - \\ m_{e_{\mathrm{j1}}} \left(c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) + M_W^2\, s_W \left(2\, \delta c_\beta + \delta Z_{H^- G^-}\, s_\beta - c_\beta \left(\delta \bar{Z}_{\mathrm{j2,j2}}^{\nu,L} + 2\, \delta Z_e + \delta Z_{G^- G^-} + \delta Z_{\mathrm{j1,j1}}^{e,R} \right) \right) \right) \end{array} \right\} \end{array} \right]
$$

$$
C(e_{\mathrm{j1}}, \overline{e}_{\mathrm{j2}}, H^{0}) = \left[\begin{array}{c} -\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\alpha\, c_\beta\, \delta m_{\mathrm{j1}}^{e}\, M_W^2\, s_W - \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} 2\, c_\alpha\, \delta c_\beta\, M_W^2\, s_W + \\ c_\beta \left(M_W^2\, s_W \left(\delta Z_{hH}\, s_\alpha - c_\alpha \left(\delta \bar{Z}_{\mathrm{j2,j2}}^{e,R} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{e,L} \right) \right) + c_\alpha \left(\delta M_W^2\, s_W + 2\, M_W^2\, (\delta s_W - \delta Z_e\, s_W) \right) \right) \end{array} \right\} \end{array} \right\} \\ -\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\alpha\, c_\beta\, \delta m_{\mathrm{j1}}^{e}\, M_W^2\, s_W - \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} 2\, c_\alpha\, \delta c_\beta\, M_W^2\, s_W + \\ c_\beta \left(M_W^2\, s_W \left(\delta Z_{hH}\, s_\alpha - c_\alpha \left(\delta \bar{Z}_{\mathrm{j2,j2}}^{e,L} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{e,R} \right) \right) + c_\alpha \left(\delta M_W^2\, s_W + 2\, M_W^2\, (\delta s_W - \delta Z_e\, s_W) \right) \right) \end{array} \right\} \end{array} \right\} \end{array} \right]
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[FFS] 2 Neutralinos – Higgs

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C(\tilde{\chi}^0_{\mathrm{n2}}, \tilde{\chi}^0_{\mathrm{n1}}, h^0) = \underset{247}{\left[-\frac{\mathrm{i}\,e}{4\,s_W^2} \left\{ \begin{array}{l} \frac{2}{c_W^3} \left\{ \begin{array}{l} \left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(c_W^3\, Z^*_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\ \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right) \left(c_W^3\, Z^*_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) \end{array} \right\} + \\ \frac{s_W}{c_W} \left\{ \begin{array}{l} \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},1} \left(\left(s_\alpha\, Z^*_{1,3} + c_\alpha\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},2} \left(\left(s_\alpha\, Z^*_{2,3} + c_\alpha\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},3} \left(\left(s_\alpha\, Z^*_{3,3} + c_\alpha\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},4} \left(\left(s_\alpha\, Z^*_{4,3} + c_\alpha\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(\left(s_\alpha\, Z^*_{1,3} + c_\alpha\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(\left(s_\alpha\, Z^*_{2,3} + c_\alpha\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(\left(s_\alpha\, Z^*_{3,3} + c_\alpha\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(\left(s_\alpha\, Z^*_{4,3} + c_\alpha\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z_{hh} \left(\left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) - \\ \delta Z_{hH} \left(\left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) \end{array} \right\} \end{array} \right\} \right.}
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$$
\underset{}{\left. -\frac{\mathrm{i}\,e}{4\,c_W^3\,s_W^2} \left\{ \begin{array}{l} 2 \left\{ \begin{array}{l} (s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}) \left(c_W^3\, Z_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\ (s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}) \left(c_W^3\, Z_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) \end{array} \right\} + \\ c_W^2\, s_W \left\{ \begin{array}{l} \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},1} \left((s_\alpha\, Z_{1,3} + c_\alpha\, Z_{1,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},2} \left((s_\alpha\, Z_{2,3} + c_\alpha\, Z_{2,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},3} \left((s_\alpha\, Z_{3,3} + c_\alpha\, Z_{3,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},4} \left((s_\alpha\, Z_{4,3} + c_\alpha\, Z_{4,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ (s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}) \left(Z_{\mathrm{n1},4}\, (c_\alpha\, \delta Z_{hh} + \delta Z_{hH}\, s_\alpha) - Z_{\mathrm{n1},3}\, (c_\alpha\, \delta Z_{hH} - \delta Z_{hh}\, s_\alpha)\right) + \\ (s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}) \left(Z_{\mathrm{n2},4}\, (c_\alpha\, \delta Z_{hh} + \delta Z_{hH}\, s_\alpha) - Z_{\mathrm{n2},3}\, (c_\alpha\, \delta Z_{hH} - \delta Z_{hh}\, s_\alpha)\right) + \\ \delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left((s_\alpha\, Z_{1,3} + c_\alpha\, Z_{1,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left((s_\alpha\, Z_{2,3} + c_\alpha\, Z_{2,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n1}} \left((s_\alpha\, Z_{3,3} + c_\alpha\, Z_{3,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left((s_\alpha\, Z_{4,3} + c_\alpha\, Z_{4,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}\right)\right) \end{array} \right\} \end{array} \right\} \right]
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\begin{aligned}
C(\tilde{\chi}^0_{\mathrm{n2}}, \tilde{\chi}^0_{\mathrm{n1}}, H^0) = {}_{248} \Bigg[& \frac{\mathrm{i}\, e}{4\, s_W^2} \Bigg\{ \frac{2}{c_W^3} \Bigg\{ \begin{array}{l} \left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(c_W^3\, Z^*_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\ \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right) \left(c_W^3\, Z^*_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) \end{array} \Bigg\} + \\
& \frac{s_W}{c_W} \Bigg\{ \begin{array}{l} \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},1} \left(\left(c_\alpha\, Z^*_{1,3} - s_\alpha\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},2} \left(\left(c_\alpha\, Z^*_{2,3} - s_\alpha\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},3} \left(\left(c_\alpha\, Z^*_{3,3} - s_\alpha\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},4} \left(\left(c_\alpha\, Z^*_{4,3} - s_\alpha\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(\left(c_\alpha\, Z^*_{1,3} - s_\alpha\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(\left(c_\alpha\, Z^*_{2,3} - s_\alpha\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(\left(c_\alpha\, Z^*_{3,3} - s_\alpha\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(\left(c_\alpha\, Z^*_{4,3} - s_\alpha\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) - \\ \delta Z_{hH} \left(\left(s_\alpha\, Z^*_{\mathrm{n1},3} + c_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(s_\alpha\, Z^*_{\mathrm{n2},3} + c_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) + \\ \delta Z_{HH} \left(\left(c_\alpha\, Z^*_{\mathrm{n1},3} - s_\alpha\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(c_\alpha\, Z^*_{\mathrm{n2},3} - s_\alpha\, Z^*_{\mathrm{n2},4}\right)\right) \end{array} \Bigg\} \Bigg\} \\
& \frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \Bigg\{ 2 \Bigg\{ \begin{array}{l} \left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right) \left(c_W^3\, Z_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\ \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right) \left(c_W^3\, Z_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) \end{array} \Bigg\} + \\
& c_W^2\, s_W \Bigg\{ \begin{array}{l} \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},1} \left(\left(c_\alpha\, Z_{1,3} - s_\alpha\, Z_{1,4}\right) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},2} \left(\left(c_\alpha\, Z_{2,3} - s_\alpha\, Z_{2,4}\right) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},3} \left(\left(c_\alpha\, Z_{3,3} - s_\alpha\, Z_{3,4}\right) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right)\right) + \\ \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},4} \left(\left(c_\alpha\, Z_{4,3} - s_\alpha\, Z_{4,4}\right) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right)\right) - \\ \delta Z_{hH} \left(\left(s_\alpha\, Z_{\mathrm{n1},3} + c_\alpha\, Z_{\mathrm{n1},4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) \left(s_\alpha\, Z_{\mathrm{n2},3} + c_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(\left(c_\alpha\, Z_{1,3} - s_\alpha\, Z_{1,4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(\left(c_\alpha\, Z_{2,3} - s_\alpha\, Z_{2,4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n1}} \left(\left(c_\alpha\, Z_{3,3} - s_\alpha\, Z_{3,4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(\left(c_\alpha\, Z_{4,3} - s_\alpha\, Z_{4,4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right)\right) + \\ \delta Z_{HH} \left(\left(c_\alpha\, Z_{\mathrm{n1},3} - s_\alpha\, Z_{\mathrm{n1},4}\right) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) \left(c_\alpha\, Z_{\mathrm{n2},3} - s_\alpha\, Z_{\mathrm{n2},4}\right)\right) \end{array} \Bigg\} \Bigg\} \Bigg]
\end{aligned}
$$

$$
C(\tilde{\chi}^0_{\mathrm{n2}}, \tilde{\chi}^0_{\mathrm{n1}}, A^0) = \left[\frac{e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l}
\left(2\, s_\beta\, Z^*_{\mathrm{n1},3} - 2\, c_\beta\, Z^*_{\mathrm{n1},4}\right) \left(c_W^3\, Z^*_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\
2\, \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right) \left(c_W^3\, Z^*_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z^*_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\
c_W^2\, s_W \left\{ \begin{array}{l}
\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},1} \left(\left(s_\beta\, Z^*_{1,3} - c_\beta\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(s_\beta\, Z^*_{\mathrm{n1},3} - c_\beta\, Z^*_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},2} \left(\left(s_\beta\, Z^*_{2,3} - c_\beta\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(s_\beta\, Z^*_{\mathrm{n1},3} - c_\beta\, Z^*_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},3} \left(\left(s_\beta\, Z^*_{3,3} - c_\beta\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(s_\beta\, Z^*_{\mathrm{n1},3} - c_\beta\, Z^*_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},4} \left(\left(s_\beta\, Z^*_{4,3} - c_\beta\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(s_\beta\, Z^*_{\mathrm{n1},3} - c_\beta\, Z^*_{\mathrm{n1},4}\right)\right) + \\
\delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(\left(s_\beta\, Z^*_{1,3} - c_\beta\, Z^*_{1,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2}\right) \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(\left(s_\beta\, Z^*_{2,3} - c_\beta\, Z^*_{2,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2}\right) \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(\left(s_\beta\, Z^*_{3,3} - c_\beta\, Z^*_{3,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2}\right) \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(\left(s_\beta\, Z^*_{4,3} - c_\beta\, Z^*_{4,4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2}\right) \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right)\right) + \\
\delta Z_{AA} \left(\left(s_\beta\, Z^*_{\mathrm{n1},3} - c_\beta\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(s_\beta\, Z^*_{\mathrm{n2},3} - c_\beta\, Z^*_{\mathrm{n2},4}\right)\right) - \\
\delta Z_{AG} \left(\left(c_\beta\, Z^*_{\mathrm{n1},3} + s_\beta\, Z^*_{\mathrm{n1},4}\right) \left(s_W\, Z^*_{\mathrm{n2},1} - c_W\, Z^*_{\mathrm{n2},2}\right) + \left(s_W\, Z^*_{\mathrm{n1},1} - c_W\, Z^*_{\mathrm{n1},2}\right) \left(c_\beta\, Z^*_{\mathrm{n2},3} + s_\beta\, Z^*_{\mathrm{n2},4}\right)\right)
\end{array} \right\} \\
-\frac{e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l}
(2\, s_\beta\, Z_{\mathrm{n1},3} - 2\, c_\beta\, Z_{\mathrm{n1},4}) \left(c_W^3\, Z_{\mathrm{n2},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n2},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\
2\, (s_\beta\, Z_{\mathrm{n2},3} - c_\beta\, Z_{\mathrm{n2},4}) \left(c_W^3\, Z_{\mathrm{n1},2}\, (\delta s_W - \delta Z_e\, s_W) + s_W^2\, Z_{\mathrm{n1},1}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)\right) + \\
c_W^2\, s_W \left\{ \begin{array}{l}
\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},1} \left((s_\beta\, Z_{1,3} - c_\beta\, Z_{1,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(s_\beta\, Z_{\mathrm{n1},3} - c_\beta\, Z_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},2} \left((s_\beta\, Z_{2,3} - c_\beta\, Z_{2,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(s_\beta\, Z_{\mathrm{n1},3} - c_\beta\, Z_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},3} \left((s_\beta\, Z_{3,3} - c_\beta\, Z_{3,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(s_\beta\, Z_{\mathrm{n1},3} - c_\beta\, Z_{\mathrm{n1},4}\right)\right) + \\
\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},4} \left((s_\beta\, Z_{4,3} - c_\beta\, Z_{4,4}) \left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(s_\beta\, Z_{\mathrm{n1},3} - c_\beta\, Z_{\mathrm{n1},4}\right)\right) - \\
\left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) \left(Z_{\mathrm{n1},4}\, \left(c_\beta\, \delta Z_{AA} + \delta Z_{AG}\, s_\beta\right) + Z_{\mathrm{n1},3}\, \left(c_\beta\, \delta Z_{AG} - \delta Z_{AA}\, s_\beta\right)\right) - \\
\left(s_W\, Z_{\mathrm{n1},1} - c_W\, Z_{\mathrm{n1},2}\right) \left(Z_{\mathrm{n2},4}\, \left(c_\beta\, \delta Z_{AA} + \delta Z_{AG}\, s_\beta\right) + Z_{\mathrm{n2},3}\, \left(c_\beta\, \delta Z_{AG} - \delta Z_{AA}\, s_\beta\right)\right) + \\
\delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left((s_\beta\, Z_{1,3} - c_\beta\, Z_{1,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{1,1} - c_W\, Z_{1,2}\right) \left(s_\beta\, Z_{\mathrm{n2},3} - c_\beta\, Z_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left((s_\beta\, Z_{2,3} - c_\beta\, Z_{2,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{2,1} - c_W\, Z_{2,2}\right) \left(s_\beta\, Z_{\mathrm{n2},3} - c_\beta\, Z_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,R}_{3,\mathrm{n1}} \left((s_\beta\, Z_{3,3} - c_\beta\, Z_{3,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{3,1} - c_W\, Z_{3,2}\right) \left(s_\beta\, Z_{\mathrm{n2},3} - c_\beta\, Z_{\mathrm{n2},4}\right)\right) + \\
\delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left((s_\beta\, Z_{4,3} - c_\beta\, Z_{4,4}) \left(s_W\, Z_{\mathrm{n2},1} - c_W\, Z_{\mathrm{n2},2}\right) + \left(s_W\, Z_{4,1} - c_W\, Z_{4,2}\right) \left(s_\beta\, Z_{\mathrm{n2},3} - c_\beta\, Z_{\mathrm{n2},4}\right)\right)
\end{array} \right\}
\end{array} \right\} \right]
$$

$$
\underset{250}{C}(\tilde{\chi}^0_{\rm n2},\tilde{\chi}^0_{\rm n1},G^0) =
\left[
-\frac{e}{4\,c_W^3\,s_W^2}
\left\{
2\left\{
\begin{array}{l}
\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\left(c_W^3\,Z^*_{\rm n2,2}\,(\delta s_W-\delta Z_e\,s_W)+s_W^2\,Z^*_{\rm n2,1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)\right)+\\
\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\left(c_W^3\,Z^*_{\rm n1,2}\,(\delta s_W-\delta Z_e\,s_W)+s_W^2\,Z^*_{\rm n1,1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)\right)
\end{array}
\right\}+
\right.
\right.
\\
\left.
\left.
c_W^2\,s_W
\left\{
\begin{array}{l}
\delta\bar{Z}^{\chi^0,R}_{\rm n2,1}\left(\left(c_\beta\,Z^*_{1,3}+s_\beta\,Z^*_{1,4}\right)\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)+\left(s_W\,Z^*_{1,1}-c_W\,Z^*_{1,2}\right)\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,R}_{\rm n2,2}\left(\left(c_\beta\,Z^*_{2,3}+s_\beta\,Z^*_{2,4}\right)\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)+\left(s_W\,Z^*_{2,1}-c_W\,Z^*_{2,2}\right)\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,R}_{\rm n2,3}\left(\left(c_\beta\,Z^*_{3,3}+s_\beta\,Z^*_{3,4}\right)\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)+\left(s_W\,Z^*_{3,1}-c_W\,Z^*_{3,2}\right)\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,R}_{\rm n2,4}\left(\left(c_\beta\,Z^*_{4,3}+s_\beta\,Z^*_{4,4}\right)\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)+\left(s_W\,Z^*_{4,1}-c_W\,Z^*_{4,2}\right)\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\right)+\\
\delta Z^{\chi^0,L}_{\rm 1,n1}\left(\left(c_\beta\,Z^*_{1,3}+s_\beta\,Z^*_{1,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{1,1}-c_W\,Z^*_{1,2}\right)\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,L}_{\rm 2,n1}\left(\left(c_\beta\,Z^*_{2,3}+s_\beta\,Z^*_{2,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{2,1}-c_W\,Z^*_{2,2}\right)\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,L}_{\rm 3,n1}\left(\left(c_\beta\,Z^*_{3,3}+s_\beta\,Z^*_{3,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{3,1}-c_W\,Z^*_{3,2}\right)\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,L}_{\rm 4,n1}\left(\left(c_\beta\,Z^*_{4,3}+s_\beta\,Z^*_{4,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{4,1}-c_W\,Z^*_{4,2}\right)\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\right)-\\
\delta Z_{AG}\left(\left(s_\beta\,Z^*_{\rm n1,3}-c_\beta\,Z^*_{\rm n1,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)\left(s_\beta\,Z^*_{\rm n2,3}-c_\beta\,Z^*_{\rm n2,4}\right)\right)+\\
\delta Z_{GG}\left(\left(c_\beta\,Z^*_{\rm n1,3}+s_\beta\,Z^*_{\rm n1,4}\right)\left(s_W\,Z^*_{\rm n2,1}-c_W\,Z^*_{\rm n2,2}\right)+\left(s_W\,Z^*_{\rm n1,1}-c_W\,Z^*_{\rm n1,2}\right)\left(c_\beta\,Z^*_{\rm n2,3}+s_\beta\,Z^*_{\rm n2,4}\right)\right)
\end{array}
\right\}
\right.
\\
\frac{e}{4\,c_W^3\,s_W^2}
\left\{
2\left\{
\begin{array}{l}
\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\left(c_W^3\,Z_{\rm n2,2}\,(\delta s_W-\delta Z_e\,s_W)+s_W^2\,Z_{\rm n2,1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)\right)+\\
\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\left(c_W^3\,Z_{\rm n1,2}\,(\delta s_W-\delta Z_e\,s_W)+s_W^2\,Z_{\rm n1,1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)\right)
\end{array}
\right\}+
\right.
\\
\left.
c_W^2\,s_W
\left\{
\begin{array}{l}
\delta\bar{Z}^{\chi^0,L}_{\rm n2,1}\left(\left(c_\beta\,Z_{1,3}+s_\beta\,Z_{1,4}\right)\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)+\left(s_W\,Z_{1,1}-c_W\,Z_{1,2}\right)\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,L}_{\rm n2,2}\left(\left(c_\beta\,Z_{2,3}+s_\beta\,Z_{2,4}\right)\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)+\left(s_W\,Z_{2,1}-c_W\,Z_{2,2}\right)\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,L}_{\rm n2,3}\left(\left(c_\beta\,Z_{3,3}+s_\beta\,Z_{3,4}\right)\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)+\left(s_W\,Z_{3,1}-c_W\,Z_{3,2}\right)\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\right)+\\
\delta\bar{Z}^{\chi^0,L}_{\rm n2,4}\left(\left(c_\beta\,Z_{4,3}+s_\beta\,Z_{4,4}\right)\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)+\left(s_W\,Z_{4,1}-c_W\,Z_{4,2}\right)\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\right)-\\
\delta Z_{AG}\left(\left(s_\beta\,Z_{\rm n1,3}-c_\beta\,Z_{\rm n1,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)\left(s_\beta\,Z_{\rm n2,3}-c_\beta\,Z_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,R}_{\rm 1,n1}\left(\left(c_\beta\,Z_{1,3}+s_\beta\,Z_{1,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{1,1}-c_W\,Z_{1,2}\right)\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,R}_{\rm 2,n1}\left(\left(c_\beta\,Z_{2,3}+s_\beta\,Z_{2,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{2,1}-c_W\,Z_{2,2}\right)\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,R}_{\rm 3,n1}\left(\left(c_\beta\,Z_{3,3}+s_\beta\,Z_{3,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{3,1}-c_W\,Z_{3,2}\right)\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\right)+\\
\delta Z^{\chi^0,R}_{\rm 4,n1}\left(\left(c_\beta\,Z_{4,3}+s_\beta\,Z_{4,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{4,1}-c_W\,Z_{4,2}\right)\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\right)+\\
\delta Z_{GG}\left(\left(c_\beta\,Z_{\rm n1,3}+s_\beta\,Z_{\rm n1,4}\right)\left(s_W\,Z_{\rm n2,1}-c_W\,Z_{\rm n2,2}\right)+\left(s_W\,Z_{\rm n1,1}-c_W\,Z_{\rm n1,2}\right)\left(c_\beta\,Z_{\rm n2,3}+s_\beta\,Z_{\rm n2,4}\right)\right)
\end{array}
\right\}
\right.
\right.
\right]
$$

[FFS] 2 Quarks – Higgs

$$C(u_{j1},\overline{u}_{j2},h^0) = \left[\begin{array}{l} -\frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l} 2\,c_\alpha\,\delta m_{j1}^u\,M_W^2\,s_\beta\,s_W + \\ m_{u_{j1}}\left(\delta Z_{hH}\,M_W^2\,s_\alpha\,s_\beta\,s_W - c_\alpha\left(s_\beta\,s_W\left(\delta M_W^2 - M_W^2\left(\delta\bar{Z}_{j2,j2}^{u,R} + 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{j1,j1}^{u,L}\right)\right) + 2\,M_W^2\,(\delta s_W\,s_\beta + \delta s_\beta\,s_W)\right)\right) \end{array}\right\} \\ -\frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l} 2\,c_\alpha\,\delta m_{j1}^u\,M_W^2\,s_\beta\,s_W + \\ m_{u_{j1}}\left(\delta Z_{hH}\,M_W^2\,s_\alpha\,s_\beta\,s_W - c_\alpha\left(s_\beta\,s_W\left(\delta M_W^2 - M_W^2\left(\delta\bar{Z}_{j2,j2}^{u,L} + 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{j1,j1}^{u,R}\right)\right) + 2\,M_W^2\,(\delta s_W\,s_\beta + \delta s_\beta\,s_W)\right)\right) \end{array}\right\} \end{array}\right]$$

$$C(d_{j1},\overline{d}_{j2},h^0) = \left[\begin{array}{l} \frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l} 2\,c_\beta\,\delta m_{j1}^d\,M_W^2\,s_\alpha\,s_W - \\ m_{d_{j1}}\left\{\begin{array}{l} s_\alpha\left(2\,\delta c_\beta\,M_W^2\,s_W + c_\beta\left(\delta M_W^2\,s_W + 2\,M_W^2\,(\delta s_W - \delta Z_e\,s_W)\right)\right) + \\ c_\beta\,M_W^2\,s_W\left(c_\alpha\,\delta Z_{hH} - s_\alpha\left(\delta\bar{Z}_{j2,j2}^{d,R} + \delta Z_{hh} + \delta Z_{j1,j1}^{d,L}\right)\right) \end{array}\right\} \end{array}\right\} \\ \frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l} 2\,c_\beta\,\delta m_{j1}^d\,M_W^2\,s_\alpha\,s_W - \\ m_{d_{j1}}\left\{\begin{array}{l} s_\alpha\left(2\,\delta c_\beta\,M_W^2\,s_W + c_\beta\left(\delta M_W^2\,s_W + 2\,M_W^2\,(\delta s_W - \delta Z_e\,s_W)\right)\right) + \\ c_\beta\,M_W^2\,s_W\left(c_\alpha\,\delta Z_{hH} - s_\alpha\left(\delta\bar{Z}_{j2,j2}^{d,L} + \delta Z_{hh} + \delta Z_{j1,j1}^{d,R}\right)\right) \end{array}\right\} \end{array}\right\} \end{array}\right]$$

$$C(u_{j1},\overline{u}_{j2},A^0) = \left[\begin{array}{l} \frac{e\,\delta_{j1,j2}}{8\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l} 2\,\delta m_{j1}^u\,M_W^2\,s_{2\beta}\,s_W - \\ m_{u_{j1}}\left(s_{2\beta}\left(\delta M_W^2\,s_W + 2\,M_W^2\,(\delta s_W - \delta Z_e\,s_W)\right) + M_W^2\,s_W\left(4\,c_\beta\,\delta s_\beta - 2\,\delta Z_{AG}\,s_\beta^2 - s_{2\beta}\left(\delta\bar{Z}_{j2,j2}^{u,R} + \delta Z_{AA} + \delta Z_{j1,j1}^{u,L}\right)\right)\right) \end{array}\right\} \\ -\frac{e\,\delta_{j1,j2}}{8\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l} 2\,\delta m_{j1}^u\,M_W^2\,s_{2\beta}\,s_W - \\ m_{u_{j1}}\left(s_{2\beta}\left(\delta M_W^2\,s_W + 2\,M_W^2\,(\delta s_W - \delta Z_e\,s_W)\right) + M_W^2\,s_W\left(4\,c_\beta\,\delta s_\beta - 2\,\delta Z_{AG}\,s_\beta^2 - s_{2\beta}\left(\delta\bar{Z}_{j2,j2}^{u,L} + \delta Z_{AA} + \delta Z_{j1,j1}^{u,R}\right)\right)\right) \end{array}\right\} \end{array}\right]$$

$$C(u_{j1},\overline{u}_{j2},G^0) = \left[\begin{array}{l} \frac{e\,\delta_{j1,j2}}{4\,M_W^3\,s_\beta\,s_W^2}\left\{\begin{array}{l} 2\,\delta m_{j1}^u\,M_W^2\,s_\beta\,s_W - \\ m_{u_{j1}}\left(s_W\left(\delta M_W^2\,s_\beta + 2\,M_W^2\,(\delta s_\beta - \delta Z_e\,s_\beta)\right) + M_W^2\left(2\,\delta s_W\,s_\beta - s_W\left(c_\beta\,\delta Z_{AG} + s_\beta\left(\delta\bar{Z}_{j2,j2}^{u,R} + \delta Z_{GG} + \delta Z_{j1,j1}^{u,L}\right)\right)\right)\right) \end{array}\right\} \\ -\frac{e\,\delta_{j1,j2}}{4\,M_W^3\,s_\beta\,s_W^2}\left\{\begin{array}{l} 2\,\delta m_{j1}^u\,M_W^2\,s_\beta\,s_W - \\ m_{u_{j1}}\left(s_W\left(\delta M_W^2\,s_\beta + 2\,M_W^2\,(\delta s_\beta - \delta Z_e\,s_\beta)\right) + M_W^2\left(2\,\delta s_W\,s_\beta - s_W\left(c_\beta\,\delta Z_{AG} + s_\beta\left(\delta\bar{Z}_{j2,j2}^{u,L} + \delta Z_{GG} + \delta Z_{j1,j1}^{u,R}\right)\right)\right)\right) \end{array}\right\} \end{array}\right]$$

$$
C(d_{\mathrm{j1}},\overline{d}_{\mathrm{j2}},A^0) = \left[\begin{array}{l}
\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
\delta m_{\mathrm{j1}}^d\,M_W^2\,s_{2\beta}\,s_W - \\
m_{d_{\mathrm{j1}}}\left\{\begin{array}{l}
M_W^2\,s_{2\beta}\,\left(\delta s_W - \delta Z_e\,s_W\right) + \\
s_W\,\left(s_\beta\,\left(c_\beta\,\delta M_W^2 + 2\,\delta c_\beta\,M_W^2\right) + c_\beta\,M_W^2\,\left(c_\beta\,\delta Z_{AG} - s_\beta\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,R} + \delta Z_{AA} + \delta Z_{\mathrm{j1,j1}}^{d,L}\right)\right)\right)
\end{array}\right.
\end{array}\right. \\
-\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
\delta m_{\mathrm{j1}}^d\,M_W^2\,s_{2\beta}\,s_W - \\
m_{d_{\mathrm{j1}}}\left\{\begin{array}{l}
M_W^2\,s_{2\beta}\,\left(\delta s_W - \delta Z_e\,s_W\right) + \\
s_W\,\left(s_\beta\,\left(c_\beta\,\delta M_W^2 + 2\,\delta c_\beta\,M_W^2\right) + c_\beta\,M_W^2\,\left(c_\beta\,\delta Z_{AG} - s_\beta\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,L} + \delta Z_{AA} + \delta Z_{\mathrm{j1,j1}}^{d,R}\right)\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(d_{\mathrm{j1}},\overline{d}_{\mathrm{j2}},G^0) = \left[\begin{array}{l}
-\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta\,M_W^3\,s_W^2}\left\{\begin{array}{l}
2\,c_\beta\,\delta m_{\mathrm{j1}}^d\,M_W^2\,s_W - \\
m_{d_{\mathrm{j1}}}\left(c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right) + M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{AG}\,s_\beta - c_\beta\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,R} + 2\,\delta Z_e + \delta Z_{GG} + \delta Z_{\mathrm{j1,j1}}^{d,L}\right)\right)\right)
\end{array}\right. \\
\dfrac{e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta\,M_W^3\,s_W^2}\left\{\begin{array}{l}
2\,c_\beta\,\delta m_{\mathrm{j1}}^d\,M_W^2\,s_W - \\
m_{d_{\mathrm{j1}}}\left(c_\beta\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right) + M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{AG}\,s_\beta - c_\beta\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,L} + 2\,\delta Z_e + \delta Z_{GG} + \delta Z_{\mathrm{j1,j1}}^{d,R}\right)\right)\right)
\end{array}\right.
\end{array}\right.
$$

$$
C(u_{\mathrm{j1}},\overline{u}_{\mathrm{j2}},H^0) = \left[\begin{array}{l}
-\dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l}
2\,\delta m_{\mathrm{j1}}^u\,M_W^2\,s_\alpha\,s_\beta\,s_W - \\
m_{u_{\mathrm{j1}}}\left\{\begin{array}{l}
s_\alpha\,\left(2\,\delta s_W\,M_W^2\,s_\beta + s_W\,\left(\delta M_W^2\,s_\beta + 2\,M_W^2\,\left(\delta s_\beta - \delta Z_e\,s_\beta\right)\right)\right) - \\
M_W^2\,s_\beta\,s_W\,\left(c_\alpha\,\delta Z_{hH} + s_\alpha\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{u,R} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{u,L}\right)\right)
\end{array}\right.
\end{array}\right. \\
-\dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l}
2\,\delta m_{\mathrm{j1}}^u\,M_W^2\,s_\alpha\,s_\beta\,s_W - \\
m_{u_{\mathrm{j1}}}\left\{\begin{array}{l}
s_\alpha\,\left(2\,\delta s_W\,M_W^2\,s_\beta + s_W\,\left(\delta M_W^2\,s_\beta + 2\,M_W^2\,\left(\delta s_\beta - \delta Z_e\,s_\beta\right)\right)\right) - \\
M_W^2\,s_\beta\,s_W\,\left(c_\alpha\,\delta Z_{hH} + s_\alpha\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{u,L} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{u,R}\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(d_{\mathrm{j1}},\overline{d}_{\mathrm{j2}},H^0) = \left[\begin{array}{l}
-\dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
2\,c_\alpha\,c_\beta\,\delta m_{\mathrm{j1}}^d\,M_W^2\,s_W - \\
m_{d_{\mathrm{j1}}}\left\{\begin{array}{l}
2\,c_\alpha\,\delta c_\beta\,M_W^2\,s_W + \\
c_\beta\,\left(M_W^2\,s_W\,\left(\delta Z_{hH}\,s_\alpha - c_\alpha\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,R} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{d,L}\right)\right) + c_\alpha\,\left(\delta M_W^2\,s_W + 2\,M_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right)\right)
\end{array}\right.
\end{array}\right. \\
-\dfrac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
2\,c_\alpha\,c_\beta\,\delta m_{\mathrm{j1}}^d\,M_W^2\,s_W - \\
m_{d_{\mathrm{j1}}}\left\{\begin{array}{l}
2\,c_\alpha\,\delta c_\beta\,M_W^2\,s_W + \\
c_\beta\,\left(M_W^2\,s_W\,\left(\delta Z_{hH}\,s_\alpha - c_\alpha\,\left(\delta\bar{Z}_{\mathrm{j2,j2}}^{d,L} + \delta Z_{HH} + \delta Z_{\mathrm{j1,j1}}^{d,R}\right)\right) + c_\alpha\,\left(\delta M_W^2\,s_W + 2\,M_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(u_{\mathrm{j1}}, \bar{d}_{\mathrm{j2}}, H^-) = \left[\begin{array}{l} \dfrac{\mathrm{i}\, e}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} \delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_W + \\ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ \begin{array}{l} \delta m^d_{\mathrm{j2}}\, M_W^2\, s_{2\beta}\, s_W - \\ m_{d_{\mathrm{j2}}} \left\{ \begin{array}{l} M_W^2\, s_{2\beta}\, (\delta s_W - \delta Z_e\, s_W) + \\ s_W \left(s_\beta \left(c_\beta\, \delta M_W^2 + 2\, \delta c_\beta\, M_W^2 \right) + c_\beta\, M_W^2 \left(c_\beta\, \delta Z_{H^-G^-} - s_\beta \left(\delta \bar{Z}^{d,R}_{\mathrm{j2,j2}} + \delta Z_{H^-H^-} + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \\ \dfrac{\mathrm{i}\, e}{4\sqrt{2}\, M_W^3\, s_\beta^2\, s_W^2} \left\{ \begin{array}{l} 2\, \delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + \\ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ \begin{array}{l} 2\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\ m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} s_{2\beta} \left(\delta M_W^2\, s_W + 2\, M_W^2\, (\delta s_W - \delta Z_e\, s_W) \right) + \\ M_W^2\, s_W \left(4\, c_\beta\, \delta s_\beta - 2\, \delta Z_{H^-G^-}\, s_\beta^2 - s_{2\beta} \left(\delta \bar{Z}^{d,L}_{\mathrm{j2,j2}} + \delta Z_{H^-H^-} + \delta Z^{u,R}_{\mathrm{j1,j1}} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right]
$$

$$
C(u_{\mathrm{j1}}, \bar{d}_{\mathrm{j2}}, G^-) = \left[\begin{array}{l} -\dfrac{\mathrm{i}\, e}{2\sqrt{2}\, c_\beta\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_W + \\ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^d_{\mathrm{j2}}\, M_W^2\, s_W - \\ m_{d_{\mathrm{j2}}} \left(c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) + M_W^2\, s_W \left(2\, \delta c_\beta + \delta Z_{H^-G^-}\, s_\beta - c_\beta \left(\delta \bar{Z}^{d,R}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) \right) \end{array} \right. \end{array} \right. \\ \dfrac{\mathrm{i}\, e}{2\sqrt{2}\, M_W^3\, s_\beta\, s_W^2} \left\{ \begin{array}{l} 2\, \delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_\beta\, s_W + \\ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ \begin{array}{l} 2\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W - \\ m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} s_W \left(\delta M_W^2\, s_\beta + 2\, M_W^2\, (\delta s_\beta - \delta Z_e\, s_\beta) \right) + \\ M_W^2 \left(2\, \delta s_W\, s_\beta - s_W \left(c_\beta\, \delta Z_{H^-G^-} + s_\beta \left(\delta \bar{Z}^{d,L}_{\mathrm{j2,j2}} + \delta Z_{G^-G^-} + \delta Z^{u,R}_{\mathrm{j1,j1}} \right) \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right]
$$

$$
C(d_{\mathrm{j1}}, \bar{u}_{\mathrm{j2}}, H^+) = \left[\begin{array}{l} \dfrac{\mathrm{i}\, e}{2\sqrt{2}\, M_W^3\, s_\beta^2\, s_W^2} \left\{ \begin{array}{l} \delta\mathrm{CKM}_{\mathrm{j2,j1}}\, m_{u_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_W + \\ \mathrm{CKM}_{\mathrm{j2,j1}} \left\{ \begin{array}{l} \delta m^u_{\mathrm{j2}}\, M_W^2\, s_{2\beta}\, s_W + \\ m_{u_{\mathrm{j2}}} \left\{ \begin{array}{l} \delta Z^*_{H^-G^-}\, M_W^2\, s_\beta^2\, s_W - \\ c_\beta \left(s_\beta\, s_W \left(\delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^-H^-} + \delta \bar{Z}^{u,R}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z^{d,L}_{\mathrm{j1,j1}} \right) \right) + 2\, M_W^2\, (\delta s_W\, s_\beta + \delta s_\beta\, s_W) \right) \end{array} \right. \end{array} \right. \end{array} \right. \\ \dfrac{\mathrm{i}\, e}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} \delta\mathrm{CKM}_{\mathrm{j2,j1}}\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + \\ \mathrm{CKM}_{\mathrm{j2,j1}} \left\{ \begin{array}{l} \delta m^d_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\ m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} c_\beta^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W + \\ s_\beta \left(M_W^2\, s_W \left(2\, \delta c_\beta - c_\beta \left(\delta \bar{Z}_{H^-H^-} + \delta \bar{Z}^{u,L}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z^{d,R}_{\mathrm{j1,j1}} \right) \right) + c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right]
$$

$$
C(d_{\mathrm{j1}}, \overline{u}_{\mathrm{j2}}, G^+) = \underset{211}{\left[\begin{array}{l}
\dfrac{\mathrm{i}\, e}{2\sqrt{2}\, M_W^3\, s_\beta\, s_W^2} \left\{ \begin{array}{l} 2\,\delta m^u_{\mathrm{j2}}\, M_W^2\, \mathrm{CKM}_{\mathrm{j2,j1}}\, s_\beta\, s_W + \\ m_{u_{\mathrm{j2}}} \left\{ \begin{array}{l} 2\,\delta\mathrm{CKM}_{\mathrm{j2,j1}}\, M_W^2\, s_\beta\, s_W - \\ \mathrm{CKM}_{\mathrm{j2,j1}} \left\{ \begin{array}{l} s_W\, \left(\delta M_W^2\, s_\beta + 2\, M_W^2\, \left(\delta s_\beta - \delta Z_e\, s_\beta\right)\right) + \\ M_W^2\, \left(2\,\delta s_W\, s_\beta - s_W\, \left(c_\beta\, \delta Z_{H^-G^-} + s_\beta\, \left(\delta \bar{Z}^{u,R}_{\mathrm{j2,j2}} + \delta Z_{G^-G^-} + \delta Z^{d,L}_{\mathrm{j1,j1}}\right)\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \\
-\dfrac{\mathrm{i}\, e}{2\sqrt{2}\, c_\beta\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta\mathrm{CKM}_{\mathrm{j2,j1}}\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W + \\ \mathrm{CKM}_{\mathrm{j2,j1}} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{d_{\mathrm{j1}}} \left(c_\beta\, \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right) + M_W^2\, s_W\, \left(2\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta - c_\beta\, \left(\delta \bar{Z}^{u,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z_{G^-G^-} + \delta Z^{d,R}_{\mathrm{j1,j1}}\right)\right)\right) \end{array} \right. \end{array} \right.
\end{array}\right]}
$$

[FFS] Chargino – Lepton – Slepton

$$
C(\tilde{\chi}^-_{\mathrm{c1}}, \overline{e}_{\mathrm{j2}}, \tilde{\nu}_{\mathrm{j1}}) = \underset{269}{\left[\begin{array}{l}
\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\, U^*_{1,2} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\, U^*_{2,2}\right) + \\ U^*_{\mathrm{c1},2}\, \left(2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}}\, \left(M_W^2\, s_W\, \left(2\,\delta c_\beta - c_\beta\, \left(\delta \bar{Z}^{e,R}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right) + c_\beta\, \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right)\right) \end{array} \right. \\
\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, s_W^2}\, \left(V_{\mathrm{c1},1}\, \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}^{e,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right) - s_W\, \left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\, V_{1,1} + \delta Z^{\chi,R}_{2,\mathrm{c1}}\, V_{2,1}\right)\right)
\end{array}\right]}
$$

$$
C(\tilde{\chi}^+_{\mathrm{c1}}, \overline{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}) = \underset{270}{\left[\begin{array}{l}
0 \\
\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta^2\, M_W^3\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}\, \left(U_{\mathrm{c1},1}\, \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) - s_W\, \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c1},1}\, U_{1,1} + \delta \bar{Z}^{\chi,L}_{\mathrm{c1},2}\, U_{2,1}\right)\right) + \\ \sqrt{2}\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c1},1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\mathrm{c1},2}\, U_{2,2}\right) + \\ U_{\mathrm{c1},2}\, \left(2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}}\, \left(M_W^2\, s_W\, \left(2\,\delta c_\beta - c_\beta\, \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + c_\beta\, \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right)\right) \end{array} \right. - \\ c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l} 2\, c_\beta\, M_W\, U_{\mathrm{c1},1}\, \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\ \sqrt{2}\, m_{e_{\mathrm{j1}}}\, U_{\mathrm{c1},2}\, \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \end{array} \right.
\end{array}\right]}
$$

$$
C(e_{\mathrm{j2}}, \tilde{\chi}^+_{\mathrm{c1}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = \underset{273}{\left[\begin{array}{l}
\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, s_W^2}\, \left(V^*_{\mathrm{c1},1}\, \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\,\delta Z_e + \delta Z^{e,L}_{\mathrm{j2,j2}}\right)\right) - s_W\, \left(\delta \bar{Z}^{\chi,R}_{\mathrm{c1},1}\, V^*_{1,1} + \delta \bar{Z}^{\chi,R}_{\mathrm{c1},2}\, V^*_{2,1}\right)\right) \\
\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c1},1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\mathrm{c1},2}\, U_{2,2}\right) + \\ U_{\mathrm{c1},2}\, \left(2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}}\, \left(M_W^2\, s_W\, \left(2\,\delta c_\beta - c_\beta\, \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\,\delta Z_e + \delta Z^{e,R}_{\mathrm{j2,j2}}\right)\right) + c_\beta\, \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right)\right) \end{array} \right.
\end{array}\right]}
$$

$$
C(\nu_{\mathrm{j1}}, \tilde{\chi}^-_{\mathrm{c1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \underset{274}{} \left[\begin{array}{c} \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} \sqrt{2}\, U^*_{\mathrm{c1},2} \left\{ \begin{array}{l} c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2} \right) + \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}} \left(M_W^2\, s_W \left(2\, \delta c_\beta - c_\beta \left(2\, \delta Z_e + \delta Z^{\nu,L}_{\mathrm{j1,j1}} \right) \right) + c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) \right) \right) \end{array} \right\} + \\ 2\, c_\beta^2\, M_W^3\, U^*_{\mathrm{c1},1} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z^{\nu,L}_{\mathrm{j1,j1}} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) \right) - \\ c_\beta\, M_W^2\, s_W \left(2\, c_\beta\, M_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\, U^*_{1,1} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\, U^*_{2,1} \right) - \sqrt{2}\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\, U^*_{1,2} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\, U^*_{2,2} \right) \right) \end{array} \right\} + \\ 0 \end{array} \right]
$$

[FFS] Chargino – Neutralino – Higgs

$$
C(\tilde{\chi}^0_{\mathrm{n1}}, \tilde{\chi}^+_{\mathrm{c2}}, H^-) = \underset{255}{} \left[\begin{array}{c} -\frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} \sqrt{2}\, V^*_{\mathrm{c2},2} \left\{ \begin{array}{l} s_W^2\, Z^*_{\mathrm{n1},1} \left(c_W^2\, \delta Z_{H^-G^-}\, s_\beta + c_\beta \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z_{H^-H^-} \right) \right) \right) + \\ c_W^2 \left\{ \begin{array}{l} c_W\, Z^*_{\mathrm{n1},2} \left(\delta Z_{H^-G^-}\, s_\beta\, s_W - c_\beta \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{H^-H^-} \right) \right) \right) + \\ c_\beta\, s_W \left\{ \begin{array}{l} \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(s_W\, Z^*_{1,1} + c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(s_W\, Z^*_{2,1} + c_W\, Z^*_{2,2} \right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(s_W\, Z^*_{3,1} + c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(s_W\, Z^*_{4,1} + c_W\, Z^*_{4,2} \right) \end{array} \right. \end{array} \right. \end{array} \right. \\ c_W^2 \left\{ \begin{array}{l} c_\beta\, s_W \left\{ \begin{array}{l} \delta \bar{Z}^{\chi,R}_{\mathrm{c2},1} \left(2\, c_W\, V^*_{1,1}\, Z^*_{\mathrm{n1},4} + \sqrt{2}\, V^*_{1,2} \left(s_W\, Z^*_{\mathrm{n1},1} + c_W\, Z^*_{\mathrm{n1},2} \right) \right) + \\ \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2} \left(2\, c_W\, V^*_{2,1}\, Z^*_{\mathrm{n1},4} + \sqrt{2}\, V^*_{2,2} \left(s_W\, Z^*_{\mathrm{n1},1} + c_W\, Z^*_{\mathrm{n1},2} \right) \right) \end{array} \right. + \\ 2\, c_W\, V^*_{\mathrm{c2},1} \left\{ \begin{array}{l} c_\beta\, s_W \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,4} \right) + \\ Z^*_{\mathrm{n1},4} \left(\delta Z_{H^-G^-}\, s_\beta\, s_W - c_\beta \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{H^-H^-} \right) \right) \right) \end{array} \right. \end{array} \right. \end{array} \right\} + \\ \frac{\mathrm{i}\, e}{2\, s_W^2} \left\{ \begin{array}{l} c_\beta\, \delta Z_{H^-G^-}\, s_W \left(U_{\mathrm{c2},1}\, Z_{\mathrm{n1},3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2} \right) \right) + \\ s_\beta \left\{ \begin{array}{l} \delta s_W \left(2\, U_{\mathrm{c2},1}\, Z_{\mathrm{n1},3} + \sqrt{2}\, U_{\mathrm{c2},2} \left(\frac{s_W^3\, Z_{\mathrm{n1},1}}{c_W^3} - Z_{\mathrm{n1},2} \right) \right) - \\ s_W \left\{ \begin{array}{l} \delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(U_{\mathrm{c2},1}\, Z_{1,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{1,1}}{c_W} + Z_{1,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(U_{\mathrm{c2},1}\, Z_{2,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{2,1}}{c_W} + Z_{2,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n1}} \left(U_{\mathrm{c2},1}\, Z_{3,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{3,1}}{c_W} + Z_{3,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(U_{\mathrm{c2},1}\, Z_{4,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{4,1}}{c_W} + Z_{4,2} \right) \right) + \\ \delta \bar{Z}^{\chi,L}_{\mathrm{c2},1} \left(U_{1,1}\, Z_{\mathrm{n1},3} - \frac{U_{1,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2} \right) \right) + \\ \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2} \left(U_{2,1}\, Z_{\mathrm{n1},3} - \frac{U_{2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2} \right) \right) + \\ \left(2\, \delta Z_e + \delta Z_{H^-H^-} \right) \left(U_{\mathrm{c2},1}\, Z_{\mathrm{n1},3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right]
$$

$$
\begin{aligned}
C(\tilde{\chi}^0_{\mathrm{n1}}, \tilde{\chi}^+_{\mathrm{c2}}, G^-) = {}_{256}
\Bigg[& -\frac{\mathrm{i}\,e}{4\,c_W^3\,s_W^2} \Bigg\{ \sqrt{2}\,V^*_{\mathrm{c2},2} \Bigg\{ s_W^2\,Z^*_{\mathrm{n1},1}\,\left(2\,\delta s_W\,s_\beta\,s_W + c_W^2\,\left(c_\beta\,\delta Z_{H^-G^-} + s_\beta\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) - \\
& c_W^2 \Bigg\{ c_W\,Z^*_{\mathrm{n1},2}\,\left(2\,\delta s_W\,s_\beta - s_W\,\left(c_\beta\,\delta Z_{H^-G^-} + s_\beta\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) - \\
& s_\beta\,s_W \Bigg\{ \delta Z^{\chi^0,L}_{1,\mathrm{n1}}\,\left(s_W\,Z^*_{1,1} + c_W\,Z^*_{1,2}\right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\,\left(s_W\,Z^*_{2,1} + c_W\,Z^*_{2,2}\right) + \\
& \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\,\left(s_W\,Z^*_{3,1} + c_W\,Z^*_{3,2}\right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\,\left(s_W\,Z^*_{4,1} + c_W\,Z^*_{4,2}\right) \Bigg\} \Bigg\} \Bigg\} + \\
& c_W^2 \Bigg\{ s_\beta\,s_W \Bigg\{ \delta \bar{Z}^{\chi,R}_{\mathrm{c2},1}\,\left(2\,c_W\,V^*_{1,1}\,Z^*_{\mathrm{n1},4} + \sqrt{2}\,V^*_{1,2}\,\left(s_W\,Z^*_{\mathrm{n1},1} + c_W\,Z^*_{\mathrm{n1},2}\right)\right) + \\
& \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2}\,\left(2\,c_W\,V^*_{2,1}\,Z^*_{\mathrm{n1},4} + \sqrt{2}\,V^*_{2,2}\,\left(s_W\,Z^*_{\mathrm{n1},1} + c_W\,Z^*_{\mathrm{n1},2}\right)\right) \Bigg\} + \\
& 2\,c_W\,V^*_{\mathrm{c2},1} \Bigg\{ s_\beta\,s_W\,\left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\,Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\,Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\,Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\,Z^*_{4,4}\right) - \\
& Z^*_{\mathrm{n1},4}\,\left(2\,\delta s_W\,s_\beta - s_W\,\left(c_\beta\,\delta Z_{H^-G^-} + s_\beta\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) \Bigg\} \Bigg\} \Bigg\} \\
& \frac{\mathrm{i}\,e}{2\,s_W^2} \Bigg\{ s_W\,\left(c_\beta\,\delta Z_{G^-G^-} - \delta Z_{H^-G^-}\,s_\beta\right)\,\left(U_{\mathrm{c2},1}\,Z_{\mathrm{n1},3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2}\right)\right) - \\
& c_\beta \Bigg\{ \delta s_W\,\left(2\,U_{\mathrm{c2},1}\,Z_{\mathrm{n1},3} + \sqrt{2}\,U_{\mathrm{c2},2}\,\left(\frac{s_W^3\,Z_{\mathrm{n1},1}}{c_W^3} - Z_{\mathrm{n1},2}\right)\right) - \\
& s_W \Bigg\{ \delta Z^{\chi^0,R}_{1,\mathrm{n1}}\,\left(U_{\mathrm{c2},1}\,Z_{1,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{1,1}}{c_W} + Z_{1,2}\right)\right) + \\
& \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\,\left(U_{\mathrm{c2},1}\,Z_{2,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{2,1}}{c_W} + Z_{2,2}\right)\right) + \\
& \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\,\left(U_{\mathrm{c2},1}\,Z_{3,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{3,1}}{c_W} + Z_{3,2}\right)\right) + \\
& \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\,\left(U_{\mathrm{c2},1}\,Z_{4,3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{4,1}}{c_W} + Z_{4,2}\right)\right) + \\
& \delta \bar{Z}^{\chi,L}_{\mathrm{c2},1}\,\left(U_{1,1}\,Z_{\mathrm{n1},3} - \frac{U_{1,2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2}\right)\right) + \\
& \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2}\,\left(U_{2,1}\,Z_{\mathrm{n1},3} - \frac{U_{2,2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2}\right)\right) + \\
& 2\,\delta Z_e\,\left(U_{\mathrm{c2},1}\,Z_{\mathrm{n1},3} - \frac{U_{\mathrm{c2},2}}{\sqrt{2}}\,\left(\frac{s_W\,Z_{\mathrm{n1},1}}{c_W} + Z_{\mathrm{n1},2}\right)\right) \Bigg\} \Bigg\} \Bigg\} \Bigg]
\end{aligned}
$$

$$
\begin{aligned}
C(\tilde{\chi}^-_{\mathrm{c}2}, \tilde{\chi}^0_{\mathrm{n}1}, H^+) = {}_{257} = \Bigg[& -\frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \Bigg\{ \sqrt{2}\, U^*_{\mathrm{c}2,2} \Bigg\{ s_W^2\, Z^*_{\mathrm{n}1,1} \left(c_\beta\, c_W^2\, \delta Z^*_{H^- G^-} - s_\beta \left(2\, \delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}_{H^- H^-} + 2\, \delta Z_e \right) \right) \right) + \\
& c_W^2 \Bigg\{ c_W\, Z^*_{\mathrm{n}1,2} \left(c_\beta\, \delta Z^*_{H^- G^-}\, s_W + s_\beta \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_{H^- H^-} + 2\, \delta Z_e \right) \right) \right) - \\
& s_\beta\, s_W \Bigg\{ \delta Z^{\chi^0,L}_{1,\mathrm{n}1} \left(s_W\, Z^*_{1,1} + c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n}1} \left(s_W\, Z^*_{2,1} + c_W\, Z^*_{2,2} \right) + \\
& \delta Z^{\chi^0,L}_{3,\mathrm{n}1} \left(s_W\, Z^*_{3,1} + c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n}1} \left(s_W\, Z^*_{4,1} + c_W\, Z^*_{4,2} \right) \Bigg\} \Bigg\} \Bigg\} - \\
& c_W^2 \Bigg\{ 2\, c_W\, U^*_{\mathrm{c}2,1} \Bigg\{ Z^*_{\mathrm{n}1,3} \left(c_\beta\, \delta Z^*_{H^- G^-}\, s_W + s_\beta \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_{H^- H^-} + 2\, \delta Z_e \right) \right) \right) - \\
& s_\beta\, s_W \left(\delta Z^{\chi^0,L}_{1,\mathrm{n}1}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n}1}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n}1}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n}1}\, Z^*_{4,3} \right) \Bigg\} - \\
& s_\beta\, s_W \Bigg\{ \delta Z^{\chi,L}_{1,\mathrm{c}2} \left(2\, c_W\, U^*_{1,1}\, Z^*_{\mathrm{n}1,3} - \sqrt{2}\, U^*_{1,2} \left(s_W\, Z^*_{\mathrm{n}1,1} + c_W\, Z^*_{\mathrm{n}1,2} \right) \right) + \\
& \delta Z^{\chi,L}_{2,\mathrm{c}2} \left(2\, c_W\, U^*_{2,1}\, Z^*_{\mathrm{n}1,3} - \sqrt{2}\, U^*_{2,2} \left(s_W\, Z^*_{\mathrm{n}1,1} + c_W\, Z^*_{\mathrm{n}1,2} \right) \right) \Bigg\} \Bigg\} \Bigg\} \\
& \frac{\mathrm{i}\, e}{2\, s_W^2} \Bigg\{ s_W \Bigg\{ c_\beta \Bigg\{ \left(c_\beta\, \delta \bar{Z}_{H^- H^-} + \delta Z^*_{H^- G^-}\, s_\beta \right) \left(V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\
& \delta Z^{\chi^0,R}_{1,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{1,1}}{c_W} + Z_{1,2} \right) \right) + \\
& \delta Z^{\chi^0,R}_{2,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{2,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{2,1}}{c_W} + Z_{2,2} \right) \right) + \\
& \delta Z^{\chi^0,R}_{3,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{3,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{3,1}}{c_W} + Z_{3,2} \right) \right) + \\
& \delta Z^{\chi^0,R}_{4,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{4,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{4,1}}{c_W} + Z_{4,2} \right) \right) + \\
& \frac{\sqrt{2}\, \delta s_W\, s_W^2\, V_{\mathrm{c}2,2}\, Z_{\mathrm{n}1,1}}{c_W^3} + \\
& \delta Z^{\chi,R}_{1,\mathrm{c}2} \left(V_{1,1}\, Z_{\mathrm{n}1,4} + \frac{V_{1,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\
& \delta Z^{\chi,R}_{2,\mathrm{c}2} \left(V_{2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\
& 2\, \delta Z_e \left(V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) \Bigg\} \Bigg\} \Bigg\} \\
& c_\beta\, \delta s_W \left(\sqrt{2}\, V_{\mathrm{c}2,2}\, Z_{\mathrm{n}1,2} + 2\, V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} \right) - \Bigg\} \Bigg\} \Bigg]
\end{aligned}
$$

$$
C(\tilde{\chi}^-_{\mathrm{c}2}, \tilde{\chi}^0_{\mathrm{n}1}, G^+) = \underset{258}{\left[\frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \sqrt{2}\, U^*_{\mathrm{c}2,2} \left\{ \begin{array}{l} s_W^2\, Z^*_{\mathrm{n}1,1} \left(c_W^2\, \delta Z_{H^-G^-}\, s_\beta - c_\beta \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z_{G^-G^-} \right) \right) \right) + \\ c_W^2 \left\{ \begin{array}{l} c_W\, Z^*_{\mathrm{n}1,2} \left(\delta Z_{H^-G^-}\, s_\beta\, s_W + c_\beta \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{G^-G^-} \right) \right) \right) - \\ c_\beta\, s_W \left\{ \begin{array}{l} \delta Z^{\chi^0,L}_{1,\mathrm{n}1} \left(s_W\, Z^*_{1,1} + c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n}1} \left(s_W\, Z^*_{2,1} + c_W\, Z^*_{2,2} \right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n}1} \left(s_W\, Z^*_{3,1} + c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n}1} \left(s_W\, Z^*_{4,1} + c_W\, Z^*_{4,2} \right) \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_W^2 \left\{ \begin{array}{l} 2\, c_W\, U^*_{\mathrm{c}2,1} \left\{ \begin{array}{l} c_\beta\, s_W \left(\delta Z^{\chi^0,L}_{1,\mathrm{n}1}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n}1}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n}1}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n}1}\, Z^*_{4,3} \right) - \\ Z^*_{\mathrm{n}1,3} \left(\delta Z_{H^-G^-}\, s_\beta\, s_W + c_\beta \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{G^-G^-} \right) \right) \right) \end{array} \right. + \\ c_\beta\, s_W \left\{ \begin{array}{l} \delta Z^{\chi,L}_{1,\mathrm{c}2} \left(2\, c_W\, U^*_{1,1}\, Z^*_{\mathrm{n}1,3} - \sqrt{2}\, U^*_{1,2} \left(s_W\, Z^*_{\mathrm{n}1,1} + c_W\, Z^*_{\mathrm{n}1,2} \right) \right) + \\ \delta Z^{\chi,L}_{2,\mathrm{c}2} \left(2\, c_W\, U^*_{2,1}\, Z^*_{\mathrm{n}1,3} - \sqrt{2}\, U^*_{2,2} \left(s_W\, Z^*_{\mathrm{n}1,1} + c_W\, Z^*_{\mathrm{n}1,2} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. + \\ \frac{\mathrm{i}\, e}{2\, s_W^2} \left\{ s_W \left\{ \begin{array}{l} \delta s_W\, s_\beta \left(\sqrt{2}\, V_{\mathrm{c}2,2}\, Z_{\mathrm{n}1,2} + 2\, V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} \right) - \\ \left(c_\beta\, \delta Z_{H^-G^-} + \delta Z_{G^-G^-}\, s_\beta \right) \left(V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\ s_\beta \left\{ \begin{array}{l} \delta Z^{\chi^0,R}_{1,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{1,1}}{c_W} + Z_{1,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{2,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{2,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{2,1}}{c_W} + Z_{2,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{3,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{3,1}}{c_W} + Z_{3,2} \right) \right) + \\ \delta Z^{\chi^0,R}_{4,\mathrm{n}1} \left(V_{\mathrm{c}2,1}\, Z_{4,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{4,1}}{c_W} + Z_{4,2} \right) \right) + \\ \frac{\sqrt{2}\, \delta s_W\, s_W^2\, V_{\mathrm{c}2,2}\, Z_{\mathrm{n}1,1}}{c_W^3} + \\ \delta Z^{\chi,R}_{1,\mathrm{c}2} \left(V_{1,1}\, Z_{\mathrm{n}1,4} + \frac{V_{1,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\ \delta Z^{\chi,R}_{2,\mathrm{c}2} \left(V_{2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) + \\ 2\, \delta Z_e \left(V_{\mathrm{c}2,1}\, Z_{\mathrm{n}1,4} + \frac{V_{\mathrm{c}2,2}}{\sqrt{2}} \left(\frac{s_W\, Z_{\mathrm{n}1,1}}{c_W} + Z_{\mathrm{n}1,2} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \right]
$$

[FFS] Chargino – Quark – Squark

$$
C(\underset{267}{\tilde{\chi}_{\mathrm{c1}}^{-}}, \bar{d}_{\mathrm{j2}}, \tilde{u}_{\mathrm{j1}}^{\mathrm{s1}}) = \left[\frac{\mathrm{i}\,e}{2\sqrt{2}\,c_\beta^2\,M_W^3\,s_W^2} \left\{ 2\,c_\beta\,\delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,U^*_{\mathrm{c1,2}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} + \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\,U^*_{1,2} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\,U^*_{2,2}\right) + U^*_{\mathrm{c1,2}} \left\{ c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \left\{ 2\,c_\beta\,\delta m^d_{\mathrm{j2}}\,M_W^2\,s_W - m_{d_{\mathrm{j2}}} \left(M_W^2\,s_W \left(2\,\delta c_\beta - c_\beta \left(\delta\bar{Z}^{d,R}_{\mathrm{j2,j2}} + 2\,\delta Z_e\right)\right) + c_\beta \left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right) \right\} \right\} \right\} \right\} \right\}
$$

$$
- \frac{\mathrm{i}\,e}{4\,M_W^3\,s_\beta^2\,s_W^2} \left\{ 2\,\delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\,M_W^2\,s_\beta\,s_W \left(2\,M_W\,s_\beta\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\,V_{\mathrm{c1},1} - \sqrt{2}\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\,V_{\mathrm{c1},2}\right) - \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ 2\,M_W^3\,s_\beta^2\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \left(V_{\mathrm{c1},1} \left(2\,\delta s_W - s_W \left(\delta\bar{Z}^{d,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e\right)\right) - s_W \left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\,V_{1,1} + \delta Z^{\chi,R}_{2,\mathrm{c1}}\,V_{2,1}\right)\right) + \sqrt{2}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \left\{ m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W \left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\,V_{1,2} + \delta Z^{\chi,R}_{2,\mathrm{c1}}\,V_{2,2}\right) + V_{\mathrm{c1},2} \left(2\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_\beta\,s_W - m_{u_{\mathrm{j1}}} \left(s_\beta\,s_W \left(\delta M_W^2 - M_W^2 \left(\delta\bar{Z}^{d,L}_{\mathrm{j2,j2}} + 2\,\delta Z_e\right)\right) + 2\,M_W^2\,\left(\delta s_W\,s_\beta + \delta s_\beta\,s_W\right)\right)\right) \right\} - M_W^2\,s_\beta\,s_W \left\{ 2\,M_W\,s_\beta\,V_{\mathrm{c1},1} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) - \sqrt{2}\,m_{u_{\mathrm{j1}}}\,V_{\mathrm{c1},2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,2}\right) \right\} \right\} \right\} \right]
$$

$$
C(\underset{268}{\tilde{\chi}_{\mathrm{c1}}^{+}}, \bar{u}_{\mathrm{j1}}, \tilde{d}_{\mathrm{j2}}^{\mathrm{s2}}) = \left[\frac{\mathrm{i}\,e}{2\sqrt{2}\,M_W^3\,s_\beta^2\,s_W^2} \left\{ 2\,\delta\mathrm{CKM}_{\mathrm{j1,j2}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,1}}\,V^*_{\mathrm{c1},2} + \mathrm{CKM}_{\mathrm{j1,j2}} \left\{ m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,1}} \left(\delta\bar{Z}^{\chi,R}_{\mathrm{c1},1}\,V^*_{1,2} + \delta\bar{Z}^{\chi,R}_{\mathrm{c1},2}\,V^*_{2,2}\right) + V^*_{\mathrm{c1},2} \left\{ m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{2,1}\right) + U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,1}} \left(2\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_\beta\,s_W - m_{u_{\mathrm{j1}}} \left(s_\beta\,s_W \left(\delta M_W^2 - M_W^2 \left(\delta\bar{Z}^{u,R}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + 2\,M_W^2\,\left(\delta s_W\,s_\beta + \delta s_\beta\,s_W\right)\right)\right) \right\} \right\} \right\} \right.
$$

$$
\left. - \frac{\mathrm{i}\,e}{4\,c_\beta^2\,M_W^3\,s_W^2} \left\{ 2\,c_\beta\,\delta\mathrm{CKM}_{\mathrm{j1,j2}}\,M_W^2\,s_W \left(2\,c_\beta\,M_W\,U_{\mathrm{c1},1}\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,1}} - \sqrt{2}\,m_{d_{\mathrm{j2}}}\,U_{\mathrm{c1},2}\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,2}}\right) - \mathrm{CKM}_{\mathrm{j1,j2}} \left\{ 2\,c_\beta^2\,M_W^3\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,1}} \left(U_{\mathrm{c1},1} \left(2\,\delta s_W - s_W \left(\delta\bar{Z}^{u,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) - s_W \left(\delta\bar{Z}^{\chi,L}_{\mathrm{c1},1}\,U_{1,1} + \delta\bar{Z}^{\chi,L}_{\mathrm{c1},2}\,U_{2,1}\right)\right) + \sqrt{2}\,U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2,2}} \left\{ c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W \left(\delta\bar{Z}^{\chi,L}_{\mathrm{c1},1}\,U_{1,2} + \delta\bar{Z}^{\chi,L}_{\mathrm{c1},2}\,U_{2,2}\right) + U_{\mathrm{c1},2} \left\{ 2\,c_\beta\,\delta m^d_{\mathrm{j2}}\,M_W^2\,s_W - m_{d_{\mathrm{j2}}} \left(M_W^2\,s_W \left(2\,\delta c_\beta - c_\beta \left(\delta\bar{Z}^{u,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + c_\beta \left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right) \right\} \right\} - c_\beta\,M_W^2\,s_W \left\{ 2\,c_\beta\,M_W\,U_{\mathrm{c1},1} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{2,1}\right) - \sqrt{2}\,m_{d_{\mathrm{j2}}}\,U_{\mathrm{c1},2} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}*}_{2,2}\right) \right\} \right\} \right]
$$

$$
C(d_{\mathrm{j2}},\tilde{\chi}^{+}_{\mathrm{c1}},\tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = \\
\left[\begin{array}{l}
\dfrac{\mathrm{i}\,e}{4\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l}
\mathrm{CKM}_{\mathrm{j1,j2}}\left\{\begin{array}{l}
\sqrt{2}\,V^*_{\mathrm{c1},2}\left\{\begin{array}{l} m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,\left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{1,2}+\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{2,2}\right)+ \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\left(2\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_\beta\,s_W-m_{u_{\mathrm{j1}}}\left(s_\beta\,s_W\,\left(\delta M_W^2-M_W^2\,\left(2\,\delta Z_e+\delta Z^{d,L}_{\mathrm{j2,j2}}\right)\right)+2\,M_W^2\,\left(\delta s_W\,s_\beta+\delta s_\beta\,s_W\right)\right)\right)\end{array}\right\}- \\
M_W^2\,s_\beta\,s_W\left\{\begin{array}{l} 2\,M_W\,s_\beta\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c1},1}\,V^*_{1,1}+\delta\bar{Z}^{\chi,R}_{\mathrm{c1},2}\,V^*_{2,1}\right)- \\ \sqrt{2}\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\left(\delta\bar{Z}^{\chi,R}_{\mathrm{c1},1}\,V^*_{1,2}+\delta\bar{Z}^{\chi,R}_{\mathrm{c1},2}\,V^*_{2,2}\right)\end{array}\right\}+ \\
2\,M_W^3\,s_\beta^2\,V^*_{\mathrm{c1},1}\left(U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\left(2\,\delta s_W-s_W\,\left(2\,\delta Z_e+\delta Z^{d,L}_{\mathrm{j2,j2}}\right)\right)-s_W\,\left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{2,1}\right)\right)\end{array}\right\}- \\
2\,\delta\mathrm{CKM}_{\mathrm{j1,j2}}\,M_W^2\,s_\beta\,s_W\,\left(2\,M_W\,s_\beta\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\,V^*_{\mathrm{c1},1}-\sqrt{2}\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\,V^*_{\mathrm{c1},2}\right)
\end{array}\right\}- \\
\dfrac{\mathrm{i}\,e}{2\,\sqrt{2}\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
\mathrm{CKM}_{\mathrm{j1,j2}}\left\{\begin{array}{l} c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,U_{\mathrm{c1},2}\,\left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{2,1}\right)+ \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\left\{\begin{array}{l} c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,\left(\delta\bar{Z}^{\chi,L}_{\mathrm{c1},1}\,U_{1,2}+\delta\bar{Z}^{\chi,L}_{\mathrm{c1},2}\,U_{2,2}\right)+ \\ U_{\mathrm{c1},2}\left(2\,c_\beta\,\delta m^d_{\mathrm{j2}}\,M_W^2\,s_W-m_{d_{\mathrm{j2}}}\left(M_W^2\,s_W\,\left(2\,\delta c_\beta-c_\beta\,\left(2\,\delta Z_e+\delta Z^{d,R}_{\mathrm{j2,j2}}\right)\right)+c_\beta\,\left(2\,\delta s_W\,M_W^2+\delta M_W^2\,s_W\right)\right)\right)\end{array}\right\}\end{array}\right\}+ \\
2\,c_\beta\,\delta\mathrm{CKM}_{\mathrm{j1,j2}}\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,U_{\mathrm{c1},2}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}
\end{array}\right\}
\end{array}\right]
$$

$$
C(u_{\mathrm{j1}},\tilde{\chi}^{-}_{\mathrm{c1}},\tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \\
\left[\begin{array}{l}
\dfrac{\mathrm{i}\,e}{4\,c_\beta^2\,M_W^3\,s_W^2}\left\{\begin{array}{l}
\mathrm{CKM}^*_{\mathrm{j1,j2}}\left\{\begin{array}{l}
\sqrt{2}\,U^*_{\mathrm{c1},2}\left\{\begin{array}{l} c_\beta\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{1,2}+\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{2,2}\right)+ \\ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(2\,c_\beta\,\delta m^d_{\mathrm{j2}}\,M_W^2\,s_W-m_{d_{\mathrm{j2}}}\left(M_W^2\,s_W\,\left(2\,\delta c_\beta-c_\beta\,\left(2\,\delta Z_e+\delta Z^{u,L}_{\mathrm{j1,j1}}\right)\right)+c_\beta\,\left(2\,\delta s_W\,M_W^2+\delta M_W^2\,s_W\right)\right)\right)\end{array}\right\}- \\
c_\beta\,M_W^2\,s_W\left\{\begin{array}{l} 2\,c_\beta\,M_W\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\,U^*_{1,1}+\delta Z^{\chi,L}_{2,\mathrm{c1}}\,U^*_{2,1}\right)- \\ \sqrt{2}\,m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\,U^*_{1,2}+\delta Z^{\chi,L}_{2,\mathrm{c1}}\,U^*_{2,2}\right)\end{array}\right\}+ \\
2\,c_\beta^2\,M_W^3\,U^*_{\mathrm{c1},1}\left(U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(2\,\delta s_W-s_W\,\left(2\,\delta Z_e+\delta Z^{u,L}_{\mathrm{j1,j1}}\right)\right)-s_W\,\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{1,1}+\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{2,1}\right)\right)\end{array}\right\}- \\
2\,c_\beta\,\delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\,M_W^2\,s_W\,\left(2\,c_\beta\,M_W\,U^*_{\mathrm{c1},1}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}-\sqrt{2}\,m_{d_{\mathrm{j2}}}\,U^*_{\mathrm{c1},2}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\right)
\end{array}\right\}- \\
\dfrac{\mathrm{i}\,e}{2\,\sqrt{2}\,M_W^3\,s_\beta^2\,s_W^2}\left\{\begin{array}{l}
\mathrm{CKM}^*_{\mathrm{j1,j2}}\left\{\begin{array}{l} m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,V_{\mathrm{c1},2}\,\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{1,1}+\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{2,1}\right)+ \\ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left\{\begin{array}{l} m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,\left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\,V_{1,2}+\delta Z^{\chi,R}_{2,\mathrm{c1}}\,V_{2,2}\right)+ \\ V_{\mathrm{c1},2}\left(2\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_\beta\,s_W-m_{u_{\mathrm{j1}}}\left(s_\beta\,s_W\,\left(\delta M_W^2-M_W^2\,\left(2\,\delta Z_e+\delta Z^{u,R}_{\mathrm{j1,j1}}\right)\right)+2\,M_W^2\,\left(\delta s_W\,s_\beta+\delta s_\beta\,s_W\right)\right)\right)\end{array}\right\}\end{array}\right\}+ \\
2\,\delta\mathrm{CKM}^*_{\mathrm{j1,j2}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_\beta\,s_W\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\,V_{\mathrm{c1},2}
\end{array}\right\}
\end{array}\right]
$$

[FFS] Gluino – Quark – Squark

$$C(\tilde{g}, \overline{u}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}) = \begin{bmatrix} \frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e^*_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{\sqrt{2}} \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left(\delta \bar{Z}^{u,R}_{\mathrm{j1,j1}} + \delta Z^{L}_{\tilde{g}} + 2\, \delta Z_{g_s} \right) \right) \\ -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{\sqrt{2}} \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta \bar{Z}^{u,L}_{\mathrm{j1,j1}} + \delta Z^{R}_{\tilde{g}} + 2\, \delta Z_{g_s} \right) \right) \end{bmatrix}$$

$$C(\tilde{g}, \overline{d}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}) = \begin{bmatrix} \frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e^*_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{\sqrt{2}} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2} + U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left(\delta \bar{Z}^{d,R}_{\mathrm{j1,j1}} + \delta Z^{L}_{\tilde{g}} + 2\, \delta Z_{g_s} \right) \right) \\ -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{\sqrt{2}} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1} + U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta \bar{Z}^{d,L}_{\mathrm{j1,j1}} + \delta Z^{R}_{\tilde{g}} + 2\, \delta Z_{g_s} \right) \right) \end{bmatrix}$$

$$C(\tilde{g}, u_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e^*_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{\sqrt{2}} \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{L}_{\tilde{g}} + 2\, \delta Z_{g_s} + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) \\ \frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{\sqrt{2}} \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,2} + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{R}_{\tilde{g}} + 2\, \delta Z_{g_s} + \delta Z^{u,R}_{\mathrm{j1,j1}} \right) \right) \end{bmatrix}$$

$$C(\tilde{g}, d_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e^*_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{\sqrt{2}} \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,1} + U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{L}_{\tilde{g}} + 2\, \delta Z_{g_s} + \delta Z^{d,L}_{\mathrm{j1,j1}} \right) \right) \\ \frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, e_{\tilde{g}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{\sqrt{2}} \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,2} + U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{R}_{\tilde{g}} + 2\, \delta Z_{g_s} + \delta Z^{d,R}_{\mathrm{j1,j1}} \right) \right) \end{bmatrix}$$

[FFS] Lepton – Neutralino – Slepton

$$C(\tilde{\chi}^0_{\mathrm{n1}}, \overline{\nu}_{\mathrm{j1}}, \tilde{\nu}_{\mathrm{j2}}) = \begin{bmatrix} 0 \\ \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_W^3\, s_W^2} \left\{ \begin{array}{l} c_W^3\, Z_{\mathrm{n1},2} \left(2\, \delta s_W - s_W \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j1,j1}} + 2\, \delta Z_e + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1} \right) \right) + \\ s_W \left\{ \begin{array}{l} s_W\, Z_{\mathrm{n1},1} \left(c_W^2 \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j1,j1}} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1} \right) + 2 \left(c_W^2\, \delta Z_e + \delta s_W\, s_W \right) \right) + \\ c_W^2 \left\{ \begin{array}{l} \delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(s_W\, Z_{1,1} - c_W\, Z_{1,2} \right) + \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(s_W\, Z_{2,1} - c_W\, Z_{2,2} \right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n1}} \left(s_W\, Z_{3,1} - c_W\, Z_{3,2} \right) + \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(s_W\, Z_{4,1} - c_W\, Z_{4,2} \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{bmatrix}$$

$$
C(\tilde{\chi}^0_{\mathrm{n1}}, \bar{e}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}) = \left[-\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_\beta^2\, M_W^3\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \left(2\, \delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}^{e,R}_{\mathrm{j1,j1}} + 2\, \delta Z_e \right) \right) + c_W^2 \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2} \right) \right) + \\ c_W^2 \left\{ \begin{array}{l} c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l} 2\, c_\beta\, M_W\, s_W\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,1} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,1} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,1} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,1} \right) + \\ c_W\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,3} \right) \end{array} \right\} + \\ c_W\, Z^*_{\mathrm{n1},3} \left\{ \begin{array}{l} c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) + \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{e_{\mathrm{j1}}} \left(M_W^2\, s_W \left(2\, \delta c_\beta - c_\beta \left(\delta \bar{Z}^{e,R}_{\mathrm{j1,j1}} + 2\, \delta Z_e \right) \right) + c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) \right) \end{array} \right\} \end{array} \right\} \end{array} \right\} \end{array} \right\} \\ -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l} c_\beta^2\, M_W^3\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^3\, Z_{\mathrm{n1},2} \left(2\, \delta s_W - s_W \left(\delta \bar{Z}^{e,L}_{\mathrm{j1,j1}} + 2\, \delta Z_e \right) \right) - s_W^2\, Z_{\mathrm{n1},1} \left(2\, \delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}^{e,L}_{\mathrm{j1,j1}} + 2\, \delta Z_e \right) \right) - \\ s_W \left\{ \begin{array}{l} c_W^3\, \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,2} + \\ c_W^2 \left\{ \begin{array}{l} \delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(s_W\, Z_{1,1} + c_W\, Z_{1,2} \right) + \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(s_W\, Z_{2,1} + c_W\, Z_{2,2} \right) + \\ \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, s_W\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(s_W\, Z_{4,1} + c_W\, Z_{4,2} \right) \end{array} \right. \end{array} \right. \end{array} \right\} - \\ c_W^2 \left\{ \begin{array}{l} c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l} c_\beta\, M_W \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) \left(s_W\, Z_{\mathrm{n1},1} + c_W\, Z_{\mathrm{n1},2} \right) - \\ c_W\, m_{e_{\mathrm{j1}}}\, Z_{\mathrm{n1},3} \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2} \right) \end{array} \right\} + \\ c_W\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, Z_{\mathrm{n1},3} \left(2\, \delta c_\beta - c_\beta \left(\delta \bar{Z}^{e,L}_{\mathrm{j1,j1}} + 2\, \delta Z_e \right) \right) + \\ c_\beta \left\{ \begin{array}{l} \delta M_W^2\, m_{e_{\mathrm{j1}}}\, s_W\, Z_{\mathrm{n1},3} + \\ M_W^2 \left\{ \begin{array}{l} 2\, \delta s_W\, m_{e_{\mathrm{j1}}}\, Z_{\mathrm{n1},3} - \\ s_W \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}} \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,3} \right) + \\ 2\, \delta m^e_{\mathrm{j1}}\, Z_{\mathrm{n1},3} \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right\} \end{array} \right]
$$

$$
C(\nu_{\mathrm{j1}}, \tilde{\chi}^0_{\mathrm{n1}}, \tilde{\nu}^\dagger_{\mathrm{j2}}) = \left[\begin{array}{c} \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_W^3\, s_W^2} \left\{ \begin{array}{l} s_W^2\, Z^*_{\mathrm{n1},1} \left(c_W^2 \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + \delta Z^{\nu,L}_{\mathrm{j1,j1}} \right) + 2 \left(c_W^2\, \delta Z_e + \delta s_W\, s_W \right) \right) - \\ c_W^2 \left\{ \begin{array}{l} c_W\, Z^*_{\mathrm{n1},2} \left(s_W \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + \delta Z^{\nu,L}_{\mathrm{j1,j1}} \right) - 2 \left(\delta s_W - \delta Z_e\, s_W \right) \right) - \\ s_W \left\{ \begin{array}{l} \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(s_W\, Z^*_{1,1} - c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(s_W\, Z^*_{2,1} - c_W\, Z^*_{2,2} \right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(s_W\, Z^*_{3,1} - c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(s_W\, Z^*_{4,1} - c_W\, Z^*_{4,2} \right) \end{array} \right. \end{array} \right. \end{array} \right. \\ 0 \end{array} \right]
$$

$$
\begin{aligned}
C(e_{\mathrm{j1}}, \tilde{\chi}^0_{\mathrm{n1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = {}_{264}
&\Bigg[-\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \Bigg\{ c_W^2 \Bigg\{ c_W \Bigg\{ Z^*_{\mathrm{n1},3} \Bigg\{ c_\beta\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2} \right) + \\
&\quad U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \Big\{ 2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - \\
&\quad m_{e_{\mathrm{j1}}} \left(M_W^2\, s_W \left(2\, \delta c_\beta - c_\beta \left(2\, \delta Z_e + \delta Z^{e,L}_{\mathrm{j1,j1}} \right) \right) + c_\beta \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) \right) \Big\} \Bigg\} + \\
&\quad c_\beta^2\, M_W^3\, Z^*_{\mathrm{n1},2} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z^{e,L}_{\mathrm{j1,j1}} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) \right) \Bigg\} - \\
&\quad c_\beta\, M_W^2\, s_W \Bigg\{ c_\beta\, M_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \Big\{ \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(s_W\, Z^*_{1,1} + c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(s_W\, Z^*_{2,1} + c_W\, Z^*_{2,2} \right) + \\
&\quad \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(s_W\, Z^*_{3,1} + c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(s_W\, Z^*_{4,1} + c_W\, Z^*_{4,2} \right) \Big\} - \\
&\quad c_W\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,3} \right) \Bigg\} \Bigg\} - \\
&\quad c_\beta^2\, M_W^3\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z^{e,L}_{\mathrm{j1,j1}} \right) \right) + c_W^2 \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) \right) \Bigg\} \\
&-\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \Bigg\{ c_\beta\, c_W^2 \Bigg\{ M_W^2\, s_W \Big\{ \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} \left(2\, c_\beta\, M_W\, s_W\, U^{\tilde{e},\mathrm{j1}}_{1,2}\, Z_{\mathrm{n1},1} + c_W\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{1,1}\, Z_{\mathrm{n1},3} \right) + \\
&\quad \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} \left(2\, c_\beta\, M_W\, s_W\, U^{\tilde{e},\mathrm{j1}}_{2,2}\, Z_{\mathrm{n1},1} + c_W\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\, Z_{\mathrm{n1},3} \right) \Big\} - \\
&\quad c_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \Big\{ \delta M_W^2\, m_{e_{\mathrm{j1}}}\, s_W\, Z_{\mathrm{n1},3} + \\
&\quad M_W^2 \Big\{ 2\, \delta s_W\, m_{e_{\mathrm{j1}}}\, Z_{\mathrm{n1},3} - \\
&\quad s_W \Big\{ m_{e_{\mathrm{j1}}} \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,3} \right) + \\
&\quad 2\, \delta m^e_{\mathrm{j1}}\, Z_{\mathrm{n1},3} \Big\} \Big\} \Big\} \Bigg\} - \\
&\quad c_W^3\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\, Z_{\mathrm{n1},3} \left(2\, \delta c_\beta - c_\beta \left(2\, \delta Z_e + \delta Z^{e,R}_{\mathrm{j1,j1}} \right) \right) + \\
&\quad 2\, c_\beta^2\, M_W^3\, s_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(Z_{\mathrm{n1},1} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z^{e,R}_{\mathrm{j1,j1}} \right) \right) + c_W^2 \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,1} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,1} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,1} \right) \right) \Bigg\} \Bigg]
\end{aligned}
$$

[FFS] Neutralino – Quark – Squark

$$
C(\underset{261}{\tilde{\chi}^0_{\mathrm{n1}}}, \overline{u}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}) =
\left[
\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_W^3\, M_W^3\, s_\beta^2\, s_W^2}
\left\{
\begin{array}{l}
4\, M_W^3\, s_\beta^2\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left(2\,\delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}^{u,R}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + c_W^2 \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)\right) + \\
c_W^2 \left\{
\begin{array}{l}
M_W^2\, s_\beta\, s_W \left\{
\begin{array}{l}
4\, M_W\, s_\beta\, s_W\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,1} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,1} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,1} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,1}\right) - \\
3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,4}\right)
\end{array}
\right\} - \\
3\, c_W\, Z^*_{\mathrm{n1},4} \left\{
\begin{array}{l}
m_{u_{\mathrm{j1}}}\, M_W^2\, s_\beta\, s_W \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + \\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left(2\,\delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W - m_{u_{\mathrm{j1}}} \left(s_\beta\, s_W \left(\delta M_W^2 - M_W^2 \left(\delta \bar{Z}^{u,R}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + 2\, M_W^2\, (\delta s_W\, s_\beta + \delta s_\beta\, s_W)\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} \\
\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_W^3\, M_W^3\, s_\beta^2\, s_W^2}
\left\{
\begin{array}{l}
M_W^3\, s_\beta^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left\{
\begin{array}{l}
c_W^3\, Z_{\mathrm{n1},2} \left(6\,\delta s_W - s_W \left(3\,\delta \bar{Z}^{u,L}_{\mathrm{j1,j1}} + 6\,\delta Z_e\right)\right) - s_W^2\, Z_{\mathrm{n1},1} \left(2\,\delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}^{u,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) - \\
s_W \left\{
\begin{array}{l}
3\, c_W^3\, \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,2} + \\
c_W^2 \left\{
\begin{array}{l}
\delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(s_W\, Z_{1,1} + 3\, c_W\, Z_{1,2}\right) + \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(s_W\, Z_{2,1} + 3\, c_W\, Z_{2,2}\right) + \\
\delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, s_W\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(s_W\, Z_{4,1} + 3\, c_W\, Z_{4,2}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} - \\
c_W^2 \left\{
\begin{array}{l}
M_W^2\, s_\beta\, s_W \left\{
\begin{array}{l}
M_W\, s_\beta \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) \left(s_W\, Z_{\mathrm{n1},1} + 3\, c_W\, Z_{\mathrm{n1},2}\right) + \\
3\, c_W\, m_{u_{\mathrm{j1}}}\, Z_{\mathrm{n1},4} \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\} - \\
3\, c_W\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left\{
\begin{array}{l}
m_{u_{\mathrm{j1}}}\, s_\beta\, s_W\, Z_{\mathrm{n1},4} \left(\delta M_W^2 - M_W^2 \left(\delta \bar{Z}^{u,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e\right)\right) + \\
M_W^2 \left\{
\begin{array}{l}
2\,\delta s_\beta\, m_{u_{\mathrm{j1}}}\, s_W\, Z_{\mathrm{n1},4} + \\
s_\beta \left\{
\begin{array}{l}
2\,\delta s_W\, m_{u_{\mathrm{j1}}}\, Z_{\mathrm{n1},4} - \\
s_W \left\{
\begin{array}{l}
m_{u_{\mathrm{j1}}} \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,4} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,4} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,4} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,4}\right) + \\
2\,\delta m^u_{\mathrm{j1}}\, Z_{\mathrm{n1},4}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\right]
$$

$$
\underset{262}{C}(\tilde{\chi}^0_{\mathrm{n1}}, \overline{d}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}) = \left[\begin{array}{l}
-\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l}
2\, c_\beta^2\, M_W^3\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left(2\,\delta s_W\, s_W + c_W^2 \left(\delta\bar{Z}^{d,R}_{\mathrm{j1,j1}} + 2\,\delta Z_e \right)\right) + c_W^2 \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2} \right)\right) + \\
c_W^2 \left\{ \begin{array}{l}
c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l}
2\, c_\beta\, M_W\, s_W\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,1} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,1} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,1} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,1} \right) + \\
3\, c_W\, m_{d_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,3} \right)
\end{array} \right\} + \\
3\, c_W\, Z^*_{\mathrm{n1},3} \left\{ \begin{array}{l}
c_\beta\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1} \right) + \\
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l}
2\, c_\beta\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\
m_{d_{\mathrm{j1}}} \left(M_W^2\, s_W \left(2\,\delta c_\beta - c_\beta \left(\delta\bar{Z}^{d,R}_{\mathrm{j1,j1}} + 2\,\delta Z_e \right)\right) + c_\beta \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W \right)\right)
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\} \\
-\dfrac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l}
c_\beta^2\, M_W^3\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l}
3\, c_W^3\, Z_{\mathrm{n1},2} \left(2\,\delta s_W - s_W \left(\delta\bar{Z}^{d,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e \right)\right) + s_W^2\, Z_{\mathrm{n1},1} \left(2\,\delta s_W\, s_W + c_W^2 \left(\delta\bar{Z}^{d,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e \right)\right) - \\
s_W \left\{ \begin{array}{l}
3\, c_W^3\, \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,2} - \\
c_W^2 \left\{ \begin{array}{l}
\delta Z^{\chi^0,R}_{1,\mathrm{n1}} \left(s_W\, Z_{1,1} - 3\, c_W\, Z_{1,2} \right) + \delta Z^{\chi^0,R}_{2,\mathrm{n1}} \left(s_W\, Z_{2,1} - 3\, c_W\, Z_{2,2} \right) + \\
\delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, s_W\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}} \left(s_W\, Z_{4,1} - 3\, c_W\, Z_{4,2} \right)
\end{array} \right\}
\end{array} \right\}
\end{array} \right\} + \\
c_W^2 \left\{ \begin{array}{l}
c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l}
c_\beta\, M_W \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1} \right) \left(s_W\, Z_{\mathrm{n1},1} - 3\, c_W\, Z_{\mathrm{n1},2} \right) + \\
3\, c_W\, m_{d_{\mathrm{j1}}}\, Z_{\mathrm{n1},3} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2} \right)
\end{array} \right\} - \\
3\, c_W\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l}
m_{d_{\mathrm{j1}}}\, M_W^2\, s_W\, Z_{\mathrm{n1},3} \left(2\,\delta c_\beta - c_\beta \left(\delta\bar{Z}^{d,L}_{\mathrm{j1,j1}} + 2\,\delta Z_e \right)\right) + \\
c_\beta \left\{ \begin{array}{l}
\delta M_W^2\, m_{d_{\mathrm{j1}}}\, s_W\, Z_{\mathrm{n1},3} + \\
M_W^2 \left\{ \begin{array}{l}
2\,\delta s_W\, m_{d_{\mathrm{j1}}}\, Z_{\mathrm{n1},3} - \\
s_W \left\{ \begin{array}{l}
m_{d_{\mathrm{j1}}} \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,3} \right) + \\
2\,\delta m^d_{\mathrm{j1}}\, Z_{\mathrm{n1},3}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right]
$$

$$
\begin{aligned}
C(u_{\mathrm{j1}}, \tilde{\chi}^0_{\mathrm{n1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = {}_{265} \Bigg[& -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_W^3\, M_W^3\, s_\beta^2\, s_W^2} \Bigg\{ c_W^2 \Bigg\{ 3\, c_W \Bigg\{ Z^*_{\mathrm{n1},4} \Bigg\{ m_{u_{\mathrm{j1}}}\, M_W^2\, s_\beta\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,2} \right) + \\
& U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \Bigg\{ 2\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W - \\
& m_{u_{\mathrm{j1}}} \left(s_\beta\, s_W \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) + 2\, M_W^2\, \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W \right) \right) \Bigg\} \Bigg\} - \\
& M_W^3\, s_\beta^2\, Z^*_{\mathrm{n1},2} \left(U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} \right) \right) \Bigg\} + \\
& M_W^2\, s_\beta\, s_W \Bigg\{ M_W\, s_\beta\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \Bigg\{ \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(s_W\, Z^*_{1,1} + 3\, c_W\, Z^*_{1,2} \right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(s_W\, Z^*_{2,1} + 3\, c_W\, Z^*_{2,2} \right) + \\
& \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(s_W\, Z^*_{3,1} + 3\, c_W\, Z^*_{3,2} \right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(s_W\, Z^*_{4,1} + 3\, c_W\, Z^*_{4,2} \right) \Bigg\} + \\
& 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,4} \right) \Bigg\} + \\
& M_W^3\, s_\beta^2\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z^{u,L}_{\mathrm{j1,j1}} \right) \right) + c_W^2 \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} \right) \right) \Bigg\} \\
& \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_W^3\, M_W^3\, s_\beta^2\, s_W^2} \Bigg\{ c_W^2\, M_W^2\, s_\beta\, s_W \Bigg\{ \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} \left(4\, M_W\, s_\beta\, s_W\, U^{\tilde{u},\mathrm{j1}}_{1,2}\, Z_{\mathrm{n1},1} - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{1,1}\, Z_{\mathrm{n1},4} \right) + \\
& \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} \left(4\, M_W\, s_\beta\, s_W\, U^{\tilde{u},\mathrm{j1}}_{2,2}\, Z_{\mathrm{n1},1} - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\, Z_{\mathrm{n1},4} \right) \Bigg\} + \\
& c_W^3\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \Bigg\{ m_{u_{\mathrm{j1}}}\, s_\beta\, s_W\, Z_{\mathrm{n1},4} \left(3\, \delta M_W^2 - 3\, M_W^2 \left(2\, \delta Z_e + \delta Z^{u,R}_{\mathrm{j1,j1}} \right) \right) - \\
& M_W^2 \Bigg\{ 3\, m_{u_{\mathrm{j1}}}\, s_\beta\, s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,4} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,4} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,4} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,4} \right) + \\
& 6\, Z_{\mathrm{n1},4} \left(\delta m^u_{\mathrm{j1}}\, s_\beta\, s_W - m_{u_{\mathrm{j1}}}\, \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W \right) \right) \Bigg\} \Bigg\} + \\
& 4\, M_W^3\, s_\beta^2\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(Z_{\mathrm{n1},1} \left(c_W^2\, \delta Z^{u,R}_{\mathrm{j1,j1}} + 2\, \delta s_W\, s_W \right) + c_W^2 \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,1} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,1} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,1} + 2\, \delta Z_e\, Z_{\mathrm{n1},1} \right) \right) \Bigg\} \Bigg]
\end{aligned}
$$

$$
\underset{266}{C(d_{\mathrm{j1}}, \tilde{\chi}^0_{\mathrm{n1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = \left[\begin{array}{l} -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l} c_W^2 \left\{ \begin{array}{l} c_W \left\{ \begin{array}{l} 3\, Z^*_{\mathrm{n1},3} \left\{ \begin{array}{l} c_\beta\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,2}\right) + \\ U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{d_{\mathrm{j1}}} \left(M_W^2\, s_W \left(2\,\delta c_\beta - c_\beta \left(2\,\delta Z_e + \delta Z^{d,L}_{\mathrm{j1,j1}}\right)\right) + c_\beta \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) \end{array} \right. \end{array} \right\} + \\ 3\, c_\beta^2\, M_W^3\, Z^*_{\mathrm{n1},2} \left(U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z^{d,L}_{\mathrm{j1,j1}}\right)\right) - s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\right)\right) \end{array} \right\} + \\ c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l} c_\beta\, M_W\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} \delta Z^{\chi^0,L}_{1,\mathrm{n1}} \left(s_W\, Z^*_{1,1} - 3\, c_W\, Z^*_{1,2}\right) + \delta Z^{\chi^0,L}_{2,\mathrm{n1}} \left(s_W\, Z^*_{2,1} - 3\, c_W\, Z^*_{2,2}\right) + \\ \delta Z^{\chi^0,L}_{3,\mathrm{n1}} \left(s_W\, Z^*_{3,1} - 3\, c_W\, Z^*_{3,2}\right) + \delta Z^{\chi^0,L}_{4,\mathrm{n1}} \left(s_W\, Z^*_{4,1} - 3\, c_W\, Z^*_{4,2}\right) \end{array} \right\} + \\ 3\, c_W\, m_{d_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n1}}\, Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n1}}\, Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n1}}\, Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n1}}\, Z^*_{4,3}\right) \end{array} \right\} \end{array} \right\} + \\ c_\beta^2\, M_W^3\, s_W^2\, Z^*_{\mathrm{n1},1} \left(U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left(2\,\delta s_W\, s_W + c_W^2 \left(2\,\delta Z_e + \delta Z^{d,L}_{\mathrm{j1,j1}}\right)\right) + c_W^2 \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\right)\right) \end{array} \right\} \\ -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{6\sqrt{2}\, c_\beta^2\, c_W^3\, M_W^3\, s_W^2} \left\{ \begin{array}{l} c_\beta\, c_W^2 \left\{ \begin{array}{l} M_W^2\, s_W \left\{ \begin{array}{l} \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}} \left(2\, c_\beta\, M_W\, s_W\, U^{\tilde{d},\mathrm{j1}}_{1,2}\, Z_{\mathrm{n1},1} + 3\, c_W\, m_{d_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j1}}_{1,1}\, Z_{\mathrm{n1},3}\right) + \\ \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}} \left(2\, c_\beta\, M_W\, s_W\, U^{\tilde{d},\mathrm{j1}}_{2,2}\, Z_{\mathrm{n1},1} + 3\, c_W\, m_{d_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\, Z_{\mathrm{n1},3}\right) \end{array} \right\} + \\ c_W\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} 3\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,3}\right) + \\ Z_{\mathrm{n1},3} \left(6\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - 3\, m_{d_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) \end{array} \right. \end{array} \right\} - \\ 3\, c_W^3\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\, Z_{\mathrm{n1},3} \left(2\,\delta c_\beta - c_\beta \left(2\,\delta Z_e + \delta Z^{d,R}_{\mathrm{j1,j1}}\right)\right) + \\ 2\, c_\beta^2\, M_W^3\, s_W^2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2} \left(Z_{\mathrm{n1},1} \left(2\,\delta s_W\, s_W + c_W^2 \left(2\,\delta Z_e + \delta Z^{d,R}_{\mathrm{j1,j1}}\right)\right) + c_W^2 \left(\delta Z^{\chi^0,R}_{1,\mathrm{n1}}\, Z_{1,1} + \delta Z^{\chi^0,R}_{2,\mathrm{n1}}\, Z_{2,1} + \delta Z^{\chi^0,R}_{3,\mathrm{n1}}\, Z_{3,1} + \delta Z^{\chi^0,R}_{4,\mathrm{n1}}\, Z_{4,1}\right)\right) \end{array} \right\} \end{array} \right]
$$

[FFV] 2 Charginos – Gauge Boson

$$
\underset{278}{C(\tilde{\chi}^+_{\mathrm{c2}}, \tilde{\chi}^-_{\mathrm{c1}}, \gamma)} = \left[\begin{array}{l} -\frac{\mathrm{i}\, e}{4\, c_W\, s_W} \left\{ \begin{array}{l} 2\, s_W \left(\delta_{\mathrm{c1,c2}} \left(\delta Z_{Z\gamma}\, s_W - c_W \left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right)\right) - c_W \left(\delta_{\mathrm{c1},1}\, \delta \bar{Z}^{\chi,L}_{\mathrm{c2},1} + \delta_{\mathrm{c1},2}\, \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2} + \delta_{\mathrm{c2},1}\, \delta Z^{\chi,L}_{1,\mathrm{c1}} + \delta_{\mathrm{c2},2}\, \delta Z^{\chi,L}_{2,\mathrm{c1}}\right)\right) - \\ \delta Z_{Z\gamma} \left(2\, U^*_{\mathrm{c1},1}\, U_{\mathrm{c2},1} + U^*_{\mathrm{c1},2}\, U_{\mathrm{c2},2}\right) \end{array} \right. \\ -\frac{\mathrm{i}\, e}{4\, c_W\, s_W} \left\{ \begin{array}{l} 2\, s_W \left(\delta_{\mathrm{c1,c2}} \left(\delta Z_{Z\gamma}\, s_W - c_W \left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right)\right) - c_W \left(\delta_{\mathrm{c1},1}\, \delta \bar{Z}^{\chi,R}_{\mathrm{c2},1} + \delta_{\mathrm{c1},2}\, \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2} + \delta_{\mathrm{c2},1}\, \delta Z^{\chi,R}_{1,\mathrm{c1}} + \delta_{\mathrm{c2},2}\, \delta Z^{\chi,R}_{2,\mathrm{c1}}\right)\right) - \\ \delta Z_{Z\gamma} \left(2\, V_{\mathrm{c1},1}\, V^*_{\mathrm{c2},1} + V_{\mathrm{c1},2}\, V^*_{\mathrm{c2},2}\right) \end{array} \right. \end{array} \right]
$$

$$
C(\tilde{\chi}^+_{\mathrm{c2}}, \tilde{\chi}^-_{\mathrm{c1}}, Z) = \left[\begin{array}{l} \frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} s_W^2 \left(4\, \delta s_W\, U^*_{\mathrm{c1},1}\, U_{\mathrm{c2},1} + \delta_{\mathrm{c1,c2}} \left(2\, c_W^3\, \delta Z_{\gamma Z} - 4\, \delta s_W\, s_W^2 - 2\, c_W^2\, \left(2\, \delta s_W + s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) \right) \right) + \\ s_W \left\{ \begin{array}{l} U^*_{\mathrm{c1},2}\, U_{\mathrm{c2},2} \left(2\, \delta s_W\, s_W + c_W^2\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) - \\ c_W^2 \left\{ \begin{array}{l} \delta Z^{\chi,L}_{1,\mathrm{c1}} \left(2\, \delta_{\mathrm{c2},1}\, s_W^2 - 2\, U^*_{1,1}\, U_{\mathrm{c2},1} - U^*_{1,2}\, U_{\mathrm{c2},2} \right) + \\ \delta Z^{\chi,L}_{2,\mathrm{c1}} \left(2\, \delta_{\mathrm{c2},2}\, s_W^2 - 2\, U^*_{2,1}\, U_{\mathrm{c2},1} - U^*_{2,2}\, U_{\mathrm{c2},2} \right) \end{array} \right. \end{array} \right. - \\ c_W^2 \left\{ \begin{array}{l} 2\, s_W^3 \left(\delta_{\mathrm{c1},1}\, \delta \bar{Z}^{\chi,L}_{\mathrm{c2},1} + \delta_{\mathrm{c1},2}\, \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2} \right) + \\ 2\, U^*_{\mathrm{c1},1} \left(U_{\mathrm{c2},1}\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) - s_W\, \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c2},1}\, U_{1,1} + \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2}\, U_{2,1} \right) \right) + \\ U^*_{\mathrm{c1},2} \left(2\, \delta s_W\, U_{\mathrm{c2},2} - s_W\, \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c2},1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\mathrm{c2},2}\, U_{2,2} \right) \right) \end{array} \right. \end{array} \right. \\ \frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} \delta_{\mathrm{c1,c2}}\, s_W^2\, \left(2\, c_W^3\, \delta Z_{\gamma Z} - 4\, \delta s_W\, s_W^2 - 2\, c_W^2\, \left(2\, \delta s_W + s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) \right) + \\ 2\, s_W\, V_{\mathrm{c1},1} \left(2\, \delta s_W\, s_W\, V^*_{\mathrm{c2},1} + c_W^2\, \left(\delta \bar{Z}^{\chi,R}_{\mathrm{c2},1}\, V^*_{1,1} + \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2}\, V^*_{2,1} \right) \right) + \\ V_{\mathrm{c1},2} \left(V^*_{\mathrm{c2},2}\, \left(2\, \delta s_W\, s_W^2 - c_W^2\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) \right) + c_W^2\, s_W\, \left(\delta \bar{Z}^{\chi,R}_{\mathrm{c2},1}\, V^*_{1,2} + \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2}\, V^*_{2,2} \right) \right) - \\ c_W^2 \left\{ \begin{array}{l} 2\, s_W^3 \left(\delta_{\mathrm{c1},1}\, \delta \bar{Z}^{\chi,R}_{\mathrm{c2},1} + \delta_{\mathrm{c1},2}\, \delta \bar{Z}^{\chi,R}_{\mathrm{c2},2} \right) + 2\, V_{\mathrm{c1},1}\, V^*_{\mathrm{c2},1}\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} \right) \right) + \\ s_W \left\{ \begin{array}{l} \delta Z^{\chi,R}_{1,\mathrm{c1}} \left(2\, \delta_{\mathrm{c2},1}\, s_W^2 - 2\, V_{1,1}\, V^*_{\mathrm{c2},1} - V_{1,2}\, V^*_{\mathrm{c2},2} \right) + \\ \delta Z^{\chi,R}_{2,\mathrm{c1}} \left(2\, \delta_{\mathrm{c2},2}\, s_W^2 - 2\, V_{2,1}\, V^*_{\mathrm{c2},1} - V_{2,2}\, V^*_{\mathrm{c2},2} \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right]
$$

[FFV] 2 Gluinos – Gluon

$$
C(\tilde{g}, \tilde{g}, g) = \left[\begin{array}{l} -\frac{g_s\, f^{\mathrm{g1,g2,g3}}}{2} \left(\delta Z_{gg} + 2\, \left(\delta Z^L_{\tilde{g}} + \delta Z_{g_s} \right) \right) \\ -\frac{g_s\, f^{\mathrm{g1,g2,g3}}}{2} \left(\delta Z_{gg} + 2\, \left(\delta Z^R_{\tilde{g}} + \delta Z_{g_s} \right) \right) \end{array} \right]
$$

[FFV] 2 Leptons – Gauge Boson

$$
C(\overline{e}_{\mathrm{j2}}, e_{\mathrm{j1}}, \gamma) = \left[\begin{array}{l} \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4} \left(4\, \delta Z_e + 2\, \delta Z_{\gamma\gamma} + 2\, \left(\delta \bar{Z}^{e,L}_{\mathrm{j2,j2}} + \delta Z^{e,L}_{\mathrm{j2,j2}} \right) + \frac{1}{c_W\, s_W} \left(\delta Z_{Z\gamma} - 2\, \delta Z_{Z\gamma}\, s_W^2 \right) \right) \\ -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, c_W} \left(\delta Z_{Z\gamma}\, s_W - c_W\, \left(\delta \bar{Z}^{e,R}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z^{e,R}_{\mathrm{j2,j2}} \right) \right) \end{array} \right]
$$

$$C(\overline{\nu}_{\mathrm{j2}}, \nu_{\mathrm{j1}}, Z) = \begin{bmatrix} -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_W^3\, s_W^2}\, \left(2\, \delta s_W\, s_W^2 - c_W^2\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_{ZZ} + \delta Z^{\nu,L}_{\mathrm{j2,j2}}\right)\right)\right) \\ 0 \end{bmatrix}$$

$$C(\overline{e}_{\mathrm{j2}}, e_{\mathrm{j1}}, Z) = \begin{bmatrix} -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{4\, c_W^3\, s_W^2}\, \left(2\, s_W^2\, \left(\delta s_W - c_W^3\, \delta Z_{\gamma Z}\right) + c_W^2\, \left(2\, \delta s_W + s_W\, \left(1 - 2\, c_W^2\right)\, \left(\delta \bar{Z}^{e,L}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_{ZZ} + \delta Z^{e,L}_{\mathrm{j2,j2}}\right)\right)\right) \\ -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, c_W^3}\, \left(2\, \delta s_W - c_W^2\, \left(c_W\, \delta Z_{\gamma Z} - s_W\, \left(\delta \bar{Z}^{e,R}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_{ZZ} + \delta Z^{e,R}_{\mathrm{j2,j2}}\right)\right)\right) \end{bmatrix}$$

$$C(\overline{e}_{\mathrm{j2}}, \nu_{\mathrm{j1}}, W^-) = \begin{bmatrix} \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, \sqrt{2}\, s_W^2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}^{e,L}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_W + \delta Z^{\nu,L}_{\mathrm{j2,j2}}\right)\right) \\ 0 \end{bmatrix}$$

$$C(\overline{\nu}_{\mathrm{j2}}, e_{\mathrm{j1}}, W^+) = \begin{bmatrix} \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\, \sqrt{2}\, s_W^2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}^{\nu,L}_{\mathrm{j2,j2}} + 2\, \delta Z_e + \delta Z_W + \delta Z^{e,L}_{\mathrm{j2,j2}}\right)\right) \\ 0 \end{bmatrix}$$

$$C(\overline{\nu}_{\mathrm{j1}}, \nu_{\mathrm{j2}}, \gamma) = \begin{bmatrix} -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}\, \delta Z_{Z\gamma}}{4\, c_W\, s_W} \\ 0 \end{bmatrix}$$

[FFV] 2 Neutralinos – Gauge Boson

$$
C(\tilde{\chi}^0_{\mathrm{n1}}, \tilde{\chi}^0_{\mathrm{n2}}, Z) = \left[\begin{array}{l} -\frac{\mathrm{i}\,e}{4\,c_W^3\,s_W^2} \left\{ \begin{array}{l} Z^*_{\mathrm{n2},3} \left\{ \begin{array}{l} 2\,\delta s_W\,s_W^2\,Z_{\mathrm{n1},3} + \\ c_W^2 \left\{ \begin{array}{l} s_W \left(\delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},1}\,Z_{1,3} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},2}\,Z_{2,3} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},3}\,Z_{3,3} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},4}\,Z_{4,3} \right) - \\ Z_{\mathrm{n1},3}\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right) \end{array} \right. \end{array} \right. + \\ c_W^2\,s_W \left\{ \begin{array}{l} Z_{\mathrm{n1},3} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n2}}\,Z^*_{1,3} + \delta Z^{\chi^0,L}_{2,\mathrm{n2}}\,Z^*_{2,3} + \delta Z^{\chi^0,L}_{3,\mathrm{n2}}\,Z^*_{3,3} + \delta Z^{\chi^0,L}_{4,\mathrm{n2}}\,Z^*_{4,3} \right) - \\ Z_{\mathrm{n1},4} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n2}}\,Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n2}}\,Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n2}}\,Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n2}}\,Z^*_{4,4} \right) \end{array} \right. - \\ Z^*_{\mathrm{n2},4} \left\{ \begin{array}{l} 2\,\delta s_W\,s_W^2\,Z_{\mathrm{n1},4} + \\ c_W^2 \left\{ \begin{array}{l} s_W \left(\delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},1}\,Z_{1,4} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},2}\,Z_{2,4} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},3}\,Z_{3,4} + \delta\bar{Z}^{\chi^0,L}_{\mathrm{n1},4}\,Z_{4,4} \right) - \\ Z_{\mathrm{n1},4}\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \\ \frac{\mathrm{i}\,e}{4\,c_W^3\,s_W^2} \left\{ \begin{array}{l} Z^*_{\mathrm{n1},3} \left\{ \begin{array}{l} c_W^2\,s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n2}}\,Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n2}}\,Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n2}}\,Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n2}}\,Z_{4,3} \right) + \\ Z_{\mathrm{n2},3}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \right. - \\ Z^*_{\mathrm{n1},4} \left\{ \begin{array}{l} c_W^2\,s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n2}}\,Z_{1,4} + \delta Z^{\chi^0,R}_{2,\mathrm{n2}}\,Z_{2,4} + \delta Z^{\chi^0,R}_{3,\mathrm{n2}}\,Z_{3,4} + \delta Z^{\chi^0,R}_{4,\mathrm{n2}}\,Z_{4,4} \right) + \\ Z_{\mathrm{n2},4}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \right. + \\ c_W^2\,s_W \left\{ \begin{array}{l} Z_{\mathrm{n2},3} \left(\delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},1}\,Z^*_{1,3} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},2}\,Z^*_{2,3} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},3}\,Z^*_{3,3} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},4}\,Z^*_{4,3} \right) - \\ Z_{\mathrm{n2},4} \left(\delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},1}\,Z^*_{1,4} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},2}\,Z^*_{2,4} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},3}\,Z^*_{3,4} + \delta\bar{Z}^{\chi^0,R}_{\mathrm{n1},4}\,Z^*_{4,4} \right) \end{array} \right. \end{array} \right. \end{array} \right]
$$

$$
C(\tilde{\chi}^0_{\mathrm{n1}}, \tilde{\chi}^0_{\mathrm{n2}}, \gamma) = \left[\begin{array}{l} -\frac{\mathrm{i}\,e\,\delta Z_{Z\gamma}}{4\,c_W\,s_W}\,\left(Z_{\mathrm{n1},3}\,Z^*_{\mathrm{n2},3} - Z_{\mathrm{n1},4}\,Z^*_{\mathrm{n2},4}\right) \\ \frac{\mathrm{i}\,e\,\delta Z_{Z\gamma}}{4\,c_W\,s_W}\,\left(Z^*_{\mathrm{n1},3}\,Z_{\mathrm{n2},3} - Z^*_{\mathrm{n1},4}\,Z_{\mathrm{n2},4}\right) \end{array} \right]
$$

[FFV] 2 Quarks – Gauge Boson

$$
C(\overline{u}_{\mathrm{j2}}, u_{\mathrm{j1}}, \gamma) = \left[\begin{array}{c} -\frac{\mathrm{i}\,e}{12\,c_W\,s_W} \left(4\,c_W\,s_W \left(\delta\bar{Z}^{u,L}_{\mathrm{j1},\mathrm{j2}} + \delta Z^{u,L}_{\mathrm{j2},\mathrm{j1}} \right) - \delta_{\mathrm{j1},\mathrm{j2}}\,\left(\delta Z_{Z\gamma}\,\left(1 - 4\,c_W^2\right) - 4\,c_W\,s_W\,\left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right) \right) \right) \\ -\frac{\mathrm{i}\,e}{3\,c_W} \left(c_W \left(\delta\bar{Z}^{u,R}_{\mathrm{j1},\mathrm{j2}} + \delta Z^{u,R}_{\mathrm{j2},\mathrm{j1}} \right) - \delta_{\mathrm{j1},\mathrm{j2}}\,\left(\delta Z_{Z\gamma}\,s_W - c_W\,\left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right) \right) \right) \end{array} \right]
$$

$$C(\overline{d}_{\mathrm{j2}}, d_{\mathrm{j1}}, \gamma) = \left[\begin{array}{c} \frac{\mathrm{i}\, e}{12\, c_W\, s_W} \left(2\, c_W\, s_W \left(\delta \bar{Z}^{d,L}_{\mathrm{j1,j2}} + \delta Z^{d,L}_{\mathrm{j2,j1}}\right) + \delta_{\mathrm{j1,j2}} \left(\delta Z_{Z\gamma} + 2 \left(c_W^2\, \delta Z_{Z\gamma} + c_W\, s_W \left(2\, \delta Z_e + \delta Z_{\gamma\gamma}\right)\right)\right)\right) \\ \frac{\mathrm{i}\, e}{6\, c_W} \left(c_W \left(\delta \bar{Z}^{d,R}_{\mathrm{j1,j2}} + \delta Z^{d,R}_{\mathrm{j2,j1}}\right) - \delta_{\mathrm{j1,j2}} \left(\delta Z_{Z\gamma}\, s_W - c_W \left(2\, \delta Z_e + \delta Z_{\gamma\gamma}\right)\right)\right) \end{array} \right]$$

$$C(\overline{u}_{\mathrm{j2}}, u_{\mathrm{j1}}, Z) = \left[\begin{array}{c} \frac{\mathrm{i}\, e}{12\, c_W^3\, s_W^2} \left(c_W^2\, s_W \left(1 - 4\, c_W^2\right) \left(\delta \bar{Z}^{u,L}_{\mathrm{j1,j2}} + \delta Z^{u,L}_{\mathrm{j2,j1}}\right) + \delta_{\mathrm{j1,j2}} \left(2\, s_W^2 \left(\delta s_W - 2\, c_W^3\, \delta Z_{\gamma Z}\right) + c_W^2 \left(6\, \delta s_W + s_W \left(1 - 4\, c_W^2\right) \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right)\right) \\ \frac{\mathrm{i}\, e}{3\, c_W^3} \left(c_W^2\, s_W \left(\delta \bar{Z}^{u,R}_{\mathrm{j1,j2}} + \delta Z^{u,R}_{\mathrm{j2,j1}}\right) + \delta_{\mathrm{j1,j2}} \left(2\, \delta s_W - c_W^2 \left(c_W\, \delta Z_{\gamma Z} - s_W \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right)\right) \end{array} \right]$$

$$C(\overline{d}_{\mathrm{j2}}, d_{\mathrm{j1}}, Z) = \left[\begin{array}{c} \frac{\mathrm{i}\, e}{12\, c_W^3\, s_W^2} \left(c_W^2\, s_W \left(1 + 2\, c_W^2\right) \left(\delta \bar{Z}^{d,L}_{\mathrm{j1,j2}} + \delta Z^{d,L}_{\mathrm{j2,j1}}\right) + \delta_{\mathrm{j1,j2}} \left(2\, s_W^2 \left(\delta s_W + c_W^3\, \delta Z_{\gamma Z}\right) - c_W^2 \left(6\, \delta s_W - s_W \left(1 + 2\, c_W^2\right) \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right)\right) \\ -\frac{\mathrm{i}\, e}{6\, c_W^3} \left(c_W^2\, s_W \left(\delta \bar{Z}^{d,R}_{\mathrm{j1,j2}} + \delta Z^{d,R}_{\mathrm{j2,j1}}\right) + \delta_{\mathrm{j1,j2}} \left(2\, \delta s_W - c_W^2 \left(c_W\, \delta Z_{\gamma Z} - s_W \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right)\right) \end{array} \right]$$

$$C(\overline{d}_{\mathrm{j2}}, u_{\mathrm{j1}}, W^-) = \left[\begin{array}{c} \frac{\mathrm{i}\, e}{2\, \sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}^*_{\mathrm{j1,j2}} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_W\right)\right) - \\ s_W \left\{ \begin{array}{l} 2\, \delta \mathrm{CKM}^*_{\mathrm{j1,j2}} + \delta \bar{Z}^{d,L}_{\mathrm{j2,1}}\, \mathrm{CKM}^*_{\mathrm{j1,1}} + \delta \bar{Z}^{d,L}_{\mathrm{j2,2}}\, \mathrm{CKM}^*_{\mathrm{j1,2}} + \delta \bar{Z}^{d,L}_{\mathrm{j2,3}}\, \mathrm{CKM}^*_{\mathrm{j1,3}} + \\ \delta Z^{u,L}_{1,\mathrm{j1}}\, \mathrm{CKM}^*_{1,\mathrm{j2}} + \delta Z^{u,L}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} + \delta Z^{u,L}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}} \end{array} \right. \end{array} \right. \\ 0 \end{array} \right]$$

$$C(\overline{u}_{\mathrm{j2}}, d_{\mathrm{j1}}, W^+) = \left[\begin{array}{c} \frac{\mathrm{i}\, e}{2\, \sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}_{\mathrm{j2,j1}} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_W\right)\right) - \\ s_W \left\{ \begin{array}{l} 2\, \delta \mathrm{CKM}_{\mathrm{j2,j1}} + \delta \bar{Z}^{u,L}_{\mathrm{j2,1}}\, \mathrm{CKM}_{\mathrm{1,j1}} + \delta \bar{Z}^{u,L}_{\mathrm{j2,2}}\, \mathrm{CKM}_{\mathrm{2,j1}} + \delta \bar{Z}^{u,L}_{\mathrm{j2,3}}\, \mathrm{CKM}_{\mathrm{3,j1}} + \\ \delta Z^{d,L}_{1,\mathrm{j1}}\, \mathrm{CKM}_{\mathrm{j2,1}} + \delta Z^{d,L}_{2,\mathrm{j1}}\, \mathrm{CKM}_{\mathrm{j2,2}} + \delta Z^{d,L}_{3,\mathrm{j1}}\, \mathrm{CKM}_{\mathrm{j2,3}} \end{array} \right. \end{array} \right. \\ 0 \end{array} \right]$$

[FFV] 2 Quarks – Gluon

$$C(\overline{u}_{\mathrm{j1}}, u_{\mathrm{j2}}, g) = \left[\begin{array}{c} -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{2} \left(\delta \bar{Z}^{u,L}_{\mathrm{j1,j1}} + \delta Z_{gg} + 2\, \delta Z_{g_s} + \delta Z^{u,L}_{\mathrm{j2,j2}}\right) \\ -\frac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{2} \left(\delta \bar{Z}^{u,R}_{\mathrm{j1,j1}} + \delta Z_{gg} + 2\, \delta Z_{g_s} + \delta Z^{u,R}_{\mathrm{j2,j2}}\right) \end{array} \right]$$

$$
\underset{427}{C(\bar{d}_{\mathrm{j1}}, d_{\mathrm{j2}}, g)} = \begin{bmatrix} -\dfrac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{2} \left(\delta \bar{Z}^{d,L}_{\mathrm{j1,j1}} + \delta Z_{gg} + 2\, \delta Z_{g_s} + \delta Z^{d,L}_{\mathrm{j2,j2}} \right) \\ -\dfrac{\mathrm{i}\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o1,o2}}}{2} \left(\delta \bar{Z}^{d,R}_{\mathrm{j1,j1}} + \delta Z_{gg} + 2\, \delta Z_{g_s} + \delta Z^{d,R}_{\mathrm{j2,j2}} \right) \end{bmatrix}
$$

[FFV] Chargino – Neutralino – Gauge Boson

$$
\underset{276}{C(\tilde{\chi}^0_{\mathrm{n2}}, \tilde{\chi}^+_{\mathrm{c1}}, W^-)} = \begin{bmatrix} -\dfrac{\mathrm{i}\, e}{4\, s_W^2} \left\{ \begin{array}{l} 2\, V^*_{\mathrm{c1},1} \left(Z_{\mathrm{n2},2}\, (2\, \delta s_W - s_W\, (2\, \delta Z_e + \delta Z_W)) - s_W \left(\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},1}\, Z_{1,2} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},2}\, Z_{2,2} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},3}\, Z_{3,2} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},4}\, Z_{4,2} \right) \right) - \\ \sqrt{2}\, V^*_{\mathrm{c1},2} \left(Z_{\mathrm{n2},4}\, (2\, \delta s_W - s_W\, (2\, \delta Z_e + \delta Z_W)) - s_W \left(\delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},1}\, Z_{1,4} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},2}\, Z_{2,4} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},3}\, Z_{3,4} + \delta \bar{Z}^{\chi^0,L}_{\mathrm{n2},4}\, Z_{4,4} \right) \right) - \\ s_W \left(2\, Z_{\mathrm{n2},2} \left(\delta \bar{Z}^{\chi,R}_{\mathrm{c1},1}\, V^*_{1,1} + \delta \bar{Z}^{\chi,R}_{\mathrm{c1},2}\, V^*_{2,1} \right) - \sqrt{2}\, Z_{\mathrm{n2},4} \left(\delta \bar{Z}^{\chi,R}_{\mathrm{c1},1}\, V^*_{1,2} + \delta \bar{Z}^{\chi,R}_{\mathrm{c1},2}\, V^*_{2,2} \right) \right) \end{array} \right\} \\ -\dfrac{\mathrm{i}\, e}{4\, s_W^2} \left\{ \begin{array}{l} 2\, Z^*_{\mathrm{n2},2} \left(U_{\mathrm{c1},1}\, (2\, \delta s_W - s_W\, (2\, \delta Z_e + \delta Z_W)) - s_W \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c1},1}\, U_{1,1} + \delta \bar{Z}^{\chi,L}_{\mathrm{c1},2}\, U_{2,1} \right) \right) + \\ \sqrt{2}\, Z^*_{\mathrm{n2},3} \left(U_{\mathrm{c1},2}\, (2\, \delta s_W - s_W\, (2\, \delta Z_e + \delta Z_W)) - s_W \left(\delta \bar{Z}^{\chi,L}_{\mathrm{c1},1}\, U_{1,2} + \delta \bar{Z}^{\chi,L}_{\mathrm{c1},2}\, U_{2,2} \right) \right) - \\ s_W \left\{ \begin{array}{l} 2\, U_{\mathrm{c1},1} \left(\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},1}\, Z^*_{1,2} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},2}\, Z^*_{2,2} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},3}\, Z^*_{3,2} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},4}\, Z^*_{4,2} \right) + \\ \sqrt{2}\, U_{\mathrm{c1},2} \left(\delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},1}\, Z^*_{1,3} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},2}\, Z^*_{2,3} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},3}\, Z^*_{3,3} + \delta \bar{Z}^{\chi^0,R}_{\mathrm{n2},4}\, Z^*_{4,3} \right) \end{array} \right\} \end{array} \right\} \end{bmatrix}
$$

$$
\underset{277}{C(\tilde{\chi}^-_{\mathrm{c1}}, \tilde{\chi}^0_{\mathrm{n2}}, W^+)} = \begin{bmatrix} -\dfrac{\mathrm{i}\, e}{4\, s_W^2} \left\{ \begin{array}{l} 2\, Z^*_{\mathrm{n2},2} \left(V_{\mathrm{c1},1}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e \right) \right) - s_W \left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\, V_{1,1} + \delta Z^{\chi,R}_{2,\mathrm{c1}}\, V_{2,1} \right) \right) - \\ \sqrt{2}\, Z^*_{\mathrm{n2},4} \left(V_{\mathrm{c1},2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e \right) \right) - s_W \left(\delta Z^{\chi,R}_{1,\mathrm{c1}}\, V_{1,2} + \delta Z^{\chi,R}_{2,\mathrm{c1}}\, V_{2,2} \right) \right) - \\ s_W \left\{ \begin{array}{l} 2\, V_{\mathrm{c1},1} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n2}}\, Z^*_{1,2} + \delta Z^{\chi^0,L}_{2,\mathrm{n2}}\, Z^*_{2,2} + \delta Z^{\chi^0,L}_{3,\mathrm{n2}}\, Z^*_{3,2} + \delta Z^{\chi^0,L}_{4,\mathrm{n2}}\, Z^*_{4,2} \right) - \\ \sqrt{2}\, V_{\mathrm{c1},2} \left(\delta Z^{\chi^0,L}_{1,\mathrm{n2}}\, Z^*_{1,4} + \delta Z^{\chi^0,L}_{2,\mathrm{n2}}\, Z^*_{2,4} + \delta Z^{\chi^0,L}_{3,\mathrm{n2}}\, Z^*_{3,4} + \delta Z^{\chi^0,L}_{4,\mathrm{n2}}\, Z^*_{4,4} \right) \end{array} \right\} \end{array} \right\} \\ -\dfrac{\mathrm{i}\, e}{4\, s_W^2} \left\{ \begin{array}{l} 2\, U^*_{\mathrm{c1},1} \left(Z_{\mathrm{n2},2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e \right) \right) - s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n2}}\, Z_{1,2} + \delta Z^{\chi^0,R}_{2,\mathrm{n2}}\, Z_{2,2} + \delta Z^{\chi^0,R}_{3,\mathrm{n2}}\, Z_{3,2} + \delta Z^{\chi^0,R}_{4,\mathrm{n2}}\, Z_{4,2} \right) \right) + \\ \sqrt{2}\, U^*_{\mathrm{c1},2} \left(Z_{\mathrm{n2},3}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e \right) \right) - s_W \left(\delta Z^{\chi^0,R}_{1,\mathrm{n2}}\, Z_{1,3} + \delta Z^{\chi^0,R}_{2,\mathrm{n2}}\, Z_{2,3} + \delta Z^{\chi^0,R}_{3,\mathrm{n2}}\, Z_{3,3} + \delta Z^{\chi^0,R}_{4,\mathrm{n2}}\, Z_{4,3} \right) \right) - \\ s_W \left(2\, Z_{\mathrm{n2},2} \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\, U^*_{1,1} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\, U^*_{2,1} \right) + \sqrt{2}\, Z_{\mathrm{n2},3} \left(\delta Z^{\chi,L}_{1,\mathrm{c1}}\, U^*_{1,2} + \delta Z^{\chi,L}_{2,\mathrm{c1}}\, U^*_{2,2} \right) \right) \end{array} \right\} \end{bmatrix}
$$

[SS] 2 Higgs

$$C(h^0, h^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hh} \\ -\mathrm{i}\,\left(\delta m^2_{hh} + \delta Z_{hh}\, M^{02}_{h^0}\right) \end{bmatrix}$$
452

$$C(h^0, H^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hH} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{Hh} + \delta Z_{hH}\,\left(M^{02}_{h^0} + M^{02}_{H^0}\right)\right) \end{bmatrix}$$
453

$$C(h^0, A^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hA} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{Ah} + \delta Z_{hA}\,\left(M^{02}_{A^0} + M^{02}_{h^0}\right)\right) \end{bmatrix}$$
454

$$C(h^0, G^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{Gh} + \delta Z_{hG}\, M^{02}_{h^0}\right) \end{bmatrix}$$
455

$$C(H^0, h^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hH} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{hH} + \delta Z_{hH}\,\left(M^{02}_{h^0} + M^{02}_{H^0}\right)\right) \end{bmatrix}$$
456

$$C(H^0, H^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{HH} \\ -\mathrm{i}\,\left(\delta m^2_{HH} + \delta Z_{HH}\, M^{02}_{H^0}\right) \end{bmatrix}$$
457

$$C(H^0, A^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{HA} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{AH} + \delta Z_{HA}\,\left(M^{02}_{A^0} + M^{02}_{H^0}\right)\right) \end{bmatrix}$$
458

$$C(H^0, G^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{HG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{GH} + \delta Z_{HG}\, M^{02}_{H^0}\right) \end{bmatrix}$$
459

$$C(A^0, h^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hA} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{hA} + \delta Z_{hA}\,\left(M^{02}_{A^0} + M^{02}_{h^0}\right)\right) \end{bmatrix}$$

$$C(A^0, H^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{HA} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{HA} + \delta Z_{HA}\,\left(M^{02}_{A^0} + M^{02}_{H^0}\right)\right) \end{bmatrix}$$

$$C(A^0, A^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{AA} \\ -\mathrm{i}\,\left(\delta m^2_{AA} + \delta Z_{AA}\,M^{02}_{A^0}\right) \end{bmatrix}$$

$$C(A^0, G^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{AG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{GA} + \delta Z_{AG}\,M^{02}_{A^0}\right) \end{bmatrix}$$

$$C(G^0, h^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{hG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{hG} + \delta Z_{hG}\,M^{02}_{h^0}\right) \end{bmatrix}$$

$$C(G^0, H^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{HG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{HG} + \delta Z_{HG}\,M^{02}_{H^0}\right) \end{bmatrix}$$

$$C(G^0, A^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{AG} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{AG} + \delta Z_{AG}\,M^{02}_{A^0}\right) \end{bmatrix}$$

$$C(G^0, G^0) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{GG} \\ -\mathrm{i}\,\delta m^2_{GG} \end{bmatrix}$$

$$C(H^-, H^+) = \begin{bmatrix} -\frac{\mathrm{i}}{2}\,\left(\delta \bar{Z}_{H^-H^-} + \delta Z_{H^-H^-}\right) \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{H^-H^-} + M^{02}_{H^-}\,\left(\delta \bar{Z}_{H^-H^-} + \delta Z_{H^-H^-}\right)\right) \end{bmatrix}$$

$$C(H^-, G^+) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{H^-G^-} \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{G^-H^-} + \delta Z_{H^-G^-}\,M^{02}_{H^-}\right) \end{bmatrix}$$
469

$$C(G^-, H^+) = \begin{bmatrix} -\mathrm{i}\,Re(\delta Z_{H^-G^-}) \\ -\frac{\mathrm{i}}{2}\,\left(2\,\delta m^2_{H^-G^-} + \delta Z_{H^-G^-}\,M^{02}_{H^-}\right) \end{bmatrix}$$
470

$$C(G^-, G^+) = \begin{bmatrix} -\mathrm{i}\,\delta Z_{G^-G^-} \\ -\mathrm{i}\,\delta m^2_{G^-G^-} \end{bmatrix}$$
471

[SS] 2 Sleptons

$$C(\tilde{\nu}^{\dagger}_{\mathrm{j1}}, \tilde{\nu}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(2\,\delta m^{\tilde{\nu},\mathrm{j1}}_{1,1} + m^2_{\tilde{\nu}_{\mathrm{j1}}}\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right) \end{bmatrix}$$
450

$$C(\tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,s1}} + \delta Z^{\tilde{e},\mathrm{j1}}_{\mathrm{s1,s2}}\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(2\,\delta m^{\tilde{e},\mathrm{j1}}_{\mathrm{s1,s2}} + \delta Z^{\tilde{e},\mathrm{j1}}_{\mathrm{s1,s2}}\,m^2_{\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,s1}}\,m^2_{\tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}}\right) \end{bmatrix}$$
451

[SS] 2 Squarks

$$C(\tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(\delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,s1}} + \delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{s1,s2}}\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(2\,\delta m^{\tilde{u},\mathrm{j1}}_{\mathrm{s1,s2}} + \delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{s1,s2}}\,m^2_{\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}} + \delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,s1}}\,m^2_{\tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}}\right) \end{bmatrix}$$
472

$$C(\tilde{d}^{\mathrm{s1},\dagger}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}) = \begin{bmatrix} -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,s1}} + \delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{s1,s2}}\right) \\ -\frac{\mathrm{i}\,\delta_{\mathrm{j1,j2}}}{2}\,\left(2\,\delta m^{\tilde{d},\mathrm{j1}}_{\mathrm{s1,s2}} + \delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{s1,s2}}\,m^2_{\tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,s1}}\,m^2_{\tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}}\right) \end{bmatrix}$$
473

[SSS] 3 Higgs

$$C(h^0,h^0,h^0) = -\frac{3\,\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} c_{2\alpha}\,\left(4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} + M_W^2\,\left(2\,c_{\alpha+\beta}\,c_\beta^2\,\delta t_\beta + s_{\alpha+\beta}\,\left(2\,\delta Z_e + 3\,\delta Z_{hh}\right)\right)\right)\right)\right) - \\ c_W^2\,\delta Z_{hH}\,M_W^2\,s_W\,\left(c_{2\alpha}\,c_{\alpha+\beta} - 2\,s_{2\alpha}\,s_{\alpha+\beta}\right) \end{array}\right\} \tag{43}$$

$$C(h^0,h^0,H^0) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,s_{2\alpha}\left\{\begin{array}{l} 4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 - \\ c_W^2\left\{\begin{array}{l} 2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\ s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} + M_W^2\,\left(2\,c_{\alpha+\beta}\,\left(c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + s_{\alpha+\beta}\,\left(\delta Z_{HH} + 2\,\left(\delta Z_e + \delta Z_{hh}\right)\right)\right)\right) \end{array}\right\} \end{array}\right\} + \\ c_{2\alpha}\left\{\begin{array}{l} c_W^2\,M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{\alpha+\beta}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(\delta Z_{HH} + 2\,\left(\delta Z_e + \delta Z_{hh}\right)\right)\right)\right)\right) \end{array}\right\} \end{array}\right\} \tag{44}$$

$$C(h^0,H^0,H^0) = \frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} c_{\alpha+\beta}\left\{\begin{array}{l} 8\,\delta s_W\,M_W^2\,s_{2\alpha}\,s_W^2 - \\ c_W^2\left\{\begin{array}{l} 4\,\delta s_W\,M_W^2\,s_{2\alpha} - \\ s_W\left\{\begin{array}{l} 2\,\delta M_W^2\,s_{2\alpha} + \\ M_W^2\,\left(c_{2\alpha}\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + s_{2\alpha}\,\left(4\,\delta Z_e + 2\,\delta Z_{hh} + 4\,\delta Z_{HH}\right)\right) \end{array}\right\} \end{array}\right\} \end{array}\right\} - \\ s_{\alpha+\beta}\left\{\begin{array}{l} 4\,c_W^2\,M_W^2\,s_{2\alpha}\,s_W\,\left(c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{2\alpha}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 + c_W^2\,\left(\delta M_W^2\,s_W - M_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{hh} + 2\,\delta Z_{HH}\right)\right)\right)\right) \end{array}\right\} \end{array}\right\} \tag{45}$$

$$C(H^0,H^0,H^0) = \frac{3\,\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,c_{\alpha+\beta}\,c_W^2\,\delta Z_{hH}\,M_W^2\,s_{2\alpha}\,s_W + \\ c_{2\alpha}\left\{\begin{array}{l} c_W^2\,M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{\alpha+\beta}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 + c_W^2\,\left(\delta M_W^2\,s_W - M_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + 3\,\delta Z_{HH}\right)\right)\right)\right) \end{array}\right\} \end{array}\right\} \tag{46}$$

$$C(h^0,A^0,A^0) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,c_W^2\,\delta Z_{AG}\,M_W^2\,s_{2\beta}\,s_{\alpha+\beta}\,s_W + \\ c_{2\beta}\left\{\begin{array}{l} 4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 - \\ c_W^2\left\{\begin{array}{l} 2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\ s_W\left\{\begin{array}{l} \delta M_W^2\,s_{\alpha+\beta} + \\ M_W^2\,\left(c_{\alpha+\beta}\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + s_{\alpha+\beta}\,\left(2\,\delta Z_e + 2\,\delta Z_{AA} + \delta Z_{hh}\right)\right) \end{array}\right\} \end{array}\right\} \end{array}\right\} \end{array}\right\} \tag{47}$$

$$C(h^0,G^0,G^0) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,c_W^2\,\delta Z_{AG}\,M_W^2\,s_{2\beta}\,s_{\alpha+\beta}\,s_W - \\ c_{2\beta}\left\{\begin{array}{l} 4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 - \\ c_W^2\left\{\begin{array}{l} 2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\ s_W\left\{\begin{array}{l} \delta M_W^2\,s_{\alpha+\beta} + \\ M_W^2\,\left(c_{\alpha+\beta}\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + s_{\alpha+\beta}\,\left(2\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{hh}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right. \end{array}\right. \end{array}\right.$$

(48)

$$C(h^0,A^0,G^0) = -\frac{\mathrm{i}\,e\,s_{2\beta}}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 - \\ c_W^2\left\{\begin{array}{l} 2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\ s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} + M_W^2\,\left(c_{\alpha+\beta}\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + s_{\alpha+\beta}\,\left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{hh}\right)\right)\right) \end{array}\right. \end{array}\right.$$

(49)

$$C(H^0,A^0,A^0) = \frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,c_{\alpha+\beta}\,c_W^2\,\delta Z_{AG}\,M_W^2\,s_{2\beta}\,s_W - \\ c_{2\beta}\left\{\begin{array}{l} c_W^2\,M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{\alpha+\beta}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(2\,\delta Z_e + 2\,\delta Z_{AA} + \delta Z_{HH}\right)\right)\right)\right) \end{array}\right. \end{array}\right.$$

(50)

$$C(H^0,G^0,G^0) = \frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} 2\,c_{\alpha+\beta}\,c_W^2\,\delta Z_{AG}\,M_W^2\,s_{2\beta}\,s_W + \\ c_{2\beta}\left\{\begin{array}{l} c_W^2\,M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{\alpha+\beta}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(2\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{HH}\right)\right)\right)\right) \end{array}\right. \end{array}\right.$$

(51)

$$C(H^0,A^0,G^0) = -\frac{\mathrm{i}\,e\,s_{2\beta}}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l} c_W^2\,M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - \\ c_{\alpha+\beta}\,\left(4\,\delta s_W\,M_W^2\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{HH}\right)\right)\right)\right) \end{array}\right.$$

(52)

$$
C(h^0,H^-,H^+) = -\frac{\mathrm{i}\,e}{4\,c_W^2\,M_W\,s_W^2}\left\{\begin{array}{l}
\delta s_W\,M_W^2\,\left(\frac{4\,c_{2\beta}\,s_{\alpha+\beta}\,s_W^2}{c_W^2} - 2\,s_\beta\,\left(c_{2\beta}\,c_\alpha + c_W^2\,\left(2\,c_\alpha - s_{2\beta}\,s_\alpha\right)\right) + s_\alpha\,\left(2\,c_\beta - 4\,c_\beta^3\,s_W^2\right)\right) + \\
s_W\left\{\begin{array}{l}
\left(\delta M_W^2 + 2\,\delta Z_e\,M_W^2\right)\,\left(c_\alpha\,s_\beta\,\left(c_{2\beta}+2\,c_W^2\right) - s_\alpha\,\left(c_\beta + c_W^2\,s_{2\beta}\,s_\beta - 2\,c_\beta^3\,s_W^2\right)\right) - \\
M_W^2\left\{\begin{array}{l}
\delta c_\beta\,s_\alpha\,\left(2-4\,c_\beta^2\,s_W^2\right) - c_\alpha\,\delta s_\beta\,\left(2-4\,s_\beta^2\,s_W^2\right) - \\
s_\beta\,\left(c_{2\beta}+2\,c_W^2\right)\,\left(\delta Z_{hH}\,s_\alpha + c_\alpha\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - \\
\left(c_\beta - 2\,c_\beta^3\,s_W^2\right)\,\left(c_\alpha\,\delta Z_{hH} - s_\alpha\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - \\
2\,Re(\delta Z_{H^-G^-})\,s_{2\beta}\,s_{\alpha+\beta}\,s_W^2 + \\
c_W^2\left\{\begin{array}{l}
c_{2\beta}\,c_{\alpha+\beta}\,\left(\delta Z_{H^-G^-} + \delta Z_{H^-G^-}^*\right) - \\
s_{2\beta}\left\{\begin{array}{l}
2\,\left(c_\alpha\,\delta c_\beta - \delta s_\beta\,s_\alpha\right) + \\
s_\beta\,\left(c_\alpha\,\delta Z_{hH} - s_\alpha\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(h^0,G^-,G^+) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l}
2\,c_W^2\,M_W^2\,s_W\,\left(c_\alpha\,\delta s_\beta\,\left(1-2\,c_\beta^2\,s_W^2\right) - \delta c_\beta\,\left(s_\alpha - 2\,s_\alpha\,s_\beta^2\,s_W^2\right) + s_{2\beta}\,\left(\delta Z_{H^-G^-}\,s_{\alpha+\beta}\,s_W^2 - c_W^2\,\left(c_\alpha\,\delta c_\beta - \delta s_\beta\,s_\alpha\right)\right)\right) - \\
c_{2\beta}\left\{\begin{array}{l}
M_W^2\,\left(2\,c_{\alpha+\beta}\,c_W^4\,\delta Z_{H^-G^-}\,s_W + 4\,\delta s_W\,s_{\alpha+\beta}\,s_W^2\right) - \\
c_W^2\left\{\begin{array}{l}
2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\
s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} - M_W^2\,\left(c_{\alpha+\beta}\,\delta Z_{hH} - s_{\alpha+\beta}\,\left(2\,\delta Z_e + \delta Z_{hh} + 2\,\delta Z_{G^-G^-}\right)\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(h^0,H^-,G^+) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l}
c_{2\beta}\,c_W^4\left\{\begin{array}{l}
M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + \\
c_{\alpha+\beta}\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)
\end{array}\right. + \\
s_W\left\{\begin{array}{l}
2\,M_W^2\,\left(c_W^4\,\delta Z_{H^-G^-}\,s_{\beta-\alpha} + 2\,\delta s_W\,s_{2\beta}\,s_{\alpha+\beta}\,s_W^3\right) + \\
c_W^2\,s_{2\beta}\,s_W\left\{\begin{array}{l}
2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} + \\
s_W\left\{\begin{array}{l}
\delta M_W^2\,s_{\alpha+\beta} + \\
M_W^2\left\{\begin{array}{l}
c_{\alpha+\beta}\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + \\
s_{\alpha+\beta}\,\left(2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$

$$
C(h^0,G^-,H^+) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l}
\frac{s_W}{2}\left\{\begin{array}{l}
2\,s_{2\beta}\,s_W\,\left(4\,\delta s_W\,M_W^2\,s_{\alpha+\beta}\,s_W^2 + c_W^2\,\left(2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} + s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} + 2\,M_W^2\,\left(c_{\alpha+\beta}\,c_\beta^2\,\delta t_\beta + \delta Z_e\,s_{\alpha+\beta}\right)\right)\right)\right) - \\
c_W^2\,M_W^2\left\{\begin{array}{l}
2\,c_{2\beta}\,\delta Z_{H^-G^-}^*\,s_{\alpha+\beta} - 2\,\delta Z_{H^-G^-}\,\left(1-2\,c_W^2\right)\,\left(c_\beta^3\,s_\alpha - c_\alpha\,s_\beta^3\right) - \\
s_{2\beta}\left\{\begin{array}{l}
\delta Z_{H^-G^-}\,\left(c_{\alpha+\beta} + 2\,c_{\alpha+\beta}\,c_W^2\right) - \\
s_W^2\,\left(2\,c_{\alpha+\beta}\,\delta Z_{hH} - 2\,s_{\alpha+\beta}\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right. + \\
c_{2\beta}\,c_W^4\left\{\begin{array}{l}
M_W^2\,s_{\alpha+\beta}\,s_W\,\left(2\,c_\beta^2\,\delta t_\beta - \delta Z_{hH}\right) + \\
c_{\alpha+\beta}\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)
\end{array}\right.
\end{array}\right.
$$
(56)

$$
C(H^0,H^-,H^+) = \frac{\mathrm{i}\,e}{4\,c_W^2\,M_W\,s_W^2}\left\{\begin{array}{l}
M_W^2\left\{\begin{array}{l}
4\,s_W^3\,\left(c_\alpha\,c_\beta^2\,\delta c_\beta + \delta s_\beta\,s_\alpha\,s_\beta^2\right) - 2\,s_W\,\left(c_\alpha\,\left(\delta c_\beta + c_W^2\,\delta s_\beta\,s_{2\beta}\right) + s_\alpha\,\left(\delta s_\beta + c_W^2\,\delta c_\beta\,s_{2\beta}\right)\right) + \\
\delta s_W\,\left(\frac{4\,c_{2\beta}\,c_{\alpha+\beta}\,s_W^2}{c_W^2} + 2\,\left(s_\alpha\,s_\beta\,\left(c_{2\beta}+2\,c_W^2\right) + c_\alpha\,\left(c_\beta + c_W^2\,s_{2\beta}\,s_\beta - 2\,c_\beta^3\,s_W^2\right)\right)\right)
\end{array}\right. - \\
s_W\left\{\begin{array}{l}
\left(\delta M_W^2 + 2\,\delta Z_e\,M_W^2\right)\,\left(s_\alpha\,s_\beta\,\left(c_{2\beta}+2\,c_W^2\right) + c_\alpha\,\left(c_\beta + c_W^2\,s_{2\beta}\,s_\beta - 2\,c_\beta^3\,s_W^2\right)\right) - \\
M_W^2\left\{\begin{array}{l}
\left(\delta Z_{hH}\,s_\alpha - c_\alpha\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\,\left(c_\beta + c_W^2\,s_{2\beta}\,s_\beta - 2\,c_\beta^3\,s_W^2\right) - \\
s_\beta\,\left(c_{2\beta}+2\,c_W^2\right)\,\left(c_\alpha\,\delta Z_{hH} + s_\alpha\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) + \\
2\,Re(\delta Z_{H^-G^-})\,\left(c_{2\beta}\,c_W^2\,s_{\alpha+\beta} + c_{\alpha+\beta}\,s_{2\beta}\,s_W^2\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$
(57)

$$
C(H^0,G^-,G^+) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l}
2\,c_W^2\,M_W^2\,s_W\,\left(\delta s_\beta\,s_\alpha\,\left(1-2\,c_\beta^2\,s_W^2\right) + c_\alpha\,\delta c_\beta\,\left(1-2\,s_\beta^2\,s_W^2\right) - s_{2\beta}\,\left(c_{\alpha+\beta}\,\delta Z_{H^-G^-}\,s_W^2 + c_W^2\,\left(c_\alpha\,\delta s_\beta + \delta c_\beta\,s_\alpha\right)\right)\right) - \\
c_{2\beta}\left\{\begin{array}{l}
M_W^2\,\left(2\,c_W^4\,\delta Z_{H^-G^-}\,s_{\alpha+\beta}\,s_W - 4\,c_{\alpha+\beta}\,\delta s_W\,s_W^2\right) + \\
c_W^2\left\{\begin{array}{l}
\delta Z_{hH}\,M_W^2\,s_{\alpha+\beta}\,s_W + \\
c_\alpha\,c_\beta\,\left(2\,\delta s_W\,M_W^2 - s_W\,\left(\delta M_W^2 + M_W^2\,\left(2\,\delta Z_e + \delta Z_{HH} + 2\,\delta Z_{G^-G^-}\right)\right)\right) + \\
s_\alpha\,s_\beta\,\left(\delta M_W^2\,s_W - M_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{HH} + 2\,\delta Z_{G^-G^-}\right)\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$
(58)

$$
C(H^0,H^-,G^+) = -\frac{\mathrm{i}\,e}{4\,c_W^4\,M_W\,s_W^2}\left\{\begin{array}{l}
c_{2\beta}\,c_W^4\left\{\begin{array}{l}
2\,\delta s_W\,M_W^2\,s_{\alpha+\beta} - \\
s_W\,\left(\delta M_W^2\,s_{\alpha+\beta} + M_W^2\,\left(c_{\alpha+\beta}\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) + s_{\alpha+\beta}\,\left(2\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)
\end{array}\right. - \\
s_W\left\{\begin{array}{l}
c_{\alpha+\beta}\,s_{2\beta}\,s_W\,\left(4\,\delta s_W\,M_W^2\,s_W^2 + c_W^2\,\left(\delta M_W^2\,s_W + M_W^2\,\left(2\,\delta s_W + s_W\,\left(2\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)\right) - \\
c_W^2\,M_W^2\left\{\begin{array}{l}
s_{2\beta}\,s_{\alpha+\beta}\,s_W^2\,\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) + \\
c_W^2\,\delta Z_{H^-G^-}\,\left(s_{2\beta}\,\left(2\,c_\beta\,s_\alpha - s_{\alpha+\beta}\right) + 2\,\left(s_\alpha\,s_\beta^3 + c_\alpha\,\left(c_\beta^3 + s_{2\beta}\,s_\beta\right)\right)\right)
\end{array}\right.
\end{array}\right.
\end{array}\right.
$$
(59)

$$
\begin{aligned}
C(H^0, G^-, H^+) = -\frac{\mathrm{i}\, e}{8\, c_W^4\, M_W\, s_W^2} \Bigg\{ & 2\, c_{2\beta} \Bigg\{ c_{\alpha+\beta}\, c_W^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W + \\
& c_W^4 \Bigg\{ 2\, \delta s_W\, M_W^2\, s_{\alpha+\beta} - \\
& s_W \Bigg\{ \delta M_W^2\, s_{\alpha+\beta} + \\
& M_W^2 \Bigg\{ c_{\alpha+\beta} \left(2\, c_\beta^2\, \delta t_\beta + \delta Z_{hH} \right) + \\
& s_{\alpha+\beta} \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \\
& s_W \Bigg\{ 2\, c_{\alpha+\beta}\, s_{2\beta}\, s_W \left(4\, \delta s_W\, M_W^2\, s_W^2 + c_W^2 \left(\delta M_W^2\, s_W + M_W^2 \left(2\, \delta s_W + s_W \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \right) \right) \right) \right) - \\
& c_W^2\, M_W^2 \Bigg\{ 2\, s_{2\beta}\, s_{\alpha+\beta}\, s_W^2 \left(2\, c_\beta^2\, \delta t_\beta + \delta Z_{hH} \right) - \\
& \delta Z_{H^-G^-} \left(2\, s_\alpha\, s_\beta^3 \left(1 - 2\, c_W^2 \right) - s_{2\beta} \left(c_\beta\, s_\alpha + 2\, c_W^2\, s_{\alpha+\beta} \right) - c_\alpha \left(s_{2\beta}\, s_\beta - 2\, c_\beta^3 \left(1 - 2\, c_W^2 \right) \right) \right) \Bigg\} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
C(A^0, H^-, G^+) = -\frac{e}{4\, M_W\, s_W^2} \left(M_W^2\, s_W \left(\delta Z_{G^-G^-} + 2 \left(c_\beta\, \delta c_\beta + \delta s_\beta\, s_\beta \right) \right) + \left(c_\beta^2 + s_\beta^2 \right) \left(\delta M_W^2\, s_W - M_W^2 \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{AA} + \delta Z_{H^-H^-} \right) \right) \right) \right)
$$

$$
C(A^0, G^-, H^+) = \frac{e}{4\, M_W\, s_W^2} \left(M_W^2\, s_W \left(\delta \bar{Z}_{H^-H^-} + 2 \left(c_\beta\, \delta c_\beta + \delta s_\beta\, s_\beta \right) \right) + \left(c_\beta^2 + s_\beta^2 \right) \left(\delta M_W^2\, s_W - M_W^2 \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-} \right) \right) \right) \right)
$$

$$
C(G^0, H^-, G^+) = \frac{e\, M_W}{4\, s_W} \left(2\, c_\beta\, \delta s_\beta - \delta Z_{AG} - 2\, \delta c_\beta\, s_\beta \right)
$$

$$
C(G^0, G^-, H^+) = -\frac{e\, M_W}{4\, s_W} \left(2\, c_\beta\, \delta s_\beta - \delta Z_{AG} - 2\, \delta c_\beta\, s_\beta \right)
$$

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$$
\underset{214}{C(A^0, \tilde{e}^{s1}_{j1}, \tilde{e}^{s2,\dagger}_{j2})} = -\frac{e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2}
\left\{
\begin{array}{l}
M_W^2 \left\{
\begin{array}{l}
s_W \left\{
\begin{array}{l}
c_\beta \left\{
\begin{array}{l}
m_{e_{j1}} \left\{
\begin{array}{l}
U^{\tilde{e},j1}_{s2,1} \left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) \left(\delta Z^{\tilde{e},j1}_{1,s1}\,U^{\tilde{e},j1*}_{1,2} + \delta Z^{\tilde{e},j1}_{2,s1}\,U^{\tilde{e},j1*}_{2,2}\right) - \\
U^{\tilde{e},j1}_{s2,2} \left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right) \left(\delta Z^{\tilde{e},j1}_{1,s1}\,U^{\tilde{e},j1*}_{1,1} + \delta Z^{\tilde{e},j1}_{2,s1}\,U^{\tilde{e},j1*}_{2,1}\right)
\end{array}
\right\} + \\
2\,\delta m^e_{j1} \left(U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} \left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2} \left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right)\right)
\end{array}
\right\} + \\
m_{e_{j1}} \left\{
\begin{array}{l}
c_\beta \left\{
\begin{array}{l}
U^{\tilde{e},j1*}_{s1,2} \left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) \left(\delta \bar{Z}^{\tilde{e},j2}_{1,s2}\,U^{\tilde{e},j1}_{1,1} + \delta \bar{Z}^{\tilde{e},j2}_{2,s2}\,U^{\tilde{e},j1}_{2,1}\right) - \\
U^{\tilde{e},j1*}_{s1,1} \left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right) \left(\delta \bar{Z}^{\tilde{e},j2}_{1,s2}\,U^{\tilde{e},j1}_{1,2} + \delta \bar{Z}^{\tilde{e},j2}_{2,s2}\,U^{\tilde{e},j1}_{2,2}\right)
\end{array}
\right\} + \\
U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} \left(2\,c_\beta^2\,\delta\mu + \delta A^{e*}_{j1,j1}\,s_{2\beta}\right) - \\
U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2} \left(2\,c_\beta^2\,\delta\mu^* + \delta A^{e}_{j1,j1}\,s_{2\beta}\right)
\end{array}
\right\}
\end{array}
\right\} - \\
2\,c_\beta\,\delta s_W\,m_{e_{j1}} \left(U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} \left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2} \left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right)\right)
\end{array}
\right\} - \\
m_{e_{j1}}\,s_W \left\{
\begin{array}{l}
\left(c_\beta\,\delta M_W^2 + M_W^2\,\left(2\,\delta c_\beta - c_\beta\,\left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right) \left(U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} \left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2} \left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right)\right) - \\
c_\beta\,\delta Z_{AG}\,M_W^2 \left(U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2} \left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} \left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right)
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\begin{aligned}
C(G^0, \tilde{e}^{s1}_{j1}, \tilde{e}^{s2,\dagger}_{j2}) = \frac{e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2} \Bigg\{ & M_W^2 \Bigg\{ s_W \Bigg\{ m_{e_{j1}} \Bigg\{ c_\beta \Bigg\{ \\
& U^{\tilde{e},j1*}_{s1,2} \Bigg\{ \begin{array}{l} \left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\left(\delta\bar{Z}^{\tilde{e},j2}_{1,s2}\,U^{\tilde{e},j1}_{1,1} + \delta\bar{Z}^{\tilde{e},j2}_{2,s2}\,U^{\tilde{e},j1}_{2,1}\right) - \\ 2\,\delta\mu\,s_\beta\,U^{\tilde{e},j1}_{s2,1} \end{array} \Bigg\} + \\
& \delta Z^{\tilde{e},j1}_{1,s1} \Bigg\{ \begin{array}{l} U^{\tilde{e},j1*}_{1,2}\,U^{\tilde{e},j1}_{s2,1}\left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right) - \\ U^{\tilde{e},j1*}_{1,1}\,U^{\tilde{e},j1}_{s2,2}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) \end{array} \Bigg\} + \\
& \delta Z^{\tilde{e},j1}_{2,s1} \Bigg\{ \begin{array}{l} U^{\tilde{e},j1*}_{2,2}\,U^{\tilde{e},j1}_{s2,1}\left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right) - \\ U^{\tilde{e},j1*}_{2,1}\,U^{\tilde{e},j1}_{s2,2}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) \end{array} \Bigg\} - \\
& \delta Z_{AG} \Bigg\{ \begin{array}{l} U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1}\left(c_\beta\,\mu + A^{e*}_{j1,j1}\,s_\beta\right) - \\ U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{e}_{j1,j1}\,s_\beta\right) \end{array} \Bigg\} - \\
& U^{\tilde{e},j1*}_{s1,1}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right)\left(\delta\bar{Z}^{\tilde{e},j2}_{1,s2}\,U^{\tilde{e},j1}_{1,2} + \delta\bar{Z}^{\tilde{e},j2}_{2,s2}\,U^{\tilde{e},j1}_{2,2}\right) \Bigg\} + \\
& 2\,c_\beta^2\,\delta A^{e*}_{j1,j1}\,U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1} - U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2}\left(2\,c_\beta^2\,\delta A^{e}_{j1,j1} - \delta\mu^*\,s_{2\beta}\right) \Bigg\} - \\
& 2\,c_\beta\,\delta m^e_{j1}\left(U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1}\left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right) \Bigg\} + \\
& 2\,c_\beta\,\delta s_W\,m_{e_{j1}}\left(U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1}\left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right) \Bigg\} + \\
& m_{e_{j1}}\,s_W\left(c_\beta\,\delta M_W^2 + M_W^2\left(2\,\delta c_\beta - c_\beta\left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\right)\left(U^{\tilde{e},j1*}_{s1,1}\,U^{\tilde{e},j1}_{s2,2}\left(A^{e}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{e},j1*}_{s1,2}\,U^{\tilde{e},j1}_{s2,1}\left(A^{e*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right) \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(h^0, \tilde{\nu}_{j1}, \tilde{\nu}^\dagger_{j2}) = -\frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,c_W^3\,M_Z\,s_W^2} \Bigg\{ & c_W^2\left(2\,\delta s_W\,M_Z^2\,s_{\alpha+\beta} - s_W\left(\delta M_Z^2\,s_{\alpha+\beta} + 2\,M_Z^2\left(c_{\alpha+\beta}\,c_\beta^2\,\delta t_\beta + \delta Z_e\,s_{\alpha+\beta}\right)\right)\right) - \\
& M_Z^2\left(2\,\delta s_W\,s_{\alpha+\beta}\,s_W^2 - c_W^2\,s_W\left(c_{\alpha+\beta}\,\delta Z_{hH} - s_{\alpha+\beta}\left(\delta\bar{Z}^{\tilde{\nu},j2}_{1,1} + \delta Z_{hh} + \delta Z^{\tilde{\nu},j1}_{1,1}\right)\right)\right) \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(H^0, \tilde{\nu}_{j1}, \tilde{\nu}^\dagger_{j2}) = -\frac{\mathrm{i}\,e\,\delta_{j1,j2}}{4\,c_W^3\,M_Z\,s_W^2} \Bigg\{ & c_{\alpha+\beta}\,c_W^2\left(\delta M_Z^2\,s_W - 2\,M_Z^2\left(\delta s_W - \delta Z_e\,s_W\right)\right) + \\
& M_Z^2\,s_W\left(2\,c_{\alpha+\beta}\,\delta s_W\,s_W - c_W^2\left(s_{\alpha+\beta}\left(2\,c_\beta^2\,\delta t_\beta + \delta Z_{hH}\right) - c_{\alpha+\beta}\left(\delta\bar{Z}^{\tilde{\nu},j2}_{1,1} + \delta Z_{HH} + \delta Z^{\tilde{\nu},j1}_{1,1}\right)\right)\right) \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(h^0,\tilde{e}^{\tilde{e},\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\tilde{e},\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4}
&\left\{ \frac{1}{c_\beta\,M_W} \left\{ \frac{1}{s_W} \left\{ \frac{1}{c_W} \left\{ \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} \left\{ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}\left(c_\alpha\,\mu + A^{e*}_{\mathrm{j1,j1}}\,s_\alpha\right) + \right. \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. \left. U^{\tilde{e},\mathrm{j1}}_{1,2}\left(2\,c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha - 2\,c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,s^2_W\right) \right\} + \right. \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. \left. U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ U^{\tilde{e},\mathrm{j1}}_{1,1}\left(2\,c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha + c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,\left(1-2\,c^2_W\right)\right) + \right. \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. \left. c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}\left(c_\alpha\,\mu^* + A^{e}_{\mathrm{j1,j1}}\,s_\alpha\right) \right\} \right. \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} \left\{ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\left(c_\alpha\,\mu + A^{e*}_{\mathrm{j1,j1}}\,s_\alpha\right) + \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. U^{\tilde{e},\mathrm{j1}}_{2,2}\left(2\,c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha - 2\,c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,s^2_W\right) \right\} + \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ U^{\tilde{e},\mathrm{j1}}_{2,1}\left(2\,c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha + c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,\left(1-2\,c^2_W\right)\right) + \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. \left. c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\left(c_\alpha\,\mu^* + A^{e}_{\mathrm{j1,j1}}\,s_\alpha\right) \right\} \right. \right. \right. \right. \right. \\
&\left. \left. \left. \left. 2\,m_{e_{\mathrm{j1}}}\left(U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_\alpha\,\delta\mu + \delta A^{e*}_{\mathrm{j1,j1}}\,s_\alpha\right) + U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,\delta\mu^* + \delta A^{e}_{\mathrm{j1,j1}}\,s_\alpha\right)\right) \right. \right. \right. \\
&\left. \left. \left. \frac{2\,\delta s_W}{c_W\,s^2_W} \left\{ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\left(c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,\mu^* + A^{e}_{\mathrm{j1,j1}}\,s_\alpha\right) + U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(2\,c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha - c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,\left(3-2\,c^2_W\right)\right)\right) + \right. \right. \right. \right. \\
&\left. \left. \left. \left. U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\left(c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_\alpha\,\mu + A^{e*}_{\mathrm{j1,j1}}\,s_\alpha\right) + 2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_W\,m^2_{e_{\mathrm{j1}}}\,s_\alpha + c_\beta\,M_W\,M_Z\,s_{\alpha+\beta}\,s^2_W\right)\right) \right\} \right. \right. \right. \right. \\
&\left. \left. \left. \left. \right\} \right. \right. \right. \right. \\
&\left. \left. \left. \left. \right\} \right. \right. \right. \right. \\
&\left. \left. \left. \right\} \right. \right. \right. \\
&\left. \left. \right\} \right. \\
&\left. \right\}
\end{aligned}
$$

$$
\underset{223}{C(H^0,\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = \frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,s_W^2}
\left\{
\begin{array}{l}
\frac{1}{c_\beta\,c_W\,M_W}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
c_W
\left\{
\begin{array}{l}
m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(A^{e*}_{\mathrm{j1,j1}}\,(2\,c_\alpha\,\delta s_W+\delta Z_{hH}\,s_\alpha\,s_W)-\mu\,(2\,\delta s_W\,s_\alpha-c_\alpha\,\delta Z_{hH}\,s_W)\right)+\\
2\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,(2\,c_\alpha\,\delta s_W+\delta Z_{hH}\,s_\alpha\,s_W)
\end{array}
\right\}+\\
2\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,(2\,c_{\alpha+\beta}\,\delta s_W-\delta Z_{hH}\,s_{\alpha+\beta}\,s_W)
\end{array}
\right\}+\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
c_\beta\,M_W\,M_Z\,\left(\delta Z_{hH}\,s_{\alpha+\beta}\,s_W\,\left(1-2\,c_W^2\right)-2\,c_{\alpha+\beta}\,\delta s_W\,\left(3-2\,c_W^2\right)\right)+\\
2\,c_W\,m^2_{e_{\mathrm{j1}}}\,(2\,c_\alpha\,\delta s_W+\delta Z_{hH}\,s_\alpha\,s_W)
\end{array}
\right\}+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(A^{e}_{\mathrm{j1,j1}}\,(2\,c_\alpha\,\delta s_W+\delta Z_{hH}\,s_\alpha\,s_W)-\mu^*\,(2\,\delta s_W\,s_\alpha-c_\alpha\,\delta Z_{hH}\,s_W)\right)
\end{array}
\right\}
\end{array}
\right\}-\\
s_W
\left\{
\begin{array}{l}
\frac{1}{c_W}
\left\{
\begin{array}{l}
\frac{1}{c_\beta\,M_W}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{1,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{2,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,\delta A^{e}_{\mathrm{j1,j1}}-\delta\mu^*\,s_\alpha\right)
\end{array}
\right\}-\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{1,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{2,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}-\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_\alpha\,\delta A^{e*}_{\mathrm{j1,j1}}-\delta\mu\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}-\\
\frac{c_{\alpha+\beta}\,\delta M_Z^2}{M_Z}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(1-2\,c_W^2\right)\right)
\end{array}
\right\}+\\
\frac{1}{c_\beta\,M_W}
\left\{
\begin{array}{l}
2\,\delta m^e_{\mathrm{j1}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\left(4\,c_\alpha\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}+U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)\right)+\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\left(4\,c_\alpha\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}+U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}+\\
\frac{1}{c_W}
\left\{
\begin{array}{l}
\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{1,2}
\left\{
\begin{array}{l}
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)+\\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}-c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\right)
\end{array}
\right\}+\\
U^{\tilde{e},\mathrm{j1}*}_{1,1}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}+\\
\frac{1}{c_W}
\left\{
\begin{array}{l}
\delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{2,2}
\left\{
\begin{array}{l}
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)+\\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}-c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\right)
\end{array}
\right\}+\\
U^{\tilde{e},\mathrm{j1}*}_{2,1}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}+\\
(2\,\delta Z_e+\delta Z_{HH})
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)+\\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}-c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\right)
\end{array}
\right\}+\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}-\\
\frac{1}{c_\beta\,M_W}
\left\{
\begin{array}{l}
\frac{1}{c_W}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{1,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{2,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,\delta A^{e}_{\mathrm{j1,j1}}-\delta\mu^*\,s_\alpha\right)
\end{array}
\right\}-\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{1,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{2,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}-\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_\alpha\,\delta A^{e*}_{\mathrm{j1,j1}}-\delta\mu\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}+\\
\frac{c_{\alpha+\beta}\,\delta M_Z^2}{M_Z}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(1-2\,c_W^2\right)\right)
\end{array}
\right\}+\\
\frac{1}{c_W}
\left\{
\begin{array}{l}
\frac{1}{c_\beta\,M_W}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{1,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{2,1}\left(2\,c_\alpha\,c_W\,m^2_{e_{\mathrm{j1}}}+c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,\left(1-2\,c_W^2\right)\right)+\\
c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\left(A^{e}_{\mathrm{j1,j1}}\,c_\alpha-\mu^*\,s_\alpha\right)
\end{array}
\right\}+\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_\alpha\,\delta A^{e}_{\mathrm{j1,j1}}-\delta\mu^*\,s_\alpha\right)
\end{array}
\right\}-\\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{1,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}+\\
\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
2\,c_{\alpha+\beta}\,c_\beta\,M_W\,M_Z\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{2,2}-\\
c_W\,\left(2\,c_\alpha\,m^2_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}+m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\,\left(A^{e*}_{\mathrm{j1,j1}}\,c_\alpha-\mu\,s_\alpha\right)\right)
\end{array}
\right\}-\\
2\,c_W\,m_{e_{\mathrm{j1}}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_\alpha\,\delta A^{e*}_{\mathrm{j1,j1}}-\delta\mu\,s_\alpha\right)
\end{array}
\right\}
\end{array}
\right\}+\\
\frac{c_{\alpha+\beta}\,\delta M_Z^2}{M_Z}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(1-2\,c_W^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(\underset{230}{H^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}}}) = \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W\, \left(c_\beta\, \mu + A^{e*}_{\mathrm{j1,j1}}\, s_\beta \right) + \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} c_\beta \left\{ \begin{array}{l} c_\beta\, \left(2\, \delta\mu\, M_W^2\, s_W - \mu\, \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) \right) + \\ M_W^2\, s_W \left\{ \begin{array}{l} 2\, \delta A^{e*}_{\mathrm{j1,j1}}\, s_\beta - \\ \mu\, \left(2\, \delta c_\beta - \delta Z^*_{H^-G^-}\, s_\beta - c_\beta\, \left(\delta \bar{Z}_{H^-H^-} + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\, \delta Z_e \right) \right) \end{array} \right. \end{array} \right. - \\ A^{e*}_{\mathrm{j1,j1}} \left\{ \begin{array}{l} c_\beta^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W + \\ s_\beta\, \left(2\, \delta c_\beta\, M_W^2\, s_W + c_\beta\, \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(\delta \bar{Z}_{H^-H^-} + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\, \delta Z_e \right) \right) \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_\beta\, M_W^2\, s_W \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}} \left(c_\beta\, \mu + A^{e*}_{\mathrm{j1,j1}}\, s_\beta \right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2} \right) - \\ \left(c_\beta\, M_W^2\, s_{2\beta} - m^2_{e_{\mathrm{j1}}}\, s_\beta \right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) \end{array} \right. - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} 2\, c_\beta^3\, \left(\delta M_W^2\, M_W^2\, s_\beta\, s_W - M_W^4\, \left(2\, \delta s_W\, s_\beta - \delta s_\beta\, s_W \right) \right) + \\ M_W^2\, s_{2\beta}\, \left(\delta s_W\, m^2_{e_{\mathrm{j1}}} - s_W\, \left(2\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}} - c_\beta\, M_W^2\, \left(\delta c_\beta + c_\beta\, \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e \right) \right) \right) \right) - \\ s_W \left\{ \begin{array}{l} m^2_{e_{\mathrm{j1}}}\, \left(\delta Z_e\, M_W^2\, s_{2\beta} - s_\beta\, \left(c_\beta\, \delta M_W^2 - M_W^2\, \left(c_\beta\, \delta \bar{Z}_{H^-H^-} - 2\, \delta c_\beta \right) \right) \right) - \\ c_\beta\, M_W^2\, \left(c_\beta\, \delta Z^*_{H^-G^-}\, \left(m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2 \right) + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\, \left(c_\beta\, M_W^2\, s_{2\beta} - m^2_{e_{\mathrm{j1}}}\, s_\beta \right) \right) \end{array} \right. \end{array} \right. \end{array} \right.
$$

$$
C(\underset{231}{H^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}}) = \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} s_W \left\{ \begin{array}{l} M_W^2 \left\{ \begin{array}{l} c_\beta \left\{ \begin{array}{l} \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} \left(m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} \left(c_\beta\, \mu^* + A^e_{\mathrm{j1,j1}}\, s_\beta \right) - U^{\tilde{e},\mathrm{j1}}_{1,1} \left(c_\beta\, M_W^2\, s_{2\beta} - m^2_{e_{\mathrm{j1}}}\, s_\beta \right) \right) + \\ \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} \left(m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{2,2} \left(c_\beta\, \mu^* + A^e_{\mathrm{j1,j1}}\, s_\beta \right) - U^{\tilde{e},\mathrm{j1}}_{2,1} \left(c_\beta\, M_W^2\, s_{2\beta} - m^2_{e_{\mathrm{j1}}}\, s_\beta \right) \right) \end{array} \right. + \\ \delta m^e_{\mathrm{j1}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(2\, c_\beta^2\, \mu^* + A^e_{\mathrm{j1,j1}}\, s_{2\beta} \right) \end{array} \right. - \\ \frac{m^2_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}}{2} \left(s_{2\beta}\, \left(\delta M_W^2 - \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\, M_W^2 \right) + M_W^2\, \left(2\, c_\beta^2\, \delta Z_{H^-G^-} + 4\, \delta c_\beta\, s_\beta - s_{2\beta}\, \left(2\, \delta Z_e + \delta Z_{H^-H^-} \right) \right) \right) \end{array} \right. - \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} 2\, c_\beta^3\, \left(\delta M_W^2\, M_W^2\, s_\beta\, s_W - M_W^4\, \left(2\, \delta s_W\, s_\beta - \delta s_\beta\, s_W \right) \right) - \\ \frac{M_W^4\, s_W}{4} \left(\delta Z_{H^-G^-} \left(4\, c_\beta^4 - s_{2\beta}^2 \right) - 4\, s_{2\beta}\, \left(c_\beta\, \delta c_\beta + c_\beta^2\, \left(2\, \delta Z_e + \delta Z_{H^-H^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) \right) + \\ m_{e_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, \left(\delta s_W\, m_{e_{\mathrm{j1}}} - 2\, \delta m^e_{\mathrm{j1}}\, s_W \right) \end{array} \right. - \\ m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left\{ \begin{array}{l} A^e_{\mathrm{j1,j1}}\, \left(s_\beta\, s_W\, \left(c_\beta\, \delta M_W^2 + 2\, \delta c_\beta\, M_W^2 \right) + M_W^2\, s_{2\beta}\, \left(\delta s_W - \delta Z_e\, s_W \right) \right) + \\ c_\beta^2\, \left(\delta M_W^2\, \mu^*\, s_W + M_W^2\, \left(2\, \delta s_W\, \mu^* - 2\, \delta\mu^*\, s_W \right) \right) - \\ \frac{M_W^2\, s_W}{2} \left\{ \begin{array}{l} 2\, \delta A^e_{\mathrm{j1,j1}}\, s_{2\beta} - A^e_{\mathrm{j1,j1}}\, \left(2\, c_\beta^2\, \delta Z_{H^-G^-} - s_{2\beta}\, \left(\delta Z_{H^-H^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) - \\ \mu^*\, \left(4\, c_\beta\, \delta c_\beta - \delta Z_{H^-G^-}\, s_{2\beta} - 2\, c_\beta^2\, \left(2\, \delta Z_e + \delta Z_{H^-H^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right.
$$

$$
\underset{234}{C}(G^+, \tilde{e}^{s2}_{j2}, \tilde{\nu}^{\dagger}_{j1}) = -\frac{\mathrm{i}\, e\, \delta_{j1,j2}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \left\{ \begin{array}{l} U^{\tilde{e},j1*}_{s2,2} \left\{ \begin{array}{l} \delta m^e_{j1}\, M_W^2\, s_W \left(2\, A^{e*}_{j1,j1}\, c_\beta^2 - \mu\, s_{2\beta}\right) + \\ m_{e_{j1}} \left\{ \begin{array}{l} M_W^2\, s_{2\beta}\, \left(\delta s_W\, \mu - s_W\, \left(\delta\mu + \delta Z_e\, \mu\right)\right) + \\ s_W \left\{ \begin{array}{l} \mu\, s_\beta\, \left(c_\beta\, \delta M_W^2 + 2\, \delta c_\beta\, M_W^2\right) + \\ \frac{M_W^2}{2} \left(c_\beta^2\, \left(4\, \delta A^{e*}_{j1,j1} - 2\, \delta Z_{H^-G^-}\, \mu\right) - \mu\, s_{2\beta}\, \left(\delta \bar{Z}^{\tilde{\nu},j1}_{1,1} + \delta Z_{G^-G^-}\right)\right) \end{array} \right\} + \\ A^{e*}_{j1,j1}\, c_\beta \left\{ \begin{array}{l} M_W^2\, s_W\, \left(c_\beta\, \delta \bar{Z}^{\tilde{\nu},j1}_{1,1} - 2\, \delta c_\beta - \delta Z_{H^-G^-}\, s_\beta\right) - \\ c_\beta\, \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) \end{array} \right\} \end{array} \right\} \end{array} \right\} + \\ c_\beta \left\{ \begin{array}{l} M_W^2\, s_W \left\{ \begin{array}{l} m_{e_{j1}} \left(A^{e*}_{j1,j1}\, c_\beta - \mu\, s_\beta\right) \left(\delta Z^{\tilde{e},j2}_{1,s2}\, U^{\tilde{e},j1*}_{1,2} + \delta Z^{\tilde{e},j2}_{2,s2}\, U^{\tilde{e},j1*}_{2,2}\right) + \\ c_\beta\, \left(m^2_{e_{j1}} - c_{2\beta}\, M_W^2\right) \left(\delta Z^{\tilde{e},j2}_{1,s2}\, U^{\tilde{e},j1*}_{1,1} + \delta Z^{\tilde{e},j2}_{2,s2}\, U^{\tilde{e},j1*}_{2,1}\right) \end{array} \right\} + \\ U^{\tilde{e},j1*}_{s2,1} \left\{ \begin{array}{l} \delta s_W\, M_W^4\, \left(2\, c_\beta^3 - s_{2\beta}\, s_\beta\right) - c_\beta\, m^2_{e_{j1}}\, \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right) - \\ M_W^2\, s_W \left\{ \begin{array}{l} m^2_{e_{j1}}\, \left(2\, \delta c_\beta + \delta Z_{H^-G^-}\, s_\beta - c_\beta\, \left(2\, \delta Z_e + \delta Z_{G^-G^-}\right)\right) - \\ c_\beta\, \delta \bar{Z}^{\tilde{\nu},j1}_{1,1}\, \left(m^2_{e_{j1}} - c_{2\beta}\, M_W^2\right) - \\ \frac{1}{2} \left\{ \begin{array}{l} 8\, c_\beta\, \delta m^e_{j1}\, m_{e_{j1}} - \left(2\, c_\beta^3 - s_{2\beta}\, s_\beta\right)\, \left(\delta M_W^2 + 2\, \delta Z_e\, M_W^2\right) - \\ M_W^2 \left\{ \begin{array}{l} 4\, c_\beta^2\, \delta c_\beta - \\ 2\, \left(\delta s_\beta\, s_{2\beta} - c_\beta\, \left(c_{2\beta}\, \delta Z_{G^-G^-} - \delta Z_{H^-G^-}\, s_{2\beta}\right)\right) \end{array} \right\} \end{array} \right\} \end{array} \right\} \end{array} \right\} \end{array} \right\} \end{array} \right\}
$$

$$
\begin{aligned}
C(G^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_\beta^2\, M_W^3\, s_W^2} \Bigg\{ & M_W^2 \Bigg\{ s_W \Bigg\{ c_\beta \Bigg\{ \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} \left(m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} \left(A^e_{\mathrm{j1,j1}}\, c_\beta - \mu^*\, s_\beta \right) + c_\beta\, U^{\tilde{e},\mathrm{j1}}_{1,1} \left(m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2 \right) \right) + \\
& \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} \left(m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{2,2} \left(A^e_{\mathrm{j1,j1}}\, c_\beta - \mu^*\, s_\beta \right) + c_\beta\, U^{\tilde{e},\mathrm{j1}}_{2,1} \left(m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2 \right) \right) - \\
& m^2_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(2\, \delta c_\beta + \delta Z_{H^-G^-}\, s_\beta - c_\beta \left(2\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) \Bigg\} + \\
& \delta m^e_{\mathrm{j1}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(2\, A^e_{\mathrm{j1,j1}}\, c_\beta^2 - \mu^*\, s_{2\beta} \right) \Bigg\} - \\
& 2\, A^e_{\mathrm{j1,j1}}\, c_\beta^2\, \delta s_W\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \Bigg\} + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \Bigg\{ \tfrac{\delta s_W\, M_W^4}{2} \left(4\, c_\beta^4 - s_{2\beta}^2 \right) - c_\beta^2\, m^2_{e_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W \right) - \\
& \tfrac{M_W^2\, s_W}{4} \Bigg\{ M_W^2 \left(8\, c_\beta^3\, \delta c_\beta - 4\, s_{2\beta} \left(c_\beta\, \delta s_\beta + c_\beta^2\, \delta Z_{H^-G^-} \right) \right) - \\
& 16\, c_\beta^2\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}} - \left(4\, c_\beta^4 - s_{2\beta}^2 \right) \left(\delta M_W^2 + M_W^2 \left(2\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) \Bigg\} \Bigg\} + \\
& m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \Bigg\{ \mu^* \left(s_\beta\, s_W \left(c_\beta\, \delta M_W^2 + 2\, \delta c_\beta\, M_W^2 \right) + M_W^2\, s_{2\beta} \left(\delta s_W - \delta Z_e\, s_W \right) \right) - \\
& s_W \Bigg\{ \delta \mu^*\, M_W^2\, s_{2\beta} + \\
& c_\beta \Bigg\{ A^e_{\mathrm{j1,j1}} \left(2\, \delta c_\beta\, M_W^2 + c_\beta \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2 \right) \right) - \\
& M_W^2 \Bigg\{ 2\, c_\beta\, \delta A^e_{\mathrm{j1,j1}} - \delta Z_{H^-G^-} \left(c_\beta\, \mu^* + A^e_{\mathrm{j1,j1}}\, s_\beta \right) + \\
& \left(A^e_{\mathrm{j1,j1}}\, c_\beta - \mu^*\, s_\beta \right) \left(\delta Z_{G^-G^-} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\}
\end{aligned}
$$

[SSS] Higgs – 2 Squarks

$$
\underset{216}{C(A^0, \tilde{u}^{\text{s1}}_{\text{j1}}, \tilde{u}^{\text{s2},\dagger}_{\text{j2}})} = -\frac{e\,\delta_{\text{j1,j2}}}{4\,M_W^3\,s_\beta^2\,s_W^2} \left\{ \begin{array}{l} M_W^2 \left\{ \begin{array}{l} s_W \left\{ \begin{array}{l} s_\beta \left\{ \begin{array}{l} m_{u_{\text{j1}}} \left\{ \begin{array}{l} \delta Z^{\tilde{u},\text{j1}}_{1,\text{s1}} \left\{ \begin{array}{l} U^{\tilde{u},\text{j1}*}_{1,2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right) - \\ U^{\tilde{u},\text{j1}*}_{1,1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) \end{array} \right\} + \\ \delta Z^{\tilde{u},\text{j1}}_{2,\text{s1}} \left\{ \begin{array}{l} U^{\tilde{u},\text{j1}*}_{2,2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right) - \\ U^{\tilde{u},\text{j1}*}_{2,1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) \end{array} \right\} - \\ \delta Z_{AG} \left\{ \begin{array}{l} U^{\tilde{u},\text{j1}*}_{\text{s1},2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(c_\beta\,\mu - A^{u*}_{\text{j1,j1}}\,s_\beta\right) - \\ U^{\tilde{u},\text{j1}*}_{\text{s1},1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(c_\beta\,\mu^* - A^{u}_{\text{j1,j1}}\,s_\beta\right) \end{array} \right\} \end{array} \right\} - \\ 2\,\delta m^u_{\text{j1}} \left(U^{\tilde{u},\text{j1}*}_{\text{s1},1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) - U^{\tilde{u},\text{j1}*}_{\text{s1},2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right) \end{array} \right\} + \\ m_{u_{\text{j1}}} \left\{ \begin{array}{l} s_\beta \left\{ \begin{array}{l} U^{\tilde{u},\text{j1}*}_{\text{s1},2} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right) \left(\delta \bar{Z}^{\tilde{u},\text{j2}}_{1,\text{s2}}\,U^{\tilde{u},\text{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\text{j2}}_{2,\text{s2}}\,U^{\tilde{u},\text{j1}}_{2,1}\right) - \\ U^{\tilde{u},\text{j1}*}_{\text{s1},1} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) \left(\delta \bar{Z}^{\tilde{u},\text{j2}}_{1,\text{s2}}\,U^{\tilde{u},\text{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\text{j2}}_{2,\text{s2}}\,U^{\tilde{u},\text{j1}}_{2,2}\right) \end{array} \right\} + \\ U^{\tilde{u},\text{j1}*}_{\text{s1},2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(\delta A^{u*}_{\text{j1,j1}}\,s_{2\beta} + 2\,\delta\mu\,s_\beta^2\right) - \\ U^{\tilde{u},\text{j1}*}_{\text{s1},1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(\delta A^{u}_{\text{j1,j1}}\,s_{2\beta} + 2\,\delta\mu^*\,s_\beta^2\right) \end{array} \right\} \end{array} \right\} + \\ 2\,m_{u_{\text{j1}}}\,(\delta s_W\,s_\beta + \delta s_\beta\,s_W) \left(U^{\tilde{u},\text{j1}*}_{\text{s1},1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) - U^{\tilde{u},\text{j1}*}_{\text{s1},2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right) \end{array} \right\} + \\ m_{u_{\text{j1}}}\,s_\beta\,s_W \left(\delta M_W^2 - M_W^2\,(2\,\delta Z_e + \delta Z_{AA})\right) \left(U^{\tilde{u},\text{j1}*}_{\text{s1},1}\,U^{\tilde{u},\text{j1}}_{\text{s2},2} \left(A^{u}_{\text{j1,j1}}\,c_\beta + \mu^*\,s_\beta\right) - U^{\tilde{u},\text{j1}*}_{\text{s1},2}\,U^{\tilde{u},\text{j1}}_{\text{s2},1} \left(A^{u*}_{\text{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right) \end{array} \right\}
$$

$$C(G^0,\tilde{u}^{s1}_{j1},\tilde{u}^{s2,\dagger}_{j2}) = \frac{e\,\delta_{j1,j2}}{4\,M_W^3\,s_\beta^2\,s_W^2}$$
$$\left\{ M_W^2 \left\{ s_W \left\{ s_\beta \left\{ m_{u_{j1}} \left\{ \begin{array}{l} U^{\tilde{u},j1}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right)\left(\delta Z^{\tilde{u},j1}_{1,s1}\,U^{\tilde{u},j1*}_{1,2} + \delta Z^{\tilde{u},j1}_{2,s1}\,U^{\tilde{u},j1*}_{2,2}\right) - \\ U^{\tilde{u},j1}_{s2,2}\left(c_\beta\,\mu^* - A^{u}_{j1,j1}\,s_\beta\right)\left(\delta Z^{\tilde{u},j1}_{1,s1}\,U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\,U^{\tilde{u},j1*}_{2,1}\right) \end{array} \right\} + \right. \right. \right.$$
$$\left. \left. \left. 2\,\delta m^u_{j1}\left(U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{u},j1}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) - U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{u},j1}_{s2,2}\left(c_\beta\,\mu^* - A^{u}_{j1,j1}\,s_\beta\right)\right) \right\} + \right.$$
$$\left. s_W \left\{ m_{u_{j1}} \left\{ \begin{array}{l} s_\beta \left\{ \begin{array}{l} U^{\tilde{u},j1*}_{s1,2}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right)\left(\delta \bar{Z}^{\tilde{u},j2}_{1,s2}\,U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j2}_{2,s2}\,U^{\tilde{u},j1}_{2,1}\right) - \\ U^{\tilde{u},j1*}_{s1,1}\left(c_\beta\,\mu^* - A^{u}_{j1,j1}\,s_\beta\right)\left(\delta \bar{Z}^{\tilde{u},j2}_{1,s2}\,U^{\tilde{u},j1}_{1,2} + \delta \bar{Z}^{\tilde{u},j2}_{2,s2}\,U^{\tilde{u},j1}_{2,2}\right) \end{array} \right\} + \\ U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{u},j1}_{s2,1}\left(\delta\mu\,s_{2\beta} - 2\,\delta A^{u*}_{j1,j1}\,s_\beta^2\right) - \\ U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{u},j1}_{s2,2}\left(\delta\mu^*\,s_{2\beta} - 2\,\delta A^{u}_{j1,j1}\,s_\beta^2\right) \end{array} \right\} \right\} - \right\} -$$
$$\left. 2\,m_{u_{j1}}\left(\delta s_W\,s_\beta + \delta s_\beta\,s_W\right)\left(U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{u},j1}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) - U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{u},j1}_{s2,2}\left(c_\beta\,\mu^* - A^{u}_{j1,j1}\,s_\beta\right)\right) \right\} -$$
$$m_{u_{j1}}\,s_\beta\,s_W \left\{ \begin{array}{l} \left(\delta M_W^2 - M_W^2\,\left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\left(U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{u},j1}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) - U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{u},j1}_{s2,2}\left(c_\beta\,\mu^* - A^{u}_{j1,j1}\,s_\beta\right)\right) - \\ \delta Z_{AG}\,M_W^2\left(U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{u},j1}_{s2,2}\left(A^{u}_{j1,j1}\,c_\beta + \mu^*\,s_\beta\right) - U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{u},j1}_{s2,1}\left(A^{u*}_{j1,j1}\,c_\beta + \mu\,s_\beta\right)\right) \end{array} \right\} \right\}$$

$$C(A^0,\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2}) = -\frac{e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2}$$
$$\left\{ M_W^2 \left\{ s_W \left\{ c_\beta \left\{ m_{d_{j1}} \left\{ \begin{array}{l} U^{\tilde{d},j1}_{s2,1}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right)\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,2}\right) - \\ U^{\tilde{d},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,1}\right) \end{array} \right\} + \right. \right. \right.$$
$$\left. \left. \left. 2\,\delta m^d_{j1}\left(U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)\right) \right\} + \right.$$
$$\left. s_W \left\{ m_{d_{j1}} \left\{ \begin{array}{l} c_\beta \left\{ \begin{array}{l} U^{\tilde{d},j1*}_{s1,2}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right)\left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,1}\right) - \\ U^{\tilde{d},j1*}_{s1,1}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)\left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,2}\right) \end{array} \right\} + \\ U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(2\,c_\beta^2\,\delta\mu + \delta A^{d*}_{j1,j1}\,s_{2\beta}\right) - \\ U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(2\,c_\beta^2\,\delta\mu^* + \delta A^{d}_{j1,j1}\,s_{2\beta}\right) \end{array} \right\} \right\} - \right\} -$$
$$\left. 2\,c_\beta\,\delta s_W\,m_{d_{j1}}\left(U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)\right) \right\} -$$
$$m_{d_{j1}}\,s_W \left\{ \begin{array}{l} \left(c_\beta\,\delta M_W^2 + M_W^2\,\left(2\,\delta c_\beta - c_\beta\,\left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right)\left(U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)\right) - \\ c_\beta\,\delta Z_{AG}\,M_W^2\left(U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right) \end{array} \right\} \right\}$$

$$
\underset{219}{C(G^0, \tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2})} = \frac{e\,\delta_{j1,j2}}{4\,c_\beta^2\,M_W^3\,s_W^2}
\left\{
M_W^2 \left\{
s_W \left\{
m_{d_{j1}} \left\{
c_\beta \left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{s1,2} \left\{
\begin{array}{l}
\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,1} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,1}\right) - \\
2\,\delta\mu\,s_\beta\,U^{\tilde{d},j1}_{s2,1}
\end{array}
\right\} + \\
\delta Z^{\tilde{d},j1}_{1,s1} \left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{1,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right) - \\
U^{\tilde{d},j1*}_{1,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right)
\end{array}
\right\} + \\
\delta Z^{\tilde{d},j1}_{2,s1} \left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{2,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right) - \\
U^{\tilde{d},j1*}_{2,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right)
\end{array}
\right\} - \\
\delta Z_{AG} \left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(c_\beta\,\mu + A^{d*}_{j1,j1}\,s_\beta\right) - \\
U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(c_\beta\,\mu^* + A^{d}_{j1,j1}\,s_\beta\right)
\end{array}
\right\} - \\
U^{\tilde{d},j1*}_{s1,1}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right)\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,2} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,2}\right)
\end{array}
\right\} + \\
2\,c_\beta^2\,\delta A^{d*}_{j1,j1}\,U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1} - U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(2\,c_\beta^2\,\delta A^{d}_{j1,j1} - \delta\mu^*\,s_{2\beta}\right)
\end{array}
\right\} - \\
2\,c_\beta\,\delta m^d_{j1}\left(U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right)
\end{array}
\right\} + \\
2\,c_\beta\,\delta s_W\,m_{d_{j1}}\left(U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right)
\end{array}
\right\} + \\
m_{d_{j1}}\,s_W\left(c_\beta\,\delta M_W^2 + M_W^2\left(2\,\delta c_\beta - c_\beta\left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\right)\left(U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\left(A^{d}_{j1,j1}\,c_\beta - \mu^*\,s_\beta\right) - U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,1}\left(A^{d*}_{j1,j1}\,c_\beta - \mu\,s_\beta\right)\right)
\end{array}
\right\}
$$

$$
\begin{aligned}
C(h^0,\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{12}
\Bigg\{ & \frac{1}{M_W\,s_\beta}\Bigg\{ \frac{1}{s_W}\Bigg\{ \frac{1}{c_W}\Bigg\{ \delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{1,1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{1,2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{1,1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{1,2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}+ \\ & \delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{2,1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{2,2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{2,1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{2,2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}\Bigg\}+ \\ & 6\,m_{u_{\mathrm{j1}}}\,\left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(c_\alpha\,\delta A^{u}_{\mathrm{j1,j1}}+\delta\mu^*\,s_\alpha\right)+U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(c_\alpha\,\delta A^{u*}_{\mathrm{j1,j1}}+\delta\mu\,s_\alpha\right)\right)\Bigg\}\Bigg\}- \\ & \frac{1}{c_W\,s^2_W}\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\Bigg\{ c_W\,\Bigg\{ 3\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\Bigg\{ \mu\,\left(2\,\delta s_W\,s_\alpha+c_\alpha\,\delta Z_{hH}\,s_W\right)+ \\ & A^{u*}_{\mathrm{j1,j1}}\,\left(2\,c_\alpha\,\delta s_W-\delta Z_{hH}\,s_\alpha\,s_W\right)\Bigg\}+ \\ & 6\,m^2_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(2\,c_\alpha\,\delta s_W-\delta Z_{hH}\,s_\alpha\,s_W\right)\Bigg\}+ \\ & 4\,M_W\,M_Z\,s_\beta\,s^2_W\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(2\,\delta s_W\,s_{\alpha+\beta}-c_{\alpha+\beta}\,\delta Z_{hH}\,s_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\Bigg\{ M_W\,M_Z\,s_\beta\,\left(c_{\alpha+\beta}\,\delta Z_{hH}\,s_W\,\left(1-4\,c^2_W\right)-2\,\delta s_W\,s_{\alpha+\beta}\,\left(7-4\,c^2_W\right)\right)+ \\ & 6\,c_W\,m^2_{u_{\mathrm{j1}}}\,\left(2\,c_\alpha\,\delta s_W-\delta Z_{hH}\,s_\alpha\,s_W\right)\Bigg\}+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(A^{u}_{\mathrm{j1,j1}}\,\left(2\,c_\alpha\,\delta s_W-\delta Z_{hH}\,s_\alpha\,s_W\right)+\mu^*\,\left(2\,\delta s_W\,s_\alpha+c_\alpha\,\delta Z_{hH}\,s_W\right)\right)\Bigg\}\Bigg\}\Bigg\}+ \\
& \frac{1}{s_W}\Bigg\{ \frac{1}{M_W\,s_\beta}\Bigg\{ 6\,\delta m^u_{\mathrm{j1}}\,\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\,\left(4\,c_\alpha\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}+U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\right)+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\,\left(4\,c_\alpha\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}+U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)\right)\Bigg\}+ \\ & \frac{1}{c_W}\Bigg\{ \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{1,2}\Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{1,1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}+ \\ & \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{2,2}\Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{2,1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}+ \\ & \left(2\,\delta Z_e+\delta Z_{hh}\right)\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}\Bigg\}- \\ & \frac{1}{M_W\,s_\beta}\Bigg\{ \frac{1}{c_W}\Bigg\{ \delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{1,1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{1,2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{1,1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{1,2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}+ \\ & \delta\bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\Bigg\{ 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{2,1}\,\left(A^{u*}_{\mathrm{j1,j1}}\,c_\alpha+\mu\,s_\alpha\right)+ \\ & U^{\tilde{u},\mathrm{j1}}_{2,2}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}-4\,M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,s^2_W\right)\Bigg\}+ \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\Bigg\{ U^{\tilde{u},\mathrm{j1}}_{2,1}\,\left(6\,c_\alpha\,c_W\,m^2_{u_{\mathrm{j1}}}+M_W\,M_Z\,s_{\alpha+\beta}\,s_\beta\,\left(1-4\,c^2_W\right)\right)+ \\ & 3\,c_W\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}}_{2,2}\,\left(A^{u}_{\mathrm{j1,j1}}\,c_\alpha+\mu^*\,s_\alpha\right)\Bigg\}\Bigg\}\Bigg\}+ \\ & 6\,m_{u_{\mathrm{j1}}}\,\left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2}\,\left(c_\alpha\,\delta A^{u}_{\mathrm{j1,j1}}+\delta\mu^*\,s_\alpha\right)+U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\,\left(c_\alpha\,\delta A^{u*}_{\mathrm{j1,j1}}+\delta\mu\,s_\alpha\right)\right)\Bigg\}\Bigg\}\Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
&\underset{225}{C}(H^0,\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{12\, s_W^2} \Bigg\{ \frac{1}{c_W\, M_W\, s_\beta} \Bigg\{ 2\,\delta s_W \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Big(3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha + c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(7 - 4\, c_W^2\right)\right)\Big) + \\
&\quad U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Big(3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right) - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - 4\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\right)\Big) \bigg\} - \\
&\quad s_W \Bigg\{ \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{1,2} \Big\{ 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right) - 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(3\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha + 2\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\right) \Big\} - \\
&\quad\quad U^{\tilde{u},\mathrm{j1}*}_{1,1} \Big\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(1 - 4\, c_W^2\right)\right) - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \Big\} \bigg\} + \\
&\quad \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{2,2} \Big\{ 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right) - 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(3\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha + 2\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\right) \Big\} - \\
&\quad\quad U^{\tilde{u},\mathrm{j1}*}_{2,1} \Big\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(1 - 4\, c_W^2\right)\right) - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \Big\} \bigg\} + \\
&\quad \left(2\,\delta Z_e + \delta Z_{HH}\right) \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Big\{ 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right) - 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(3\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha + 2\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\right) \Big\} - \\
&\quad\quad U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Big\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(1 - 4\, c_W^2\right)\right) - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \Big\} \bigg\} \Bigg\} \Bigg\} + \\
&\quad s_W \Bigg\{ \frac{1}{M_W\, s_\beta} \Bigg\{ \frac{\delta Z_{hH}}{c_W} \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Big\{ 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(A^{u*}_{\mathrm{j1,j1}}\, c_\alpha + \mu\, s_\alpha\right) + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(6\, c_\alpha\, c_W\, m^2_{u_{\mathrm{j1}}} - 4\, M_W\, M_Z\, s_{\alpha+\beta}\, s_\beta\, s_W^2\right) \Big\} + \\
&\quad\quad U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Big\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, c_\alpha\, c_W\, m^2_{u_{\mathrm{j1}}} + M_W\, M_Z\, s_{\alpha+\beta}\, s_\beta \left(1 - 4\, c_W^2\right)\right) + 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(A^u_{\mathrm{j1,j1}}\, c_\alpha + \mu^*\, s_\alpha\right) \Big\} \bigg\} + \\
&\quad 6\,\delta m^u_{\mathrm{j1}} \bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Big(4\, m_{u_{\mathrm{j1}}}\, s_\alpha\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right)\Big) + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Big(4\, m_{u_{\mathrm{j1}}}\, s_\alpha\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right)\Big) \bigg\} \Bigg\} + \\
&\quad \frac{1}{c_W} \Bigg\{ \frac{1}{M_W\, s_\beta} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \bigg\{ \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} \Big\{ U^{\tilde{u},\mathrm{j1}}_{1,1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(1 - 4\, c_W^2\right)\right) - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \Big\} + \\
&\quad\quad \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} \Big\{ U^{\tilde{u},\mathrm{j1}}_{2,1} \left(6\, c_W\, m^2_{u_{\mathrm{j1}}}\, s_\alpha - c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta \left(1 - 4\, c_W^2\right)\right) - 3\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{2,2} \left(c_\alpha\, \mu^* - A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \Big\} - \\
&\quad\quad 6\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(c_\alpha\, \delta\mu^* - \delta A^u_{\mathrm{j1,j1}}\, s_\alpha\right) \bigg\} + \\
&\quad U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \bigg\{ \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} \Big\{ 4\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{1,2} + c_W \left(6\, m^2_{u_{\mathrm{j1}}}\, s_\alpha\, U^{\tilde{u},\mathrm{j1}}_{1,2} - 3\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right)\right) \Big\} + \\
&\quad\quad \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} \Big\{ 4\, c_{\alpha+\beta}\, M_W\, M_Z\, s_\beta\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{2,2} + c_W \left(6\, m^2_{u_{\mathrm{j1}}}\, s_\alpha\, U^{\tilde{u},\mathrm{j1}}_{2,2} - 3\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} \left(c_\alpha\, \mu - A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right)\right) \Big\} - \\
&\quad\quad 6\, c_W\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_\alpha\, \delta\mu - \delta A^{u*}_{\mathrm{j1,j1}}\, s_\alpha\right) \bigg\} \Bigg\} + \ldots \Bigg\} - \ldots
\end{aligned}
$$

$$
C(h^0, \tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}) = \frac{\mathrm{i}\, e\, \delta_{j1,j2}}{12}
$$
$$
\begin{Bmatrix}
\frac{1}{c_\beta\, M_W} \begin{Bmatrix}
\frac{1}{s_W} \begin{Bmatrix}
\frac{1}{c_W} \begin{Bmatrix}
\delta \bar{Z}^{\tilde{d},j2}_{1,s2} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{1,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) + \\ U^{\tilde{d},j1}_{1,2} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - 2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{s1,1} \begin{Bmatrix} U^{\tilde{d},j1}_{1,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{1,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix} + \\
\delta \bar{Z}^{\tilde{d},j2}_{2,s2} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) + \\ U^{\tilde{d},j1}_{2,2} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - 2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{s1,1} \begin{Bmatrix} U^{\tilde{d},j1}_{2,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix} \\
6\, m_{d_{j1}} \left(U^{\tilde{d},j1*}_{s1,2}\, U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \delta\mu + \delta A^{d*}_{j1,j1}\, s_\alpha \right) + U^{\tilde{d},j1*}_{s1,1}\, U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \delta\mu^* + \delta A^{d}_{j1,j1}\, s_\alpha \right) \right)
\end{Bmatrix} + \\
\frac{2\, \delta s_W}{c_W\, s^2_W} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,1} \left(3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) + U^{\tilde{d},j1}_{s2,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(5 - 2\, c^2_W \right) \right) \right) + \\
U^{\tilde{d},j1*}_{s1,2} \left(2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W\, U^{\tilde{d},j1}_{s2,2} + c_W\, \left(6\, m^2_{d_{j1}}\, s_\alpha\, U^{\tilde{d},j1}_{s2,2} + 3\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) \right) \right)
\end{Bmatrix}
\end{Bmatrix} + \\
\frac{1}{s_W} \begin{Bmatrix}
\frac{1}{c_\beta\, M_W} \begin{Bmatrix}
\frac{1}{c_W} \begin{Bmatrix}
6\, \delta m^d_{j1} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,1} \left(4\, m_{d_{j1}}\, s_\alpha\, U^{\tilde{d},j1}_{s2,1} + U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \right) + \\
U^{\tilde{d},j1*}_{s1,2} \left(4\, m_{d_{j1}}\, s_\alpha\, U^{\tilde{d},j1}_{s2,2} + U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) \right)
\end{Bmatrix} - \\
\delta Z_{hH} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,1} \left(A^{d*}_{j1,j1}\, c_\alpha - \mu\, s_\alpha \right) + \\ 2\, U^{\tilde{d},j1}_{s2,2} \left(3\, c_\alpha\, c_W\, m^2_{d_{j1}} - c_{\alpha+\beta}\, c_\beta\, M_W\, M_Z\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{s1,1} \begin{Bmatrix} U^{\tilde{d},j1}_{s2,1} \left(6\, c_\alpha\, c_W\, m^2_{d_{j1}} - c_{\alpha+\beta}\, c_\beta\, M_W\, M_Z\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,2} \left(A^{d}_{j1,j1}\, c_\alpha - \mu^*\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix} - \\
\delta Z^{\tilde{d},j1}_{1,s1} \begin{Bmatrix}
U^{\tilde{d},j1*}_{1,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) + \\ U^{\tilde{d},j1}_{s2,2} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - 2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{1,1} \begin{Bmatrix} U^{\tilde{d},j1}_{s2,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix} - \\
\delta Z^{\tilde{d},j1}_{2,s1} \begin{Bmatrix}
U^{\tilde{d},j1*}_{2,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) + \\ U^{\tilde{d},j1}_{s2,2} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - 2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{2,1} \begin{Bmatrix} U^{\tilde{d},j1}_{s2,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix} - \\
(2\, \delta Z_e + \delta Z_{hh}) \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,2} \begin{Bmatrix} 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) + \\ U^{\tilde{d},j1}_{s2,2} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - 2\, c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, s^2_W \right) \end{Bmatrix} + \\
U^{\tilde{d},j1*}_{s1,1} \begin{Bmatrix} U^{\tilde{d},j1}_{s2,1} \left(6\, c_W\, m^2_{d_{j1}}\, s_\alpha - c_\beta\, M_W\, M_Z\, s_{\alpha+\beta}\, \left(1 + 2\, c^2_W \right) \right) + \\ 3\, c_W\, m_{d_{j1}}\, U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \end{Bmatrix}
\end{Bmatrix}
\end{Bmatrix} - \\
\frac{1}{c_\beta\, M_W} \begin{Bmatrix}
U^{\tilde{d},j1*}_{s1,2} \left(2\, m_{d_{j1}}\, s_\alpha\, U^{\tilde{d},j1}_{s2,2} + U^{\tilde{d},j1}_{s2,1} \left(c_\alpha\, \mu^* + A^{d}_{j1,j1}\, s_\alpha \right) \right) + \\
U^{\tilde{d},j1*}_{s1,1} \left(2\, m_{d_{j1}}\, s_\alpha\, U^{\tilde{d},j1}_{s2,1} + U^{\tilde{d},j1}_{s2,2} \left(c_\alpha\, \mu + A^{d*}_{j1,j1}\, s_\alpha \right) \right)
\end{Bmatrix}
\end{Bmatrix}
\end{Bmatrix}
$$

$$
\underset{227}{C(H^0,\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2})} = -\frac{\mathrm{i}\,e\,\delta_{j1,j2}}{12}
$$

$$
\begin{aligned}
C(H^+, \tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1}) = -\frac{\mathrm{i}\, e}{2\sqrt{2}\, M_W\, s_W^2} \Bigg\{ & \frac{2}{s_{2\beta}} \Bigg\{ s_W \Bigg\{ \left(2\,\delta \mathrm{CKM}_{j1,j2} + \delta \bar{Z}_{H^- H^-}\, \mathrm{CKM}_{j1,j2}\right) \left\{ U^{\tilde{d},j2*}_{s2,1} \left\{ U^{\tilde{u},j1}_{s1,1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{j1}} - m^2_{d_{j2}}\, s_\beta^2 \right) - \right\} - \right\} + \\
& \frac{\delta M_W^2\, \mathrm{CKM}_{j1,j2}}{M_W^2} \left\{ m_{d_{j2}}\, U^{\tilde{d},j2*}_{s2,2} \left(m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} + s_\beta\, U^{\tilde{u},j1}_{s1,1} \left(c_\beta\, \mu + A^{d*}_{j2,j2}\, s_\beta \right) \right) + \right. \\
& \left. U^{\tilde{d},j2*}_{s2,1} \left(c_\beta\, m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} \left(A^u_{j1,j1}\, c_\beta + \mu^*\, s_\beta \right) + U^{\tilde{u},j1}_{s1,1} \left(c_\beta^2\, m^2_{u_{j1}} + s_\beta^2 \left(m^2_{d_{j2}} + 2\, c_\beta^2\, M_W^2 \right) \right) \right) \right\} \Bigg\} - \\
& \mathrm{CKM}_{j1,j2}\, \left(2\,\delta s_W - 2\,\delta Z_e\, s_W\right) \left\{ U^{\tilde{d},j2*}_{s2,1} \left\{ U^{\tilde{u},j1}_{s1,1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{j1}} - m^2_{d_{j2}}\, s_\beta^2 \right) - \right\} - \right\} \Bigg\} + \\
& \mathrm{CKM}_{j1,j2}\, s_W \Bigg\{ 2 \left\{ \frac{\delta c_\beta}{c_\beta^2} \left\{ s_\beta\, U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,1} \left(m^2_{d_{j2}} + c_\beta^2\, M_W^2 \right) + \right\} + \right. \\
& \left. \frac{\delta s_\beta}{s_\beta^2} \left\{ c_\beta\, m_{d_{j2}}\, m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2}\, U^{\tilde{d},j2*}_{s2,2} + \right\} \right\} + \\
& \frac{1}{s_{2\beta}} \Bigg\{ 2 \Bigg\{ \delta \bar{Z}^{\tilde{u},j1}_{1,s1} \left\{ U^{\tilde{d},j2*}_{s2,1} \left\{ U^{\tilde{u},j1}_{1,1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{j1}} - m^2_{d_{j2}}\, s_\beta^2 \right) - \right\} - \right\} + \\
& \delta \bar{Z}^{\tilde{u},j1}_{2,s1} \left\{ U^{\tilde{d},j2*}_{s2,1} \left\{ U^{\tilde{u},j1}_{2,1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{j1}} - m^2_{d_{j2}}\, s_\beta^2 \right) - \right\} - \right\} + \\
& \delta Z^*_{H^- G^-} \left\{ m_{d_{j2}}\, s_\beta\, U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,2} \left(A^{d*}_{j2,j2}\, c_\beta - \mu\, s_\beta \right) + \right\} - \\
& U^{\tilde{d},j2*}_{s2,2} \left\{ m_{d_{j2}} \left(2\,\delta m^u_{j1}\, U^{\tilde{u},j1}_{s1,2} + U^{\tilde{u},j1}_{s1,1} \left(\delta\mu\, s_{2\beta} + 2\,\delta A^{d*}_{j2,j2}\, s_\beta^2 \right) \right) + \right\} - \\
& \delta m^d_{j2} \left(2\, m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} + U^{\tilde{u},j1}_{s1,1} \left(\mu\, s_{2\beta} + 2\, A^{d*}_{j2,j2}\, s_\beta^2 \right) \right) \Bigg\} - \\
& U^{\tilde{d},j2*}_{s2,1} \left\{ 4\,\delta m^d_{j2}\, m_{d_{j2}}\, s_\beta^2\, U^{\tilde{u},j1}_{s1,1} + m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} \left(2\, c_\beta^2\, \delta A^u_{j1,j1} + \delta\mu^*\, s_{2\beta} \right) + \right\} \Bigg\} - \\
& m_{d_{j2}} \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,2} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,2} \right) \left(2\, m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} + U^{\tilde{u},j1}_{s1,1} \left(\mu\, s_{2\beta} + 2\, A^{d*}_{j2,j2}\, s_\beta^2 \right) \right) - \\
& \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1} \right) \left(m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2} \left(2\, A^u_{j1,j1}\, c_\beta^2 + \mu^*\, s_{2\beta} \right) - U^{\tilde{u},j1}_{s1,1} \left(M_W^2\, s_{2\beta}^2 - 2 \left(c_\beta^2\, m^2_{u_{j1}} + m^2_{d_{j2}}\, s_\beta^2 \right) \right) \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
C(H^-,\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\,e}{2\sqrt{2}\,M_W\,s_W^2}
\left\{
\begin{array}{l}
\frac{2}{s_{2\beta}}
\left\{
\begin{array}{l}
\mathrm{CKM}^{*}_{\mathrm{j1,j2}}
\left\{
\begin{array}{l}
(2\,\delta s_W - 2\,\delta Z_e\,s_W)
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(\frac{M_W^2\,s_{2\beta}^2}{2} - c_\beta^2\,m^2_{u_{\mathrm{j1}}} - m^2_{d_{\mathrm{j2}}}\,s_\beta^2\right) - \\
\frac{m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}}{2}\left(\mu^*\,s_{2\beta} + 2\,A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right)
\end{array}
\right\} - \\
m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + c_\beta\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(A^{u*}_{\mathrm{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right)
\end{array}
\right\} - \\
\frac{s_W}{2}
\left\{
\begin{array}{l}
\left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right)
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(M_W^2\,s_{2\beta}^2 - 2\left(c_\beta^2\,m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\,s_\beta^2\right)\right) - \\
m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(\mu^*\,s_{2\beta} + 2\,A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right)
\end{array}
\right\} - \\
m_{u_{\mathrm{j1}}}\left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)\left(2\,m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(2\,A^{u*}_{\mathrm{j1,j1}}\,c_\beta^2 + \mu\,s_{2\beta}\right)\right)
\end{array}
\right\}
\end{array}
\right\} - \\
s_W
\left\{
\begin{array}{l}
\left(2\,\delta\mathrm{CKM}^{*}_{\mathrm{j1,j2}} + \delta Z_{H^-H^-}\,\mathrm{CKM}^{*}_{\mathrm{j1,j2}}\right)
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(\frac{M_W^2\,s_{2\beta}^2}{2} - c_\beta^2\,m^2_{u_{\mathrm{j1}}} - m^2_{d_{\mathrm{j2}}}\,s_\beta^2\right) - \\
\frac{m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}}{2}\left(\mu^*\,s_{2\beta} + 2\,A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right)
\end{array}
\right\} - \\
m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + c_\beta\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(A^{u*}_{\mathrm{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right)
\end{array}
\right\} + \\
\frac{\mathrm{CKM}^{*}_{\mathrm{j1,j2}}}{2\,M_W^2}
\left\{
\begin{array}{l}
m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
\mu\left(2\,c_\beta^2\,\delta Z_{H^-G^-}\,M_W^2 + \delta M_W^2\,s_{2\beta}\right) + \\
A^{u*}_{\mathrm{j1,j1}}\left(2\,c_\beta^2\,\delta M_W^2 - \delta Z_{H^-G^-}\,M_W^2\,s_{2\beta}\right)
\end{array}
\right\} + \\
2\,\delta M_W^2\,m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}
\end{array}
\right\} + \\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
\delta Z_{H^-G^-}\,M_W^2\,s_{2\beta}\left(m^2_{d_{\mathrm{j2}}} - m^2_{u_{\mathrm{j1}}} - c_{2\beta}\,M_W^2\right) + \\
\delta M_W^2\left(M_W^2\,s_{2\beta}^2 + 2\left(c_\beta^2\,m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\,s_\beta^2\right)\right)
\end{array}
\right\} + \\
m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}
\left\{
\begin{array}{l}
A^{d}_{\mathrm{j2,j2}}\left(\delta Z_{H^-G^-}\,M_W^2\,s_{2\beta} + 2\,\delta M_W^2\,s_\beta^2\right) + \\
\mu^*\left(\delta M_W^2\,s_{2\beta} - 2\,\delta Z_{H^-G^-}\,M_W^2\,s_\beta^2\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} - \\
\mathrm{CKM}^{*}_{\mathrm{j1,j2}}\,s_W
\left\{
\begin{array}{l}
\frac{2}{s_{2\beta}^2}
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(M_W^2\,s_{2\beta}^2\,(c_\beta\,\delta s_\beta + \delta c_\beta\,s_\beta) + 4\left(c_\beta^3\,\delta s_\beta\,m^2_{u_{\mathrm{j1}}} + \delta c_\beta\,m^2_{d_{\mathrm{j2}}}\,s_\beta^3\right)\right) + \\
2\,\delta c_\beta\,m_{d_{\mathrm{j2}}}\,s_\beta\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(\mu^*\,s_{2\beta} + 2\,A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right)
\end{array}
\right\} + \\
2\,m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left(c_\beta\,\delta s_\beta\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(2\,A^{u*}_{\mathrm{j1,j1}}\,c_\beta^2 + \mu\,s_{2\beta}\right) + 2\,m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(c_\beta^3\,\delta s_\beta + \delta c_\beta\,s_\beta^3\right)\right)
\end{array}
\right\} + \\
\frac{2}{s_{2\beta}}
\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
c_\beta^2\,m^2_{u_{\mathrm{j1}}}\,U^{\tilde{d},\mathrm{j2}}_{1,1} + \\
s_\beta\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{1,2}\left(c_\beta\,\mu^* + A^{d}_{\mathrm{j2,j2}}\,s_\beta\right) - U^{\tilde{d},\mathrm{j2}}_{1,1}\left(c_\beta\,M_W^2\,s_{2\beta} - m^2_{d_{\mathrm{j2}}}\,s_\beta\right)\right)
\end{array}
\right\} + \\
m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{1,2} + c_\beta\,U^{\tilde{d},\mathrm{j2}}_{1,1}\left(A^{u*}_{\mathrm{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right)
\end{array}
\right\} + \\
\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
c_\beta^2\,m^2_{u_{\mathrm{j1}}}\,U^{\tilde{d},\mathrm{j2}}_{2,1} + \\
s_\beta\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{2,2}\left(c_\beta\,\mu^* + A^{d}_{\mathrm{j2,j2}}\,s_\beta\right) - U^{\tilde{d},\mathrm{j2}}_{2,1}\left(c_\beta\,M_W^2\,s_{2\beta} - m^2_{d_{\mathrm{j2}}}\,s_\beta\right)\right)
\end{array}
\right\} + \\
m_{u_{\mathrm{j1}}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left(m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{2,2} + c_\beta\,U^{\tilde{d},\mathrm{j2}}_{2,1}\left(A^{u*}_{\mathrm{j1,j1}}\,c_\beta + \mu\,s_\beta\right)\right)
\end{array}
\right\} + \\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
m_{u_{\mathrm{j1}}}\left(2\,\delta m^{d}_{\mathrm{j2}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(2\,c_\beta^2\,\delta A^{u*}_{\mathrm{j1,j1}} + \delta\mu\,s_{2\beta}\right)\right) + \\
\delta m^{u}_{\mathrm{j1}}\left(2\,m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left(2\,A^{u*}_{\mathrm{j1,j1}}\,c_\beta^2 + \mu\,s_{2\beta}\right)\right)
\end{array}
\right\} + \\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
4\,c_\beta^2\,\delta m^{u}_{\mathrm{j1}}\,m_{u_{\mathrm{j1}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} + m_{d_{\mathrm{j2}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(\delta\mu^*\,s_{2\beta} + 2\,\delta A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right) + \\
\delta m^{d}_{\mathrm{j2}}\left(4\,m_{d_{\mathrm{j2}}}\,s_\beta^2\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} + U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left(\mu^*\,s_{2\beta} + 2\,A^{d}_{\mathrm{j2,j2}}\,s_\beta^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\underset{232}{C(G^+, \tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1})} = \frac{\mathrm{i}\, e}{2\sqrt{2}\, M_W\, s_W^2} \left\{ \right.
$$

$$
\left. \right\}
$$

$$
\underset{233}{C(G^-,\tilde{u}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2})} = -\frac{\mathrm{i}\,e}{2\sqrt{2}\,M_W\,s_W^2}\left\{
\begin{aligned}
&\tfrac{1}{s_{2\beta}}\left(2\,\delta\mathrm{CKM}^*_{j1,j2}\,s_W - \mathrm{CKM}^*_{j1,j2}\,(2\,\delta s_W - s_W\,(2\,\delta Z_e + \delta Z_{G^-G^-}))\right)\left\{
\begin{aligned}
&m_{u_{j1}}\,U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{d},j2}_{s2,1}\left(2\,c_\beta^2\,\mu - A^{u*}_{j1,j1}\,s_{2\beta}\right) + \\
&U^{\tilde{u},j1*}_{s1,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,s_{2\beta} - 2\,\mu^*\,s_\beta^2\right) + s_{2\beta}\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right. \\
&\mathrm{CKM}^*_{j1,j2}\,s_W\left\{
\begin{aligned}
&\tfrac{1}{s_\beta}\left\{
\begin{aligned}
&\tfrac{1}{c_\beta}\left\{
\begin{aligned}
&\delta Z^{\tilde{u},j1}_{1,s1}\left\{
\begin{aligned}
&c_\beta\,m_{u_{j1}}\,U^{\tilde{u},j1*}_{1,2}\,U^{\tilde{d},j2}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) + \\
&s_\beta\,U^{\tilde{u},j1*}_{1,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + c_\beta\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right\} + \\
&\delta Z^{\tilde{u},j1}_{2,s1}\left\{
\begin{aligned}
&c_\beta\,m_{u_{j1}}\,U^{\tilde{u},j1*}_{2,2}\,U^{\tilde{d},j2}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) + \\
&s_\beta\,U^{\tilde{u},j1*}_{2,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + c_\beta\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right\} - \\
&\tfrac{\delta M_W^2}{M_W^2}\left\{
\begin{aligned}
&c_\beta\,m_{u_{j1}}\,U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{d},j2}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) + \\
&s_\beta\,U^{\tilde{u},j1*}_{s1,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + c_\beta\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} + c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right.
\end{aligned}\right\} - \\
&2\,U^{\tilde{d},j2}_{s2,1}\left\{
\begin{aligned}
&2\,\delta m^u_{j1}\,m_{u_{j1}}\,s_\beta\,U^{\tilde{u},j1*}_{s1,1} - \\
&U^{\tilde{u},j1*}_{s1,2}\left(m_{u_{j1}}\left(c_\beta\,\delta\mu - \delta A^{u*}_{j1,j1}\,s_\beta\right) + \delta m^u_{j1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right)\right)
\end{aligned}\right.
\end{aligned}\right\} + \\
&\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\left\{
\begin{aligned}
&\tfrac{m_{u_{j1}}\,U^{\tilde{d},j2}_{1,1}\,U^{\tilde{u},j1*}_{s1,2}}{s_\beta}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) + \\
&U^{\tilde{u},j1*}_{s1,1}\left(\tfrac{m_{d_{j2}}\,U^{\tilde{d},j2}_{1,2}}{c_\beta}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + U^{\tilde{d},j2}_{1,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right\} + \\
&\delta\bar{Z}^{\tilde{d},j2}_{2,s2}\left\{
\begin{aligned}
&\tfrac{m_{u_{j1}}\,U^{\tilde{d},j2}_{2,1}\,U^{\tilde{u},j1*}_{s1,2}}{s_\beta}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right) + \\
&U^{\tilde{u},j1*}_{s1,1}\left(\tfrac{m_{d_{j2}}\,U^{\tilde{d},j2}_{2,2}}{c_\beta}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + U^{\tilde{d},j2}_{2,1}\left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\,M_W^2\right)\right)
\end{aligned}\right\} - \\
&\tfrac{2\,\delta c_\beta}{c_\beta^2}\left\{
\begin{aligned}
&c_\beta\,m_{d_{j2}}\,m_{u_{j1}}\,U^{\tilde{u},j1*}_{s1,2}\,U^{\tilde{d},j2}_{s2,2} + \\
&U^{\tilde{u},j1*}_{s1,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right) + c_\beta\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{d_{j2}} + c_\beta^2\,M_W^2\right)\right)
\end{aligned}\right\} - \\
&\tfrac{\delta Z_{H^-G^-}}{s_{2\beta}}\left\{
\begin{aligned}
&m_{u_{j1}}\,U^{\tilde{u},j1*}_{s1,2}\left(2\,m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2} + U^{\tilde{d},j2}_{s2,1}\left(2\,A^{u*}_{j1,j1}\,c_\beta^2 + \mu\,s_{2\beta}\right)\right) + \\
&U^{\tilde{u},j1*}_{s1,1}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(\mu^*\,s_{2\beta} + 2\,A^d_{j2,j2}\,s_\beta^2\right) - U^{\tilde{d},j2}_{s2,1}\left(M_W^2\,s_{2\beta}^2 - 2\left(c_\beta^2\,m^2_{u_{j1}} + m^2_{d_{j2}}\,s_\beta^2\right)\right)\right)
\end{aligned}\right\} + \\
&\tfrac{2\,U^{\tilde{u},j1*}_{s1,1}}{c_\beta}\left(m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,2}\left(c_\beta\,\delta A^d_{j2,j2} - \delta\mu^*\,s_\beta\right) + \delta m^d_{j2}\left(2\,c_\beta\,m_{d_{j2}}\,U^{\tilde{d},j2}_{s2,1} + U^{\tilde{d},j2}_{s2,2}\left(A^d_{j2,j2}\,c_\beta - \mu^*\,s_\beta\right)\right)\right) + \\
&\tfrac{2\,\delta s_\beta}{s_\beta^2}\left(s_\beta\,U^{\tilde{u},j1*}_{s1,1}\,U^{\tilde{d},j2}_{s2,1}\left(m^2_{u_{j1}} + M_W^2\,s_\beta^2\right) + m_{u_{j1}}\,U^{\tilde{u},j1*}_{s1,2}\left(m_{d_{j2}}\,s_\beta\,U^{\tilde{d},j2}_{s2,2} - U^{\tilde{d},j2}_{s2,1}\left(c_\beta\,\mu - A^{u*}_{j1,j1}\,s_\beta\right)\right)\right)
\end{aligned}\right\}
\end{aligned}\right\}
$$

[SSSS] 2 Higgs – 2 Sleptons

$$
\underset{280}{C(h^0,h^0,\tilde{\nu}_{j2},\tilde{\nu}^\dagger_{j1})} = \frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{8\,c_W^4\,s_W^3}\left(c_W^2\,s_W\left(2\,\delta Z_{hH}\,s_{2\alpha} + c_{2\alpha}\left(\delta\bar{Z}^{\tilde{\nu},j1}_{1,1} + 2\,\delta Z_{hh} + \delta Z^{\tilde{\nu},j2}_{1,1}\right)\right) + 4\,c_{2\alpha}\left(\delta s_W\,s_W^2 - c_W^2\,(\delta s_W - \delta Z_e\,s_W)\right)\right)
$$

$$
\begin{aligned}
C(h^0, h^0, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3} \Bigg\{ & U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \Bigg\{ c_\beta\, c_W^2\, M_W^2\, s_W \left(2\, c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\alpha^2 - c_{2\alpha}\, c_\beta^2\, M_W^2 \left(1 - 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
& 2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \Bigg\{ c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_\alpha^2\, s_W - \\
& \quad m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta c_\beta\, M_W^2\, s_\alpha^2\, s_W + \\
& \quad c_\beta \Bigg\{ 4\, \delta s_W\, M_W^2\, s_\alpha^2 + \\
& \quad s_W \Bigg\{ 2\, s_\alpha^2 \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right) + \\
& \quad \delta Z_{hH}\, M_W^2\, s_{2\alpha} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \\
& c_\beta^3\, M_W^4 \Bigg\{ c_{2\alpha} \left(2\, \delta s_W\, s_W^2 \left(1 - 2\, c_W^2\right) + c_W^2 \left(2\, \delta s_W + s_W \left(1 - 2\, c_W^2\right) \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right) + \\
& c_W^2\, \delta Z_{hH}\, s_{2\alpha}\, s_W \left(1 - 2\, c_W^2\right) \Bigg\} \Bigg\} \Bigg\} + \\
& 2\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \Bigg\{ c_\beta\, c_W^2\, M_W^2\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\alpha^2 + c_{2\alpha}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
& \quad 2\, c_\beta^3\, M_W^4\, s_W^3 \left(c_W^2\, \delta Z_{hH}\, s_{2\alpha} + c_{2\alpha} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right) + \\
& \quad U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \Bigg\{ c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_\alpha^2\, s_W - \\
& \quad m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta c_\beta\, M_W^2\, s_\alpha^2\, s_W + \\
& \quad c_\beta \Bigg\{ 4\, \delta s_W\, M_W^2\, s_\alpha^2 + \\
& \quad s_W \Bigg\{ 2\, s_\alpha^2 \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right) + \\
& \quad \delta Z_{hH}\, M_W^2\, s_{2\alpha} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& c_\beta\, c_W^2\, M_W^2\, s_W \Bigg\{ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \left(2\, c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\alpha^2 - c_{2\alpha}\, c_\beta^2\, M_W^2 \left(1 - 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
& \quad 2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\alpha^2 + c_{2\alpha}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \Bigg\} \Bigg\}
\end{aligned}
$$

$$
C(H^0, H^0, \tilde{\nu}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_W^4\, s_W^3} \left(c_W^2\, s_W \left(2\, \delta Z_{hH}\, s_{2\alpha} - c_{2\alpha} \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\, \delta Z_{HH} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1}\right)\right) - 4\, c_{2\alpha} \left(\delta s_W\, s_W^2 - c_W^2 \left(\delta s_W - \delta Z_e\, s_W\right)\right)\right)
$$

$$
C(H^0,H^0,\tilde{e}^{\mathrm{s2}}_{\mathrm{j2}},\tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_\beta^3\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(2\,c_\alpha^2\,c_W^2\,m^2_{e_{\mathrm{j1}}} + c_{2\alpha}\,c_\beta^2\,M_W^2\,\left(1-2\,c_W^2\right)\right)\left(\delta\bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
c_W^4\,m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
4\,c_\alpha^2\,c_\beta\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\
m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
c_\beta\,\delta Z_{hH}\,M_W^2\,s_{2\alpha}\,s_W + \\
2\,c_\alpha^2\,\left(2\,\delta c_\beta\,M_W^2\,s_W + c_\beta\,\left(2\,\delta s_W\,M_W^2 + s_W\,\left(\delta M_W^2 - M_W^2\,\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right)\right)
\end{array}
\right.
\end{array}
\right\} - \\
c_\beta^3\,M_W^4
\left\{
\begin{array}{l}
c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W\,\left(1-2\,c_W^2\right) - \\
c_{2\alpha}\,\left(2\,\delta s_W\,s_W^2\,\left(1-2\,c_W^2\right) + c_W^2\,\left(2\,\delta s_W + s_W\,\left(1-2\,c_W^2\right)\,\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right)
\end{array}
\right.
\end{array}
\right\}
\end{array}
\right\} + \\
2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2}
\left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(c_\alpha^2\,c_W^2\,m^2_{e_{\mathrm{j1}}} - c_{2\alpha}\,c_\beta^2\,M_W^2\,s_W^2\right)\left(\delta\bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
2\,c_\beta^3\,M_W^4\,s_W^3\,\left(c_W^2\,\delta Z_{hH}\,s_{2\alpha} - c_{2\alpha}\,\left(2\,\delta s_W\,s_W + c_W^2\,\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right) + \\
c_W^4\,m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
4\,c_\alpha^2\,c_\beta\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\
m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
c_\beta\,\delta Z_{hH}\,M_W^2\,s_{2\alpha}\,s_W + \\
2\,c_\alpha^2\,\left(2\,\delta c_\beta\,M_W^2\,s_W + c_\beta\,\left(2\,\delta s_W\,M_W^2 + s_W\,\left(\delta M_W^2 - M_W^2\,\left(2\,\delta Z_e + \delta Z_{HH}\right)\right)\right)\right)
\end{array}
\right.
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
c_\beta\,c_W^2\,M_W^2\,s_W
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}\,\left(2\,c_\alpha^2\,c_W^2\,m^2_{e_{\mathrm{j1}}} + c_{2\alpha}\,c_\beta^2\,M_W^2\,\left(1-2\,c_W^2\right)\right)\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}\,\left(c_\alpha^2\,c_W^2\,m^2_{e_{\mathrm{j1}}} - c_{2\alpha}\,c_\beta^2\,M_W^2\,s_W^2\right)\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right.
$$

$$
C(A^0,A^0,\tilde{\nu}_{\mathrm{j2}},\tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_W^4\,s_W^3}\,\left(c_W^2\,s_W\,\left(2\,\delta Z_{AG}\,s_{2\beta} + c_{2\beta}\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\,\delta Z_{AA} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1}\right)\right) + 4\,c_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right)\right)
$$

$$
C(G^0,G^0,\tilde{\nu}_{\mathrm{j2}},\tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_W^4\,s_W^3}\,\left(c_W^2\,s_W\,\left(2\,\delta Z_{AG}\,s_{2\beta} - c_{2\beta}\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\,\delta Z_{GG} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1}\right)\right) - 4\,c_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right)\right)
$$

$$
C(A^0,G^0,\tilde{\nu}_{\mathrm{j2}},\tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}\,s_{2\beta}}{8\,c_W^4\,s_W^3}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\left(\delta s_W - \delta Z_e\,s_W\right) - s_W\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + \delta Z_{AA} + \delta Z_{GG} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1}\right)\right)\right)
$$

$$
\underset{291}{C(A^0, A^0, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_W\, \left(c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_{2\beta}\, s_\beta - c_{2\beta}\, c_\beta^3\, M_W^2\, \left(1-2\,c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
2\, c_W^4\, m_{e_{\mathrm{j1}}}\, s_\beta
\left\{
\begin{array}{l}
\delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\
m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
\frac{s_{2\beta}}{2}\, \left(2\,\delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right) + \\
M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{AG} + 2\,\delta c_\beta\, s_\beta\right)
\end{array}
\right.
\end{array}
\right\} - \\
c_\beta^3\, M_W^4
\left\{
\begin{array}{l}
c_{2\beta}\, \left(2\,\delta s_W\, s_W^2\, \left(1-2\,c_W^2\right) + c_W^2\, \left(2\,\delta s_W + s_W\, \left(1-2\,c_W^2\right)\, \left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right) + \\
c_W^2\, \delta Z_{AG}\, s_{2\beta}\, s_W\, \left(1-2\,c_W^2\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
2\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2}
\left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W\, \left(c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
c_\beta^3\, M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{AG}\, s_{2\beta} + c_{2\beta}\, \left(2\,\delta s_W\, s_W + c_W^2\, \left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right) + \\
c_W^4\, m_{e_{\mathrm{j1}}}\, s_\beta
\left\{
\begin{array}{l}
\delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\
m_{e_{\mathrm{j1}}}
\left\{
\begin{array}{l}
\frac{s_{2\beta}}{2}\, \left(2\,\delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{AA}\right)\right)\right) + \\
M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{AG} + 2\,\delta c_\beta\, s_\beta\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
c_\beta\, c_W^2\, M_W^2\, s_W
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}\, \left(2\, c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\beta^2 - c_{2\beta}\, c_\beta^2\, M_W^2\, \left(1-2\,c_W^2\right)\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}\, \left(c_W^2\, m^2_{e_{\mathrm{j1}}}\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
\underset{292}{C(G^0, G^0, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta\, c_W^4\, M_W^4\, s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W\, \left(2\, c_W^2\, m^2_{e_{\mathrm{j1}}} + c_{2\beta}\, M_W^2\, \left(1-2\,c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
2\, c_W^4\, m^2_{e_{\mathrm{j1}}}\, \left(M_W^2\, s_W\, \left(2\,\delta c_\beta + \delta Z_{AG}\, s_\beta\right) + c_\beta\, \left(2\,\delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\right)\right) - \\
c_\beta
\left\{
\begin{array}{l}
4\, c_W^4\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W - \\
M_W^4
\left\{
\begin{array}{l}
c_W^2\, \delta Z_{AG}\, s_{2\beta}\, s_W\, \left(1-2\,c_W^2\right) - \\
c_{2\beta}
\left\{
\begin{array}{l}
2\, \delta s_W\, s_W^2\, \left(1-2\,c_W^2\right) + \\
c_W^2\, \left(2\,\delta s_W + s_W\, \left(1-2\,c_W^2\right)\, \left(2\,\delta Z_e + \delta Z_{GG}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
2\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2}
\left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W\, \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) - \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
c_W^4\, m^2_{e_{\mathrm{j1}}}\, \left(M_W^2\, s_W\, \left(2\,\delta c_\beta + \delta Z_{AG}\, s_\beta\right) + c_\beta\, \left(2\,\delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\right)\right) - \\
c_\beta
\left\{
\begin{array}{l}
M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{AG}\, s_{2\beta} - c_{2\beta}\, \left(2\,\delta s_W\, s_W + c_W^2\, \left(2\,\delta Z_e + \delta Z_{GG}\right)\right)\right) + \\
2\, c_W^4\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
c_\beta\, c_W^2\, M_W^2\, s_W
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1}\, \left(2\, c_W^2\, m^2_{e_{\mathrm{j1}}} + c_{2\beta}\, M_W^2\, \left(1-2\,c_W^2\right)\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2}\, \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
\begin{aligned}
C(A^0, G^0, \tilde{e}^{\tilde{e},\mathrm{s2}}_{\mathrm{j2}}, \tilde{e}^{\tilde{e},\mathrm{s1},\dagger}_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^2\, c_W^4\, M_W^4\, s_W^3} \Bigg\{ & U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \Bigg\{ c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}} + c_\beta^2\, M_W^2\, \left(1 - 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \Bigg\{ c_\beta^2\, M_W^4\, s_{2\beta} \left(c_W^2\, s_W \left(1 - 2\, c_W^2\right) \left(\delta Z_{AA} + \delta Z_{GG}\right) + 4 \left(\delta s_W\, s_W^2 + c_W^2 \left(1 - 2\, s_W^2\right) \left(\delta s_W - \delta Z_e\, s_W\right)\right)\right) + \\
& c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\
& m_{e_{\mathrm{j1}}} \Bigg\{ s_{2\beta} \left(4\, \delta s_W\, M_W^2 + 2\, s_W \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
& M_W^2\, s_W \left(8\, \delta c_\beta\, s_\beta + 2\, \delta Z_{AG} \left(c_\beta^2 + s_\beta^2\right) - s_{2\beta} \left(\delta Z_{AA} + \delta Z_{GG}\right)\right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \Bigg\{ c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) - \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \Bigg\{ 2\, c_\beta^2\, M_W^4\, s_{2\beta}\, s_W^3 \left(4\, \delta s_W\, s_W + c_W^2 \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right) - \\
& c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\
& m_{e_{\mathrm{j1}}} \Bigg\{ s_{2\beta} \left(4\, \delta s_W\, M_W^2 + 2\, s_W \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
& M_W^2\, s_W \left(8\, \delta c_\beta\, s_\beta + 2\, \delta Z_{AG} \left(c_\beta^2 + s_\beta^2\right) - s_{2\beta} \left(\delta Z_{AA} + \delta Z_{GG}\right)\right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& c_W^2\, M_W^2\, s_{2\beta}\, s_W \Bigg\{ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} + c_\beta^2\, M_W^2\, \left(1 - 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \Bigg\} \Bigg\}
\end{aligned}
$$

$$
C(h^0, H^0, \tilde{\nu}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}\, s_{2\alpha}}{8\, c_W^4\, s_W^3} \left(4\, \delta s_W\, s_W^2 - c_W^2 \left(4\, \left(\delta s_W - \delta Z_e\, s_W\right) - s_W \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + \delta Z_{hh} + \delta Z_{HH} + \delta Z^{\tilde{\nu},\mathrm{j2}}_{1,1}\right)\right)\right)
$$

$$
\begin{aligned}
C(h^0, H^0, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{e}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3} \Bigg\{ & U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \Bigg\{ c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}} + c_\beta^2\, M_W^2\, \left(1 - 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \Bigg\{ c_\beta^3\, M_W^4\, s_{2\alpha} \left(4\, \delta s_W\, s_W^2\, \left(1 - 2\, c_W^2\right) + c_W^2\, \left(4\, \delta s_W + s_W\, \left(1 - 2\, c_W^2\right)\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right) + \\
& c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\alpha}\, s_W - \\
& m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta c_\beta\, M_W^2\, s_{2\alpha}\, s_W + \\
& c_\beta \Bigg\{ 4\, \delta s_W\, M_W^2\, s_{2\alpha} + \\
& s_W \Bigg\{ 2\, \delta M_W^2\, s_{2\alpha} + \\
& M_W^2 \Bigg\{ 2\, \delta Z_{hH}\, \left(c_\alpha^2 + s_\alpha^2\right) - \\
& s_{2\alpha}\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},2} \Bigg\{ c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) - \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \Bigg\{ 2\, c_\beta^3\, M_W^4\, s_{2\alpha}\, s_W^3\, \left(4\, \delta s_W\, s_W + c_W^2\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right) - \\
& c_W^4\, m_{e_{\mathrm{j1}}} \Bigg\{ 4\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\alpha}\, s_W - \\
& m_{e_{\mathrm{j1}}} \Bigg\{ 4\, \delta c_\beta\, M_W^2\, s_{2\alpha}\, s_W + \\
& c_\beta \Bigg\{ 4\, \delta s_W\, M_W^2\, s_{2\alpha} + \\
& s_W \Bigg\{ 2\, \delta M_W^2\, s_{2\alpha} + \\
& M_W^2 \Bigg\{ 2\, \delta Z_{hH}\, \left(c_\alpha^2 + s_\alpha^2\right) - \\
& s_{2\alpha}\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \Bigg\{ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},1} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} + c_\beta^2\, M_W^2\, \left(1 - 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s1},2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \Bigg\} \Bigg\}
\end{aligned}
\tag{301}
$$

$$
\begin{aligned}
C(h^0, H^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, \sqrt{2}\, c_\beta^3\, M_W^4\, s_W^3} \Bigg\{ & c_\beta\, M_W^2\, s_W \left(c_{\alpha+\beta}\, c_\beta^2\, M_W^2 + m^2_{e_{\mathrm{j1}}}\, s_\alpha\, s_\beta\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \Bigg\{ m_{e_{\mathrm{j1}}}\, s_{2\beta}\, s_\alpha \left(2\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) + \\
& \tfrac{M_W^2\, s_W}{2} \Bigg\{ \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \left(2\, c_{\alpha+\beta}\, c_\beta^3\, M_W^2 + m^2_{e_{\mathrm{j1}}}\, s_{2\beta}\, s_\alpha\right) - \\
& m^2_{e_{\mathrm{j1}}} \Bigg\{ s_{2\beta}\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) + \\
& s_\alpha\, \left(2\, c_\beta^2\, \delta Z_{H^-G^-} + 8\, \delta c_\beta\, s_\beta\right) \Bigg\} \Bigg\} - \\
& \tfrac{c_\beta^2\, M_W^4}{2} \Bigg\{ 2\, c_\alpha\, c_\beta^2\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - \\
& s_\alpha\, s_W\, \left(2\, c_\beta^2\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) - s_{2\beta}\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - \\
& s_{2\beta}\, \left(4\, \delta s_W\, s_\alpha + c_\alpha\, s_W\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right)\right) \Bigg\} \Bigg\} \Bigg\}
\end{aligned}
\tag{316}
$$

$$
\begin{aligned}
C(h^0, G^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\sqrt{2}\, c_\beta^2\, M_W^4\, s_W^3} \Bigg\{ & c_\beta\, M_W^2\, s_W \left(m_{e_{\mathrm{j1}}}^2\, s_\alpha - c_\beta\, M_W^2\, s_{\alpha+\beta}\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
& U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \Bigg\{ c_\beta \Bigg\{ \tfrac{M_W^4}{2} \Bigg\{ 2\, m_{e_{\mathrm{j1}}}\, s_\alpha \left(2\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) + \\
& \qquad c_\beta^2 \left\{ \begin{array}{l} 8\, \delta s_W\, s_\alpha + \\ 2\, s_W\, \left(c_\alpha\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) \end{array} \right\} - \\
& \qquad s_{2\beta} \left\{ \begin{array}{l} s_\alpha\, s_W\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - \\ c_\alpha\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) \end{array} \right\} \Bigg\} \Bigg\} + \\
& \qquad M_W^2\, s_W \left\{ \begin{array}{l} c_\beta\, \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \left(m_{e_{\mathrm{j1}}}^2\, s_\alpha - c_\beta\, M_W^2\, s_{\alpha+\beta}\right) - \\ m_{e_{\mathrm{j1}}}^2 \left\{ \begin{array}{l} s_\alpha\, \left(4\, \delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) + \\ c_\beta\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) \end{array} \right\} \end{array} \right\} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(h^0, H^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\sqrt{2}\, c_\beta^3\, M_W^4\, s_W^3} \Bigg\{ & M_W^2\, s_W \left(2\, c_{\alpha+\beta}\, c_\beta^3\, M_W^2 + m_{e_{\mathrm{j1}}}^2\, s_{2\beta}\, s_\alpha\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
& U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \Bigg\{ m_{e_{\mathrm{j1}}}^2\, M_W^2\, s_\alpha\, s_W \left(2\, c_\beta^2\, \delta Z^*_{H^-G^-} + 8\, \delta c_\beta\, s_\beta\right) - \\
& \qquad m_{e_{\mathrm{j1}}}\, s_{2\beta} \left\{ \begin{array}{l} 4\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_\alpha\, s_W - \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} M_W^2\, s_\alpha\, \left(4\, \delta s_W - \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\, s_W\right) + \\ s_W\, \left(2\, \delta M_W^2\, s_\alpha + M_W^2\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{hh}\right)\right)\right) \end{array} \right\} \end{array} \right\} - \\
& \qquad M_W^4 \left\{ \begin{array}{l} 2\, c_\beta^3\, s_W\, \left(c_{\alpha+\beta}\, \delta \bar{Z}_{H^-H^-} + \delta Z^*_{H^-G^-}\, s_{\alpha+\beta}\right) + \\ 2\, c_\beta^4\, \left(\delta Z_{hH}\, s_\alpha\, s_W - c_\alpha\, \left(4\, \delta s_W - s_W\, \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 4\, \delta Z_e + \delta Z_{hh}\right)\right)\right) + \\ c_\beta^2\, s_{2\beta}\, \left(s_\alpha\, \left(4\, \delta s_W - \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\, s_W\right) + s_W\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh}\right)\right)\right) \end{array} \right\} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(h^0, G^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\sqrt{2}\, c_\beta^2\, M_W^4\, s_W^3} \Bigg\{ & 2\, c_\beta\, M_W^2\, s_W \left(m_{e_{\mathrm{j1}}}^2\, s_\alpha - c_\beta\, M_W^2\, s_{\alpha+\beta}\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
& U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \Bigg\{ m_{e_{\mathrm{j1}}}^2\, M_W^2\, s_\alpha\, s_W\, \left(8\, \delta c_\beta + 2\, \delta Z_{H^-G^-}\, s_\beta\right) - \\
& \qquad 2\, c_\beta\, m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_\alpha\, s_W - \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} M_W^2\, s_\alpha\, \left(4\, \delta s_W - \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\, s_W\right) + \\ s_W\, \left(2\, \delta M_W^2\, s_\alpha + M_W^2\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right) \end{array} \right\} \end{array} \right\} + \\
& \qquad M_W^4 \left\{ \begin{array}{l} c_\beta\, s_{2\beta}\, \left(\delta Z_{hH}\, s_\alpha\, s_W - c_\alpha\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{hh}\right)\right)\right) - \\ 2\, c_\beta^3\, \left(4\, \delta s_W\, s_\alpha + s_W\, \left(c_\alpha\, \delta Z_{hH} - s_\alpha\, \left(4\, \delta Z_e + \delta Z_{hh}\right)\right)\right) + \\ 2\, c_\beta^2\, s_W\, \left(c_{\alpha+\beta}\, \delta Z_{H^-G^-} + s_{\alpha+\beta}\, \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + \delta Z_{G^-G^-}\right)\right) \end{array} \right\} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
\underset{320}{C(A^0, H^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = \frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\sqrt{2}\,c_\beta^3\,M_W^4\,s_W^3} \left\{ \begin{array}{l} c_\beta\,M_W^2\,s_W\,\left(c_{2\beta}\,c_\beta^2\,M_W^2 + m_{e_{\mathrm{j1}}}^2\,s_\beta^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\ \frac{U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}}{4} \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}}^2\,M_W^2\,s_W\,\left(16\,\delta c_\beta\,s_\beta^2 + 2\,c_\beta\,s_{2\beta}\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)\right) - \\ 2\,m_{e_{\mathrm{j1}}}\,s_{2\beta}\,s_\beta \left\{ \begin{array}{l} 4\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\ m_{e_{\mathrm{j1}}}\,\left(s_W\,\left(2\,\delta M_W^2 - M_W^2\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{H^-H^-}\right)\right) + M_W^2\,\left(4\,\delta s_W - \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\,s_W\right)\right) \end{array} \right\} + \\ M_W^4 \left\{ \begin{array}{l} \left(4\,c_\beta^5 - c_\beta\,s_{2\beta}^2\right)\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{H^-H^-}\right)\right) - \\ 4\,c_\beta^3\,s_W\,\left(c_{2\beta}\,\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} + s_{2\beta}\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)\right) \end{array} \right. \end{array} \right. \end{array} \right\}
$$

$$
\underset{321}{C(G^0, G^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = \frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\sqrt{2}\,c_\beta\,M_W^4\,s_W^3} \left\{ \begin{array}{l} c_\beta\,M_W^2\,s_W\,\left(m_{e_{\mathrm{j1}}}^2 - c_{2\beta}\,M_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} 2\,c_\beta\,m_{e_{\mathrm{j1}}}\,\left(2\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - m_{e_{\mathrm{j1}}}\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right) + \\ \frac{M_W^4}{2} \left\{ \begin{array}{l} c_\beta^3\,\left(8\,\delta s_W - 2\,s_W\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right) - \\ s_{2\beta}\,\left(s_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right) - 2\,c_\beta\,s_W\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)\right) \end{array} \right. - \\ M_W^2\,s_W \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}}^2\,\left(4\,\delta c_\beta + s_\beta\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right) - c_\beta\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right) - \\ c_\beta\,\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\,\left(m_{e_{\mathrm{j1}}}^2 - c_{2\beta}\,M_W^2\right) \end{array} \right. \end{array} \right. \end{array} \right\}
$$

$$
\underset{322}{C(A^0, G^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = -\frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\sqrt{2}\,c_\beta^2\,M_W^4\,s_W^3} \left\{ \begin{array}{l} \frac{M_W^2\,s_{2\beta}\,s_W}{2}\,\left(m_{e_{\mathrm{j1}}}^2 - 2\,c_\beta^2\,M_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} 2\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,\left(\delta s_W\,m_{e_{\mathrm{j1}}} - \delta m^e_{\mathrm{j1}}\,s_W\right) - \\ \frac{M_W^4}{4} \left\{ \begin{array}{l} s_W\,\left(4\,c_\beta^4 - s_{2\beta}^2\right)\,\left(\delta Z_{AG} - \delta Z_{H^-G^-}\right) + \\ 4\,c_\beta^2\,s_{2\beta}\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}\right)\right) \end{array} \right. - \\ s_W \left\{ \begin{array}{l} \frac{\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\,M_W^2\,s_{2\beta}}{2}\,\left(m_{e_{\mathrm{j1}}}^2 - 2\,c_\beta^2\,M_W^2\right) - \\ m_{e_{\mathrm{j1}}}^2 \left\{ \begin{array}{l} \delta M_W^2\,s_{2\beta} + \\ \frac{M_W^2}{2} \left\{ \begin{array}{l} 8\,\delta c_\beta\,s_\beta + 2\,\left(c_\beta^2\,\delta Z_{AG} + \delta Z_{H^-G^-}\,s_\beta^2\right) - \\ s_{2\beta}\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right\}
$$

$$
C(G^0, H^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\,\sqrt{2}\,c_\beta^2\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
\frac{M_W^2\,s_{2\beta}\,s_W}{2}\,\left(m_{e_{\mathrm{j1}}}^2 - 2\,c_\beta^2\,M_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left\{
\begin{array}{l}
m_{e_{\mathrm{j1}}}\,s_{2\beta}\,\left(2\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - m_{e_{\mathrm{j1}}}\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right) + \\
\frac{M_W^4}{4}\left\{
\begin{array}{l}
4\,c_\beta^2\,s_{2\beta}\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{H^-H^-}\right)\right) - \\
s_W\,\left(4\,c_\beta^4 - s_{2\beta}^2\right)\,\left(\delta Z_{AG} - \delta Z_{H^-G^-}\right)
\end{array}
\right\} - \\
\frac{M_W^2\,s_W}{2}\left\{
\begin{array}{l}
m_{e_{\mathrm{j1}}}^2\,\left(2\,c_\beta^2\,\delta Z_{H^-G^-} + 8\,\delta c_\beta\,s_\beta + 2\,\delta Z_{AG}\,s_\beta^2 - s_{2\beta}\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{H^-H^-}\right)\right) - \\
\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\,s_{2\beta}\,\left(m_{e_{\mathrm{j1}}}^2 - 2\,c_\beta^2\,M_W^2\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
$$

$$
C(A^0, H^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = -\frac{e^2\,\delta_{\mathrm{j1,j2}}}{16\,\sqrt{2}\,c_\beta^3\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
2\,M_W^2\,s_W\,\left(2\,c_{2\beta}\,c_\beta^3\,M_W^2 + m_{e_{\mathrm{j1}}}^2\,s_{2\beta}\,s_\beta\right)\,\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}\left\{
\begin{array}{l}
m_{e_{\mathrm{j1}}}^2\,M_W^2\,s_W\,\left(16\,\delta c_\beta\,s_\beta^2 + 2\,c_\beta\,s_{2\beta}\,\left(\delta Z_{AG} + \delta Z^*_{H^-G^-}\right)\right) - \\
2\,m_{e_{\mathrm{j1}}}\,s_{2\beta}\,s_\beta\left\{
\begin{array}{l}
4\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\
m_{e_{\mathrm{j1}}}\left(s_W\,\left(2\,\delta M_W^2 - M_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{AA}\right)\right) + M_W^2\,\left(4\,\delta s_W - \delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\,s_W\right)\right)
\end{array}
\right\} + \\
M_W^4\left\{
\begin{array}{l}
\left(4\,c_\beta^5 - c_\beta\,s_{2\beta}^2\right)\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA}\right)\right) - \\
4\,c_\beta^3\,s_W\,\left(c_{2\beta}\,\left(\delta\bar{Z}_{H^-H^-} + \delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\right) + s_{2\beta}\,\left(\delta Z_{AG} + \delta Z^*_{H^-G^-}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
$$

$$
C(G^0, G^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = -\frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\,\sqrt{2}\,c_\beta\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
c_\beta\,M_W^2\,s_W\,\left(m_{e_{\mathrm{j1}}}^2 - c_{2\beta}\,M_W^2\right)\,\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}\left\{
\begin{array}{l}
2\,c_\beta\,m_{e_{\mathrm{j1}}}\,\left(2\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - m_{e_{\mathrm{j1}}}\,\left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right) - \\
\frac{M_W^4}{2}\left\{
\begin{array}{l}
s_{2\beta}\,s_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{GG}\right)\right) - c_\beta^3\,\left(8\,\delta s_W - 2\,s_W\,\left(4\,\delta Z_e + \delta Z_{GG}\right)\right) + \\
2\,c_\beta\,s_W\,\left(c_{2\beta}\,\delta Z_{G^-G^-} - s_{2\beta}\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)\right)
\end{array}
\right\} - \\
M_W^2\,s_W\left\{
\begin{array}{l}
m_{e_{\mathrm{j1}}}^2\,\left(4\,\delta c_\beta + s_\beta\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right) - c_\beta\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right) - \\
c_\beta\,\delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\,\left(m_{e_{\mathrm{j1}}}^2 - c_{2\beta}\,M_W^2\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
$$

$$
\underset{326}{C(A^0, G^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}})} = \frac{e^2\,\delta_{\mathrm{j1,j2}}}{4\sqrt{2}\,c_\beta^2\,M_W^4\,s_W^3}\left\{\begin{array}{l}
\frac{M_W^2\,s_{2\beta}\,s_W}{2}\left(m^2_{e_{\mathrm{j1}}} - 2\,c_\beta^2\,M_W^2\right)\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}\left\{\begin{array}{l}
2\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\left(\delta s_W\,m_{e_{\mathrm{j1}}} - \delta m^e_{\mathrm{j1}}\,s_W\right) - \\
\frac{M_W^4}{4}\left\{\begin{array}{l}
\delta Z_{AG}\,s_W\left(4\,c_\beta^4 - s_{2\beta}^2\right) + \\
4\,c_\beta^2\left(4\,\delta s_W\,s_{2\beta} - s_W\left(c_{2\beta}\,\delta Z_{H^-G^-} + s_{2\beta}\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}\right)\right)\right)
\end{array}\right\} - \\
s_W\left\{\begin{array}{l}
\frac{\delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\,M_W^2\,s_{2\beta}}{2}\left(m^2_{e_{\mathrm{j1}}} - 2\,c_\beta^2\,M_W^2\right) - \\
m^2_{e_{\mathrm{j1}}}\left\{\begin{array}{l}
\delta M_W^2\,s_{2\beta} + \\
\frac{M_W^2}{2}\left\{\begin{array}{l}
8\,\delta c_\beta\,s_\beta + 2\left(c_\beta^2\,\delta Z_{AG} + \delta Z_{H^-G^-}\,s_\beta^2\right) - \\
s_{2\beta}\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}\right)
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
$$

$$
\underset{327}{C(G^0, H^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}})} = \frac{e^2\,\delta_{\mathrm{j1,j2}}}{16\sqrt{2}\,c_\beta^2\,M_W^4\,s_W^3}\left\{\begin{array}{l}
2\,M_W^2\,s_{2\beta}\,s_W\left(m^2_{e_{\mathrm{j1}}} - 2\,c_\beta^2\,M_W^2\right)\left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1}\left\{\begin{array}{l}
M_W^4\left(\delta Z_{AG}\,s_W\left(4\,c_\beta^4 - s_{2\beta}^2\right) - 4\,c_\beta^2\,s_{2\beta}\left(4\,\delta s_W - s_W\left(\delta\bar{Z}_{H^-H^-} + \delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 4\,\delta Z_e + \delta Z_{GG}\right)\right)\right) + \\
M_W^2\,s_W\left(4\,c_\beta^2\,\delta Z^*_{H^-G^-}\left(m^2_{e_{\mathrm{j1}}} - c_{2\beta}\,M_W^2\right) + m^2_{e_{\mathrm{j1}}}\left(16\,\delta c_\beta\,s_\beta + 4\,\delta Z_{AG}\,s_\beta^2\right)\right) - \\
2\,m_{e_{\mathrm{j1}}}\,s_{2\beta}\left\{\begin{array}{l}
4\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\
m_{e_{\mathrm{j1}}}\left(s_W\left(2\,\delta M_W^2 - M_W^2\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{GG}\right)\right) + M_W^2\left(4\,\delta s_W - \delta\bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\,s_W\right)\right)
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
$$

$$
\underset{332}{C(H^0, H^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{4\sqrt{2}\,c_\beta^3\,M_W^4\,s_W^3}\left\{\begin{array}{l}
c_\beta\,M_W^2\,s_W\left(c_\beta^2\,M_W^2\,s_{\alpha+\beta} - c_\alpha\,m^2_{e_{\mathrm{j1}}}\,s_\beta\right)\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left\{\begin{array}{l}
c_\alpha\,m_{e_{\mathrm{j1}}}\left(2\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W - m_{e_{\mathrm{j1}}}\left(2\,\delta s_W\,M_W^2\,s_{2\beta} + s_W\left(4\,\delta c_\beta\,M_W^2\,s_\beta + s_{2\beta}\left(\delta M_W^2 - 2\,\delta Z_e\,M_W^2\right)\right)\right)\right) + \\
c_\beta^3\,M_W^4\left\{\begin{array}{l}
4\,s_{\alpha+\beta}\left(\delta s_W - \delta Z_e\,s_W\right) - \\
s_W\left\{\begin{array}{l}
c_\alpha\left(c_\beta\left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) + s_\beta\left(\delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) - \\
s_\alpha\left(s_\beta\left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - c_\beta\left(\delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)
\end{array}\right\}
\end{array}\right\} - \\
\frac{M_W^2\,s_W}{2}\left\{\begin{array}{l}
m^2_{e_{\mathrm{j1}}}\left(2\,c_\alpha\,c_\beta^2\,\delta Z_{H^-G^-} + s_{2\beta}\left(\delta Z_{hH}\,s_\alpha - c_\alpha\left(\delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right) - \\
\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\left(c_\alpha\,m^2_{e_{\mathrm{j1}}}\,s_{2\beta} - 2\,c_\beta^3\,M_W^2\,s_{\alpha+\beta}\right)
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
$$

$$
C(H^0, G^-, \tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\sqrt{2}\, c_\beta^2\, M_W^4\, s_W^3} \left\{ \begin{array}{l} c_\beta\, M_W^2\, s_W\, \left(c_\alpha\, m^2_{e_{\mathrm{j1}}} - c_{\alpha+\beta}\, c_\beta\, M_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_\alpha\, \left(4\, c_\beta\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W - 2\, m^2_{e_{\mathrm{j1}}}\, \left(2\, \delta c_\beta\, M_W^2\, s_W + c_\beta\, \left(\delta M_W^2\, s_W + M_W^2\, \left(2\, \delta s_W - 2\, \delta Z_e\, s_W\right)\right)\right)\right) - \\ \frac{c_\beta\, M_W^4}{2} \left\{ \begin{array}{l} s_{2\beta}\, \left(4\, \delta s_W\, s_\alpha - s_W\, \left(c_\alpha\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_\alpha\, \left(4\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right) - \\ 2\, c_\beta^2\, \left(c_\alpha\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) + s_\alpha\, s_W\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right)\right) \end{array} \right\} - \\ M_W^2\, s_W \left\{ \begin{array}{l} m^2_{e_{\mathrm{j1}}}\, \left(c_\alpha\, \delta Z_{H^-G^-}\, s_\beta + c_\beta\, \left(\delta Z_{hH}\, s_\alpha - c_\alpha\, \left(\delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right) - \\ c_\beta\, \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\, \left(c_\alpha\, m^2_{e_{\mathrm{j1}}} - c_{\alpha+\beta}\, c_\beta\, M_W^2\right) \end{array} \right. \end{array} \right. \end{array} \right.
$$

$$
C(H^0, H^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\sqrt{2}\, c_\beta^3\, M_W^4\, s_W^3} \left\{ \begin{array}{l} M_W^2\, s_W\, \left(c_\alpha\, m^2_{e_{\mathrm{j1}}}\, s_{2\beta} - 2\, c_\beta^3\, M_W^2\, s_{\alpha+\beta}\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_\alpha\, m^2_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, \left(2\, c_\beta^2\, \delta Z^*_{H^-G^-} + 8\, \delta c_\beta\, s_\beta\right) - \\ m_{e_{\mathrm{j1}}}\, s_{2\beta} \left\{ \begin{array}{l} 4\, c_\alpha\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W + \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} M_W^2\, s_W\, \left(c_\alpha\, \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} - \delta Z_{hH}\, s_\alpha\right) - \\ c_\alpha\, \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{HH}\right)\right)\right) \end{array} \right. \end{array} \right. - \\ M_W^4 \left\{ \begin{array}{l} c_\beta^2\, s_{2\beta}\, \left(\delta Z_{hH}\, s_\alpha\, s_W + c_\alpha\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{HH}\right)\right)\right) + \\ 2 \left\{ \begin{array}{l} c_\beta^3\, s_W\, \left(c_{\alpha+\beta}\, \delta Z^*_{H^-G^-} - s_{\alpha+\beta}\, \left(\delta \bar{Z}_{H^-H^-} + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right) + \\ c_\beta^4\, \left(4\, \delta s_W\, s_\alpha - s_W\, \left(c_\alpha\, \delta Z_{hH} + s_\alpha\, \left(4\, \delta Z_e + \delta Z_{HH}\right)\right)\right) \end{array} \right. \end{array} \right. \end{array} \right.
$$

$$
C(H^0, G^+, \tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^\dagger_{\mathrm{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\sqrt{2}\, c_\beta^2\, M_W^4\, s_W^3} \left\{ \begin{array}{l} 2\, c_\beta\, M_W^2\, s_W\, \left(c_\alpha\, m^2_{e_{\mathrm{j1}}} - c_{\alpha+\beta}\, c_\beta\, M_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_\alpha\, m^2_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, \left(8\, \delta c_\beta + 2\, \delta Z_{H^-G^-}\, s_\beta\right) - \\ 2\, c_\beta\, m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, c_\alpha\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W + \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} M_W^2\, s_W\, \left(c_\alpha\, \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} - \delta Z_{hH}\, s_\alpha\right) - \\ c_\alpha\, \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right) \end{array} \right. \end{array} \right. + \\ M_W^4 \left\{ \begin{array}{l} c_\beta\, s_{2\beta}\, \left(4\, \delta s_W\, s_\alpha - s_W\, \left(c_\alpha\, \delta Z_{hH} + s_\alpha\, \left(4\, \delta Z_e + \delta Z_{HH}\right)\right)\right) - \\ 2 \left\{ \begin{array}{l} c_\beta^3\, \left(\delta Z_{hH}\, s_\alpha\, s_W + c_\alpha\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{HH}\right)\right)\right) + \\ c_\beta^2\, s_W\, \left(\delta Z_{H^-G^-}\, s_{\alpha+\beta} - c_{\alpha+\beta}\, \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + \delta Z_{G^-G^-}\right)\right) \end{array} \right. \end{array} \right. \end{array} \right.
$$

$$
C(H^-,H^+,\tilde{\nu}_{\mathrm{j1}},\tilde{\nu}^\dagger_{\mathrm{j2}}) = \frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{32\,c_\beta^3\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
4\,c_\beta\,M_W^4\,\left(c_{2\beta}\,c_\beta^2\,c_W^2\,\delta\bar{Z}_{H^-H^-}\,s_W\,\left(1-2\,c_W^2\right)+\left(4\,c_\beta^4-s_{2\beta}^2\right)\,\left(\delta s_W\,s_W^2-\left(c_W^2-2\,c_W^4\right)\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)\right)+ \\
c_W^2\left\{
\begin{array}{l}
M_W^4\,s_W\,\left(1-2\,c_W^2\right)\left\{
\begin{array}{l}
4\,\left(c_{2\beta}\,c_\beta^3\,\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+c_\beta^5\,\left(\delta Z_{H^-H^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)-c_\beta\,s_{2\beta}^2\,\left(\delta Z_{H^-H^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)+ \\
8\,Re(\delta Z_{H^-G^-})\,c_\beta^3\,s_{2\beta}
\end{array}
\right\}+ \\
c_W^2\left\{
\begin{array}{l}
m^2_{e_{\mathrm{j1}}}\,M_W^2\,s_W\,\left(8\,Re(\delta Z_{H^-G^-})\,c_\beta\,s_{2\beta}+32\,\delta c_\beta\,s_\beta^2\right)- \\
4\,m_{e_{\mathrm{j1}}}\,s_{2\beta}\,s_\beta\left\{
\begin{array}{l}
4\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W- \\
m_{e_{\mathrm{j1}}}\left\{
\begin{array}{l}
M_W^2\,\left(4\,\delta s_W-s_W\,\left(\delta\bar{Z}_{H^-H^-}+4\,\delta Z_e\right)\right)+ \\
s_W\,\left(2\,\delta M_W^2-M_W^2\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{H^-H^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(G^-,G^+,\tilde{\nu}_{\mathrm{j1}},\tilde{\nu}^\dagger_{\mathrm{j2}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{16\,c_\beta\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
M_W^4\left\{
\begin{array}{l}
4\,\left(2\,c_\beta^3-s_{2\beta}\,s_\beta\right)\,\left(\delta s_W\,s_W^2-\left(c_W^2-2\,c_W^4\right)\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)+ \\
c_W^2\,s_W\,\left(1-2\,c_W^2\right)\left\{
\begin{array}{l}
2\,c_\beta^3\,\delta Z_{G^-G^-}-s_{2\beta}\,\left(4\,c_\beta\,\delta Z_{H^-G^-}+\delta Z_{G^-G^-}\,s_\beta\right)+ \\
2\,c_{2\beta}\,c_\beta\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{G^-G^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)
\end{array}
\right\}
\end{array}
\right\}+ \\
c_W^4\left\{
\begin{array}{l}
16\,c_\beta\,\delta m^e_{\mathrm{j1}}\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_W- \\
4\,m^2_{e_{\mathrm{j1}}}\left\{
\begin{array}{l}
M_W^2\,s_W\,\left(4\,\delta c_\beta+2\,\delta Z_{H^-G^-}\,s_\beta\right)+ \\
c_\beta\,\left(s_W\,\left(2\,\delta M_W^2-M_W^2\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+2\,\delta Z_{G^-G^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)+4\,M_W^2\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(H^-,G^+,\tilde{\nu}_{\mathrm{j1}},\tilde{\nu}^\dagger_{\mathrm{j2}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_\beta^2\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
c_W^4\,m^2_{e_{\mathrm{j1}}}\left\{
\begin{array}{l}
s_{2\beta}\,\left(2\,\delta M_W^2\,s_W+4\,M_W^2\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)+ \\
M_W^2\,s_W\,\left(8\,\delta c_\beta\,s_\beta+2\,\delta Z_{H^-G^-}\,\left(c_\beta^2+s_\beta^2\right)-s_{2\beta}\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{G^-G^-}+\delta Z_{H^-H^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)
\end{array}
\right\}- \\
s_{2\beta}\left\{
\begin{array}{l}
c_\beta^2\,M_W^4\,\left(4\,\left(\delta s_W\,s_W^2-\left(c_W^2-2\,c_W^4\right)\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)+c_W^2\,s_W\,\left(1-2\,c_W^2\right)\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{G^-G^-}+\delta Z_{H^-H^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)+ \\
4\,c_W^4\,\delta m^e_{\mathrm{j1}}\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_W
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(G^-,H^+,\tilde{\nu}_{\mathrm{j1}},\tilde{\nu}^\dagger_{\mathrm{j2}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,s_W^3}
\left\{
\begin{array}{l}
4\,s_{2\beta}\,\left(\delta Z_e\,s_W\,\left(2-\frac{1}{c_W^2}\right)-\delta s_W\,\left(2-\frac{1}{c_W^2}+\frac{s_W^2}{c_W^4}\right)\right)+ \\
\frac{1}{c_\beta^2\,c_W^2\,M_W^4}\left\{
\begin{array}{l}
c_W^2\,m^2_{e_{\mathrm{j1}}}\left\{
\begin{array}{l}
s_{2\beta}\,\left(2\,\delta M_W^2\,s_W+4\,M_W^2\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)+ \\
M_W^2\,s_W\,\left\{
\begin{array}{l}
8\,\delta c_\beta\,s_\beta+2\,\left(c_\beta^2\,\delta Z^*_{H^-G^-}+\delta Z_{H^-G^-}\,s_\beta^2\right)- \\
s_{2\beta}\,\left(\delta\bar{Z}_{H^-H^-}+\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{G^-G^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)
\end{array}
\right\}
\end{array}
\right\}- \\
s_W\left\{
\begin{array}{l}
c_\beta^2\,M_W^4\,\left(1-2\,c_W^2\right)\,\left(2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_{2\beta}+s_{2\beta}\,\left(\delta\bar{Z}_{H^-H^-}+\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z_{G^-G^-}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)+ \\
4\,c_W^2\,\delta m^e_{\mathrm{j1}}\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\underset{340}{C(H^-,H^+,\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = \frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_\beta^3\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
c_\beta\,M_W^2 \left\{
\begin{array}{l}
M_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{
\begin{array}{l}
c_{2\beta}\,c_\beta^2\,c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{
\begin{array}{l}
\delta s_W\,\left(4\,c_\beta^8\,s_W^2 - 4\,c_\beta^2\,c_W^2\,\left(1 - 2\,c_W^2\,s_\beta^2 + 2\,c_{2\beta}\,s_\beta^4\,s_W^2\right)\right) + \\
c_\beta^2\,s_W \left\{
\begin{array}{l}
c_W^2\,\delta Z^*_{H^-G^-}\,s_{2\beta} + \\
c_{2\beta}\,\left(\delta s_W\,s_{2\beta}^2\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right) - \\
2\left\{
\begin{array}{l}
2\,\delta s_W\,s_\beta^6\,s_W - \\
c_W^2\left\{
\begin{array}{l}
4\,c_\beta\,\delta c_\beta + \delta s_\beta\,\left(4\,s_\beta - 8\,s_\beta^3\right) + \\
\frac{s_{2\beta}}{2}\,\left(\delta Z_{H^-G^-} - 8\,\delta c_\beta\,s_\beta + 2\,\delta s_W\,s_{2\beta}\,s_W\,\left(1 + 2\,s_\beta^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
c_W^2\,s_W \left\{
\begin{array}{l}
c_{2\beta}\,c_\beta^2\,M_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) - \\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,\left(c_W^2\,m^2_{e_{\mathrm{j1}}}\,s_\beta^2 + c_{2\beta}\,c_\beta^2\,M_W^2\,s_W^2\right)\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(c_W^2\,m^2_{e_{\mathrm{j1}}}\,s_\beta^2 + c_{2\beta}\,c_\beta^2\,M_W^2\,s_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
\frac{U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}}{2} \left\{
\begin{array}{l}
2\,c_\beta^3\,M_W^4\,s_W^3\,\left(c_W^2\,s_{2\beta}\,\left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right) + c_{2\beta}\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right)\right) - \\
c_W^4 \left\{
\begin{array}{l}
m^2_{e_{\mathrm{j1}}}\,M_W^2\,s_W\,\left(8\,\delta c_\beta\,s_\beta^2 + c_\beta\,s_{2\beta}\,\left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right) - \\
m_{e_{\mathrm{j1}}}\,s_{2\beta}\,s_\beta \left\{
\begin{array}{l}
4\,\delta m^e_{\mathrm{j1}}\,M_W^2\,s_W - \\
m_{e_{\mathrm{j1}}}\,\left(4\,\delta s_W\,M_W^2 + s_W\,\left(2\,\delta M_W^2 - M_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\underset{341}{C(G^-,G^+,\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{8\,c_\beta\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
M_W^2 \left\{
\begin{array}{l}
M_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{
\begin{array}{l}
c_{2\beta}\,c_\beta\,c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left\{
\begin{array}{l}
2\,c_{2\beta}\,c_\beta^2\,c_W^2\,\delta c_\beta\,s_W - s_{2\beta}\,\left(2\,\delta s_W\,s_\beta\,s_W^2 - c_W^2\,\left(2\,\delta s_W\,s_\beta + c_{2\beta}\,\delta s_\beta\,s_W\right)\right) + \\
c_\beta\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W + s_W\,\left(\delta Z_{H^-G^-}\,s_{2\beta} - c_{2\beta}\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\} + \\
c_\beta\,c_W^2\,s_W \left\{
\begin{array}{l}
c_{2\beta}\,M_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,\left(c_W^2\,m^2_{e_{\mathrm{j1}}} - c_{2\beta}\,M_W^2\,s_W^2\right)\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(c_W^2\,m^2_{e_{\mathrm{j1}}} - c_{2\beta}\,M_W^2\,s_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right) - \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left\{
\begin{array}{l}
2\,c_W^4\,m^2_{e_{\mathrm{j1}}}\,\left(M_W^2\,s_W\,\left(2\,\delta c_\beta + \delta Z_{H^-G^-}\,s_\beta\right) + c_\beta\,\left(2\,\delta s_W\,M_W^2 + s_W\,\left(\delta M_W^2 - M_W^2\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)\right) - \\
c_\beta \left\{
\begin{array}{l}
2\,M_W^4\,s_W^3\,\left(c_W^2\,\delta Z_{H^-G^-}\,s_{2\beta} - c_{2\beta}\,\left(2\,\delta s_W\,s_W + c_W^2\,\left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) + \\
4\,c_W^4\,\delta m^e_{\mathrm{j1}}\,m_{e_{\mathrm{j1}}}\,M_W^2\,s_W
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(H^-, G^+, \tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^2\, c_W^4\, M_W^4\, s_W^3}
$$
342
$$
\left\{
\begin{array}{l}
2 \left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{
\begin{array}{l}
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left\{
\begin{array}{l}
\frac{M_W^2\, s_{2\beta}\, s_W}{2} \left(4\, c_W^4\, \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2 \left(4\, \delta s_W\, s_W + c_W^2\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) - \\
c_W^4\, m^2_{e_{\mathrm{j1}}} \left\{
\begin{array}{l}
M_W^2\, s_W \left(4\, \delta c_\beta\, s_\beta + \delta Z_{H^-G^-} \left(c_\beta^2 + s_\beta^2\right)\right) + \\
\frac{s_{2\beta}}{2} \left(2\, \delta M_W^2\, s_W + M_W^2\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left\{
\begin{array}{l}
c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
c_\beta^3\, M_W^4\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{
\begin{array}{l}
2\, c_W^2\, s_\beta\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
\frac{U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}}{2} \left\{
\begin{array}{l}
s_\beta \left(16\, \delta s_W\, s_W^2 - 16\, c_W^4 \left(\delta s_W - 3\, \delta s_\beta\, s_\beta^3\, s_W\right)\right) + \\
c_W^2\, s_W \left\{
\begin{array}{l}
4\, \delta c_\beta\, s_{2\beta} \left(3 + s_\beta^2\right) + \delta s_\beta \left(5\, s_{2\beta}^2 + 4\, s_\beta^2 - 4\, s_\beta^4 \left(5 - 12\, s_W^2\right)\right) + \\
4\, s_\beta\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-} - 4\, \delta s_W\, s_W\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(G^-, H^+, \tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{8\, c_\beta^2\, c_W^4\, M_W^4\, s_W^3}
$$
343
$$
\left\{
\begin{array}{l}
2 \left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{
\begin{array}{l}
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left\{
\begin{array}{l}
\frac{c_W^4\, m_{e_{\mathrm{j1}}}}{2} \left\{
\begin{array}{l}
4\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\
m_{e_{\mathrm{j1}}} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_{2\beta} + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_{2\beta} + \\
M_W^2 \left\{
\begin{array}{l}
8\, \delta c_\beta\, s_\beta + 2\, \delta Z_{H^-G^-}\, s_\beta^2 - \\
s_{2\beta}\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} - \\
c_\beta^2 \left\{
\begin{array}{l}
c_W^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\, s_W^2\right) + \\
M_W^4\, s_W^3 \left\{
\begin{array}{l}
4\, \delta s_W\, s_{2\beta}\, s_W + \\
c_W^2\, \left(c_{2\beta}\, \delta Z_{H^-G^-} + s_{2\beta}\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left\{
\begin{array}{l}
c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(c_W^2\, m^2_{e_{\mathrm{j1}}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
c_\beta\, M_W^4\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{
\begin{array}{l}
c_\beta\, c_W^2\, s_{2\beta}\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\
\frac{U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}}{2} \left\{
\begin{array}{l}
c_W^2\, s_W \left(c_\beta^2\, s_{2\beta}\, \left(12\, \delta c_\beta + 5\, \delta s_\beta\, s_{2\beta}\right) + c_{2\beta}\, c_\beta\, \left(2\, \delta Z_{H^-G^-} - 2\, \delta Z^*_{H^-G^-}\right) + s_{2\beta}^2 \left(\delta s_\beta + \delta c_\beta\, s_{2\beta} - \delta s_\beta\, s_\beta^2\, \left(5 - 12\, \left(c_W^2 + s_\right.\right.\right. \\
c_\beta\, s_{2\beta} \left(\delta s_W\, \left(8\, c_W^4 - 8\, s_W^2\right) - 2\, c_W^2\, s_W\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-} - 4\, \delta s_W\, s_W\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

[SSSS] 2 Higgs – 2 Squarks

$$
\underset{282}{C(h^0, h^0, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_W^4\, M_W^4\, s_\beta^3\, s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_\beta\, s_W \left(6\, c_\alpha^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} + c_{2\alpha}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) + \\
2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left\{
\begin{array}{l}
3\, c_W^4\, m_{u_{\mathrm{j1}}} \left\{
\begin{array}{l}
4\, c_\alpha^2\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W - \\
m_{u_{\mathrm{j1}}} \left\{
\begin{array}{l}
2\, c_\alpha^2 \left(2\, \delta s_\beta\, M_W^2\, s_W + s_\beta \left(2\, \delta s_W\, M_W^2 + s_W \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right)\right) - \\
\delta Z_{hH}\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W
\end{array}
\right.
\end{array}
\right\} + \\
M_W^4\, s_\beta^3 \left\{
\begin{array}{l}
c_{2\alpha} \left(2\, \delta s_W\, s_W^2 \left(1 - 4\, c_W^2\right) + c_W^2 \left(6\, \delta s_W + s_W \left(1 - 4\, c_W^2\right) \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right) + \\
c_W^2\, \delta Z_{hH}\, s_{2\alpha}\, s_W \left(1 - 4\, c_W^2\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_\beta\, s_W \left(3\, c_\alpha^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 2\, c_{2\alpha}\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) - \\
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left\{
\begin{array}{l}
4\, M_W^4\, s_\beta^3\, s_W^3 \left(c_W^2\, \delta Z_{hH}\, s_{2\alpha} + c_{2\alpha} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right) - \\
3\, c_W^4\, m_{u_{\mathrm{j1}}} \left\{
\begin{array}{l}
4\, c_\alpha^2\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W - \\
m_{u_{\mathrm{j1}}} \left\{
\begin{array}{l}
2\, c_\alpha^2 \left(2\, \delta s_\beta\, M_W^2\, s_W + s_\beta \left(2\, \delta s_W\, M_W^2 + s_W \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{hh}\right)\right)\right)\right) - \\
\delta Z_{hH}\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
c_W^2\, M_W^2\, s_\beta\, s_W \left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(6\, c_\alpha^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} + c_{2\alpha}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right)\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + \\
2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left(3\, c_\alpha^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 2\, c_{2\alpha}\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
\underset{283}{C(h^0,h^0,\tilde{d}^{s2}_{j2},\tilde{d}^{s1,\dagger}_{j1})} = -\frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{24\,c_\beta^3\,c_W^4\,M_W^4\,s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{s2,1}
\left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(6\,c_W^2\,m_{d_{j1}}^2\,s_\alpha^2+c_{2\alpha}\,c_\beta^2\,M_W^2\,\left(1+2\,c_W^2\right)\right)\left(\delta\bar{Z}^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1}_{1,1}+\delta\bar{Z}^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1}_{2,1}\right)+ \\
2\,U^{\tilde{d},j1}_{s1,1}
\left\{
\begin{array}{l}
3\,c_W^4\,m_{d_{j1}}
\left\{
\begin{array}{l}
4\,c_\beta\,\delta m^d_{j1}\,M_W^2\,s_\alpha^2\,s_W- \\
m_{d_{j1}}
\left\{
\begin{array}{l}
4\,\delta c_\beta\,M_W^2\,s_\alpha^2\,s_W+ \\
c_\beta
\left\{
\begin{array}{l}
4\,\delta s_W\,M_W^2\,s_\alpha^2+ \\
s_W
\left\{
\begin{array}{l}
2\,s_\alpha^2\,\left(\delta M_W^2-M_W^2\,\left(2\,\delta Z_e+\delta Z_{hh}\right)\right)+ \\
\delta Z_{hH}\,M_W^2\,s_{2\alpha}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
+ \\
2\,U^{\tilde{d},j1*}_{s2,2}
\left\{
\begin{array}{l}
c_\beta\,c_W^2\,M_W^2\,s_W\,\left(3\,c_W^2\,m_{d_{j1}}^2\,s_\alpha^2+c_{2\alpha}\,c_\beta^2\,M_W^2\,s_W^2\right)\left(\delta\bar{Z}^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1}_{1,2}+\delta\bar{Z}^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1}_{2,2}\right)+ \\
U^{\tilde{d},j1}_{s1,2}
\left\{
\begin{array}{l}
2\,c_\beta^3\,M_W^4\,s_W^3\,\left(c_W^2\,\delta Z_{hH}\,s_{2\alpha}+c_{2\alpha}\,\left(2\,\delta s_W\,s_W+c_W^2\,\left(2\,\delta Z_e+\delta Z_{hh}\right)\right)\right)+ \\
3\,c_W^4\,m_{d_{j1}}
\left\{
\begin{array}{l}
4\,c_\beta\,\delta m^d_{j1}\,M_W^2\,s_\alpha^2\,s_W- \\
m_{d_{j1}}
\left\{
\begin{array}{l}
4\,\delta c_\beta\,M_W^2\,s_\alpha^2\,s_W+ \\
c_\beta
\left\{
\begin{array}{l}
4\,\delta s_W\,M_W^2\,s_\alpha^2+ \\
s_W
\left\{
\begin{array}{l}
2\,s_\alpha^2\,\left(\delta M_W^2-M_W^2\,\left(2\,\delta Z_e+\delta Z_{hh}\right)\right)+ \\
\delta Z_{hH}\,M_W^2\,s_{2\alpha}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
+ \\
c_\beta\,c_W^2\,M_W^2\,s_W
\left\{
\begin{array}{l}
U^{\tilde{d},j1}_{s1,1}\,\left(6\,c_W^2\,m_{d_{j1}}^2\,s_\alpha^2+c_{2\alpha}\,c_\beta^2\,M_W^2\,\left(1+2\,c_W^2\right)\right)\left(\delta Z^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1*}_{1,1}+\delta Z^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1*}_{2,1}\right)+ \\
2\,U^{\tilde{d},j1}_{s1,2}\,\left(3\,c_W^2\,m_{d_{j1}}^2\,s_\alpha^2+c_{2\alpha}\,c_\beta^2\,M_W^2\,s_W^2\right)\left(\delta Z^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1*}_{1,2}+\delta Z^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
C(H^0, H^0, \tilde{u}^{\text{s2}}_{\text{j2}}, \tilde{u}^{\text{s1},\dagger}_{\text{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\text{j1,j2}}}{24\, c_W^4\, M_W^4\, s_\beta^3\, s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{u},\text{j1}*}_{\text{s2,1}} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_\beta\, s_W\, \left(6\, c_W^2\, m^2_{u_{\text{j1}}}\, s_\alpha^2 - c_{2\alpha}\, M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{1,s1}}\, U^{\tilde{u},\text{j1}}_{\text{1,1}} + \delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{2,s1}}\, U^{\tilde{u},\text{j1}}_{\text{2,1}}\right) + \\
2\, U^{\tilde{u},\text{j1}}_{\text{s1,1}} \left\{
\begin{array}{l}
3\, c_W^4\, m_{u_{\text{j1}}} \left\{
\begin{array}{l}
4\, \delta m^u_{\text{j1}}\, M_W^2\, s_\alpha^2\, s_\beta\, s_W - \\
m_{u_{\text{j1}}} \left\{
\begin{array}{l}
4\, M_W^2\, s_\alpha^2\, \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W\right) + \\
s_\beta\, s_W\, \left(2\, \delta M_W^2\, s_\alpha^2 - M_W^2\, \left(\delta Z_{hH}\, s_{2\alpha} + s_\alpha^2\, \left(4\, \delta Z_e + 2\, \delta Z_{HH}\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\} + \\
M_W^4\, s_\beta^3 \left\{
\begin{array}{l}
c_W^2\, \delta Z_{hH}\, s_{2\alpha}\, s_W\, \left(1 - 4\, c_W^2\right) - \\
c_{2\alpha}\, \left(2\, \delta s_W\, s_W^2\, \left(1 - 4\, c_W^2\right) + c_W^2\, \left(6\, \delta s_W + s_W\, \left(1 - 4\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
2\, U^{\tilde{u},\text{j1}*}_{\text{s2,2}} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_\beta\, s_W\, \left(3\, c_W^2\, m^2_{u_{\text{j1}}}\, s_\alpha^2 + 2\, c_{2\alpha}\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{1,s1}}\, U^{\tilde{u},\text{j1}}_{\text{1,2}} + \delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{2,s1}}\, U^{\tilde{u},\text{j1}}_{\text{2,2}}\right) - \\
U^{\tilde{u},\text{j1}}_{\text{s1,2}} \left\{
\begin{array}{l}
4\, M_W^4\, s_\beta^3\, s_W^3\, \left(c_W^2\, \delta Z_{hH}\, s_{2\alpha} - c_{2\alpha}\, \left(2\, \delta s_W\, s_W + c_W^2\, \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right) - \\
3\, c_W^4\, m_{u_{\text{j1}}} \left\{
\begin{array}{l}
4\, \delta m^u_{\text{j1}}\, M_W^2\, s_\alpha^2\, s_\beta\, s_W - \\
m_{u_{\text{j1}}} \left\{
\begin{array}{l}
4\, \delta s_\beta\, M_W^2\, s_\alpha^2\, s_W + \\
s_\beta \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_\alpha^2 + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_\alpha^2 - \\
M_W^2\, \left(\delta Z_{hH}\, s_{2\alpha} + s_\alpha^2\, \left(4\, \delta Z_e + 2\, \delta Z_{HH}\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
c_W^2\, M_W^2\, s_\beta\, s_W \left\{
\begin{array}{l}
U^{\tilde{u},\text{j1}}_{\text{s1,1}}\, \left(6\, c_W^2\, m^2_{u_{\text{j1}}}\, s_\alpha^2 - c_{2\alpha}\, M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta Z^{\tilde{u},\text{j2}}_{\text{1,s2}}\, U^{\tilde{u},\text{j1}*}_{\text{1,1}} + \delta Z^{\tilde{u},\text{j2}}_{\text{2,s2}}\, U^{\tilde{u},\text{j1}*}_{\text{2,1}}\right) + \\
2\, U^{\tilde{u},\text{j1}}_{\text{s1,2}}\, \left(3\, c_W^2\, m^2_{u_{\text{j1}}}\, s_\alpha^2 + 2\, c_{2\alpha}\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\text{j2}}_{\text{1,s2}}\, U^{\tilde{u},\text{j1}*}_{\text{1,2}} + \delta Z^{\tilde{u},\text{j2}}_{\text{2,s2}}\, U^{\tilde{u},\text{j1}*}_{\text{2,2}}\right)
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(\underset{287}{H^0}, H^0, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{d}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_\beta\, c_W^2\, M_W^2\, s_W \left(6\, c_\alpha^2\, c_W^2\, m^2_{d_{\mathrm{j1}}} - c_{2\alpha}\, c_\beta^2\, M_W^2 \left(1 + 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\right) + \\ 2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \begin{array}{l} 3\, c_W^4\, m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, c_\alpha^2\, c_\beta\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} c_\beta\, \delta Z_{hH}\, M_W^2\, s_{2\alpha}\, s_W + \\ 2\, c_\alpha^2 \left(2\, \delta c_\beta\, M_W^2\, s_W + c_\beta \left(2\, \delta s_W\, M_W^2 + s_W \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right)\right) \end{array} \right. \end{array} \right. \\ c_\beta^3\, M_W^4 \left\{ \begin{array}{l} c_W^2\, \delta Z_{hH}\, s_{2\alpha}\, s_W \left(1 + 2\, c_W^2\right) - \\ c_{2\alpha} \left(2\, \delta s_W\, s_W^2 \left(1 + 2\, c_W^2\right) - c_W^2 \left(6\, \delta s_W - s_W \left(1 + 2\, c_W^2\right) \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. + \\ 2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_\beta\, c_W^2\, M_W^2\, s_W \left(3\, c_\alpha^2\, c_W^2\, m^2_{d_{\mathrm{j1}}} - c_{2\alpha}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{2,2}\right) + \\ U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},2} \left\{ \begin{array}{l} 2\, c_\beta^3\, M_W^4\, s_W^3 \left(c_W^2\, \delta Z_{hH}\, s_{2\alpha} - c_{2\alpha} \left(2\, \delta s_W\, s_W + c_W^2 \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right) + \\ 3\, c_W^4\, m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, c_\alpha^2\, c_\beta\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} c_\beta\, \delta Z_{hH}\, M_W^2\, s_{2\alpha}\, s_W + \\ 2\, c_\alpha^2 \left(2\, \delta c_\beta\, M_W^2\, s_W + c_\beta \left(2\, \delta s_W\, M_W^2 + s_W \left(\delta M_W^2 - M_W^2 \left(2\, \delta Z_e + \delta Z_{HH}\right)\right)\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_\beta\, c_W^2\, M_W^2\, s_W \left\{ \begin{array}{l} U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},1} \left(6\, c_\alpha^2\, c_W^2\, m^2_{d_{\mathrm{j1}}} - c_{2\alpha}\, c_\beta^2\, M_W^2 \left(1 + 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1}\right) + \\ 2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},2} \left(3\, c_\alpha^2\, c_W^2\, m^2_{d_{\mathrm{j1}}} - c_{2\alpha}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2}\right) \end{array} \right. \end{array} \right.
$$

$$
\underset{294}{C(A^0,A^0,\tilde{u}^{\mathrm{s2}}_{\mathrm{j2}},\tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}}{24\,c_W^4\,M_W^4\,s_\beta^3\,s_W^3}
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
c_W^2\,M_W^2\,s_\beta\,s_W\,\left(6\,c_\beta^2\,c_W^2\,m^2_{u_{\mathrm{j1}}}+c_{2\beta}\,M_W^2\,s_\beta^2\,\left(1-4\,c_W^2\right)\right)\left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{2,1}\right)+ \\
2\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
6\,c_\beta\,c_W^4\,m_{u_{\mathrm{j1}}}
\left\{
\begin{array}{l}
\delta m^u_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W- \\
m_{u_{\mathrm{j1}}}
\left\{
\begin{array}{l}
c_\beta\,\left(2\,\delta s_\beta\,M_W^2\,s_W+s_\beta\,\left(2\,\delta s_W\,M_W^2+s_W\,\left(\delta M_W^2-M_W^2\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)\right)\right)- \\
\delta Z_{AG}\,M_W^2\,s_\beta^2\,s_W
\end{array}
\right.
\end{array}
\right\}+ \\
M_W^4\,s_\beta^3
\left\{
\begin{array}{l}
c_\beta^2\,\left(c_W^2\,\left(6\,\delta s_W+s_W\,\left(1-4\,c_W^2\right)\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)-\delta s_W\,\left(6\,s_W^2-8\,s_W^4\right)\right)- \\
s_\beta^2\,\left(2\,\delta s_W\,s_W^2\,\left(1-4\,c_W^2\right)+c_W^2\,\left(6\,\delta s_W+s_W\,\left(1-4\,c_W^2\right)\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)\right)+ \\
c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W\,\left(1-4\,c_W^2\right)
\end{array}
\right.
\end{array}
\right\}+
\end{array}
\right\}+ \\
2\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2}
\left\{
\begin{array}{l}
c_W^2\,M_W^2\,s_\beta\,s_W\,\left(3\,c_\beta^2\,c_W^2\,m^2_{u_{\mathrm{j1}}}-2\,c_{2\beta}\,M_W^2\,s_\beta^2\,s_W^2\right)\left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{1,2}+\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}}_{2,2}\right)+ \\
2\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
3\,c_\beta\,c_W^4\,m_{u_{\mathrm{j1}}}
\left\{
\begin{array}{l}
\delta m^u_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W- \\
\frac{m_{u_{\mathrm{j1}}}}{2}
\left\{
\begin{array}{l}
2\,\delta s_W\,M_W^2\,s_{2\beta}+ \\
s_W
\left\{
\begin{array}{l}
\delta M_W^2\,s_{2\beta}+ \\
M_W^2\,\left(4\,c_\beta\,\delta s_\beta-2\,\delta Z_{AG}\,s_\beta^2-s_{2\beta}\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\}+ \\
2\,M_W^4\,s_\beta^3\,s_W^3
\left\{
\begin{array}{l}
2\,\delta s_W\,s_\beta^2\,s_W-c_\beta^2\,\left(2\,\delta s_W\,s_W+c_W^2\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)- \\
c_W^2\,\left(\delta Z_{AG}\,s_{2\beta}-s_\beta^2\,\left(2\,\delta Z_e+\delta Z_{AA}\right)\right)
\end{array}
\right.
\end{array}
\right\}+
\end{array}
\right\}+ \\
c_W^2\,M_W^2\,s_\beta\,s_W
\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\,\left(6\,c_\beta^2\,c_W^2\,m^2_{u_{\mathrm{j1}}}+c_{2\beta}\,M_W^2\,s_\beta^2\,\left(1-4\,c_W^2\right)\right)\left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1}+\delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right)+ \\
2\,U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\,\left(3\,c_\beta^2\,c_W^2\,m^2_{u_{\mathrm{j1}}}-2\,c_{2\beta}\,M_W^2\,s_\beta^2\,s_W^2\right)\left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j1}*}_{1,2}+\delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
\underset{295}{C(G^0, G^0, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_W^4\, M_W^4\, s_\beta\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_\beta\, s_W\, \left(6\, c_W^2\, m^2_{u_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) - \\ 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \begin{array}{l} 6\, c_W^4\, m^2_{u_{\mathrm{j1}}}\, \left(2\, \delta s_W\, M_W^2\, s_\beta + s_W\, \left(\delta M_W^2\, s_\beta + M_W^2\, \left(2\, \delta s_\beta - c_\beta\, \delta Z_{AG} - s_\beta\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right)\right) - \\ s_\beta \left\{ \begin{array}{l} 12\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_W + \\ M_W^4 \left\{ \begin{array}{l} c_W^2\, \delta Z_{AG}\, s_{2\beta}\, s_W\, \left(1 - 4\, c_W^2\right) + \\ s_\beta^2\, \left(c_W^2\, \left(6\, \delta s_W + s_W\, \left(1 - 4\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right) - \delta s_W\, \left(6\, s_W^2 - 8\, s_W^4\right)\right) - \\ c_\beta^2 \left\{ \begin{array}{l} 2\, \delta s_W\, s_W^2\, \left(1 - 4\, c_W^2\right) + \\ c_W^2\, \left(6\, \delta s_W + s_W\, \left(1 - 4\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ 2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_\beta\, s_W\, \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + 2\, c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) - \\ 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left\{ \begin{array}{l} 3\, c_W^4\, m^2_{u_{\mathrm{j1}}}\, \left(2\, \delta s_W\, M_W^2\, s_\beta + s_W\, \left(\delta M_W^2\, s_\beta + M_W^2\, \left(2\, \delta s_\beta - c_\beta\, \delta Z_{AG} - s_\beta\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right)\right) + \\ s_\beta \left\{ \begin{array}{l} 2\, M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{AG}\, s_{2\beta} - c_{2\beta}\, \left(2\, \delta s_W\, s_W + c_W^2\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right) - \\ 6\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_W \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_W^2\, M_W^2\, s_\beta\, s_W \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\, \left(6\, c_W^2\, m^2_{u_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + \\ 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\, \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + 2\, c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right) \end{array} \right. \end{array} \right.
$$

$$
C(\underset{296}{A^0}, G^0, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_W^4\, M_W^4\, s_\beta^2\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \begin{array}{l} 6\, c_W^4\, m^2_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} \delta Z_{AG}\, M_W^2\, s_W \left(c_\beta^2 + s_\beta^2\right) - \\ c_\beta \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_\beta + \\ s_W \left(4\, \delta s_\beta\, M_W^2 + s_\beta \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right) \end{array} \right. \end{array} \right\} + \\ c_\beta \left\{ \begin{array}{l} 24\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_\beta\, s_W + \\ 2\, M_W^4\, s_\beta^3 \left\{ \begin{array}{l} 4\, \delta s_W\, s_W^2 - 4\, c_W^4\, s_W\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right) + \\ c_W^2\, \left(4\, \delta s_W\, \left(3 - 4\, s_W^2\right) + s_W\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) + \\ 2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_\beta \left(12\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_\beta\, s_W - 4\, M_W^4\, s_\beta^3\, s_W^3\, \left(4\, \delta s_W\, s_W + c_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right) + \\ 3\, c_W^4\, m^2_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} \delta Z_{AG}\, M_W^2\, s_W \left(c_\beta^2 + s_\beta^2\right) - \\ c_\beta \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_\beta + \\ s_W \left(4\, \delta s_\beta\, M_W^2 + s_\beta \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_W^2\, M_W^2\, s_{2\beta}\, s_W \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right)\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right) \end{array} \right. \end{array} \right\}
$$

$$
\underset{297}{C(A^0, A^0, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{d}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_W\, \left(3\, c_W^2\, m^2_{d_{\mathrm{j1}}}\, s_{2\beta}\, s_\beta + c_{2\beta}\, c_\beta^3\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\right) + \\ 2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \begin{array}{l} 6\, c_W^4\, m_{d_{\mathrm{j1}}}\, s_\beta \left\{ \begin{array}{l} \delta m^d_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\ m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} \frac{s_{2\beta}}{2} \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\, \delta Z_e + \delta Z_{AA}\right)\right)\right) + \\ M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{AG} + 2\, \delta c_\beta\, s_\beta\right) \end{array} \right. \end{array} \right. + \\ c_\beta^3\, M_W^4 \left\{ \begin{array}{l} c_\beta^2\, \left(2\, \delta s_W\, s_W^2\, \left(1 + 2\, c_W^2\right) - c_W^2\, \left(6\, \delta s_W - s_W\, \left(1 + 2\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{AA}\right)\right)\right) + \\ s_\beta^2\, \left(c_W^2\, \left(6\, \delta s_W - s_W\, \left(1 + 2\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{AA}\right)\right) - \delta s_W\, \left(6\, s_W^2 - 4\, s_W^4\right)\right) + \\ c_W^2\, \delta Z_{AG}\, s_{2\beta}\, s_W\, \left(1 + 2\, c_W^2\right) \end{array} \right. \end{array} \right. \end{array} \right. + \\ U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_\beta\, c_W^2\, M_W^2\, s_W\, \left(3\, c_W^2\, m^2_{d_{\mathrm{j1}}}\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}}_{2,2}\right) + \\ 2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_\beta^3\, M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{AG}\, s_{2\beta} + c_{2\beta}\, \left(2\, \delta s_W\, s_W + c_W^2\, \left(2\, \delta Z_e + \delta Z_{AA}\right)\right)\right) + \\ 3\, c_W^4\, m_{d_{\mathrm{j1}}}\, s_\beta \left\{ \begin{array}{l} \delta m^d_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \\ m_{d_{\mathrm{j1}}} \left\{ \begin{array}{l} \frac{s_{2\beta}}{2} \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\, \delta Z_e + \delta Z_{AA}\right)\right)\right) + \\ M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{AG} + 2\, \delta c_\beta\, s_\beta\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_\beta\, c_W^2\, M_W^2\, s_W \left\{ \begin{array}{l} U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},1}\, \left(6\, c_W^2\, m^2_{d_{\mathrm{j1}}}\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1}\right) + \\ 2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s1},2} \left(3\, c_W^2\, m^2_{d_{\mathrm{j1}}}\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2}\right) \end{array} \right. \end{array} \right\}
$$

$$
C(G^0, G^0, \tilde{d}^{s2}_{j2}, \tilde{d}^{s1,\dagger}_{j1}) = -\frac{\mathrm{i}\, e^2\, \delta_{j1,j2}}{24\, c_\beta\, c_W^4\, M_W^4\, s_W^3}
$$
(298)
$$
\left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{s2,1} \left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W\, \left(6\, c_W^2\, m_{d_{j1}}^2 - c_{2\beta}\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,1}\right) - \\
2\, U^{\tilde{d},j1}_{s1,1} \left\{
\begin{array}{l}
6\, c_W^4\, m_{d_{j1}}^2\, \left(M_W^2\, s_W\, \left(2\, \delta c_\beta + \delta Z_{AG}\, s_\beta\right) + c_\beta\, \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right)\right) - \\
c_\beta \left\{
\begin{array}{l}
12\, c_W^4\, \delta m^d_{j1}\, m_{d_{j1}}\, M_W^2\, s_W + \\
M_W^4 \left\{
\begin{array}{l}
c_W^2\, \delta Z_{AG}\, s_{2\beta}\, s_W\, \left(1 + 2\, c_W^2\right) - \\
s_\beta^2\, \left(c_W^2\, \left(6\, \delta s_W - s_W\, \left(1 + 2\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right) - \delta s_W\, \left(6\, s_W^2 - 4\, s_W^4\right)\right) - \\
c_\beta^2 \left\{
\begin{array}{l}
2\, \delta s_W\, s_W^2\, \left(1 + 2\, c_W^2\right) - \\
c_W^2\, \left(6\, \delta s_W - s_W\, \left(1 + 2\, c_W^2\right)\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
2\, U^{\tilde{d},j1*}_{s2,2} \left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W\, \left(3\, c_W^2\, m_{d_{j1}}^2 - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,2}\right) - \\
2\, U^{\tilde{d},j1}_{s1,2} \left\{
\begin{array}{l}
3\, c_W^4\, m_{d_{j1}}^2\, \left(M_W^2\, s_W\, \left(2\, \delta c_\beta + \delta Z_{AG}\, s_\beta\right) + c_\beta\, \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right)\right) - \\
c_\beta \left\{
\begin{array}{l}
M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{AG}\, s_{2\beta} - c_{2\beta}\, \left(2\, \delta s_W\, s_W + c_W^2\, \left(2\, \delta Z_e + \delta Z_{GG}\right)\right)\right) + \\
6\, c_W^4\, \delta m^d_{j1}\, m_{d_{j1}}\, M_W^2\, s_W
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
c_\beta\, c_W^2\, M_W^2\, s_W \left\{
\begin{array}{l}
U^{\tilde{d},j1}_{s1,1} \left(6\, c_W^2\, m_{d_{j1}}^2 - c_{2\beta}\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,1}\right) + \\
2\, U^{\tilde{d},j1}_{s1,2} \left(3\, c_W^2\, m_{d_{j1}}^2 - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
C(A^0, G^0, \tilde{d}^{s2}_{j2}, \tilde{d}^{s1,\dagger}_{j1}) = \frac{\mathrm{i}\, e^2\, \delta_{j1,j2}}{24\, c_\beta^2\, c_W^4\, M_W^4\, s_W^3}
$$
(299)
$$
\left\{
\begin{array}{l}
U^{\tilde{d},j1*}_{s2,1} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_{2\beta}\, s_W\, \left(3\, c_W^2\, m_{d_{j1}}^2 - c_\beta^2\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,1}\right) - \\
U^{\tilde{d},j1}_{s1,1} \left\{
\begin{array}{l}
6\, c_W^4\, m_{d_{j1}}^2 \left\{
\begin{array}{l}
M_W^2\, s_W\, \left(4\, \delta c_\beta\, s_\beta + \delta Z_{AG}\, \left(c_\beta^2 + s_\beta^2\right)\right) + \\
\frac{s_{2\beta}}{2}\, \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right)
\end{array}
\right\} - \\
s_\beta \left\{
\begin{array}{l}
24\, c_\beta\, c_W^4\, \delta m^d_{j1}\, m_{d_{j1}}\, M_W^2\, s_W - \\
2\, c_\beta^3\, M_W^4 \left\{
\begin{array}{l}
4\, \delta s_W\, s_W^2 + 2\, c_W^4\, s_W\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right) - \\
c_W^2\, \left(4\, \delta s_W\, \left(3 - 2\, s_W^2\right) - s_W\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
U^{\tilde{d},j1*}_{s2,2} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_{2\beta}\, s_W\, \left(3\, c_W^2\, m_{d_{j1}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,2}\right) + \\
2\, U^{\tilde{d},j1}_{s1,2} \left\{
\begin{array}{l}
s_\beta\, \left(12\, c_\beta\, c_W^4\, \delta m^d_{j1}\, m_{d_{j1}}\, M_W^2\, s_W - 2\, c_\beta^3\, M_W^4\, s_W^3\, \left(4\, \delta s_W\, s_W + c_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right) - \\
3\, c_W^4\, m_{d_{j1}}^2 \left\{
\begin{array}{l}
M_W^2\, s_W\, \left(4\, \delta c_\beta\, s_\beta + \delta Z_{AG}\, \left(c_\beta^2 + s_\beta^2\right)\right) + \\
\frac{s_{2\beta}}{2}\, \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
c_W^2\, M_W^2\, s_{2\beta}\, s_W \left\{
\begin{array}{l}
U^{\tilde{d},j1}_{s1,1} \left(3\, c_W^2\, m_{d_{j1}}^2 - c_\beta^2\, M_W^2\, \left(1 + 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,1}\right) + \\
U^{\tilde{d},j1}_{s1,2} \left(3\, c_W^2\, m_{d_{j1}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
$$

$$
\underset{302}{C(h^0, H^0, \tilde{u}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{24\, c_W^4\, M_W^4\, s_\beta^3\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \begin{array}{l} M_W^4\, s_{2\alpha}\, s_\beta^3 \left(4\, \delta s_W\, s_W^2 \left(1 - 4\, c_W^2\right) + c_W^2 \left(12\, \delta s_W + s_W \left(1 - 4\, c_W^2\right) \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right) + \\ 3\, c_W^4\, m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W - \\ m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_{2\alpha}\, s_\beta + \\ s_W \left\{ \begin{array}{l} 4\, \delta s_\beta\, M_W^2\, s_{2\alpha} + \\ s_\beta \left\{ \begin{array}{l} 2\, \delta M_W^2\, s_{2\alpha} - \\ M_W^2 \left\{ \begin{array}{l} 2\, \delta Z_{hH} \left(c_\alpha^2 + s_\alpha^2\right) + \\ s_{2\alpha} \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s2},2} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) - \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left\{ \begin{array}{l} 4\, M_W^4\, s_{2\alpha}\, s_\beta^3\, s_W^3 \left(4\, \delta s_W\, s_W + c_W^2 \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right) - \\ 3\, c_W^4\, m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W - \\ m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_{2\alpha}\, s_\beta + \\ s_W \left\{ \begin{array}{l} 4\, \delta s_\beta\, M_W^2\, s_{2\alpha} + \\ s_\beta \left\{ \begin{array}{l} 2\, \delta M_W^2\, s_{2\alpha} - \\ M_W^2 \left\{ \begin{array}{l} 2\, \delta Z_{hH} \left(c_\alpha^2 + s_\alpha^2\right) + \\ s_{2\alpha} \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_W^2\, M_W^2\, s_{2\alpha}\, s_\beta\, s_W \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right)\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right) \end{array} \right. \end{array} \right.
$$

$$
\underset{303}{C(h^0, H^0, \tilde{d}^{\bar{s}2}_{j2}, \tilde{d}^{s1,\dagger}_{j1})} = \frac{\mathrm{i}\, e^2\, \delta_{j1,j2}}{24\, c_\beta^3\, c_W^4\, M_W^4\, s_W^3} \left\{ \begin{array}{l} U^{\tilde{d},j1*}_{s2,1} \left\{ \begin{array}{l} c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \left(3\, c_W^2\, m^2_{d_{j1}} - c_\beta^2\, M_W^2 \left(1 + 2\, c_W^2\right)\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,1}\right) - \\ U^{\tilde{d},j1}_{s1,1} \left\{ \begin{array}{l} c_\beta^3\, M_W^4\, s_{2\alpha} \left(4\, \delta s_W\, s_W^2 \left(1 + 2\, c_W^2\right) - c_W^2 \left(12\, \delta s_W - s_W \left(1 + 2\, c_W^2\right) \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right) - \\ 3\, c_W^4\, m_{d_{j1}} \left\{ \begin{array}{l} 4\, c_\beta\, \delta m^d_{j1}\, M_W^2\, s_{2\alpha}\, s_W - \\ m_{d_{j1}} \left\{ \begin{array}{l} 4\, \delta c_\beta\, M_W^2\, s_{2\alpha}\, s_W + \\ c_\beta \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_{2\alpha} + \\ s_W \left\{ \begin{array}{l} 2\, \delta M_W^2\, s_{2\alpha} + \\ M_W^2 \left\{ \begin{array}{l} 2\, \delta Z_{hH} \left(c_\alpha^2 + s_\alpha^2\right) - \\ s_{2\alpha} \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ U^{\tilde{d},j1*}_{s2,2} \left\{ \begin{array}{l} c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \left(3\, c_W^2\, m^2_{d_{j1}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1}_{2,2}\right) - \\ U^{\tilde{d},j1}_{s1,2} \left\{ \begin{array}{l} 2\, c_\beta^3\, M_W^4\, s_{2\alpha}\, s_W^3 \left(4\, \delta s_W\, s_W + c_W^2 \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right) - \\ 3\, c_W^4\, m_{d_{j1}} \left\{ \begin{array}{l} 4\, c_\beta\, \delta m^d_{j1}\, M_W^2\, s_{2\alpha}\, s_W - \\ m_{d_{j1}} \left\{ \begin{array}{l} 4\, \delta c_\beta\, M_W^2\, s_{2\alpha}\, s_W + \\ c_\beta \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_{2\alpha} + \\ s_W \left\{ \begin{array}{l} 2\, \delta M_W^2\, s_{2\alpha} + \\ M_W^2 \left\{ \begin{array}{l} 2\, \delta Z_{hH} \left(c_\alpha^2 + s_\alpha^2\right) - \\ s_{2\alpha} \left(4\, \delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. + \\ c_\beta\, c_W^2\, M_W^2\, s_{2\alpha}\, s_W \left\{ \begin{array}{l} U^{\tilde{d},j1}_{s1,1} \left(3\, c_W^2\, m^2_{d_{j1}} - c_\beta^2\, M_W^2 \left(1 + 2\, c_W^2\right)\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,1}\right) + \\ U^{\tilde{d},j1}_{s1,2} \left(3\, c_W^2\, m^2_{d_{j1}} - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1*}_{2,2}\right) \end{array} \right. \end{array} \right.
$$

$$
\underset{304}{C}(h^0, H^-, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ \mathrm{CKM}^*_{\mathrm{j1,j2}} \Bigg\{ \frac{s_{2\beta}}{2} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Bigg\{ \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W}{2} \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2}\right) +
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \Big\{ \delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W +
m_{d_{\mathrm{j2}}} \Big\{ \delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W -
m_{u_{\mathrm{j1}}} \Big\{ 2\,\delta c_\beta\, M_W^2\, s_\beta\, s_{\beta-\alpha}\, s_W +
c_\beta \Big\{ 4\,\delta s_W\, M_W^2\, s_\beta\, s_{\beta-\alpha} +
s_W \Big\{ 2\,\delta s_\beta\, M_W^2\, s_{\beta-\alpha} +
s_\beta \Big\{ 2\,\delta M_W^2\, s_{\beta-\alpha} -
M_W^2 \Big\{ c_{\beta-\alpha} \left\{ \delta Z_{hH} - \delta Z_{H^-G^-} \right\} + s_{\beta-\alpha} \left\{ 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-} \right\} \Big\} \Big\} \Big\} \Big\} \Big\} \Big\} \Big\} \Bigg\} +
M_W^2\, s_W \Bigg\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(c_\alpha\, c_\beta^3\, m_{u_{\mathrm{j1}}}^2 - s_\beta^2 \left(c_{\alpha+\beta}\, c_\beta^2\, M_W^2 + m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta\right)\right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) +
\frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{2\beta}\, s_{\beta-\alpha}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}}{2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right) \Bigg\} \Bigg\} +
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Bigg\{ \frac{M_W^2\, s_{2\beta}\, s_W}{8} \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1}\right) \left(4\, c_\alpha\, c_\beta^3\, m_{u_{\mathrm{j1}}}^2 - c_{\alpha+\beta}\, M_W^2\, s_{2\beta}^2 - 4\, m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta^3\right) +
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \Bigg\{ c_\beta^3 \Big\{ 2\, c_\alpha\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W +
\frac{m_{u_{\mathrm{j1}}}^2}{2} \Big\{ \delta Z_{hH}\, M_W^2\, s_{2\beta}\, s_\alpha\, s_W -
c_\alpha \Big\{ 4\,\delta s_W\, M_W^2\, s_{2\beta} +
s_W \Big\{ 2\,\delta M_W^2\, s_{2\beta} +
M_W^2 \Big\{ 8\, c_\beta\, \delta s_\beta - 2\,\delta Z_{H^-G^-}\, s_\beta^2 -
s_{2\beta} \left\{ 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-} \right\} \Big\} \Big\} \Big\} \Big\} \Big\} -
s_\beta^3 \Big\{ 2\,\delta m^d_{\mathrm{j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_\alpha\, s_W -
c_\beta^3\, M_W^4 \left\{ c_{\alpha+\beta} \left(4\,\delta s_W - s_W \left(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - s_{\alpha+\beta}\, s_W \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) \right\} -
m_{d_{\mathrm{j2}}}^2 \Big\{ M_W^2\, s_\alpha\, s_W \left(c_\beta^2\, \delta Z_{H^-G^-} + 4\,\delta c_\beta\, s_\beta\right) +
\Big\{ 4\,\delta s_W\, M_W^2\, s_\alpha +
\Big\{ 2\,\delta M_W^2\, s_\alpha +
\Big\{ c_\alpha\, \delta Z_{hH} -
$$

$$
\begin{aligned}
C(h^0, G^-, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\sqrt{2}\,\mathrm{i}\,e^2\,c_\beta}{M_W^4\,s_{2\beta}^3\,s_W^3}
\Bigg\{ \mathrm{CKM}^{*}_{\mathrm{j1,j2}} \Bigg\{ s_\beta \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \Bigg\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \Bigg\{ \frac{c_{\beta-\alpha}\,m_{d_{\mathrm{j2}}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,s_W}{2} \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2} \right) + \\
c_{\beta-\alpha}\,\delta m^d_{\mathrm{j2}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,s_W + \\
m_{d_{\mathrm{j2}}} \Bigg\{ c_{\beta-\alpha}\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W - \\
\frac{m_{u_{\mathrm{j1}}}}{2} \Bigg\{ M_W^2\,s_{2\beta}\,s_{\beta-\alpha}\,s_W\,(\delta Z_{hH} + \delta Z_{H^-G^-}) + \\
c_{\beta-\alpha} \Bigg\{ 4\,\delta s_W\,M_W^2\,s_{2\beta} + \\
s_W \Bigg\{ 2\,\delta M_W^2\,s_{2\beta} + \\
M_W^2 \Bigg\{ 4\,(c_\beta\,\delta s_\beta + \delta c_\beta\,s_\beta) - \\
s_{2\beta} \Bigg\{ 4\,\delta Z_e + \\
\delta Z_{hh} + \\
\delta Z_{G^-G^-} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \\
\frac{M_W^2\,s_{2\beta}\,s_W}{2} \Bigg\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(m^2_{d_{\mathrm{j2}}}\,s_\alpha\,s_\beta + c_\beta \left(c_\alpha\,m^2_{u_{\mathrm{j1}}} - M_W^2\,s_{\alpha+\beta}\,s_\beta \right) \right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) - \\
c_{\beta-\alpha}\,m_{d_{\mathrm{j2}}}\,m_{u_{\mathrm{j1}}}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} \right) \Bigg\} \Bigg\} - \\
\Bigg\} - \\
\Bigg\} + \\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \Bigg\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \Bigg\{ c_\beta\,M_W^2\,s_\beta^2\,s_W \left(m^2_{d_{\mathrm{j2}}}\,s_\alpha\,s_\beta + c_\beta \left(c_\alpha\,m^2_{u_{\mathrm{j1}}} - M_W^2\,s_{\alpha+\beta}\,s_\beta \right) \right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1} \right) + \\
\frac{c_\beta\,m_{u_{\mathrm{j1}}}\,s_{2\beta}}{2} \Bigg\{ m_{u_{\mathrm{j1}}} \Bigg\{ 4\,c_\alpha\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_\beta\,s_W + \\
c_\alpha \Bigg\{ \delta Z_{hH}\,M_W^2\,s_\alpha\,s_\beta\,s_W - \\
s_W \Bigg\{ 4\,\delta s_W\,M_W^2\,s_\beta + \\
M_W^2 \Bigg\{ 2\,\delta M_W^2\,s_\beta + \\
s_\beta \Bigg\{ 4\,\delta s_\beta - c_\beta\,\delta Z_{H^-G^-} - \\
4\,\delta Z_e + \\
\delta Z_{hh} + \\
\delta Z_{G^-G^-} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
s_\beta^3 \Bigg\{ 4\,c_\beta\,\delta m^d_{\mathrm{j2}}\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_\alpha\,s_W + \\
c_\beta^2\,M_W^4 \Bigg\{ 4\,\delta s_W\,s_{\alpha+\beta} + \\
s_W \Bigg\{ c_{\alpha+\beta}\,(\delta Z_{hH} - \delta Z_{H^-G^-}) - \\
s_{\alpha+\beta}\,(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}) \Bigg\} \Bigg\} - \\
m^2_{d_{\mathrm{j2}}} \Bigg\{ M_W^2\,s_\alpha\,s_W\,(4\,\delta c_\beta + \delta Z_{H^-G^-}\,s_\beta) + \\
c_\beta \Bigg\{ 4\,\delta s_W\,M_W^2\,s_\alpha + \\
s_W \Bigg\{ 2\,\delta M_W^2\,s_\alpha + \\
M_W^2 \Bigg\{ c_\alpha\,\delta Z_{hH} - \\
s_\alpha \Bigg\{ 4\,\delta Z_e + \\
\delta Z_{hh} + \\
\end{aligned}
$$

$$
\underset{306}{C}(h^0, H^+, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ \mathrm{CKM}_{\mathrm{j1,j2}} \Bigg\{ \frac{s_{2\beta}}{2} \Bigg\{ U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2} \Bigg\{ \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W}{2} \left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \Bigg\{ \delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W + m_{d_{\mathrm{j2}}} \Bigg\{ \delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W - m_{u_{\mathrm{j1}}} \Bigg\{ M_W^2\, s_\beta\, s_W \left(c_\beta\, c_{\beta-\alpha}\, \delta Z^*_{H^-G^-} + 2\,\delta c_\beta\, s_{\beta-\alpha}\right) + c_\beta \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\beta\, s_{\beta-\alpha} + s_W \Bigg\{ 2\,\delta s_\beta\, M_W^2\, s_{\beta-\alpha} + s_\beta \Bigg\{ 2\,\delta M_W^2\, s_{\beta-\alpha} - M_W^2 \Bigg\{ c_{\beta-\alpha}\, \delta Z_{hH} + s_{\beta-\alpha} \Bigg\{ 4\,\delta Z_e + \delta\bar{Z}_{H^-H^-} + \delta Z_{hh} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + M_W^2\, s_W \Bigg\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(c_\alpha\, c_\beta^3\, m_{u_{\mathrm{j1}}}^2 - s_\beta^2 \left(c_{\alpha+\beta}\, c_\beta^2\, M_W^2 + m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta\right)\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,1}\right) + \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{2\beta}\, s_{\beta-\alpha}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}}{2} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,2}\right) \Bigg\} \Bigg\} + \frac{U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}}{8} \Bigg\{ M_W^2\, s_{2\beta}\, s_W \left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) \left(4\, c_\alpha\, c_\beta^3\, m_{u_{\mathrm{j1}}}^2 - c_{\alpha+\beta}\, M_W^2\, s_{2\beta}^2 - 4\, m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta^3\right) - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \Bigg\{ M_W^4\, s_{2\beta}^3 \left(\delta Z_{hH}\, s_{\alpha+\beta}\, s_W - c_{\alpha+\beta} \left(4\,\delta s_W - s_W \left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{hh}\right)\right)\right) + M_W^2\, s_W \Bigg\{ 32\, c_\alpha\, c_\beta^4\, \delta s_\beta\, m_{u_{\mathrm{j1}}}^2 - 32\, \delta c_\beta\, m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta^4 + \delta Z^*_{H^-G^-}\, s_{2\beta}^2 \left(M_W^2\, s_{2\beta}\, s_{\alpha+\beta} - 2 \left(c_\alpha\, c_\beta\, m_{u_{\mathrm{j1}}}^2 + m_{d_{\mathrm{j2}}}^2\, s_\alpha\, s_\beta\right)\right) \Bigg\} - s_{2\beta} \Bigg\{ 4\, c_\beta^3\, m_{u_{\mathrm{j1}}} \Bigg\{ 4\, c_\alpha\, \delta m^u_{\mathrm{j1}}\, M_W^2\, s_W + m_{u_{\mathrm{j1}}} \Bigg\{ \delta Z_{hH}\, M_W^2\, s_\alpha\, s_W - c_\alpha \Bigg\{ 4\,\delta s_W\, M_W^2 + s_W \Bigg\{ 2\,\delta M_W^2 - M_W^2 \Bigg\{ 4\,\delta Z_e + \delta\bar{Z}_{H^-H^-} + \delta Z_{hh} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - 4\, m_{d_{\mathrm{j2}}}\, s_\beta^3 \Bigg\{ 4\,\delta m^d_{\mathrm{j2}}\, M_W^2\, s_\alpha\, s_W - m_{d_{\mathrm{j2}}} \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\alpha + s_W \Bigg\{ 2\,\delta M_W^2\, s_\alpha + M_W^2 \Bigg\{ c_\alpha\, \delta Z_{hH} - s_\alpha \Bigg\{ 4\,\delta Z_e + \delta\bar{Z}_{H^-H^-} + \delta Z_{hh}
$$

$$
\underset{307}{C}(h^0, G^+, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{\sqrt{2}\,\mathrm{i}\,e^2\,c_\beta}{M_W^4\,s_{2\beta}^3\,s_W^3} \left\{ \mathrm{CKM}_{\mathrm{j1,j2}} \left\{ s_\beta \left\{ U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2} \left\{ \frac{c_{\beta-\alpha}\, m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W}{2} \left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left\{ c_{\beta-\alpha}\,\delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + m_{d_{\mathrm{j2}}} \left\{ c_{\beta-\alpha}\,\delta m^u_{\mathrm{j1}}\, M_W^2\, s_{2\beta}\, s_W - \frac{m_{u_{\mathrm{j1}}}}{2} \left\{ M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W\, (\delta Z_{hH} + \delta Z_{H^-G^-}) + c_{\beta-\alpha} \left\{ 4\,\delta s_W\, M_W^2\, s_{2\beta} + s_W \left\{ 2\,\delta M_W^2\, s_{2\beta} + M_W^2 \left\{ 4\,(c_\beta\,\delta s_\beta + \delta c_\beta\, s_\beta) - s_{2\beta} \left\{ 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-} \right\} \right\} \right\} \right\} \right\} \right\} \right\} - \frac{M_W^2\, s_{2\beta}\, s_W}{2} \left\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(m^2_{d_{\mathrm{j2}}}\, s_\alpha\, s_\beta + c_\beta \left(c_\alpha\, m^2_{u_{\mathrm{j1}}} - M_W^2\, s_{\alpha+\beta}\, s_\beta\right)\right) \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,1}\right) - c_{\beta-\alpha}\, m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,2}\right) \right\} \right\} - U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1} \left\{ c_\beta\, M_W^2\, s_\beta^2\, s_W \left(m^2_{d_{\mathrm{j2}}}\, s_\alpha\, s_\beta + c_\beta \left(c_\alpha\, m^2_{u_{\mathrm{j1}}} - M_W^2\, s_{\alpha+\beta}\, s_\beta\right)\right) \left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left\{ \frac{c_\beta\, m_{u_{\mathrm{j1}}}\, s_{2\beta}}{2} \left\{ 4\,c_\alpha\,\delta m^u_{\mathrm{j1}}\, M_W^2\, s_\beta\, s_W + m_{u_{\mathrm{j1}}} \left\{ \delta Z_{hH}\, M_W^2\, s_\alpha\, s_\beta\, s_W - c_\alpha \left\{ 4\,\delta s_W\, M_W^2\, s_\beta + s_W \left\{ 2\,\delta M_W^2\, s_\beta + M_W^2 \left\{ 4\,\delta s_\beta - c_\beta\,\delta Z_{H^-G^-} - s_\beta \left\{ 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-} \right\} \right\} \right\} \right\} \right\} \right\} + s_\beta^3 \left\{ 4\,c_\beta\,\delta m^d_{\mathrm{j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_\alpha\, s_W + c_\beta^2\, M_W^4 \left\{ 4\,\delta s_W\, s_{\alpha+\beta} + s_W \left\{ c_{\alpha+\beta}\, (\delta Z_{hH} - \delta Z_{H^-G^-}) - s_{\alpha+\beta}\, (4\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}) \right\} \right\} - m^2_{d_{\mathrm{j2}}} \left\{ M_W^2\, s_\alpha\, s_W\, (4\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta) + c_\beta \left\{ 4\,\delta s_W\, M_W^2\, s_\alpha + s_W \left\{ 2\,\delta M_W^2\, s_\alpha + M_W^2 \left\{ c_\alpha\,\delta Z_{hH} - s_\alpha \left\{ 4\,\delta Z_e + \delta Z_{hh} + \right.\right.\right.\right.\right.\right.\right.\right.\right.\right.
$$

$$
\underset{308}{C(A^0, H^-, \tilde{u}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2})} = -\frac{\sqrt{2}\, e^2}{M_W^4\, s_{2\beta}^3\, s_W^3}
\left\{
\begin{array}{l}
\text{CKM}^*_{j1,j2}
\left\{
\begin{array}{l}
U^{\tilde{u},j1*}_{s1,1}
\left\{
\begin{array}{l}
\frac{M_W^2\, s_{2\beta}\, s_W}{8}
\left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,1}\right)
\left(4\, c_\beta^4\, m^2_{u_{j1}} - c_{2\beta}\, M_W^2\, s_{2\beta}^2 - 4\, m^2_{d_{j2}}\, s_\beta^4\right) + \\
U^{\tilde{d},j2}_{s2,1}
\left\{
\begin{array}{l}
c_\beta^4
\left\{
\begin{array}{l}
2\,\delta m^u_{j1}\, m_{u_{j1}}\, M_W^2\, s_{2\beta}\, s_W + \\
m^2_{u_{j1}}
\left\{
\begin{array}{l}
M_W^2\, s_\beta^2\, s_W\, (\delta Z_{AG} + \delta Z_{H^-G^-}) - \\
c_\beta
\left\{
\begin{array}{l}
4\,\delta s_W\, M_W^2\, s_\beta + \\
s_W
\left\{
\begin{array}{l}
4\,\delta s_\beta\, M_W^2 + \\
s_\beta
\left\{
\begin{array}{l}
2\,\delta M_W^2 - \\
M_W^2
\left\{
\begin{array}{l}
4\,\delta Z_e + \\
\delta Z_{AA} + \\
\delta Z_{H^-H^-}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
c_\beta^3\, M_W^4
\left\{
\begin{array}{l}
c_{2\beta}\, (4\,\delta s_W - s_W\, (4\,\delta Z_e + \delta Z_{AA} + \delta Z_{H^-H^-})) - \\
s_{2\beta}\, s_W\, (\delta Z_{AG} + \delta Z_{H^-G^-})
\end{array}
\right. - \\
s_\beta^3
\left\{
\begin{array}{l}
2\,\delta m^d_{j2}\, m_{d_{j2}}\, M_W^2\, s_{2\beta}\, s_W - \\
s_\beta
\left\{
\begin{array}{l}
M_W^2\, s_W
\left(4\,\delta c_\beta\, s_\beta + c_\beta^2\, (\delta Z_{AG} + \delta Z_{H^-G^-})\right) + \\
m^2_{d_{j2}}
\left\{
\begin{array}{l}
\frac{s_{2\beta}}{2}
\left\{
\begin{array}{l}
4\,\delta s_W\, M_W^2 + \\
s_W
\left\{
\begin{array}{l}
2\,\delta M_W^2 - \\
M_W^2
\left\{
\begin{array}{l}
4\,\delta Z_e + \\
\delta Z_{AA} + \\
\delta Z_{H^-H^-}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. - \\
\frac{M_W^2\, s_{2\beta}\, s_W}{2}
\left\{
\begin{array}{l}
U^{\tilde{d},j2}_{s2,1}
\left(\delta Z^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1*}_{2,1}\right)
\left(\frac{c_{2\beta}\, M_W^2\, s_{2\beta}^2}{4} - c_\beta^4\, m^2_{u_{j1}} + m^2_{d_{j2}}\, s_\beta^4\right) + \\
\frac{m_{d_{j2}}\, m_{u_{j1}}\, s_{2\beta}\, U^{\tilde{u},j1*}_{s1,2}\, U^{\tilde{d},j2}_{s2,2}}{2}\, (\delta Z_{AG} - \delta Z_{H^-G^-})
\end{array}
\right. \\
\delta\text{CKM}^*_{j1,j2}\, M_W^2\, s_{2\beta}\, s_W\, U^{\tilde{u},j1*}_{s1,1}\, U^{\tilde{d},j2}_{s2,1}
\left(\frac{c_{2\beta}\, M_W^2\, s_{2\beta}^2}{4} - c_\beta^4\, m^2_{u_{j1}} + m^2_{d_{j2}}\, s_\beta^4\right)
\end{array}
\right.
$$

$$
\underset{309}{C(G^0, G^-, \tilde{u}_{\mathrm{j1}}^{\mathrm{s1}}, \tilde{d}_{\mathrm{j2}}^{\mathrm{s2},\dagger})} = \frac{e^2}{2\sqrt{2}\, M_W^4\, s_{2\beta}\, s_W^3} \left\{ \begin{array}{l} \mathrm{CKM}_{\mathrm{j1,j2}}^{*} \left\{ \begin{array}{l} U_{\mathrm{s1},1}^{\tilde{u},\mathrm{j1}*} \left\{ \begin{array}{l} U_{\mathrm{s2},1}^{\tilde{d},\mathrm{j2}} \left\{ \begin{array}{l} \frac{M_W^2\, s_{2\beta}\, s_W}{2} \left(\delta \bar{Z}_{1,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{1,1}^{\tilde{d},\mathrm{j2}} + \delta \bar{Z}_{2,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{2,1}^{\tilde{d},\mathrm{j2}} \right) \left(m_{d_{\mathrm{j2}}}^2 - m_{u_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2 \right) - \\ m_{d_{\mathrm{j2}}}^2\, s_W \left\{ \begin{array}{l} \delta M_W^2\, s_{2\beta} + \\ \frac{M_W^2}{2} \left\{ \begin{array}{l} 8\, \delta c_\beta\, s_\beta + 2\, s_\beta^2\, (\delta Z_{AG} + \delta Z_{H^-G^-}) - \\ s_{2\beta}\, (4\, \delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}) \end{array} \right. \end{array} \right. \\ \frac{M_W^4\, s_{2\beta}}{2} \left\{ \begin{array}{l} s_{2\beta}\, s_W\, (\delta Z_{AG} + \delta Z_{H^-G^-}) + \\ \left(c_\beta^2 - s_\beta^2 \right) (4\, \delta s_W - s_W\, (4\, \delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-})) \end{array} \right. \\ c_\beta \left\{ \begin{array}{l} M_W^2\, s_\beta \left(4\, \delta m_{\mathrm{j1}}^u\, m_{u_{\mathrm{j1}}}\, s_W + 4\, m_{d_{\mathrm{j2}}} \left(\delta s_W\, m_{d_{\mathrm{j2}}} - \delta m_{\mathrm{j2}}^d\, s_W \right) \right) - \\ m_{u_{\mathrm{j1}}}^2 \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_\beta + \\ s_W \left\{ \begin{array}{l} 2\, \delta M_W^2\, s_\beta + \\ M_W^2 \left\{ \begin{array}{l} 4\, \delta s_\beta - \\ c_\beta\, (\delta Z_{AG} + \delta Z_{H^-G^-}) - \\ s_\beta\, (4\, \delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \\ M_W^2\, s_W \left\{ \begin{array}{l} \frac{s_{2\beta}\, U_{\mathrm{s2},1}^{\tilde{d},\mathrm{j2}}}{2} \left(\delta Z_{1,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{1,1}^{\tilde{u},\mathrm{j1}*} + \delta Z_{2,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{2,1}^{\tilde{u},\mathrm{j1}*} \right) \left(m_{d_{\mathrm{j2}}}^2 - m_{u_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2 \right) - \\ m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U_{\mathrm{s1},2}^{\tilde{u},\mathrm{j1}*}\, U_{\mathrm{s2},2}^{\tilde{d},\mathrm{j2}}\, (\delta Z_{AG} - \delta Z_{H^-G^-}) \end{array} \right. \end{array} \right. \\ \delta\mathrm{CKM}_{\mathrm{j1,j2}}^{*}\, M_W^2\, s_{2\beta}\, s_W\, U_{\mathrm{s1},1}^{\tilde{u},\mathrm{j1}*}\, U_{\mathrm{s2},1}^{\tilde{d},\mathrm{j2}} \left(m_{d_{\mathrm{j2}}}^2 - m_{u_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2 \right) \end{array} \right\}
$$

$$
\underset{310}{C}(A^0, G^-, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{e^2}{\sqrt{2}\, M_W^4\, s_{2\beta}^2\, s_W^3}
\left\{ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left\{ \frac{M_W^2\, s_{2\beta}\, s_W}{4} \left(M_W^2\, s_{2\beta}^2 - 2 \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1} \right) - \right. \right. \right.
$$

$$
\left. \left. \left. c_\beta^2 \left\{ 2\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + m^2_{u_{\mathrm{j1}}} \left\{ M_W^2\, s_W \left(c_\beta^2\, \delta Z_{H^-G^-} + \delta Z_{AG}\, s_\beta^2 \right) - c_\beta \left\{ 4\, \delta s_W\, M_W^2\, s_\beta + s_W \left\{ 4\, \delta s_\beta\, M_W^2 + s_\beta \left\{ 2\, \delta M_W^2 - M_W^2 \left\{ \begin{array}{l} 4\, \delta Z_e + \\ \delta Z_{AA} + \\ \delta Z_{G^-G^-} \end{array} \right. \right\} \right\} \right\} \right\} \right\} + \right. \right. \right.
$$

$$
\left. \left. \left. s_\beta^2 \left\{ 2\, \delta m^d_{\mathrm{j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_W + c_\beta^2\, M_W^4 \left\{ 4\, \delta s_W\, s_{2\beta} + s_W \left\{ \begin{array}{l} c_{2\beta}\, (\delta Z_{AG} - \delta Z_{H^-G^-}) - \\ s_{2\beta}\, (4\, \delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}) \end{array} \right\} \right\} - m^2_{d_{\mathrm{j2}}} \left\{ M_W^2\, s_W \left(c_\beta^2\, \delta Z_{AG} + 4\, \delta c_\beta\, s_\beta + \delta Z_{H^-G^-}\, s_\beta^2 \right) + \frac{s_{2\beta}}{2} \left\{ 4\, \delta s_W\, M_W^2 + s_W \left(2\, \delta M_W^2 - M_W^2\, (4\, \delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}) \right) \right\} \right\} \right\} \right\} \right\} -
$$

$$
\left. M_W^2\, s_{2\beta}\, s_W \left\{ \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}}{2} \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2} \right) - \frac{U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}}{4} \left(M_W^2\, s_{2\beta}^2 - 2 \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) \right\} -
$$

$$
\left. U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left\{ 2\, c_\beta\, M_W^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left(\delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, s_\beta\, s_W + m_{d_{\mathrm{j2}}} \left(\delta m^u_{\mathrm{j1}}\, s_\beta\, s_W - m_{u_{\mathrm{j1}}}\, (2\, \delta s_W\, s_\beta + \delta s_\beta\, s_W) \right) \right) - m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_W \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\, \left(\delta M_W^2\, s_{2\beta} + M_W^2\, s_\beta\, (2\, \delta c_\beta - c_\beta\, (4\, \delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-})) \right) - \\ \frac{M_W^2\, s_{2\beta}}{2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} \right) \end{array} \right\} \right\} \right\} -
$$

$$
\left. \delta \mathrm{CKM}^*_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W \left(m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} - U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{\mathrm{j1}}} - m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \right) \right\}
$$

$$
\underset{311}{C}(G^0, H^-, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{e^2}{\sqrt{2}\, M_W^4\, s_{2\beta}^2\, s_W^3} \left\{ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ s_W \left\{ M_W^2\, s_{2\beta} \left\{ \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}}{2} \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2} \right) - \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. \frac{U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}}{2} \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) \right\} + \right. \right.
$$

$$
\left. \left. \left. \frac{M_W^4\, s_{2\beta}^3\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}}{4} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) \right\} + \right.
$$

$$
\left. \frac{M_W^2\, s_{2\beta}\, s_W}{4} \left(M_W^2\, s_{2\beta}^2 - 2 \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1} \right) - \right.
$$

$$
\left. U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left\{ c_\beta^2 \left\{ 2\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. m^2_{u_{\mathrm{j1}}} \left\{ M_W^2\, s_W \left(c_\beta^2\, \delta Z_{AG} + \delta Z_{H^-G^-}\, s_\beta^2 \right) - \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. c_\beta \left\{ 4\, \delta s_W\, M_W^2\, s_\beta + \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. s_W \left\{ 4\, \delta s_\beta\, M_W^2 + \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. s_\beta \left\{ 2\, \delta M_W^2 - \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. M_W^2 \left\{ 4\, \delta Z_e + \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. \delta Z_{GG} + \right. \right. \right. \right.
$$

$$
\left. \left. \left. \left. \delta Z_{H^-H^-} \right\} \right\} \right\} \right\} \right\} \right\} \right\} \right\} + \right.
$$

$$
\left. \left. \left. s_\beta^2 \left\{ 2\, \delta m^d_{\mathrm{j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_W + \right. \right. \right.
$$

$$
\left. \left. \left. c_\beta^2\, M_W^4 \left\{ 4\, \delta s_W\, s_{2\beta} - \right. \right. \right.
$$

$$
\left. \left. \left. s_W \left\{ s_{2\beta}\, \left(4\, \delta Z_e + \delta Z_{GG} + \delta Z_{H^-H^-} \right) + \right. \right. \right.
$$

$$
\left. \left. \left. c_{2\beta}\, \left(\delta Z_{AG} - \delta Z_{H^-G^-} \right) \right\} \right\} - \right.
$$

$$
\left. \left. m^2_{d_{\mathrm{j2}}} \left\{ M_W^2\, s_W \left(c_\beta^2\, \delta Z_{H^-G^-} + 4\, \delta c_\beta\, s_\beta + \delta Z_{AG}\, s_\beta^2 \right) + \right. \right. \right.
$$

$$
\left. \left. \left. \frac{s_{2\beta}}{2} \left\{ 4\, \delta s_W\, M_W^2 + \right. \right. \right.
$$

$$
\left. \left. \left. s_W \left(2\, \delta M_W^2 - M_W^2\, \left(4\, \delta Z_e + \delta Z_{GG} + \delta Z_{H^-H^-} \right) \right) \right\} \right\} \right\} \right\} \right\} +
$$

$$
\left. U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left\{ 2\, c_\beta\, M_W^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left(\delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, s_\beta\, s_W + m_{d_{\mathrm{j2}}} \left(\delta m^u_{\mathrm{j1}}\, s_\beta\, s_W - m_{u_{\mathrm{j1}}}\, \left(2\, \delta s_W\, s_\beta + \delta s_\beta\, s_W \right) \right) \right) - \right. \right.
$$

$$
\left. \left. m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_W \left\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left(\delta M_W^2\, s_{2\beta} + M_W^2\, s_\beta\, \left(2\, \delta c_\beta - c_\beta\, \left(4\, \delta Z_e + \delta Z_{GG} + \delta Z_{H^-H^-} \right) \right) \right) - \right. \right.
$$

$$
\left. \left. \left. \frac{M_W^2\, s_{2\beta}}{2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} \right) \right\} \right\} \right\} +
$$

$$
\left. \delta \mathrm{CKM}^*_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W \left(m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{\mathrm{j1}}} - m^2_{d_{\mathrm{j2}}}\, s_\beta^2 \right) \right) \right\}
$$

$$
\underset{312}{C}(A^0, H^+, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = \frac{\sqrt{2}\, e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ \mathrm{CKM}_{\mathrm{j1,j2}} \Bigg\{ \frac{U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}}{8} \Bigg\{ M_W^2\, s_{2\beta}\, s_W \left(\delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) \left(4\, c_\beta^4\, m_{u_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2\, s_{2\beta}^2 - 4\, m_{d_{\mathrm{j2}}}^2\, s_\beta^4\right) + U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \Bigg\{ M_W^4 \Big\{ s_{2\beta}^3 \left(c_\beta^2 - s_\beta^2\right) \left(4\,\delta s_W - s_W \left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{AA}\right)\right) - s_{2\beta}^4\, s_W \left(\delta Z_{AG} + \delta Z^*_{H^-G^-}\right) \Big\} - M_W^2\, s_W \Big\{ m_{u_{\mathrm{j1}}}^2 \left(32\, c_\beta^5\, \delta s_\beta - 2\, c_\beta^2\, s_{2\beta}^2 \left(\delta Z_{AG} + \delta Z^*_{H^-G^-}\right)\right) - 32\, \delta c_\beta\, m_{d_{\mathrm{j2}}}^2\, s_\beta^5 + 2\, m_{d_{\mathrm{j2}}}^2\, s_{2\beta}^2\, s_\beta^2 \left(\delta Z_{AG} + \delta Z^*_{H^-G^-}\right) \Big\} + s_{2\beta} \Bigg\{ 4\, c_\beta^4\, m_{u_{\mathrm{j1}}} \Big\{ 4\,\delta m^u_{\mathrm{j1}}\, M_W^2\, s_W - m_{u_{\mathrm{j1}}} \Big\{ 4\,\delta s_W\, M_W^2 + s_W \left(2\,\delta M_W^2 - M_W^2 \left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{AA}\right)\right) \Big\} \Big\} - 4\, m_{d_{\mathrm{j2}}}\, s_\beta^4 \Big\{ 4\,\delta m^d_{\mathrm{j2}}\, M_W^2\, s_W - m_{d_{\mathrm{j2}}} \Big\{ 4\,\delta s_W\, M_W^2 + s_W \left(2\,\delta M_W^2 - M_W^2 \left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{AA}\right)\right) \Big\} \Big\} \Bigg\} \Bigg\} \Bigg\} - \frac{M_W^2\, s_{2\beta}\, s_W}{2} \Big\{ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1} \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,1}\right) \left(\frac{c_{2\beta}\, M_W^2\, s_{2\beta}^2}{4} - c_\beta^4\, m_{u_{\mathrm{j1}}}^2 + m_{d_{\mathrm{j2}}}^2\, s_\beta^4\right) + \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{2\beta}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2}}{2} \left(\delta Z_{AG} - \delta Z^*_{H^-G^-}\right) \Big\} \Bigg\} - \delta\mathrm{CKM}_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1} \left(\frac{c_{2\beta}\, M_W^2\, s_{2\beta}^2}{4} - c_\beta^4\, m_{u_{\mathrm{j1}}}^2 + m_{d_{\mathrm{j2}}}^2\, s_\beta^4\right) \Bigg\}
$$

$$
\underset{313}{C(G^0, G^+, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}})} = -\frac{e^2}{2\sqrt{2}\, M_W^4\, s_{2\beta}\, s_W^3}
\left\{
\mathrm{CKM}_{\mathrm{j1,j2}}
\left\{
U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}
\left\{
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\frac{M_W^2\, s_{2\beta}\, s_W}{2}\left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right)\left(m^2_{d_{\mathrm{j2}}} - m^2_{u_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\right) - \\
m^2_{d_{\mathrm{j2}}}\, s_W \left\{ \begin{array}{l} \delta M_W^2\, s_{2\beta} + \\ \frac{M_W^2}{2}\left\{ \begin{array}{l} 8\,\delta c_\beta\, s_\beta + 2\, s_\beta^2\, (\delta Z_{AG} + \delta Z_{H^-G^-}) - \\ s_{2\beta}\, (4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}) \end{array} \right\} \end{array} \right\} - \\
\frac{M_W^4\, s_{2\beta}}{2}\left\{ \begin{array}{l} s_{2\beta}\, s_W\, (\delta Z_{AG} + \delta Z_{H^-G^-}) + \\ \left(c_\beta^2 - s_\beta^2\right)(4\,\delta s_W - s_W\, (4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-})) \end{array} \right\} + \\
c_\beta \left\{ \begin{array}{l} M_W^2\, s_\beta \left(4\,\delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, s_W + 4\, m_{d_{\mathrm{j2}}}\left(\delta s_W\, m_{d_{\mathrm{j2}}} - \delta m^d_{\mathrm{j2}}\, s_W\right)\right) - \\ m^2_{u_{\mathrm{j1}}} \left\{ \begin{array}{l} 4\,\delta s_W\, M_W^2\, s_\beta + \\ s_W \left\{ \begin{array}{l} 2\,\delta M_W^2\, s_\beta + \\ M_W^2 \left\{ \begin{array}{l} 4\,\delta s_\beta - \\ c_\beta\, (\delta Z_{AG} + \delta Z_{H^-G^-}) - \\ s_\beta\, (4\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right.
\end{array}
\right\} + \\
M_W^2\, s_W \left\{ \begin{array}{l} \frac{s_{2\beta}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}}{2}\left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,1}\right)\left(m^2_{d_{\mathrm{j2}}} - m^2_{u_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\right) - \\ m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2}\, (\delta Z_{AG} - \delta Z_{H^-G^-}) \end{array} \right\}
\right\} + \\
\delta\mathrm{CKM}_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}\left(m^2_{d_{\mathrm{j2}}} - m^2_{u_{\mathrm{j1}}} - c_{2\beta}\, M_W^2\right)
\end{array}
\right\}
$$

$$
\underset{314}{C}(A^0, G^+, \tilde{d}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s1},\dagger}_{\mathrm{j1}}) = -\frac{e^2}{\sqrt{2}\, M_W^4\, s_{2\beta}^2\, s_W^3}
\left\{
\mathrm{CKM}_{\mathrm{j1,j2}}
\left\{
U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}
\left\{
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
c_\beta^2
\left\{
\begin{array}{l}
2\,\delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + \\
m^2_{u_{\mathrm{j1}}}
\left\{
\begin{array}{l}
M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{H^-G^-} + \delta Z_{AG}\, s_\beta^2\right) - \\
c_\beta
\left\{
\begin{array}{l}
4\,\delta s_W\, M_W^2\, s_\beta + \\
s_W
\left\{
\begin{array}{l}
4\,\delta s_\beta\, M_W^2 + \\
s_\beta
\left\{
\begin{array}{l}
2\,\delta M_W^2 - \\
M_W^2
\left\{
\begin{array}{l}
4\,\delta Z_e + \\
\delta Z_{AA} + \\
\delta Z_{G^-G^-}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
s_\beta^2
\left\{
\begin{array}{l}
2\,\delta m^d_{\mathrm{j2}}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_{2\beta}\, s_W + \\
c_\beta^2\, M_W^4
\left\{
\begin{array}{l}
4\,\delta s_W\, s_{2\beta} + \\
s_W
\left\{
\begin{array}{l}
c_{2\beta}\, (\delta Z_{AG} - \delta Z_{H^-G^-}) - \\
s_{2\beta}\, (4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-})
\end{array}
\right.
\end{array}
\right. - \\
m^2_{d_{\mathrm{j2}}}
\left\{
\begin{array}{l}
M_W^2\, s_W\, \left(c_\beta^2\, \delta Z_{AG} + 4\,\delta c_\beta\, s_\beta + \delta Z_{H^-G^-}\, s_\beta^2\right) + \\
\frac{s_{2\beta}}{2}
\left\{
\begin{array}{l}
4\,\delta s_W\, M_W^2 + \\
s_W\, \left(2\,\delta M_W^2 - M_W^2\, (4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-})\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. - \\
\frac{M_W^2\, s_{2\beta}\, s_W}{4}\, \left(M_W^2\, s_{2\beta}^2 - 2\, \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2\right)\right)\, \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right) -
\end{array}
\right.
\right.
\right. - \\
M_W^2\, s_{2\beta}\, s_W
\left\{
\begin{array}{l}
\frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2}}{2}\, \left(\delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}}_{2,2}\right) - \\
\frac{U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}}{4}\, \left(M_W^2\, s_{2\beta}^2 - 2\, \left(c_\beta^2\, m^2_{u_{\mathrm{j1}}} + m^2_{d_{\mathrm{j2}}}\, s_\beta^2\right)\right)\, \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,1}\right)
\end{array}
\right. - \\
U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
2\, c_\beta\, M_W^2\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2}\, \left(\delta m^d_{\mathrm{j2}}\, m_{u_{\mathrm{j1}}}\, s_\beta\, s_W + m_{d_{\mathrm{j2}}}\, \left(\delta m^u_{\mathrm{j1}}\, s_\beta\, s_W - m_{u_{\mathrm{j1}}}\, (2\,\delta s_W\, s_\beta + \delta s_\beta\, s_W)\right)\right) - \\
m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_W
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2}\, \left(\delta M_W^2\, s_{2\beta} + M_W^2\, s_\beta\, (2\,\delta c_\beta - c_\beta\, (4\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-}))\right) - \\
\frac{M_W^2\, s_{2\beta}}{2}\, \left(\delta Z^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. - \\
\delta\mathrm{CKM}_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W\, \left(m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},2} - U^{\tilde{u},\mathrm{j1}}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s2},1}\, \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{\mathrm{j1}}} - m^2_{d_{\mathrm{j2}}}\, s_\beta^2\right)\right)
\end{array}
\right\}
$$

$$
\underset{315}{C(G^0, H^+, \tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1})} = -\frac{e^2}{\sqrt{2}\, M_W^4\, s_{2\beta}^2\, s_W^3} \left\{ \begin{array}{l}
\mathrm{CKM}_{j1,j2} \left\{ \begin{array}{l}
s_W \left\{ \begin{array}{l}
M_W^2\, s_{2\beta} \left\{ \begin{array}{l}
\frac{m_{d_{j2}}\, m_{u_{j1}}\, U^{\tilde{d},j2*}_{s2,2}}{2} \left(\delta \bar{Z}^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1}_{1,2} + \delta \bar{Z}^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1}_{2,2} \right) - \\
\frac{U^{\tilde{u},j1}_{s1,1}}{2} \left(c_\beta^2\, m^2_{u_{j1}} + m^2_{d_{j2}}\, s_\beta^2 \right) \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1} \right)
\end{array} \right\} + \\
\frac{M_W^4\, s_{2\beta}^3\, U^{\tilde{u},j1}_{s1,1}}{4} \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1} \right)
\end{array} \right\} + \\
U^{\tilde{d},j2*}_{s2,1} \left\{ \begin{array}{l}
\frac{M_W^2\, s_{2\beta}\, s_W}{4} \left(M_W^2\, s_{2\beta}^2 - 2 \left(c_\beta^2\, m^2_{u_{j1}} + m^2_{d_{j2}}\, s_\beta^2 \right) \right) \left(\delta \bar{Z}^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1}_{2,1} \right) - \\
U^{\tilde{u},j1}_{s1,1} \left\{ \begin{array}{l}
\frac{M_W^4\, s_{2\beta}^2}{4} \left(4\, \delta s_W\, s_{2\beta} - s_W \left(c_{2\beta}\, \delta Z_{AG} + s_{2\beta} \left(\delta \bar{Z}_{H^- H^-} + 4\, \delta Z_e + \delta Z_{GG} \right) \right) \right) + \\
c_\beta^3\, m_{u_{j1}} \left\{ \begin{array}{l}
4\, \delta m^u_{j1}\, M_W^2\, s_\beta\, s_W - \\
m_{u_{j1}} \left(s_\beta\, s_W \left(2\, \delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^- H^-} + 4\, \delta Z_e \right) \right) + 4\, M_W^2 \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W \right) \right)
\end{array} \right\} + \\
M_W^2 \left\{ \begin{array}{l}
c_\beta^3\, m^2_{u_{j1}}\, s_W \left(c_\beta\, \delta Z_{AG} + \delta Z_{GG}\, s_\beta \right) - \\
2\, m_{d_{j2}}\, s_{2\beta}\, s_\beta^2 \left(\delta s_W\, m_{d_{j2}} - \delta m^d_{j2}\, s_W \right)
\end{array} \right\} - \\
s_W \left\{ \begin{array}{l}
\frac{\delta Z^*_{H^- G^-}\, M_W^2\, s_{2\beta}^2}{4} \left(m^2_{d_{j2}} - m^2_{u_{j1}} - c_{2\beta}\, M_W^2 \right) + \\
m^2_{d_{j2}}\, s_\beta^3 \left\{ \begin{array}{l}
M_W^2 \left(4\, \delta c_\beta + \delta Z_{AG}\, s_\beta \right) + \\
c_\beta \left(2\, \delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^- H^-} + 4\, \delta Z_e + \delta Z_{GG} \right) \right)
\end{array} \right.
\end{array} \right.
\end{array} \right\} + \\
U^{\tilde{u},j1}_{s1,2} \left\{ \begin{array}{l}
2\, c_\beta\, M_W^2\, U^{\tilde{d},j2*}_{s2,2} \left(\delta m^d_{j2}\, m_{u_{j1}}\, s_\beta\, s_W + m_{d_{j2}} \left(\delta m^u_{j1}\, s_\beta\, s_W - m_{u_{j1}} \left(2\, \delta s_W\, s_\beta + \delta s_\beta\, s_W \right) \right) \right) - \\
m_{d_{j2}}\, m_{u_{j1}}\, s_W \left\{ \begin{array}{l}
U^{\tilde{d},j2*}_{s2,2} \left(\delta M_W^2\, s_{2\beta} + M_W^2\, s_\beta \left(2\, \delta c_\beta - c_\beta \left(\delta \bar{Z}_{H^- H^-} + 4\, \delta Z_e + \delta Z_{GG} \right) \right) \right) - \\
\frac{M_W^2\, s_{2\beta}}{2} \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,2} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,2} \right)
\end{array} \right.
\end{array} \right\} \\
\delta \mathrm{CKM}_{j1,j2}\, M_W^2\, s_{2\beta}\, s_W \left(m_{d_{j2}}\, m_{u_{j1}}\, U^{\tilde{u},j1}_{s1,2}\, U^{\tilde{d},j2*}_{s2,2} + U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,1} \left(\frac{M_W^2\, s_{2\beta}^2}{2} - c_\beta^2\, m^2_{u_{j1}} - m^2_{d_{j2}}\, s_\beta^2 \right) \right)
\end{array} \right.
$$

$$
\underset{328}{C}(H^0,H^-,\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\,s_{2\beta}^3\,s_W^3}\left\{ \mathrm{CKM}^*_{\mathrm{j1,j2}} \left\{ \begin{array}{l}
\frac{s_{2\beta}}{2}\left\{ \begin{array}{l}
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\left\{ \begin{array}{l}
\frac{c_{\beta-\alpha}\,m_{d_{\mathrm{j2}}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,s_W}{2}\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{1,2}+\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{2,2}\right)+\\
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\left\{ \begin{array}{l}
c_{\beta-\alpha}\,\delta m^d_{\mathrm{j2}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,s_W+\\
\frac{m_{d_{\mathrm{j2}}}}{2}\left\{ \begin{array}{l}
2\,c_{\beta-\alpha}\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_{2\beta}\,s_W+\\
m_{u_{\mathrm{j1}}}\left\{ \begin{array}{l}
M_W^2\,s_{2\beta}\,s_{\beta-\alpha}\,s_W\,(\delta Z_{hH}+\delta Z_{H^-G^-})-\\
c_{\beta-\alpha}\left\{ \begin{array}{l}
4\,\delta s_W\,M_W^2\,s_{2\beta}+\\
s_W\left\{ \begin{array}{l}
2\,\delta M_W^2\,s_{2\beta}+\\
M_W^2\left\{ \begin{array}{l}
4\,(c_\beta\,\delta s_\beta+\delta c_\beta\,s_\beta)-\\
s_{2\beta}\left\{ \begin{array}{l}
4\,\delta Z_e+\\
\delta Z_{HH}+\\
\delta Z_{H^-H^-}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}-\\
M_W^2\,s_W\left\{ \begin{array}{l}
\frac{U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}}{4}\left(M_W^2\,s_{2\beta}^2\,s_{\alpha+\beta}-4\left(c_\beta^3\,m_{u_{\mathrm{j1}}}^2\,s_\alpha+c_\alpha\,m_{d_{\mathrm{j2}}}^2\,s_\beta^3\right)\right)\left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1}+\delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right)-\\
\frac{c_{\beta-\alpha}\,m_{d_{\mathrm{j2}}}\,m_{u_{\mathrm{j1}}}\,s_{2\beta}\,U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}}{2}\left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,2}+\delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array}\right\}
\end{array}\right\}-\\
U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\left\{ \begin{array}{l}
\frac{M_W^2\,s_{2\beta}\,s_W}{8}\left(M_W^2\,s_{2\beta}^2\,s_{\alpha+\beta}-4\left(c_\beta^3\,m_{u_{\mathrm{j1}}}^2\,s_\alpha+c_\alpha\,m_{d_{\mathrm{j2}}}^2\,s_\beta^3\right)\right)\left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{1,1}+\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{d},\mathrm{j2}}_{2,1}\right)-\\
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\left\{ \begin{array}{l}
c_\beta^3\left\{ \begin{array}{l}
2\,\delta m^u_{\mathrm{j1}}\,m_{u_{\mathrm{j1}}}\,M_W^2\,s_{2\beta}\,s_\alpha\,s_W+\\
m_{u_{\mathrm{j1}}}^2\left\{ \begin{array}{l}
\delta Z_{H^-G^-}\,M_W^2\,s_\alpha\,s_\beta^2\,s_W-\\
c_\beta\left\{ \begin{array}{l}
4\,\delta s_W\,M_W^2\,s_\alpha\,s_\beta+\\
s_W\left\{ \begin{array}{l}
4\,\delta s_\beta\,M_W^2\,s_\alpha+\\
s_\beta\left\{ \begin{array}{l}
2\,\delta M_W^2\,s_\alpha-\\
M_W^2\left\{ \begin{array}{l}
c_\alpha\,\delta Z_{hH}+\\
s_\alpha\left\{ \begin{array}{l}
4\,\delta Z_e+\\
\delta Z_{HH}+\\
\delta Z_{H^-H^-}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}+\\
s_\beta^3\left\{ \begin{array}{l}
2\,c_\alpha\,\delta m^d_{\mathrm{j2}}\,m_{d_{\mathrm{j2}}}\,M_W^2\,s_{2\beta}\,s_W+\\
c_\beta^3\,M_W^4\left\{ \begin{array}{l}
4\,\delta s_W\,s_{\alpha+\beta}-\\
s_W\left\{ \begin{array}{l}
s_{\alpha+\beta}\,(4\,\delta Z_e+\delta Z_{HH}+\delta Z_{H^-H^-})+\\
c_{\alpha+\beta}\,(\delta Z_{hH}-\delta Z_{H^-G^-})
\end{array}\right\}
\end{array}\right\}-\\
m_{d_{\mathrm{j2}}}^2\left\{ \begin{array}{l}
\frac{\delta Z_{hH}\,M_W^2\,s_{2\beta}\,s_\alpha\,s_W}{2}+\\
c_\alpha\left\{ \begin{array}{l}
M_W^2\,s_W\left(c_\beta^2\,\delta Z_{H^-G^-}+4\,\delta c_\beta\,s_\beta\right)+\\
\frac{s_{2\beta}}{2}\left\{ \begin{array}{l}
4\,\delta s_W\,M_W^2+\\
\left\{ \begin{array}{l}
2\,\delta M_W^2-\\
\left\{ \begin{array}{l}
4\,\delta Z_e+
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right.
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}+\right\}
$$

$$
\underset{329}{C}(H^0, G^-, \tilde{u}^{\text{s1}}_{\text{j1}}, \tilde{d}^{\text{s2},\dagger}_{\text{j2}}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ \mathrm{CKM}^*_{\text{j1,j2}} \Bigg\{ \frac{s_{2\beta}}{2} \Bigg\{ U^{\tilde{u},\text{j1}*}_{\text{s1},2} \Bigg\{ \frac{m_{d_{\text{j2}}}\, m_{u_{\text{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W}{2} \left(\delta\bar{Z}^{\tilde{d},\text{j2}}_{1,\text{s2}}\, U^{\tilde{d},\text{j2}}_{1,2} + \delta\bar{Z}^{\tilde{d},\text{j2}}_{2,\text{s2}}\, U^{\tilde{d},\text{j2}}_{2,2}\right) + U^{\tilde{d},\text{j2}}_{\text{s2},2} \Bigg\{ \delta m^d_{\text{j2}}\, m_{u_{\text{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W + m_{d_{\text{j2}}} \Bigg\{ \delta m^u_{\text{j1}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W - m_{u_{\text{j1}}} \Bigg\{ 2\,\delta c_\beta\, M_W^2\, s_\beta\, s_{\beta-\alpha}\, s_W + c_\beta \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\beta\, s_{\beta-\alpha} + s_W \Bigg\{ 2\,\delta s_\beta\, M_W^2\, s_{\beta-\alpha} + s_\beta \Bigg\{ 2\,\delta M_W^2\, s_{\beta-\alpha} + M_W^2 \Bigg\{ c_{\beta-\alpha} \Big\{ \delta Z_{hH} - \delta Z_{H^-G^-} \Big\} - s_{\beta-\alpha} \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \frac{M_W^2\, s_{2\beta}\, s_W}{2} \Bigg\{ U^{\tilde{d},\text{j2}}_{\text{s2},1} \left(c_\alpha\, m^2_{d_{\text{j2}}}\, s_\beta - c_\beta \left(m^2_{u_{\text{j1}}}\, s_\alpha + c_{\alpha+\beta}\, M_W^2\, s_\beta\right)\right) \left(\delta Z^{\tilde{u},\text{j1}}_{1,\text{s1}}\, U^{\tilde{u},\text{j1}*}_{1,1} + \delta Z^{\tilde{u},\text{j1}}_{2,\text{s1}}\, U^{\tilde{u},\text{j1}*}_{2,1}\right) - m_{d_{\text{j2}}}\, m_{u_{\text{j1}}}\, s_{\beta-\alpha}\, U^{\tilde{d},\text{j2}}_{\text{s2},2} \left(\delta Z^{\tilde{u},\text{j1}}_{1,\text{s1}}\, U^{\tilde{u},\text{j1}*}_{1,2} + \delta Z^{\tilde{u},\text{j1}}_{2,\text{s1}}\, U^{\tilde{u},\text{j1}*}_{2,2}\right) \Bigg\} \Bigg\} + U^{\tilde{u},\text{j1}*}_{\text{s1},1} \Bigg\{ \frac{M_W^2\, s_{2\beta}^2\, s_W}{8} \left(\delta\bar{Z}^{\tilde{d},\text{j2}}_{1,\text{s2}}\, U^{\tilde{d},\text{j2}}_{1,1} + \delta\bar{Z}^{\tilde{d},\text{j2}}_{2,\text{s2}}\, U^{\tilde{d},\text{j2}}_{2,1}\right) \left(c_{\alpha+\beta}\, M_W^2\, s_{2\beta} + 2\, c_\beta\, m^2_{u_{\text{j1}}}\, s_\alpha - 2\, c_\alpha\, m^2_{d_{\text{j2}}}\, s_\beta\right) + s_{2\beta}\, U^{\tilde{d},\text{j2}}_{\text{s2},1} \Bigg\{ \frac{c_\beta^2\, m_{u_{\text{j1}}}}{2} \Bigg\{ 4\,\delta m^u_{\text{j1}}\, M_W^2\, s_\alpha\, s_\beta\, s_W - m_{u_{\text{j1}}} \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\alpha\, s_\beta + s_W \Bigg\{ s_\alpha \left(4\,\delta s_\beta\, M_W^2 + 2\,\delta M_W^2\, s_\beta\right) - M_W^2 \Bigg\{ c_\beta\, \delta Z_{H^-G^-}\, s_\alpha + s_\beta \Bigg\{ c_\alpha\, \delta Z_{hH} + s_\alpha \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - s_\beta^2 \Bigg\{ 2\, c_\alpha\, c_\beta\, \delta m^d_{\text{j2}}\, m_{d_{\text{j2}}}\, M_W^2\, s_W - \frac{m^2_{d_{\text{j2}}}}{2} \Bigg\{ c_\beta\, \delta Z_{hH}\, M_W^2\, s_\alpha\, s_W + c_\alpha \Bigg\{ M_W^2\, s_W \left(4\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) + c_\beta \Bigg\{ 4\,\delta s_W\, M_W^2 + s_W \Bigg\{ 2\,\delta M_W^2 - M_W^2 \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} + \cdots
$$

$$
\begin{aligned}
C(H^0, H^+, \tilde{d}_{\mathrm{j2}}^{\mathrm{s2}}, \tilde{u}_{\mathrm{j1}}^{\mathrm{s1},\dagger}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ & \mathrm{CKM}_{\mathrm{j1,j2}} \Bigg\{ \frac{s_{2\beta}}{2} \Bigg\{ U_{\mathrm{s2,2}}^{\tilde{d},\mathrm{j2}*} \Bigg\{ U_{\mathrm{s1,2}}^{\tilde{u},\mathrm{j1}} \Bigg\{ \frac{c_{\beta-\alpha}\, m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W}{2} \left(\delta \bar{Z}_{\mathrm{1,s1}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{1,2}}^{\tilde{u},\mathrm{j1}} + \delta \bar{Z}_{\mathrm{2,s1}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{2,2}}^{\tilde{u},\mathrm{j1}} \right) + \\
& c_{\beta-\alpha}\, \delta m_{\mathrm{j2}}^d\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_W + \\
& c_{\beta-\alpha}\, \delta m_{\mathrm{j1}}^u\, M_W^2\, s_{2\beta}\, s_W - \\
& m_{d_{\mathrm{j2}}} \Bigg\{ M_W^2\, s_\beta\, s_W\, \left(2\, c_{\beta-\alpha}\, \delta c_\beta - c_\beta\, \delta Z_{H^-G^-}^*\, s_{\beta-\alpha} \right) + \\
& m_{u_{\mathrm{j1}}} \Bigg\{ M_W^2\, s_W\, \left(2\, c_{\beta-\alpha}\, \delta s_\beta - \delta Z_{hH}\, s_\beta\, s_{\beta-\alpha} \right) + \\
& c_\beta \Bigg\{ 4\, \delta s_W\, M_W^2 + \\
& c_{\beta-\alpha}\, s_\beta \Bigg\{ 2\, \delta M_W^2 - \\
& s_W \Bigg\{ M_W^2 \Bigg\{ \begin{array}{l} 4\, \delta Z_e + \\ \delta \bar{Z}_{H^-H^-} + \\ \delta Z_{HH} \end{array} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \\
& M_W^2\, s_W \Bigg\{ \frac{U_{\mathrm{s1,1}}^{\tilde{u},\mathrm{j1}}}{4} \left(M_W^2\, s_{2\beta}^2\, s_{\alpha+\beta} - 4 \left(c_\beta^3\, m_{u_{\mathrm{j1}}}^2\, s_\alpha + c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta^3 \right) \right) \left(\delta Z_{\mathrm{1,s2}}^{\tilde{d},\mathrm{j2}}\, U_{\mathrm{1,1}}^{\tilde{d},\mathrm{j2}*} + \delta Z_{\mathrm{2,s2}}^{\tilde{d},\mathrm{j2}}\, U_{\mathrm{2,1}}^{\tilde{d},\mathrm{j2}*} \right) - \\
& \frac{c_{\beta-\alpha}\, m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{2\beta}\, U_{\mathrm{s1,2}}^{\tilde{u},\mathrm{j1}}}{2} \left(\delta Z_{\mathrm{1,s2}}^{\tilde{d},\mathrm{j2}}\, U_{\mathrm{1,2}}^{\tilde{d},\mathrm{j2}*} + \delta Z_{\mathrm{2,s2}}^{\tilde{d},\mathrm{j2}}\, U_{\mathrm{2,2}}^{\tilde{d},\mathrm{j2}*} \right) \Bigg\} \Bigg\} - \\
& \frac{s_{2\beta}}{2} \Bigg\{ U_{\mathrm{s2,1}}^{\tilde{d},\mathrm{j2}*} \Bigg\{ U_{\mathrm{s1,1}}^{\tilde{u},\mathrm{j1}} \Bigg\{ \frac{M_W^2\, s_{2\beta}\, s_W}{8} \left(M_W^2\, s_{2\beta}^2\, s_{\alpha+\beta} - 4 \left(c_\beta^3\, m_{u_{\mathrm{j1}}}^2\, s_\alpha + c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta^3 \right) \right) \left(\delta \bar{Z}_{\mathrm{1,s1}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{1,1}}^{\tilde{u},\mathrm{j1}} + \delta \bar{Z}_{\mathrm{2,s1}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{2,1}}^{\tilde{u},\mathrm{j1}} \right) - \\
& \frac{M_W^4\, s_{2\beta}^3}{8} \left(4\, \delta s_W\, s_{\alpha+\beta} - s_W\, \left(c_{\alpha+\beta}\, \delta Z_{hH} + s_{\alpha+\beta}\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{HH} \right) \right) \right) + \\
& c_\beta^4\, m_{u_{\mathrm{j1}}} \Bigg\{ 4\, \delta m_{\mathrm{j1}}^u\, M_W^2\, s_\alpha\, s_\beta\, s_W - \\
& m_{u_{\mathrm{j1}}} \Bigg\{ 4\, M_W^2\, s_\alpha\, \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W \right) + \\
& s_\beta\, s_W \Bigg\{ 2\, \delta M_W^2\, s_\alpha - \\
& M_W^2 \Bigg\{ \begin{array}{l} c_\alpha\, \delta Z_{hH} + \\ s_\alpha\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{HH} \right) \end{array} \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& c_\alpha\, m_{d_{\mathrm{j2}}}\, s_\beta^4 \Bigg\{ 4\, c_\beta\, \delta m_{\mathrm{j2}}^d\, M_W^2\, s_W - \\
& m_{d_{\mathrm{j2}}} \Bigg\{ 4\, \delta c_\beta\, M_W^2\, s_W + \\
& c_\beta\, \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e \right) \right) \right) \Bigg\} \Bigg\} + \\
& c_\beta\, M_W^2\, s_\beta^2\, s_W \Bigg\{ m_{d_{\mathrm{j2}}}^2\, s_\beta^2\, \left(c_\alpha\, \delta Z_{HH} - \delta Z_{hH}\, s_\alpha \right) - \\
& c_\beta\, \delta Z_{H^-G^-}^*\, \left(c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta - c_\beta\, \left(m_{u_{\mathrm{j1}}}^2\, s_\alpha + c_{\alpha+\beta}\, M_W^2\, s_\beta \right) \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} + \\
& \frac{\delta \mathrm{CKM}_{\mathrm{j1,j2}}\, M_W^2\, s_{2\beta}\, s_W}{4} \left(2\, c_{\beta-\alpha}\, m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{2\beta}\, U_{\mathrm{s1,2}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{s2,2}}^{\tilde{d},\mathrm{j2}*} - U_{\mathrm{s1,1}}^{\tilde{u},\mathrm{j1}}\, U_{\mathrm{s2,1}}^{\tilde{d},\mathrm{j2}*} \left(M_W^2\, s_{2\beta}^2\, s_{\alpha+\beta} - 4 \left(c_\beta^3\, m_{u_{\mathrm{j1}}}^2\, s_\alpha + c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta^3 \right) \right) \right) \Bigg\}
\end{aligned}
$$

$$
\underset{331}{C}(H^0, G^+, \tilde{d}_{\mathrm{j2}}^{\mathrm{s2}}, \tilde{u}_{\mathrm{j1}}^{\mathrm{s1},\dagger}) = \frac{\sqrt{2}\,\mathrm{i}\,e^2}{M_W^4\, s_{2\beta}^3\, s_W^3} \Bigg\{ \mathrm{CKM}_{\mathrm{j1,j2}} \Bigg\{ \frac{s_{2\beta}}{2} \Bigg\{ U_{\mathrm{s2},2}^{\tilde{d},\mathrm{j2}*} \Bigg\{ \frac{m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W}{2} \left(\delta\bar{Z}_{1,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{1,2}^{\tilde{u},\mathrm{j1}} + \delta\bar{Z}_{2,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{2,2}^{\tilde{u},\mathrm{j1}}\right) + U_{\mathrm{s1},2}^{\tilde{u},\mathrm{j1}} \Bigg\{ \delta m_{\mathrm{j2}}^{d}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W + m_{d_{\mathrm{j2}}} \Bigg\{ \delta m_{\mathrm{j1}}^{u}\, M_W^2\, s_{2\beta}\, s_{\beta-\alpha}\, s_W - m_{u_{\mathrm{j1}}} \Bigg\{ 2\,\delta c_\beta\, M_W^2\, s_\beta\, s_{\beta-\alpha}\, s_W + c_\beta \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\beta\, s_{\beta-\alpha} + s_W \Bigg\{ 2\,\delta s_\beta\, M_W^2\, s_{\beta-\alpha} + s_\beta \Bigg\{ 2\,\delta M_W^2\, s_{\beta-\alpha} + M_W^2 \Bigg\{ c_{\beta-\alpha} \Big\{ \delta Z_{hH} - \delta Z_{H^-G^-} \Big\} - s_{\beta-\alpha} \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - \frac{M_W^2\, s_{2\beta}\, s_W}{2} \Bigg\{ U_{\mathrm{s1},1}^{\tilde{u},\mathrm{j1}} \left(c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta - c_\beta \left(m_{u_{\mathrm{j1}}}^2\, s_\alpha + c_{\alpha+\beta}\, M_W^2\, s_\beta\right)\right) \left(\delta Z_{1,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{1,1}^{\tilde{d},\mathrm{j2}*} + \delta Z_{2,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{2,1}^{\tilde{d},\mathrm{j2}*}\right) - m_{d_{\mathrm{j2}}}\, m_{u_{\mathrm{j1}}}\, s_{\beta-\alpha}\, U_{\mathrm{s1},2}^{\tilde{u},\mathrm{j1}} \left(\delta Z_{1,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{1,2}^{\tilde{d},\mathrm{j2}*} + \delta Z_{2,\mathrm{s2}}^{\tilde{d},\mathrm{j2}}\, U_{2,2}^{\tilde{d},\mathrm{j2}*}\right) \Bigg\} \Bigg\} + U_{\mathrm{s2},1}^{\tilde{d},\mathrm{j2}*} \Bigg\{ \frac{M_W^2\, s_{2\beta}^2\, s_W}{8} \left(\delta\bar{Z}_{1,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{1,1}^{\tilde{u},\mathrm{j1}} + \delta\bar{Z}_{2,\mathrm{s1}}^{\tilde{u},\mathrm{j1}}\, U_{2,1}^{\tilde{u},\mathrm{j1}}\right) \left(c_{\alpha+\beta}\, M_W^2\, s_{2\beta} + 2\, c_\beta\, m_{u_{\mathrm{j1}}}^2\, s_\alpha - 2\, c_\alpha\, m_{d_{\mathrm{j2}}}^2\, s_\beta\right) + s_{2\beta}\, U_{\mathrm{s1},1}^{\tilde{u},\mathrm{j1}} \Bigg\{ \frac{c_\beta^2\, m_{u_{\mathrm{j1}}}}{2} \Bigg\{ 4\,\delta m_{\mathrm{j1}}^{u}\, M_W^2\, s_\alpha\, s_\beta\, s_W - m_{u_{\mathrm{j1}}} \Bigg\{ 4\,\delta s_W\, M_W^2\, s_\alpha\, s_\beta + s_W \Bigg\{ s_\alpha \left(4\,\delta s_\beta\, M_W^2 + 2\,\delta M_W^2\, s_\beta\right) - M_W^2 \Bigg\{ c_\beta\, \delta Z_{H^-G^-}\, s_\alpha + s_\beta \Bigg\{ c_\alpha\, \delta Z_{hH} + s_\alpha \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} - s_\beta^2 \Bigg\{ 2\, c_\alpha\, c_\beta\, \delta m_{\mathrm{j2}}^{d}\, m_{d_{\mathrm{j2}}}\, M_W^2\, s_W - \frac{m_{d_{\mathrm{j2}}}^2}{2} \Bigg\{ c_\beta\, \delta Z_{hH}\, M_W^2\, s_\alpha\, s_W + c_\alpha \Bigg\{ M_W^2\, s_W \left(4\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) + c_\beta \Bigg\{ 4\,\delta s_W\, M_W^2 + s_W \Bigg\{ 2\,\delta M_W^2 - M_W^2 \Big\{ 4\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} \Big\} \Bigg\} \Bigg\} \Bigg\} + \cdots
$$

$$
\underset{344}{C(H^-,H^+,\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = -\frac{\mathrm{i}\,e^2}{3\,c_W^4\,M_W^4\,s_{2\beta}^3\,s_W^3}
\left\{
c_\beta \left\{
2\,c_\beta^2\,\delta_{\mathrm{j1,j2}}\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \left\{
\frac{U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}}{2} \left\{
c_W^4 \left\{
m_{u_{\mathrm{j1}}}^2\,M_W^2\,s_W \left(24\,c_\beta^2\,\delta s_\beta - 3\,s_{2\beta}\,s_\beta \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right) - \right.\right.\right.\right.
\right.\right.\right.\right.
\left.\left.\left.\left.
3\,c_\beta\,m_{u_{\mathrm{j1}}}\,s_{2\beta} \left\{
4\,\delta m^u_{\mathrm{j1}}\,M_W^2\,s_W - \right.\right.\right.\right.
\left.\left.\left.\left.
m_{u_{\mathrm{j1}}} \left\{
4\,\delta s_W\,M_W^2 + \right.\right.\right.\right.
\left.\left.\left.\left.
s_W \left(2\,\delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right)
\right\}\right\}\right\}\right\}\right\}
\right.\right.\right.\right.
\left.\left.\left.\left.
c_W^2\,M_W^2\,s_\beta\,s_W \left\{
s_\beta^2\,U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) \left\{
c_{2\beta}\,c_\beta^2\,\delta_{\mathrm{j1,j2}}\,M_W^2\,\left(1+2\,c_W^2\right) + \right.\right.\right.\right.
\left.\left.\left.\left.
6\,c_W^2\,s_\beta^2 \left\{
m^2_{d_1}\,\mathrm{CKM}^*_{\mathrm{j1,1}}\,\mathrm{CKM}_{\mathrm{j2,1}} + m^2_{d_2}\,\mathrm{CKM}^*_{\mathrm{j1,2}}\,\mathrm{CKM}_{\mathrm{j2,2}} + \right.\right.\right.\right.
\left.\left.\left.\left.
m^2_{d_3}\,\mathrm{CKM}^*_{\mathrm{j1,3}}\,\mathrm{CKM}_{\mathrm{j2,3}}
\right\}\right\}\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
\delta_{\mathrm{j1,j2}}\,U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}} \left(6\,c_\beta^4\,c_W^2\,m^2_{u_{\mathrm{j1}}} - c_{2\beta}\,M_W^2\,s^2_{2\beta}\,s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\right\}\right\}
\right\}
\right.
$$

$$
\left.
s_\beta^3\,U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \left\{
c_W^2\,M_W^2\,s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{u},\mathrm{j2}}_{2,1}\right) \left\{
c_{2\beta}\,c_\beta^3\,\delta_{\mathrm{j1,j2}}\,M_W^2\,\left(1+2\,c_W^2\right) + \right.\right.\right.\right.
\left.\left.\left.\left.
3\,c_W^2\,s_{2\beta}\,s_\beta \left\{
m^2_{d_1}\,\mathrm{CKM}^*_{\mathrm{j1,1}}\,\mathrm{CKM}_{\mathrm{j2,1}} + m^2_{d_2}\,\mathrm{CKM}^*_{\mathrm{j1,2}}\,\mathrm{CKM}_{\mathrm{j2,2}} + \right.\right.\right.\right.
\left.\left.\left.\left.
m^2_{d_3}\,\mathrm{CKM}^*_{\mathrm{j1,3}}\,\mathrm{CKM}_{\mathrm{j2,3}}
\right\}\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}} \left\{
c_\beta^3\,\delta_{\mathrm{j1,j2}}\,M_W^4 \left\{
c_W^2\,s_{2\beta}\,s_W\,\left(1+2\,c_W^2\right)\,\left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right) + \right.\right.\right.\right.
\left.\left.\left.\left.
c_{2\beta} \left\{
4\,\delta s_W\,s_W^2 - c_W^4 \left(8\,\delta s_W - 2\,s_W \left(\delta \bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right) - \right.\right.\right.\right.
\left.\left.\left.\left.
c_W^2 \left(4\,\delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right)
\right\}\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
6\,c_W^4\,s_\beta \left\{
\frac{m^2_{d_3}\,s_W}{2} \left\{
2\,\delta\mathrm{CKM}_{\mathrm{j2,3}}\,M_W^2\,\mathrm{CKM}^*_{\mathrm{j1,3}}\,s_{2\beta} + \right.\right.\right.\right.
\left.\left.\left.\left.
\mathrm{CKM}_{\mathrm{j2,3}} \left\{
2\,\delta\mathrm{CKM}^*_{\mathrm{j1,3}}\,M_W^2\,s_{2\beta} - \right.\right.\right.\right.
\left.\left.\left.\left.
\mathrm{CKM}^*_{\mathrm{j1,3}} \left\{
s_{2\beta} \left(2\,\delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{H^-H^-}\right)\right) + \right.\right.\right.\right.
\left.\left.\left.\left.
M_W^2 \left(8\,\delta c_\beta\,s_\beta + 2\,c_\beta^2 \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right)
\right\}\right\}\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
m_{d_1}\,\mathrm{CKM}_{\mathrm{j2,1}} \left\{
\delta\mathrm{CKM}^*_{\mathrm{j1,1}}\,m_{d_1}\,M_W^2\,s_{2\beta}\,s_W + \right.\right.\right.\right.
\left.\left.\left.\left.
\mathrm{CKM}^*_{\mathrm{j1,1}} \left\{
2\,\delta m_1^d\,M_W^2\,s_{2\beta}\,s_W - \right.\right.\right.\right.
\left.\left.\left.\left.
\frac{m_{d_1}}{2} \left\{
M_W^2\,s_W \left(8\,\delta c_\beta\,s_\beta + 2\,c_\beta^2 \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right) + \right.\right.\right.\right.
\left.\left.\left.\left.
s_{2\beta} \left\{
4\,\delta s_W\,M_W^2 + \right.\right.\right.\right.
\left.\left.\left.\left.
s_W \left\{
2\,\delta M_W^2 - \right.\right.\right.\right.
\left.\left.\left.\left.
M_W^2 \left\{
4\,\delta Z_e + \right.\right.\right.\right.
\left.\left.\left.\left.
\delta \bar{Z}_{H^-H^-} + \right.\right.\right.\right.
\left.\left.\left.\left.
\delta Z_{H^-H^-}
\right\}\right\}\right\}\right\}\right\}\right\}\right\}\right\}\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
s_{2\beta} \left\{
\delta\mathrm{CKM}_{\mathrm{j2,1}}\,m^2_{d_1}\,M_W^2\,\mathrm{CKM}^*_{\mathrm{j1,1}}\,s_W + \right.\right.\right.\right.
\left.\left.\left.\left.
m_{d_2}\,\mathrm{CKM}^*_{\mathrm{j1,2}}\,\mathrm{CKM}_{\mathrm{j2,2}} \left(2\,\delta m_2^d\,M_W^2\,s_W - m_{d_2} \left(2\,\delta s_W\,M_W^2 + \delta M_W^2\,s_W\right)\right)
\right\} +
\right.\right.\right.\right.
\left.\left.\left.\left.
\left\{
\left\{
2\,\delta\mathrm{CKM}^*_{\mathrm{j1,2}}\,s_{2\beta} - \right.\right.\right.\right.
\right.\right.\right.\right.
$$

$$
\underset{345}{C}(G^-, G^+, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2}{12\, c_W^4\, M_W^4\, s_{2\beta}\, s_W^3} \left\{ \right.
$$

$$
c_\beta \left\{ \right.
$$

$$
2\,\delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \left\{ \right.
$$

$$
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}} \left\{ \right.
$$

$$
c_W^2\, M_W^2\, s_\beta\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + 2\, c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{1,s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{2,s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,2}\right) -
$$

$$
3\, c_W^4\, m^2_{u_{\mathrm{j1}}} \left\{ \right.
$$

$$
4\,\delta s_W\, M_W^2\, s_\beta +
$$

$$
s_W \left\{ \right.
$$

$$
2\,\delta M_W^2\, s_\beta +
$$

$$
M_W^2\, \left(4\,\delta s_\beta - 2\, \left(c_\beta\, \delta Z_{H^-G^-} + s_\beta\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)
$$

$$
\left. \right\} \left. \right\} + \left. \right\} \left. \right\} -
$$

$$
s_\beta \left\{ \right.
$$

$$
4\, M_W^4\, s_W^3 \left(c_W^2\, \delta Z_{H^-G^-}\, s_{2\beta} - c_{2\beta} \left(2\,\delta s_W\, s_W + c_W^2\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) -
$$

$$
12\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_W
$$

$$
\left. \right\} \left. \right\} \left. \right\} -
$$

$$
c_W^2\, M_W^2\, s_\beta\, s_W \left\{ \right.
$$

$$
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{1,s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{2,s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) \left\{ \right.
$$

$$
c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 + 2\, c_W^2\right) -
$$

$$
6\, c_W^2 \left\{ \right.
$$

$$
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1,1}}\, \mathrm{CKM}_{\mathrm{j2,1}} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1,2}}\, \mathrm{CKM}_{\mathrm{j2,2}} +
$$

$$
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1,3}}\, \mathrm{CKM}_{\mathrm{j2,3}}
$$

$$
\left. \right\} \left. \right\} -
$$

$$
2\,\delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + 2\, c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{1,s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{\mathrm{2,s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
$$

$$
\left. \right\} \left. \right\} \left. \right\} -
$$

$$
s_\beta\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \left\{ \right.
$$

$$
c_\beta\, c_W^2\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{1,s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{2,s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,1}\right) \left\{ \right.
$$

$$
c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 + 2\, c_W^2\right) -
$$

$$
6\, c_W^2 \left\{ \right.
$$

$$
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1,1}}\, \mathrm{CKM}_{\mathrm{j2,1}} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1,2}}\, \mathrm{CKM}_{\mathrm{j2,2}} +
$$

$$
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1,3}}\, \mathrm{CKM}_{\mathrm{j2,3}}
$$

$$
\left. \right\} \left. \right\} -
$$

$$
2\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}} \left\{ \right.
$$

$$
c_\beta\, \delta_{\mathrm{j1,j2}}\, M_W^4 \left\{ \right.
$$

$$
c_W^2\, \delta Z_{H^-G^-}\, s_{2\beta}\, s_W\, \left(1 + 2\, c_W^2\right) -
$$

$$
c_{2\beta} \left\{ \right.
$$

$$
2\,\delta s_W\, s_W^2 - c_W^4\, \left(4\,\delta s_W - 2\, s_W\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right) -
$$

$$
c_W^2\, \left(2\,\delta s_W - s_W\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)
$$

$$
\left. \right\} \left. \right\} +
$$

$$
3\, c_W^4 \left\{ \right.
$$

$$
m_{d_1}\, \mathrm{CKM}_{\mathrm{j2,1}} \left\{ \right.
$$

$$
2\, c_\beta\, \delta \mathrm{CKM}^*_{\mathrm{j1,1}}\, m_{d_1}\, M_W^2\, s_W +
$$

$$
\mathrm{CKM}^*_{\mathrm{j1,1}} \left\{ \right.
$$

$$
4\, c_\beta\, \delta m_1^d\, M_W^2\, s_W -
$$

$$
2\, m_{d_1} \left\{ \right.
$$

$$
M_W^2\, s_W\, \left(2\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) +
$$

$$
c_\beta\, \left(2\,\delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)
$$

$$
\left. \right\} \left. \right\} \left. \right\} \left. \right\} +
$$

$$
M_W^2 \left\{ \right.
$$

$$
2\, m^2_{d_2}\, \mathrm{CKM}_{\mathrm{j2,2}}\, s_W \left\{ \right.
$$

$$
c_\beta\, \delta \mathrm{CKM}^*_{\mathrm{j1,2}} -
$$

$$
\mathrm{CKM}^*_{\mathrm{j1,2}}\, \left(2\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta - c_\beta\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)
$$

$$
\left. \right\} +
$$

$$
c_\beta \left\{ \right.
$$

$$
2\,\delta \mathrm{CKM}_{\mathrm{j2,2}}\, m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1,2}}\, s_W -
$$

$$
4\, m_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1,3}}\, \mathrm{CKM}_{\mathrm{j2,3}}\, \left(\delta s_W\, m_{d_3} - \delta m_3^d\, s_W\right)
$$

$$
\left. \right\} \left. \right\} +
$$

$$
2 \left\{ \right.
$$

$$
m^2_{d_3}\, s_W \left\{ \right.
$$

$$
c_\beta\, \delta \mathrm{CKM}_{\mathrm{j2,3}}\, M_W^2\, \mathrm{CKM}^*_{\mathrm{j1,3}} +
$$

$$
\mathrm{CKM}_{\mathrm{j2,3}} \left\{ \right.
$$

$$
c_\beta\, \delta \mathrm{CKM}^*_{\mathrm{j1,3}}\, M_W^2 -
$$

$$
\mathrm{CKM}^*_{\mathrm{j1,3}} \left\{ \right.
$$

$$
M_W^2\, \left(2\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) +
$$

$$
c_\beta\, \left(\delta M_W^2 - M_W^2\, \left(2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)
$$

$$
\left. \right\} \left. \right\} \left. \right\} +
$$

$$
c_\beta \left\{ \right.
$$

$$
\delta \mathrm{CKM}_{\mathrm{j2,1}}\, m^2_{d_1}\, M_W^2\, \mathrm{CKM}^*_{\mathrm{j1,1}}\, s_W +
$$

$$
m_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1,2}}\, \mathrm{CKM}_{\mathrm{j2,2}}\, \left(2\,\delta m_2^d\, M_W^2\, s_W - m_{d_2}\, \left(2\,\delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right)
$$

$$
\left. \right\} \left. \right\} \left. \right\}
$$

$$
\underset{346}{C(H^-, G^+, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}})} = -\frac{\mathrm{i}\, e^2}{3\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3}
$$

$$
\left\{
\begin{array}{l}
c_\beta \left\{
\begin{array}{l}
\frac{c_\beta\, \delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}}{2} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,2}\right) - \\
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},2} \left\{
\begin{array}{l}
3\, c_W^4\, m^2_{u_{\mathrm{j1}}} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_{2\beta} + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_{2\beta} + \\
M_W^2 \left\{
\begin{array}{l}
8\, c_\beta\, \delta s_\beta - 2\, \delta Z_{H^-G^-} - \\
s_{2\beta}\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
s_{2\beta} \left\{
\begin{array}{l}
4\, M_W^4\, s_\beta^2\, s_W^3 \left(4\, \delta s_W\, s_W + c_W^2\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) - \\
12\, c_W^4\, \delta m^u_{\mathrm{j1}}\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_W
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
c_W^2\, M_W^2\, s_\beta\, s_W \left\{
\begin{array}{l}
s_\beta^2\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) \left\{
\begin{array}{l}
c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 + 2\, c_W^2\right) - \\
3\, c_W^2 \left\{
\begin{array}{l}
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2} + \\
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1},3}\, \mathrm{CKM}_{\mathrm{j2},3}
\end{array}
\right\}
\end{array}
\right\} + \\
\delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},2} \left(3\, c_\beta^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} - M_W^2\, s_{2\beta}^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
s_\beta^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{
\begin{array}{l}
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,1}\right) \left\{
\begin{array}{l}
c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 + 2\, c_W^2\right) - \\
3\, c_W^2 \left\{
\begin{array}{l}
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2} + \\
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1},3}\, \mathrm{CKM}_{\mathrm{j2},3}
\end{array}
\right\}
\end{array}
\right\} + \\
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},1} \left\{
\begin{array}{l}
\frac{c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^4\, s_{2\beta}}{2} \left\{
\begin{array}{l}
4\, \delta s_W\, s_W^2 - c_W^4\, \left(8\, \delta s_W - 2\, s_W\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) - \\
c_W^2\, \left(4\, \delta s_W - s_W\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)
\end{array}
\right\} - \\
3\, c_W^4 \left\{
\begin{array}{l}
m^2_{d_3}\, s_W \left\{
\begin{array}{l}
\delta \mathrm{CKM}_{\mathrm{j2},3}\, M_W^2\, \mathrm{CKM}^*_{\mathrm{j1},3}\, s_{2\beta} + \\
\frac{\mathrm{CKM}_{\mathrm{j2},3}}{2} \left\{
\begin{array}{l}
2\, \delta \mathrm{CKM}^*_{\mathrm{j1},3}\, M_W^2\, s_{2\beta} - \\
\mathrm{CKM}^*_{\mathrm{j1},3} \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_{2\beta} + \\
M_W^2 \left\{
\begin{array}{l}
8\, \delta c_\beta\, s_\beta + 2\, \delta Z_{H^-G^-} \left(c_\beta^2 + s_\beta^2\right) - \\
s_{2\beta}\, \left(4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
m_{d_1}\, \mathrm{CKM}_{\mathrm{j2},1} \left\{
\begin{array}{l}
\delta \mathrm{CKM}^*_{\mathrm{j1},1}\, m_{d_1}\, M_W^2\, s_{2\beta}\, s_W + \\
\mathrm{CKM}^*_{\mathrm{j1},1} \left\{
\begin{array}{l}
2\, \delta m_1^d\, M_W^2\, s_{2\beta}\, s_W - \\
M_W^2\, s_W\, \left(\delta Z_{H^-G^-} + 4\, \delta c_\beta\, s_\beta\right) + \\
m_{d_1} \left\{
\begin{array}{l}
\frac{s_{2\beta}}{2} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2 + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2 - \\
M_W^2 \left\{
\begin{array}{l}
4\, \delta Z_e + \\
\delta Z_{H^-H^-} + \\
\delta Z_{G^-G^-}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
s_{2\beta} \left\{
\begin{array}{l}
\delta \mathrm{CKM}_{\mathrm{j2},1}\, m^2_{d_1}\, M_W^2\, \mathrm{CKM}^*_{\mathrm{j1},1}\, s_W + \\
m_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2} \left(2\, \delta m_2^d\, M_W^2\, s_W - m_{d_2}\, \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right)
\end{array}
\right\} + \\
\left\{
\begin{array}{l}
\left(\delta Z_{H^-G^-} + 4\, \delta c_\beta\, s_\beta\right) \left(m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2}\right) + \\
\left(\delta \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + \mathrm{CKM}^*_{\mathrm{j1},1}\, \delta \mathrm{CKM}_{\mathrm{j2},1}\right) m^2_{d_1}\, m_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\underset{347}{C(G^-, H^+, \tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2}{6\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3}}
\left\{
\begin{array}{l}
2\, c_\beta \left\{ \begin{array}{l}
c_\beta\, \delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l}
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} - 4\, M_W^2\, s_\beta^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,2}\right) - \\
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},2} \left\{ \begin{array}{l}
2\, M_W^4\, s_\beta^2\, s_W^3 \left(4\, \delta s_W\, s_{2\beta}\, s_W + c_W^2 \left(c_{2\beta}\, \delta Z_{H^-G^-} + s_{2\beta} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)\right) + \\
c_\beta\, c_W^4\, m_{u_{\mathrm{j1}}} \left\{ \begin{array}{l}
m_{u_{\mathrm{j1}}}\, s_\beta\, s_W \left(6\, \delta M_W^2 - 3\, M_W^2 \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e\right)\right) - \\
12\, M_W^2 \left(\delta m^u_{\mathrm{j1}}\, s_\beta\, s_W - m_{u_{\mathrm{j1}}} \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W\right)\right)
\end{array} \right\} - \\
M_W^2\, s_W \left\{ \begin{array}{l}
3\, c_\beta\, c_W^4\, m^2_{u_{\mathrm{j1}}} \left(c_\beta\, \delta Z_{H^-G^-} + \delta Z_{G^-G^-}\, s_\beta\right) + \\
c_W^2\, \delta Z^*_{H^-G^-}\, s_\beta^2 \left(3\, c_W^2\, m^2_{u_{\mathrm{j1}}} + 2\, c_{2\beta}\, M_W^2\, s_W^2\right)
\end{array} \right.
\end{array} \right.
\end{array} \right\} + \\
c_W^2\, M_W^2\, s_\beta\, s_W \left\{ \begin{array}{l}
s_\beta^2\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\right) \left\{ \begin{array}{l}
c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^2 \left(1 + 2\, c_W^2\right) - \\
3\, c_W^2 \left\{ \begin{array}{l}
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2} + \\
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1},3}\, \mathrm{CKM}_{\mathrm{j2},3}
\end{array} \right.
\end{array} \right\} + \\
\delta_{\mathrm{j1,j2}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},2} \left(3\, c_\beta^2\, c_W^2\, m^2_{u_{\mathrm{j1}}} - M_W^2\, s_{2\beta}^2\, s_W^2\right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2}\right)
\end{array} \right\} + \\
s_\beta^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l}
c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j2}}_{2,1}\right) \left\{ \begin{array}{l}
c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^2 \left(1 + 2\, c_W^2\right) - \\
3\, c_W^2 \left\{ \begin{array}{l}
m^2_{d_1}\, \mathrm{CKM}^*_{\mathrm{j1},1}\, \mathrm{CKM}_{\mathrm{j2},1} + m^2_{d_2}\, \mathrm{CKM}^*_{\mathrm{j1},2}\, \mathrm{CKM}_{\mathrm{j2},2} + \\
m^2_{d_3}\, \mathrm{CKM}^*_{\mathrm{j1},3}\, \mathrm{CKM}_{\mathrm{j2},3}
\end{array} \right.
\end{array} \right\} + \\
U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2},1} \left\{ \begin{array}{l}
c_\beta^2\, \delta_{\mathrm{j1,j2}}\, M_W^4 \left\{ \begin{array}{l}
c_{2\beta}\, c_W^2\, s_W \left(1 + 2\, c_W^2\right) \left(\delta Z_{H^-G^-} - \delta Z^*_{H^-G^-}\right) + \\
s_{2\beta} \left\{ \begin{array}{l}
4\, \delta s_W\, s_W^2 - c_W^4 \left(8\, \delta s_W - 2\, s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right) - \\
c_W^2 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)
\end{array} \right.
\end{array} \right\} - \\
6\, c_W^4 \left\{ \begin{array}{l}
m^2_{d_3}\, s_W \left\{ \begin{array}{l}
\delta \mathrm{CKM}_{\mathrm{j2},3}\, M_W^2\, \mathrm{CKM}^*_{\mathrm{j1},3}\, s_{2\beta} + \\
\frac{\mathrm{CKM}_{\mathrm{j2},3}}{2} \left\{ \begin{array}{l}
2\, \delta \mathrm{CKM}^*_{\mathrm{j1},3}\, M_W^2\, s_{2\beta} - \\
\mathrm{CKM}^*_{\mathrm{j1},3} \left\{ \begin{array}{l}
2\, \delta M_W^2\, s_{2\beta} + \\
M_W^2 \left\{ \begin{array}{l}
8\, \delta c_\beta\, s_\beta + \\
2 \left(c_\beta^2\, \delta Z^*_{H^-G^-} + \delta Z_{H^-G^-}\, s_\beta^2\right) - \\
s_{2\beta} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right\} + \\
m_{d_1}\, \mathrm{CKM}_{\mathrm{j2},1} \left\{ \begin{array}{l}
\delta \mathrm{CKM}^*_{\mathrm{j1},1}\, m_{d_1}\, M_W^2\, s_{2\beta}\, s_W + \\
\mathrm{CKM}^*_{\mathrm{j1},1} \left\{ \begin{array}{l}
2\, \delta m_1^d\, M_W^2\, s_{2\beta}\, s_W - \\
m_{d_1} \left\{ \begin{array}{l}
c_\beta^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W + \\
s_\beta \left\{ \begin{array}{l}
M_W^2\, s_W \left(4\, \delta c_\beta + \delta Z_{H^-G^-}\, s_\beta\right) + \\
c_\beta \left\{ \begin{array}{l}
4\, \delta s_W\, M_W^2 + \\
s_W \left\{ \begin{array}{l}
2\, \delta M_W^2 - \\
M_W^2 \left\{ \begin{array}{l}
4\, \delta Z_e + \\
\delta \bar{Z}_{H^-H^-} + \\
\delta Z_{G^-G^-}
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right.
\end{array} \right\} + \\
\mathbf{103}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
\end{array} \right\}
$$

$$
\begin{aligned}
C(H^-, H^+, \tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2}{3\, c_W^4\, M_W^4\, s_{2\beta}^3\, s_W^3}
\end{aligned}
$$

$$
\left\{
\begin{array}{l}
s_\beta \left\{
\begin{array}{l}
2\,\delta_{\mathrm{j1,j2}}\, s_\beta^2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1,2}} \left\{
\begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W \left(3\, c_W^2\, m_{d_{\mathrm{j1}}}^2\, s_\beta^2 + c_{2\beta}\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{1,s2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{1,2}} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{2,s2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{2,2}}\right) + \\
\frac{U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,2}}}{2} \left\{
\begin{array}{l}
2\, c_\beta^3\, M_W^4\, s_W^3 \left(c_W^2\, s_{2\beta} \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right) + c_{2\beta} \left(4\, \delta s_W\, s_W + c_W^2 \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{H^-H^-}\right)\right)\right) - \\
c_W^4 \left\{
\begin{array}{l}
m_{d_{\mathrm{j1}}}^2\, M_W^2\, s_W \left(24\, \delta c_\beta\, s_\beta^2 + 3\, c_\beta\, s_{2\beta} \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right) - \\
3\, m_{d_{\mathrm{j1}}}\, s_{2\beta}\, s_\beta \left\{
\begin{array}{l}
4\, \delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - \\
m_{d_{\mathrm{j1}}} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2 + \\
s_W \left(2\, \delta M_W^2 - M_W^2 \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{H^-H^-}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. \\
c_\beta\, c_W^2\, M_W^2\, s_W \left\{
\begin{array}{l}
c_\beta^2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,1}} \left(\delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{1,s1}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{1,1}} + \delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{2,s1}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{2,1}}\right) \left\{
\begin{array}{l}
c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right) + \\
6\, c_\beta^2\, c_W^2 \left\{
\begin{array}{l}
m_{u_1}^2\, \mathrm{CKM}_{\mathrm{1,j1}}\, \mathrm{CKM}^*_{\mathrm{1,j2}} + m_{u_2}^2\, \mathrm{CKM}_{\mathrm{2,j1}}\, \mathrm{CKM}^*_{\mathrm{2,j2}} + \\
m_{u_3}^2\, \mathrm{CKM}_{\mathrm{3,j1}}\, \mathrm{CKM}^*_{\mathrm{3,j2}}
\end{array}
\right.
\end{array}
\right. + \\
\frac{\delta_{\mathrm{j1,j2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,2}}}{2} \left(12\, c_W^2\, m_{d_{\mathrm{j1}}}^2\, s_\beta^4 + c_{2\beta}\, M_W^2\, s_{2\beta}^2\, s_W^2\right) \left(\delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{1,s1}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{1,2}} + \delta Z^{\tilde{d},\mathrm{j1}}_{\mathrm{2,s1}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{2,2}}\right)
\end{array}
\right.
\end{array}
\right. \\
c_\beta^3\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1,1}} \left\{
\begin{array}{l}
c_W^2\, M_W^2\, s_\beta\, s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{1,s2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{1,1}} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{\mathrm{2,s2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{2,1}}\right) \left\{
\begin{array}{l}
c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right) + \\
6\, c_\beta^2\, c_W^2 \left\{
\begin{array}{l}
m_{u_1}^2\, \mathrm{CKM}_{\mathrm{1,j1}}\, \mathrm{CKM}^*_{\mathrm{1,j2}} + m_{u_2}^2\, \mathrm{CKM}_{\mathrm{2,j1}}\, \mathrm{CKM}^*_{\mathrm{2,j2}} + \\
m_{u_3}^2\, \mathrm{CKM}_{\mathrm{3,j1}}\, \mathrm{CKM}^*_{\mathrm{3,j2}}
\end{array}
\right.
\end{array}
\right. + \\
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2,1}} \left\{
\begin{array}{l}
\delta_{\mathrm{j1,j2}}\, M_W^4\, s_\beta^3 \left\{
\begin{array}{l}
c_W^2\, s_{2\beta}\, s_W \left(1 - 4\, c_W^2\right) \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right) - \\
c_{2\beta} \left\{
\begin{array}{l}
c_W^2 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{H^-H^-}\right)\right) - \\
4 \left(\delta s_W\, s_W^2 + c_W^4 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{H^-H^-}\right)\right)\right)
\end{array}
\right.
\end{array}
\right. + \\
6\, c_\beta\, c_W^4 \left\{
\begin{array}{l}
m_{u_1}\, \mathrm{CKM}_{\mathrm{1,j1}} \left\{
\begin{array}{l}
\delta \mathrm{CKM}^*_{\mathrm{1,j2}}\, m_{u_1}\, M_W^2\, s_{2\beta}\, s_W + \\
\mathrm{CKM}^*_{\mathrm{1,j2}} \left\{
\begin{array}{l}
2\, \delta m_1^u\, M_W^2\, s_{2\beta}\, s_W - \\
\frac{m_{u_1}}{2} \left\{
\begin{array}{l}
M_W^2\, s_W \left(8\, c_\beta\, \delta s_\beta - 2\, s_\beta^2 \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)\right) + \\
s_{2\beta} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2 + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2 - \\
M_W^2 \left\{
\begin{array}{l}
4\, \delta Z_e + \\
\delta \bar{Z}_{H^-H^-} + \\
\delta Z_{H^-H^-}
\end{array}
\right.
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\right.
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\right.
\end{array}
\right. + \\
s_W \left\{
\begin{array}{l}
\delta \mathrm{CKM}_{\mathrm{1,j1}}\, m_{u_1}^2\, M_W^2\, \mathrm{CKM}^*_{\mathrm{1,j2}}\, s_{2\beta} + \\
m_{u_3}^2 \left\{
\begin{array}{l}
\mathrm{CKM}_{\mathrm{3,j1}}\, s_{2\beta} \left(\delta \mathrm{CKM}^*_{\mathrm{3,j2}}\, M_W^2 - \mathrm{CKM}^*_{\mathrm{3,j2}} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
\frac{M_W^2\, \mathrm{CKM}^*_{\mathrm{3,j2}}}{2} \left\{
\begin{array}{l}
2\, \delta \mathrm{CKM}_{\mathrm{3,j1}}\, s_{2\beta} + \\
\mathrm{CKM}_{\mathrm{3,j1}} \left\{
\begin{array}{l}
s_{2\beta} \left(\delta \bar{Z}_{H^-H^-} + \delta Z_{H^-H^-}\right) + \\
2\, s_\beta^2 \left(\delta Z_{H^-G^-} + \delta Z^*_{H^-G^-}\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right. + \\
c_\beta\, m_{u_2}\, \mathrm{CKM}_{\mathrm{2,j1}} \left\{
\begin{array}{l}
m_{u_2}\, s_\beta\, s_W \left(2\, \delta \mathrm{CKM}^*_{\mathrm{2,j2}}\, M_W^2 - 2\, \mathrm{CKM}^*_{\mathrm{2,j2}} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
4\, M_W^2\, \mathrm{CKM}^*_{\mathrm{2,j2}} \left(\delta m_2^u\, s_\beta\, s_W - m_{u_2} \left(\delta s_W\, s_\beta + \delta s_\beta\, s_W\right)\right)
\end{array}
\right. -
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\right.
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\underset{349}{C}(G^-, G^+, \tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = -\frac{\mathrm{i}\, e^2}{12\, c_W^4\, M_W^4\, s_{2\beta}\, s_W^3} \Big\{ s_\beta \Big\{ 2\,\delta_{\mathrm{j1,j2}}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2} \Big\{ c_\beta\, c_W^2\, M_W^2\, s_W \left(3\, c_W^2\, m_{d_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2}\right) - U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \Big\{ 3\, c_W^4\, m_{d_{\mathrm{j1}}}^2 \Big\{ 2\, M_W^2\, s_W\, (2\,\delta c_\beta + \delta Z_{H^-G^-}\, s_\beta) + c_\beta\, \left(4\,\delta s_W\, M_W^2 + 2\, s_W\, \left(\delta M_W^2 - M_W^2\, (2\,\delta Z_e + \delta Z_{G^-G^-})\right)\right) \Big\} - c_\beta \Big\{ 2\, M_W^4\, s_W^3\, \left(c_W^2\, \delta Z_{H^-G^-}\, s_{2\beta} - c_{2\beta}\, \left(2\,\delta s_W\, s_W + c_W^2\, (2\,\delta Z_e + \delta Z_{G^-G^-})\right)\right) + 12\, c_W^4\, \delta m^d_{\mathrm{j1}}\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W \Big\} \Big\} \Big\} - c_\beta\, c_W^2\, M_W^2\, s_W \Big\{ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1}\right) \Big\{ c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 - 4\, c_W^2\right) - 6\, c_W^2 \Big\{ m_{u_1}^2\, \mathrm{CKM}_{1,\mathrm{j1}}\, \mathrm{CKM}^*_{1,\mathrm{j2}} + m_{u_2}^2\, \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} + m_{u_3}^2\, \mathrm{CKM}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}} \Big\} \Big\} - 2\,\delta_{\mathrm{j1,j2}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left(3\, c_W^2\, m_{d_{\mathrm{j1}}}^2 - c_{2\beta}\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2}\right) \Big\} \Big\} - c_\beta\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1} \Big\{ c_W^2\, M_W^2\, s_\beta\, s_W \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1}\right) \Big\{ c_{2\beta}\, \delta_{\mathrm{j1,j2}}\, M_W^2\, \left(1 - 4\, c_W^2\right) - 6\, c_W^2 \Big\{ m_{u_1}^2\, \mathrm{CKM}_{1,\mathrm{j1}}\, \mathrm{CKM}^*_{1,\mathrm{j2}} + m_{u_2}^2\, \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} + m_{u_3}^2\, \mathrm{CKM}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}} \Big\} \Big\} - 2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \Big\{ \delta_{\mathrm{j1,j2}}\, M_W^4\, s_\beta \Big\{ c_W^2\, \delta Z_{H^-G^-}\, s_{2\beta}\, s_W\, \left(1 - 4\, c_W^2\right) - c_{2\beta} \Big\{ 2\,\delta s_W\, s_W^2 + c_W^4\, \left(8\,\delta s_W - 4\, s_W\, (2\,\delta Z_e + \delta Z_{G^-G^-})\right) - c_W^2\, \left(2\,\delta s_W - s_W\, (2\,\delta Z_e + \delta Z_{G^-G^-})\right) \Big\} \Big\} + 3\, c_W^4 \Big\{ m_{u_1}\, \mathrm{CKM}_{1,\mathrm{j1}} \Big\{ 2\,\delta\mathrm{CKM}^*_{1,\mathrm{j2}}\, m_{u_1}\, M_W^2\, s_\beta\, s_W + \mathrm{CKM}^*_{1,\mathrm{j2}} \Big\{ 4\,\delta m^u_1\, M_W^2\, s_\beta\, s_W - m_{u_1} \Big\{ 4\,\delta s_W\, M_W^2\, s_\beta + s_W \Big\{ 2\,\delta M_W^2\, s_\beta + M_W^2 \Big\{ 4\,\delta s_\beta - 2 \Big\{ c_\beta\, \delta Z_{H^-G^-} + s_\beta \Big\{ 2\,\delta Z_e + \delta Z_{G^-G^-} \Big\} \Big\} \Big\} \Big\} \Big\} \Big\} \Big\} + M_W^2 \Big\{ 4\, m_{u_3}\, \mathrm{CKM}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}}\, \left(\delta m^u_3\, s_\beta\, s_W - m_{u_3}\, (\delta s_W\, s_\beta + \delta s_\beta\, s_W)\right) + \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} \Big\{ 2\, m_{u_2}^2\, s_W\, (c_\beta\, \delta Z_{H^-G^-} + \delta Z_{G^-G^-}\, s_\beta) + 4\, m_{u_2}\, \left(\delta m^u_2\, s_\beta\, s_W - m_{u_2}\, (\delta s_W\, s_\beta + \delta s_\beta\, s_W)\right) \Big\} \Big\} + s_W \Big\{ 2\, m_{u_3}^2 \Big\{ \delta\mathrm{CKM}_{3,\mathrm{j1}}\, M_W^2\, \mathrm{CKM}^*_{3,\mathrm{j2}}\, s_\beta + \mathrm{CKM}_{3,\mathrm{j1}} \Big\{ \delta\mathrm{CKM}^*_{3,\mathrm{j2}}\, M_W^2\, s_\beta - \mathrm{CKM}^*_{3,\mathrm{j2}} \Big\{ \delta M_W^2\, s_\beta - M_W^2 \Big\{ c_\beta\, \delta Z_{H^-G^-} + s_\beta\, (2\,\delta Z_e + \delta Z_{G^-G^-}) \Big\} \Big\} \Big\} \Big\} +
$$

$$
\underset{350}{C}(H^-, G^+, \tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}) = \frac{\mathrm{i}\, e^2}{3\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3} \Bigg\{ s_\beta \Bigg\{ \delta_{\mathrm{j1,j2}}\, s_\beta\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2} \Bigg\{ \frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(3\, c_W^2\, m_{d_{\mathrm{j1}}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2}\right) - U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \Bigg\{ 3\, c_W^4\, m_{d_{\mathrm{j1}}}^2 \Big\{ M_W^2\, s_W\, (\delta Z_{H^-G^-} + 4\, \delta c_\beta\, s_\beta) + \frac{s_{2\beta}}{2} \left(4\, \delta s_W\, M_W^2 + s_W\, \left(2\, \delta M_W^2 - M_W^2\, (4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-})\right)\right) \Big\} + s_\beta \Big\{ 2\, c_\beta^3\, M_W^4\, s_W^3\, \left(4\, \delta s_W\, s_W + c_W^2\, (4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-})\right) - 12\, c_\beta\, c_W^4\, \delta m^d_{\mathrm{j1}}\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W \Big\} \Bigg\} \Bigg\} - c_\beta\, c_W^2\, M_W^2\, s_W \Bigg\{ c_\beta^2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{2,1}\right) \Big\{ \delta_{\mathrm{j1,j2}}\, M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right) + 3\, c_W^2\, \big\{ m_{u_1}^2\, \mathrm{CKM}_{1,\mathrm{j1}}\, \mathrm{CKM}^*_{1,\mathrm{j2}} + m_{u_2}^2\, \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} + m_{u_3}^2\, \mathrm{CKM}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}} \big\} \Big\} - \delta_{\mathrm{j1,j2}}\, s_\beta^2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left(3\, c_W^2\, m_{d_{\mathrm{j1}}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{d},\mathrm{j1}*}_{2,2}\right) \Bigg\} \Bigg\} - c_\beta^2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1} \Bigg\{ \frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(\delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta\bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1}\right) \Big\{ \delta_{\mathrm{j1,j2}}\, M_W^2\, s_\beta^2\, \left(1 - 4\, c_W^2\right) + 3\, c_W^2\, \big\{ m_{u_1}^2\, \mathrm{CKM}_{1,\mathrm{j1}}\, \mathrm{CKM}^*_{1,\mathrm{j2}} + m_{u_2}^2\, \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}} + m_{u_3}^2\, \mathrm{CKM}_{3,\mathrm{j1}}\, \mathrm{CKM}^*_{3,\mathrm{j2}} \big\} \Big\} - U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \Bigg\{ \frac{\delta_{\mathrm{j1,j2}}\, M_W^4\, s_{2\beta}\, s_\beta^2}{2} \Big\{ c_W^2\, \left(4\, \delta s_W - s_W\, (4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-})\right) - 4\, \left(\delta s_W\, s_W^2 + c_W^4\, \left(4\, \delta s_W - s_W\, (4\, \delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-})\right)\right) \Big\} - 3\, c_W^4 \Bigg\{ m_{u_1}\, \mathrm{CKM}_{1,\mathrm{j1}} \Bigg\{ \delta\mathrm{CKM}^*_{1,\mathrm{j2}}\, m_{u_1}\, M_W^2\, s_{2\beta}\, s_W + \mathrm{CKM}^*_{1,\mathrm{j2}} \Bigg\{ 2\, \delta m^u_1\, M_W^2\, s_{2\beta}\, s_W - m_{u_1} \Bigg\{ 2\, \delta s_W\, M_W^2\, s_{2\beta} + \frac{s_W}{2} \Big\{ 2\, \delta M_W^2\, s_{2\beta} + M_W^2 \big\{ 8\, c_\beta\, \delta s_\beta - 2\, \delta Z_{H^-G^-} - s_{2\beta} \{ 4\, \delta Z_e + \delta Z_{H^-H^-} + \delta Z_{G^-G^-} \} \big\} \Big\} \Bigg\} \Bigg\} \Bigg\} + s_W \Bigg\{ \delta\mathrm{CKM}_{1,\mathrm{j1}}\, m_{u_1}^2\, M_W^2\, \mathrm{CKM}^*_{1,\mathrm{j2}}\, s_{2\beta} + m_{u_3}^2 \Bigg\{ \delta\mathrm{CKM}_{3,\mathrm{j1}}\, M_W^2\, \mathrm{CKM}^*_{3,\mathrm{j2}}\, s_{2\beta} + \frac{\mathrm{CKM}_{3,\mathrm{j1}}}{2} \Bigg\{ 2\, \delta\mathrm{CKM}^*_{3,\mathrm{j2}}\, M_W^2\, s_{2\beta} - \mathrm{CKM}^*_{3,\mathrm{j2}} \Big\{ 2\, \delta M_W^2\, s_{2\beta} - M_W^2 \big\{ 2\, \delta Z_{H^-G^-} \left(c_\beta^2 + s_\beta^2\right) + s_{2\beta} \{ 4\, \delta Z_e + \delta Z_{H^-H^-} + \delta Z_{G^-G^-} \} \big\} \Big\} \Bigg\} \Bigg\} + \Big\{ 4\, M_W^2\, \mathrm{CKM}_{2,\mathrm{j1}}\, \mathrm{CKM}^*_{2,\mathrm{j2}}\, (\delta m^u_2\, s_\beta\, s_W - m_{u_2}\, (\delta s_W\, s_\beta + \delta s_\beta\, s_W)) + \cdots
$$

$$
C(G^-, H^+, \tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}) = \frac{\mathrm{i}\, e^2}{6\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3}
$$
$$
\left\{
\begin{array}{l}
2\, s_\beta \left\{
\begin{array}{l}
\delta_{j1,j2}\, s_\beta\, U^{\tilde{d},j1*}_{s1,2} \left\{
\begin{array}{l}
\frac{c_W^2\, M_W^2\, s_{2\beta}\, s_W}{2} \left(3\, c_W^2\, m_{d_{j1}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,2} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,2}\right) + \\
U^{\tilde{d},j2}_{s2,2} \left\{
\begin{array}{l}
\frac{3\, c_W^4\, m_{d_{j1}}}{2} \left\{
\begin{array}{l}
4\, \delta m^d_{j1}\, M_W^2\, s_{2\beta}\, s_W - \\
m_{d_{j1}} \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_{2\beta} + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_{2\beta} + \\
M_W^2 \left\{
\begin{array}{l}
8\, \delta c_\beta\, s_\beta + 2\, \delta Z_{H^-G^-}\, s_\beta^2 - \\
s_{2\beta} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} - \\
c_\beta^2 \left\{
\begin{array}{l}
c_W^2\, \delta Z^*_{H^-G^-}\, M_W^2\, s_W \left(3\, c_W^2\, m_{d_{j1}}^2 - c_{2\beta}\, M_W^2\, s_W^2\right) + \\
M_W^4\, s_W^3 \left\{
\begin{array}{l}
4\, \delta s_W\, s_{2\beta}\, s_W + \\
c_W^2 \left(c_{2\beta}\, \delta Z_{H^-G^-} + s_{2\beta} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} - \\
c_\beta\, c_W^2\, M_W^2\, s_W \left\{
\begin{array}{l}
c_\beta^2\, U^{\tilde{d},j2}_{s2,1} \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,1}\right) \left\{
\begin{array}{l}
\delta_{j1,j2}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right) + \\
3\, c_W^2 \left\{
\begin{array}{l}
m^2_{u_1}\, \mathrm{CKM}_{1,j1}\, \mathrm{CKM}^*_{1,j2} + m^2_{u_2}\, \mathrm{CKM}_{2,j1}\, \mathrm{CKM}^*_{2,j2} + \\
m^2_{u_3}\, \mathrm{CKM}_{3,j1}\, \mathrm{CKM}^*_{3,j2}
\end{array}
\right.
\end{array}
\right\} - \\
\delta_{j1,j2}\, s_\beta^2\, U^{\tilde{d},j2}_{s2,2} \left(3\, c_W^2\, m_{d_{j1}}^2 - 2\, c_\beta^2\, M_W^2\, s_W^2\right) \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,2}\right)
\end{array}
\right.
\end{array}
\right\} - \\
c_W^2\, M_W^2\, s_{2\beta}\, s_W \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,1}\right) \left\{
\begin{array}{l}
\delta_{j1,j2}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right) + \\
3\, c_W^2 \left\{
\begin{array}{l}
m^2_{u_1}\, \mathrm{CKM}_{1,j1}\, \mathrm{CKM}^*_{1,j2} + m^2_{u_2}\, \mathrm{CKM}_{2,j1}\, \mathrm{CKM}^*_{2,j2} + \\
m^2_{u_3}\, \mathrm{CKM}_{3,j1}\, \mathrm{CKM}^*_{3,j2}
\end{array}
\right.
\end{array}
\right\} + \\
c_\beta^2\, U^{\tilde{d},j1*}_{s1,1} \left\{
\begin{array}{l}
U^{\tilde{d},j2}_{s2,1} \left\{
\begin{array}{l}
\delta_{j1,j2}\, M_W^4\, s_\beta^2 \left\{
\begin{array}{l}
c_{2\beta}\, c_W^2\, s_W \left(1 - 4\, c_W^2\right) \left(\delta Z_{H^-G^-} - \delta Z^*_{H^-G^-}\right) - \\
s_{2\beta} \left\{
\begin{array}{l}
c_W^2 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right) - \\
4 \left(\delta s_W\, s_W^2 + c_W^4 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)
\end{array}
\right.
\end{array}
\right\} + \\
m_{u_1}\, \mathrm{CKM}_{1,j1} \left\{
\begin{array}{l}
\delta \mathrm{CKM}^*_{1,j2}\, m_{u_1}\, M_W^2\, s_{2\beta}\, s_W + \\
\mathrm{CKM}^*_{1,j2} \left\{
\begin{array}{l}
2\, \delta m_1^u\, M_W^2\, s_{2\beta}\, s_W + \\
m_{u_1} \left\{
\begin{array}{l}
\delta Z^*_{H^-G^-}\, M_W^2\, s_\beta^2\, s_W - \\
c_\beta \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_\beta + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_\beta + \\
M_W^2 \left\{
\begin{array}{l}
4\, \delta s_\beta - \\
c_\beta\, \delta Z_{H^-G^-} - \\
s_\beta \left\{
\begin{array}{l}
4\, \delta Z_e + \\
\delta \bar{Z}_{H^-H^-} + \\
\delta Z_{G^-G^-}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
6\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3 \left\{
\begin{array}{l}
\delta \mathrm{CKM}_{1,j1}\, m^2_{u_1}\, M_W^2\, \mathrm{CKM}^*_{1,j2}\, s_{2\beta} + \\
\left\{
\begin{array}{l}
\mathrm{CKM}_{3,j1}\, s_{2\beta} \left(\delta \mathrm{CKM}^*_{3,j2}\, M_W^2 - \mathrm{CKM}^*_{3,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
\left(\mathrm{CKM}_{3,j1}\, c_{2\beta} + \mathrm{CKM}_{2,j1}\, s_{2\beta}\right) \left(\delta \mathrm{CKM}^*_{2,j2}\, M_W^2 - \mathrm{CKM}^*_{2,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
\left(\mathrm{CKM}_{2,j1}\, c_{2\beta} - \mathrm{CKM}_{3,j1}\, s_{2\beta}\right) \left(\delta \mathrm{CKM}^*_{1,j2}\, M_W^2 - \mathrm{CKM}^*_{1,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right)
\end{array}
\right\}
\end{array}
\right\} + \\
\delta_{j1,j2}\, M_W^2\, s_\beta^2 \left\{
\begin{array}{l}
\delta_{j1,j2}\, M_W^2\, s_\beta^2 \left(1 - 4\, c_W^2\right) + \\
3\, c_W^2 \left\{
\begin{array}{l}
m^2_{u_1}\, \mathrm{CKM}_{1,j1}\, \mathrm{CKM}^*_{1,j2} + m^2_{u_2}\, \mathrm{CKM}_{2,j1}\, \mathrm{CKM}^*_{2,j2} + \\
m^2_{u_3}\, \mathrm{CKM}_{3,j1}\, \mathrm{CKM}^*_{3,j2}
\end{array}
\right.
\end{array}
\right\} + \\
\delta_{j1,j2}\, M_W^4\, s_\beta^2 \left\{
\begin{array}{l}
c_{2\beta}\, c_W^2\, s_W \left(1 - 4\, c_W^2\right) \left(\delta Z_{H^-G^-} - \delta Z^*_{H^-G^-}\right) - \\
s_{2\beta} \left\{
\begin{array}{l}
c_W^2 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right) - \\
4 \left(\delta s_W\, s_W^2 + c_W^4 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)
\end{array}
\right.
\end{array}
\right\} + \\
m_{u_1}\, \mathrm{CKM}_{1,j1} \left\{
\begin{array}{l}
\delta \mathrm{CKM}^*_{1,j2}\, m_{u_1}\, M_W^2\, s_{2\beta}\, s_W + \\
\mathrm{CKM}^*_{1,j2} \left\{
\begin{array}{l}
2\, \delta m_1^u\, M_W^2\, s_{2\beta}\, s_W + \\
m_{u_1} \left\{
\begin{array}{l}
\delta Z^*_{H^-G^-}\, M_W^2\, s_\beta^2\, s_W - \\
c_\beta \left\{
\begin{array}{l}
4\, \delta s_W\, M_W^2\, s_\beta + \\
s_W \left\{
\begin{array}{l}
2\, \delta M_W^2\, s_\beta + \\
M_W^2 \left\{
\begin{array}{l}
4\, \delta s_\beta - \\
c_\beta\, \delta Z_{H^-G^-} - \\
s_\beta \left\{
\begin{array}{l}
4\, \delta Z_e + \\
\delta \bar{Z}_{H^-H^-} + \\
\delta Z_{G^-G^-}
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right.
\end{array}
\right\} + \\
6\, c_W^4\, M_W^4\, s_{2\beta}^2\, s_W^3 \left\{
\begin{array}{l}
\delta \mathrm{CKM}_{1,j1}\, m^2_{u_1}\, M_W^2\, \mathrm{CKM}^*_{1,j2}\, s_{2\beta} + \\
\left\{
\begin{array}{l}
\mathrm{CKM}_{3,j1}\, s_{2\beta} \left(\delta \mathrm{CKM}^*_{3,j2}\, M_W^2 - \mathrm{CKM}^*_{3,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
\left(\mathrm{CKM}_{3,j1}\, c_{2\beta} + \mathrm{CKM}_{2,j1}\, s_{2\beta}\right) \left(\delta \mathrm{CKM}^*_{2,j2}\, M_W^2 - \mathrm{CKM}^*_{2,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right) + \\
\left(\mathrm{CKM}_{2,j1}\, c_{2\beta} - \mathrm{CKM}_{3,j1}\, s_{2\beta}\right) \left(\delta \mathrm{CKM}^*_{1,j2}\, M_W^2 - \mathrm{CKM}^*_{1,j2} \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right.
\end{array}
\right\}
$$

[SSSS] 2 Sleptons – 2 Squarks

$$
\underset{375}{C(\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2},\tilde{e}^{s3}_{j3},\tilde{e}^{s4,\dagger}_{j4})} = -\frac{\mathrm{i}\,e^2\,\delta_{j1,j2}\,\delta_{j3,j4}}{24\,c_\beta^3\,c_W^4\,M_W^4\,s_W^3}
$$

$$
\left\{
\begin{array}{l}
2\,U^{\tilde{e},j3*}_{s3,2}\left\{
\begin{array}{l}
c_\beta\,M_W^2\,s_W\left\{
\begin{array}{l}
2\,c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{d},j1*}_{s1,2}\left\{
\begin{array}{l}
c_W^2\,U^{\tilde{e},j3}_{s4,2}\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,2}+\delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,2}\right)+\\
U^{\tilde{d},j1}_{s2,2}\left(4\,U^{\tilde{e},j3}_{s4,2}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\,\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,2}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,2}\right)\right)
\end{array}
\right\}+\\
c_W^2\left\{
\begin{array}{l}
2\,c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{d},j1}_{s2,2}\,U^{\tilde{e},j3}_{s4,2}\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,2}+\delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,2}\right)+\\
\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,1}+\delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,1}\right)\left(3\,c_W^2\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{d},j1}_{s2,2}\,U^{\tilde{e},j3}_{s4,1}+c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{d},j1}_{s2,1}\,U^{\tilde{e},j3}_{s4,2}\right)
\end{array}
\right\}
\end{array}
\right\}+\\
U^{\tilde{d},j1*}_{s1,1}\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\left(3\,c_\beta\,c_W^4\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{d},j1}_{1,2}\,U^{\tilde{e},j3}_{s4,1}+c_\beta^3\,c_W^2\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{1,1}\,U^{\tilde{e},j3}_{s4,2}\right)+\\
\delta\bar{Z}^{\tilde{d},j2}_{2,s2}\left(3\,c_\beta\,c_W^4\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{d},j1}_{2,2}\,U^{\tilde{e},j3}_{s4,1}+c_\beta^3\,c_W^2\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{2,1}\,U^{\tilde{e},j3}_{s4,2}\right)+\\
c_\beta^3\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{s2,1}\left(4\,U^{\tilde{e},j3}_{s4,2}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\,\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,2}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,2}\right)\right)+\\
c_W^4\,U^{\tilde{d},j1}_{s2,2}\left\{
\begin{array}{l}
c_\beta\left\{
\begin{array}{l}
M_W^2\,s_W\left\{
\begin{array}{l}
3\,m_{d_{j1}}\,m_{e_{j3}}\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,1}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,1}\right)+\\
6\,U^{\tilde{e},j3}_{s4,1}\left(\delta m^e_{j3}\,m_{d_{j1}}+\delta m^d_{j1}\,m_{e_{j3}}\right)
\end{array}
\right.\\
6\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{e},j3}_{s4,1}\left(2\,\delta s_W\,M_W^2+\delta M_W^2\,s_W\right)
\end{array}
\right\}-\\
12\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{e},j3}_{s4,1}\left(\delta c_\beta-c_\beta\,\delta Z_e\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}-\\
c_\beta\,c_W^2\,M_W^2\,s_W\left\{
\begin{array}{l}
\left(\delta Z^{\tilde{e},j3}_{1,s3}\,U^{\tilde{e},j3*}_{1,1}+\delta Z^{\tilde{e},j3}_{2,s3}\,U^{\tilde{e},j3*}_{2,1}\right)\left\{
\begin{array}{l}
c_\beta^2\,M_W^2\,U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,1}\,U^{\tilde{e},j3}_{s4,1}\left(1-4\,c_W^2\right)+\\
2\,U^{\tilde{d},j1*}_{s1,2}\left(c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{d},j1}_{s2,2}\,U^{\tilde{e},j3}_{s4,1}-3\,c_W^2\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{d},j1}_{s2,1}\,U^{\tilde{e},j3}_{s4,2}\right)
\end{array}
\right\}-\\
2\,\left(\delta Z^{\tilde{e},j3}_{1,s3}\,U^{\tilde{e},j3*}_{1,2}+\delta Z^{\tilde{e},j3}_{2,s3}\,U^{\tilde{e},j3*}_{2,2}\right)\left(3\,c_W^2\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,2}\,U^{\tilde{e},j3}_{s4,1}+c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{e},j3}_{s4,2}\left(U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,1}+2\,U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,2}\right)\right)
\end{array}
\right\}-\\
U^{\tilde{e},j3*}_{s3,1}\left\{
\begin{array}{l}
c_\beta^3\,M_W^4\,U^{\tilde{d},j1*}_{s1,1}\left\{
\begin{array}{l}
c_W^2\,s_W\,U^{\tilde{e},j3}_{s4,1}\left(1-4\,c_W^2\right)\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,1}+\delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,1}\right)+\\
U^{\tilde{d},j1}_{s2,1}\left\{
\begin{array}{l}
c_W^2\,s_W\,\left(1-4\,c_W^2\right)\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,1}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,1}\right)+\\
4\,U^{\tilde{e},j3}_{s4,1}\left(c_W^2\,\delta Z_e\,s_W^3+\delta s_W\,s_W^4+3\,c_W^4\,\left(\delta s_W-\delta Z_e\,s_W\right)\right)
\end{array}
\right.
\end{array}
\right\}+\\
c_\beta\,c_W^2\,M_W^2\,s_W\left\{
\begin{array}{l}
c_\beta^2\,M_W^2\,U^{\tilde{d},j1}_{s2,1}\,U^{\tilde{e},j3}_{s4,1}\left(1-4\,c_W^2\right)\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,1}+\delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,1}\right)+\\
2\,\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,2}+\delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,2}\right)\left(c_\beta^2\,M_W^2\,s_W^2\,U^{\tilde{d},j1}_{s2,2}\,U^{\tilde{e},j3}_{s4,1}-3\,c_W^2\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{d},j1}_{s2,1}\,U^{\tilde{e},j3}_{s4,2}\right)
\end{array}
\right\}+\\
2\,U^{\tilde{d},j1*}_{s1,2}\left\{
\begin{array}{l}
\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\left(c_\beta^3\,c_W^2\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{1,2}\,U^{\tilde{e},j3}_{s4,1}-3\,c_\beta\,c_W^4\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{d},j1}_{1,1}\,U^{\tilde{e},j3}_{s4,2}\right)+\\
\delta\bar{Z}^{\tilde{d},j2}_{2,s2}\left(c_\beta^3\,c_W^2\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{2,2}\,U^{\tilde{e},j3}_{s4,1}-3\,c_\beta\,c_W^4\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{d},j1}_{2,1}\,U^{\tilde{e},j3}_{s4,2}\right)-\\
c_W^4\,U^{\tilde{d},j1}_{s2,1}\left\{
\begin{array}{l}
c_\beta\left\{
\begin{array}{l}
M_W^2\,s_W\left\{
\begin{array}{l}
3\,m_{d_{j1}}\,m_{e_{j3}}\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,2}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,2}\right)+\\
6\,U^{\tilde{e},j3}_{s4,2}\left(\delta m^e_{j3}\,m_{d_{j1}}+\delta m^d_{j1}\,m_{e_{j3}}\right)
\end{array}
\right.\\
6\,m_{d_{j1}}\,m_{e_{j3}}\,U^{\tilde{e},j3}_{s4,2}\left(2\,\delta s_W\,M_W^2+\delta M_W^2\,s_W\right)
\end{array}
\right\}-\\
12\,m_{d_{j1}}\,m_{e_{j3}}\,M_W^2\,s_W\,U^{\tilde{e},j3}_{s4,2}\left(\delta c_\beta-c_\beta\,\delta Z_e\right)
\end{array}
\right\}+\\
c_\beta^3\,M_W^4\,s_W^3\,U^{\tilde{d},j1}_{s2,2}\left(4\,U^{\tilde{e},j3}_{s4,1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\,\left(\delta\bar{Z}^{\tilde{e},j4}_{1,s4}\,U^{\tilde{e},j3}_{1,1}+\delta\bar{Z}^{\tilde{e},j4}_{2,s4}\,U^{\tilde{e},j3}_{2,1}\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\underset{376}{C(\tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, \tilde{\nu}_{j3}, \tilde{\nu}^{\dagger}_{j4})} = \frac{\mathrm{i}\, e^2\, \delta_{j1,j2}\, \delta_{j3,j4}}{24\, c_W^4\, s_W^3} \left\{ \begin{array}{l} s_W \left\{ \begin{array}{l} 2\, s_W^2\, U^{\tilde{d},j1*}_{s1,2} \left\{ \begin{array}{l} c_W^2 \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1}_{2,2} \right) + \\ U^{\tilde{d},j1}_{s2,2} \left(c_W^2 \left(\delta \bar{Z}^{\tilde{\nu},j4}_{1,1} + \delta Z^{\tilde{\nu},j3}_{1,1} \right) + 4 \left(c_W^2\, \delta Z_e + \delta s_W\, s_W \right) \right) \end{array} \right. + \\ c_W^2 \left\{ \begin{array}{l} U^{\tilde{d},j1}_{s2,1} \left(1 + 2\, c_W^2 \right) \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,1} \right) + \\ 2\, s_W^2\, U^{\tilde{d},j1}_{s2,2} \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,2} \right) \end{array} \right. \end{array} \right. + \\ U^{\tilde{d},j1*}_{s1,1} \left\{ \begin{array}{l} c_W^2\, s_W \left(1 + 2\, c_W^2 \right) \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1}_{2,1} \right) + \\ U^{\tilde{d},j1}_{s2,1} \left(4\, \delta s_W\, s_W^2 + c_W^2\, s_W \left(1 + 2\, c_W^2 \right) \left(\delta \bar{Z}^{\tilde{\nu},j4}_{1,1} + \delta Z^{\tilde{\nu},j3}_{1,1} \right) - \left(c_W^2 + 2\, c_W^4 \right) \left(4\, \delta s_W - 4\, \delta Z_e\, s_W \right) \right) \end{array} \right. \end{array} \right.
$$

$$
\underset{378}{C(\tilde{d}^{s1}_{j1}, \tilde{e}^{s2,\dagger}_{j2}, \tilde{\nu}_{j3}, \tilde{u}^{s4,\dagger}_{j4})} = -\frac{\mathrm{i}\, e^2\, \delta_{j2,j3}}{4\, c_\beta^3\, M_W^4\, s_W^3} \left\{ \begin{array}{l} \mathrm{CKM}_{j4,j1} \left\{ \begin{array}{l} c_\beta^3\, M_W^4\, U^{\tilde{d},j1*}_{s1,1} \left\{ \begin{array}{l} s_W\, U^{\tilde{e},j2}_{s2,1} \left(\delta \bar{Z}^{\tilde{u},j4}_{1,s4}\, U^{\tilde{u},j4}_{1,1} + \delta \bar{Z}^{\tilde{u},j4}_{2,s4}\, U^{\tilde{u},j4}_{2,1} \right) + \\ U^{\tilde{u},j4}_{s4,1} \left\{ \begin{array}{l} s_W \left(\delta \bar{Z}^{\tilde{e},j2}_{1,s2}\, U^{\tilde{e},j2}_{1,1} + \delta \bar{Z}^{\tilde{e},j2}_{2,s2}\, U^{\tilde{e},j2}_{2,1} \right) - \\ U^{\tilde{e},j2}_{s2,1} \left(4\, \delta s_W - s_W \left(4\, \delta Z_e + \delta Z^{\tilde{\nu},j3}_{1,1} \right) \right) \end{array} \right. \end{array} \right. + \\ U^{\tilde{d},j1*}_{s1,2} \left\{ \begin{array}{l} c_\beta\, m_{d_{j1}}\, m_{e_{j2}}\, M_W^2\, s_W\, U^{\tilde{e},j2}_{s2,2} \left(\delta \bar{Z}^{\tilde{u},j4}_{1,s4}\, U^{\tilde{u},j4}_{1,1} + \delta \bar{Z}^{\tilde{u},j4}_{2,s4}\, U^{\tilde{u},j4}_{2,1} \right) + \\ U^{\tilde{u},j4}_{s4,1} \left\{ \begin{array}{l} c_\beta\, m_{d_{j1}}\, m_{e_{j2}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},j2}_{1,s2}\, U^{\tilde{e},j2}_{1,2} + \delta \bar{Z}^{\tilde{e},j2}_{2,s2}\, U^{\tilde{e},j2}_{2,2} \right) + \\ U^{\tilde{e},j2}_{s2,2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^d_{j1}\, m_{e_{j2}}\, M_W^2\, s_W + \\ m_{d_{j1}} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{j2}\, M_W^2\, s_W - \\ m_{e_{j2}} \left\{ \begin{array}{l} c_\beta \left(4\, \delta s_W\, M_W^2 + 2\, \delta M_W^2\, s_W \right) + \\ M_W^2\, s_W \left(4\, \delta c_\beta - c_\beta \left(4\, \delta Z_e + \delta Z^{\tilde{\nu},j3}_{1,1} \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \\ c_\beta\, M_W^2\, s_W\, U^{\tilde{u},j4}_{s4,1} \left\{ \begin{array}{l} c_\beta^2\, M_W^2\, U^{\tilde{e},j2}_{s2,1} \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,1} \right) + \\ m_{d_{j1}}\, m_{e_{j2}}\, U^{\tilde{e},j2}_{s2,2} \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,2} \right) \end{array} \right. \end{array} \right. + \\ 2\, c_\beta\, \delta \mathrm{CKM}_{j4,j1}\, M_W^2\, s_W\, U^{\tilde{u},j4}_{s4,1} \left(c_\beta^2\, M_W^2\, U^{\tilde{d},j1*}_{s1,1}\, U^{\tilde{e},j2}_{s2,1} + m_{d_{j1}}\, m_{e_{j2}}\, U^{\tilde{d},j1*}_{s1,2}\, U^{\tilde{e},j2}_{s2,2} \right) \end{array} \right.
$$

$$
\underset{379}{C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \tilde{u}^{\mathrm{s3}}_{\mathrm{j3}}, \tilde{\nu}^{\dagger}_{\mathrm{j4}})} = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j4}}}{4\, c_\beta^3\, M_W^4\, s_W^3} \left\{ \begin{array}{l} \mathrm{CKM}^*_{\mathrm{j3,j2}} \left\{ \begin{array}{l} c_\beta^3\, M_W^4\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1} \left\{ \begin{array}{l} s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,1} \right) - \\ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j4}}_{1,1} + 4\, \delta Z_e \right) \right) \end{array} \right\} + \\ s_W\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\, U^{\tilde{u},\mathrm{j3}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\, U^{\tilde{u},\mathrm{j3}*}_{2,1} \right) \end{array} \right\} + \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1} \left\{ \begin{array}{l} c_\beta\, m_{d_{\mathrm{j2}}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{1,2} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j2}}_{2,2} \right) + \\ U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^d_{\mathrm{j2}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W + \\ m_{d_{\mathrm{j2}}} \left\{ \begin{array}{l} 2\, c_\beta\, \delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - \\ m_{e_{\mathrm{j1}}} \left\{ \begin{array}{l} c_\beta \left(4\, \delta s_W\, M_W^2 + 2\, \delta M_W^2\, s_W \right) + \\ M_W^2\, s_W \left(4\, \delta c_\beta - c_\beta \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j4}}_{1,1} + 4\, \delta Z_e \right) \right) \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right. \end{array} \right\} + \\ c_\beta\, m_{d_{\mathrm{j2}}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\, U^{\tilde{u},\mathrm{j3}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\, U^{\tilde{u},\mathrm{j3}*}_{2,1} \right) \end{array} \right\} + \\ c_\beta\, M_W^2\, s_W\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1} \left\{ \begin{array}{l} c_\beta^2\, M_W^2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) + \\ m_{d_{\mathrm{j2}}}\, m_{e_{\mathrm{j1}}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2} \right) \end{array} \right. \end{array} \right\} + \\ 2\, c_\beta\, \delta \mathrm{CKM}^*_{\mathrm{j3,j2}}\, M_W^2\, s_W\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1} \left(c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1} + m_{d_{\mathrm{j2}}}\, m_{e_{\mathrm{j1}}}\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2} \right) \end{array} \right\}
$$

$$
\begin{aligned}
C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}},\tilde{u}^{\mathrm{s3}}_{\mathrm{j3}},\tilde{u}^{\mathrm{s4},\dagger}_{\mathrm{j4}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}}{24\,c_W^4\,s_W^3}
\end{aligned}
\tag{382}
$$

$$
\left\{
\begin{array}{l}
U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\left\{
\begin{array}{l}
s_W\left\{
\begin{array}{l}
4\,s_W^2\,U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},2}\left\{
\begin{array}{l}
c_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,2}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,2}\right)+\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(4\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right)\right)
\end{array}
\right\}-\\
c_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(1+2\,c_W^2\right)\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,1}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,1}\right)-\\
4\,s_W^2\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,2}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\}-\\
U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1}\left\{
\begin{array}{l}
c_W^2\,s_W\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(1+2\,c_W^2\right)\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,1}\right)+\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left\{
\begin{array}{l}
c_W^2\,s_W\left(1+2\,c_W^2\right)\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right)+\\
4\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(\delta s_W\,s_W^2-\left(c_W^2+2\,c_W^4\right)\left(\delta s_W-\delta Z_e\,s_W\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}+\\
s_W\left\{
\begin{array}{l}
c_W^2\left\{
\begin{array}{l}
2\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,2}+\delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,2}\right)\left(U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1}\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}-4\,U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},2}\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\right)+\\
U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1}+\delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right)\left(4\,s_W^2\,U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},2}\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}-U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1}\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(1+2\,c_W^2\right)\right)
\end{array}
\right\}+\\
2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1}\left\{
\begin{array}{l}
c_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,1}\right)+\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(4\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right)\right)
\end{array}
\right\}-\\
4\,U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},2}\left\{
\begin{array}{l}
c_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,2}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,2}\right)+\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(4\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)+c_W^2\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,2}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right)\right)
\end{array}
\right\}+\\
c_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,1}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,1}\right)-\\
4\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,2}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
\begin{aligned}
C(\tilde{\nu}^{\dagger}_{\mathrm{j1}},\tilde{\nu}^{\dagger}_{\mathrm{j2}},\tilde{u}^{\mathrm{s3}}_{\mathrm{j3}},\tilde{u}^{\mathrm{s4},\dagger}_{\mathrm{j4}}) = -\frac{\mathrm{i}\,e^2\,\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}}{24\,c_W^4\,s_W^3}
\end{aligned}
\tag{384}
$$

$$
\left\{
\begin{array}{l}
s_W\left\{
\begin{array}{l}
4\,s_W^2\,U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},2}\left\{
\begin{array}{l}
c_W^2\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,2}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,2}\right)+\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(c_W^2\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)+4\left(c_W^2\,\delta Z_e+\delta s_W\,s_W\right)\right)
\end{array}
\right\}-\\
c_W^2\left\{
\begin{array}{l}
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(1-4\,c_W^2\right)\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,1}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,1}\right)-\\
4\,s_W^2\,U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},2}\left(\delta Z^{\tilde{u},\mathrm{j3}}_{1,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{1,2}+\delta Z^{\tilde{u},\mathrm{j3}}_{2,\mathrm{s3}}\,U^{\tilde{u},\mathrm{j3}*}_{2,2}\right)
\end{array}
\right\}
\end{array}
\right\}-\\
U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3},1}\left\{
\begin{array}{l}
c_W^2\,s_W\left(1-4\,c_W^2\right)\left(\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{1,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{1,1}+\delta\bar{Z}^{\tilde{u},\mathrm{j4}}_{2,\mathrm{s4}}\,U^{\tilde{u},\mathrm{j3}}_{2,1}\right)-\\
U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4},1}\left(\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\left(3\,c_W^4\,s_W-c_W^2\,s_W^3\right)-4\left(c_W^2\,\delta Z_e\,s_W^3+\delta s_W\,s_W^4+3\,c_W^4\left(\delta s_W-\delta Z_e\,s_W\right)\right)\right)
\end{array}
\right\}
\end{array}
\right\}
$$

[SSSS] 4 Higgs

$$C(h^0,h^0,h^0,h^0) = -\frac{3\,\mathrm{i}\,e^2\,c_{2\alpha}}{2\,c_W^4\,s_W^3}\,\left(c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W + c_{2\alpha}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e + \delta Z_{hh}\right)\right)\right)\right)$$
91

$$C(h^0,h^0,h^0,H^0) = -\frac{3\,\mathrm{i}\,e^2\,s_{2\alpha}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W + c_{2\alpha}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + 3\,\delta Z_{hh} + \delta Z_{HH}\right)\right)\right)\right)$$
92

$$C(h^0,h^0,H^0,H^0) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\,\left(1 - 3\,s_{2\alpha}^2\right)\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right)$$
93

$$C(h^0,H^0,H^0,H^0) = -\frac{3\,\mathrm{i}\,e^2\,s_{2\alpha}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W - c_{2\alpha}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{hh} + 3\,\delta Z_{HH}\right)\right)\right)\right)$$
94

$$C(H^0,H^0,H^0,H^0) = \frac{3\,\mathrm{i}\,e^2\,c_{2\alpha}}{2\,c_W^4\,s_W^3}\,\left(c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W - c_{2\alpha}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e + \delta Z_{HH}\right)\right)\right)\right)$$
95

$$C(h^0,h^0,A^0,A^0) = -\frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\,\left\{\begin{array}{l} c_{2\beta}\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W + \\ c_{2\alpha}\,\left(c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W + c_{2\beta}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{hh}\right)\right)\right)\right) \end{array}\right\}$$
96

$$C(h^0,h^0,G^0,G^0) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\,\left\{\begin{array}{l} c_{2\beta}\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W - \\ c_{2\alpha}\,\left(c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W - c_{2\beta}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{GG} + \delta Z_{hh}\right)\right)\right)\right) \end{array}\right\}$$
97

$$C(h^0,h^0,A^0,G^0) = -\frac{\mathrm{i}\,e^2\,s_{2\beta}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W + c_{2\alpha}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + 2\,\delta Z_{hh}\right)\right)\right)\right)$$
98

$$C(h^0,H^0,A^0,A^0) = -\frac{\mathrm{i}\,e^2\,s_{2\alpha}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W + c_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + 2\,\delta Z_{AA} + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right)\right)$$
99

$$C(h^0,H^0,G^0,G^0) = -\frac{\mathrm{i}\,e^2\,s_{2\alpha}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W - c_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right)\right)$$
100

$$C(h^0,H^0,A^0,G^0) = -\frac{\mathrm{i}\,e^2\,s_{2\alpha}\,s_{2\beta}}{8\,c_W^4\,s_W^3}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{hh} + \delta Z_{HH}\right)\right)\right)$$
101

$$C(H^0,H^0,A^0,A^0) = -\frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,\left(c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W - c_{2\alpha}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{HH}\right)\right)\right)\right) - \\ c_{2\alpha}\,c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W \end{array}\right\} \tag{102}$$

$$C(H^0,H^0,G^0,G^0) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W + \\ c_{2\alpha}\,\left(c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W - c_{2\beta}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{GG} + \delta Z_{HH}\right)\right)\right)\right) \end{array}\right\} \tag{103}$$

$$C(H^0,H^0,A^0,G^0) = -\frac{\mathrm{i}\,e^2\,s_{2\beta}}{8\,c_W^4\,s_W^3}\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha}\,s_W - c_{2\alpha}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + 2\,\delta Z_{HH}\right)\right)\right)\right) \tag{104}$$

$$C(h^0,h^0,H^-,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,\left(4\,c_{2\alpha}\,\delta s_W\,s_W^4 + c_W^2\,s_W^3\,\left(2\,\delta Z_{hH}\,s_{2\alpha} + c_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)\right) + \\ 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,s_W\,\left(c_{2\beta}\,c_W^2\,s_{2\alpha} + c_{2\alpha}\,s_{2\beta}\,s_W^2\right) - \\ c_W^4\left\{\begin{array}{l} 4\,\delta s_W\,\left(1 - s_{2\alpha}\,s_{2\beta}\right) - \\ s_W\left\{\begin{array}{l} \delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{H^-H^-} + \\ s_{2\beta}\,\left(2\,c_{2\alpha}\,\delta Z_{hH} - s_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right\} \tag{105}$$

$$C(h^0,h^0,G^-,G^+) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} 2\,c_{2\alpha}\,c_{2\beta}\,\delta s_W\,s_W^4 + \\ c_W^2\,s_W^3\,\left(c_{2\beta}\,\delta Z_{hH}\,s_{2\alpha} - c_{2\alpha}\,\left(\delta Z_{H^-G^-}\,s_{2\beta} - c_{2\beta}\,\left(2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right) + \\ c_W^4\left\{\begin{array}{l} 2\,\delta s_W\,\left(1 + s_{2\alpha}\,s_{2\beta}\right) - \\ s_W\left\{\begin{array}{l} 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-} + c_{2\beta}\,\delta Z_{H^-G^-}\,s_{2\alpha} - \\ s_{2\beta}\,\left(c_{2\alpha}\,\delta Z_{hH} - s_{2\alpha}\,\left(2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right\} \tag{106}$$

$$C(h^0,h^0,H^-,G^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,c_W^4\,\left(4\,\delta s_W\,s_{2\alpha} + s_W\,\left(2\,c_{2\alpha}\,\delta Z_{hH} - s_{2\alpha}\,\left(4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) - \\ s_W\left\{\begin{array}{l} 2\,c_W^4\,\delta Z_{H^-G^-} + \\ s_{2\beta}\,s_W^2\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha} + c_{2\alpha}\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) \end{array}\right. \end{array}\right\} \tag{107}$$

$$C(h^0,h^0,G^-,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\left\{\begin{array}{l} 2\,c_{2\alpha}\,c_W^2\,\delta Z_{H^-G^-}\,s_W^3 - \\ c_W^4\,\left(4\,\delta s_W\,s_{2\alpha} + s_W\,\left(2\,c_{2\alpha}\,\delta Z_{hH} - s_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right) \end{array}\right. - \\ s_W\left\{\begin{array}{l} 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,\left(c_{2\alpha}\,c_{2\beta}\,s_W^2 - c_W^2\,\left(1 + s_{2\alpha}\,s_{2\beta}\right)\right) + \\ s_{2\beta}\left\{\begin{array}{l} s_{2\alpha}\,\left(2\,c_W^4\,\delta Z_{H^-G^-} - 2\,c_W^2\,\delta Z_{hH}\,s_W^2\right) - \\ c_{2\alpha}\,s_W^2\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right\} \tag{108}$$

$$C(h^0,H^0,H^-,H^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\alpha}\,c_W^4\,s_{2\beta}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) - \\ s_W\left\{\begin{array}{l} 2\,c_W^4\,\delta Z_{hH} + \\ c_{2\beta}\,s_{2\alpha}\,s_W^2\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) - \\ 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,\left(c_{2\alpha}\,c_{2\beta}\,c_W^2 - s_{2\alpha}\,s_{2\beta}\,s_W^2\right) \end{array}\right. \end{array}\right\}$$
109

$$C(h^0,H^0,G^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} 2\,\left(c_W^4\,\delta Z_{hH}\,s_W + c_W^2\,\delta Z_{H^-G^-}\,s_{2\alpha}\,s_{2\beta}\,s_W^3\right) - \\ c_{2\beta}\,s_{2\alpha}\,s_W^3\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + 2\,\delta Z_{G^-G^-}\right)\right) + \\ c_{2\alpha}\,c_W^4\,\left(4\,\delta s_W\,s_{2\beta} - s_W\,\left(2\,c_{2\beta}\,\delta Z_{H^-G^-} + s_{2\beta}\,\left(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + 2\,\delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\}$$
110

$$C(h^0,H^0,H^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} s_{2\alpha}\,s_{2\beta}\,s_W^3\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) + \\ c_{2\alpha}\,c_{2\beta}\,c_W^4\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) \end{array}\right\}$$
111

$$C(h^0,H^0,G^-,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} s_{2\alpha}\,s_{2\beta}\,s_W^3\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) + \\ c_{2\alpha}\,c_{2\beta}\,c_W^4\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{hh} + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) + \\ 2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_W^2\,s_W\,\left(c_{2\alpha}\,c_W^2\,s_{2\beta} + c_{2\beta}\,s_{2\alpha}\,s_W^2\right) \end{array}\right\}$$
112

$$C(H^0,H^0,H^-,H^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,\left(4\,c_{2\alpha}\,\delta s_W\,s_W^4 - c_W^2\,s_W^3\,\left(2\,\delta Z_{hH}\,s_{2\alpha} - c_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right) + \\ 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,s_W\,\left(c_{2\beta}\,c_W^2\,s_{2\alpha} + c_{2\alpha}\,s_{2\beta}\,s_W^2\right) + \\ c_W^4\left\{\begin{array}{l} 4\,\delta s_W\,\left(1 + s_{2\alpha}\,s_{2\beta}\right) - \\ s_W\left\{\begin{array}{l} \delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{H^-H^-} + \\ s_{2\beta}\,\left(2\,c_{2\alpha}\,\delta Z_{hH} + s_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right\}$$
113

$$C(H^0,H^0,G^-,G^+) = -\frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} 2\,c_{2\alpha}\,c_{2\beta}\,\delta s_W\,s_W^4 - \\ c_W^2\,s_W^3\,\left(c_{2\beta}\,\delta Z_{hH}\,s_{2\alpha} + c_{2\alpha}\,\left(\delta Z_{H^-G^-}\,s_{2\beta} - c_{2\beta}\,\left(2\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right) - \\ c_W^4\left\{\begin{array}{l} 2\,\delta s_W\,\left(1 - s_{2\alpha}\,s_{2\beta}\right) - \\ s_W\left\{\begin{array}{l} 2\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-} - c_{2\beta}\,\delta Z_{H^-G^-}\,s_{2\alpha} - \\ s_{2\beta}\,\left(c_{2\alpha}\,\delta Z_{hH} + s_{2\alpha}\,\left(2\,\delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) \end{array}\right. \end{array}\right. \end{array}\right\}$$
114

$$C(H^0,H^0,H^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} s_{2\beta}\,s_W^3\,\left(2\,c_W^2\,\delta Z_{hH}\,s_{2\alpha} - c_{2\alpha}\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) + \\ c_W^4\left\{\begin{array}{l} 2\,\delta Z_{H^-G^-}\,s_W + \\ c_{2\beta}\,\left(4\,\delta s_W\,s_{2\alpha} - s_W\,\left(2\,c_{2\alpha}\,\delta Z_{hH} + s_{2\alpha}\,\left(4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) \end{array}\right\} \end{array}\right\}$$
(115)

$$C(H^0,H^0,G^-,H^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\left\{\begin{array}{l} 2\,c_{2\alpha}\,c_W^2\,\delta Z_{H^-G^-}\,s_W^3 - \\ c_W^4\,\left(4\,\delta s_W\,s_{2\alpha} - s_W\,\left(2\,c_{2\alpha}\,\delta Z_{hH} + s_{2\alpha}\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\} - \\ s_W\left\{\begin{array}{l} 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,\left(c_{2\alpha}\,c_{2\beta}\,s_W^2 + c_W^2\,\left(1 - s_{2\alpha}\,s_{2\beta}\right)\right) + \\ s_{2\beta}\left\{\begin{array}{l} 2\,c_W^2\,s_{2\alpha}\,\left(c_W^2\,\delta Z_{H^-G^-} + \delta Z_{hH}\,s_W^2\right) - \\ c_{2\alpha}\,s_W^2\,\left(4\,\delta s_W\,s_W + c_W^2\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) \end{array}\right\} \end{array}\right\} \end{array}\right\}$$
(116)

$$C(h^0,A^0,H^-,G^+) = -\frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} c_\beta\,\left(4\,\delta s_W\,s_\alpha - s_W\,\left(c_\alpha\,\left(\delta Z_{AG} - \delta Z_{hH}\right) + s_\alpha\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)\right) - \\ s_\beta\,\left(c_\alpha\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) + s_\alpha\,s_W\,\left(\delta Z_{AG} - \delta Z_{hH}\right)\right) + \\ \delta Z_{G^-G^-}\,s_{\beta-\alpha}\,s_W \end{array}\right\}$$
(117)

$$C(h^0,A^0,G^-,H^+) = \frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} s_W\,\left(\delta\bar{Z}_{H^-H^-}\,s_{\beta-\alpha} - s_\alpha\,s_\beta\,\left(\delta Z_{AG} - \delta Z_{hH}\right)\right) - \\ c_\alpha\,s_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) + \\ c_\beta\,\left(4\,\delta s_W\,s_\alpha - s_W\,\left(c_\alpha\,\left(\delta Z_{AG} - \delta Z_{hH}\right) + s_\alpha\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\}$$
(118)

$$C(h^0,G^0,H^-,G^+) = -\frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} s_\beta\,\left(4\,\delta s_W\,s_\alpha + c_\alpha\,s_W\,\left(\delta Z_{AG} + \delta Z_{hH}\right)\right) + \\ c_\alpha\,c_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) - \\ s_W\,\left(c_{\beta-\alpha}\,\delta Z_{G^-G^-} + s_\alpha\,\left(c_\beta\,\left(\delta Z_{AG} + \delta Z_{hH}\right) + s_\beta\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)\right) \end{array}\right\}$$
(119)

$$C(h^0,G^0,G^-,H^+) = \frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} s_\beta\,\left(4\,\delta s_W\,s_\alpha + c_\alpha\,s_W\,\left(\delta Z_{AG} + \delta Z_{hH}\right)\right) + \\ c_\alpha\,c_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right) - \\ s_W\,\left(c_{\beta-\alpha}\,\delta\bar{Z}_{H^-H^-} + s_\alpha\,\left(c_\beta\,\left(\delta Z_{AG} + \delta Z_{hH}\right) + s_\beta\,\left(4\,\delta Z_e + \delta Z_{GG} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\}$$
(120)

$$C(H^0,A^0,H^-,G^+) = \frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} 4\,\delta s_W\,s_\alpha\,s_\beta + \\ c_\alpha\,\left(c_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right) - s_\beta\,s_W\,\left(\delta Z_{AG} + \delta Z_{hH}\right)\right) - \\ s_W\,\left(c_{\beta-\alpha}\,\delta Z_{G^-G^-} - s_\alpha\,\left(c_\beta\,\left(\delta Z_{AG} + \delta Z_{hH}\right) - s_\beta\,\left(4\,\delta Z_e + \delta Z_{AA} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right) \end{array}\right\}$$
(121)

$$C(H^0,A^0,G^-,H^+) = -\frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} 4\,\delta s_W\,s_\alpha\,s_\beta - \\ s_W\,\left(c_{\beta-\alpha}\,\delta\bar{Z}_{H^-H^-} - s_\alpha\,\left(c_\beta\,\left(\delta Z_{AG}+\delta Z_{hH}\right) - s_\beta\,\left(4\,\delta Z_e+\delta Z_{AA}+\delta Z_{HH}+\delta Z_{G^-G^-}\right)\right)\right) + \\ c_\alpha\,\left(c_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e+\delta Z_{AA}+\delta Z_{HH}+\delta Z_{G^-G^-}\right)\right) - s_\beta\,s_W\,\left(\delta Z_{AG}+\delta Z_{hH}\right)\right) \end{array}\right\} \tag{122}$$

$$C(H^0,G^0,H^-,G^+) = \frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} c_\alpha\,s_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e+\delta Z_{GG}+\delta Z_{HH}+\delta Z_{H^-H^-}\right)\right) - \\ c_\beta\,\left(4\,\delta s_W\,s_\alpha + s_W\,\left(c_\alpha\,\left(\delta Z_{AG}-\delta Z_{hH}\right) - s_\alpha\,\left(4\,\delta Z_e+\delta Z_{GG}+\delta Z_{HH}+\delta Z_{H^-H^-}\right)\right)\right) - \\ s_W\,\left(\delta Z_{G^-G^-}\,s_{\beta-\alpha} + s_\alpha\,s_\beta\,\left(\delta Z_{AG}-\delta Z_{hH}\right)\right) \end{array}\right\} \tag{123}$$

$$C(H^0,G^0,G^-,H^+) = \frac{e^2}{8\,s_W^3}\left\{\begin{array}{l} s_W\,\left(\delta\bar{Z}_{H^-H^-}\,s_{\beta-\alpha} + s_\alpha\,s_\beta\,\left(\delta Z_{AG}-\delta Z_{hH}\right)\right) - \\ c_\alpha\,s_\beta\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e+\delta Z_{GG}+\delta Z_{HH}+\delta Z_{G^-G^-}\right)\right) + \\ c_\beta\,\left(4\,\delta s_W\,s_\alpha + s_W\,\left(c_\alpha\,\left(\delta Z_{AG}-\delta Z_{hH}\right) - s_\alpha\,\left(4\,\delta Z_e+\delta Z_{GG}+\delta Z_{HH}+\delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\} \tag{124}$$

$$C(A^0,A^0,A^0,A^0) = \frac{3\,\mathrm{i}\,e^2}{64\,c_W^4\,s_W^3}\left\{\begin{array}{l} \delta s_W\,s_W^2\,\left(9\,s_{2\beta}^6 - 32\,s_\beta^{12} + 16\,s_{2\beta}^2\,s_\beta^4\,\left(2-3\,s_\beta^4\right) - 2\,s_{2\beta}^4\,\left(8-4\,c_{2\beta}-s_\beta^4\right)\right) - \\ 32\,c_\beta^{12}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e+\delta Z_{AA}\right)\right)\right) - \\ 2\,c_\beta^2\,s_{2\beta}^2\,\left(c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W\,\left(14-3\,s_{2\beta}^2\right) + 4\,c_{2\beta}\,\left(4-s_{2\beta}^2\right)\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e+\delta Z_{AA}\right)\right)\right)\right) + \\ s_{2\beta}\,\left\{\begin{array}{l} 4\,c_\beta^6\,\left(c_W^2\,\delta Z_{AG}\,s_W\,\left(4+5\,s_{2\beta}^2\right) + 8\,c_{2\beta}\,s_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e+\delta Z_{AA}\right)\right)\right)\right) + \\ 2\,c_\beta^4\,\left\{\begin{array}{l} s_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(\delta Z_e+\delta Z_{AA}\right)\right)\right)\,\left(16-24\,c_{2\beta}^2-11\,s_{2\beta}^2\right) - \\ 8\,c_{2\beta}\,c_W^2\,\delta Z_{AG}\,s_W\,\left(1+3\,s_{2\beta}^2\right) \end{array}\right. \end{array}\right\} - \\ c_W^2\,\left\{\begin{array}{l} \left(\delta s_W - s_W\,\left(\delta Z_e+\delta Z_{AA}\right)\right)\,\left(9\,s_{2\beta}^6 - 48\,s_{2\beta}^2\,s_\beta^8 - 32\,s_\beta^{12} - 8\,s_{2\beta}^4\,\left(2-c_{2\beta}\right) + s_\beta^4\,\left(32\,s_{2\beta}^2+2\,s_{2\beta}^4\right)\right) + \\ \delta Z_{AG}\,s_{2\beta}\,s_W\,\left(16\,\left(c_{2\beta}\,c_\beta^8 + c_\beta^{10}\right) + 2\,\left(s_{2\beta}^2\,s_\beta^2\,\left(3\,s_{2\beta}^2 - 2\,\left(7-s_\beta^2-6\,s_\beta^4\right)\right) + c_{2\beta}\,\left(11\,s_{2\beta}^4 - 12\,s_{2\beta}^2\,\left(1-2\,s_\beta^4\right) + 8\,\left(s_\beta^4+s_\beta^8\right)\right)\right)\right) + \\ s_W\,\left\{\begin{array}{l} 128\,c_\beta^{11}\,\delta c_\beta - 32\,c_{2\beta}\,c_\beta^7\,\delta s_\beta\,s_{2\beta} + \\ 2\,c_\beta\,s_{2\beta}^2\,\left(2\,c_{2\beta}\,\delta c_\beta\,\left(12-5\,s_{2\beta}^2\right) + \delta s_\beta\,s_{2\beta}\,\left(16-15\,s_{2\beta}^2\right)\right) - \\ s_\beta\,\left(48\,c_{2\beta}\,\delta s_\beta\,s_{2\beta}^2 - 20\,c_{2\beta}\,\delta s_\beta\,s_{2\beta}^4 + 42\,\delta c_\beta\,s_{2\beta}^5 - 8\,\delta c_\beta\,s_{2\beta}^3\,\left(4-c_{2\beta}\right)\right) + \\ 144\,\delta s_\beta\,s_{2\beta}^2\,s_\beta^7 + 96\,\delta c_\beta\,s_{2\beta}\,s_\beta^9 - s_\beta^5\,\left(32\,\delta c_\beta\,s_{2\beta} - 112\,c_{2\beta}\,\delta s_\beta\,s_{2\beta}^2 - 32\,\delta c_\beta\,s_{2\beta}^3\right) - s_\beta^3\,\left(48\,\delta s_\beta\,s_{2\beta}^2 - 16\,c_{2\beta}\,\delta c_\beta\,s_{2\beta}^3 + 24\,\delta s_\beta\,s_{2\beta}^4\right) + \\ 128\,\delta s_\beta\,s_\beta^{11} + \\ s_{2\beta}\,\left\{\begin{array}{l} 8\,c_\beta^3\,\left(18\,c_{2\beta}^2\,\delta c_\beta\,s_{2\beta} - 6\,\delta c_\beta\,s_{2\beta}\,\left(1-s_{2\beta}^2\right) + c_{2\beta}\,\delta s_\beta\,\left(4-3\,s_{2\beta}^2\right)\right) - \\ 16\,c_\beta^5\,\left(7\,c_{2\beta}\,\delta c_\beta\,s_{2\beta} - \delta s_\beta\,\left(4-s_{2\beta}^2\right)\right) \end{array}\right. \end{array}\right. \end{array}\right. \end{array}\right\} \tag{125}$$

$$
\underset{126}{C(A^0,A^0,A^0,G^0)} = \frac{3\,\mathrm{i}\,e^2}{16\,c_W^4\,s_W^3}\left\{\begin{array}{l}
c_{2\beta}\,s_{2\beta}\left\{\begin{array}{l}
c_W^2\,s_W\,\left(\delta Z_{AG}\,s_{2\beta}\,\left(1+c_\beta^2\right)\,\left(4\,c_\beta^2-4\,c_\beta^4-s_{2\beta}^2\right)-2\,\delta c_\beta\,\left(8\,c_\beta^7+2\,c_\beta^3\,\left(2+9\,s_{2\beta}^2\right)-s_{2\beta}\,s_\beta\,\left(6-11\,s_{2\beta}^2-12\,s_\beta^4\right)\right)\right)- \\
c_\beta^8\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)- \\
c_\beta^4\left\{\begin{array}{l}
4\,\delta s_W\,s_W^2\,\left(1+22\,s_\beta^4\right)- \\
c_W^2\left\{\begin{array}{l}
\delta s_W\,\left(4+88\,s_\beta^4\right)- \\
s_W\,\left(176\,\delta s_\beta\,s_\beta^3+\delta Z_e\,\left(4+88\,s_\beta^4\right)+\left(1+22\,s_\beta^4\right)\,\left(3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)
\end{array}\right\}
\end{array}\right\}+ \\
s_\beta\left\{\begin{array}{l}
c_W^2\,\delta s_\beta\,s_W\,\left(24\,c_\beta^2-48\,c_\beta^6\right)+ \\
s_{2\beta}\,\left(3\,c_\beta-6\,c_\beta^5\right)\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)- \\
s_\beta^2\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(1+3\,s_{2\beta}^2+s_\beta^4\right)- \\
c_W^2\left\{\begin{array}{l}
4\,\delta s_W\,\left(s_\beta+3\,s_{2\beta}^2\,s_\beta+s_\beta^5\right)- \\
s_W\left\{\begin{array}{l}
4\,\delta s_\beta\,\left(2+9\,s_{2\beta}^2+4\,s_\beta^4\right)+ \\
s_\beta\,\left(1+3\,s_{2\beta}^2+s_\beta^4\right)\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}-
\end{array}\right\}+ \\
2\left\{\begin{array}{l}
c_\beta^{11}\,\left(4\,\delta s_W\,s_\beta\,s_W^2-c_W^2\,\left(4\,\delta s_W\,s_\beta-s_W\,\left(2\,\delta s_\beta+s_\beta\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)\right)+ \\
\frac{c_W^2\,s_W}{32}\left\{\begin{array}{l}
4\,\delta c_\beta\,s_{2\beta}\,\left(56\,c_\beta^9-2\,c_\beta^5\,\left(12+37\,s_{2\beta}^2\right)+c_\beta\,s_{2\beta}^2\,\left(38-13\,s_{2\beta}^2\right)+2\,s_{2\beta}\,s_\beta^3\,\left(11\,s_{2\beta}^2-2\,\left(9-s_\beta^2-4\,s_\beta^4\right)\right)\right)- \\
\delta Z_{AG}\left\{\begin{array}{l}
32\,c_\beta^8-32\,c_\beta^{12}-39\,s_{2\beta}^6+32\,s_\beta^8\,\left(1-s_\beta^4\right)+s_{2\beta}^4\,\left(44-94\,s_\beta^4\right)- \\
s_{2\beta}^2\,\left(16\,s_\beta^4\,\left(2+3\,s_\beta^4\right)+2\,c_\beta^4\,\left(16+24\,c_{2\beta}^2+59\,s_{2\beta}^2\right)\right)
\end{array}\right\}
\end{array}\right\}+ \\
\frac{s_{2\beta}\,s_\beta^5}{2}\left\{\begin{array}{l}
2\,c_W^2\,\delta s_\beta\,s_W\,\left(3-7\,s_\beta^4\right)+ \\
c_\beta^2\,s_\beta\,\left(1+s_\beta^2\right)\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)
\end{array}\right\}- \\
\frac{s_{2\beta}^3\,s_\beta}{8}\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(7-5\,s_\beta^4\right)- \\
c_W^2\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,\left(7-5\,s_\beta^4\right)- \\
s_W\,\left(\delta s_\beta\,\left(38-74\,s_\beta^4\right)+s_\beta\,\left(7-5\,s_\beta^4\right)\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)
\end{array}\right\}
\end{array}\right\}- \\
c_\beta^7\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(1+6\,s_\beta^4\right)- \\
c_W^2\,\left(4\,\delta s_W\,\left(s_\beta+6\,s_\beta^5\right)-s_W\,\left(\delta s_\beta\,\left(2+44\,s_\beta^4\right)+s_\beta\,\left(1+6\,s_\beta^4\right)\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)
\end{array}\right\}- \\
s_\beta^2\left\{\begin{array}{l}
c_\beta^9\,\left(20\,\delta s_W\,s_\beta\,s_W^2+c_W^2\,\left(6\,\delta s_\beta\,s_W-5\,s_\beta\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)\right)\right)\right)- \\
c_\beta^5\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(7+6\,s_\beta^4\right)- \\
c_W^2\left\{\begin{array}{l}
4\,\delta s_W\,s_\beta\,\left(7+6\,s_\beta^4\right)- \\
s_W\left\{\begin{array}{l}
2\,\delta s_\beta\,\left(9+26\,s_\beta^4\right)+ \\
s_\beta\,\left(7+6\,s_\beta^4\right)\,\left(4\,\delta Z_e+3\,\delta Z_{AA}+\delta Z_{GG}\right)
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right\}
\end{array}\right.
$$

$$
C_{127}(A^0, A^0, G^0, G^0) = -\frac{\mathrm{i}\, e^2}{32\, c_W^4\, s_W^3} \left\{ \begin{array}{l} 2\,\delta s_W\, s_W^2 \left(12\, s_{2\beta}^6 + 16\, s_{2\beta}^2\, s_\beta^4 - 8\, s_\beta^8 - 3\, s_{2\beta}^4 \left(5 - 2\, c_{2\beta} - 8\, s_\beta^4\right)\right) - \\ \left(8\, c_\beta^8 - s_{2\beta}^2 \left(8\, c_\beta^4 \left(2 + 3\, s_{2\beta}^2\right) + c_{2\beta} \left(24\, c_\beta^6 - 6\, c_\beta^2 \left(4 - s_{2\beta}^2\right)\right)\right)\right) \left(2\,\delta s_W\, s_W^2 - c_W^2 \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right)\right)\right) + \\ c_W^2 \left\{ \begin{array}{l} 2\,\delta s_W \left(8\, s_\beta^8 - 8\, s_{2\beta}^2\, s_\beta^4 \left(2 + 3\, s_{2\beta}^2\right) + 3\, s_{2\beta}^4 \left(5 - 2\, c_{2\beta} - 4\, s_{2\beta}^2\right)\right) - \\ s_W \left\{ \begin{array}{l} 48\, c_\beta^9\, \delta s_\beta\, s_{2\beta} + 6\, c_\beta\, s_{2\beta}^2 \left(2\,\delta s_\beta\, s_{2\beta} \left(5 - 8\, s_{2\beta}^2\right) + c_{2\beta}\,\delta c_\beta \left(12 - 5\, s_{2\beta}^2\right)\right) + \\ 12\, c_\beta^3\, s_{2\beta} \left(c_{2\beta}\,\delta s_\beta \left(4 - 3\, s_{2\beta}^2\right) - \delta c_\beta\, s_{2\beta} \left(4 + 13\, s_{2\beta}^2\right)\right) - \\ 8 \left(c_\beta^5\, s_{2\beta} \left(21\, c_{2\beta}\,\delta c_\beta\, s_{2\beta} + \delta s_\beta \left(4 + 9\, s_{2\beta}^2\right)\right) + c_\beta^7 \left(6\, c_{2\beta}\,\delta s_\beta\, s_{2\beta} - \delta c_\beta \left(4 - 3\, s_{2\beta}^2\right)\right)\right) - \\ s_\beta \left(72\, c_{2\beta}\,\delta s_\beta\, s_{2\beta}^2 - 30\, c_{2\beta}\,\delta s_\beta\, s_{2\beta}^4 + 96\,\delta c_\beta\, s_{2\beta}^5 - 12\,\delta c_\beta\, s_{2\beta}^3 \left(5 - c_{2\beta}\right)\right) - \\ s_\beta^5 \left(32\,\delta c_\beta\, s_{2\beta} - 168\, c_{2\beta}\,\delta s_\beta\, s_{2\beta}^2 + 72\,\delta c_\beta\, s_{2\beta}^3\right) + s_\beta^3 \left(48\,\delta s_\beta\, s_{2\beta}^2 - 24\, c_{2\beta}\,\delta c_\beta\, s_{2\beta}^3 + 156\,\delta s_\beta\, s_{2\beta}^4\right) + \\ 48\,\delta c_\beta\, s_{2\beta}\, s_\beta^9 + \delta s_\beta\, s_\beta^7 \left(32 - 24\, s_{2\beta}^2\right) - \\ \left(2\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG}\right) \left(12\, s_{2\beta}^6 - 8\, s_\beta^8 - 3\, s_{2\beta}^4 \left(5 - 2\, c_{2\beta}\right) + s_\beta^4 \left(16\, s_{2\beta}^2 + 24\, s_{2\beta}^4\right)\right) \end{array} \right\} \end{array} \right\} \end{array} \right\}
$$

$$
\underset{128}{C(A^0,G^0,G^0,G^0)} = \frac{3\,\mathrm{i}\,e^2}{16\,c_W^4\,s_W^3}
\left\{
\begin{array}{l}
c_{2\beta}\,s_{2\beta}
\left\{
\begin{array}{l}
c_W^2\,s_W\,\left(\delta Z_{AG}\,s_{2\beta}\,\left(1+c_\beta^2\right)\,\left(4\,c_\beta^2-4\,c_\beta^4-s_{2\beta}^2\right)+2\,\delta c_\beta\,\left(8\,c_\beta^7+2\,c_\beta^3\,\left(2+9\,s_{2\beta}^2\right)-s_{2\beta}\,s_\beta\,\left(6-11\,s_{2\beta}^2-12\,s_\beta^4\right)\right)\right)+\\
c_\beta^8\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)+\\
c_\beta^4\left\{
\begin{array}{l}
4\,\delta s_W\,s_W^2\,\left(1+22\,s_\beta^4\right)-\\
c_W^2\left\{
\begin{array}{l}
\delta s_W\,\left(4+88\,s_\beta^4\right)-\\
s_W\,\left(176\,\delta s_\beta\,s_\beta^3+\delta Z_e\,\left(4+88\,s_\beta^4\right)+\left(1+22\,s_\beta^4\right)\,\left(\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)
\end{array}
\right\}
\end{array}
\right\}-\\
s_\beta\left\{
\begin{array}{l}
c_W^2\,\delta s_\beta\,s_W\,\left(24\,c_\beta^2-48\,c_\beta^6\right)+\\
s_{2\beta}\,\left(3\,c_\beta-6\,c_\beta^5\right)\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)-\\
s_\beta^2\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(1+3\,s_{2\beta}^2+s_\beta^4\right)-\\
c_W^2\left\{
\begin{array}{l}
4\,\delta s_W\,\left(s_\beta+3\,s_{2\beta}^2\,s_\beta+s_\beta^5\right)-\\
s_W\left\{
\begin{array}{l}
4\,\delta s_\beta\,\left(2+9\,s_{2\beta}^2+4\,s_\beta^4\right)+\\
s_\beta\,\left(1+3\,s_{2\beta}^2+s_\beta^4\right)\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}+\\
2\left\{
\begin{array}{l}
c_\beta^{11}\,\left(4\,\delta s_W\,s_\beta\,s_W^2-c_W^2\,\left(4\,\delta s_W\,s_\beta-s_W\,\left(2\,\delta s_\beta+s_\beta\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)\right)+\\
\frac{c_W^2\,s_W}{32}\left\{
\begin{array}{l}
4\,\delta c_\beta\,s_{2\beta}\,\left(56\,c_\beta^9-2\,c_\beta^5\,\left(12+37\,s_{2\beta}^2\right)+c_\beta\,s_{2\beta}^2\,\left(38-13\,s_{2\beta}^2\right)+2\,s_{2\beta}\,s_\beta^3\,\left(11\,s_{2\beta}^2-2\,\left(9-s_\beta^2-4\,s_\beta^4\right)\right)\right)+\\
\delta Z_{AG}\left\{
\begin{array}{l}
32\,c_\beta^8-32\,c_\beta^{12}-39\,s_{2\beta}^6+32\,s_\beta^8\,\left(1-s_\beta^4\right)+s_{2\beta}^4\,\left(44-94\,s_\beta^4\right)-\\
s_{2\beta}^2\,\left(16\,s_\beta^4\,\left(2+3\,s_\beta^4\right)+2\,c_\beta^4\,\left(16+24\,c_{2\beta}^2+59\,s_{2\beta}^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}+\\
\frac{s_{2\beta}\,s_\beta^5}{2}\left\{
\begin{array}{l}
2\,c_W^2\,\delta s_\beta\,s_W\,\left(3-7\,s_\beta^4\right)+\\
c_\beta^2\,s_\beta\,\left(1+s_\beta^2\right)\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)
\end{array}
\right\}-\\
\frac{s_{2\beta}^3\,s_\beta}{8}\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(7-5\,s_\beta^4\right)-\\
c_W^2\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,\left(7-5\,s_\beta^4\right)-\\
s_W\,\left(\delta s_\beta\,\left(38-74\,s_\beta^4\right)+s_\beta\,\left(7-5\,s_\beta^4\right)\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)
\end{array}
\right\}
\end{array}
\right\}-\\
c_\beta^7\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(1+6\,s_\beta^4\right)-\\
c_W^2\,\left(4\,\delta s_W\,\left(s_\beta+6\,s_\beta^5\right)-s_W\,\left(\delta s_\beta\,\left(2+44\,s_\beta^4\right)+s_\beta\,\left(1+6\,s_\beta^4\right)\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)
\end{array}
\right\}-\\
s_\beta^2\left\{
\begin{array}{l}
c_\beta^9\,\left(20\,\delta s_W\,s_\beta\,s_W^2+c_W^2\,\left(6\,\delta s_\beta\,s_W-5\,s_\beta\,\left(4\,\delta s_W-s_W\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)\right)\right)\right)-\\
c_\beta^5\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,s_W^2\,\left(7+6\,s_\beta^4\right)-\\
c_W^2\left\{
\begin{array}{l}
4\,\delta s_W\,s_\beta\,\left(7+6\,s_\beta^4\right)-\\
s_W\left\{
\begin{array}{l}
2\,\delta s_\beta\,\left(9+26\,s_\beta^4\right)+\\
s_\beta\,\left(7+6\,s_\beta^4\right)\,\left(4\,\delta Z_e+\delta Z_{AA}+3\,\delta Z_{GG}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(G^0,G^0,G^0,G^0) = \frac{3\,\mathrm{i}\,e^2}{64\,c_W^4\,s_W^3}
$$
(129)
$$
\left\{
\begin{array}{l}
\delta s_W\,s_W^2\,\left(9\,s_{2\beta}^6-32\,s_\beta^{12}+16\,s_{2\beta}^2\,s_\beta^4\,\left(2-3\,s_\beta^4\right)-2\,s_{2\beta}^4\,\left(8-4\,c_{2\beta}-s_\beta^4\right)\right)- \\
32\,c_\beta^{12}\,\left(\delta s_W\,s_W^2-c_W^2\,\left(\delta s_W-s_W\,\left(\delta Z_e+\delta Z_{GG}\right)\right)\right)+ \\
c_\beta^2\,s_{2\beta}^2\,\left(2\,c_W^2\,\delta Z_{AG}\,s_{2\beta}\,s_W\,\left(14-3\,s_{2\beta}^2\right)-8\,c_{2\beta}\,\left(4-s_{2\beta}^2\right)\,\left(\delta s_W\,s_W^2-c_W^2\,\left(\delta s_W-s_W\,\left(\delta Z_e+\delta Z_{GG}\right)\right)\right)\right)- \\
c_W^2\left\{
\begin{array}{l}
\delta s_W\,\left(9\,s_{2\beta}^6-32\,s_\beta^{12}+16\,s_{2\beta}^2\,s_\beta^4\,\left(2-3\,s_\beta^4\right)-2\,s_{2\beta}^4\,\left(8-4\,c_{2\beta}-s_\beta^4\right)\right)+ \\
s_W\left\{
\begin{array}{l}
128\,c_\beta^{11}\,\delta c_\beta+2\,c_\beta\,s_{2\beta}^2\,\left(2\,c_{2\beta}\,\delta c_\beta\,\left(12-5\,s_{2\beta}^2\right)+\delta s_\beta\,s_{2\beta}\,\left(16-15\,s_{2\beta}^2\right)\right)- \\
\delta Z_e\,\left(9\,s_{2\beta}^6-32\,s_\beta^{12}+16\,s_{2\beta}^2\,s_\beta^4\,\left(2-3\,s_\beta^4\right)-2\,s_{2\beta}^4\,\left(8-4\,c_{2\beta}-s_\beta^4\right)\right)- \\
16\,\delta Z_{AG}\,s_{2\beta}\,\left(c_{2\beta}\,c_\beta^8+c_\beta^{10}\right)- \\
\delta Z_{GG}\,\left(9\,s_{2\beta}^6-32\,s_\beta^{12}+16\,s_{2\beta}^2\,s_\beta^4\,\left(2-3\,s_\beta^4\right)-2\,s_{2\beta}^4\,\left(8-s_\beta^4\right)\right)- \\
2\,c_{2\beta}\,s_{2\beta}\left\{
\begin{array}{l}
s_\beta\,\left(4\,\delta c_\beta\,s_{2\beta}^2\,\left(1-2\,s_\beta^2\right)+2\,\delta s_\beta\,s_{2\beta}\,\left(12-5\,s_{2\beta}^2-28\,s_\beta^4\right)\right)+ \\
4\,\delta Z_{GG}\,s_{2\beta}^3+\delta Z_{AG}\,\left(11\,s_{2\beta}^4-12\,s_{2\beta}^2\,\left(1-2\,s_\beta^4\right)+8\,\left(s_\beta^4+s_\beta^8\right)\right)
\end{array}
\right\}- \\
2\,s_\beta\left\{
\begin{array}{l}
\delta c_\beta\,s_{2\beta}\,\left(21\,s_{2\beta}^4+16\,s_\beta^4-48\,s_\beta^8-16\,s_{2\beta}^2\,\left(1+s_\beta^4\right)\right)+ \\
s_\beta\left\{
\begin{array}{l}
4\,\delta s_\beta\,s_\beta\,\left(3\,s_{2\beta}^4-16\,s_\beta^8+s_{2\beta}^2\,\left(6-18\,s_\beta^4\right)\right)+ \\
\delta Z_{AG}\,s_{2\beta}^3\,\left(3\,s_{2\beta}^2-2\,\left(7-s_\beta^2-6\,s_\beta^4\right)\right)
\end{array}
\right\}
\end{array}
\right\}- \\
s_{2\beta}\left\{
\begin{array}{l}
32\,c_{2\beta}\,c_\beta^7\,\delta s_\beta- \\
8\,c_\beta^3\,\left(18\,c_{2\beta}^2\,\delta c_\beta\,s_{2\beta}-6\,\delta c_\beta\,s_{2\beta}\,\left(1-s_{2\beta}^2\right)+c_{2\beta}\,\delta s_\beta\,\left(4-3\,s_{2\beta}^2\right)\right)+ \\
16\,c_\beta^5\,\left(7\,c_{2\beta}\,\delta c_\beta\,s_{2\beta}-\delta s_\beta\,\left(4-s_{2\beta}^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}- \\
s_{2\beta}\left\{
\begin{array}{l}
4\,c_\beta^6\,\left(c_W^2\,\delta Z_{AG}\,s_W\,\left(4+5\,s_{2\beta}^2\right)-8\,c_{2\beta}\,s_{2\beta}\,\left(\delta s_W\,s_W^2-c_W^2\,\left(\delta s_W-s_W\,\left(\delta Z_e+\delta Z_{GG}\right)\right)\right)\right)- \\
2\,c_\beta^4\left\{
\begin{array}{l}
\delta s_W\,s_{2\beta}\,s_W^2\,\left(16-24\,c_{2\beta}^2-11\,s_{2\beta}^2\right)+ \\
c_W^2\left\{
\begin{array}{l}
c_{2\beta}\,\delta Z_{AG}\,s_W\,\left(8+24\,s_{2\beta}^2\right)+ \\
\left(\delta s_W-s_W\,\left(\delta Z_e+\delta Z_{GG}\right)\right)\,\left(11\,s_{2\beta}^3-8\,s_{2\beta}\,\left(2-3\,c_{2\beta}^2\right)\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\}
$$

$$
C(A^0,A^0,H^-,H^+) = -\frac{\mathrm{i}\,e^2\,c_{2\beta}}{8\,c_W^4\,s_W^3}
$$
(130)
$$
\left\{
\begin{array}{l}
c_{2\beta}\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(\delta\bar{Z}_{H^-H^-}+16\,c_\beta\,\delta c_\beta+4\,\delta Z_e+2\,\delta Z_{AA}+\delta Z_{H^-H^-}+16\,\delta s_\beta\,s_\beta\right)\right)\right)+ \\
2\,c_W^2\,s_{2\beta}\,s_W\,\left(Re(\delta Z_{H^-G^-})+\delta Z_{AG}\right)
\end{array}
\right\}
$$

$$
C(A^0,A^0,H^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}
$$
(131)
$$
\left\{
\begin{array}{l}
2\,c_W^2\,s_W\,\left(\delta Z_{AG}\,s_{2\beta}^2-c_W^2\,\left(\delta Z_{AG}-\delta Z_{H^-G^-}\right)\right)+ \\
c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2-c_W^2\,\left(4\,\delta s_W-s_W\,\left(16\,c_\beta\,\delta c_\beta+4\,\delta Z_e+2\,\delta Z_{AA}+\delta Z_{G^-G^-}+\delta Z_{H^-H^-}+16\,\delta s_\beta\,s_\beta\right)\right)\right)
\end{array}
\right\}
$$

$$C(A^0,A^0,G^-,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} 4\,c_{2\beta}\,s_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - s_W\,\left(4\,c_\beta\,\delta c_\beta + \delta Z_e + 4\,\delta s_\beta\,s_\beta\right)\right)\right) + \\ c_W^2\,s_W\left\{\begin{array}{l} 2\,c_W^2\,\delta Z^*_{H^-G^-} - 2\,\delta Z_{AG}\,\left(c_W^2 - s_{2\beta}^2\right) + c_{2\beta}\,s_{2\beta}\,\left(\delta\bar{Z}_{H^-H^-} + 2\,\delta Z_{AA} + \delta Z_{G^-G^-}\right) + \\ 2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_{2\beta}^2 \end{array}\right. \end{array}\right\}$$
(132)

$$C(A^0,A^0,G^-,G^+) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,c_W^2\,s_W\,\left(s_{2\beta}\,\left(\delta Z_{AG} - \delta Z_{H^-G^-}\right) + c_{2\beta}\,\left(8\,c_\beta\,\delta c_\beta + 2\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-} + 8\,\delta s_\beta\,s_\beta\right)\right) + \\ 2\,\left(c_{2\beta}^2\,\delta s_W\,s_W^4 + c_W^4\,\left(\delta s_W\,\left(1 + s_{2\beta}^2\right) - s_W\,\left(6\,c_\beta\,\delta c_\beta + 2\,\delta Z_e + \delta Z_{AA} + \delta Z_{G^-G^-} + 6\,\delta s_\beta\,s_\beta\right)\right)\right) \end{array}\right\}$$
(133)

$$C(A^0,G^0,H^-,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{H^-H^-} + 16\,\delta s_\beta\,s_\beta\right)\right)\right) + \\ s_W\,\left(2\,c_W^4\,\delta Z_{AG} - 2\,Re(\delta Z_{H^-G^-})\,c_W^2\,\left(c_W^2 - s_{2\beta}^2\right)\right) \end{array}\right\}$$
(134)

$$C(A^0,G^0,H^-,G^+) = -\frac{\mathrm{i}\,e^2}{32\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_W^4\,\left(\delta s_W\,\left(16 + s_{2\beta}^6 - 8\,\left(s_{2\beta}^2 + s_{2\beta}^4\right)\right) - 4\,s_W\,\left(16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-} + 16\,c_{2\beta}^2\,\delta s_\beta\,s_\beta\right)\right) - \\ s_{2\beta}^2\left\{\begin{array}{l} \delta s_W\,s_W^2\,\left(8\,\left(c_\beta^8 + s_\beta^8\right) - s_W^2\,\left(24 - 8\,s_{2\beta}^2 + s_{2\beta}^4\right)\right) + \\ 4\,c_W^2\left\{\begin{array}{l} \delta s_W\,\left(2 - 4\,s_W^2\right)\,\left(c_\beta^8 + s_\beta^8\right) - \\ s_W\,\left(16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-} + 16\,\delta s_\beta\,s_\beta\,s_W^2\right) \end{array}\right. \end{array}\right. \end{array}\right\}$$
(135)

$$C(A^0,G^0,G^-,H^+) = -\frac{\mathrm{i}\,e^2}{32\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_W^4\,\left(\delta s_W\,\left(16 + s_{2\beta}^6 - 8\,\left(s_{2\beta}^2 + s_{2\beta}^4\right)\right) - 16\,s_W\,\left(4\,c_\beta\,\delta c_\beta + \delta Z_e + 4\,c_{2\beta}^2\,\delta s_\beta\,s_\beta\right)\right) - \\ s_{2\beta}^2\,\left(\delta s_W\,s_W^2\,\left(8\,\left(c_\beta^8 + s_\beta^8\right) - s_W^2\,\left(24 - 8\,s_{2\beta}^2 + s_{2\beta}^4\right)\right) - 8\,c_W^2\,\left(8\,\delta s_\beta\,s_\beta\,s_W^3 + 2\,s_W\,\left(4\,c_\beta\,\delta c_\beta + \delta Z_e\right) - \delta s_W\,\left(c_\beta^8 + s_\beta^8 - 2\,s_W^2\,\left(c_\beta^8 + s_\beta^8\right)\right)\right)\right) + \\ 4\,c_W^2\,s_W\,\left(2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_{2\beta}\,s_{2\beta} - \left(c_W - s_{2\beta}\right)\,\left(c_W + s_{2\beta}\right)\,\left(\delta\bar{Z}_{H^-H^-} + \delta Z_{AA} + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right) \end{array}\right\}$$
(136)

$$C(A^0,G^0,G^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} s_W\,\left(2\,c_W^4\,\delta Z_{AG} - 2\,c_W^2\,\delta Z_{H^-G^-}\,\left(c_W - s_{2\beta}\right)\,\left(c_W + s_{2\beta}\right)\right) - \\ c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + \delta Z_{AA} + \delta Z_{GG} + 2\,\delta Z_{G^-G^-} + 16\,\delta s_\beta\,s_\beta\right)\right)\right) \end{array}\right\}$$
(137)

$$C(G^0,G^0,H^-,H^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} 4\,c_{2\beta}^2\,\delta s_W\,s_W^4 + \\ c_W^4\,\left(4\,\delta s_W\,\left(1 + s_{2\beta}^2\right) - 2\,s_W\,\left(\delta\bar{Z}_{H^-H^-} + 12\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{H^-H^-} + 12\,\delta s_\beta\,s_\beta\right)\right) + \\ c_{2\beta}\,c_W^2\,s_W\left\{\begin{array}{l} c_{2\beta}\,\left(\delta\bar{Z}_{H^-H^-} + 16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{H^-H^-} + 16\,\delta s_\beta\,s_\beta\right) + \\ s_{2\beta}\,\left(2\,Re(\delta Z_{H^-G^-}) - 2\,\delta Z_{AG}\right) \end{array}\right. \end{array}\right\}$$
(138)

$$C(G^0,G^0,H^-,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} s_W\,\left(2\,c_W^4\,\delta Z_{H^-G^-} - 2\,c_W^2\,\delta Z_{AG}\,\left(c_W - s_{2\beta}\right)\,\left(c_W + s_{2\beta}\right)\right) - \\ c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{G^-G^-} + \delta Z_{H^-H^-} + 16\,\delta s_\beta\,s_\beta\right)\right)\right) \end{array}\right\}$$
(139)

$$C(G^0,G^0,G^-,H^+) = \frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 16\,c_\beta\,\delta c_\beta + 4\,\delta Z_e + 2\,\delta Z_{GG} + \delta Z_{G^-G^-} + 16\,\delta s_\beta\,s_\beta\right)\right)\right) - \\ s_W\,\left(2\,c_W^4\,\delta Z_{H^-G^-} - c_W^2\,\left(2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_{2\beta}^2 + 2\,\delta Z_{AG}\,\left(c_W - s_{2\beta}\right)\,\left(c_W + s_{2\beta}\right)\right)\right) \end{array}\right\}$$

$$C(G^0,G^0,G^-,G^+) = \frac{\mathrm{i}\,e^2\,c_{2\beta}}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_W^2\,s_{2\beta}\,s_W\,\left(\delta Z_{AG} + \delta Z_{H^-G^-}\right) - \\ c_{2\beta}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(8\,c_\beta\,\delta c_\beta + 2\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-} + 8\,\delta s_\beta\,s_\beta\right)\right)\right) \end{array}\right\}$$

$$C(H^-,H^-,H^+,H^+) = -\frac{\mathrm{i}\,e^2\,c_{2\beta}}{2\,c_W^4\,s_W^3}\,\left(c_W^2\,s_W\,\left(c_{2\beta}\,\delta\bar{Z}_{H^-H^-} + 2\,Re(\delta Z_{H^-G^-})\,s_{2\beta}\right) + \left(c_\beta^2 - s_\beta^2\right)\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{H^-H^-}\right)\right)\right)\right)$$

$$C(H^-,H^-,H^+,G^+) = -\frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} \frac{c_W^2\,s_W}{2}\,\left(2\,s_{2\beta}\,\left(c_{2\beta}\,\delta\bar{Z}_{H^-H^-} + \delta Z_{H^-G^-}^*\,s_{2\beta}\right) + \delta Z_{H^-G^-}\,\left(2\,c_{2\beta}^2 - 2\,c_\beta^4 + 3\,s_{2\beta}^2 - 2\,s_\beta^4\right)\right) + \\ c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{G^-G^-} + 2\,\delta Z_{H^-H^-}\right)\right)\right) \end{array}\right\}$$

$$C(H^-,H^-,G^+,G^+) = -\frac{\mathrm{i}\,e^2\,s_{2\beta}^2}{2\,c_W^4\,s_W^3}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)$$

$$C(H^-,G^-,H^+,H^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} 8\,c_{2\beta}\,s_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right) - \\ c_W^2\,s_W\,\left\{\begin{array}{l} \delta Z_{H^-G^-}^*\,\left(2 - 4\,s_{2\beta}^2\right) - \delta Z_{H^-G^-}\,\left(2\,c_\beta^4 + s_{2\beta}^2 + 2\,s_\beta^4\right) - \\ s_{2\beta}\,\left(4\,c_{2\beta}\,\delta\bar{Z}_{H^-H^-} + \left(2\,c_\beta^2 - 2\,s_\beta^2\right)\,\left(\delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) \end{array}\right\} \end{array}\right\}$$

$$C(H^-,G^-,H^+,G^+) = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left\{\begin{array}{l} 2\,c_{2\beta}\,c_W^2\,s_{2\beta}\,s_W\,\left(\delta Z_{H^-G^-} - \delta Z_{H^-G^-}^*\right) + \\ \left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right)\,\left(\frac{3\,s_{2\beta}^2}{2} - c_\beta^4 - s_\beta^4\right) \end{array}\right\}$$

$$C(H^-,G^-,G^+,G^+) = -\frac{\mathrm{i}\,e^2\,s_{2\beta}}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} 4\,\delta s_W\,s_\beta^2\,s_W^2 - c_\beta^2\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right)\right) - \\ c_W^2\,\left(s_\beta^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{G^-G^-} + \delta Z_{H^-H^-}\right)\right) + s_W\,\left(2\,c_{2\beta}\,\delta Z_{G^-G^-} - 2\,\delta Z_{H^-G^-}\,s_{2\beta}\right)\right) \end{array}\right\}$$

$$C(G^-,G^-,H^+,H^+) = -\frac{\mathrm{i}\,e^2\,s_{2\beta}}{2\,c_W^4\,s_W^3}\,\left(2\,\mathrm{i}\,Im(\delta Z_{H^-G^-})\,c_{2\beta}\,c_W^2\,s_W + s_{2\beta}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 2\,\delta Z_e + \delta Z_{G^-G^-}\right)\right)\right)\right)$$

$$C(G^-,G^-,H^+,G^+) = -\frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\left\{\begin{array}{l} c_W^2\,s_W\,\left(c_{2\beta}^2\,\delta Z_{H^-G^-}^* - c_{2\beta}\,\delta\bar{Z}_{H^-H^-}\,s_{2\beta} - \frac{\delta Z_{H^-G^-}}{2}\,\left(2\,c_\beta^4 - 5\,s_{2\beta}^2 + 2\,s_\beta^4\right)\right) - \\ c_{2\beta}\,s_{2\beta}\,\left(4\,\delta s_W\,s_W^2 - c_W^2\,\left(4\,\delta s_W - s_W\,\left(4\,\delta Z_e + 3\,\delta Z_{G^-G^-}\right)\right)\right) \end{array}\right\}$$

$$C(G^-,G^-,G^+,G^+) = \frac{\mathrm{i}\,e^2\,c_{2\beta}}{2\,c_W^4\,s_W^3}\,\left(c_W^2\,s_W\,\left(2\,\delta Z_{H^-G^-}\,s_{2\beta} - \delta Z_{G^-G^-}\,\left(1 + c_\beta^2 - 3\,s_\beta^2\right)\right) - 2\,c_{2\beta}\,\left(\delta s_W\,s_W^2 - c_W^2\,\left(\delta s_W - \delta Z_e\,s_W\right)\right)\right)$$

[SSSS] 4 Sleptons

$$
\begin{aligned}
&c_\beta\, c_W^2\, M_W^2\, s_W \left\{ \begin{array}{l}
\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) \left\{ \begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}} \left\{ \begin{array}{l} 2\, c_W^2\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2} + \\ c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},1} - 2\, s_W^2\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},2}\right) \end{array} \right\} + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}} \left\{ \begin{array}{l} 2\, c_W^2\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j3}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},1} + \\ c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},1} - 2\, s_W^2\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},2}\right) \end{array} \right\}
\end{array} \right\} + \\
2 \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \left\{ \begin{array}{l}
c_\beta^2\, M_W^2\, s_W^2 \left\{ \begin{array}{l} 2\, \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2} - \\ \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},1} - 2\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},2}\right) \end{array} \right\} + \\
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},1} \left(c_W^2\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} - c_\beta^2\, M_W^2\, s_W^2\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2}\right) + \\
c_W^2\, \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j3}}}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{e},\mathrm{j3}}_{\mathrm{s4},2}
\end{array} \right\}
\end{array} \right\} + \\
&U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}} \left\{ \begin{array}{l}
c_\beta^3\, M_W^4 \left\{ \begin{array}{l}
U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},1} \left\{ \begin{array}{l}
c_W^2\, s_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j2}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j2}}_{2,1}\right) + \\
U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{1,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{2,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\ 4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(\delta s_W\, s_W^2 - c_W^2\, (\delta s_W - \delta Z_e\, s_W)\right) \end{array} \right\}
\end{array} \right\} - \\
2\, c_W^2\, s_W^3\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(\delta Z^{\tilde{e},\mathrm{j3}}_{1,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j3}}_{2,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{2,2}\right)
\end{array} \right\} - \\
2\, U^{\tilde{e},\mathrm{j2}*}_{\mathrm{s3},2} \left\{ \begin{array}{l}
\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} \left(c_\beta^3\, c_W^2\, M_W^4\, s_W^3\, U^{\tilde{e},\mathrm{j2}}_{1,2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} - c_\beta\, c_W^4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, s_W\, U^{\tilde{e},\mathrm{j2}}_{1,1}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2}\right) + \\
\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} \left(c_\beta^3\, c_W^2\, M_W^4\, s_W^3\, U^{\tilde{e},\mathrm{j2}}_{2,2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} - c_\beta\, c_W^4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, s_W\, U^{\tilde{e},\mathrm{j2}}_{2,1}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2}\right) - \\
c_W^4\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1} \left\{ \begin{array}{l} c_\beta \left\{ \begin{array}{l} m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{1,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{2,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\ 2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2} \left\{ \begin{array}{l} \delta m^e_{\mathrm{j2}}\, m_{e_{\mathrm{j1}}}\, M_W^2\, s_W + \\ m_{e_{\mathrm{j2}}} \left(\delta m^e_{\mathrm{j1}}\, M_W^2\, s_W - m_{e_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) \end{array} \right. \end{array} \right\} - \\
4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, s_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2}\, (\delta c_\beta - c_\beta\, \delta Z_e)
\end{array} \right\} + \\
c_\beta^3\, M_W^4\, s_W^3\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},2} \left(4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right) + c_W^2 \left(\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{1,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{2,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right)\right)
\end{array} \right\} + \\
s_W\, U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2},1} \left\{ \begin{array}{l}
c_\beta^3\, c_W^2\, M_W^4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},1} \left(\delta Z^{\tilde{e},\mathrm{j3}}_{1,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j3}}_{2,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{2,1}\right) + \\
2\, c_\beta\, c_W^4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s4},2} \left(\delta Z^{\tilde{e},\mathrm{j3}}_{1,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j3}}_{2,\mathrm{s3}}\, U^{\tilde{e},\mathrm{j2}*}_{2,2}\right)
\end{array} \right\} \\
s_W \left\{ \begin{array}{l}
\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{1,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j3}}_{1,1} \left(c_\beta^3\, c_W^2\, M_W^4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1} + 2\, c_\beta\, c_W^4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j3}}}\, M_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2}\right) + \\
c_\beta^3\, c_W^2\, M_W^4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{2,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j3}}_{2,1}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1} - 2\, \delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{1,\mathrm{s4}}\, s_W^2\, U^{\tilde{e},\mathrm{j3}}_{1,2}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2}\right)
\end{array} \right\} - \\
\delta \bar{Z}^{\tilde{e},\mathrm{j4}}_{2,\mathrm{s4}}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2} \left(2\, c_\beta^3\, c_W^2\, M_W^4\, s_W^3\, U^{\tilde{e},\mathrm{j3}}_{2,2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} - 2\, c_\beta\, c_W^4\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j3}}}\, M_W^2\, s_W\, U^{\tilde{e},\mathrm{j3}}_{2,1}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\right) + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}} \left\{ \begin{array}{l}
c_\beta\, c_W^2\, M_W^2\, s_W \left\{ \begin{array}{l} c_\beta^2\, M_W^2\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1} \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\ 2\, c_W^2\, m_{e_{\mathrm{j1}}}\, m_{e_{\mathrm{j3}}}\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2} \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) \end{array} \right\} + \\
\left\{ \begin{array}{l} 4\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},1} \left(\delta s_W\, s_W^2 - c_W^2\, (\delta s_W - \delta Z_e\, s_W)\right) + \\ 2\, U^{\tilde{e},\mathrm{j3}*}_{\mathrm{s3},2} \left\{ \begin{array}{l} \delta m^e_{\mathrm{j1}}\, m_{e_{\mathrm{j2}}}\, M_W^2\, s_W + \\ m_{e_{\mathrm{j1}}} \left(\delta m^e_{\mathrm{j2}}\, M_W^2\, s_W - m_{e_{\mathrm{j2}}} \left(2\, \delta s_W\, M_W^2 + \delta M_W^2\, s_W\right)\right) \end{array} \right. \end{array} \right\} U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}
\end{array} \right\}
\end{array} \right\}
\end{aligned}
$$

$$
\underset{381}{C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}},\tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}},\tilde{\nu}_{\mathrm{j3}},\tilde{\nu}^{\dagger}_{\mathrm{j4}})} = -\frac{\mathrm{i}\,e^2}{8\,s_W^3}\left\{\begin{array}{l}
4\,\delta s_W\left\{\begin{array}{l}\frac{\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\,s_W^4}{c_W^4}\left(U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,1}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,1}}-2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,2}}\right)+\\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,1}}\left(\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,1}}-2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,1}}\right)-\\ \frac{2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\,m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}}{c_\beta^2\,M_W^2}\end{array}\right\}+\\
s_W\left\{\begin{array}{l}\frac{1}{c_\beta^3\,c_W^2\,M_W^4}\left\{\begin{array}{l}c_\beta^3\,M_W^4\left\{\begin{array}{l}U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,1}}\left\{\begin{array}{l}\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{1,s2}}\left(2\,c_W^2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{1,1}}+\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{1,1}}\,\left(1-2\,c_W^2\right)\right)+\\ \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{2,s2}}\left(2\,c_W^2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{2,1}}+\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{2,1}}\,\left(1-2\,c_W^2\right)\right)\end{array}\right\}-\\ 2\,\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{1,s2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{1,2}}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{2,s2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{2,2}}\right)\end{array}\right\}+\\
c_W^2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\left\{\begin{array}{l}2\,c_\beta\left\{\begin{array}{l}m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,M_W^2\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{1,s2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{1,2}}+\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{\mathrm{2,s2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{2,2}}\right)+\\ 2\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}\left(\delta m^{e}_{\mathrm{j2}}\,m_{e_{\mathrm{j1}}}\,M_W^2-m_{e_{\mathrm{j2}}}\left(\delta M_W^2\,m_{e_{\mathrm{j1}}}-\delta m^{e}_{\mathrm{j1}}\,M_W^2\right)\right)\end{array}\right\}-\\ 8\,\delta c_\beta\,m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,M_W^2\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}\end{array}\right\}\end{array}\right\}-\\
\delta Z^{\tilde{e},\mathrm{j1}}_{\mathrm{1,s1}}\left\{\begin{array}{l}\frac{\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}}{c_W^2}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{1,2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,2}}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{1,1}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,1}}\,\left(1-2\,c_W^2\right)\right)-\\ 2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\left(\frac{m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{1,2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}}{c_\beta^2\,M_W^2}+U^{\tilde{e},\mathrm{j1}*}_{\mathrm{1,1}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,1}}\right)\end{array}\right\}-\\
\delta Z^{\tilde{e},\mathrm{j1}}_{\mathrm{2,s1}}\left\{\begin{array}{l}\frac{\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}}{c_W^2}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{2,2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,2}}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{2,1}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,1}}\,\left(1-2\,c_W^2\right)\right)-\\ 2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\left(\frac{m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{2,2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}}{c_\beta^2\,M_W^2}+U^{\tilde{e},\mathrm{j1}*}_{\mathrm{2,1}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,1}}\right)\end{array}\right\}-\\
\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j4}}_{\mathrm{1,1}}+4\,\delta Z_e+\delta Z^{\tilde{\nu},\mathrm{j3}}_{\mathrm{1,1}}\right)\left\{\begin{array}{l}\frac{\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}}{c_W^2}\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,2}}-U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,1}}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2,1}}\,\left(1-2\,c_W^2\right)\right)-\\ 2\,\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}\left(\frac{m_{e_{\mathrm{j1}}}\,m_{e_{\mathrm{j2}}}\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,2}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,2}}}{c_\beta^2\,M_W^2}+U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1,1}}\,U^{\tilde{e},\mathrm{j2}}_{\mathrm{s2,1}}\right)\end{array}\right\}\end{array}\right\}\end{array}\right\}
$$

$$
\underset{383}{C(\tilde{\nu}_{\mathrm{j1}},\tilde{\nu}^{\dagger}_{\mathrm{j2}},\tilde{\nu}_{\mathrm{j3}},\tilde{\nu}^{\dagger}_{\mathrm{j4}})} = -\frac{\mathrm{i}\,e^2}{8\,c_W^4\,s_W^3}\left(\delta_{\mathrm{j1,j4}}\,\delta_{\mathrm{j2,j3}}+\delta_{\mathrm{j1,j2}}\,\delta_{\mathrm{j3,j4}}\right)\left(4\,\delta s_W\,s_W^2-c_W^2\left(4\,\left(\delta s_W-\delta Z_e\,s_W\right)-s_W\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{\mathrm{1,1}}+\delta\bar{Z}^{\tilde{\nu},\mathrm{j4}}_{\mathrm{1,1}}+\delta Z^{\tilde{\nu},\mathrm{j1}}_{\mathrm{1,1}}+\delta Z^{\tilde{\nu},\mathrm{j3}}_{\mathrm{1,1}}\right)\right)\right)
$$

[SSSS] **4 Squarks**

$$
\left(
\begin{array}{l}
e^2 \left\{
\begin{array}{l}
\frac{4}{c_\beta^3\, c_W^4\, M_W^4\, s_W^3}
\left\{
\begin{array}{l}
c_W^4 \left\{
\begin{array}{l}
18\, \delta c_\beta\, m_{d_{\mathrm{j1}}}\, M_W^2\, s_W
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{d_{\mathrm{j2}}}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2} + \\
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1}
\end{array}
\right\} + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{d_{\mathrm{j3}}}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} + \\
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}
\end{array}
\right\}
\end{array}
\right\} - \\
9\, c_\beta\, \left(\delta m^d_{\mathrm{j1}}\, M_W^2\, s_W - m_{d_{\mathrm{j1}}}\, \left(2\, \delta s_W\, M_W^2 + s_W\, \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2\right)\right)\right)
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{d_{\mathrm{j2}}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2} + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{d_{\mathrm{j3}}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1}
\end{array}
\right\} + \\
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{d_{\mathrm{j2}}}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1} + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{d_{\mathrm{j3}}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} - \\
c_\beta^3\, M_W^4 \left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1}\, \left(\delta s_W\, s_W^2 - \left(c_W^2 + 8\, c_W^4\right)\, \left(\delta s_W - \delta Z_e\, s_W\right)\right) + \\
2\, s_W^3\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)
\end{array}
\right\} + \\
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, \left(\delta s_W\, s_W^2 - \left(c_W^2 + 8\, c_W^4\right)\, \left(\delta s_W - \delta Z_e\, s_W\right)\right) + \\
2\, s_W^3\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)
\end{array}
\right\}
\end{array}
\right\} + \\
2\, s_W^3\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, \left(c_W^2\, \delta Z_e + \delta s_W\, s_W\right)
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2}\, \left(U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1} + 2\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\right) + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2}\, \left(U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} + 2\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}\right)
\end{array}
\right\}
\end{array}
\right\}
\end{array}
\right\} + \\
\frac{36\, m_{d_{\mathrm{j1}}}}{c_\beta^2\, M_W^2\, s_W^2}
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, \delta m^d_{\mathrm{j2}}\, \left(U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1} + U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j2}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2}\right) + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, \delta m^d_{\mathrm{j3}}\, \left(U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} + U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}\right)
\end{array}
\right\}
\end{array}
\right\} \\
\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}
\left\{
\begin{array}{l}
\delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}
\left\{
\begin{array}{l}
\frac{e^2}{c_\beta^2\, c_W^2\, M_W^2\, s_W^2}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
18\, c_W^2\, m_{d_{\mathrm{j1}}}\, m_{d_{\mathrm{j2}}}\, U^{\tilde{d},\mathrm{j2}}_{1,1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2} + \\
c_\beta^2\, M_W^2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1}\, \left(2\, s_W^2\, U^{\tilde{d},\mathrm{j2}}_{1,2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2} + U^{\tilde{d},\mathrm{j2}}_{1,1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, \left(1 + 8\, c_W^2\right)\right)
\end{array}
\right\} + \\
2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
9\, c_W^2\, m_{d_{\mathrm{j1}}}\, m_{d_{\mathrm{j2}}}\, U^{\tilde{d},\mathrm{j2}}_{1,2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1} + \\
c_\beta^2\, M_W^2\, s_W^2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2}\, \left(U^{\tilde{d},\mathrm{j2}}_{1,1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1} + 2\, U^{\tilde{d},\mathrm{j2}}_{1,2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
36\, g_s^2\, T^x_{\mathrm{o2,o3}} T^x_{\mathrm{o4,o1}}\, \left(U^{\tilde{d},\mathrm{j2}}_{1,1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},1} - U^{\tilde{d},\mathrm{j2}}_{1,2}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\right)\, \left(U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},1} - U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2}\right)
\end{array}
\right\} + \\
\delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}
\left\{
\begin{array}{l}
\frac{e^2}{c_\beta^2\, c_W^2\, M_W^2\, s_W^2}
\left\{
\begin{array}{l}
U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}
\left\{
\begin{array}{l}
18\, c_W^2\, m_{d_{\mathrm{j1}}}\, m_{d_{\mathrm{j3}}}\, U^{\tilde{d},\mathrm{j1}}_{1,2}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} + \\
c_\beta^2\, M_W^2\, U^{\tilde{d},\mathrm{j1}}_{1,1}\, \left(2\, s_W^2\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2} + U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1}\, \left(1 + 8\, c_W^2\right)\right)
\end{array}
\right\} + \\
2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}
\left\{
\begin{array}{l}
9\, c_W^2\, m_{d_{\mathrm{j1}}}\, m_{d_{\mathrm{j3}}}\, U^{\tilde{d},\mathrm{j1}}_{1,1}\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2} + \\
c_\beta^2\, M_W^2\, s_W^2\, U^{\tilde{d},\mathrm{j1}}_{1,2}\, \left(U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} + 2\, U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}\right)
\end{array}
\right\}
\end{array}
\right\} + \\
36\, g_s^2\, T^x_{\mathrm{o2,o1}} T^x_{\mathrm{o4,o3}}\, \left(U^{\tilde{d},\mathrm{j1}}_{1,1}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1} - U^{\tilde{d},\mathrm{j1}}_{1,2}\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\right)\, \left(U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},1}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},1} - U^{\tilde{d},\mathrm{j3}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j3}}_{\mathrm{s4},2}\right)
\end{array}
\right\}
\end{array}
\right\} - \\
\qquad U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ 18\, c_W^2\, m_{d_{\mathrm{j1}}}\, m_{d_{\mathrm{j2}}}\, U^{\tilde{d},\mathrm{j2}}_{2,1}\, U^{\tilde{d},\mathrm{j2}*}_{\mathrm{s3},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s4},2} + \right.
\end{array}
$$

$$
\begin{aligned}
e^2 \Bigg\{ & \frac{4}{c_W^4\, M_W^4\, s_\beta^3\, s_W^3} \Bigg\{ c_W^4 \Bigg\{ 18\, \delta s_\beta\, m_{u_{\mathrm{j1}}}\, M_W^2\, s_W \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{u_{\mathrm{j2}}} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} \Bigg\} + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{u_{\mathrm{j3}}} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \Bigg\} \Bigg\} - \\ & 9\, s_\beta \left(\delta m^u_{\mathrm{j1}}\, M_W^2\, s_W - m_{u_{\mathrm{j1}}} \left(2\, \delta s_W\, M_W^2 + s_W \left(\delta M_W^2 - 2\, \delta Z_e\, M_W^2 \right) \right) \right) \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{u_{\mathrm{j3}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} \Bigg\} + \\ & \qquad U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, m_{u_{\mathrm{j3}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \Bigg\} \Bigg\} \Bigg\} \\ & M_W^4\, s_\beta^3 \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \Bigg\{ \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,1}} \Bigg\{ U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} \left(\delta s_W\, s_W^2 - \left(c_W^2 + 8\, c_W^4 \right) \left(\delta s_W - \delta Z_e\, s_W \right) \right) - \\ & \qquad 4\, s_W^3\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \left(c_W^2\, \delta Z_e + \delta s_W\, s_W \right) \Bigg\} + \\ & \qquad \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} \Bigg\{ U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} \left(\delta s_W\, s_W^2 - \left(c_W^2 + 8\, c_W^4 \right) \left(\delta s_W - \delta Z_e\, s_W \right) \right) - \\ & \qquad 4\, s_W^3\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \left(c_W^2\, \delta Z_e + \delta s_W\, s_W \right) \Bigg\} \Bigg\} - \\ & U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \left(U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} - 4\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \right) + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,2}} \left(U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} - 4\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} \\ & \frac{36\, m_{u_{\mathrm{j1}}}}{M_W^2\, s_\beta^2\, s_W^2} \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}}\, \delta m^u_{\mathrm{j2}} \left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \right) + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}}\, \delta m^u_{\mathrm{j3}} \left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,2}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} + U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2,1}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \right) \Bigg\} \Bigg\} \\
& \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{\mathrm{1,s2}} \Bigg\{ \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}} \Bigg\{ \frac{e^2}{c_W^2\, M_W^2\, s_\beta^2\, s_W^2} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \Bigg\{ 18\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} - \\ & \qquad M_W^2\, s_\beta^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} \left(4\, s_W^2\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} - U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} \left(1 + 8\, c_W^2 \right) \right) \Bigg\} + \\ & \qquad 2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \Bigg\{ 9\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} - \\ & \qquad 2\, M_W^2\, s_\beta^2\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \left(U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} - 4\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \right) \Bigg\} \Bigg\} + \\ & \qquad 36\, g_s^2\, T^x_{\mathrm{o2,o3}} T^x_{\mathrm{o4,o1}} \left(U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} - U^{\tilde{u},\mathrm{j2}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \right) \left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} - U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \right) \Bigg\} + \\ & \qquad \delta_{\mathrm{j1,j2}}\, \delta_{\mathrm{j3,j4}} \Bigg\{ \frac{e^2}{c_W^2\, M_W^2\, s_\beta^2\, s_W^2} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \Bigg\{ 18\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j3}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} - \\ & \qquad M_W^2\, s_\beta^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,1}} \left(4\, s_W^2\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} - U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} \left(1 + 8\, c_W^2 \right) \right) \Bigg\} + \\ & \qquad 2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \Bigg\{ 9\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j3}}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} - \\ & \qquad 2\, M_W^2\, s_\beta^2\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,2}} \left(U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} - 4\, U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \right) \Bigg\} \Bigg\} + \\ & \qquad 36\, g_s^2\, T^x_{\mathrm{o2,o1}} T^x_{\mathrm{o4,o3}} \left(U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,1}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} - U^{\tilde{u},\mathrm{j1}}_{\mathrm{1,2}}\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \right) \left(U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,1}} - U^{\tilde{u},\mathrm{j3}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j3}}_{\mathrm{s4,2}} \right) \Bigg\} - \\ & \qquad \delta_{\mathrm{j1,j4}}\, \delta_{\mathrm{j2,j3}} \Bigg\{ \frac{e^2}{c_W^2\, M_W^2\, s_\beta^2\, s_W^2} \Bigg\{ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}} \Bigg\{ 18\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} - \\ & \qquad M_W^2\, s_\beta^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} \left(4\, s_W^2\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} - U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} \left(1 + 8\, c_W^2 \right) \right) \Bigg\} + \\ & \qquad 2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}} \Bigg\{ 9\, c_W^2\, m_{u_{\mathrm{j1}}}\, m_{u_{\mathrm{j2}}}\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} - \\ & \qquad 2\, M_W^2\, s_\beta^2\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \left(U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} - 4\, U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \right) \Bigg\} \Bigg\} + \\ & \qquad 36\, g_s^2\, T^x_{\mathrm{o2,o1}} T^x_{\mathrm{o4,o3}} \left(U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,1}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,1}} - U^{\tilde{u},\mathrm{j2}}_{\mathrm{2,2}}\, U^{\tilde{u},\mathrm{j2}*}_{\mathrm{s3,2}} \right) \left(U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,1}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,1}} - U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1,2}}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s4,2}} \right) \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\} \Bigg\}
\end{aligned}
$$

[SSV] 2 Higgs – Gauge Boson

$$C(G^-, G^+, \gamma) = \frac{\mathrm{i}\, e}{4} \left(4\,\delta Z_e + 2\,\delta Z_{\gamma\gamma} + 4\,\delta Z_{G^-G^-} + \delta Z_{Z\gamma} \left(\frac{c_W}{s_W} - \frac{s_W}{c_W}\right)\right)$$
1

$$C(G^-, G^+, Z) = -\frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 2\,\delta s_W\, s_W^4 + c_W^4\, \left(2\,\delta s_W - s_W\, \left(2\,\delta Z_e + \delta Z_{ZZ} + 2\,\delta Z_{G^-G^-}\right)\right) - \\ s_W^2\, \left(2\, c_W^3\, \delta Z_{\gamma Z} - c_W^2\, \left(4\,\delta s_W + s_W\, \left(2\,\delta Z_e + \delta Z_{ZZ} + 2\,\delta Z_{G^-G^-}\right)\right)\right) \end{array} \right\}$$
2

$$C(G^0, G^-, W^+) = -\frac{e}{4\, s_W^2} \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\,\delta Z_e + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)$$
3

$$C(G^0, G^+, W^-) = -\frac{e}{4\, s_W^2} \left(2\,\delta s_W - s_W\, \left(2\,\delta Z_e + \delta Z_W + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)$$
4

$$C(h^0, A^0, Z) = \frac{e}{4\, c_W^3\, s_W^2} \left(c_W^2\, s_{\beta-\alpha}\, s_W\, \left(\delta Z_{AG} - \delta Z_{hH}\right) + c_{\beta-\alpha}\, \left(2\,\delta s_W\, s_W^2 - c_W^2\, \left(2\,\delta s_W - s_W\, \left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{AA} + \delta Z_{hh}\right)\right)\right)\right)$$
65

$$C(h^0, G^0, Z) = \frac{e}{4\, c_W^3\, s_W^2} \left(2\,\delta s_W\, s_{\beta-\alpha}\, s_W^2 - c_W^2\, \left(2\,\delta s_W\, s_{\beta-\alpha} - s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{AG} + \delta Z_{hH}\right) + s_{\beta-\alpha}\, \left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{GG} + \delta Z_{hh}\right)\right)\right)\right)$$
66

$$C(H^0, A^0, Z) = -\frac{e}{4\, c_W^3\, s_W^2} \left(2\,\delta s_W\, s_{\beta-\alpha}\, s_W^2 - c_W^2\, \left(2\,\delta s_W\, s_{\beta-\alpha} + s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{AG} + \delta Z_{hH}\right) - s_{\beta-\alpha}\, \left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{AA} + \delta Z_{HH}\right)\right)\right)\right)$$
67

$$C(H^0, G^0, Z) = -\frac{e}{4\, c_W^3\, s_W^2} \left(c_W^2\, s_{\beta-\alpha}\, s_W\, \left(\delta Z_{AG} - \delta Z_{hH}\right) - c_{\beta-\alpha}\, \left(2\,\delta s_W\, s_W^2 - c_W^2\, \left(2\,\delta s_W - s_W\, \left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{GG} + \delta Z_{HH}\right)\right)\right)\right)$$
68

$$C(H^-, H^+, \gamma) = \frac{\mathrm{i}\, e}{4} \left(4\,\delta Z_e + 2\,\delta Z_{\gamma\gamma} + \delta Z_{Z\gamma} \left(\frac{c_W}{s_W} - \frac{s_W}{c_W}\right) + 2\, \left(\delta \bar{Z}_{H^-H^-} + \delta Z_{H^-H^-}\right)\right)$$
69

$$C(H^-, H^+, Z) = -\frac{\mathrm{i}\, e}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 2\,\delta s_W\, s_W^4 + c_W^4\, \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}_{H^-H^-} + 2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right) - \\ s_W^2\, \left(2\, c_W^3\, \delta Z_{\gamma Z} - c_W^2\, \left(4\,\delta s_W + s_W\, \left(\delta \bar{Z}_{H^-H^-} + 2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right)\right) \end{array} \right\}$$
70

$$C(h^0, H^-, W^+) = \frac{\mathrm{i}\, e}{4\, s_W^2} \left(c_{\beta-\alpha}\, \left(2\,\delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right) + s_{\beta-\alpha}\, s_W\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right)\right)$$
71

$$C(h^0, G^-, W^+) = \frac{\mathrm{i}\, e}{4\, s_W^2} \left(2\,\delta s_W\, s_{\beta-\alpha} - s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha}\, \left(\delta \bar{Z}_W + 2\,\delta Z_e + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)$$
72

$$C(H^0, H^-, W^+) = -\frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(2\, \delta s_W\, s_{\beta-\alpha} + s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) - s_{\beta-\alpha}\, \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right)$$
73

$$C(H^0, G^-, W^+) = \frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(c_{\beta-\alpha}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) - s_{\beta-\alpha}\, s_W\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right)\right)$$
74

$$C(h^0, H^+, W^-) = -\frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(c_{\beta-\alpha}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e + \delta Z_W + \delta Z_{hh}\right)\right) + s_{\beta-\alpha}\, s_W\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}^*\right)\right)$$
75

$$C(h^0, G^+, W^-) = -\frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(2\, \delta s_W\, s_{\beta-\alpha} - s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha}\, \left(2\, \delta Z_e + \delta Z_W + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)$$
76

$$C(H^0, H^+, W^-) = \frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(2\, \delta s_W\, s_{\beta-\alpha} + s_W\, \left(c_{\beta-\alpha}\, \left(\delta Z_{hH} + \delta Z_{H^-G^-}^*\right) - s_{\beta-\alpha}\, \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e + \delta Z_W + \delta Z_{HH}\right)\right)\right)$$
77

$$C(H^0, G^+, W^-) = -\frac{\mathrm{i}\, e}{4\, s_W^2}\, \left(c_{\beta-\alpha}\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_W + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right) - s_{\beta-\alpha}\, s_W\, \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right)\right)$$
78

$$C(A^0, H^-, W^+) = -\frac{e}{4\, s_W^2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{AA} + \delta Z_{H^-H^-}\right)\right)$$
79

$$C(A^0, H^+, W^-) = -\frac{e}{4\, s_W^2}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_{H^-H^-} + 2\, \delta Z_e + \delta Z_W + \delta Z_{AA}\right)\right)$$
80

$$C(H^-, G^+, \gamma) = \mathrm{i}\, e\, \delta Z_{H^-G^-}$$
392

$$C(H^+, G^-, \gamma) = \mathrm{i}\, e\, Re(\delta Z_{H^-G^-})$$
393

$$C(H^-, G^+, Z) = -\frac{\mathrm{i}\, e\, \delta Z_{H^-G^-}}{2\, c_W\, s_W}\, \left(1 - 2\, c_W^2\right)$$
394

$$C(H^+, G^-, Z) = -\frac{\mathrm{i}\, e\, Re(\delta Z_{H^-G^-})}{2\, c_W\, s_W}\, \left(1 - 2\, c_W^2\right)$$
395

$$C(A^0, G^-, W^+) = \frac{e}{4\, s_W}\, \left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)$$
396

$$C(A^0, G^+, W^-) = \frac{e}{4\, s_W}\, \left(\delta Z_{AG} + \delta Z_{H^-G^-}\right)$$
397

$$C(G^0, H^-, W^+) = \frac{e}{4\,s_W}\,(\delta Z_{AG} + \delta Z_{H^-G^-})$$
398

$$C(G^0, H^+, W^-) = \frac{e}{4\,s_W}\,(\delta Z_{AG} + \delta Z^*_{H^-G^-})$$
399

$$C(h^0, A^0, \gamma) = \frac{e\,c_{\beta-\alpha}\,\delta Z_{Z\gamma}}{4\,c_W\,s_W}$$
446

$$C(h^0, G^0, \gamma) = \frac{e\,\delta Z_{Z\gamma}\,s_{\beta-\alpha}}{4\,c_W\,s_W}$$
447

$$C(H^0, A^0, \gamma) = -\frac{e\,\delta Z_{Z\gamma}\,s_{\beta-\alpha}}{4\,c_W\,s_W}$$
448

$$C(H^0, G^0, \gamma) = \frac{e\,c_{\beta-\alpha}\,\delta Z_{Z\gamma}}{4\,c_W\,s_W}$$
449

[SSV] 2 Sleptons – Gauge Boson

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{\nu}^\dagger_{\mathrm{j2}}, Z) = -\frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,c_W^3\,s_W^2}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + 2\,\delta Z_e + \delta Z_{ZZ} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)\right)$$
236

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma) = \frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,c_W\,s_W}\,\left\{\begin{array}{l} 2\,c_W\,s_W\,\left(\delta_{\mathrm{s1},1}\,\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1},2}\,\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2},1}\,\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2},2}\,\delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}}\,\left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right)\right) - \\ \delta Z_{Z\gamma}\,\left(2\,s_W^2\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(1 - 2\,s_W^2\right)\right) \end{array}\right\}$$
237

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, Z) = \frac{\mathrm{i}\,e\,\delta_{\mathrm{j1,j2}}}{4\,c_W^3\,s_W^2}\,\left\{\begin{array}{l} 2\,c_W^3\,\delta_{\mathrm{s1,s2}}\,\delta Z_{\gamma Z}\,s_W^2 - \\ s_W\,\left\{\begin{array}{l} 2\,s_W\,U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\,\left\{\begin{array}{l} c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,\left(2\,\delta s_W\,s_W^2 + c_W^2\,\left(2\,\delta s_W + s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array}\right\} + \\ c_W^2\,\left\{\begin{array}{l} U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(1 - 2\,c_W^2\right)\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\ 2\,s_W^2\,U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2}\,\left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\,U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \end{array}\right\} \end{array}\right\} - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\,\left\{\begin{array}{l} c_W^2\,s_W\,\left(1 - 2\,c_W^2\right)\,\left(\delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta\bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\,U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\,\left(\delta s_W\,\left(2\,s_W^2 - 4\,s_W^4\right) - c_W^2\,\left(\delta s_W\,\left(6 - 4\,c_W^2\right) + s_W\,\left(1 - 2\,c_W^2\right)\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array}\right\} \end{array}\right\}$$
238

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, W^-) = \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, s_W^2} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(2\,\delta s_W - s_W \left(2\,\delta Z_e + \delta Z_W + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) \right)$$

$$C(\tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}}, W^+) = \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, s_W^2} \left(U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left(2\,\delta s_W - s_W \left(\delta \bar{Z}_W + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\,\delta Z_e \right) \right) - s_W \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) \right)$$

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{\nu}^{\dagger}_{\mathrm{j2}}, \gamma) = -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}\, \delta Z_{Z\gamma}}{4\, c_W\, s_W}$$

[SSV] 2 Squarks – Gauge Boson

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma) = -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{12\, c_W\, s_W} \left\{ \begin{array}{l} 4\, c_W\, s_W \left(\delta_{\mathrm{s1},1}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1},2}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2},1}\, \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2},2}\, \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}} \left(2\,\delta Z_e + \delta Z_{\gamma\gamma} \right) \right) - \\ \delta Z_{Z\gamma} \left(4\, s_W^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(3 - 4\, s_W^2 \right) \right) \end{array} \right\}$$

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, Z) = -\frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{12\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 4\, c_W^3\, \delta_{\mathrm{s1,s2}}\, \delta Z_{\gamma Z}\, s_W^2 - \\ s_W \left\{ \begin{array}{l} 4\, s_W\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,2} \right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(2\,\delta s_W\, s_W^2 + c_W^2 \left(2\,\delta s_W + s_W \left(2\,\delta Z_e + \delta Z_{ZZ} \right) \right) \right) \end{array} \right\} + \\ c_W^2 \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(1 - 4\, c_W^2 \right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) + \\ 4\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} \right) \end{array} \right\} \end{array} \right\} - \\ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} c_W^2\, s_W \left(1 - 4\, c_W^2 \right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} \right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(2\,\delta s_W\, s_W^2 \left(1 - 4\, c_W^2 \right) + c_W^2 \left(\delta s_W \left(14 - 8\, c_W^2 \right) + s_W \left(1 - 4\, c_W^2 \right) \left(2\,\delta Z_e + \delta Z_{ZZ} \right) \right) \right) \end{array} \right\} \end{array} \right\}$$

$$C(\tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma) = \frac{\mathrm{i}\, e\, \delta_{\mathrm{j1,j2}}}{12\, c_W\, s_W} \left\{ \begin{array}{l} 2\, c_W\, s_W \left(\delta_{\mathrm{s1},1}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1},2}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2},1}\, \delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2},2}\, \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}} \left(2\,\delta Z_e + \delta Z_{\gamma\gamma} \right) \right) - \\ \delta Z_{Z\gamma} \left(2\, s_W^2\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left(3 - 2\, s_W^2 \right) \right) \end{array} \right\}$$

$$C(\tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, Z) = \frac{\mathrm{i}\, e\, \delta_{j1,j2}}{12\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 2\, c_W^3\, \delta_{s1,s2}\, \delta Z_{\gamma Z}\, s_W^2 - \\ s_W \left\{ \begin{array}{l} 2\, s_W\, U^{\tilde{d},j1*}_{s1,2} \left\{ \begin{array}{l} c_W^2\, s_W\, \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1}_{1,2} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1}_{2,2}\right) + \\ U^{\tilde{d},j1}_{s2,2}\, \left(2\, \delta s_W\, s_W^2 + c_W^2\, \left(2\, \delta s_W + s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \right\} - \\ c_W^2 \left\{ \begin{array}{l} U^{\tilde{d},j1}_{s2,1}\, \left(1 + 2\, c_W^2\right)\, \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,1}\right) - \\ 2\, s_W^2\, U^{\tilde{d},j1}_{s2,2}\, \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,2}\right) \end{array} \right\} \end{array} \right\} + \\ U^{\tilde{d},j1*}_{s1,1} \left\{ \begin{array}{l} c_W^2\, s_W\, \left(1 + 2\, c_W^2\right)\, \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1}_{2,1}\right) + \\ U^{\tilde{d},j1}_{s2,1}\, \left(2\, \left(\delta s_W\, s_W^2 + c_W^4\, \left(2\, \delta s_W + s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right) - c_W^2\, \left(2\, \delta s_W\, \left(5 - 2\, s_W^2\right) - s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \right\} \end{array} \right\}$$

$$C(\tilde{u}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, W^-) = -\frac{\mathrm{i}\, e}{2\, \sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}^*_{j1,j2} \left\{ \begin{array}{l} s_W\, U^{\tilde{d},j2}_{s2,1}\, \left(\delta Z^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1*}_{2,1}\right) - \\ U^{\tilde{u},j1*}_{s1,1}\, \left(U^{\tilde{d},j2}_{s2,1}\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_W\right)\right) - s_W\, \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,1}\right)\right) \end{array} \right\} + \\ 2\, \delta \mathrm{CKM}^*_{j1,j2}\, s_W\, U^{\tilde{u},j1*}_{s1,1}\, U^{\tilde{d},j2}_{s2,1} \end{array} \right\}$$

$$C(\tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1}, W^+) = -\frac{\mathrm{i}\, e}{2\, \sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}_{j1,j2} \left\{ \begin{array}{l} s_W\, U^{\tilde{u},j1}_{s1,1}\, \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1}\right) - \\ U^{\tilde{d},j2*}_{s2,1}\, \left(U^{\tilde{u},j1}_{s1,1}\, \left(2\, \delta s_W - s_W\, \left(\delta \bar{Z}_W + 2\, \delta Z_e\right)\right) - s_W\, \left(\delta \bar{Z}^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1}_{2,1}\right)\right) \end{array} \right\} + \\ 2\, \delta \mathrm{CKM}_{j1,j2}\, s_W\, U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,1} \end{array} \right\}$$

[SSV] 2 Squarks – Gluon

$$C(\tilde{u}^{s1}_{j1}, \tilde{u}^{s2,\dagger}_{j2}, g) = -\frac{\mathrm{i}\, g_s\, \delta_{j1,j2}\, T^{g1}_{o2,o1}}{2}\, \left(\delta_{s1,1}\, \delta \bar{Z}^{\tilde{u},j2}_{1,s2} + \delta_{s1,2}\, \delta \bar{Z}^{\tilde{u},j2}_{2,s2} + \delta_{s2,1}\, \delta Z^{\tilde{u},j1}_{1,s1} + \delta_{s2,2}\, \delta Z^{\tilde{u},j1}_{2,s1} + \delta_{s1,s2}\, \left(\delta Z_{gg} + 2\, \delta Z_{g_s}\right)\right)$$

$$C(\tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, g) = -\frac{\mathrm{i}\, g_s\, \delta_{j1,j2}\, T^{g1}_{o2,o1}}{2}\, \left(\delta_{s1,1}\, \delta \bar{Z}^{\tilde{d},j2}_{1,s2} + \delta_{s1,2}\, \delta \bar{Z}^{\tilde{d},j2}_{2,s2} + \delta_{s2,1}\, \delta Z^{\tilde{d},j1}_{1,s1} + \delta_{s2,2}\, \delta Z^{\tilde{d},j1}_{2,s1} + \delta_{s1,s2}\, \left(\delta Z_{gg} + 2\, \delta Z_{g_s}\right)\right)$$

[SSVV] 2 Higgs – 2 Gauge Bosons

$$C(h^0, h^0, Z, Z) = \frac{\mathrm{i}\, e^2}{2\, c_W^4\, s_W^3}\, \left(2\, \delta s_W\, s_W^2 - c_W^2\, \left(2\, \delta s_W - s_W\, \left(2\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{hh}\right)\right)\right)$$

$$C(h^0,h^0,W^-,W^+) = -\frac{\mathrm{i}\,e^2}{4\,s_W^3}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_W + 2\,\delta Z_{hh}\right)\right)$$
32

$$C(G^0,G^0,Z,Z) = \frac{\mathrm{i}\,e^2}{2\,c_W^4\,s_W^3}\,\left(2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{GG}\right)\right)\right)$$
33

$$C(G^0,G^0,W^-,W^+) = -\frac{\mathrm{i}\,e^2}{4\,s_W^3}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_W + 2\,\delta Z_{GG}\right)\right)$$
34

$$C(G^-,G^+,\gamma,\gamma) = \frac{\mathrm{i}\,e^2}{c_W\,s_W}\,\left(\delta Z_{Z\gamma}\,\left(c_W^2 - s_W^2\right) + 2\,c_W\,s_W\,\left(2\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{G^-G^-}\right)\right)$$
35

$$C(G^-,G^+,\gamma,Z) = -\frac{\mathrm{i}\,e^2}{4\,c_W^3\,s_W^2}\,\left\{\begin{array}{l} 4\,\delta s_W\,s_W^4 - \delta Z_{Z\gamma}\,\left(c_W^5 + c_W\,s_W^4\right) + 2\,c_W^4\,\left(2\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} + 2\,\delta Z_{G^-G^-}\right)\right) + \\ s_W^2\,\left(2\,c_W^2\,\left(4\,\delta s_W + s_W\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} + 2\,\delta Z_{G^-G^-}\right)\right) - 2\,c_W^3\,\left(2\,\delta Z_{\gamma Z} - \delta Z_{Z\gamma}\right)\right) \end{array}\right\}$$
36

$$C(G^-,G^+,Z,Z) = \frac{\mathrm{i}\,e^2}{2\,c_W^4\,s_W^3}\,\left(1 - 2\,c_W^2\right)\,\left(2\,\delta s_W\,s_W^4 + c_W^4\,\left(2\,\delta s_W - s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{G^-G^-}\right)\right) - s_W^2\,\left(2\,c_W^3\,\delta Z_{\gamma Z} - c_W^2\,\left(4\,\delta s_W + s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{G^-G^-}\right)\right)\right)\right)$$
37

$$C(G^-,G^+,W^-,W^+) = -\frac{\mathrm{i}\,e^2}{4\,s_W^3}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_W + 2\,\delta Z_{G^-G^-}\right)\right)$$
38

$$C(h^0,H^-,\gamma,W^+) = -\frac{\mathrm{i}\,e^2}{4\,c_W\,s_W^2}\,\left(c_W\,s_{\beta-\alpha}\,s_W\,\left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) + c_{\beta-\alpha}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)\right)\right)$$
151

$$C(h^0,G^-,\gamma,W^+) = -\frac{\mathrm{i}\,e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_{\beta-\alpha}\,s_W^2 + c_W\,\left(2\,\delta s_W\,s_{\beta-\alpha} - s_W\,\left(c_{\beta-\alpha}\,\left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha}\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)\right)$$
152

$$C(h^0,H^-,Z,W^+) = \frac{\mathrm{i}\,e^2}{4\,c_W^3\,s_W}\,\left(c_W^2\,s_{\beta-\alpha}\,s_W\,\left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) + c_{\beta-\alpha}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{hh} + \delta Z_{H^-H^-}\right)\right)\right)$$
153

$$C(h^0,G^-,Z,W^+) = \frac{\mathrm{i}\,e^2}{4\,c_W^3\,s_W}\,\left(s_{\beta-\alpha}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2\right) - c_W^2\,s_W\,\left(c_{\beta-\alpha}\,\left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha}\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)$$
154

$$C(h^0,H^+,\gamma,W^-) = -\frac{\mathrm{i}\,e^2}{4\,c_W\,s_W^2}\,\left(c_W\,s_{\beta-\alpha}\,s_W\,\left(\delta Z_{hH} - \delta Z_{H^-G^-}^*\right) + c_{\beta-\alpha}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{hh}\right)\right)\right)\right)$$
155

$$C(h^0,G^+,\gamma,W^-) = -\frac{\mathrm{i}\,e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_{\beta-\alpha}\,s_W^2 + c_W\,\left(2\,\delta s_W\,s_{\beta-\alpha} - s_W\,\left(c_{\beta-\alpha}\,\left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha}\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)\right)$$
156

$$C(h^0, H^+, Z, W^-) = \frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(c_W^2\, s_{\beta-\alpha}\, s_W \left(\delta Z_{hH} - \delta Z_{H^-G^-}^*\right) + c_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{hh}\right)\right)\right)$$

$$C(h^0, G^+, Z, W^-) = \frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(s_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2\right) - c_W^2\, s_W \left(c_{\beta-\alpha} \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) + s_{\beta-\alpha} \left(4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{hh} + \delta Z_{G^-G^-}\right)\right)\right)$$

$$C(H^0, H^0, Z, Z) = \frac{\mathrm{i}\, e^2}{2\, c_W^4\, s_W^3} \left(2\, \delta s_W\, s_W^2 - c_W^2 \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{HH}\right)\right)\right)$$

$$C(H^0, H^0, W^-, W^+) = -\frac{\mathrm{i}\, e^2}{4\, s_W^3} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_W + 2\, \delta Z_{HH}\right)\right)$$

$$C(H^0, H^-, \gamma, W^+) = \frac{\mathrm{i}\, e^2}{4\, c_W\, s_W^2} \left(\delta Z_{Z\gamma}\, s_{\beta-\alpha}\, s_W^2 + c_W \left(2\, \delta s_W\, s_{\beta-\alpha} + s_W \left(c_{\beta-\alpha} \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) - s_{\beta-\alpha} \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right)\right)$$

$$C(H^0, G^-, \gamma, W^+) = \frac{\mathrm{i}\, e^2}{4\, c_W\, s_W^2} \left(c_W\, s_{\beta-\alpha}\, s_W \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - c_{\beta-\alpha} \left(\delta Z_{Z\gamma}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right)\right)$$

$$C(H^0, H^-, Z, W^+) = -\frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(s_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2\right) + c_W^2\, s_W \left(c_{\beta-\alpha} \left(\delta Z_{hH} + \delta Z_{H^-G^-}\right) - s_{\beta-\alpha} \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{HH} + \delta Z_{H^-H^-}\right)\right)\right)$$

$$C(H^0, G^-, Z, W^+) = -\frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(c_W^2\, s_{\beta-\alpha}\, s_W \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - c_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right)$$

$$C(H^0, H^+, \gamma, W^-) = \frac{\mathrm{i}\, e^2}{4\, c_W\, s_W^2} \left(\delta Z_{Z\gamma}\, s_{\beta-\alpha}\, s_W^2 + c_W \left(2\, \delta s_W\, s_{\beta-\alpha} + s_W \left(c_{\beta-\alpha} \left(\delta Z_{hH} + \delta Z_{H^-G^-}^*\right) - s_{\beta-\alpha} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{HH}\right)\right)\right)\right)$$

$$C(H^0, G^+, \gamma, W^-) = \frac{\mathrm{i}\, e^2}{4\, c_W\, s_W^2} \left(c_W\, s_{\beta-\alpha}\, s_W \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - c_{\beta-\alpha} \left(\delta Z_{Z\gamma}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right)\right)$$

$$C(H^0, H^+, Z, W^-) = -\frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(s_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2\right) + c_W^2\, s_W \left(c_{\beta-\alpha} \left(\delta Z_{hH} + \delta Z_{H^-G^-}^*\right) - s_{\beta-\alpha} \left(\delta \bar{Z}_{H^-H^-} + 4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{HH}\right)\right)\right)$$

$$C(H^0, G^+, Z, W^-) = -\frac{\mathrm{i}\, e^2}{4\, c_W^3\, s_W} \left(c_W^2\, s_{\beta-\alpha}\, s_W \left(\delta Z_{hH} - \delta Z_{H^-G^-}\right) - c_{\beta-\alpha} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{HH} + \delta Z_{G^-G^-}\right)\right)\right)$$

$$C(A^0, A^0, Z, Z) = \frac{\mathrm{i}\, e^2}{2\, c_W^4\, s_W^3} \left(2\, \delta s_W\, s_W^2 - c_W^2 \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{AA}\right)\right)\right)$$

$$C(A^0,A^0,W^-,W^+) = -\frac{\mathrm{i}\,e^2}{4\,s_W^3}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_W + 2\,\delta Z_{AA}\right)\right)$$

$$C(A^0,H^-,\gamma,W^+) = \frac{e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{AA} + \delta Z_{H^-H^-}\right)\right)\right)$$

$$C(A^0,H^-,Z,W^+) = -\frac{e^2}{4\,c_W^3\,s_W}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{AA} + \delta Z_{H^-H^-}\right)\right)$$

$$C(A^0,H^+,\gamma,W^-) = -\frac{e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{AA}\right)\right)\right)$$

$$C(A^0,H^+,Z,W^-) = \frac{e^2}{4\,c_W^3\,s_W}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{AA}\right)\right)$$

$$C(G^0,G^-,\gamma,W^+) = \frac{e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)\right)$$

$$C(G^0,G^-,Z,W^+) = -\frac{e^2}{4\,c_W^3\,s_W}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,s_W\,\left(\delta\bar{Z}_W + 4\,\delta Z_e + \delta Z_{ZZ} + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)$$

$$C(G^0,G^+,\gamma,W^-) = -\frac{e^2}{4\,c_W\,s_W^2}\,\left(\delta Z_{Z\gamma}\,s_W^2 + c_W\,\left(2\,\delta s_W - s_W\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)\right)$$

$$C(G^0,G^+,Z,W^-) = \frac{e^2}{4\,c_W^3\,s_W}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,s_W\,\left(4\,\delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{GG} + \delta Z_{G^-G^-}\right)\right)$$

$$C(H^-,H^+,\gamma,\gamma) = \frac{\mathrm{i}\,e^2}{c_W\,s_W}\,\left(\delta Z_{Z\gamma}\,\left(c_W^2 - s_W^2\right) + c_W\,s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{\gamma\gamma} + \delta Z_{H^-H^-}\right)\right)$$

$$C(H^-,H^+,\gamma,Z) = -\frac{\mathrm{i}\,e^2}{4\,c_W^3\,s_W^2}\,\left\{\begin{array}{l} 4\,\delta s_W\,s_W^4 - \delta Z_{Z\gamma}\,\left(c_W^5 + c_W\,s_W^4\right) + 2\,c_W^4\,\left(2\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right) + \\ s_W^2\,\left(2\,c_W^2\,\left(4\,\delta s_W + s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right) - 2\,c_W^3\,\left(2\,\delta Z_{\gamma Z} - \delta Z_{Z\gamma}\right)\right) \end{array}\right\}$$

$$C(H^-,H^+,Z,Z) = \frac{\mathrm{i}\,e^2}{4\,c_W^4\,s_W^3}\,\left(1 - 2\,c_W^2\right)\,\left\{\begin{array}{l} 4\,\delta s_W\,s_W^4 + c_W^4\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right) - \\ s_W^2\,\left(4\,c_W^3\,\delta Z_{\gamma Z} - c_W^2\,\left(8\,\delta s_W + s_W\,\left(\delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + 2\,\delta Z_{ZZ} + \delta Z_{H^-H^-}\right)\right)\right) \end{array}\right\}$$

$$C(H^-,H^+,W^-,W^+) = -\frac{\mathrm{i}\,e^2}{4\,s_W^3}\,\left(4\,\delta s_W - s_W\,\left(\delta\bar{Z}_W + \delta\bar{Z}_{H^-H^-} + 4\,\delta Z_e + \delta Z_W + \delta Z_{H^-H^-}\right)\right)$$

[SSVV] 2 Sleptons – 2 Gauge Bosons

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{\nu}^{\dagger}_{\mathrm{j2}}, Z, Z) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, c_W^4\, s_W^3} \left(4\, \delta s_W\, s_W^2 - c_W^2 \left(4\, \delta s_W - s_W \left(\delta \bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} + 2\, (2\, \delta Z_e + \delta Z_{ZZ})\right)\right)\right) \tag{352}$$

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma, \gamma) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{c_W\, s_W} \left\{ \begin{array}{l} c_W\, s_W \left(\delta_{\mathrm{s1},1}\, \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1},2}\, \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2},1}\, \delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2},2}\, \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}} + 2\, \delta_{\mathrm{s1,s2}}\, (2\, \delta Z_e + \delta Z_{\gamma\gamma})\right) - \\ \delta Z_{Z\gamma} \left(2\, s_W^2\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\, \left(1 - 2\, s_W^2\right)\right) \end{array} \right\} \tag{353}$$

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma, Z) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 4\, c_W^3\, \delta_{\mathrm{s1,s2}}\, \delta Z_{\gamma Z}\, s_W^2 - \\ 2\, s_W \left\{ \begin{array}{l} 2\, s_W\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) + \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(s_W^2\, (2\, \delta s_W - c_W\, \delta Z_{Z\gamma}) + c_W^2\, (2\, \delta s_W + s_W\, (4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ}))\right) \end{array} \right\} + \\ c_W^2 \left\{ \begin{array}{l} U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1}\, \left(1 - 2\, c_W^2\right) \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\ 2\, s_W^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \end{array} \right\} \end{array} \right\} - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} 2\, c_W^2\, s_W\, \left(1 - 2\, c_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) - \\ U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(c_W\, \left(1 - 2\, c_W^2\right)^2\, \delta Z_{Z\gamma} + \delta s_W\, \left(4\, s_W^2 - 8\, s_W^4\right) - 2\, c_W^2\, \left(\delta s_W\, \left(6 - 4\, c_W^2\right) + s_W\, \left(1 - 2\, c_W^2\right)\, (4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ})\right)\right) \end{array} \right\} \end{array} \right\} \tag{354}$$

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, Z, Z) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, c_W^4\, s_W^3} \left\{ \begin{array}{l} s_W \left\{ \begin{array}{l} 4\, s_W^3\, U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,2}\right) - \\ 2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, (2\, \delta s_W + s_W\, (2\, \delta Z_e + \delta Z_{ZZ}))\right) \end{array} \right\} + \\ c_W^2 \left\{ \begin{array}{l} \left(1 - 2\, c_W^2\right)^2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right) + \\ 4\, s_W^4\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,2}\right) \end{array} \right\} \end{array} \right\} + \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1}\, \left(1 - 2\, c_W^2\right) \left\{ \begin{array}{l} c_W^2\, s_W\, \left(1 - 2\, c_W^2\right) \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right) + \\ 2\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(4\, \delta s_W\, s_W^4 - 2\, s_W^2\, \left(\delta s_W + c_W^3\, \delta Z_{\gamma Z}\right) + c_W^2\, \left(\delta s_W\, \left(6 - 4\, c_W^2\right) + s_W\, \left(1 - 2\, c_W^2\right)\, (2\, \delta Z_e + \delta Z_{ZZ})\right)\right) \end{array} \right\} \end{array} \right\} \tag{355}$$

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma, W^-) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{2\, \sqrt{2}\, c_W\, s_W^2} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z_{Z\gamma}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1}\right)\right)\right) - c_W\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1}\right)\right) \tag{364}$$

$$C(\tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}}, \gamma, W^+) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{2\, \sqrt{2}\, c_W\, s_W^2} \left(U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left(\delta Z_{Z\gamma}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_W + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 4\, \delta Z_e + \delta Z_{\gamma\gamma}\right)\right)\right) - c_W\, s_W \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1}\right)\right) \tag{365}$$

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, Z, W^-) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_W^3\, s_W} \left(c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) - U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right) \right)$$

$$C(\tilde{e}^{\mathrm{s2}}_{\mathrm{j2}}, \tilde{\nu}^{\dagger}_{\mathrm{j1}}, Z, W^+) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{2\sqrt{2}\, c_W^3\, s_W} \left(c_W^2\, s_W \left(\delta Z^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) - U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s2},1} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(\delta \bar{Z}_W + \delta \bar{Z}^{\tilde{\nu},\mathrm{j1}}_{1,1} + 4\, \delta Z_e + \delta Z_{ZZ} \right) \right) \right)$$

$$C(\tilde{\nu}_{\mathrm{j1}}, \tilde{\nu}^{\dagger}_{\mathrm{j2}}, W^-, W^+) = -\frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, s_W^3} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_W + \delta \bar{Z}^{\tilde{\nu},\mathrm{j2}}_{1,1} + 4\, \delta Z_e + \delta Z_W + \delta Z^{\tilde{\nu},\mathrm{j1}}_{1,1} \right) \right)$$

$$C(\tilde{e}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{e}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, W^-, W^+) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{4\, s_W^3} \left\{ \begin{array}{l} s_W\, U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(\delta Z^{\tilde{e},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{e},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{e},\mathrm{j1}*}_{2,1} \right) - \\ U^{\tilde{e},\mathrm{j1}*}_{\mathrm{s1},1} \left(U^{\tilde{e},\mathrm{j1}}_{\mathrm{s2},1} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_W \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{e},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{e},\mathrm{j1}}_{2,1} \right) \right) \end{array} \right\}$$

[SSVV] 2 Squarks – 2 Gauge Bosons

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma, \gamma) = \frac{2\, \mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{9\, c_W\, s_W} \left\{ \begin{array}{l} 2\, c_W\, s_W \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2,1}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2,2}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}}\, \left(4\, \delta Z_e + 2\, \delta Z_{\gamma\gamma} \right) \right) - \\ \delta Z_{Z\gamma} \left(4\, s_W^2\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} - U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(3 - 4\, s_W^2 \right) \right) \end{array} \right\}$$

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, \gamma, Z) = \frac{\mathrm{i}\, e^2\, \delta_{\mathrm{j1,j2}}}{36\, c_W^3\, s_W^2} \left\{ \begin{array}{l} 16\, c_W^3\, \delta_{\mathrm{s1,s2}}\, \delta Z_{\gamma Z}\, s_W^2 - \\ 4\, s_W \left\{ \begin{array}{l} 4\, s_W\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},2} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,2} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,2} \right) + \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(s_W^2\, \left(2\, \delta s_W - c_W\, \delta Z_{\gamma Z} \right) + c_W^2\, \left(2\, \delta s_W + s_W\, \left(4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} \right) \right) \right) \end{array} \right\} + \\ c_W^2 \left\{ \begin{array}{l} U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(1 - 4\, c_W^2 \right) \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,1} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,1} \right) + \\ 4\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},2} \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{1,2} + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}}\, U^{\tilde{u},\mathrm{j1}*}_{2,2} \right) \end{array} \right. \end{array} \right\} - \\ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} 4\, c_W^2\, s_W\, \left(1 - 4\, c_W^2 \right) \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1} \right) - \\ U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(c_W \left(1 - 4\, c_W^2 \right)^2 \delta Z_{Z\gamma} - 8\, \delta s_W\, s_W^2\, \left(1 - 4\, c_W^2 \right) - 4\, c_W^2\, \left(\delta s_W\, \left(14 - 8\, c_W^2 \right) + s_W\, \left(1 - 4\, c_W^2 \right)\, \left(4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ} \right) \right) \right) \end{array} \right. \end{array} \right\}$$

$$
\begin{aligned}
C(\tilde{u}^{s1}_{j1},\tilde{u}^{s2,\dagger}_{j2},Z,Z) = \frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{36\,c_W^4\,s_W^3}
\Bigg\{ & s_W \Bigg\{ 16\,s_W^3\,U^{\tilde{u},j1*}_{s1,2} \Bigg\{ \begin{array}{l} c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{u},j2}_{1,s2}\,U^{\tilde{u},j1}_{1,2} + \delta\bar{Z}^{\tilde{u},j2}_{2,s2}\,U^{\tilde{u},j1}_{2,2}\right) - \\ 2\,U^{\tilde{u},j1}_{s2,2}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W + s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} + \\
& c_W^2 \Bigg\{ \begin{array}{l} \left(1-4\,c_W^2\right)^2\,U^{\tilde{u},j1}_{s2,1}\,\left(\delta Z^{\tilde{u},j1}_{1,s1}\,U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\,U^{\tilde{u},j1*}_{2,1}\right) + \\ 16\,s_W^4\,U^{\tilde{u},j1}_{s2,2}\,\left(\delta Z^{\tilde{u},j1}_{1,s1}\,U^{\tilde{u},j1*}_{1,2} + \delta Z^{\tilde{u},j1}_{2,s1}\,U^{\tilde{u},j1*}_{2,2}\right) \end{array} \Bigg\} \Bigg\} + \\
& U^{\tilde{u},j1*}_{s1,1}\,\left(1-4\,c_W^2\right) \Bigg\{ \begin{array}{l} c_W^2\,s_W\,\left(1-4\,c_W^2\right)\,\left(\delta\bar{Z}^{\tilde{u},j2}_{1,s2}\,U^{\tilde{u},j1}_{1,1} + \delta\bar{Z}^{\tilde{u},j2}_{2,s2}\,U^{\tilde{u},j1}_{2,1}\right) + \\ 2\,U^{\tilde{u},j1}_{s2,1}\,\left(8\,\delta s_W\,s_W^4 - s_W^2\,\left(6\,\delta s_W + 4\,c_W^3\,\delta Z_{\gamma Z}\right) + c_W^2\,\left(\delta s_W\,\left(14-8\,c_W^2\right) + s_W\,\left(1-4\,c_W^2\right)\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2},\gamma,\gamma) = \frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{9\,c_W\,s_W}
\Bigg\{ & c_W\,s_W\,\left(\delta_{s1,1}\,\delta\bar{Z}^{\tilde{d},j2}_{1,s2} + \delta_{s1,2}\,\delta\bar{Z}^{\tilde{d},j2}_{2,s2} + \delta_{s2,1}\,\delta Z^{\tilde{d},j1}_{1,s1} + \delta_{s2,2}\,\delta Z^{\tilde{d},j1}_{2,s1} + 2\,\delta_{s1,s2}\,\left(2\,\delta Z_e + \delta Z_{\gamma\gamma}\right)\right) - \\
& \delta Z_{Z\gamma}\,\left(2\,s_W^2\,U^{\tilde{d},j1*}_{s1,2}\,U^{\tilde{d},j1}_{s2,2} - U^{\tilde{d},j1*}_{s1,1}\,U^{\tilde{d},j1}_{s2,1}\,\left(3-2\,s_W^2\right)\right) \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2},\gamma,Z) = \frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{36\,c_W^3\,s_W^2}
\Bigg\{ & 4\,c_W^3\,\delta_{s1,s2}\,\delta Z_{\gamma Z}\,s_W^2 - \\
& 2\,s_W \Bigg\{ 2\,s_W\,U^{\tilde{d},j1*}_{s1,2} \Bigg\{ \begin{array}{l} c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,2} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,2}\right) + \\ U^{\tilde{d},j1}_{s2,2}\,\left(s_W^2\,\left(2\,\delta s_W - c_W\,\delta Z_{Z\gamma}\right) + c_W^2\,\left(2\,\delta s_W + s_W\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} - \\
& c_W^2 \Bigg\{ \begin{array}{l} U^{\tilde{d},j1}_{s2,1}\,\left(1+2\,c_W^2\right)\,\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,1}\right) - \\ 2\,s_W^2\,U^{\tilde{d},j1}_{s2,2}\,\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,2}\right) \end{array} \Bigg\} \Bigg\} + \\
& U^{\tilde{d},j1*}_{s1,1} \Bigg\{ \begin{array}{l} 2\,c_W^2\,s_W\,\left(1+2\,c_W^2\right)\,\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,1} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,1}\right) + \\ U^{\tilde{d},j1}_{s2,1}\,\left(c_W\,\left(1+2\,c_W^2\right)^2\,\delta Z_{Z\gamma} + 4\,\delta s_W\,s_W^2\,\left(1+2\,c_W^2\right) - 2\,c_W^2\,\left(\delta s_W\,\left(10-4\,c_W^2\right) - s_W\,\left(1+2\,c_W^2\right)\,\left(4\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} \Bigg\}
\end{aligned}
$$

$$
\begin{aligned}
C(\tilde{d}^{s1}_{j1},\tilde{d}^{s2,\dagger}_{j2},Z,Z) = \frac{\mathrm{i}\,e^2\,\delta_{j1,j2}}{36\,c_W^4\,s_W^3}
\Bigg\{ & s_W \Bigg\{ 4\,s_W^3\,U^{\tilde{d},j1*}_{s1,2} \Bigg\{ \begin{array}{l} c_W^2\,s_W\,\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,2} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,2}\right) - \\ 2\,U^{\tilde{d},j1}_{s2,2}\,\left(c_W^3\,\delta Z_{\gamma Z} - 2\,\delta s_W\,s_W^2 - c_W^2\,\left(2\,\delta s_W + s_W\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} + \\
& c_W^2 \Bigg\{ \begin{array}{l} \left(1+2\,c_W^2\right)^2\,U^{\tilde{d},j1}_{s2,1}\,\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,1}\right) + \\ 4\,s_W^4\,U^{\tilde{d},j1}_{s2,2}\,\left(\delta Z^{\tilde{d},j1}_{1,s1}\,U^{\tilde{d},j1*}_{1,2} + \delta Z^{\tilde{d},j1}_{2,s1}\,U^{\tilde{d},j1*}_{2,2}\right) \end{array} \Bigg\} \Bigg\} + \\
& U^{\tilde{d},j1*}_{s1,1}\,\left(1+2\,c_W^2\right) \Bigg\{ \begin{array}{l} c_W^2\,s_W\,\left(1+2\,c_W^2\right)\,\left(\delta\bar{Z}^{\tilde{d},j2}_{1,s2}\,U^{\tilde{d},j1}_{1,1} + \delta\bar{Z}^{\tilde{d},j2}_{2,s2}\,U^{\tilde{d},j1}_{2,1}\right) - \\ 2\,U^{\tilde{d},j1}_{s2,1}\,\left(4\,\delta s_W\,s_W^4 - 2\,s_W^2\,\left(3\,\delta s_W + c_W^3\,\delta Z_{\gamma Z}\right) + c_W^2\,\left(\delta s_W\,\left(10-4\,c_W^2\right) - s_W\,\left(1+2\,c_W^2\right)\,\left(2\,\delta Z_e + \delta Z_{ZZ}\right)\right)\right) \end{array} \Bigg\} \Bigg\}
\end{aligned}
$$

$$C(\tilde{u}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, \gamma, W^-) = \frac{\mathrm{i}\, e^2}{6\sqrt{2}\, c_W\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}^*_{j1,j2} \left\{ \begin{array}{l} U^{\tilde{u},j1*}_{s1,1} \left\{ \begin{array}{l} c_W\, s_W \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,1} \right) - \\ U^{\tilde{d},j2}_{s2,1} \left(\delta Z_{\gamma Z}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(4\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W \right) \right) \right) \end{array} \right\} + \\ c_W\, s_W\, U^{\tilde{d},j2}_{s2,1} \left(\delta Z^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1*}_{2,1} \right) \end{array} \right\} + \\ 2\, c_W\, \delta\mathrm{CKM}^*_{j1,j2}\, s_W\, U^{\tilde{u},j1*}_{s1,1}\, U^{\tilde{d},j2}_{s2,1} \end{array} \right\}$$

$$C(\tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1}, \gamma, W^+) = \frac{\mathrm{i}\, e^2}{6\sqrt{2}\, c_W\, s_W^2} \left\{ \begin{array}{l} \mathrm{CKM}_{j1,j2} \left\{ \begin{array}{l} U^{\tilde{d},j2*}_{s2,1} \left\{ \begin{array}{l} c_W\, s_W \left(\delta \bar{Z}^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1}_{2,1} \right) - \\ U^{\tilde{u},j1}_{s1,1} \left(\delta Z_{\gamma Z}\, s_W^2 + c_W \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{\gamma\gamma} \right) \right) \right) \end{array} \right\} + \\ c_W\, s_W\, U^{\tilde{u},j1}_{s1,1} \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1} \right) \end{array} \right\} + \\ 2\, c_W\, \delta\mathrm{CKM}_{j1,j2}\, s_W\, U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,1} \end{array} \right\}$$

$$C(\tilde{u}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, Z, W^-) = -\frac{\mathrm{i}\, e^2}{6\sqrt{2}\, c_W^3\, s_W} \left\{ \begin{array}{l} \mathrm{CKM}^*_{j1,j2} \left\{ \begin{array}{l} U^{\tilde{u},j1*}_{s1,1} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2}_{2,1} \right) - \\ U^{\tilde{d},j2}_{s2,1} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(4\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} \right) \right) \end{array} \right\} + \\ c_W^2\, s_W\, U^{\tilde{d},j2}_{s2,1} \left(\delta Z^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1*}_{2,1} \right) \end{array} \right\} + \\ 2\, c_W^2\, \delta\mathrm{CKM}^*_{j1,j2}\, s_W\, U^{\tilde{u},j1*}_{s1,1}\, U^{\tilde{d},j2}_{s2,1} \end{array} \right\}$$

$$C(\tilde{d}^{s2}_{j2}, \tilde{u}^{s1,\dagger}_{j1}, Z, W^+) = -\frac{\mathrm{i}\, e^2}{6\sqrt{2}\, c_W^3\, s_W} \left\{ \begin{array}{l} \mathrm{CKM}_{j1,j2} \left\{ \begin{array}{l} U^{\tilde{d},j2*}_{s2,1} \left\{ \begin{array}{l} c_W^2\, s_W \left(\delta \bar{Z}^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1}_{2,1} \right) - \\ U^{\tilde{u},j1}_{s1,1} \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 - c_W^2\, s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_{ZZ} \right) \right) \end{array} \right\} + \\ c_W^2\, s_W\, U^{\tilde{u},j1}_{s1,1} \left(\delta Z^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j2*}_{1,1} + \delta Z^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j2*}_{2,1} \right) \end{array} \right\} + \\ 2\, c_W^2\, \delta\mathrm{CKM}_{j1,j2}\, s_W\, U^{\tilde{u},j1}_{s1,1}\, U^{\tilde{d},j2*}_{s2,1} \end{array} \right\}$$

$$C(\tilde{u}^{s1}_{j1}, \tilde{u}^{s2,\dagger}_{j2}, W^-, W^+) = \frac{\mathrm{i}\, e^2\, \delta_{j1,j2}}{4\, s_W^3} \left\{ \begin{array}{l} s_W\, U^{\tilde{u},j1}_{s2,1} \left(\delta Z^{\tilde{u},j1}_{1,s1}\, U^{\tilde{u},j1*}_{1,1} + \delta Z^{\tilde{u},j1}_{2,s1}\, U^{\tilde{u},j1*}_{2,1} \right) - \\ U^{\tilde{u},j1*}_{s1,1} \left(U^{\tilde{u},j1}_{s2,1} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_W \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{u},j2}_{1,s2}\, U^{\tilde{u},j1}_{1,1} + \delta \bar{Z}^{\tilde{u},j2}_{2,s2}\, U^{\tilde{u},j1}_{2,1} \right) \right) \end{array} \right\}$$

$$C(\tilde{d}^{s1}_{j1}, \tilde{d}^{s2,\dagger}_{j2}, W^-, W^+) = \frac{\mathrm{i}\, e^2\, \delta_{j1,j2}}{4\, s_W^3} \left\{ \begin{array}{l} s_W\, U^{\tilde{d},j1}_{s2,1} \left(\delta Z^{\tilde{d},j1}_{1,s1}\, U^{\tilde{d},j1*}_{1,1} + \delta Z^{\tilde{d},j1}_{2,s1}\, U^{\tilde{d},j1*}_{2,1} \right) - \\ U^{\tilde{d},j1*}_{s1,1} \left(U^{\tilde{d},j1}_{s2,1} \left(4\, \delta s_W - s_W \left(\delta \bar{Z}_W + 4\, \delta Z_e + \delta Z_W \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{d},j2}_{1,s2}\, U^{\tilde{d},j1}_{1,1} + \delta \bar{Z}^{\tilde{d},j2}_{2,s2}\, U^{\tilde{d},j1}_{2,1} \right) \right) \end{array} \right\}$$

[SSVV] 2 Squarks – 2 Gluons

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, g) = \frac{\mathrm{i}\, g_s^2\, \delta_{\mathrm{j1,j2}}}{2} \left((T^{\mathrm{g1}} T^{\mathrm{g2}})_{\mathrm{o2,o1}} + (T^{\mathrm{g2}} T^{\mathrm{g1}})_{\mathrm{o2,o1}}\right) \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2,1}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2,2}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} + 2\, \delta_{\mathrm{s1,s2}}\, (\delta Z_{gg} + 2\, \delta Z_{g_s})\right)$$

$$C(\tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, g) = \frac{\mathrm{i}\, g_s^2\, \delta_{\mathrm{j1,j2}}}{2} \left((T^{\mathrm{g1}} T^{\mathrm{g2}})_{\mathrm{o2,o1}} + (T^{\mathrm{g2}} T^{\mathrm{g1}})_{\mathrm{o2,o1}}\right) \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2,1}}\, \delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2,2}}\, \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}} + 2\, \delta_{\mathrm{s1,s2}}\, (\delta Z_{gg} + 2\, \delta Z_{g_s})\right)$$

[SSVV] 2 Squarks – Gauge Boson – Gluon

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, \gamma) = \frac{\mathrm{i}\, e\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{6\, c_W\, s_W} \left\{ \begin{array}{l} 4\, c_W\, s_W \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2,1}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2,2}}\, \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}}\, (2\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{gg} + 2\, \delta Z_{g_s})\right) - \\ \delta Z_{Z\gamma} \left(4\, \delta_{\mathrm{s1,s2}}\, s_W^2 - 3\, U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\right) \end{array} \right\}$$

$$C(\tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, \gamma) = -\frac{\mathrm{i}\, e\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{6\, c_W\, s_W} \left\{ \begin{array}{l} 2\, c_W\, s_W \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}} + \delta_{\mathrm{s2,1}}\, \delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}} + \delta_{\mathrm{s2,2}}\, \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}} + \delta_{\mathrm{s1,s2}}\, (2\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{gg} + 2\, \delta Z_{g_s})\right) - \\ \delta Z_{Z\gamma} \left(2\, \delta_{\mathrm{s1,s2}}\, s_W^2 - 3\, U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\right) \end{array} \right\}$$

$$C(\tilde{u}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{u}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, Z) = \frac{\mathrm{i}\, e\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{6\, c_W^3\, s_W^2} \left\{ \begin{array}{l} \delta_{\mathrm{s1,s2}}\, s_W^2 \left(4\, c_W^3\, \delta Z_{\gamma Z} - 8\, \delta s_W\, s_W^2 - 4\, c_W^2 \left(2\, \delta s_W + s_W \left(2\, \delta Z_e + \delta Z_{gg} + \delta Z_{ZZ} + 2\, \delta Z_{g_s}\right)\right)\right) - \\ c_W^2 \left\{ \begin{array}{l} 4\, s_W^3 \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\right) + \\ s_W \left(\delta Z^{\tilde{u},\mathrm{j1}}_{1,\mathrm{s1}} \left(4\, \delta_{\mathrm{s2,1}}\, s_W^2 - 3\, U^{\tilde{u},\mathrm{j1}*}_{1,1}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\right) + \delta Z^{\tilde{u},\mathrm{j1}}_{2,\mathrm{s1}} \left(4\, \delta_{\mathrm{s2,2}}\, s_W^2 - 3\, U^{\tilde{u},\mathrm{j1}*}_{2,1}\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1}\right)\right) \end{array} \right\} + \\ U^{\tilde{u},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} 6\, \delta s_W\, s_W^2\, U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} - \\ c_W^2 \left(U^{\tilde{u},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, \delta s_W - 3\, s_W \left(2\, \delta Z_e + \delta Z_{gg} + \delta Z_{ZZ} + 2\, \delta Z_{g_s}\right)\right) - 3\, s_W \left(\delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{u},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{u},\mathrm{j1}}_{2,1}\right)\right) \end{array} \right\} \end{array} \right\}$$

$$C(\tilde{d}^{\mathrm{s1}}_{\mathrm{j1}}, \tilde{d}^{\mathrm{s2},\dagger}_{\mathrm{j2}}, g, Z) = -\frac{\mathrm{i}\, e\, g_s\, \delta_{\mathrm{j1,j2}}\, T^{\mathrm{g1}}_{\mathrm{o2,o1}}}{6\, c_W^3\, s_W^2} \left\{ \begin{array}{l} \delta_{\mathrm{s1,s2}}\, s_W^2 \left(2\, c_W^3\, \delta Z_{\gamma Z} - 4\, \delta s_W\, s_W^2 - 2\, c_W^2 \left(2\, \delta s_W + s_W \left(2\, \delta Z_e + \delta Z_{gg} + \delta Z_{ZZ} + 2\, \delta Z_{g_s}\right)\right)\right) - \\ c_W^2 \left\{ \begin{array}{l} 2\, s_W^3 \left(\delta_{\mathrm{s1,1}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}} + \delta_{\mathrm{s1,2}}\, \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\right) + \\ s_W \left(\delta Z^{\tilde{d},\mathrm{j1}}_{1,\mathrm{s1}} \left(2\, \delta_{\mathrm{s2,1}}\, s_W^2 - 3\, U^{\tilde{d},\mathrm{j1}*}_{1,1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\right) + \delta Z^{\tilde{d},\mathrm{j1}}_{2,\mathrm{s1}} \left(2\, \delta_{\mathrm{s2,2}}\, s_W^2 - 3\, U^{\tilde{d},\mathrm{j1}*}_{2,1}\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1}\right)\right) \end{array} \right\} + \\ U^{\tilde{d},\mathrm{j1}*}_{\mathrm{s1},1} \left\{ \begin{array}{l} 6\, \delta s_W\, s_W^2\, U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} - \\ c_W^2 \left(U^{\tilde{d},\mathrm{j1}}_{\mathrm{s2},1} \left(6\, \delta s_W - 3\, s_W \left(2\, \delta Z_e + \delta Z_{gg} + \delta Z_{ZZ} + 2\, \delta Z_{g_s}\right)\right) - 3\, s_W \left(\delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{1,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{1,1} + \delta \bar{Z}^{\tilde{d},\mathrm{j2}}_{2,\mathrm{s2}}\, U^{\tilde{d},\mathrm{j1}}_{2,1}\right)\right) \end{array} \right\} \end{array} \right\}$$

$$C(\tilde{u}^{\text{s1}}_{\text{j1}}, \tilde{d}^{\text{s2},\dagger}_{\text{j2}}, g, W^-) = \frac{\mathrm{i}\, e\, g_s\, T^{\text{g1}}_{\text{o2,o1}}}{\sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \text{CKM}^*_{\text{j1,j2}} \left\{ \begin{array}{l} s_W\, U^{\tilde{d},\text{j2}}_{\text{s2,1}} \left(\delta Z^{\tilde{u},\text{j1}}_{\text{1,s1}}\, U^{\tilde{u},\text{j1}*}_{\text{1,1}} + \delta Z^{\tilde{u},\text{j1}}_{\text{2,s1}}\, U^{\tilde{u},\text{j1}*}_{\text{2,1}} \right) - \\ U^{\tilde{u},\text{j1}*}_{\text{s1,1}} \left(U^{\tilde{d},\text{j2}}_{\text{s2,1}} \left(2\, \delta s_W - s_W \left(2\, \delta Z_e + \delta Z_{gg} + \delta Z_W + 2\, \delta Z_{g_s} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{d},\text{j2}}_{\text{1,s2}}\, U^{\tilde{d},\text{j2}}_{\text{1,1}} + \delta \bar{Z}^{\tilde{d},\text{j2}}_{\text{2,s2}}\, U^{\tilde{d},\text{j2}}_{\text{2,1}} \right) \right) \end{array} \right\} + \\ 2\, \delta\text{CKM}^*_{\text{j1,j2}}\, s_W\, U^{\tilde{u},\text{j1}*}_{\text{s1,1}}\, U^{\tilde{d},\text{j2}}_{\text{s2,1}} \end{array} \right\}$$

$$C(\tilde{d}^{\text{s2}}_{\text{j2}}, \tilde{u}^{\text{s1},\dagger}_{\text{j1}}, g, W^+) = \frac{\mathrm{i}\, e\, g_s\, T^{\text{g1}}_{\text{o1,o2}}}{\sqrt{2}\, s_W^2} \left\{ \begin{array}{l} \text{CKM}_{\text{j1,j2}} \left\{ \begin{array}{l} s_W\, U^{\tilde{u},\text{j1}}_{\text{s1,1}} \left(\delta Z^{\tilde{d},\text{j2}}_{\text{1,s2}}\, U^{\tilde{d},\text{j2}*}_{\text{1,1}} + \delta Z^{\tilde{d},\text{j2}}_{\text{2,s2}}\, U^{\tilde{d},\text{j2}*}_{\text{2,1}} \right) - \\ U^{\tilde{d},\text{j2}*}_{\text{s2,1}} \left(U^{\tilde{u},\text{j1}}_{\text{s1,1}} \left(2\, \delta s_W - s_W \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{gg} + 2\, \delta Z_{g_s} \right) \right) - s_W \left(\delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{1,s1}}\, U^{\tilde{u},\text{j1}}_{\text{1,1}} + \delta \bar{Z}^{\tilde{u},\text{j1}}_{\text{2,s1}}\, U^{\tilde{u},\text{j1}}_{\text{2,1}} \right) \right) \end{array} \right\} + \\ 2\, \delta\text{CKM}_{\text{j1,j2}}\, s_W\, U^{\tilde{u},\text{j1}}_{\text{s1,1}}\, U^{\tilde{d},\text{j2}*}_{\text{s2,1}} \end{array} \right\}$$

[SV] Higgs – Gauge Boson

$$C(A^0, Z) = \begin{bmatrix} -\delta Z_{AG}\, M_Z \\ 0 \end{bmatrix}$$

$$C(G^0, Z) = \begin{bmatrix} -\frac{M_Z}{2} \left(\frac{\delta M_Z^2}{M_Z^2} + \delta Z_{ZZ} + \delta Z_{GG} \right) \\ 0 \end{bmatrix}$$

$$C(G^0, \gamma) = \begin{bmatrix} -\frac{\delta Z_{Z\gamma}\, M_Z}{2} \\ 0 \end{bmatrix}$$

$$C(H^-, W^+) = \begin{bmatrix} \mathrm{i}\, \delta Z_{H^-G^-}\, M_W \\ 0 \end{bmatrix}$$

$$C(H^+, W^-) = \begin{bmatrix} -\mathrm{i}\, \delta Z_{H^-G^-}\, M_W \\ 0 \end{bmatrix}$$

$$C(G^-, W^+) = \begin{bmatrix} \frac{\mathrm{i}\, M_W}{2} \left(\frac{\delta M_W^2}{M_W^2} + \delta Z_W + \delta Z_{G^-G^-} \right) \\ 0 \end{bmatrix}$$
406

$$C(G^+, W^-) = \begin{bmatrix} -\frac{\mathrm{i}\, M_W}{2} \left(\frac{\delta M_W^2}{M_W^2} + \delta Z_W + \delta Z_{G^-G^-} \right) \\ 0 \end{bmatrix}$$
407

[SVV] Higgs – 2 Gauge Bosons

$$C(G^-, \gamma, W^+) = -\frac{\mathrm{i}\, e}{2\, c_W\, M_W} \left(\delta Z_{Z\gamma}\, M_W^2\, s_W - c_W \left(\delta M_W^2 + M_W^2 \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_{G^-G^-} \right) \right) \right)$$
5

$$C(G^+, \gamma, W^-) = -\frac{\mathrm{i}\, e}{2\, c_W\, M_W} \left(\delta Z_{Z\gamma}\, M_W^2\, s_W - c_W \left(\delta M_W^2 + M_W^2 \left(2\, \delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W + \delta Z_{G^-G^-} \right) \right) \right)$$
6

$$C(G^-, Z, W^+) = \frac{\mathrm{i}\, e}{2\, c_W^3\, M_W} \left(M_W^2 \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 \right) - c_W^2 \left(\delta M_W^2\, s_W + M_W^2 \left(2\, \delta s_W + s_W \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_{ZZ} + \delta Z_{G^-G^-} \right) \right) \right) \right)$$
7

$$C(G^+, Z, W^-) = \frac{\mathrm{i}\, e}{2\, c_W^3\, M_W} \left(M_W^2 \left(c_W^3\, \delta Z_{\gamma Z} - 2\, \delta s_W\, s_W^2 \right) - c_W^2 \left(\delta M_W^2\, s_W + M_W^2 \left(2\, \delta s_W + s_W \left(2\, \delta Z_e + \delta Z_W + \delta Z_{ZZ} + \delta Z_{G^-G^-} \right) \right) \right) \right)$$
8

$$C(h^0, Z, Z) = \frac{\mathrm{i}\, e}{2\, c_W^4\, M_W\, s_W^2} \left\{ \begin{array}{l} 4\, \delta s_W\, M_W^2\, s_{\beta-\alpha}\, s_W^2 - \\ c_W^2 \left(2\, \delta s_W\, M_W^2\, s_{\beta-\alpha} - s_W \left(\delta M_W^2\, s_{\beta-\alpha} + M_W^2 \left(c_{\beta-\alpha} \left(2\, c_\beta^2\, \delta t_\beta + \delta Z_{hH} \right) + s_{\beta-\alpha} \left(\delta Z_{hh} + 2 \left(\delta Z_e + \delta Z_{ZZ} \right) \right) \right) \right) \right) \end{array} \right\}$$
81

$$C(H^0, Z, Z) = -\frac{\mathrm{i}\, e}{2\, c_W^4\, M_W\, s_W^2} \left\{ \begin{array}{l} c_W^2\, M_W^2\, s_{\beta-\alpha}\, s_W \left(2\, c_\beta^2\, \delta t_\beta - \delta Z_{hH} \right) - \\ c_{\beta-\alpha} \left(4\, \delta s_W\, M_W^2\, s_W^2 - c_W^2 \left(2\, \delta s_W\, M_W^2 - s_W \left(\delta M_W^2 + M_W^2 \left(\delta Z_{HH} + 2 \left(\delta Z_e + \delta Z_{ZZ} \right) \right) \right) \right) \right) \end{array} \right\}$$
82

$$C(h^0, W^-, W^+) = -\frac{\mathrm{i}\, e}{2\, M_W\, s_W^2} \left(2\, \delta s_W\, M_W^2\, s_{\beta-\alpha} - s_W \left(\delta M_W^2\, s_{\beta-\alpha} + M_W^2 \left(c_{\beta-\alpha} \left(2\, c_\beta^2\, \delta t_\beta + \delta Z_{hH} \right) + s_{\beta-\alpha} \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_W + \delta Z_{hh} \right) \right) \right) \right)$$
83

$$C(H^0, W^-, W^+) = -\frac{\mathrm{i}\, e}{2\, M_W\, s_W^2} \left(M_W^2\, s_{\beta-\alpha}\, s_W \left(2\, c_\beta^2\, \delta t_\beta - \delta Z_{hH} \right) + c_{\beta-\alpha} \left(2\, \delta s_W\, M_W^2 - s_W \left(\delta M_W^2 + M_W^2 \left(\delta \bar{Z}_W + 2\, \delta Z_e + \delta Z_W + \delta Z_{HH} \right) \right) \right) \right)$$
84

$$C(h^0, Z, \gamma) = \frac{\mathrm{i}\, e\, \delta Z_{Z\gamma}\, M_W\, s_{\beta-\alpha}}{2\, c_W^2\, s_W}$$

$$C(H^0, Z, \gamma) = \frac{\mathrm{i}\, e\, c_{\beta-\alpha}\, \delta Z_{Z\gamma}\, M_W}{2\, c_W^2\, s_W}$$

$$C(H^-, \gamma, W^+) = \frac{\mathrm{i}\, e\, \delta Z_{H^-G^-}\, M_W}{2}$$

$$C(H^+, \gamma, W^-) = \frac{\mathrm{i}\, e\, \delta Z^*_{H^-G^-}\, M_W}{2}$$

$$C(H^-, Z, W^+) = -\frac{\mathrm{i}\, e\, \delta Z_{H^-G^-}\, M_W\, s_W}{2\, c_W}$$

$$C(H^+, Z, W^-) = -\frac{\mathrm{i}\, e\, \delta Z^*_{H^-G^-}\, M_W\, s_W}{2\, c_W}$$

[UU] 2 Ghosts

$$C(u_\gamma, \overline{u}_\gamma) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_{\gamma\gamma}}{2} - \delta U_{\gamma\gamma}\right) \\ 0 \end{bmatrix}$$

$$C(u_Z, \overline{u}_Z) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_{ZZ}}{2} - \delta U_{ZZ}\right) \\ -\frac{\mathrm{i}\,\xi_Z}{2}\left(\delta M_Z^2 + M_Z^2\,(2\,\delta U_{ZZ} - \delta Z_{G^0})\right) \end{bmatrix}$$

$$C(u_Z, \overline{u}_\gamma) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_{\gamma Z}}{2} - \delta U_{\gamma Z}\right) \\ 0 \end{bmatrix}$$

$$C(u_\gamma, \overline{u}_Z) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_{Z\gamma}}{2} - \delta U_{Z\gamma}\right) \\ -\mathrm{i}\,\delta U_{Z\gamma}\, M_Z^2\, \xi_Z \end{bmatrix}$$

$$C(u_-, \overline{u}_-) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_W}{2} - \delta U_W\right) \\ -\frac{\mathrm{i}\,\xi_W}{2}\left(\delta M_W^2 + M_W^2\,(2\,\delta U_W - \delta Z_G)\right) \end{bmatrix}$$
416

$$C(u_+, \overline{u}_+) = \begin{bmatrix} \mathrm{i}\left(\frac{\delta Z_W}{2} - \delta U_W\right) \\ -\frac{\mathrm{i}\,\xi_W}{2}\left(\delta M_W^2 + M_W^2\,(2\,\delta U_W - \delta Z_G)\right) \end{bmatrix}$$
417

[UUV] 2 Ghosts – Gauge Boson

$$C(\overline{u}_-, u_-, \gamma) = \begin{bmatrix} -\frac{\mathrm{i}\,e}{2}\left(\frac{c_W\,\delta Z_{Z\gamma}}{s_W} + 2\,\delta U_W + 2\,\delta Z_e + \delta Z_{\gamma\gamma} - \delta Z_W\right) \\ 0 \end{bmatrix}$$
19

$$C(\overline{u}_+, u_+, \gamma) = \begin{bmatrix} \frac{\mathrm{i}\,e}{2}\left(\frac{c_W\,\delta Z_{Z\gamma}}{s_W} + 2\,\delta U_W + 2\,\delta Z_e + \delta Z_{\gamma\gamma} - \delta Z_W\right) \\ 0 \end{bmatrix}$$
20

$$C(\overline{u}_-, u_-, Z) = \begin{bmatrix} \frac{\mathrm{i}\,e}{2\,c_W\,s_W^2}\left(2\,\delta s_W - c_W\,s_W\,\left(\delta Z_{\gamma Z}\,s_W - c_W\,\left(\delta Z_W - \delta Z_{ZZ} - 2\,\left(\delta U_W + \delta Z_e\right)\right)\right)\right) \\ 0 \end{bmatrix}$$
21

$$C(\overline{u}_+, u_+, Z) = \begin{bmatrix} -\frac{\mathrm{i}\,e}{2\,c_W\,s_W^2}\left(2\,\delta s_W - c_W\,s_W\,\left(\delta Z_{\gamma Z}\,s_W - c_W\,\left(\delta Z_W - \delta Z_{ZZ} - 2\,\left(\delta U_W + \delta Z_e\right)\right)\right)\right) \\ 0 \end{bmatrix}$$
22

$$C(\overline{u}_-, u_\gamma, W^-) = \begin{bmatrix} \mathrm{i}\,e\left(\frac{c_W\,\delta U_{Z\gamma}}{s_W} + \delta U_{\gamma\gamma} + \delta Z_e\right) \\ 0 \end{bmatrix}$$
23

$$C(\overline{u}_+, u_\gamma, W^+) = \left[\begin{array}{c} -\mathrm{i}\, e \left(\dfrac{c_W\, \delta U_{Z\gamma}}{s_W} + \delta U_{\gamma\gamma} + \delta Z_e \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_\gamma, u_+, W^-) = \left[\begin{array}{c} \dfrac{\mathrm{i}\, e}{2} \left(\dfrac{c_W\, \delta Z_{\gamma Z}}{s_W} - 2\, \delta U_W - 2\, \delta Z_e + \delta Z_{\gamma\gamma} - \delta Z_W \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_\gamma, u_-, W^+) = \left[\begin{array}{c} \mathrm{i}\, e \left(\delta U_W - \dfrac{1}{2} \left(\dfrac{c_W\, \delta Z_{\gamma Z}}{s_W} - 2\, \delta Z_e + \delta Z_{\gamma\gamma} - \delta Z_W \right) \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_-, u_Z, W^-) = \left[\begin{array}{c} -\dfrac{\mathrm{i}\, e}{c_W\, s_W^2} \left(\delta s_W - c_W\, s_W \left(\delta U_{\gamma Z}\, s_W + c_W \left(\delta U_{ZZ} + \delta Z_e \right) \right) \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_+, u_Z, W^+) = \left[\begin{array}{c} \dfrac{\mathrm{i}\, e}{c_W\, s_W^2} \left(\delta s_W - c_W\, s_W \left(\delta U_{\gamma Z}\, s_W + c_W \left(\delta U_{ZZ} + \delta Z_e \right) \right) \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_Z, u_+, W^-) = \left[\begin{array}{c} \dfrac{\mathrm{i}\, e}{2\, c_W\, s_W^2} \left(2\, \delta s_W + c_W\, s_W \left(\delta Z_{Z\gamma}\, s_W - c_W \left(\delta Z_W - \delta Z_{ZZ} + 2 \left(\delta U_W + \delta Z_e \right) \right) \right) \right) \\ 0 \end{array} \right]$$

$$C(\overline{u}_Z, u_-, W^+) = \left[\begin{array}{c} -\dfrac{\mathrm{i}\, e}{2\, c_W\, s_W^2} \left(2\, \delta s_W + c_W\, s_W \left(\delta Z_{Z\gamma}\, s_W - c_W \left(\delta Z_W - \delta Z_{ZZ} + 2 \left(\delta U_W + \delta Z_e \right) \right) \right) \right) \\ 0 \end{array} \right]$$

[VV] 2 Gauge Bosons

$$C(W^+, W^-) = \begin{bmatrix} \mathrm{i}\,\delta Z_W \\ \mathrm{i}\,\left(\delta M_W^2 + \delta Z_W\, M_W^2\right) \\ -\mathrm{i}\,\delta Z_W \end{bmatrix}$$
408

$$C(Z, Z) = \begin{bmatrix} \mathrm{i}\,\delta Z_{ZZ} \\ \mathrm{i}\,\left(\delta M_Z^2 + \delta Z_{ZZ}\, M_Z^2\right) \\ -\mathrm{i}\,\delta Z_{ZZ} \end{bmatrix}$$
409

$$C(\gamma, \gamma) = \begin{bmatrix} \mathrm{i}\,\delta Z_{\gamma\gamma} \\ 0 \\ -\mathrm{i}\,\delta Z_{\gamma\gamma} \end{bmatrix}$$
410

$$C(\gamma, Z) = \begin{bmatrix} \frac{\mathrm{i}}{2}\,\left(\delta Z_{\gamma Z} + \delta Z_{Z\gamma}\right) \\ \frac{\mathrm{i}\,\delta Z_{Z\gamma}\, M_Z^2}{2} \\ -\frac{\mathrm{i}}{2}\,\left(\delta Z_{\gamma Z} + \delta Z_{Z\gamma}\right) \end{bmatrix}$$
411

[VV] 2 Gluons

$$C(g, g) = \begin{bmatrix} \mathrm{i}\,\delta_{\mathrm{g1,g2}}\,\delta Z_{gg} \\ 0 \\ -\mathrm{i}\,\delta_{\mathrm{g1,g2}}\,\delta Z_{gg} \end{bmatrix}$$
474

[VVV] 3 Gauge Bosons

$$C(\gamma, W^+, W^-) = -\frac{\mathrm{i}\, e}{2}\left(\frac{c_W\, \delta Z_{Z\gamma}}{s_W} + \delta Z_{\gamma\gamma} + 2\,(\delta Z_e + \delta Z_W)\right)$$
9

$$C(Z, W^+, W^-) = \frac{\mathrm{i}\, e}{2\, c_W\, s_W^2}\,(2\,\delta s_W - c_W\, s_W\,(\delta Z_{\gamma Z}\, s_W + c_W\,(\delta Z_{ZZ} + 2\,(\delta Z_e + \delta Z_W))))$$
10

[VVV] 3 Gluons

$$C(g, g, g) = \frac{g_s\, f^{\mathrm{g1,g2,g3}}}{2}\,(3\,\delta Z_{gg} + 2\,\delta Z_{g_s})$$
424

[VVVV] 4 Gauge Bosons

$$C(\gamma, \gamma, W^-, W^+) = \begin{bmatrix} -\frac{2\,\mathrm{i}\, e^2}{s_W}\,(c_W\,\delta Z_{Z\gamma} + s_W\,(2\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W)) \\ \frac{\mathrm{i}\, e^2}{s_W}\,(c_W\,\delta Z_{Z\gamma} + s_W\,(2\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W)) \\ \frac{\mathrm{i}\, e^2}{s_W}\,(c_W\,\delta Z_{Z\gamma} + s_W\,(2\,\delta Z_e + \delta Z_{\gamma\gamma} + \delta Z_W)) \end{bmatrix}$$
39

$$C(\gamma, Z, W^-, W^+) = \begin{bmatrix} \frac{\mathrm{i}\, e^2}{c_W\, s_W^2}\left(2\,\delta s_W - c_W\,\left(c_W^2\,\delta Z_{Z\gamma} + \delta Z_{\gamma Z}\, s_W^2 + c_W\, s_W\,(4\,\delta Z_e + \delta Z_{\gamma\gamma} + 2\,\delta Z_W + \delta Z_{ZZ})\right)\right) \\ -\frac{\mathrm{i}\, e^2}{2\, c_W\, s_W^2}\left(2\,\delta s_W - c_W\,\left(c_W^2\,\delta Z_{Z\gamma} + \delta Z_{\gamma Z}\, s_W^2 + c_W\, s_W\,(4\,\delta Z_e + \delta Z_{\gamma\gamma} + 2\,\delta Z_W + \delta Z_{ZZ})\right)\right) \\ -\frac{\mathrm{i}\, e^2}{2\, c_W\, s_W^2}\left(2\,\delta s_W - c_W\,\left(c_W^2\,\delta Z_{Z\gamma} + \delta Z_{\gamma Z}\, s_W^2 + c_W\, s_W\,(4\,\delta Z_e + \delta Z_{\gamma\gamma} + 2\,\delta Z_W + \delta Z_{ZZ})\right)\right) \end{bmatrix}$$
40

$$C(Z,Z,W^-,W^+) = \begin{bmatrix} \frac{2\,\mathrm{i}\,e^2}{s_W^3}\,(2\,\delta s_W - c_W\,s_W\,(\delta Z_{\gamma Z}\,s_W + c_W\,(2\,\delta Z_e + \delta Z_W + \delta Z_{ZZ}))) \\ -\frac{\mathrm{i}\,e^2}{s_W^3}\,(2\,\delta s_W - c_W\,s_W\,(\delta Z_{\gamma Z}\,s_W + c_W\,(2\,\delta Z_e + \delta Z_W + \delta Z_{ZZ}))) \\ -\frac{\mathrm{i}\,e^2}{s_W^3}\,(2\,\delta s_W - c_W\,s_W\,(\delta Z_{\gamma Z}\,s_W + c_W\,(2\,\delta Z_e + \delta Z_W + \delta Z_{ZZ}))) \end{bmatrix}$$
41

$$C(W^-,W^-,W^+,W^+) = \begin{bmatrix} -\frac{4\,\mathrm{i}\,e^2}{s_W^3}\,(\delta s_W - s_W\,(\delta Z_e + \delta Z_W)) \\ \frac{2\,\mathrm{i}\,e^2}{s_W^3}\,(\delta s_W - s_W\,(\delta Z_e + \delta Z_W)) \\ \frac{2\,\mathrm{i}\,e^2}{s_W^3}\,(\delta s_W - s_W\,(\delta Z_e + \delta Z_W)) \end{bmatrix}$$
42

[VVVV] 4 Gluons

$$C(g,g,g,g) = \begin{bmatrix} -2\,\mathrm{i}\,g_s^2\,(\delta Z_{gg} + \delta Z_{g_s})\,\left(f^{\mathrm{g1,g3},x} f^{x,\mathrm{g2,g4}} - f^{\mathrm{g1,g4},x} f^{x,\mathrm{g3,g2}}\right) \\ -2\,\mathrm{i}\,g_s^2\,(\delta Z_{gg} + \delta Z_{g_s})\,\left(f^{\mathrm{g1,g2},x} f^{x,\mathrm{g3,g4}} + f^{\mathrm{g1,g4},x} f^{x,\mathrm{g3,g2}}\right) \\ 2\,\mathrm{i}\,g_s^2\,(\delta Z_{gg} + \delta Z_{g_s})\,\left(f^{\mathrm{g1,g2},x} f^{x,\mathrm{g3,g4}} + f^{\mathrm{g1,g3},x} f^{x,\mathrm{g2,g4}}\right) \end{bmatrix}$$
423