MSSM

$$\underset{267}{C}\left(\tilde{\chi}_{c1}^{-}, \bar{e}_{g2}, \tilde{\nu}_{g3}\right) = \frac{ie\delta_{g2,g3}}{s_W}\begin{bmatrix} \dfrac{m_{e_{g3}}U_{c1,2}^{*}}{\sqrt{2}c_{\beta}M_W} \\[2ex] -V_{c1,1} \end{bmatrix}$$

$$\underset{268}{C}\left(\tilde{\chi}_{c1}^{+}, \bar{\nu}_{g2}, \tilde{e}_{g3}^{s3}\right) = \frac{ie\delta_{g2,g3}}{2s_W}\left(\frac{\sqrt{2}m_{e_{g2}}U_{c1,2}U_{s3,2}^{\tilde{e}_{g2}*}}{c_{\beta}M_W} - 2U_{c1,1}U_{s3,1}^{\tilde{e}_{g2}*}\right)\begin{bmatrix} 0 \\ \hline 1 \end{bmatrix}$$

$$\underset{271}{C}\left(e_{g1}, \tilde{\chi}_{c2}^{+}, \tilde{\nu}_{g3}^{\dagger}\right) = \frac{ie\delta_{g1,g3}}{s_W}\begin{bmatrix} -V_{c2,1}^{*} \\[2ex] \dfrac{m_{e_{g3}}U_{c2,2}}{\sqrt{2}c_{\beta}M_W} \end{bmatrix}$$

$$\underset{272}{C}\left(\nu_{g1}, \tilde{\chi}_{c2}^{-}, \tilde{e}_{g3}^{s3,\dagger}\right) = \frac{ie\delta_{g1,g3}}{2s_W}\left(\frac{\sqrt{2}m_{e_{g1}}U_{c2,2}^{*}U_{s3,2}^{\tilde{e}_{g1}}}{c_{\beta}M_W} - 2U_{c2,1}^{*}U_{s3,1}^{\tilde{e}_{g1}}\right)\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

[FFS] **Chargino – Neutralino – Higgs**

$$\underset{253}{C}\left(\tilde{\chi}_{n1}^{0}, \tilde{\chi}_{c2}^{+}, H^{-}\right) = -\frac{ie}{s_W}\begin{bmatrix} c_{\beta}\left(\dfrac{V_{c2,2}^{*}}{\sqrt{2}}\left(\dfrac{s_W Z_{n1,1}^{*}}{c_W} + Z_{n1,2}^{*}\right) + V_{c2,1}^{*}Z_{n1,4}^{*}\right) \\ \hline -s_{\beta}\left(\dfrac{U_{c2,2}}{\sqrt{2}}\left(\dfrac{s_W Z_{n1,1}}{c_W} + Z_{n1,2}\right) - U_{c2,1}Z_{n1,3}\right) \end{bmatrix}$$

$$\underset{254}{C}\left(\tilde{\chi}_{n1}^{0}, \tilde{\chi}_{c2}^{+}, G^{-}\right) = -\frac{ie}{s_W}\begin{bmatrix} s_{\beta}\left(\dfrac{V_{c2,2}^{*}}{\sqrt{2}}\left(\dfrac{s_W Z_{n1,1}^{*}}{c_W} + Z_{n1,2}^{*}\right) + V_{c2,1}^{*}Z_{n1,4}^{*}\right) \\ \hline c_{\beta}\left(\dfrac{U_{c2,2}}{\sqrt{2}}\left(\dfrac{s_W Z_{n1,1}}{c_W} + Z_{n1,2}\right) - U_{c2,1}Z_{n1,3}\right) \end{bmatrix}$$

$$\underset{255}{C}\left(\tilde{\chi}_{c1}^{-}, \tilde{\chi}_{n2}^{0}, H^{+}\right) = -\frac{ie}{s_W}\begin{bmatrix} -s_{\beta}\left(\dfrac{U_{c1,2}^{*}}{\sqrt{2}}\left(\dfrac{s_W Z_{n2,1}^{*}}{c_W} + Z_{n2,2}^{*}\right) - U_{c1,1}^{*}Z_{n2,3}^{*}\right) \\ \hline c_{\beta}\left(\dfrac{V_{c1,2}}{\sqrt{2}}\left(\dfrac{s_W Z_{n2,1}}{c_W} + Z_{n2,2}\right) + V_{c1,1}Z_{n2,4}\right) \end{bmatrix}$$

$$\underset{256}{C}\left(\tilde{\chi}_{c1}^{-}, \tilde{\chi}_{n2}^{0}, G^{+}\right) = -\frac{ie}{s_W}\left[\begin{array}{c} c_\beta\left(\dfrac{U_{c1,2}^*}{\sqrt{2}}\left(\dfrac{s_W Z_{n2,1}^*}{c_W} + Z_{n2,2}^*\right) - U_{c1,1}^* Z_{n2,3}^*\right) \\ \hline s_\beta\left(\dfrac{V_{c1,2}}{\sqrt{2}}\left(\dfrac{s_W Z_{n2,1}}{c_W} + Z_{n2,2}\right) + V_{c1,1} Z_{n2,4}\right) \end{array}\right]$$

[FFS] Chargino – Quark – Squark

$$\underset{265}{C}\left(\tilde{\chi}_{c1}^{-}, \overline{d}_{g2}, \tilde{u}_{g3}^{s3}\right) = \frac{ie\,\mathrm{CKM}_{g3,g2}^*}{M_W s_W}\left[\begin{array}{c} \dfrac{m_{d_{g2}} U_{c1,2}^* U_{s3,1}^{\tilde{u}_{g3}*}}{\sqrt{2}c_\beta} \\ \hline -\dfrac{1}{2s_\beta}\left(2M_W s_\beta V_{c1,1} U_{s3,1}^{\tilde{u}_{g3}*} - \sqrt{2}m_{u_{g3}} V_{c1,2} U_{s3,2}^{\tilde{u}_{g3}*}\right) \end{array}\right]$$

$$\underset{266}{C}\left(\tilde{\chi}_{c1}^{+}, \overline{u}_{g2}, \tilde{d}_{g3}^{s3}\right) = \frac{ie\,\mathrm{CKM}_{g2,g3}}{M_W s_W}\left[\begin{array}{c} \dfrac{m_{u_{g2}} U_{s3,1}^{\tilde{d}_{g3}*} V_{c1,2}^*}{\sqrt{2}s_\beta} \\ \hline -\dfrac{1}{2c_\beta}\left(2c_\beta M_W U_{c1,1} U_{s3,1}^{\tilde{d}_{g3}*} - \sqrt{2}m_{d_{g3}} U_{c1,2} U_{s3,2}^{\tilde{d}_{g3}*}\right) \end{array}\right]$$

$$\underset{269}{C}\left(d_{g1}, \tilde{\chi}_{c2}^{+}, \tilde{u}_{g3}^{s3,\dagger}\right) = \frac{ie\,\mathrm{CKM}_{g3,g1}}{M_W s_W}\left[\begin{array}{c} -\dfrac{1}{2s_\beta}\left(2M_W s_\beta U_{s3,1}^{\tilde{u}_{g3}} V_{c2,1}^* - \sqrt{2}m_{u_{g3}} U_{s3,2}^{\tilde{u}_{g3}} V_{c2,2}^*\right) \\ \hline \dfrac{m_{d_{g1}} U_{c2,2} U_{s3,1}^{\tilde{u}_{g3}}}{\sqrt{2}c_\beta} \end{array}\right]$$

$$\underset{270}{C}\left(u_{g1}, \tilde{\chi}_{c2}^{-}, \tilde{d}_{g3}^{s3,\dagger}\right) = \frac{ie\,\mathrm{CKM}_{g1,g3}^*}{M_W s_W}\left[\begin{array}{c} -\dfrac{1}{2c_\beta}\left(2c_\beta M_W U_{c2,1}^* U_{s3,1}^{\tilde{d}_{g3}} - \sqrt{2}m_{d_{g3}} U_{c2,2}^* U_{s3,2}^{\tilde{d}_{g3}}\right) \\ \hline \dfrac{m_{u_{g1}} V_{c2,2} U_{s3,1}^{\tilde{d}_{g3}}}{\sqrt{2}s_\beta} \end{array}\right]$$

[FFS] Lepton – Neutralino – Slepton

$$\underset{257}{C}\left(\tilde{\chi}_{n1}^{0}, \overline{\nu}_{g2}, \tilde{\nu}_{g3}\right) = \frac{ie\,\delta_{g2,g3}}{\sqrt{2}c_W s_W}\left(s_W Z_{n1,1} - c_W Z_{n1,2}\right)\left[\begin{array}{c} 0 \\ \hline 1 \end{array}\right]$$

$$\underset{258}{C}\left(\tilde{\chi}^0_{\text{n1}}, \bar{e}_{\text{g2}}, \tilde{e}^{\text{s3}}_{\text{g3}}\right) = \frac{ie\delta_{\text{g2,g3}}}{\sqrt{2}c_{\text{W}}c_\beta M_{\text{W}}s_{\text{W}}}\left[\frac{-2c_\beta M_{\text{W}}s_{\text{W}}U^{\tilde{e}_{\text{g2}}*}_{\text{s3,2}}Z^*_{\text{n1,1}} - c_{\text{W}}m_{e_{\text{g2}}}U^{\tilde{e}_{\text{g2}}*}_{\text{s3,1}}Z^*_{\text{n1,3}}}{c_\beta M_{\text{W}}\left(s_{\text{W}}Z_{\text{n1,1}} + c_{\text{W}}Z_{\text{n1,2}}\right)U^{\tilde{e}_{\text{g2}}*}_{\text{s3,1}} - c_{\text{W}}m_{e_{\text{g2}}}Z_{\text{n1,3}}U^{\tilde{e}_{\text{g2}}*}_{\text{s3,2}}}\right]$$

$$\underset{261}{C}\left(\nu_{\text{g1}}, \tilde{\chi}^0_{\text{n2}}, \tilde{\nu}^\dagger_{\text{g3}}\right) = \frac{ie\delta_{\text{g1,g3}}}{\sqrt{2}c_{\text{W}}s_{\text{W}}}\left(s_{\text{W}}Z^*_{\text{n2,1}} - c_{\text{W}}Z^*_{\text{n2,2}}\right)\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{262}{C}\left(e_{\text{g1}}, \tilde{\chi}^0_{\text{n2}}, \tilde{e}^{\text{s3},\dagger}_{\text{g3}}\right) = \frac{ie\delta_{\text{g1,g3}}}{\sqrt{2}c_{\text{W}}c_\beta M_{\text{W}}s_{\text{W}}}\left[\frac{c_\beta M_{\text{W}}s_{\text{W}}U^{\tilde{e}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,1}} + c_{\text{W}}\left(c_\beta M_{\text{W}}U^{\tilde{e}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,2}} - m_{e_{\text{g1}}}U^{\tilde{e}_{\text{g1}}}_{\text{s3,2}}Z^*_{\text{n2,3}}\right)}{-c_{\text{W}}m_{e_{\text{g1}}}Z_{\text{n2,3}}U^{\tilde{e}_{\text{g1}}}_{\text{s3,1}} - 2c_\beta M_{\text{W}}s_{\text{W}}Z_{\text{n2,1}}U^{\tilde{e}_{\text{g1}}}_{\text{s3,2}}}\right]$$

[FFS] **Neutralino – Quark – Squark**

$$\underset{259}{C}\left(\tilde{\chi}^0_{\text{n1}}, \bar{u}_{\text{g2}}, \tilde{u}^{\text{s3}}_{\text{g3}}\right) = \frac{ie\delta_{\text{g2,g3}}}{3\sqrt{2}c_{\text{W}}M_{\text{W}}s_{\text{W}}s_\beta}\left[\frac{4M_{\text{W}}s_{\text{W}}s_\beta U^{\tilde{u}_{\text{g2}}*}_{\text{s3,2}}Z^*_{\text{n1,1}} - 3c_{\text{W}}m_{u_{\text{g2}}}U^{\tilde{u}_{\text{g2}}*}_{\text{s3,1}}Z^*_{\text{n1,4}}}{-M_{\text{W}}s_\beta\left(s_{\text{W}}Z_{\text{n1,1}} + 3c_{\text{W}}Z_{\text{n1,2}}\right)U^{\tilde{u}_{\text{g2}}*}_{\text{s3,1}} - 3c_{\text{W}}m_{u_{\text{g2}}}Z_{\text{n1,4}}U^{\tilde{u}_{\text{g2}}*}_{\text{s3,2}}}\right]$$

$$\underset{260}{C}\left(\tilde{\chi}^0_{\text{n1}}, \bar{d}_{\text{g2}}, \tilde{d}^{\text{s3}}_{\text{g3}}\right) = \frac{ie\delta_{\text{g2,g3}}}{3\sqrt{2}c_{\text{W}}c_\beta M_{\text{W}}s_{\text{W}}}\left[\frac{-2c_\beta M_{\text{W}}s_{\text{W}}U^{\tilde{d}_{\text{g2}}*}_{\text{s3,2}}Z^*_{\text{n1,1}} - 3c_{\text{W}}m_{d_{\text{g2}}}U^{\tilde{d}_{\text{g2}}*}_{\text{s3,1}}Z^*_{\text{n1,3}}}{-c_\beta M_{\text{W}}\left(s_{\text{W}}Z_{\text{n1,1}} - 3c_{\text{W}}Z_{\text{n1,2}}\right)U^{\tilde{d}_{\text{g2}}*}_{\text{s3,1}} - 3c_{\text{W}}m_{d_{\text{g2}}}Z_{\text{n1,3}}U^{\tilde{d}_{\text{g2}}*}_{\text{s3,2}}}\right]$$

$$\underset{263}{C}\left(u_{\text{g1}}, \tilde{\chi}^0_{\text{n2}}, \tilde{u}^{\text{s3},\dagger}_{\text{g3}}\right) = -\frac{ie\delta_{\text{g1,g3}}}{3\sqrt{2}c_{\text{W}}M_{\text{W}}s_{\text{W}}s_\beta}\left[\frac{M_{\text{W}}s_{\text{W}}s_\beta U^{\tilde{u}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,1}} + 3c_{\text{W}}\left(M_{\text{W}}s_\beta U^{\tilde{u}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,2}} + m_{u_{\text{g1}}}U^{\tilde{u}_{\text{g1}}}_{\text{s3,2}}Z^*_{\text{n2,4}}\right)}{3c_{\text{W}}m_{u_{\text{g1}}}Z_{\text{n2,4}}U^{\tilde{u}_{\text{g1}}}_{\text{s3,1}} - 4M_{\text{W}}s_{\text{W}}s_\beta Z_{\text{n2,1}}U^{\tilde{u}_{\text{g1}}}_{\text{s3,2}}}\right]$$

$$\underset{264}{C}\left(d_{\text{g1}}, \tilde{\chi}^0_{\text{n2}}, \tilde{d}^{\text{s3},\dagger}_{\text{g3}}\right) = -\frac{ie\delta_{\text{g1,g3}}}{3\sqrt{2}c_{\text{W}}c_\beta M_{\text{W}}s_{\text{W}}}\left[\frac{c_\beta M_{\text{W}}s_{\text{W}}U^{\tilde{d}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,1}} - 3c_{\text{W}}\left(c_\beta M_{\text{W}}U^{\tilde{d}_{\text{g1}}}_{\text{s3,1}}Z^*_{\text{n2,2}} - m_{d_{\text{g1}}}U^{\tilde{d}_{\text{g1}}}_{\text{s3,2}}Z^*_{\text{n2,3}}\right)}{3c_{\text{W}}m_{d_{\text{g1}}}Z_{\text{n2,3}}U^{\tilde{d}_{\text{g1}}}_{\text{s3,1}} + 2c_\beta M_{\text{W}}s_{\text{W}}Z_{\text{n2,1}}U^{\tilde{d}_{\text{g1}}}_{\text{s3,2}}}\right]$$

[FFS] **2 Charginos – Higgs**

$$\underset{249}{C}\left(\tilde{\chi}_{c1}^-, \tilde{\chi}_{c2}^+, h^0\right) = \frac{ie}{\sqrt{2}s_W}\left[\frac{s_\alpha U_{c1,2}^* V_{c2,1}^* - c_\alpha U_{c1,1}^* V_{c2,2}^*}{s_\alpha U_{c2,2} V_{c1,1} - c_\alpha U_{c2,1} V_{c1,2}}\right]$$

$$\underset{250}{C}\left(\tilde{\chi}_{c1}^-, \tilde{\chi}_{c2}^+, H^0\right) = -\frac{ie}{\sqrt{2}s_W}\left[\frac{c_\alpha U_{c1,2}^* V_{c2,1}^* + s_\alpha U_{c1,1}^* V_{c2,2}^*}{c_\alpha U_{c2,2} V_{c1,1} + s_\alpha U_{c2,1} V_{c1,2}}\right]$$

$$\underset{251}{C}\left(\tilde{\chi}_{c1}^-, \tilde{\chi}_{c2}^+, A^0\right) = \frac{e}{\sqrt{2}s_W}\left[\frac{-s_\beta U_{c1,2}^* V_{c2,1}^* - c_\beta U_{c1,1}^* V_{c2,2}^*}{s_\beta U_{c2,2} V_{c1,1} + c_\beta U_{c2,1} V_{c1,2}}\right]$$

$$\underset{252}{C}\left(\tilde{\chi}_{c1}^-, \tilde{\chi}_{c2}^+, G^0\right) = \frac{e}{\sqrt{2}s_W}\left[\frac{c_\beta U_{c1,2}^* V_{c2,1}^* - s_\beta U_{c1,1}^* V_{c2,2}^*}{-c_\beta U_{c2,2} V_{c1,1} + s_\beta U_{c2,1} V_{c1,2}}\right]$$

[FFS] **2 Leptons – Higgs**

$$\underset{181}{C}\left(e_{g1}, \bar{e}_{g2}, h^0\right) = \frac{ie\delta_{g1,g2}m_{e_{g1}}s_\alpha}{2c_\beta M_W s_W}\left[\frac{1}{1}\right]$$

$$\underset{184}{C}\left(e_{g1}, \bar{e}_{g2}, G^0\right) = \frac{e\delta_{g1,g2}m_{e_{g1}}}{2M_W s_W}\left[\frac{-1}{1}\right]$$

$$\underset{194}{C}\left(e_{g1}, \bar{e}_{g2}, H^0\right) = -\frac{ie\delta_{g1,g2}c_\alpha m_{e_{g1}}}{2c_\beta M_W s_W}\left[\frac{1}{1}\right]$$

$$\underset{197}{C}\left(e_{\text{g1}}, \bar{e}_{\text{g2}}, A^0\right) = \frac{e\delta_{\text{g1,g2}}m_{e_{\text{g1}}}t_\beta}{2M_W s_W}\begin{bmatrix} 1 \\ \hline -1 \end{bmatrix}$$

$$\underset{200}{C}\left(\nu_{\text{g1}}, \bar{e}_{\text{g2}}, G^-\right) = -\frac{ie\delta_{\text{g1,g2}}m_{e_{\text{g2}}}}{\sqrt{2}M_W s_W}\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

$$\underset{201}{C}\left(e_{\text{g1}}, \bar{\nu}_{\text{g2}}, G^+\right) = -\frac{ie\delta_{\text{g1,g2}}m_{e_{\text{g1}}}}{\sqrt{2}M_W s_W}\begin{bmatrix} 0 \\ \hline 1 \end{bmatrix}$$

$$\underset{204}{C}\left(\nu_{\text{g1}}, \bar{e}_{\text{g2}}, H^-\right) = \frac{ie\delta_{\text{g1,g2}}m_{e_{\text{g2}}}t_\beta}{\sqrt{2}M_W s_W}\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

$$\underset{205}{C}\left(e_{\text{g1}}, \bar{\nu}_{\text{g2}}, H^+\right) = \frac{ie\delta_{\text{g1,g2}}m_{e_{\text{g1}}}t_\beta}{\sqrt{2}M_W s_W}\begin{bmatrix} 0 \\ \hline 1 \end{bmatrix}$$

[FFS] **2 Neutralinos – Higgs**

$$\underset{245}{C}\left(\tilde{\chi}^0_{\text{n1}}, \tilde{\chi}^0_{\text{n2}}, h^0\right) = \frac{ie}{2c_W s_W}\begin{bmatrix} \begin{aligned} &-\left(s_\alpha Z^*_{\text{n1,3}} + c_\alpha Z^*_{\text{n1,4}}\right)\left(s_W Z^*_{\text{n2,1}} - c_W Z^*_{\text{n2,2}}\right) - \\ &s_\alpha\left(s_W Z^*_{\text{n1,1}} - c_W Z^*_{\text{n1,2}}\right) Z^*_{\text{n2,3}} - \\ &c_\alpha\left(s_W Z^*_{\text{n1,1}} - c_W Z^*_{\text{n1,2}}\right) Z^*_{\text{n2,4}} \end{aligned} \\ \hline \begin{aligned} &-\left(s_\alpha Z_{\text{n1,3}} + c_\alpha Z_{\text{n1,4}}\right)\left(s_W Z_{\text{n2,1}} - c_W Z_{\text{n2,2}}\right) - \\ &\left(s_W s_\alpha Z_{\text{n1,1}} - c_W s_\alpha Z_{\text{n1,2}}\right) Z_{\text{n2,3}} - \\ &\left(c_\alpha s_W Z_{\text{n1,1}} - c_W c_\alpha Z_{\text{n1,2}}\right) Z_{\text{n2,4}} \end{aligned} \end{bmatrix}$$

$$\underset{246}{C}\left(\tilde{\chi}_{n1}^0, \tilde{\chi}_{n2}^0, H^0\right) = \frac{ie}{2c_W s_W} \left[\begin{array}{c} \left(c_\alpha Z_{n1,3}^* - s_\alpha Z_{n1,4}^*\right)\left(s_W Z_{n2,1}^* - c_W Z_{n2,2}^*\right) + \\ c_\alpha \left(s_W Z_{n1,1}^* - c_W Z_{n1,2}^*\right) Z_{n2,3}^* - \\ \left(s_W s_\alpha Z_{n1,1}^* - c_W s_\alpha Z_{n1,2}^*\right) Z_{n2,4}^* \\ \hline \left(c_\alpha Z_{n1,3} - s_\alpha Z_{n1,4}\right)\left(s_W Z_{n2,1} - c_W Z_{n2,2}\right) + \\ c_\alpha \left(s_W Z_{n1,1} - c_W Z_{n1,2}\right) Z_{n2,3} - \\ \left(s_W s_\alpha Z_{n1,1} - c_W s_\alpha Z_{n1,2}\right) Z_{n2,4} \end{array} \right]$$

$$\underset{247}{C}\left(\tilde{\chi}_{n1}^0, \tilde{\chi}_{n2}^0, A^0\right) = \frac{e}{2c_W s_W} \left[\begin{array}{c} \left(s_\beta Z_{n1,3}^* - c_\beta Z_{n1,4}^*\right)\left(s_W Z_{n2,1}^* - c_W Z_{n2,2}^*\right) + \\ s_\beta \left(s_W Z_{n1,1}^* - c_W Z_{n1,2}^*\right) Z_{n2,3}^* - \\ \left(c_\beta s_W Z_{n1,1}^* - c_W c_\beta Z_{n1,2}^*\right) Z_{n2,4}^* \\ \hline - \left(s_\beta Z_{n1,3} - c_\beta Z_{n1,4}\right)\left(s_W Z_{n2,1} - c_W Z_{n2,2}\right) - \\ s_\beta \left(s_W Z_{n1,1} - c_W Z_{n1,2}\right) Z_{n2,3} + \\ \left(c_\beta s_W Z_{n1,1} - c_W c_\beta Z_{n1,2}\right) Z_{n2,4} \end{array} \right]$$

$$\underset{248}{C}\left(\tilde{\chi}_{n1}^0, \tilde{\chi}_{n2}^0, G^0\right) = \frac{e}{2c_W s_W} \left[\begin{array}{c} - \left(c_\beta Z_{n1,3}^* + s_\beta Z_{n1,4}^*\right)\left(s_W Z_{n2,1}^* - c_W Z_{n2,2}^*\right) - \\ c_\beta \left(s_W Z_{n1,1}^* - c_W Z_{n1,2}^*\right) Z_{n2,3}^* - \\ s_\beta \left(s_W Z_{n1,1}^* - c_W Z_{n1,2}^*\right) Z_{n2,4}^* \\ \hline \left(c_\beta Z_{n1,3} + s_\beta Z_{n1,4}\right)\left(s_W Z_{n2,1} - c_W Z_{n2,2}\right) + \\ c_\beta \left(s_W Z_{n1,1} - c_W Z_{n1,2}\right) Z_{n2,3} + \\ s_\beta \left(s_W Z_{n1,1} - c_W Z_{n1,2}\right) Z_{n2,4} \end{array} \right]$$

[FFS] **2 Quarks – Higgs**

$$\underset{182}{C}\left(u_{g1}, \bar{u}_{g2}, h^0\right) = -\frac{ie\delta_{g1,g2}c_\alpha m_{u_{g1}}}{2M_W s_W s_\beta} \left[\begin{array}{c} 1 \\ \hline 1 \end{array} \right]$$

$$\mathop{C}_{183}\left(d_{\mathrm{g1}},\bar{d}_{\mathrm{g2}},h^0\right)=\frac{ie\delta_{\mathrm{g1,g2}}m_{d_{\mathrm{g1}}}s_\alpha}{2c_\beta M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{1}{1}\right]$$

$$\mathop{C}_{185}\left(u_{\mathrm{g1}},\bar{u}_{\mathrm{g2}},G^0\right)=\frac{e\delta_{\mathrm{g1,g2}}m_{u_{\mathrm{g1}}}}{2M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{1}{-1}\right]$$

$$\mathop{C}_{186}\left(d_{\mathrm{g1}},\bar{d}_{\mathrm{g2}},G^0\right)=\frac{e\delta_{\mathrm{g1,g2}}m_{d_{\mathrm{g1}}}}{2M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{-1}{1}\right]$$

$$\mathop{C}_{195}\left(u_{\mathrm{g1}},\bar{u}_{\mathrm{g2}},H^0\right)=-\frac{ie\delta_{\mathrm{g1,g2}}m_{u_{\mathrm{g1}}}s_\alpha}{2M_{\mathrm{W}}s_{\mathrm{W}}s_\beta}\left[\frac{1}{1}\right]$$

$$\mathop{C}_{196}\left(d_{\mathrm{g1}},\bar{d}_{\mathrm{g2}},H^0\right)=-\frac{ie\delta_{\mathrm{g1,g2}}c_\alpha m_{d_{\mathrm{g1}}}}{2c_\beta M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{1}{1}\right]$$

$$\mathop{C}_{198}\left(u_{\mathrm{g1}},\bar{u}_{\mathrm{g2}},A^0\right)=\frac{e\delta_{\mathrm{g1,g2}}m_{u_{\mathrm{g1}}}}{2M_{\mathrm{W}}s_{\mathrm{W}}t_\beta}\left[\frac{1}{-1}\right]$$

$$\mathop{C}_{199}\left(d_{\mathrm{g1}},\bar{d}_{\mathrm{g2}},A^0\right)=\frac{e\delta_{\mathrm{g1,g2}}m_{d_{\mathrm{g1}}}t_\beta}{2M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{1}{-1}\right]$$

$$\mathop{C}_{206}\left(u_{\mathrm{g1}},\bar{d}_{\mathrm{g2}},G^-\right)=\frac{ie\mathrm{CKM}^*_{\mathrm{g1,g2}}}{\sqrt{2}M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{-m_{d_{\mathrm{g2}}}}{m_{u_{\mathrm{g1}}}}\right]$$

$$\mathop{C}_{207}\left(d_{\mathrm{g1}},\bar{u}_{\mathrm{g2}},G^+\right)=\frac{ie\mathrm{CKM}_{\mathrm{g2,g1}}}{\sqrt{2}M_{\mathrm{W}}s_{\mathrm{W}}}\left[\frac{m_{u_{\mathrm{g2}}}}{-m_{d_{\mathrm{g1}}}}\right]$$

$$\underset{210}{C}\left(u_{g1}, \bar{d}_{g2}, H^-\right) = \frac{ie\mathrm{CKM}^*_{g1,g2}}{\sqrt{2}M_W s_W}\begin{bmatrix} m_{d_{g2}}t_\beta \\[2mm] \dfrac{m_{u_{g1}}}{t_\beta} \end{bmatrix}$$

$$\underset{211}{C}\left(d_{g1}, \bar{u}_{g2}, H^+\right) = \frac{ie\mathrm{CKM}_{g2,g1}}{\sqrt{2}M_W s_W}\begin{bmatrix} \dfrac{m_{u_{g2}}}{t_\beta} \\[2mm] m_{d_{g1}}t_\beta \end{bmatrix}$$

[FFV] **Chargino – Neutralino – Gauge Boson**

$$\underset{274}{C}\left(\tilde{\chi}^0_{n1}, \tilde{\chi}^+_{c2}, W^-\right) = \frac{ie}{s_W}\begin{bmatrix} -\dfrac{Z_{n1,4}V^*_{c2,2}}{\sqrt{2}} + Z_{n1,2}V^*_{c2,1} \\[3mm] \dfrac{U_{c2,2}Z^*_{n1,3}}{\sqrt{2}} + U_{c2,1}Z^*_{n1,2} \end{bmatrix}$$

$$\underset{275}{C}\left(\tilde{\chi}^-_{c1}, \tilde{\chi}^0_{n2}, W^+\right) = \frac{ie}{s_W}\begin{bmatrix} -\dfrac{V_{c1,2}Z^*_{n2,4}}{\sqrt{2}} + V_{c1,1}Z^*_{n2,2} \\[3mm] \dfrac{Z_{n2,3}U^*_{c1,2}}{\sqrt{2}} + Z_{n2,2}U^*_{c1,1} \end{bmatrix}$$

[FFV] **2 Charginos – Gauge Boson**

$$\underset{276}{C}\left(\tilde{\chi}^+_{c1}, \tilde{\chi}^-_{c2}, \gamma\right) = ie\begin{bmatrix} 1 \\[2mm] \overline{} \\[1mm] 1 \end{bmatrix}$$

$$\underset{277}{C}\left(\tilde{\chi}^+_{c1}, \tilde{\chi}^-_{c2}, Z\right) = -\frac{ie}{c_W s_W}\begin{bmatrix} -\left(\dfrac{1}{2}U_{c1,2}U^*_{c2,2}\right) + s^2_W - U_{c1,1}U^*_{c2,1} \\[3mm] -\left(\dfrac{1}{2}V_{c2,2}V^*_{c1,2}\right) + s^2_W - V_{c2,1}V^*_{c1,1} \end{bmatrix}$$

[FFV] 2 Leptons – Gauge Boson

$$\underset{187}{C}\left(\bar{e}_{g1}, e_{g2}, \gamma\right) = ie\delta_{g1,g2}\begin{bmatrix} 1 \\ \hline 1 \end{bmatrix}$$

$$\underset{190}{C}\left(\bar{\nu}_{g1}, \nu_{g2}, Z\right) = -\frac{ie\delta_{g1,g2}}{2c_W s_W}\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

$$\underset{191}{C}\left(\bar{e}_{g1}, e_{g2}, Z\right) = -\frac{ie\delta_{g1,g2}}{c_W}\begin{bmatrix} -\frac{1}{s_W}\left(\frac{1}{2} - s_W^2\right) \\ \hline s_W \end{bmatrix}$$

$$\underset{202}{C}\left(\bar{e}_{g1}, \nu_{g2}, W^-\right) = -\frac{ie\delta_{g1,g2}}{\sqrt{2}s_W}\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

$$\underset{203}{C}\left(\bar{\nu}_{g1}, e_{g2}, W^+\right) = -\frac{ie\delta_{g1,g2}}{\sqrt{2}s_W}\begin{bmatrix} 1 \\ \hline 0 \end{bmatrix}$$

[FFV] 2 Neutralinos – Gauge Boson

$$\underset{273}{C}\left(\tilde{\chi}_{n1}^0, \tilde{\chi}_{n2}^0, Z\right) = \frac{ie}{2c_W s_W}\begin{bmatrix} -Z_{n1,3}Z_{n2,3}^* + Z_{n1,4}Z_{n2,4}^* \\ \hline Z_{n2,3}Z_{n1,3}^* - Z_{n2,4}Z_{n1,4}^* \end{bmatrix}$$

[FFV] 2 Quarks – Gauge Boson

$$\underset{188}{C}\left(\bar{u}_{g1}, u_{g2}, \gamma\right) = -\frac{2}{3}ie\delta_{g1,g2}\begin{bmatrix} 1 \\ \hline 1 \end{bmatrix}$$

$$\underset{189}{C}\left(\bar{d}_{\text{g}1}, d_{\text{g}2}, \gamma\right) = \frac{1}{3} ie\delta_{\text{g}1,\text{g}2} \begin{bmatrix} 1 \\ \hline \\ 1 \end{bmatrix}$$

$$\underset{192}{C}\left(\bar{u}_{\text{g}1}, u_{\text{g}2}, Z\right) = \frac{ie\delta_{\text{g}1,\text{g}2}}{c_{\text{W}}} \begin{bmatrix} -\dfrac{1}{6s_{\text{W}}}\left(3 - 4s_{\text{W}}^2\right) \\ \hline \\ \dfrac{2s_{\text{W}}}{3} \end{bmatrix}$$

$$\underset{193}{C}\left(\bar{d}_{\text{g}1}, d_{\text{g}2}, Z\right) = -\frac{ie\delta_{\text{g}1,\text{g}2}}{c_{\text{W}}} \begin{bmatrix} -\dfrac{1}{6s_{\text{W}}}\left(3 - 2s_{\text{W}}^2\right) \\ \hline \\ \dfrac{s_{\text{W}}}{3} \end{bmatrix}$$

$$\underset{208}{C}\left(\bar{d}_{\text{g}1}, u_{\text{g}2}, W^-\right) = -\frac{ie\text{CKM}_{\text{g}2,\text{g}1}^*}{\sqrt{2}s_{\text{W}}} \begin{bmatrix} 1 \\ \hline \\ 0 \end{bmatrix}$$

$$\underset{209}{C}\left(\bar{u}_{\text{g}1}, d_{\text{g}2}, W^+\right) = -\frac{ie\text{CKM}_{\text{g}1,\text{g}2}}{\sqrt{2}s_{\text{W}}} \begin{bmatrix} 1 \\ \hline \\ 0 \end{bmatrix}$$

[SSS] **3 Higgs**

$$\underset{43}{C}\left(h^0, h^0, h^0\right) = \begin{bmatrix} -\dfrac{3iec_{2\alpha}M_{\text{W}}s_{\alpha+\beta}}{2s_{\text{W}}c_{\text{W}}^2} \end{bmatrix}$$

$$\underset{44}{C}\left(h^0, h^0, H^0\right) = \begin{bmatrix} \dfrac{ieM_{\text{W}}}{2s_{\text{W}}c_{\text{W}}^2}\left(c_{2\alpha}c_{\alpha+\beta} - 2s_{2\alpha}s_{\alpha+\beta}\right) \end{bmatrix}$$

$$\underset{45}{C}\left(h^0, H^0, H^0\right) = \begin{bmatrix} \dfrac{ieM_{\text{W}}}{2s_{\text{W}}c_{\text{W}}^2}\left(2c_{\alpha+\beta}s_{2\alpha} + c_{2\alpha}s_{\alpha+\beta}\right) \end{bmatrix}$$

$$\underset{46}{C}\left(H^0, H^0, H^0\right) = \begin{bmatrix} -\dfrac{3iec_{2\alpha}c_{\alpha+\beta}M_{\text{W}}}{2s_{\text{W}}c_{\text{W}}^2} \end{bmatrix}$$

$$\underset{47}{C}\left(h^0, A^0, A^0\right) = \begin{bmatrix} -\dfrac{iec_{2\beta}M_{\text{W}}s_{\alpha+\beta}}{2s_{\text{W}}c_{\text{W}}^2} \end{bmatrix}$$

$$C_{48}\left(h^0, A^0, G^0\right) = \left[-\frac{ieM_W s_{2\beta} s_{\alpha+\beta}}{2s_W c_W^2} \right]$$

$$C_{49}\left(h^0, G^0, G^0\right) = \left[\frac{iec_{2\beta} M_W s_{\alpha+\beta}}{2s_W c_W^2} \right]$$

$$C_{50}\left(H^0, A^0, A^0\right) = \left[\frac{iec_{2\beta} c_{\alpha+\beta} M_W}{2s_W c_W^2} \right]$$

$$C_{51}\left(H^0, A^0, G^0\right) = \left[\frac{iec_{\alpha+\beta} M_W s_{2\beta}}{2s_W c_W^2} \right]$$

$$C_{52}\left(H^0, G^0, G^0\right) = \left[-\frac{iec_{2\beta} c_{\alpha+\beta} M_W}{2s_W c_W^2} \right]$$

$$C_{53}\left(h^0, H^-, H^+\right) = \left[-\frac{ieM_W}{s_W}\left(\frac{c_{2\beta} s_{\alpha+\beta}}{2c_W^2} + s_{\beta-\alpha} \right) \right]$$

$$C_{54}\left(h^0, H^-, G^+\right) = \left[-\frac{ieM_W}{2s_W}\left(\frac{s_{2\beta} s_{\alpha+\beta}}{c_W^2} - c_{\beta-\alpha} \right) \right]$$

$$C_{55}\left(h^0, G^-, H^+\right) = \left[-\frac{ieM_W}{2s_W}\left(\frac{s_{2\beta} s_{\alpha+\beta}}{c_W^2} - c_{\beta-\alpha} \right) \right]$$

$$C_{56}\left(h^0, G^-, G^+\right) = \left[\frac{iec_{2\beta} M_W s_{\alpha+\beta}}{2s_W c_W^2} \right]$$

$$C_{57}\left(H^0, H^-, H^+\right) = \left[\frac{ieM_W}{s_W}\left(\frac{c_{2\beta} c_{\alpha+\beta}}{2c_W^2} - c_{\beta-\alpha} \right) \right]$$

$$C_{58}\left(H^0, H^-, G^+\right) = \left[\frac{ieM_W}{2s_W}\left(\frac{c_{\alpha+\beta} s_{2\beta}}{c_W^2} - s_{\beta-\alpha} \right) \right]$$

$$C_{59}\left(H^0, G^-, H^+\right) = \left[\frac{ieM_W}{2s_W}\left(\frac{c_{\alpha+\beta} s_{2\beta}}{c_W^2} - s_{\beta-\alpha} \right) \right]$$

$$C_{60}\left(H^0, G^-, G^+\right) = \left[-\frac{iec_{2\beta} c_{\alpha+\beta} M_W}{2s_W c_W^2} \right]$$

$$C_{61}\left(A^0, H^-, G^+\right) = \left[-\frac{eM_W}{2s_W} \right]$$

$$C_{62}\left(A^0, G^-, H^+\right) = \left[\frac{eM_W}{2s_W} \right]$$

$$\underset{212}{C}\left(A^0, \tilde{e}_{g2}^{s2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; -\frac{e\delta_{g2,g3}m_{e_{g2}}}{2M_W s_W}\left(\left(\mu + t_\beta A_{g2,g2}^{e*}\right)U_{s2,2}^{\tilde{e}_{g2}*}U_{s3,1}^{\tilde{e}_{g2}} - \left(\mu^* + t_\beta A_{g2,g2}^{e}\right)U_{s2,1}^{\tilde{e}_{g2}*}U_{s3,2}^{\tilde{e}_{g2}}\right) \;\right]$$

$$\underset{213}{C}\left(G^0, \tilde{e}_{g2}^{s2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; -\frac{e\delta_{g2,g3}m_{e_{g2}}}{2M_W s_W}\left(\left(\mu t_\beta - A_{g2,g2}^{e*}\right)U_{s2,2}^{\tilde{e}_{g2}*}U_{s3,1}^{\tilde{e}_{g2}} - \left(t_\beta\mu^* - A_{g2,g2}^{e}\right)U_{s2,1}^{\tilde{e}_{g2}*}U_{s3,2}^{\tilde{e}_{g2}}\right) \;\right]$$

$$\underset{218}{C}\left(h^0, \tilde{\nu}_{g2}, \tilde{\nu}_{g3}^{\dagger}\right) = \left[\; \frac{ie\delta_{g2,g3}M_Z s_{\alpha+\beta}}{2c_W s_W} \;\right]$$

$$\underset{219}{C}\left(H^0, \tilde{\nu}_{g2}, \tilde{\nu}_{g3}^{\dagger}\right) = \left[\; -\frac{ie\delta_{g2,g3}c_{\alpha+\beta}M_Z}{2c_W s_W} \;\right]$$

$$\underset{220}{C}\left(h^0, \tilde{e}_{g2}^{s2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; \frac{ie\delta_{g2,g3}}{2c_W c_\beta M_W s_W}\left(\begin{pmatrix}\left(2c_W s_\alpha m_{e_{g2}}^2 - c_\beta M_W M_Z s_{\alpha+\beta}\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g2}} + \\ c_W m_{e_{g2}}\left(c_\alpha\mu^* + s_\alpha A_{g2,g2}^{e}\right)U_{s3,2}^{\tilde{e}_{g2}}\end{pmatrix}U_{s2,1}^{\tilde{e}_{g2}*} + \begin{pmatrix}c_W m_{e_{g2}}\left(\mu c_\alpha + s_\alpha A_{g2,g2}^{e*}\right)U_{s3,1}^{\tilde{e}_{g2}} + 2c_W s_\alpha m_{e_{g2}}^2 U_{s3,2}^{\tilde{e}_{g2}} - \\ 2c_\beta M_W M_Z s_{\alpha+\beta}s_W^2 U_{s3,2}^{\tilde{e}_{g2}}\end{pmatrix}U_{s2,2}^{\tilde{e}_{g2}*}\right) \;\right]$$

$$\underset{221}{C}\left(H^0, \tilde{e}_{g2}^{s2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; \frac{ie\delta_{g2,g3}}{2c_W c_\beta M_W s_W}\left(\begin{pmatrix}c_W m_{e_{g2}}\left(\mu s_\alpha - c_\alpha A_{g2,g2}^{e*}\right)U_{s3,1}^{\tilde{e}_{g2}} - 2c_W c_\alpha m_{e_{g2}}^2 U_{s3,2}^{\tilde{e}_{g2}} + \\ 2c_{\alpha+\beta}c_\beta M_W M_Z s_W^2 U_{s3,2}^{\tilde{e}_{g2}}\end{pmatrix}U_{s2,2}^{\tilde{e}_{g2}*} - \begin{pmatrix}\left(2c_W c_\alpha m_{e_{g2}}^2 - c_{\alpha+\beta}c_\beta M_W M_Z\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g2}} - \\ c_W m_{e_{g2}}\left(s_\alpha\mu^* - c_\alpha A_{g2,g2}^{e}\right)U_{s3,2}^{\tilde{e}_{g2}}\end{pmatrix}U_{s2,1}^{\tilde{e}_{g2}*}\right) \;\right]$$

$$\underset{228}{C}\left(H^+, \tilde{e}_{g2}^{s2}, \tilde{\nu}_{g3}^{\dagger}\right) = \left[\; \frac{ie\delta_{g2,g3}}{\sqrt{2}M_W s_W}\left(\left(t_\beta m_{e_{g3}}^2 - s_{2\beta}M_W^2\right)U_{s2,1}^{\tilde{e}_{g3}*} + m_{e_{g3}}\left(\mu + t_\beta A_{g3,g3}^{e*}\right)U_{s2,2}^{\tilde{e}_{g3}*}\right) \;\right]$$

$$\underset{229}{C}\left(H^-, \tilde{\nu}_{g2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; \frac{ie\delta_{g2,g3}}{\sqrt{2}M_W s_W}\left(\left(t_\beta m_{e_{g2}}^2 - s_{2\beta}M_W^2\right)U_{s3,1}^{\tilde{e}_{g2}} + m_{e_{g2}}\left(\mu^* + t_\beta A_{g2,g2}^{e}\right)U_{s3,2}^{\tilde{e}_{g2}}\right) \;\right]$$

$$\underset{232}{C}\left(G^+, \tilde{e}_{g2}^{s2}, \tilde{\nu}_{g3}^{\dagger}\right) = \left[\; -\frac{ie\delta_{g2,g3}}{\sqrt{2}M_W s_W}\left(\left(m_{e_{g3}}^2 - c_{2\beta}M_W^2\right)U_{s2,1}^{\tilde{e}_{g3}*} - m_{e_{g3}}\left(\mu t_\beta - A_{g3,g3}^{e*}\right)U_{s2,2}^{\tilde{e}_{g3}*}\right) \;\right]$$

$$\underset{233}{C}\left(G^-, \tilde{\nu}_{g2}, \tilde{e}_{g3}^{s3,\dagger}\right) = \left[\; -\frac{ie\delta_{g2,g3}}{\sqrt{2}M_W s_W}\left(\left(m_{e_{g2}}^2 - c_{2\beta}M_W^2\right)U_{s3,1}^{\tilde{e}_{g2}} - m_{e_{g2}}\left(t_\beta\mu^* - A_{g2,g2}^{e}\right)U_{s3,2}^{\tilde{e}_{g2}}\right) \;\right]$$

$$\underset{214}{C}\left(A^0, \tilde{u}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[-\frac{e\delta_{g2,g3}m_{u_{g2}}}{2M_W s_W t_\beta}\left(\left(\mu t_\beta + A_{g2,g2}^{u*}\right)U_{s2,2}^{\tilde{u}_{g2}*}U_{s3,1}^{\tilde{u}_{g2}} - \left(t_\beta\mu^* + A_{g2,g2}^{u}\right)U_{s2,1}^{\tilde{u}_{g2}*}U_{s3,2}^{\tilde{u}_{g2}}\right) \right]$$

$$\underset{215}{C}\left(G^0, \tilde{u}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[\frac{e\delta_{g2,g3}m_{u_{g2}}}{2M_W s_W t_\beta}\left(\left(\mu - t_\beta A_{g2,g2}^{u*}\right)U_{s2,2}^{\tilde{u}_{g2}*}U_{s3,1}^{\tilde{u}_{g2}} - \left(\mu^* - t_\beta A_{g2,g2}^{u}\right)U_{s2,1}^{\tilde{u}_{g2}*}U_{s3,2}^{\tilde{u}_{g2}}\right) \right]$$

$$\underset{216}{C}\left(A^0, \tilde{d}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[-\frac{e\delta_{g2,g3}m_{d_{g2}}}{2M_W s_W}\left(\left(\mu + t_\beta A_{g2,g2}^{d*}\right)U_{s2,2}^{\tilde{d}_{g2}*}U_{s3,1}^{\tilde{d}_{g2}} - \left(\mu^* + t_\beta A_{g2,g2}^{d}\right)U_{s2,1}^{\tilde{d}_{g2}*}U_{s3,2}^{\tilde{d}_{g2}}\right) \right]$$

$$\underset{217}{C}\left(G^0, \tilde{d}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[-\frac{e\delta_{g2,g3}m_{d_{g2}}}{2M_W s_W}\left(\left(\mu t_\beta - A_{g2,g2}^{d*}\right)U_{s2,2}^{\tilde{d}_{g2}*}U_{s3,1}^{\tilde{d}_{g2}} - \left(t_\beta\mu^* - A_{g2,g2}^{d}\right)U_{s2,1}^{\tilde{d}_{g2}*}U_{s3,2}^{\tilde{d}_{g2}}\right) \right]$$

$$\underset{222}{C}\left(h^0, \tilde{u}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[-\frac{ie\delta_{g2,g3}}{6c_W M_W s_W s_\beta}\left(\begin{array}{l}\left(\begin{array}{l}\left(6c_W c_\alpha m_{u_{g2}}^2 - M_W M_Z s_{\alpha+\beta}s_\beta\left(3-4s_W^2\right)\right)U_{s3,1}^{\tilde{u}_{g2}} + \\ 3c_W m_{u_{g2}}\left(s_\alpha\mu^* + c_\alpha A_{g2,g2}^{u}\right)U_{s3,2}^{\tilde{u}_{g2}}\end{array}\right)U_{s2,1}^{\tilde{u}_{g2}*} + \\ \left(\begin{array}{l}3c_W m_{u_{g2}}\left(\mu s_\alpha + c_\alpha A_{g2,g2}^{u*}\right)U_{s3,1}^{\tilde{u}_{g2}} + 6c_W c_\alpha m_{u_{g2}}^2 U_{s3,2}^{\tilde{u}_{g2}} - \\ 4M_W M_Z s_{\alpha+\beta}s_\beta s_W^2 U_{s3,2}^{\tilde{u}_{g2}}\end{array}\right)U_{s2,2}^{\tilde{u}_{g2}*}\end{array}\right) \right]$$

$$\underset{223}{C}\left(H^0, \tilde{u}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[-\frac{ie\delta_{g2,g3}}{6c_W M_W s_W s_\beta}\left(\begin{array}{l}\left(\begin{array}{l}\left(6c_W s_\alpha m_{u_{g2}}^2 + c_{\alpha+\beta}M_W M_Z s_\beta\left(3-4s_W^2\right)\right)U_{s3,1}^{\tilde{u}_{g2}} - \\ 3c_W m_{u_{g2}}\left(c_\alpha\mu^* - s_\alpha A_{g2,g2}^{u}\right)U_{s3,2}^{\tilde{u}_{g2}}\end{array}\right)U_{s2,1}^{\tilde{u}_{g2}*} - \\ \left(\begin{array}{l}3c_W m_{u_{g2}}\left(\mu c_\alpha - s_\alpha A_{g2,g2}^{u*}\right)U_{s3,1}^{\tilde{u}_{g2}} - 6c_W s_\alpha m_{u_{g2}}^2 U_{s3,2}^{\tilde{u}_{g2}} - \\ 4c_{\alpha+\beta}M_W M_Z s_\beta s_W^2 U_{s3,2}^{\tilde{u}_{g2}}\end{array}\right)U_{s2,2}^{\tilde{u}_{g2}*}\end{array}\right) \right]$$

$$\underset{224}{C}\left(h^0, \tilde{d}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[\frac{ie\delta_{g2,g3}}{6c_W c_\beta M_W s_W}\left(\begin{array}{l}\left(\begin{array}{l}\left(6c_W s_\alpha m_{d_{g2}}^2 - c_\beta M_W M_Z s_{\alpha+\beta}\left(3-2s_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g2}} + \\ 3c_W m_{d_{g2}}\left(c_\alpha\mu^* + s_\alpha A_{g2,g2}^{d}\right)U_{s3,2}^{\tilde{d}_{g2}}\end{array}\right)U_{s2,1}^{\tilde{d}_{g2}*} + \\ \left(\begin{array}{l}3c_W m_{d_{g2}}\left(\mu c_\alpha + s_\alpha A_{g2,g2}^{d*}\right)U_{s3,1}^{\tilde{d}_{g2}} + 6c_W s_\alpha m_{d_{g2}}^2 U_{s3,2}^{\tilde{d}_{g2}} - \\ 2c_\beta M_W M_Z s_{\alpha+\beta}s_W^2 U_{s3,2}^{\tilde{d}_{g2}}\end{array}\right)U_{s2,2}^{\tilde{d}_{g2}*}\end{array}\right) \right]$$

$$\underset{225}{C}\left(H^0, \tilde{d}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[\frac{ie\delta_{g2,g3}}{6c_W c_\beta M_W s_W}\left(\begin{array}{l}\left(\begin{array}{l}3c_W m_{d_{g2}}\left(\mu s_\alpha - c_\alpha A_{g2,g2}^{d*}\right)U_{s3,1}^{\tilde{d}_{g2}} - 6c_W c_\alpha m_{d_{g2}}^2 U_{s3,2}^{\tilde{d}_{g2}} + \\ 2c_{\alpha+\beta}c_\beta M_W M_Z s_W^2 U_{s3,2}^{\tilde{d}_{g2}}\end{array}\right)U_{s2,2}^{\tilde{d}_{g2}*} - \\ \left(\begin{array}{l}\left(6c_W c_\alpha m_{d_{g2}}^2 - c_{\alpha+\beta}c_\beta M_W M_Z\left(3-2s_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g2}} - \\ 3c_W m_{d_{g2}}\left(s_\alpha\mu^* - c_\alpha A_{g2,g2}^{d}\right)U_{s3,2}^{\tilde{d}_{g2}}\end{array}\right)U_{s2,1}^{\tilde{d}_{g2}*}\end{array}\right) \right]$$

$$\underset{226}{C}\left(H^+, \tilde{d}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[\frac{ie\mathrm{CKM}_{g3,g2}}{\sqrt{2}M_W s_W t_\beta}\left(\begin{array}{l} m_{d_{g2}}U_{s2,2}^{\tilde{d}_{g2}*}\left(t_\beta\left(\mu + t_\beta A_{g2,g2}^{d*}\right)U_{s3,1}^{\tilde{u}_{g3}} + m_{u_{g3}}\left(1+t_\beta^2\right)U_{s3,2}^{\tilde{u}_{g3}}\right) + \\ \left(\begin{array}{l}\left(m_{u_{g3}}^2 + t_\beta\left(t_\beta m_{d_{g2}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{u}_{g3}} + \\ m_{u_{g3}}\left(t_\beta\mu^* + A_{g3,g3}^u\right)U_{s3,2}^{\tilde{u}_{g3}}\end{array}\right)U_{s2,1}^{\tilde{d}_{g2}*}\end{array}\right)\right]$$

$$\underset{227}{C}\left(H^-, \tilde{u}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[\frac{ie\mathrm{CKM}_{g2,g3}^*}{\sqrt{2}M_W s_W t_\beta}\left(\begin{array}{l} m_{u_{g2}}U_{s2,2}^{\tilde{u}_{g2}*}\left(\left(\mu t_\beta + A_{g2,g2}^{u*}\right)U_{s3,1}^{\tilde{d}_{g3}} + m_{d_{g3}}\left(1+t_\beta^2\right)U_{s3,2}^{\tilde{d}_{g3}}\right) + \\ \left(\begin{array}{l}\left(m_{u_{g2}}^2 + t_\beta\left(t_\beta m_{d_{g3}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g3}} + \\ m_{d_{g3}}t_\beta\left(\mu^* + t_\beta A_{g3,g3}^d\right)U_{s3,2}^{\tilde{d}_{g3}}\end{array}\right)U_{s2,1}^{\tilde{u}_{g2}*}\end{array}\right)\right]$$

$$\underset{230}{C}\left(G^+, \tilde{d}_{g2}^{s2}, \tilde{u}_{g3}^{s3,\dagger}\right) = \left[\frac{ie\mathrm{CKM}_{g3,g2}}{\sqrt{2}M_W s_W t_\beta}\left(\begin{array}{l} m_{d_{g2}}t_\beta\left(\mu t_\beta - A_{g2,g2}^{d*}\right)U_{s2,2}^{\tilde{d}_{g2}*}U_{s3,1}^{\tilde{u}_{g3}} - \\ U_{s2,1}^{\tilde{d}_{g2}*}\left(t_\beta\left(m_{d_{g2}}^2 - m_{u_{g3}}^2 - c_{2\beta}M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}} + m_{u_{g3}}\left(\mu^* - t_\beta A_{g3,g3}^u\right)U_{s3,2}^{\tilde{u}_{g3}}\right)\end{array}\right)\right]$$

$$\underset{231}{C}\left(G^-, \tilde{u}_{g2}^{s2}, \tilde{d}_{g3}^{s3,\dagger}\right) = \left[-\frac{ie\mathrm{CKM}_{g2,g3}^*}{\sqrt{2}M_W s_W t_\beta}\left(\begin{array}{l} m_{u_{g2}}\left(\mu - t_\beta A_{g2,g2}^{u*}\right)U_{s2,2}^{\tilde{u}_{g2}*}U_{s3,1}^{\tilde{d}_{g3}} + \\ t_\beta U_{s2,1}^{\tilde{u}_{g2}*}\left(\left(m_{d_{g3}}^2 - m_{u_{g2}}^2 - c_{2\beta}M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}} - m_{d_{g3}}\left(t_\beta\mu^* - A_{g3,g3}^d\right)U_{s3,2}^{\tilde{d}_{g3}}\right)\end{array}\right)\right]$$

[SSV] **2 Higgs – Gauge Boson**

$$\underset{1}{C}\left(G^-, G^+, \gamma\right) = \left[\ ie\ \right]$$

$$\underset{2}{C}\left(G^-, G^+, Z\right) = \left[\frac{ie}{2c_W s_W}\left(c_W^2 - s_W^2\right)\right]$$

$$\underset{3}{C}\left(G^0, G^-, W^+\right) = \left[\frac{e}{2s_W}\right]$$

$$\underset{4}{C}\left(G^0, G^+, W^-\right) = \left[\frac{e}{2s_W}\right]$$

$$\underset{63}{C}\left(h^0, A^0, Z\right) = \left[\frac{ec_{\beta-\alpha}}{2c_W s_W}\right]$$

$$\underset{64}{C}\left(h^0, G^0, Z\right) = \left[\frac{es_{\beta-\alpha}}{2c_W s_W}\right]$$

$$\underset{65}{C}\left(H^0, A^0, Z\right) = \left[-\frac{es_{\beta-\alpha}}{2c_W s_W}\right]$$

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$$\underset{66}{C}\left(H^0, G^0, Z\right) = \left[\ \frac{ec_{\beta-\alpha}}{2c_W s_W}\ \right]$$

$$\underset{67}{C}\left(H^-, H^+, \gamma\right) = \left[\ ie\ \right]$$

$$\underset{68}{C}\left(H^-, H^+, Z\right) = \left[\ \frac{ie}{2c_W s_W}\left(c_W^2 - s_W^2\right)\ \right]$$

$$\underset{69}{C}\left(h^0, H^-, W^+\right) = \left[\ -\frac{iec_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{70}{C}\left(h^0, G^-, W^+\right) = \left[\ -\frac{ies_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{71}{C}\left(H^0, H^-, W^+\right) = \left[\ \frac{ies_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{72}{C}\left(H^0, G^-, W^+\right) = \left[\ -\frac{iec_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{73}{C}\left(h^0, H^+, W^-\right) = \left[\ \frac{iec_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{74}{C}\left(h^0, G^+, W^-\right) = \left[\ \frac{ies_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{75}{C}\left(H^0, H^+, W^-\right) = \left[\ -\frac{ies_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{76}{C}\left(H^0, G^+, W^-\right) = \left[\ \frac{iec_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{77}{C}\left(A^0, H^-, W^+\right) = \left[\ \frac{e}{2s_W}\ \right]$$

$$\underset{78}{C}\left(A^0, H^+, W^-\right) = \left[\ \frac{e}{2s_W}\ \right]$$

$$\underset{234}{C}\left(\tilde{\nu}_{g1}, \tilde{\nu}_{g2}^{\dagger}, Z\right) = \left[\; -\frac{ie\delta_{g1,g2}}{2c_W s_W} \;\right]$$

$$\underset{235}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, \gamma\right) = \left[\; ie\delta_{g1,g2}\delta_{s1,s2} \;\right]$$

$$\underset{236}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, Z\right) = \left[\; \frac{ie\delta_{g1,g2}}{2c_W s_W}\left(\left(1-2s_W^2\right)U_{s1,1}^{\tilde{e}_{g1}*}U_{s2,1}^{\tilde{e}_{g1}} - 2s_W^2 U_{s1,2}^{\tilde{e}_{g1}*}U_{s2,2}^{\tilde{e}_{g1}}\right) \;\right]$$

$$\underset{243}{C}\left(\tilde{\nu}_{g1}, \tilde{e}_{g2}^{s2,\dagger}, W^-\right) = \left[\; -\frac{ie\delta_{g1,g2}U_{s2,1}^{\tilde{e}_{g1}}}{\sqrt{2}s_W} \;\right]$$

$$\underset{244}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{\nu}_{g2}^{\dagger}, W^+\right) = \left[\; -\frac{ie\delta_{g1,g2}U_{s1,1}^{\tilde{e}_{g2}*}}{\sqrt{2}s_W} \;\right]$$

$$\underset{237}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, \gamma\right) = \left[\; -\frac{2}{3}ie\delta_{g1,g2}\delta_{s1,s2} \;\right]$$

$$\underset{238}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, Z\right) = \left[\; -\frac{ie\delta_{g1,g2}}{6c_W s_W}\left(\left(3-4s_W^2\right)U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{u}_{g1}} - 4s_W^2 U_{s1,2}^{\tilde{u}_{g1}*}U_{s2,2}^{\tilde{u}_{g1}}\right) \;\right]$$

$$\underset{239}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \gamma\right) = \left[\; \frac{1}{3}ie\delta_{g1,g2}\delta_{s1,s2} \;\right]$$

$$\underset{240}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, Z\right) = \left[\; \frac{ie\delta_{g1,g2}}{6c_W s_W}\left(\left(3-2s_W^2\right)U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}} - 2s_W^2 U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}\right) \;\right]$$

$$\underset{241}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, W^-\right) = \left[\; -\frac{ie\text{CKM}_{g1,g2}^{*}U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{d}_{g2}}}{\sqrt{2}s_W} \;\right]$$

$$\underset{242}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, W^+\right) = \left[\; -\frac{ie\text{CKM}_{g2,g1}U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{u}_{g2}}}{\sqrt{2}s_W} \;\right]$$

$$\underset{11}{C}\left(G^0, u_-, \overline{u}_-\right) = \left[\ -\frac{e\xi_W M_W}{2s_W}\ \right]$$

$$\underset{12}{C}\left(G^0, u_+, \overline{u}_+\right) = \left[\ \frac{e\xi_W M_W}{2s_W}\ \right]$$

$$\underset{13}{C}\left(G^-, u_\gamma, \overline{u}_-\right) = \left[\ -ie\xi_W M_W\ \right]$$

$$\underset{14}{C}\left(G^+, u_\gamma, \overline{u}_+\right) = \left[\ -ie\xi_W M_W\ \right]$$

$$\underset{15}{C}\left(G^-, u_Z, \overline{u}_-\right) = \left[\ -\frac{ie\xi_W M_W}{2c_W s_W}\left(c_W^2 - s_W^2\right)\ \right]$$

$$\underset{16}{C}\left(G^+, u_Z, \overline{u}_+\right) = \left[\ -\frac{ie\xi_W M_W}{2c_W s_W}\left(c_W^2 - s_W^2\right)\ \right]$$

$$\underset{17}{C}\left(G^-, u_+, \overline{u}_Z\right) = \left[\ \frac{ie\xi_Z M_W}{2c_W s_W}\ \right]$$

$$\underset{18}{C}\left(G^+, u_-, \overline{u}_Z\right) = \left[\ \frac{ie\xi_Z M_W}{2c_W s_W}\ \right]$$

$$\underset{83}{C}\left(h^0, u_Z, \overline{u}_Z\right) = \left[\ -\frac{ie\xi_Z M_W s_{\beta-\alpha}}{2s_W c_W^2}\ \right]$$

$$\underset{84}{C}\left(H^0, u_Z, \overline{u}_Z\right) = \left[\ -\frac{ie\xi_Z c_{\beta-\alpha} M_W}{2s_W c_W^2}\ \right]$$

$$\underset{85}{C}\left(h^0, u_-, \overline{u}_-\right) = \left[\ -\frac{ie\xi_W M_W s_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{86}{C}\left(H^0, u_-, \overline{u}_-\right) = \left[\ -\frac{ie\xi_W c_{\beta-\alpha} M_W}{2s_W}\ \right]$$

$$\underset{87}{C}\left(h^0, u_+, \overline{u}_+\right) = \left[\ -\frac{ie\xi_W M_W s_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{88}{C}\left(H^0, u_+, \overline{u}_+\right) = \left[\ -\frac{ie\xi_W c_{\beta-\alpha} M_W}{2s_W}\ \right]$$

[SVV] Higgs – 2 Gauge Bosons

$$\underset{5}{C}\left(G^-,\gamma,W^+\right) = \left[\; ieM_W \;\right]$$

$$\underset{6}{C}\left(G^+,\gamma,W^-\right) = \left[\; ieM_W \;\right]$$

$$\underset{7}{C}\left(G^-,Z,W^+\right) = \left[\; -\frac{ieM_W s_W}{c_W} \;\right]$$

$$\underset{8}{C}\left(G^+,Z,W^-\right) = \left[\; -\frac{ieM_W s_W}{c_W} \;\right]$$

$$\underset{79}{C}\left(h^0,Z,Z\right) = \left[\; \frac{ieM_W s_{\beta-\alpha}}{s_W c_W^2} \;\right]$$

$$\underset{80}{C}\left(H^0,Z,Z\right) = \left[\; \frac{iec_{\beta-\alpha}M_W}{s_W c_W^2} \;\right]$$

$$\underset{81}{C}\left(h^0,W^-,W^+\right) = \left[\; \frac{ieM_W s_{\beta-\alpha}}{s_W} \;\right]$$

$$\underset{82}{C}\left(H^0,W^-,W^+\right) = \left[\; \frac{iec_{\beta-\alpha}M_W}{s_W} \;\right]$$

[UUV] 2 Ghosts – Gauge Boson

$$\underset{19}{C}\left(\bar{u}_-,u_-,\gamma\right) = -ie \left[\begin{array}{c} 1 \\ \hline 0 \end{array}\right]$$

$$\underset{20}{C}\left(\bar{u}_+,u_+,\gamma\right) = ie \left[\begin{array}{c} 1 \\ \hline 0 \end{array}\right]$$

$$\underset{21}{C}\left(\bar{u}_-,u_-,Z\right) = -\frac{iec_W}{s_W} \left[\begin{array}{c} 1 \\ \hline 0 \end{array}\right]$$

$$\underset{22}{C}\left(\bar{u}_{+}, u_{+}, Z\right) = \frac{iec_{\mathrm{W}}}{s_{\mathrm{W}}}\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{23}{C}\left(\bar{u}_{-}, u_{\gamma}, W^{-}\right) = ie\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{24}{C}\left(\bar{u}_{+}, u_{\gamma}, W^{+}\right) = -ie\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{25}{C}\left(\bar{u}_{\gamma}, u_{+}, W^{-}\right) = -ie\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{26}{C}\left(\bar{u}_{\gamma}, u_{-}, W^{+}\right) = ie\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{27}{C}\left(\bar{u}_{-}, u_{Z}, W^{-}\right) = \frac{iec_{\mathrm{W}}}{s_{\mathrm{W}}}\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{28}{C}\left(\bar{u}_{+}, u_{Z}, W^{+}\right) = -\frac{iec_{\mathrm{W}}}{s_{\mathrm{W}}}\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{29}{C}\left(\bar{u}_{Z}, u_{+}, W^{-}\right) = -\frac{iec_{\mathrm{W}}}{s_{\mathrm{W}}}\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{30}{C}\left(\bar{u}_{Z}, u_{-}, W^{+}\right) = \frac{iec_{\mathrm{W}}}{s_{\mathrm{W}}}\begin{bmatrix}1\\ \hline 0\end{bmatrix}$$

$$\underset{9}{C}\left(\gamma, W^+, W^-\right) = \left[\ -ie\ \right]$$

$$\underset{10}{C}\left(Z, W^+, W^-\right) = \left[\ -\frac{iec_W}{s_W}\ \right]$$

[SSSS] **4 Higgs**

$$\underset{89}{C}\left(h^0, h^0, h^0, h^0\right) = \left[\ -\frac{3ie^2 c_{2\alpha}^2}{4c_W^2 s_W^2}\ \right]$$

$$\underset{90}{C}\left(h^0, h^0, h^0, H^0\right) = \left[\ -\frac{3ie^2 c_{2\alpha} s_{2\alpha}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{91}{C}\left(h^0, h^0, H^0, H^0\right) = \left[\ \frac{ie^2}{4c_W^2 s_W^2}\left(1 - 3s_{2\alpha}^2\right)\ \right]$$

$$\underset{92}{C}\left(h^0, H^0, H^0, H^0\right) = \left[\ \frac{3ie^2 c_{2\alpha} s_{2\alpha}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{93}{C}\left(H^0, H^0, H^0, H^0\right) = \left[\ -\frac{3ie^2 c_{2\alpha}^2}{4c_W^2 s_W^2}\ \right]$$

$$\underset{94}{C}\left(h^0, h^0, A^0, A^0\right) = \left[\ -\frac{ie^2 c_{2\alpha} c_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{95}{C}\left(h^0, h^0, A^0, G^0\right) = \left[\ -\frac{ie^2 c_{2\alpha} s_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{96}{C}\left(h^0, h^0, G^0, G^0\right) = \left[\ \frac{ie^2 c_{2\alpha} c_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{97}{C}\left(h^0, H^0, A^0, A^0\right) = \left[\ -\frac{ie^2 c_{2\beta} s_{2\alpha}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{98}{C}\left(h^0, H^0, A^0, G^0\right) = \left[\ -\frac{ie^2 s_{2\alpha} s_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{99}{C}\left(h^0, H^0, G^0, G^0\right) = \left[\ \frac{ie^2 c_{2\beta} s_{2\alpha}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{100}{C}\left(H^0, H^0, A^0, A^0\right) = \left[\ \frac{ie^2 c_{2\alpha} c_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{101}{C}\left(H^0, H^0, A^0, G^0\right) = \left[\ \frac{ie^2 c_{2\alpha} s_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{102}{C}\left(H^0, H^0, G^0, G^0\right) = \left[\ -\frac{ie^2 c_{2\alpha} c_{2\beta}}{4c_W^2 s_W^2}\ \right]$$

$$\underset{103}{C}\left(h^0, h^0, H^-, H^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(1 + \frac{c_{2\alpha} c_{2\beta} s_W^2}{c_W^2} - s_{2\alpha} s_{2\beta}\right)\ \right]$$

$$\underset{104}{C}\left(h^0, h^0, H^-, G^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(\frac{c_{2\alpha} s_{2\beta} s_W^2}{c_W^2} + c_{2\beta} s_{2\alpha}\right)\ \right]$$

$$\underset{105}{C}\left(h^0, h^0, G^-, H^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(\frac{c_{2\alpha} s_{2\beta} s_W^2}{c_W^2} + c_{2\beta} s_{2\alpha}\right)\ \right]$$

$$\underset{106}{C}\left(h^0, h^0, G^-, G^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(1 - \frac{c_{2\alpha} c_{2\beta} s_W^2}{c_W^2} + s_{2\alpha} s_{2\beta}\right)\ \right]$$

$$\underset{107}{C}\left(h^0, H^0, H^-, H^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(\frac{c_{2\beta} s_{2\alpha} s_W^2}{c_W^2} + c_{2\alpha} s_{2\beta}\right)\ \right]$$

$$\underset{108}{C}\left(h^0, H^0, H^-, G^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(\frac{s_{2\alpha} s_{2\beta} s_W^2}{c_W^2} - c_{2\alpha} c_{2\beta}\right)\ \right]$$

$$\underset{109}{C}\left(h^0, H^0, G^-, H^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(\frac{s_{2\alpha} s_{2\beta} s_W^2}{c_W^2} - c_{2\alpha} c_{2\beta}\right)\ \right]$$

$$\underset{110}{C}\left(h^0, H^0, G^-, G^+\right) = \left[\ \frac{ie^2}{4s_W^2}\left(\frac{c_{2\beta} s_{2\alpha} s_W^2}{c_W^2} + c_{2\alpha} s_{2\beta}\right)\ \right]$$

$$\underset{111}{C}\left(H^0, H^0, H^-, H^+\right) = \left[\ -\frac{ie^2}{4s_W^2}\left(1 - \frac{c_{2\alpha} c_{2\beta} s_W^2}{c_W^2} + s_{2\alpha} s_{2\beta}\right)\ \right]$$

$$\underset{112}{C}\left(H^0, H^0, H^-, G^+\right) = \left[\ \frac{ie^2}{4s_W^2}\left(\frac{c_{2\alpha} s_{2\beta} s_W^2}{c_W^2} + c_{2\beta} s_{2\alpha}\right)\ \right]$$

$$\underset{113}{C}\left(H^0, H^0, G^-, H^+\right) = \left[\frac{ie^2}{4s_W^2}\left(\frac{c_{2\alpha}s_{2\beta}s_W^2}{c_W^2} + c_{2\beta}s_{2\alpha}\right) \right]$$

$$\underset{114}{C}\left(H^0, H^0, G^-, G^+\right) = \left[-\frac{ie^2}{4s_W^2}\left(1 + \frac{c_{2\alpha}c_{2\beta}s_W^2}{c_W^2} - s_{2\alpha}s_{2\beta}\right) \right]$$

$$\underset{115}{C}\left(h^0, A^0, H^-, G^+\right) = \left[-\frac{e^2 s_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{116}{C}\left(h^0, A^0, G^-, H^+\right) = \left[\frac{e^2 s_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{117}{C}\left(h^0, G^0, H^-, G^+\right) = \left[\frac{e^2 c_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{118}{C}\left(h^0, G^0, G^-, H^+\right) = \left[-\frac{e^2 c_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{119}{C}\left(H^0, A^0, H^-, G^+\right) = \left[-\frac{e^2 c_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{120}{C}\left(H^0, A^0, G^-, H^+\right) = \left[\frac{e^2 c_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{121}{C}\left(H^0, G^0, H^-, G^+\right) = \left[-\frac{e^2 s_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{122}{C}\left(H^0, G^0, G^-, H^+\right) = \left[\frac{e^2 s_{\beta-\alpha}}{4s_W^2} \right]$$

$$\underset{123}{C}\left(A^0, A^0, A^0, A^0\right) = \left[-\frac{3ie^2 c_{2\beta}^2}{4c_W^2 s_W^2} \right]$$

$$\underset{124}{C}\left(A^0, A^0, A^0, G^0\right) = \left[-\frac{3ie^2 c_{2\beta}s_{2\beta}}{4c_W^2 s_W^2} \right]$$

$$\underset{125}{C}\left(A^0, A^0, G^0, G^0\right) = \left[\frac{ie^2}{4c_W^2 s_W^2}\left(1 - 3s_{2\beta}^2\right) \right]$$

$$\underset{126}{C}\left(A^0, G^0, G^0, G^0\right) = \left[\frac{3ie^2 c_{2\beta}s_{2\beta}}{4c_W^2 s_W^2} \right]$$

$$\underset{127}{C}\left(G^0,G^0,G^0,G^0\right) = \left[\; -\frac{3ie^2c_{2\beta}^2}{4c_W^2s_W^2} \;\right]$$

$$\underset{128}{C}\left(A^0,A^0,H^-,H^+\right) = \left[\; -\frac{ie^2c_{2\beta}^2}{4c_W^2s_W^2} \;\right]$$

$$\underset{129}{C}\left(A^0,A^0,H^-,G^+\right) = \left[\; -\frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{130}{C}\left(A^0,A^0,G^-,H^+\right) = \left[\; -\frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{131}{C}\left(A^0,A^0,G^-,G^+\right) = \left[\; -\frac{ie^2}{4s_W^2}\left(1-\frac{c_{2\beta}^2s_W^2}{c_W^2}+s_{2\beta}^2\right) \;\right]$$

$$\underset{132}{C}\left(A^0,G^0,H^-,H^+\right) = \left[\; -\frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{133}{C}\left(A^0,G^0,H^-,G^+\right) = \left[\; -\frac{ie^2}{4s_W^2}\left(\frac{s_W^2s_{2\beta}^2}{c_W^2}-c_{2\beta}^2\right) \;\right]$$

$$\underset{134}{C}\left(A^0,G^0,G^-,H^+\right) = \left[\; -\frac{ie^2}{4s_W^2}\left(\frac{s_W^2s_{2\beta}^2}{c_W^2}-c_{2\beta}^2\right) \;\right]$$

$$\underset{135}{C}\left(A^0,G^0,G^-,G^+\right) = \left[\; \frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{136}{C}\left(G^0,G^0,H^-,H^+\right) = \left[\; -\frac{ie^2}{4s_W^2}\left(1-\frac{c_{2\beta}^2s_W^2}{c_W^2}+s_{2\beta}^2\right) \;\right]$$

$$\underset{137}{C}\left(G^0,G^0,H^-,G^+\right) = \left[\; \frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{138}{C}\left(G^0,G^0,G^-,H^+\right) = \left[\; \frac{ie^2c_{2\beta}s_{2\beta}}{4c_W^2s_W^2} \;\right]$$

$$\underset{139}{C}\left(G^0,G^0,G^-,G^+\right) = \left[\; -\frac{ie^2c_{2\beta}^2}{4c_W^2s_W^2} \;\right]$$

$$\underset{140}{C}\left(H^-,H^-,H^+,H^+\right)=\left[-\frac{ie^2c_{2\beta}^2}{2c_W^2s_W^2}\right]$$

$$\underset{141}{C}\left(H^-,H^-,H^+,G^+\right)=\left[-\frac{ie^2c_{2\beta}s_{2\beta}}{2c_W^2s_W^2}\right]$$

$$\underset{142}{C}\left(H^-,H^-,G^+,G^+\right)=\left[-\frac{ie^2s_{2\beta}^2}{2c_W^2s_W^2}\right]$$

$$\underset{143}{C}\left(H^-,G^-,H^+,H^+\right)=\left[-\frac{ie^2c_{2\beta}s_{2\beta}}{2c_W^2s_W^2}\right]$$

$$\underset{144}{C}\left(H^-,G^-,H^+,G^+\right)=\left[\frac{ie^2}{4c_W^2s_W^2}\left(c_{2\beta}^2-s_{2\beta}^2\right)\right]$$

$$\underset{145}{C}\left(H^-,G^-,G^+,G^+\right)=\left[\frac{ie^2c_{2\beta}s_{2\beta}}{2c_W^2s_W^2}\right]$$

$$\underset{146}{C}\left(G^-,G^-,H^+,H^+\right)=\left[-\frac{ie^2s_{2\beta}^2}{2c_W^2s_W^2}\right]$$

$$\underset{147}{C}\left(G^-,G^-,H^+,G^+\right)=\left[\frac{ie^2c_{2\beta}s_{2\beta}}{2c_W^2s_W^2}\right]$$

$$\underset{148}{C}\left(G^-,G^-,G^+,G^+\right)=\left[-\frac{ie^2c_{2\beta}^2}{2c_W^2s_W^2}\right]$$

[SSSS] **4 Sleptons**

$$\underset{378}{C}\left(\tilde{e}_{g1}^{s1},\tilde{e}_{g2}^{s2,\dagger},\tilde{e}_{g3}^{s3},\tilde{e}_{g4}^{s4,\dagger}\right)=\left[-\frac{ie^2}{4c_W^2c_\beta^2M_W^2s_W^2}\left(\boxed{2}U_{s1,1}^{\tilde{e}g1*}+2\boxed{1}U_{s1,2}^{\tilde{e}g1*}\right)\right]$$

$$\boxed{2}=\delta_{g1,g4}\delta_{g2,g3}c_\beta^2M_W^2U_{s2,1}^{\tilde{e}g2}U_{s3,1}^{\tilde{e}g2*}U_{s4,1}^{\tilde{e}g1}-2\delta_{g1,g4}\delta_{g2,g3}U_{s3,2}^{\tilde{e}g2*}\left(c_\beta^2M_W^2s_W^2U_{s2,2}^{\tilde{e}g2}U_{s4,1}^{\tilde{e}g1}-m_{e_{g1}}m_{e_{g2}}c_W^2U_{s2,1}^{\tilde{e}g2}U_{s4,2}^{\tilde{e}g1}\right)+$$
$$\delta_{g1,g2}\delta_{g3,g4}\left(c_\beta^2M_W^2U_{s2,1}^{\tilde{e}g1}U_{s3,1}^{\tilde{e}g3*}U_{s4,1}^{\tilde{e}g3}+2U_{s3,2}^{\tilde{e}g3*}\left(m_{e_{g1}}m_{e_{g3}}c_W^2U_{s2,2}^{\tilde{e}g1}U_{s4,1}^{\tilde{e}g3}-c_\beta^2M_W^2s_W^2U_{s2,1}^{\tilde{e}g1}U_{s4,2}^{\tilde{e}g3}\right)\right)$$

$$\boxed{1}=2\delta_{g1,g4}\delta_{g2,g3}c_\beta^2M_W^2s_W^2U_{s2,2}^{\tilde{e}g2}U_{s3,2}^{\tilde{e}g2*}U_{s4,2}^{\tilde{e}g1}+\delta_{g1,g4}\delta_{g2,g3}U_{s3,1}^{\tilde{e}g2*}\left(m_{e_{g1}}m_{e_{g2}}c_W^2U_{s2,2}^{\tilde{e}g2}U_{s4,1}^{\tilde{e}g1}-c_\beta^2M_W^2s_W^2U_{s2,1}^{\tilde{e}g2}U_{s4,2}^{\tilde{e}g1}\right)+$$
$$\delta_{g1,g2}\delta_{g3,g4}\left(2c_\beta^2M_W^2s_W^2U_{s2,2}^{\tilde{e}g1}U_{s3,2}^{\tilde{e}g3*}U_{s4,2}^{\tilde{e}g3}-U_{s3,1}^{\tilde{e}g3*}\left(c_\beta^2M_W^2s_W^2U_{s2,2}^{\tilde{e}g1}U_{s4,1}^{\tilde{e}g3}-m_{e_{g1}}m_{e_{g3}}c_W^2U_{s2,1}^{\tilde{e}g1}U_{s4,2}^{\tilde{e}g3}\right)\right)$$

$$\underset{379}{C}\left(\tilde{e}_{g1}^{s1},\tilde{e}_{g2}^{s2,\dagger},\tilde{v}_{g3},\tilde{v}_{g4}^{\dagger}\right) = \left[\; \frac{ie^2}{4s_W^2}\left(\begin{array}{l} \dfrac{\delta_{g1,g2}\delta_{g3,g4}}{c_W^2}\left(\left(c_W^2 - s_W^2\right)U_{s1,1}^{\tilde{e}_{g1}*}U_{s2,1}^{\tilde{e}_{g1}} + 2s_W^2 U_{s1,2}^{\tilde{e}_{g1}*}U_{s2,2}^{\tilde{e}_{g1}}\right) - \\ \dfrac{2\delta_{g1,g4}\delta_{g2,g3}}{c_\beta^2 M_W^2}\left(c_\beta^2 M_W^2 U_{s1,1}^{\tilde{e}_{g1}*}U_{s2,1}^{\tilde{e}_{g2}} + m_{e_{g1}}m_{e_{g2}}U_{s1,2}^{\tilde{e}_{g1}*}U_{s2,2}^{\tilde{e}_{g2}}\right) \end{array}\right)\right]$$

$$\underset{381}{C}\left(\tilde{v}_{g1},\tilde{v}_{g2}^{\dagger},\tilde{v}_{g3},\tilde{v}_{g4}^{\dagger}\right) = \left[\; -\frac{ie^2}{4c_W^2 s_W^2}\left(\delta_{g1,g4}\delta_{g2,g3} + \delta_{g1,g2}\delta_{g3,g4}\right)\;\right]$$

[SSSS] 4 Squarks

$$\underset{372}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},\tilde{d}_{g3}^{s3},\tilde{d}_{g4}^{s4,\dagger}\right) = \left[\; (\boxed{2})\delta_{g1,g4}\delta_{g2,g3} + (\boxed{1})\delta_{g1,g2}\delta_{g3,g4}\;\right]$$

$$\boxed{2} = \frac{ie^2}{36c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} -i\left(T_{c2,c3}^x T_{c4,c1}^x\right)g_s^2\left(U_{s2,1}^{\tilde{d}_{g2}}U_{s3,1}^{\tilde{d}_{g2}*} - U_{s2,2}^{\tilde{d}_{g2}}U_{s3,2}^{\tilde{d}_{g2}*}\right)\left(U_{s1,1}^{\tilde{d}_{g1}*}U_{s4,1}^{\tilde{d}_{g1}} - U_{s1,2}^{\tilde{d}_{g1}*}U_{s4,2}^{\tilde{d}_{g1}}\right) - \\[2mm] \left(\begin{array}{l} \left(\begin{array}{l} \left(8c_W^2 + 1\right)c_\beta^2 M_W^2 U_{s2,1}^{\tilde{d}_{g2}}U_{s3,1}^{\tilde{d}_{g2}*}U_{s4,1}^{\tilde{d}_{g1}} + \\ 2U_{s3,2}^{\tilde{d}_{g2}*}\left(c_\beta^2 M_W^2 s_W^2 U_{s2,2}^{\tilde{d}_{g2}}U_{s4,1}^{\tilde{d}_{g1}} + 9m_{d_{g1}}m_{d_{g2}}c_W^2 U_{s2,1}^{\tilde{d}_{g2}}U_{s4,2}^{\tilde{d}_{g1}}\right)\end{array}\right)U_{s1,1}^{\tilde{d}_{g1}*} + \\[4mm] 2\left(\begin{array}{l} 2c_\beta^2 M_W^2 s_W^2 U_{s2,2}^{\tilde{d}_{g2}}U_{s3,2}^{\tilde{d}_{g2}*}U_{s4,2}^{\tilde{d}_{g1}} + \\ U_{s3,1}^{\tilde{d}_{g2}*}\left(9m_{d_{g1}}m_{d_{g2}}c_W^2 U_{s2,2}^{\tilde{d}_{g2}}U_{s4,1}^{\tilde{d}_{g1}} + c_\beta^2 M_W^2 s_W^2 U_{s2,1}^{\tilde{d}_{g2}}U_{s4,2}^{\tilde{d}_{g1}}\right)\end{array}\right)U_{s1,2}^{\tilde{d}_{g1}*}\end{array}\right)\end{array}\right)$$

$$\boxed{1} = \frac{ie^2}{36c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} -i\left(T_{c2,c1}^x T_{c4,c3}^x\right)g_s^2\left(U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}} - U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}\right)\left(U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g3}} - U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g3}}\right) - \\[2mm] \left(\begin{array}{l} 2\left(\begin{array}{l} 2c_\beta^2 M_W^2 s_W^2 U_{s2,2}^{\tilde{d}_{g1}}U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g3}} + \\ U_{s3,1}^{\tilde{d}_{g3}*}\left(c_\beta^2 M_W^2 s_W^2 U_{s2,2}^{\tilde{d}_{g1}}U_{s4,1}^{\tilde{d}_{g3}} + 9m_{d_{g1}}m_{d_{g3}}c_W^2 U_{s2,1}^{\tilde{d}_{g1}}U_{s4,2}^{\tilde{d}_{g3}}\right)\end{array}\right)U_{s1,2}^{\tilde{d}_{g1}*} + \\[4mm] \left(\begin{array}{l} \left(8c_W^2 + 1\right)c_\beta^2 M_W^2 U_{s2,1}^{\tilde{d}_{g1}}U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g3}} + \\ 2U_{s3,2}^{\tilde{d}_{g3}*}\left(9m_{d_{g1}}m_{d_{g3}}c_W^2 U_{s2,2}^{\tilde{d}_{g1}}U_{s4,1}^{\tilde{d}_{g3}} + c_\beta^2 M_W^2 s_W^2 U_{s2,1}^{\tilde{d}_{g1}}U_{s4,2}^{\tilde{d}_{g3}}\right)\end{array}\right)U_{s1,1}^{\tilde{d}_{g1}*}\end{array}\right)\end{array}\right)$$

$$\underset{375}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},\tilde{u}_{g3}^{s3},\tilde{u}_{g4}^{s4,\dagger}\right) = \left[\;\boxed{1}\;\right]$$

$$
\boxed{1} = \begin{pmatrix} -\dfrac{ie^2\mathrm{CKM}_{g4,g1}\mathrm{CKM}^*_{g3,g2}}{2c_\beta^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l} s_\beta^2\left(c_\beta^2 M_W^2 U^{\tilde{d}_{g1}*}_{s1,1}U^{\tilde{d}_{g2}}_{s2,1}+m_{d_{g1}}m_{d_{g2}}U^{\tilde{d}_{g1}*}_{s1,2}U^{\tilde{d}_{g2}}_{s2,2}\right)U^{\tilde{u}_{g3}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1}+ \\ m_{u_{g3}}m_{u_{g4}}c_\beta^2 U^{\tilde{d}_{g1}*}_{s1,1}U^{\tilde{d}_{g2}}_{s2,1}U^{\tilde{u}_{g3}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2}\end{array}\right) - \\[2em] \left(\begin{array}{l} i\left(T^{\mathrm{x}}_{c2,c1}T^{\mathrm{x}}_{c4,c3}\right)g_s^2\left(U^{\tilde{d}_{g1}*}_{s1,1}U^{\tilde{d}_{g1}}_{s2,1}-U^{\tilde{d}_{g1}*}_{s1,2}U^{\tilde{d}_{g1}}_{s2,2}\right)\left(U^{\tilde{u}_{g3}*}_{s3,1}U^{\tilde{u}_{g3}}_{s4,1}-U^{\tilde{u}_{g3}*}_{s3,2}U^{\tilde{u}_{g3}}_{s4,2}\right) - \\[1.5em] \dfrac{ie^2}{36c_W^2 s_W^2}\left(\begin{array}{l}\left(\left(9c_W^2-s_W^2\right)U^{\tilde{d}_{g1}*}_{s1,1}U^{\tilde{d}_{g1}}_{s2,1}-2s_W^2 U^{\tilde{d}_{g1}*}_{s1,2}U^{\tilde{d}_{g1}}_{s2,2}\right)U^{\tilde{u}_{g3}*}_{s3,1}U^{\tilde{u}_{g3}}_{s4,1}+ \\ 4s_W^2\left(U^{\tilde{d}_{g1}*}_{s1,1}U^{\tilde{d}_{g1}}_{s2,1}+2U^{\tilde{d}_{g1}*}_{s1,2}U^{\tilde{d}_{g1}}_{s2,2}\right)U^{\tilde{u}_{g3}*}_{s3,2}U^{\tilde{u}_{g3}}_{s4,2}\end{array}\right)\end{array}\right)\delta_{g1,g2}\delta_{g3,g4}\end{pmatrix}
$$

$$
\underset{383}{C}\left(\tilde{u}^{s1}_{g1},\tilde{u}^{s2,\dagger}_{g2},\tilde{u}^{s3}_{g3},\tilde{u}^{s4,\dagger}_{g4}\right) = \left[\;(\boxed{2})\delta_{g1,g4}\delta_{g2,g3}+(\boxed{1})\delta_{g1,g2}\delta_{g3,g4}\;\right]
$$

$$
\boxed{2} = \begin{pmatrix}-i\left(T^{\mathrm{x}}_{c2,c3}T^{\mathrm{x}}_{c4,c1}\right)g_s^2\left(U^{\tilde{u}_{g2}}_{s2,1}U^{\tilde{u}_{g2}*}_{s3,1}-U^{\tilde{u}_{g2}}_{s2,2}U^{\tilde{u}_{g2}*}_{s3,2}\right)\left(U^{\tilde{u}_{g1}*}_{s1,1}U^{\tilde{u}_{g1}}_{s4,1}-U^{\tilde{u}_{g1}*}_{s1,2}U^{\tilde{u}_{g1}}_{s4,2}\right) - \\[1.5em] \dfrac{ie^2}{36c_W^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l}\left(\begin{array}{l}\left(8c_W^2+1\right)M_W^2 s_\beta^2 U^{\tilde{u}_{g2}}_{s2,1}U^{\tilde{u}_{g2}*}_{s3,1}U^{\tilde{u}_{g1}}_{s4,1}- \\ 2U^{\tilde{u}_{g2}*}_{s3,2}\left(2M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g2}}_{s2,2}U^{\tilde{u}_{g1}}_{s4,1}-9m_{u_{g1}}m_{u_{g2}}c_W^2 U^{\tilde{u}_{g2}}_{s2,1}U^{\tilde{u}_{g1}}_{s4,2}\right)\end{array}\right)U^{\tilde{u}_{g1}*}_{s1,1}+ \\[2.5em] 2\left(\begin{array}{l}8M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g2}}_{s2,2}U^{\tilde{u}_{g2}*}_{s3,2}U^{\tilde{u}_{g1}}_{s4,2}+ \\ U^{\tilde{u}_{g2}*}_{s3,1}\left(9m_{u_{g1}}m_{u_{g2}}c_W^2 U^{\tilde{u}_{g2}}_{s2,2}U^{\tilde{u}_{g1}}_{s4,1}-2M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g2}}_{s2,1}U^{\tilde{u}_{g1}}_{s4,2}\right)\end{array}\right)U^{\tilde{u}_{g1}*}_{s1,2}\end{array}\right)\end{pmatrix}
$$

$$
\boxed{1} = \begin{pmatrix}-i\left(T^{\mathrm{x}}_{c2,c1}T^{\mathrm{x}}_{c4,c3}\right)g_s^2\left(U^{\tilde{u}_{g1}*}_{s1,1}U^{\tilde{u}_{g1}}_{s2,1}-U^{\tilde{u}_{g1}*}_{s1,2}U^{\tilde{u}_{g1}}_{s2,2}\right)\left(U^{\tilde{u}_{g3}*}_{s3,1}U^{\tilde{u}_{g3}}_{s4,1}-U^{\tilde{u}_{g3}*}_{s3,2}U^{\tilde{u}_{g3}}_{s4,2}\right) - \\[1.5em] \dfrac{ie^2}{36c_W^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l}2\left(\begin{array}{l}8M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g1}}_{s2,2}U^{\tilde{u}_{g3}*}_{s3,2}U^{\tilde{u}_{g3}}_{s4,2}- \\ U^{\tilde{u}_{g3}*}_{s3,1}\left(2M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g1}}_{s2,2}U^{\tilde{u}_{g3}}_{s4,1}-9m_{u_{g1}}m_{u_{g3}}c_W^2 U^{\tilde{u}_{g1}}_{s2,1}U^{\tilde{u}_{g3}}_{s4,2}\right)\end{array}\right)U^{\tilde{u}_{g1}*}_{s1,2}+ \\[2.5em] \left(\begin{array}{l}\left(8c_W^2+1\right)M_W^2 s_\beta^2 U^{\tilde{u}_{g1}}_{s2,1}U^{\tilde{u}_{g3}*}_{s3,1}U^{\tilde{u}_{g3}}_{s4,1}+ \\ 2U^{\tilde{u}_{g3}*}_{s3,2}\left(9m_{u_{g1}}m_{u_{g3}}c_W^2 U^{\tilde{u}_{g1}}_{s2,2}U^{\tilde{u}_{g3}}_{s4,1}-2M_W^2 s_W^2 s_\beta^2 U^{\tilde{u}_{g1}}_{s2,1}U^{\tilde{u}_{g3}}_{s4,2}\right)\end{array}\right)U^{\tilde{u}_{g1}*}_{s1,1}\end{array}\right)\end{pmatrix}
$$

$\boxed{[\text{SSSS}]\ \textbf{2 Higgs} - \textbf{2 Sleptons}}$

$$
\underset{278}{C}\left(h^0,h^0,\tilde{\nu}_{g3},\tilde{\nu}^{\dagger}_{g4}\right) = \left[\;\dfrac{ie^2\delta_{g3,g4}c_{2\alpha}}{4c_W^2 s_W^2}\;\right]
$$

$$
\underset{279}{C}\left(h^0,h^0,\tilde{e}^{s3}_{g3},\tilde{e}^{s4,\dagger}_{g4}\right) = \left[\;-\dfrac{ie^2\delta_{g3,g4}}{4c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l}\left(c_{2\alpha}c_\beta^2 M_W^2\left(1-2s_W^2\right)+2c_W^2 m_{e_{g4}}^2 s_\alpha^2\right)U^{\tilde{e}_{g4}*}_{s3,1}U^{\tilde{e}_{g4}}_{s4,1}+ \\ 2\left(c_{2\alpha}c_\beta^2 M_W^2 s_W^2+c_W^2 m_{e_{g4}}^2 s_\alpha^2\right)U^{\tilde{e}_{g4}*}_{s3,2}U^{\tilde{e}_{g4}}_{s4,2}\end{array}\right)\;\right]
$$

$$\underset{282}{C}\left(H^0, H^0, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^\dagger\right) = \left[-\frac{ie^2\delta_{g3,g4}c_{2\alpha}}{4c_W^2 s_W^2} \right]$$

$$\underset{283}{C}\left(H^0, H^0, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{4c_W^2 c_\beta^2 M_W^2 s_W^2} \left(\begin{array}{c} \left(2c_W^2 c_\alpha^2 m_{e_{g4}}^2 - c_{2\alpha}c_\beta^2 M_W^2\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g4}*}U_{s4,1}^{\tilde{e}_{g4}} + \\ 2\left(c_W^2 c_\alpha^2 m_{e_{g4}}^2 - c_{2\alpha}c_\beta^2 M_W^2 s_W^2\right)U_{s3,2}^{\tilde{e}_{g4}*}U_{s4,2}^{\tilde{e}_{g4}} \end{array} \right) \right]$$

$$\underset{286}{C}\left(A^0, A^0, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^\dagger\right) = \left[\frac{ie^2\delta_{g3,g4}c_{2\beta}}{4c_W^2 s_W^2} \right]$$

$$\underset{287}{C}\left(A^0, A^0, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{4c_W^2 M_W^2 s_W^2} \left(\begin{array}{c} \left(c_{2\beta}M_W^2\left(1-2s_W^2\right) + 2c_W^2 m_{e_{g4}}^2 t_\beta^2\right)U_{s3,1}^{\tilde{e}_{g4}*}U_{s4,1}^{\tilde{e}_{g4}} + \\ 2\left(c_{2\beta}M_W^2 s_W^2 + c_W^2 m_{e_{g4}}^2 t_\beta^2\right)U_{s3,2}^{\tilde{e}_{g4}*}U_{s4,2}^{\tilde{e}_{g4}} \end{array} \right) \right]$$

$$\underset{290}{C}\left(G^0, G^0, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^\dagger\right) = \left[-\frac{ie^2\delta_{g3,g4}c_{2\beta}}{4c_W^2 s_W^2} \right]$$

$$\underset{291}{C}\left(G^0, G^0, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{4c_W^2 M_W^2 s_W^2} \left(\begin{array}{c} \left(2c_W^2 m_{e_{g4}}^2 - c_{2\beta}M_W^2\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g4}*}U_{s4,1}^{\tilde{e}_{g4}} + \\ 2\left(c_W^2 m_{e_{g4}}^2 - c_{2\beta}M_W^2 s_W^2\right)U_{s3,2}^{\tilde{e}_{g4}*}U_{s4,2}^{\tilde{e}_{g4}} \end{array} \right) \right]$$

$$\underset{294}{C}\left(h^0, H^0, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^\dagger\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\alpha}}{4c_W^2 s_W^2} \right]$$

$$\underset{295}{C}\left(h^0, H^0, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\alpha}}{4c_W^2 c_\beta^2 M_W^2 s_W^2} \left(\begin{array}{c} \left(c_W^2 m_{e_{g4}}^2 - c_\beta^2 M_W^2\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g4}*}U_{s4,1}^{\tilde{e}_{g4}} + \\ \left(c_W^2 m_{e_{g4}}^2 - 2c_\beta^2 M_W^2 s_W^2\right)U_{s3,2}^{\tilde{e}_{g4}*}U_{s4,2}^{\tilde{e}_{g4}} \end{array} \right) \right]$$

$$\underset{296}{C}\left(A^0, G^0, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^\dagger\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\beta}}{4c_W^2 s_W^2} \right]$$

$$\underset{297}{C}\left(A^0, G^0, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\beta}}{4c_W^2 c_\beta^2 M_W^2 s_W^2} \left(\begin{array}{c} \left(c_W^2 m_{e_{g4}}^2 - c_\beta^2 M_W^2\left(1-2s_W^2\right)\right)U_{s3,1}^{\tilde{e}_{g4}*}U_{s4,1}^{\tilde{e}_{g4}} + \\ \left(c_W^2 m_{e_{g4}}^2 - 2c_\beta^2 M_W^2 s_W^2\right)U_{s3,2}^{\tilde{e}_{g4}*}U_{s4,2}^{\tilde{e}_{g4}} \end{array} \right) \right]$$

$$\underset{310}{C}\left(h^0, H^-, \tilde{\nu}_{g3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g3,g4}U_{s4,1}^{\tilde{e}_{g3}}}{2\sqrt{2}s_W^2} \left(\frac{s_\alpha t_\beta m_{e_{g3}}^2}{c_\beta M_W^2} + c_{\alpha+\beta} \right) \right]$$

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$$\underset{311}{C}\left(h^0, H^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{s_\alpha t_\beta m^2_{e_{g4}}}{c_\beta M^2_W} + c_{\alpha+\beta}\right) \right]$$

$$\underset{312}{C}\left(h^0, G^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{s_\alpha m^2_{e_{g3}}}{c_\beta M^2_W} - s_{\alpha+\beta}\right) \right]$$

$$\underset{313}{C}\left(h^0, G^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{s_\alpha m^2_{e_{g4}}}{c_\beta M^2_W} - s_{\alpha+\beta}\right) \right]$$

$$\underset{314}{C}\left(A^0, H^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[\frac{e^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{m^2_{e_{g3}}t^2_\beta}{M^2_W} + c_{2\beta}\right) \right]$$

$$\underset{315}{C}\left(A^0, H^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[-\frac{e^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{m^2_{e_{g4}}t^2_\beta}{M^2_W} + c_{2\beta}\right) \right]$$

$$\underset{316}{C}\left(A^0, G^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[-\frac{e^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{t_\beta m^2_{e_{g3}}}{M^2_W} - s_{2\beta}\right) \right]$$

$$\underset{317}{C}\left(A^0, G^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[\frac{e^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{t_\beta m^2_{e_{g4}}}{M^2_W} - s_{2\beta}\right) \right]$$

$$\underset{326}{C}\left(H^0, H^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{c_\alpha t_\beta m^2_{e_{g3}}}{c_\beta M^2_W} - s_{\alpha+\beta}\right) \right]$$

$$\underset{327}{C}\left(H^0, H^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{c_\alpha t_\beta m^2_{e_{g4}}}{c_\beta M^2_W} - s_{\alpha+\beta}\right) \right]$$

$$\underset{328}{C}\left(H^0, G^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{c_\alpha m^2_{e_{g3}}}{c_\beta M^2_W} - c_{\alpha+\beta}\right) \right]$$

$$\underset{329}{C}\left(H^0, G^+, \tilde{e}^{s3}_{g3}, \tilde{v}^{\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}U^{\tilde{e}_{g4}*}_{s3,1}}{2\sqrt{2}s^2_W}\left(\frac{c_\alpha m^2_{e_{g4}}}{c_\beta M^2_W} - c_{\alpha+\beta}\right) \right]$$

$$\underset{330}{C}\left(G^0, H^-, \tilde{v}_{g3}, \tilde{e}^{s4,\dagger}_{g4}\right) = \left[-\frac{e^2\delta_{g3,g4}U^{\tilde{e}_{g3}}_{s4,1}}{2\sqrt{2}s^2_W}\left(\frac{t_\beta m^2_{e_{g3}}}{M^2_W} - s_{2\beta}\right) \right]$$

$$\underset{331}{C}\left(G^0, H^+, \tilde{e}_{g3}^{s3}, \tilde{v}_{g4}^\dagger\right) = \left[\ \frac{e^2 \delta_{g3,g4} U_{s3,1}^{\tilde{e}_{g4}*}}{2\sqrt{2}s_W^2}\left(\frac{t_\beta m_{e_{g4}}^2}{M_W^2} - s_{2\beta}\right)\ \right]$$

$$\underset{332}{C}\left(G^0, G^-, \tilde{v}_{g3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\ \frac{e^2 \delta_{g3,g4} U_{s4,1}^{\tilde{e}_{g3}}}{2\sqrt{2}s_W^2}\left(\frac{m_{e_{g3}}^2}{M_W^2} - c_{2\beta}\right)\ \right]$$

$$\underset{333}{C}\left(G^0, G^+, \tilde{e}_{g3}^{s3}, \tilde{v}_{g4}^\dagger\right) = \left[\ -\frac{e^2 \delta_{g3,g4} U_{s3,1}^{\tilde{e}_{g4}*}}{2\sqrt{2}s_W^2}\left(\frac{m_{e_{g4}}^2}{M_W^2} - c_{2\beta}\right)\ \right]$$

$$\underset{334}{C}\left(H^-, H^+, \tilde{v}_{g3}, \tilde{v}_{g4}^\dagger\right) = \left[\ -\frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(\frac{m_{e_{g3}}^2 t_\beta^2}{M_W^2} + \left(\frac{1}{2}c_{2\beta}\right)\left(2 - \frac{1}{c_W^2}\right)\right)\ \right]$$

$$\underset{335}{C}\left(H^-, G^+, \tilde{v}_{g3}, \tilde{v}_{g4}^\dagger\right) = \left[\ \frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(\frac{t_\beta m_{e_{g3}}^2}{M_W^2} - \left(\frac{1}{2}s_{2\beta}\right)\left(2 - \frac{1}{c_W^2}\right)\right)\ \right]$$

$$\underset{336}{C}\left(G^-, H^+, \tilde{v}_{g3}, \tilde{v}_{g4}^\dagger\right) = \left[\ \frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(\frac{t_\beta m_{e_{g3}}^2}{M_W^2} - \left(\frac{1}{2}s_{2\beta}\right)\left(2 - \frac{1}{c_W^2}\right)\right)\ \right]$$

$$\underset{337}{C}\left(H^-, H^+, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\ \frac{ie^2 \delta_{g3,g4}}{4c_W^2 M_W^2 s_W^2}\left(c_{2\beta} M_W^2 U_{s3,1}^{\tilde{e}_{g3}*} U_{s4,1}^{\tilde{e}_{g3}} - 2\left(c_{2\beta} M_W^2 s_W^2 + c_W^2 m_{e_{g3}}^2 t_\beta^2\right) U_{s3,2}^{\tilde{e}_{g3}*} U_{s4,2}^{\tilde{e}_{g3}}\right)\ \right]$$

$$\underset{338}{C}\left(H^-, G^+, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\ \frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(s_{2\beta}\left(1 - \frac{1}{c_W^2}\left(\frac{1}{2} - s_W^2\right)\right) U_{s3,1}^{\tilde{e}_{g3}*} U_{s4,1}^{\tilde{e}_{g3}} + \left(\frac{t_\beta m_{e_{g3}}^2}{M_W^2} - \frac{s_{2\beta} s_W^2}{c_W^2}\right) U_{s3,2}^{\tilde{e}_{g3}*} U_{s4,2}^{\tilde{e}_{g3}}\right)\ \right]$$

$$\underset{339}{C}\left(G^-, H^+, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\ \frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(s_{2\beta}\left(1 - \frac{1}{c_W^2}\left(\frac{1}{2} - s_W^2\right)\right) U_{s3,1}^{\tilde{e}_{g3}*} U_{s4,1}^{\tilde{e}_{g3}} + \left(\frac{t_\beta m_{e_{g3}}^2}{M_W^2} - \frac{s_{2\beta} s_W^2}{c_W^2}\right) U_{s3,2}^{\tilde{e}_{g3}*} U_{s4,2}^{\tilde{e}_{g3}}\right)\ \right]$$

$$\underset{346}{C}\left(G^-, G^+, \tilde{v}_{g3}, \tilde{v}_{g4}^\dagger\right) = \left[\ -\frac{ie^2 \delta_{g3,g4}}{4c_W^2 M_W^2 s_W^2}\left(2c_W^2 m_{e_{g3}}^2 + c_{2\beta}\left(1 - 2c_W^2\right) M_W^2\right)\ \right]$$

$$\underset{347}{C}\left(G^-, G^+, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[\ -\frac{ie^2 \delta_{g3,g4}}{2s_W^2}\left(c_{2\beta}\left(1 - \frac{1}{c_W^2}\left(\frac{1}{2} - s_W^2\right)\right) U_{s3,1}^{\tilde{e}_{g3}*} U_{s4,1}^{\tilde{e}_{g3}} + \left(\frac{m_{e_{g3}}^2}{M_W^2} - \frac{c_{2\beta} s_W^2}{c_W^2}\right) U_{s3,2}^{\tilde{e}_{g3}*} U_{s4,2}^{\tilde{e}_{g3}}\right)\ \right]$$

$$\underset{280}{C}\left(h^0, h^0, \tilde{u}^{s3}_{g3}, \tilde{u}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l} \left(6c_W^2 c_\alpha^2 m_{u_{g4}}^2 - c_{2\alpha}M_W^2\left(3-4s_W^2\right)s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 c_\alpha^2 m_{u_{g4}}^2 - 2c_{2\alpha}M_W^2 s_W^2 s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{281}{C}\left(h^0, h^0, \tilde{d}^{s3}_{g3}, \tilde{d}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(c_{2\alpha}c_\beta^2 M_W^2\left(3-2s_W^2\right) + 6c_W^2 m_{d_{g4}}^2 s_\alpha^2\right)U^{\tilde{d}_{g4}*}_{s3,1}U^{\tilde{d}_{g4}}_{s4,1} + \\ 2\left(c_{2\alpha}c_\beta^2 M_W^2 s_W^2 + 3c_W^2 m_{d_{g4}}^2 s_\alpha^2\right)U^{\tilde{d}_{g4}*}_{s3,2}U^{\tilde{d}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{284}{C}\left(H^0, H^0, \tilde{u}^{s3}_{g3}, \tilde{u}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l} \left(6c_W^2 m_{u_{g4}}^2 s_\alpha^2 + c_{2\alpha}M_W^2\left(3-4s_W^2\right)s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 m_{u_{g4}}^2 s_\alpha^2 + 2c_{2\alpha}M_W^2 s_W^2 s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{285}{C}\left(H^0, H^0, \tilde{d}^{s3}_{g3}, \tilde{d}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6c_W^2 c_\alpha^2 m_{d_{g4}}^2 - c_{2\alpha}c_\beta^2 M_W^2\left(3-2s_W^2\right)\right)U^{\tilde{d}_{g4}*}_{s3,1}U^{\tilde{d}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 c_\alpha^2 m_{d_{g4}}^2 - c_{2\alpha}c_\beta^2 M_W^2 s_W^2\right)U^{\tilde{d}_{g4}*}_{s3,2}U^{\tilde{d}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{288}{C}\left(A^0, A^0, \tilde{u}^{s3}_{g3}, \tilde{u}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2 t_\beta^2}\left(\begin{array}{l} \left(6c_W^2 m_{u_{g4}}^2 - c_{2\beta}M_W^2\left(3-4s_W^2\right)t_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 m_{u_{g4}}^2 - 2c_{2\beta}M_W^2 s_W^2 t_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{289}{C}\left(A^0, A^0, \tilde{d}^{s3}_{g3}, \tilde{d}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(c_{2\beta}M_W^2\left(3-2s_W^2\right) + 6c_W^2 m_{d_{g4}}^2 t_\beta^2\right)U^{\tilde{d}_{g4}*}_{s3,1}U^{\tilde{d}_{g4}}_{s4,1} + \\ 2\left(c_{2\beta}M_W^2 s_W^2 + 3c_W^2 m_{d_{g4}}^2 t_\beta^2\right)U^{\tilde{d}_{g4}*}_{s3,2}U^{\tilde{d}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{292}{C}\left(G^0, G^0, \tilde{u}^{s3}_{g3}, \tilde{u}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6c_W^2 m_{u_{g4}}^2 + c_{2\beta}M_W^2\left(3-4s_W^2\right)\right)U^{\tilde{u}_{g4}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 m_{u_{g4}}^2 + 2c_{2\beta}M_W^2 s_W^2\right)U^{\tilde{u}_{g4}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{293}{C}\left(G^0, G^0, \tilde{d}^{s3}_{g3}, \tilde{d}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}}{12c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6c_W^2 m_{d_{g4}}^2 - c_{2\beta}M_W^2\left(3-2s_W^2\right)\right)U^{\tilde{d}_{g4}*}_{s3,1}U^{\tilde{d}_{g4}}_{s4,1} + \\ 2\left(3c_W^2 m_{d_{g4}}^2 - c_{2\beta}M_W^2 s_W^2\right)U^{\tilde{d}_{g4}*}_{s3,2}U^{\tilde{d}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{298}{C}\left(h^0, H^0, \tilde{u}^{s3}_{g3}, \tilde{u}^{s4,\dagger}_{g4}\right) = \left[-\frac{ie^2\delta_{g3,g4}s_{2\alpha}}{12c_W^2 M_W^2 s_W^2 s_\beta^2}\left(\begin{array}{l} \left(3c_W^2 m_{u_{g4}}^2 - M_W^2\left(3-4s_W^2\right)s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,1}U^{\tilde{u}_{g4}}_{s4,1} + \\ \left(3c_W^2 m_{u_{g4}}^2 - 4M_W^2 s_W^2 s_\beta^2\right)U^{\tilde{u}_{g4}*}_{s3,2}U^{\tilde{u}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{299}{C}\left(h^0, H^0, \tilde{d}^{s3}_{g3}, \tilde{d}^{s4,\dagger}_{g4}\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\alpha}}{12c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(3c_W^2 m_{d_{g4}}^2 - c_\beta^2 M_W^2\left(3-2s_W^2\right)\right)U^{\tilde{d}_{g4}*}_{s3,1}U^{\tilde{d}_{g4}}_{s4,1} + \\ \left(3c_W^2 m_{d_{g4}}^2 - 2c_\beta^2 M_W^2 s_W^2\right)U^{\tilde{d}_{g4}*}_{s3,2}U^{\tilde{d}_{g4}}_{s4,2} \end{array}\right) \right]$$

$$\underset{300}{C}\left(A^0, G^0, \tilde{u}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g3,g4}s_{2\beta}}{12c_W^2 M_W^2 s_W^2 s_\beta^2} \left(\begin{array}{l} \left(3c_W^2 m_{u_{g4}}^2 - M_W^2\left(3-4s_W^2\right)s_\beta^2\right)U_{s3,1}^{\tilde{u}_{g4}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ \left(3c_W^2 m_{u_{g4}}^2 - 4M_W^2 s_W^2 s_\beta^2\right)U_{s3,2}^{\tilde{u}_{g4}*}U_{s4,2}^{\tilde{u}_{g4}} \end{array} \right) \right]$$

$$\underset{301}{C}\left(A^0, G^0, \tilde{d}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2\delta_{g3,g4}s_{2\beta}}{12c_W^2 c_\beta^2 M_W^2 s_W^2} \left(\begin{array}{l} \left(3c_W^2 m_{d_{g4}}^2 - c_\beta^2 M_W^2\left(3-2s_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g4}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ \left(3c_W^2 m_{d_{g4}}^2 - 2c_\beta^2 M_W^2 s_W^2\right)U_{s3,2}^{\tilde{d}_{g4}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array} \right) \right]$$

$$\underset{302}{C}\left(h^0, H^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 CKM_{g3,g4}^*}{2\sqrt{2}s_{2\beta}M_W^2 s_W^2 s_\beta^2} \left(\begin{array}{l} s_{2\beta}\left(c_\alpha c_\beta m_{u_{g3}}^2 - s_\beta\left(c_{\alpha+\beta}s_\beta M_W^2 + s_\alpha m_{d_{g4}}^2 t_\beta^2\right)\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ 2m_{d_{g4}}m_{u_{g3}}s_{\beta-\alpha}s_\beta^2 U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array} \right) \right]$$

$$\underset{303}{C}\left(h^0, H^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 CKM_{g4,g3}}{2\sqrt{2}s_{2\beta}M_W^2 s_W^2 s_\beta^2} \left(\begin{array}{l} s_{2\beta}\left(c_\alpha c_\beta m_{u_{g4}}^2 - s_\beta\left(c_{\alpha+\beta}s_\beta M_W^2 + s_\alpha m_{d_{g3}}^2 t_\beta^2\right)\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ 2m_{d_{g3}}m_{u_{g4}}s_{\beta-\alpha}s_\beta^2 U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{array} \right) \right]$$

$$\underset{304}{C}\left(h^0, G^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 CKM_{g3,g4}^*}{2\sqrt{2}c_\beta s_{2\beta}s_\beta M_W^2 s_W^2} \left(\begin{array}{l} s_{2\beta}\left(s_\alpha s_\beta m_{d_{g4}}^2 + c_\alpha c_\beta m_{u_{g3}}^2 - c_\beta s_{\alpha+\beta}s_\beta M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} - \\ 2c_\beta c_{\beta-\alpha}m_{d_{g4}}m_{u_{g3}}s_\beta U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array} \right) \right]$$

$$\underset{305}{C}\left(h^0, G^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 CKM_{g4,g3}}{2\sqrt{2}c_\beta s_{2\beta}s_\beta M_W^2 s_W^2} \left(\begin{array}{l} s_{2\beta}\left(s_\alpha s_\beta m_{d_{g3}}^2 + c_\alpha c_\beta m_{u_{g4}}^2 - c_\beta s_{\alpha+\beta}s_\beta M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} - \\ 2c_\beta c_{\beta-\alpha}m_{d_{g3}}m_{u_{g4}}s_\beta U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{array} \right) \right]$$

$$\underset{306}{C}\left(A^0, H^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{e^2 CKM_{g3,g4}^* U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}}}{2\sqrt{2}s_W^2} \left(\frac{m_{u_{g3}}^2}{M_W^2 t_\beta^2} - \frac{m_{d_{g4}}^2 t_\beta^2}{M_W^2} - c_{2\beta} \right) \right]$$

$$\underset{307}{C}\left(A^0, H^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{e^2 CKM_{g4,g3} U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}}}{2\sqrt{2}s_W^2} \left(\frac{m_{u_{g4}}^2}{M_W^2 t_\beta^2} - \frac{m_{d_{g3}}^2 t_\beta^2}{M_W^2} - c_{2\beta} \right) \right]$$

$$\underset{308}{C}\left(A^0, G^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{e^2 CKM_{g3,g4}^*}{2\sqrt{2}s_{2\beta}t_\beta M_W^2 s_W^2} \left(\begin{array}{l} s_{2\beta}\left(m_{u_{g3}}^2 + t_\beta\left(t_\beta m_{d_{g4}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ 2m_{d_{g4}}m_{u_{g3}}t_\beta U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array} \right) \right]$$

$$\underset{309}{C}\left(A^0, G^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{e^2 CKM_{g4,g3}}{2\sqrt{2}s_{2\beta}t_\beta M_W^2 s_W^2} \left(\begin{array}{l} s_{2\beta}\left(m_{u_{g4}}^2 + t_\beta\left(t_\beta m_{d_{g3}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ 2m_{d_{g3}}m_{u_{g4}}t_\beta U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{array} \right) \right]$$

$$\underset{318}{C}\left(H^0, H^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 CKM_{g3,g4}^*}{2\sqrt{2}s_{2\beta}M_W^2 s_W^2 s_\beta^2} \left(\begin{array}{l} s_{2\beta}\left(c_\beta s_\alpha m_{u_{g3}}^2 - s_\beta\left(s_{\alpha+\beta}s_\beta M_W^2 - c_\alpha m_{d_{g4}}^2 t_\beta^2\right)\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ 2c_{\beta-\alpha}m_{d_{g4}}m_{u_{g3}}s_\beta^2 U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array} \right) \right]$$

$$\underset{319}{C}\left(H^0, H^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2 \text{CKM}_{g4,g3}}{2\sqrt{2}s_{2\beta}M_W^2 s_W^2 s_\beta^2}\begin{pmatrix} s_{2\beta}\left(c_\beta s_\alpha m_{u_{g4}}^2 - s_\beta\left(s_{\alpha+\beta}s_\beta M_W^2 - c_\alpha m_{d_{g3}}^2 t_\beta^2\right)\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ 2c_{\beta-\alpha}m_{d_{g3}}m_{u_{g4}}s_\beta^2 U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{320}{C}\left(H^0, G^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2 \text{CKM}_{g3,g4}^*}{2\sqrt{2}c_\beta s_{2\beta}s_\beta M_W^2 s_W^2}\begin{pmatrix} s_{2\beta}\left(c_\alpha s_\beta m_{d_{g4}}^2 - c_\beta s_\alpha m_{u_{g3}}^2 - c_{\alpha+\beta}c_\beta s_\beta M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} - \\ 2c_\beta m_{d_{g4}}m_{u_{g3}}s_\beta s_{\beta-\alpha}U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{pmatrix}\right]$$

$$\underset{321}{C}\left(H^0, G^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2 \text{CKM}_{g4,g3}}{2\sqrt{2}c_\beta s_{2\beta}s_\beta M_W^2 s_W^2}\begin{pmatrix} s_{2\beta}\left(c_\alpha s_\beta m_{d_{g3}}^2 - c_\beta s_\alpha m_{u_{g4}}^2 - c_{\alpha+\beta}c_\beta s_\beta M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} - \\ 2c_\beta m_{d_{g3}}m_{u_{g4}}s_\beta s_{\beta-\alpha}U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{322}{C}\left(G^0, H^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{e^2 \text{CKM}_{g3,g4}^*}{2\sqrt{2}s_{2\beta}t_\beta M_W^2 s_W^2}\begin{pmatrix} s_{2\beta}\left(m_{u_{g3}}^2 + t_\beta\left(t_\beta m_{d_{g4}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} - \\ 2m_{d_{g4}}m_{u_{g3}}t_\beta U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{pmatrix}\right]$$

$$\underset{323}{C}\left(G^0, H^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{e^2 \text{CKM}_{g4,g3}}{2\sqrt{2}s_{2\beta}t_\beta M_W^2 s_W^2}\begin{pmatrix} s_{2\beta}\left(m_{u_{g4}}^2 + t_\beta\left(t_\beta m_{d_{g3}}^2 - s_{2\beta}M_W^2\right)\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} - \\ 2m_{d_{g3}}m_{u_{g4}}t_\beta U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{324}{C}\left(G^0, G^-, \tilde{u}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[\frac{e^2 \text{CKM}_{g3,g4}^* U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}}}{2\sqrt{2}M_W^2 s_W^2}\left(m_{d_{g4}}^2 - m_{u_{g3}}^2 - c_{2\beta}M_W^2\right)\right]$$

$$\underset{325}{C}\left(G^0, G^+, \tilde{d}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{e^2 \text{CKM}_{g4,g3} U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}}}{2\sqrt{2}M_W^2 s_W^2}\left(m_{d_{g3}}^2 - m_{u_{g4}}^2 - c_{2\beta}M_W^2\right)\right]$$

$$\underset{340}{C}\left(H^-, H^+, \tilde{u}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12c_W^2 M_W^2 s_W^2 t_\beta^2}\begin{pmatrix} t_\beta^2\left(\delta_{g3,g4}c_{2\beta}\left(1+2c_W^2\right)M_W^2 + 6\left(\sum_{gn=1}^{3}\text{CKM}_{g4,gn}\text{CKM}_{g3,gn}^* m_{d_{gn}}^2\right)c_W^2 t_\beta^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ 2\delta_{g3,g4}\left(3c_W^2 m_{u_{g3}}^2 - 2c_{2\beta}M_W^2 s_W^2 t_\beta^2\right)U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{341}{C}\left(H^-, G^+, \tilde{u}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2}{12t_\beta c_W^2 M_W^2 s_W^2}\begin{pmatrix} t_\beta\left(6\left(\sum_{gn=1}^{3}\text{CKM}_{g4,gn}\text{CKM}_{g3,gn}^* m_{d_{gn}}^2\right)t_\beta c_W^2 - \delta_{g3,g4}s_{2\beta}\left(1+2c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} - \\ 2\delta_{g3,g4}\left(3c_W^2 m_{u_{g3}}^2 - 2s_{2\beta}t_\beta M_W^2 s_W^2\right)U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{342}{C}\left(G^-, H^+, \tilde{u}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[\frac{ie^2}{12t_\beta c_W^2 M_W^2 s_W^2}\begin{pmatrix} t_\beta\left(6\left(\sum_{gn=1}^{3}\text{CKM}_{g4,gn}\text{CKM}_{g3,gn}^* m_{d_{gn}}^2\right)t_\beta c_W^2 - \delta_{g3,g4}s_{2\beta}\left(1+2c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} - \\ 2\delta_{g3,g4}\left(3c_W^2 m_{u_{g3}}^2 - 2s_{2\beta}t_\beta M_W^2 s_W^2\right)U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{pmatrix}\right]$$

$$\underset{343}{C}\left(H^-, H^+, \tilde{d}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12c_W^2 M_W^2 s_W^2 t_\beta^2}\left(\begin{array}{l} \left(6\left(\sum_{gn=1}^{3}\text{CKM}_{gn,g3}\text{CKM}_{gn,g4}^* m_{u_{gn}}^2\right)c_W^2 + \delta_{g3,g4}c_{2\beta}\left(1-4c_W^2\right)M_W^2 t_\beta^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ 2\delta_{g3,g4}t_\beta^2\left(c_{2\beta}M_W^2 s_W^2 + 3c_W^2 m_{d_{g3}}^2 t_\beta^2\right)U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array}\right)\right]$$

$$\underset{344}{C}\left(H^-, G^+, \tilde{d}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12 t_\beta c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6\left(\sum_{gn=1}^{3}\text{CKM}_{gn,g3}\text{CKM}_{gn,g4}^* m_{u_{gn}}^2\right)c_W^2 + \delta_{g3,g4}s_{2\beta}t_\beta\left(1-4c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} - \\ 2\delta_{g3,g4}t_\beta\left(3t_\beta c_W^2 m_{d_{g3}}^2 - s_{2\beta}M_W^2 s_W^2\right)U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array}\right)\right]$$

$$\underset{345}{C}\left(G^-, H^+, \tilde{d}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12 t_\beta c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6\left(\sum_{gn=1}^{3}\text{CKM}_{gn,g3}\text{CKM}_{gn,g4}^* m_{u_{gn}}^2\right)c_W^2 + \delta_{g3,g4}s_{2\beta}t_\beta\left(1-4c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} - \\ 2\delta_{g3,g4}t_\beta\left(3t_\beta c_W^2 m_{d_{g3}}^2 - s_{2\beta}M_W^2 s_W^2\right)U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array}\right)\right]$$

$$\underset{348}{C}\left(G^-, G^+, \tilde{u}_{g3}^{s3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6\left(\sum_{gn=1}^{3}\text{CKM}_{g4,gn}\text{CKM}_{g3,gn}^* m_{d_{gn}}^2\right)c_W^2 - \delta_{g3,g4}c_{2\beta}\left(1+2c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g4}} + \\ 2\delta_{g3,g4}\left(3c_W^2 m_{u_{g3}}^2 + 2c_{2\beta}M_W^2 s_W^2\right)U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g4}} \end{array}\right)\right]$$

$$\underset{349}{C}\left(G^-, G^+, \tilde{d}_{g3}^{s3}, \tilde{d}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2}{12c_W^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(6\left(\sum_{gn=1}^{3}\text{CKM}_{gn,g3}\text{CKM}_{gn,g4}^* m_{u_{gn}}^2\right)c_W^2 - \delta_{g3,g4}c_{2\beta}\left(1-4c_W^2\right)M_W^2\right)U_{s3,1}^{\tilde{d}_{g3}*}U_{s4,1}^{\tilde{d}_{g4}} + \\ 2\delta_{g3,g4}\left(3c_W^2 m_{d_{g3}}^2 - c_{2\beta}M_W^2 s_W^2\right)U_{s3,2}^{\tilde{d}_{g3}*}U_{s4,2}^{\tilde{d}_{g4}} \end{array}\right)\right]$$

[SSSS] **2 Sleptons – 2 Squarks**

$$\underset{373}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \tilde{e}_{g3}^{s3}, \tilde{e}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\delta_{g1,g2}\delta_{g3,g4}}{12c_W^2 c_\beta^2 M_W^2 s_W^2}\left(\begin{array}{l} \left(\begin{array}{l} c_\beta^2 M_W^2\left(3c_W^2 - s_W^2\right)U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}}U_{s4,1}^{\tilde{e}_{g3}} - \\ 2U_{s1,2}^{\tilde{d}_{g1}*}\left(c_\beta^2 M_W^2 s_W^2 U_{s2,2}^{\tilde{d}_{g1}}U_{s4,1}^{\tilde{e}_{g3}} - 3m_{d_{g1}}m_{e_{g3}}c_W^2 U_{s2,1}^{\tilde{d}_{g1}}U_{s4,2}^{\tilde{e}_{g3}}\right) \end{array}\right)U_{s3,1}^{\tilde{e}_{g3}*} + \\ 2\left(\begin{array}{l} 2c_\beta^2 M_W^2 s_W^2 U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}U_{s4,2}^{\tilde{e}_{g3}} + \\ U_{s1,1}^{\tilde{d}_{g1}*}\left(3m_{d_{g1}}m_{e_{g3}}c_W^2 U_{s2,2}^{\tilde{d}_{g1}}U_{s4,1}^{\tilde{e}_{g3}} + c_\beta^2 M_W^2 s_W^2 U_{s2,1}^{\tilde{d}_{g1}}U_{s4,2}^{\tilde{e}_{g3}}\right) \end{array}\right)U_{s3,2}^{\tilde{e}_{g3}*} \end{array}\right)\right]$$

$$\underset{374}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \tilde{\nu}_{g3}, \tilde{\nu}_{g4}^{\dagger}\right) = \left[\frac{ie^2\delta_{g1,g2}\delta_{g3,g4}}{12c_W^2 s_W^2}\left(\left(1+2c_W^2\right)U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}} + 2s_W^2 U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}\right)\right]$$

$$\underset{376}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, \tilde{\nu}_{g3}, \tilde{u}_{g4}^{s4,\dagger}\right) = \left[-\frac{ie^2\text{CKM}_{g4,g1}\delta_{g2,g3}U_{s4,1}^{\tilde{u}_{g4}}}{2c_\beta^2 M_W^2 s_W^2}\left(c_\beta^2 M_W^2 U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{e}_{g2}} + m_{d_{g1}}m_{e_{g2}}U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{e}_{g2}}\right)\right]$$

$$\underset{377}{C}\left(\tilde{e}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},\tilde{u}_{g3}^{s3},\tilde{v}_{g4}^{\dagger}\right)=\left[\;-\frac{ie^2\delta_{g1,g4}\mathrm{CKM}_{g3,g2}^*U_{s3,1}^{\tilde{u}_{g3}*}}{2c_\beta^2M_W^2s_W}\left(c_\beta^2M_W^2U_{s1,1}^{\tilde{e}_{g1}*}U_{s2,1}^{\tilde{d}_{g2}}+m_{d_{g2}}m_{e_{g1}}U_{s1,2}^{\tilde{e}_{g1}*}U_{s2,2}^{\tilde{d}_{g2}}\right)\;\right]$$

$$\underset{380}{C}\left(\tilde{e}_{g1}^{s1},\tilde{e}_{g2}^{s2,\dagger},\tilde{u}_{g3}^{s3},\tilde{u}_{g4}^{s4,\dagger}\right)=\left[\;-\frac{ie^2\delta_{g1,g2}\delta_{g3,g4}}{12c_W^2s_W^2}\left(\begin{array}{l}2s_W^2U_{s1,2}^{\tilde{e}_{g1}*}U_{s2,2}^{\tilde{e}_{g1}}\left(U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g3}}-4U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g3}}\right)-\\[4pt]U_{s1,1}^{\tilde{e}_{g1}*}U_{s2,1}^{\tilde{e}_{g1}}\left(\left(1+2c_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g3}}-4s_W^2U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g3}}\right)\end{array}\right)\;\right]$$

$$\underset{382}{C}\left(\tilde{v}_{g1},\tilde{v}_{g2}^{\dagger},\tilde{u}_{g3}^{s3},\tilde{u}_{g4}^{s4,\dagger}\right)=\left[\;-\frac{ie^2\delta_{g1,g2}\delta_{g3,g4}}{12c_W^2s_W^2}\left(\left(3c_W^2-s_W^2\right)U_{s3,1}^{\tilde{u}_{g3}*}U_{s4,1}^{\tilde{u}_{g3}}+4s_W^2U_{s3,2}^{\tilde{u}_{g3}*}U_{s4,2}^{\tilde{u}_{g3}}\right)\;\right]$$

[SSVV] **2 Higgs – 2 Gauge Bosons**

$$\underset{31}{C}\left(h^0,h^0,Z,Z\right)=\left[\;\frac{ie^2}{2c_W^2s_W^2}\;\right]$$

$$\underset{32}{C}\left(h^0,h^0,W^-,W^+\right)=\left[\;\frac{ie^2}{2s_W^2}\;\right]$$

$$\underset{33}{C}\left(G^0,G^0,Z,Z\right)=\left[\;\frac{ie^2}{2c_W^2s_W^2}\;\right]$$

$$\underset{34}{C}\left(G^0,G^0,W^-,W^+\right)=\left[\;\frac{ie^2}{2s_W^2}\;\right]$$

$$\underset{35}{C}\left(G^-,G^+,\gamma,\gamma\right)=\left[\;2ie^2\;\right]$$

$$\underset{36}{C}\left(G^-,G^+,\gamma,Z\right)=\left[\;\frac{ie^2}{c_Ws_W}\left(c_W^2-s_W^2\right)\;\right]$$

$$\underset{37}{C}\left(G^-,G^+,Z,Z\right)=\left[\;\frac{ie^2}{2c_W^2s_W^2}\left(c_W^2-s_W^2\right)^2\;\right]$$

$$\underset{38}{C}\left(G^-,G^+,W^-,W^+\right)=\left[\;\frac{ie^2}{2s_W^2}\;\right]$$

$$\underset{149}{C}\left(h^0,H^-,\gamma,W^+\right)=\left[\;\frac{ie^2c_{\beta-\alpha}}{2s_W}\;\right]$$

$$C_{150}\left(h^0, H^-, Z, W^+\right) = \left[-\frac{ie^2 c_{\beta-\alpha}}{2c_W} \right]$$

$$C_{151}\left(h^0, G^-, \gamma, W^+\right) = \left[\frac{ie^2 s_{\beta-\alpha}}{2s_W} \right]$$

$$C_{152}\left(h^0, G^-, Z, W^+\right) = \left[-\frac{ie^2 s_{\beta-\alpha}}{2c_W} \right]$$

$$C_{153}\left(h^0, H^+, \gamma, W^-\right) = \left[\frac{ie^2 c_{\beta-\alpha}}{2s_W} \right]$$

$$C_{154}\left(h^0, H^+, Z, W^-\right) = \left[-\frac{ie^2 c_{\beta-\alpha}}{2c_W} \right]$$

$$C_{155}\left(h^0, G^+, \gamma, W^-\right) = \left[\frac{ie^2 s_{\beta-\alpha}}{2s_W} \right]$$

$$C_{156}\left(h^0, G^+, Z, W^-\right) = \left[-\frac{ie^2 s_{\beta-\alpha}}{2c_W} \right]$$

$$C_{157}\left(H^0, H^0, Z, Z\right) = \left[\frac{ie^2}{2c_W^2 s_W^2} \right]$$

$$C_{158}\left(H^0, H^0, W^-, W^+\right) = \left[\frac{ie^2}{2s_W^2} \right]$$

$$C_{159}\left(H^0, H^-, \gamma, W^+\right) = \left[-\frac{ie^2 s_{\beta-\alpha}}{2s_W} \right]$$

$$C_{160}\left(H^0, H^-, Z, W^+\right) = \left[\frac{ie^2 s_{\beta-\alpha}}{2c_W} \right]$$

$$C_{161}\left(H^0, G^-, \gamma, W^+\right) = \left[\frac{ie^2 c_{\beta-\alpha}}{2s_W} \right]$$

$$C_{162}\left(H^0, G^-, Z, W^+\right) = \left[-\frac{ie^2 c_{\beta-\alpha}}{2c_W} \right]$$

$$C_{163}\left(H^0, H^+, \gamma, W^-\right) = \left[-\frac{ie^2 s_{\beta-\alpha}}{2s_W} \right]$$

$$\underset{164}{C}\left(H^0, H^+, Z, W^-\right) = \left[\ \frac{ie^2 s_{\beta-\alpha}}{2c_W}\ \right]$$

$$\underset{165}{C}\left(H^0, G^+, \gamma, W^-\right) = \left[\ \frac{ie^2 c_{\beta-\alpha}}{2s_W}\ \right]$$

$$\underset{166}{C}\left(H^0, G^+, Z, W^-\right) = \left[\ -\frac{ie^2 c_{\beta-\alpha}}{2c_W}\ \right]$$

$$\underset{167}{C}\left(A^0, A^0, Z, Z\right) = \left[\ \frac{ie^2}{2c_W^2 s_W^2}\ \right]$$

$$\underset{168}{C}\left(A^0, A^0, W^-, W^+\right) = \left[\ \frac{ie^2}{2s_W^2}\ \right]$$

$$\underset{169}{C}\left(A^0, H^-, \gamma, W^+\right) = \left[\ -\frac{e^2}{2s_W}\ \right]$$

$$\underset{170}{C}\left(A^0, H^-, Z, W^+\right) = \left[\ \frac{e^2}{2c_W}\ \right]$$

$$\underset{171}{C}\left(A^0, H^+, \gamma, W^-\right) = \left[\ \frac{e^2}{2s_W}\ \right]$$

$$\underset{172}{C}\left(A^0, H^+, Z, W^-\right) = \left[\ -\frac{e^2}{2c_W}\ \right]$$

$$\underset{173}{C}\left(G^0, G^-, \gamma, W^+\right) = \left[\ -\frac{e^2}{2s_W}\ \right]$$

$$\underset{174}{C}\left(G^0, G^-, Z, W^+\right) = \left[\ \frac{e^2}{2c_W}\ \right]$$

$$\underset{175}{C}\left(G^0, G^+, \gamma, W^-\right) = \left[\ \frac{e^2}{2s_W}\ \right]$$

$$\underset{176}{C}\left(G^0, G^+, Z, W^-\right) = \left[\ -\frac{e^2}{2c_W}\ \right]$$

$$\underset{177}{C}\left(H^-, H^+, \gamma, \gamma\right) = \left[\ 2ie^2\ \right]$$

$$\underset{178}{C}\left(H^-, H^+, \gamma, Z\right) = \left[\ \frac{ie^2}{c_W s_W}\left(c_W^2 - s_W^2\right)\ \right]$$

$$\underset{179}{C}\left(H^-, H^+, Z, Z\right) = \left[\ \frac{ie^2}{2c_W^2 s_W^2}\left(c_W^2 - s_W^2\right)^2\ \right]$$

$$\underset{180}{C}\left(H^-, H^+, W^-, W^+\right) = \left[\ \frac{ie^2}{2s_W^2}\ \right]$$

[SSVV] **2 Sleptons – 2 Gauge Bosons**

$$\underset{350}{C}\left(\tilde{\nu}_{g1}, \tilde{\nu}_{g2}^\dagger, Z, Z\right) = \left[\ \frac{ie^2 \delta_{g1,g2}}{2c_W^2 s_W^2}\ \right]$$

$$\underset{351}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, \gamma, \gamma\right) = \left[\ 2ie^2 \delta_{g1,g2}\delta_{s1,s2}\ \right]$$

$$\underset{352}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, \gamma, Z\right) = \left[\ \frac{ie^2 \delta_{g1,g2}}{c_W s_W}\left(\left(1 - 2s_W^2\right) U_{s1,1}^{\tilde{e}_{g1}*} U_{s2,1}^{\tilde{e}_{g1}} - 2s_W^2 U_{s1,2}^{\tilde{e}_{g1}*} U_{s2,2}^{\tilde{e}_{g1}}\right)\ \right]$$

$$\underset{353}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, Z, Z\right) = \left[\ \frac{ie^2 \delta_{g1,g2}}{2c_W^2 s_W^2}\left(\left(1 - 2s_W^2\right)^2 U_{s1,1}^{\tilde{e}_{g1}*} U_{s2,1}^{\tilde{e}_{g1}} + 4s_W^4 U_{s1,2}^{\tilde{e}_{g1}*} U_{s2,2}^{\tilde{e}_{g1}}\right)\ \right]$$

$$\underset{362}{C}\left(\tilde{\nu}_{g1}, \tilde{e}_{g2}^{s2,\dagger}, \gamma, W^-\right) = \left[\ -\frac{ie^2 \delta_{g1,g2} U_{s2,1}^{\tilde{e}_{g1}}}{\sqrt{2}s_W}\ \right]$$

$$\underset{363}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{\nu}_{g2}^\dagger, \gamma, W^+\right) = \left[\ -\frac{ie^2 \delta_{g1,g2} U_{s1,1}^{\tilde{e}_{g2}*}}{\sqrt{2}s_W}\ \right]$$

$$\underset{366}{C}\left(\tilde{\nu}_{g1}, \tilde{e}_{g2}^{s2,\dagger}, Z, W^-\right) = \left[\ \frac{ie^2 \delta_{g1,g2} U_{s2,1}^{\tilde{e}_{g1}}}{\sqrt{2}c_W}\ \right]$$

$$\underset{367}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{\nu}_{g2}^\dagger, Z, W^+\right) = \left[\ \frac{ie^2 \delta_{g1,g2} U_{s1,1}^{\tilde{e}_{g2}*}}{\sqrt{2}c_W}\ \right]$$

$$\underset{368}{C}\left(\tilde{\nu}_{g1}, \tilde{\nu}_{g2}^\dagger, W^-, W^+\right) = \left[\ \frac{ie^2 \delta_{g1,g2}}{2s_W^2}\ \right]$$

$$\underset{369}{C}\left(\tilde{e}_{g1}^{s1}, \tilde{e}_{g2}^{s2,\dagger}, W^-, W^+\right) = \left[\ \frac{ie^2 \delta_{g1,g2} U_{s1,1}^{\tilde{e}_{g1}*} U_{s2,1}^{\tilde{e}_{g1}}}{2s_W^2}\ \right]$$

$$\underset{354}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, \gamma, \gamma\right) = \left[\ \frac{8}{9}ie^2\delta_{g1,g2}\delta_{s1,s2}\ \right]$$

$$\underset{355}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, \gamma, Z\right) = \left[\ \frac{2ie^2\delta_{g1,g2}}{9c_Ws_W}\left(\left(3-4s_W^2\right)U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{u}_{g1}} - 4s_W^2 U_{s1,2}^{\tilde{u}_{g1}*}U_{s2,2}^{\tilde{u}_{g1}}\right)\ \right]$$

$$\underset{356}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, Z, Z\right) = \left[\ \frac{ie^2\delta_{g1,g2}}{18c_W^2s_W^2}\left(\left(3-4s_W^2\right)^2 U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{u}_{g1}} + 16s_W^4 U_{s1,2}^{\tilde{u}_{g1}*}U_{s2,2}^{\tilde{u}_{g1}}\right)\ \right]$$

$$\underset{357}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \gamma, \gamma\right) = \left[\ \frac{2}{9}ie^2\delta_{g1,g2}\delta_{s1,s2}\ \right]$$

$$\underset{358}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \gamma, Z\right) = \left[\ \frac{ie^2\delta_{g1,g2}}{9c_Ws_W}\left(\left(3-2s_W^2\right)U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}} - 2s_W^2 U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}\right)\ \right]$$

$$\underset{359}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, Z, Z\right) = \left[\ \frac{ie^2\delta_{g1,g2}}{18c_W^2s_W^2}\left(\left(3-2s_W^2\right)^2 U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}} + 4s_W^4 U_{s1,2}^{\tilde{d}_{g1}*}U_{s2,2}^{\tilde{d}_{g1}}\right)\ \right]$$

$$\underset{360}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, \gamma, W^-\right) = \left[\ \frac{ie^2\mathrm{CKM}_{g1,g2}^* U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{d}_{g2}}}{3\sqrt{2}s_W}\ \right]$$

$$\underset{361}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, \gamma, W^+\right) = \left[\ \frac{ie^2\mathrm{CKM}_{g2,g1} U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{u}_{g2}}}{3\sqrt{2}s_W}\ \right]$$

$$\underset{364}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, Z, W^-\right) = \left[\ -\frac{ie^2\mathrm{CKM}_{g1,g2}^* U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{d}_{g2}}}{3\sqrt{2}c_W}\ \right]$$

$$\underset{365}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, Z, W^+\right) = \left[\ -\frac{ie^2\mathrm{CKM}_{g2,g1} U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{u}_{g2}}}{3\sqrt{2}c_W}\ \right]$$

$$\underset{370}{C}\left(\tilde{u}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, W^-, W^+\right) = \left[\ \frac{ie^2\delta_{g1,g2} U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{u}_{g1}}}{2s_W^2}\ \right]$$

$$\underset{371}{C}\left(\tilde{d}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, W^-, W^+\right) = \left[\ \frac{ie^2\delta_{g1,g2} U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}}}{2s_W^2}\ \right]$$

$$C_{39}\left(\gamma,\gamma,W^-,W^+\right) = ie^2 \begin{bmatrix} -2 \\ \hline 1 \\ \hline 1 \end{bmatrix}$$

$$C_{40}\left(\gamma,Z,W^-,W^+\right) = \frac{ie^2 c_W}{s_W} \begin{bmatrix} -2 \\ \hline 1 \\ \hline 1 \end{bmatrix}$$

$$C_{41}\left(Z,Z,W^-,W^+\right) = \frac{ie^2 c_W^2}{s_W^2} \begin{bmatrix} -2 \\ \hline 1 \\ \hline 1 \end{bmatrix}$$

$$C_{42}\left(W^-,W^-,W^+,W^+\right) = \frac{ie^2}{s_W^2} \begin{bmatrix} 2 \\ \hline -1 \\ \hline -1 \end{bmatrix}$$