MSSMQCD

Gluino – Quark – Higgs

$$\underset{9}{C}\left(\tilde{g}, \overline{u}_{\text{g2}}, \tilde{u}_{\text{g3}}^{\text{s3}}\right) = \sqrt{2}\mathrm{i}g_{\text{s}}\delta_{\text{g2,g3}}T_{\text{c2,c3}}^{\text{g1}}\begin{bmatrix} e_{\text{Gl}}^{*}U_{\text{s3,2}}^{\tilde{u}_{\text{g2}}*} \\ \hline -e_{\text{Gl}}U_{\text{s3,1}}^{\tilde{u}_{\text{g2}}*} \end{bmatrix}$$

$$\underset{10}{C}\left(\tilde{g}, \overline{d}_{\text{g2}}, \tilde{d}_{\text{g3}}^{\text{s3}}\right) = \sqrt{2}\mathrm{i}g_{\text{s}}\delta_{\text{g2,g3}}T_{\text{c2,c3}}^{\text{g1}}\begin{bmatrix} e_{\text{Gl}}^{*}U_{\text{s3,2}}^{\tilde{d}_{\text{g2}}*} \\ \hline -e_{\text{Gl}}U_{\text{s3,1}}^{\tilde{d}_{\text{g2}}*} \end{bmatrix}$$

$$\underset{11}{C}\left(\tilde{g}, u_{\text{g2}}, \tilde{u}_{\text{g3}}^{\text{s3,}\dagger}\right) = \sqrt{2}\mathrm{i}g_{\text{s}}\delta_{\text{g2,g3}}T_{\text{c3,c2}}^{\text{g1}}\begin{bmatrix} -e_{\text{Gl}}^{*}U_{\text{s3,1}}^{\tilde{u}_{\text{g2}}} \\ \hline e_{\text{Gl}}U_{\text{s3,2}}^{\tilde{u}_{\text{g2}}} \end{bmatrix}$$

$$\underset{12}{C}\left(\tilde{g}, d_{\text{g2}}, \tilde{d}_{\text{g3}}^{\text{s3,}\dagger}\right) = \sqrt{2}\mathrm{i}g_{\text{s}}\delta_{\text{g2,g3}}T_{\text{c3,c2}}^{\text{g1}}\begin{bmatrix} -e_{\text{Gl}}^{*}U_{\text{s3,1}}^{\tilde{d}_{\text{g2}}} \\ \hline e_{\text{Gl}}U_{\text{s3,2}}^{\tilde{d}_{\text{g2}}} \end{bmatrix}$$

2 Gluinos – Gauge Boson

$$\underset{6}{C}\left(\tilde{g}, \tilde{g}, g\right) = -g_{\text{s}}f^{\text{g1,g2,g3}}\begin{bmatrix} 1 \\ \hline 1 \end{bmatrix}$$

2 Quarks – Gauge Boson

$$\underset{4}{C}\left(\overline{u}_{\text{g1}}, u_{\text{g2}}, g\right) = -\mathrm{i}g_{\text{s}}\delta_{\text{g1,g2}}T_{\text{c1,c2}}^{\text{g3}}\begin{bmatrix} 1 \\ \hline 1 \end{bmatrix}$$

$$\underset{5}{C}\left(\overline{d}_{\text{g1}}, d_{\text{g2}}, g\right) = -\mathrm{i}g_{\text{s}}\delta_{\text{g1,g2}}T_{\text{c1,c2}}^{\text{g3}}\begin{bmatrix} 1 \\ \hline 1 \end{bmatrix}$$

$$\underset{7}{C}\left(\tilde{u}_{g1}^{s1},\tilde{u}_{g2}^{s2,\dagger},g\right) = \left[\quad -ig_s\delta_{g1,g2}\delta_{s1,s2}T_{c2,c1}^{g3}\quad\right]$$

$$\underset{8}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},g\right) = \left[\quad -ig_s\delta_{g1,g2}\delta_{s1,s2}T_{c2,c1}^{g3}\quad\right]$$

[UUV] **2 Ghosts – Gauge Boson**

$$\underset{3}{C}\left(\overline{u}_g,u_g,g\right) = g_s f^{g1,g2,g3}\left[\begin{array}{c}1\\ \rule{1em}{0.4pt}\\ 0\end{array}\right]$$

[VVV] **3 Gauge Bosons**

$$\underset{2}{C}(g,g,g) = \left[\quad g_s f^{g1,g2,g3}\quad\right]$$

[SSVV] **2 Higgs – 2 Gauge Bosons**

$$\underset{13}{C}\left(\tilde{u}_{g1}^{s1},\tilde{u}_{g2}^{s2,\dagger},g,g\right) = \left[\quad ig_s^2\delta_{g1,g2}\delta_{s1,s2}\left((T^{g3}T^{g4})_{c2,c1}+(T^{g4}T^{g3})_{c2,c1}\right)\quad\right]$$

$$\underset{14}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},g,g\right) = \left[\quad ig_s^2\delta_{g1,g2}\delta_{s1,s2}\left((T^{g3}T^{g4})_{c2,c1}+(T^{g4}T^{g3})_{c2,c1}\right)\quad\right]$$

$$\underset{15}{C}\left(\tilde{u}_{g1}^{s1},\tilde{u}_{g2}^{s2,\dagger},g,\gamma\right) = \left[\quad \frac{4}{3}ieg_s\delta_{g1,g2}\delta_{s1,s2}T_{c2,c1}^{g3}\quad\right]$$

$$\underset{16}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},g,\gamma\right) = \left[\quad -\frac{2}{3}ieg_s\delta_{g1,g2}\delta_{s1,s2}T_{c2,c1}^{g3}\quad\right]$$

$$\underset{17}{C}\left(\tilde{u}_{g1}^{s1},\tilde{u}_{g2}^{s2,\dagger},g,Z\right) = \left[\quad -\frac{2ieg_s\delta_{g1,g2}T_{c2,c1}^{g3}}{c_W s_W}\left(\frac{2}{3}\delta_{s1,s2}s_W^2-\frac{1}{2}U_{s1,1}^{\tilde{u}_{g1}*}U_{s2,1}^{\tilde{u}_{g1}}\right)\quad\right]$$

$$\underset{18}{C}\left(\tilde{d}_{g1}^{s1},\tilde{d}_{g2}^{s2,\dagger},g,Z\right) = \left[\quad \frac{2ieg_s\delta_{g1,g2}T_{c2,c1}^{g3}}{c_W s_W}\left(\frac{1}{3}\delta_{s1,s2}s_W^2-\frac{1}{2}U_{s1,1}^{\tilde{d}_{g1}*}U_{s2,1}^{\tilde{d}_{g1}}\right)\quad\right]$$

$$\underset{19}{\mathrm{C}}\left(\tilde{u}_{g1}^{s1}, \tilde{d}_{g2}^{s2,\dagger}, g, W^-\right) = \left[\frac{\sqrt{2}ieg_s\mathrm{CKM}_{g1,g2}^* T_{c2,c1}^{g3} U_{s1,1}^{\tilde{u}_{g1}*} U_{s2,1}^{\tilde{d}_{g2}}}{s_W}\right]$$

$$\underset{20}{\mathrm{C}}\left(\tilde{d}_{g1}^{s1}, \tilde{u}_{g2}^{s2,\dagger}, g, W^+\right) = \left[\frac{\sqrt{2}ieg_s\mathrm{CKM}_{g2,g1} T_{c2,c1}^{g3} U_{s1,1}^{\tilde{d}_{g1}*} U_{s2,1}^{\tilde{u}_{g2}}}{s_W}\right]$$

[VVVV] **4 Gauge Bosons**

$$\underset{1}{\mathrm{C}}(g,g,g,g) = -ig_s^2 \left[\begin{array}{c} f^{g1,g3,x}f^{x,g2,g4} - f^{g1,g4,x}f^{x,g3,g2} \\ \hline f^{g1,g2,x}f^{x,g3,g4} + f^{g1,g4,x}f^{x,g3,g2} \\ \hline -\left(f^{g1,g2,x}f^{x,g3,g4}\right) - f^{g1,g3,x}f^{x,g2,g4} \end{array}\right]$$