

$$\begin{aligned}
& g_L \rightarrow g_L \\
& g_S \rightarrow g_S \\
& g_V \rightarrow g_B^2 \\
& Y_d^{11,12} \rightarrow Y_d^{1112} \\
& Y_e^{11,12} \rightarrow C_{He}^{1112} \\
& Y_u^{11,12} \rightarrow Y_u^{1112} \\
& \lambda \rightarrow -2 C_H^4 - \frac{2}{15} \hbar C_H^2 \frac{1}{M_\phi^2} C_B^2 + 2 \hbar C_H^2 \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{2,1,0} [M_\phi P, M_\chi r] - 2 \hbar C_H^2 \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{3,1,-1} [M_\phi P, M_\chi r] \\
& \mu_2 \rightarrow C_H^2 \\
& C_{11HH}^{11,12} \rightarrow 0 \\
& C_{dG}^{11,12} \rightarrow 0 \\
& C_{dG}^{11,12} \rightarrow 0 \\
& C_{dw}^{11,12} \rightarrow 0 \\
& C_{dw}^{11,12} \rightarrow \frac{1}{4} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} C_{He}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] - \frac{1}{4} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} C_{He}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \\
& C_{ed}^{11,12} \rightarrow -\frac{4}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} + \frac{1}{8} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] \delta_{134} + \frac{1}{16} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \delta_{134} \\
& C_{ed}^{11,12} \rightarrow -\frac{1}{15} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} - \frac{1}{8} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] \delta_{134} - \frac{1}{8} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] \delta_{134} + \frac{1}{24} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \delta_{134} + \frac{1}{24} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \delta_{134} + \frac{1}{16} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{2,1,1,-1} [M_\phi, M_\chi P, M_\chi r] + \frac{1}{16} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{2,1,1,-1} [M_\phi, M_\chi P, M_\chi r] \\
& C_{ee}^{11,12} \rightarrow -\frac{1}{30} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} + \frac{1}{2} \hbar \lambda_{H_X} \text{ps} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} C_{He}^{11r} L F_{2,1,0} [M_\phi, M_\chi s] + \frac{1}{2} \hbar \lambda_{H_X} \text{ps} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} C_{He}^{11r} L F_{3,1,-1} [M_\phi, M_\chi s] - \frac{1}{2} \hbar \lambda_{H_X} \text{ps} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} C_{He}^{11r} L F_{4,1,-2} [M_\phi, M_\chi s] + \frac{1}{4} \hbar \lambda_{H_X} \text{ps} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{2,1,1,-1} [M_\chi s, M_\phi, M_\chi P] - \frac{1}{4} \hbar \lambda_{H_X} \text{ps} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{2,1,1,-1} [M_\chi s, M_\phi, M_\chi P] \\
& C_{eu}^{11,12} \rightarrow \frac{8}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} + \frac{1}{3} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] \delta_{134} - \frac{1}{9} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \delta_{134} \\
& C_{ew}^{11,12} \rightarrow 0 \\
& C_G \rightarrow 0 \\
& C_G \rightarrow 0 \\
& C_6 \rightarrow 0 \\
& C_H \rightarrow -\frac{1}{3} \hbar \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rs} \lambda_{H_X} \text{sp} L F_{1,1,1,0} [M_\chi P, M_\chi r, M_\chi s] \\
& C_{HB} \rightarrow 0 \\
& C_H \square \rightarrow -\frac{1}{30} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} + \frac{1}{2} \hbar \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{2,1,0} [M_\chi P, M_\chi r] - \frac{1}{2} \hbar \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{3,1,-1} [M_\chi P, M_\chi r] \\
& C_H \otimes \rightarrow 0 \\
& C_{hd}^{11,12} \rightarrow \frac{2}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \\
& C_{hd}^{11,12} \rightarrow -\frac{2}{15} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{134} \\
& C_{hd}^{11,12} \rightarrow \frac{2}{15} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} + \frac{1}{4} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{3,1,-1} [M_\phi, M_\chi P] - \frac{1}{12} \hbar C_B^2 \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{4,1,-2} [M_\phi, M_\chi P] \\
& C_{hg} \rightarrow 0 \\
& C_H \rightarrow 0 \\
& C_{hl}^{(1)11,12} \rightarrow \frac{1}{15} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} + \frac{1}{4} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{2,1,0} [M_\phi, M_\chi r] - \frac{1}{2} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{3,1,-1} [M_\phi, M_\chi r] + \frac{1}{4} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{4,1,-2} [M_\phi, M_\chi r] \\
& C_{hl}^{(3)11,12} \rightarrow \frac{1}{4} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{2,1,0} [M_\phi, M_\chi r] - \frac{1}{2} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{3,1,-1} [M_\phi, M_\chi r] + \frac{1}{4} \hbar \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X} \text{sr} \overline{C_{He}}^{11s} L F_{4,1,-2} [M_\phi, M_\chi r] \\
& C_{hq}^{(1)11,12} \rightarrow -\frac{1}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \\
& C_{hq}^{(3)11,12} \rightarrow 0 \\
& C_{hud}^{11,12} \rightarrow -\frac{4}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \\
& C_{hud}^{11,12} \rightarrow 0 \\
& C_{hw} \rightarrow 0 \\
& C_{ld}^{(1)11,12,13,14} \rightarrow 0 \\
& C_{ld}^{(3)11,12,13,14} \rightarrow 0 \\
& C_{ldq}^{(1)11,12,13,14} \rightarrow -\frac{1}{30} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{leq}^{(1)11,12,13,14} \rightarrow -\frac{1}{30} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{leq}^{(3)11,12,13,14} \rightarrow 0 \\
& C_{lu}^{(1)11,12,13,14} \rightarrow \frac{4}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{lu}^{(3)11,12,13,14} \rightarrow 0 \\
& C_{qd}^{(1)11,12,13,14} \rightarrow \frac{2}{135} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{qd}^{(8)11,12,13,14} \rightarrow 0 \\
& C_{qq}^{(1)11,12,13,14} \rightarrow \frac{2}{45} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{qq}^{(3)11,12,13,14} \rightarrow 0 \\
& C_{qqd}^{(1)11,12,13,14} \rightarrow -\frac{1}{270} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{qqd}^{(3)11,12,13,14} \rightarrow 0 \\
& C_{qu}^{(1)11,12,13,14} \rightarrow -\frac{4}{135} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{qu}^{(8)11,12,13,14} \rightarrow 0 \\
& C_{quqd}^{(1)11,12,13,14} \rightarrow 0 \\
& C_{quqd}^{(8)11,12,13,14} \rightarrow 0 \\
& C_{ub}^{(1)11,12,13,14} \rightarrow 0 \\
& C_{ud}^{(1)11,12,13,14} \rightarrow \frac{8}{135} \hbar \frac{1}{M_\phi^2} C_B^2 \delta_{112} \delta_{134} \\
& C_{ud}^{(8)11,12,13,14} \rightarrow 0 \\
& C_{uw}^{(1)11,12,13,14} \rightarrow 0 \\
& C_W \rightarrow 0 \\
& C_W \rightarrow 0 \\
& C_{H2} \rightarrow -\hbar \lambda_{H_X} \text{pp} (M_\chi P)^2 + \mu 2 - \hbar \lambda_{H_X} \text{pp} (M_\chi P)^2 \text{Log} \left[\frac{\mu^2}{(M_\chi P)^2} \right] \\
& C_{He}^{11,12} \rightarrow Y_e^{11,12} \rightarrow \frac{1}{8} \hbar Y_e^{11r} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} - \frac{1}{2} \hbar Y_e^{11r} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{1,1,0} [M_\phi, M_\chi P] + \frac{1}{4} \hbar Y_e^{11r} \overline{\lambda_{\psi_X}}^{12p} \lambda_{\psi_X}^{11r} L F_{2,1,-1} [M_\phi, M_\chi P] \\
& C_{H4} \rightarrow -\frac{1}{15} \hbar C_H g_V^4 \frac{1}{M_\phi^2} - \frac{1}{2} \lambda + \frac{1}{2} \hbar \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{1,1,0} [M_\phi, M_\chi r] + \hbar C_H \lambda_{H_X} \text{pr} \lambda_{H_X} \text{rp} L F_{2,1,-1} [M_\phi, M_\chi r]
\end{aligned}$$