

$$\begin{aligned}
C_{\text{HW}} \rightarrow \hbar \bigg(& -\frac{1}{16} g_2^2 \left(2 c_\gamma^2 \overline{y_e^{\text{pr}}} y_e^{\text{pr}} + \sum_{\text{p}} c_{2\gamma} g_1^2 \right) \text{LF}_{3,0} [m_l^{\text{p}}] + \frac{1}{16} g_2^2 \left(2 c_\gamma^2 \overline{y_e^{\text{pr}}} y_e^{\text{pr}} + \sum_{\text{p}} c_{2\gamma} g_1^2 \right) \\
& \text{LF}_{4,-1} [m_l^{\text{p}}] + \frac{1}{16} g_2^2 \left(-6 c_\gamma^2 \overline{y_d^{\text{pr}}} y_d^{\text{pr}} - 6 s_\gamma^2 \overline{y_u^{\text{pr}}} y_u^{\text{pr}} + \sum_{\text{p}} c_{2\gamma} g_1^2 \right) \text{LF}_{3,0} [m_q^{\text{p}}] + \\
& \frac{1}{16} g_2^2 \left(6 c_\gamma^2 \overline{y_d^{\text{pr}}} y_d^{\text{pr}} + 6 s_\gamma^2 \overline{y_u^{\text{pr}}} y_u^{\text{pr}} - \sum_{\text{p}} c_{2\gamma} g_1^2 \right) \text{LF}_{4,-1} [m_q^{\text{p}}] + \\
& \frac{1}{64} \left(g_1^2 g_2^2 (1 + 3 c_{4\gamma}) + 3 g_2^4 (-1 + c_{4\gamma}) \right) \text{LF}_{3,0} [m_\Phi] - \\
& \frac{1}{64} g_2^2 \left(g_1^2 (1 + 3 c_{4\gamma}) + 3 g_2^2 (-1 + c_{4\gamma}) \right) \text{LF}_{4,-1} [m_\Phi] + \frac{5}{4} g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{2,2,-1} [m_2, \tilde{\mu}] + \\
& m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{2,2,0} [m_2, \tilde{\mu}] + g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{3,1,-1} [m_2, \tilde{\mu}] - \\
& g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{3,2,-2} [m_2, \tilde{\mu}] - 2 m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{3,2,-1} [m_2, \tilde{\mu}] - \\
& g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{4,1,-2} [m_2, \tilde{\mu}] - 2 m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{4,1,-1} [m_2, \tilde{\mu}] - \\
& \frac{1}{4} g_2^2 (c_\gamma \overline{a_e^{\text{pr}}} - s_\gamma \tilde{\mu} \overline{y_e^{\text{pr}}}) (c_\gamma a_e^{\text{pr}} - s_\gamma \tilde{\mu} y_e^{\text{pr}}) \text{LF}_{4,1,-1} [m_l^{\text{p}}, m_e^{\text{r}}] + \\
& \frac{1}{4} g_2^2 (c_\gamma \overline{a_e^{\text{pr}}} - s_\gamma \tilde{\mu} \overline{y_e^{\text{pr}}}) (c_\gamma a_e^{\text{pr}} - s_\gamma \tilde{\mu} y_e^{\text{pr}}) \text{LF}_{5,1,-2} [m_l^{\text{p}}, m_e^{\text{r}}] - \\
& \frac{3}{4} g_2^2 (c_\gamma \overline{a_d^{\text{pr}}} - s_\gamma \tilde{\mu} \overline{y_d^{\text{pr}}}) (c_\gamma a_d^{\text{pr}} - s_\gamma \tilde{\mu} y_d^{\text{pr}}) \text{LF}_{4,1,-1} [m_q^{\text{p}}, m_d^{\text{r}}] + \\
& \frac{3}{4} g_2^2 (c_\gamma \overline{a_d^{\text{pr}}} - s_\gamma \tilde{\mu} \overline{y_d^{\text{pr}}}) (c_\gamma a_d^{\text{pr}} - s_\gamma \tilde{\mu} y_d^{\text{pr}}) \text{LF}_{5,1,-2} [m_q^{\text{p}}, m_d^{\text{r}}] - \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{2,2,0} [m_q^{\text{p}}, m_u^{\text{r}}] - \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{3,1,0} [m_q^{\text{p}}, m_u^{\text{r}}] + \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{3,2,-1} [m_q^{\text{p}}, m_u^{\text{r}}] + \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{4,1,-1} [m_q^{\text{p}}, m_u^{\text{r}}] + \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{3,1,0} [m_u^{\text{r}}, m_q^{\text{p}}] + \\
& \frac{3}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{3,2,-1} [m_u^{\text{r}}, m_q^{\text{p}}] - \\
& \frac{9}{8} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{4,1,-1} [m_u^{\text{r}}, m_q^{\text{p}}] + \\
& \frac{3}{4} g_2^2 (s_\gamma \overline{a_u^{\text{pr}}} - \tilde{\mu} c_\gamma \overline{y_u^{\text{pr}}}) (s_\gamma a_u^{\text{pr}} - \tilde{\mu} c_\gamma y_u^{\text{pr}}) \text{LF}_{5,1,-2} [m_u^{\text{r}}, m_q^{\text{p}}] - \\
& \frac{1}{8} g_1^2 g_2^2 (c_\gamma^2 + s_\gamma^2) \text{LF}_{3,1,-1} [\tilde{\mu}, m_1] - \frac{1}{4} m_1 s_\gamma \tilde{\mu} c_\gamma g_1^2 g_2^2 \text{LF}_{3,1,0} [\tilde{\mu}, m_1] + \\
& \frac{3}{8} g_1^2 g_2^2 (c_\gamma^2 + s_\gamma^2) \text{LF}_{4,1,-2} [\tilde{\mu}, m_1] + \frac{1}{2} m_1 s_\gamma \tilde{\mu} c_\gamma g_1^2 g_2^2 \text{LF}_{4,1,-1} [\tilde{\mu}, m_1] - \\
& \frac{1}{4} g_1^2 g_2^2 (c_\gamma^2 + s_\gamma^2) \text{LF}_{5,1,-3} [\tilde{\mu}, m_1] - \frac{1}{2} m_1 s_\gamma \tilde{\mu} c_\gamma g_1^2 g_2^2 \text{LF}_{5,1,-2} [\tilde{\mu}, m_1] - \\
& \frac{3}{8} g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{3,1,-1} [\tilde{\mu}, m_2] - \frac{3}{4} m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{3,1,0} [\tilde{\mu}, m_2] - \\
& g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{3,2,-2} [\tilde{\mu}, m_2] - 2 m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{3,2,-1} [\tilde{\mu}, m_2] + \\
& \frac{9}{8} g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{4,1,-2} [\tilde{\mu}, m_2] + \frac{3}{2} m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{4,1,-1} [\tilde{\mu}, m_2] - \\
& \left. \frac{3}{4} g_2^4 (c_\gamma^2 + s_\gamma^2) \text{LF}_{5,1,-3} [\tilde{\mu}, m_2] - \frac{3}{2} m_2 s_\gamma \tilde{\mu} c_\gamma g_2^4 \text{LF}_{5,1,-2} [\tilde{\mu}, m_2] \right)
\end{aligned}$$