

$$\begin{aligned} & \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} + \hbar \left( \frac{1}{72} \frac{1}{m_e^2} s_\gamma^2 \left( \overline{y_d}^{i4i3} \left( 27 \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} \left( 1 + s_\gamma^2 \right) + y_e^{i1i2} \left( 25 g_1^2 + \right. \right. \right. \right. \\ & \quad \left. \left. \left. 27 g_2^2 + 48 g_3^2 - 36 c_\gamma^2 \left( 3 \overline{y_d}^{pr} y_d^{pr} + \overline{y_e}^{pr} y_e^{pr} \right) \right) \right) + \right. \\ & \quad \left. 9 y_e^{i1i2} \left( 3 \overline{y_d}^{ri3} \overline{y_d}^{i4p} y_d^{rp} \left( 1 + s_\gamma^2 \right) - \overline{y_d}^{pi3} \overline{y_u}^{i4r} y_u^{pr} \left( -1 + c_\gamma^2 \right) \right) \right) + \\ & \quad \frac{1}{2} \sum_p s_\gamma g_1^2 \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( 2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma} \right) \text{LF}_{1,0} \left[ m_d^p \right] + \\ & \quad 3 s_\gamma \frac{1}{m_e^4} \overline{y_d}^{pr} \overline{y_d}^{i4i3} y_d^{pr} y_e^{i1i2} \left( -s_{2\gamma} c_\gamma + s_\gamma^3 \right) \text{LF}_{1,0} \left[ m_d^r \right] + \\ & \quad \frac{1}{2} \sum_p s_\gamma g_1^2 \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( 2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma} \right) \text{LF}_{1,0} \left[ m_e^p \right] + \\ & \quad s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} \overline{y_e}^{pr} y_e^{pr} y_e^{i1i2} \left( -s_{2\gamma} c_\gamma + s_\gamma^3 \right) \text{LF}_{1,0} \left[ m_e^r \right] + \\ & \quad \frac{1}{2} s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( 2 \overline{y_e}^{pr} y_e^{pr} \left( -s_{2\gamma} c_\gamma + s_\gamma^3 \right) - \sum_p g_1^2 \left( 2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma} \right) \right) \text{LF}_{1,0} \left[ m_l^p \right] + \\ & \quad \frac{1}{2} s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \\ & \quad \left( 6 \overline{y_d}^{pr} y_d^{pr} \left( -s_{2\gamma} c_\gamma + s_\gamma^3 \right) + 6 c_\gamma \overline{y_u}^{pr} y_u^{pr} \left( s_{2\gamma} + s_\gamma c_\gamma \right) + \sum_p g_1^2 \left( 2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma} \right) \right) \\ & \quad \text{LF}_{1,0} \left[ m_q^p \right] - \sum_p s_\gamma g_1^2 \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( 2 s_{2\gamma} c_\gamma + s_\gamma c_{2\gamma} \right) \text{LF}_{1,0} \left[ m_l^p \right] + \\ & \quad 3 s_\gamma c_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \overline{y_u}^{pr} y_u^{pr} \left( s_{2\gamma} + s_\gamma c_\gamma \right) \text{LF}_{1,0} \left[ m_u^r \right] + \frac{1}{4} s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \\ & \quad \left( 3 s_{4\gamma} c_\gamma \left( g_1^2 + g_2^2 \right) + s_\gamma \left( g_1^2 \left( -1 + 3 c_{2\gamma}^2 \right) + 3 g_2^2 \left( -1 + c_{2\gamma}^2 \right) \right) \right) \text{LF}_{1,0} \left[ m_\Phi \right] + \\ & \quad \frac{1}{4} \frac{1}{m_e^2} s_\gamma^2 \left( \overline{y_d}^{i4i3} \left( -3 s_\gamma^2 \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} + 2 y_e^{i1i2} \left( g_1^2 + 3 g_2^2 \right) \right) + \right. \\ & \quad \left. 3 y_e^{i1i2} \left( -s_\gamma^2 \overline{y_d}^{ri3} \overline{y_d}^{i4p} y_d^{rp} + c_\gamma^2 \overline{y_d}^{pi3} \overline{y_u}^{i4r} y_u^{pr} \right) \right) \text{LF}_{1,1} \left[ m_\Phi \right] - \\ & \quad \frac{1}{4} s_\gamma^2 y_e^{i1i2} \left( \overline{y_d}^{i4i3} \left( g_1^2 + 3 g_2^2 \right) + 2 c_\gamma^2 \overline{y_d}^{pi3} \overline{y_u}^{i4r} y_u^{pr} \right) \text{LF}_{1,2} \left[ m_\Phi \right] - \\ & \quad \frac{1}{9} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_1, m_d^{i3} \right] + \frac{1}{18} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_1, m_d^{i3} \right] - \\ & \quad g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_1, m_e^{i2} \right] + \frac{1}{2} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_1, m_e^{i2} \right] - \\ & \quad \frac{1}{4} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_1, m_l^{i1} \right] + \frac{1}{8} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_1, m_l^{i1} \right] - \\ & \quad \frac{1}{36} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_1, m_q^{i4} \right] + \frac{1}{72} g_1^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_1, m_q^{i4} \right] - \\ & \quad g_1^2 \frac{1}{m_e^4} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \left( c_\gamma^2 + s_\gamma^2 \right) \text{LF}_{1,1,-1} \left[ m_1, \tilde{\mu} \right] - \\ & \quad 2 m_1 s_\gamma \tilde{\mu} c_\gamma g_1^2 \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( c_\gamma^2 - 2 s_\gamma^2 \right) \text{LF}_{1,1,0} \left[ m_1, \tilde{\mu} \right] - \\ & \quad \frac{3}{4} g_2^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_2, m_l^{i1} \right] + \frac{3}{8} g_2^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_2, m_l^{i1} \right] - \\ & \quad \frac{3}{4} g_2^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_2, m_q^{i4} \right] + \frac{3}{8} g_2^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_2, m_q^{i4} \right] - \\ & \quad 3 g_2^2 \frac{1}{m_e^4} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \left( c_\gamma^2 + s_\gamma^2 \right) \text{LF}_{1,1,-1} \left[ m_2, \tilde{\mu} \right] - \\ & \quad 6 m_2 s_\gamma \tilde{\mu} c_\gamma g_2^2 \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \left( c_\gamma^2 - 2 s_\gamma^2 \right) \text{LF}_{1,1,0} \left[ m_2, \tilde{\mu} \right] - \\ & \quad \frac{4}{3} g_3^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_3, m_d^{i3} \right] + \frac{2}{3} g_3^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_3, m_d^{i3} \right] - \\ & \quad \frac{4}{3} g_3^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_3, m_q^{i4} \right] + \frac{2}{3} g_3^2 \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} y_e^{i1i2} \text{LF}_{2,1,-1} \left[ m_3, m_q^{i4} \right] - \\ & \quad \frac{1}{2} \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{ri3} \overline{y_d}^{i4p} y_d^{rp} y_e^{i1i2} \text{LF}_{1,1,0} \left[ m_d^p, \tilde{\mu} \right] + 3 s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \\ & \quad \left( s_\gamma \overline{a_d}^{pr} a_d^{pr} \left( -2 c_\gamma^2 + s_\gamma^2 \right) - \tilde{\mu} c_\gamma \left( c_\gamma^2 - 2 s_\gamma^2 \right) \left( \overline{y_d}^{pr} a_d^{pr} + y_d^{pr} \overline{a_d}^{pr} \right) + 3 s_\gamma \tilde{\mu}^2 c_\gamma^2 \overline{y_d}^{pr} y_d^{pr} \right) \\ & \quad \text{LF}_{1,1,0} \left[ m_d^r, m_q^p \right] + s_\gamma \frac{1}{m_e^4} \overline{y_d}^{i4i3} y_e^{i1i2} \\ & \quad \left( s_\gamma \overline{a_e}^{pr} a_e^{pr} \left( -2 c_\gamma^2 + s_\gamma^2 \right) - \tilde{\mu} c_\gamma \left( c_\gamma^2 - 2 s_\gamma^2 \right) \left( \overline{y_e}^{pr} a_e^{pr} + y_e^{pr} \overline{a_e}^{pr} \right) + 3 s_\gamma \tilde{\mu}^2 c_\gamma^2 \overline{y_e}^{pr} y_e^{pr} \right) \\ & \quad \text{LF}_{1,1,0} \left[ m_e^r, m_l^p \right] - \frac{1}{2} \frac{1}{m_e^2} s_\gamma^2 \overline{y_d}^{i4i3} \overline{y_e}^{pr} y_e^{pi2} y_e^{i1r} \text{LF}_{1,1,0} \left[ m_e^r, \tilde{\mu} \right] + s_\gamma c$$