

$$\begin{aligned} & \frac{1}{6} s_\gamma c_\gamma y_d^{pi2} \bar{y}_u^{si1} (\bar{y}_d^{pr} y_d^{sr} (3c_\gamma^2 + s_\gamma^2) + \bar{y}_u^{pr} y_u^{sr} (c_\gamma^2 + 3s_\gamma^2)) - \\ & \frac{1}{18} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,0}[m_1, m_q^P] + \frac{1}{9} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,-1}[m_1, m_q^P] - \\ & \frac{1}{18} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{4,1,-2}[m_1, m_q^P] - \frac{3}{2} s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,0}[m_2, m_q^P] + \\ & 3 s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,-1}[m_2, m_q^P] - \frac{3}{2} s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{4,1,-2}[m_2, m_q^P] - \\ & \frac{8}{3} s_\gamma c_\gamma g_3^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,0}[m_3, m_q^P] + \frac{16}{3} s_\gamma c_\gamma g_3^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,-1}[m_3, m_q^P] - \\ & \frac{8}{3} s_\gamma c_\gamma g_3^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{4,1,-2}[m_3, m_q^P] - s_\gamma c_\gamma \bar{y}_d^{pr} y_d^{pi2} y_d^{sr} \bar{y}_u^{si1} LF_{2,1,0}[\tilde{\mu}, m_d^r] + \\ & 2 s_\gamma c_\gamma \bar{y}_d^{pr} y_d^{pi2} y_d^{sr} \bar{y}_u^{si1} LF_{3,1,-1}[\tilde{\mu}, m_d^r] - \\ & s_\gamma c_\gamma \bar{y}_d^{pr} y_d^{pi2} y_d^{sr} \bar{y}_u^{si1} LF_{4,1,-2}[\tilde{\mu}, m_d^r] - s_\gamma c_\gamma y_d^{pi2} \bar{y}_u^{pr} \bar{y}_u^{si1} y_u^{sr} LF_{2,1,0}[\tilde{\mu}, m_u^r] + \\ & 2 s_\gamma c_\gamma y_d^{pi2} \bar{y}_u^{pr} \bar{y}_u^{si1} y_u^{sr} LF_{3,1,-1}[\tilde{\mu}, m_u^r] - s_\gamma c_\gamma y_d^{pi2} \bar{y}_u^{pr} \bar{y}_u^{si1} y_u^{sr} LF_{4,1,-2}[\tilde{\mu}, m_u^r] + \\ & \frac{1}{18} m_1 s_\gamma g_1^2 \bar{y}_u^{pi1} (-c_\gamma a_d^{pi2} + s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,1,1,0}[m_1, m_d^{i2}, m_q^P] + \\ & \frac{1}{36} m_1 s_\gamma g_1^2 \bar{y}_u^{pi1} (c_\gamma a_d^{pi2} - s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,2,1,-1}[m_1, m_d^{i2}, m_q^P] + \\ & \frac{1}{18} m_1 s_\gamma g_1^2 \bar{y}_u^{pi1} (c_\gamma a_d^{pi2} - s_\gamma \tilde{\mu} y_d^{pi2}) LF_{3,1,1,-1}[m_1, m_d^{i2}, m_q^P] + \\ & \frac{1}{36} m_1 s_\gamma g_1^2 \bar{y}_u^{pi1} (-c_\gamma a_d^{pi2} + s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,2,1,-1}[m_1, m_q^P, m_d^{i2}] + \\ & \frac{1}{9} m_1 c_\gamma g_1^2 y_d^{pi2} (s_\gamma \bar{a}_u^{pi1} - \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,1,1,0}[m_1, m_q^P, m_u^{i1}] + \\ & \frac{1}{18} m_1 c_\gamma g_1^2 y_d^{pi2} (s_\gamma \bar{a}_u^{pi1} - \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,2,1,-1}[m_1, m_q^P, m_u^{i1}] + \\ & \frac{1}{9} m_1 c_\gamma g_1^2 y_d^{pi2} (-s_\gamma \bar{a}_u^{pi1} + \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{3,1,1,-1}[m_1, m_q^P, m_u^{i1}] + \\ & \frac{1}{6} m_1 \tilde{\mu} g_1^2 y_d^{pi2} \bar{y}_u^{pi1} (-c_\gamma^2 + s_\gamma^2) LF_{2,1,1,0}[m_1, m_q^P, \tilde{\mu}] + \\ & \frac{1}{6} m_1 \tilde{\mu} g_1^2 y_d^{pi2} \bar{y}_u^{pi1} (c_\gamma^2 - s_\gamma^2) LF_{3,1,1,-1}[m_1, m_q^P, \tilde{\mu}] + \\ & \frac{1}{18} m_1 c_\gamma g_1^2 y_d^{pi2} (-s_\gamma \bar{a}_u^{pi1} + \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,2,1,-1}[m_1, m_u^{i1}, m_q^P] - \\ & \frac{1}{6} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_d^{i2}] - \\ & \frac{1}{6} m_1 \tilde{\mu} g_1^2 s_\gamma^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_d^{i2}] + \frac{1}{4} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_q^P] + \\ & \frac{1}{12} \tilde{\mu} g_1^2 y_d^{pi2} \bar{y}_u^{pi1} (2m_1(2c_\gamma^2 + s_\gamma^2) + 3s_\gamma \tilde{\mu} c_\gamma) LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_q^P] - \\ & \frac{1}{3} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-2}[m_1, \tilde{\mu}, m_u^{i1}] - \\ & \frac{1}{3} m_1 \tilde{\mu} g_1^2 c_\gamma^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-1}[m_1, \tilde{\mu}, m_u^{i1}] + \frac{9}{2} s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,1,-1}[m_2, m_q^P, \tilde{\mu}] + \\ & \frac{3}{2} m_2 \tilde{\mu} g_2^2 y_d^{pi2} \bar{y}_u^{pi1} (c_\gamma^2 + s_\gamma^2) LF_{2,1,1,0}[m_2, m_q^P, \tilde{\mu}] - \\ & 3 s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,1,-2}[m_2, m_q^P, \tilde{\mu}] - \frac{3}{2} m_2 \tilde{\mu} g_2^2 y_d^{pi2} \bar{y}_u^{pi1} (c_\gamma^2 + s_\gamma^2) \\ & LF_{3,1,1,-1}[m_2, m_q^P, \tilde{\mu}] - \frac{9}{4} s_\gamma c_\gamma g_2^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,2,1,-2}[m_2, \tilde{\mu}, m_q^P] - \\ & \frac{3}{4} \tilde{\mu} g_2^2 y_d^{pi2} \bar{y}_u^{pi1} (2m_2(c_\gamma^2 + s_\gamma^2) + s_\gamma \tilde{\mu} c_\gamma) LF_{2,2,1,-1}[m_2, \tilde{\mu}, m_q^P] + \\ & \frac{4}{3} m_3 s_\gamma g_3^2 \bar{y}_u^{pi1} (c_\gamma a_d^{pi2} - s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,1,1,0}[m_3, m_d^{i2}, m_q^P] + \\ & \frac{2}{3} m_3 s_\gamma g_3^2 \bar{y}_u^{pi1} (-c_\gamma a_d^{pi2} + s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,2,1,-1}[m_3, m_d^{i2}, m_q^P] + \\ & \frac{4}{3} m_3 s_\gamma g_3^2 \bar{y}_u^{pi1} (-c_\gamma a_d^{pi2} + s_\gamma \tilde{\mu} y_d^{pi2}) LF_{3,1,1,-1}[m_3, m_d^{i2}, m_q^P] + \\ & \frac{2}{3} m_3 s_\gamma g_3^2 \bar{y}_u^{pi1} (c_\gamma a_d^{pi2} - s_\gamma \tilde{\mu} y_d^{pi2}) LF_{2,2,1,-1}[m_3, m_q^P, m_d^{i2}] + \\ & \frac{4}{3} m_3 c_\gamma g_3^2 y_d^{pi2} (s_\gamma \bar{a}_u^{pi1} - \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,1,1,0}[m_3, m_q^P, m_u^{i1}] + \\ & \frac{2}{3} m_3 c_\gamma g_3^2 y_d^{pi2} (s_\gamma \bar{a}_u^{pi1} - \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,2,1,-1}[m_3, m_q^P, m_u^{i1}] + \\ & \frac{4}{3} m_3 c_\gamma g_3^2 y_d^{pi2} (-s_\gamma \bar{a}_u^{pi1} + \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{3,1,1,-1}[m_3, m_q^P, m_u^{i1}] + \\ & \frac{2}{3} m_3 c_\gamma g_3^2 y_d^{pi2} (-s_\gamma \bar{a}_u^{pi1} + \tilde{\mu} c_\gamma \bar{y}_u^{pi1}) LF_{2,2,1,-1}[m_3, m_u^{i1}, m_q^P] + \\ & \frac{1}{4} \tilde{\mu} c_\gamma \bar{y}_d^{pr} y_d^{pi2} \bar{y}_u^{si1} (-c_\gamma a_d^{sr} + s_\gamma \tilde{\mu} y_d^{sr}) LF_{2,2,1,-1}[m_d^r, \tilde{\mu}, m_q^S] + \\ & \frac{1}{4} s_\gamma \tilde{\mu} y_d^{pi2} \bar{y}_u^{si1} y_u^{sr} (s_\gamma \bar{a}_u^{pr} - \tilde{\mu} c_\gamma \bar{y}_u^{pr}) LF_{2,2,1,-1}[m_q^P, \tilde{\mu}, m_u^r] + \\ & \frac{1}{4} \tilde{\mu} c_\gamma \bar{y}_d^{pr} y_d^{pi2} \bar{y}_u^{si1} (c_\gamma a_d^{sr} - s_\gamma \tilde{\mu} y_d^{sr}) LF_{2,2,1,-1}[m_q^S, \tilde{\mu}, m_d^r] + \\ & \frac{1}{4} s_\gamma \tilde{\mu} y_d^{pi2} \bar{y}_u^{si1} y_u^{sr} (-s_\gamma \bar{a}_u^{pr} + \tilde{\mu} c_\gamma \bar{y}_u^{pr}) LF_{2,2,1,-1}[m_u^r, \tilde{\mu}, m_q^P] + \\ & \frac{1}{2} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,1,-1}[\tilde{\mu}, m_1, m_d^{i2}] + \frac{1}{3} m_1 \tilde{\mu} g_1^2 s_\gamma^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,1,0}[\tilde{\mu}, m_1, m_d^{i2}] - \\ & \frac{1}{3} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,1,-2}[\tilde{\mu}, m_1, m_d^{i2}] - \frac{1}{3} m_1 \tilde{\mu} g_1^2 s_\gamma^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{3,1,1,-1}[\tilde{\mu}, m_1, m_d^{i2}] + \\ & \frac{1}{4} s_\gamma c_\gamma g_1^2 y_d^{pi2} \bar{y}_u^{pi1} LF_{2,1,1,-1}[\tilde{\mu}, m_1, m_q^P] - \frac{1}{2} s_\gamma c_\gamma g_1^2 \tilde$$