

$$\begin{aligned}
&= \sum_{M,N} \tilde{c}(MN) \left[ \text{Li}_1(q_T^N q_U^M) + \frac{1}{2\pi N T_2} \text{Li}_2(q_T^N q_U^M) \right] \\
&\quad - c_2(MN) \left[ \frac{3N}{\pi U_2} \text{Li}_2(q_T^N q_U^M) + \frac{3}{2\pi^2 T_2 U_2} \text{Li}_3(q_T^N q_U^M) \right] + \text{c.c.}
\end{aligned}$$