

$$\begin{aligned}
& \text{Diagram 1: } \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{F_{\text{ph};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} \\
&= \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{ph};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} + \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{ph};12ba}^{qkk_1}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} \boxed{F_{\text{ph};\partial c34}^{qk_1k'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} \\
& \quad \quad \quad \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{F_{\text{ph};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} = \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{ph};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} - \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{ph};12ba}^{q_{\text{ph}}k_{\text{ph}}k_1;\overline{\text{ph}}}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} \boxed{F_{\text{ph};\partial c34}^{q_{\text{ph}}k_1;\overline{\text{ph}}k'_{\text{ph}}}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} \\
& \quad \quad \quad \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{pp};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} = \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k-q;2} \end{array} \boxed{\Gamma_{\text{pp};1234}^{qkk'}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k'-q;3} \end{array} + \frac{1}{2} \begin{array}{c} \xrightarrow{k;1} \\ \xleftarrow{k'-q;3} \end{array} \boxed{\Gamma_{\text{pp};1\partial3b}^{q_{\text{pp}}k_{\text{pp}}k_1;\text{pp}}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k-q;2} \end{array} \boxed{F_{\text{pp};c2a4}^{q_{\text{pp}}k_1;\text{pp}k'_{\text{pp}}}} \begin{array}{c} \xrightarrow{k';4} \\ \xleftarrow{k-q;2} \end{array}
\end{aligned}$$