

$$\int d\phi \mathcal{S}(\vec{q}_T, \vec{v}_t, \mu) =$$

$$\begin{aligned} & \sum_{X_s} f_{X_s}(\vec{q}'_T) \int_{X_s} \text{Diagram 1} \text{Diagram 2} \delta\left(1 - \left|\sum_i \vec{k}_{iT}\right|^2\right) \prod_i \delta^+(k_i) \\ &= f_1(q'_T) \int d^d k_1 \text{Diagram 3} \text{Diagram 4} \delta\left(1 - \vec{k}_{1T}^2\right) \delta^+(k_1) \\ &+ f_2(q'_T) \int d^d k_1 \text{Diagram 5} \delta\left(1 - |\vec{k}_{1T} + \vec{k}_{2T}|^2\right) \delta^+(k_1) \delta^+(k_2) + \dots \end{aligned}$$

The diagrams are:

- Diagram 1:** A vertex with four external lines. Top-left: line 1; top-right: line $t, (1, +\hat{v}_t)$; bottom-left: line 2; bottom-right: line $\bar{t}, (1, -\hat{v}_t)$.
- Diagram 2:** A vertex with four external lines. Top-left: line t ; top-right: line 1; bottom-left: line \bar{t} ; bottom-right: line 2.
- Diagram 3:** A vertex with four external lines. Top-right: line i ; bottom-right: line j . A wavy line connects the top-right and bottom-right vertices.
- Diagram 4:** A vertex with four external lines. Top-right: line i ; bottom-right: line j . A wavy line connects the top-right and bottom-right vertices.
- Diagram 5:** A vertex with four external lines. Top-right: line i ; bottom-right: line j . A wavy line connects the top-right and bottom-right vertices.