

Renormalize quasi TMD-PDF on lattice

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Non-local operator has linear divergence on lattice. RI/MOM scheme cannot eliminate the linear divergence in quasi-PDF operator, especially for the clover valence quark. Using RI/MOM scheme will undermine the credibility of our results.

We try to use the square root of Wilson loop to renormalize bare matrix element of TMD-PDF. When calculating TMD-PDF in the rest frame, we found renormalized matrix elements on different lattice spacings are separated, especially for the finer lattice. But if we change the scale from fm to a (lattice spacing), the curves of different lattice spacings are consistent, which indicates that the linear divergence has been eliminated and only the $\log(z/a)$ and $\log(b/a)$ are left. In fact, perturbation theory tells us that Wilson loop is not able to cancel out all the log divergences, even in the one-loop level.

We are trying to remove those log divergences and renormalize quasi TMD-PDF.

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