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Renormalization of twist-two operators and its application to singlet splitting functions in QCD

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The splitting functions determine the scaling violations of deep-inelastic scattering structure functions and govern the evolution of Parton densities. A determination of N3LO Parton densities requires the knowledge of 4-loop splitting functions. It is important to find efficient methods to compute 4-loop splitting functions. The method of computing the off-shell matrix elements with a twist-two operator insertion is one of the most efficient methods. However, the nature of off-shell quantity in the unpolarized case requires us to find all gauge-variant operators which mix with the physical twist-two operators.

In this talk, I will introduce a systematic framework to determine all gauge-variant operators, and apply the framework to determine the unpolarized singlet splitting functions to the three-loop order. Our framework can also be directly applied to determine all counterterms to extract the 4-loop splitting functions.

Submitted on behalf of a Collaboration?

No

Participate in poster competition?

No

Primary author: YANG, Tongzhi (University of Zurich)

Co-authors: VON MANTEUFFEL, Andreas (Michigan State University); GEHRMANN, Thomas (University of Zurich)

Presenter: YANG, Tongzhi (University of Zurich)

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