Resummation, Evolution, Factorization 2022



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Infrared renormalon effects in color dipole TMD PDF at small-x.

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Perturbation series in quantum field theory are usually divergent even after term by term renormalization. There are resummation procedures to regularize divergence series, for factorially divergent series Borel summation is mostly used. In the small momenta regions, within the window of momentum scale Λ QCD and saturation scale Qs where the running coupling becomes large, infrared renormalons is believed to be the source of the divergence in the perturbation series and gives estimates to the uncertainty due to non-perturbative effects. In this work [Nucl. Phys. B 953 (2020), 114961], we estimated uncertainties from the infrared renormalons in the (color dipole) gluon distribution. We have shown that non-linear saturation effects at small-x shift the first IR pole at the Borel plane towards zero from $2/\beta 2$ to $1/\beta 2$ where $\beta 2$ is beta function of QCD. This leads to enhanced non-perturbative uncertainty for the (color dipole) gluon distribution.

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