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# Jet transverse momentum broadening

In deeply inelastic lepton-nucleus scattering, hadron-nucleus and heavy-ion collisions; multiple scatterings of energetic partons in the nuclear medium lead to a broadening of the average jet transverse momentum. This jet broadening phenomenon offers a useful tool for probing the properties of nuclear media, including the quark-gluon plasma formed in high-energy heavy-ion collisions. Many theoretical frameworks have been developed in the study of multiple scatterings and their subsequent effects. For this work, we focus on the collisional and radiative parton energy loss formalisms, as well as the higher-twist collinear factorization framework. We compute the transverse momentum broadening of final hadrons in semi-inclusive deep inelastic scattering (SIDIS) at Twist-4, and compare to the broadening predictions calculated using the Djordjevic-Gyulassy-Levai-Vitev (DGLV) energy loss model. We aim to compare both sets of jet broadening predictions to experimental data, with a view to reconciling the DGLV energy loss techniques with the novel Twist-4 methods in SIDIS.

## Apply to be considered for a student ; award (Yes / No)?

Yes

## Level for award;(Hons, MSc, PhD, N/A)?

MSc

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