

Transverse energy-energy correlators in the Color-Glass Condensate

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Transverse energy-energy correlators (TEECs) are event-shape observables that can be used to study QCD by examining angular correlations between produced particles. As they are weighted by the energy of the particle, they are an infrared-safe observable that can be calculated to high accuracy. This makes TEECs a potentially useful tool in extracting the target structure in DIS and studying physics in the small- x regime where saturation effects are believed to be important.

In this talk, we will present results for TEECs in back-to-back electron-hadron production in the small- x region of DIS [1]. We establish a factorization theorem given in terms of the hard function, soft function, TEEC jet function, and quark distribution. The quark distribution is written in terms of the small- x dipole amplitudes which incorporate the saturation effects. By considering both proton and nuclear targets in DIS, we demonstrate that TEECs can be a powerful tool to understand gluon saturation and nuclear modification at the upcoming Electron-Ion Collider.

[1] Zhongbo Kang, Jani Penttala, Fanyi Zhao, Yiyu Zhou, arXiv:2311.17142 [hep-ph]

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