Contribution ID: **34** Type: **Oral report**

# Multiple parton scattering and gluon saturation in dijet production at EIC

Large angle gluon radiations induced by multiple parton scatterings contribute to dijet production in deeply inelastic scattering off a large nucleus at the Electron-Ion Collider. Within the generalized high-twist approach to multiple parton scattering, such contributions at the leading order in perturbative QCD and large Bjorken momentum fraction $x_B$ can be expressed as a convolution of the multiple parton scattering amplitudes and the transverse momentum dependent (TMD) two-parton correlation matrix elements. We study this medium-induced dijet spectrum and its azimuthal angle correlation under the approximation of small longitudinal momentum transfer in the secondary scattering and the factorization of two-parton correlation matrix elements as a product of quark and gluon TMD parton distribution function (PDF). Contributions to dijet cross section from double scattering are power-suppressed and only become sizable for mini-jets at small transverse momentum. We find that the total dijet correlation for these mini-jets, which also includes the contribution from single scattering, is sensitive to the transverse momentum broadening in the quark TMD PDF at large x and saturation in the gluon TMD PDF at small x inside the nucleus. The correlation from double scattering is also found to increase with the dijet rapidity gap and have a quadratic nuclear-size dependence because of the Landau-Pomeranchuk-Migdal (LPM) interference in gluon emission induced by multiple scattering. Experimental measurements of such unique features in the dijet correlation can shed light on the LPM interference in strong interaction and gluon saturation in large nuclei.

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**Track Classification:** 3. 重离子物理