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Probing gluon number density with electron-dijet correlations at EIC

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We propose a novel way of studying the gluon number density (the so-called Weizsäcker-Williams gluon distribution) using the planned Electron Ion Collider. Namely, with the help of the azimuthal correlations between the total transverse momentum of the dijet system and the scattered electron, we examine an interplay between the effect of the soft gluon emissions (the Sudakov form factor) and the gluon saturation effects. The kinematic cuts are chosen such that the dijet system is produced in the forward direction in the laboratory frame, which provides an upper bound on the probed longitudinal fractions of the hadron momentum carried by scattered gluons. Further cuts enable us to use the factorization formalism that directly involves the unpolarized Weizsäcker-Williams gluon distribution. We find this observable to be very sensitive to the soft gluon emission and moderately sensitive to the gluon saturation.

Primary author: KUTAK, Krzysztof (Institute of Nuclear Physics Polish Academy of Sciences)

Presenter: KUTAK, Krzysztof (Institute of Nuclear Physics Polish Academy of Sciences)

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