

Measurements of jet and soft activity in $\sqrt{s_{\text{NN}}} = 200 \text{ GeV}$ p+Au collisions at STAR

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Proton-ion collisions at the LHC and RHIC have yielded unexpected trends, notably in measurements of jet nuclear modification factor as a function of event activity (EA). Recent preliminary measurements from STAR in p+Au collisions at $\sqrt{s_{\text{NN}}} = 200 \text{ GeV}$ demonstrate inherent correlations between high- Q^2 parton scatterings and EA measured at backward (Au-going) rapidities or underlying event (UE) at mid-rapidity. The measurements at STAR disfavor jet quenching as an explanation for the suppression of jet yield observed in high-EA collisions. This leads to an opportunity to probe the early stages of the proton-ion collisions. In this talk, we show correlations of backward-rapidity EA with mid-rapidity UE, as well as measurements of EA-dependent modifications to charged hadron spectra and jet production. In particular, we present measurements of the UE for various EA selections and discuss its kinematic dependence on jet pseudorapidity and transverse momentum (p_{T}) as a means of examining the correlation between initial hard scatterings and soft processes. We also investigate the EA dependence of high- p_{T} hadron and jet properties—including fully corrected ungroomed and SoftDrop groomed jet substructure observables—to study the impact of initial and final state effects.