Activity-dependent underlying event and jet measurements in $\sqrt{s_{\mathrm{NN}}} = 200\,\mathrm{GeV}$ p+Au collisions at STAR

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Over the past decade, measurements of p+A c ollisions at the LHC and RHIC have shown interesting correlations between mid-rapidity jet yields and high-rapidity event activity (EA). In this poster, STAR presents a number of measurements in p+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200\,\mathrm{GeV}$ which help to address the cause of this behavior in small systems. We show the underlying event (UE) at mid-rapidities and its dependence on EA measured at backward (Au-going) rapidities and on jet kinematics, after correcting for jet energy scale. We also show measurements of jet production recoiling from high-energy triggers as a function of EA, and determine via a Pythia8 model that the likely cause of the observed EA-dependence is early-time phase space constraints between the hard and soft processes. Lastly, we find, after fully correcting inclusive jet substructure observables for detector effects with a two-dimensional Bayesian unfolding, that jets are unmodified in high-EA collisions. Collectively, these measurements favor a picture of early-time modification due to cold nuclear matter effects or physical constraints as opposed to jet quenching.