Jet substructure in p+p and p+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV at STAR

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Abstract

In order to attribute the partonic energy loss experienced by jets (jet quenching) observed in A+A collisions to the traversal of partons through the hot QCD medium, it is necessary to examine the cold nuclear matter (CNM) effects on the corresponding jets. Such an examination has historically been done using p+A collisions. In this talk, we present fully corrected measurements of jet substructure – with a focus on jet mass – in p+Au collisions at STAR at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV as a function of the event activity (EA) to increase or decrease the magnitude of CNM effects. EA is determined in the backward (Au-going) rapidity ($-5.0 < \eta < -3.3$) by the STAR Beam-Beam Counter to minimize auto-correlation with jets measured at mid-rapidity. By differentiating the measured jets by rapidity, we explore potential Bjorken-x dependence of CNM effects. Finally, we compare the results in p+Au collisions to model calculations, and to fully corrected corresponding measurements in p+p collisions and vacuum Monte Carlo models to isolate these CNM effects in anticipation of an upcoming jet mass measurement in Au+Au collisions.