Correlations between semi-inclusive jet production and event activity in $\sqrt{s_{\rm NN}} = 200\,\text{GeV}$ p+Au collisions at STAR

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Jets are formed early in high energy collisions and are causally uncorrelated with soft particle production (event activity, EA) sufficiently separated in phase space. This makes jets ideal probes for quark-gluon plasma (QGP) formation in A+A collisions: EA and jets simultaneously measure centrality and medium conditions, with jet suppression indicating QGP formation. In the ongoing effort to understand QGP-like flow signals in small system (p/d/He+A) collisions, corresponding small system jet measurements provide critical inputs. In this talk we present correlations between semi-inclusive R = 0.4 jets and EA from p+Au collisions at STAR, with EA azimuthally transverse to the jets at mid-rapidity and/or at Au-going high rapidity. These are the first semi-inclusive small system jet spectrum measurements at RHIC energies and show a clear jet spectra dependence on EA. Suggestively, this dependence is at comparable x_p at which jet nuclear modification factor ($R_{p\rm Pb}$) at LHC is measured to be EA dependent. We conclude that the observed modification to jet yields most likely results from phase space constraints in the initial collision system and/or early time dynamics, and discuss how to address that bias in this semi-inclusive measurement.