Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Understanding Uncertainties and Biases in Jet Quenching in High-Energy Nucleus-Nucleus Collisions[1] MATTHIAS HEINZ, Ohio State Univ - Columbus — Jets are the collimated streams of particles resulting from hard scattering in the initial state of high-energy collisions. In heavy-ion collisions, jets interact with the quark-gluon plasma (QGP) before freezeout, providing a probe into the internal structure and properties of the QGP. In order to study jets, background must be subtracted from the measured event, potentially introducing a bias. We aim to understand quantify this subtraction bias. PYTHIA, a library to simulate pure jet events, is used to simulate a model for a signature with one pure jet (a photon) and one quenched jet, where all quenched particle momenta are reduced by the same fraction. Background for the event is simulated using multiplicity values generated by the TRENTO initial state model of heavy-ion collisions fed into a thermal model from which to sample particle types and a 3-dimensional Boltzmann distribution from which to sample particle momenta. Data from the simulated events is used to train a statistical model, which computes a posterior distribution of the quench factor for a data set. The model was tested first on pure jet events and later on full events including the background. This model will allow for a quantitative determination of biases induced by various methods of background subtraction.

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Matthias Heinz
Ohio State Univ - Columbus

Date submitted: 01 Aug 2017 Electronic form version 1.4