Contribution ID: **743** Type: **Poster**

Partial Thermalization of Long Range Correlations in Nuclear Collisions

Is thermalization necessary for hydrodynamic flow in nuclear collisions? The discovery of flow-like azimuthal correlations in pA and high-multiplicity pp collisions raises profound questions about the onset of collective flow and its relation to hydrodynamics. We seek independent experimental information on the degree of thermalization in order to identify those truly hydrodynamic collision systems in which flow is sensitive to equilibrium QCD properties.

We aim to develop a protocol for identifying the degree of thermalization using a combination of momentum and multiplicity correlation observables. To study the effect of thermalization on these correlations, we turn to the Boltzmann equation in the relaxation time approximation with Langevin noise. We derive a new nonequilibrium transport equation for the two-body distribution function that is consistent with the conservation laws obeyed by microscopic scattering processes. We find that these conservation laws constrain the long-range behavior of the correlation observables to behave differently depending on the degree of thermalization. We find that transverse momentum fluctuations in peripheral PbPb collisions at LHC markedly deviate from equilibrium behavior. We propose new measurements that can provide more refined information.

Preferred Track

Initial State Physics and Approach to Equilibrium

Collaboration

Not applicable

Primary author: GAVIN, Sean (Wayne State University)

Presenter: GAVIN, Sean (Wayne State University)

Session Classification: Poster Session