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Rapidity Correlation Structure in Nuclear Collisions

The forces that drive the nuclear collision system towards local thermal equilibrium leave few observable traces. We show that measurements of the rapidity dependence of transverse momentum correlations can be used to determine the characteristic time τ_π that dictates the rate of isotropization of the stress energy tensor, as well as the shear viscosity $\nu = \eta/sT$. We formulate methods for computing these correlations using second order dissipative hydrodynamics with noise. Current data are consistent with $\tau_\pi/\nu \approx 10$ in the temperature independent case. We extend this result to include a realistic equation of state and temperature dependent first and second order transport coefficients. We then discuss how measurements of the beam energy and system size dependence of the rapidity distribution can be used as a precise test of theoretical transport coefficient calculations.

Preferred Track

Initial State Physics and Approach to Equilibrium

Collaboration

Not applicable

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