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Estimation of viscosity based on transverse momentum correlations

Content :

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The heavy ion program at RHIC created a paradigm shift in the exploration of strongly interacting hot and dense matter. An important milestone achieved is the discovery of the formation of strongly interacting matter which seemingly flows like a liquid at temperatures on the scale of $T \sim 2 \times 10^{12}$ K [1]. As a next step, we consider measurements of transport coefficients such as kinematic, shear or bulk viscosity. Many calculations based on event anisotropy measurements indicate that the shear viscosity to the entropy density ratio (η/s) of the fluid formed at RHIC is significantly below that of all known fluids including the superfluid ${}^4\text{He}$ [2].

Precise determination of η/s ratio is currently a subject of extensive study.

We present an alternative technique for the determination of medium viscosity proposed by Gavin and Aziz [3]. Preliminary results of measurements of the evolution of the transverse momentum correlation function with collision centrality of Au + Au interactions at $\sqrt{s_{NN}} \sim 200$ GeV will be shown. We present results on differential version of the correlation measure and describe its use within this model for the experimental determination of η/s .

References:

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- [2] R. A. Lacey *et al.*, Phys. Rev. Lett. **98** (2007) 092301.
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