

An investigation of forward-backward correlations in hybrid UrQMD-hydro generated data

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One of the prime objectives of heavy ion collisions (HIC) is to find experimental evidence of the deconfinement phase transition from hadronic matter to quark-gluon plasma (QGP) in the reaction products of heavy ion collisions. Various hadronic models are used to study the investigation of the signature of QGP. One of the most successful models is the hybrid UrQMD-hydro model. It is a micro+macro hybrid approach that incorporates a hydrodynamic phase into the UrQMD hadronic model using Equations of State (EoS's). The evolution of the system is divided into three parts: (i) initialize with particle degrees of freedom; (ii) evolve with hydrodynamics; and (iii) free particle production with the Cooper-Frye approach.

Numerous observables are used to study correlations and fluctuations in HIC. One such important observable is forward-backward (F-B) correlations in rapidity or pseudorapidity space. The source of the fluctuations in the final state phases is the initial event-by-event fluctuation in energy density. Many researchers have already studied F-B correlations. A rigorous study on F-B correlations in nucleus-nucleus collisions has been reported by NA22 Collaboration, STAR of RHIC, and ALICE of LHC. The same study will be significant to be carried out at the highest SIS100 energy of FAIR as according to the hydrodynamical calculations the deconfined phase boundary will be accessible around the same energy. In this study, an attempt has been made to investigate the F-B correlation in UrQMD-hydro generated data for 10 AGeV Au+Au collisions.

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