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Residual 3rd-body Coulomb Effect on Identical Charged Pion Correlations in Au+Au Collisions at STAR

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Measurements of identical pion femtoscopy offer insights into collision dynamics, such as collective expansion, geometry of the collision zone at freeze-out, etc. In addition to the quantum interference among the pion pairs, Coulomb interactions between the pair and the net positive charge in the emitting source affect the final measurements as well. Furthermore, due to the imbalance of protons and neutrons inside the colliding nuclei, initial isospin, which also affects the correlation functions, plays an important role in determining the Equation of State of the medium in collisions at high baryon density.

To extract the effect of the isospin, a systematic analysis of the identical charged pion correlations from $\sqrt{s_{NN}} = 3.0, 3.2, 3.5, 3.9, 4.5, 5.2, 7.7$ GeV Au+Au collisions collected by the STAR experiment has been carried out. A new procedure has been developed to remove the residual effect from the 3rd-body Coulomb force and to extract the contribution from isospin. In this talk, we will report collision energy dependence of the source size parameters extracted from the positive and negative charged pion correlation functions after removing the 3rd-body Coulomb effect. Transport model UrQMD calculations with realistic experimental cuts will be used to aid the discussions.

Category

Experiment

Collaboration (if applicable)

STAR

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