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Non-Identicle particle femtoscopy in Au+Au collisions at 200 GeV using UrQMD modeled with CRAB

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Two particle femtoscopy provide a powerful tool for studying the space–time dynamics of the hot and dense matter (QGP) created in these collisions such as the size, shape, and lifetime as well as advancing our understanding of the behavior of matter at extreme conditions by measuring the relative momentum correlations between pairs of particles emitted in the same direction from the collision. These correlations arise due to quantum statistics, Coulomb and strong final state interactions. From the non-identical particle correlation study, particularly the hyperon-nucleon correlations, one can obtain information about the equation of state (EoS) of neutron stars and the existence of various exotic hadrons (H-dibaryons).We report the calculations of femtoscopic correlations between proton and lambda pairs in Au+Au events simulated using the Ultra-Relativistic Quantum Molecular Dynamics (UrQMD) model at $\sqrt{s_{NN}}$ = 200 GeV via CRAB (Correlation After Burner) to account for the Final State Interaction among the emitted particles. The Correlation Analysis Tool using the Schrödinger equation (CATS) package is used to analyze the p$-\Lambda$ correlation functions obtained from these simulations and extract the source radii and to investigate the interaction potential for p$-\Lambda$ pairs which do not have well determined scattering parameters. However, the calculated femtoscopic radii were compared to STAR experimental data. The study of source radii in heavy-ion collisions at different collision energies can provide information about the phase transition from hadronic matter to quark-gluon plasma and can help to distinguish between different models of the initial state and particle production mechanisms. Furthermore having the source fixed at both high and low energies allows for a direct comparison of the interaction at different energies.

Category

Theory

Collaboration (if applicable)

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