

Measurements of Light Nuclei (d , t , ${}^3\text{He}$) and Λ correlation in Au+Au collisions at $\sqrt{s_{\text{NN}}} = 3$ GeV from STAR

Xialei Jiang (for the STAR Collaboration)
Central China Normal University

Abstract

Heavy-ion collisions offer a new way to understand hyperon-nucleon (Y - N) interactions. The two-particle correlation in pair relative momentum, which reveals valuable information about the space-time evolution of the particle-emitting source and final state interactions involving hyperons, is the primary observable of interest. The measurements of correlations between light nuclei (d , t , ${}^3\text{He}$) and Λ can shed light on internal structure and binding energy of hypernuclei as well as the many-body interactions among hyperon and nucleons which are important for understanding the inner structure and equation of state of neutron stars.

In this talk, we present the first measurement of d - Λ , t - Λ and ${}^3\text{He}$ - Λ correlations with high statistics data of $\sqrt{s_{\text{NN}}} = 3$ GeV Au+Au collisions from the STAR Beam Energy Scan II. The correlation functions are analyzed within the Lednicky-Lyuboshitz formalism in order to characterize the emission source size, the scattering length, and the effective range of light nuclei- Λ interactions. The extracted parameters will be compared to those from other baryon correlations and various effective theory model calculations. Finally, physics implications on final state interactions involving hyperons and the inner structure of the light hypernuclei will be discussed.