



Contribution ID: 300

Type: Poster

Measurements of Hypernuclei Production and Their Properties in Heavy-Ion Collisions at STAR

Tuesday, 5 September 2023 17:30 (2h 10m)

Hypernuclei, bound states of nuclei with one or more hyperons, serve as a natural laboratory to investigate the hyperon-nucleon (Y - N) interaction, an important ingredient for the equation-of-state (EoS) of nuclear matter. Precise measurements of hypernuclei properties and their production yields in heavy-ion collisions are crucial for the understanding of their production mechanisms and the strength of the Y - N interaction. The strangeness population factor, $S_A = (\Lambda^A \text{H}/\Lambda^A \text{He})/(\Lambda/p)$ ($A=3,4$), is of particular interest as it directly relates to the ratio of light nuclei and hypernuclei coalescence parameters B_A . Moreover, it is suggested that S_A might be sensitive to the onset of deconfinement. The STAR Beam Energy Scan II program and isobar collisions offer a great opportunity to investigate energy and system size dependence of hypernuclei production.

In this talk, we present new measurements on transverse momentum (p_T), rapidity y , and centrality dependence of ${}^3\text{H}$, ${}^4\text{H}$, and ${}^4\text{He}$ production yields in Au+Au collisions from $\sqrt{s_{\text{NN}}} = 3$ to 27 GeV, as well as in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV. Strangeness population factors $S_{3,4}$ as functions of collision energy, centrality, p_T , and y are also reported. In addition, we present new measurements on ${}^4\text{He}$ and ${}^5\text{He}$ lifetimes. These results are compared with phenomenological model calculations, and the physics implications on the hypernuclei production mechanism and properties of Y - N interaction will be discussed.

Category

Experiment

Collaboration (if applicable)

STAR Collaboration

Primary author: LI, Xiujun (USTC)

Presenter: LI, Xiujun (USTC)

Session Classification: Poster Session

Track Classification: Light and strange flavor