Contribution ID: 271

Type: Oral report

Collision Energy Dependence of Hypertriton Production in Au+Au Collisions at RHIC

Friday, 16 August 2024 11:40 (15 minutes)

Despite extensive measurements on the production yields of light nuclei in heavy-ion collisions, a consensus on their formation mechanism remains elusive. In contrast to normal nuclei, hypernuclei carries strangeness and can offer an additional dimension for such studies. In particular, the hypertriton ${}^3_{\Lambda}$ H, a bound state consisting of a proton, neutron and Λ hyperon, is the lightest known hypernucleus with a very small binding energy of ~ 130 keV. Currently, published measurements of the ${}^3_{\Lambda}$ H yield are scarce and are limited to low ($\sqrt{s_{\rm NN}} < 5$ GeV) or high collision energies ($\sqrt{s_{\rm NN}} \ge 200$ GeV). Precise measurements on the energy dependence of ${}^3_{\Lambda}$ H production will give invaluable information on hypernuclei production mechanisms due to its unique intrinsic properties.

In this presentation, we will present comprehensive measurements of the collision energy dependence of ${}^{3}_{\Lambda}$ H transverse momentum $p_{\rm T}$ and $p_{\rm T}$ -integrated yield at mid-rapidity in Au+Au collisions at ten collision energies between $\sqrt{s_{\rm NN}} = 3$ and 27 GeV. It is found that thermal model calculations overestimated the ${}^{3}_{\Lambda}$ H yield and the ${}^{3}_{\Lambda}$ H/ Λ ratio by a factor of ~ 2 in the reported energy region, while coalescence calculations are closer to data. We will also present the mean $p_{\rm T}$ of ${}^{3}_{\Lambda}$ H as a function of collision energy. The mean $p_{\rm T}$ of ${}^{3}_{\Lambda}$ H is observed to be lower than the Blast-Wave expectation using the same freeze-out parameters from light hadrons. These observations suggest that similar to light nuclei, hypertritons are formed at a later stage than light hadrons possibly through nucleon/hyperon coalescence during these collisions.

Primary author: 鄢, 雨楼 (N) Presenter: 鄢, 雨楼 (N) Session Classification: 分会场三

Track Classification: 重离子物理