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Measurement of Hypertriton Production at RHIC

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Hypernuclei are bound nuclear systems of nucleons and hyperons. The hypernuclei production mechanism in heavy-ion collisions remains not fully understood. In particular, the hypertriton ($^{3}_{\Lambda}\mathrm{H}$), a bound state consisting of a proton, neutron, and hyperon, is the lightest known hypernucleus with a remarkably small binding energy. Precise measurements of the energy and multiplicity dependencies of the production of $^{3}_{\Lambda}\mathrm{H}$ will provide crucial information on the mechanisms of hypernuclei production.

In this presentation, we report comprehensive measurements from the STAR experiment at RHIC on the collision energy dependence of $^{3}_{\Lambda}\mathrm{H}$ mean transverse momentum ($\langle p_T \rangle$), p_T-integrated yield, and the yield double ratio $S_3 = {}^{3}_{\Lambda}\mathrm{H}/\left({}^{3}\mathrm{He} \times (\Lambda/p)\right)$ in mid-rapidity in Au + Au collisions at collision energies between 3 and 27 GeV, covering the region of high baryon density. Within this energy range, we also investigate the system size dependence of S_3 through charged-particle multiplicity. In addition to the measurements in Au+Au collisions, at the top RHIC energy ($\sqrt{s_{NN}} = 200$ GeV) we also present recent results on S_3 from isobar (Zr+Zr and Ru+Ru) collisions. These results will be compared with model calculations, and physics implications on hypernuclei production mechanism will be discussed.

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