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Collision Energy Dependence of Light Nuclei (Triton) Production at STAR

Summary

In high-energy nuclear collisions, light nuclei provide a unique tool to explore the QCD phase structure. The production of light nuclei is sensitive to the temperature and phase-space density of the system at freeze-out. In addition, phase transition will lead to large baryon density fluctuations, which will be reflected in the light nuclei production. For example, the ratio of proton ($N(p)$) and triton ($N(t)$) to deuteron ($N(d)$) yields, which is defined as $N(t)\cdot N(p)/N^2(d)$, may be used as a sensitive observable to search for the QCD critical point[1][2].

In this talk, we will report the first results of the collision energy and centrality dependence of triton production in Au+Au collisions at $\sqrt{s_{\rm NN}}$ = 7.7, 11.5, 14.5, 19.6, 27, 39, 62.4, and 200 GeV measured by the STAR experiment at RHIC. We will present the beam energy dependence for the coalescence parameter $B_2(d)$ and $B_3(t)$, particle ratios (d/p, t/p, and t/d), and the yield ratio of $N(t)\cdot N(p)/N^2(d)$. Their physics implications will be discussed.

[1] K. J. Sun, L. W. Chen, C. M. Ko, and Z. Xu, Phys. Lett. B 774, 103 (2017).

[2] K. J. Sun, L. W. Chen, C. M. Ko, J. Pu, and Z. Xu, Phys. Lett. B 781, 499 (2018).

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