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Beam Energy Dependence of Triton Production and Yield Ratio ($\mathrm{N}_t \times \mathrm{N}_p/\mathrm{N}_d^2$) in Au+Au Collisions at RHIC

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In high-energy nuclear collisions, the light nuclei production is predicted to be sensitive to the local baryon density fluctuations and can be used to probe the QCD phase transition. For example, the ratio of proton (N_p) and triton (N_t) to deuteron (N_d) yields, which is defined as $N_t \times N_p/N_d^2$, is considered sensitive observable to search for the QCD critical point.

In this talk, we will report the first measurement of triton production in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}}$ = 7.7, 11.5, 14.5, 19.6, 27, 39, 54.4, 62.4, and 200 GeV carried out by the STAR experiment at RHIC [1]. We will present collision energy dependence of the particle yield ratios (N_d/N_p and N_t/N_p), and the nuclear compound yield ratio $N_t \times N_p/N_d^2$ as a function of charged-particle multiplicity ($dN_{ch}/d\eta$), collision energy, centrality, and its transverse momentum acceptance dependence. The results are compared with model calculations and their physics implications will be discussed.

[1] The STAR Collaboration, arXiv:2209.08058 [nucl-ex]

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