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Collective flow of light nuclei and hyper-nuclei in Au+Au collisions at $\sqrt{s_{NN}} = 3, 14.6, 19.6, 27, \text{ and } 54.4$ GeV using the STAR detector

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The production and interaction of light nuclei and hyper-nuclei in high-energy heavy-ion collisions have been a focus of theoretical and experimental interests for a long time. The production of light nuclei in heavy-ion collisions can be explained by the coalescence of produced or transported nucleons. Due to the low binding energies of light nuclei and hyper-nuclei, it is more likely that they are formed at later stages of the evolution of the fireball. Therefore, studying the collective flow of light nuclei and hyper-nuclei in the heavy-ion collisions can provide insights into their production mechanism. Further, the study of the collective flow of hyper-nuclei will shed light on the hyperon-nucleon (YN) interaction in dense nuclear medium.

In this talk, we will present the transverse momentum (p_T) and centrality dependence of elliptic flow (v_2) of d , t , and ${}^3\text{He}$ and their antiparticles in Au+Au collisions at $\sqrt{s_{NN}} = 14.6, 19.6, 27, \text{ and } 54.4$ GeV. $v_2(p_T)$ of light (anti-)nuclei will be compared with the AMPT+coalescence model. Mass number scaling of $v_2(p_T)$ of light (anti-)nuclei will also be shown. We will also report the first observation of the hyper-nuclei ${}^3_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{H}$ directed flow (v_1) in $\sqrt{s_{NN}} = 3$ GeV mid-central (5-40%) Au+Au collisions in the fixed target mode.

Present via

Online

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