

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

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Abstract

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

9 In this talk, we will present the transverse momentum (p_T) and centrality dependence of el-
10 liptic flow (v_2) of d , t , and ${}^3\text{He}$ and their antiparticles in Au+Au collisions at $\sqrt{s_{NN}} = 14.6, 19.6,$
11 $27,$ and 54.4 GeV . $v_2(p_T)$ of light (anti-)nuclei will be compared with the AMPT+coalescence
12 model. Mass number scaling of $v_2(p_T)$ of light (anti-)nuclei will also be shown. We will also
13 report the first observation of the hyper-nuclei ${}^3_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{H}$ directed flow (v_1) in $\sqrt{s_{NN}} = 3$
14 GeV mid-central (5-40%) Au+Au collisions in the fixed target mode.