

Measurements on the production and lifetime of light hypernuclei at STAR

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1 Hypernuclei are bound states of nucleons and hyperons. The hyperon-
2 nucleon (Y - N) interaction, an important ingredient for the nuclear equation-of-
3 state (EoS), remains poorly constrained. Precise measurements of hypernuclei
4 intrinsic properties and production yields in heavy-ion collisions are crucial to
5 the investigation of their production mechanisms and the strength of the Y - N
6 interaction. Model calculations predict that hypernuclei are abundantly pro-
7 duced at low energies due to high baryon density.

8 Thanks to the high statistical data taken from the STAR BES II program
9 in 2018-2021, a series of measurements on production yields and properties of
10 light hypernuclei at low energies are carried out. In this talk, the rapidity and
11 energy dependence of light hypernuclei (${}^3_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{He}$) yields in Au+Au $\sqrt{s_{\text{NN}}} =$
12 3, 19.6, and 27 GeV collisions will be presented. The ratio of hypernuclei to
13 light nuclei production yields will also be presented. We will also report precise
14 lifetime measurements of light hypernuclei (${}^3_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{He}$) utilizing the BES
15 datasets. The results will be compared with model calculations and physics
16 implications will be discussed.