

Lifetime measurements of light hypernuclei in Au+Au collisions from STAR experiment

Xiujun Li (for the STAR Collaboration)
University of Science and Technology of China

1 Hypernuclei are bound nuclear systems of correlated nucleons and hyperons. Therefore,
2 the production of hypernuclei in heavy-ion collisions provides an experimental avenue for
3 studying hyperon–nucleon (Y-N) interaction, which is an important ingredient, not only in
4 the equation-of-state of astrophysical objects such as neutron stars, but also in the description
5 of the hadronic phase of a heavy-ion collision. The strength of the Y-N interaction can be
6 investigated by measuring the properties of hypernuclei. For example, light Λ -hypernuclei
7 containing one hyperon are conventionally understood as a weakly bound system of a Λ and
8 a nucleus, suggesting their lifetimes are close to the free- Λ lifetime.

9 In heavy-ion collisions, light hypernuclei are expected to be abundantly produced at low
10 collision energies due to the high baryon density. In this presentation, we will report precise
11 lifetime measurements of ${}^3_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{H}$, and ${}^4_{\Lambda}\text{He}$ in Au+Au collisions at $\sqrt{s_{NN}} = 3$ GeV and 7.2
12 GeV, recorded by the STAR experiment at RHIC in the fixed-target mode in 2018. The
13 results will be compared with model calculations and physics implications will be discussed.