$^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H Lifetime and Yield Measurements in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 3$ GeV with the STAR detector

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The study of hyperon-nucleon(Y-N) interaction is of great interest in recent years because of its relation to high-density matter systems such as neutron stars. The presence of hyperons inside neutron stars would soften the equation of state, inhibiting the formation of large mass neutron stars. Hypernuclei, bound states of nucleons and hyperons, serve as a probe to study the Y-N interaction. Heavy-ion collisions at high baryon density regions provide a unique laboratory to study the properties of these hypernuclei. Precise measurements of the lifetime can provide direct information on the Y-N interaction, while measurements on the production yield may provide further insight on their production mechanisms in heavy-ion collisions.

The data from fixed target Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 3$ GeV, taken in 2018 by the STAR detector, is ideal for studying the properties of light hypernuclei, such as $^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H, due to the large statistics and high production yield. In this talk, the lifetime of $^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H, and the rapidity dependence in their yields, in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 3$ GeV will be presented. The results will be compared to previous measurements and theoretical models, and the physics implications will be discussed.