$^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H Lifetime, Yield and Directed Flow 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. Hypernuclei, bound states of nucleons and hyperons, serve as a probe to study the Y-N interaction.

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, the rapidity and centrality dependence of their yields in Au+Au collisions at $\sqrt{s_{\mathrm{NN}}} = 3$ GeV will be presented. The measured yield will be compared to measurements at other energies and theoretical models, and the physics implications will be discussed. We also report the first observation of the $^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H directed flow in $5-40\%$ centrality. The directed flow of $^{3}_{\Lambda}$H and $^{4}_{\Lambda}$H are compared with those of the copiously produced particles such as p, Λ, d, t, ^{3}He and ^{4}He. These results will shed light on light hypernuclei production in heavy-ion collisions in high baryon density region.