

Measurement of ${}^4_{\Lambda}\text{He}$ lifetime in Au+Au collisions from STAR fixed target mode experiment

mardi 4 juin 2024 18:55 (1 minute)

Hypernuclei are bound nuclear systems of nucleons and hyperons. The intrinsic properties of hypernuclei, such as their binding energy and lifetime, provide experimental avenues for studying the hyperon-nucleon (Y-N) interaction. The Y-N interaction, as an essential ingredient in the equation of state of high-baryon-density matter, remains poorly constrained. The precise measurement of Λ hypernuclei lifetimes, and its difference to that of the free Λ , will shed light towards the understanding of the Y-N interactions. In particular, the study of isospin mirror hypernuclei, such as $({}^4_{\Lambda}\text{H}-{}^4_{\Lambda}\text{He})$, may help us gain insight into the isospin dependence of the Y-N interaction. Although there have been numerous measurements of the ${}^4_{\Lambda}\text{H}$ lifetime, there is a scarcity of lifetime measurements for ${}^4_{\Lambda}\text{He}$ due to its low production rate and low reconstruction efficiency. The high statistics data, collected with the STAR fixed target mode (FXT) Au+Au collisions ($\sqrt{s_{NN}} = 3.0 - 7.7$ GeV), provides a great opportunity to measure the ${}^4_{\Lambda}\text{He}$ production with good precision.

In this presentation, we will report the first ${}^4_{\Lambda}\text{He}$ lifetime measurement in heavy-ion collisions with the STAR FXT Au+Au collisions. A comparison of the lifetimes of ${}^4_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{He}$ will provide a rigorous test for model calculations, accounting for isospin differences.

Auteur principal: Mlle LI, XIUJUN (University of Science and Technology of China)

Co-auteur: TRZECIAK, Barbara Antonina (Czech Technical University in Prague)

Orateur: Mlle LI, XIUJUN (University of Science and Technology of China)

Classification de Session: Posters

Classification de thématique: Resonances and Hyper-nuclei