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HIGH ENERGY NUCLEAR PHYSICS IN CHINA

HENPIC

The 186th HENPIC seminar

Hypernuclei collective flow and its implication on the in-medium hyperon-nucleon interaction

Speaker: Dr. Yapeng Zhang（张亚鹏）

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ABSTRACT:

Hyperon-nucleon (YN) interaction is fundamentally important for exploring the nature of strong interaction. Density dependent YN and YNN interaction are essential inputs for understanding the inner structure of neutron stars. Heavy-ion collision is a unique tool to create dense nuclear matter in the laboratory. Collective flow has been commonly used for studying the properties of matter created in high-energy heavy-ion collisions. Collective flow of hypernuclei, bound state of hyperon(s) and nucleons, may shed light on YN interaction in condensed nuclear medium with finite pressure.

In this talk, I will report hypernuclei ${}^{3}_{\Lambda}$H and ${}^{4}_{\Lambda}$H reconstructions in √sNN=3 GeV mid-central Au+Au collisions at RHIC. Then, the first observation of the hyper-nuclei ${}^{3}_{\Lambda}$H and ${}^{4}_{\Lambda}$H directed flow v1 from 5–40% data sample will be presented. 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, 3He and 4He. It is observed that the slopes of v1 at mid-rapidity for the hyper-nuclei ${}^{3}_{\Lambda}$H and ${}^{4}_{\Lambda}$H follow a baryon number scaling implying that coalescence process is a dominant mechanism for the hyper-nuclei production in these collisions. The hypernuclei collective flow and its implication on the in-medium YN interaction will be discussed.

ABOUT THE SPEAKER:

Yapeng Zhang is a researcher in IMP, CAS. He received his Ph.D degree from Heidelberg University in 2013. After 6 months postdoc in Heidelberg University, Zhang joined Institute of Modern Physics (IMP), CAS as an associate research fellow from 2013.8 to 2022.12. He owned the “West Young Scholar” Grant in 2022. His research interests cover hypernuclei physics, equation of state and phase structure of QCD matter. He plays a leading role in software development of the CEE experiment, first large-scale domestic spectrometer for high-energy nuclear physics, aiming to take data in 2024 at the accelerator complex at Lanzhou HIRFL-CSR.

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