

The 127th HENPIC seminar by Dr. Haojie Xu 徐浩浩 (Huzhou U.), Nov. 12, 2020, Thursday, 10:30 am (UTC+8)

Talk title: Probing the neutron skin with ultra-relativistic isobaric collisions

Speaker: Dr. Haojie Xu, Huzhou University

Abstract: Neutron structure and skin thickness in nuclei have been traditionally measured by low-energy scatterings where the nuclei are only gently disturbed. Their precisions have been limited by theoretical uncertainties in modeling the nuclear force. Here, we propose an unconventional approach to probe the neutron skin by smashing isobar nuclei completely apart at relativistic energies to compare their produced hadron multiplicities. Because particle production in relativistic heavy-ion collisions depends on the details of the nucleon density distributions in the colliding nuclei, we demonstrate that the small difference in hadron multiplicities between isobar collisions, together with state-of-the-art calculations of nuclear structure, can provide exquisite sensitivity to the poorly constrained neutron density distributions and skin thickness, which can in turn put stringent constraints on the nuclear symmetry energy.

Self-introduction: Haojie Xu, currently a research assistant at Huzhou University(湖州师范学院), obtained his Ph.D. under the supervision of Prof. Qun Wang from USTC in 2012. His research focuses on the phenomenological and experimental study of correlations and fluctuations in relativistic heavy-ion collisions.

Presenter: Dr XU, Haojie