The 147th HENPIC seminar by Prof. Jiangyong Jia (Stony Brook U. and Brookhaven National Lab.), September 9, 2021, Thursday, 10:30 am (UTC+8)

Talk title: New opportunities to probe nuclear deformation using high-energy heavy-ion collisions

Abstract: High-energy heavy-ion collisions, a branch of nuclear physics that focus on study of quark-gluon plasma (QGP) and nuclear phase diagram, have always assumed an initial condition from the nuclear structure physics, e.g. the Woods-Saxon geometry. Recent progress in hydrodynamic modeling together with the wealth of precision collective flow data, however, allow us to not only perform quantitative extractions of the transportproperties of the QGP, but very importantly start to strongly constrain the initial state of the colliding nuclei. In this talk, I will discuss the exciting possibility of imaging the shape of atomic nuclei using precision flow measurements, including the quadruple, tri-axial and octupole deformations. I will discuss how the shape information probed by heavy ion collision might be different or complementary to those obtained in the nuclear structure experiments. I will argue how a carefully planned system scan of stable species in the nuclear chart at RHIC and other facilities could open new direction of research innuclear physics.
[1] "Shape of atomic nuclei in heavy ion collisions", arXiv:2106.08768
[2] "Constraining nuclear quadrupole deformation from correlation of elliptic flow and transverse momentum in nuclear collisions", arXiv:2105.05713
[3] "The impact of nuclear deformation on relativistic heavy-ion collisions: assessing consistency in nuclear physics across energy scales", arXiv:2105.01638

About the speaker: Jiangyong Jia is a full professor in Stony Brook University (SBU) and senior physicist in Brookhaven National Laboratory (BNL). He is member of RHIC-STAR and LHC-ATLAS, and previously the RHIC-PHENIX experiments, with broad interests in high energy nuclear physics and particle physics. However, his main expertise is in the area of collective flow, hydrodynamics and particle correlations from small to large collision systems. He received his B.S. degree from USTC in 1997, Ph.D. from SBU in 2003, worked as a postdoc in Columbia University, before joining the faculty at SBU and BNL in 2006.

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