

## The 233th HENPIC seminar by Shengli Huang (黄胜利), Stony Brook University, 10:30, September 18, 2025

Title: Probing the Quark–Gluon Plasma Droplets through Anisotropic Flow in Small Symmetric and Asymmetric Systems

Abstract: Understanding the formation criteria of quark–gluon plasma (QGP) droplets represents a key frontier in heavy ion physics. Whether a QGP droplet on the femtometer scale can be formed, and how its properties emerge, remain open questions. In this talk, I will present a comparative measurement of elliptic ( $v_2$ ) and triangular ( $v_3$ ) flow in asymmetric d+Au and symmetric 16O+16O collisions at  $\sqrt{s_{NN}}=200$  GeV. By selecting systems that include the most elongated light nucleus—the deuteron—these collisions produce media of comparable size but with very different initial geometries. The observed  $v_2(\text{d+Au}) > v_2(\text{O+O})$  reflects the dominant elliptic geometry in d+Au collisions, while the similar  $v_3(\text{d+Au}) \approx v_3(\text{O+O})$  is naturally explained by subnucleonic fluctuations. The data are well described by state-of-the-art hydrodynamic models tuned to large-system collisions, suggesting the formation of QGP droplets with similar properties across different system sizes. This study demonstrates that comparing asymmetric and symmetric systems provides a powerful way to engineer droplet shapes with unprecedented geometric control, offering enhanced sensitivity to final-state responses and the properties of the QGP.

### Summary