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PHENIX measurements of higher-order flow harmonics in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV: implications for Initial-eccentricity models and the specific viscosity of the Quark Gluon Plasma

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The higher-order flow harmonics v_n can provide constraints crucial for precision extraction of the specific shear viscosity eta/s, of the plasma (QGP) produced in full energy ($\sqrt{s_{NN}} = 200$ GeV) Au+Au collisions at RHIC. It can also provide reliable estimates of the flow correlations which contribute to the underlying event for jet-driven two-particle azimuthal angle correlation studies; the latter is important to the development of a quantitative understanding of the opacity of the QGP. Thus, significant recent attention has been given to theoretical studies of v_n (odd and even) and the associated initial [fluctuating] eccentricities which drive v_n. In recent experiments, the PHENIX Collaboration has made
detailed differential measurements of v_n (odd and even) relative
to the participant event planes Ψ_n, as well as measurements of the correlations between different Ψ_n planes. The results from these measurements will be presented. Comparisons to LHC data and hydrodynamical calculations will be shown as appropriate. We will also discuss the detailed implications of these measurements for (i) improved precision for separating the flow and jet-driven contributions to $\Delta\Phi$ correlation functions, (ii) distinguishing between the two leading eccentricity models, and (iii) a more constrained estimate of η/s.

Primary author: Prof. LACEY, Roy (Stony Brook University)

Presenter: Prof. LACEY, Roy (Stony Brook University)

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