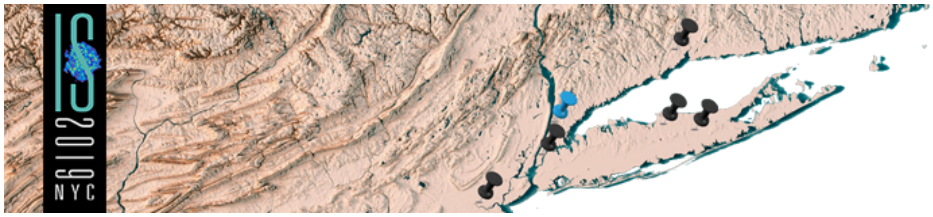

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Non-Gaussian fluctuations of v_1, v_2, v_3 and v_4 and their correlations in Pb+Pb collisions with the ATLAS detector

Tuesday, 25 June 2019 17:40 (20 minutes)

The measurements of the flow phenomena in Xe+Xe and Pb+Pb collisions provide an excellent opportunity to study the interplay of viscous effects – which diminish the azimuthal anisotropies more in Xe+Xe compared to Pb+Pb – and initial geometry fluctuations which have an opposite effect. With the recently developed techniques, used for suppression of non-flow correlations in small systems, applied to 0.49 nb^{-1} of Pb+Pb and 3$\mu\mathrm{b}^{-1}$ of Xe+Xe data significant reduction of non-flow biases is achieved with respect to the previous measurements both at high p_{T} and in peripheral collisions. An interesting scaling relationships is observed in the v_n across different centralities, where up to an overall scaling the the v_n as a function of p_{T} have identical shapes. The origin of this scaling and its implications are discussed in the framework of hydrodynamic models. Multi-particle azimuthal cumulants measured in the Pb+Pb collisions provide information on the event-by-event fluctuations of harmonic flow coefficients v_n and correlated fluctuations between two harmonics v_n and v_m. For the first time, a non-zero four-particle cumulant is observed for dipolar flow, v_1. The four-particle cumulants for elliptic flow, v_2, and triangular flow, v_3, exhibit a strong centrality dependence and change sign in ultra-central collisions. Correlations between two harmonics are studied with three- and four-particle mixed-harmonic cumulants, which also decrease in strength towards central collisions and either approach zero or change sign in ultra-central collisions. To investigate the possible flow fluctuations arising from intrinsic centrality or volume fluctuations, the results are compared between two different event classes used for centrality definitions. In peripheral and mid-central collisions where the cumulant signals are large, only small differences are observed. In ultra-central collisions, the differences are much larger and transverse momentum dependent. These results provide new information to disentangle flow fluctuations from the initial and final states, as well as new insights on the influence of centrality fluctuations.

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