

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



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## Measurement of the Cumulants of Conserved Charge Multiplicity Distributions in Au+Au Collisions from the STAR experiment

*Tuesday 5 November 2019 11:20 (20 minutes)*

Higher-order cumulants of conserved quantities ( $B$ ,  $Q$ ,  $S$ ) are sensitive observables to study the QCD phase structures, nature of quark-hadron phase transition and freeze-out dynamics.

In this talk, we will present new measurements of sixth to second-order cumulant ratios ( $C_6/C_2$ ) of net-proton distributions in Au+Au collisions at  $\sqrt{s_{NN}} = 54.4$  and 200 GeV, as well as cumulants up to the fourth-order of net-proton, net-kaon and net-charge multiplicity distributions in Au+Au collisions at  $\sqrt{s_{NN}} = 27$  and 54.4 GeV. The  $C_6/C_2$  results are compared with a recent model calculation which predicts a negative  $C_6/C_2$  value if the freeze-out occurs 10 near the chiral transition temperature. The dependence of cumulants, measured in Au+Au collisions at  $\sqrt{s_{NN}} = 27$  GeV, on the centrality definition was tested using the Event Plane Detector (EPD). The physics implications of the results, a detailed discussion of the background contributions and the status and prospects of phase II of the STAR Beam Energy Scan program are discussed.

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