

Search for the QCD critical point by higher moments of the net-charge multiplicity distribution

The Relativistic Heavy-Ion Collider (RHIC), at BNL, has undertaken its beam energy scan program in order to probe the QCD critical point. Theoretical calculations reveal that the higher moments of the multiplicity distribution of the conserved quantities like net-charge, net-baryon, net-strangeness are related to the corresponding susceptibilities and the correlation length of the system. These quantities show deviation from monotonic behavior at the CP compared to the other region.

Here we report the first measurement of the moments (standard deviation, skewness and kurtosis) of the net-charge multiplicity distribution measured by the STAR detector for wider range of energies. The energy and centrality dependence of these higher moments and their products will be presented for the 200 GeV, 39 GeV, 11.5 GeV and 7.7 GeV center of mass energies of the Au+Au collisions which correspond to the baryonic chemical potential from 20 MeV to 550 MeV. Theoretical predictions, containing the non-CP physics, from the Hadron Resonance Gas models, HIJING and UrQMD models are compared with the data.

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Track Classification: QCD phase diagram