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Measurements of off-diagonal cumulants of net-charge, net-proton and net-kaon distributions at STAR

Study of event-by-event fluctuations of conserved charges, i.e. susceptibilities of conserved charges is a powerful tool to understand and characterize the thermodynamic properties of the hot and dense QCD matter. The ratios of 2nd order off-diagonal to diagonal susceptibilities such as $\chi^{1,1}_{B,S}/\chi^{2}_{S}$, $\chi^{1,1}_{Q,B}/\chi^{2}_{B}$, and $\chi^{1,1}_{Q,S}/\chi^{2}_{S}$, are sensitive to the phase of the matter created in heavy-ion collisions. We report various 2nd order off-diagonal cumulants (i.e, covariances) between net-charge, net-proton and net-kaon along with their ratios to the diagonal cumulants (i,e, variances) as a function of centrality at mid-rapidity in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV with the STAR experiment at RHIC. These results will help to extract the freeze-out parameters by comparing those with theoretical calculations.

As the fluctuation measurements depend on the phase space acceptances, we have studied the transverse momentum and pseudorapidity window dependences of the cumulants. These results will be presented and discussed.

Preferred Track

Correlations and Fluctuations

Collaboration

STAR

Primary author: CHATTERJEE, Arghya (Variable Energy Cyclotron Centre, Kolkata)

Presenter: CHATTERJEE, Arghya (Variable Energy Cyclotron Centre, Kolkata)

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