

Fluctuations of conserved charges within an hadron resonance gas model

In recent years, the study of fluctuations of conserved charges has received increasing attention: they turned out to be a promising tool to study the deconfinement phase transition of QCD, the existence of a critical point in the phase diagram and, more recently, the freeze-out conditions in heavy-ion collisions (HICs).

The study of the lower and higher order moments of particle distributions measured in HICs would be very useful to provide insight in the chemical freeze-out process.

On one side, fluctuations could represent a complementary tool, along with the thermal fits to particle yields and ratios, to narrow the range of temperature and baryochemical potential at freeze-out.

Moreover, since recent lattice QCD simulations and phenomenological models have found first indications for a different transition-temperature for strange and light quarks, the analysis of the higher order moments of the strange particle distributions measured in HICs would be very useful to clarify this issue.

Results on the moments of net-charge and net-proton number have been presented by the STAR collaboration.

Combinations of such moments are related to volume-independent ratios of cumulants, which can be calculated in the Hadron Resonance Gas (HRG) model.

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