Contribution ID: **44** Type: **not specified**

Higher order fluctuations of strangeness and flavor hierarchy

Friday, 26 September 2014 18:00 (30 minutes)

Fluctuations of conserved charges, such as electric charge, baryon number and strangeness, are proving to be a promising and useful tool to investigate the deconfinement phase transition of QCD and recently also the freeze-out dynamics in heavy-ion collisions (HICs).

Lattice QCD calculations involving higher order susceptibilities have shown some first indications that a flavour hierarchy in the deconfinement process between strange and light quarks might occur.
Moreover, theoretical models based on statistical and thermal properties of particles produced during the collision show that the freeze-out temperature for strange mesons and baryons seems to be higher than the one associated to protons and pions.

The analysis of higher order moments of strange particle distributions measured in HICs might provide more insight into this issue.
Preliminary results on the moments of net-charged kaons have been presented by the STAR collaboration for several collision energies, as part of the RHIC beam energy scan program. Besides, particle ratios involving strange mesons and baryons are available at both STAR and ALICE experiment.
We present results for higher order fluctuations of strangeness within the Hadron Resonance Gas (HRG) model including resonance feed-down corrections and kinematic cuts.
We compare our results to the STAR data of net-kaon cumulants and extract their freeze-out temperature as a function of the collision energy. This result is compared to the independent freeze-out temperature estimate from the evaluation of particle ratios at STAR and ALICE center-of-mass energies.

Moreover, in order to constrain even more the range of the freeze-out temperature, we suggest the study of higher order moments for specific subsets of strange particles. The analysis of higher order fluctuations of strangeness for such subsets could be performed in the future at HIC facilities and lead to more precise estimates of the freeze-out parameters.

Primary authors: Dr RATTI, Claudia (Torino University); Dr MCDONALD, Daniel (University of Houston); Dr BLUHM, Marcus (nc state university); Dr NAHRGANG, Marlene (Duke university); Mr ALBA, Paolo Giuseppe (University of Turin and INFN); Prof. BELLWIED, Rene (University of Houston); Dr MANTOVANI SARTI, Valentina (University of Turin-INFN Turin); Dr LLOPE, William J. (T.W. Bonner Nuclear Laboratory Rice University)

Presenter: Dr MANTOVANI SARTI, Valentina (University of Turin-INFN Turin)

Session Classification: Talks