Contribution ID: **48** Type: **Poster**

Higher order Symmetric Cumulants

Tuesday 11 June 2019 18:45 (2 hours)

In the exploration of the phase diagram of strong nuclear force, some of the most intriguing questions are associated with the phase dubbed Quark-Gluon Plasma (QGP). One of the most successful programs in ultra-relativistic nuclear collisions for the studies of QGP properties are the analyses of anisotropic flow phenomenon with correlation techniques. Many additional insights about QGP properties can be extracted with the recently introduced new flow observables, dubbed Symmetric Cumulants. These observables quantify the correlated fluctuations of two different flow harmonics and therefore extract information which is inaccessible to the traditional measurements of individual flow harmonics.

In this talk, the generalization of Symmetric Cumulants for the studies of correlated fluctuations of more than two flow harmonics is presented. A new set of independent, higher order, flow observables is introduced and outlined how in a unique way the genuine multi-harmonic correlations can be extracted from the flow harmonics estimated with two- and multi-particle azimuthal correlators. This generalization advocates the shift of paradigm in the use of correlation techniques in anisotropic flow analyses. By using the realistic iEBE-VISHNU model we demonstrate that the measurements of higher order Symmetric Cumulants are feasible and we provide the first predictions for their centrality dependence in Pb–Pb collisions at LHC energies. A separate study is presented for their values in the coordinate space. These new higher order observables contain information which is inaccessible to individual flow harmonics and correlated fluctuations of only two flow harmonics, and therefore they provide further and independent constraints for the properties of QGP in ultra-relativistic nuclear collisions.

Based on: C. Mordasini, AB, D. Karakoc, and S. F. Taghavi, 'Higher order Symmetric Cumulants', arXiv:1901.06968 (submitted to Phys. Rev. C)

Collaboration name

Track

QCD phase diagram and critical point

Primary author: BILANDZIC, Ante (Technische Universitaet Muenchen (DE))

Co-authors: MORDASINI, Cindy (Technische Universitaet Muenchen (DE)); TAGHAVI, Seyed Farid (Technische Universitaet Muenchen (DE)); KARAKOC, Deniz

Presenter: BILANDZIC, Ante (Technische Universitaet Muenchen (DE))

Session Classification: Poster session with "aperitivo"