

Contribution submission to the conference SMuK 2021

New developments in flow analyses techniques — ●ANTE BILANDZIC for the ALICE-Collaboration — Technical University of Munich, Germany

With the advent of large statistics heavy-ion datasets at RHIC and LHC it is becoming feasible to study the properties of Quark–Gluon Plasma with unprecedented precision. One of the most informative probes in such studies is the collective anisotropic flow.

In this talk, we present the new developments in flow analysis techniques. We reconcile for the first time the strict mathematical formalism of multivariate cumulants with the usage of cumulants in anisotropic flow analyses. This yields to the next generation of observables to be used in flow analyses: *Event-by-event cumulants of azimuthal angles, Symmetric and Asymmetric cumulants of flow amplitudes, Cumulants of Symmetry Plane Correlations*. We show that properties of cumulants are preserved only for the stochastic observables on which the cumulant expansion has been performed directly, and if there are no underlying symmetries due to which some terms in the cumulant expansion are identically zero [1].

We derive for the first time the analytic solutions for the contribution of combinatorial background in the measured 2- and 3-particle correlations [2].

[1] A. Bilandzic, M. Lesch, C. Mordasini, S. F. Taghavi, [arXiv:2101.05619 [physics.data-an]]

[2] A. Bilandzic, [arXiv:2106.05760 [hep-ph]]

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