Measurement of initial-state fluctuations using principal-components of elliptic and triangular flow in $\sqrt{s_{NN}}$ = 3.0 GeV Au+Au collisions at the STAR detector

Yang Wu for the STAR Collaboration

University of California, Riverside, USA

Abstract

Initial-state fluctuations could contribute to the factorization breaking in two-particle azimuthal correlations $V_{n\Delta}(p^a, p^b)$ at high transverse momentum p_T. Principal-component analysis (PCA) provides a set of novel experimental observables ($V_n^1(p_T)$,$V_n^2(p_T)$,...) which directly quantifies the magnitude of the factorization breaking caused by the initial-state fluctuations to high accuracy, by expanding the complex flow coefficient using the orthogonal principal components built from a symmetric and semidefinite covariance data matrices. Measuring of initial-state fluctuations from STAR BES-II collision energies with relatively high baryon chemical potential could provide further constraints for theoretical models on Quark-Gluon Plasma (QGP) properties. In this analysis, we present the measurement of the first two leading components for n=2,3 extracted from $\sqrt{s_{NN}}$ = 3.0 GeV Au+Au collisions at STAR.