

# Longitudinal De-correlation of Anisotropic Flow in Au+Au Collisions at $\sqrt{s_{NN}} = 27$ GeV from STAR

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1        Studies of longitudinal de-correlation of anisotropic flow provide unique con-  
2        straints on the initial conditions and dynamical evolution of the quark gluon-  
3        plasma in heavy-ion collisions. The newly installed Event Plane Detector (EPD)  
4        in both forward and backward directions provides a unique opportunity to mea-  
5        sure the flow de-correlation at STAR/RHIC. In this study, the factorization  
6        ratio for flow harmonics,  $r_n(\eta^a, \eta^b)$  ( $n = 2, 3$ ), is obtained over a wide  $\eta$  range  
7        for 27 GeV Au+Au collisions as functions of centrality and transverse momen-  
8        tum. Comparing to results from LHC and 200 GeV Au+Au collision, a clear  
9        energy dependence is observed indicating a stronger longitudinal de-correlation  
10       at lower collision energies. The results may provide new insights into the three-  
11       dimensional modeling of the evolution of relativistic heavy-ion collisions and the  
12       shear viscosity of the QGP, especially their collision energy dependence.