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Measurements of longitudinal decorrelation of anisotropic flow in 27, 54.4 and 200 GeV Au+Au collisions from STAR

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Studies of longitudinal decorrelation of anisotropic flow provide unique constraints on the initial conditions and dynamical evolution of the quark- gluon-plasma in heavy-ion collisions. With data collected by the STAR experiment at RHIC, the factorization ratio for flow harmonics, $rn(\eta, \eta ref)(n = 2,3)$, are obtained over a wide η range for 27, 54.4 and 200 GeV Au+Au collisions as a function of centrality. We observe a clear collision energy dependence indicating a stronger longitudinal decorrelation at lower collision energies. The 4-particle correlator (Rn($\eta, \eta ref$)(n = 2, 3)) used to separate the event-plane twist from vn magnitude fluctuations, will also be presented. The results provide new insights into the three-dimensional modeling of the initial stage and the evolution of relativistic heavy-ion collisions, especially their collision energy dependence.

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