

Beam-energy dependence of the longitudinal broadening of two-particle transverse momentum correlations from STAR

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Two-particle transverse momentum correlator is a powerful technique for understanding the dynamics of relativistic heavy-ion collisions. Among these, the transverse momentum correlator $G_2(\Delta\eta, \Delta\varphi)$ is of particular interest for its potential sensitivity to the shear viscosity per entropy density η/s of the quark-gluon plasma formed in the collisions [1,2]. We used the data of Au–Au collisions at $\sqrt{s_{\text{NN}}} = 200\text{--}11.5$ GeV to investigate: (i) the longitudinal broadening of the $G_2(\Delta\eta, \Delta\varphi)$ correlator, (ii) the long range azimuthal dependence of the $G_2(\Delta\eta, \Delta\varphi)$ [3]. We will present the centrality and event shape dependence of the longitudinal width $\sigma(\Delta\eta)$ and the azimuthal harmonics a_n^{pT} of the $G_2(\Delta\eta, \Delta\varphi)$ correlator for different beam energies. Our measurements are compared to similar LHC measurements [4]. The $G_2(\Delta\eta, \Delta\varphi)$ beam-energy dependence is expected to reflect the temperature (T) and chemical potential (μ_B) dependence of η/s .

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[3] N. Magdy, et al., arXiv:2101.01555

[4] ALICE Collaboration Phys.Lett.B 804 (2020) 135375