

1 Beam-energy dependence of transverse momentum and flow correlations in STAR

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3 Extraction of the transport properties of the quark-gluon plasma (QGP) is a central objective of
4 the heavy-ion program at the Relativistic Heavy-Ion Collider (RHIC). Measurements that are selec-
5 tively sensitive to both initial-state effects and final-state viscous attenuation can provide invaluable
6 constraints for temperature (T) and chemical potential (μ_B) dependence of the specific shear vis-
7 cosity η/s . The transverse momentum correlator $G_2(\Delta\eta, \Delta\varphi)$ has been shown to be sensitive to
8 η/s [1,2]. Correspondingly, the $\rho(v_2^2, \langle p_T \rangle)$ correlator, that measures the strength of the correlation
9 between an event's mean-transverse momentum $\langle p_T \rangle$ and its v_2^2 magnitude, indicates more sensi-
10 tivity to the initial-state than to final-state effects [3,4]. A comprehensive set of $G_2(\Delta\eta, \Delta\varphi)$ and
11 $\rho(v_2^2, \langle p_T \rangle)$ measurements for Au+Au collisions spanning the beam energy range of $\sqrt{s_{\text{NN}}} = 11.5$ -
12 200 GeV, will be presented for several centralities and event shape selections. The results, which
13 show characteristic beam-energy-dependent trends, are compared to similar LHC measurements and
14 calculations from several theoretical models [2,4]. The data-model comparisons indicate that the
15 measurements provide significant constraints for the respective influence of initial-state fluctuations,
16 system-size, system-shape, and $\eta/s(\mu_B, T)$.

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