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The ridge and di-hadron correlations from the Beam Energy Scan at RHIC

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Di-hadron correlations are a key observable in heavy-ion collisions, and play a critical role in establishing the equation of state for hot and dense matter. Long range di-hadron correlations, also known as the ridge, have been observed at the top RHIC energies and the LHC in A+A, p+A, and d+A collisions and are crucial to probing the collectivity of the various systems. We will present the first set of results of 2D di-hadron correlations ($\Delta\phi$, $\Delta\eta$) for Au+Au collisions with center-of-mass energies 7, 11.5, 14.5, 19.6, 27, and 39 GeV from the STAR experiment. Measurements of these correlations will utilize both the TPC and FTPC to provide extensive coverage in azimuth and pseudo-rapidity, where the ranges extend to $0 < \phi < 2\pi$ and $0 < |\eta| < 4$ respectively and are integrated over $0.2 < p_T < 2.0$ GeV/c. We will obtain anisotropy coefficients of orders 2-5 ($v_{2-5}\{2\}$) from the ridge, and show how they depend on energy and centrality. In particular, when scaled by the multiplicity, we find $v_3\{2\}$ shows a non-monotonic behavior as a function of energy. Hints of similar behavior are observed when $v_3\{2\}$ and $v_4\{2\}$ are scaled by $v_2\{2\}$. We will discuss the relevance of this observation in terms of a possible pressure minimum, and how such a minimum might relate to critical point searches in the Beam Energy Scan. Finally, we will analyze the near-side peak, which could be narrowed in the
presence of radial flow, via studying its beam-energy and centrality dependence.

On behalf of collaboration:

STAR

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