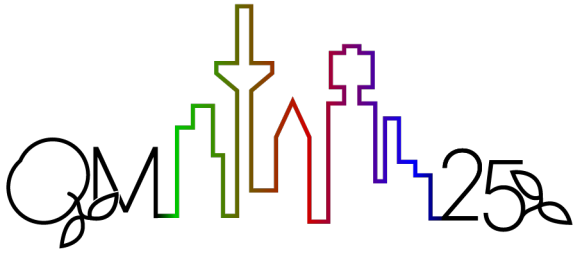

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Jet Elliptic Anisotropy and Suppression in PbPb, AuAu and OO

The elliptic anisotropy of energetic particles produced in heavy-ion collisions is understood as an effect of a geometrical selection bias due to energy loss. In the measured ensemble, particles oriented in the direction in which the medium is shorter are over-represented as compared to those oriented in the direction in which the medium is longer. In this work we present the first semi-analytical predictions, including propagation through a realistic, hydrodynamical background, of the elliptic anisotropy for jets, obtaining quantitative agreement with available experimental data.

Jets are multi-partonic, extended objects and their energy loss is sensitive to substructure fluctuations. The ability of the medium to resolve those partonic fluctuations is determined by the physics of color coherence. We find that jet v_2 has a specially strong dependence on coherence physics due to the marked length-dependence of the critical angle θ_c. By combining our predictions for the collision systems and center of mass energies studied at RHIC and the LHC, we show that the relative size of jet v_2 for jets with different cone-sizes R follows a universal trend that indicates a transition from a coherent regime of jet quenching to a decoherent regime. These results suggest a way forward to experimentally reveal the role played by the physics of jet color decoherence in probing deconfined QCD matter. To this end, precise jet measurements from sPHENIX will be determinant as one explores larger values of θ_c in AuAu collisions. Our study incorporates results for OO collisions at the LHC as well, providing predictions for both jet $R_{\rm AA}$ and jet v_2 for different R.

Category

Theory

Collaboration (if applicable)

Primary authors: Dr MEHTAR-TANI, Yacine (Brookhaven National Laboratory); PABLOS, Daniel (IGFAE, USC); TAKACS, Adam (Heidelberg University); TYWONIUK, Konrad (University of Bergen (NO))

Presenters: Dr MEHTAR-TANI, Yacine (Brookhaven National Laboratory); PABLOS, Daniel (IGFAE, USC); TAKACS, Adam (Heidelberg University); TYWONIUK, Konrad (University of Bergen (NO))

Track Classification: Jets