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Unveiling the Interplay of Multi-Partonic Structures and Strongly-Interacting Media via R-dependent Jet Modifications in Heavy-Ion Collisions (remote)

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Jets provide a powerful tool to study the properties of hot nuclear matter and its effect on quantum processes. The degree of modification of jets by the medium depends on how well the medium can resolve the internal jet structure. In this work, we investigate the interplay between the multi-partonic structure of jets and their interaction with a strongly-interacting medium. Specifically, we focus on the R-dependence of the jet v_2 coefficients as a function of collision centrality, which provides a unique handle on coherence physics.
Using resummed quenching weights that incorporate both elastic and state-of-the-art radiative energy loss and embedding the system into a realistic heavy-ion environment, we compute the R-dependence of jet suppression at RHIC and the LHC. We observe a very mild R-dependence at RHIC kinematics, similar to what was found at the LHC. Our predictions are in excellent agreement with existing experimental data.
Finally, we present results for the jet azimuthal anisotropy v_2 as a function of R, which shows a sequential collapse of v_2 for moderate R jets towards the result for small R=0.1 as centrality is decreased. This behavior is due to the strong dependence of the decoherence angle θ_c on the in-medium traversed length, which affects the size of the resolved phase-space over which quenching weights are resummed. Our results highlight the sensitivity of $v_2(R)$ to the typical value of θ_c at a given centrality.

Category

Theory

Collaboration (if applicable)

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