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Dihadron correlations as a probe of partonic energy loss in small and large systems

We present preliminary predictions for the dihadron away-side suppression ratio I_{AA} in $p + A$ and $A + A$ collisions at RHIC and the LHC. Our predictions are made using a perturbative quantum chromodynamics (pQCD)-based energy loss model coupled to event-by-event hydrodynamic evolution of the medium, with short path length corrections to the energy loss. The $p + p$ reference is generated with the Monte Carlo event generator `Pythia`, providing a vacuum fragmentation baseline against which the medium-modified yields are normalized. While the single-inclusive nuclear modification factor R_{AA} integrates over the full geometry of the collision, dihadron correlations select a biased subset of it. The trigger requirement preferentially surfaces partons produced near the medium boundary, so that the away-side parton traverses a longer and more sharply constrained path length, and the away-side associated yield at $\Delta\phi \approx \pi$ therefore probes both the magnitude of the energy loss and the angular redistribution of the radiated energy. We present the extracted I_{AA} as a function of trigger and associated transverse momentum, and argue that away-side suppression provides an additional test of whether a quark-gluon plasma is formed in small collision systems.

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