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No-quenching baseline for energy-loss signals in small system collisions

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In this work, we perform computations of inclusive jet and semi-inclusive jet-hadron cross sections for minimum-bias oxygen-oxygen collisions. We compute the no-quenching baseline for the jet nuclear modification factor R_{AA} and jet-, and hadron-triggered semi-inclusive nuclear modification factors I_{AA}. We do this with state-of-the-art nuclear parton distribution functions, NLO matrix elements and parton shower. We show significant deviations from unity due to cold-nuclear effects even in the absence of quenching. We demonstrate that the nPDF uncertainties constitute a major limitation in detecting potentially small energy loss effects in small collision systems. Hadron-triggered observables are in particular sensitive to uncertainties due to the non-trivial correlation of the trigger hadron and analyzed particles. For jet-triggered I_{AA}, there exist kinematic regions in which errors cancel down to 2%, overcoming the main limitation of small-system energy loss measurements.

Ref. Jannis Gebhard, Aleksas Mazeliauskas, and Adam Takacs, No-quenching baseline for energy-loss signals in small system collisions, in pre-paration.

Category

Theory

Collaboration

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