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Investigating the R-Dependence of Jet Suppression

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Jet quenching measurements in heavy-ion collisions, such as the suppression of the jet yield compared to pp collisions, aim to elucidate the various mechanisms of parton energy loss. Differential measurements of the dependence of the inclusive jet nuclear modification factor (R_{AA}) on the jet resolution parameter (R) may help disentangle energy loss mechanisms and discriminate between different jet quenching models. One recent R-dependence measurement by the ALICE collaboration hints that large-R jets lose more energy. This result is inconsistent with the expectation that jets with larger radii will recover more of the energy redistributed to larger angles via jet-medium interactions. However, many models can describe the trend despite including different implementations of physics effects, making it difficult to isolate the impact of a single energy loss mechanism. In this work, we utilize PYTHIA simulations coupled with phenomenologically-derived quenching to better understand the contribution of single effects to this observed R-dependence. These effects include the R-dependence of the vacuum jet spectrum, differences in energy loss of quark- and gluon-initiated jets, and the impact of wide-angle radiation recovered at large R. This work is carried out across RHIC and LHC p_{T}-scales, detector acceptances, and center-of-mass energies and compared to experimental data to help interpret experimental results.

Category

Experiment

Collaboration (if applicable)

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