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Effects of color decoherence and virtuality on jet quenching

In this talk, we will discuss the effects of color decoherence and virtuality evolution on jet quenching observed in relativistic heavy-ion collisions. First, we will show that the jet multiplicity, calculated according to the color coherence picture, provides a reasonable description of inclusive jet data up to $p_T \sim 1$ TeV in pp collisions at the LHC. Building on this understanding of the virtuality evolution of vacuum jets, we combine the color coherence picture (angular ordering) with color decoherence in QCD matter at a virtuality determined by the interplay between vacuum evolution and medium-induced momentum broadening. Using radiative energy loss calculated within the BDMPS formalism and modeling QCD bulk matter with the (2+1)-dimensional OSU hydrodynamic code, we perform a detailed calculation of the inclusive jet modification factor R_{AA} in PbPb collisions at $\sqrt{s_{NN}} = 5.02$ TeV. Our results demonstrate that the observed R_{AA} spectrum at high p_T , which requires larger energy loss than at lower p_T , is correlated with jet multiplicity as predicted by the virtuality evolution of jets. This study indicates that virtuality evolution and color decoherence play critical roles in providing a comprehensive understanding of jet quenching.

Category

Theory

Collaboration (if applicable)

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