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Jet modification from RHIC to LHC

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We calculate the modification of hard jets in dense extended matter in the higher-twist formalism. The single gluon emission spectrum from a hard quark due to multiple scattering in a medium is evaluated as a power series in inverse powers of the virtuality of the hard jet. Retaining corrections up to next to leading power, we calculate the medium modified fragmentation function by resumming the effect of multiple gluon emissions in a virtuality ordered DGLAP like evolution equation. This new formalism is applied to the computation of the R_{AA} in high-energy heavy-ion collisions at RHIC and LHC. The medium is modeled using viscous 2+1D fluid dynamics which has been tuned to describe both the spectra and the v_2 at a p_T < 2 GeV. The sole parameter of the calculation $\hat{q}$ is set proportional to the entropy density and is found to be approximately 2 GeV$^2/fm$ at a plasma temperature of $T = 350$ MeV. Using this we obtain a satisfactory description of the centrality and transverse momentum dependence of the R_{AA} at RHIC as well as its dependence on the azimuthal angle. With no change in parameters we obtain a natural description of the rising R_{AA} as measured by the ALICE collaboration at the LHC. Some new results from a Monte-Carlo routine based on this formalism will also be presented.

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