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First calculation of $\hat{q}$ on a quenched SU(3) lattice and its scale dependence

Thursday 4 October 2018 11:45 (20 minutes)

The jet transport coefficient $\hat{q}$ is the leading parameter that controls the modification of hard jets in a dense extended medium. In this talk, we outline an *ab-initio* framework to compute $\hat{q}$ on a quenched SU(3) lattice. We consider a leading order diagram where a hard parton probes the thermal medium by exchanging a Glauber gluon. The non-perturbative part of this process is expressed in terms of a non-local (two-point) Field-Strength-Field-Strength operator product which can be Taylor expanded after analytic continuation to the Euclidean region. Such an expansion allows us to write $\hat{q}$ in terms of the expectation of local operators. In this talk, we demonstrate that $\hat{q}$ like other non-perturbative quantities such as parton distribution functions (PDFs) and fragmentation functions (FFs) depends on the energy of the probe and the interaction scale between the hard parton and the medium. To explore the scale dependence of the jet transport coefficient, we carry out a perturbative analysis both on the lattice and in continuum field theory. We discuss the matching of these two approaches and the effect of higher order terms from the perturbative expansion on the extracted value of $\hat{q}$.

Summary

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