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Short Path Length Energy Loss in the Quark Gluon Plasma

The Quark Gluon Plasma has been studied extensively at the LHC, with jet quenching and particle suppression playing an important role in our ability to characterize this fundamental state of matter. A number of theoretical descriptions concerning the mechanisms whereby particle suppression occurs have been put forward, with perturbative methods successfully describing suppression patterns in very central Pb-Pb collisions at the LHC. However, particle suppression is by no means the only hallmark of the existence of the QGP and many measurements at the LHC of smaller colliding systems, such as peripheral Pb-Pb and central p-Pb and p-p, have hinted at the production of a droplet of QGP in alarmingly small volumes. In stark contrast, existing perturbative Quantum Chromodynamical methods rely heavily on the assumption that the system under consideration is large, demanding an extension of pQCD methods to smaller systems. We present precisely such an extension and find corrections on the order of 100% at high energies, revealing a number of shortcomings and problematic assumptions that are present even in traditional pQCD energy loss calculations.

I intend to submit my contribution for the proceedings

Yes

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