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Radiative Energy Loss in the absorptive QGP

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A firm knowledge of medium-induced energy loss mechanisms in the deconfined plasma state of QCD matter is essential for our understanding of phenomena such as strong jet quenching and high-pT hadron suppression observed in high energy nuclear collisions at RHIC and LHC. Based on perturbative QCD calculations, it is commonly accepted that the radiative energy loss contribution is dominant, where heavy quarks radiate less than light partons. In these studies, however, possible damping mechanisms on bremsstrahlung gluons have so far been neglected.

In this talk it is argued that in an absorptive and polarizable plasma the radiation spectrum becomes significantly reduced, in particular, for charges with high initial energy [1]. This is because damping mechanisms in the absorptive medium may influence the formation of radiation, prominently, in the case of large formation times. Consequently, a suppression of the radiation spectrum has to be attributed to absorption rather than to coherence effects. Being quark mass independent, this new effect might provide a suitable explanation for the observed single electron puzzle. Moreover, as an imaginable damping mechanism, gluon bremsstrahlung from preformed radiation gluons could serve as a source for isotropic, low energy gluon radiation with a significant impact on phenomena studied at RHIC and even more at LHC.

[1] M. Bluhm, P. B. Gossiaux, J. Aichelin, Phys. Rev. Lett. 107, 265004 (2011).

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