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Jet suppression in ultrarelativistic heavy ion collisions

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D mesons are considered to be excellent probes of QCD matter created in ultra relativistic heavy ion collisions. Here we examine charm quark suppression in central Au+Au collisions at RHIC, since D mesons have an advantage that fragmentation does not modify bare charm quark suppression. For this, we use a theoretical formalism based on energy loss calculations in a finite size dynamical QCD medium [1], which is integrated in a numerical procedure [2] that allows generating predictions with no free parameters used in comparing with the experimental data. The generated predictions have recently shown a robust agreement [3] with various experimental data, which spans across different probes, experiments (RHIC and LHC) and experimental conditions (i.e. all available centrality regions). This model has several key ingredients, such as: i) inclusion of the dynamical scattering centers, ii) inclusion of collisional energy loss, iii) inclusion of running coupling, iv) finite magnetic mass, etc. While all these ingredients are required based on theoretical grounds, it is currently unclear how they individually contribute to the accurate comparison with the experimental data. To that end, we test [4] how accuracy of the predictions is affected by neglecting collisional or radiative energy loss, finite magnetic mass effects and/or effective gluon mass and by using finite coupling constant. We expect that these results will further simplify analysis and interpretation of the underlying experimental results.

[1] M. Djordjevic, Phys. Rev. C 80, 064909 (2009).

[2] M. Djordjevic and M. Djordjevic, arXiv:1307.4098, PLB in press.

[3] M. Djordjevic, M. Djordjevic and B. Blagojevic, arXiv:1405.4250

[4] B. Blagojevic and M. Djordjevic, to be submitted (2014).

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