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The dynamical energy loss formalism: from explaining unexpected suppression patterns to implications for future experiments

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Understanding properties of Quark-Gluon Plasma requires an unbiased comparison of experimental data with theoretical predictions. To that end, we developed the dynamical energy loss formalism which, in distinction to most other methods, takes into account a realistic medium composed of dynamical scattering centers. The formalism also allows making numerical predictions for a wide number of observables with the same parameter set fixed to standard literature values. I will first briefly review the most recent developments of the formalism. I will further argue that numerical implementation of the formalism has reached the stage where it can provide comprehensive and realistic predictions for both the existing and the upcoming experimental data, and also guide some of the future experiments. To that end, I will show: i) that the model post-dictions agree with numerous data for both central and non-central collisions, including qualitatively explaining some of unexpected experimental observations, ii) show that the predictions, which were published well before the data became available, agree very well with these data, again explaining some of the unexpected experimentally observed suppression patterns, iii) predictions for the upcoming data, where some point to qualitative expectations that can be used to distinguish between different energy loss mechanisms, and consequently guide future experiments. Overall, these results show that the dynamical energy loss formalism predicts high pt suppression with high accuracy. The first steps in our work towards the application of this model as a novel high-precision tomographic tool of QGP medium, will also be discussed.

Content type

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