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Energy loss and shear viscosity at NLO in a high-temperature QGP

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We present a set of kinetic equations which extend the AMY energy loss formalism to NLO in the strong coupling constant. A novel aspect of the NLO analysis is a consistent description of wider-angle bremsstrahlung (semi-collinear emissions) which smoothly interpolates between 2to2 scattering and collinear bremsstrahlung. Similarly, the NLO treatment describes how the soft collinear emissions can be incorporated into the drag coefficient at NLO. We describe how many of the ingredients of the NLO transport equations (such as the drag coefficient) can be computed using a Euclidean formalism pioneered by S. Caron-Huot.

In the second part of the talk we show how the same framework can be used to address the shear viscosity at NLO, up to a coefficient which cannot be determined using the Euclidean formalism. By treating this coefficient as an unknown parameter (within an estimated range) we can however estimate the NLO corrections to η.

Refs: J. Ghiglieri, G. Moore, D. Teaney, "Towards the shear viscosity at NLO in high temperature plasmas", in preparation. J. Ghiglieri, G. Moore, D. Teaney, "Energy loss at NLO in high temperature plasmas", in preparation. J. Ghiglieri and D. Teaney, "Parton energy loss and momentum broadening at NLO in high temperature QCD plasmas", arXiv:1502.03730 [hep-ph]. J. Ghiglieri, et al, "Next-to-leading order thermal photon production in a weakly coupled quark-gluon plasma", JHEP 1305, 010 (2013) [arXiv:1302.5970 [hep-ph]].

On behalf of collaboration:

NONE

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