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Heavy quark momentum diffusion coefficient in 3D gluon plasma

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We study the heavy-quark momentum diffusion coefficient in far from equilibrium gluon plasma in a self-similar regime using real-time lattice techniques. We use 3 methods for the extraction: an unequal time electric field 2-point correlator integrated over the time difference, hard loop (HTL) perturbation theory and a kinetic theory formula, both using our recently acquired data on the gluon spectral function. The time-evolution of the momentum diffusion coefficient extracted from all three methods is consistent with an approximate $t^{\frac{-1}{2}}$ power law. We also study the extracted diffusion coefficient as a function of the upper limit of the time integration. We find that combining HTL expressions with the infrared enhancement of the equal-time correlation function that we have observed improves the agreement with the data for transient time behavior considerably. This is a gauge invariant confirmation of the infrared enhancement previously observed only in gauge fixed correlation functions.

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