

Data-driven constraints on the drag and diffusion of light partons

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The momentum exchanged by hard partons with the quark-gluon plasma ranges from frequent soft interactions to rare large angle scatterings. The larger number of soft interactions makes possible an effective stochastic description of parton-plasma interactions in terms of a small number of transport coefficients, drag and diffusion [1]. In this work, we study jet energy loss in heavy ion collisions using a combined stochastic and large angle scattering parton energy loss model, building on the systematic division between soft and hard parton-plasma interactions derived for a high temperature plasma in Ref. [2]. We use a Bayesian analysis to perform a first systematic extraction of the transport properties of light partons propagating in a quark-gluon plasma, constraining the temperature dependence of the drag and diffusion coefficients by comparison with data. We further study the dependence of this result on the separation of scale between soft and hard parton-plasma interactions.

[1] Moore and Teaney, Phys.Rev.C71:064904 (2005)

[2] Ghiglieri, Moore and Teaney, JHEP1603:095 (2016)

Summary

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