

Holography and the problem of parton energy loss in a quark-gluon plasma

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The nearly perfect fluidity of the quark-gluon plasma (QGP) and its apparent strongly coupled nature has opened a rich window of phenomenology for holographic techniques. These studies offer key benchmarks against which to interpret the data in the context of the long term quest towards the determination of the nature of the QGP degrees of freedom at collider relevant temperatures. In particular, the phenomenon of jet quenching, or parton energy loss, can be modelled through hybrid frameworks that exploit the wide separation of scales present in the system, combining perturbative QCD methods and holographic insights at their corresponding regime of applicability. In this talk, I will present the basis and phenomenology of such models, which are already capable of giving not only qualitative but also a quantitative description of many experimental data produced at the LHC and RHIC. Indeed, by exploring the geometric intuitions provided by holography, we are able to address genuine non-perturbative aspects of many body QCD that will hopefully lead us to a better understanding of the emerging collective behaviour observed in experiments (also in small systems), a crucial task in which the phenomenology of the jet/plasma interplay plays a central role due to its potential to unravel the precise way in which energy and momentum hydrodynamize in such short time scales.

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