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Advancing our understanding of the in-medium q -> qg splitting function

A central ingredient in the description of QCD jets in the quark-gluon plasma is the gluon emission probability off a quark leg. Despite its critical importance, this object has only been computed under a set of approximations concerning both the kinematics of the process and the description of the medium. In this talk we will present new results that go significantly beyond the state-of-the-art by following a twofold approach. First, we formulate the problem in coordinate space and obtain the splitting function with exact kinematics and finite-N_c corrections by solving a system of Schrödinger-like equations [1]. We also explore a momentum space formulation that results in a set of Dyson-like equations. The latter approach significantly helps to extend the medium description beyond the harmonic oscillator approximation [2]. In both cases, we will present numerical routines that are fast, efficient and flexible. We establish the size of both kinematic corrections and refinements on the medium description. The resultant improvements in the emission spectrum allow for precise calculations of many in-medium jet observables, including energy-energy correlators, which are also shown and confronted with experimental data.

[1] JHEP 09 (2023) 049
[2] JHEP 07 (2020) 114

Category

Theory

Collaboration (if applicable)

Authors: GUERREIRO, Afonso (IST-UL); SOTO ONTOSO, Alba (Universidad de Granada (ES)); SOYEZ, Gregory (IPhT, CEA Saclay); Dr MILHANO, Guilherme (LIP-Lisbon & CERN TH); ISAKSEN, Johannes Hamre (University of Bergen); LEITÃO, Marco (LIP - Lisbon & IST-UL)

Presenter: LEITÃO, Marco (LIP - Lisbon & IST-UL)

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