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Dynamically groomed jet radius in heavy-ion collisions

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Jet substructure is a powerful tool to probe the perturbative regime of jet evolution in proton-proton and heavy-ion collisions. Over the past few years, various substructure observables have been proposed to understand specific aspects of jet dynamics in a quark-gluon plasma (QGP).

In this talk, based on [1,2,3], we will explore the ability of such an observable, called Dynamical Grooming, to pin down the properties of the QGP. In particular, we will present the computation via analytic resummation techniques and Monte-Carlo simulations, of the opening angle θ_g of the hardest splitting in the jet as defined by Dynamical Grooming. This calculation, grounded in perturbative QCD, accounts for the factorization in time between vacuum-like and medium-induced processes in the double logarithmic approximation. Our main result is that the dominating scale in the θ_g-distribution is the decoherence angle θ_c which characterizes the medium's resolution power to propagate color probes, which makes this observable particularly interesting to measure θ_c experimentally. To that aim, we will highlight a suitable combination of the Dynamical Grooming condition and the jet radius that leads to a pQCD-dominated observable with minimal sensitivity to the medium response.

Refs:
[1] P. Caucal, A. Soto-Ontoso and A. Takacs, JHEP07(2021)020
[2] P. Caucal, A. Soto-Ontoso and A. Takacs, Phys.Rev.D105(2022)114046
[3] J.H. Isaksen, A. Takacs and K. Tywoniuk, arXiv:2206.02811

Declaration

I certify that I have checked that I am authorised to submit the abstract with the listed co-authors with their current affiliations

Change of Speaker

I understand that change of speaker is allowed provided that no participant gives more than one talk. Otherwise, we will ask the speaker to choose between one or the other abstract to be presented.

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