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Dynamically groomed jet radius in heavy-ion collisions

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We explore the ability of a recently proposed jet substructure technique, Dynamical Grooming, to pin down the properties of the Quark-Gluon Plasma formed in ultra-relativistic heavy-ion collisions. In particular, we compute, both analytically and via Monte-Carlo simulations, the opening angle θ_g of the hardest splitting in the jet as defined by Dynamical Grooming. Our calculation, grounded in perturbative QCD, accounts for the factorization in time between vacuum-like and medium-induced processes in the double logarithmic approximation. We observe that the dominating scale in the θ_g-distribution is the decoherence angle θ_c which characterises the resolution power of the medium to propagating color probes. This feature also persists in strong coupling models for jet quenching. We further propose for potential experimental measurements a suitable combination of the Dynamical Grooming condition and the jet radius that leads to a pQCD dominated observable with a very small sensitivity ($\lesssim$10%) to medium response.

References:
[1] P. Caucal, A. Soto-Ontoso and A. Takacs, arXiv:2111.14768
[2] P. Caucal, A. Soto-Ontoso and A. Takacs, JHEP, 20 (2021)

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