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Large angle energy flow in medium modified jets

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The advent of the LHC opened up new perspectives for jet-quenching physics. For the first time, high enough energies are reached in heavy-ion experiments to produced jets in large numbers, and the unprecedented detector capabilities of ALICE, ATLAS and CMS, not only extend the kinematic range for the measurements previously performed at RHIC, but also allow to explore a variety of new jet-quenching observables. In this talk, I address the question of the angular broadening of jets in the presence of a dense QCD matter. I start by discussing the fundamental mechanisms underlying the formation of gluon cascades induced by multiple interactions of high energy jets with the quark-gluon plasma. Then, the rate equation that describes the evolution of the energy and angular distribution of the in-medium gluon shower is presented and solved. Two remarkable phenomena emerge. First and foremost the energy spectrum (of jet constituents) exhibits a scaling behavior characterized by a constant flow of energy towards low momenta akin to wave turbulence. As a result, energy is rapidly transported from the energy containing partons to low momentum gluons before it dissipates into the medium. Second, medium-induced gluon cascades develop and transport energy at parametrically large angles with respect to the jet axis. This picture is in semi-quantitive agreement with a recent CMS analysis of the missing energy in asymmetric dijet events where the energy balance is recovered at large angles and very soft particles.

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