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Jet Tomography and Opaqueness Evolution from RHIC to LHC[1]

JINFENG LIAO, Indiana University & RBRC — High energy jets, penetrating the hot QCD matter created in heavy ion collisions, provide unique probe of the medium property. It is of great interest to extract possible nontrivial temperature dependence of the jet-medium coupling. Particularly sensitive to such T-dependence are two sets of observables: 1) the anisotropy of jet energy loss via the azimuthal angle dependence of suppression $R_{AA}(\phi)$ (or the various harmonic coefficients v_n at high p_t); 2) the evolution of the overall suppression with beam energy $R_{AA}(\sqrt{s})$. We report our systematic study of these observables using event-by-event simulations, in comparison with available data from RHIC to LHC. The results strongly suggest a nontrivial enhancement of jet-medium coupling near the parton/hadron phase boundary. Recently emerging evidences for such a scenario from various other jet modelings, as well as efforts to understand such peculiar medium property from microscopic theories will also be discussed. Finally we briefly discuss potential final state jet attenuation in (possibly created) hot medium in the "mini-bang" (pPb and dAu collisions) and demonstrate that jet quenching anisotropy could provide a clean probe to tell whether there is substantial final state interaction in those collisions.

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