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Jet quenching in a semi-Quark-Gluon-Monopole Plasma: Light and Heavy flavor RAA&v2 at RHIC&LHC

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Experimental data from heavy ion collisions at Relativistic Heavy Ion Collider (RHIC) and Large Hadron Collider (LHC) as well as first-principle lattice simulations, have provided rich information about the properties of the QCD plasma phase in the $1 \sim 3T_c$ regime. In particular, extensive jet energy loss measurements have allowed unique opportunity for probing the "internal working"of such plasma and for understanding the non-perturbative dynamics that underlies the confinement transition at T_c. Significant progress has been made recently in constructing such a microscopic model —the semi-quark-gluon-monopole plasma (sQGMP) which integrates two essential elements of confinements, i.e. the Polyakov-loop suppression of quarks/gluons and emergent magnetic monopoles. Based on sQGMP, a new comprehensive framework for simulating jet energy loss has been developed, called CUJET3.0, which (1) treats the radiative energy loss in the DGLV formalism; (2) convolutes energy loss with a bulk evolution of heavy ion collisions from the state-of-the-art viscous hydrodynamic simulation (VISHNU hydro) that is data-validated; (3) constrains the thermodynamic contents of the plasma constituents by current lattice QCD data. The CUJET3.0 simulation results have successfully passed the test of seven sets of jet quenching (leading-hadron) observables, including light hadrons' R_{AA} and v_2 at AuAu 200GeV and at PbPb 2.76TeV as well as D and B mesons R_{AA} and v_2 at PbPb 2.76TeV. In this talk the newest results from CUJET3.0 will be reported, with systematic predictions for the light and heavy flavor R_AA and v_2 at the LHC 5TeV PbPb collisions. Furthermore, quantification of potential final-state jet attenuation effects from CUJET3.0 for small colliding systems at RHIC and LHC will also be presented.
[Refs] J.Xu, J.Liao and M.Gyulassy: (1) in preparation; (2) JHEP1602(2016)169; (3)CPL32(2015)092501.

Preferred Track

Jets and High pT Hadrons

Collaboration

Not applicable

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