XXIV QUARK MATTER
DARMSTADT 2014

Contribution ID: **240** Type: **Poster**

The Tricky Azimuthal Dependence of Jet Quenching at RHIC and LHC via CUJET2.0=rcDGLV+elastic+VISH(2+1)

Tuesday 20 May 2014 16:30 (2 hours)

We present a $\chi^2/d.o.f.$ analysis of RHIC and LHC R_{AA} ($p_T > 10$ GeV/c) and v_2 ($p_T > 10$ GeV/c) data using the new open C++ source CUJET2.0 code [1] developed as a component of the DOE JET collaboration project. The code evaluates jet path integral involving running coupling DGLV induced radiated gluon energy loss rates as well as elastic energy loss for jets propagating though viscous hydrodynamics VISH 2+1D expanding thermal fields $T(x, y, t)$ constrained by fits to bulk low p_T observables. We compare numerical results as a function of our main control parameter, α_{max}, an assumed upper bound on the vacuum running coupling in the infrared. A $\chi^2/d.o.f.$ analysis shows that R^{π}_{AA} data from RHIC and LHC are consistent with CUJET2.0 at the $\chi^2/d.o.f. < 2$ level for $\alpha_{max} = 0.22 - 0.27$. The corresponding $\hat{q}(E_{jet}, T)/T^3$ effective jet transport coefficient field of this model is evaluated and compared to other (HT-BW, HT-M, MARTINI, McGill-AMY) JET collaboration models [2]. We focus here on the main current jet quenching puzzle (not discussed in [2]) the underestimation of jet elliptic asymmetry, $v_2(p_T)$ at both RHIC and LHC by CUJET and most other pQCD based tomographic models. We show that relaxing the assumption that α_{max} is independent of the local T field can reduce the v_2 discrepancy between CUJET and data to the $\chi^2_{v_2}/d.o.f. < 2$ level by allowing as small as 10% variations of the path averaged $\alpha_{max}(T(z))$ along in and out paths. We speculate about origin of such variations and propose additional future tests to help elucidate the "tricky azimuthal dependence" of jet quenching seen at RHIC and LHC.

References

[1] Jiechen Xu, Alessandro Buzzatti, Miklos Gyulassy, "Azimuthal Jet Flavor Tomography with CUJET2.0 of Nuclear Collisions at RHIC and LHC", arXiv:1402.2956.

[2] The JET Collaboration, "Extracting jet transport coefficient from jet quenching at RHIC and LHC", arXiv:1312.5003.

Author: XU, Jiechen (Columbia University)

Co-authors: Dr BUZZATTI, Alessandro (Columbia University, LBNL); Prof. GYULASSY, Miklos (Columbia University, LBNL, Wigner RCP)

Presenter: XU, Jiechen (Columbia University)

Session Classification: Poster session

Track Classification: Jets