

Summary of the 3rd Workshop on Jet Modification in the RHIC and LHC Era @ Wayne State University

An unordered, unprioritized summary

Town Hall Meeting



Address the important fundamental questions of "how" and "why" partons lose energy in the QGP

- Understanding of how to model the bulk is under control (via hydro coupled to hadronic cascade) and there has been significant progress in our understanding of quenching
- Jet quenching measurements at RHIC and LHC provide significant **constraints on the partonic E_{loss} mechanisms**
 - Will be used towards a **standard formulation of E_{loss} in the QGP**
 - Not yet at the precision stage wrt to the bulk formulation
 - **Where does the "lost" energy go?**
 - Important to **constrain models and in their coupling** with the medium
 - Missing p_T measurements at the LHC
 - RHIC measurements via Jet Geometry Engineering
 - Advances towards **medium & jet energy conservation simultaneously in MC needed!**
- T dependence of the QGP coupling -> Near T_c Enhancement?
 - Needs complementary LHC and RHIC measurements

- **Length scale via interaction hardness (Q^2)**
 - What are we scattering off?
 - point-like at LHC \rightarrow lower energy jets at RHIC?
 - quasi-particles, fields \Leftrightarrow **Microscopy of the QGP**
 - **qhat vs. ehat** with RHIC/LHC temperature lever arm
- RHIC
 - STAR will continue its jet program (medium-term)
 - **sPhenix** increased capabilities will allow a direct comparison to the LHC
 - High luminosity will allow data collection **without imposing online trigger** “biases” allows full exploration of “Jet Geometry Engineering”
 - Increased precision in the long-term are needed to map out T evolution
 - Could the different densities/associated time evolution of **different collision systems** allow access to **different effective temperatures** than centrality or $\sqrt{s_{NN}}$ variations with respect to quenching?
- LHC
 - Allows **precision jet measurements**
 - **New jet observables**: Jet(sub-) structures will allow access to well defined QCD observables: Jet shapes, jet mass, multi-jet, etc

- Major theory milestone is the **formulation/implementation of most theoretical E_{loss} variants in MC form**
 - Allows details of the experimental jet definitions to be reproduced
- LHC run 2+3 will provide precision measurements and unprecedented kinematical reach
 - **Direct photon/Z measurements provide the cleanest access to the parton kinematics** in heavy-ion collisions
- RHIC steeply falling partonic spectrum can be used as an advantage towards **Jet Geometry Engineering**
 - High rates of sPhenix are needed for unbiased measurements required for the baseline
 - High p_T , high statistics **gamma-jet measurements** will allow clean access to parton kinematics
- There is a need to formulate a **framework which allows direct comparison of measurements and full-event MC simulation**
 - Lisbon Accord -> Rivet
 - Analytical/1st principles calculations and advances are needed towards a text-book formulation