

Introduction to the workshop

Will Brooks
Jefferson Lab

- ❑ Nobel prize for asymptotic freedom in QCD
- ❑ An important accolade, but the story is just beginning...
- ❑ Non-Abelian nature is true distinctive of QCD, leads to

confinement

- ❑ Understanding confinement via its several manifestations is a defining task, spans several subfields

Hadronization as manifestation of confinement

- ❑ Touchpoint: hadronization is confinement in action!
- ❑ High-energy jet: wild spray of colored quarks and radiated gluons over a large space-time volume, but somehow they all 'know about each other' because

the final system is colorless

- ❑ This profound reality is orchestrated by confinement
- ❑ Very little of what we believe about this process is constrained by data

Hadronization and quark energy loss

- ❑ Gluon emission is a fundamental QCD process
- ❑ Gluon emission and absorption drive both hadronization and quark energy loss: in some sense these two are

inseparable processes

- ❑ Understanding more about these dual processes is one of the motivations for the workshop

QCD phases as manifestation of confinement

- ❑ The QCD phase diagram shows another manifestation of confinement
- ❑ At high energy and density, systems of protons and neutrons dissolve into quarks and gluons: they become

deconfined

- ❑ One ‘proof’ of this is the extinction of energetic jets
- ❑ Understanding how quark energy loss and hadronization drive this extinction is another of the motivations for the workshop

Workshop focus, goals, and questions

“The focus of the workshop is *to understand in-medium hadronization dynamics and partonic energy loss*. A minimal goal is to determine the primary reaction mechanism for the observed hadron attenuation in nuclear DIS experiments, and to understand the implications this holds for the interpretation of the observed jet quenching and mono-jet production at RHIC.”

- What is the role of coherence in parton and hadron transport?
- What relevant information can be meaningfully extracted from DIS data?
- What experimental tools are needed to extract the above information?
- How can the understanding of the DIS data be applied to hot dense matter?

Workshop breadth and multi-disciplinarity

- We have gathered together a diverse group of people to try to bring coherence to the understanding of these closely related, thorny topics:
 - theorists and experimentalists
 - RHI, DIS, DY, general QCD
 - RHIC, DESY/HERMES, Jlab, CERN/LHC, Fermilab

Workshop format

- We have left plenty of time in the schedule for discussion
 - Do not feel too constrained by the scheduled times
- We wish to identify important topics for further extended discussions
 - Focused discussion periods will be scheduled for these
 - The schedule is flexible, watch for changes
- *Please try to include as much elementary-level discussion as possible in your talks*