

LLNL Progress and Plans

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Meeting of the University of California Consortium for EIC physics
LBNL, September 18, 2019



LLNL Heavy Ion Group: Personnel

- ▶ Supported through a combination of LDRD, DOE NP/HEP, and NSF
- ▶ Currently two staff scientists:
 - Soltz: sPHENIX and Jetscape, also group leader for NPP
 - Angerami: ATLAS and sPHENIX
- ▶ Have multiple openings for postdocs looking to fill ASAP
 - Hope to have two new group members by the next meeting of this consortium!
- ▶ Opportunities for students to come to LLNL for a period
 - Both graduate and undergraduate

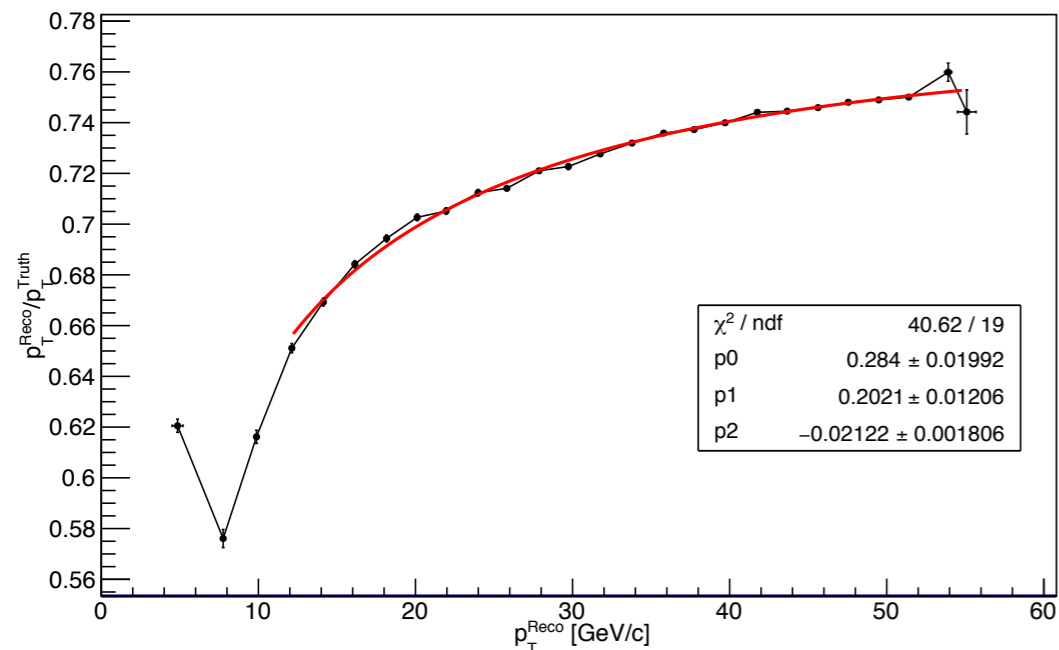
LLNL Heavy Ion Group: Interests and expertise

- ▶ Physics interests
 - Jet quenching phenomena: especially jet substructure and quantifying the role of coherence in energy loss
 - Ultra-peripheral collisions
- ▶ Technical interests
 - Jet measurements: reconstruction, calibration and uncertainties
 - Applying models to data (including uncertainties) to draw quantitative conclusions
 - Applications of high performance computing and machine learning to all aspects of HI program (reconstruction, simulation, modeling and calibration)

LLNL Heavy Ion Group: Progress

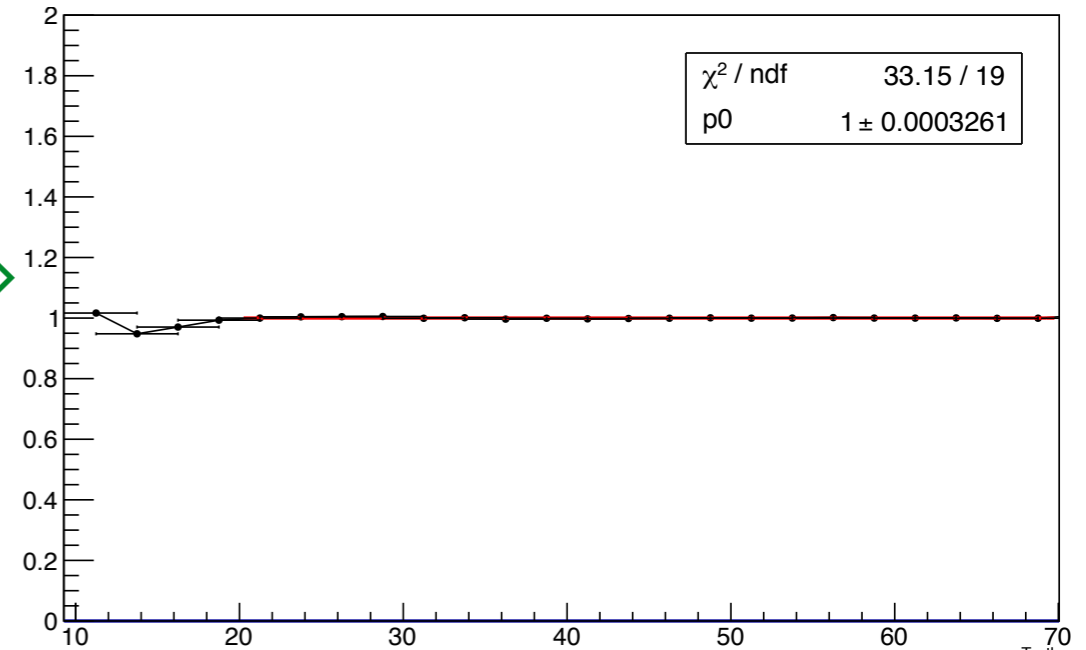
- ▶ LLNL deliverable: supervision a student from UCB for summer
 - Fernando Torales-Acosta
 - Studies of jet performance in sPHENIX
 - Apply method used by ATLAS and CMS for MC-based jet energy scale calibration

Detector scale



Response < 1 due to missing energy and non-compensation of hadronic response

Calibrated scale



Unit response obtained through calibration procedure

LLNL Heavy Ion Group: Progress and future directions

- ▶ As part of our involvement with ATLAS and sPHENIX, looking to apply LLNLs computing resources
 - Testing of sPHENIX and ATLAS workflows on HPC resources
 - New LDRD starting FY20 to apply ML methods to improve ATLAS calorimeter clustering
 - ➔ Use of neural network calibrating hadronic response based on high-dimensional input: showers as images

- ▶ We expect to continue developing these capabilities
 - Ready to jump on any applications for EIC although all indications are that computing resource requirements for the EIC will be significantly less than those of RHIC or the LHC.