UC Davis Progress and Plans

Daniel Cebra and Manuel Calderon
UC Davis

Progress

The UC Davis team for EIC:

- Daniel Cebra
- Manuel Calderon
- Sam Heppelmann

The Davis effort is really only just getting started. Cebra has been on sabbatical leave at BNL for the past year (returned Monday).

Our main progress to date have been to identify and put in place an experienced graduate student – Sam Heppelmann

Progress

From the MRI Budget justification:

The graduate student at UC Davis will collaborate with personnel from UC Berkeley, LBNL and LANL to perform EIC experiment integrated tracker simulations and collaborate with personnel from LBNL. S/he will also work with laboratory personnel to develop an EIC software package to run on high performance computing platforms.

Sam is a senior graduate student (starting his fifth year). As an undergraduate, he worked with Elke Aschenauer on the STAR forward upgrade. At Davis, he has done service work developing a GEANT model of the Event Plane Detector (EPD) and for the target and target frame added into STAR for the fixed target program. His thesis work will be on the higher moments analysis of the net-proton yields in the fixed-target data sets currently being taken as part of the Beam Energy Scan program. At LBNL, he will share his time 50/50 between analysis of the STAR data and on EIC software development.

Plans

Integrated Tracker Simulations

Calderon and Cebra's primary expertise focuses on the software and data analysis of the Time Projection Chamber. Calderon was part of the team that developed the original tracking packages for STAR. Cebra authored early versions of the vertexing code. Therefore EIC tracking code and simulations seemed to be the area where we could best contribute.

Heppelmann has experience running heavy-ion event simulators through the STAR GEANT model which is essential for studying the tracking performance.

Plans

Physics Goals: Heavy quarkonia production in DIS and in photon-nucleus collisions

Building on the expertise of Calderon, who has studied upsilon production at RHIC and at the LHC in p+p, p+A, and A+A collisions, and the theoretical work of our colleague, Ramona Vogt, we would like to continue this research into the EIC era.

Photonuclear collisions involving the exclusive production of light vector mesons (ρ, ω, Φ) and of heavy quarkonia (J/ψ and Υ particles) provide an excellent tool to probe gluon distributions at low *x*. Tagging the outgoing electron and is necessary to fully constrain the kinematics. Tracking is essential for the measurement of the leptons from the decays of the vector mesons and heavy quarkonia – this stimulates our interest in tracking simulations and performance.

Plans

Short time-line goals:

Identify the correct contacts for Sam at LBNL and LLNL