ECCE Physics Benchmarks Team IB Meeting Report

October 11th, 2021

Carlos Muñoz, Rosi Reed

IJCLab Irène Joliot-Curie Laboratoire de Physique des 2 Infinis

LEHIGH UNIVERSITY

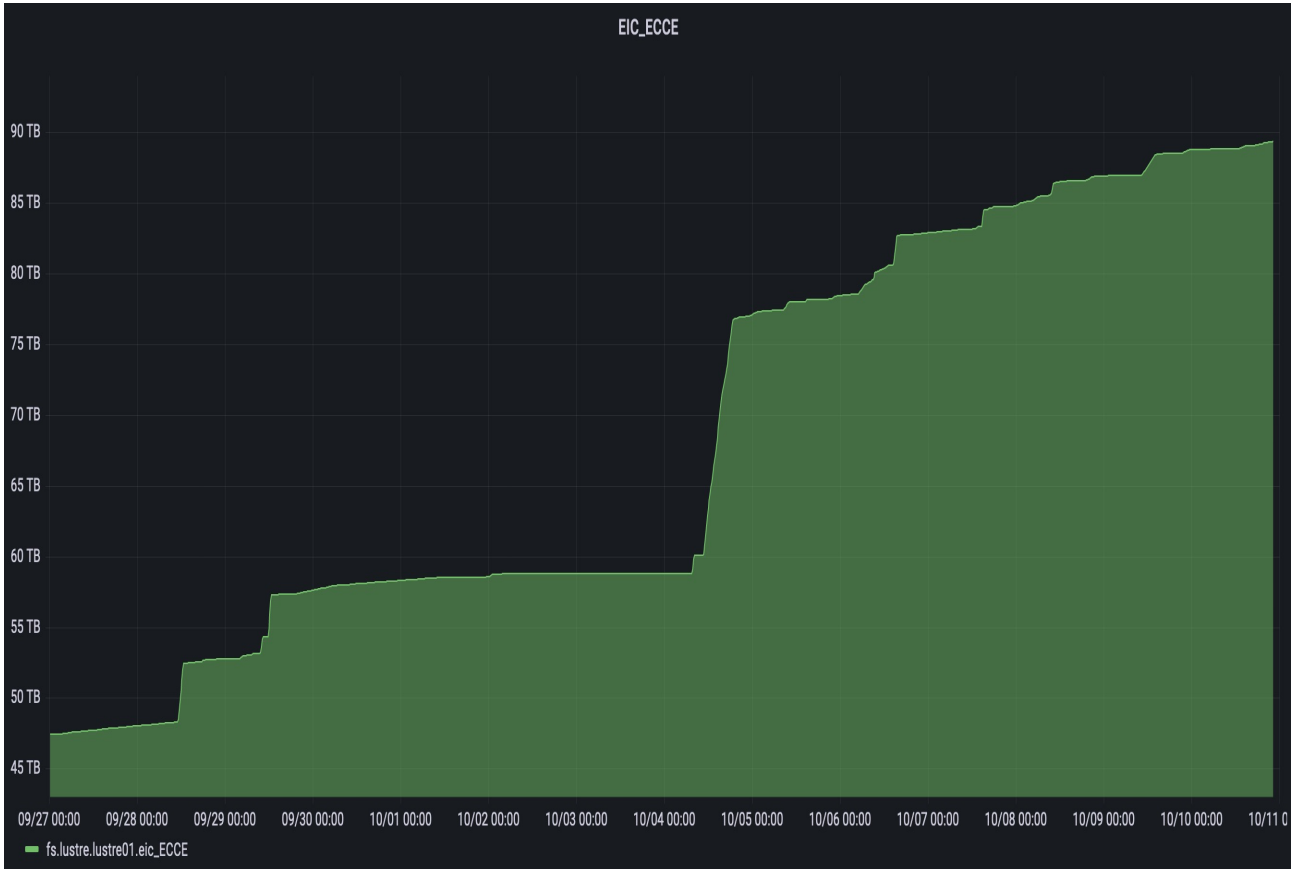
Featured Presentations Today

- Electroweak & Beyond the Standard Model
- Jets & Heavy Flavor
- This will be a short update w/general news and brief status reports from the other Working Groups

Simulation WG

- Campaign 2 is nearly complete
- Last few SIDIS events are filtering into storage
- Only one production request not launched, pending discussion with PWG conveners
- Simulation table populated with samples and locations
- Looking towards “Campaign 3”; small campaign of ~30M events
- We have a “getting started” web-page on how to access the data

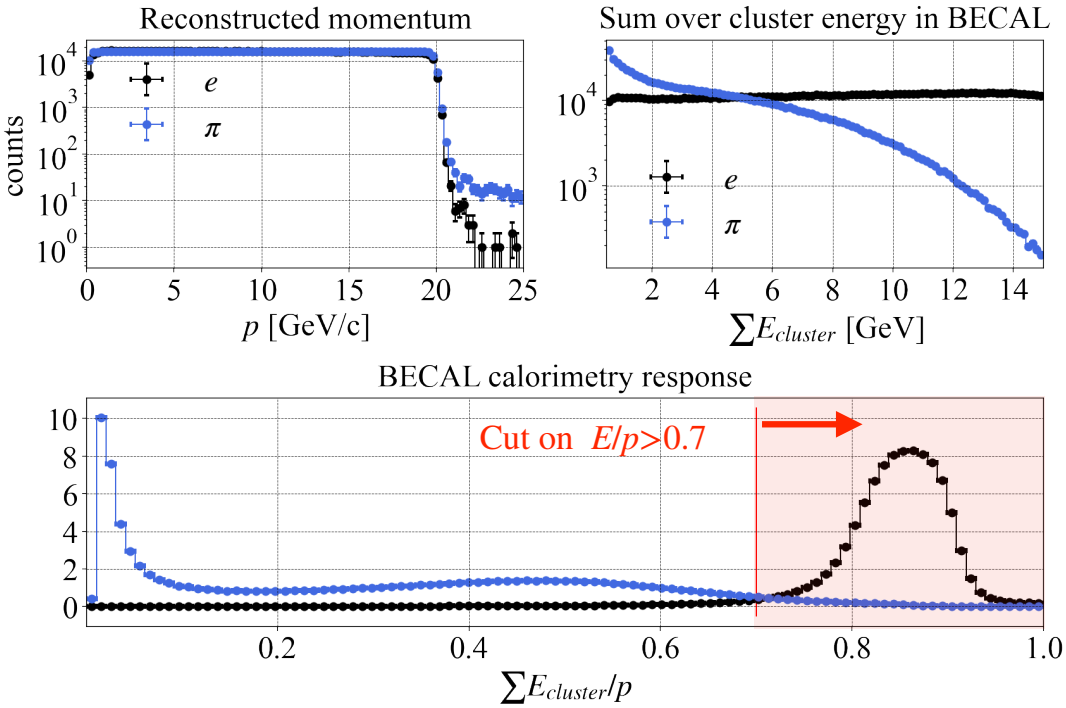
Simulation WG



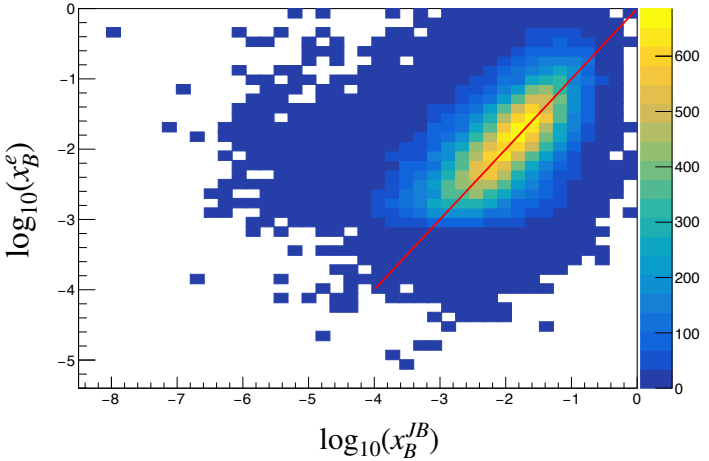
S3 storage since last bi-weekly meeting

Inclusive Working Group

Electron PID from single particle simulations



- Use > 0.7 for ePID
- In BECAL: ~95% electron survival/4% pion survival
- Adding cut on hadron calorimeters



Electrons selected by ePID look reasonable

Inclusive Working Group

Outstanding problems:

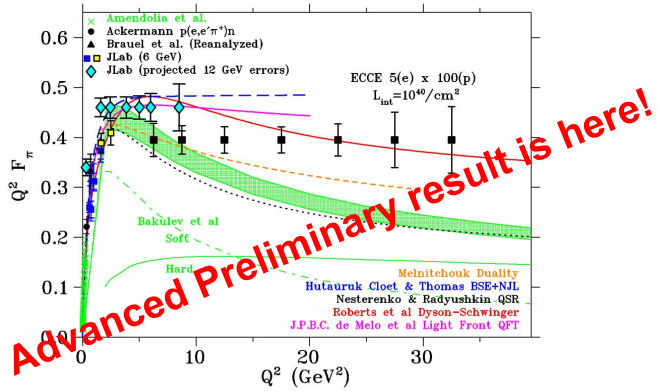
- Electromagnetic calorimeters not calibrated
- Track matching fails for $p_e < 5$ GeV (no matched clusters $\rightarrow E/p = 0$)
- ePID only identifies an electron 50% of the time (not necessarily true electron)

In progress:

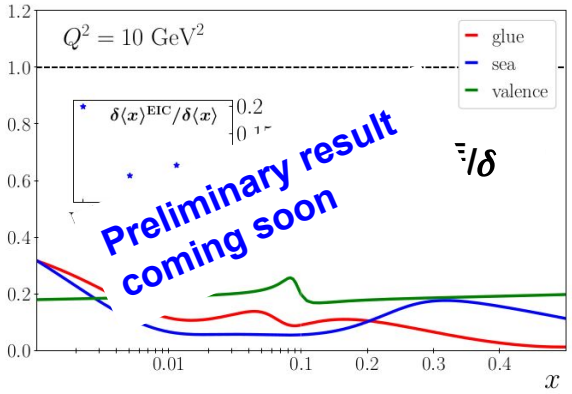
- Refining ePID
- Analyzing new simulations without truth information

Diffractive and Tagging Working Group

Pion form factor (Stephen & Garth)

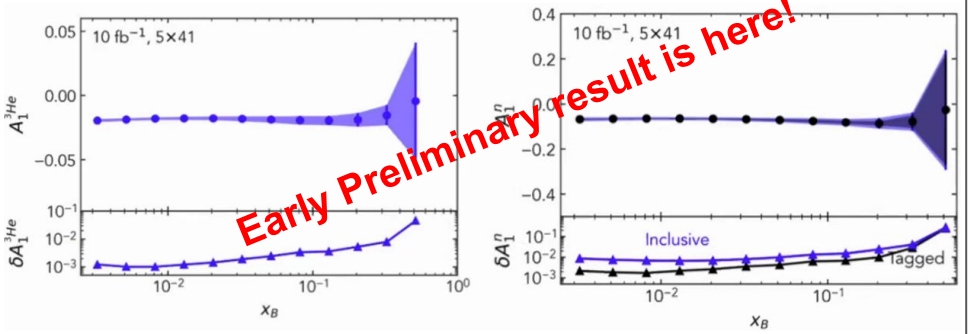


Pion Structure Function (Richard)

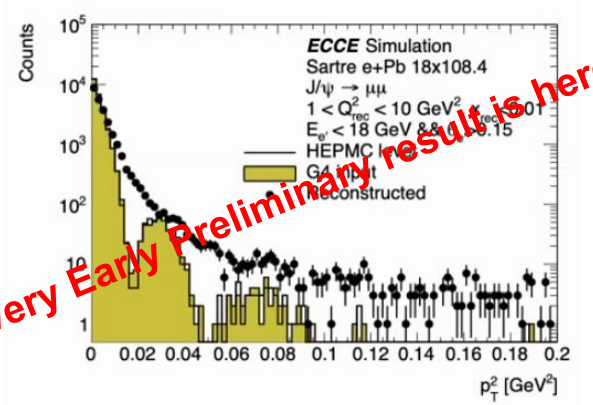


A1n through e-^{3}He: 5x41 GeV per nucleon (Dien & Jackson)

A1 He3 A1n



eZr, ePb, eAu J/psi production (Peter, Mark, Dhevan)



Diffractive and Tagging Working Group

Please take a look at the WG progress

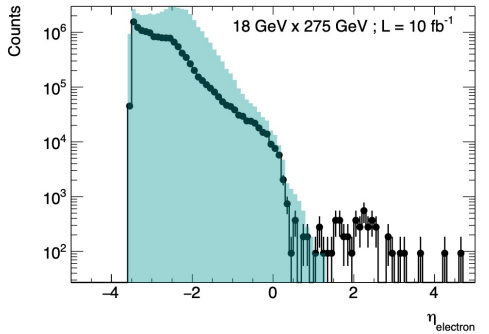
- https://drive.google.com/file/d/1YzswHiAEPIH4LGF0fIJRDrJMzM3ObXy6/view
- Four top priority studies will be ready by next week!

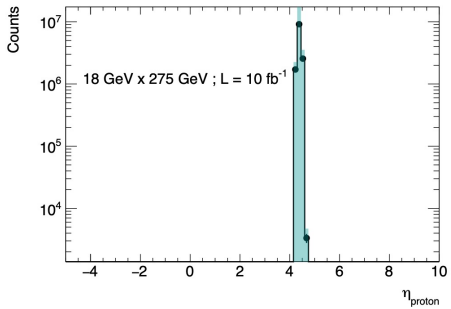
Exclusive Working Group

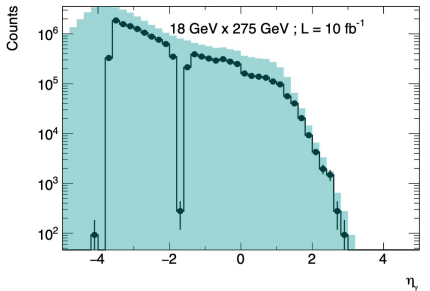
- **Simulation with Prop 4.0 completed**
  - 32 M events generated,
  - Thanks to Bill Li's work on the JLab farms.
- **Gathering preliminary plots promised today**
  - At noon ½ were uploaded on Overleaf (DVCS ep, DVCS eHe4),
  - The other ½ will probably be late
- **Tech notes**:
  - DVCS ep note being edited, needs to be updated on overleaf,
  - Other still to be written offline.

Reactions under study

DVCS ep, DVCS eHe4, DVMP ep, DVMP eA (several A), TCS ep.







Conclusions/Outlook

- Simulation team → “Campaign 3” very small w/few updates
  - Listed on wiki
  - **Analyzers should use the July concept campaign!**
  - Some new detectors (TRD + MRPG barrel detector) which can be switched out for specialized performance studies
- Analysis Note Guidelines:
  - Details of the generator used
  - Any relevant assumptions for the physics or analysis
  - ECCE Detector Configuration
  - Number of simulated events and any pruning done
  - Details of the uncertainty calculation
  - Conclusions for what this means for detector or physics performance.

Conclusions/Outlook

- **Preliminary drafts of Physics Analysis Notes are due Today!! (Monday October 11)**
  - These drafts should contain both the plots and text
  - Do not need to be pretty (yet)
  - Recommend using the plotting macro whenever possible ☺
- The final **deadline for the analysis notes is Monday October 18th.**

Back-Up

Reminder: Top Physics Priorities

Inclusive
- F2A @ low-x [Saturation, nuclei]
- A1p vs. x [Spin & Flavor, nucleon]
- A1n vs. x [Spin & Flavor, nucleon]
- Twist-3 gTq vs. x [Spin & Flavor]

SIDIS
- Quark Sivers function [Momentum imaging, nucleon]
- Sea quark helicities via SIDIS A1 A_{LL} measurements [Spin & Flavor, nucleon]

Electroweak and BSM
- Parity violating asymmetries
- Charged Lepton Flavor Violation

Heavy Flavors and Jets
- In medium correction for heavy flavor [Hadronization, nuclei]
- Di-hadron correlations [Saturation, nuclei]

Exclusive
- DVCS ep [Position Imaging, nucleon]
- DVCS eA [Position Imaging, nuclei]
- J/ψ production in ep [Position Imaging, nucleon]

Diffractive & Tagging
- A1n from double tagged ^{3}He [Spin & Flavor]
- Diffractive meson (J/ψ) production [Saturation]
- Pion structure [Mass]
- Kaon FF [Mass]