

ECCE Physics Benchmarks Team Bi-weekly Meeting Report

September 27th, 2021

Carlos Muñoz, Rosi Reed

Featured presentations today

- Inclusive reactions WG
- Exclusive reactions WG

❖ Only a short overview update here,
including general news and brief status reports from other WG

Remaining Electroweak & BSM + Jets & HF
Working Groups will be featured next bi-weekly meeting

4th Simulation Workshop

Tuesday Sep 21st at 11:30AM EDT

<https://indico.bnl.gov/event/13060/>

4th ECCE Simulation Workshop

Tuesday 21 Sep 2021, 11:30 → 13:30 US/Eastern

Description Zoom link: <https://ijclab.zoom.us/j/2011254190>

Recording: [Zoom.mp4](#)

Topics covered:

- How to use hadron PID information
- Calorimeter clusterization afterburner
- DIS kinematics reconstruction module
- Plotting style macros for plots in proposal

11:30 → 12:00 Hadron PID

Speakers: Cameron Dean (LANL), Dr Jin Huang (Brookhaven National Lab)

[branching_and_hadr...](#) [calculating_contami...](#) [contamination_plot...](#) [DLL_values.png](#) [HadronPID.pdf](#)

12:00 → 12:30 Calorimeter Clusterizer Afterburner

Speaker: Friederike Bock (ORNL)

[ECCE_Ornl_Afterbur...](#)

12:30 → 12:50 Calorimeter Clusterizer on DST

Speaker: Tristan Protzman (Lenigh University)

[Calo_Clustering_DS...](#) [Clustering Demo Re...](#)

12:50 → 13:20 DIS Kineamtic Module

Speaker: Tyler Kutz (MIT)

[sim_workshop_DIS...](#)

13:20 → 13:30 ECCE Plotting Macro

Speaker: Peter Steinberg (BNL)

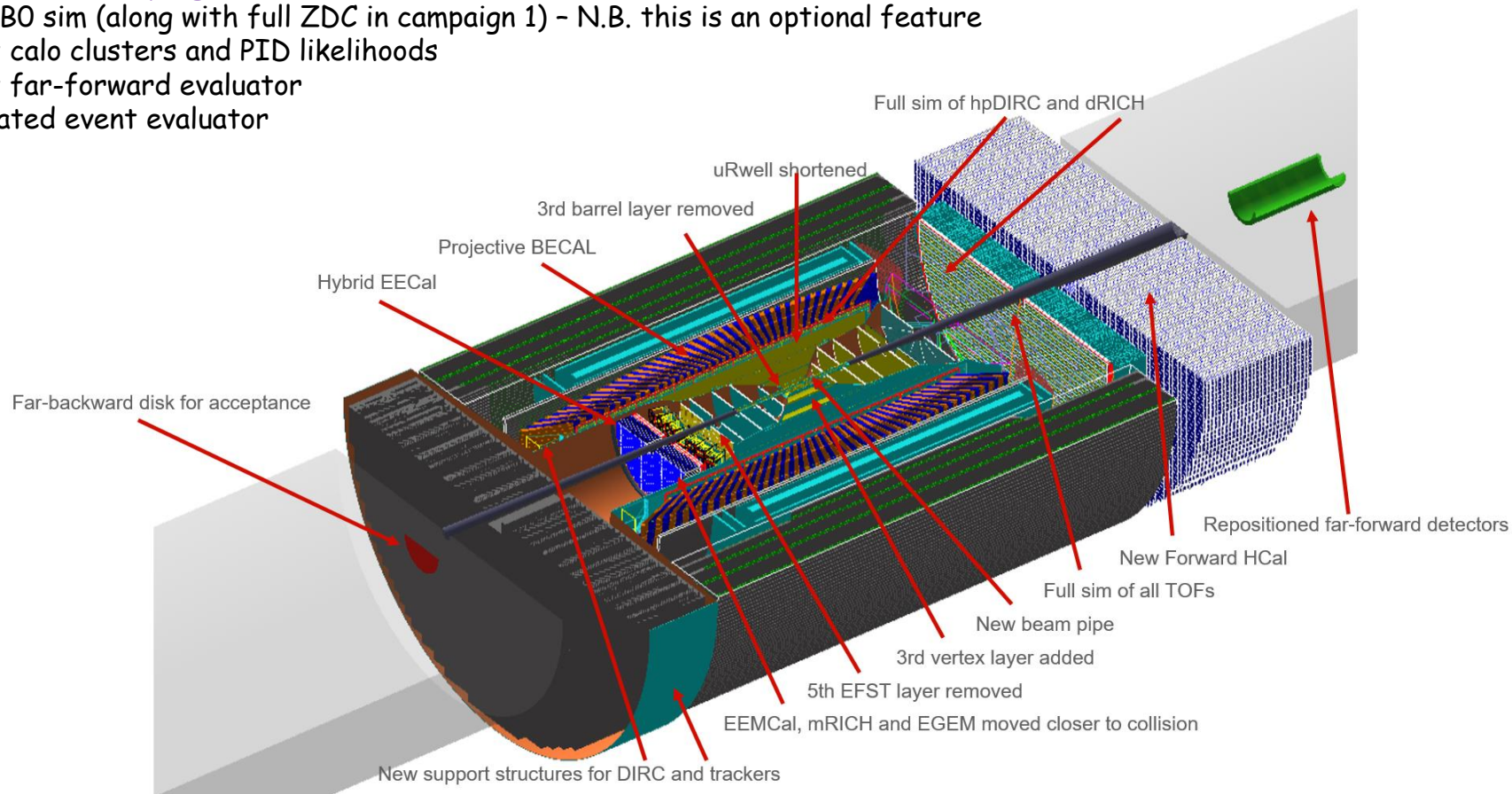
[Steinberg_ECCE202...](#)

- **Reminder:** weekly Office Hours & very active Mattermost channels

2nd campaign

Changes for Campaign 2:

- Full B0 sim (along with full ZDC in campaign 1) - N.B. this is an optional feature
- New calo clusters and PID likelihoods
- New far-forward evaluator
- Updated event evaluator



Campaign 2: production status

All issues from initial tests have been addressed:

- Large memory use - Now down to < 2.4GB per job
- Overlaps - All fixed
- Detector arrangement - Inner service barrel moved behind 3rd vtx layer
- Clusterizers and PID - Added to DST and evaluators

Production sites have all launched jobs with all evaluators enabled:

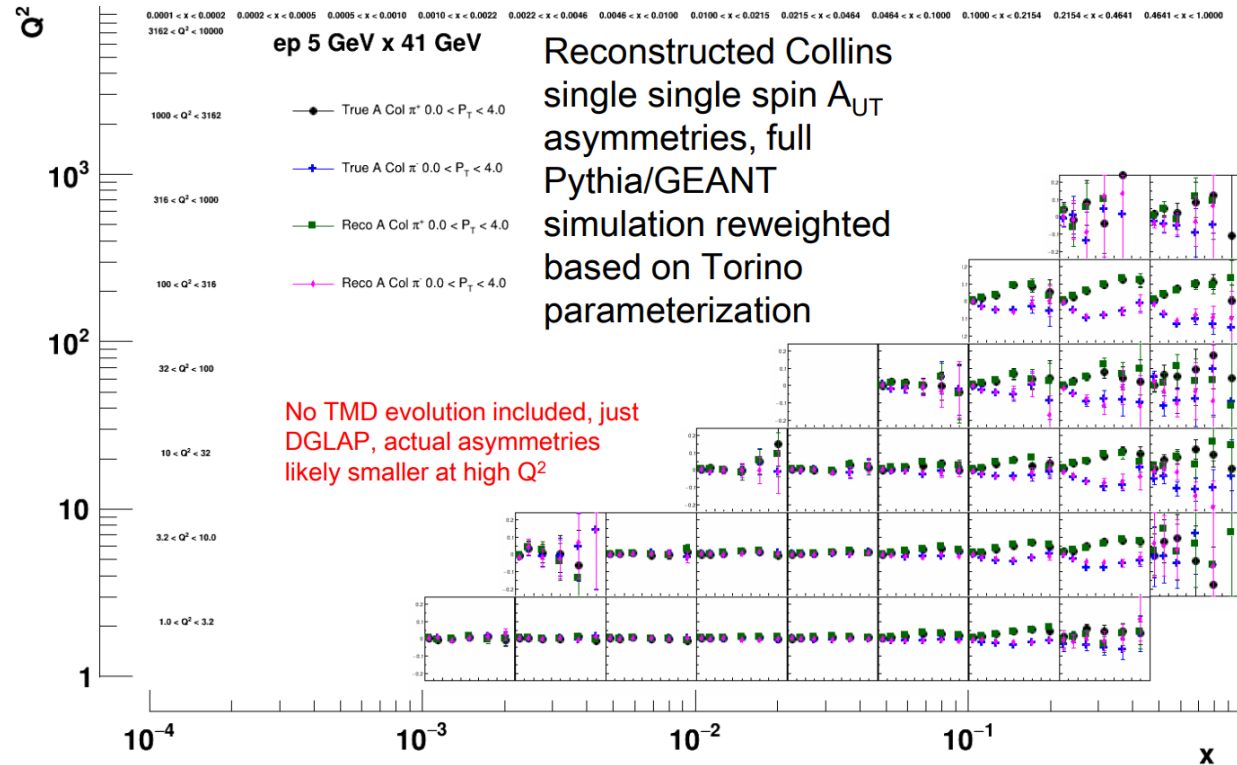
- 10M single electrons
- 10M single pion
- 20M SIDIS ep at 10x100 GeV
- 20M SIDIS ep at 18x275 GeV
- 1M HF&Jet eAu at 10x100 GeV

Files are on S3 and xRootD under the folder prop.4 (e.g. icS3/eictest/ECCE/MC/prop.4/prop.4.0/...)

Semi-inclusive reactions WG

- Started looking at 2nd campaign data
- Implementing realistic PID based on pion, kaon and proton Log likelihoods
- Finalizing several analysis notes

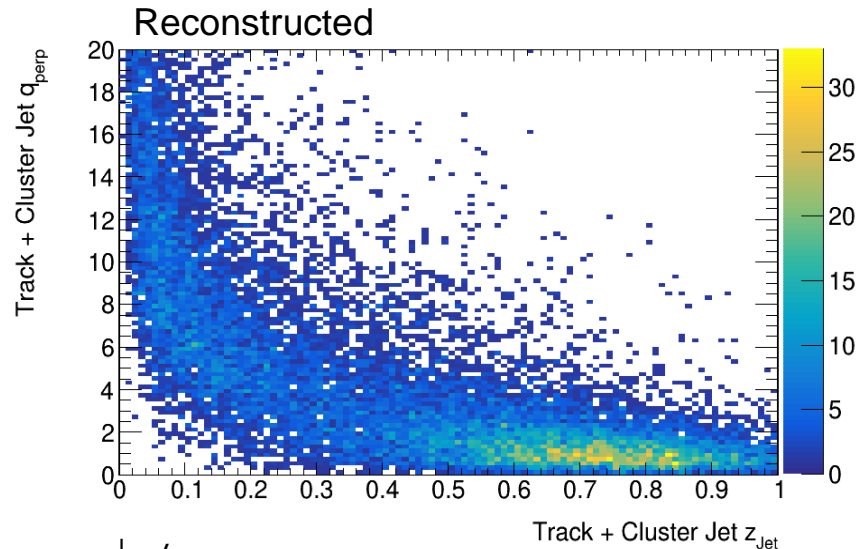
From 1st campaign



Jets & HF working group

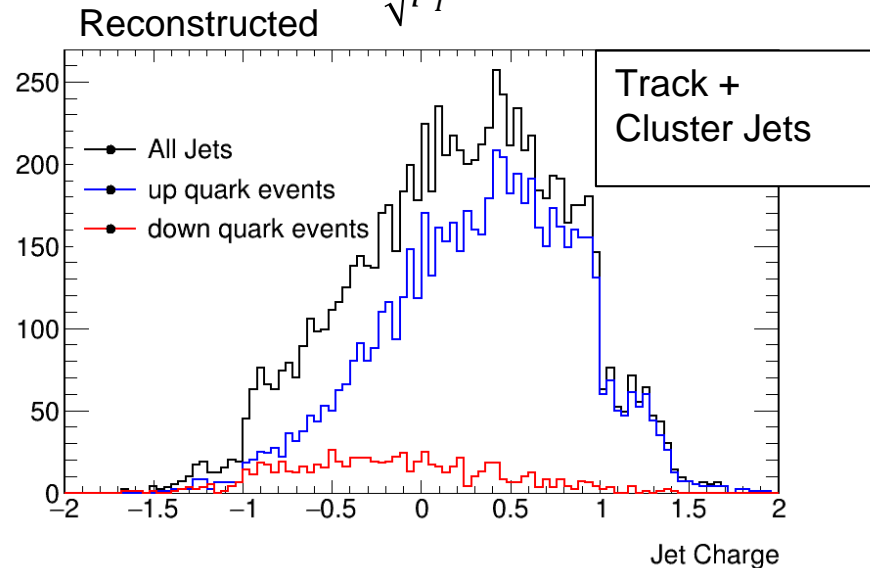
Jet finding using Centauro Algorithm (arXiv: [2006.10751v2](https://arxiv.org/abs/2006.10751v2))

$$Q_{jet} = \frac{1}{\sqrt{p_T^{jet}}} \sum_i q_i p_i^{0.5}$$



$$q_T = p_{jet}^\perp / z_{jet}$$

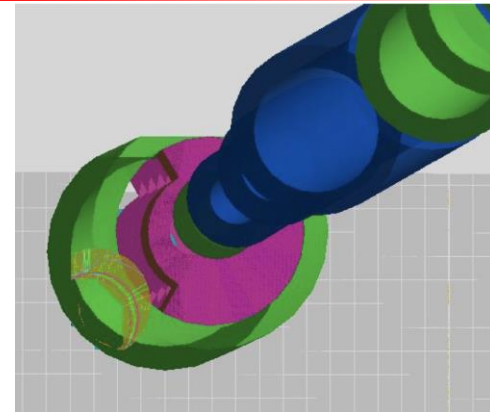
q_{prep} in $0.5 < z_{jet} < 1$: this is the transverse momentum of the jet with respect to the scattered quark direction.



Possible to isolate statistically enriched samples of u,d quarks jets

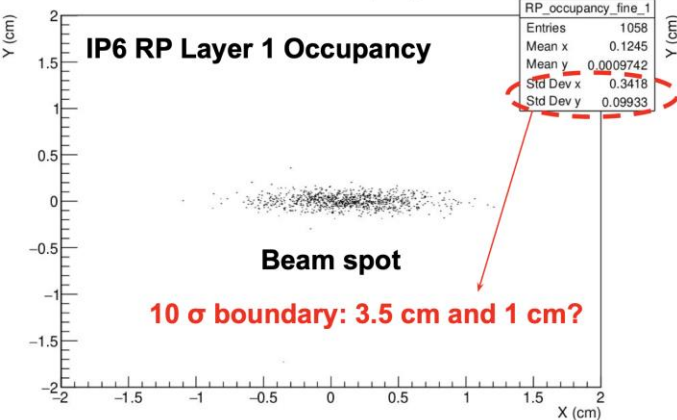
Diffractive & Tagging WG

- Simulation Round 6 underway on 9/23
 - IP6 and IP8, 7 beam energy settings per IP
 - Includes newest detector stack, realistic BO Geometry, far-backward plane
- Studies of RP Occupancies
 - Assess beam spot positions to establish 10σ hole.



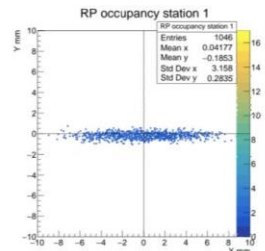
IP-6

RP station 1 occupancy XY

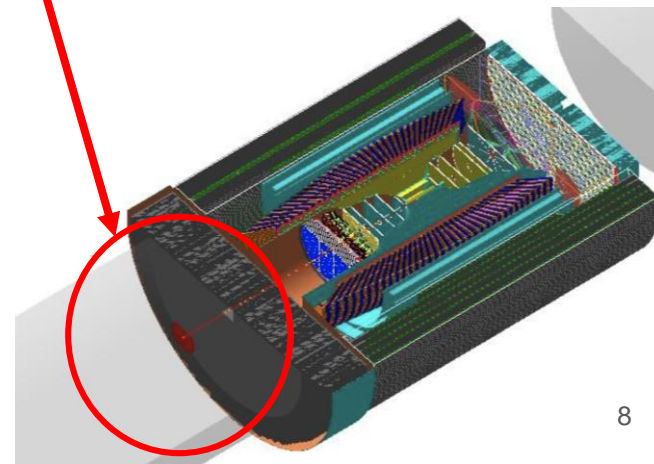
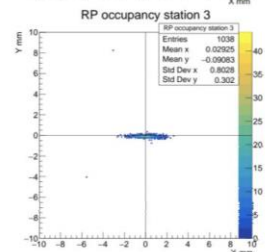


IP-8

Before
Secondary Focus



After
Secondary Focus



Electro-weak & BSM WG

Working closely with the inclusive reactions working group (see dedicated report later)

Ongoing dedicated work:

- Unfolding to Born level asymmetries and cross sections
- Fitting the weak mixing angle

Summary & Outlook

- 2nd campaign underway...
- All working groups actively looking at the data and writing analysis notes on different channels
- Still time to join the Physics Team and start doing analysis:
 - [1st, 2nd, 3rd & 4th simulation workshops](#), with recordings and slides posted
 - Weekly 'Office Hours' + [Mattermost](#) & [Discourse](#) communication channels