

ECCE Physics Benchmarks Team Bi-weekly Meeting Report

August 2nd, 2021

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Featured presentations today

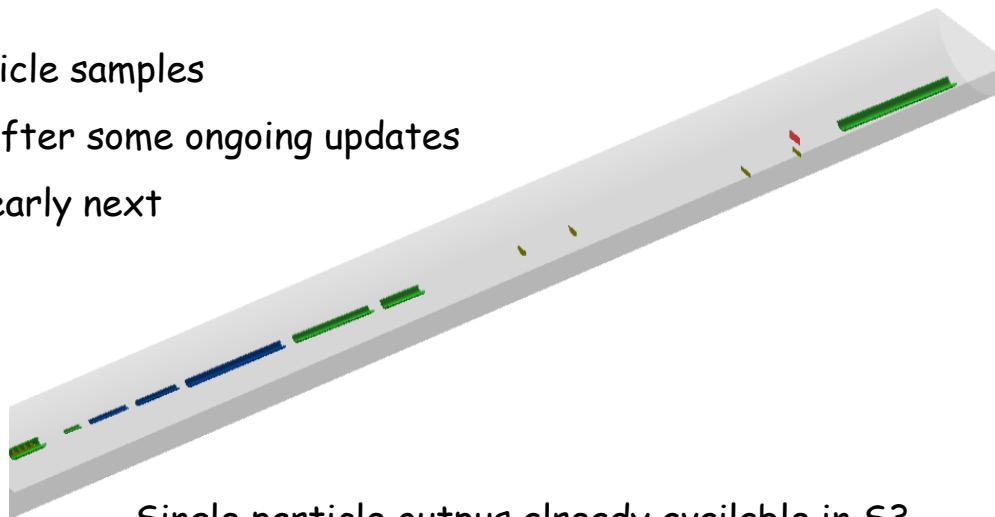
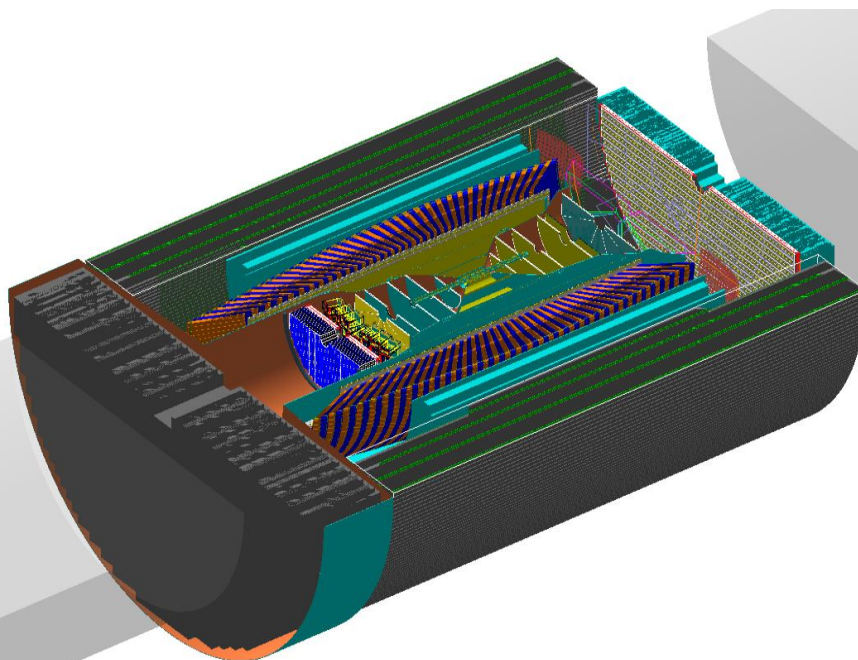
- Semi-inclusive reactions WG
- Diffractive and Tagging WG

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

Other 4 working groups will be featured
in the next 2 bi-weekly meeting

Simulation working group: 2nd campaign

- Kicked-off last Saturday with 5M single particle samples
- Another round of single particle production after some ongoing updates
- Physics production expected late this week/early next



Single particle output already available in S3
(more than 6.7M ready as of today):

- `eicS3/eictest/ECCE/MC/ana.26/79e1691/General/particleGun/singleElectron/` (33 GB)
- `eicS3/eictest/ECCE/MC/ana.26/408060a/General/particleGun/singlePion/` (51 GB)


(includes also metadata and logfiles)

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

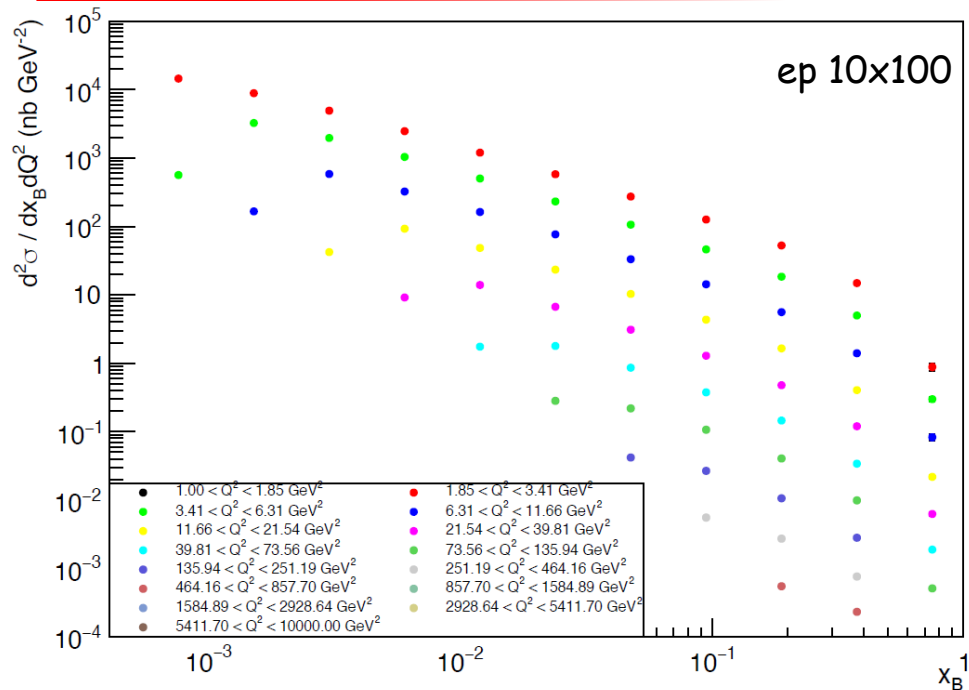
The topics that will be covered are:

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

Ideas/requests for additional topics are welcome
(contact any of the PWG conveners)

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

Inclusive reactions WG



- Unfolding of leptonic counts completed using Fun4All
- Includes statistical uncertainty for 10 fb⁻¹

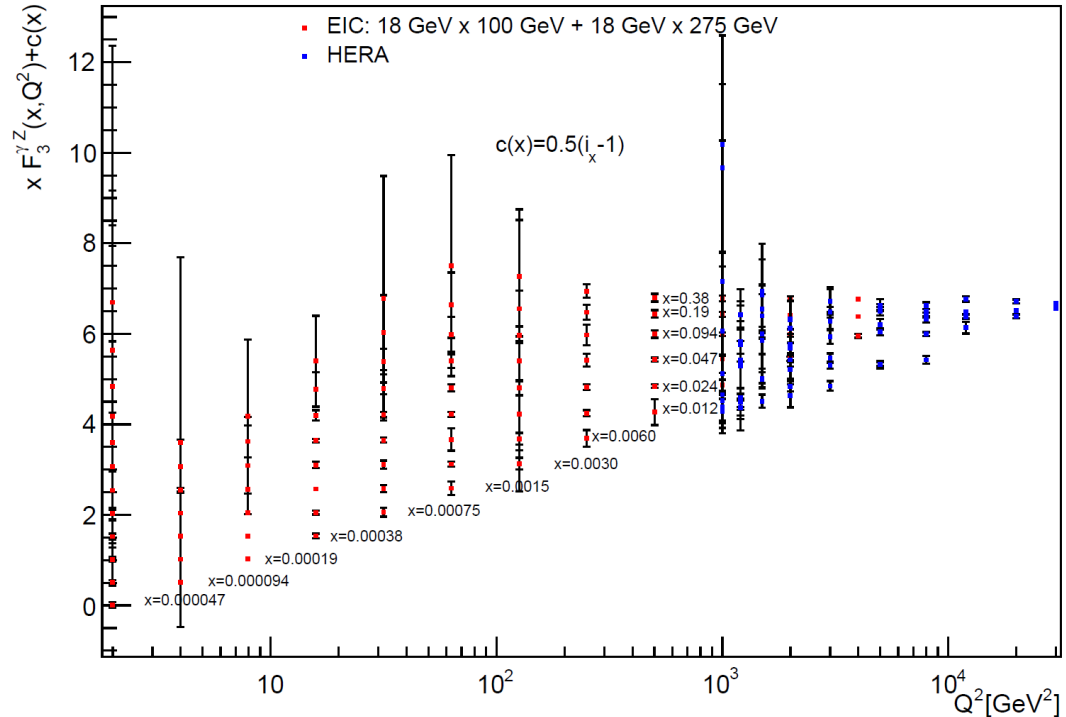
In progress/upcoming tasks:

- Analyzing rest of simulation
- Consistency check with DJANGO fast-smearing
- Finish reconstruction with 2nd simulation campaign
- Projected extraction from cross sections: structure function, asymmetries...

Electro-weak & BSM WG

Projections for $F_3^{\gamma Z}$ structure function from ep PVDIS asymmetry

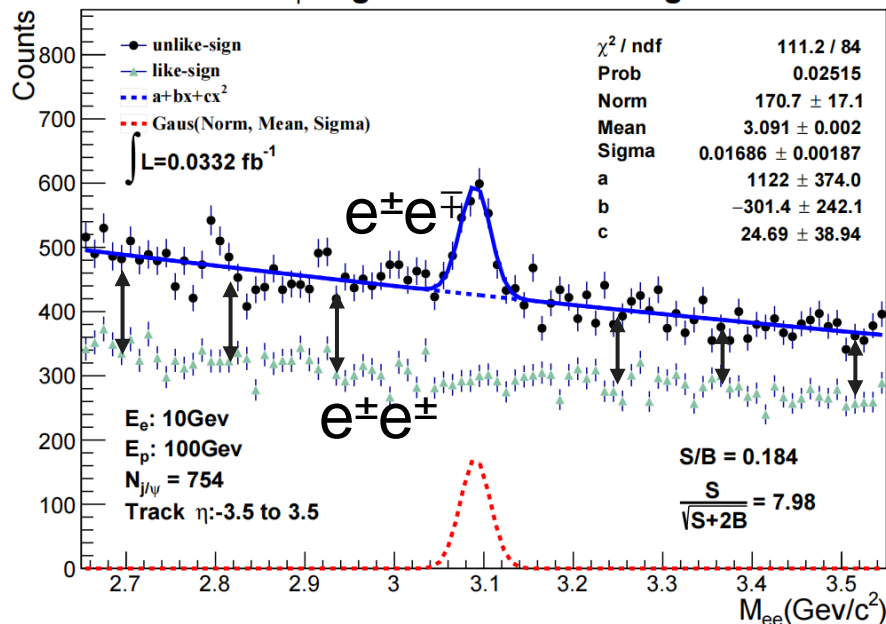
- Unfolding effects included
- A combination of data from the 18x100 GeV and 18x275 GeV settings are used, with 50fb⁻¹ in each configuration for a total of 100 fb⁻¹
- Comparison with HERA data (blue points)
- Currently, the projection analysis for the asymmetry uses the limit $Q^2 \ll M_z^2$ (next iteration will remove this approximation)



Jets & HF working group

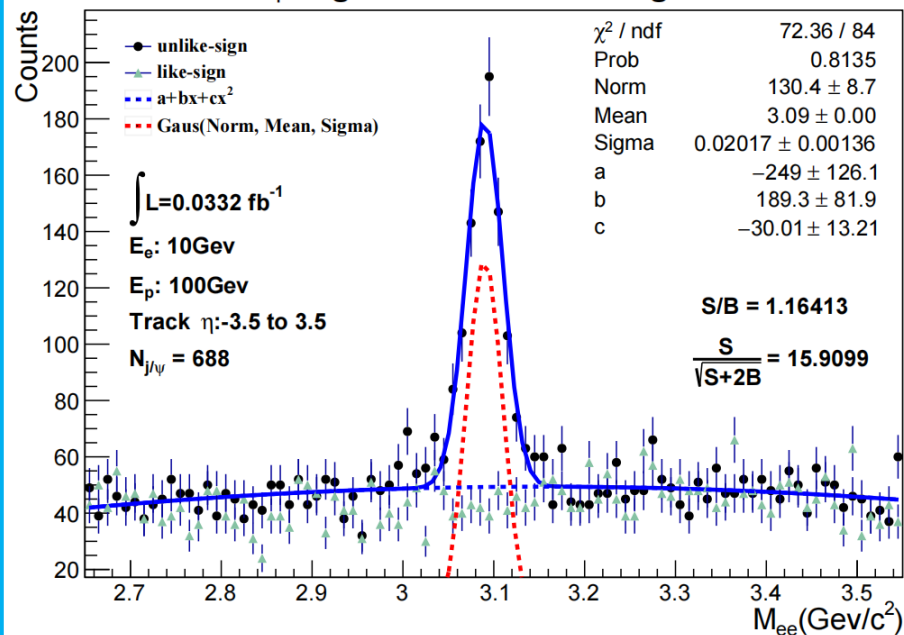
Using track evaluator from the 1st simulation campaign with perfect eID

J/ψ Signal Peak over background



A gap between unlike-sign (foreground) and like-sign (combinatorial background) electron pairs' invariant mass distributions

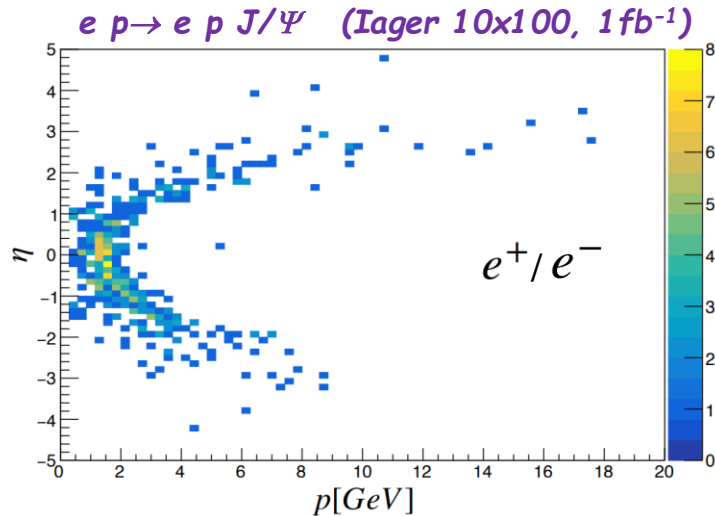
With e^\pm cuts
J/ψ Signal Peak over background



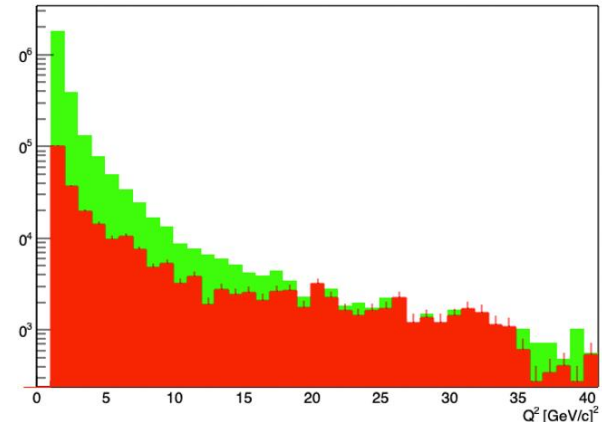
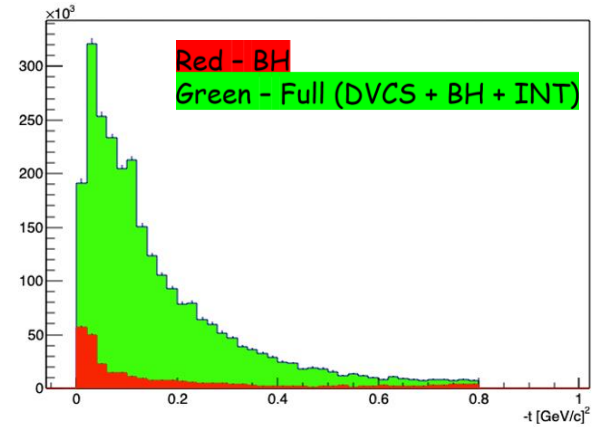
- Light cone cut applied to remove beam electrons
- Veto e^\pm from light hadron decay
- The unlike and like-sign pair distribution is now at the same level

Exclusive Reactions WG

- **Priority studies:**
 - DVCS ep [MILOU]
 - DVCS He4 [TOPEG]
 - Exclusive J/Ψ production (in ep) [Iager]
- Key reactions for extraction of GPDs
- Also studying:
 - Other DVMP eA , currently ϕ production due to its greater sensitivity to gluon saturation effects than J/Ψ
 - Coherent J/ψ production with eA (BNL) and related studies into incoherent backgrounds and p_T resolutions



DVCS 10x100 GeV (with ZEUS angular cuts)



Summary & Outlook

- First simulation campaign analysis almost completed; 2nd campaign started...
- All working groups actively looking at the data and implementing analysis codes
- **Still time to join the Physics Team and start doing analysis:**
 - [1st, 2nd and 3rd simulation workshops](#), with recordings and slides posted
 - [4th simulation workshop](#) on Sep 21 (11:30 AM EDT)
 - Weekly 'Office Hours' + [Mattermost](#) & [Discourse](#) communication channels

Back-Up

Timeline

- First Simulation Campaign (April 1st - May 15th)
 - Initial simulation runs using existing implementation
 - Finish implementing ECCE setup
 - Agree on technology, main physics observable and arrange required event generators
- First Analysis Campaign (May – June 15th)
 - Determine statistics
 - Iterate: simulation \leftrightarrow analysis
- Final Production (June 15th – August)
- Second Simulation Campaign (July 15th – September 1st)
 - Analysis of simulation data to demonstrate physics extraction
 - Drafts of physics plots
- Proposal Writing (September 1st – October 15th)
 - All physics 'plots' are done
 - Compose narrative around simulation results and selected technologies
- Proposal Deadline – **December 1st**

