

From last week: **Plans given to the simulation team on what we need for the initial simulation campaign**

- Please tell us as soon as you have info if wrong/you have updated details on any item (eg reaction, config event no and files size) for initial studies with high stats (ie first high stat campaign and not whole study)
- We should be aiming for **at least** one or two reactions from the priority channels for these initial mass stats
- We are currently behind schedule for this (should be starting now) - what are your updated timelines?
- From last week: we are going to try to follow the diffractive group simulations scheme (run simulation on JLab farm ourselves) JR to learn how to do the submissions, once you are ready to submit send me an email.

Full Production

June 2021 Concept

PWG	Process	Generator	Beam Parameters	No. Events Requested	No. Events In Storage	Notes
Diff. & Tag.	Meson Structure	DEMP		2M	0	There are 8 configurations here?
Diff. & Tag.	Neutron Spin			< 1M	0	
Diff. & Tag.	Coherent	BeAGLE		1.4M	0	There are 2 configurations here?
Exclusive	DVCS ep	MILOU3D	275 on 18 GeV; 41 on 5 GeV	expect ~1M/config	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	DVCS epi0	Root files from YR converted to correct format to be passed through EICSmear	275 on 18 GeV; 41 on 5 GeV	?	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	DVCS eHe	TOPEG	110 on 18 GeV; 41 on 5 GeV	1M/config	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	DVMP on proton (J/Psi for 1st campaign)	IAger	275 on 18 GeV; 41 on 5 GeV	?	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	DVMP on proton (several mesons in 1st study) and BH, ie on the order of around 4 reactions per configuration	DEEPSim (VT)	275 on 18 GeV; 41 on 5 GeV	?	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	DVMP eA (currently starting with phi production from gold but may swap to lead)	Sartre	110 on 18 GeV; 41 on 5 GeV	?	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.
Exclusive	TCS (ep)	Expect to receive events from external generator compatible with EICSmear/Fun4All in July (don't know name yet)	275 on 18 GeV; 41 on 5 GeV	?	0	Possibly want 2 solenoid settings per beam configuration - need to confirm.

Diffraction and tagging meeting

(<https://indico.bnl.gov/event/12330/>)

Update on the status of the far-forward detectors:

- some new configuration in the work, expect updates in a few weeks.
- If you need some info from the project (EIC vs ECCE), ask Or or Tanja they will get you the info asap.

3rd ECCE Simulation workshop (<https://indico.bnl.gov/event/12245/>)

To me:

Everything was worth the listen.

Of note

- Computing environment and resources [David Lawrence]:
 - Where is everything list (next slide)
- Beam effects in ECCE simulation and reconstruction [Jin Huang]:
 - going from heads on collisions to collider collision: Beam effect after burner (next+2 slide)
 - new default reference frame for IP6 (next +3 slides)
- First look at the data: eA exclusive production reconstruction with beam effects [Peter Steinberg]
 - reconstruction of t

Where is Everything? wiki page

https://wiki.bnl.gov/eicug/index.php/ECCE:Where_is_everything%3F



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ECCE:Where is everything?

Here are some notes on where some things are that a newbie might not know where to look when first starting out.

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- 6 Where are the generated events files?
- 7 Where are the simulation campaign job scripts?
- 8 Where can I access the S3 storage space at BNL?
- 9 Where can I access the xrootd server at JLab?
- 10 Where is the Computing Plan document?

Where is the best top-level place to go for ECCE information? [\[edit\]](#) [\[edit source\]](#)

The best place to start for pretty much everything ECCE is: <https://www.ecce-eic.org/>

Where are the tutorials? [\[edit\]](#) [\[edit source\]](#)

The tutorials for ECCE can be found here: https://ecce-eic.github.io/tutorials_landing_page.html
(Note that these are pretty minimal and look to be basically a copy of the tutorials [here](#).)

It may be useful to look at Fun4all documentation. In particular for sPHENIX since the ECCE code base is a clone of the sPHENIX code. Some information on the sPHENIX Fun4all implementation can be found [here](#).

Where is the source code? [\[edit\]](#) [\[edit source\]](#)

Good question! End users should probably start by looking at the macros repository: <https://github.com/ECCE->



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ECCE

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 - Physics
 - Software
- Working Groups
- Yellow Report:
 - Physics WGs
- Yellow Report:
 - Detector WGs
- Tools

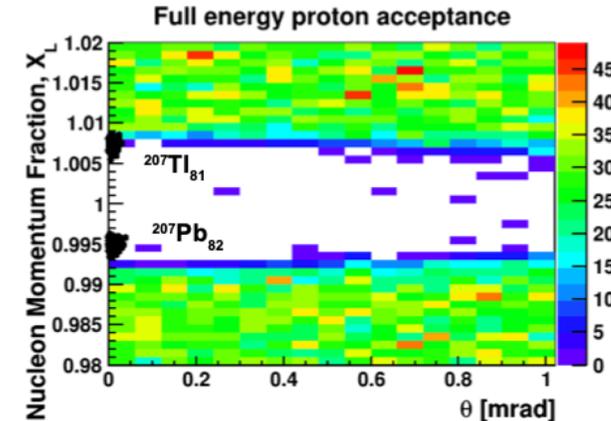
Summary

- ▶ EIC has complex beam effects: crossing angle, beam divergence, beam energy spread and crabbing on beam momentum, vertex
- ▶ Need to take into account for all analysis in proposal stage
- ▶ Not all event generator can handle these beam effect → beam eff. after-burner
- ▶ ECCE simulation campaign will take
 - Event generators in head-on frame
 - Apply these beam effects via Fun4All afterburner
- ▶ Analyzers need to be aware of the beam effect
 - Average beam crossing angle can be taken into analysis, e.g. e- along $-z$ axis, proton carry full crossing angle:
 - Shift of beam energy $E_{Lab} = E_{HeadOn}/\cos(\text{crossing angle}/2)$
 - Electron beam four vector: $(0,0,-1, 1)*E_{e_lab}$
 - Proton beam Ip6, Ip8: $(-\sin(25\text{mrad}),0,\cos(25\text{mrad}),1)*E_{p_lab}$, $(+\sin(35\text{mrad}),0,\cos(35\text{mrad}),1)*E_{p_lab}$
 - Some effect are stochastic, e.g. beam divergence and the effect will be part of experimental uncertainty

t reconstruction

- **In principle straightforward**
 - for e+p, $t = (p' - p)^2$ using outgoing proton
 - Main focus of tagging effort for DVCS, etc.
- **In practice, difficult for e+A**
 - t values are very small - tiny deflection of A even in incoherent events
 - *Mark Baker showed acceptance of IP8 for 207Tl and 207Pb*
 - Nucleus can also break up easily, so t can't be defined for incoherent events using nuclear fragments)
- **So standard approach (again from YR)**
 - Measure t using 4-vector conservation, only using J/ψ & scattered electron
 - $k+p = k'+p'+v \rightarrow (p-p') = (k'-k)+v \rightarrow t = v + q$
 - For now, use *truth* electron kinematics, to focus only on ECCE tracking
 - Also, since t is primarily transverse, use only transverse components of (v+q)
- **The catch**
 - t is very small and very sensitive to crossing angle and beam divergence!

A-1 particles from e+²⁰⁸Pb J/ψ diffraction



08-July-2021

M.D.Baker - Diffraction

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