

Detector Working Group Progress



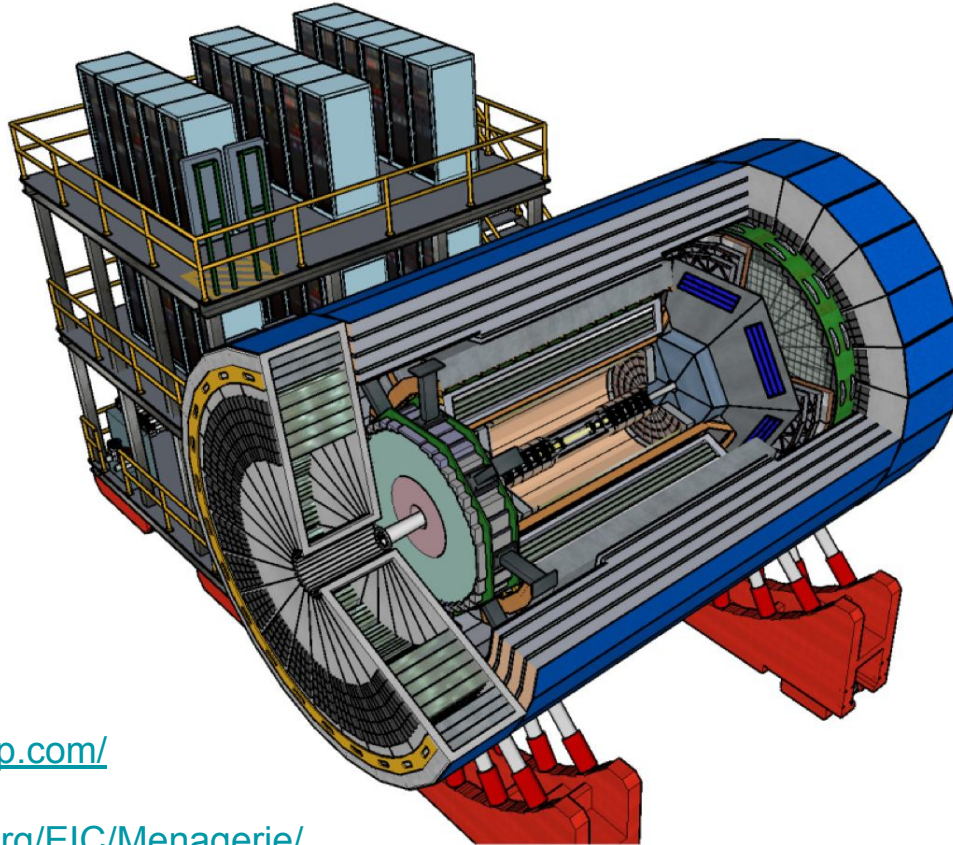
- DWGs active and underway with regular meeting times. *Join us!*
- Candidate technologies and alternatives under review and discussion in different DWGs.
- Synergies with other groups in the far forward / far back being explored.
- Some joint WG meetings will be arranged soon.
- June 14th: internal goal for ECCE detector baseline configuration (with very limited list of appropriate alternatives and upgrade options)
- For purposes of discussion, draft ECCE concept with recognized leading detector options under evaluation available here (and in backup slides):
https://www.dropbox.com/s/1fdrq0tk3qf7u7o/5_ECCE-Status-EICUG-20May2021-final.pdf?dl=0
- Those slides shown at recent EICUG meeting and distributed to DWG co-conveners for feedback.

DWG Progress



- Sub-detector selections will be used to update various codes:
 - Fun4all / GEANT4 Simulations
 - Sketchup Visualizations
 - NX Engineering Drawings
- Planning a dedicated meeting for mid-June (see Doodle poll)
- https://doodle.com/poll/huscr9az5dqmx5y5?utm_source=poll&utm_medium=link

ECCE concept in SketchUp



<https://www.sketchup.com/>

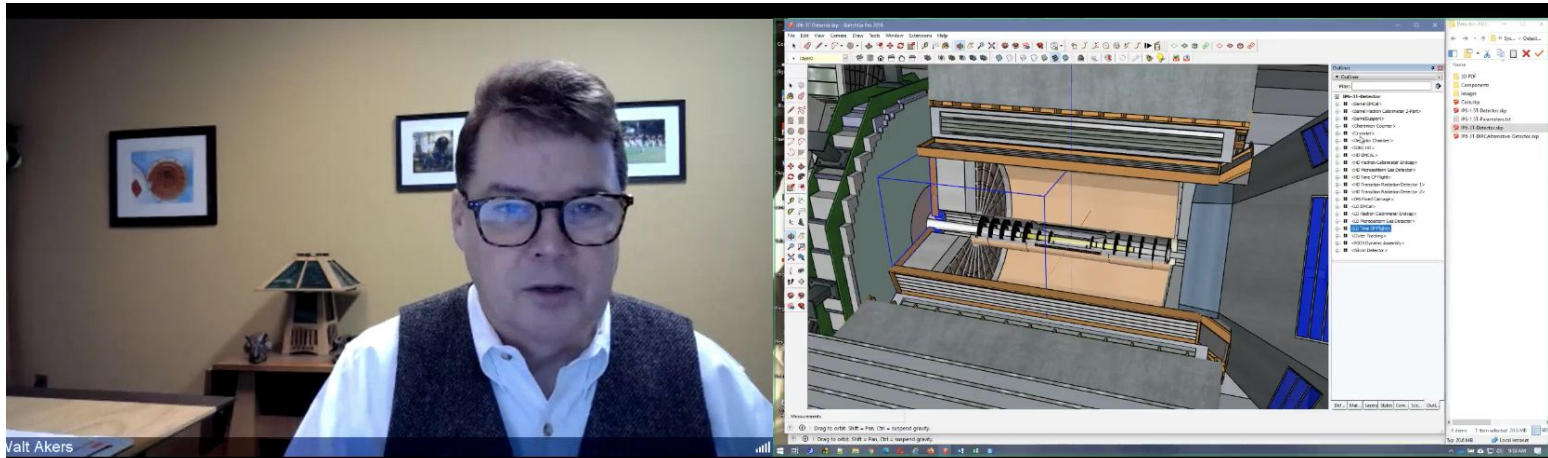
<https://physdiv.jlab.org/EIC/Menagerie/>

SketchUp 3D Modeling



- Helps quickly visualize ECCE detector options. Lightweight. Shareable.
- Allows exploration of where to locate services, distribute reductions in acceptance, and manipulate alternatives.
- Facilitates clear communication with engineering teams and physicists.
- NOT meant to replace available mechanical engineering expertise where needed.
- SketchUp tutorial:

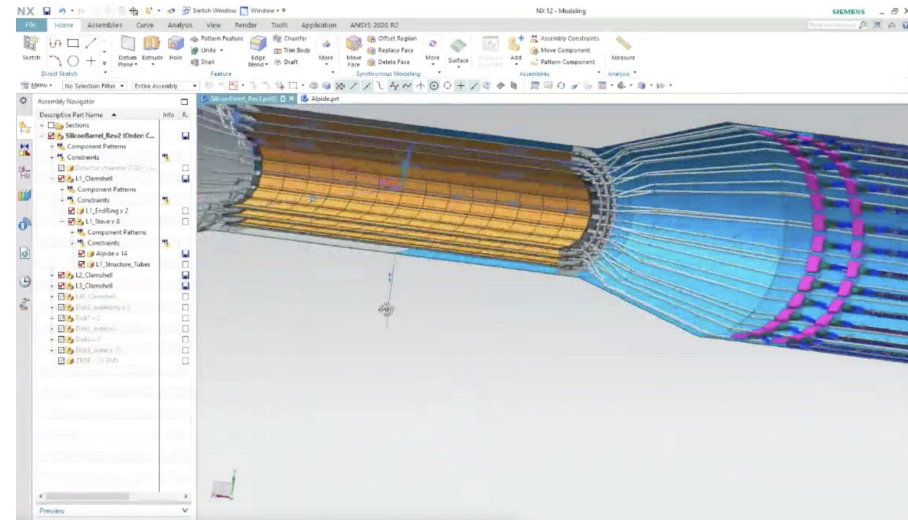
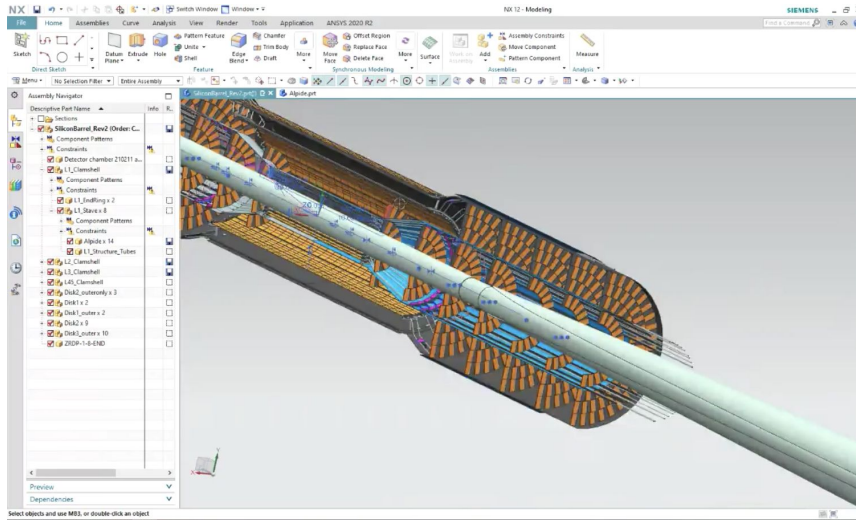
<https://drive.google.com/file/d/1xevuYqqN1ygyktH5ZYbind7eaNSrOcPC/view?usp=sharing>



Engineering Checks



- Using the JLab Siemens NX CAD tool (BNL uses the similar PTC CREO)
- Shown is a concept for a central silicon tracker with beamline, cooling, cables, & supports.
- https://drive.google.com/file/d/1QAYrVzFWnFGJ05o_gGjEB1wIXP1oDZm3/view?usp=sharing



DAQ/Readout/Electronics DWG



- Streaming Readout definitely anticipated
 - For this timescale of implementation, appears highly appropriate/feasible
 - Clear concurrences at first ECCE DAQ meeting.
- Detailed one page spreadsheet subsystem survey shown (from JLab 12GeV GlueX). Once updated for ECCE, a potential page of our proposal.
- Based on upcoming detector baseline (June 14th), DAQ DWG with help from other DWGs can complete survey spreadsheet of requirements for Front End Electronics, Readout Electronics, Cables, etc. (with implications for cost).

Detector Working Groups Communication Tools

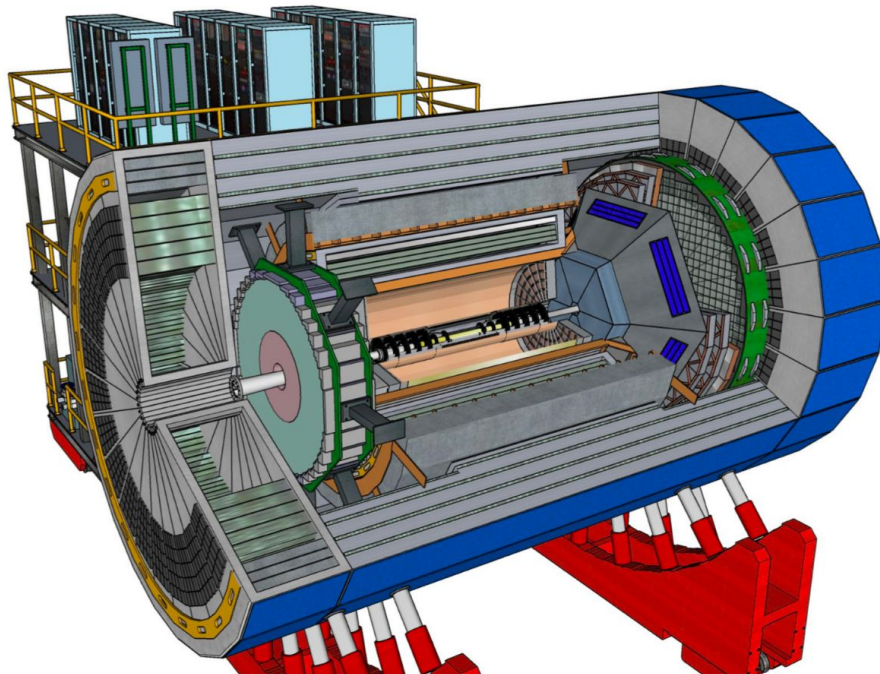


- ecce-eic-det-l@lists.bnl.gov used increasingly. Please, be sure to subscribe!
- All DWG meetings listed here:
 - <https://indico.bnl.gov/category/339/calendar>
 - <https://indico.bnl.gov/category/345/>
- Detector Wiki pages:
https://wiki.bnl.gov/eicug/index.php/ECCE_Detector
- *Join us!* on BNL Mattermost Fun4All-<subsystem> and Discourse ECCE channels.
- **Highlight talk from PID DWG today!**

BACKUP

ECCE General Detector Concept

The ECCE detector concept is undergoing rapid development



ECCE ELECTRON ENDCAP STRAWMAN

Tracking: MAPS, Micro Pattern Gaseous Detectors (MPGD)

Electron Detection: PWO&SciGlass

- Inner part: PWO crystals (reuse some)
- Outer part: SciGlass (backup PbGl)

h-PID: mRICH

- From yellow report

HCAL: Steel from magnet or Pb/Sc or Fe/Sc

- Not instrumented and only serve as flux return?
- Instrumented \w reduced thickness (lower energies)

ECCE CENTRAL BARREL STRAWMAN

Tracking: Silicon barrel tracker (optional Si/GEM hybrid)

Electron PID: SciGlass (backup: W/Sc (Pb/Sc) shashlik)

- SciGlass remains to be demonstrated
- Several backup options – lower resolution though

h-PID: hpDIRC & AC-LGAD

- Compact
- AC-LGAD never been shown for barrel configuration
- AC-LGAD backup: dE/dx (needs more space)

HCAL: magnet steel (**reuse**) - Fe/Sc

ECCE HADRON ENDCAP STRAWMAN

Tracking: MAPS, Micro Pattern Gaseous Detectors (MPGD)

h-PID: dRICH&TOF

e/h separation: TOF & aerogel

- TRD to separate electrons from high momentum hadrons?

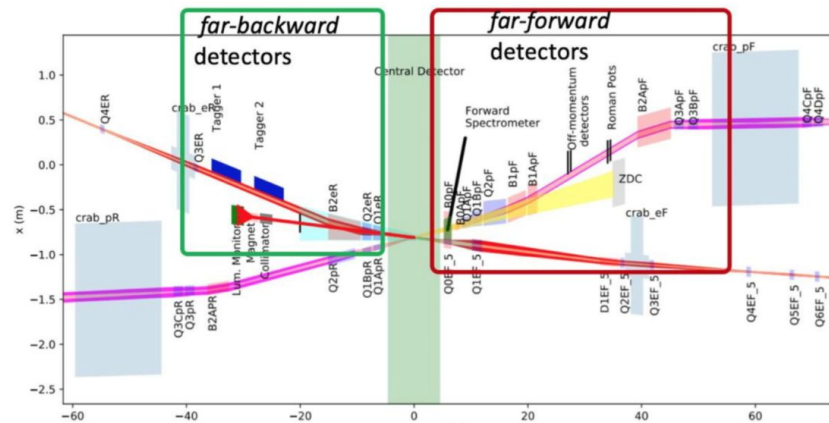
Electron PID: W/ScFi, Pb/Sc or W/Sc shashlik

HCAL: Pb/Sc or Fe/Sc

- Alternative for improved resolution: dual readout, high-granularity

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Detector Technologies (from YR)

FAR BACKWARD DETECTORS

- low-Q2 tagger
- Lumi-detector

Lepton polarimetry
hadron polarimetry

FAR FORWARD DETECTORS

- ZDC – Si/W & PWO (SciGlass)
- Roman Pots – Silicon sensors, AC-LGADs
- Off-momentum det. – Silicon sensors
- B0-trackers – MAPS & timing layers

Lepton polarimetry
hadron polarimetry

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