



**BI-WEEKLY MEETING**  
**28 March 2022**

Or Hen, Tanja Horn, John Lajoie

# Meeting Agenda



- ❑ Introduction and overview
  - ❑ DPAP report
  - ❑ EIC Project Follow-Up
  - ❑ The Path Forward following various organizational meetings (ECCE, ATHENA-ECCE-EIC Project)
  
- ❑ Discussion about the path forward: steps and timeline(s) towards the consolidation and development of EIC Detector 1 based on ECCE as the reference design
  
- ❑ The Teams will present their updates on publications; Bylaws Committee Report

## 24th ECCE Bi-Weekly Meeting

Monday 28 Mar 2022, 08:00 → 11:00 US/Eastern

Description **Connection Information:**

Please click this URL to start or join. <https://iastate.zoom.us/j/98236651699?pwd=UGFmZ3FITkZ2T0UrajRXV2RhSWVaQT0>  
Or, go to <https://iastate.zoom.us/join> and enter meeting ID: 982 3665 1699 and password: 201043

**Meeting Recording:**

---

**08:00** → 08:30 **ECCE News and Status**  
Speaker: Tanja Horn (Cath)

**08:30** → 09:00 **Detector Team: Publication Status**  
Conveners: Douglas Higinbotham (Jefferson Lab) , Kenneth Read (Oak Ridge National Laboratory)  
[Detector Team Upd...](#) [ECCE\\_tracking\\_nim...](#)

**09:00** → 09:30 **Physics Team: Publication Status**  
Conveners: Carlos Munoz Camacho (IJCLab-Orsay (France)) , Carlos Munoz Camacho (IJCLab, CNRS/IN2P3) , Rosi Reed (Lehigh University)

**09:30** → 10:00 **Computing Team: Publication Status**  
Conveners: Cristiano Fanelli (MIT) , David Lawrence (Jefferson Lab)

**10:00** → 10:20 **ECCE Bylaws Committee Report**  
Speakers: Richard Milner (MIT) , Senta Greene (Vanderbilt University)

# EIC Detector Proposal Advisory Panel Report



*DPAP closeout meeting March 8, DPAP final report March 21*

- ❑ “The panel unanimously recommends ECCE as Detector 1. The proto-collaboration is urged to openly accept additional collaborators and quickly consolidate its design so that the Project Detector can advance to CD2/3a in a timely way.”
- ❑ “The panel supports the case for a second EIC detector, however, given the current funding and available resources, the committee finds that a decision on Detector 2 should be delayed until the resources and schedule for the Project detector (Detector 1) are more fully realized.”

# DPAP report and the Path Forward



- ❑ The final DPAP report was released on 21 March and can be downloaded from the [DPAP Panel Meeting web site](#). Based on the DPAP recommendations, the EIC project has confirmed that the ECCE detector design will serve as the reference in developing a technical design for CD-2/3a.

*“The EIC Project recognizes that the panel recommended ECCE as the Project Detector. As described in the panel report, we will urge the proto-collaboration to: (1) integrate new collaborators in a manner that enables them to make contributions that impact the capabilities and success of the experiment in significant ways, including new collaborating individuals and groups into positions of responsibility and leadership; and (2) integrate new experimental concepts and technologies that improve physics capabilities without introducing inappropriate risk. **ECCE is the reference design for this optimization and consolidation so that the Project Detector can advance to CD2/3a in a timely way**” – email communication from the EIC Project Team on 13 March 2022.*

# DPAP report and the Path Forward



- ❑ The final DPAP report was released on 21 March and can be downloaded from the [DPAP Panel Meeting web site](#). Based on the DPAP recommendations, the EIC project has confirmed that the ECCE detector design will serve as the reference in developing a technical design for CD-2/3a.

*“The EIC Project recognizes that the panel recommended ECCE as the Project Detector. As described in the panel report, we will urge the proto-collaboration to: (1) integrate new collaborators in a manner that enables them to make contributions that impact the capabilities and success of the experiment in significant ways, including new collaborating individuals and groups into positions of responsibility and leadership; and (2) integrate new experimental concepts and technologies that improve physics capabilities without introducing inappropriate risk. **ECCE is the reference design for this optimization and consolidation so that the Project Detector can advance to CD2/3a in a timely way**”* – email communication from the EIC Project Team on 13 March 2022.

- ❑ We now need to prepare for working with the EIC community to consolidate and develop the EIC project detector based on the ECCE reference design. Active discussions with EIC PM, the EICUG Steering committee, and the proto-collaborations are underway with two main focus areas:
  - *Evolve the ECCE reference design* towards the technical design based on science and an eye to cost and risk
  - Move towards the new Detector 1 collaboration including all the elements of the “ECCE Culture”

# Calendar of Meetings



- ❑ March 10: ECCE Follow-up Meeting
- ❑ March 10: ECCE with host labs (Tim Hallman participating)
- ❑ March 13: communication from EIC Project
- ❑ March 14: Follow-up Meeting ECCE with host labs
- ❑ March 14: Reach out from EIC Project for meeting with ECCE and ATHENA Leadership on detector 1
- ❑ March 20: Joint meeting ECCE-ATHENA-EIC Project, Action items defined
- ❑ March 22: ECCE and ATHENA Leadership meeting
- ❑ March 24: Follow up joint meeting ECCE-ATHENA-EIC Project, initial thinking on optimization and consolidation of detector 1 based on the ECCE reference design towards detector 1 technical design
- ❑ March 29: Follow up ECCE and ATHENA Leadership meeting
- ❑ March 29: Kickoff meeting on Path to detector 2: ATHENA, CORE, ECCE, EIC UG Chair/Vice-Chair, EIC Project
- ❑ March 31: Joint presentation at Quarterly EIC UG meeting on the Path Forward

Also internal ECCE meetings with Teams and Teams+Conveners

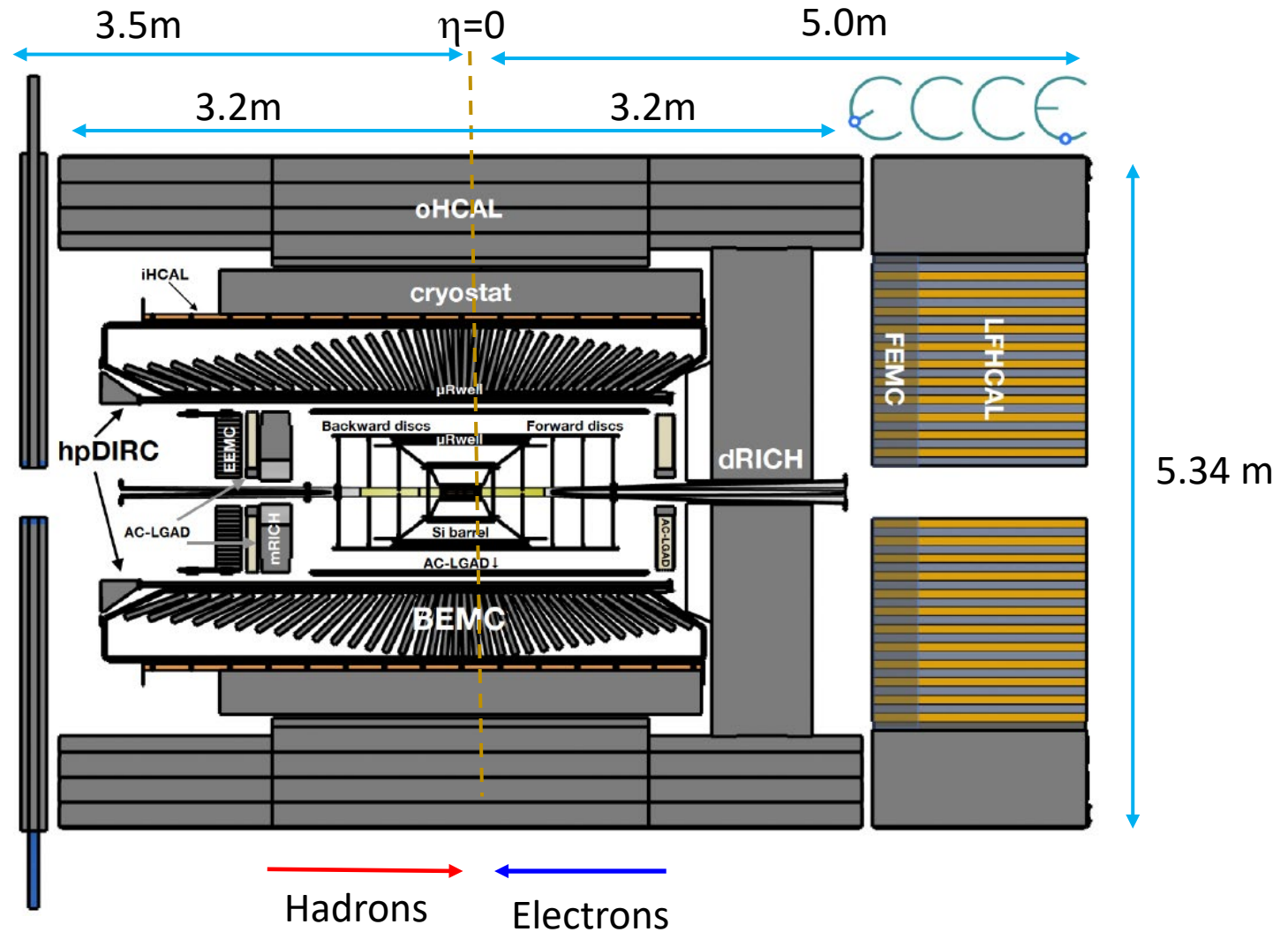
# The ECCE Reference Detector



The ECCE detector size is determined by the reuse of the BaBar magnet and sPHENIX HCAL, and further EIC detector needs:

- Needs +5 m on proton/ion side.
- Needs less space (-3.5 m) on electron side.
- The detector radius is 2.7 meter, with the RCS beam at 3.35 meter.

Also need to include:  
 + Far-Forward/Far-Backward  
 + DAQ/Electronics and Software



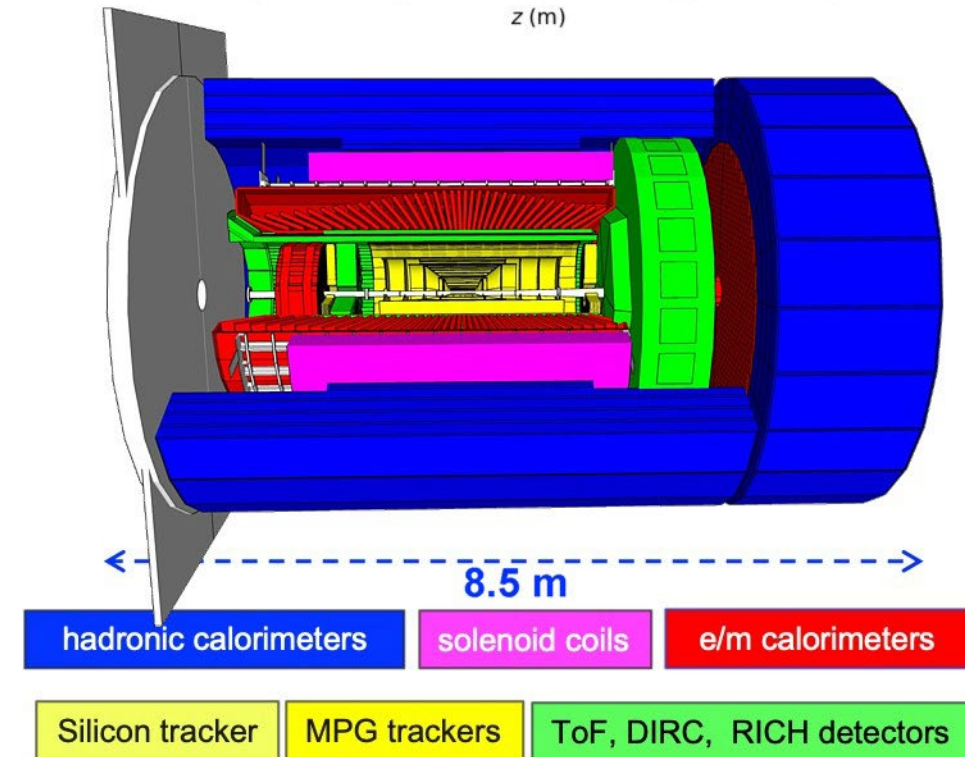
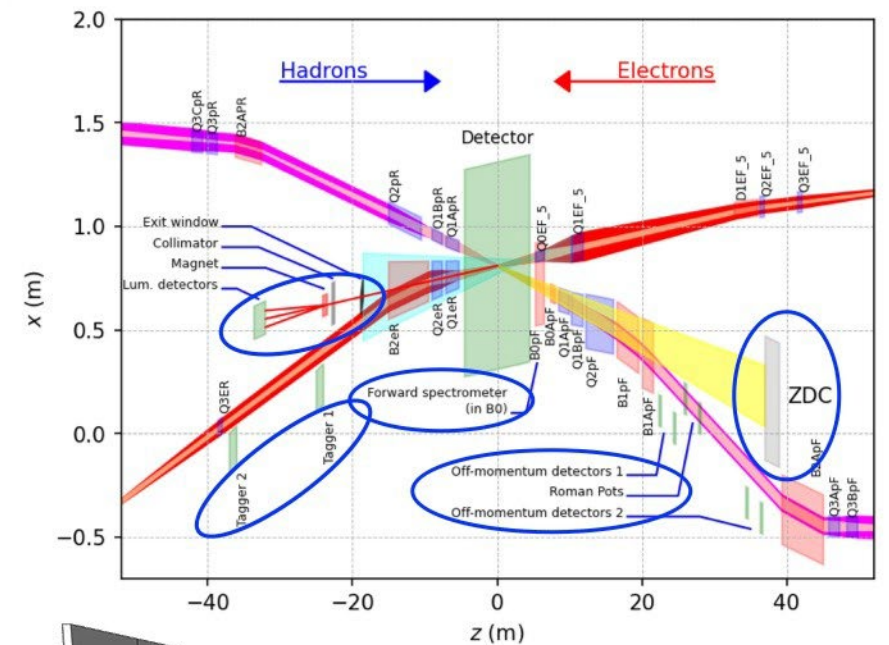
- ❑ -4.5 /+5.0 m machine-element-free region available for central EIC detector
- ❑ 25 mrad crossing angle (IP6 design)
- ❑ Detector rotated by 8 mrad in horizontal plane to account for e-beam angle

# Towards a Technical Design

(Initial thoughts by ECCE SC presented in 3/24 meeting with ATHENA-ECCE-EICPM)

Divide the discussion into three main categories:

- ❑ **Category 1:** Systems that share many commonalities between the ECCE and ATHENA designs and/or physics output and do not seem to be very sensitive to design differences.
- ❑ **Category 2:** Systems that differ significantly between the ECCE and ATHENA designs, but have a similar technical approach/design concept. Do not anticipate substantial complications comparing their performance, risk and cost in a way that will allow making an informed decision on the appropriate setup for the technical design stage.
- ❑ **Category 3:** Systems that are very different between the ECCE and ATHENA designs, cover a large rapidity range, and are very versatile in terms of the physics they are used for (e.g., different focus/requirements in the negative eta vs. positive eta range). Anticipate some challenges in comparing their performance.







# Towards a Technical Design – Category 1

- Si tracking (\w EICSC, focusing on services etc)
- dRICH (This should include as part of the optimization another look at the magnetic field uniformity requirements as a way to provide more detailed input to the risk mitigation design.)
- DIRC (\w DIRC consortium)
- Backward endcap EMCAL (\w EEEMCAL consortium, including possibility of a high-rapidity insert and potentials for mechanical optimization to reduce dead areas)
- Far-forward/Far-backward: B0 tracking, Off-momentum trackers, Roman pots, ZDC, Low-Q2 taggers, Lumi monitors
- Barrel HCAL
- Muon chambers (Israel in-kind)
- DAQ/Electronics and Software

**Proposed Charge:** can be overall similar and emphasize the following tasks:

- ❖ Group items in existing Working Group Structures
- ❖ Reach out to existing Consortia that seem universal (EICSC, EEEMCAL, MPGD, DIRC, DRICH)
- ❖ Create joint homogeneous working groups to introduce existing designs by each collaboration.
- ❖ Identify any non-trivial differences and/or need for optimization, e.g., geometry. For each non-trivial difference, prepare a pro/con list accounting for technical performance, risk, and cost. The pro/con list can be made based on existing knowledge and/or via the running of dedicated simulation studies as needed. For optimizations, make a list for the path forward toward the design.

# Towards a Technical Design – Category 2

**Category 2:** Systems that *differ significantly* between the ECCE and ATHENA designs, but have a similar technical approach/design concept.

- MPGD tracking system (technology used and detectors layout)
- AC-LGAD TOF + Tracking
- Backward endcap RICH detector (mRICH compared to pfRICH)
- Forward endcap calorimeters (EM+Had) : An emphasis in this discussion should be placed on the path forward for the existing scintillating tile design in light of issues associated with the previously assumed use of a Russian supplier.
- [Backward endcap HCAL](#)
- [B0 EMCal](#)

## Proposed Charge:

- ❖ overall need to include an introduction of the existing designs, including performance, risk and cost. Based on this information we can prepare a pro/con list and discuss possible optimizations of the designs and placement of the subsystems in the overall detector, as needed, together with the project. Selected physics studies will likely be needed to make informed decisions. NOTE: all systems need to fit the ECCE reference design.
- ❖ May need Working Groups to work more like in Yellow Report era with series of meetings

# Towards a Technical Design – Category 3

**Category 3:** Systems that are very different between the ECCE and ATHENA designs, cover a large rapidity range, and are very versatile in terms of the physics they are used for (e.g., different focus/requirements in the negative eta vs. positive eta range). Anticipate some challenges in comparing their performance.

- Barrel EMCal

## Proposed Charge:

- ❖ Propose to start by presenting the current designs, focus, performance studies and benefits of each system independently of the other. Should explore (quantify?) how the geometrical constraints of the ECCE reference design impact the proposed ATHENA solution both in terms of physics performance and in terms of risk and cost (e.g. risk and cost might be reduced due to the smaller radius). Following these presentations we will discuss the best path forward for defining a relevant set of comparative physics performance studies.

# Towards a Technical Design – Summary

- ❑ Focus on the nearer timescale will be on the technical evolution of the EIC Detector 1
- ❑ Some groups are already working together, e.g., DAQ/Electronics and Software, Detector R&D Consortia, etc. – continue this making use of joint homogeneous working groups taking into account the charge (TBA)
- ❑ Subsystems Category 2 and 3:
  - Kickoff meetings and formation of joint WGs soon (TBA).
  - These topics may require a series of meetings in the style of the Yellow Report

**Joint WG process is an opportunity to build collaboration and trust – understand why different choices were made and how to improve the reference design so that the full EIC program can be carried out**

- ❑ Will proceed in parallel with discussions on a path to collaboration formation for detector 1, but on a longer timescale than the technical evolution of the detector
- ❑ These collaboration formation discussions should take into account the elements of ECCE Culture (more in Vicki/Richard update)
  - Open collaboration that emphasizes scientific collaboration
  - Balance of early career and experienced scientists
  - Founded on DE&I principles of respect and inclusion

# What's next – 1-4 weeks timescale



Activities towards the consolidation and technical evolution of the ECCE Reference Design

- Category 1 subsystems have already started or will start soon – details of the charge TBA
- Formation of joint Working Groups, and in particular for category 2 and 3 subsystems

Anticipate the **first Detector 1 Meeting** for the **end of April** – tentatively Thursday 28 April at 10:00AM ET