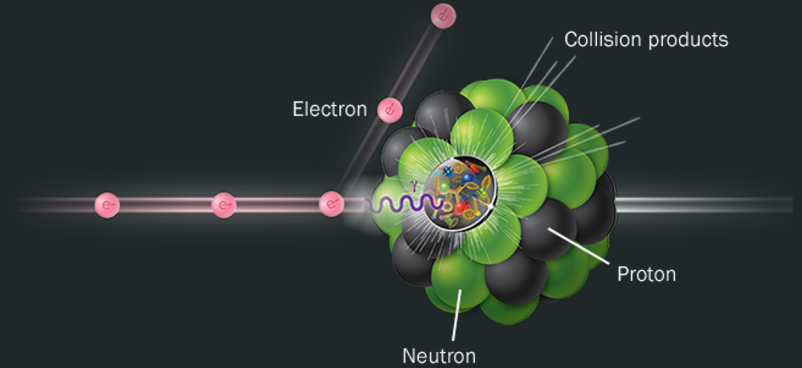


EIC Users Group

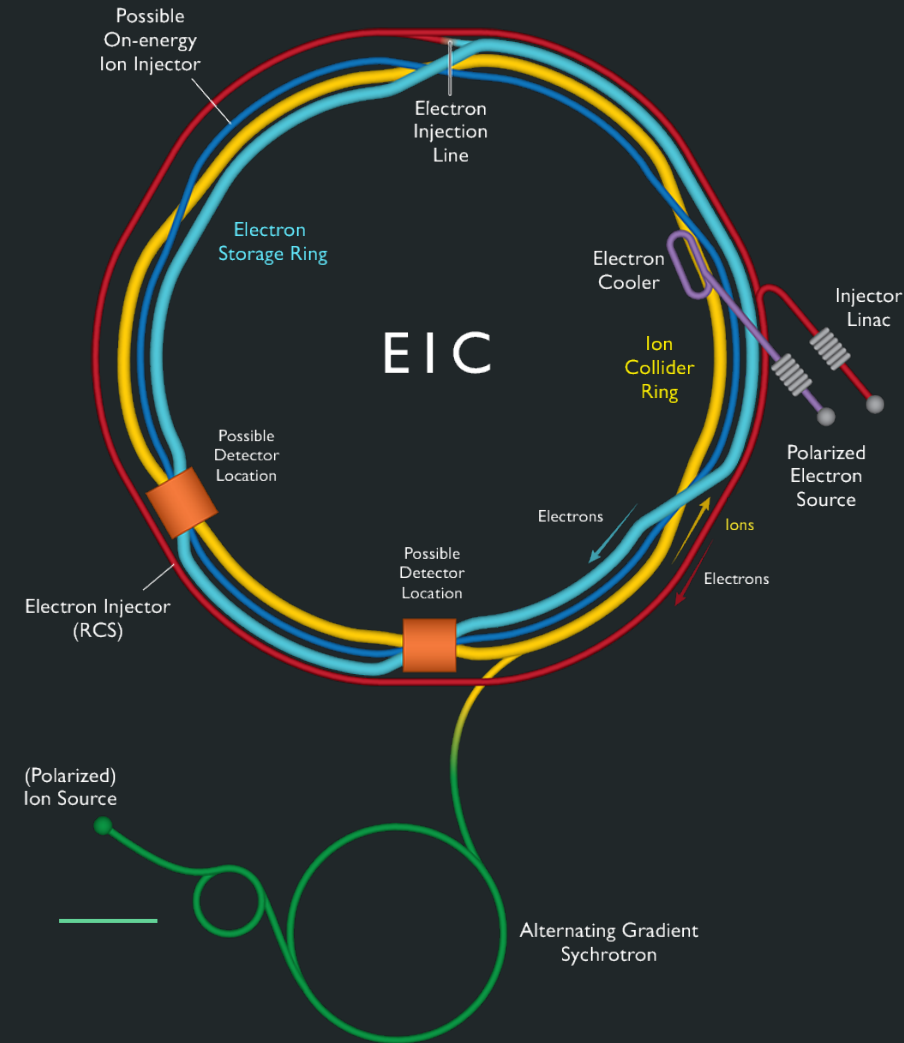


Renee Fatemi
for the EICUG Steering Committee

December 16, 2021

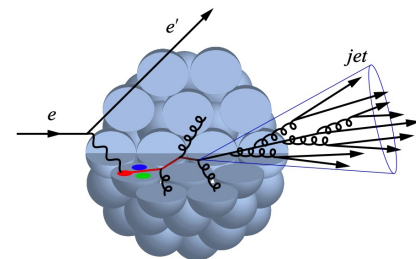
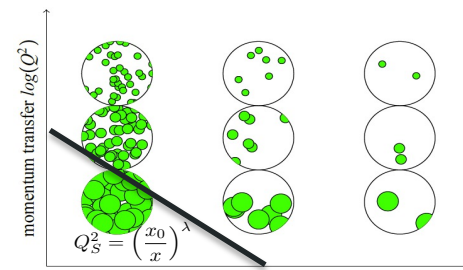
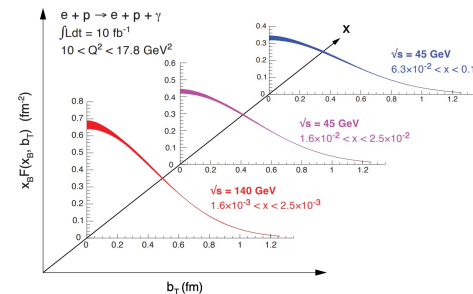
Project Design Goals

- High Luminosity: $L = 10^{33}\text{-}10^{34} \text{ cm}^{-2}\text{s}^{-1}$
- Integrated Luminosity 10 -100 $\text{fb}^{-1}/\text{year}$
- Highly Polarized Beams : 70%
- Large CM Energy Range : 20-140 GeV
- Large Ion Species Range : p - Uranium
- Large Detector Acceptance – meets requirements of the Yellow Report.
- Accommodate a Second Interaction Region (IR)

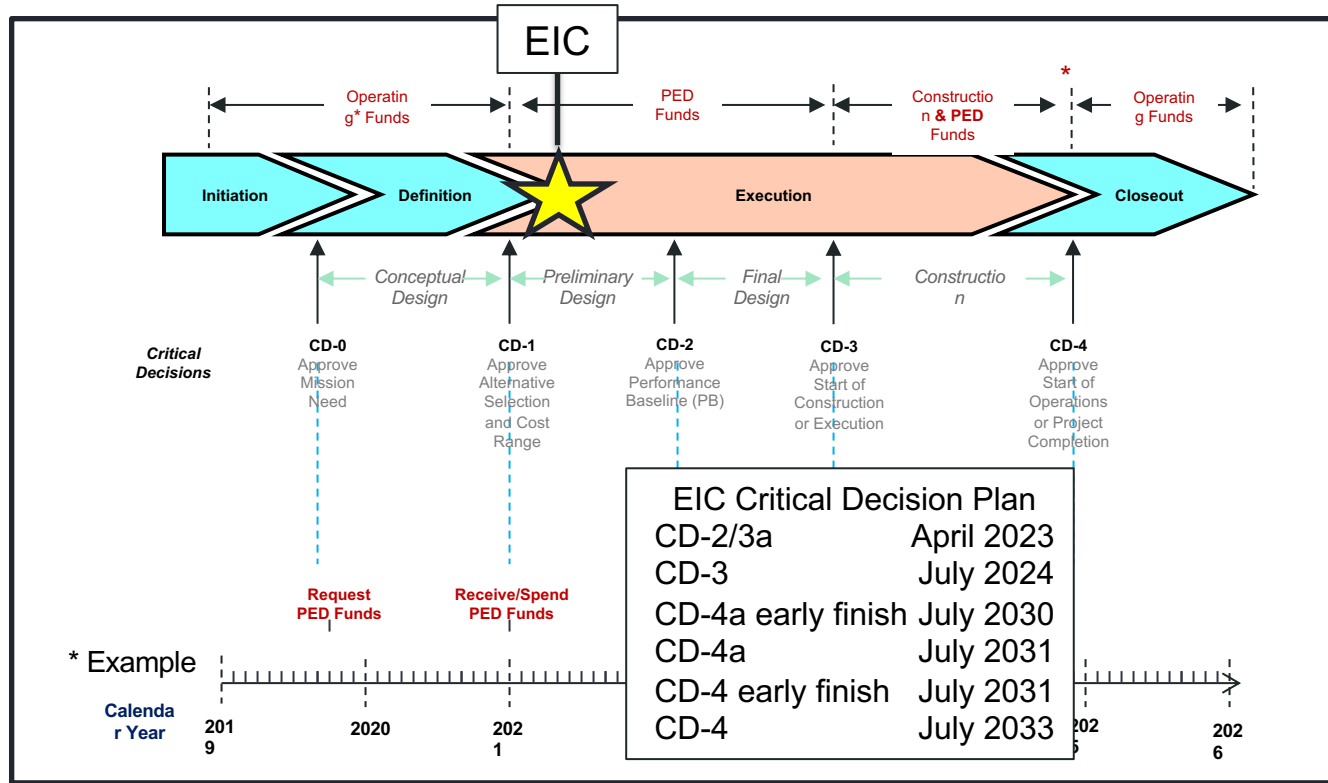


Scientific Goals

- 3D precision imaging of protons and nuclei
 - Tomography – map out spatial and momentum distribution of quarks inside of protons
- Proton spin puzzle
 - How do the quark and gluon spin align to form the total spin of the proton – especially at low x .
- Search for gluon saturation
 - At what scale does gluon emission balance gluon recombination? What is the nature of the CGC?
- Quark and Gluon Confinement
 - How is spin and momentum correlated with hadronization?
- Quarks and gluons in nuclei
 - How does dense nuclear matter change the initial distributions of quarks and gluons? How does it affect hadronization?



DOE Project Planning Process*



*Presented by Jim Yeck at the October Quarterly EICUG Meeting

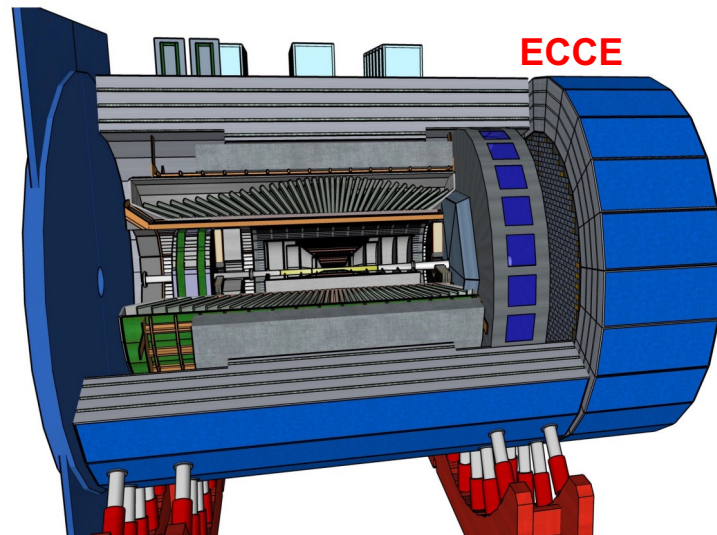
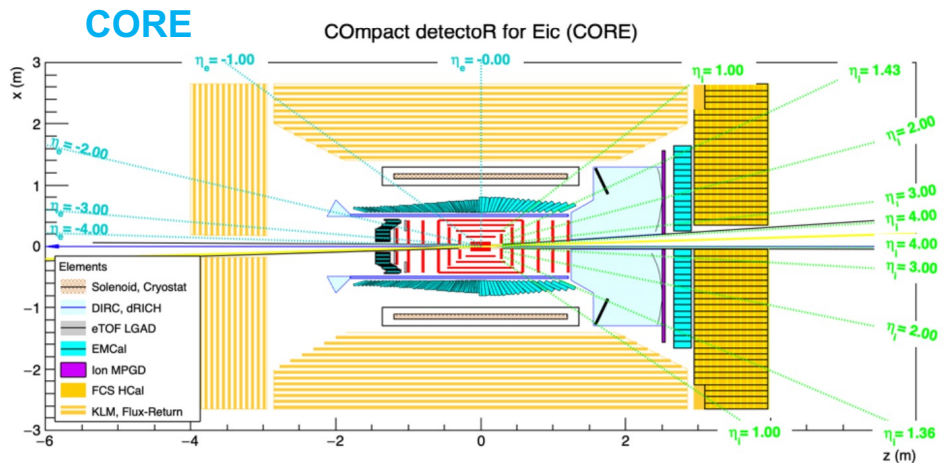
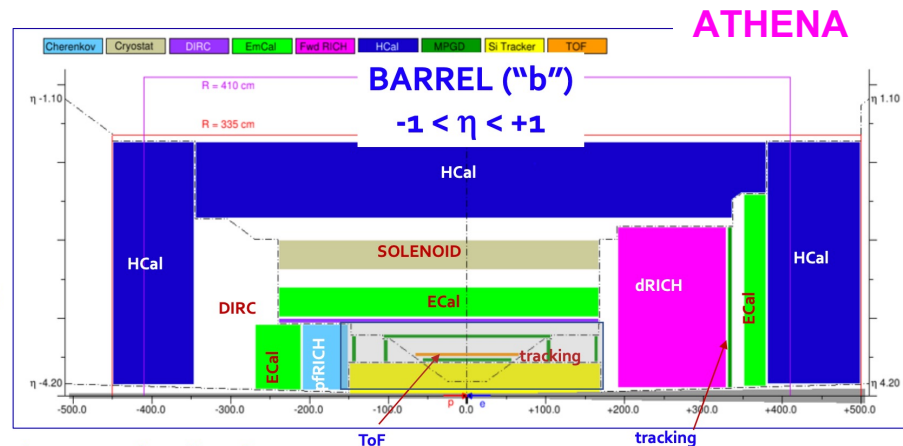
Yellow Report

- In 2020 the EICUG organized the Yellow Report Effort
- Update the physics case and detector requirements for the *reference* detector
- <https://arxiv.org/abs/2103.05419>



Detector Proposals

- Call for detector proposals in early March 2021 - for reference and IR2 detectors.
- Three detector proposals submitted Dec 1st
- Presentations to Detector Proposal Advisory Panel (DPAP) this week and mid-January.
- DPAP review expected early March



EIC Users Group

→ 1301 Members

- ◆ 802 Experimentalist
- ◆ 325 Theorists
- ◆ 160 Accelerator Scientists
- ◆ 8 Computer Scientists
- ◆ 4 Support Members
- ◆ 2 Other

→ 265 Institutions

→ 36 Countries



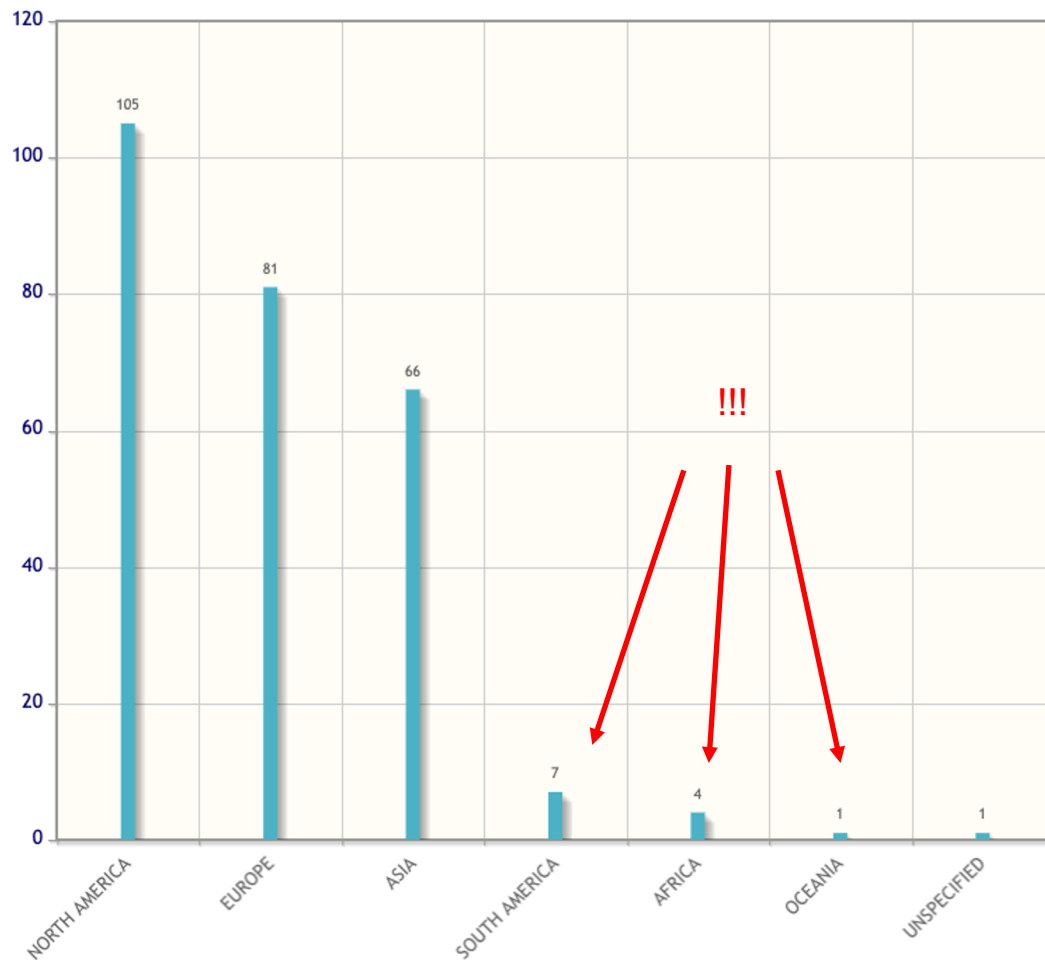
Who are we?

→ 1301 Members

- ◆ 802 Experimentalist
- ◆ 325 Theorists
- ◆ 160 Accelerator Scientists
- ◆ 8 Computer Scientists
- ◆ 4 Support Members
- ◆ 2 Other

→ 265 Institutions

→ 36 Countries



Resources

- International network of nuclear and accelerator physicists, broad range of technical experts. This includes a very engaged theory community.
- Access to annual EICUG meeting, typically a ~week, along with three “quarterly” meetings throughout the year. Built in opportunities to attend talks and meet the community.
- Strong Early Career organization and participation. This is an important support structure for integrating new early career physicists.
- Access to groups that are leading detector projects for reference and IR2 detectors. 2022-23 will be an important year for securing funding for these projects.

2nd IR Opportunity

- The EIC Users Group feels the science goals of an EIC, and the nuclear physics community in general, are best served by having at least two detectors.
- Funding for a second detector, and the associated equipment for the interaction region, will likely require strong support from outside DOE, and this provides an excellent opportunity for international collaboration and leadership.
- Timeline for 2nd IR detector is likely to be staggered by a few years with “reference” detector.

