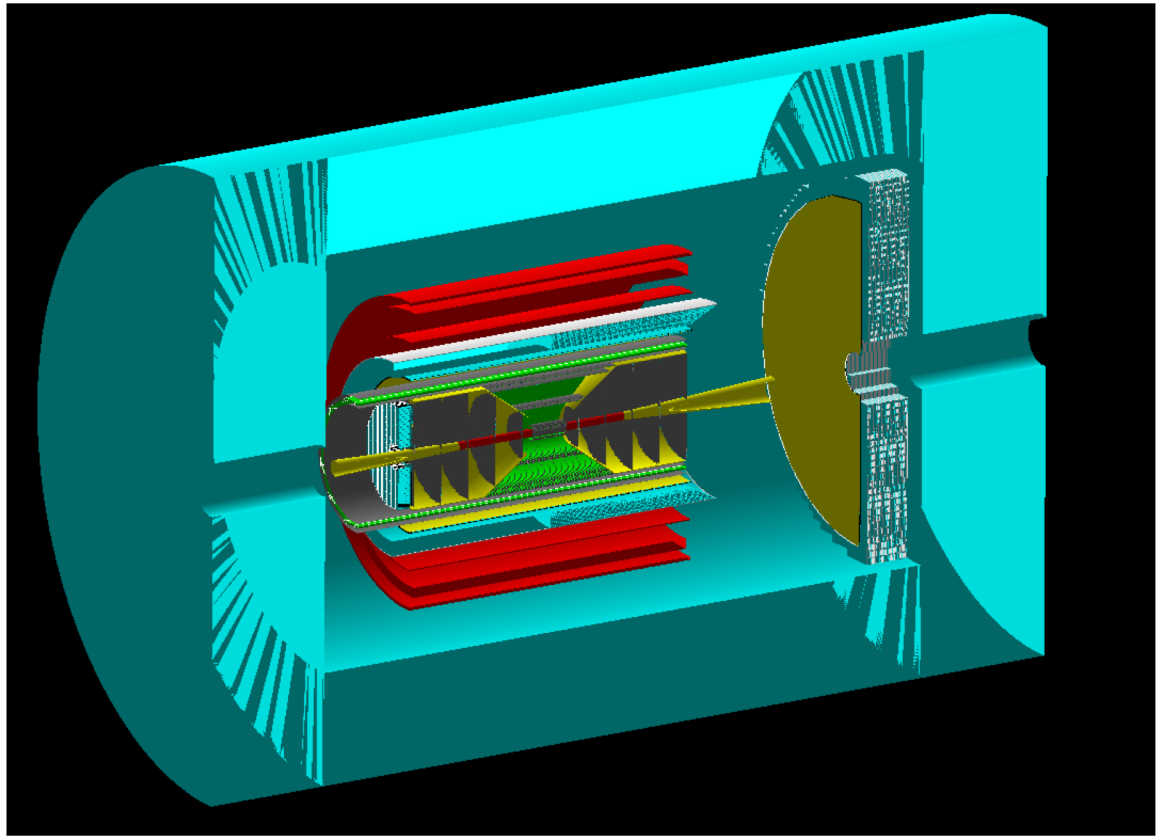
CORE: wiki and RHIC/AGS presentation highlights

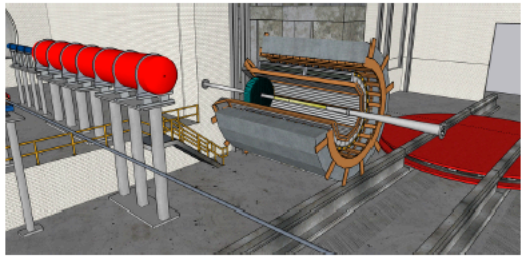


CORE meeting, June 14, 2021

CORE wiki is up!

Main Page

From Core Wiki



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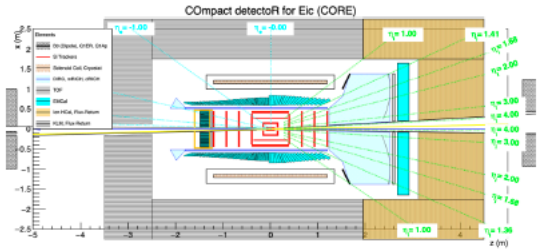


CORE Overview

General Information

Subsystem Information

Meetings and Presentations

Contacts and Advisors

Physics Working Groups

CORE Collaboration

CORE Calendar

Mailing Lists and Wiki access

You can sign up for the CORE mailing lists here. A JLab account is NOT needed.

General CORE Mailing List (https://mailman.jlab.org/mailman/listinfo/eic-core)

CORE Detector Mailing List (https://mailman.jlab.org/mailman/listinfo/eic-core-det)

CORE Physics Mailing List (https://mailman.jlab.org/mailman/listinfo/eic-core-phys)

Editing the Wiki

Since the wiki is hosted at JLab, you need to register in order to edit it.

https://www.jlab.org/human_resources/jris/processing

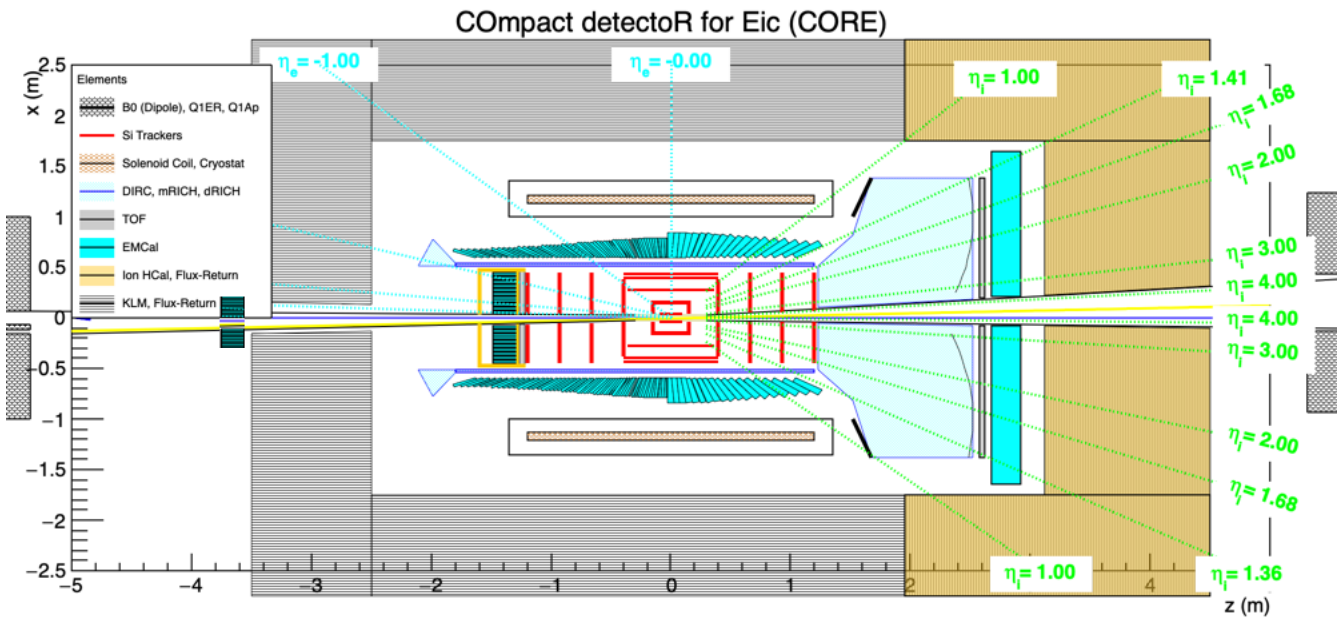
For off-site use, this is (usually) quick and straightforward.

Retrieved from "https://eic.jlab.org/core/index.php?title=Main_Page&oldid=108"

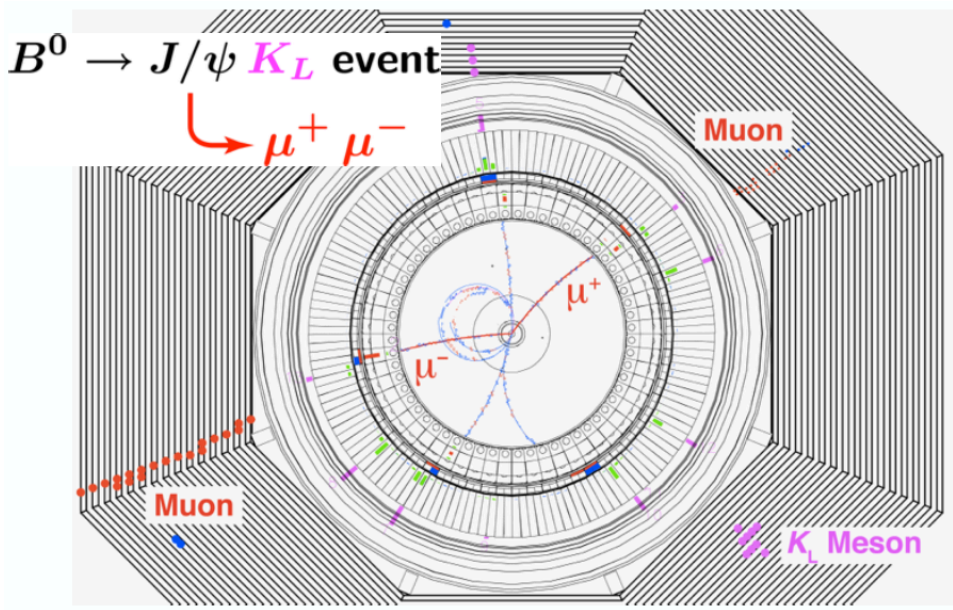
- This page was last modified on 14 June 2021, at 09:34.

- The CORE wiki is public, but hosted at JLab, so a JLab account is needed for editing.
  - Off-site access is straightforward
  - Instructions for registering are on the wiki page.
- The wiki has direct links for editing subscription details for all CORE mailing lists.

K_0 ID



The Belle II K_L-μ (KLM) system

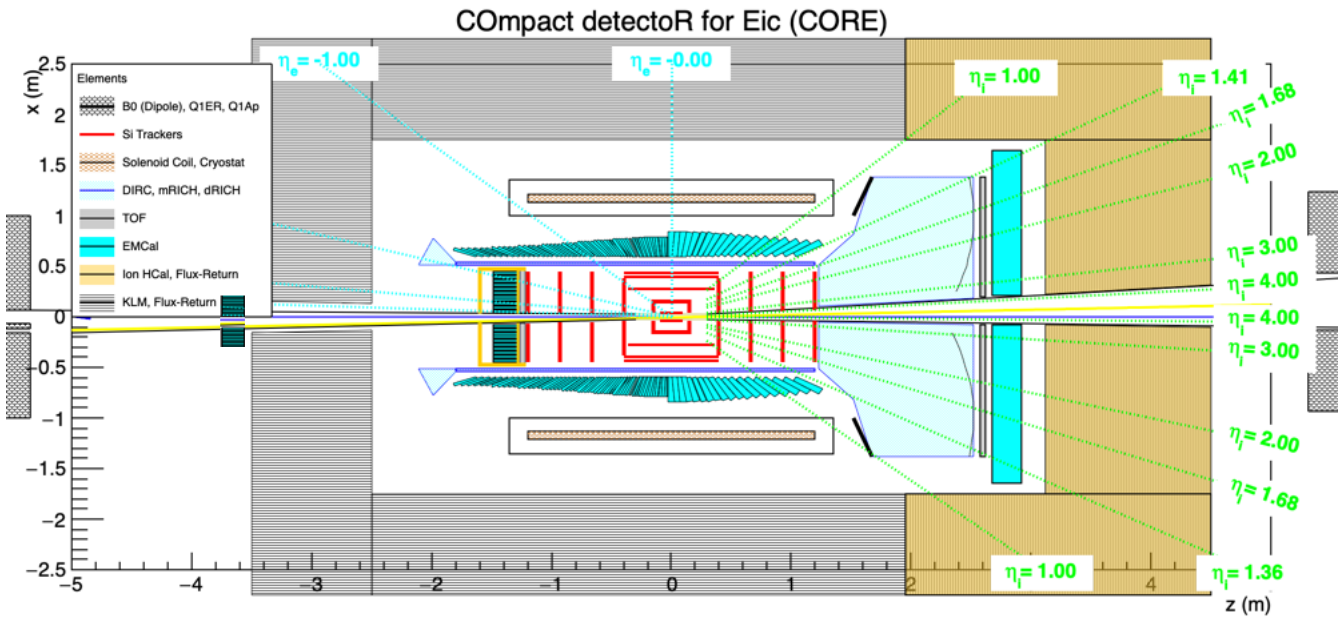


- $K_s \rightarrow \pi^+\pi^-$ decays ($c\tau$ = 2.68 cm) can be measured in the outer part of the tracker
  - K_s with all momenta can be measured, but the efficiency will drop with momentum.
  - p/π^+ ID in the DIRC will distinguish $K_s \rightarrow \pi^+\pi^-$ from $\Lambda \rightarrow p\pi^-$.

Tracker optimization

- K_L will be detected in the KLM/Hcal, which will provide a precise angular measurement
  - p_T for a single neutral hadron can be obtained from p_T balance
  - For a single neutral hadron, n/K_L ID can be obtained from hermeticity and baryon conservation (*target* baryons stay near the beam)

4π EMcal



PWO (1-2%) for electron hemisphere: (up to 2π, $\eta < 0$ coverage)

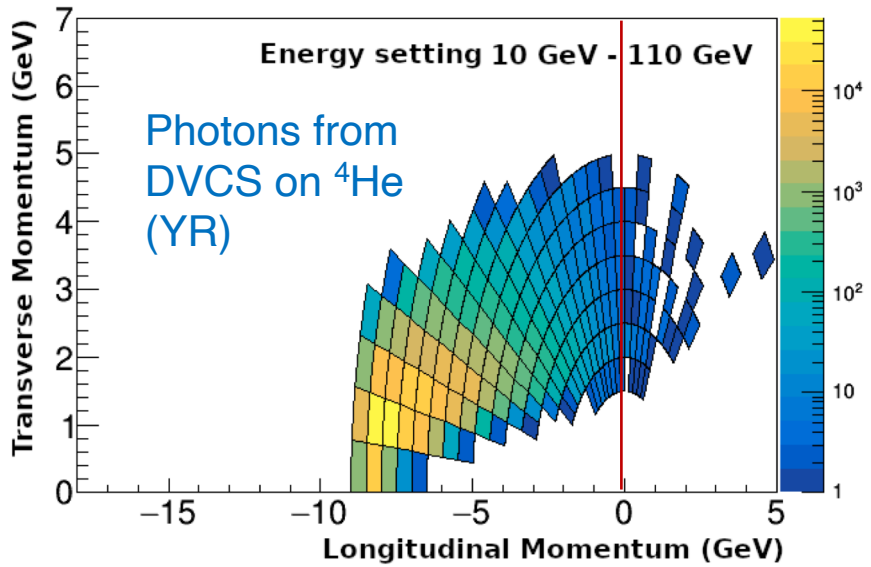
- Both the endcap and barrel could be projective
- The small-angle EMcal could be SciGlass.

W-Shashlyk (6%?) for hadron hemisphere: ($\eta > 0$ coverage)

- Projective modules in the barrel
- Non-projective modules in the endcap

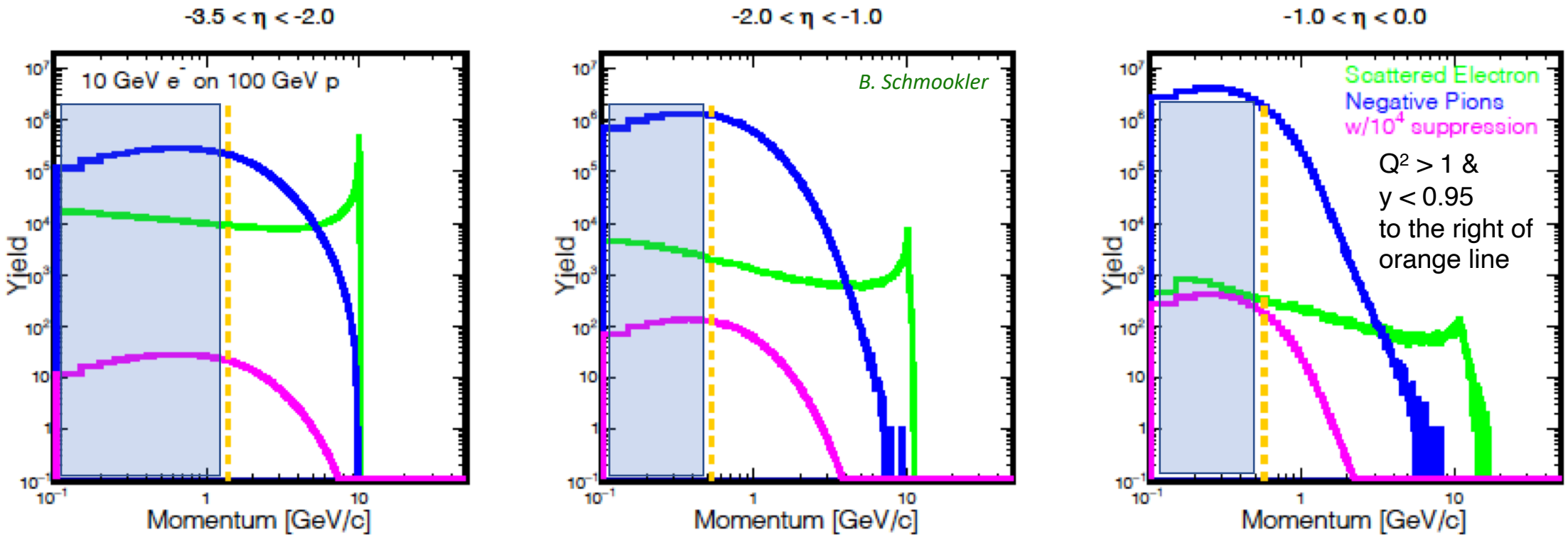
- DVCS on nuclei:

  A high-resolution EMcal in the electron hemisphere makes it possible to reconstruct the t-distribution from the DVCS photon



e/π identification in the electron hemisphere

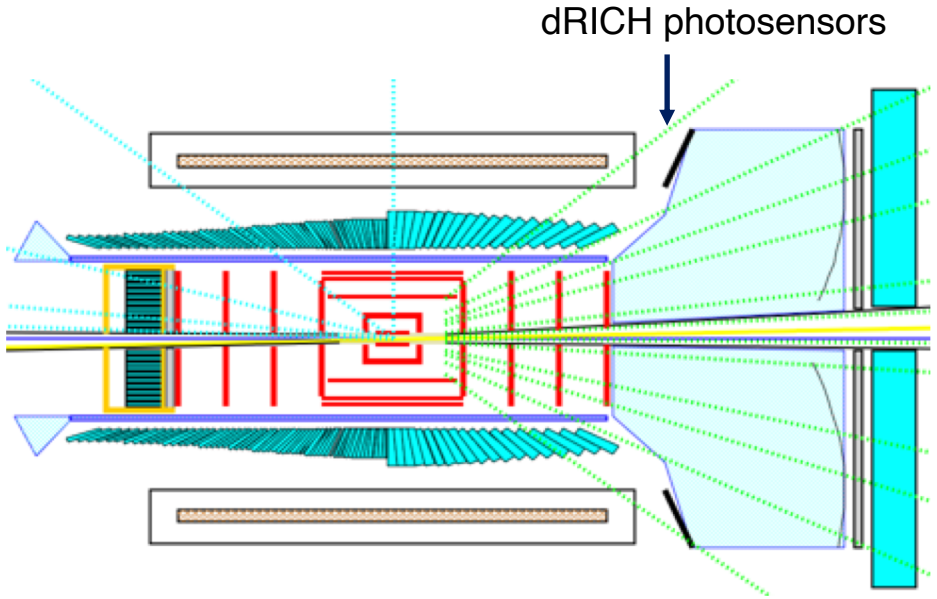
$\eta = -\ln(\tan(\theta/2))$



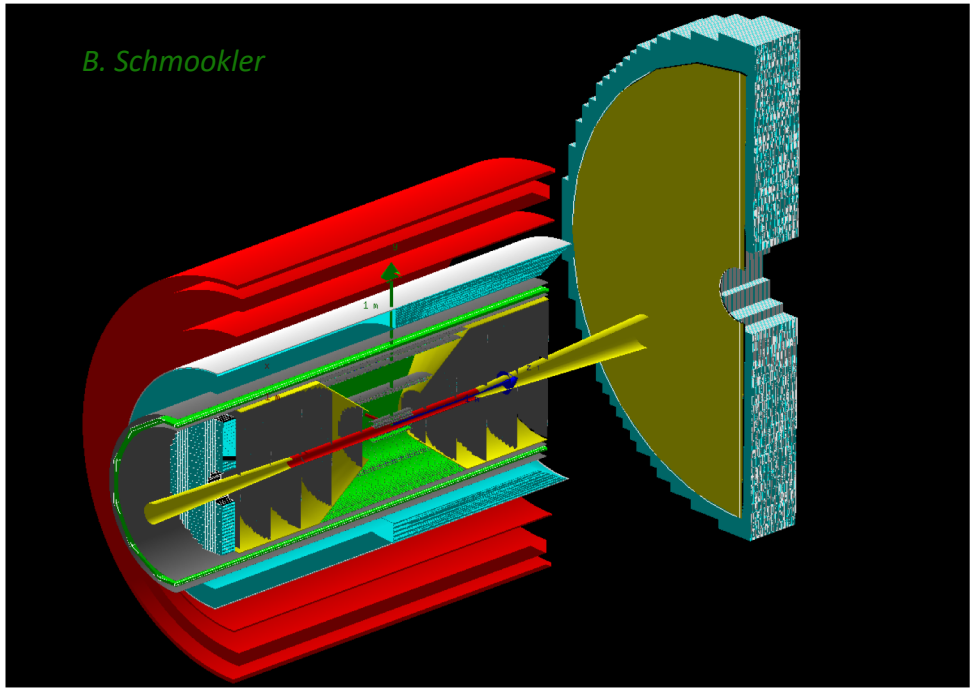
- For the EIC, a clean identification of the scattered electron is essential.
- The barrel region poses the greatest challenge and requires the best electron ID.
- CORE addresses this issue by extending the PWO EMcal coverage up to $\eta < 0$ (or possibly -0.5)
- Additional e/π suppression (at least 1:10 up to 1.2 GeV) is also provided by the DIRC.

Thank you!

CORE systems



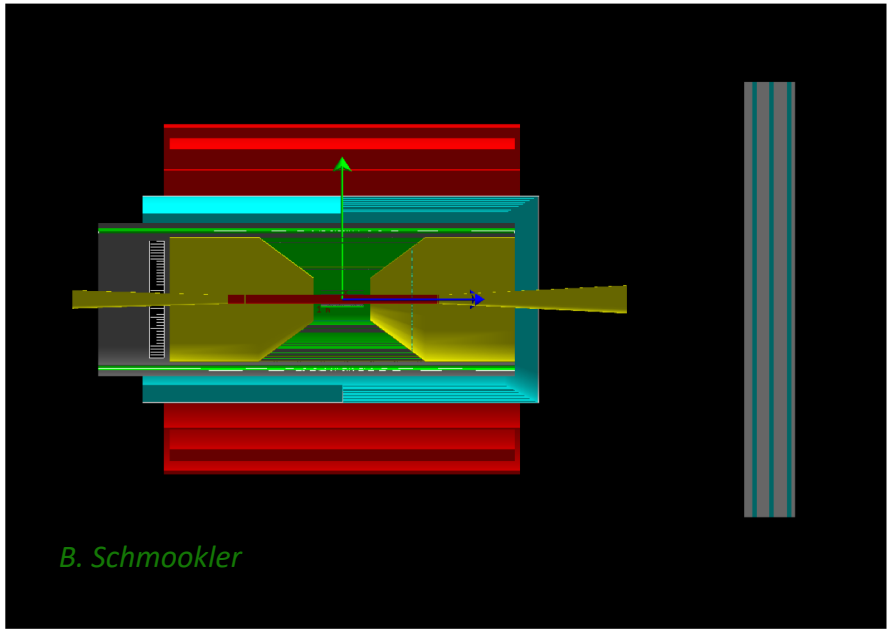
inner CORE in Geant (fun4all)



- New 2.5 T solenoid (2.5 m long, 1 m inner radius)
- Tracking: central all-Si tracker (eRD25) and h-endcap GEM tracker (eRD6)
- EMcal (eRD1): PWO for $\eta < 0$ and W-Shashlyk for $\eta > 0$
- Cherenkov PID (eRD14): DIRC (50 cm radius) in barrel and dual-radiator RICH in h-endcap
- TOF: LGADs in e-endcap (eRD29) and a simple TOF behind the dRICH
- Hcal / K_L-μ (KLM) detector integrated with the magnetic flux return

CORE solenoid

- The CORE solenoid is 2.5 m long with a 1 m inner radius
- CORE is compatible with any field in the 2 - 4 T range
- 2.5 T is the current baseline option



- A 1 m inner radius leaves 50 cm between the DIRC and solenoid

cost (2020 M$) = 1.8 x 0.458 x (stored energy)$^{0.7}$
M. A. Green and S. J. St. Lorant, Adv. Cryo. Eng. **39**

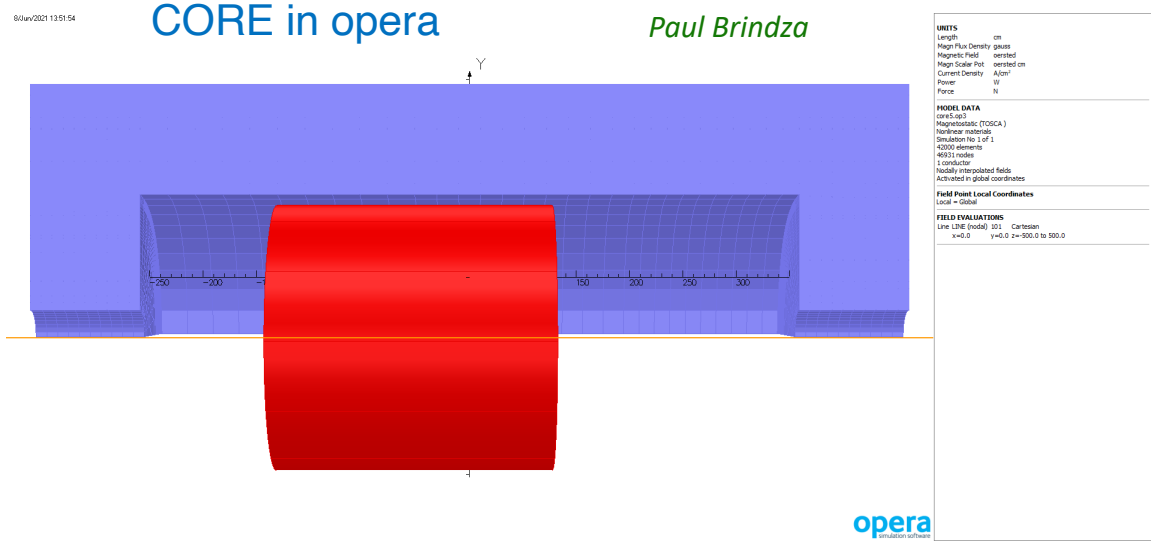
solenoid	field (T)	volume (m^3)	2020 cost (M$)
EIC-IP6	3	29	21
CORE	3	7.8	8.5
CORE	**2.5**	**7.8**	**6.6**
CORE	2	7.8	4.8

- Excellent projectivity for the field in the dual-radiator RICH.
- The field at the DIRC photosensors is less than 2 T, enabling use of MCP-PMTs:
  - best performance and low technical risk

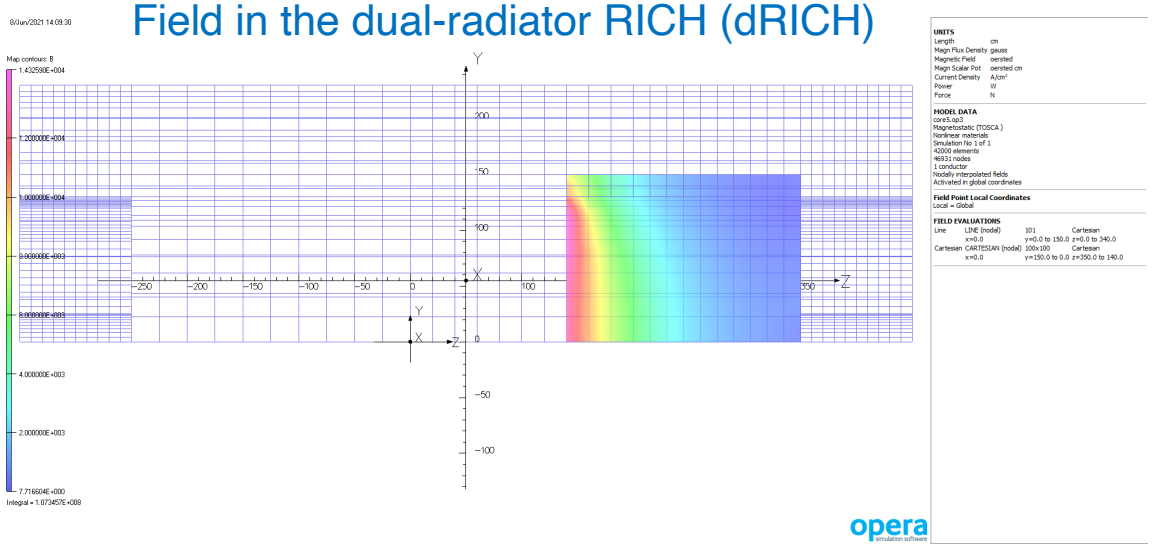
CORE solenoid in opera – 2.6 T on axis at IP

CORE in opera

Paul Brindza



Field in the dual-radiator RICH (dRICH)



Field on iron surfaces