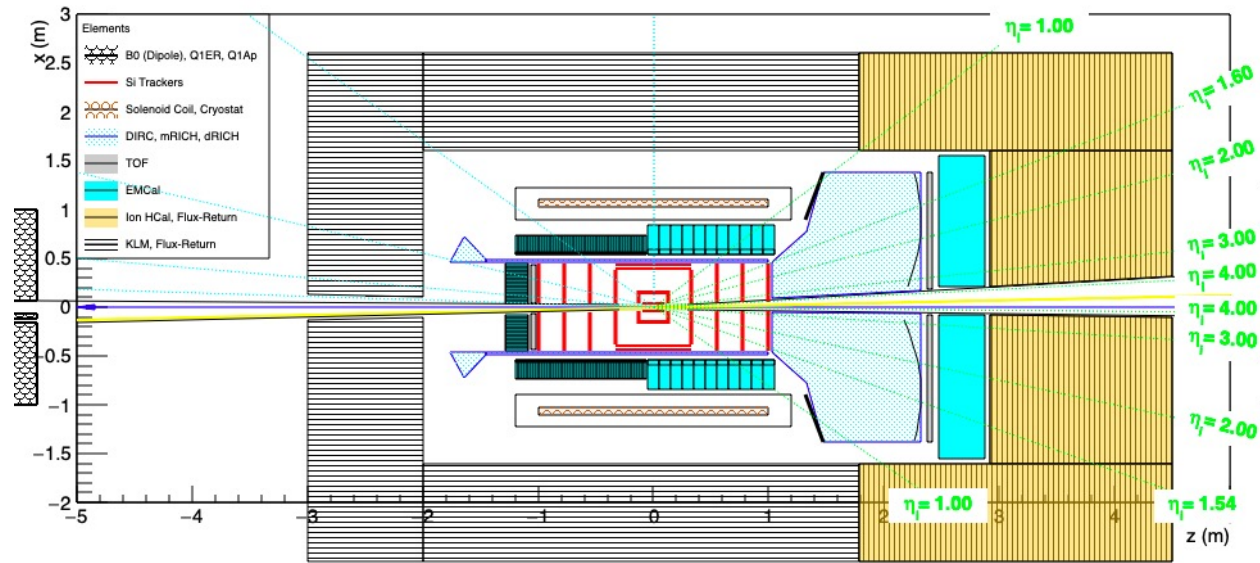


3 May 2021

Compact detector for Eic (CORE)



# CORE Collaboration Meeting

Charles Hyde\*

Old Dominion University

<https://userweb.jlab.org/~hyde/EIC-CORE/>



**OLD DOMINION**  
UNIVERSITY

\*Support from

DOE DE-  
FG02-96ER40960

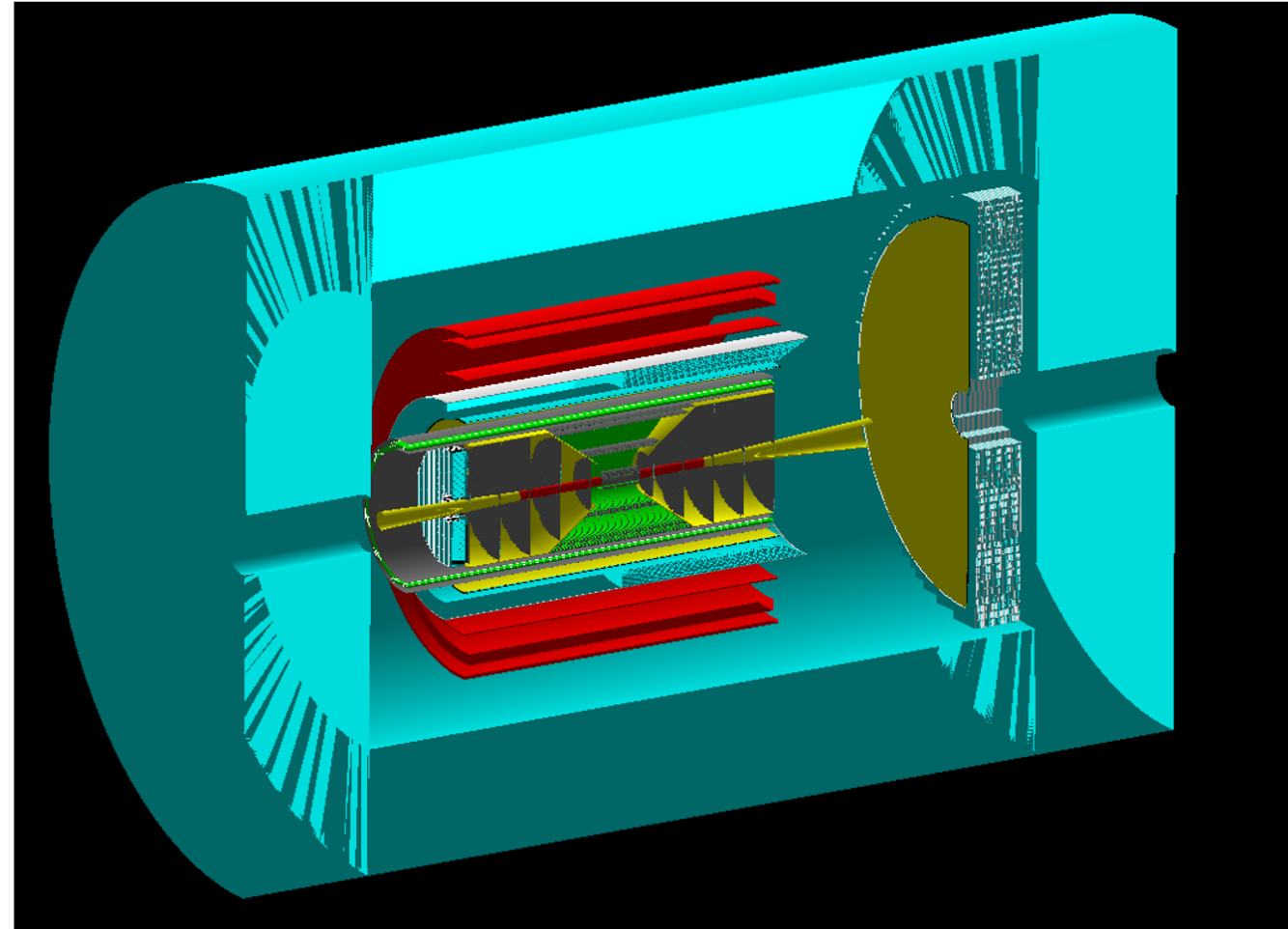
SBU-CFNS

BNL

Generic Detector R&D  
SURA/CNF

# What is CORE? Update

- A proposal for a second detector
  - Located in IR8
  - Interaction region design (not finalized):
    - 25-35 mrad crossing angle
    - High Dispersion secondary focus
      - Maximum  $x_L > 0.99$  @  $p_T = 0$
      - Resolve daughter nuclei A-1
    - CORE can boost luminosity by allowing magnets closer to IP (4m vs 5m)
- Subsystems
  - Central Si Tracker (MAPS) + ion Endcap MPGD
  - 2pi EMCAL: PbWO<sub>4</sub>, 2pi sampling: W-Shashlik or W-powder sampling
  - Barrel DIRC, ion-side dual RICH, electron endcap LGAD TOF *à la* ATLAS HGTD
  - Open questions: Pre-shower for PbWO<sub>4</sub> in barrel. Post DIRC tracker
  - All Digitizers can be *in situ*: compatible with streaming readout



# ATLAS

## High Granularity Timing Detector

- ATLAS: 70 cm radius + interface electronics
  - ALTIROC digitizer on-pixel
- CORE: Electron end-cap 45 cm radius
  - Interface electronics must be folded to back for CORE
- CORE implementation can be 15 cm thick sensors+readout.

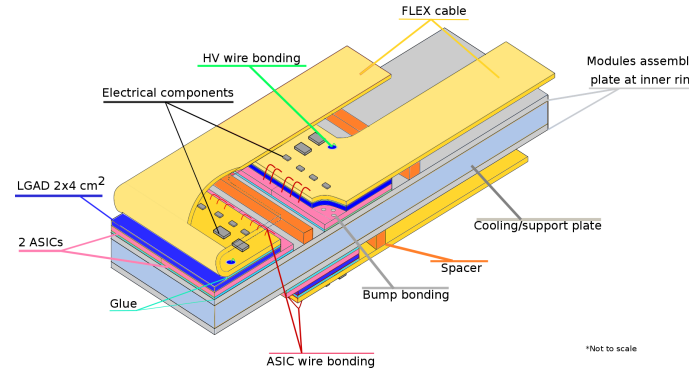


Figure 4.8: Schematic drawing of two adjacent modules on the top side and one on the bottom side of the cooling plate; the modules are mounted on thin support plates. The first flex cable is folded, while the others are straight.

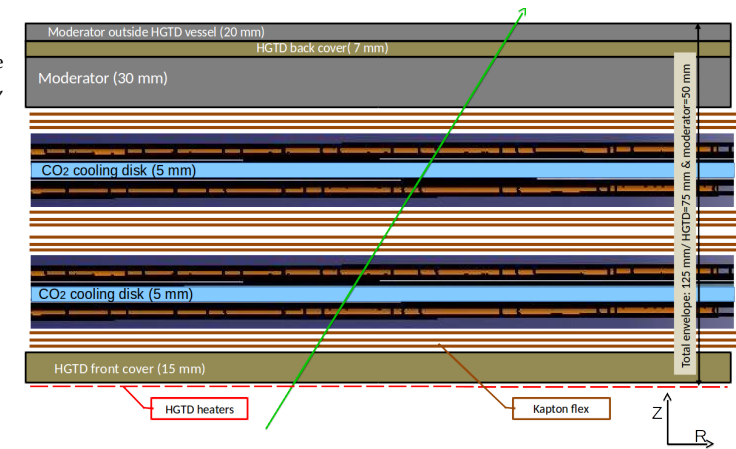
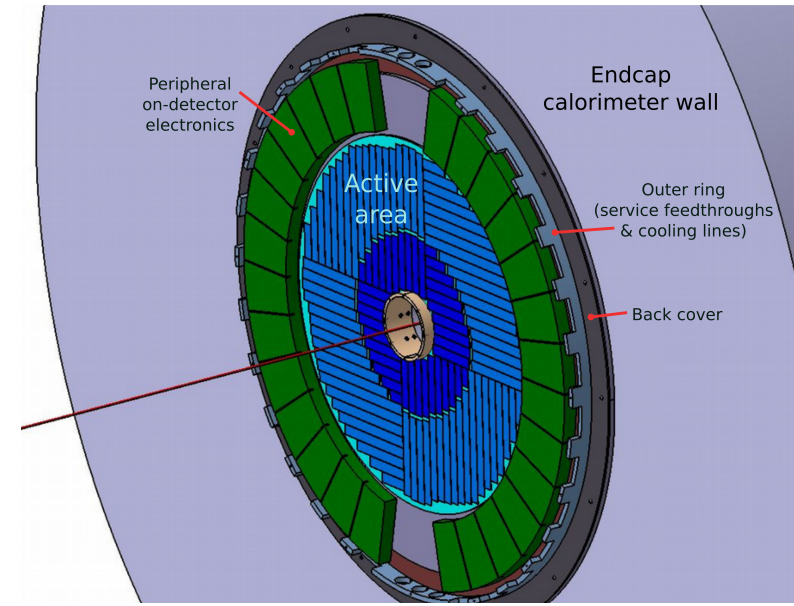


Figure 4.11: Cross section of the entire HGTD vessel including two active layers installed on the cooling plates, the front and back covers, and the moderator. An extra 20 mm moderator is located outside the vessel in close contact with the endcap cryostat.

# Collaboration

- We are a small group, but enthusiastic
- Looking for volunteers to pick up the effort on incorporation into Fun4All: (Update from B. Schmookler)
- Looking for advisors for each CORE subsystem.
  - Effort less than “Convenor”
  - Verify our design and performance parameters (e.g. for FastMC) are reasonable.
- Guidance needed on critical topics for simulations
  - Call for proposals gives some requirements
  - Identify physics topics that highlight capability and complementarity of CORE
- CORE subsystem specification nearly complete
  - Detectors: P. Nadel-Turonski
  - Magnet: P. Brindza
- Meeting this week with EIC Project Leaders
  - Costing guidelines
  - Review process after Dec 1
- Si-tracking, PID, LGAD, Hcal.. consortia exist independent of detector collaborations
  - Looking to form a Dual RICH consortium.



# Discussion

## COmpact detectoR for Eic (CORE)

