



"Kick-Off" Workshop for "COmpact detectoR for Eic" (CORE)  
29-30 March 2021  
Hosted by SBU Center for Frontiers in Nuclear Science

# INTRODUCTION TO CORE WORKSHOP

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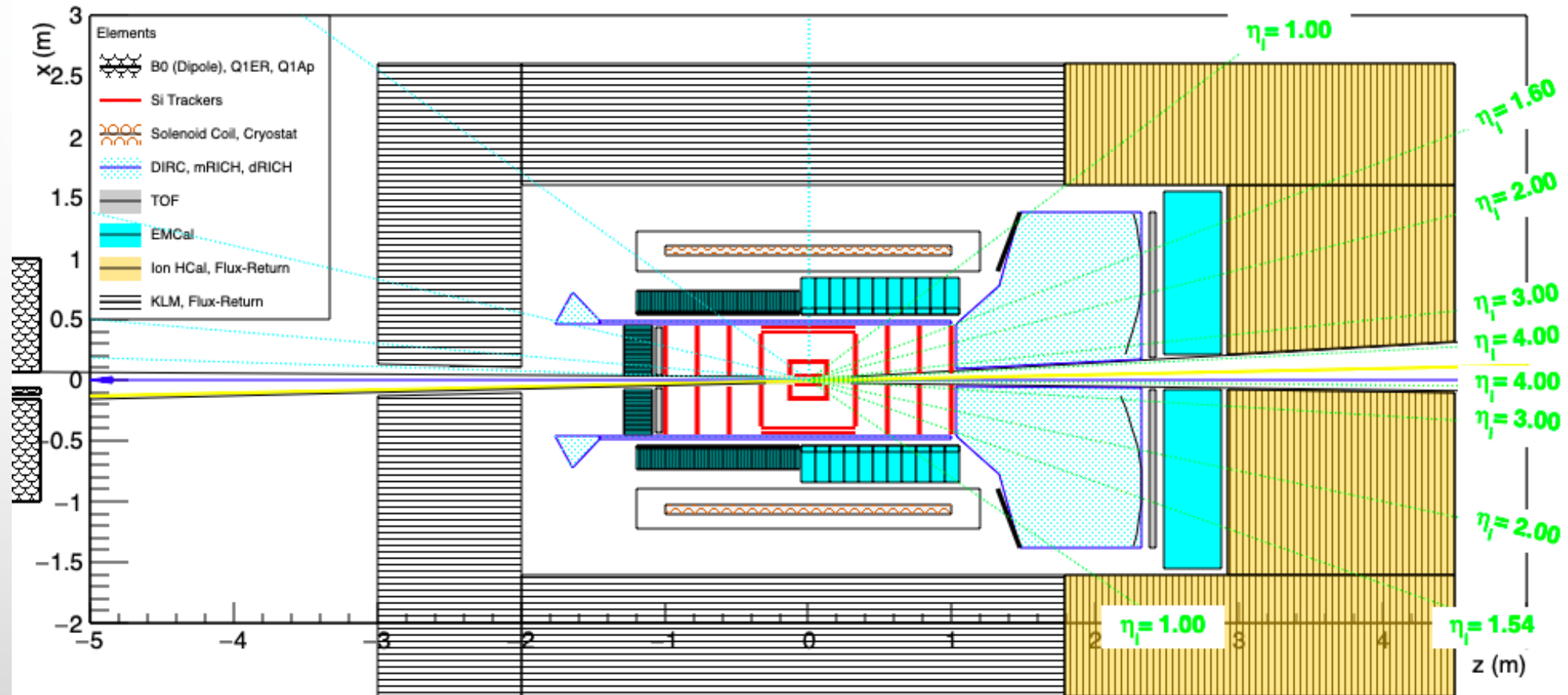


\*Support from  
DOE DE-FG02-96ER40960  
SBU-CFNS  
BNL Generic Detector R&D  
SURA/CNF

# ORGANIZING PRINCIPLES OF CORE

COmpact detectoR for Eic (CORE)

- All Si Tracker
- Compact Solenoid
- $2\pi$  PbWO<sub>4</sub> EMCal
- hpDIRC in Barrel
- dual-RICH in Ion EndCap



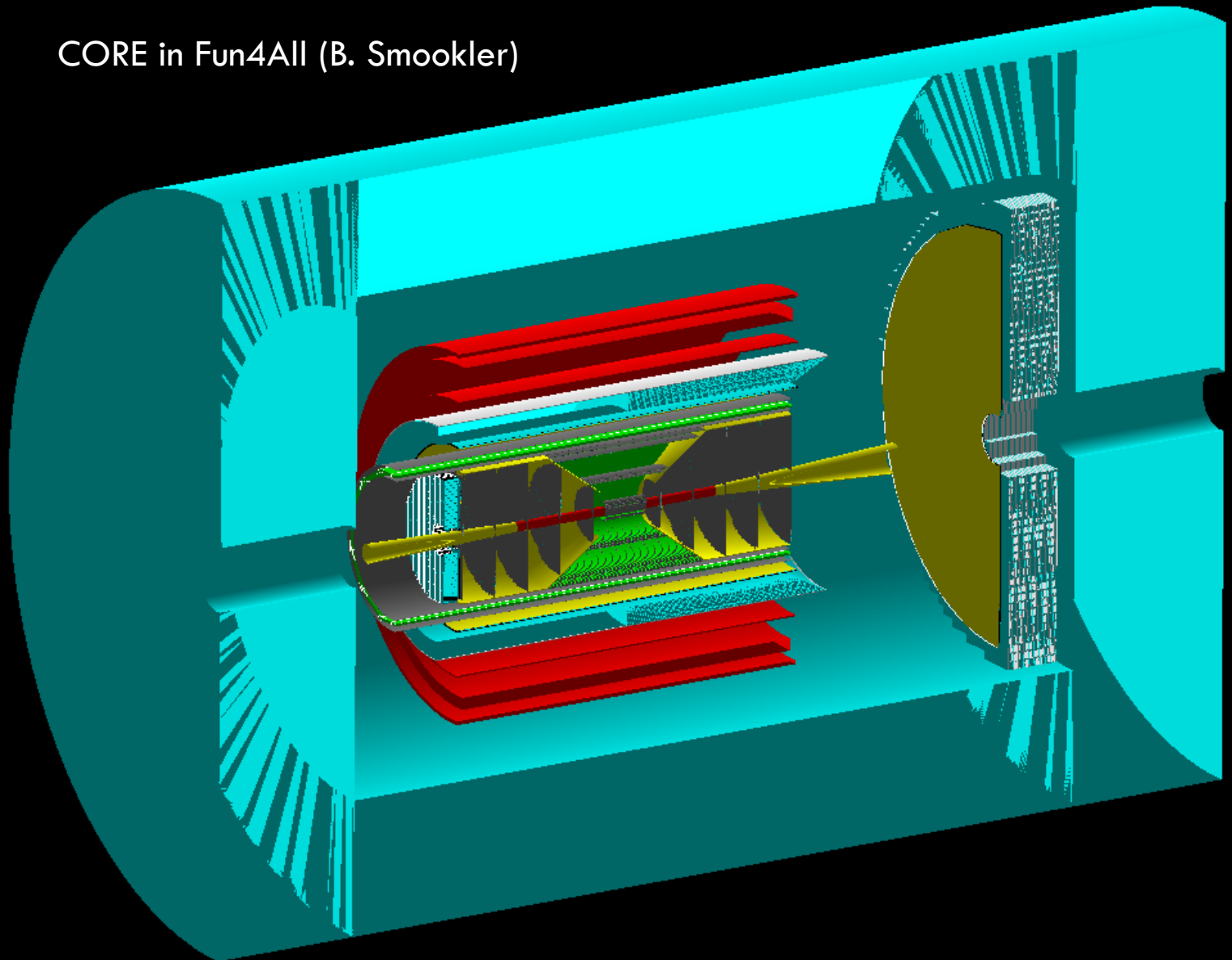
# ADDITIONAL ASPECTS OF CORE

- Ample space in forward Barrel and ion-Endcap for EMCAL

## Compact size

- HCal & Muon detection as required by physics
- Complete Roll-In, Roll-Out?
- Move quads closer for higher luminosity?
- Option for high field Solenoid

CORE in Fun4All (B. Smookler)



# “MID-LIFE” UPGRADE OPTIONS (AFTER FIRST 5-10 YEARS OF OPERATION)

COmpact detectoR for Eic (CORE)

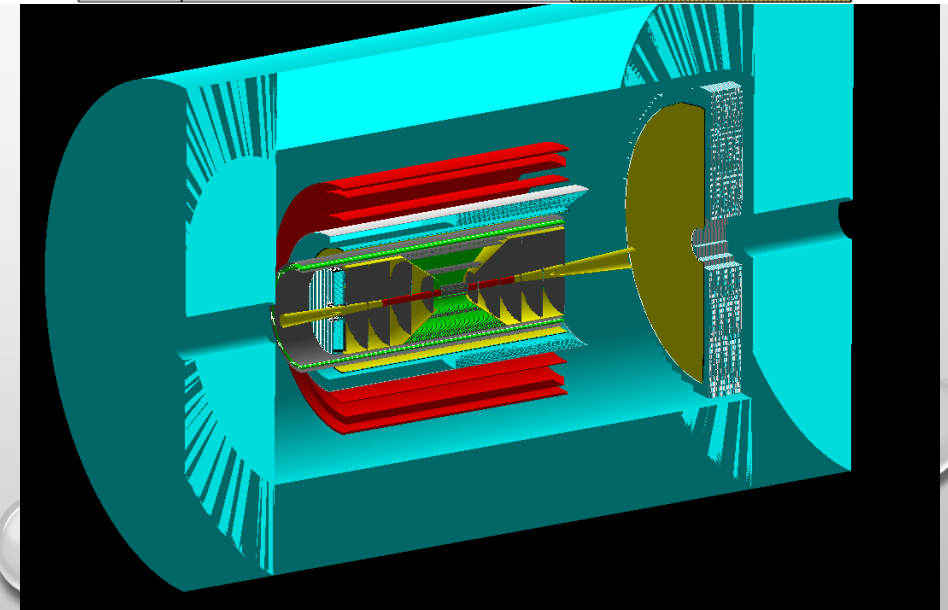
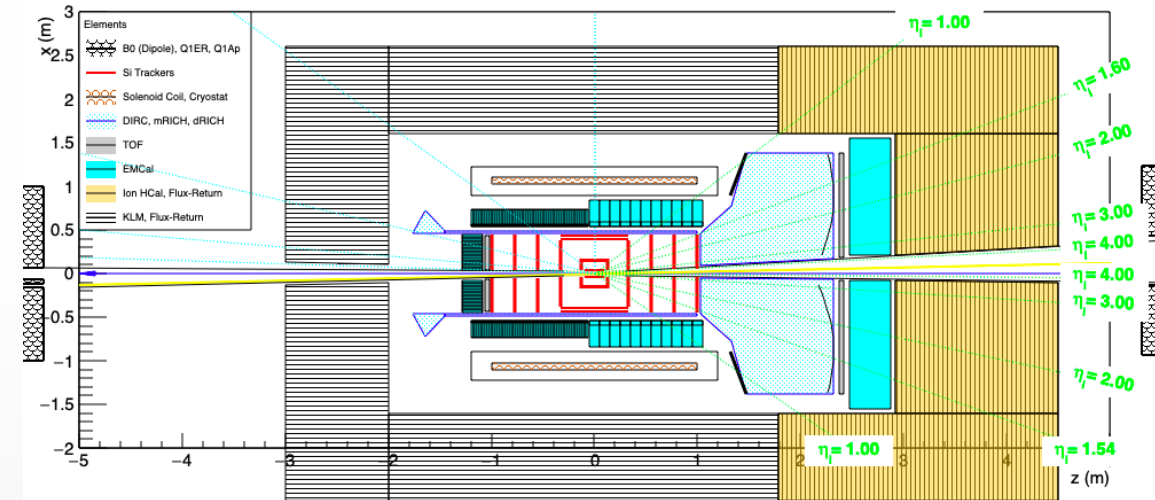
- DIRC

- Photosensor timing beyond 100 ps rms could increase the momentum reach of the DIRC, even at day 1
- Advances in low-noise SiPMs could enable DIRC operation in very high magnetic fields.

- New Cherenkov metamaterials:

- Compact PID with  $(n-1) = (4 \rightarrow 20) \cdot 10^{-4}$ 
  - V.Ginis PRL **113** (2014) 167402

- Smaller pixel size Si Tracker upgrade





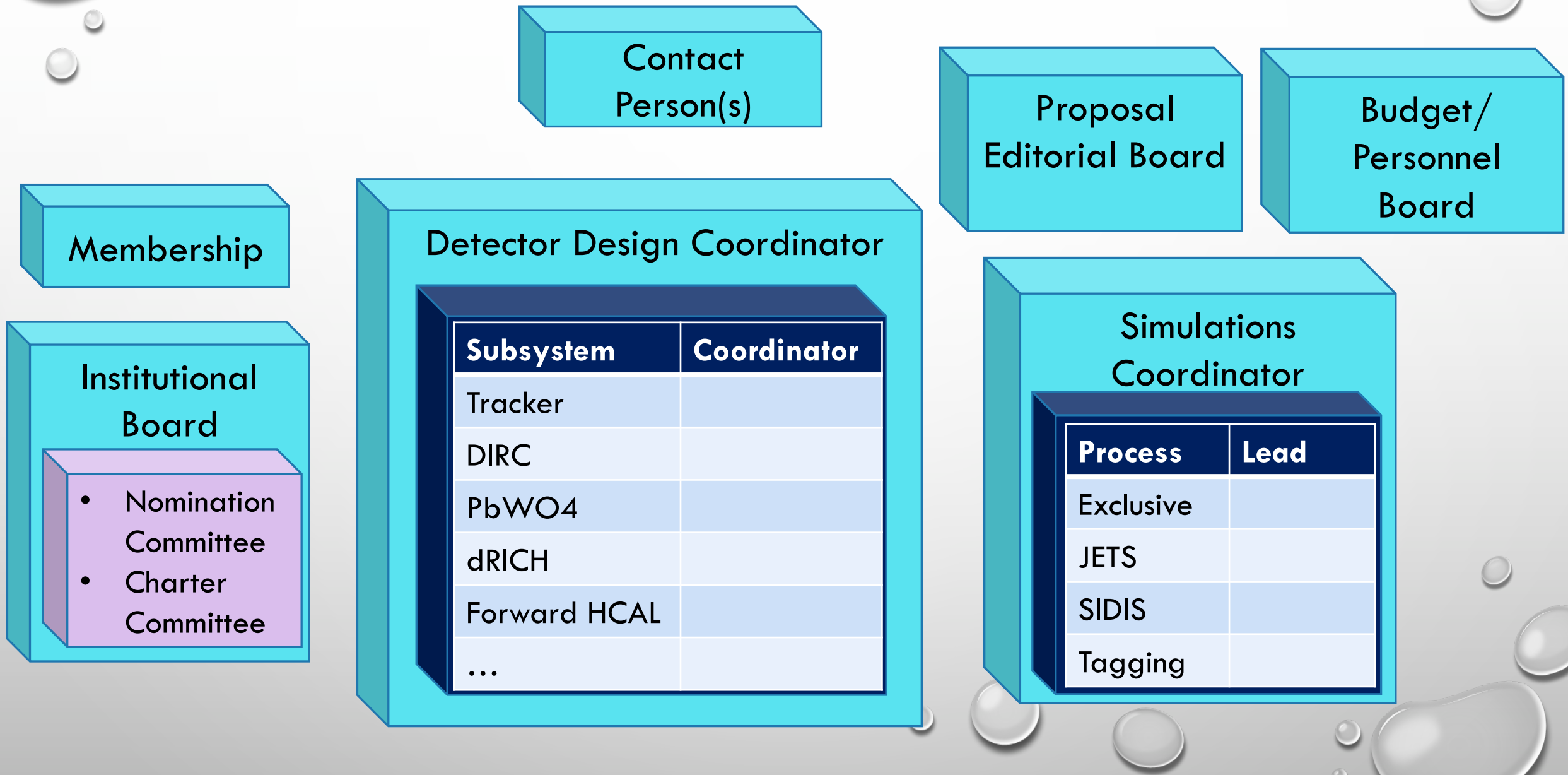
# EIC CALL FOR COLLABORATION PROPOSALS FOR DETECTORS ([HTTPS://WWW.BNL.GOV/EIC/CFC.PHP](https://www.bnl.gov/eic/cfc.php))

- **DETECTOR 1** IS WITHIN THE SCOPE OF THE EIC PROJECT AND SHOULD BE BASED ON THE ... YELLOW REPORT (YR) AND THE CONCEPTUAL DESIGN REPORT (CDR).... IT IS CURRENTLY PLANNED TO BE LOCATED AT INTERACTION POINT 6 (IP6) ON THE RELATIVISTIC HEAVY-ION COLLIDER.
- **DETECTOR 2** COULD BE A COMPLEMENTARY DETECTOR... WOULD RESIDE AT A DIFFERENT INTERACTION POINT FROM DETECTOR 1. ... IS CURRENTLY NOT WITHIN THE EIC PROJECT SCOPE. ROUTES TO MAKE DETECTOR 2 AND A SECOND INTERACTION REGION POSSIBLE ARE BEING EXPLORED.
- **THE PROPOSALS SHOULD INCLUDE TWO PARTS:**
  - A DESCRIPTION OF THE SCIENCE ADDRESSED AND PERFORMANCE ESTIMATED THROUGH SIMULATION ... THE R&D NEEDS, RISKS, AND, IF APPLICABLE, ADOPTION OF EMERGING NEW TECHNOLOGIES.
  - A COLLABORATION ROSTER AND STRUCTURE, TIMESCALE AND COST (INCLUDING POTENTIAL SOURCES OF FUNDING SOURCES AND ASSUMPTIONS), AND POTENTIAL UPGRADE PATHS.

# BUILDING A COLLABORATION

- All are welcome
  - Today is just a “Coming-out-Party”
  - We will soon ask for people to officially declare interest
  - Participation in CORE does not exclude participation in any other detector proposal
- One major decision we need to make soon:
  - Is this a Detector-1 Proposal (Included in Project Budget)?
  - Is this a Detector-2 Proposal (Not included in Project Budget)?

# POSSIBLE COLLABORATION STRUCTURE



# CORE COLLABORATION TIMELINE

- APRIL 2021

- INITIAL MEMBERSHIP, CHARTER
- COORDINATORS

- MAY 2021

- CHARTER RATIFICATION
- ELECTIONS (AS PER CHARTER)
- SUB-SYSTEM TOP-LEVEL DECISIONS
- SIMULATION STRATEGY/ FRAMEWORK

- JUNE 2021

- FINAL DESIGN DECISIONS
- INITIAL SIMULATIONS

- JULY 2021

- TECHNICAL PERFORMANCE EVAL.
- DRAFT OF SUB-SYSTEM TEXT
- INITIAL COSTING

- AUGUST 2021

- FULL SIMULATIONS
- COLLABORATION STRUCTURE DEF'N

- SEPTEMBER 2021

- FINALIZE COSTING
- DEFINE TDR ROLES / RESPONSIBILITIES
- ROUGH DRAFT OF FULL PROPOSAL

- OCTOBER-NOVEMBER 2021

- FINALIZE PROPOSAL