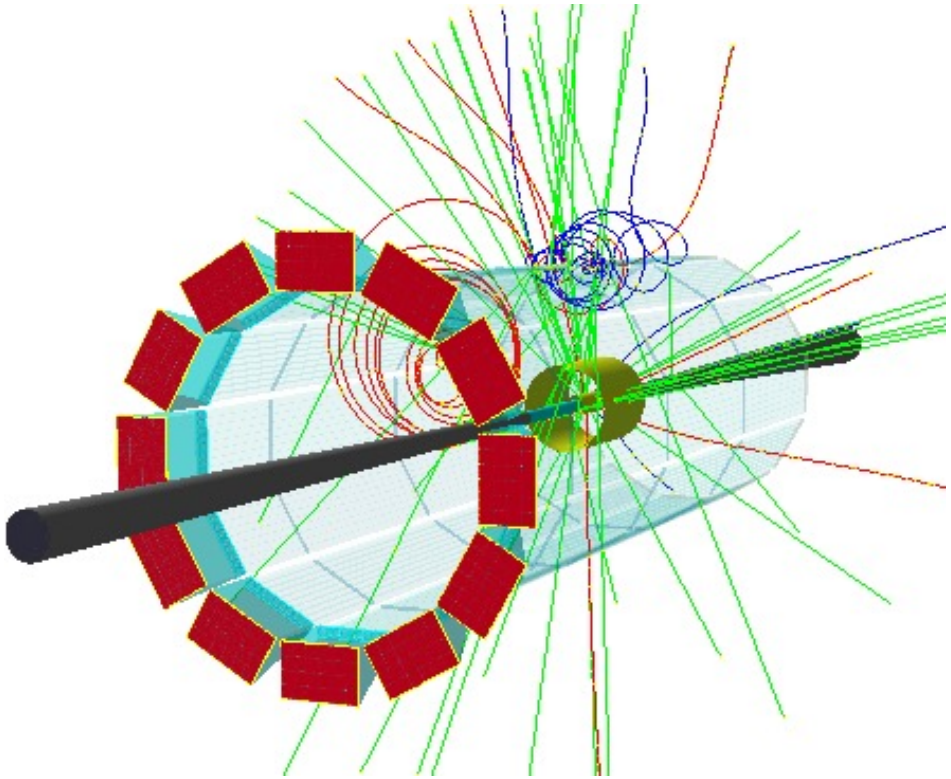
ePIC hpDIRC DSSC Meeting



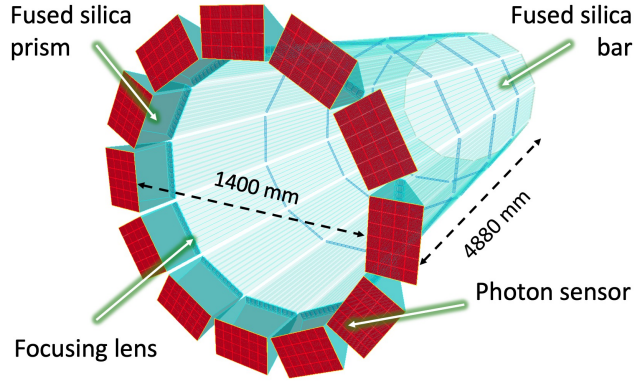
- Organisation matters
- eRD103 Hardware Updates
- Simulation Status (Nilanga)
- Moving forward

Greg Kalicy

CUA

HPDIRC DSSC ORGANIZATION MATTERS

- Please sign up for mailing list
- Looking for best place to upload important information, documents etc.
  Wiki, Google drive…
- "Biweekly meeting to discuss progress, organizational matters, and related actions from other groups"
  - Current technical meetings: 2 x R&D, Bars QA setup, Engineering and Design, CRT/Prototype
  - Nilanga will join Software meetings, we need someone to join Calorimetry DSG and Tracking DSG meetings
- DIRC@EIC Annual Meeting June 1-4th
  Jlab F226 + ZOOM, Agenda in progress, please send time constrains
- Looking for best options to add manpower through grants



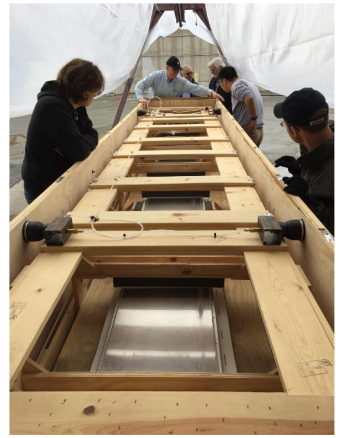
eRD103 R&D - BaBar DIRC bar reuse

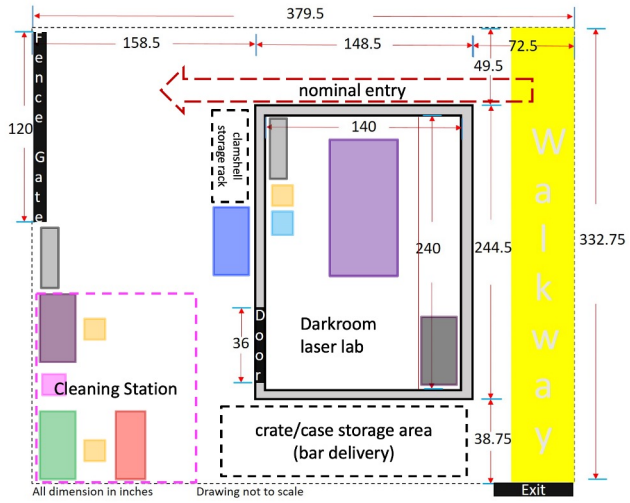
- BaBar bar box transfer from SLAC to Jlab:
  - Formal agreement and budget from SLAC progressing
  - Two shipping companies sent quotes, need to discuss details
- Disassembly of the bars:
  - Space in Jlab chosen, components being arranged
- Validation of mechanical and optical bar quality in QA laser setup
  - Dark room almost finished
  - Most of components of setup in Jlab, ready to be installed
  - Working on software
  - Cleaning station in preparation
  - Long term storage – received quote

DIRC barboxes in SLAC

BaBar DIRC bars

BaBar DIRC bars transport for GlueX





QA Lab In JLab

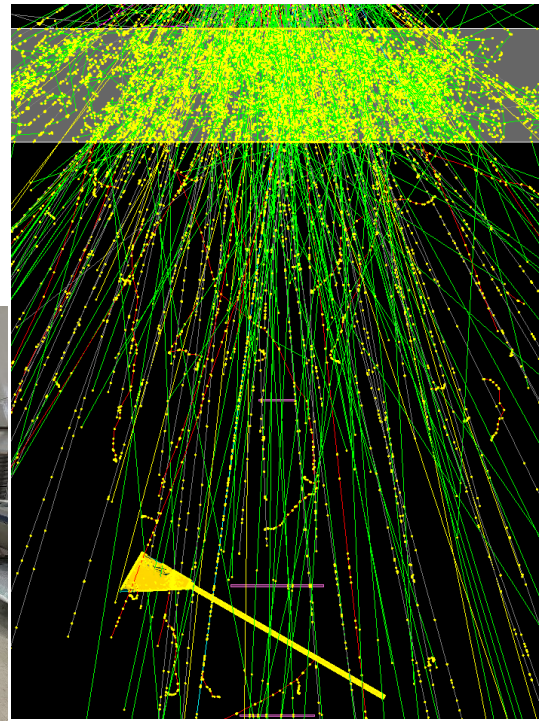
eRD103 R&D Prototype in CRT

- Components of prototype arrived from GSI in SBU!
- Components for CRT are being ordered
- Work on arrangement of Tracking stations is in progress
- Cherenkov Tagger at ODU will be revaluated in next days

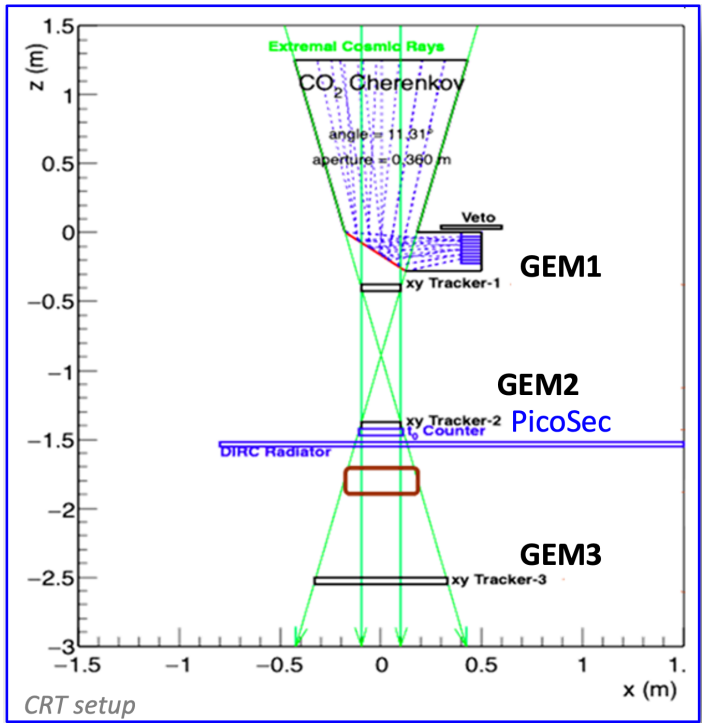
Prototype components from GSI

DIRC lab/CRT space at SBU

Simulation

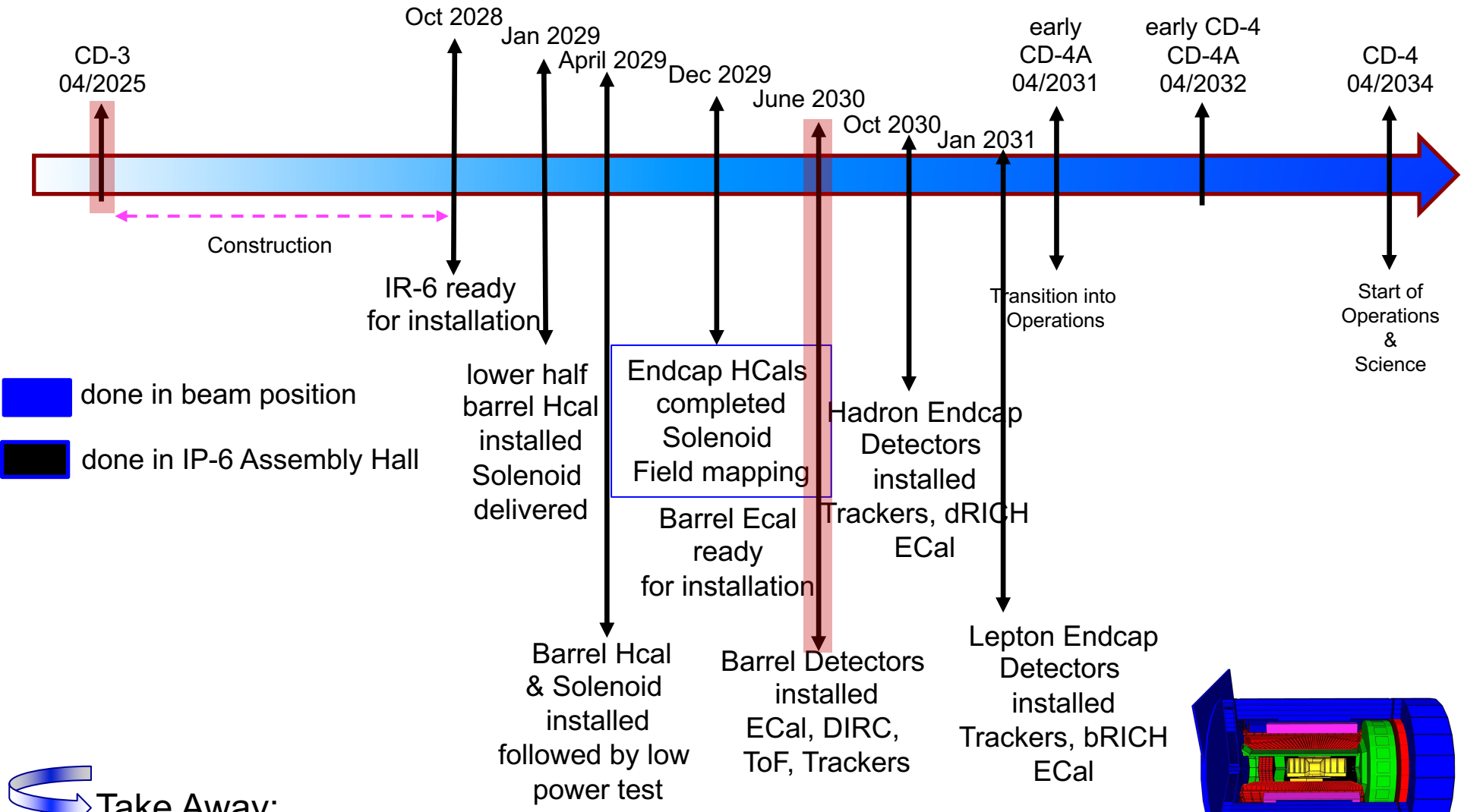


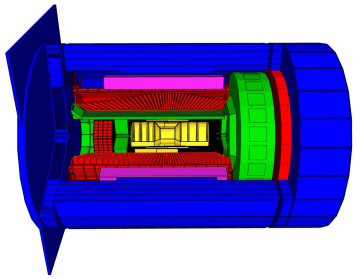
Preliminary CRT setup



CRT setup

High Level Installation Schedule





Take Away:

- Solenoid and Barrel HCal need to be ready by Jan 2029
- all other subdetectors need to be ready between 06/29 to 09/30 depending on their location in the detector

BASELINE HPDIRC DESIGN FOR EPIC

- Radiator bars:
  - Size: 4580mm x 35mm x 17mm (L x W x T)
  - Barrel: 715mm radius, 12 bar boxes, 10 long bars per bar box

    long bar: 4 bars glued end-to-end, flat mirror on far end

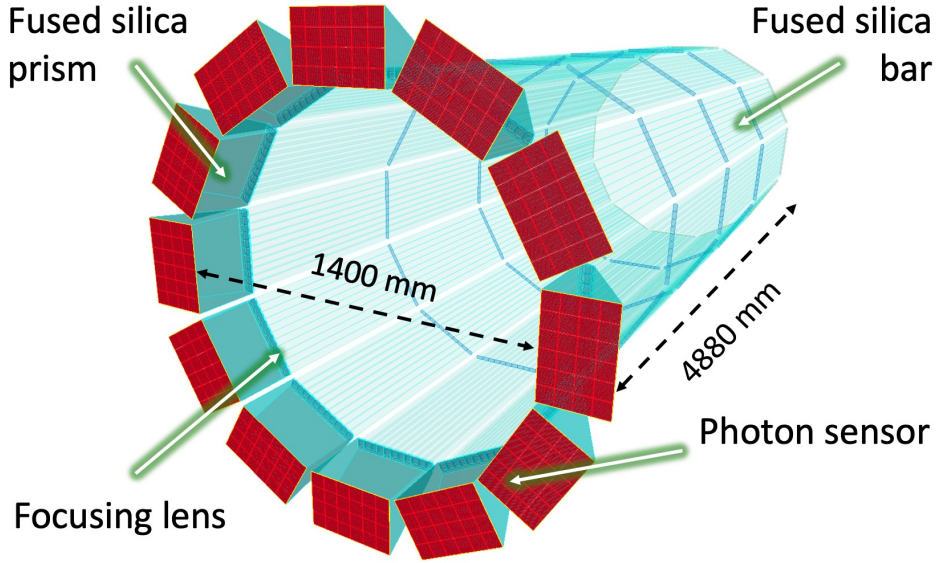
    baseline design: reuse of BaBar DIRC bars (R&D started)
- Focusing optics:

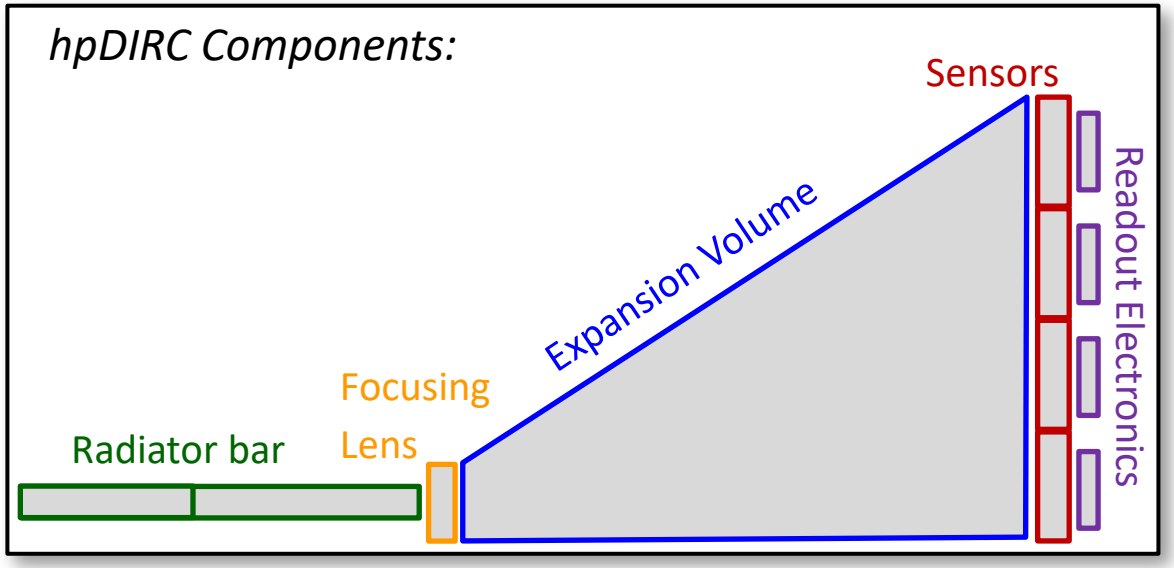
  Radiation-hard 3-layer spherical lens (sapphire or PbF_2)
- Expansion volume:

  Solid fused silica prism: 240 x 360 x 300 mm^3 (H x W x L)
- Readout system:

  MCP-PMT Sensors (e.g. Photek/Photonis/Incom)

  ASIC-based Electronics (e.g UH/Nalu Scientific, EICROC)
- Several core design aspects, as well as detailed Geant simulation, validated in PANDA Barrel DIRC beam tests (prototype tests in cosmic rays and test beams in preparation)





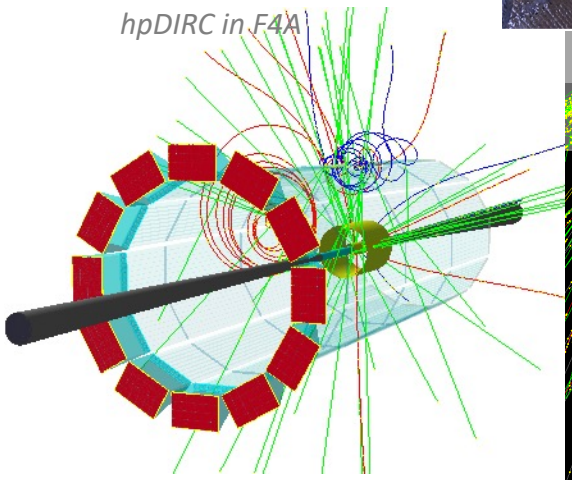
HPDIRC R&D PROGRAMS

- Validation of the BaBar DIRC bar reuse:
  - BaBar bar box transfer from SLAC to JLab and disassembly
  - Validation of mechanical and optical bar quality in QA laser setup
- hpDIRC studies in simulation:
  - Study of the hpDIRC performance with background and magnetic field (DD4HEP, Fun4All, Standalone)
- hpDIRC prototype program:
  - Modular hpDIRC prototype in Cosmic Ray Telescope at SBU
  - Incremental hpDIRC optical components integration and evaluation
  - Adaptation and evaluation of sensors and readout electronics in hpDIRC prototype
- Generic DIRC R&D explores innovate optical DIRC configurations to create opportunities for cost reduction, performance improvement, and complementarity
- Benefiting from synergies with PANDA barrel DIRC

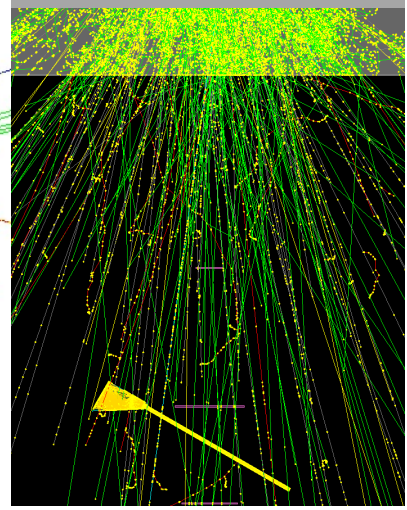
BaBar DIRC bars

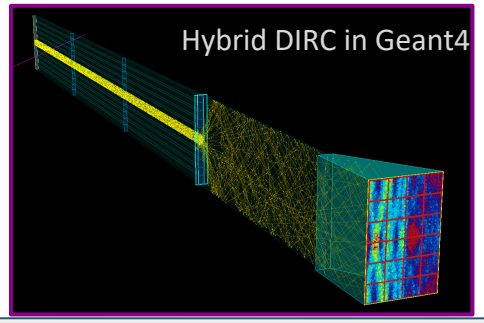
DIRC barboxes in SLAC

hpDIRC in F4A



10s of hpDIRC in CRT simulation



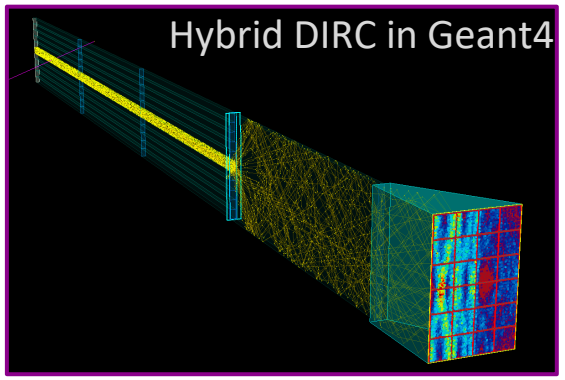


DIRC lab/CRT space at SBU

xpDIRC Generic R&D

hpDIRC baseline design performance matches requirements for ePIC.

Reuse of BaBar DIRC bars limits ePIC hpDIRC design options, novel optical designs ("xpDIRC") are explored in generic R&D program.



- Hybrid optics in different focusing lens configurations
  - Reduce cost
  - Potential for smaller prism (may enable SiPM application)
  - Potentially improve DIRC performance at high momentum
  - Provide complimentarity to ePIC hpDIRC
- Thinner bars
  - Improve DIRC performance at low momentum
  - Reduce impact on EMCal performance
  - Provide complimentarity to ePIC hpDIRC