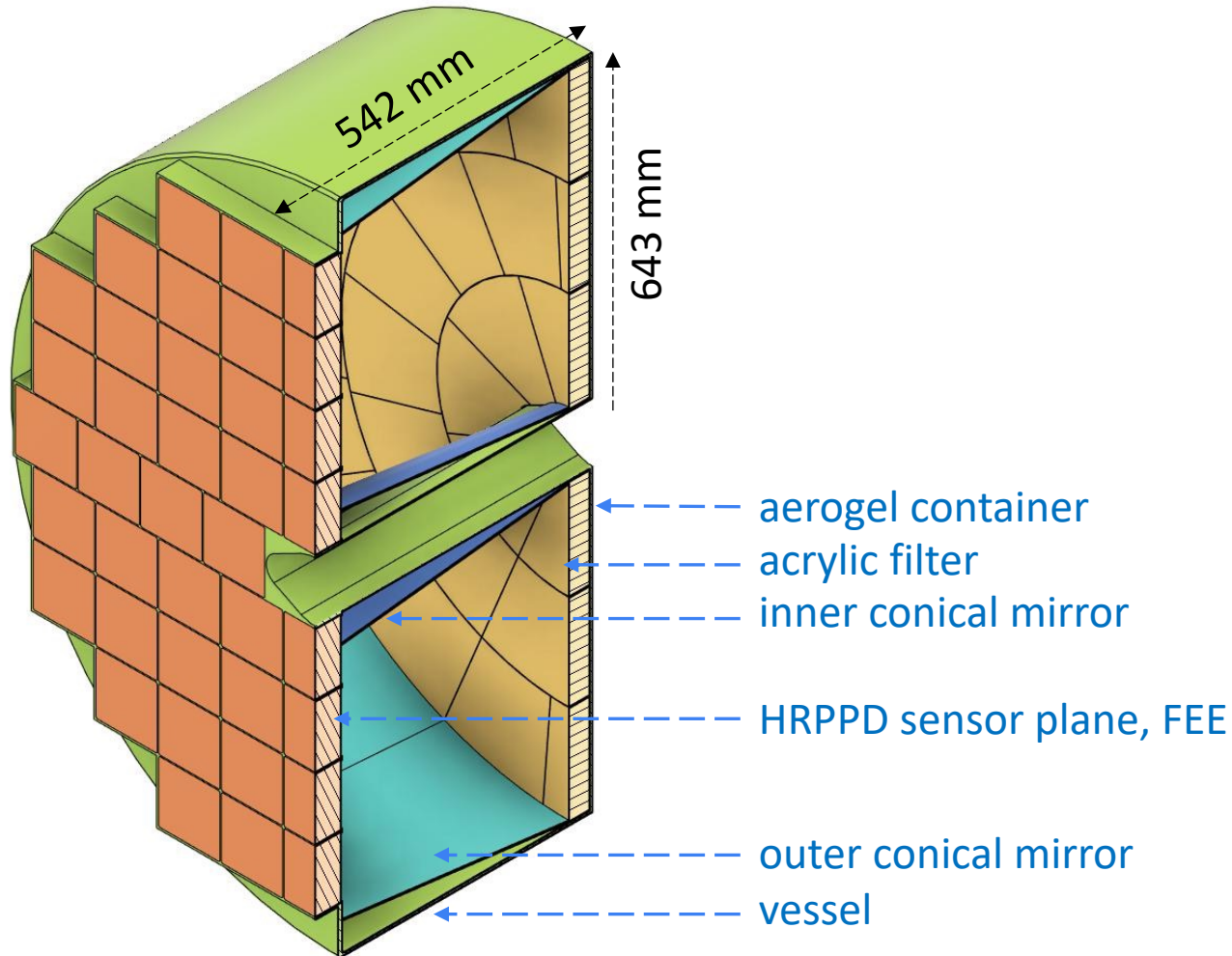


(pf)RICH prototype construction & beam test



- Timelines
 - May 2023: no sensors, aerogel, FEE, ...
 - Fall 2024: Final Design Review
- Beam test goals
- Participants
 - Modeling, proposal writing
 - Construction
 - Beam test
 - Offline data analysis afterwards
- Scope
- Construction site
- Budget
- Ingredients

What realistically can we build? Fallback strategies?

(pf)RICH prototype construction & beam test

➤ Aerogel

- EIC Project is ordering new tiles from Chiba
- Their performance will be quantified in advance

➤ HRPPD photosensors

- A 2x2 matrix should become available
- A separate short beam test ~January 2024?

➤ Vessel

- A “sector test” version, see next slide
 - Front plate with aerogel compartments
 - Aluminum rear plate

➤ Mirror mockup

- Order a full-size sector from CMA? \$\$\$\$
- *Is this prototype test an opportunity window for a Stony Brook mirror option?*
- What about pyramid mirrors?

➤ Readout

- Build a 4096ch HGCROC3 version?
 - ASICs will be available, < \$10k
 - Oak Ridge / Orsay & JLAB help with the engineering as part of the eRD109 FY24 request
 - Incom / BNL / Techtra to solve the integration problem

➤ *BNL 512ch DRS4 is always a fallback option*

➤ Services

- HV -> a scaled down “final” version: < \$20k
- LV -> a scaled down “final” version: < \$10k

- Gas system -> a final version would be <\$10k
- Cooling -> if chiller & circulator can be borrowed (?), the rest is by far < \$10k

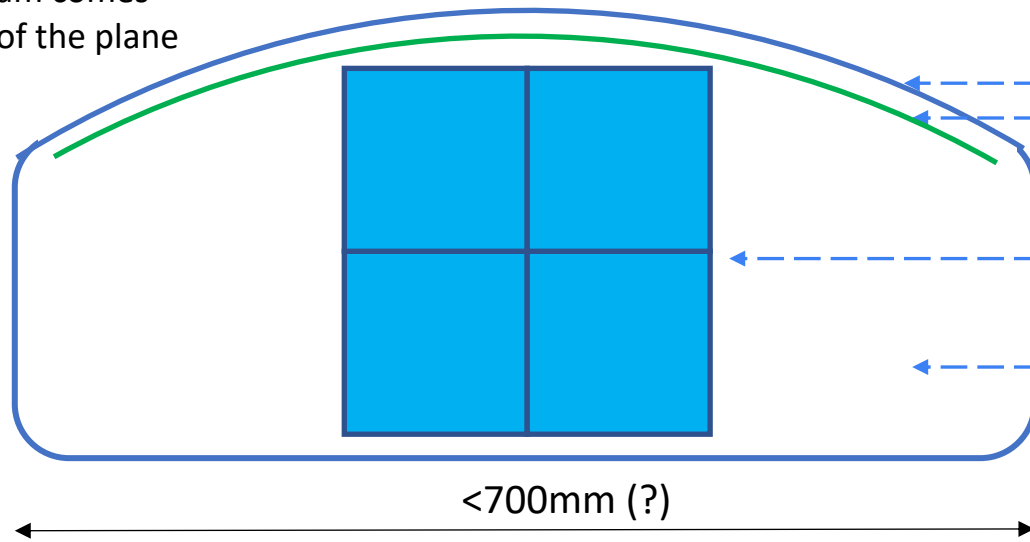
Relevant timelines

EIC Project Detector R&D FY24 call deadline	July 7, 2023
FY24 R&D funding availability	October 1, 2023, the earliest
Aerogel availability	Starting September 2023 or so
Work on HGCROC ASIC integration	TBD
HRPPD manufacturing (first five tiles)	September 2023 – March 2024
HRPPD (and aerogel?) beam test opportunity	Beginning of 2024 ?
(pf)RICH prototype beam test	May – June 2024
ePIC Final Design Review readiness	Mid Fall 2024

(pf)RICH prototype construction & beam test

Iteration #2: a hangar with a curved roof

Beam comes
out of the plane



vessel

60° outer conical mirror sector

HRPPD sensor plane

rear aluminum plate

Same as in the final design?

➤ Vessel

- Build as a “single HC/CF piece” or not?
- Will it be manageable in the beam test?
- Will it be “representative enough”?
 - Sturdiness overall, given a smaller size
 - Reinforcement ring material and layout
 - Aluminum rear plate with HRPPD slots
 - Aerogel tile integration

➤ Services

- Can pack and test as much as the EIC project agrees to fund this time

➤ Readout

- Develop HGCROC ASIC solution, but use it at Fermilab only if 100% sure we are not wasting a beam test debugging it

➤ Mirrors

- ?