mRICH Updates

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Three things to be discussed today

- mRICH publication status
- 2nd mRICH prototype
- mRICH in fsPHENIX

mRICH Publication

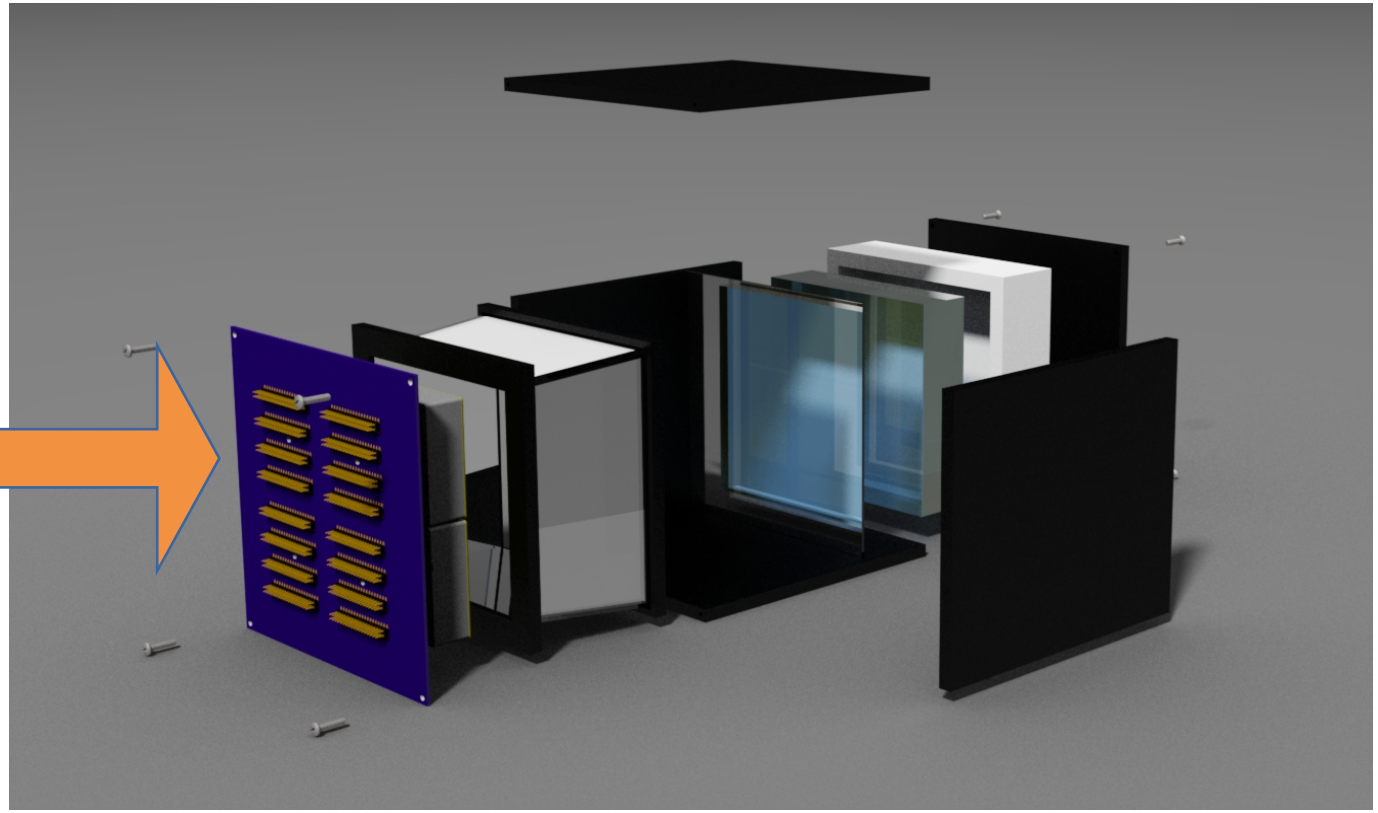
- Two review reports were received
  - Response to the 2nd reviewer's comments is nearly done.
  - We had a meeting with Marco about two weeks to address the comments from the 1st reviewer about the detector (from beam and readout) noise. Ping is working on analyzing the data following Marco's suggestion.
- If you are interested in keeping track of the progress, please follow this link - https://www.overleaf.com/read/zzgrgsmpdnhk
- The plan is to submit the revision within one week from today. Please send us any comments you may have.

2nd mRICH Prototype

(recap the presentation on Nov 2, 2016)

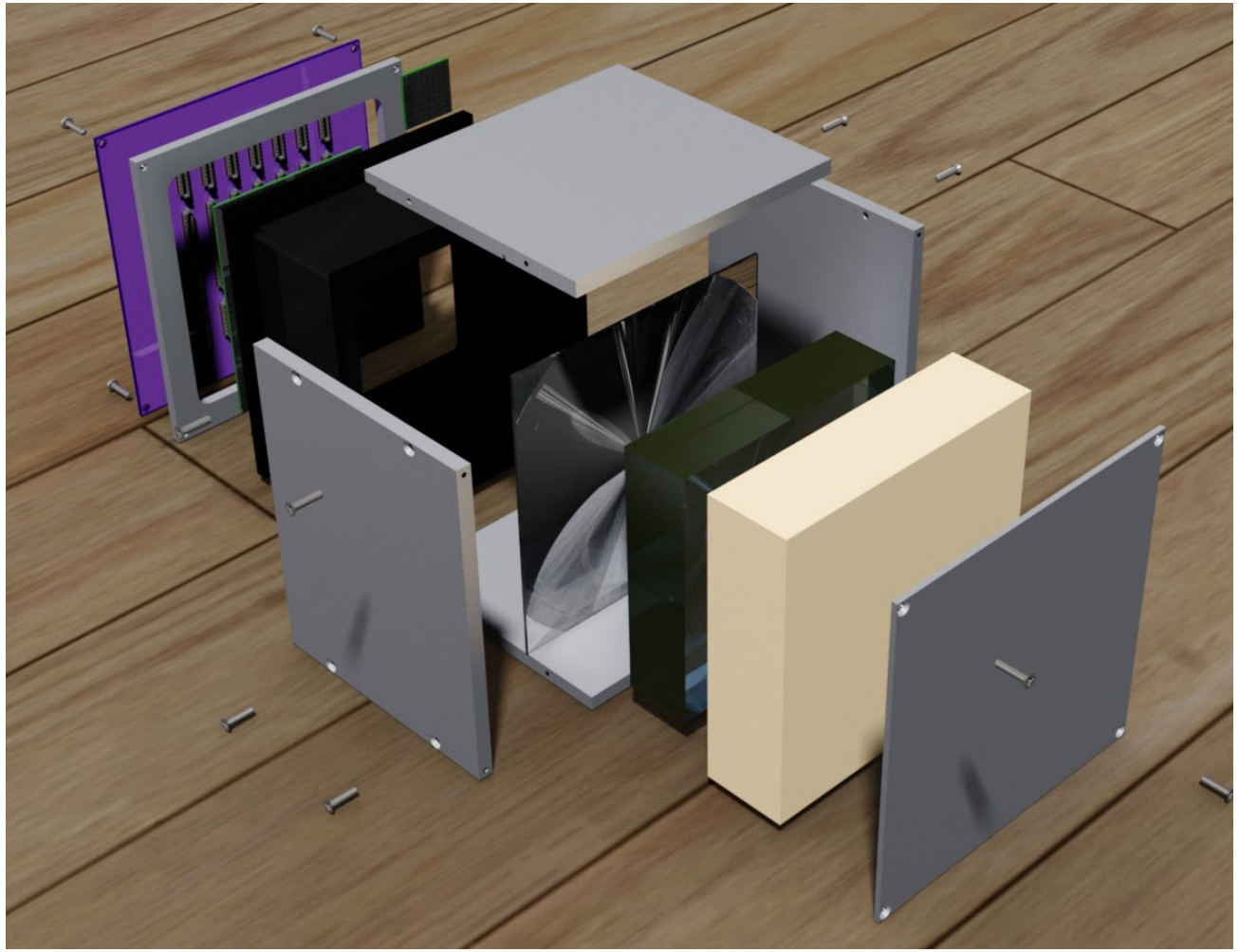
New Holder Box Design (Improved!!!)

- Readout electronics will be attached to the back of the holder box in order to avoid over heating from the readout electronics – a lesson learned from the 1st prototype test.
- Smaller pixel size for PID capability.
- Increased fresnel lenz focal length.



(recap the presentation on Nov 2, 2016)

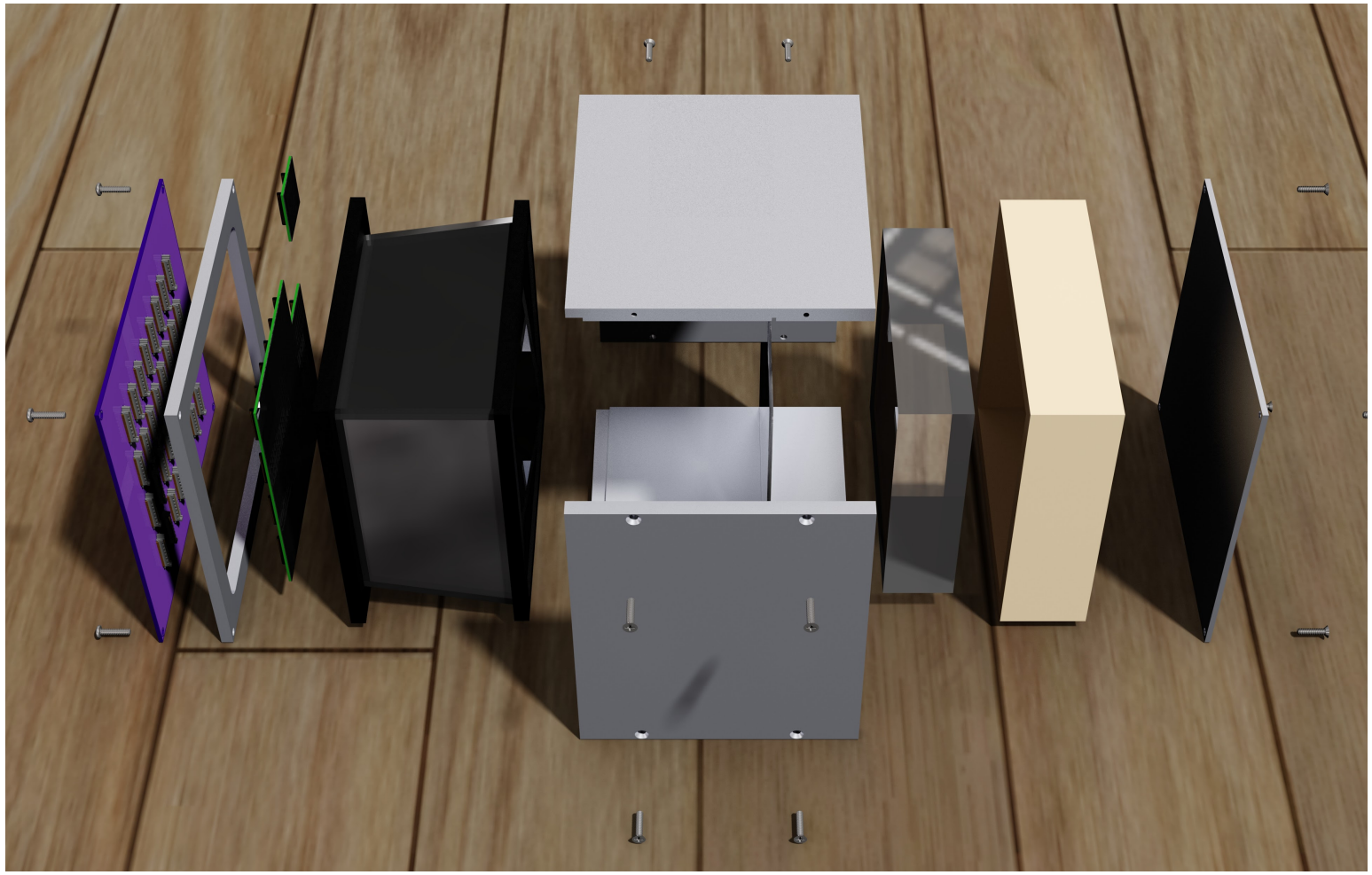
Close Up View (front side)



Easy access to the components with removable aluminum panels for variety test configurations.

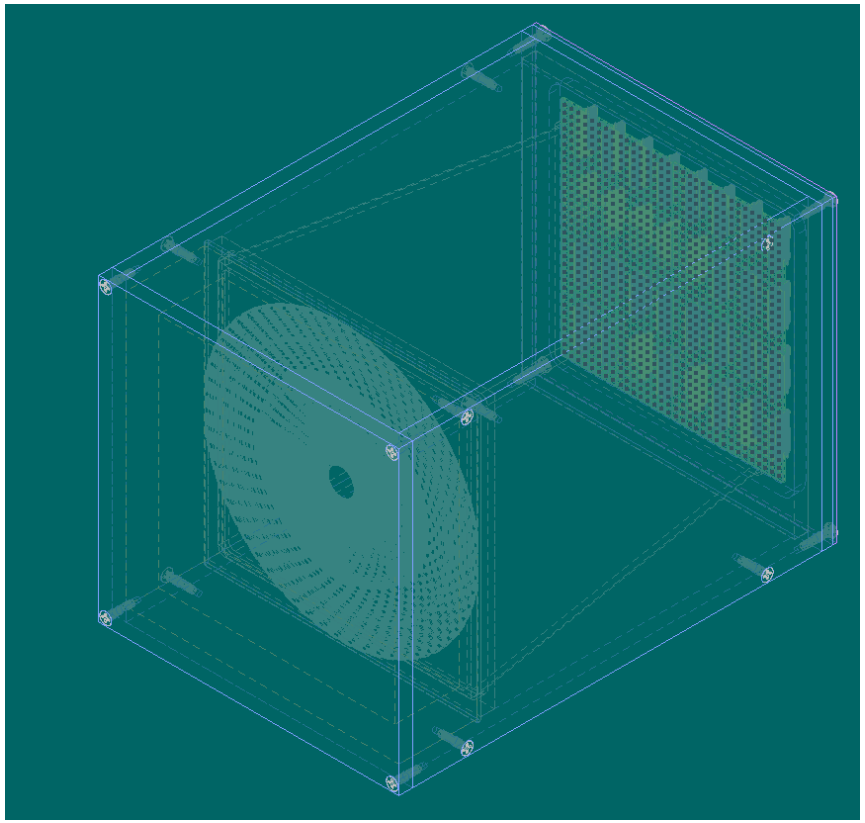
(recap the presentation on Nov 2, 2016)

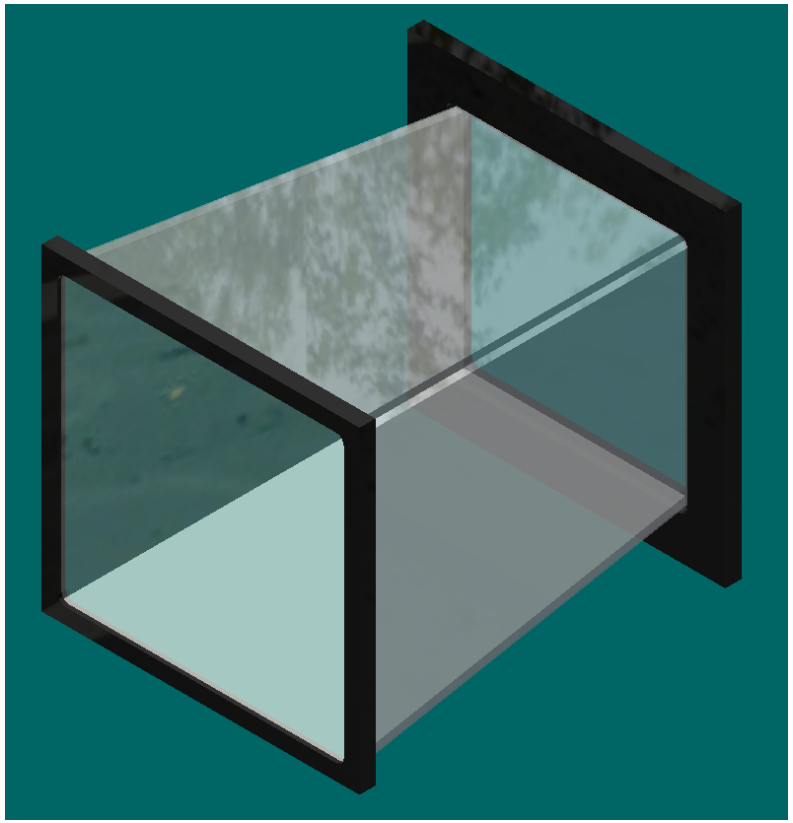
Close Up View (side view)



(recap the presentation on Nov 2, 2016)

Fresnel Lens (f = 6”) and Mirror Set

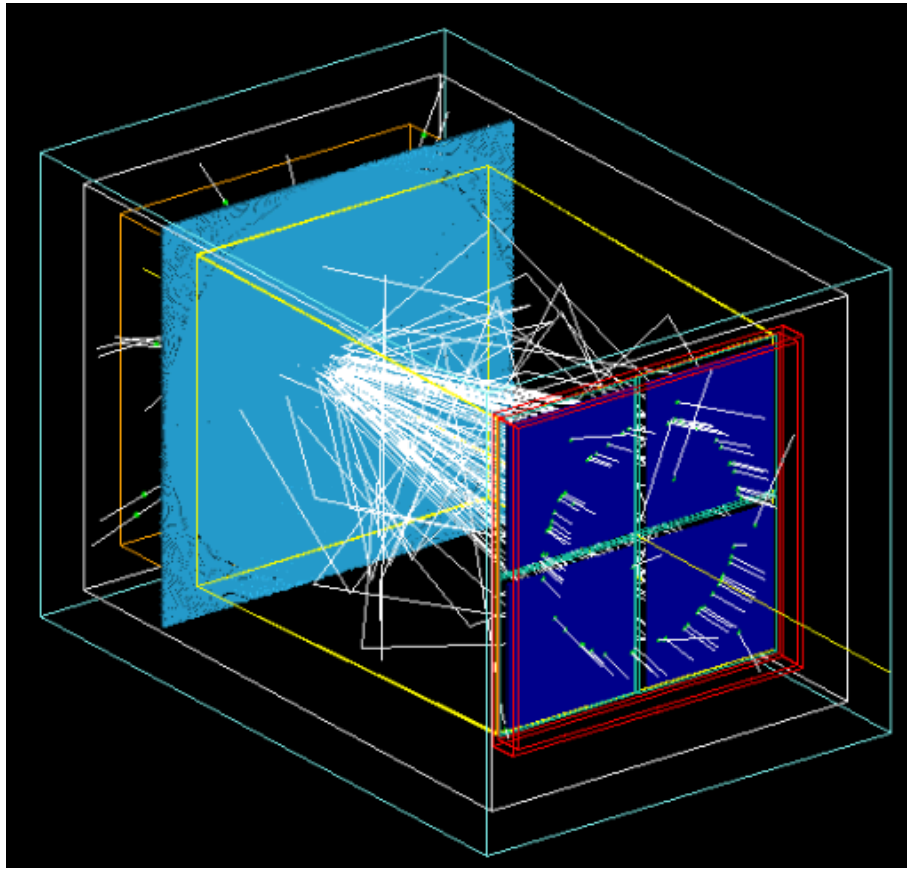


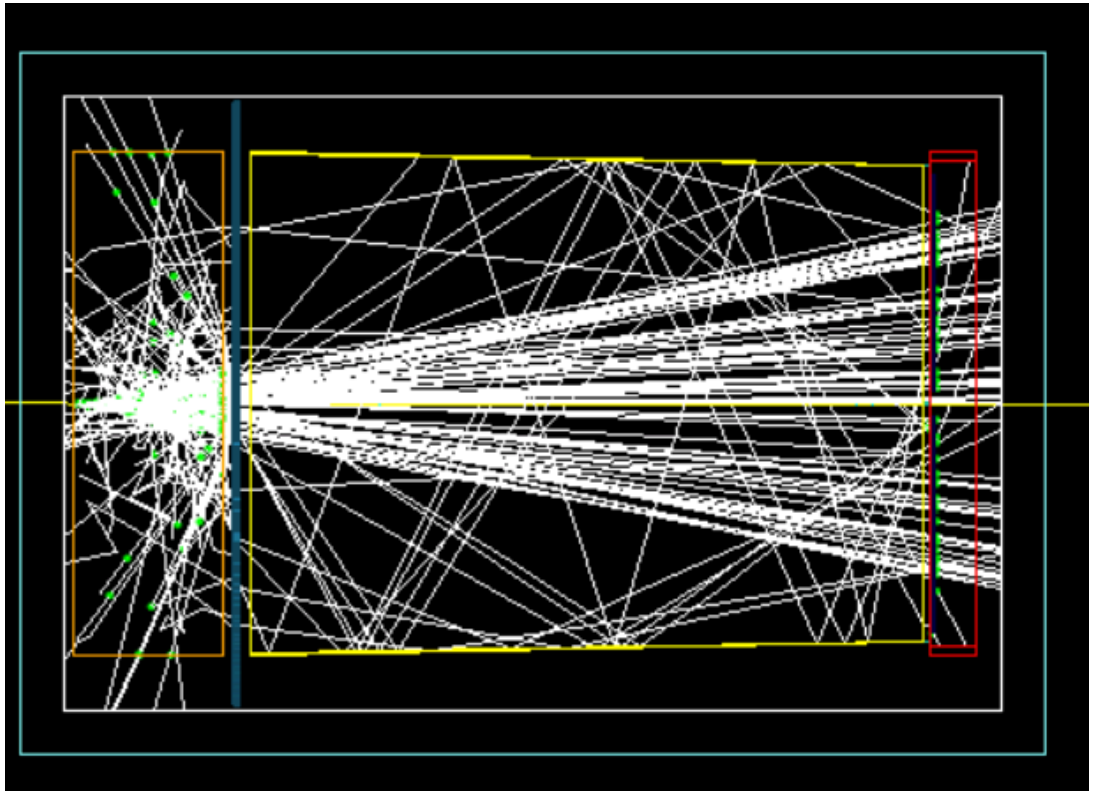


f = 3” for the first prototype.

(recap the presentation on Nov 2, 2016)

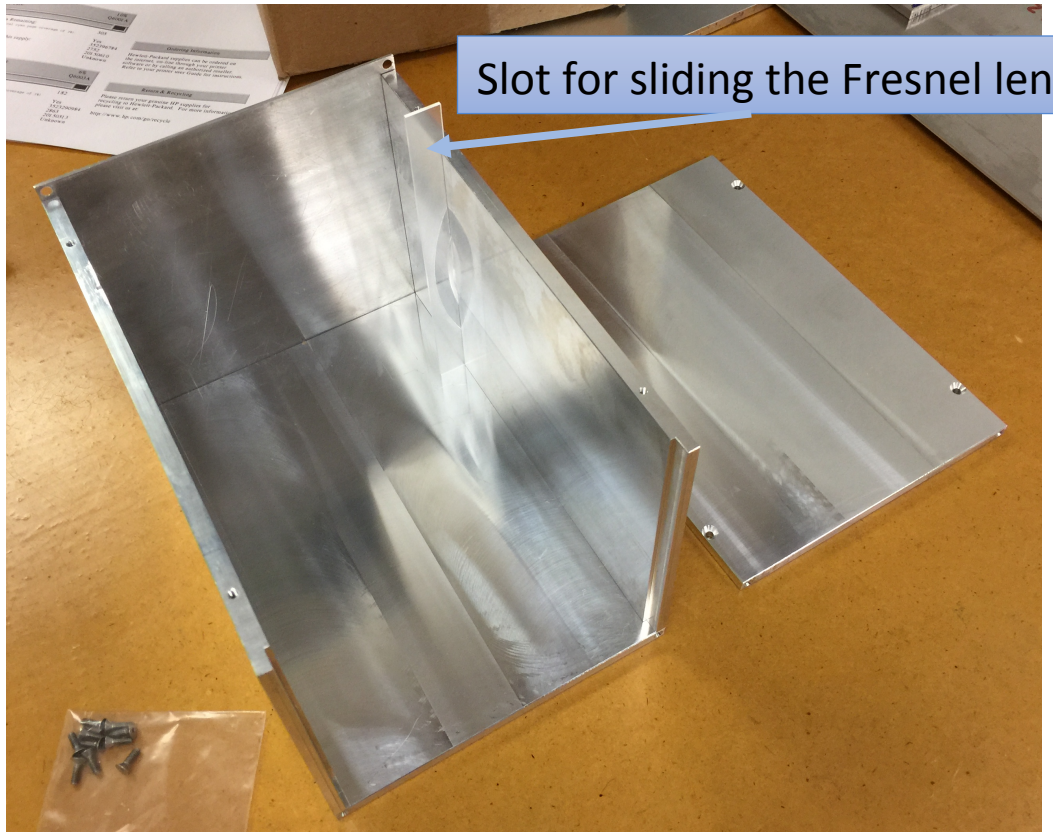
Ping's Updated Simulation Event Display

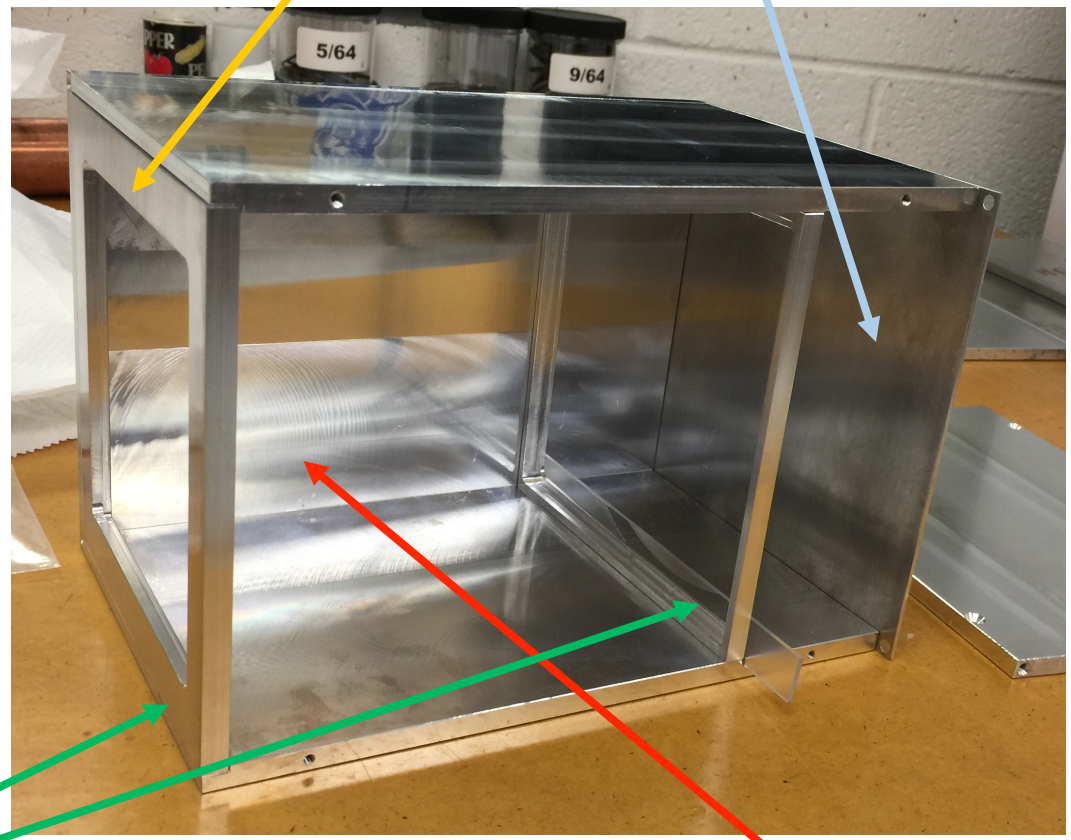




New

Building the 2nd Prototype

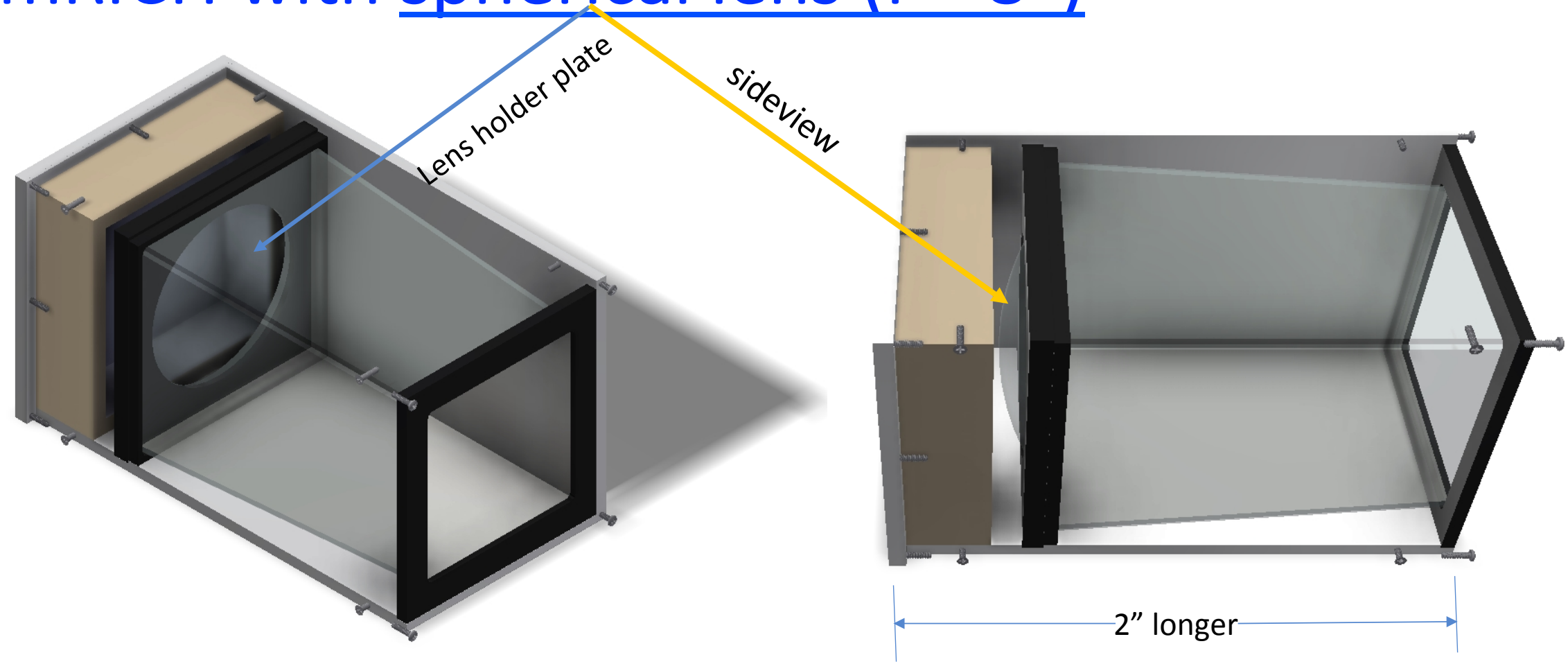




(1) Components were made one week ago. (2) It is likely that we will either anodize or paint the inner surface the inner surface reflection. (3) The mirror wall will be assembled starting from this week.

Newer

mRICH with spherical lens (f = 8”)

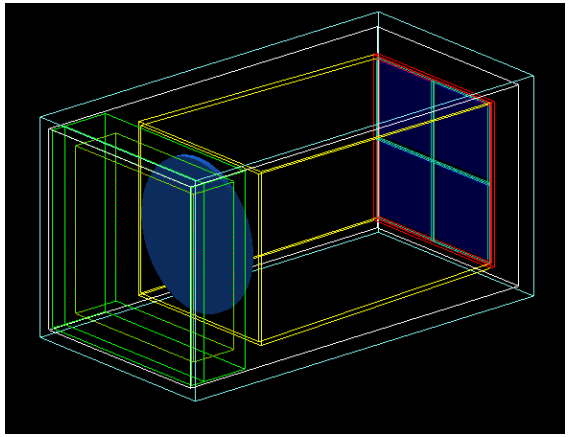


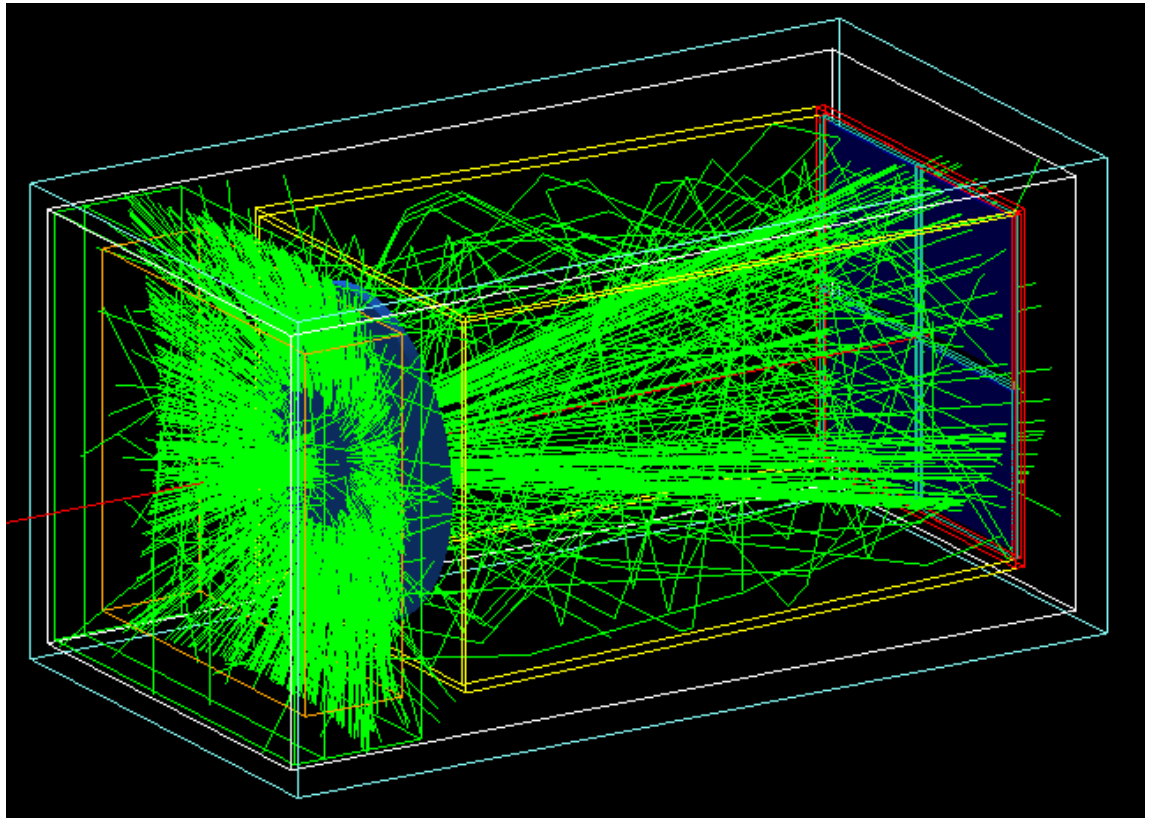
Reduce the image distortion; slightly higher light transmission.

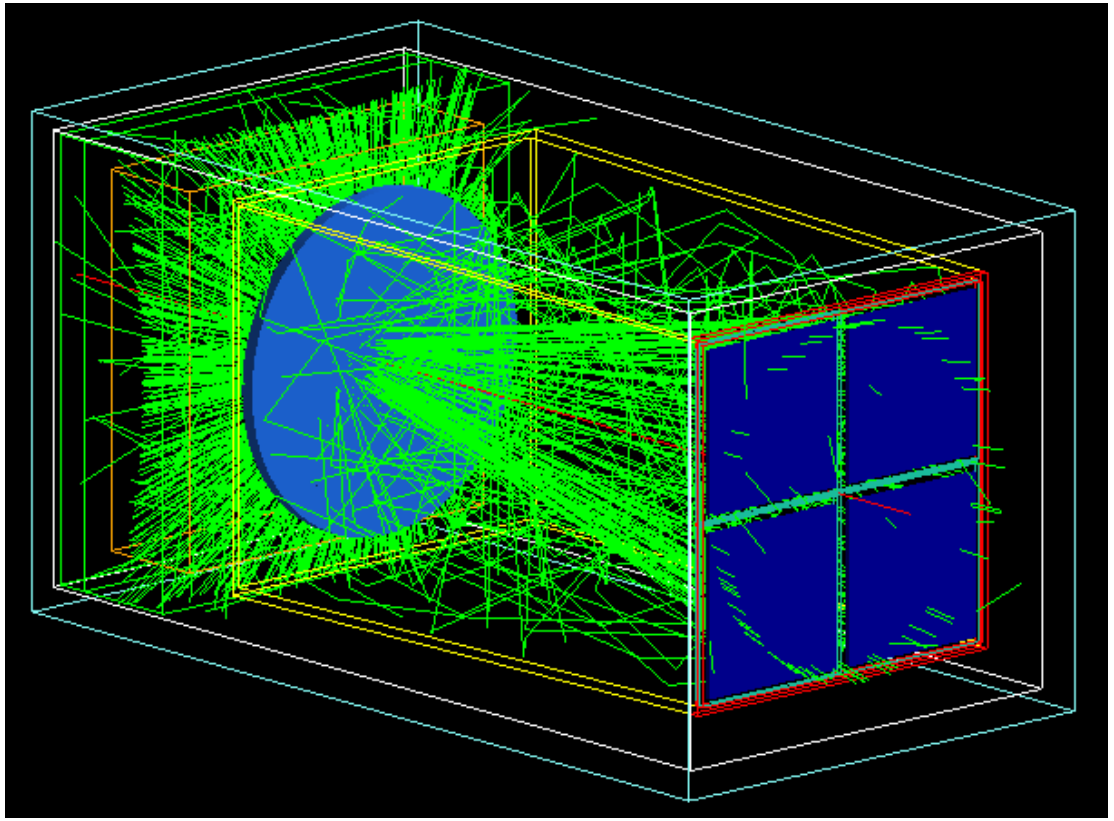
Newer

Ping's New Simulation

One event display from a 9 GeV/c pion



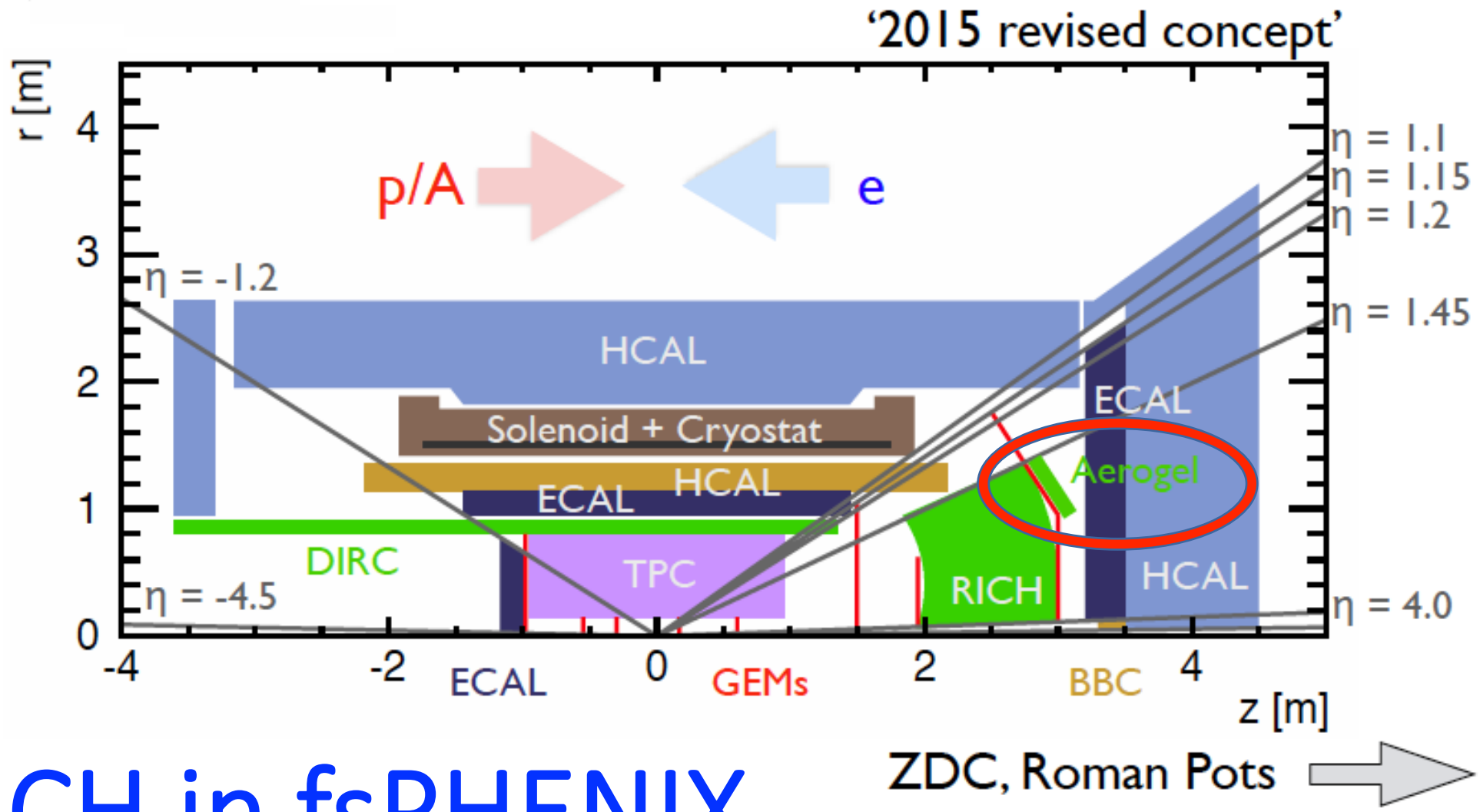




Quantitative comparison study against Fresnel lens configuration will be done.

Path for the 2nd Prototype Beam Test

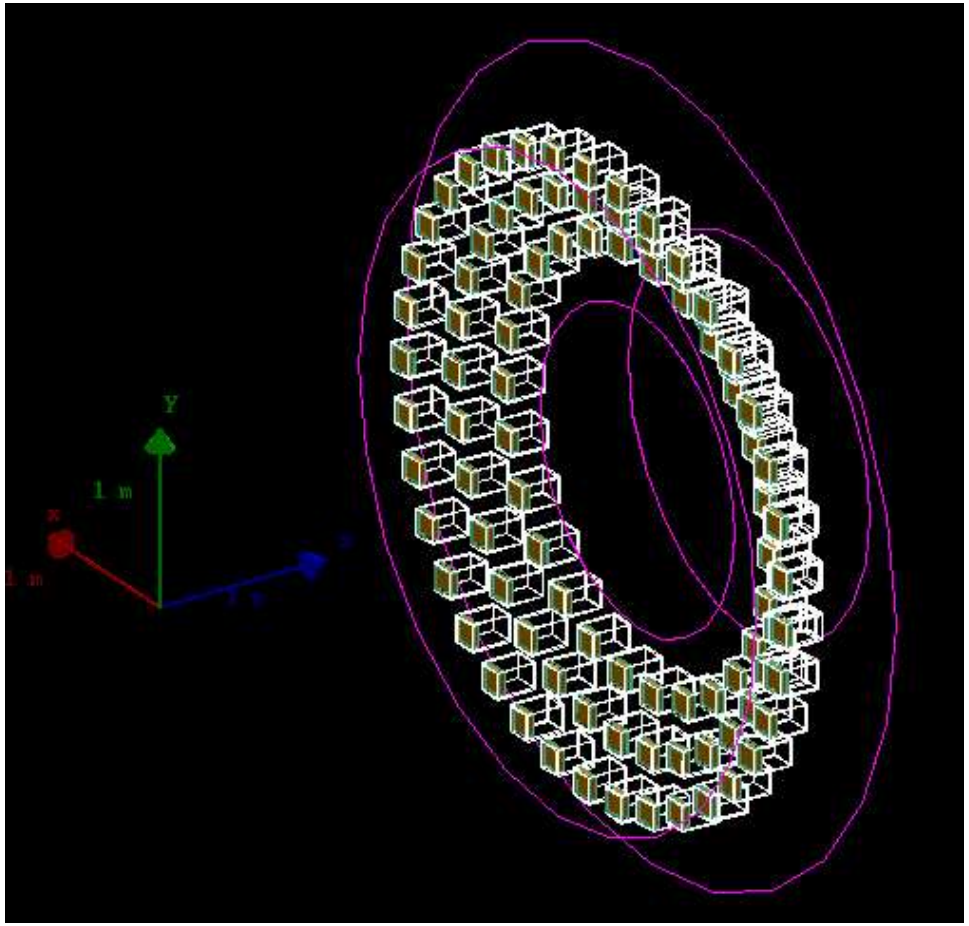
- Readout options
  - Contribution from Marco's group as it was very successfully accomplished.
  - Contribution from the Hawaii group led by Gary and Isar.
- Beam test schedule
  - It is very likely that the test will be done in early spring of 2018. The Fermilab beam test schedule for this year ends near the end of June.
- Photosensors
  - Two H13700-03 will be available around the mid of May and the other two will be delivered in June from Hamamatsu.
  - Using MPPC array is another possibility.

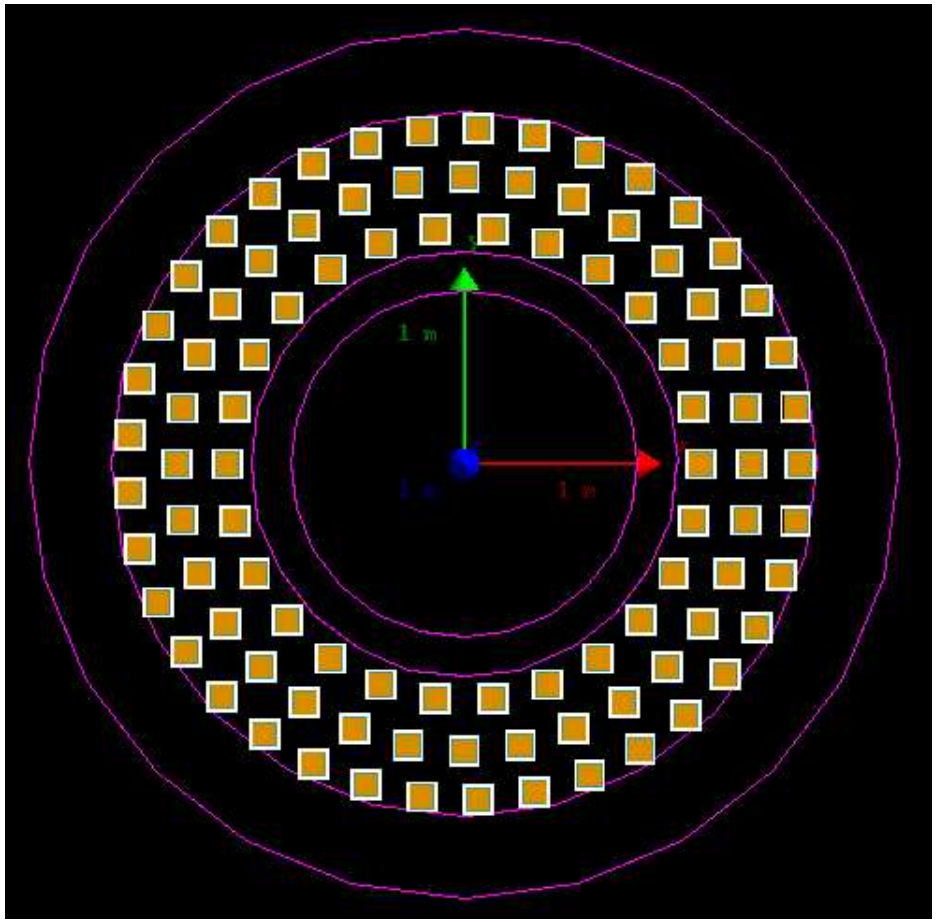


mRICH in fsPHENIX

Ping has started learning fsPHENIX simulation software and was able to implement the mRICH design in the sPHENIX forward region.

mRICH Ring in fsPHENIX





More compact array will be implemented with larger active coverage.

New eRD14 Proposal (FY18) – mRICH

- Man power support (Ping).
- Travel support to Fermilab beam test and to conference.
- Readout electronics development cost.
- Test stand frame (extruded aluminum) and the associated components.
- MPPC Array.