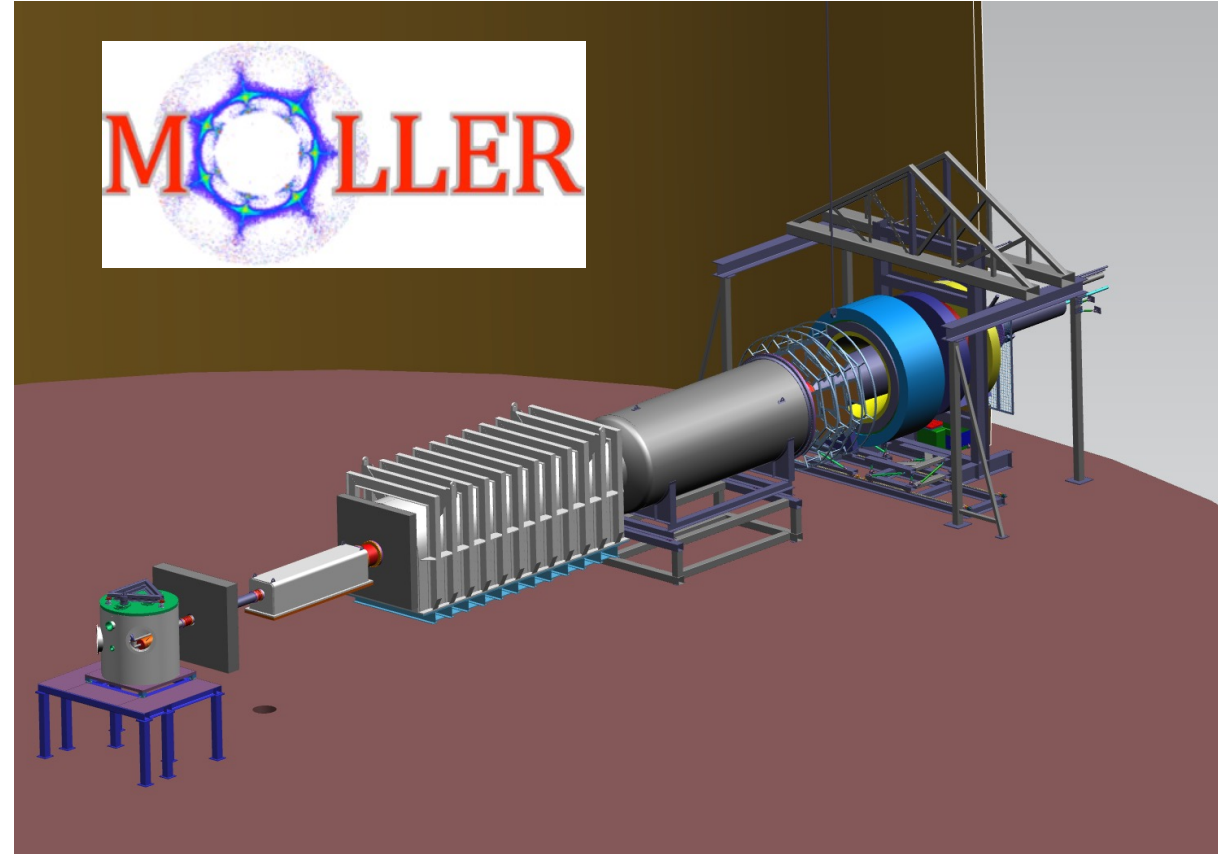


# Detector Region z Locations and new Collar-2 and LAMs

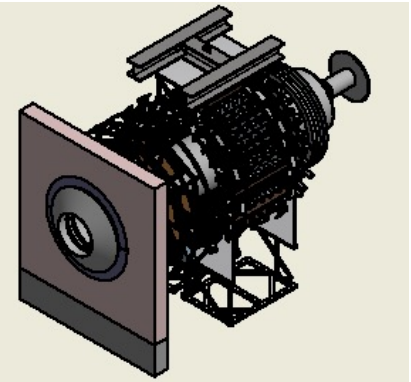
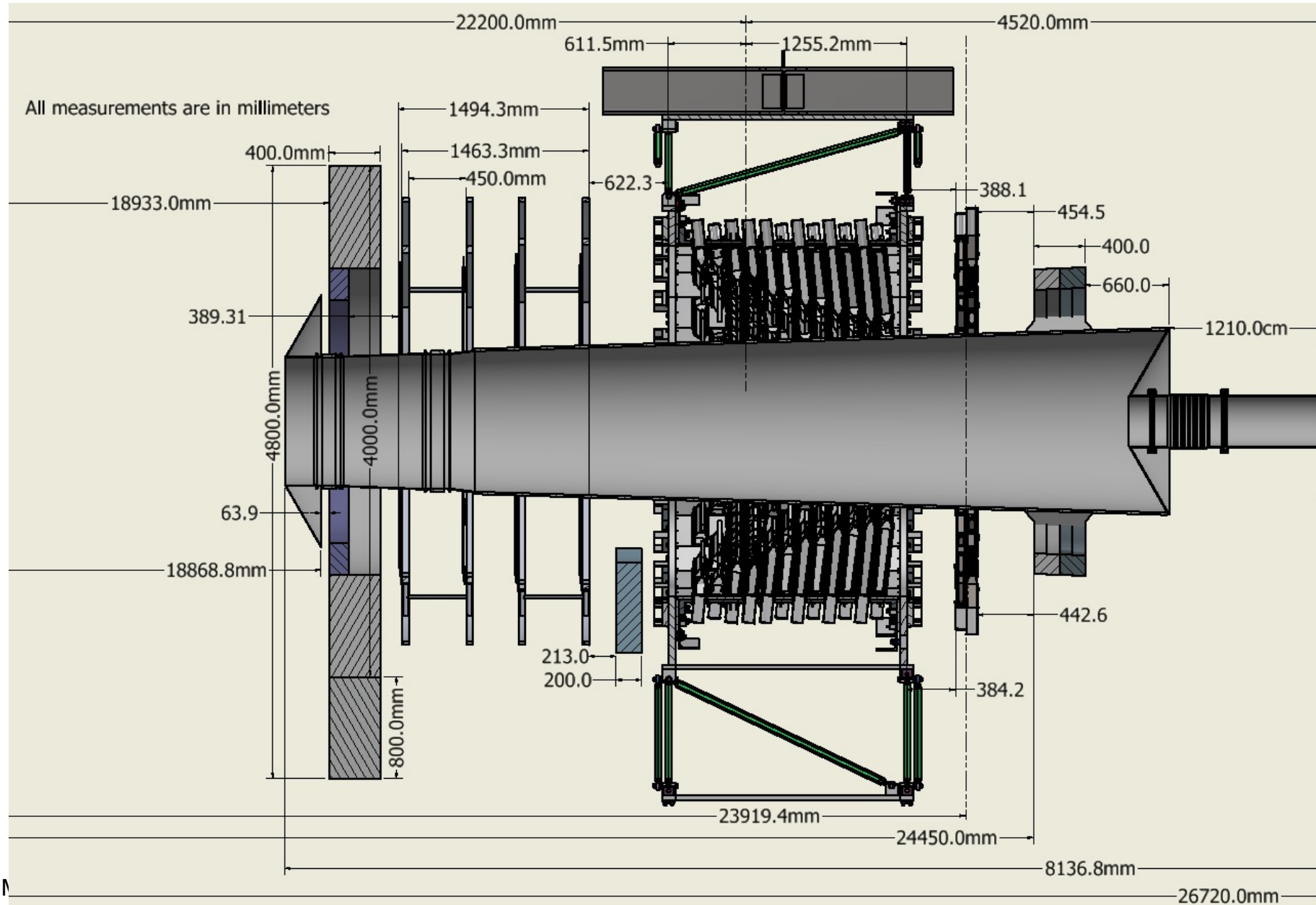
Dustin McNulty – Idaho State University

CAD work by Edwin Sosa

Jefferson Lab



# z Locations from July 20, 2021 meeting



# Repositioning Collar 2 to the DS end of barite wall (for LAMs)

- Collar-2 size and position (from Chandan):

IR (US,  $z = 18941.09$  mm) = 998 mm,  
IR (DS,  $z = 18941.09 + 150$  mm) = 1007 mm.

OR = 1300 mm (but not set yet)

\*Note there was a 8.4 mm z offset between US face of Collar-2 and US face of barite wall

All z locations are with respect to hall center

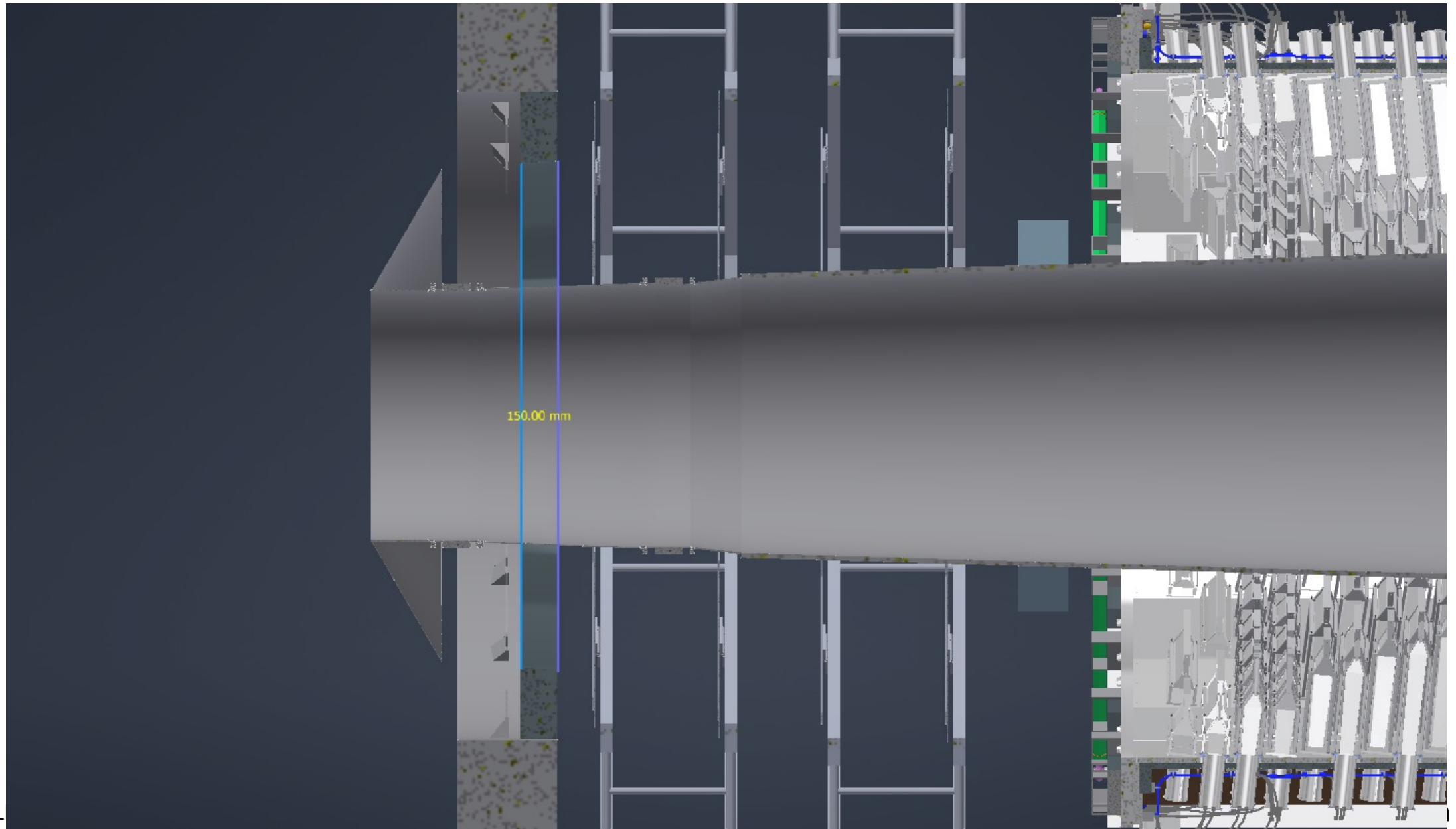
- New position and size of Collar-2 (to make room for LAMs):
  - Moved Collar-2 250 mm downstream using 60 mrad projection to determine new position and size

IR (US,  $z = 19182.69$  mm) = 1013 mm,  
IR (DS,  $z = 19182.69 + 150$  mm) = 1022 mm.

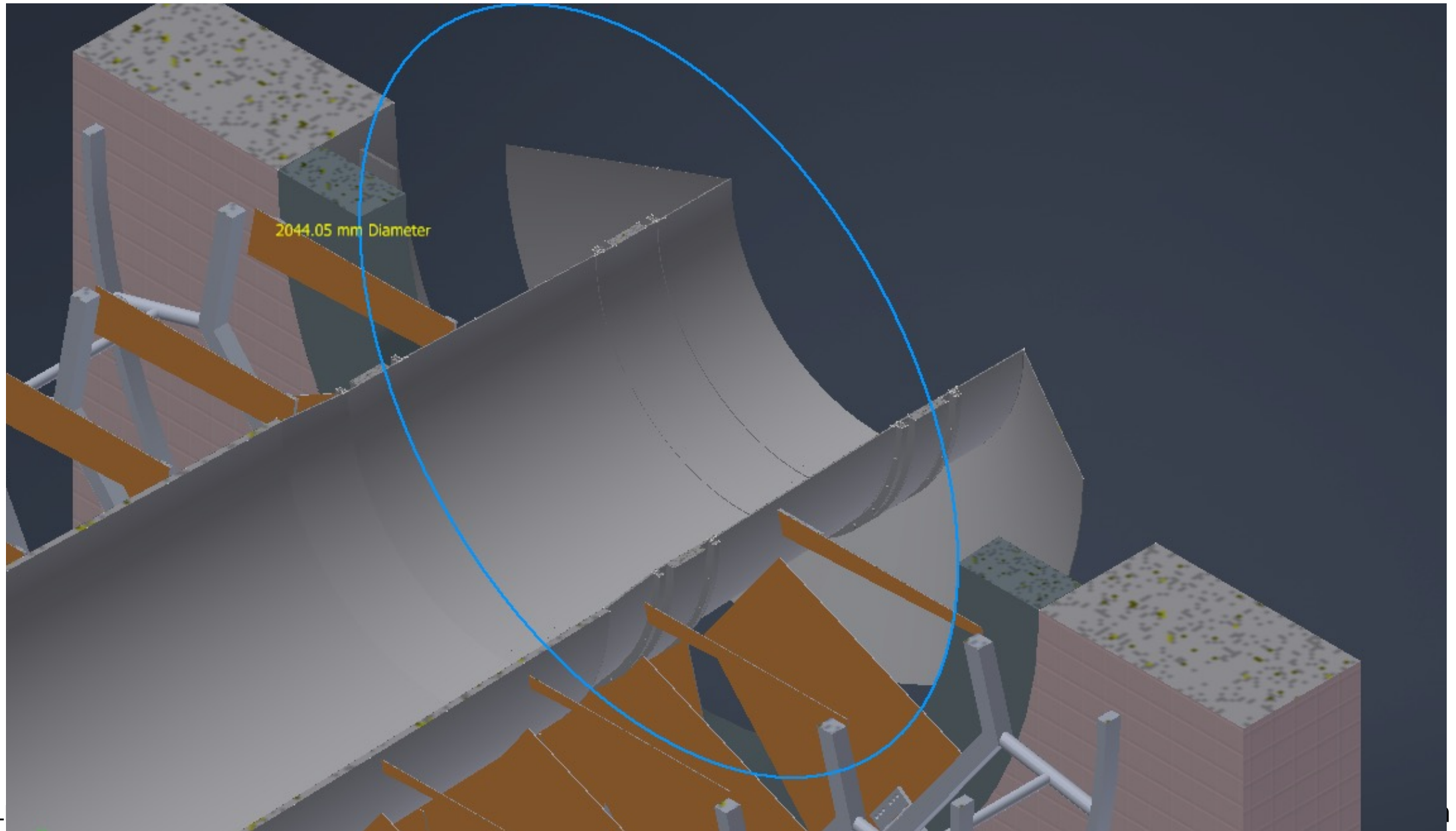
OR = 1315 mm

- IR of barite wall is now 1315 mm; outer wall dimensions have not changed --  $4 \times 4 \times 0.4$  m<sup>3</sup> barite wall centered on beamline supported by  $4 \times 0.8 \times 0.4$  m<sup>3</sup> concrete block

# New Collar-2 (needs to be checked by Chandan)

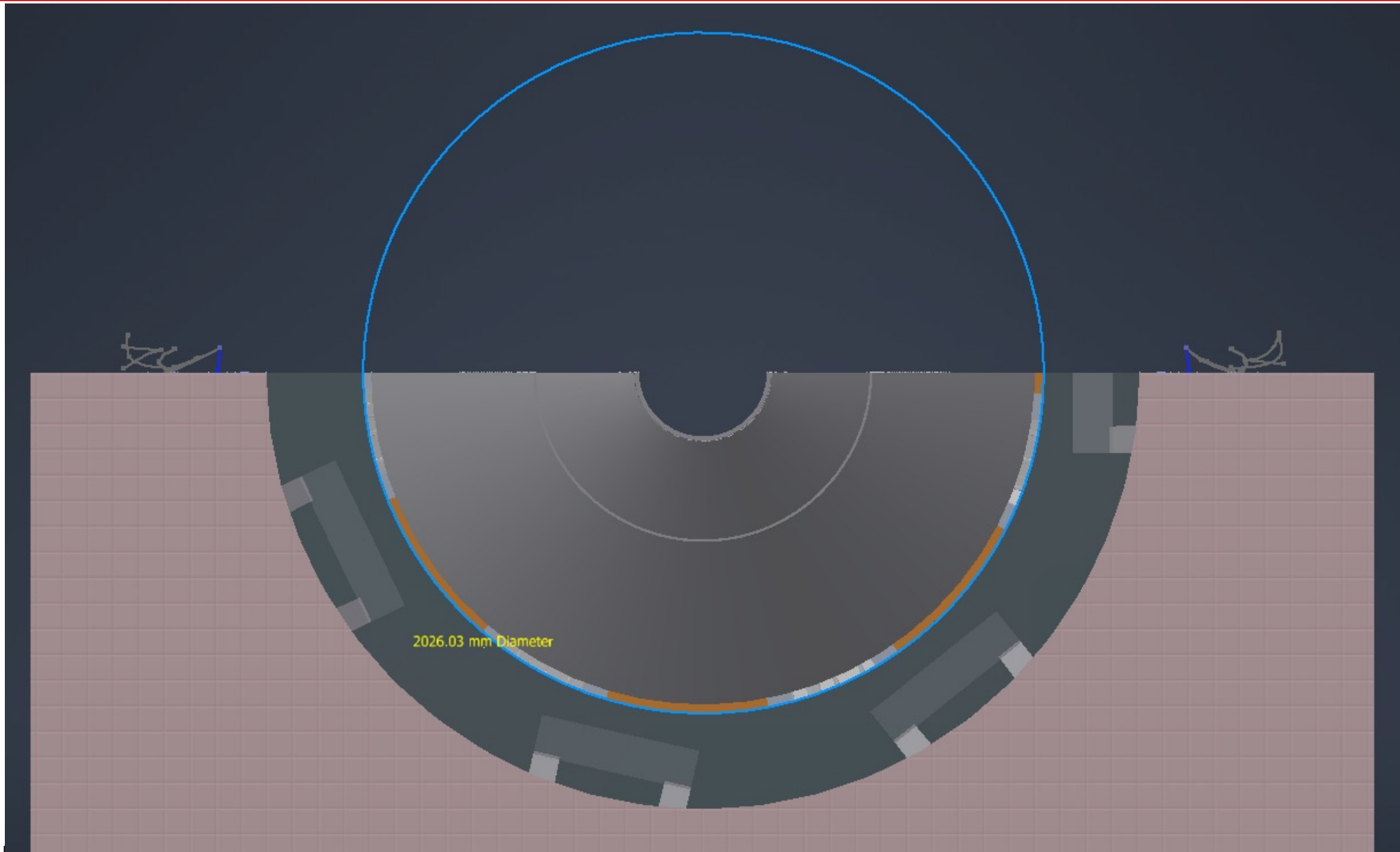


# DS Collar-2 ID





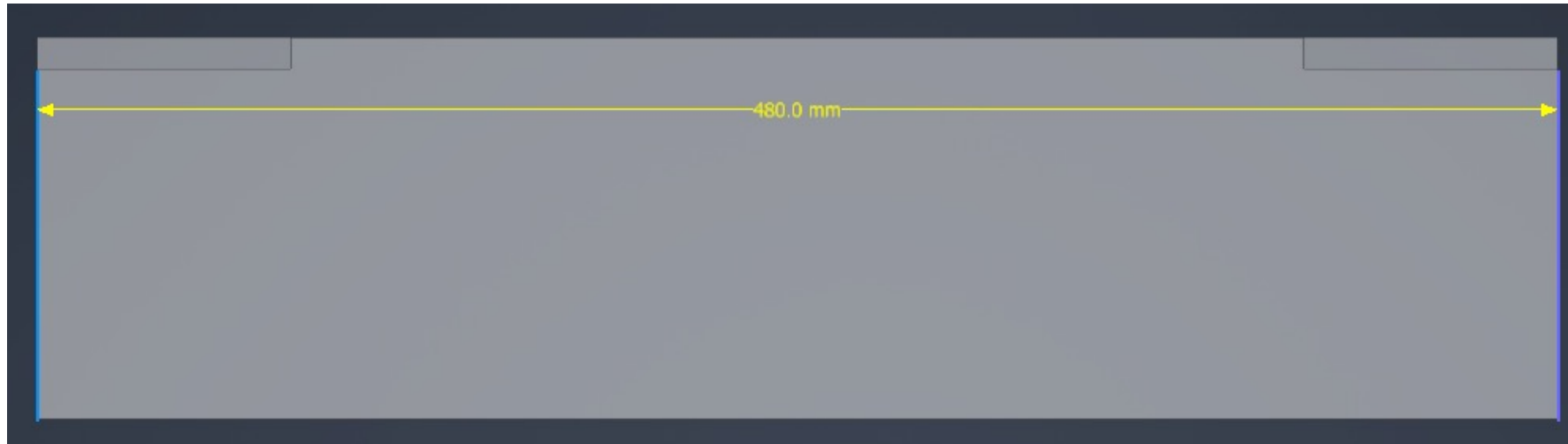
# US Collar-2 ID



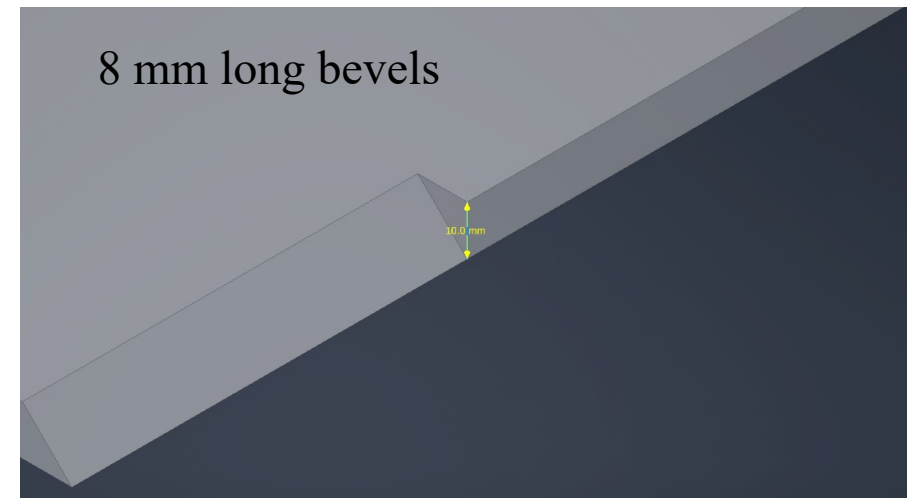
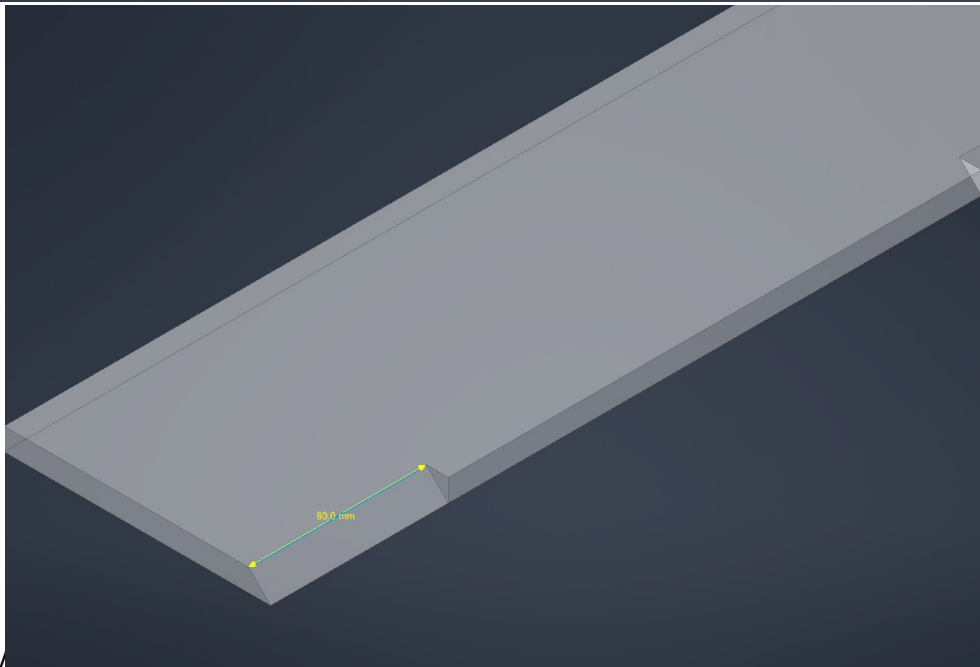
## LAM array detector concept (from Mark Pitt)

- Array consists of 7 detector modules centered in the Open phi regions just upstream of Collar-2; designed to monitor large angle scattered spray from particle flux going where it shouldn't.
- 48 cm x 12 cm x 1 cm quartz bar with two 8.0 cm long bevel cutouts on each end for light readout; we increased length from 35 to 48 cm in order to get PMTs closer to the Closed phi regions.
- ~100 mm long, one-bounce lightguides attach at each bevel; length is chosen such that PMTs are embedded in barite wall
- IR (at center of quartz bar) is 1100 mm; this is just a best guess at this point for exact radial positioning
- DS quartz face z location is 50 mm from US face of Collar-2 (at  $z = 19132.7$  mm from hall center)

# LAM quartz bar views

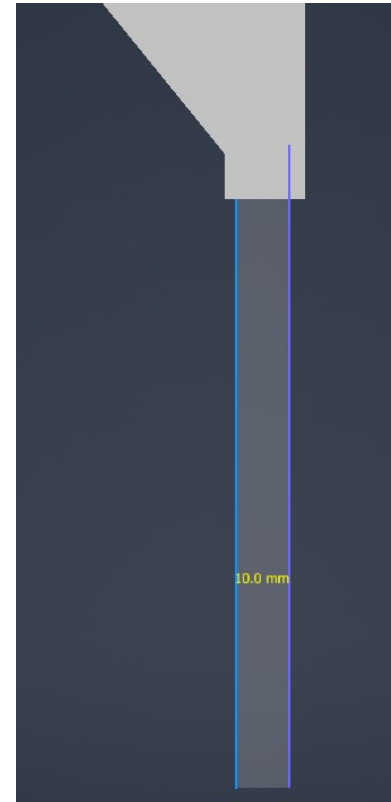
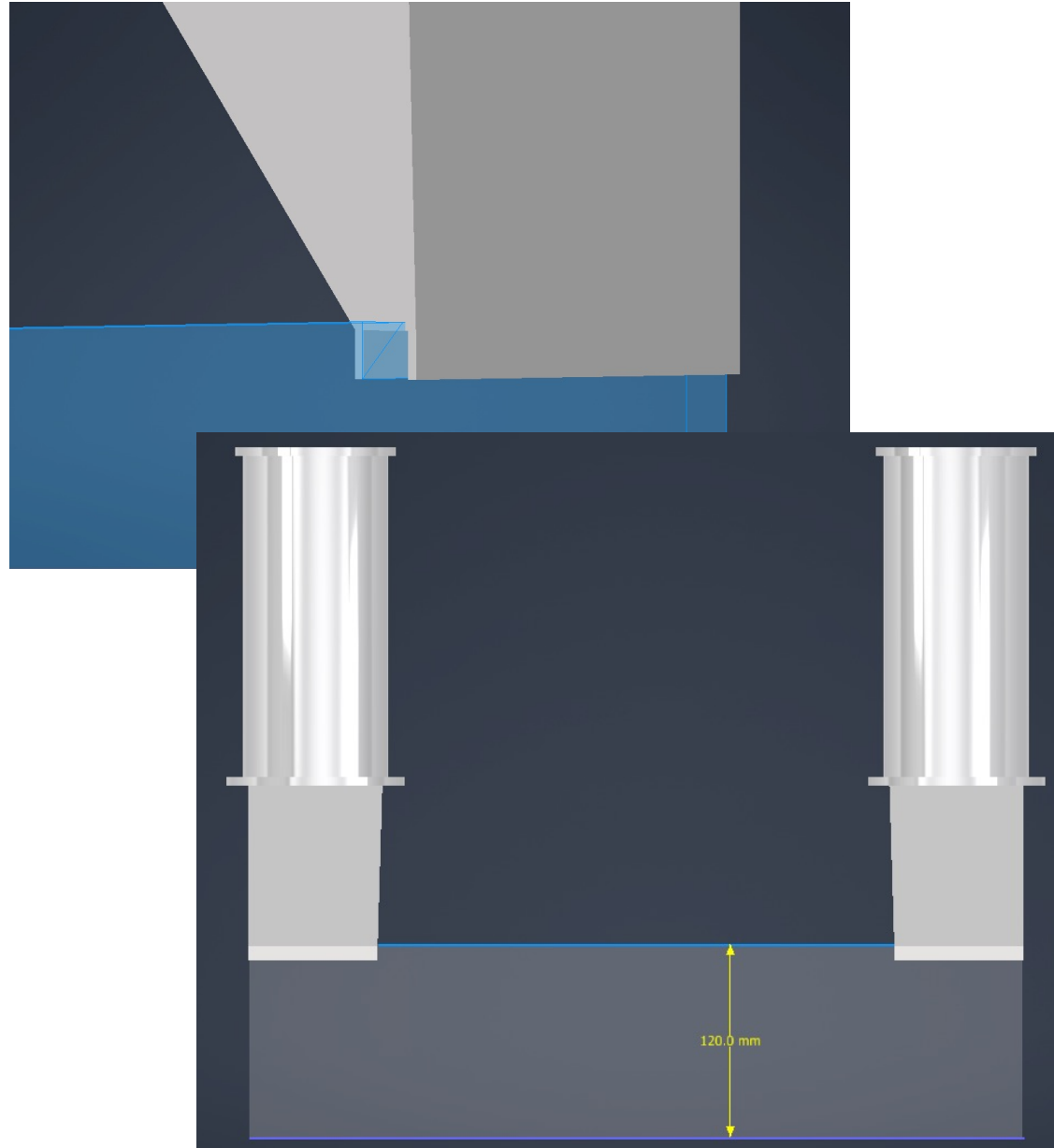
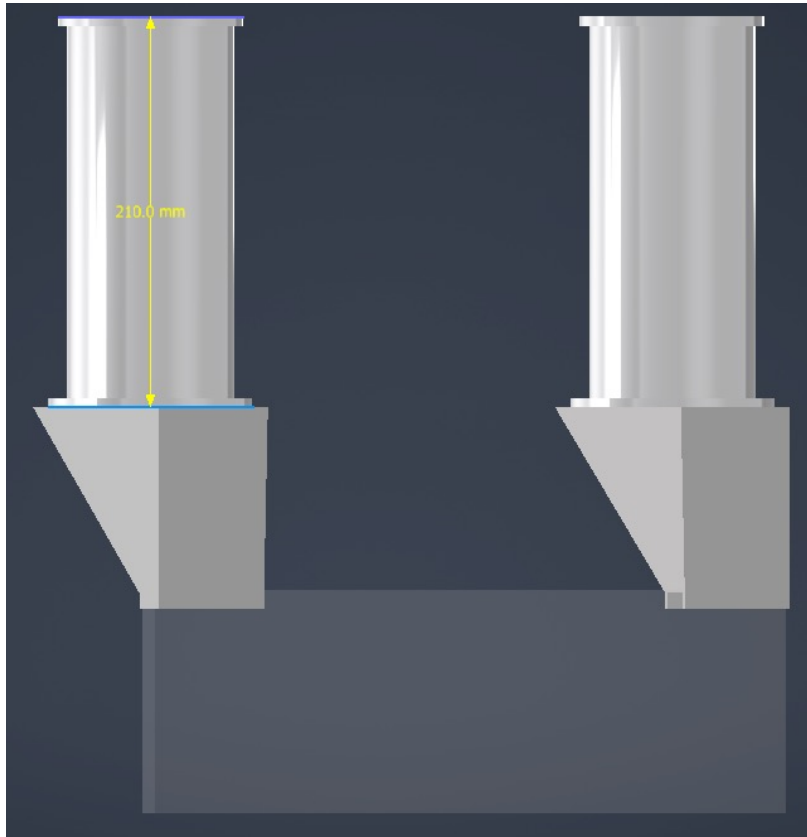


480 mm x 120 mm x 10 mm



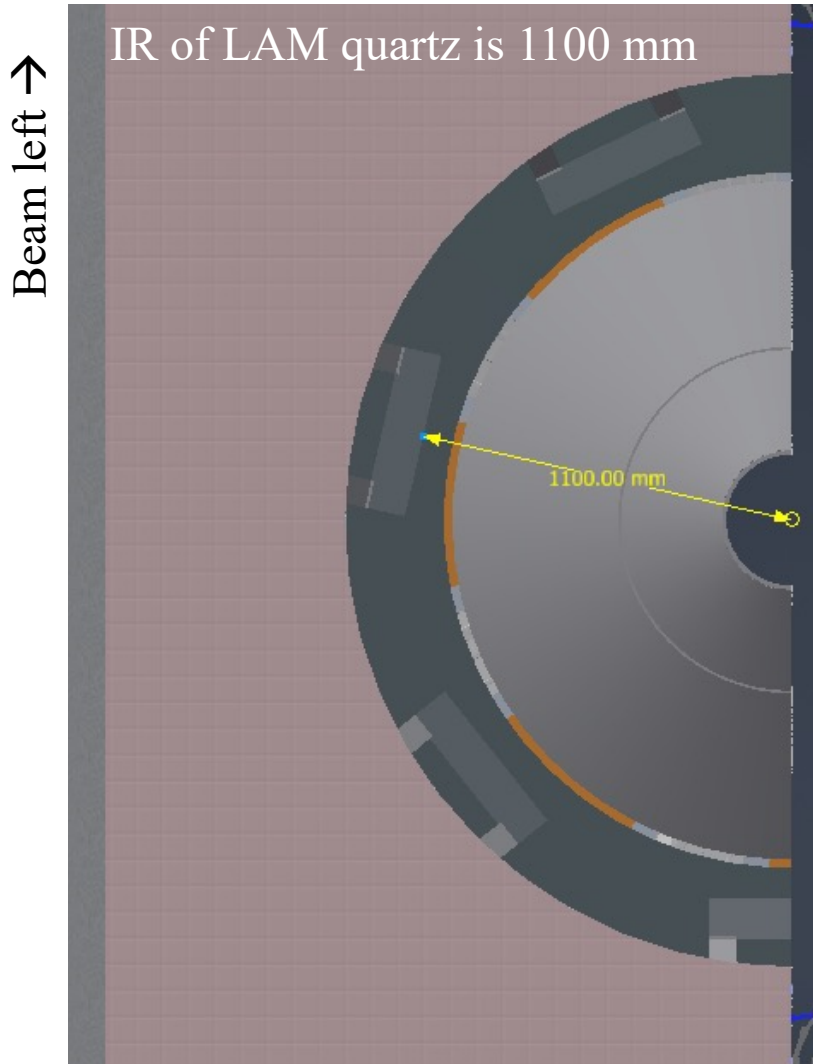


# Views of the LAM

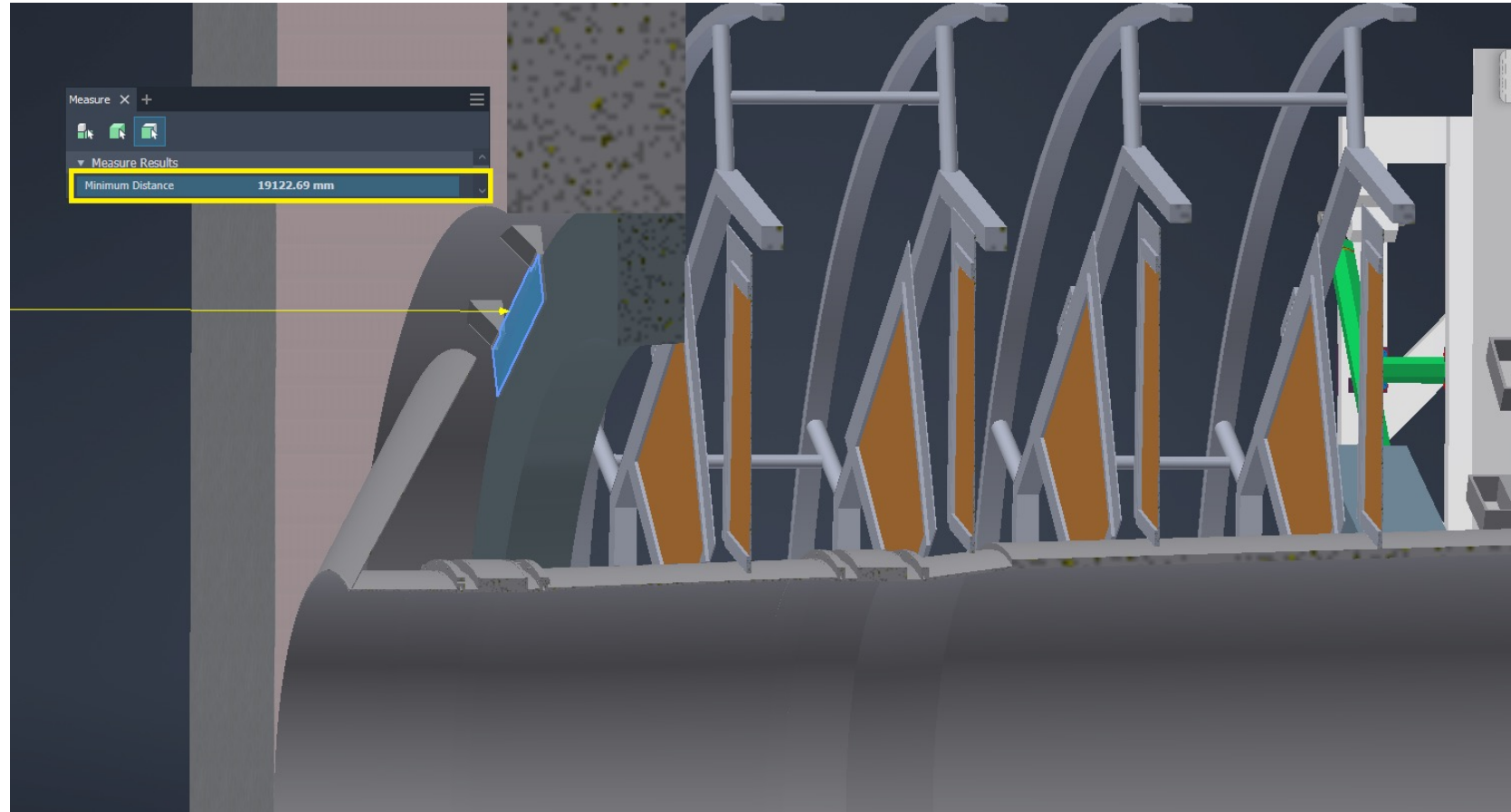


# LAM array positioning

Looking Downstream



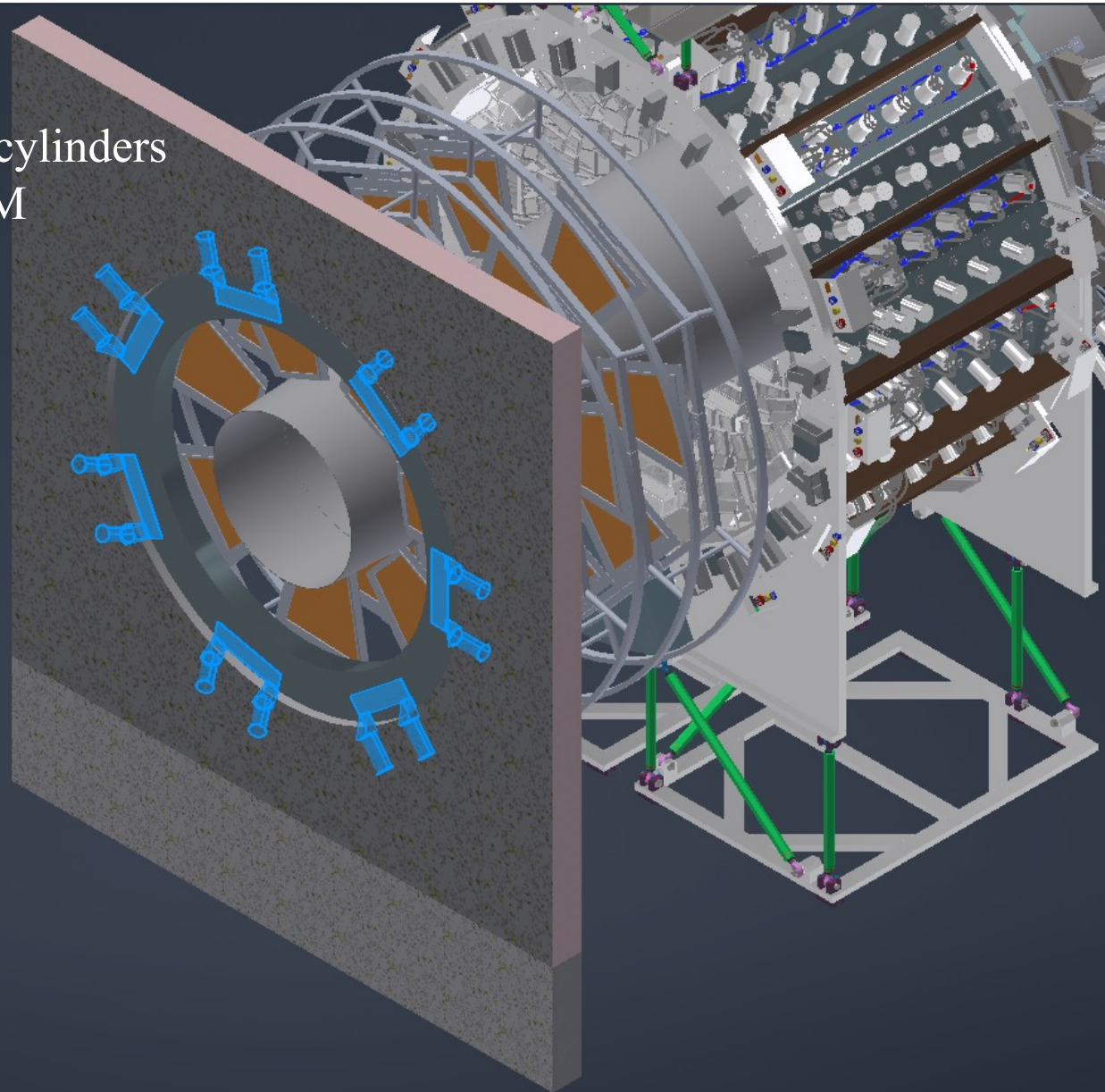
US LAM quartz face at  $z = 19122.7$  mm



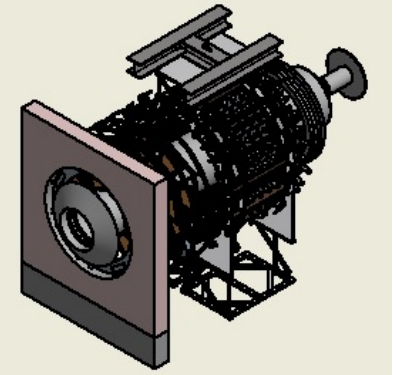
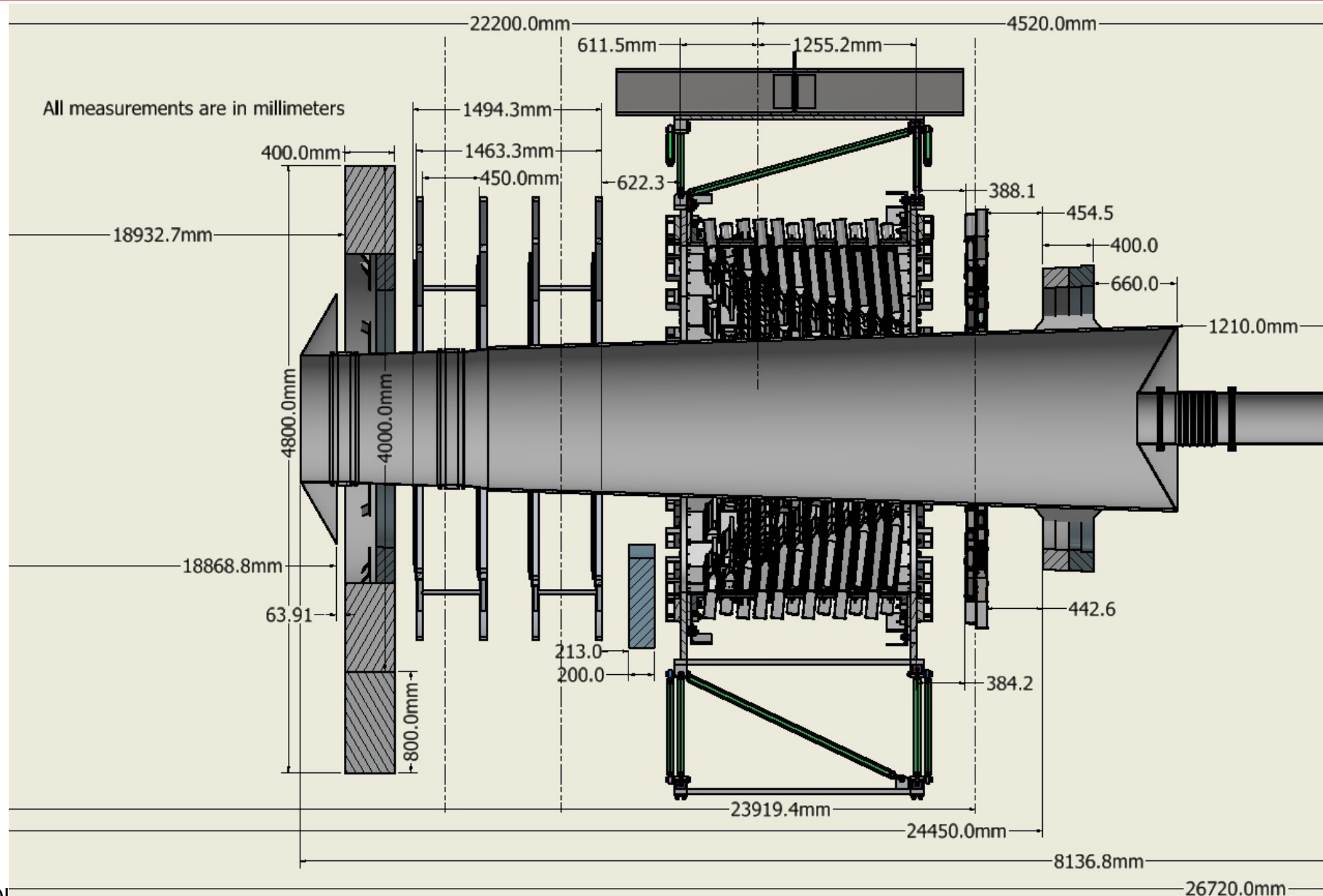
Lightguide should be long enough to tuck the PMTs inside the barite

# LAM view

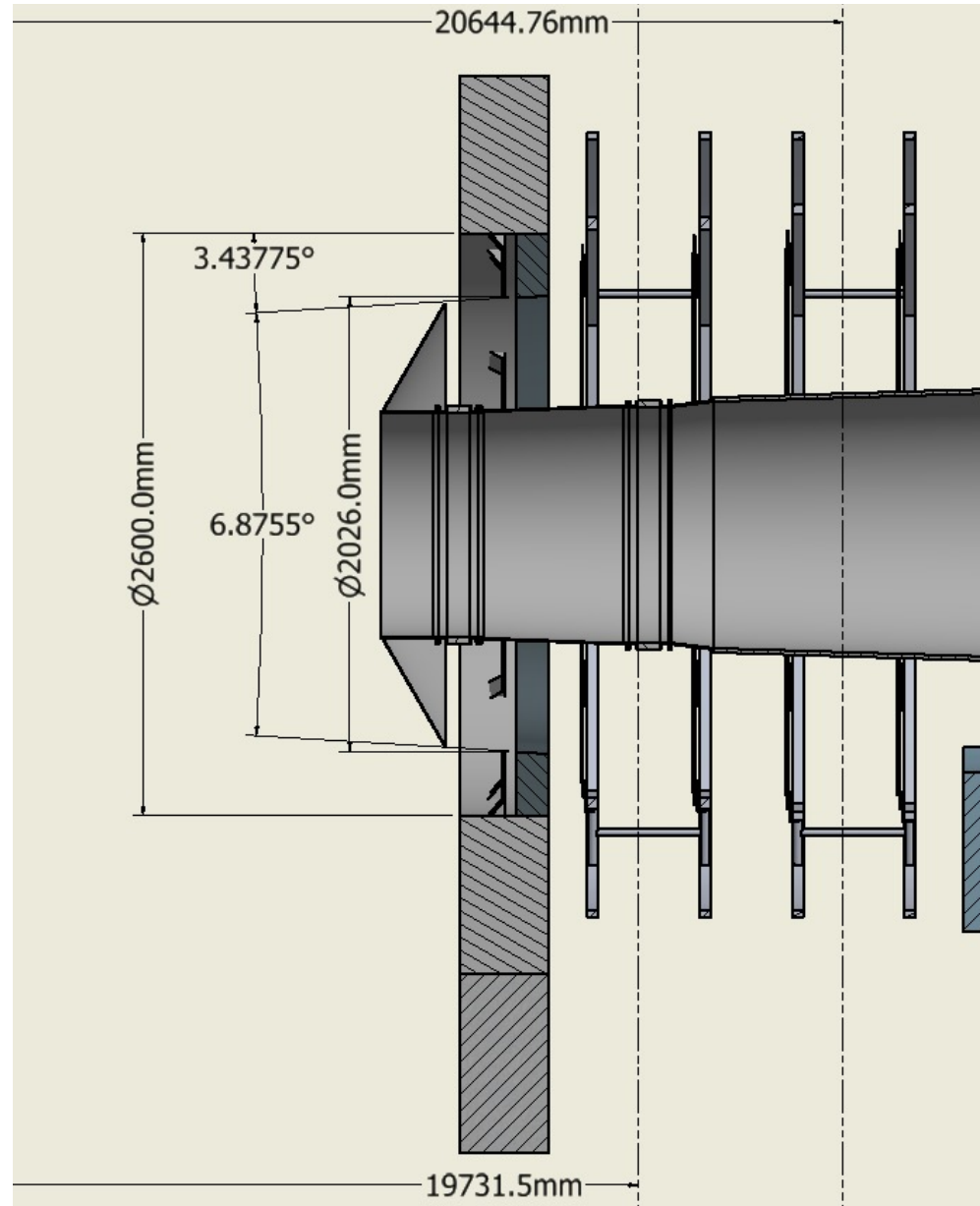
- Using same PMT cylinders as main det and SM



# New z Locations Drawing (only Collar-2 change and LAM addition)



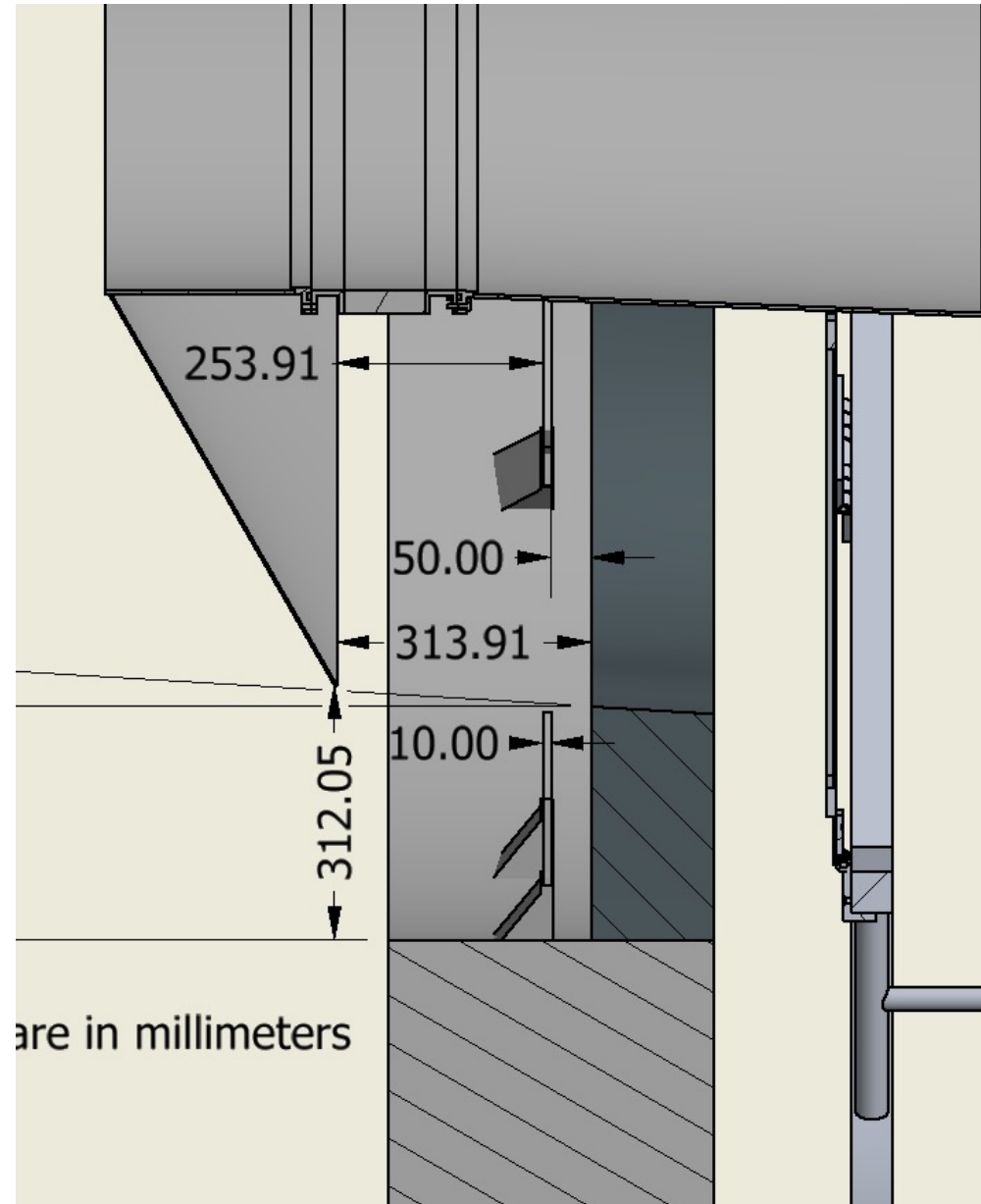
# Zoom in on neckdown region



Z locations of center of GEM wheels shown



# Zoom in on neckdown region





# Summary and discussion

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- These are our current plans for z locations between vacuum window and pion donut and we are wanting to freeze them. Folks still have to sign off on this and there will likely be some further iteration.
- Space around neckdown vacuum window region: How much is needed for window and protection system? Pass along any updated drawings for the window supports, etc. as they are available.
- For Shower-max and pion detector considerations, what is latest conical pipe and pion donut support system design/z-footprint?
- The z-location of SM may change depending on how its TBD support structure can interface with I-beam/A-frame supports etc. Has there been any change in the A-frame plans or design?