

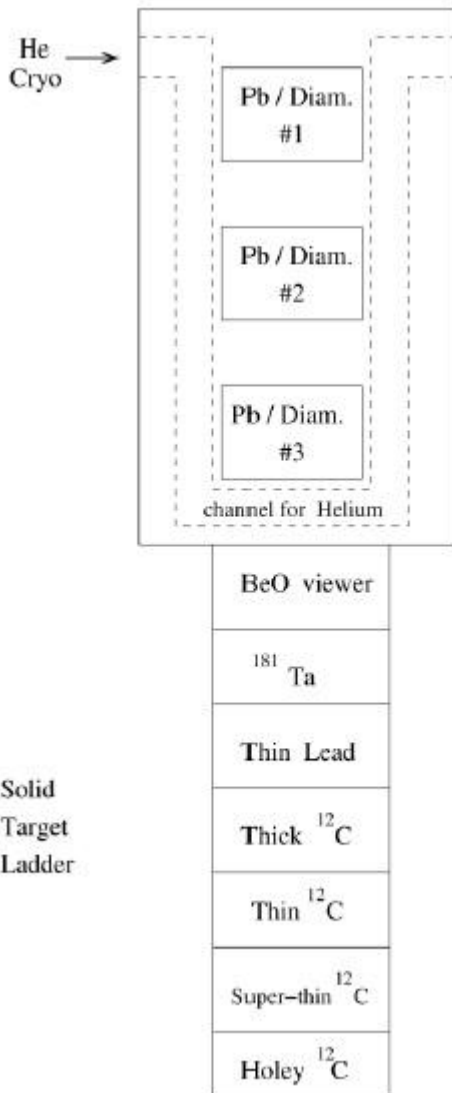
PREX-II Target Design

Silviu Covrig Dusa

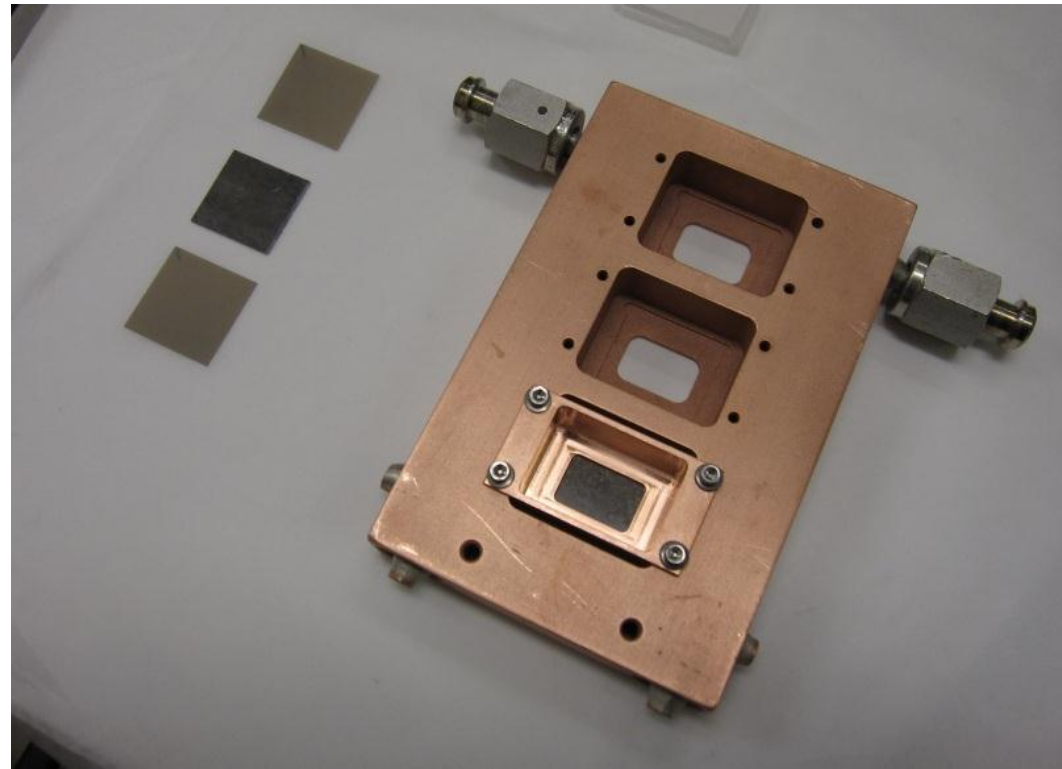
Jlab

16 Dec 2014

PREX-I Target



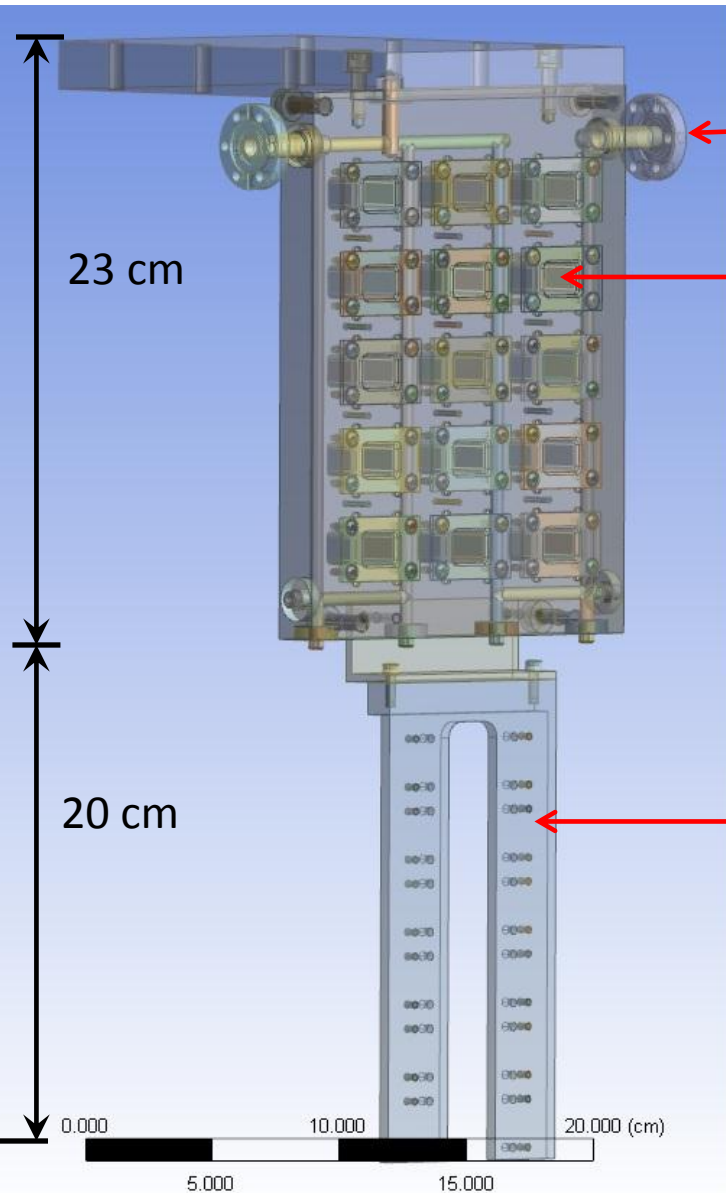
- PREX-I used a linear vertical target with 3 positions
- Each position had a sandwich C-Pb-C (0.15-0.5-0.15 mm)
- Pb is isotopically pure (expensive) and did not seem to last more than 1 week/position due to melting
- Needs largest raster possible, thick C (8% background)



Purpose of Target Design

- PREX-II approved for 35 days, 5 weeks, at least 5 target positions would be needed if the rate of target melting stays the same as in PREX-I
- Q: could we get a 2D array of targets for PREX-II to increase the number of available target positions, which means horizontal motion for the target
- A: one possibility would be to use the qweak target upper chamber
- Qweak target lifter 50 cm range of motion, horizontal table 10 cm range of motion

PREX-II Concept Design

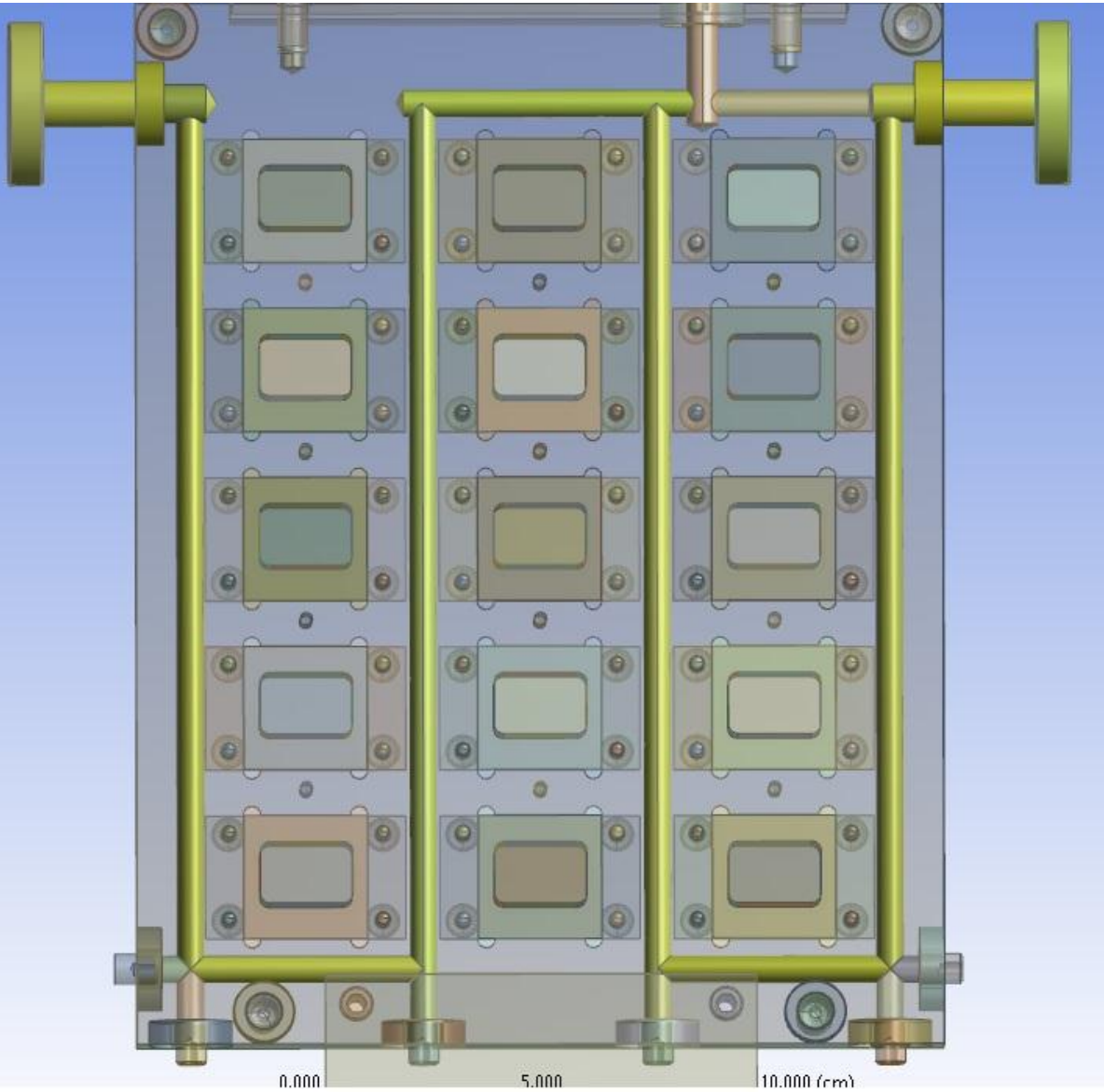


Coolant lines

3 columns of 1" square Pb targets incased in Cu frame with a Cu top plate that connects to a multi-axes cell adjuster

Dummy targets ladder

Pb Target 2D Array Concept



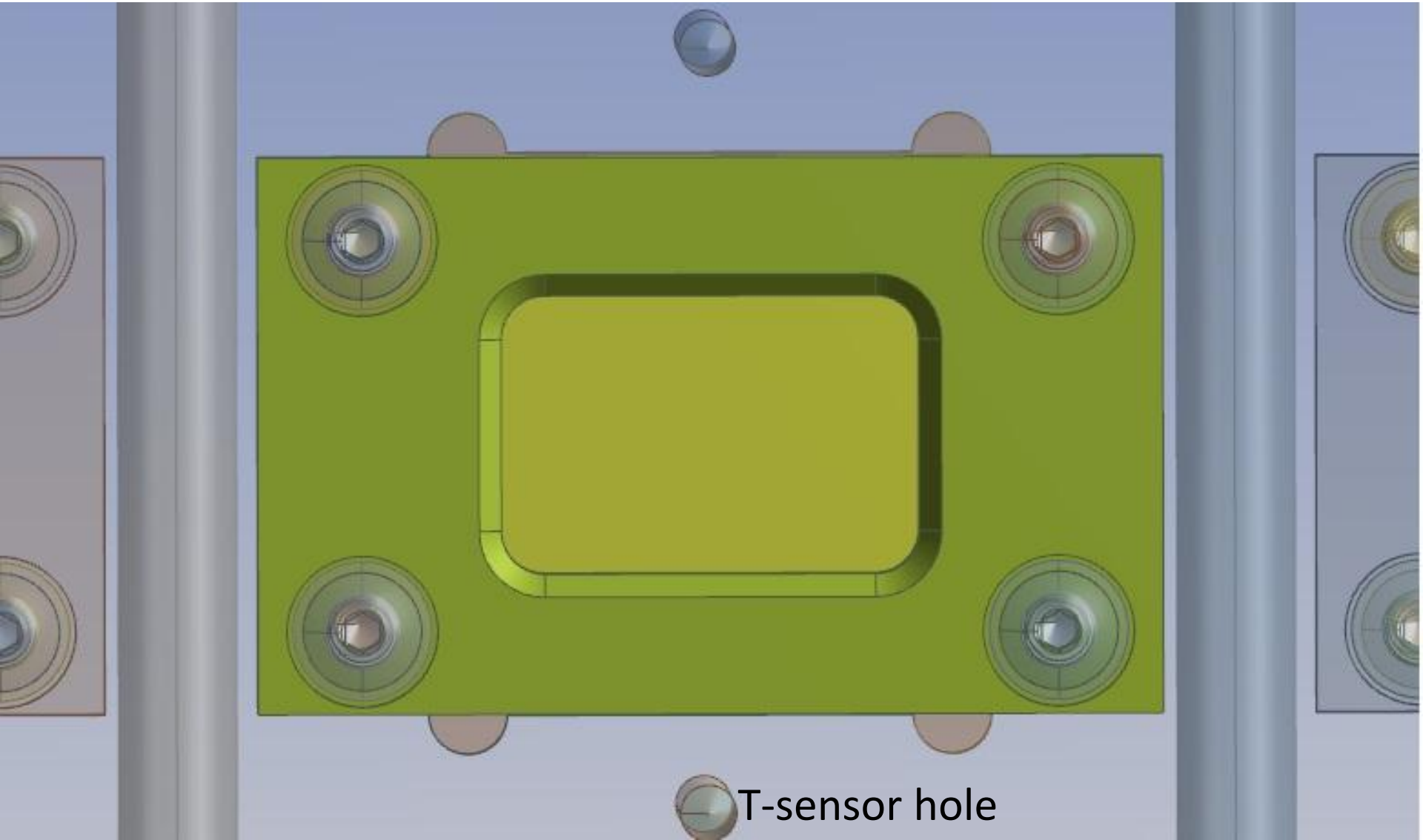
Coolant circuit
through the Cu frame

15 positions for
targets, Pb, hole
targets etc., one
column on the vertical
axis in case h-motion
fails

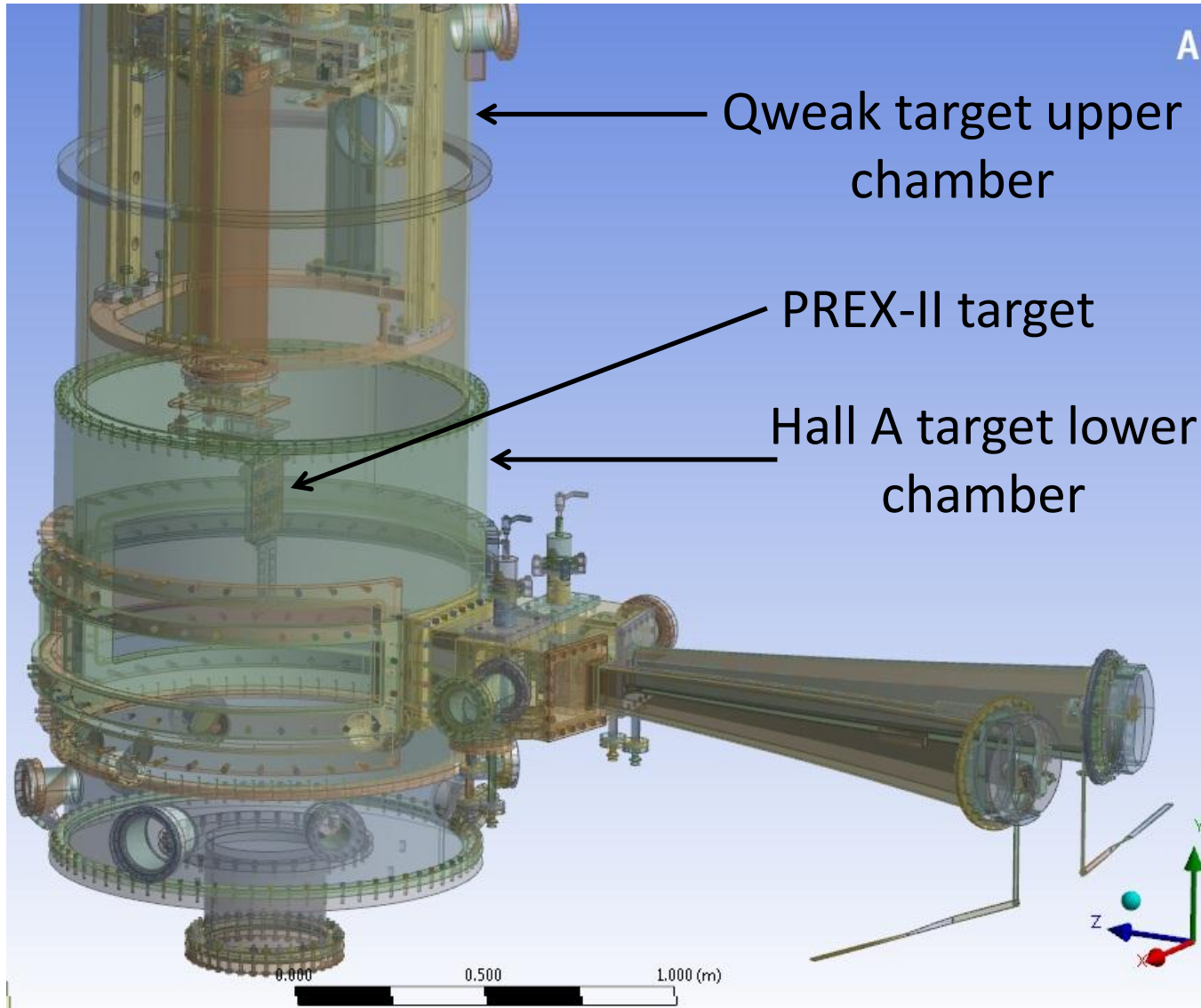
Qweak target h-motion
lasted 2 years for a 4%
radiator

Pb Target Close-up

Coolant channel

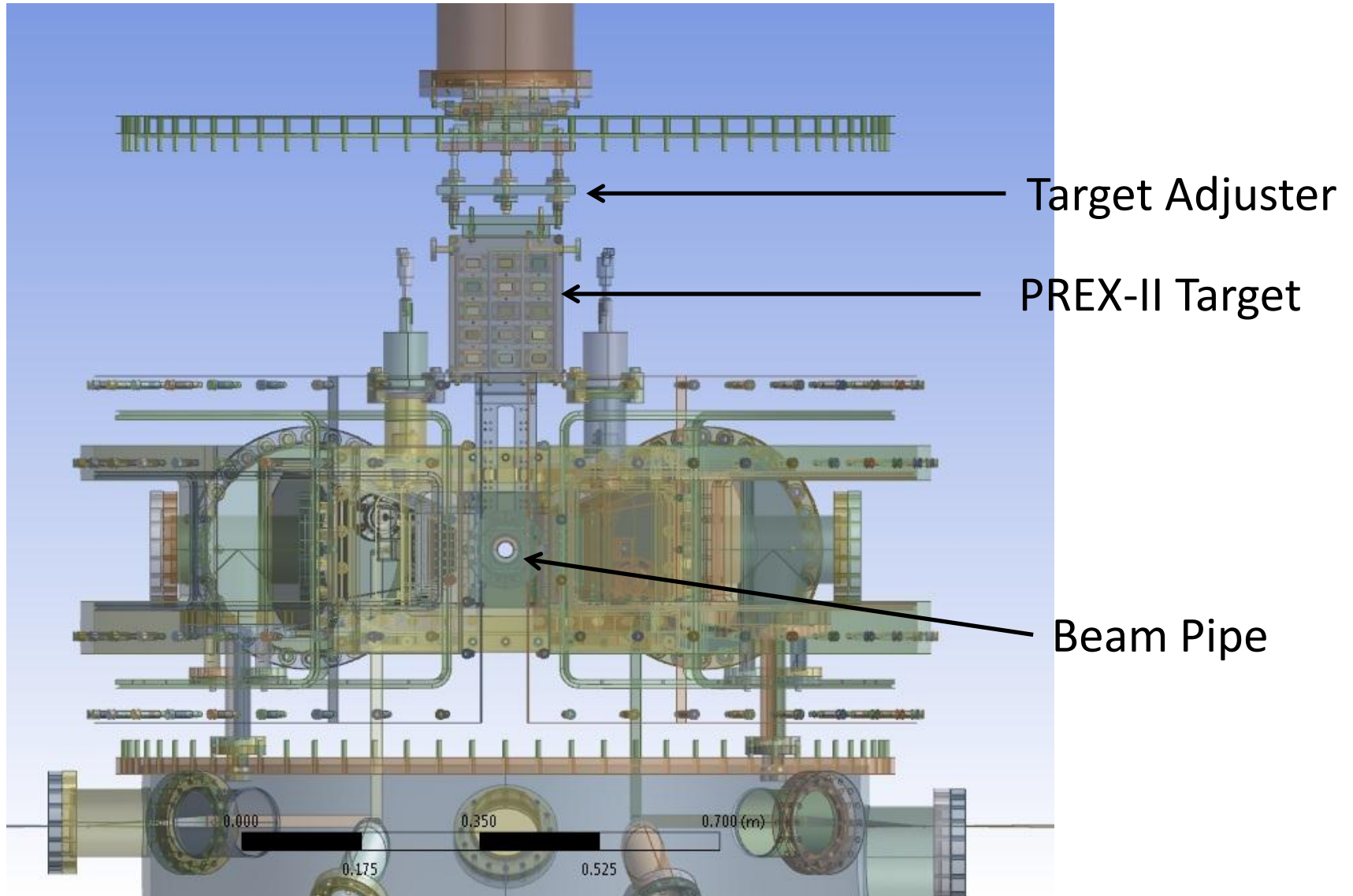


Target Assembly Concept

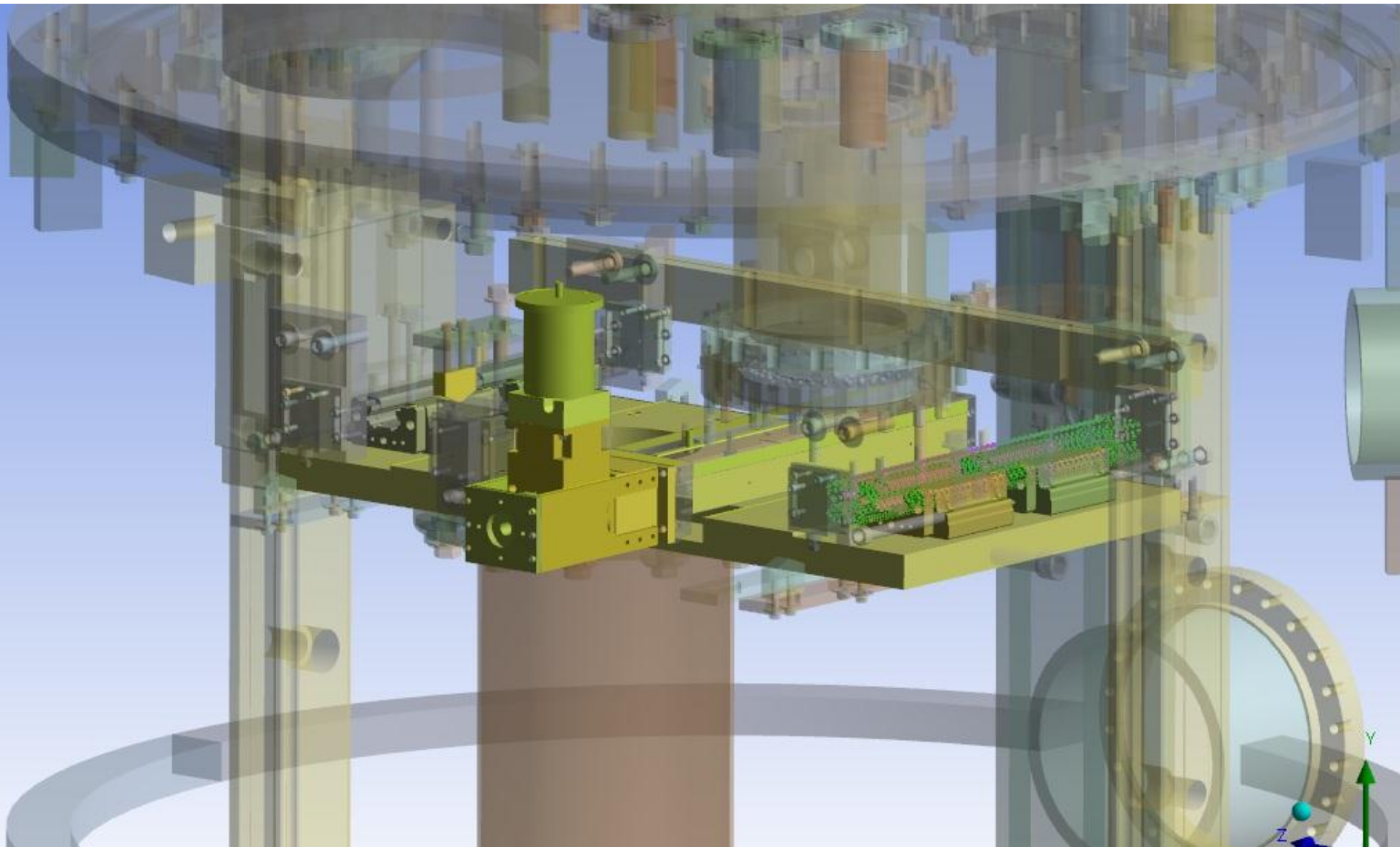


Qweak top plate has 2 cryo-towers (2 JT-valves)

Beam View



Qweak Horizontal Motion Table



Summary

- It seems possible to get 2D array with at least 15 target positions for PREX-II
- PREX collaboration has to decide if it wants it
- Working on costing the 2D PREX-II target
- CFDFAC is working on a thermal analysis of the PREX-II 2D target to fine tune the Pb targets mounting, beam raster size and current, coolant lines etc.
- All mechanical design work done by V. Razmyslovich (from Mech-Div@jlab), work supported by CFDFAC