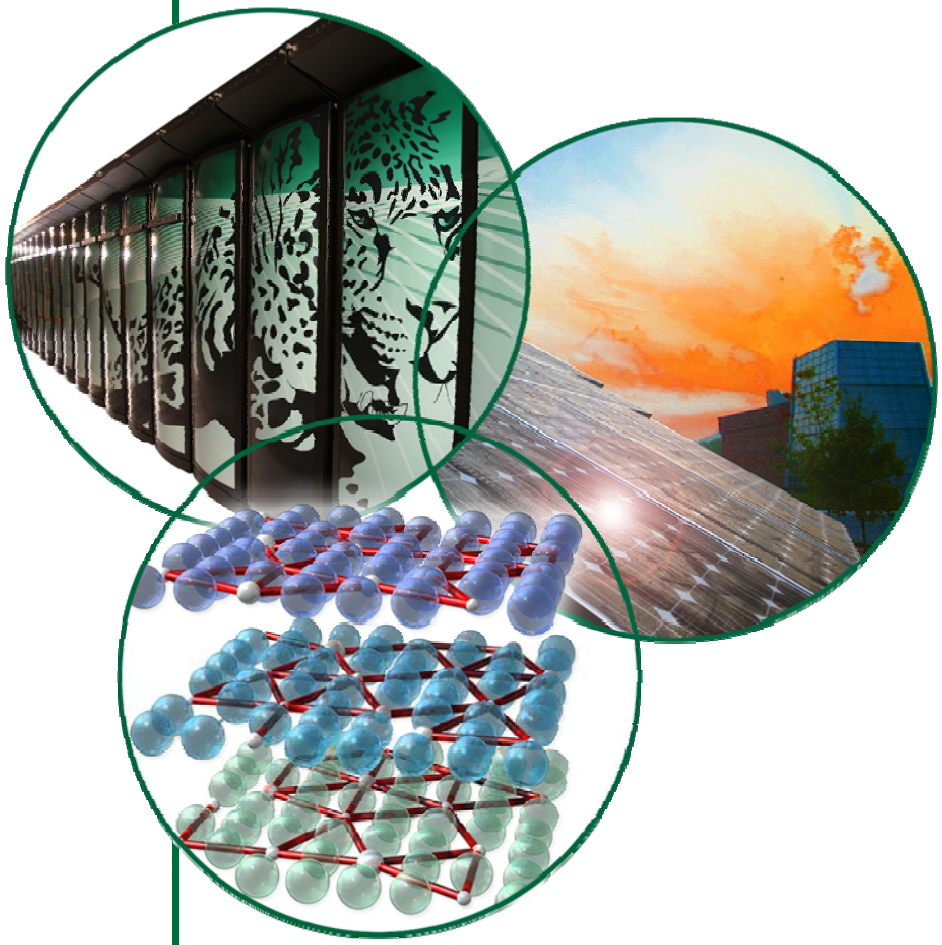
Carbon Target Initial Concept for 20to2T5m (Updated)

Van Graves



January 30, 2014

U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
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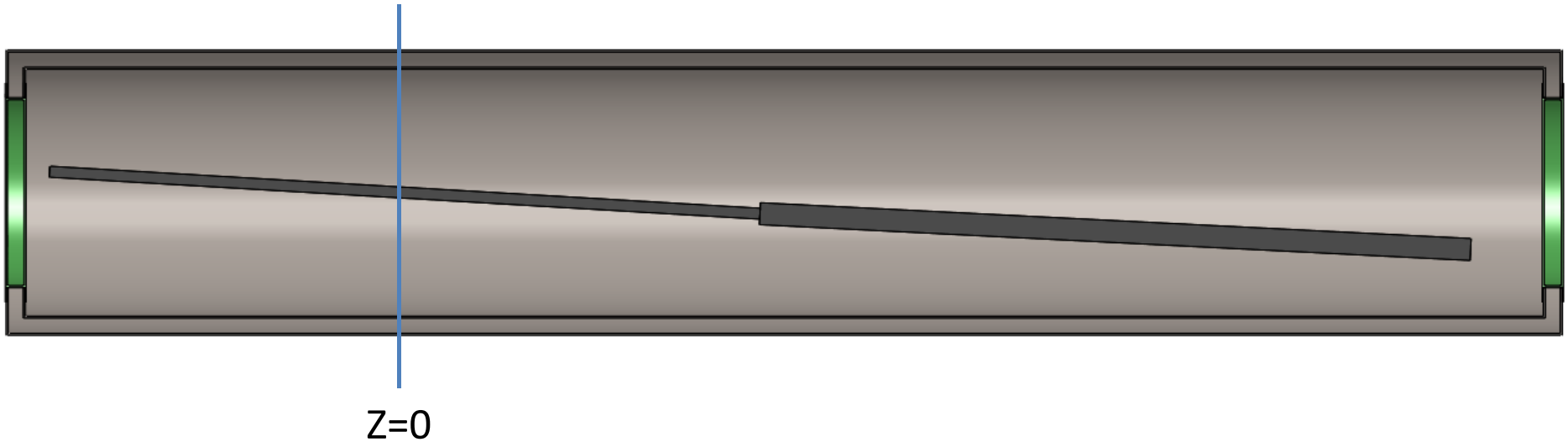
Geometry

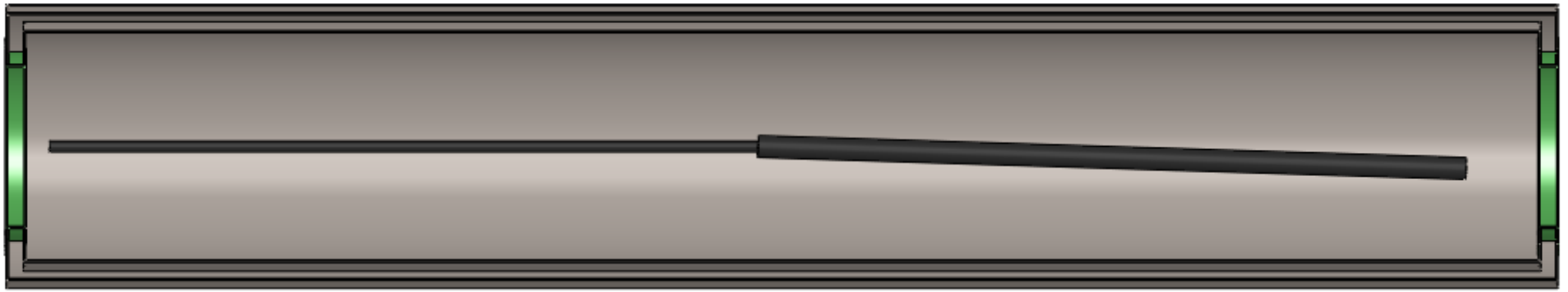
- From Ding's presentation Beam Dump for Carbon Target with IDS120h Configuration at 6.75 GeV (updated) & Kirk McDonald guidance
- Target
  - Radius: 0.58 cm, length: 75 cm, angle to yz plane: -59 mrad
  - Center of target at z = 0
- Beam dump (case 6)
  - Radius: 1.09 cm, length: 75 cm, angle to yz plane: -59 mrad, angle to xz plane: 30.9 mrad
  - Start of beam dump at z = 37.5 cm
- Target chamber: double wall, 14-15 cm OR, double Be windows
- Tungsten shield: 51-52 cm IR, 110-115 cm OR
- Cu module: designed for replacement with a Hg target module

Target Chamber Elevation View

- **Target + Dump = 150 cm**
- **End of Dump at z ≈ 112.5 cm**

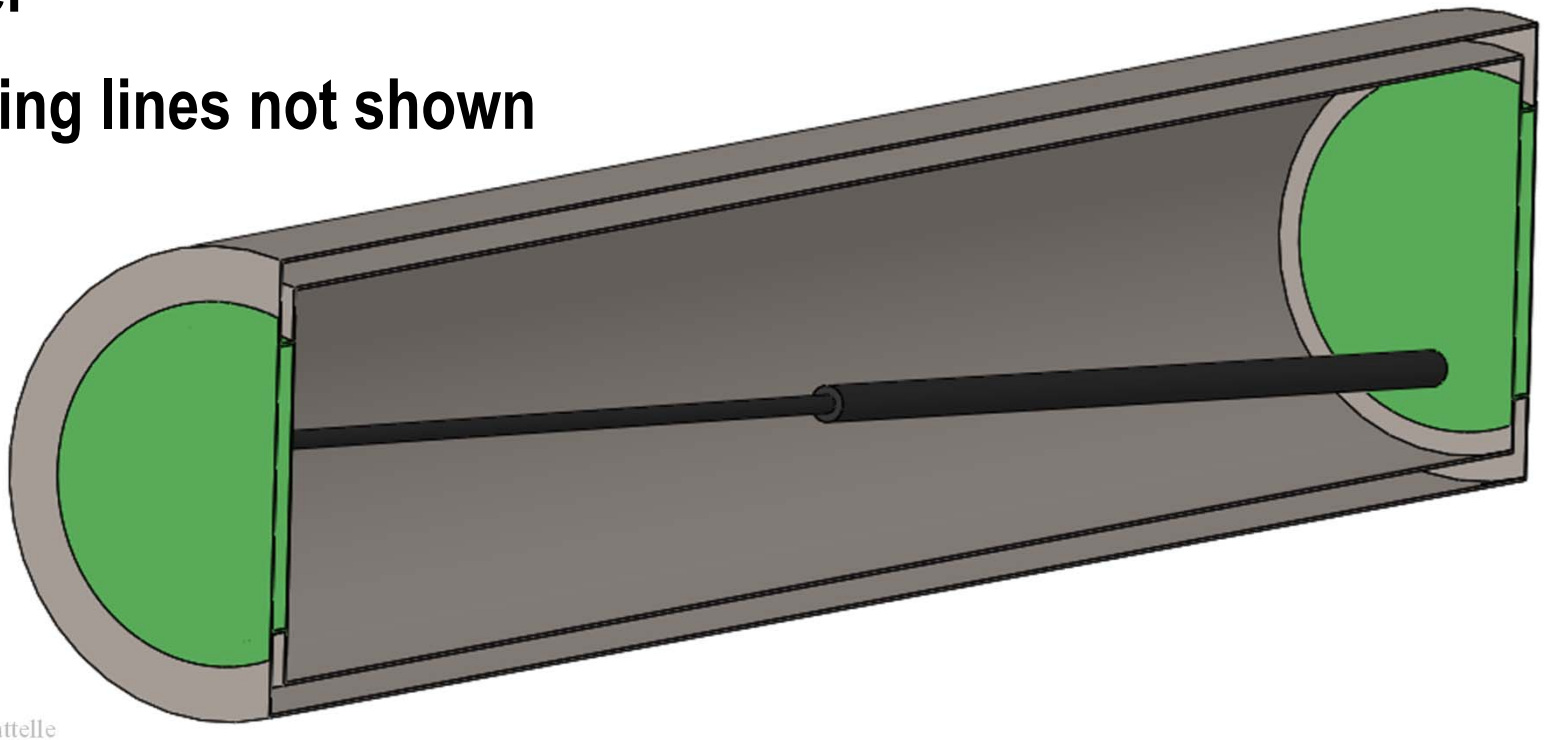


Target Chamber Plan View

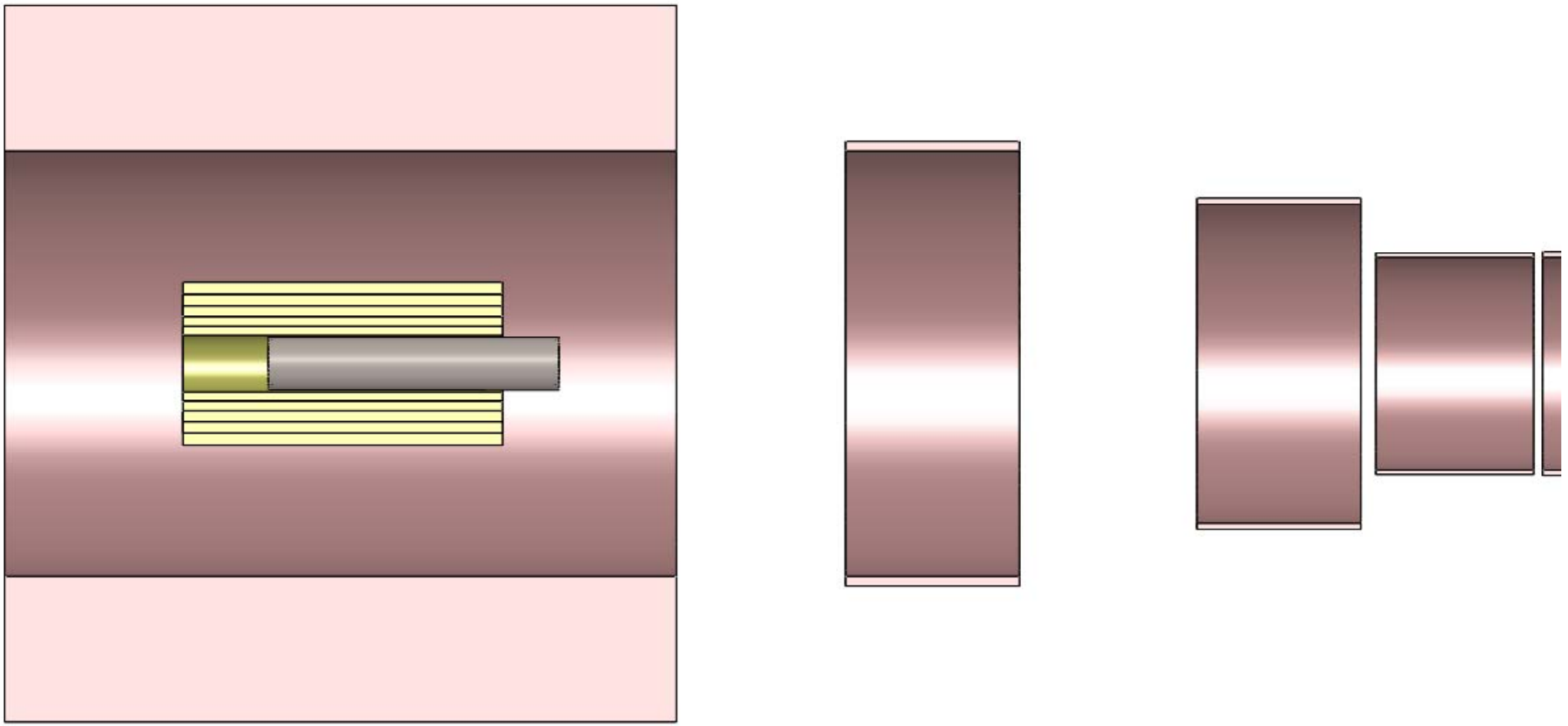


Target Chamber Isometric

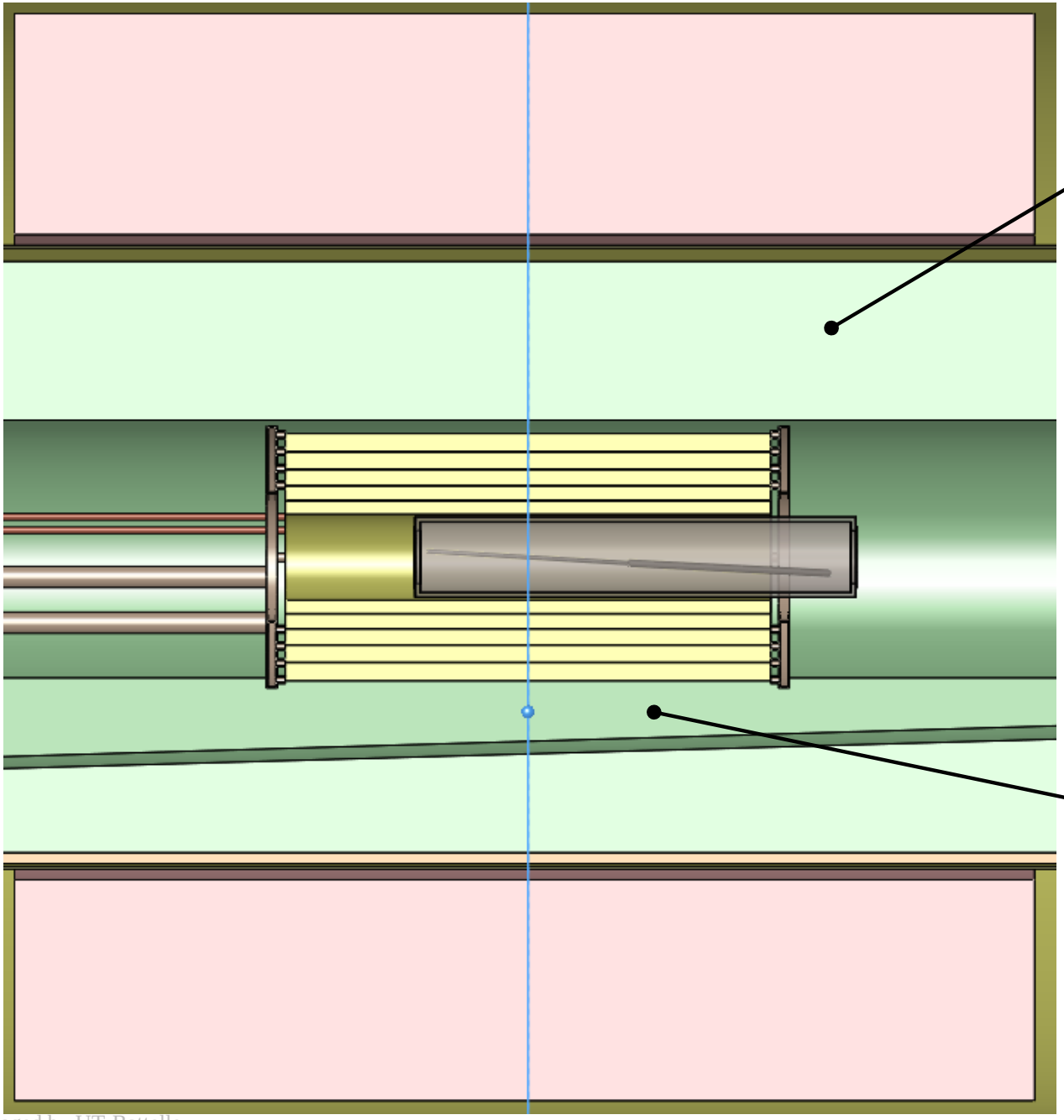
- **Double Be windows both upstream and downstream**
  - **Upstream window could be smaller and perhaps non-axisymmetric, downstream window size determined by beam pipe**
  - **[Upstream window will be replaced by a "snout" ~ 4-5 m long to place the window upstream where the proton beam spot is larger.]**
- **C target chamber much simpler than Hg since only a beam enters chamber**
- **He cooling lines not shown**



Target Chamber in Coils: 20to2T5m configuration



Target Chamber (blue line z = 0)

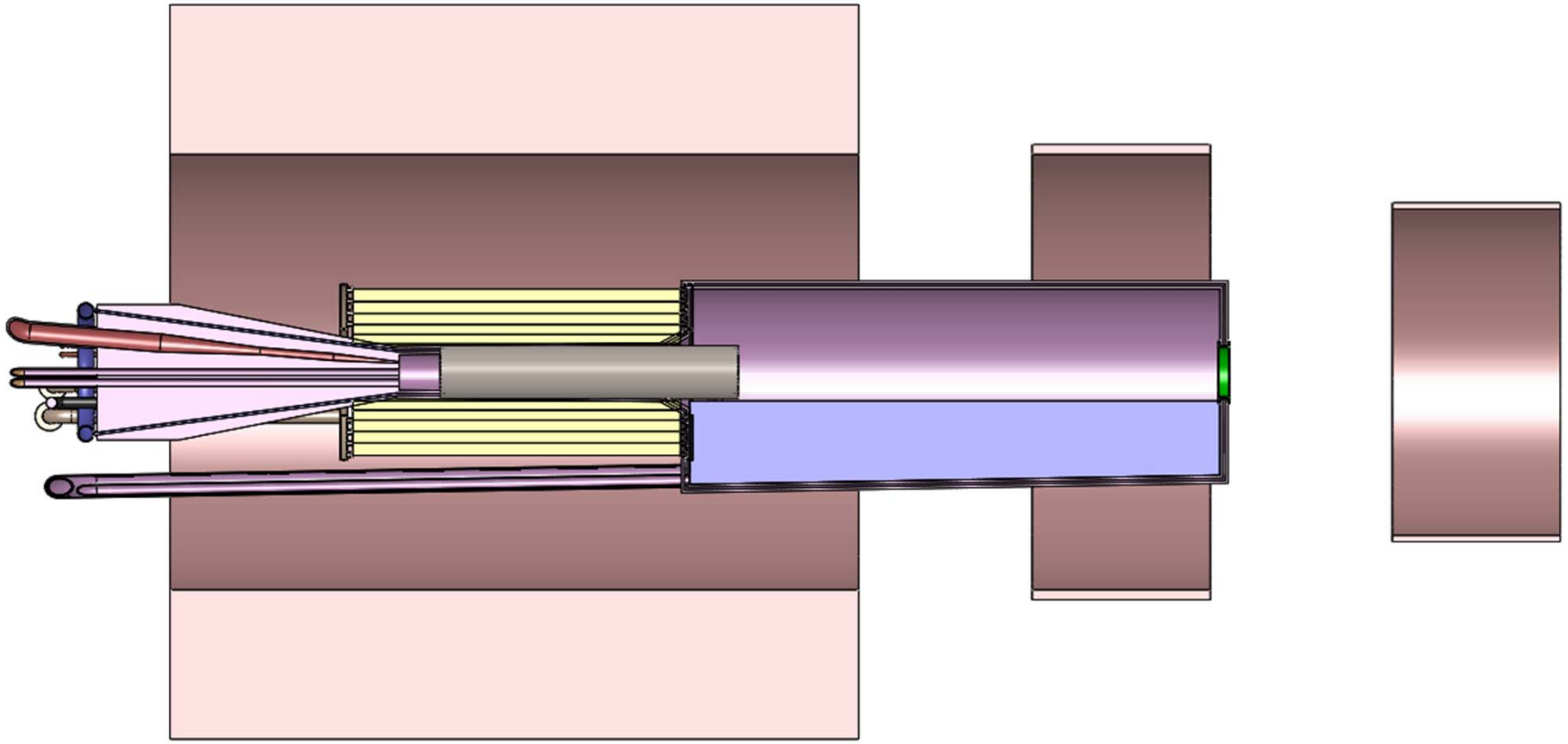


"Old" shielding module – not yet updated

"Slot" in shielding provides space for Hg drain lines

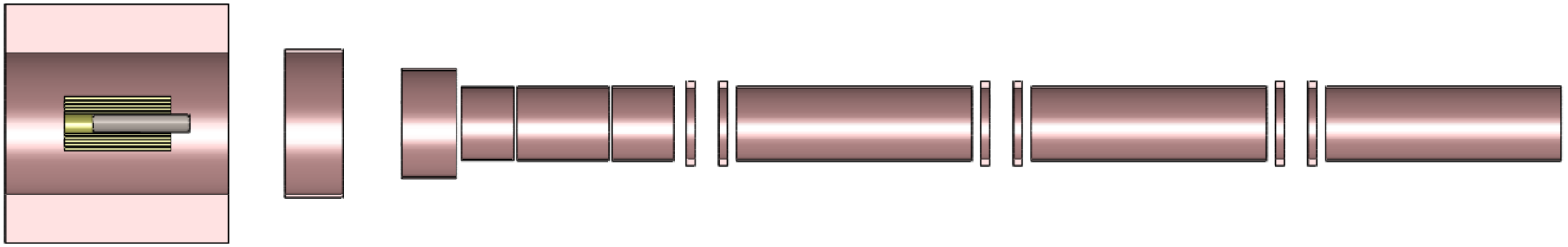
Target Chamber in Coils w/Hg Module

- **Hg module shifted by +37.5 cm in z**
- **Carbon target chamber length? [Must end before "flare" of beampipe.]**
- **Shielding module length? [Could be ~ 5 m to match length of possible cryostat containing the 1st and 2nd SC coils.]**



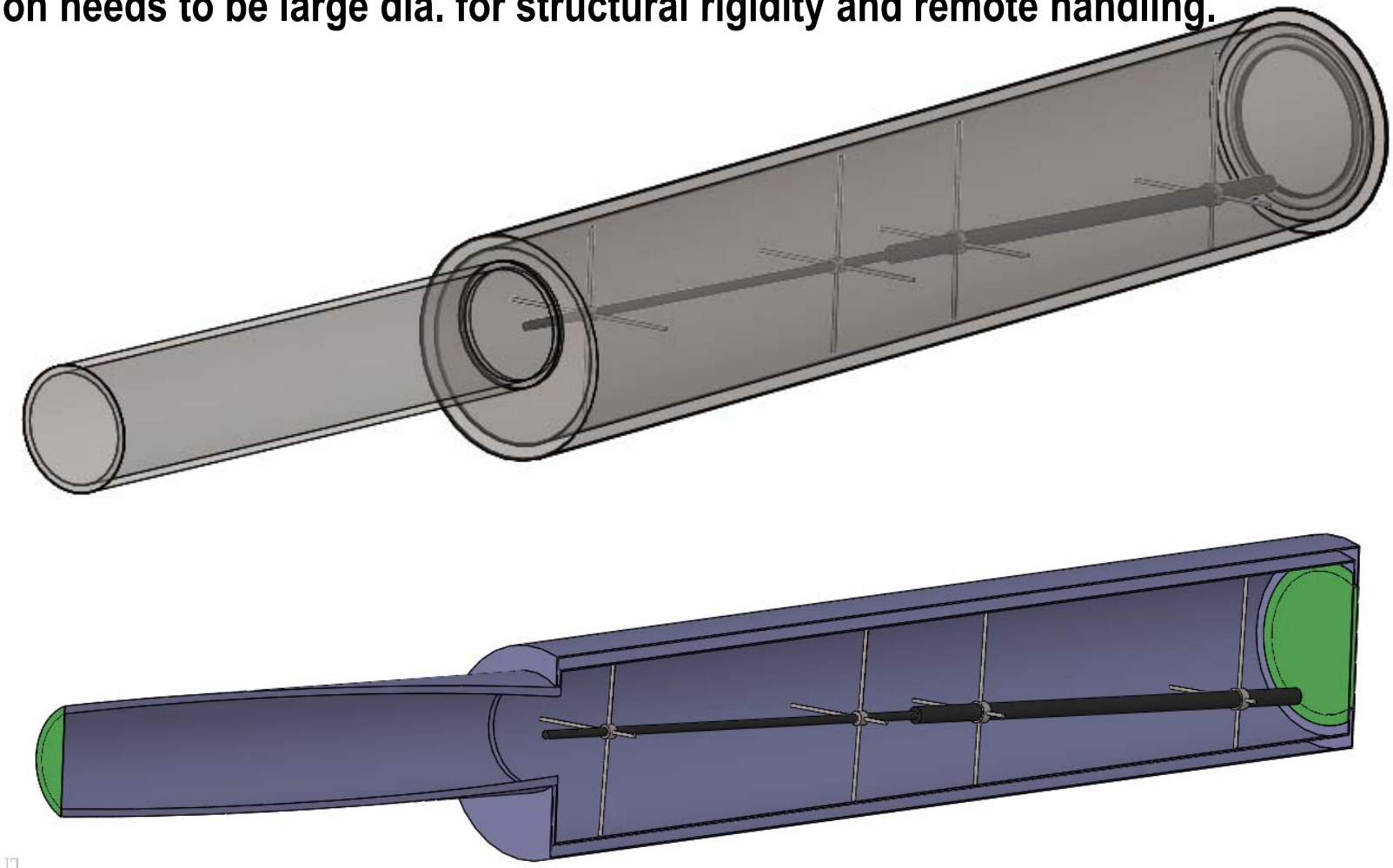
Coils

- **Layout suggests multiple cryostat configurations**
  - **1+1+5+3+3+…**
  - **2+5+3+3+…**



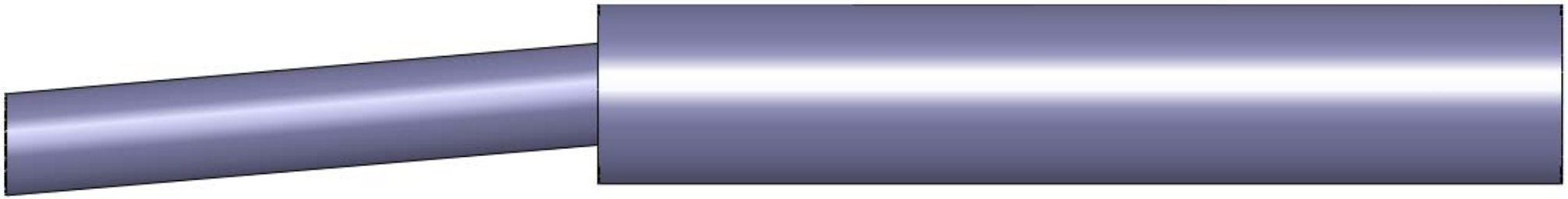
Updated Carbon Chamber

- **Added rod holders. Would need to be small enough to not require direct cooling.**
- **Moved upstream beam window. Extension not currently double-walled. This would complicate cooling, especially as length grows.**
- **Extension needs to be large dia. for structural rigidity and remote handling.**

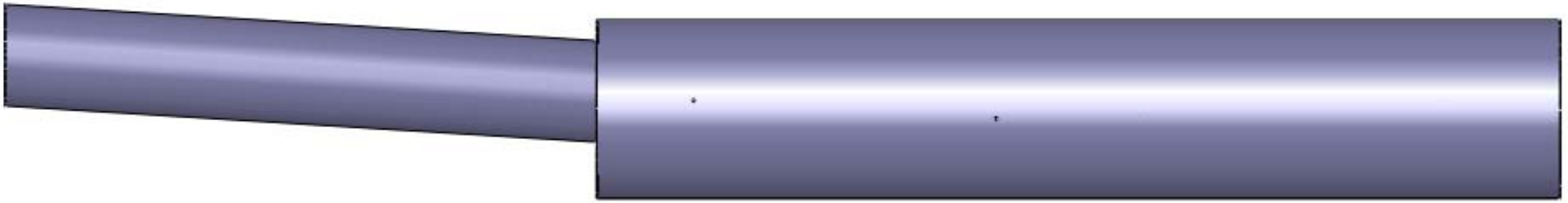


Additional Carbon Chamber Views

Moved upstream beam window further upstream. Looking along the beam path (+Z), the beam comes from above (+Y) and from the right side (-X).



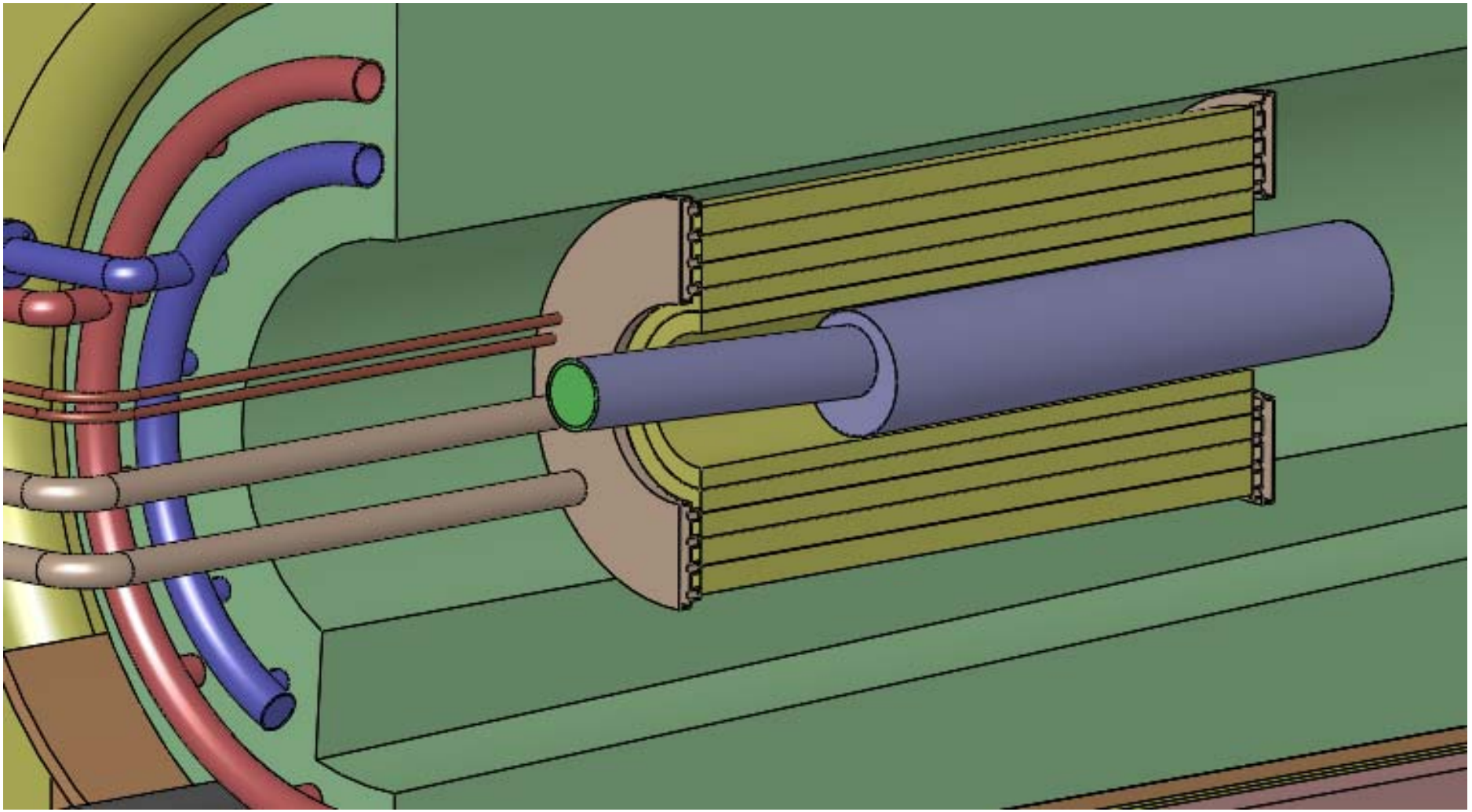
Plan View



Elevation View

New Carbon Chamber in Position

- **Cooling paths need to be added**



Initial Shielding & Cryostat Layout

- **IGNORE THE TAPER IN THE 2ND SHIELD MODULE – IT IS THE OLD TAPER!**
- **First shielding module dimensions: IR 51cm, OR 110cm, upstream end Z=-190cm, downstream end Z=+420cm**
- **Second shielding module dimensions: IR tbd, OR 50cm, upstream end Z=+430cm, downstream end Z=+1000cm**