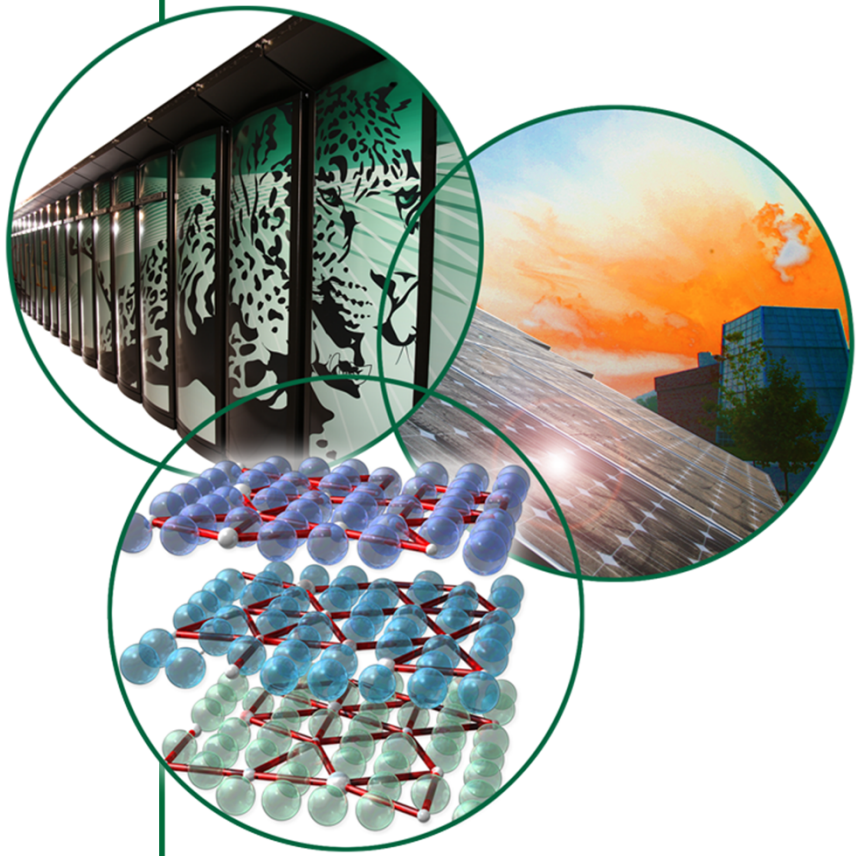
Neutrino Factory Target Vessel Concept Update

V. Graves

Target Studies EVO

June 12, 2012



U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
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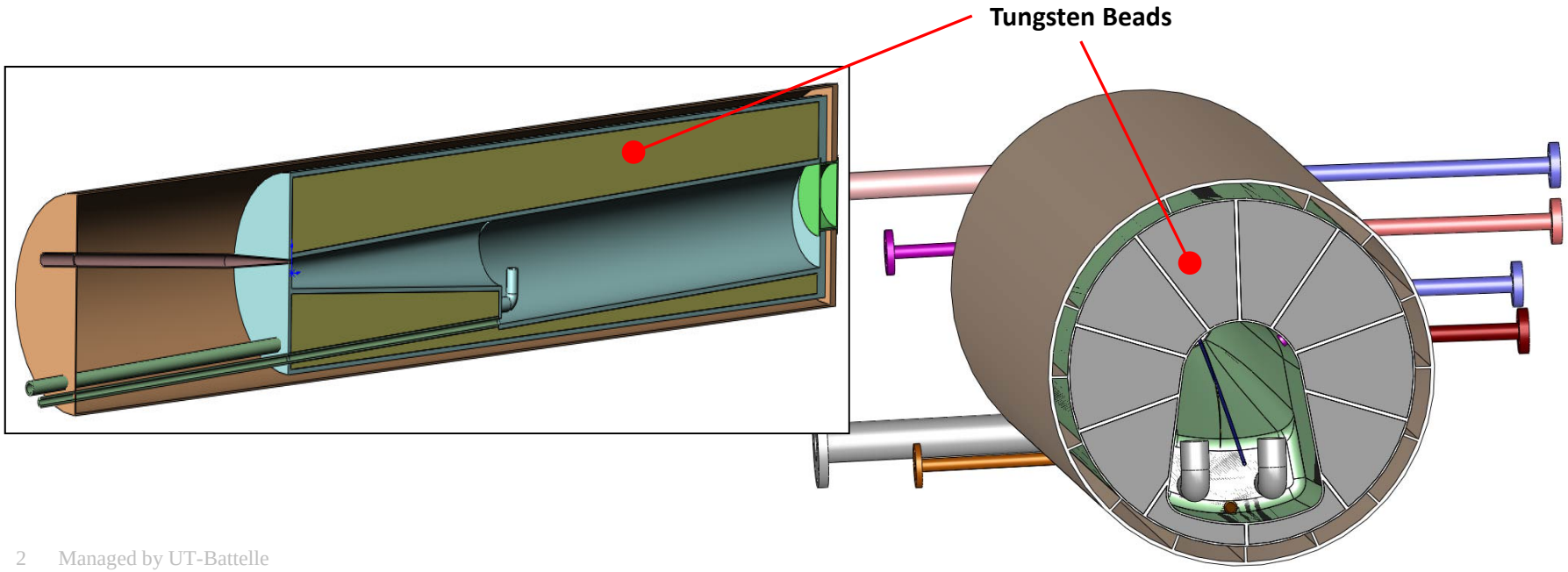
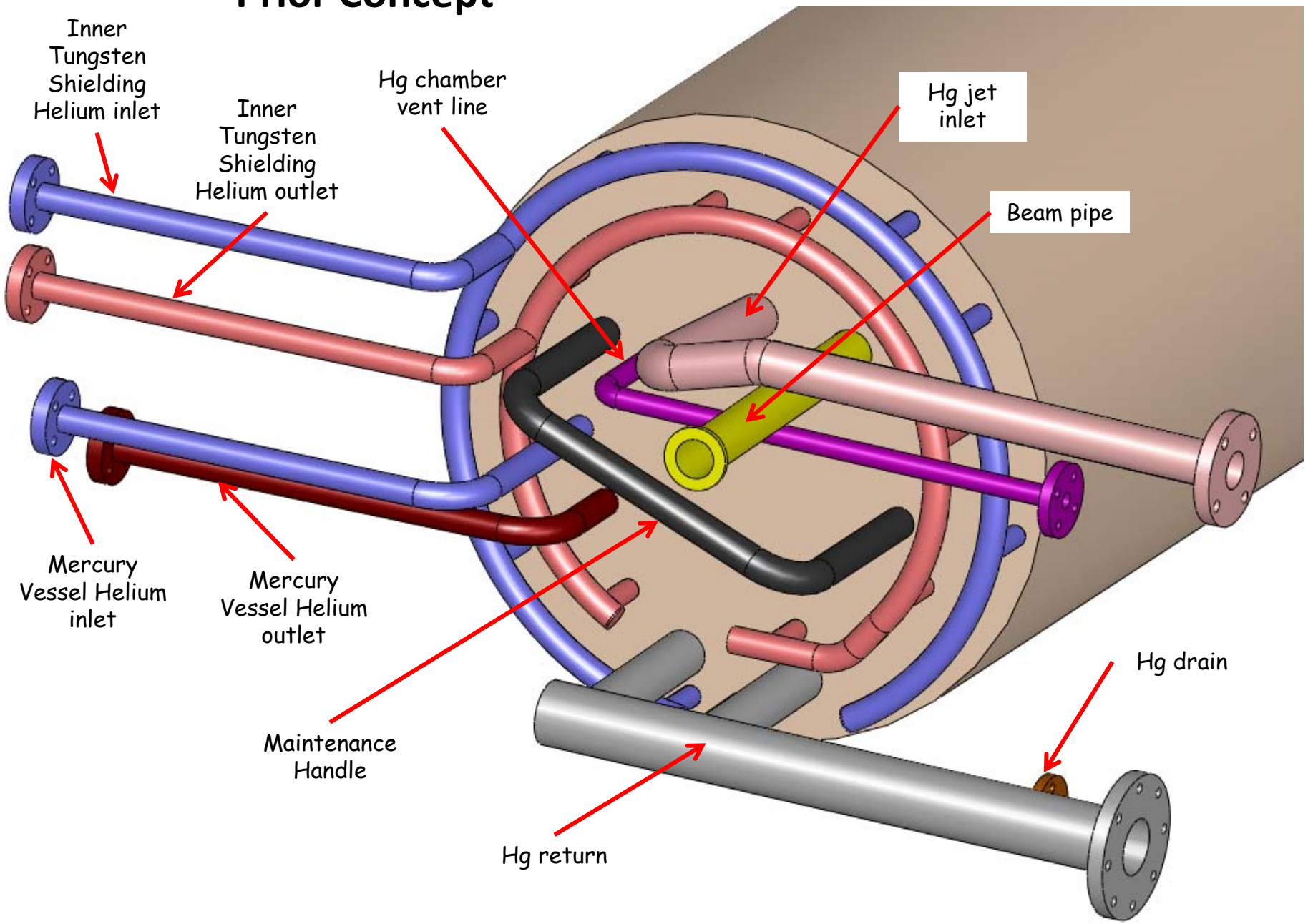
Review – IPAC Paper Concept

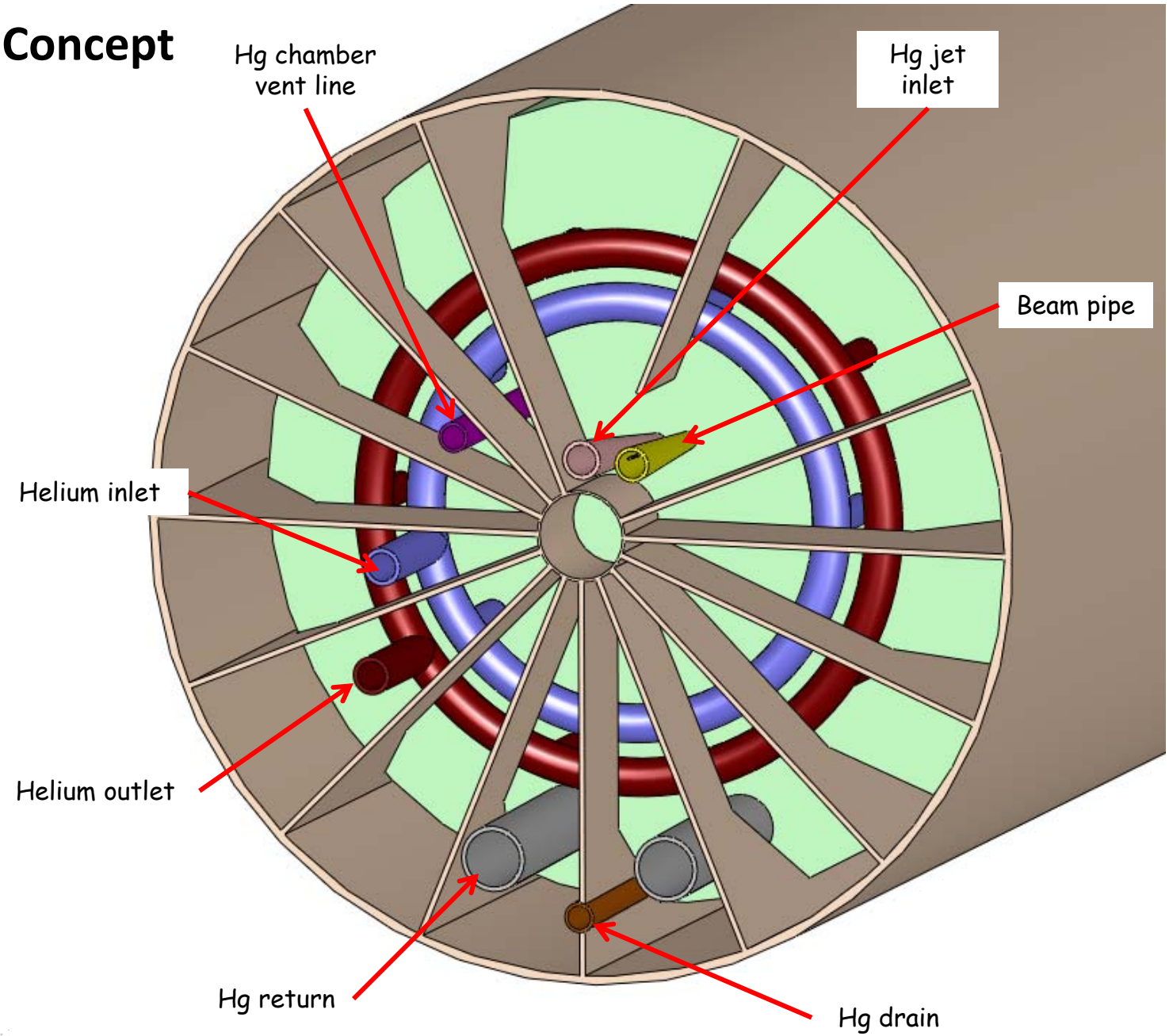
- Double-wall container for mercury containment
- Inner container is a hollow SS shell filled with He-cooled W beads
  - Actually provides triple-wall mercury containment in most areas
- Issue is that it allows Hg to leak into a shielding container that is not part of the mercury system
- Next step: move outer Hg containment wall inside W, segregate mercury containment and shielding functions



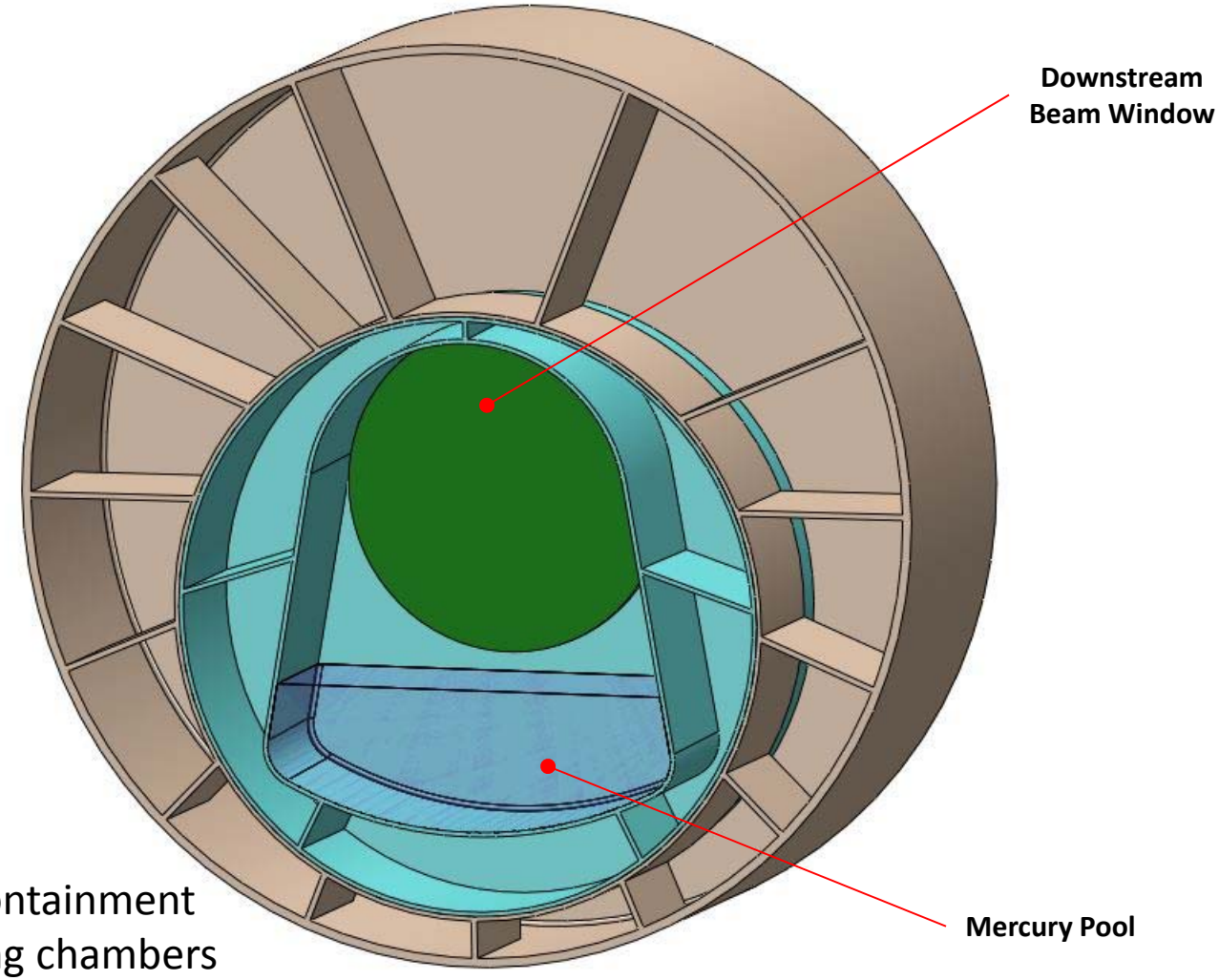
Prior Concept



Prior Concept

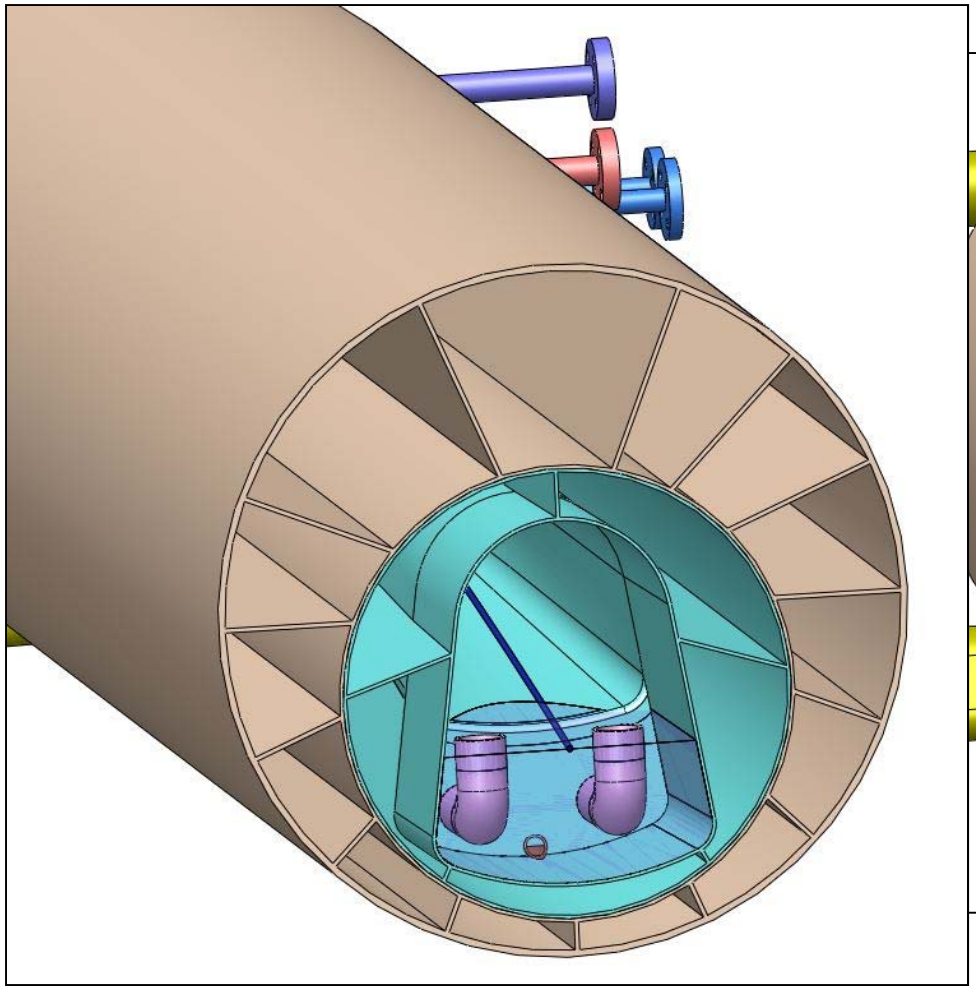


Updated Concept – Separate Mercury Containment from Shielding

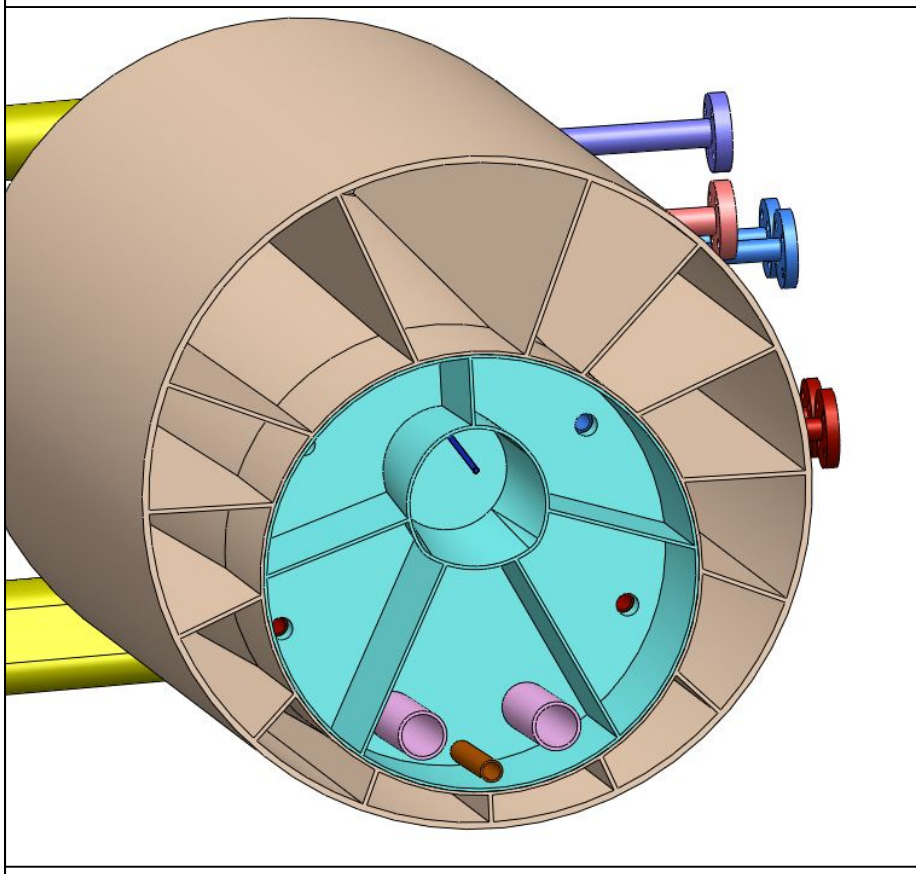


Double wall mercury containment inside tungsten shielding chambers

Segmented Mercury Interstitial Space

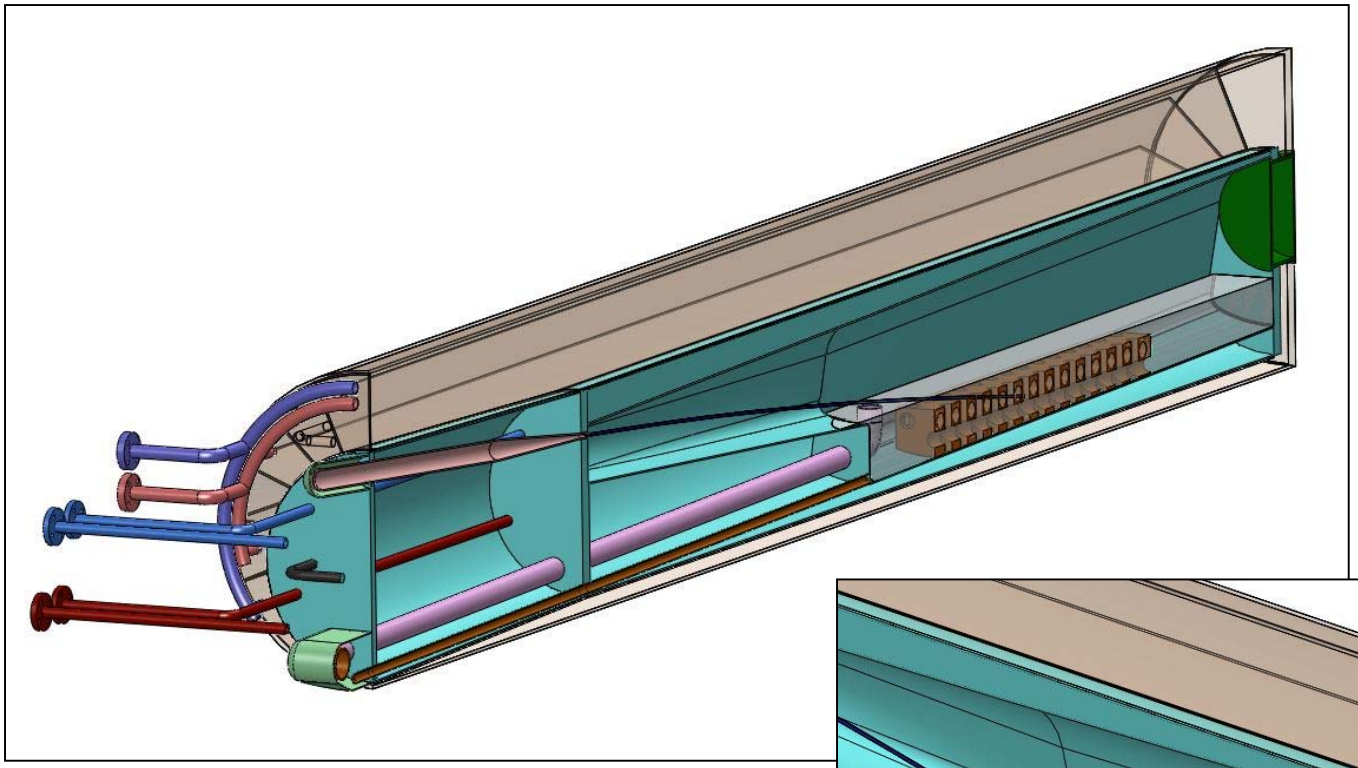


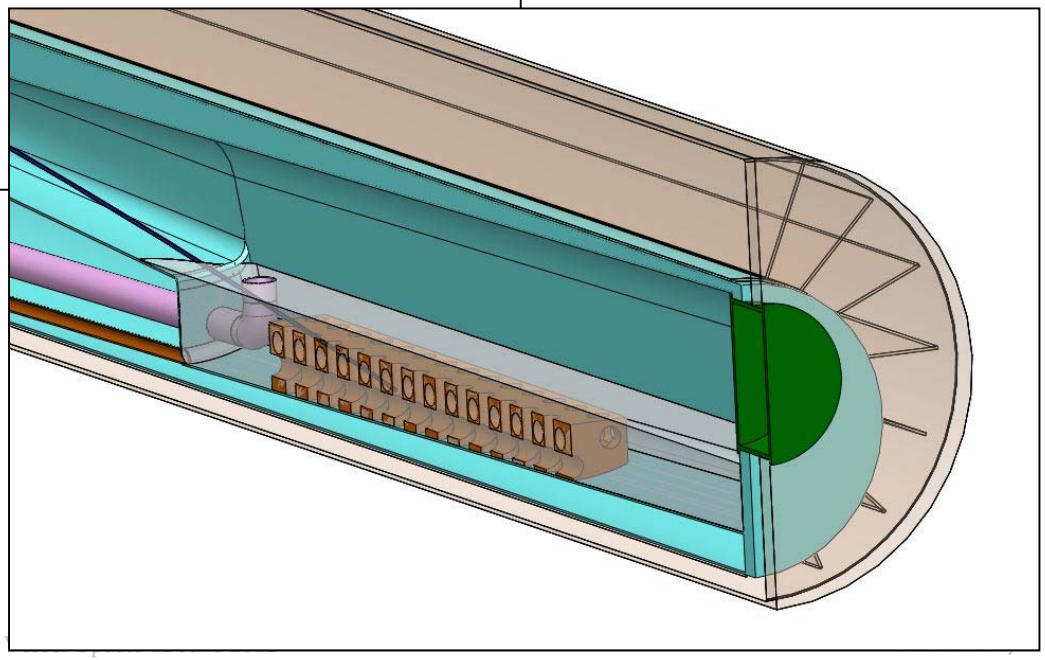
Upstream View From Hg Pool



Upstream View Before Hg Pool

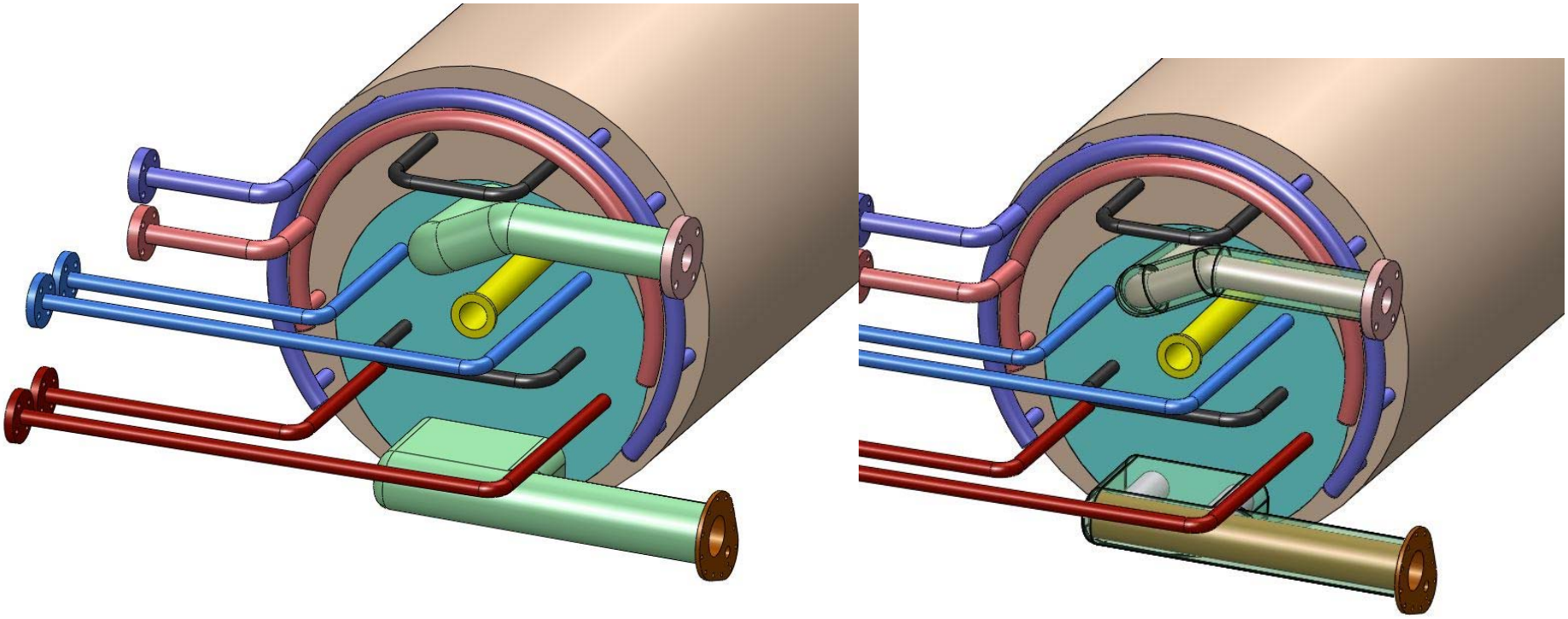
Mercury and Shielding Modules



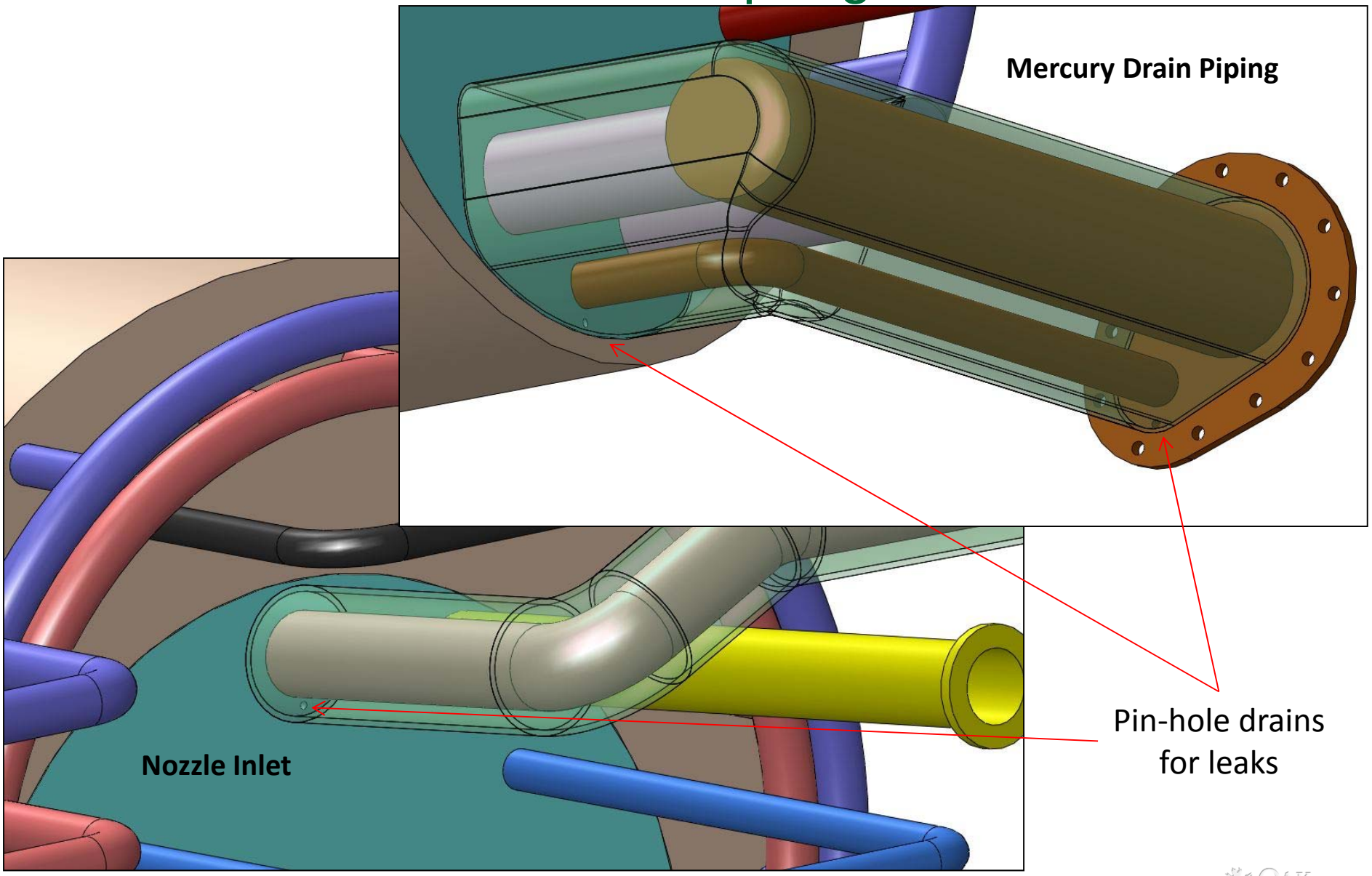


Double-Wall Supply & Return Piping

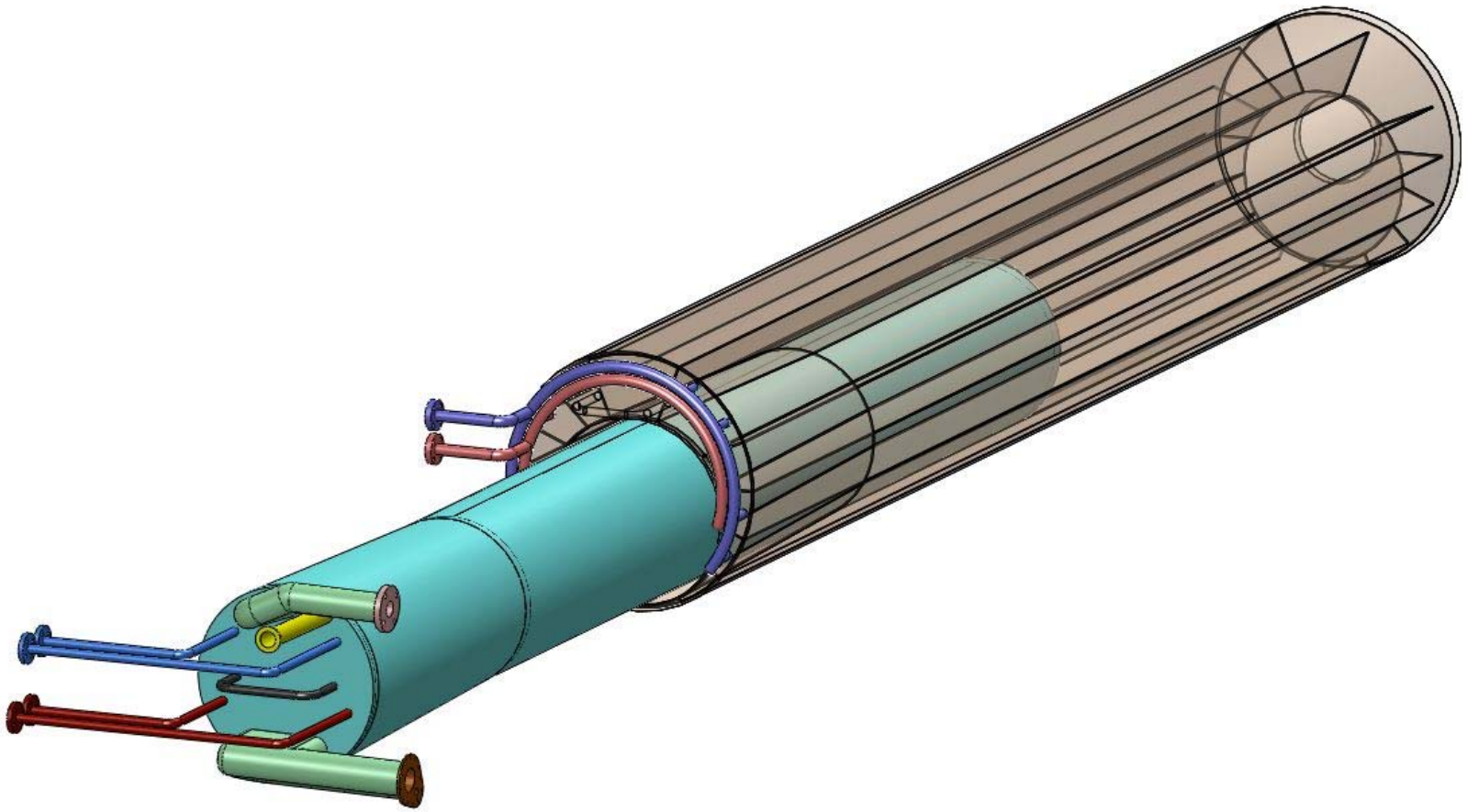
- Mercury requires double containment outside the mercury equipment cell



Double Containment Piping

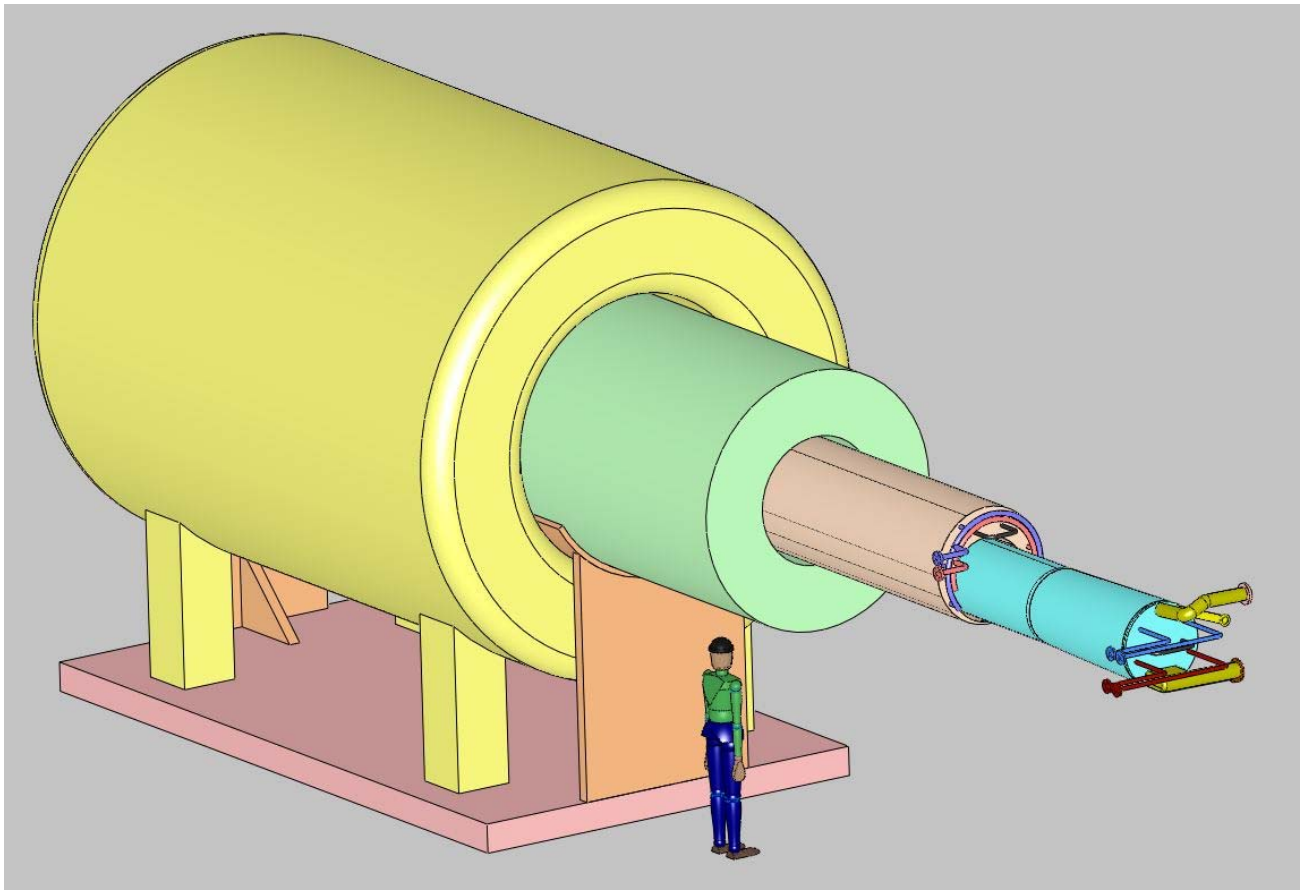


Mercury Module Extraction



Cryostat Modules

- Now have three distinct modules within the first cryostat
- Could combine the shielding modules into one



Comments

- Isolating the mercury module from the shielding makes remote handling simpler
- Still a very complicated geometry and mechanically difficult to fabricate
- How much heat energy does this new mercury module have to dissipate?