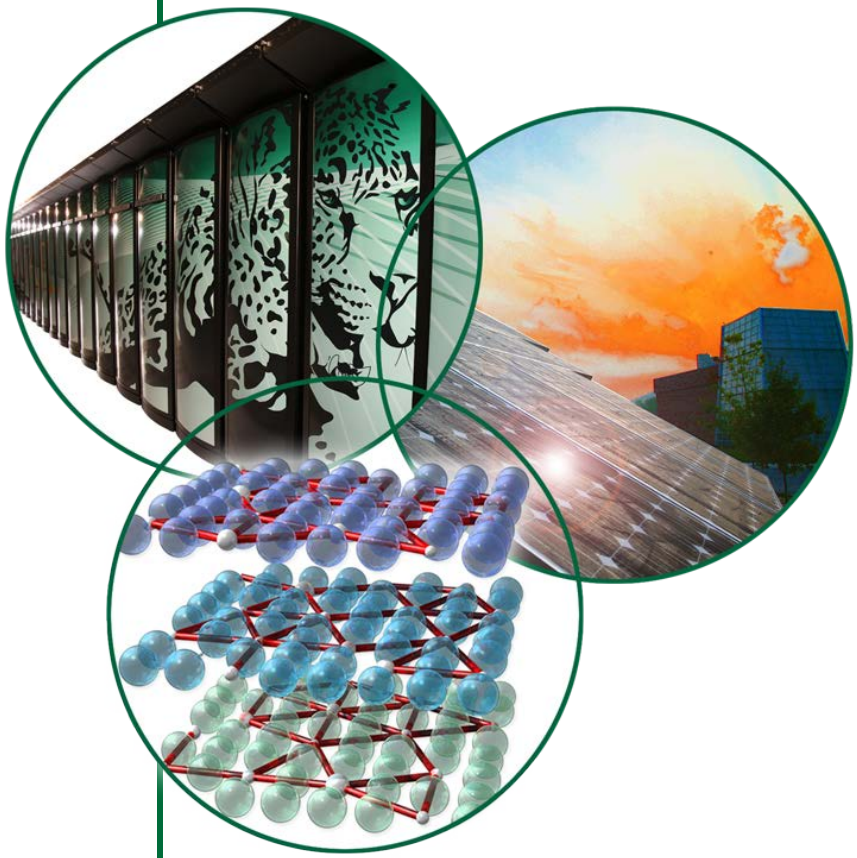
Neutrino Factory Target Vessel Concept

V. Graves



Target Studies EVO

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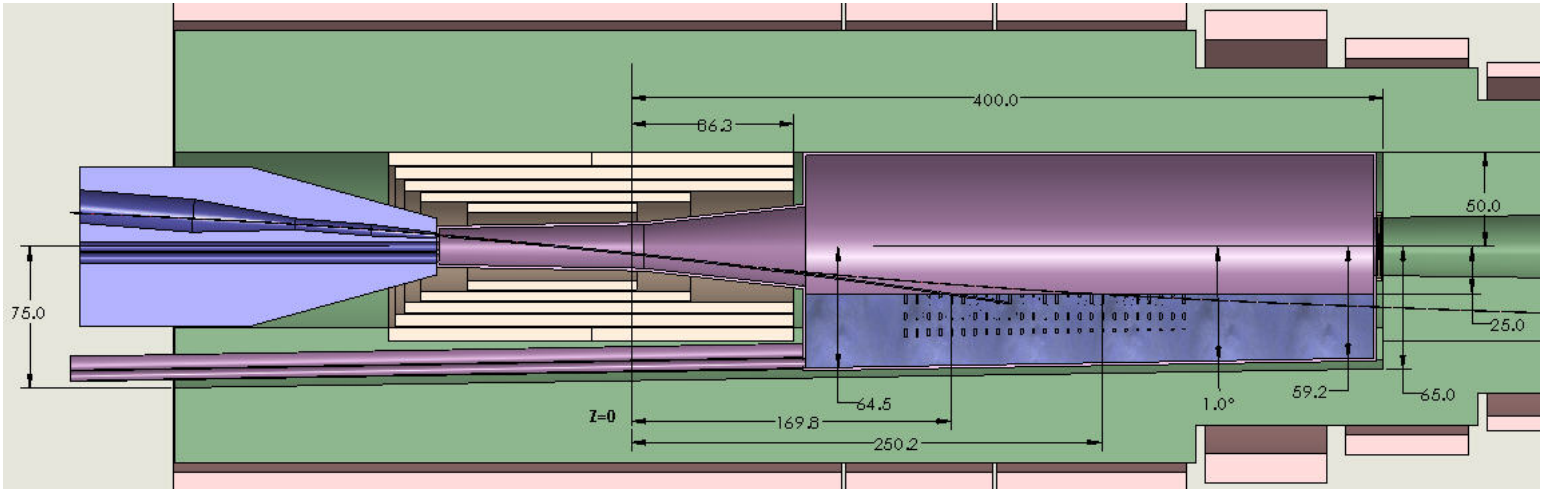
U.S. DEPARTMENT OF ENERGY

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Target Vessel Requirements

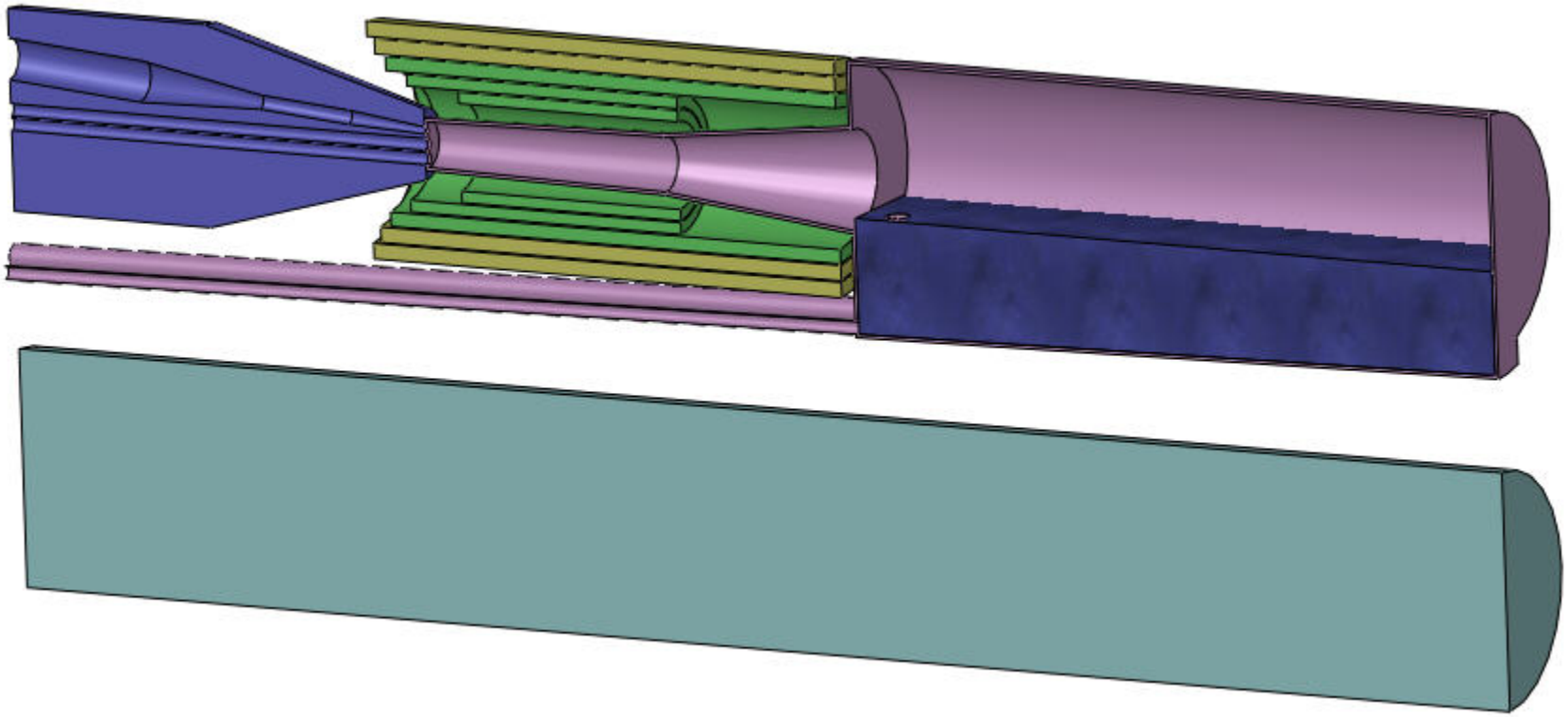
- Accurate jet placement
- Jet/beam dump pool
- Double containment of mercury
- Beam entrance port(s)
- Chamber ventilation
- Provisions for cooling
- Provisions for draining
- Additional SC coil shielding

Starting Point: Integrated with Resistive Magnets

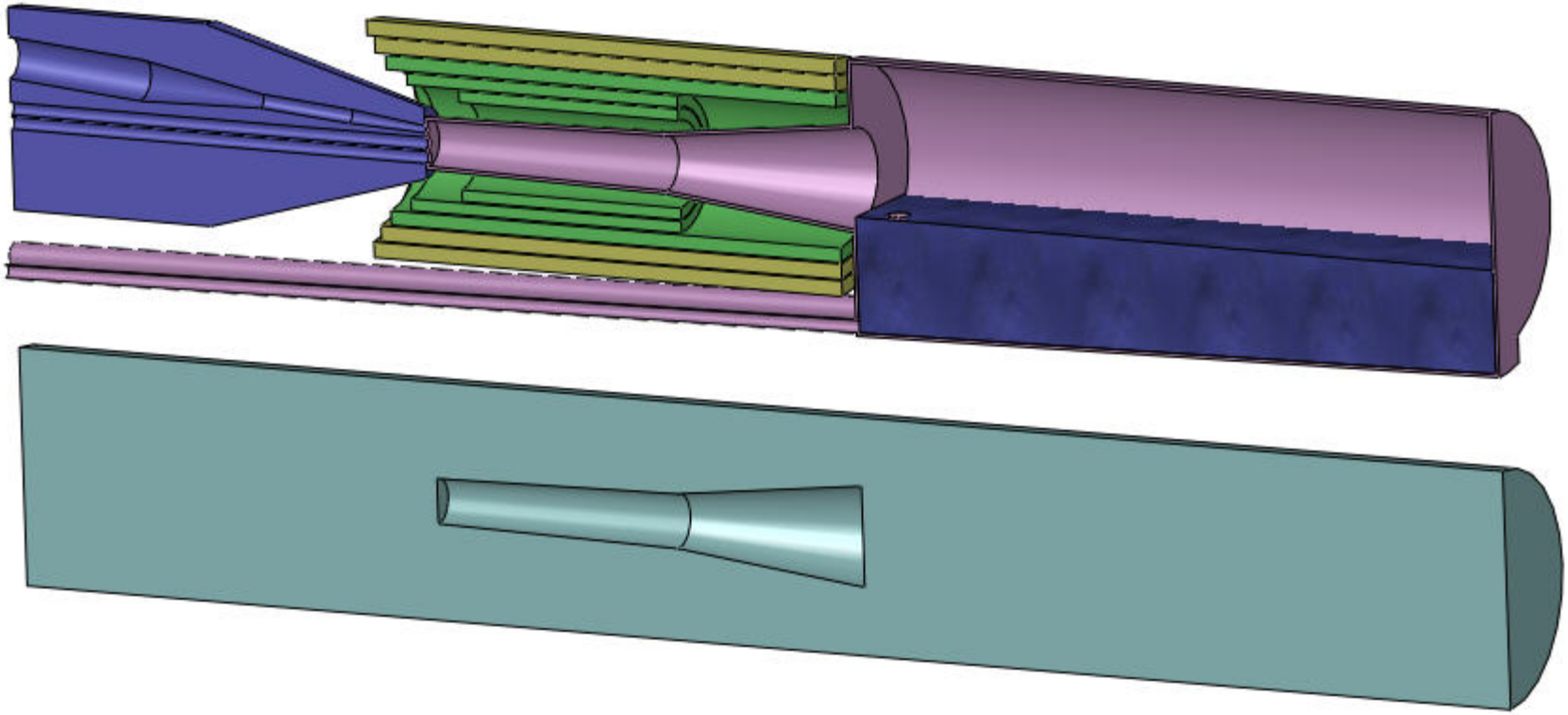


- Goal: develop concept with no resistive magnets
- Method: start with solid cylinder of SS and remove material as required

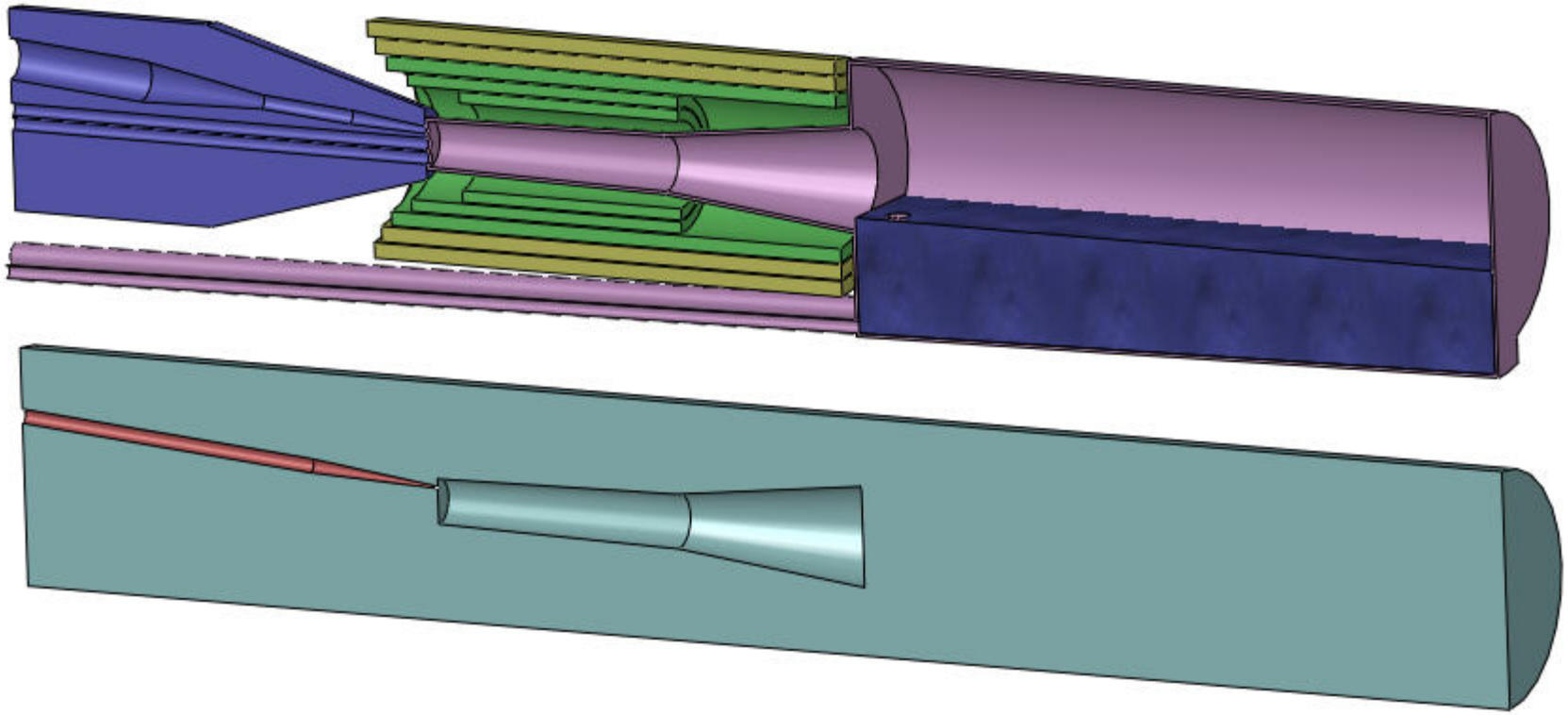
Cylinder



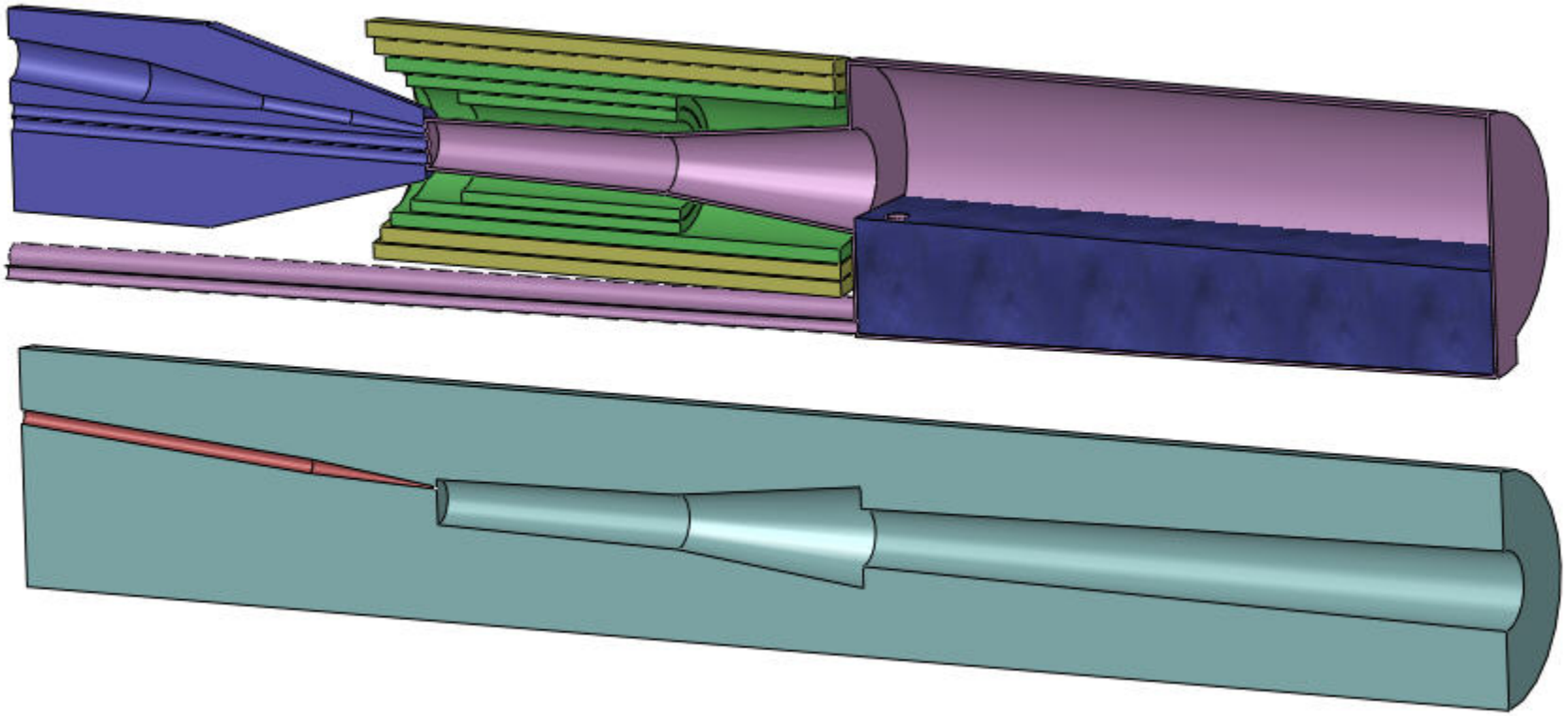
Jet/Beam Chamber



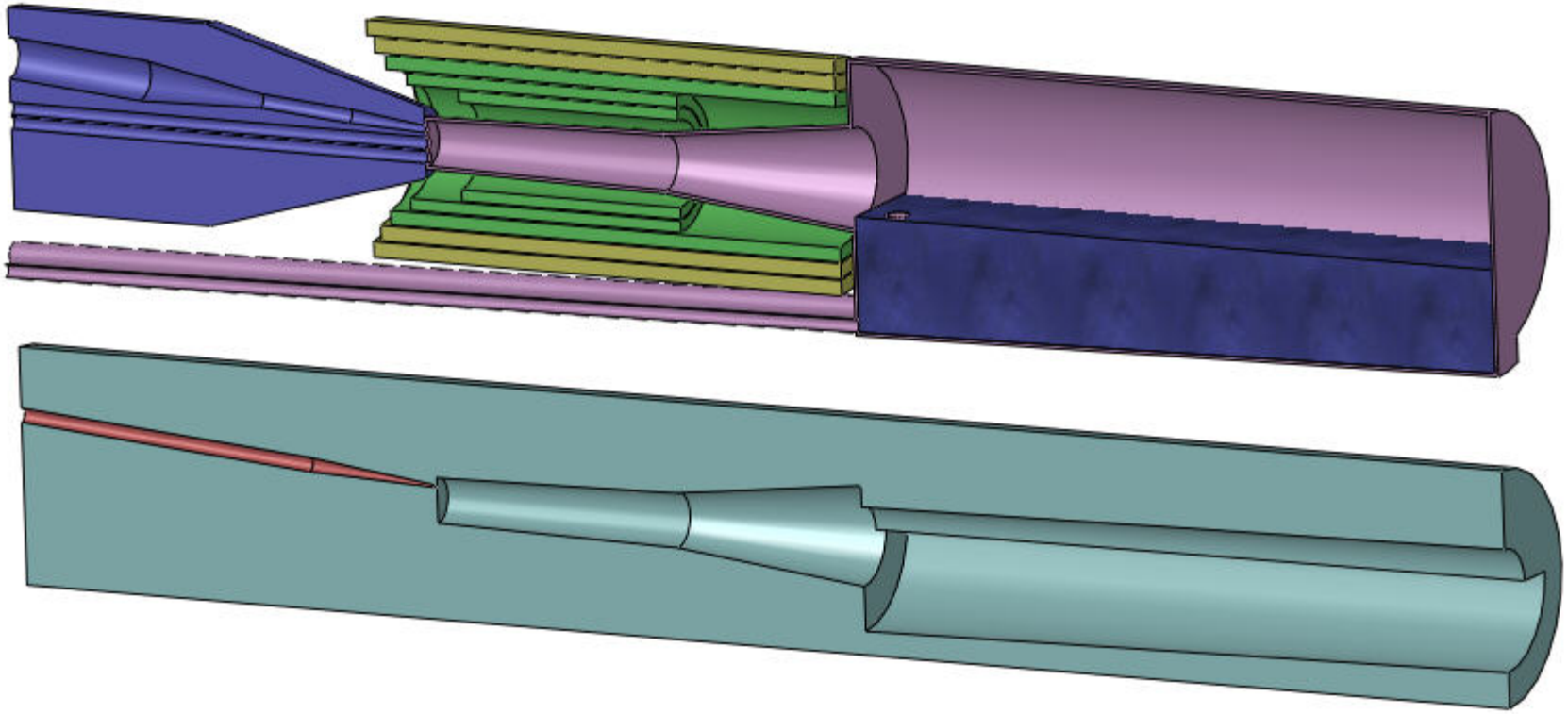
Nozzle



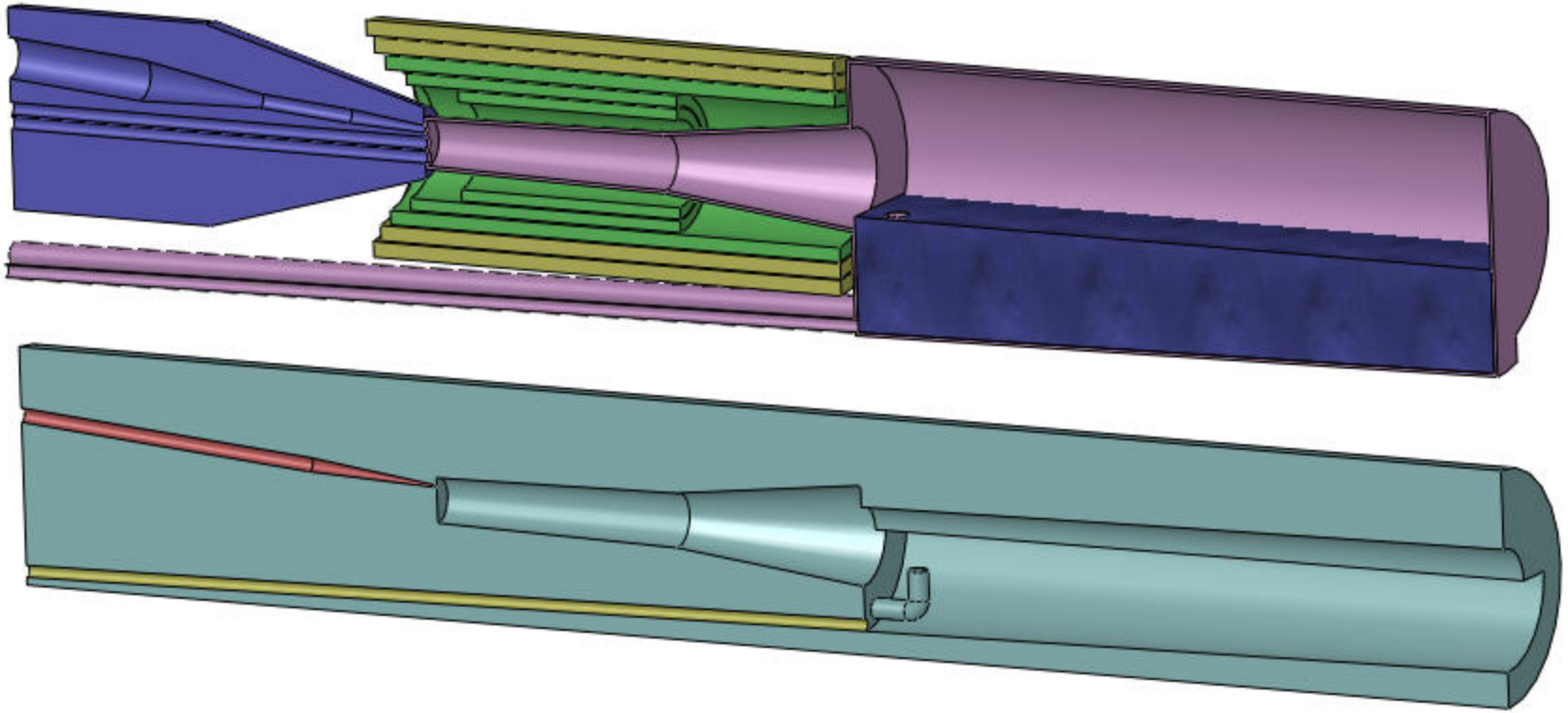
Beam Pipe



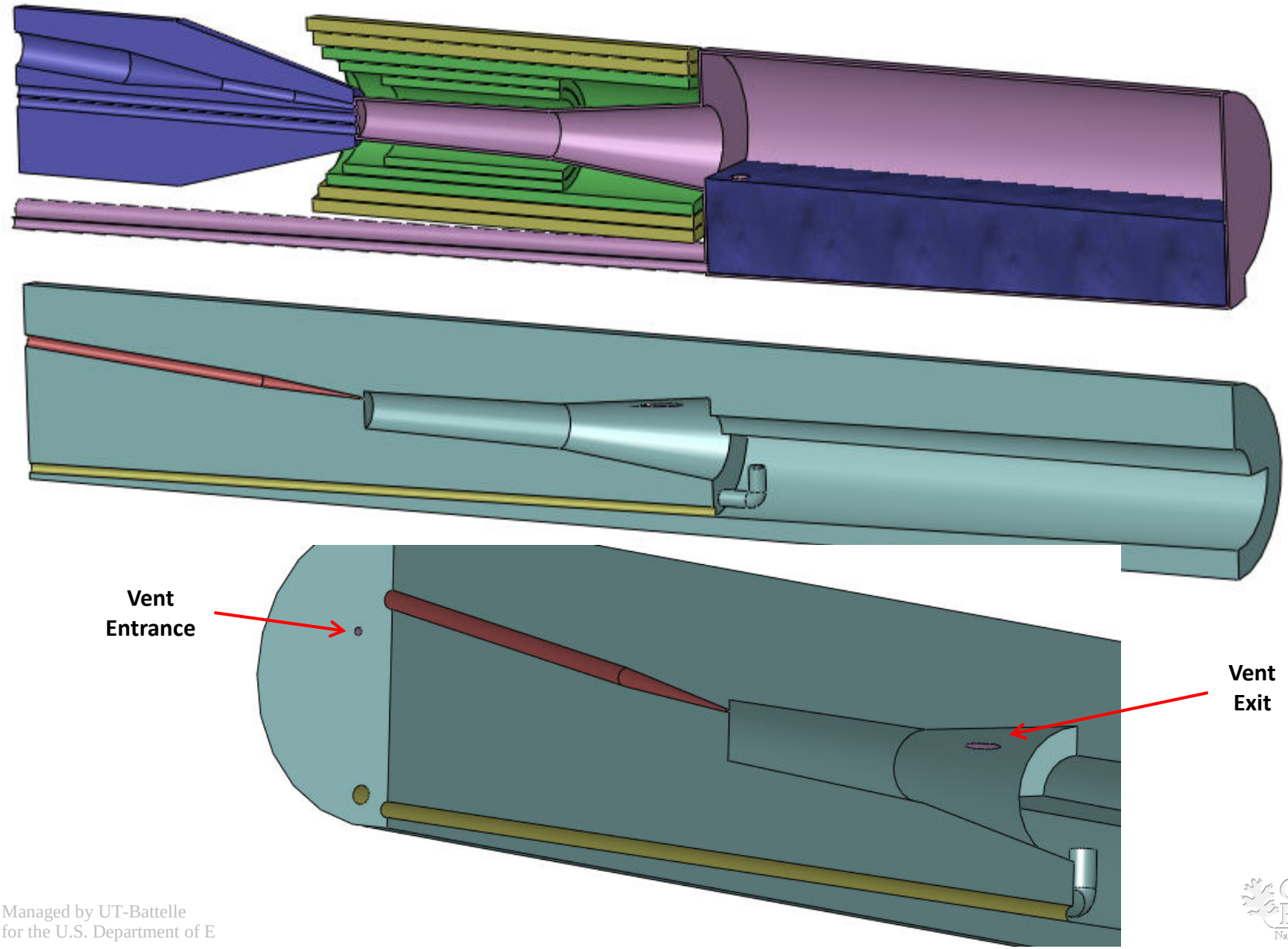
Mercury Pool Trough



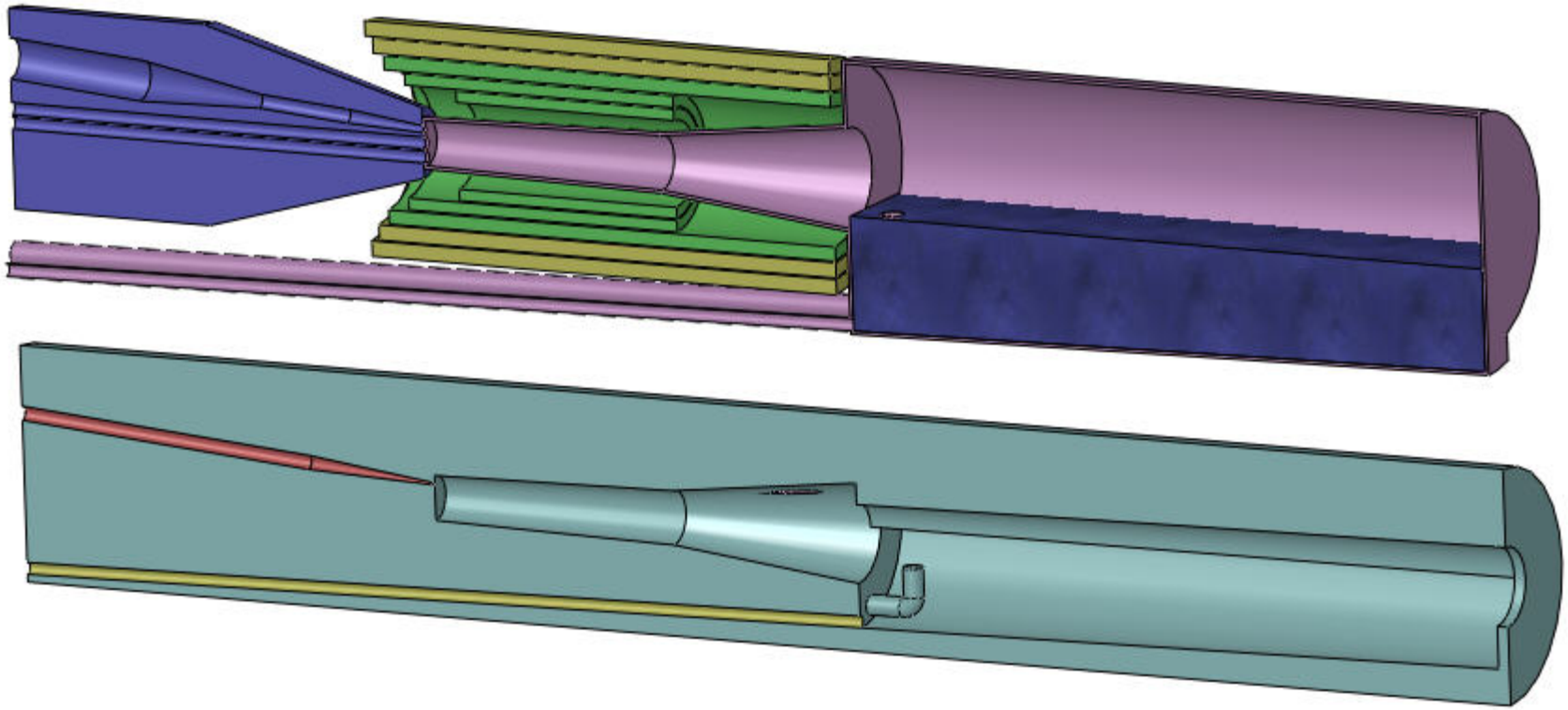
Drains



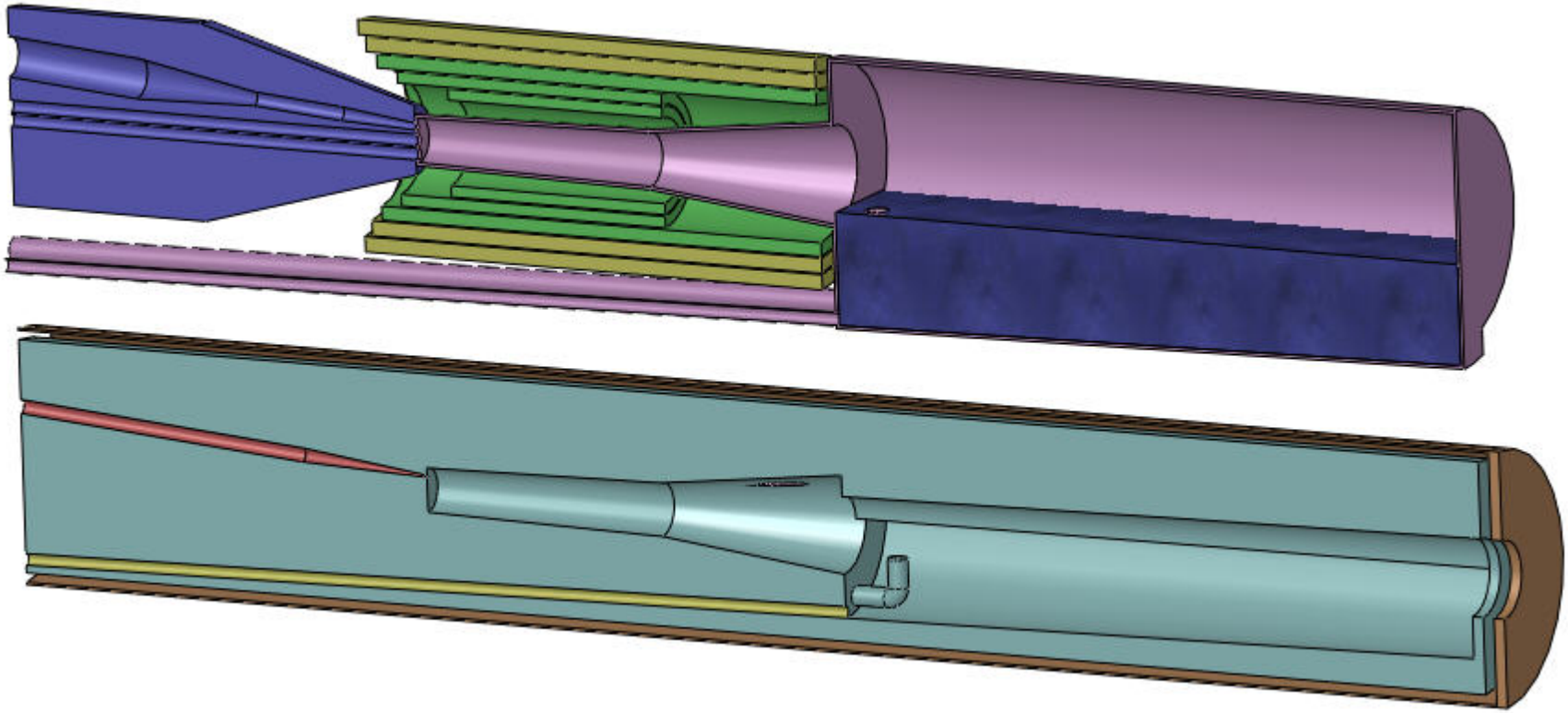
Vents



Downstream End Cap

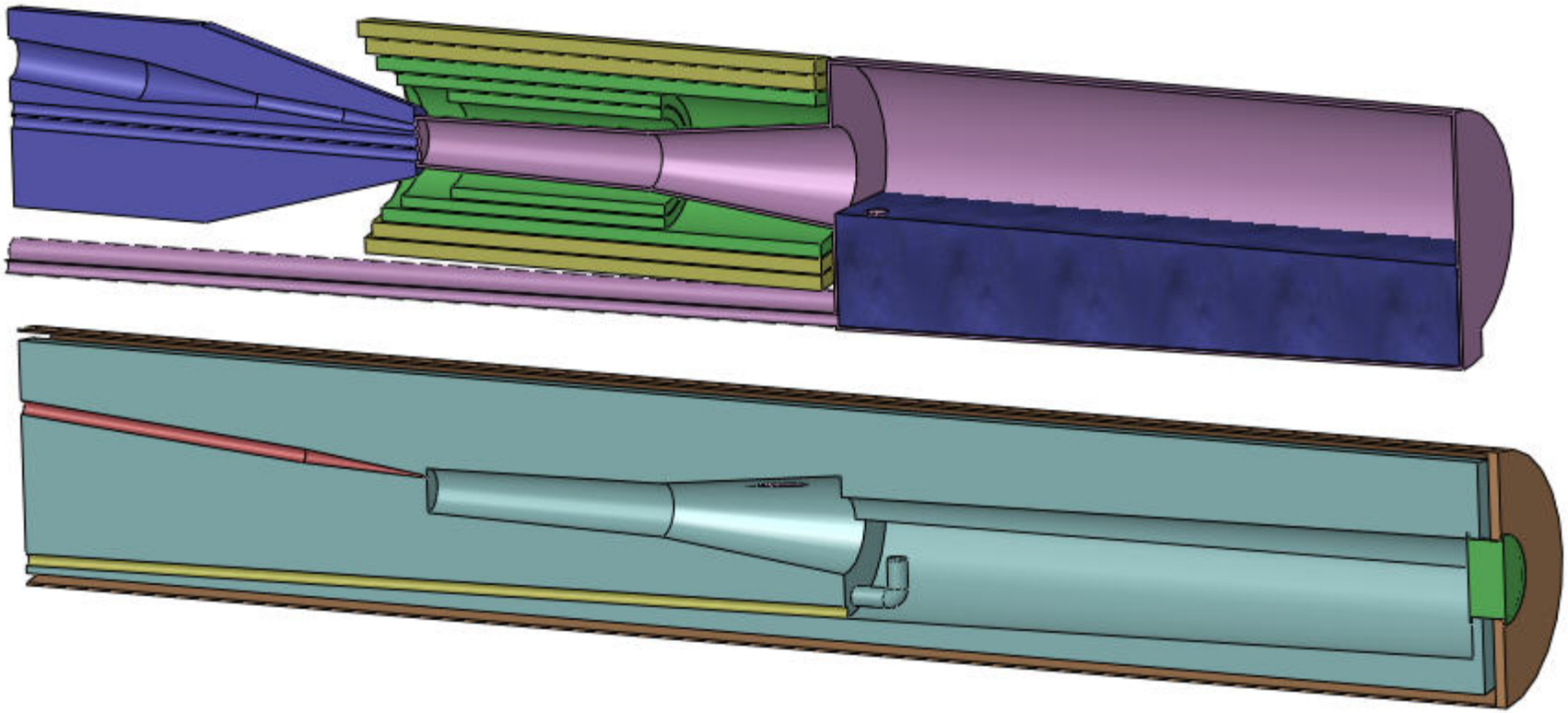


Double Wall

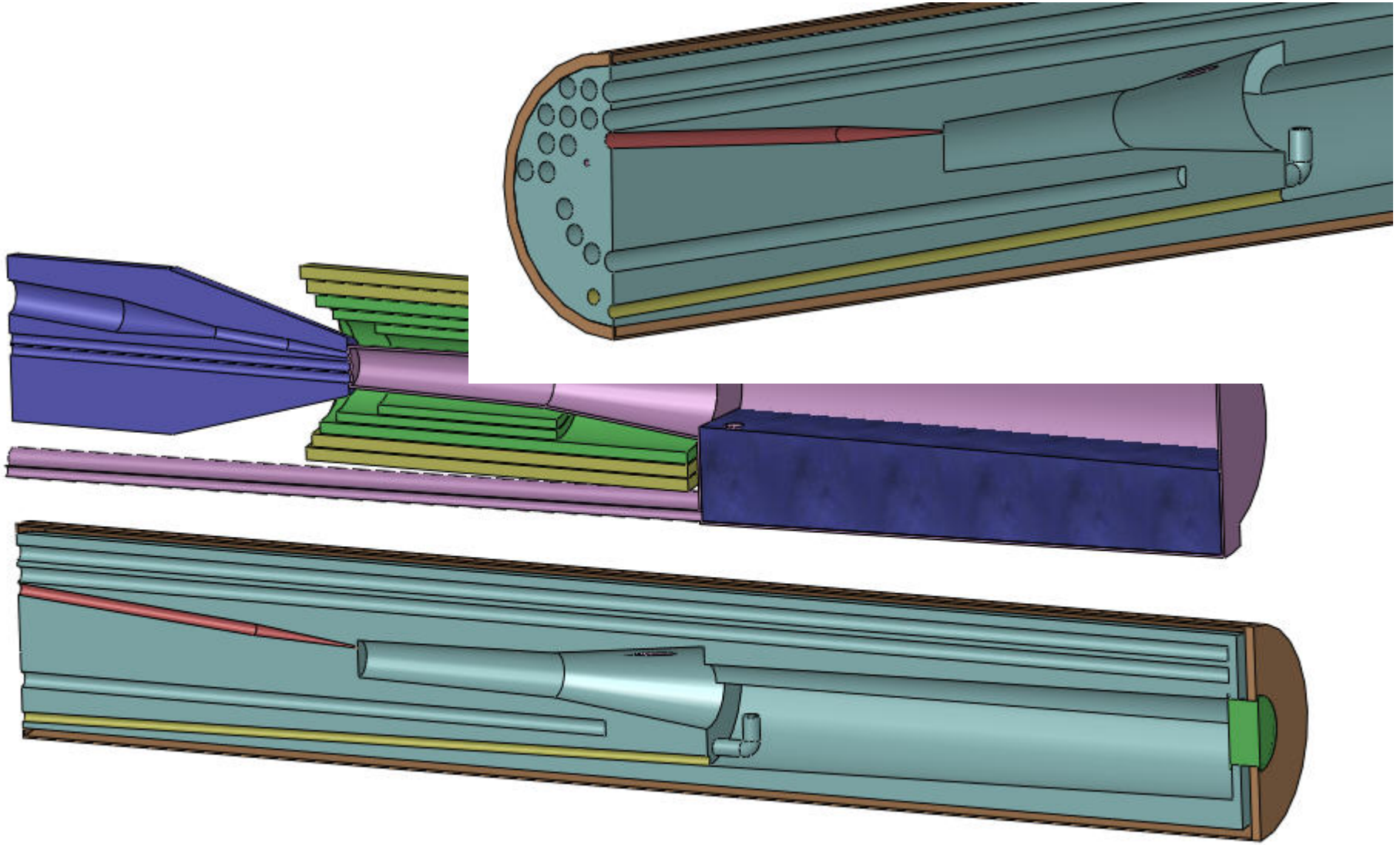


Beam Window

- Could add flow channels to interstitial space for water or helium cooling
- Beam window becomes integral part of assembly
- Be/SS interface TBD



Cooling Channels



Comments

- These images were created to aid in discussion. No specific fabrication details were included.
- A machined billet will be more precise, rigid, and more accurately place the nozzle than a welded shell filled with tungsten beads.
- This concept still has numerous issues to be worked out. For instance, all fluid passages must be self-draining.
- Space on the upstream end is still a major concern. The small beam/jet angles cause significant mechanical issues.