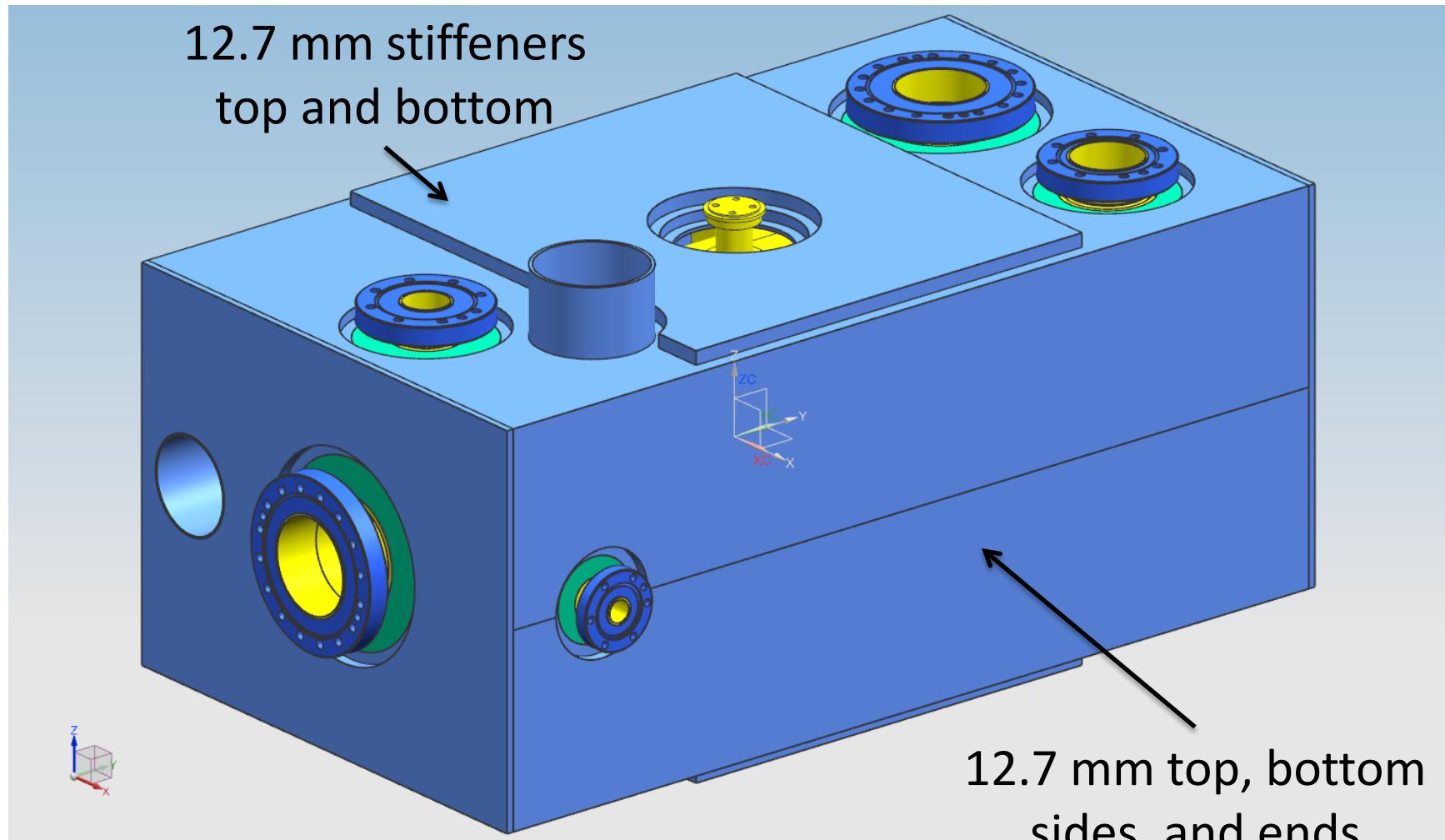


RF Dipole Pressure Analysis Update

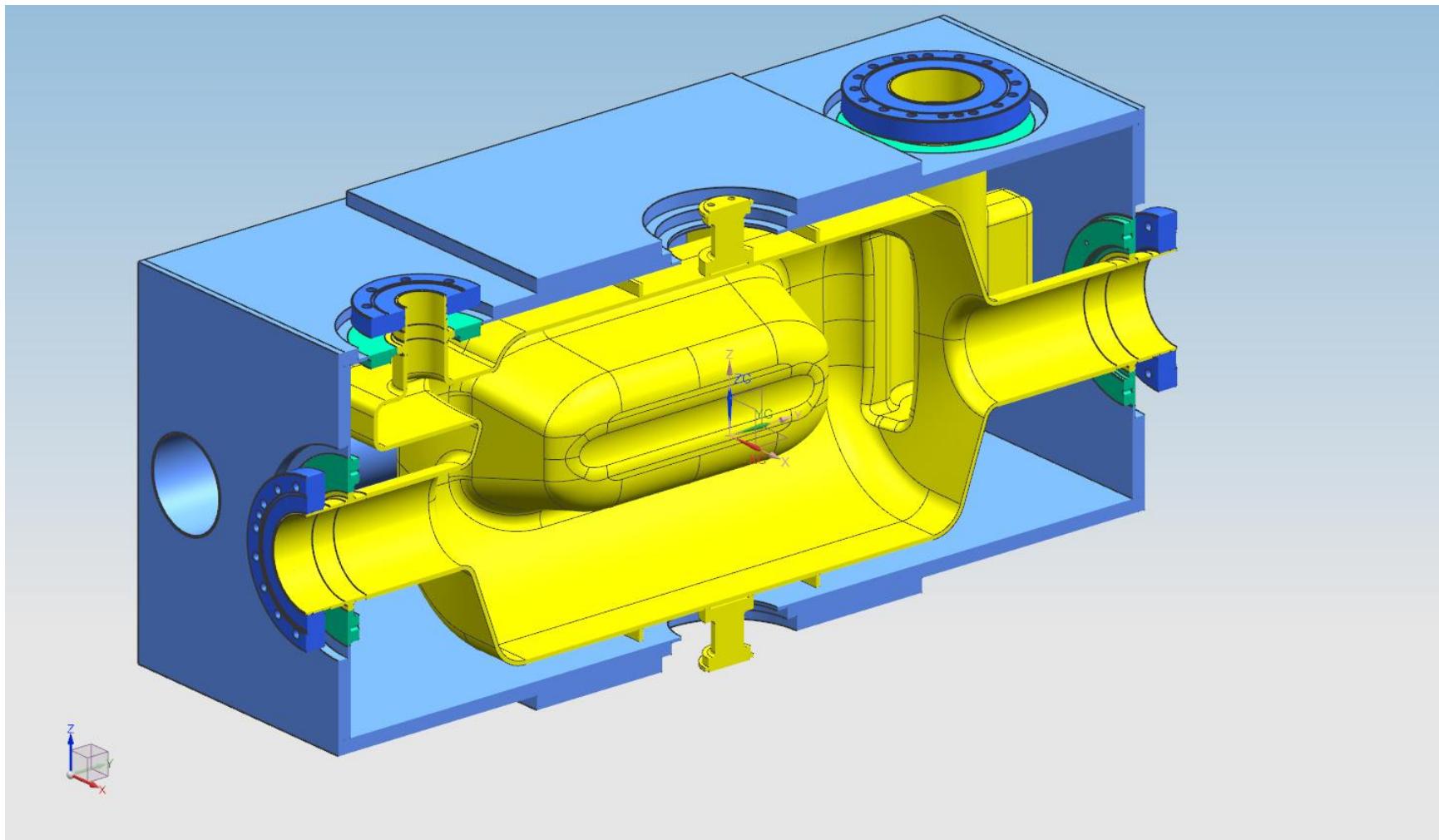
Tom Nicol – Fermilab
October 31, 2014

RF Dipole – v8 – dressed cavity

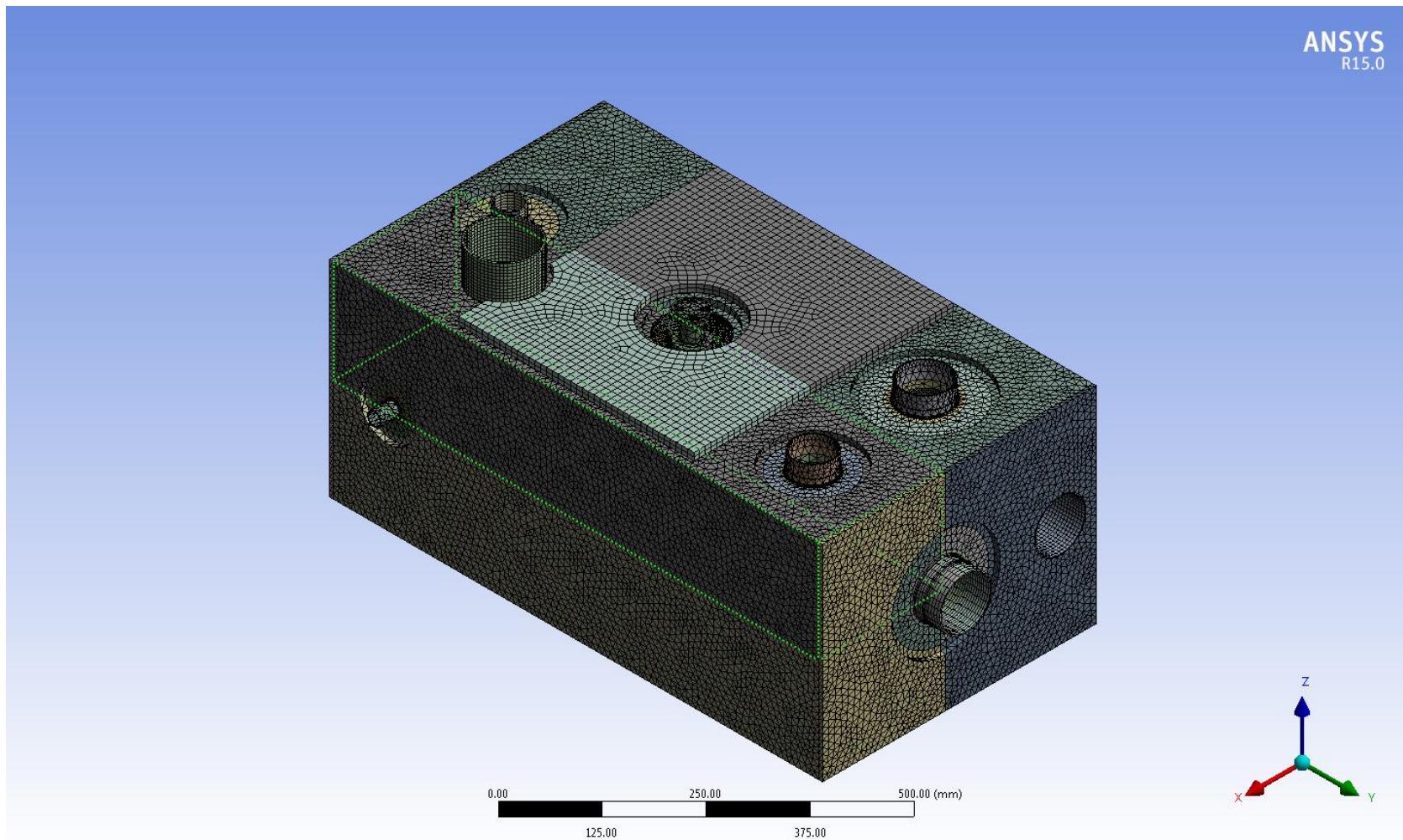


Estimated weight = 153 kg

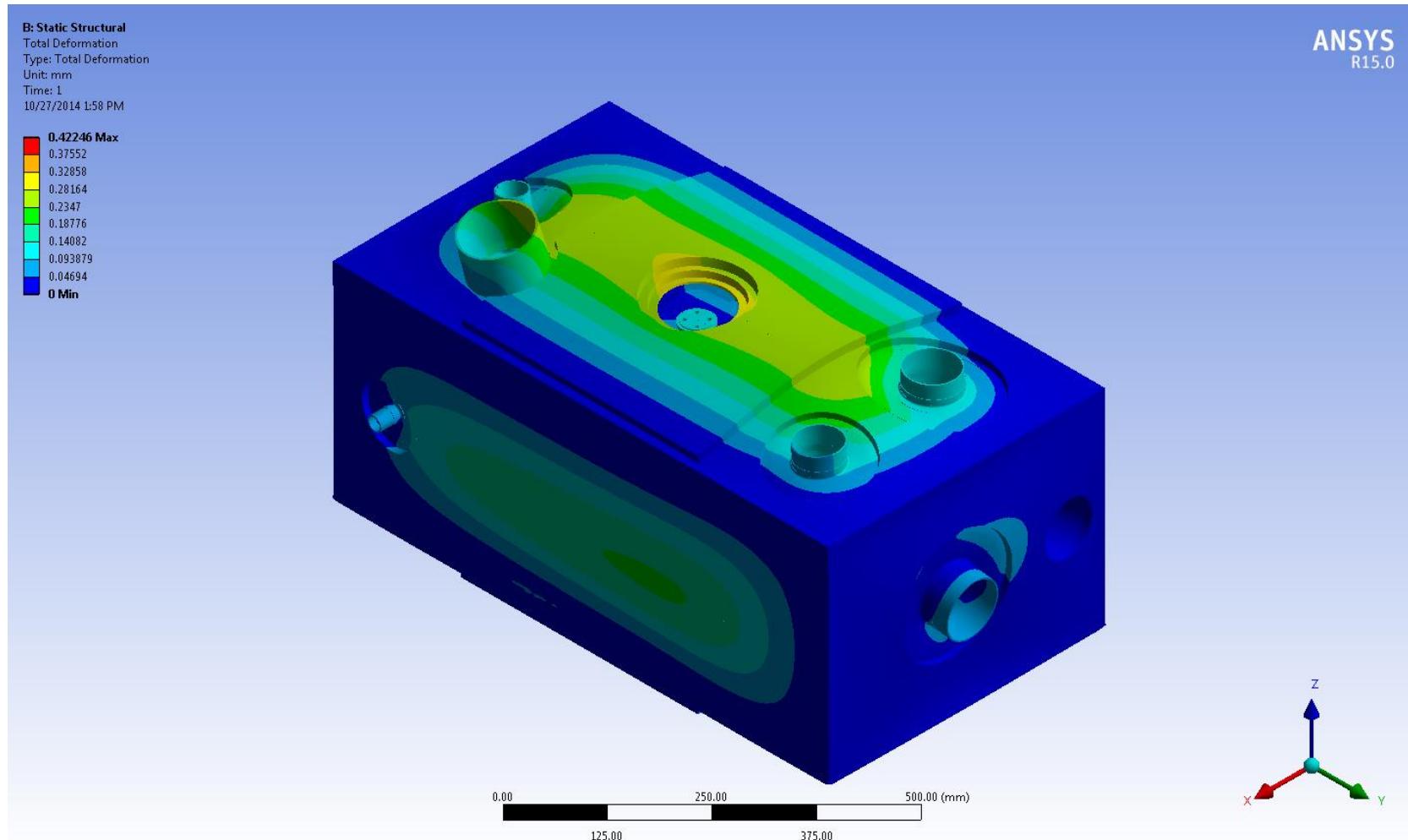
RF Dipole – v8 – dressed cavity



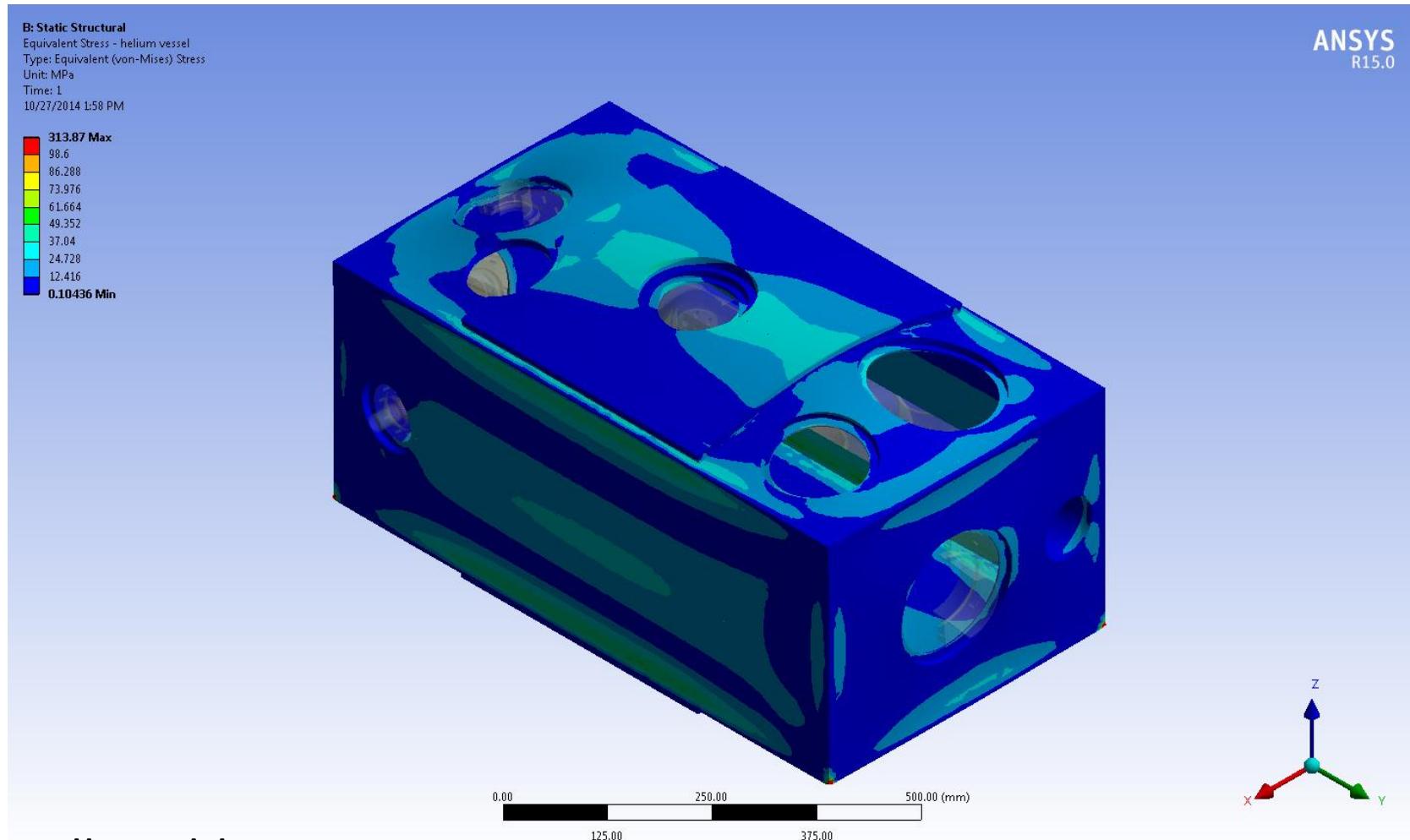
RF Dipole – v8 – mesh



Helium vessel deformation

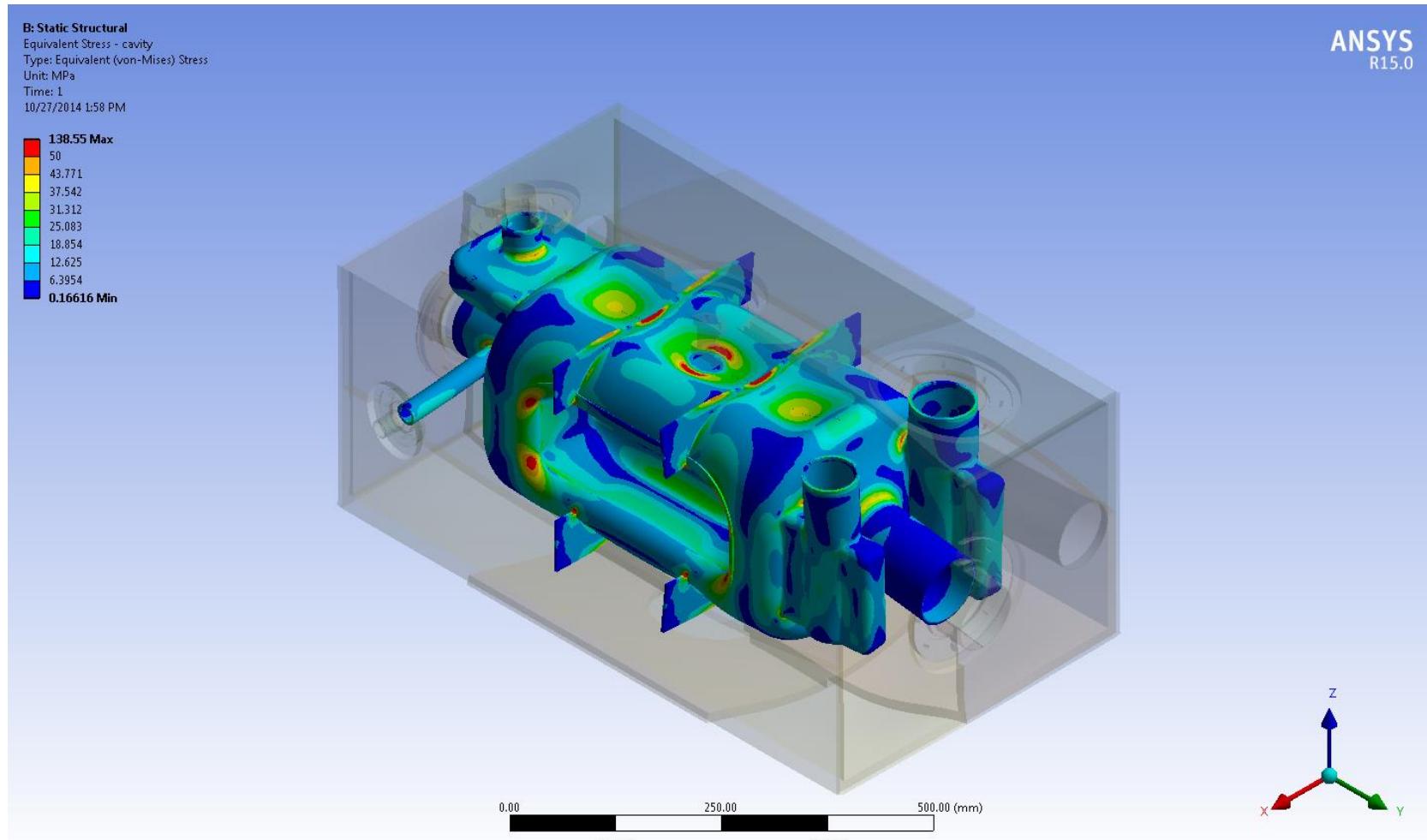


Helium vessel stress



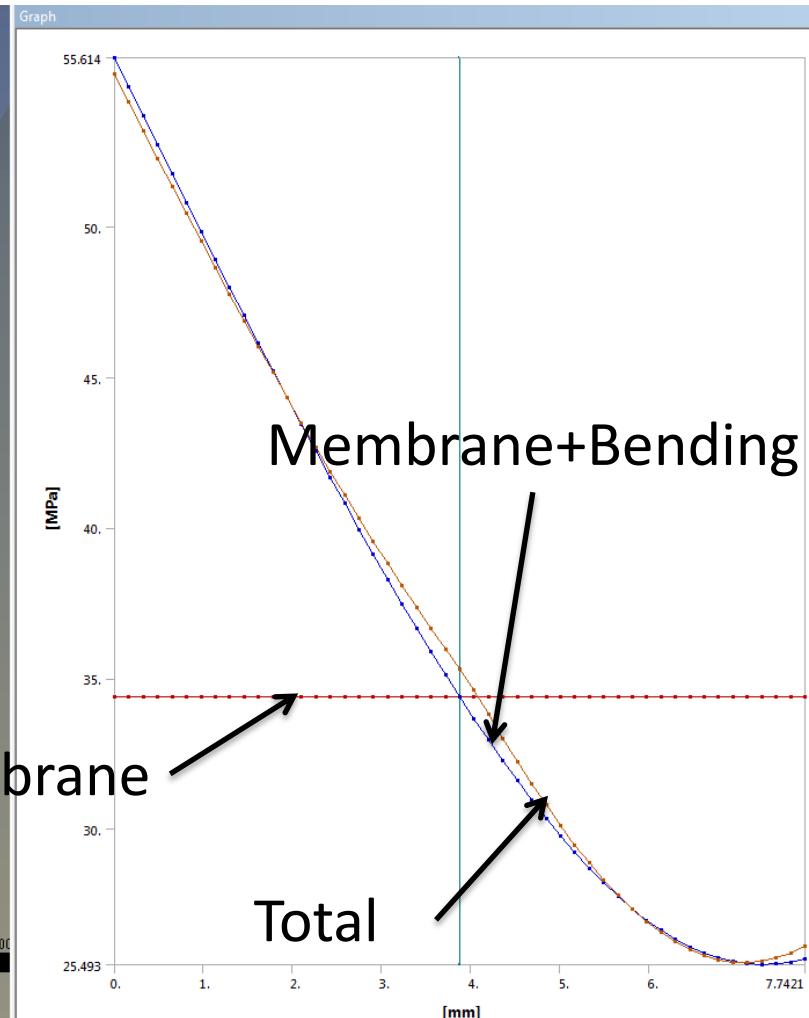
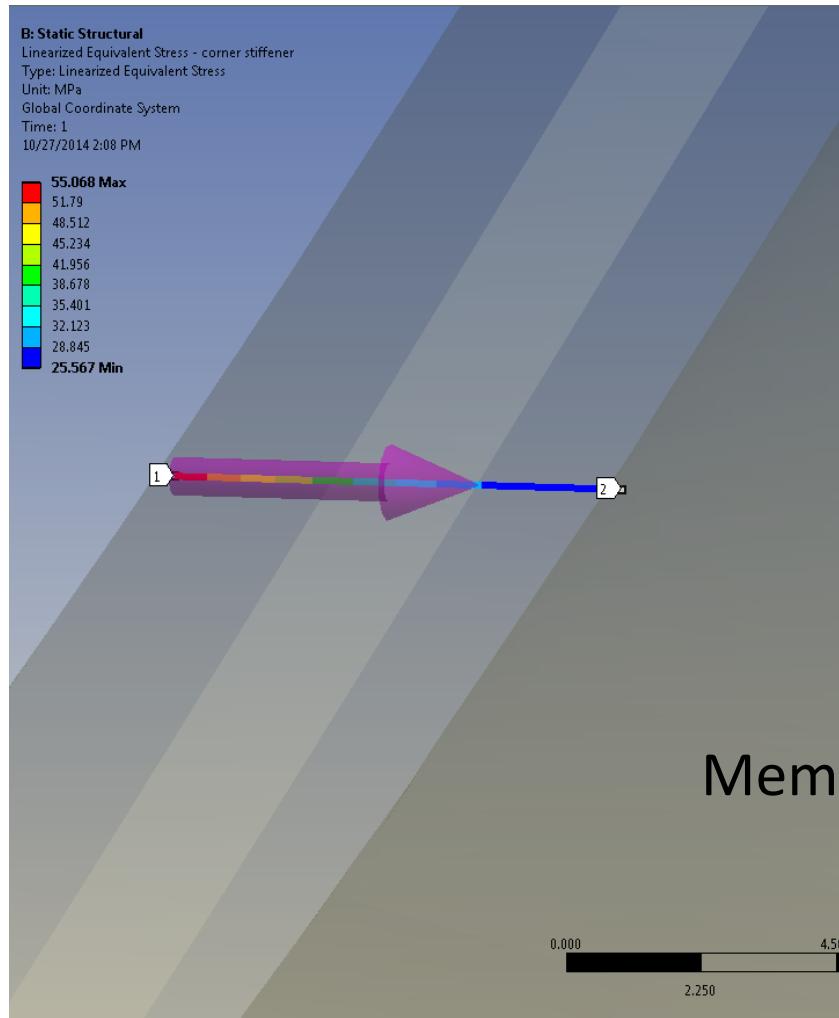
Allowable = 98.6 MPa
(using values from ASME Code, Section II, Part D, Table 1B)

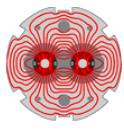
Cavity stress



Allowable = 50 MPa
(min yield from CERN Technical Specification No. 3300)

Linearized stress through corner stiffener



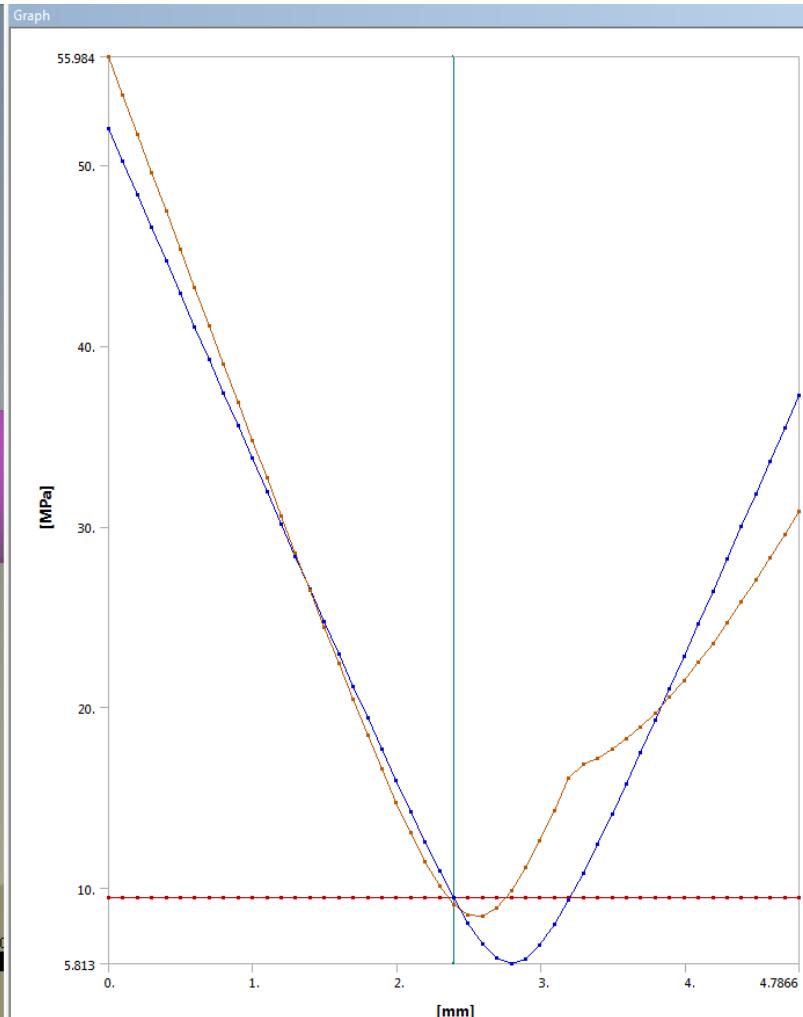
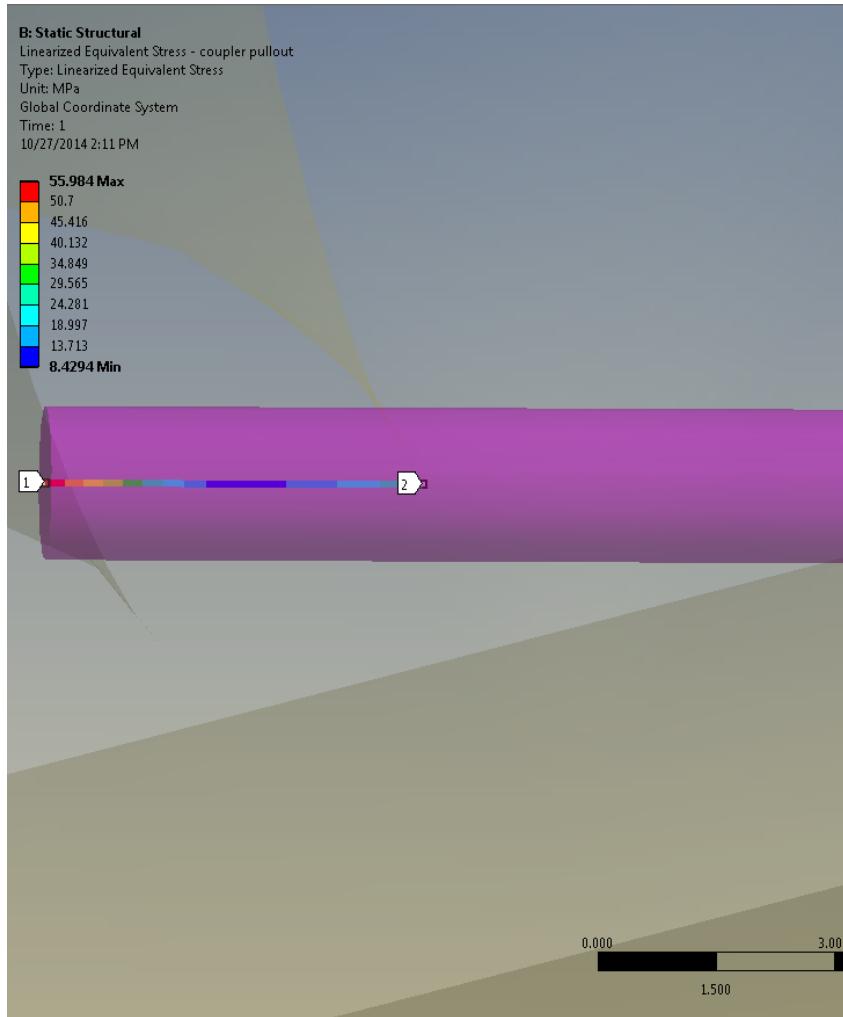


LARP

Linearized stress through input coupler pull-out

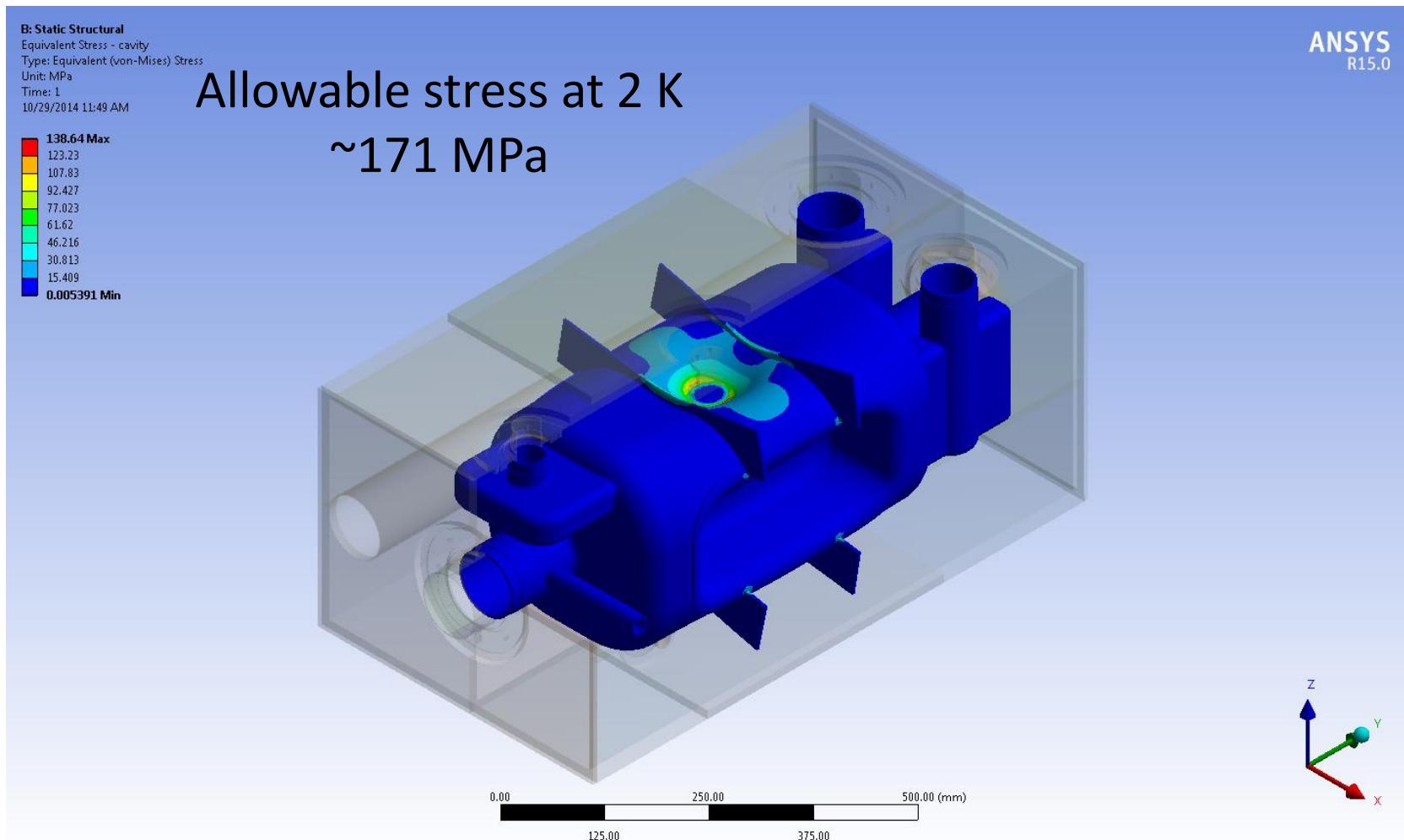


High
Luminosity
LHC

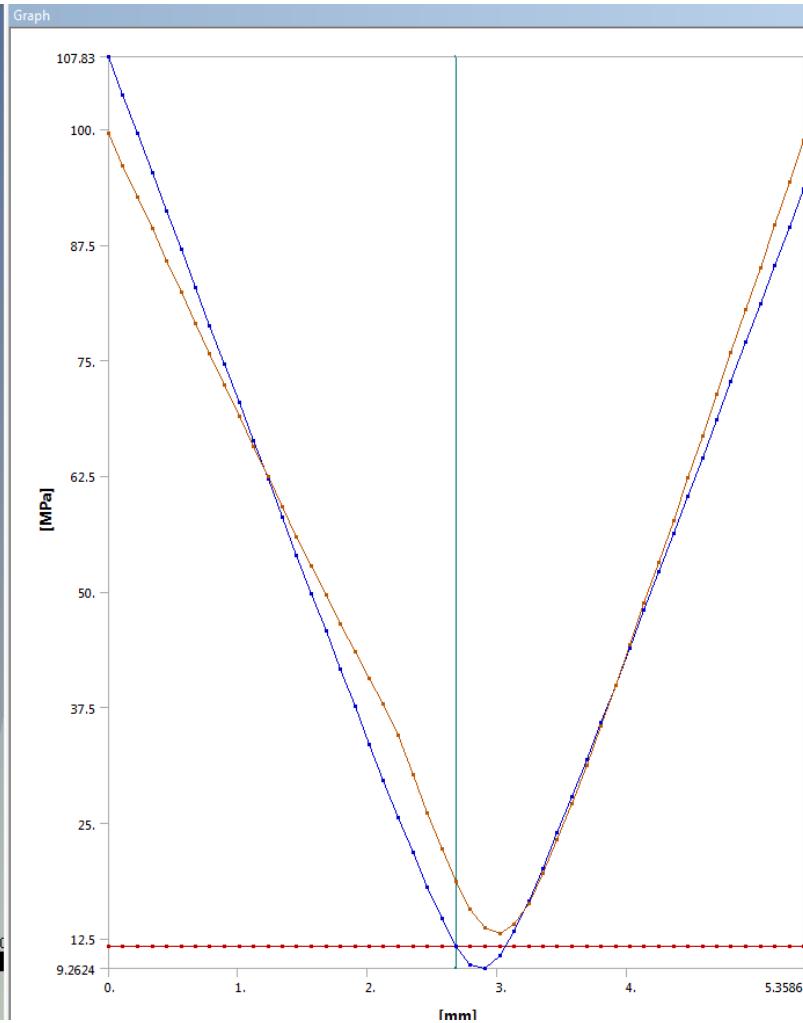
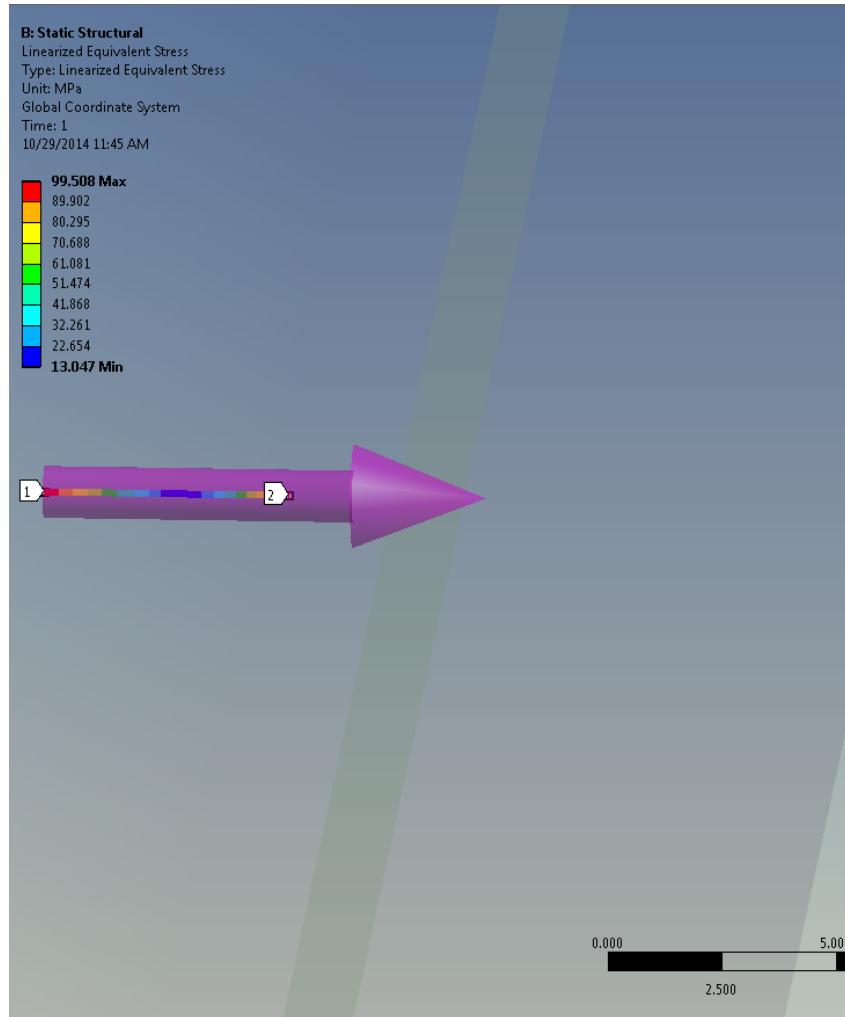




Cavity stress resulting from +/-2500 N tuner force



Linearized stress resulting from +/-2500 N tuner force



Summary

- With the exception of local discontinuities the pressure induced helium vessel stress is below the allowable of 98.6 MPa.
- With the exception of local discontinuities the pressure induced cavity membrane stress is below the allowable of 50 MPa and the combined membrane plus bending is less than 1.5×50 MPa.
- Cavity stress due to tuner force at 2 K is less than the allowable stress at that temperature.