

Preliminary design 704MHz copper cavity

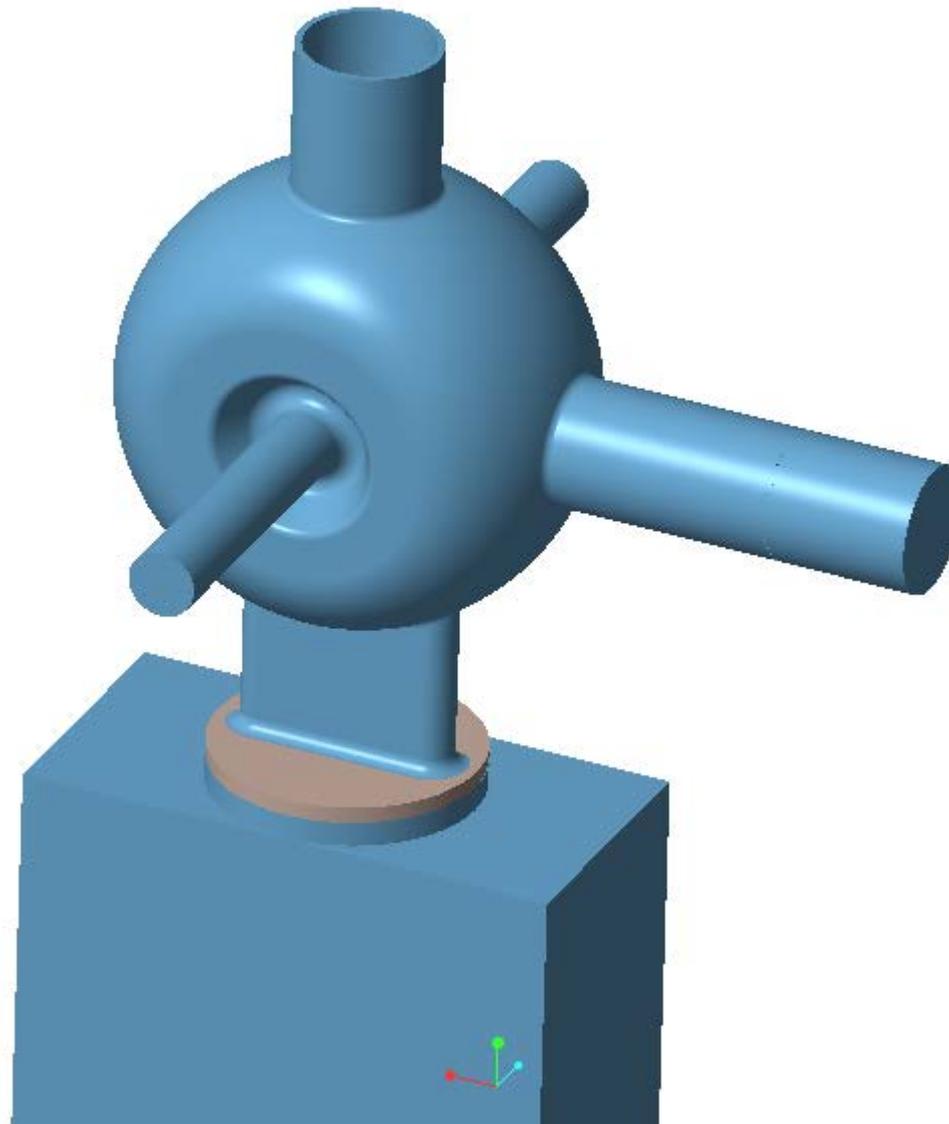
C. Pai

4/24/2015

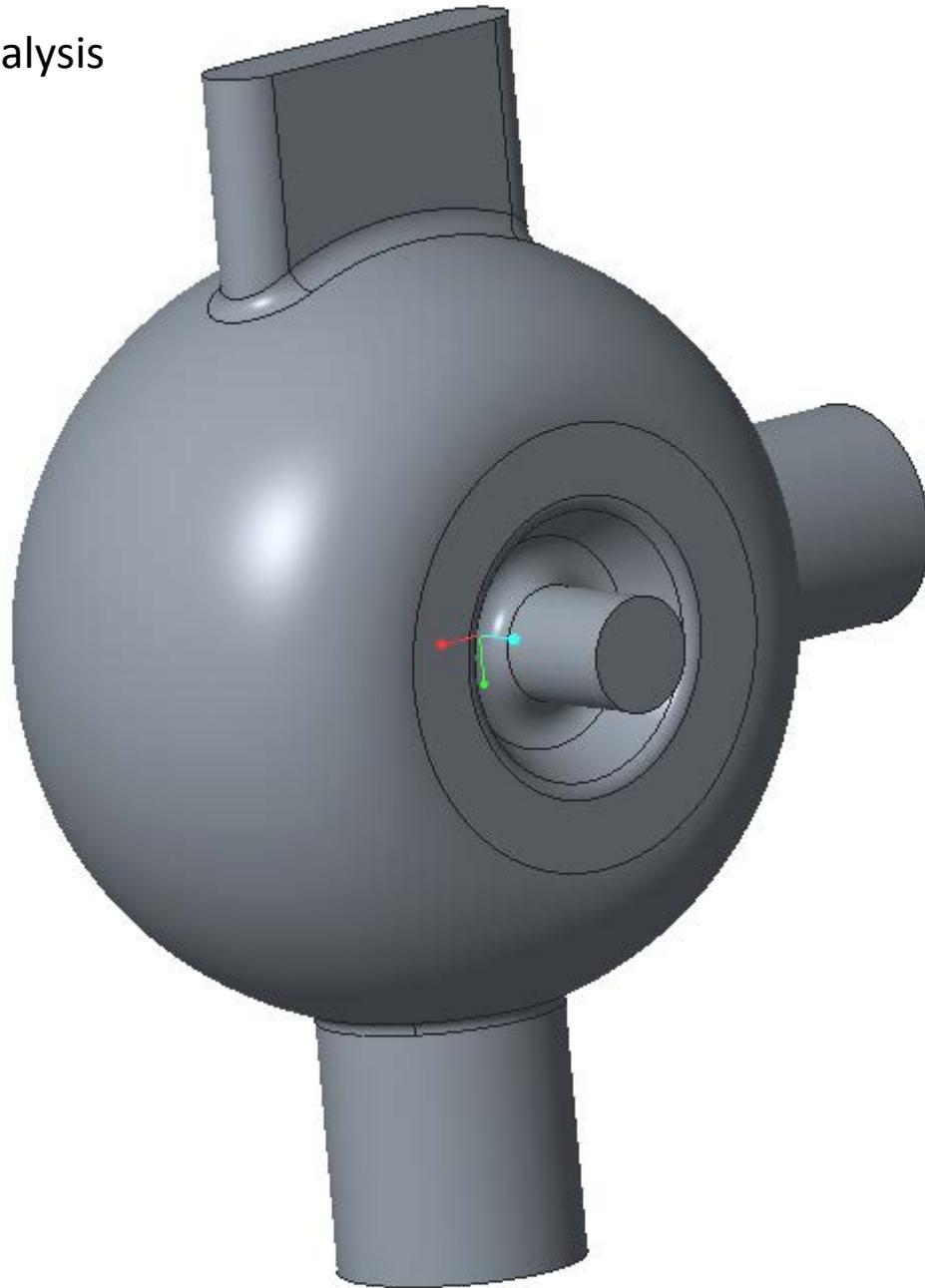
704 MHz cavity shape

Gap voltage: 250KV

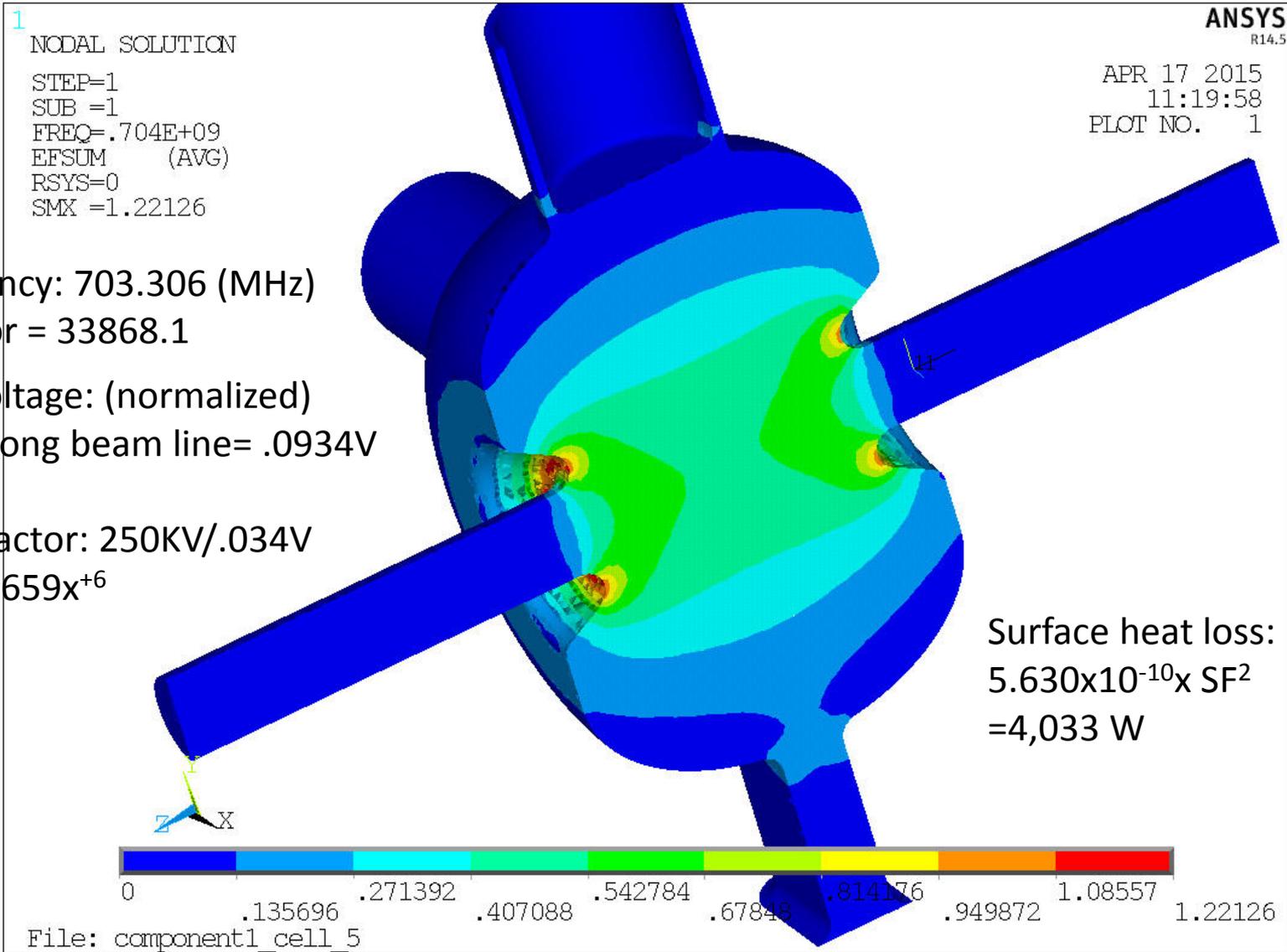
Dissipate heat: 12 KW



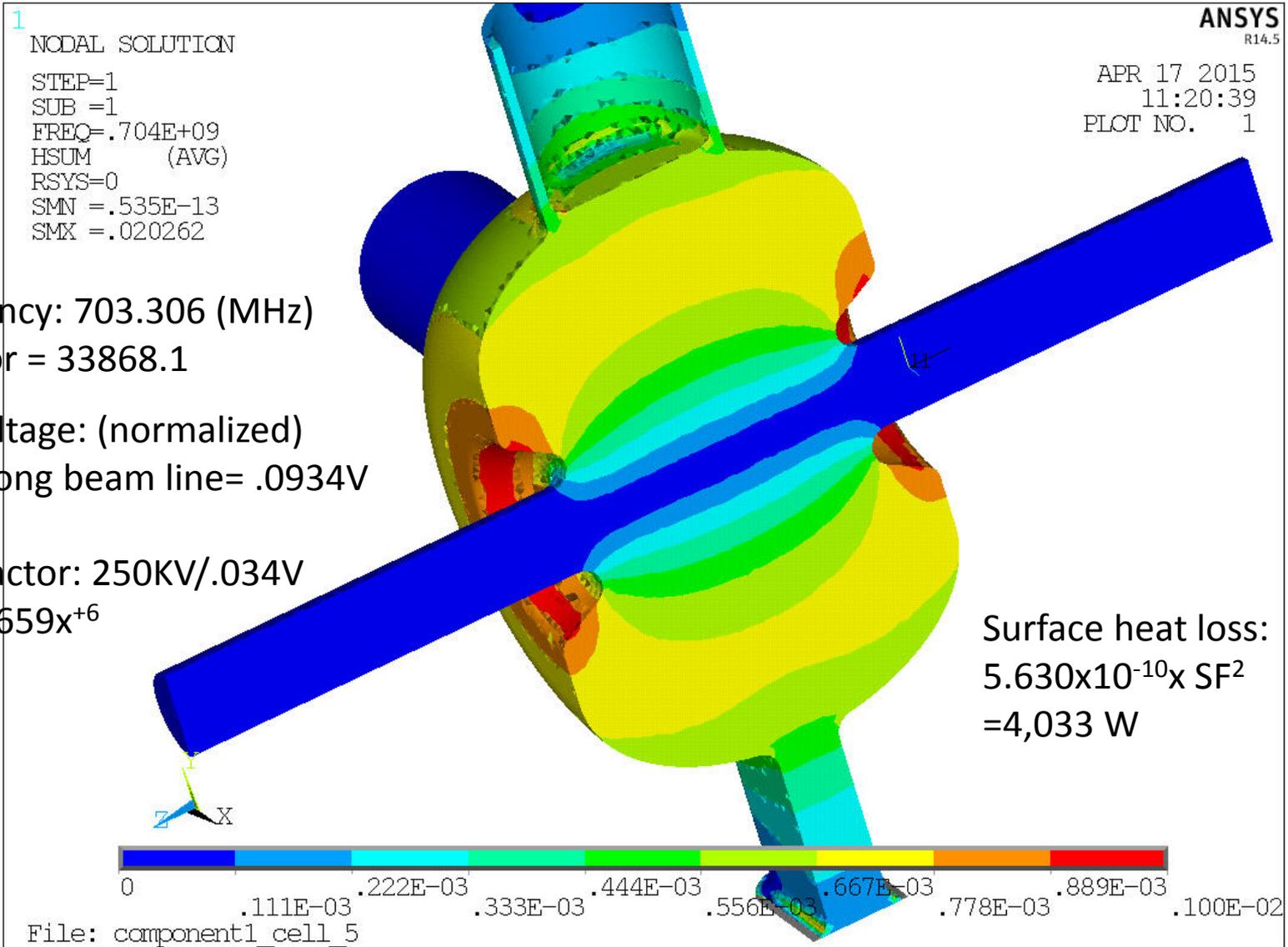
Cavity volume for analysis



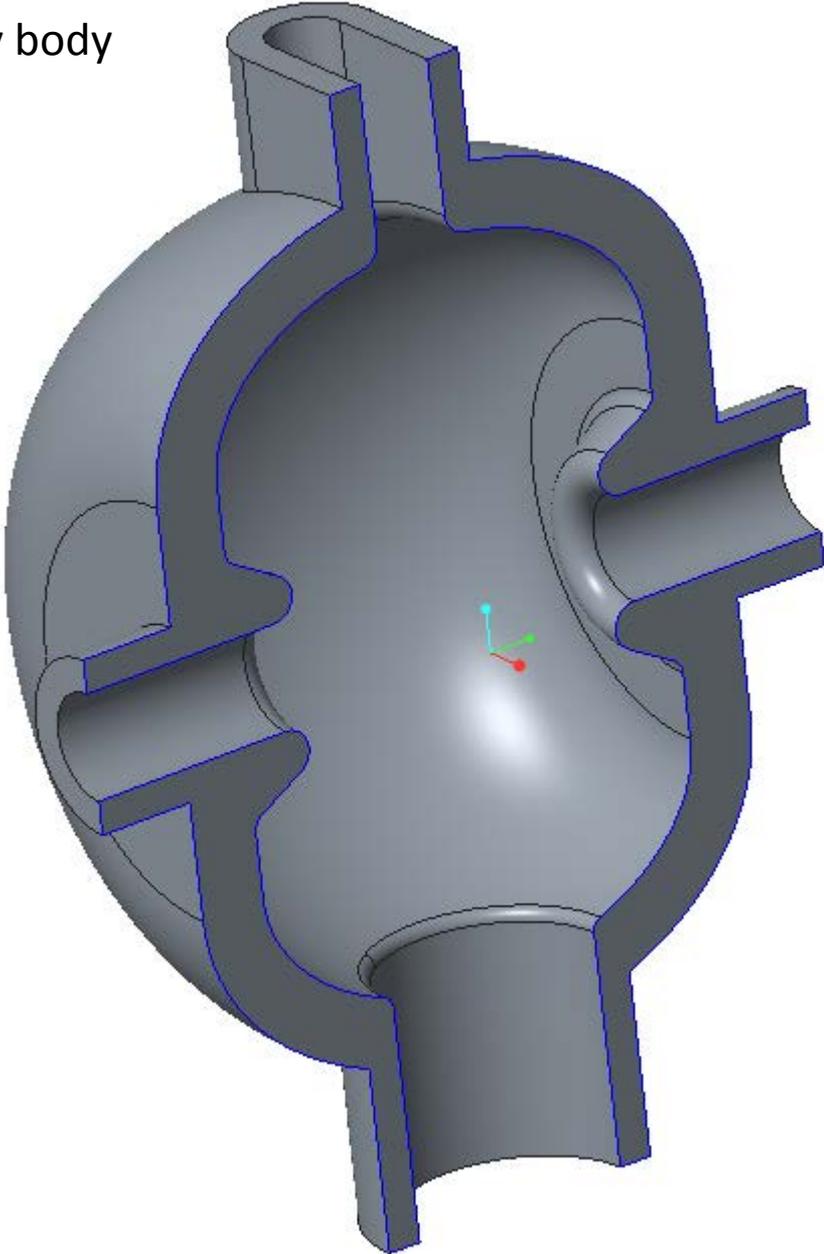
E field plot of preliminary calculation



H field plot of preliminary rough model calculation



Envelope of copper cavity body



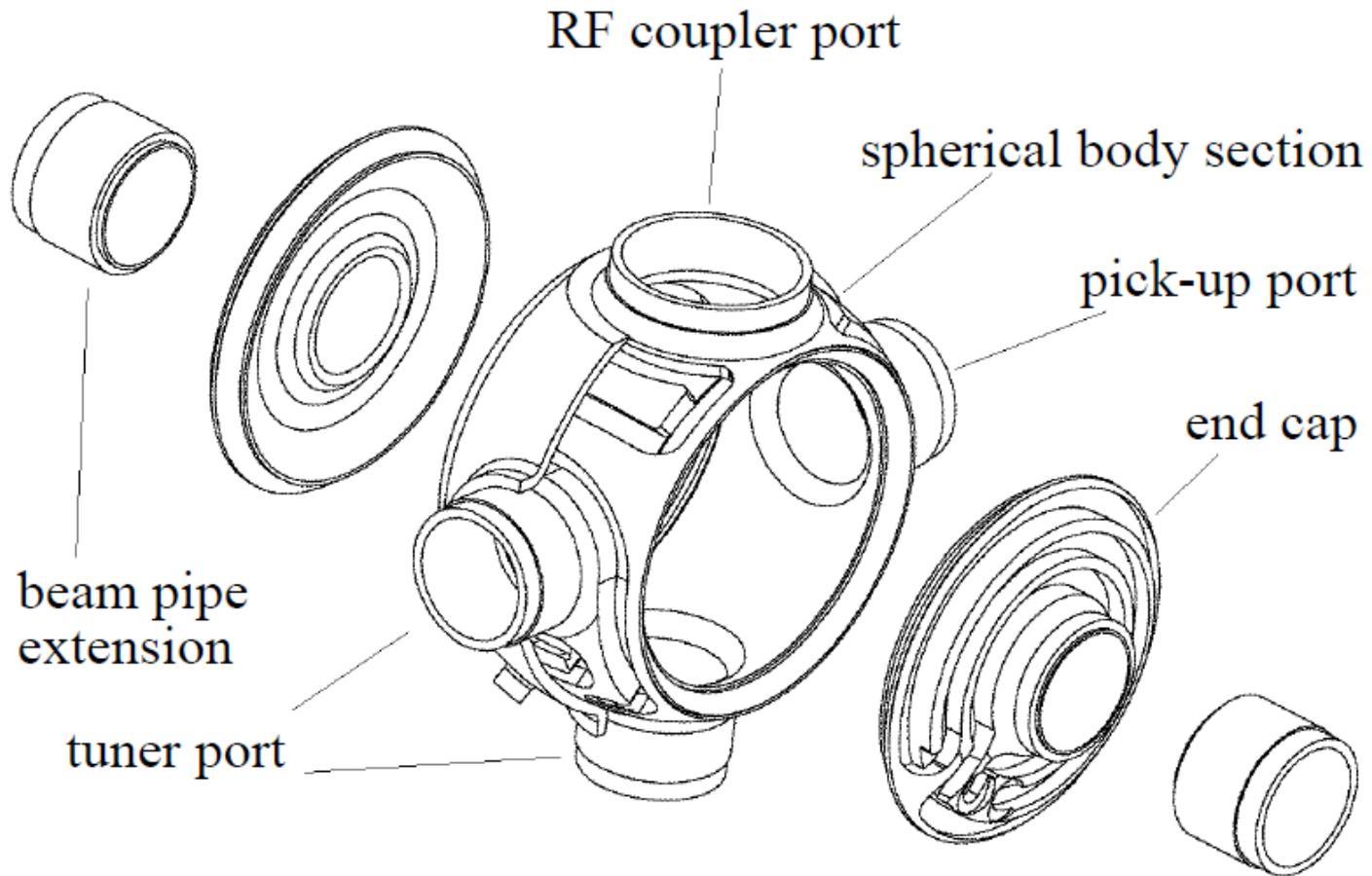


Figure 44 ALS third harmonic cavity assembly.

Forging >> finish and water loop Machining >> EB welding>> water seal cover thick plating

Forged body and cap
Before machining

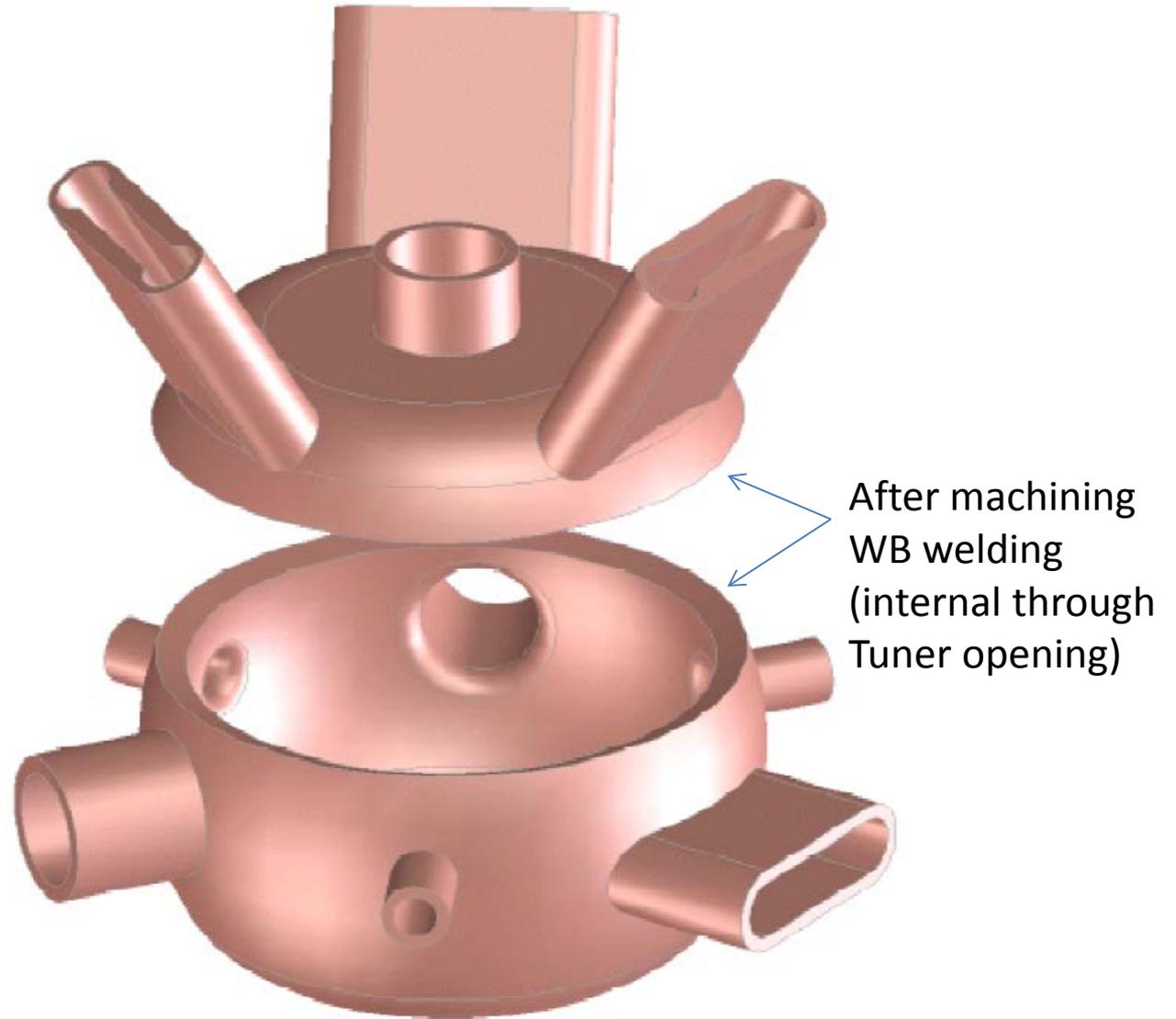


Figure 45. Two main components of proposed NLC cavity.

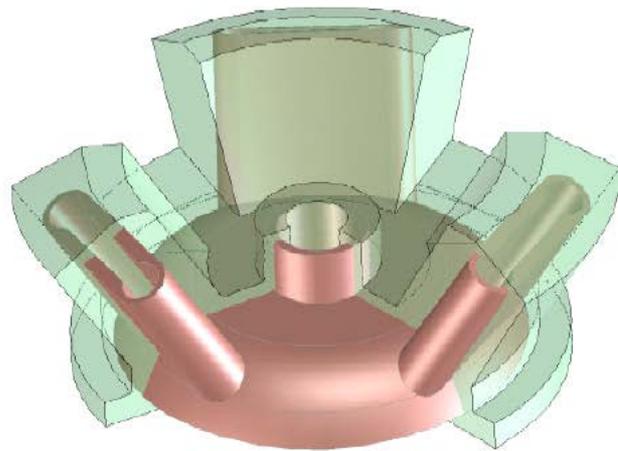


Figure 46. "Lid" forging.

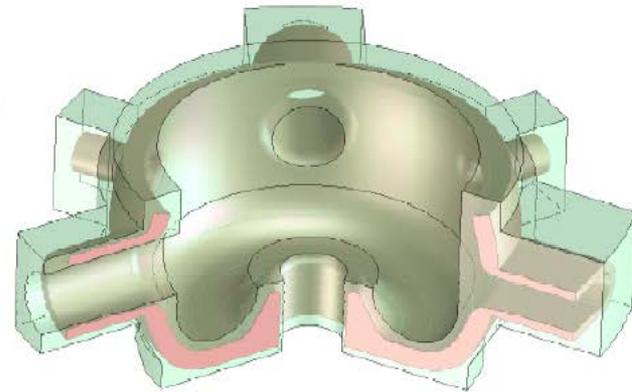
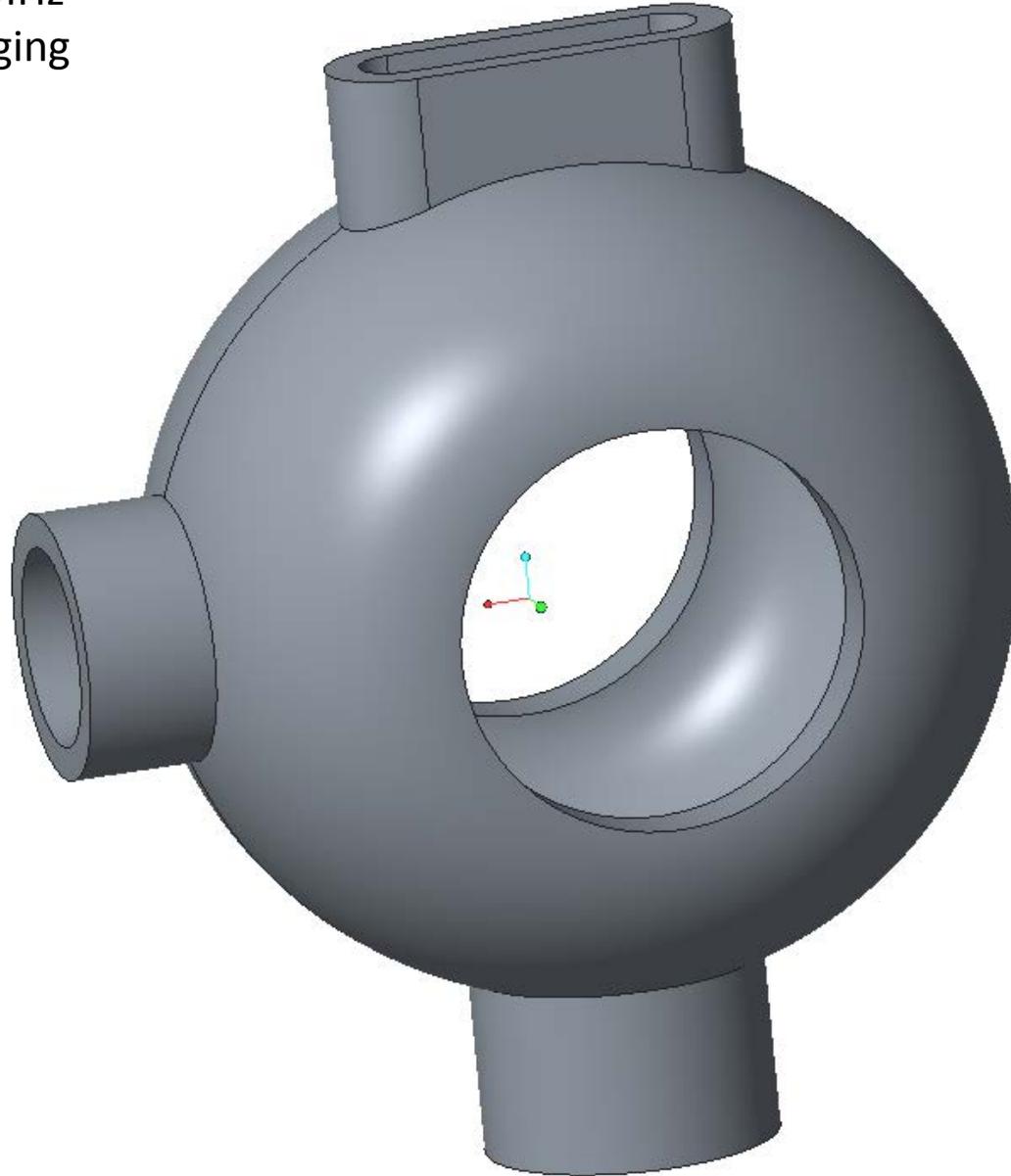


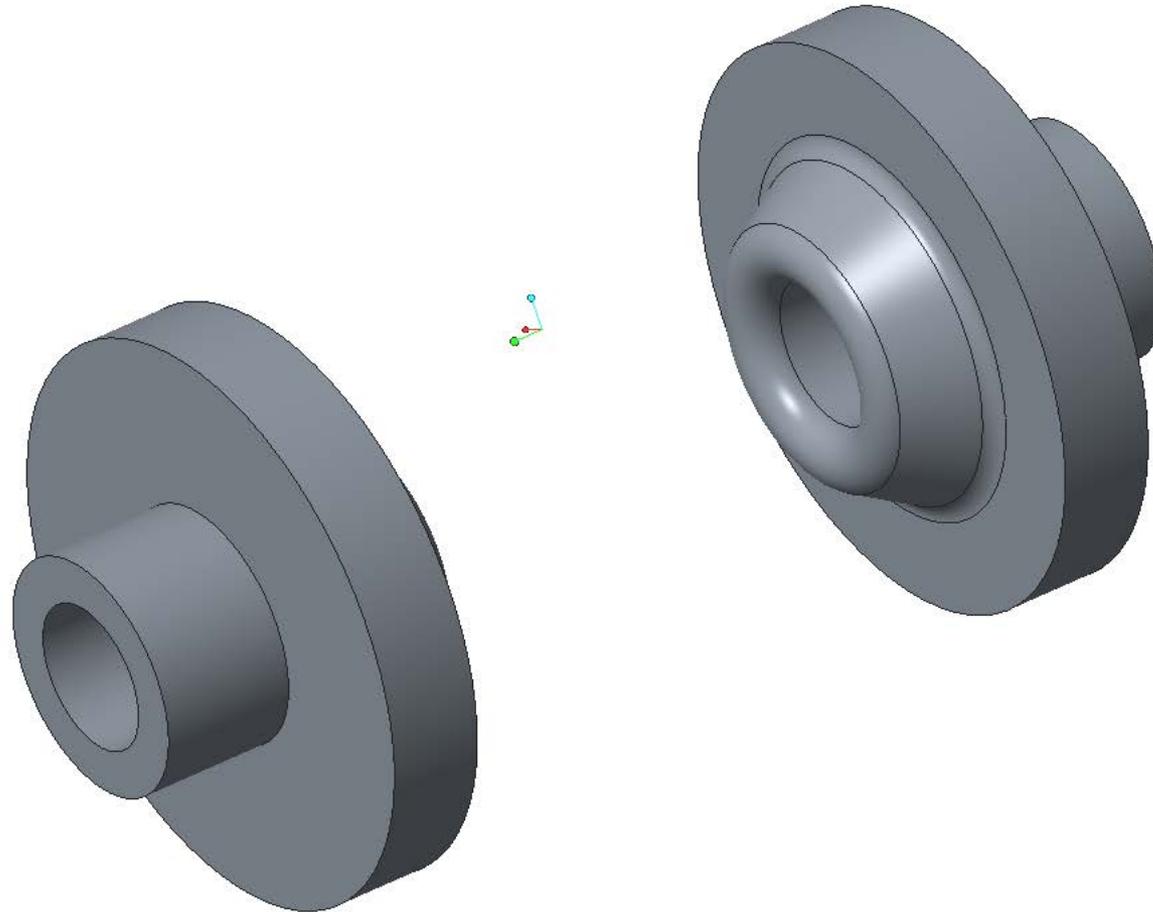
Figure 47. "Body" forging.

FORGING BULK VOLUME REDUCTION

Conceptual 704 MHz
main body by forging



Conceptual 704 MHz
Beam pipe cap by forging



Finish machining with water loop

Water flow estimates:

Heat load: 12 KW

Temperature rise: 15 °C

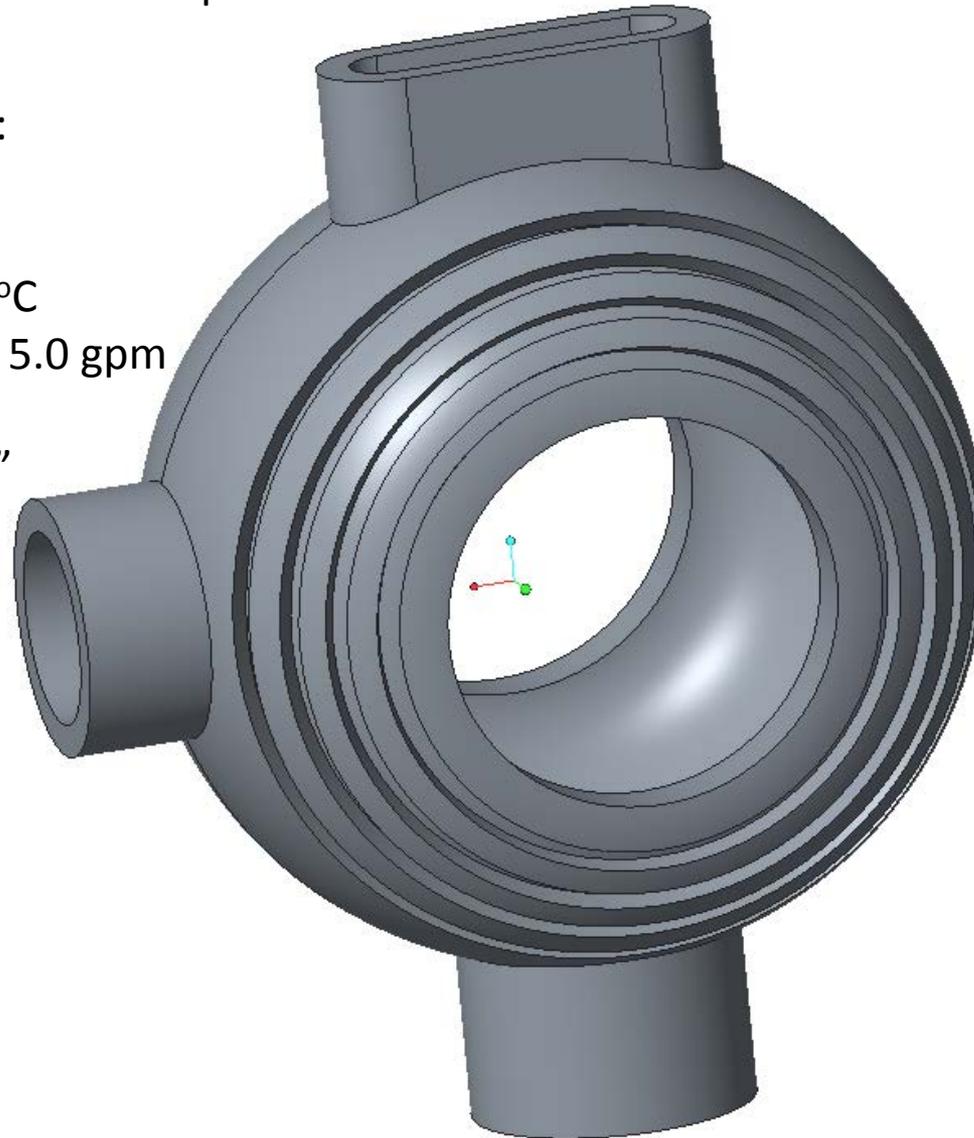
Min. Water flow rate: 5.0 gpm

IF H: 5000 W/m²K,

Water groove : .3"x.3"

Length: 210"

(Φ5.5"x6 loopx2)



Finish machining with water loop

Water flow estimates:

Heat load: 12 KW

Temperature rise: 15 °C

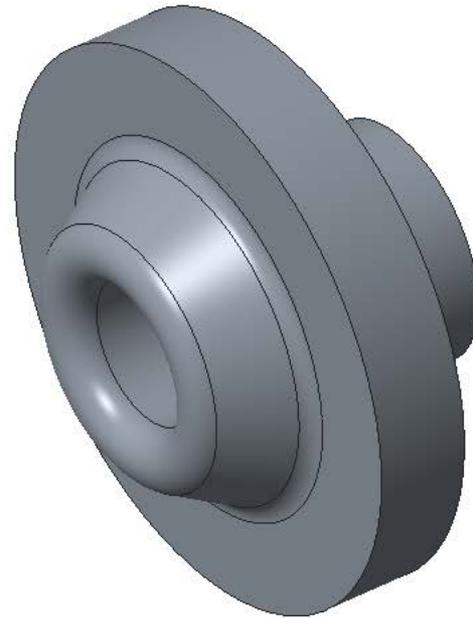
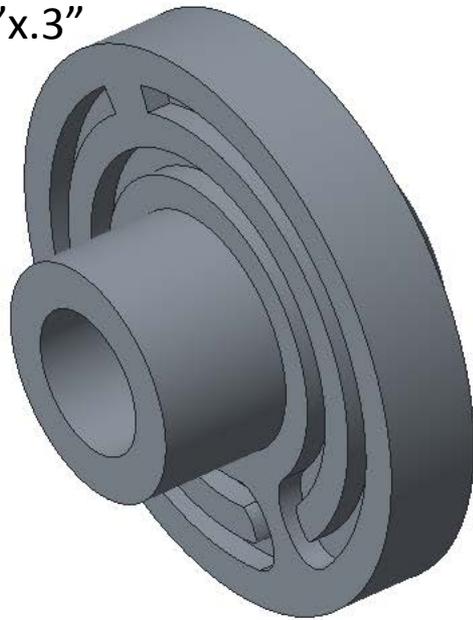
Min. Water flow rate: 5.0 gpm

IF H: 5000 W/m²K,

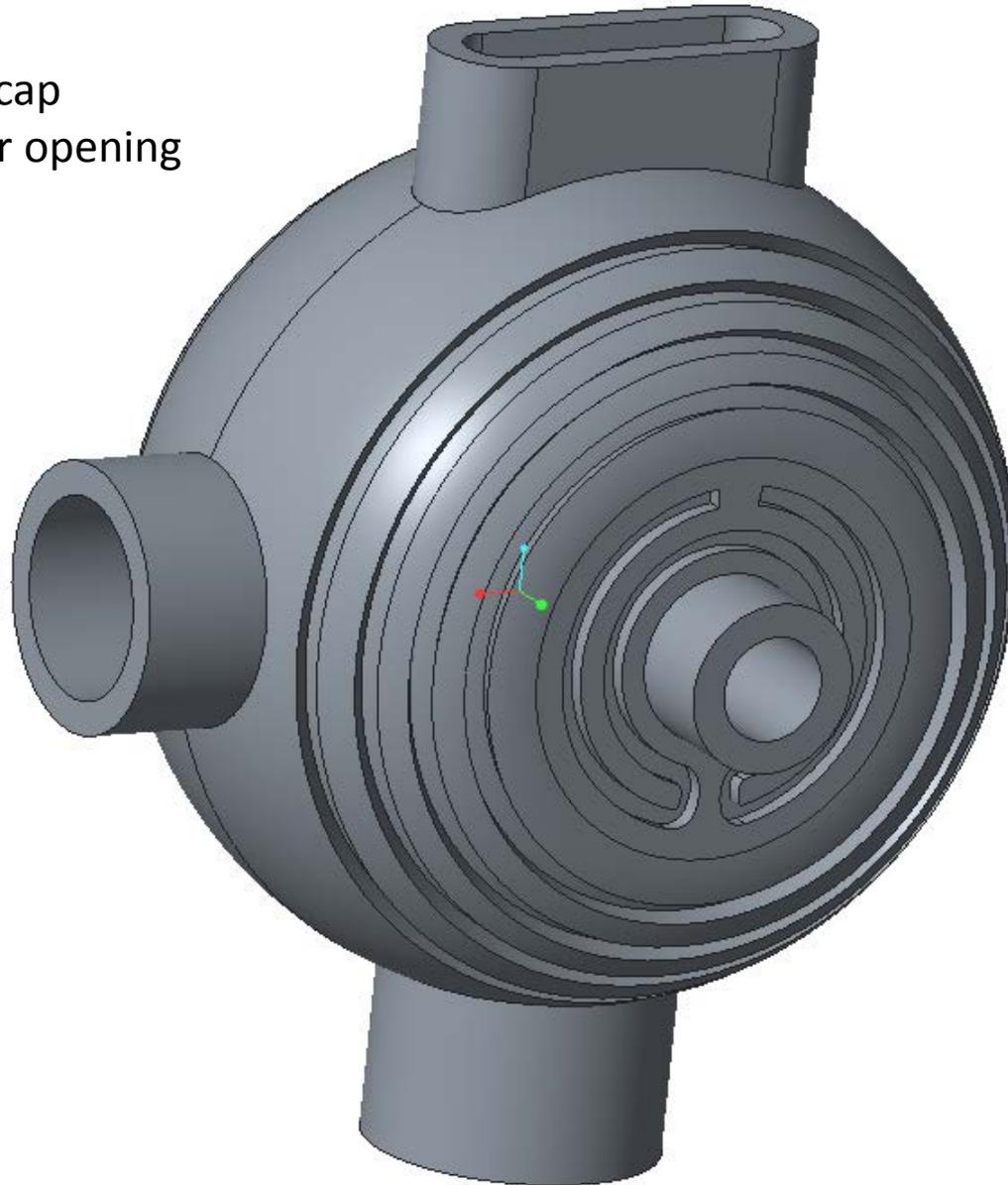
Water groove : .3"x.3"

Length: 210"

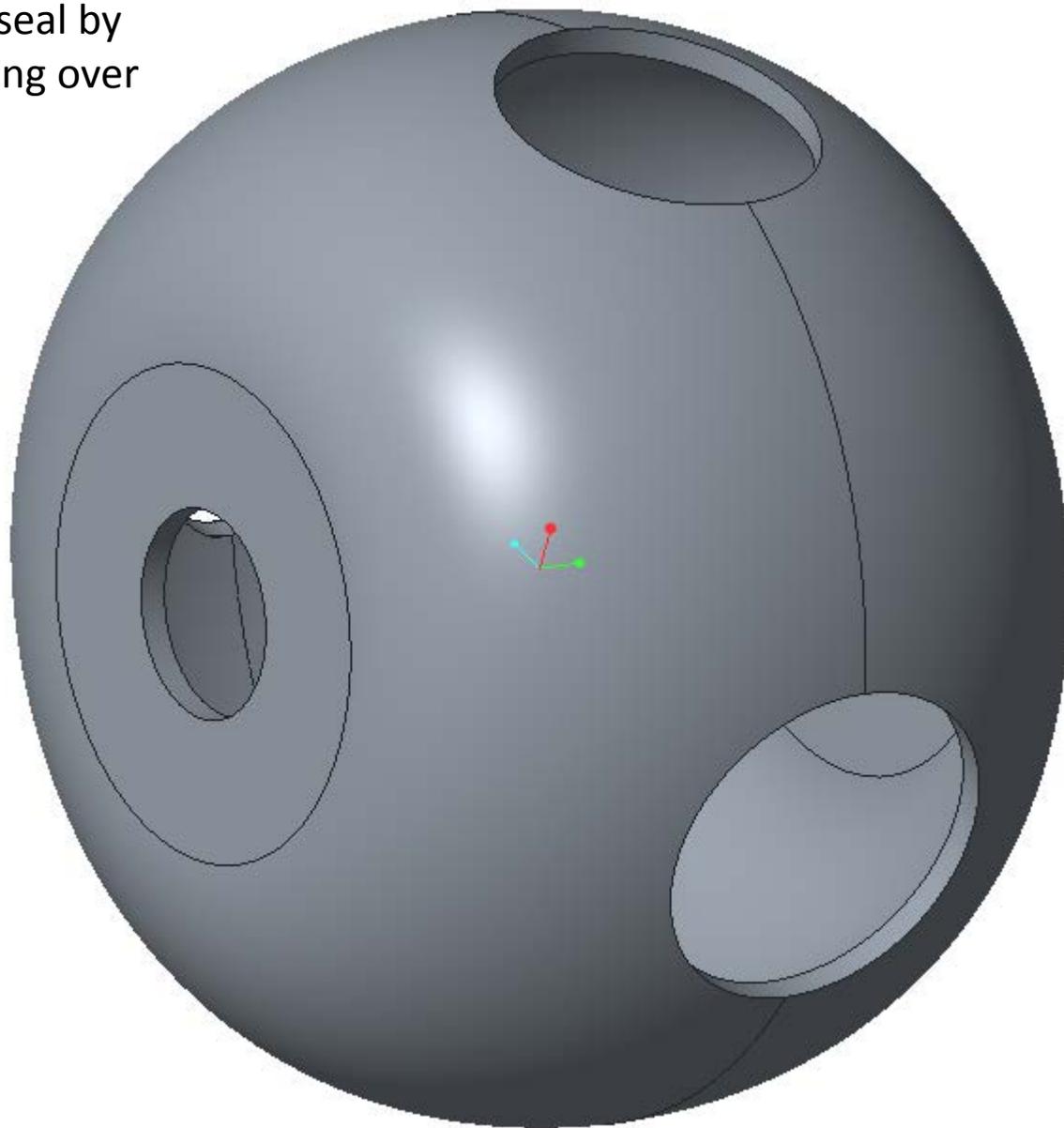
(Φ5.5"x6 loopx2)



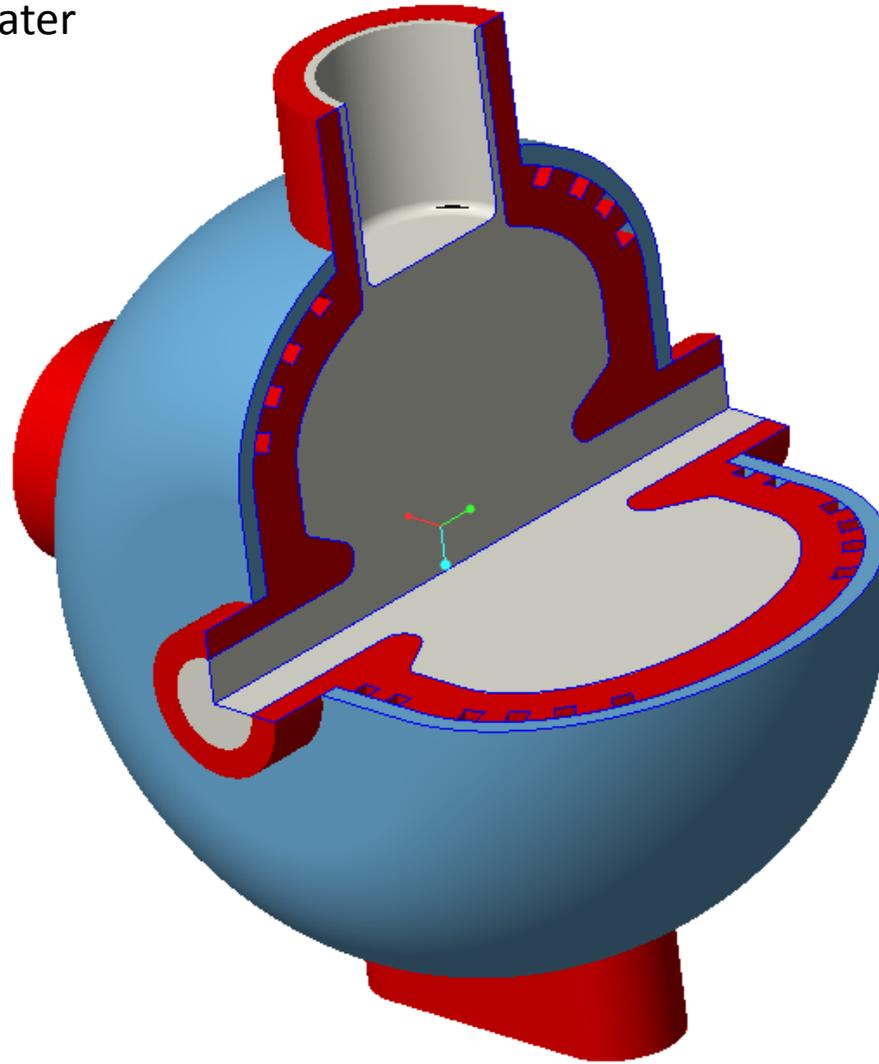
EB welding body and cap
Internal through tuner opening



Cover and water seal by
thick copper plating over
main body



Final shape of cavity
Water fitting will add later



Final shape of cavity
Water fitting will add later

