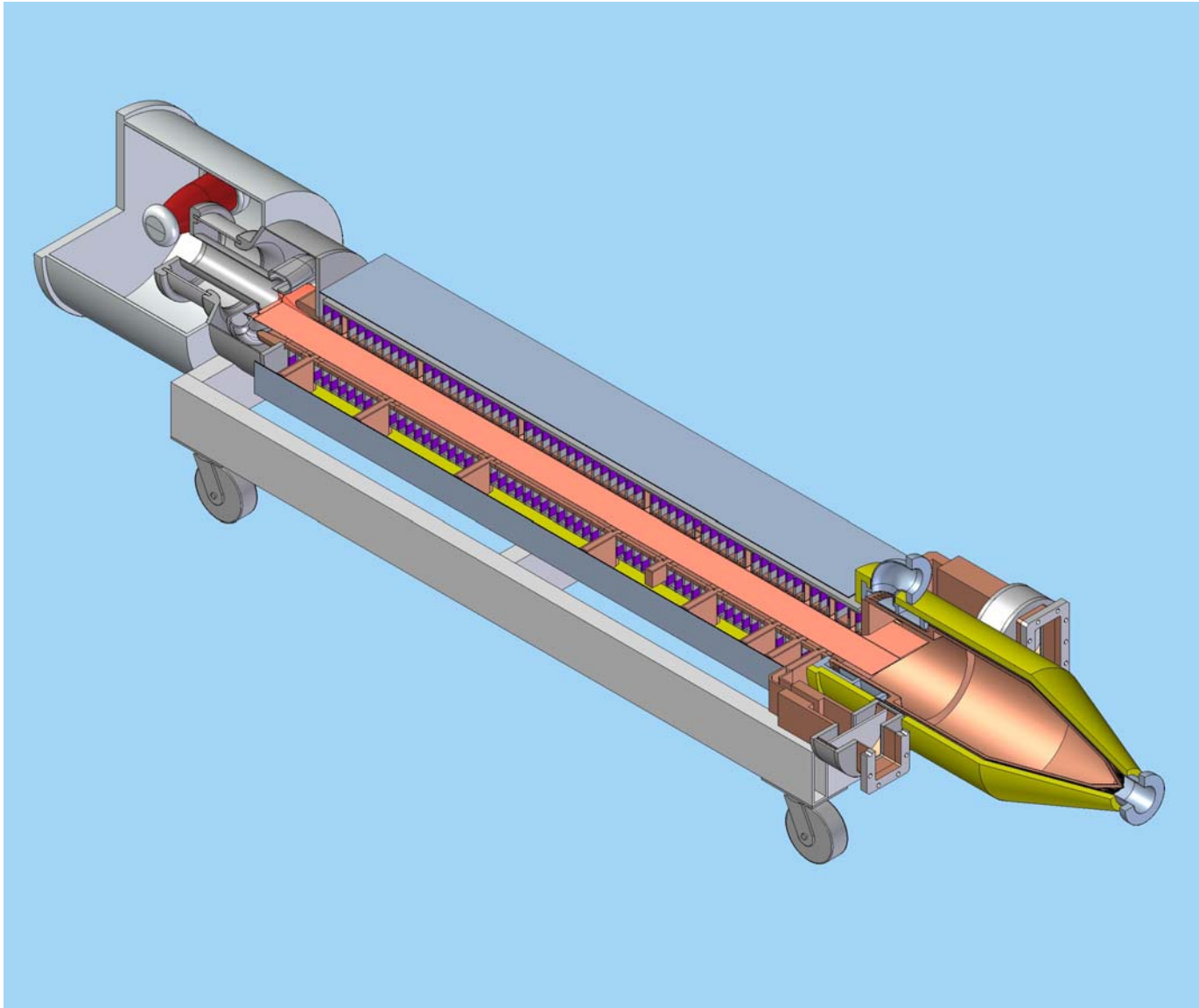


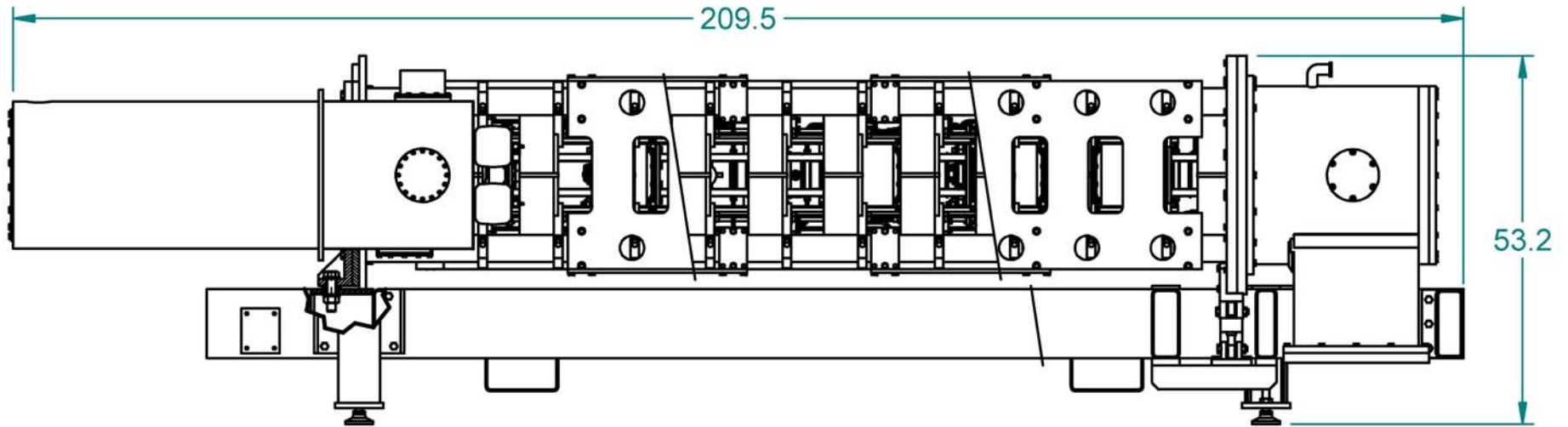


International Linear Collider
at Stanford Linear Accelerator Center

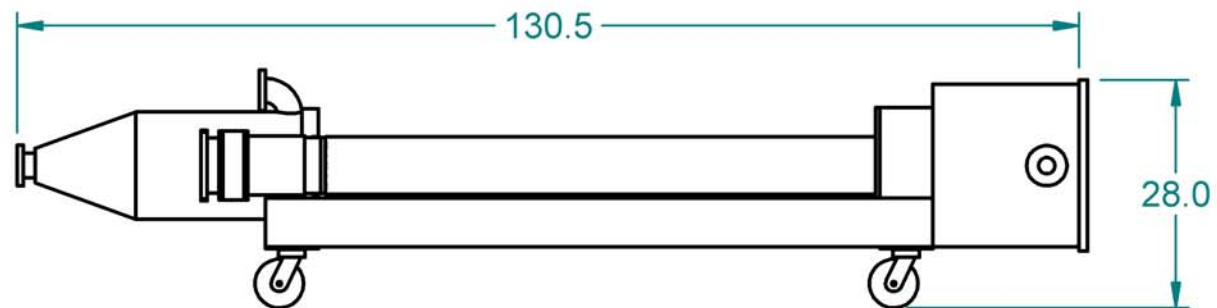
ILC SBK Development Status

September 27, 2007





B-FACTORY KLYSTRON



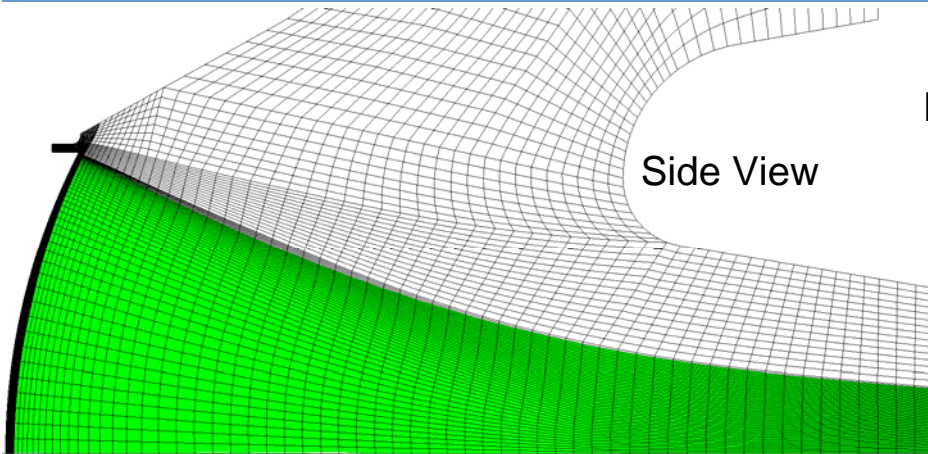
ILC SHEET BEAM KLYSTRON



- 3D design complete, good elliptical beam, slightly hollow for better transport
- Finishing up analysis of FE bias changes and assembly tolerances
- Transport studies focusing on entrance polepiece and edge shaping for beam confinement

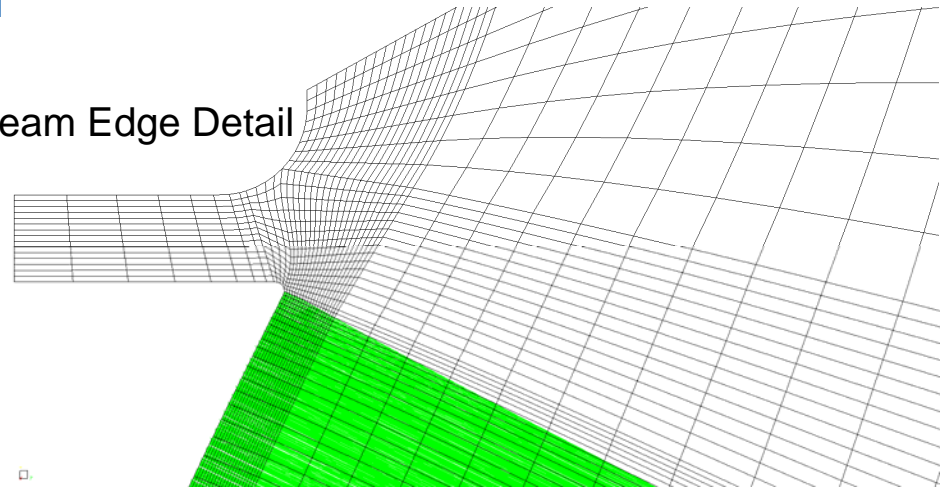


3D Gun Simulations

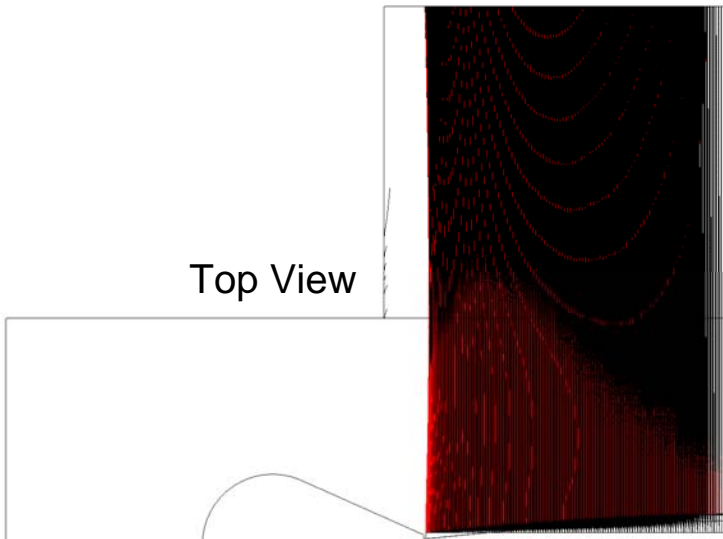


Side View

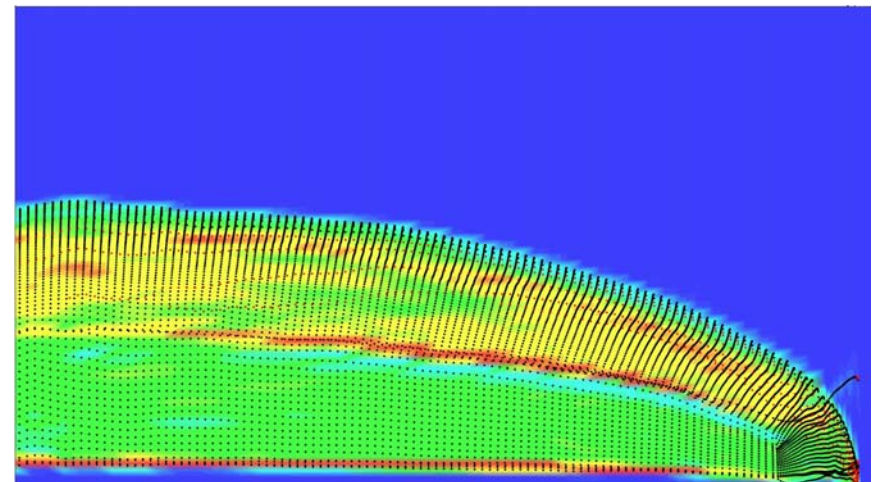
Beam Edge Detail



Top View



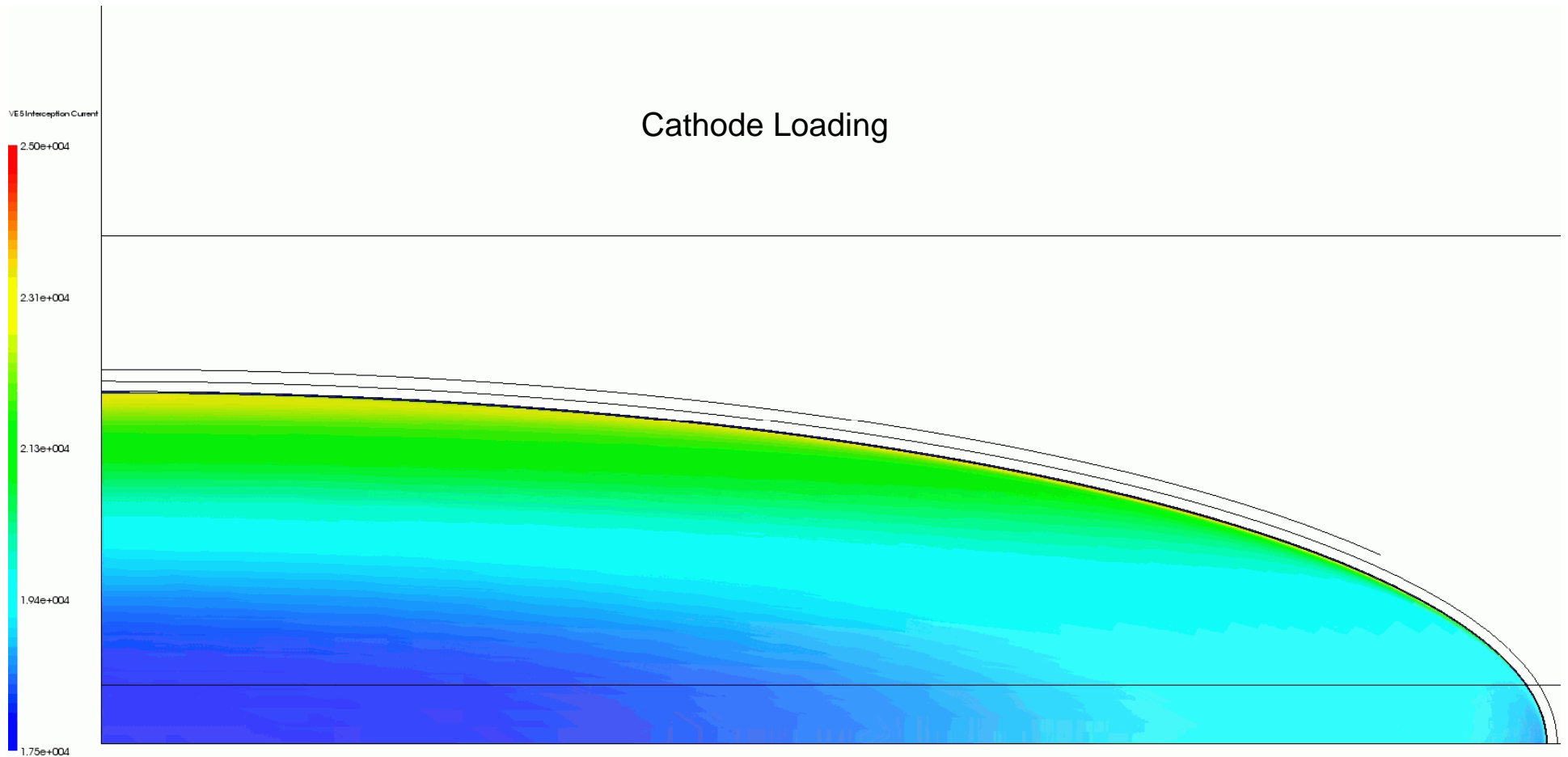
Cut Plane Position = 0.1599 (m)



Beam Minimum Cross-section



Cathode Loading

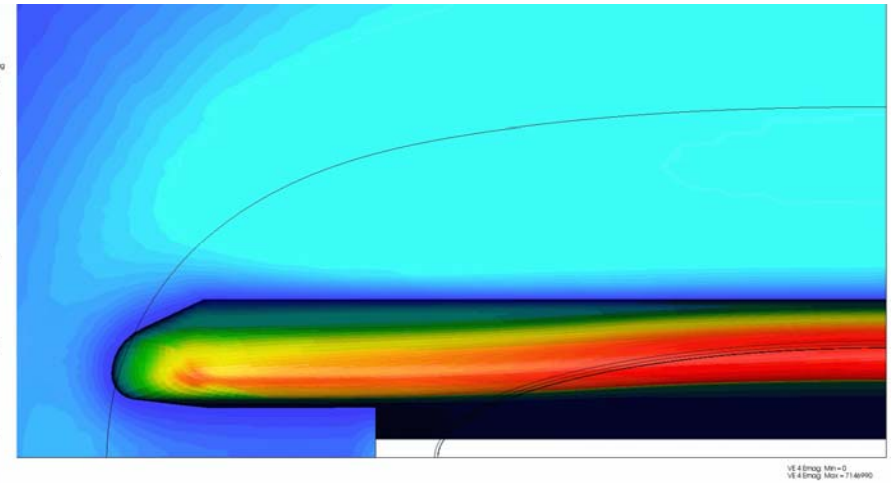
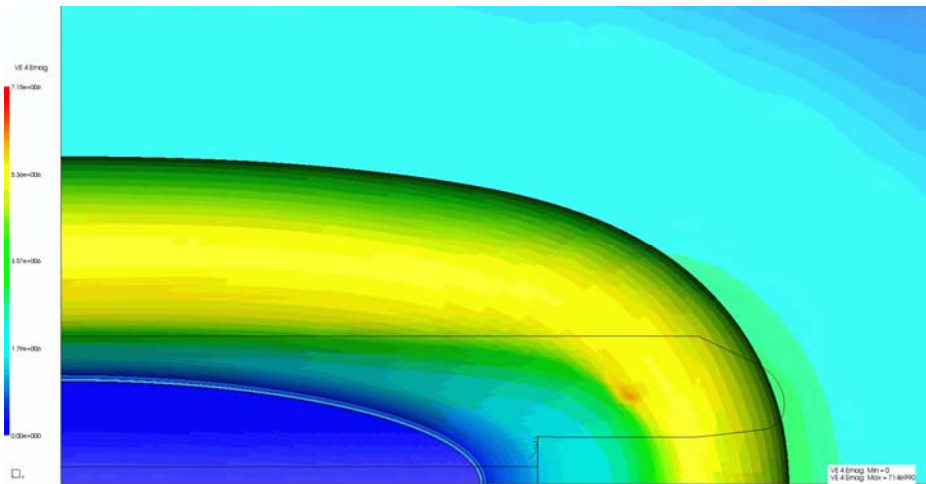
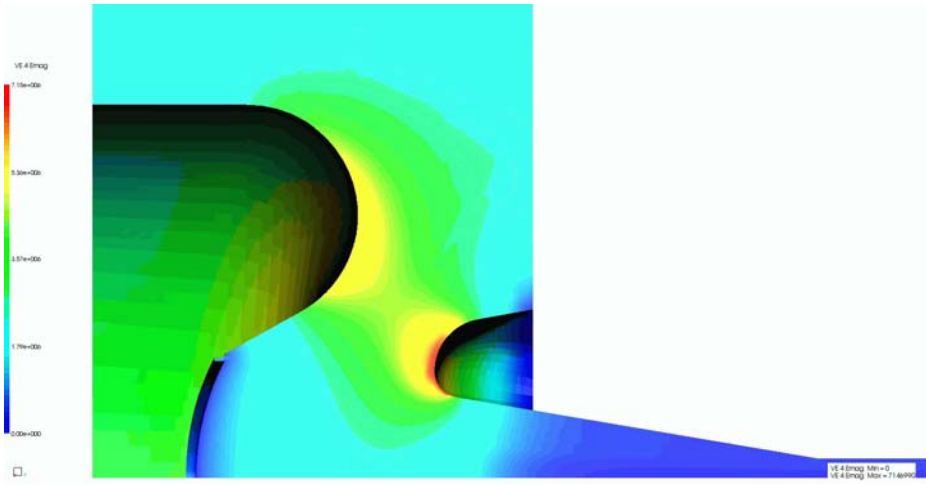


VE5 Interception Current: Min = 17500
VE5 Interception Current: Max = 25000



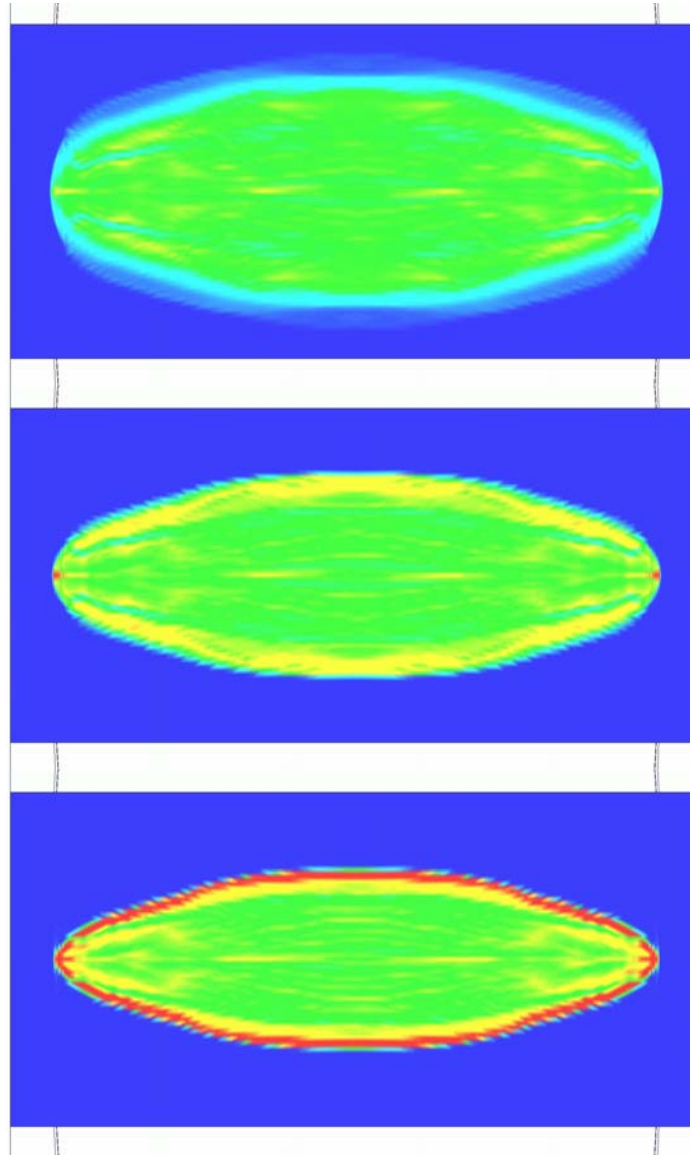
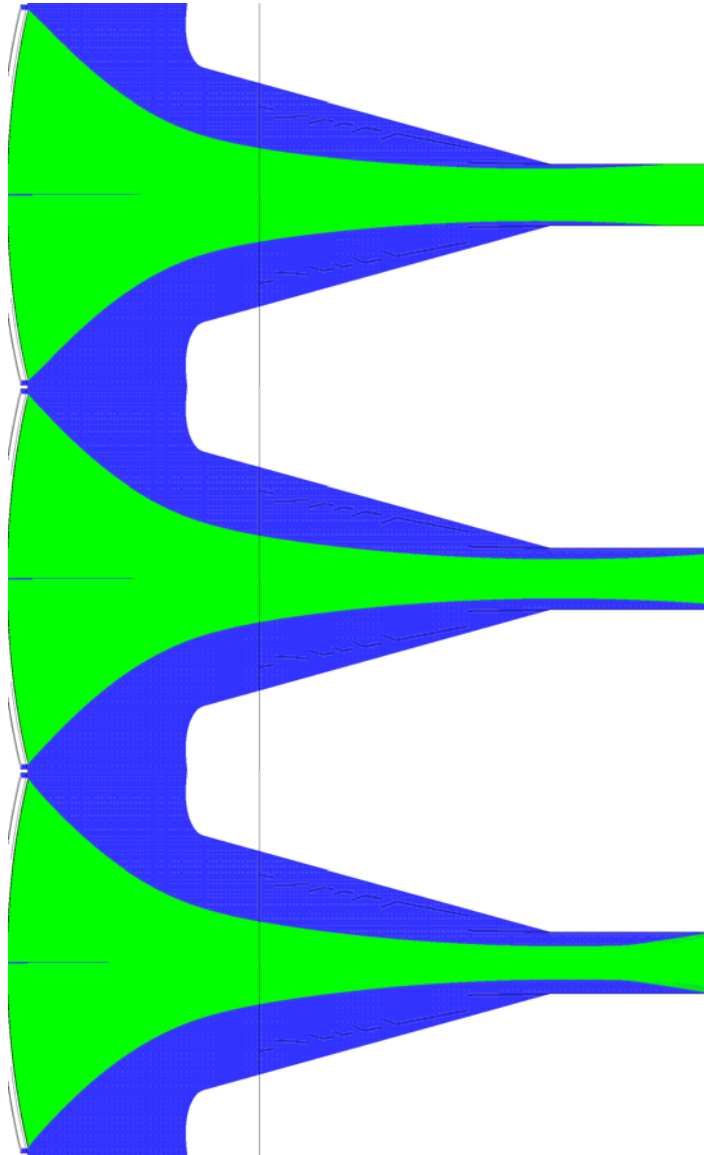
3D Gun Simulations

FE Gradients Below 60kV/cm,
Anode Below 72 kV/cm





3D Gun Simulations



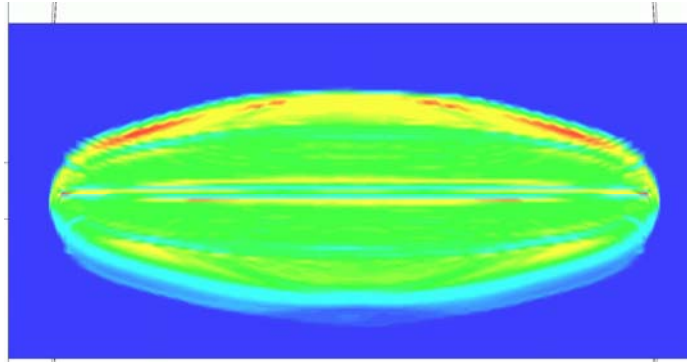
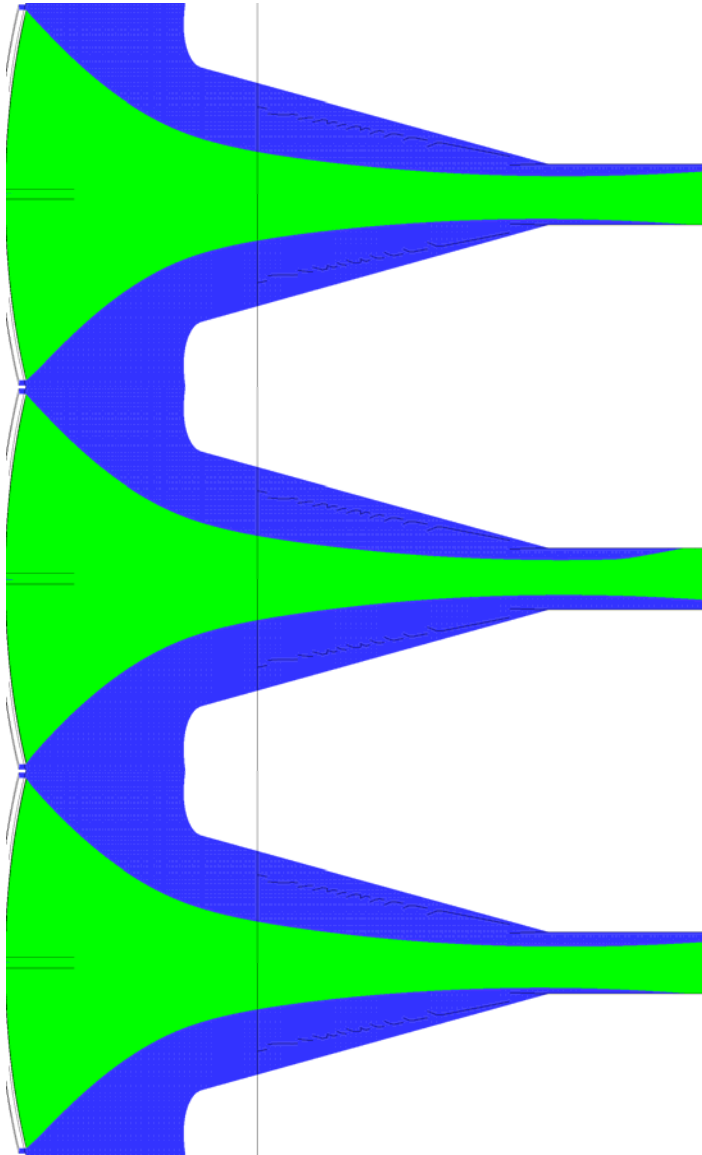
-400 V Bias

-500 V Bias

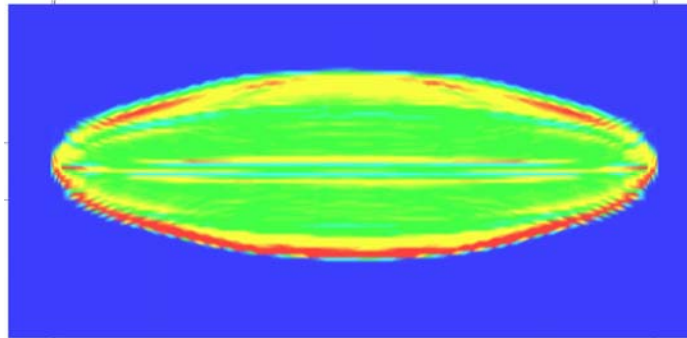
-600 V Bias



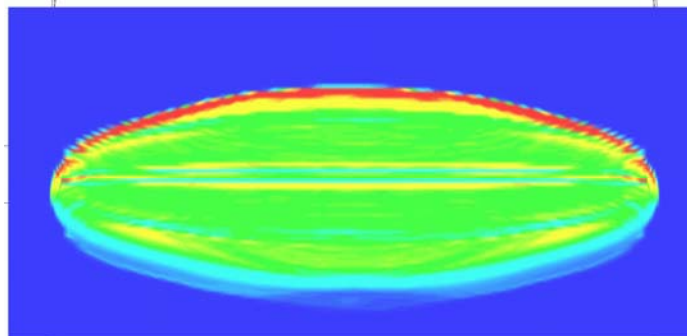
3D Gun Simulations



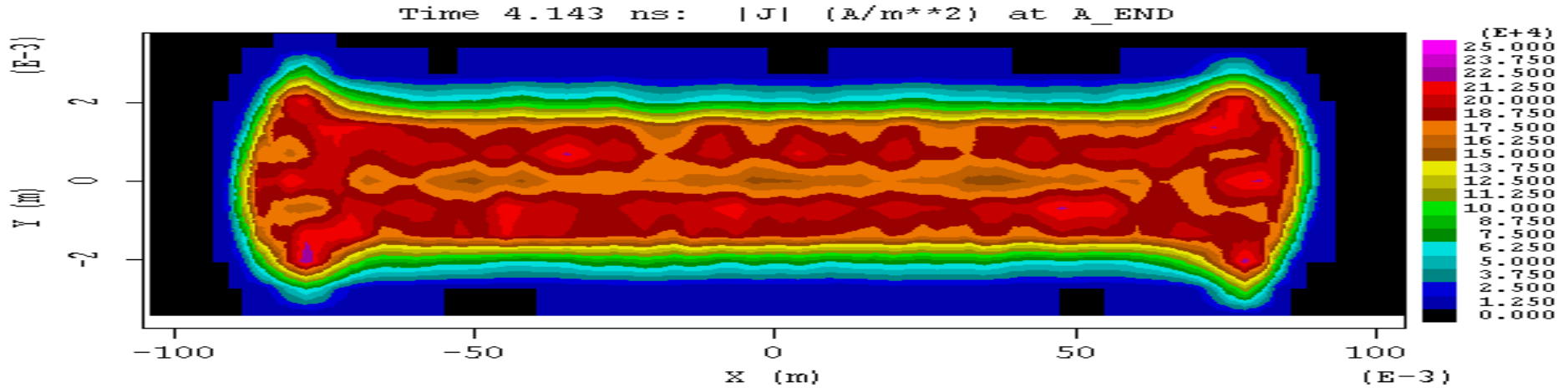
**-500 V bias Top
-400 V bias Bottom**



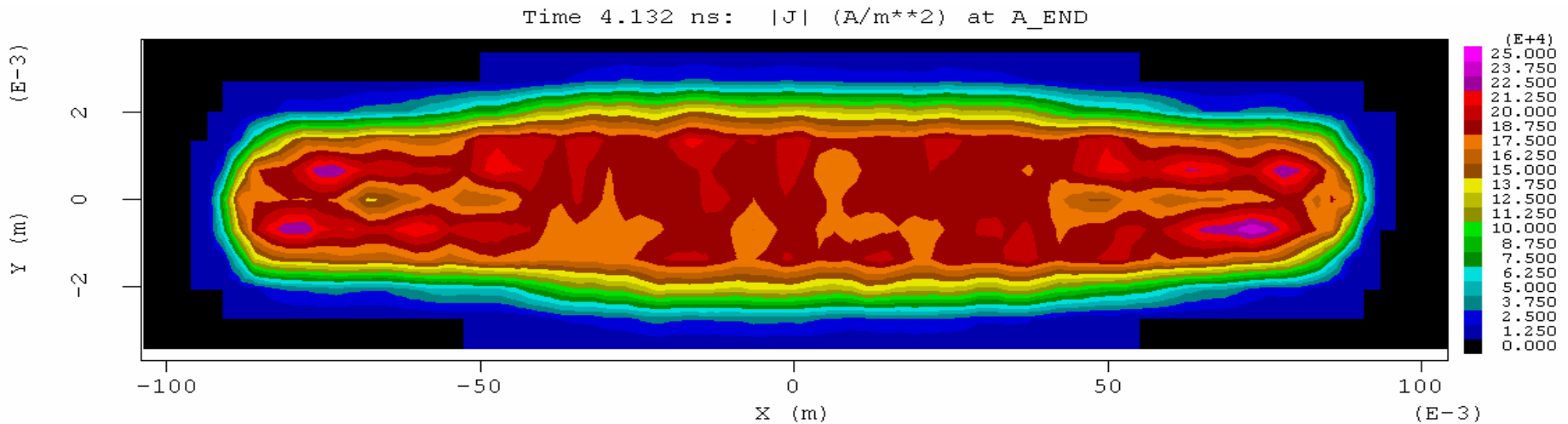
**-500 V bias Top
-600 V bias Bottom**



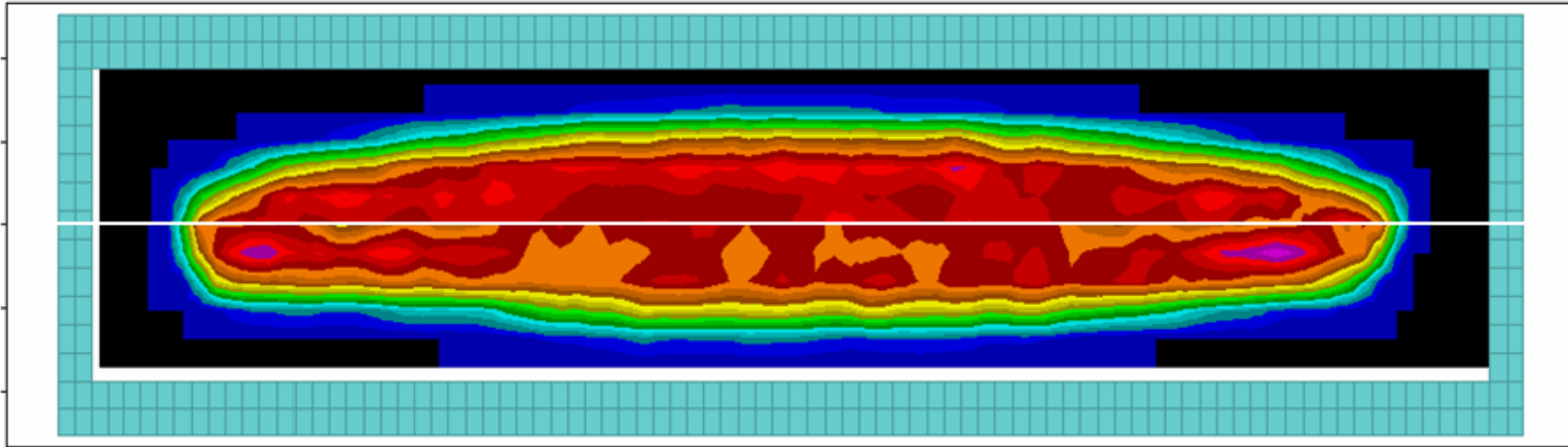
**-600 V bias Top
-400 V bias Bottom**



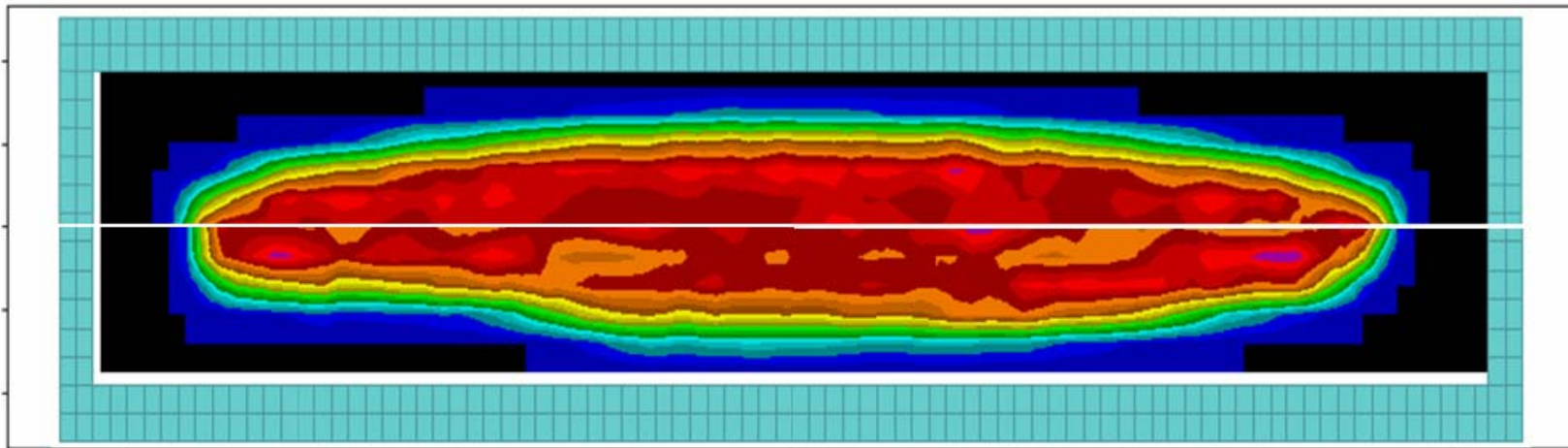
Actual Beam @ z=84cm



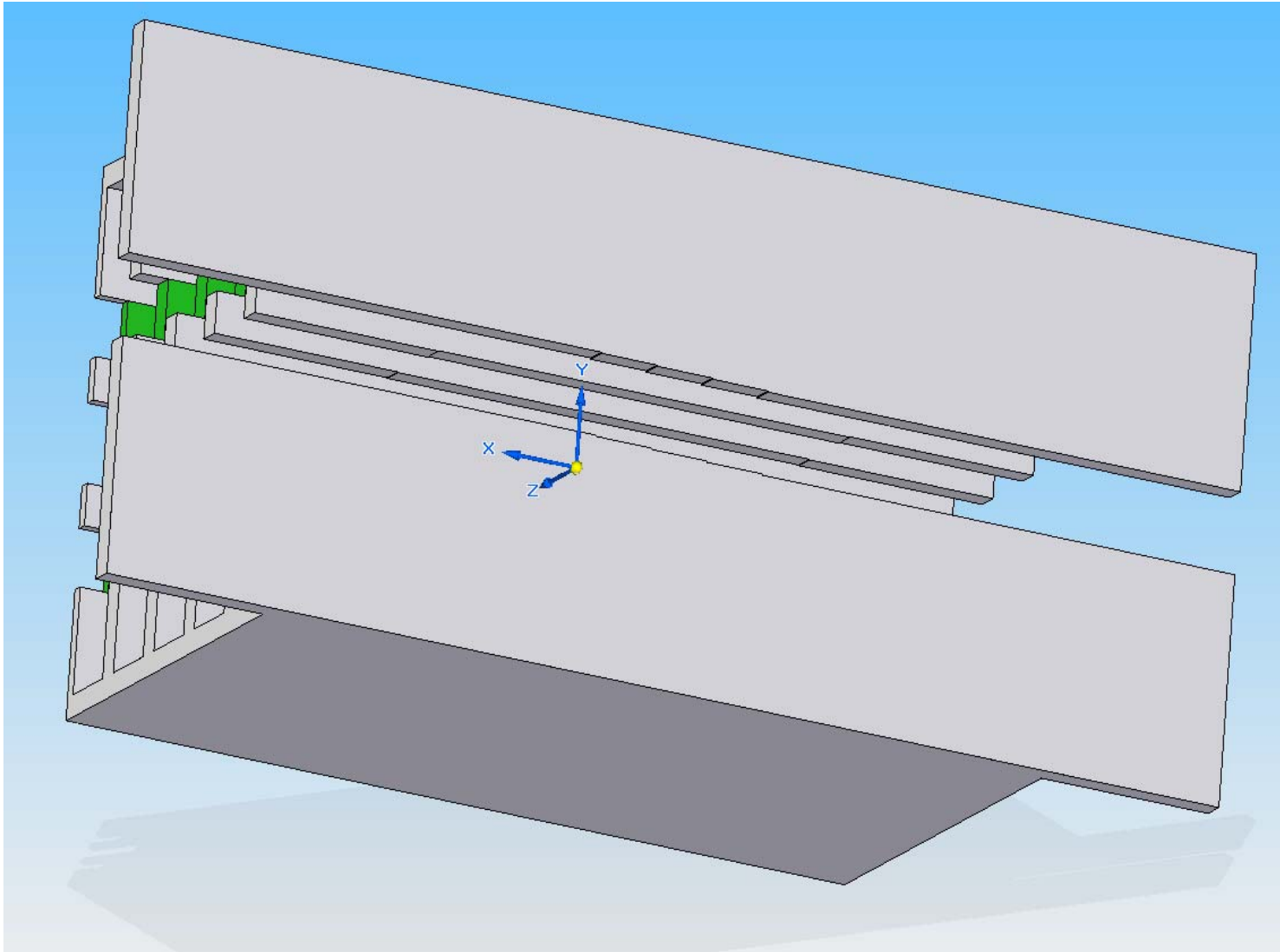
Actual Beam @ z=84cm with $P_x(z=0) = 0$



Actual Beam @ z=14cm (top half) & 84cm (bottom half) with $P_x(z=0) = 0$



Actual Beam @ z=14cm (top half) & 84cm (bottom half) with Tailored Entrance Pole

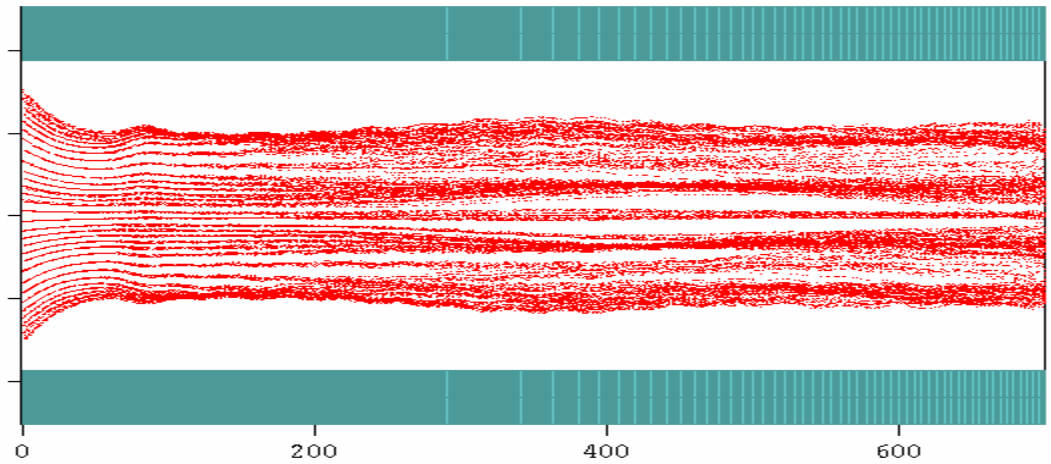


Tailored Entrance
Polepiece To
Introduce Initial
Field Tilt

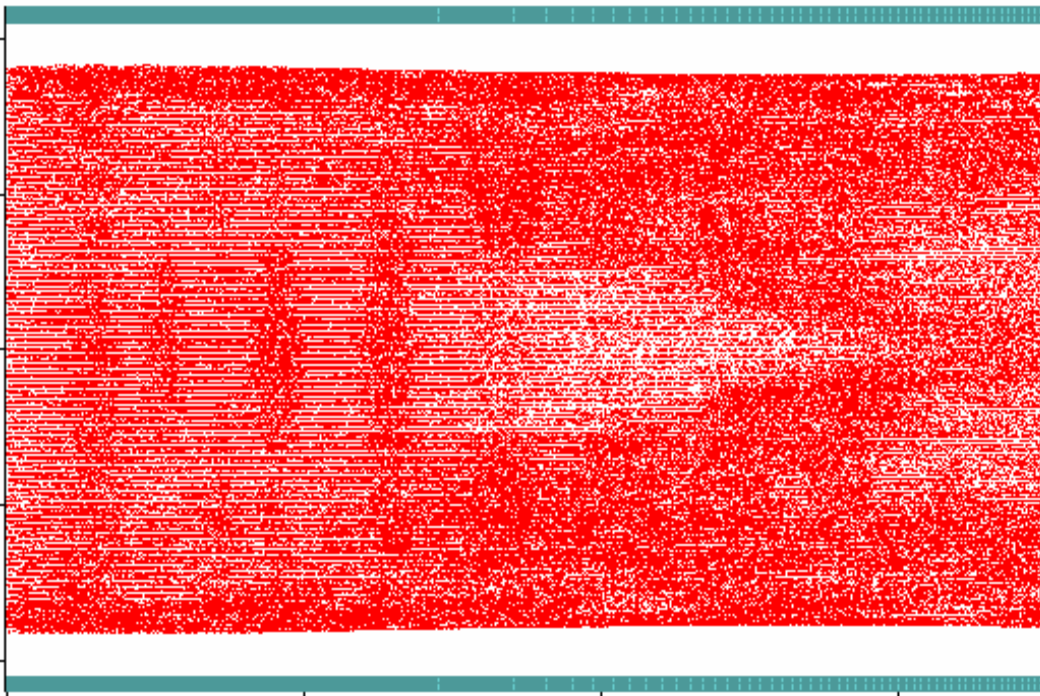


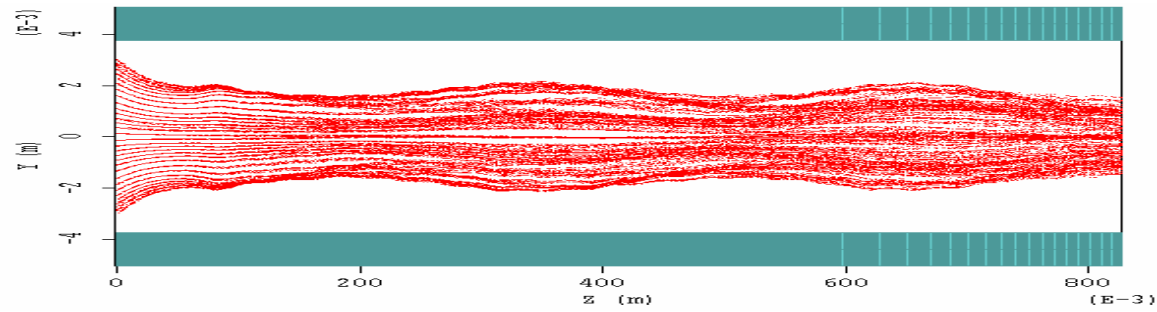
3D Beam Transport

Side View

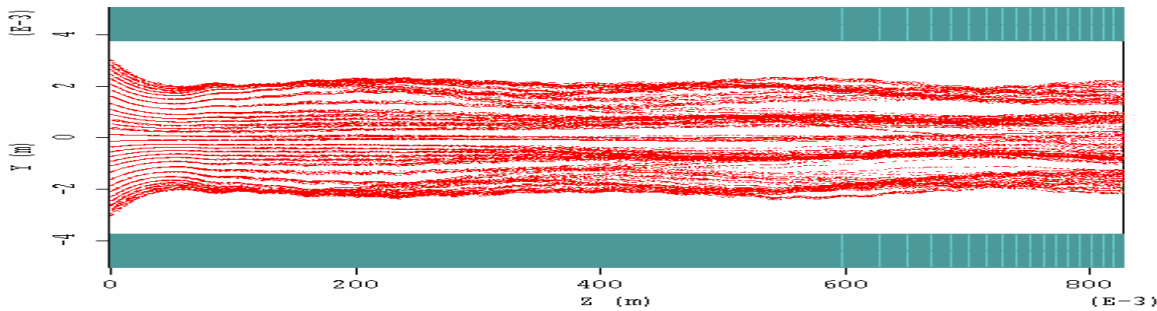
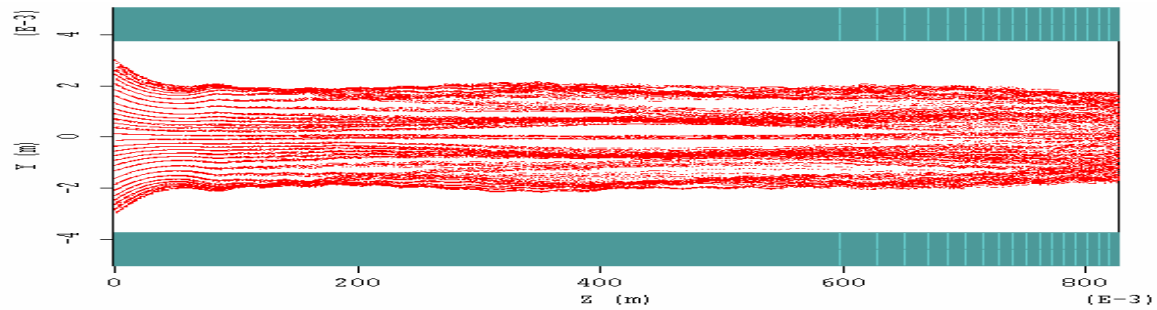


Top View



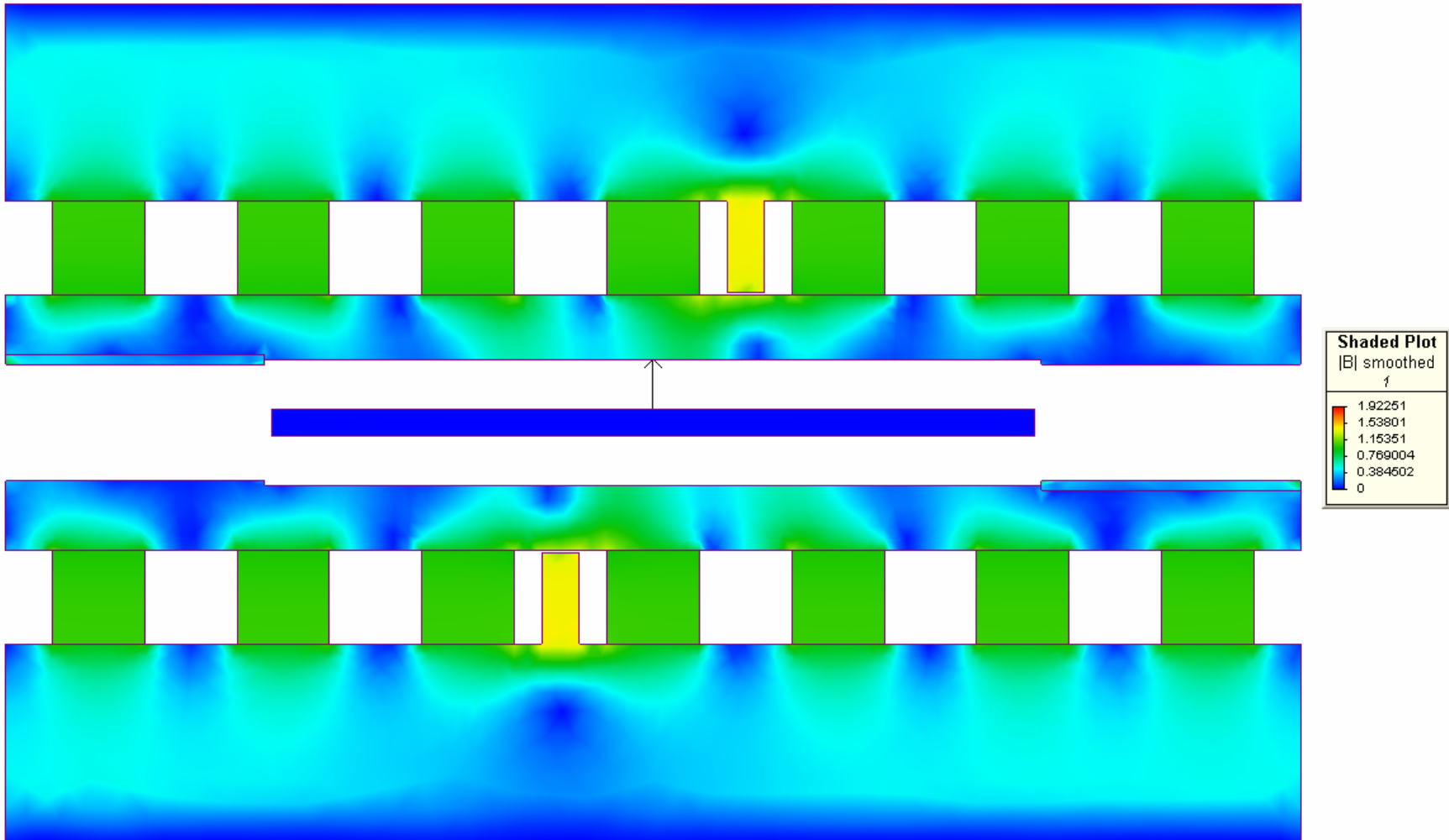


+5%

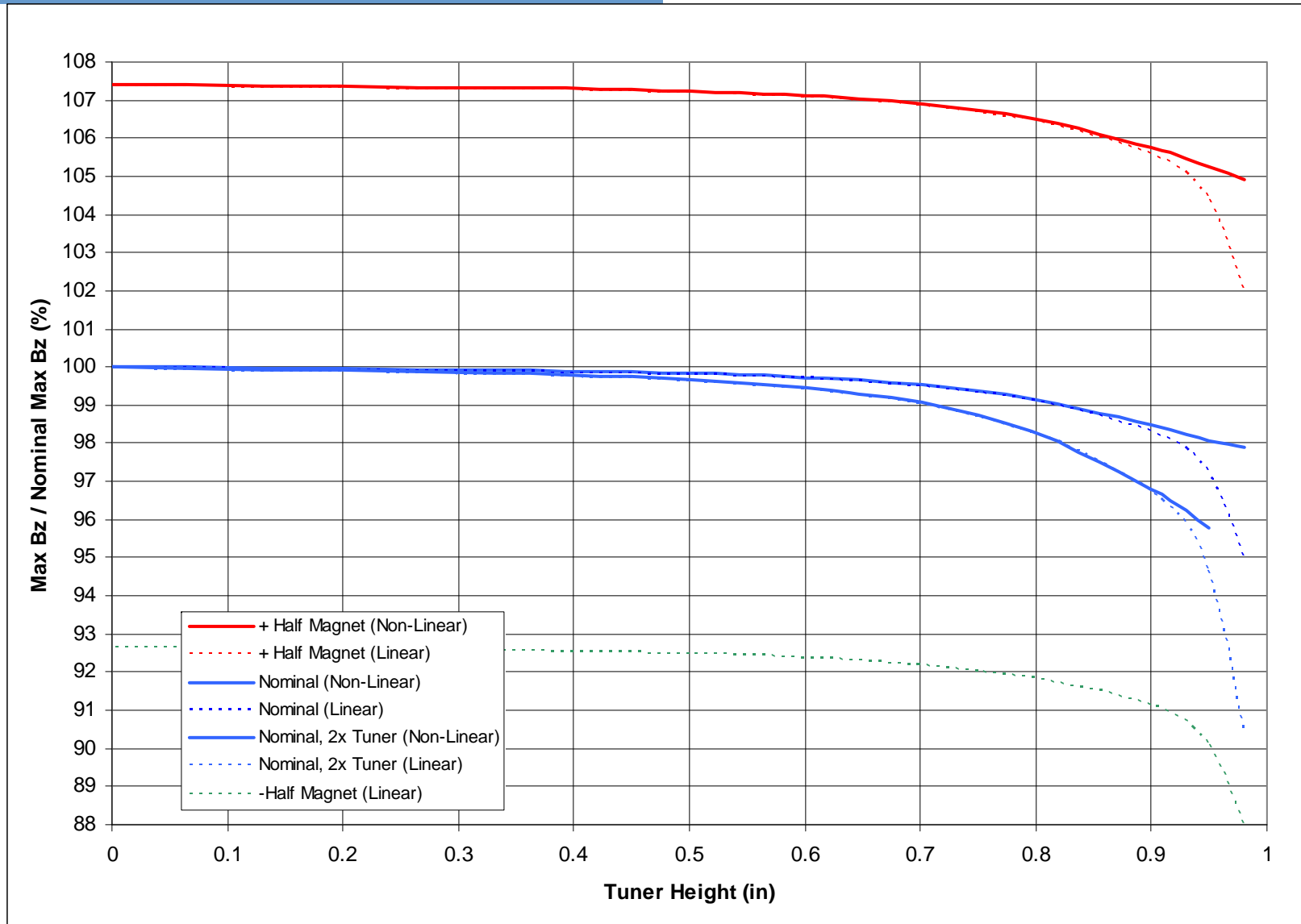


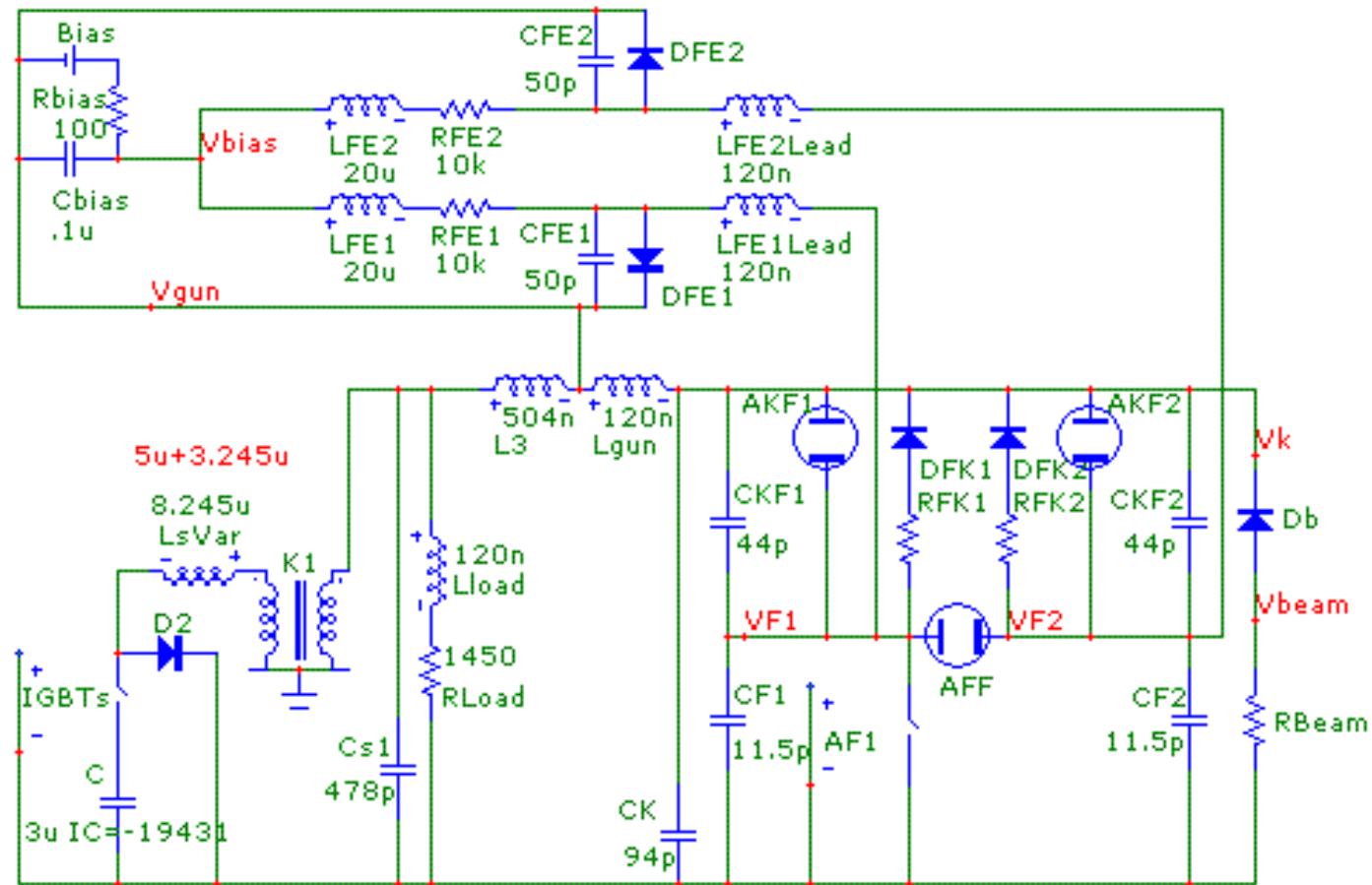
-5%

Field Strength Variation

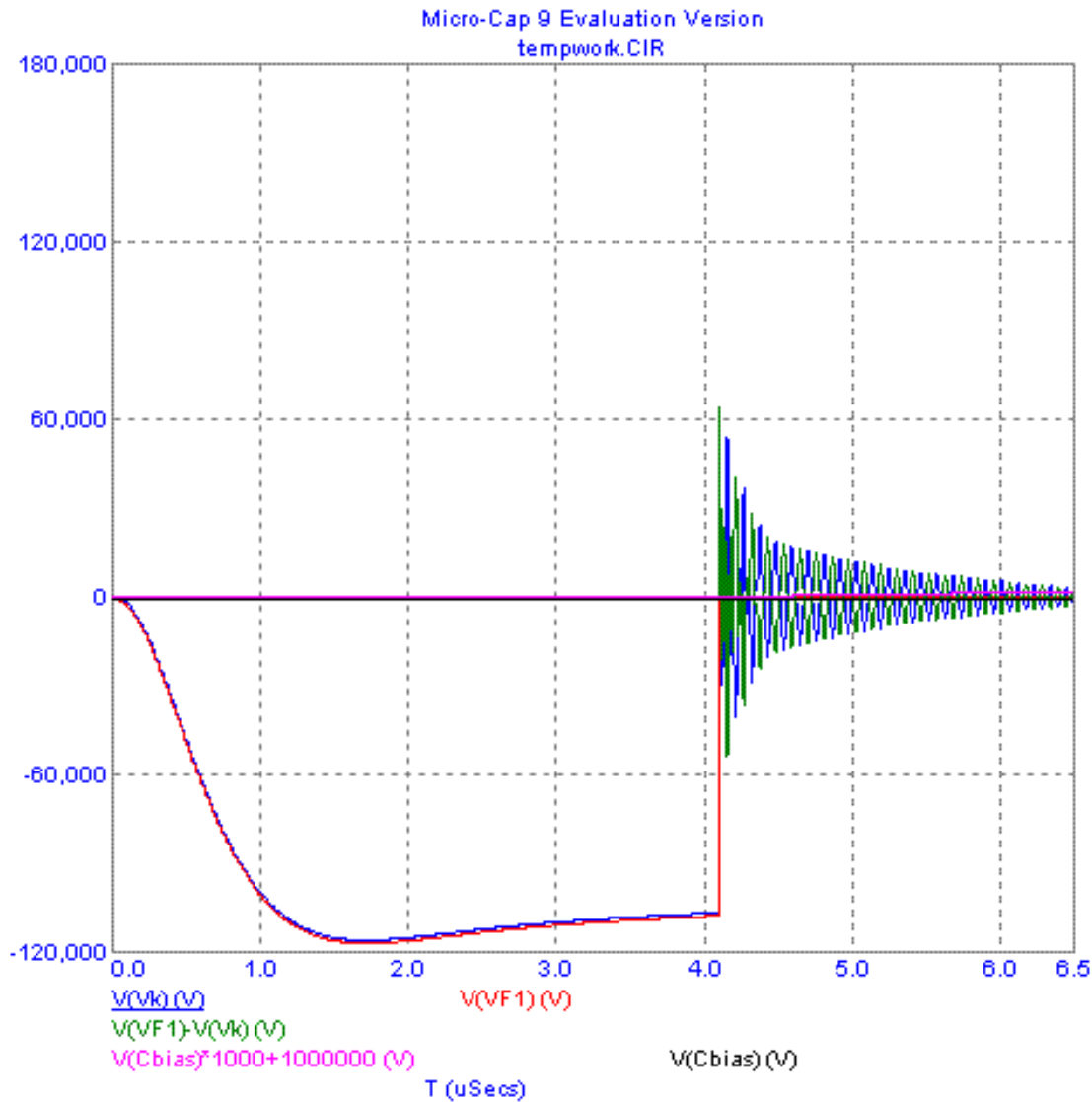


Magnet Trim Stud Simulations





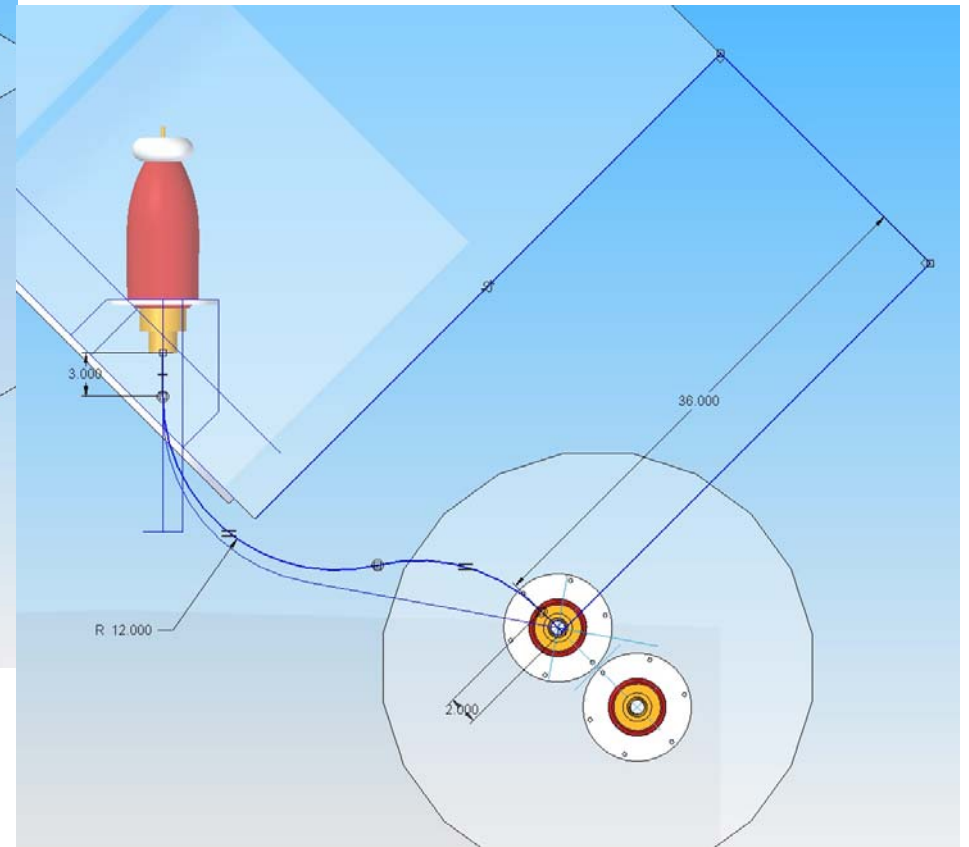
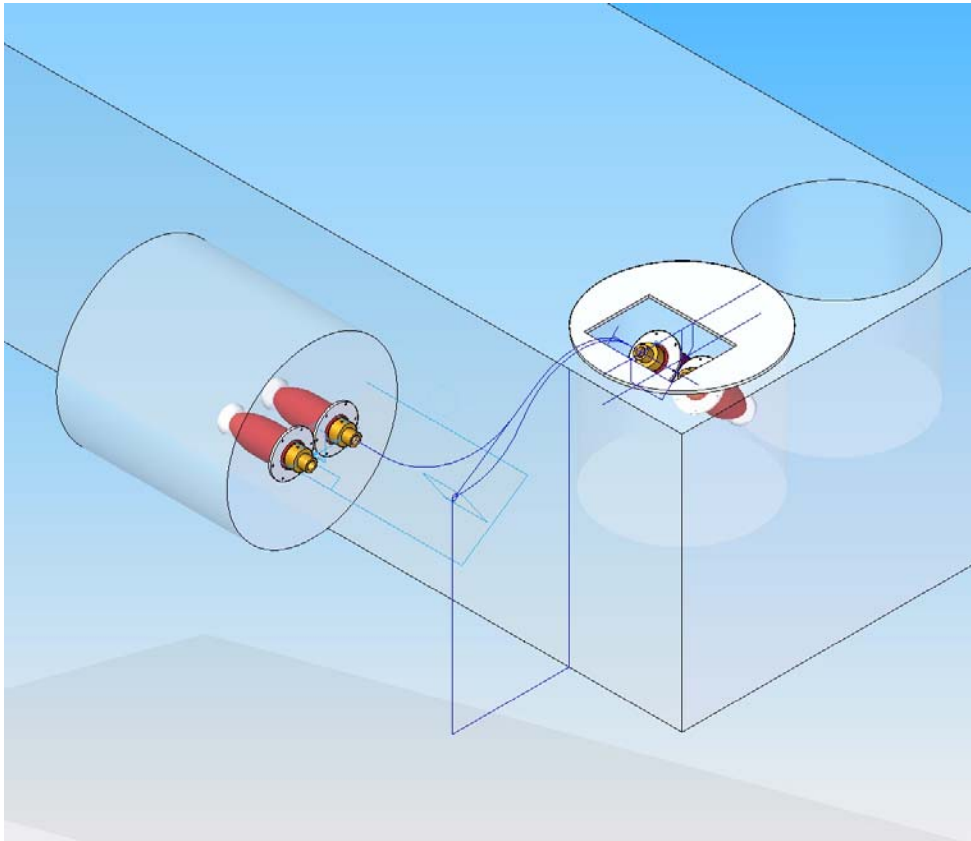
Simplified Modulator and FE Bias Supply Schematic



FE to Anode Arc Waveforms

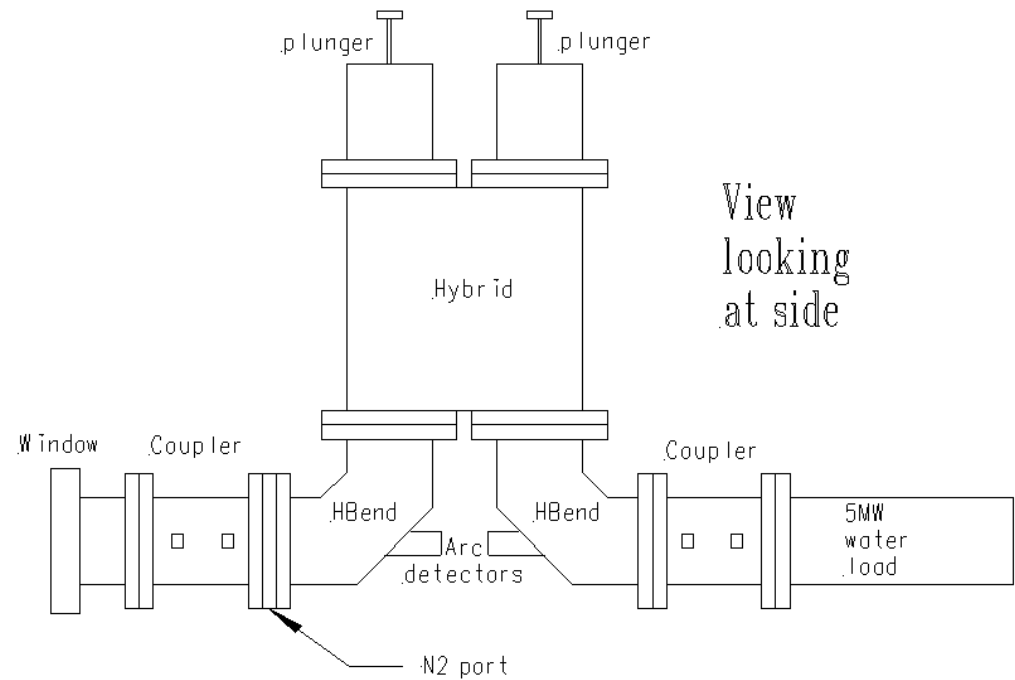
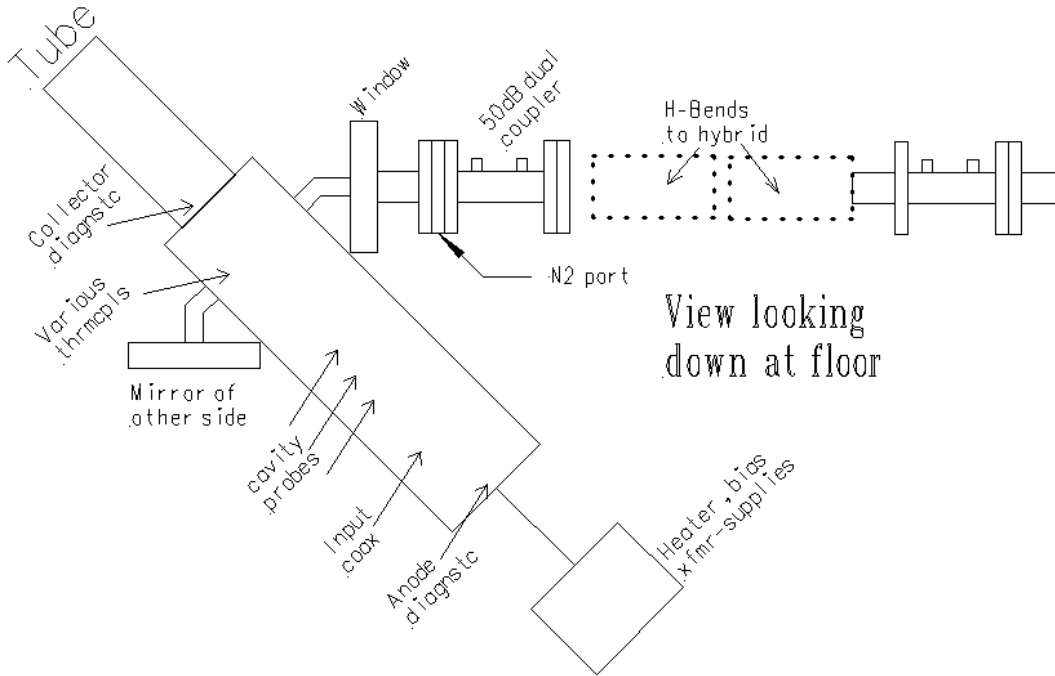


DTI Modulator Cable Layout



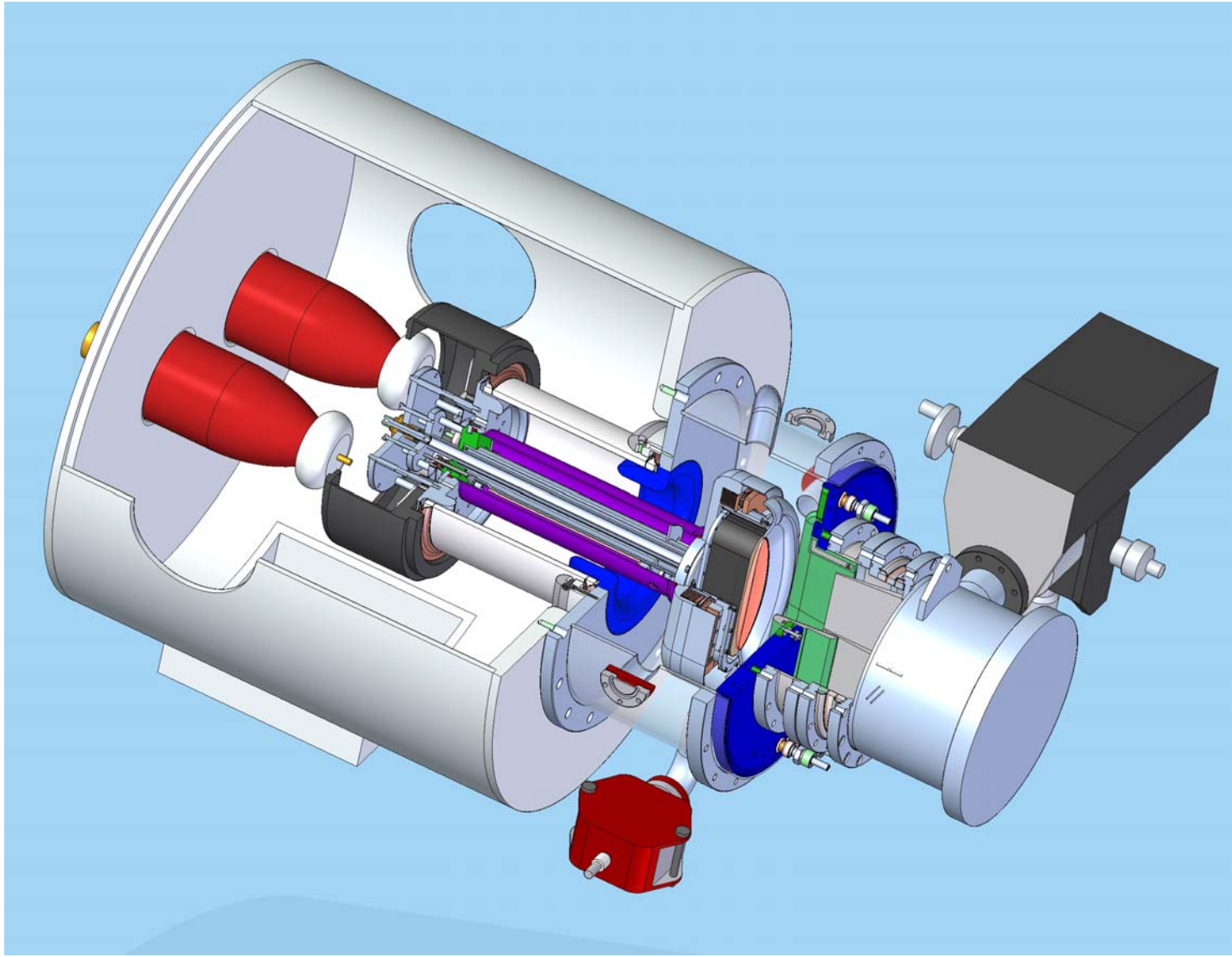


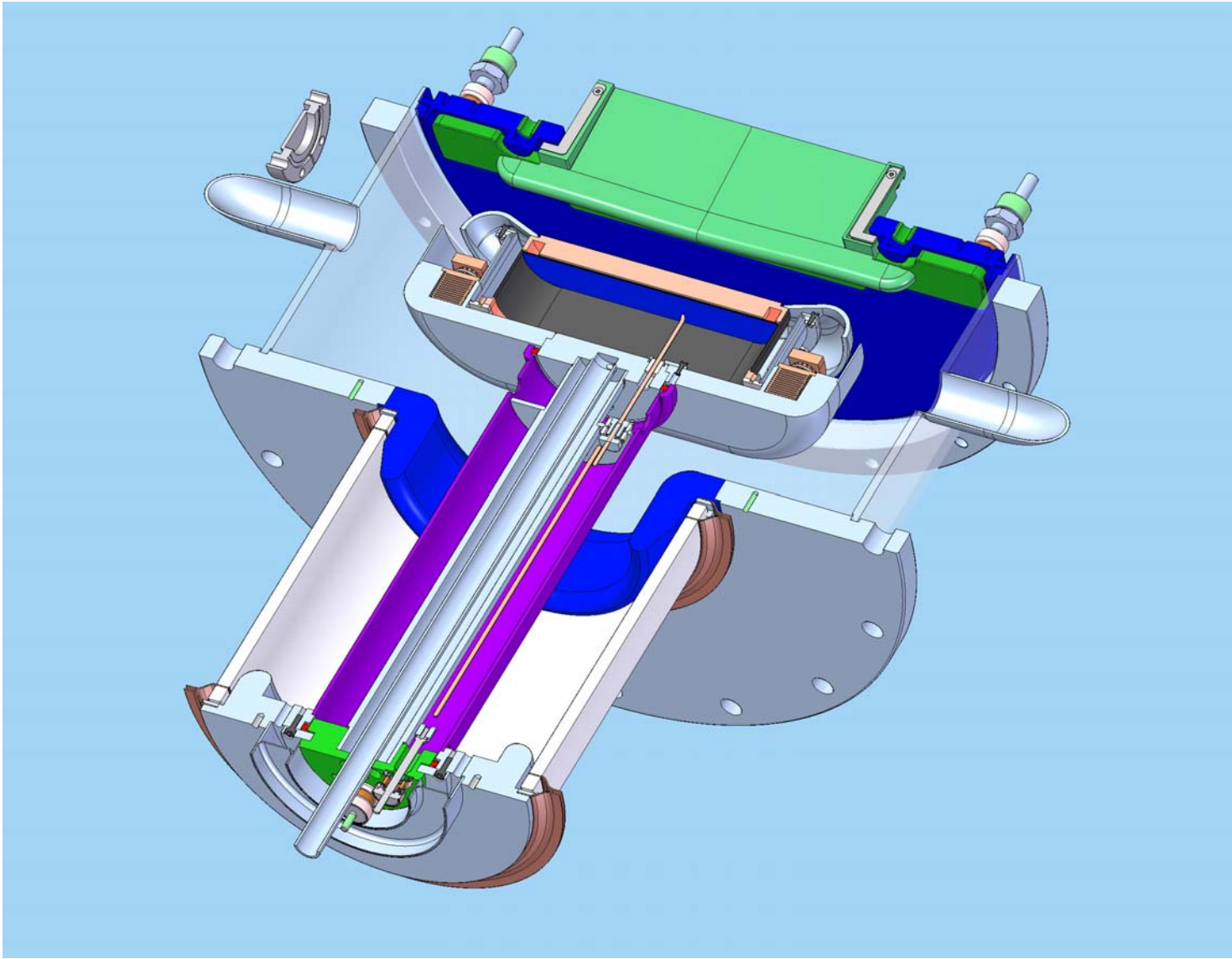
Hot Test Waveguide Layout

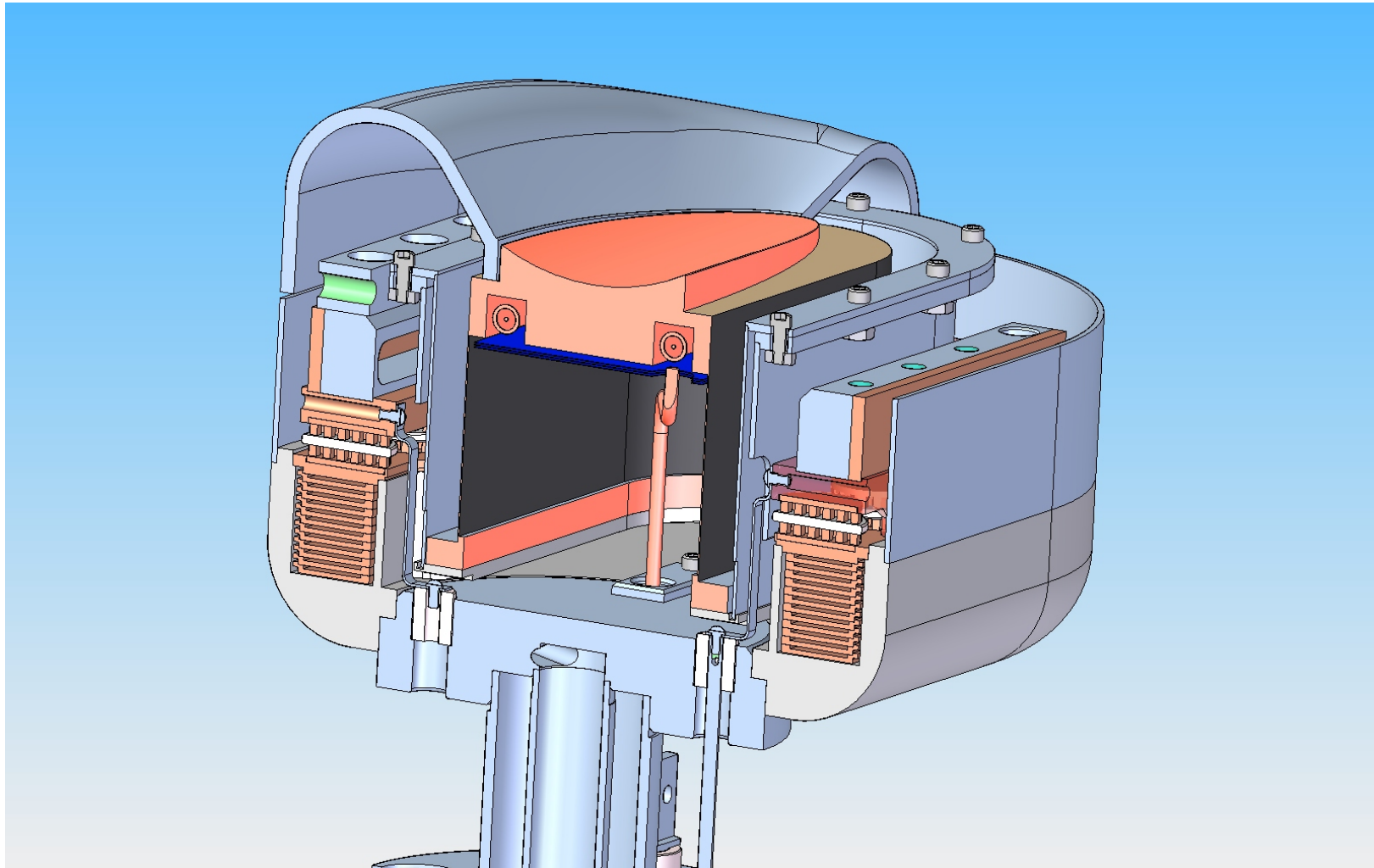


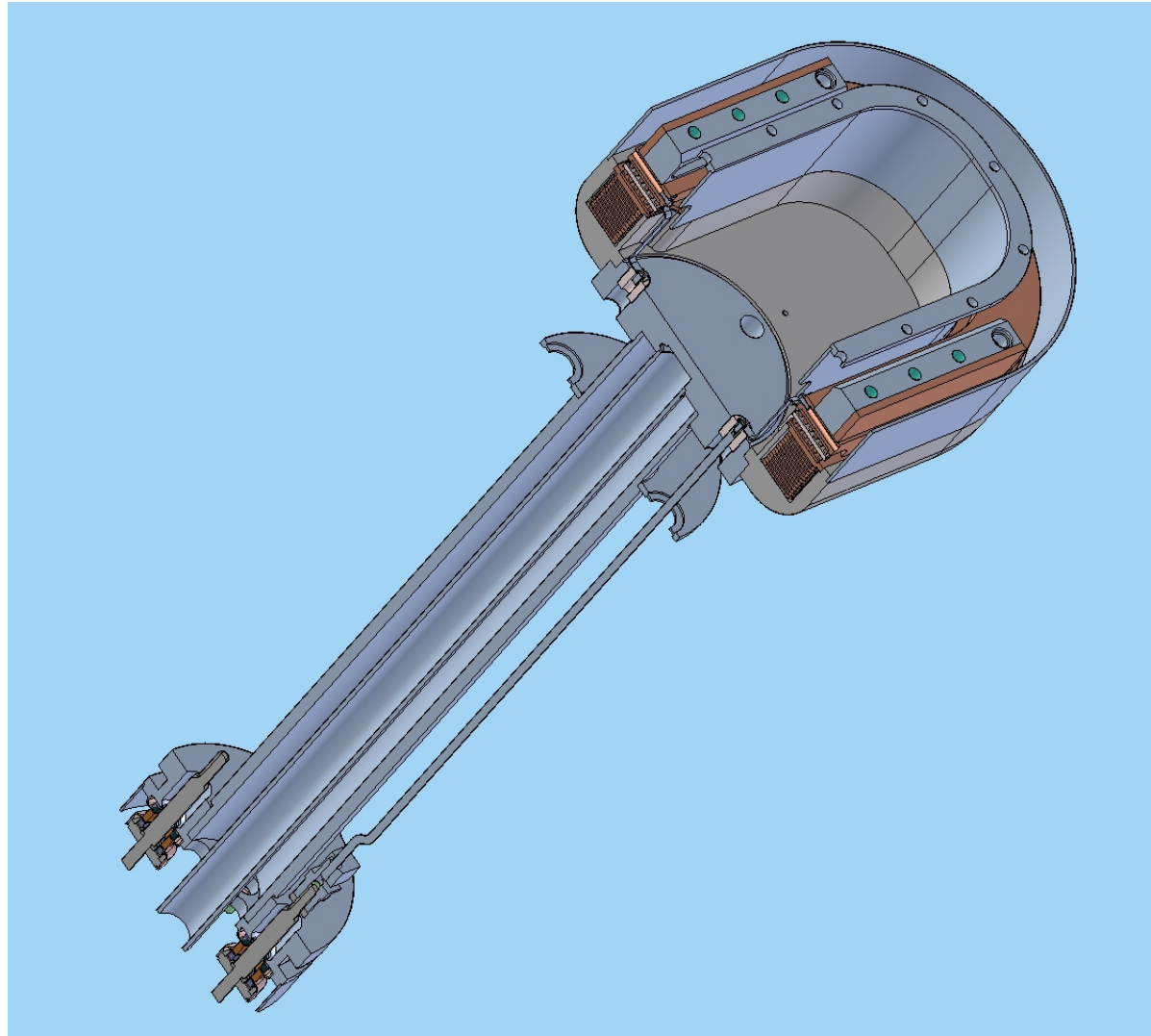


- Electron gun:
 - Design finalized, geometry to mechanical design
 - Tolerance studies, bias sweeps and HV sweeps
- RF circuit:
 - RF cavity geometry finalized awaiting comparison with cold test. Final PPM PIC simulations awaiting magnetics design.
- Window design :
 - Sent to ACD group to verify using SLAC in-house code – still looking at ghost modes, multipactor, etc.
- Magnetics design for beam transport:
 - Nearing completion of polepiece shaping for entrance conditions and edge focusing.



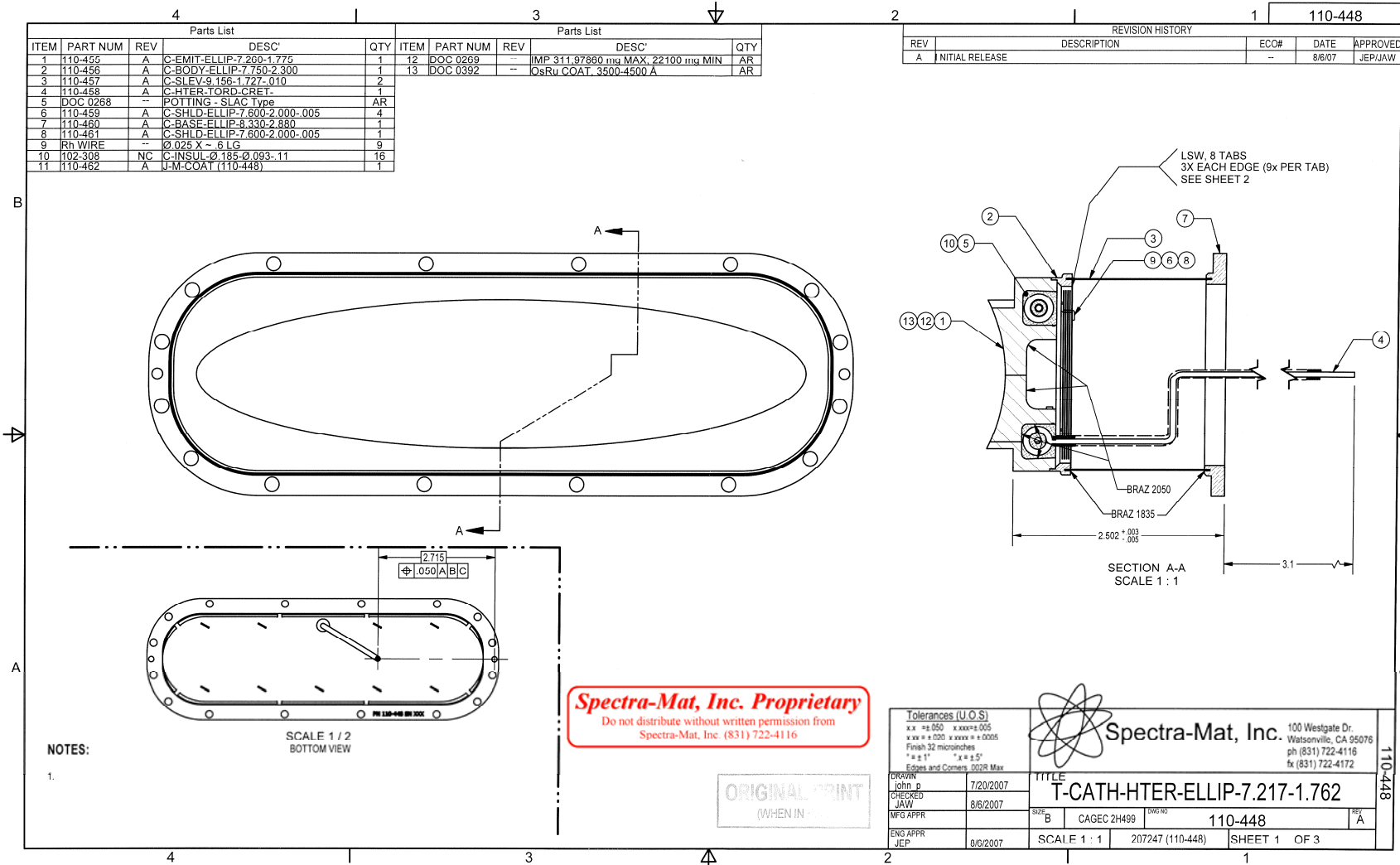






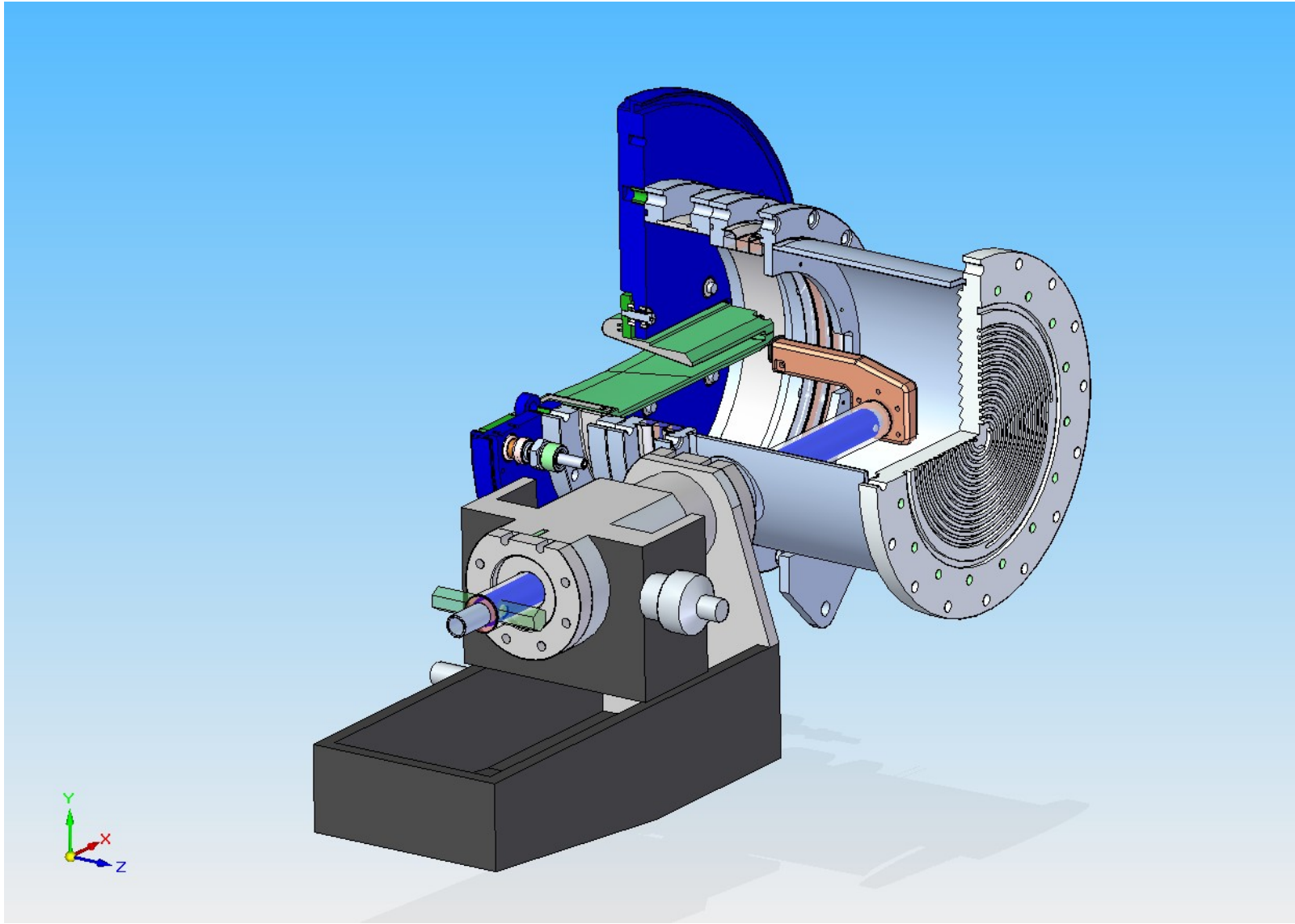


Spectra-Mat Cathode Design



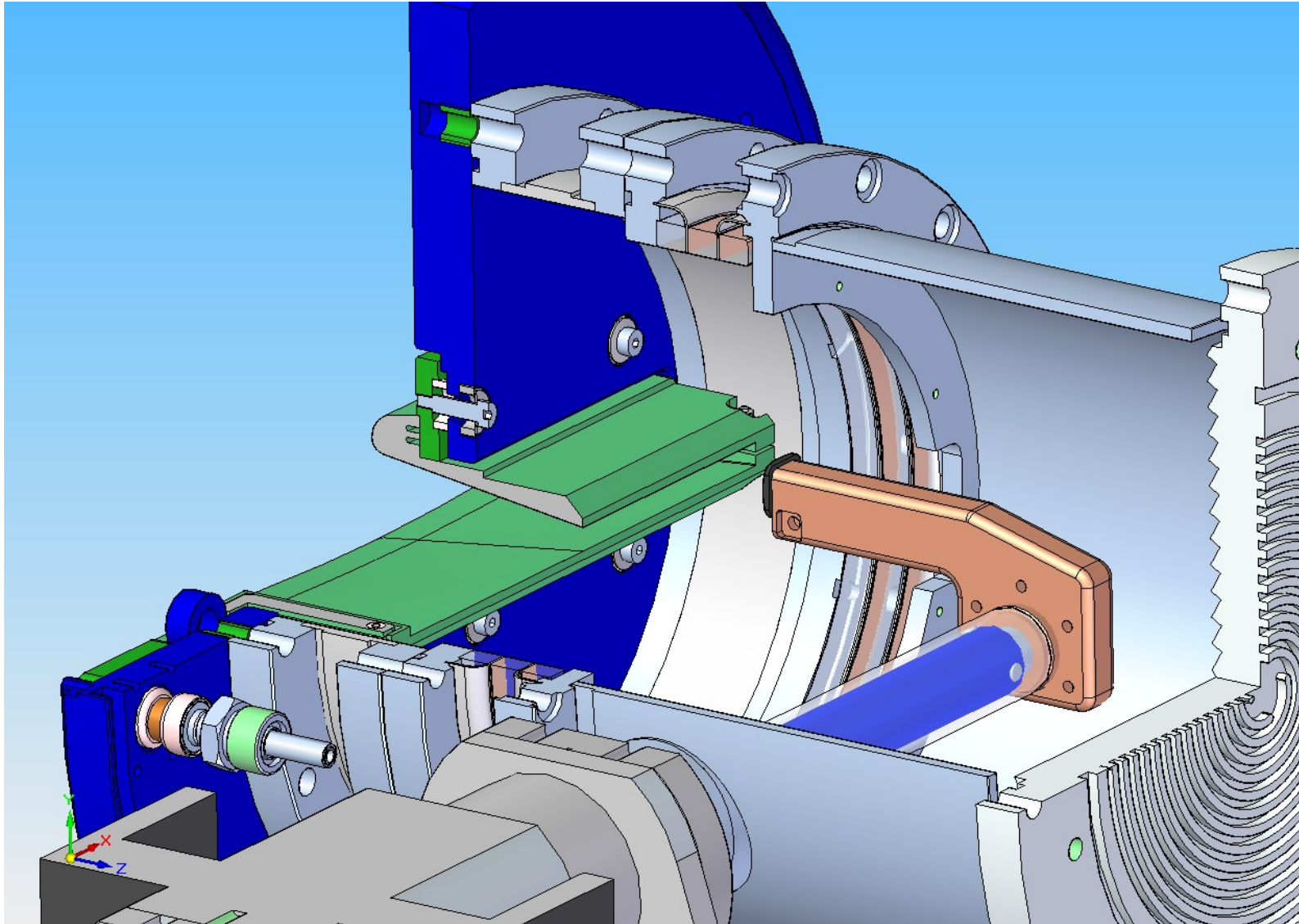


Beam Sampling Device Assembly



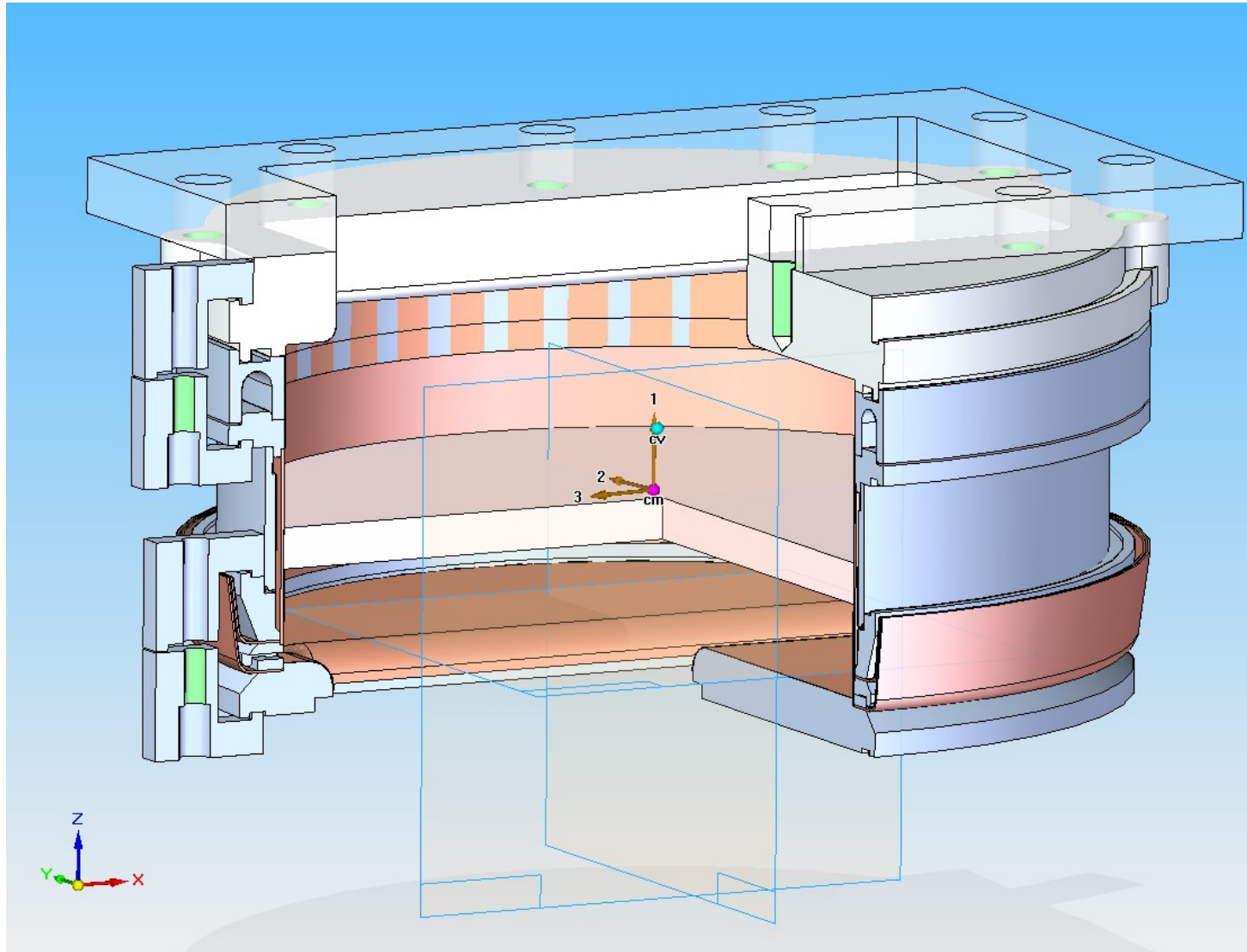


Beam Sampling Probe Detail



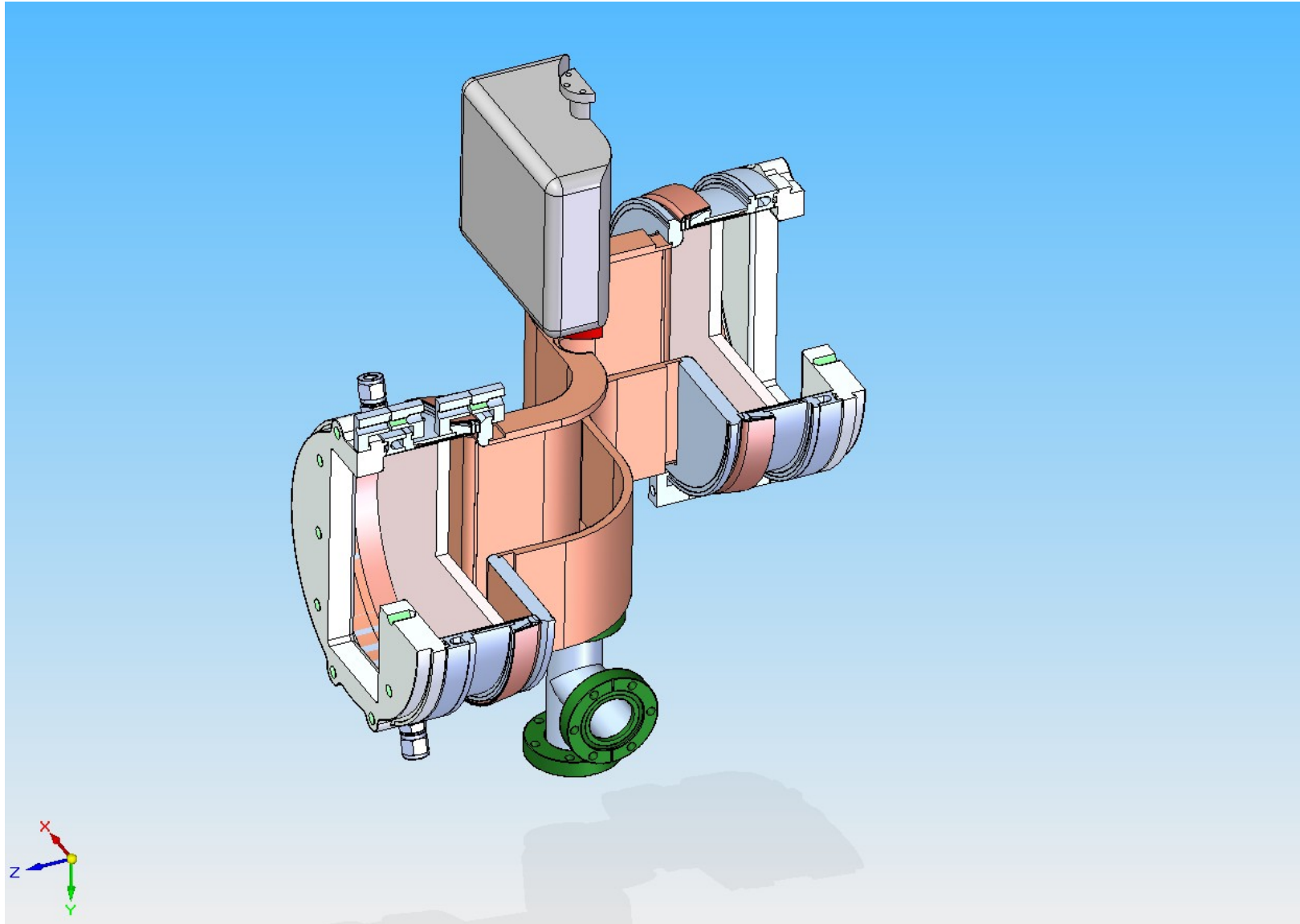


Window Assembly



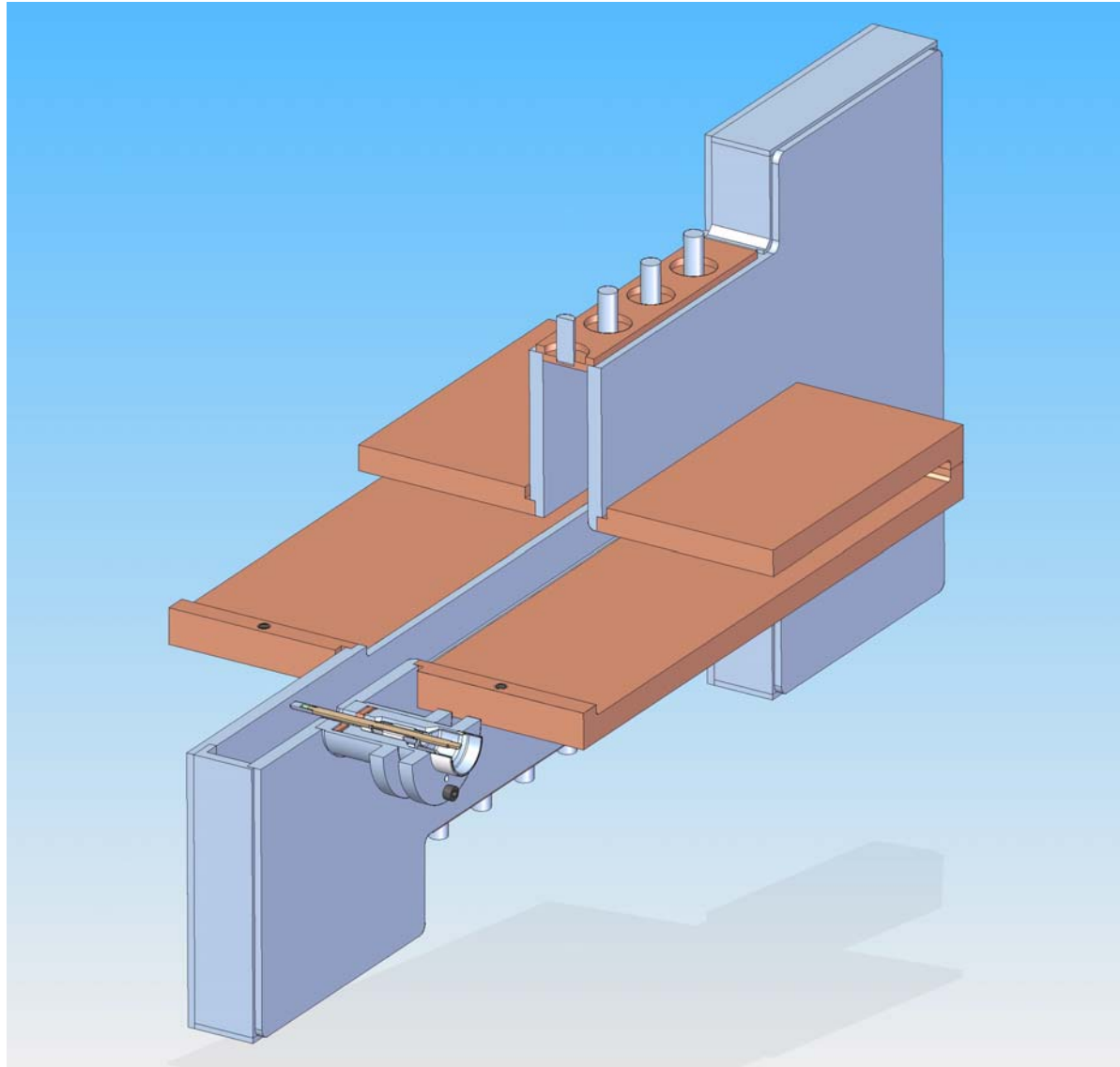


Window Hot Test Assembly



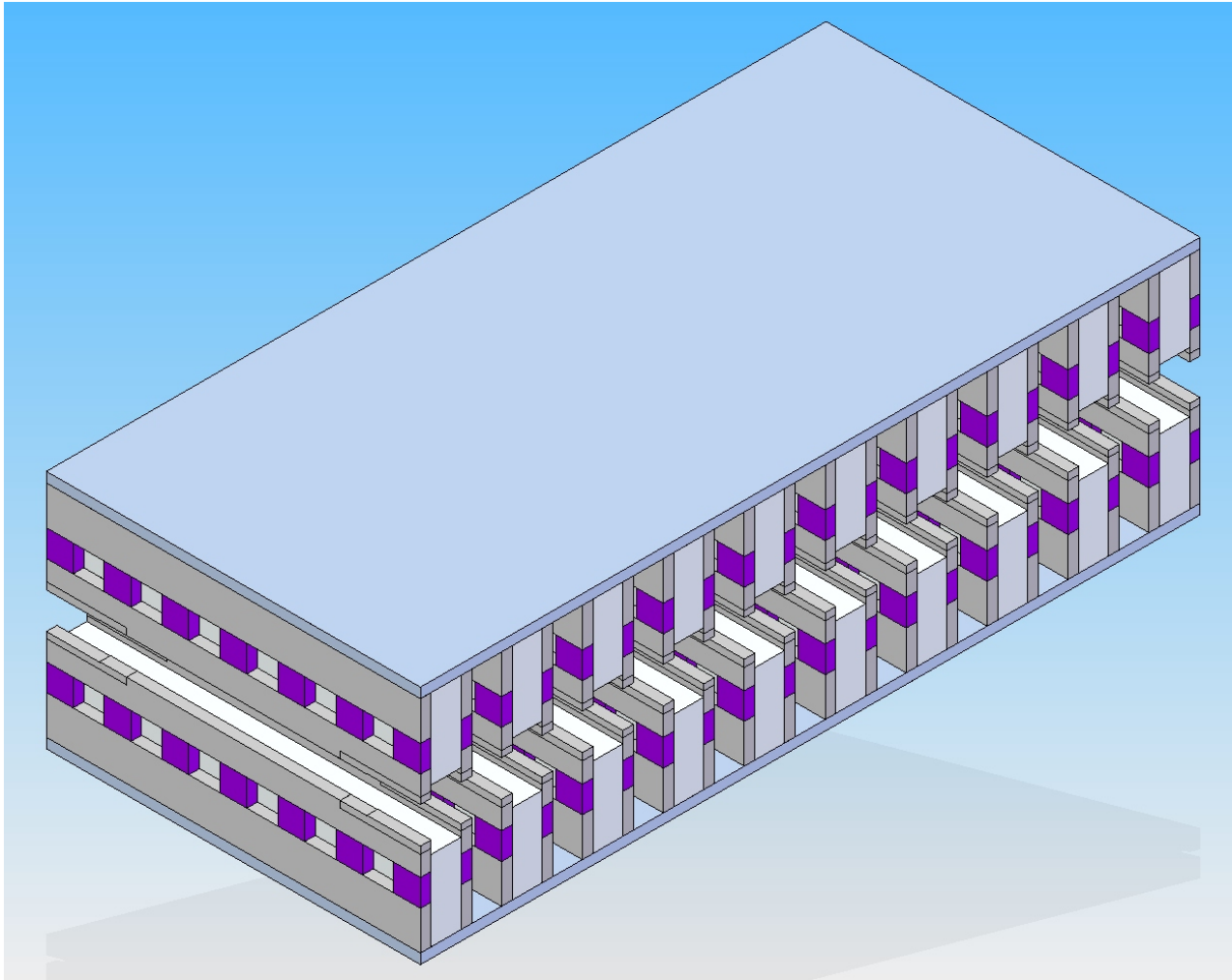


Cold Test Cavity Assembly



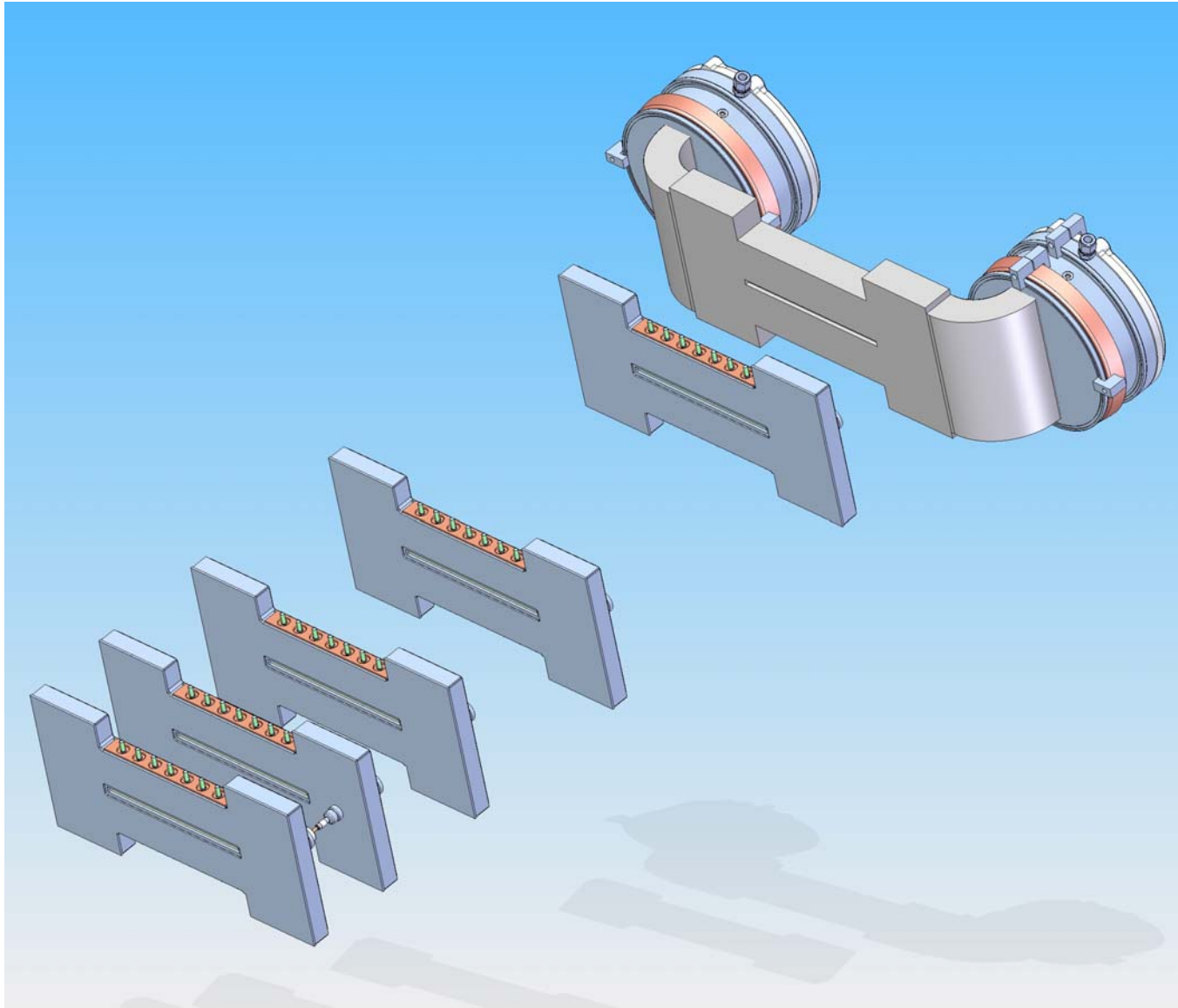


Periodic Focusing Magnet Assembly





Klystron Circuit Layout

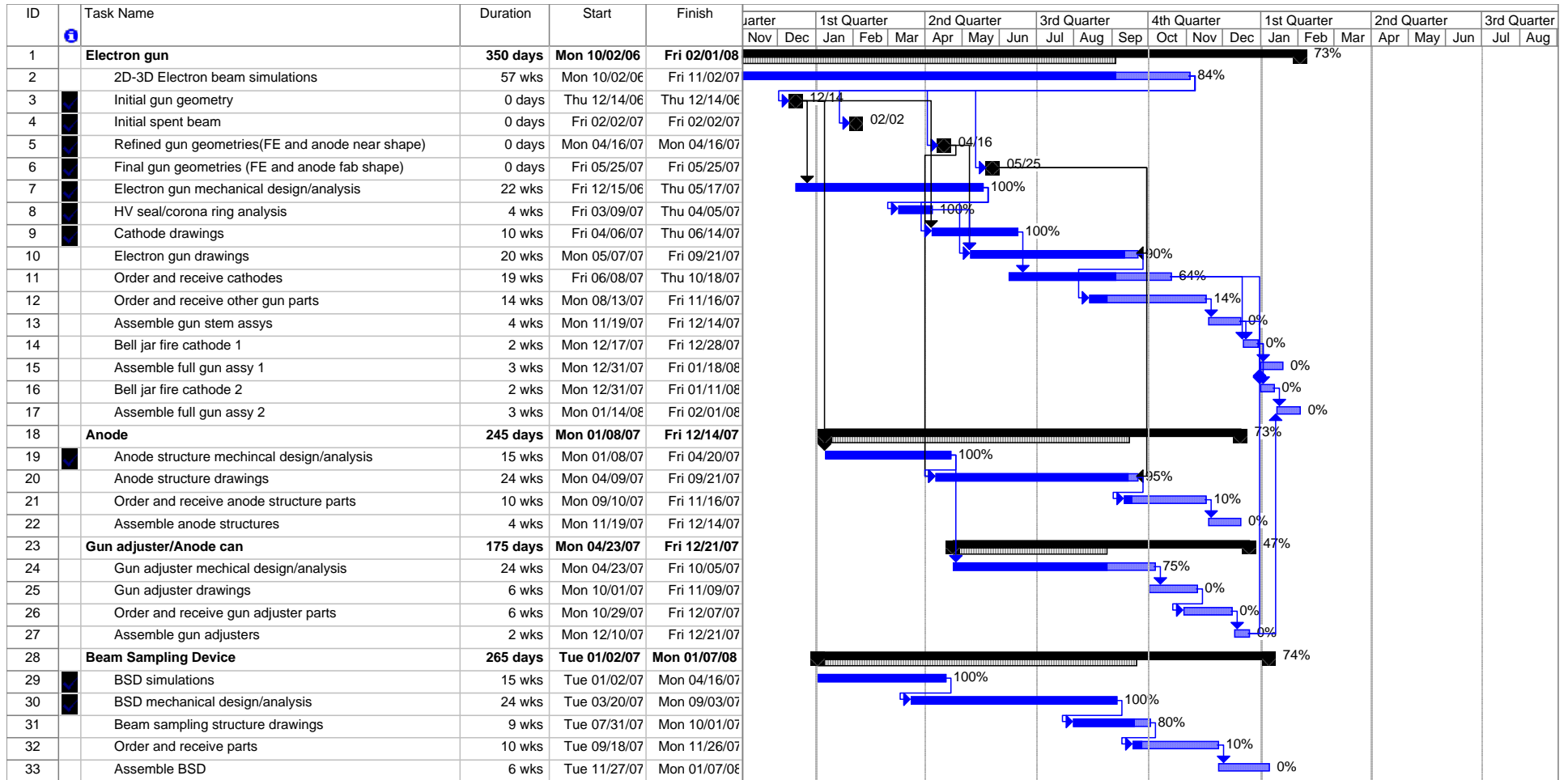




- Electron gun:
 - Cathode order has been placed (3 cathodes)
 - Design of stem, FE, cathode support structure finished
 - Drawings in check
- Anode:
 - Split isolated anode design finished
 - Drawings finished, parts on order
- Beam diagnostic:
 - Design finalized
 - Drawings in check, parts on order
- RF cavity/cold test :
 - Design finalized
 - Drawings in check
- Klystron circuit modeling and analysis underway



Schedule





Schedule (continued)

