UT-BATTELLE

MERIT Collaboration Meeting

ISSUES RELATING TO THE Hg-JET TARGET SYSTEM

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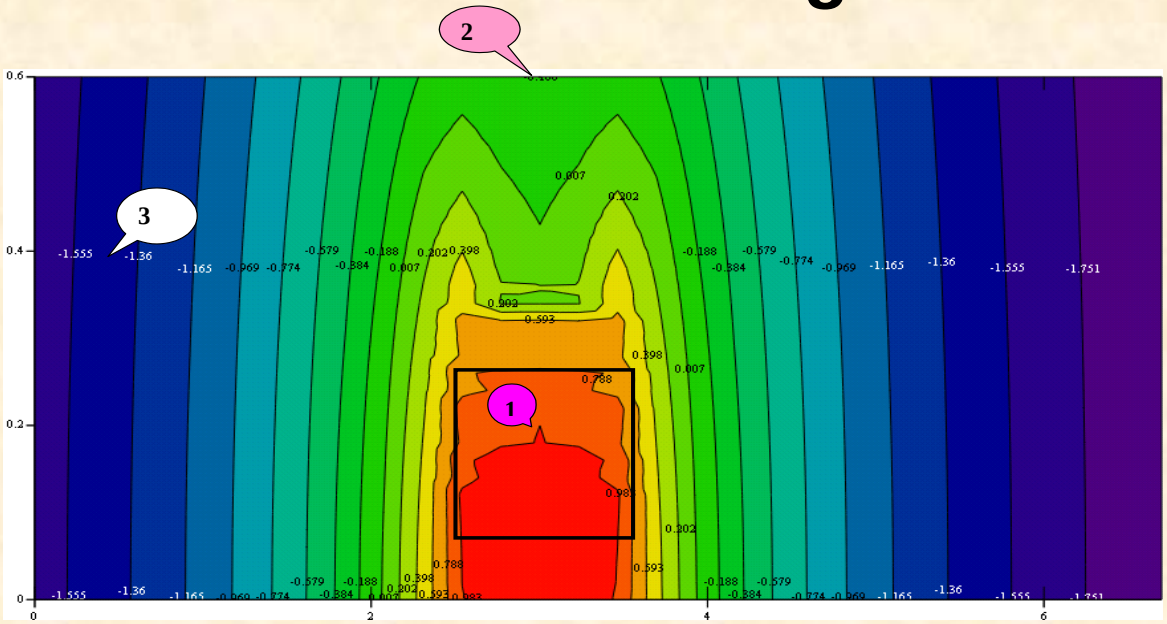
Outline Of Issues

- **Solenoid**
  - **Stray Fields**
  - **Replacing Nozzle/Plenum In Situ**
- **Nozzle Tests**
  - **Schedule**
- **Material Compatibility for Windows**
  - **Welding Ti Alloy to Stainless Steel**
- **MHD Simulations**
  - **Jet Stability, Shape Distortion**
  - **Reaction Forces Across Field Lines**
- **Laser Optics**
  - **Schedule**
- **Activation Products**
  - **Filters ?**
- **MERIT Schedule**

Stray Magnetic Fields

- **Hydraulic Cylinders/Hg Pump Cylinder**
- **Hydraulic Hoses and Fittings**

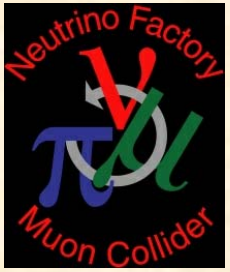


$(xyz_0, xyz_1, \log(xyz_2))$

Magnetic field distribution: the axes are in meters; the rectangle is one half of the solenoid.

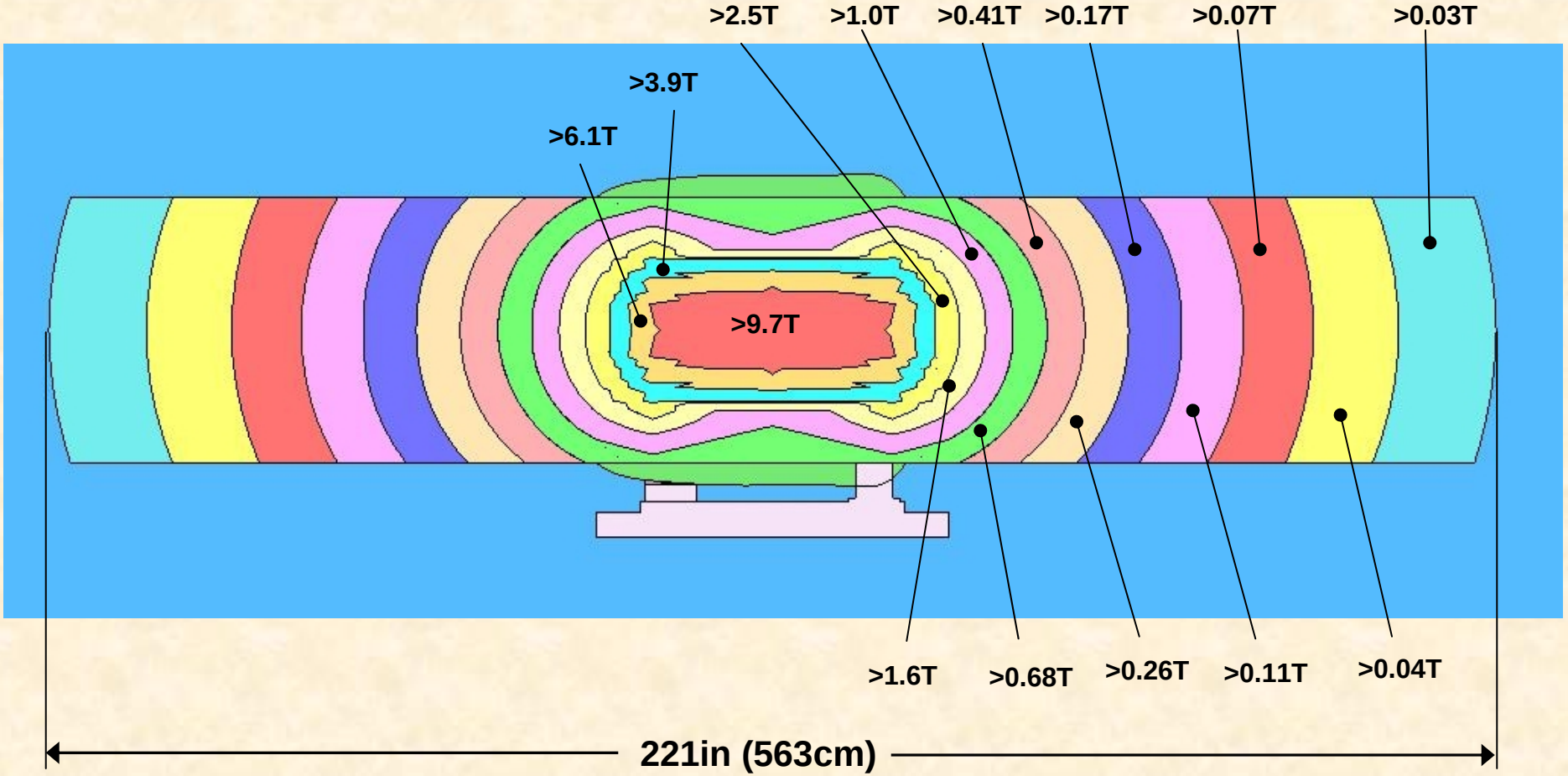
- **The volume within the conductor is > 9.7 T (red), > 6.1 T (orange).**
- **The field at Z=0, R=0.6 is >0.6 T, at R=1.0 (base support structure), B> ~0.1 T (1000 G).**
- **The field at Z=-2.5, R=0.4 (pump motor) is 0.03<B<0.07 T (300-700 G).**

Field Issues (cont.)

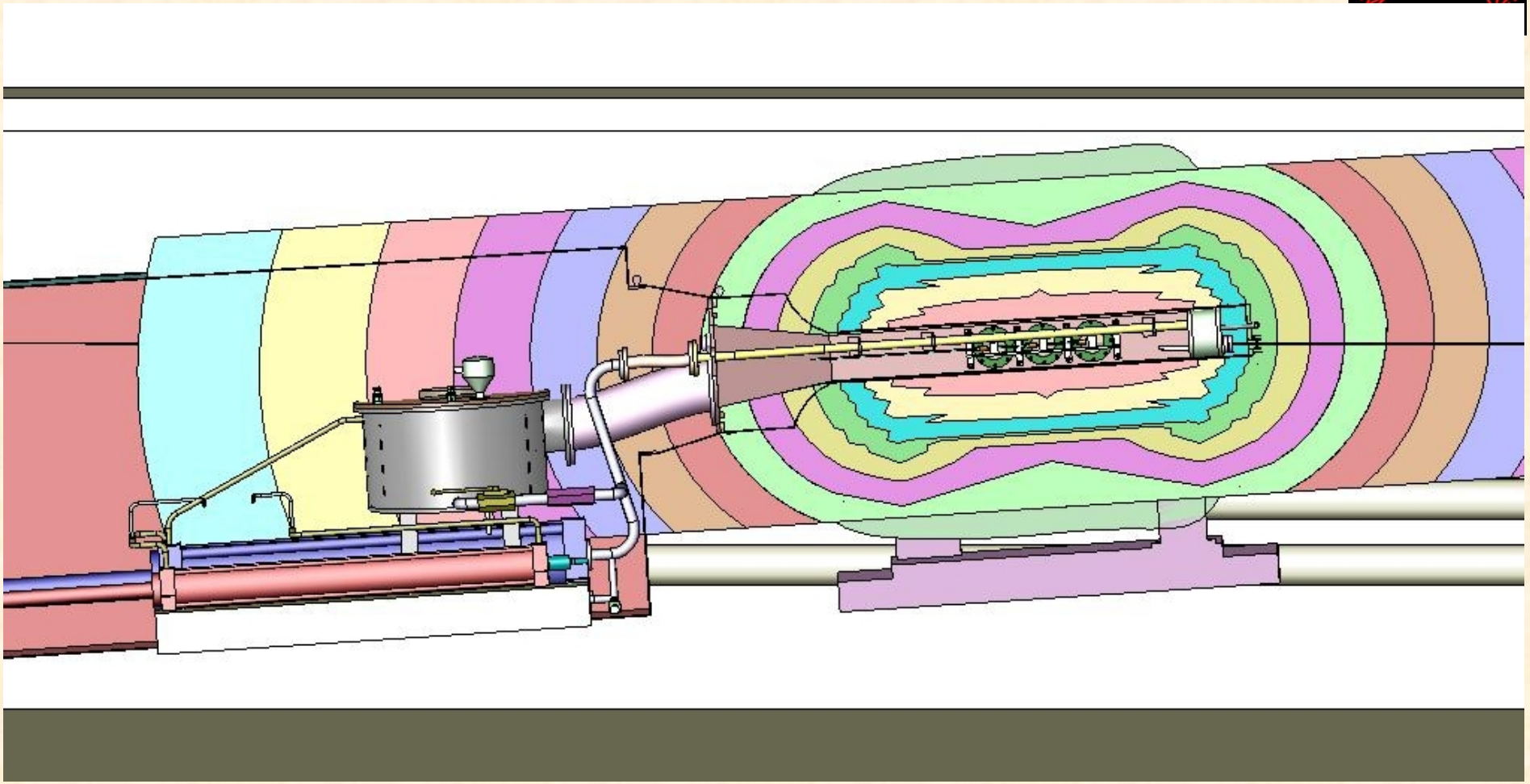


- **Position hydraulic pump to minimize field effects**
- **Max field at cylinders between 0.17T & 0.26T**
- **Need steel cover plates for magnetic shielding over cylinders?**
- **Remote valve or sensor concerns?**

Stray Field Values



Field Near Equipment



Nozzle Tests

- **Results are needed as soon as possible in order to make changes during the fabrication of the plenum/nozzle components**
  - **Must be before April ’06 when the target system is delivered to ORNL**

Beam Windows

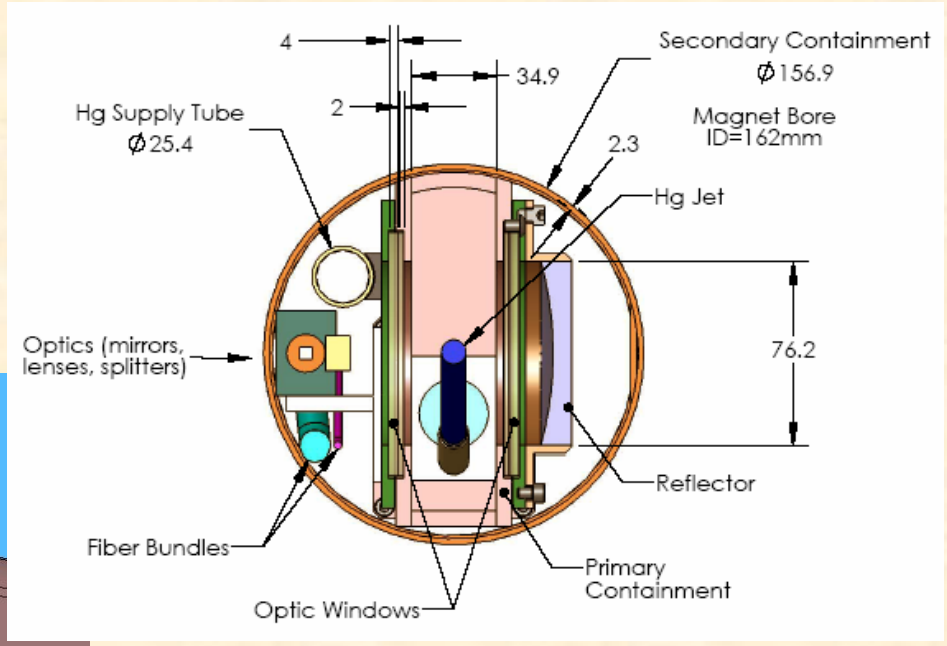
- **There is concern regarding welding titanium alloy to stainless steel**
  - **Mechanically attached windows require more space**

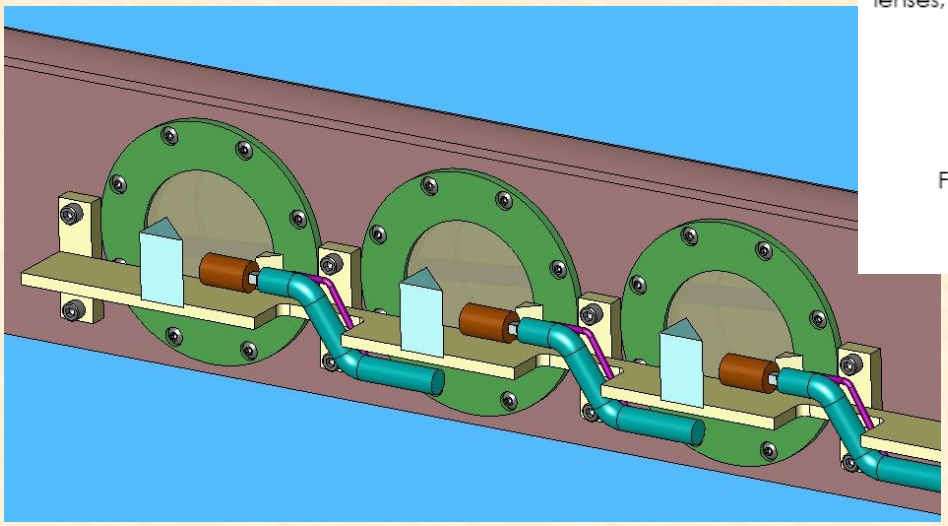
MHD Simulations

- **MHD simulations are needed to assess jet stability, distortion, and reaction forces for a nozzle crossing field lines**

Laser Optics

- **The laser optics should be delivered to ORNL as a module ready to install**
  - **Detailed interface drawings have been provided**
  - **Deliver equipment in early April '06**





Activation Products

- **Develop list of radionuclides and their half lives**
  - **Establish the safe time for access into the secondary enclosure**
  - **Assess the effectiveness of secondary containment air filtration**

Schedule

Highlights

- **Solenoid Tests at MIT Jan ’06**
- **Target Tests at ORNL May-Aug ’06**
- **Integrated Tests at MIT Sep-Oct ’06**
  - **Retest, if needed Nov ’06**
- **Beam Tests at CERN Apr ’07**
  - **Retest, if needed Jun ‘07**