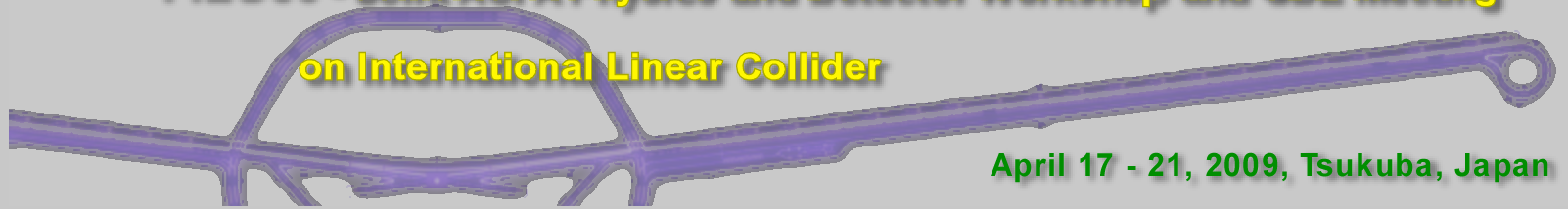


TILC09 - Joint ACFA Physics and Detector Workshop and GDE Meeting
on International Linear Collider



April 17 - 21, 2009, Tsukuba, Japan

Status Report and Future Plans for the ATF2 Superconducting Magnet Upgrade

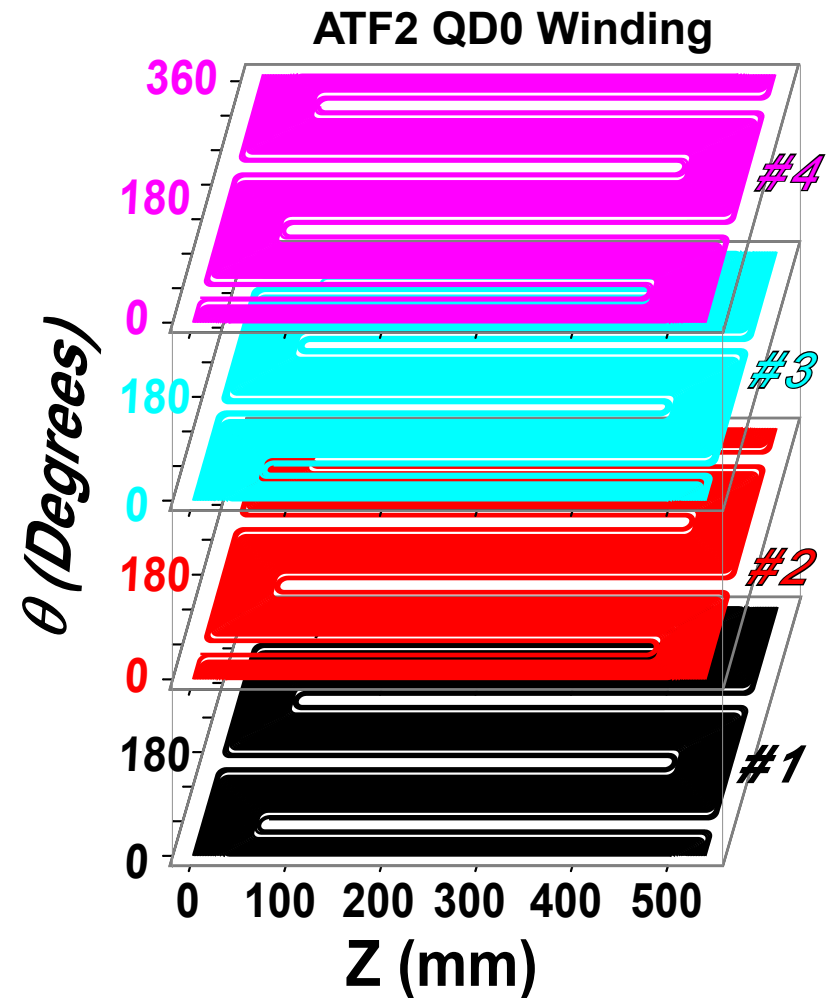
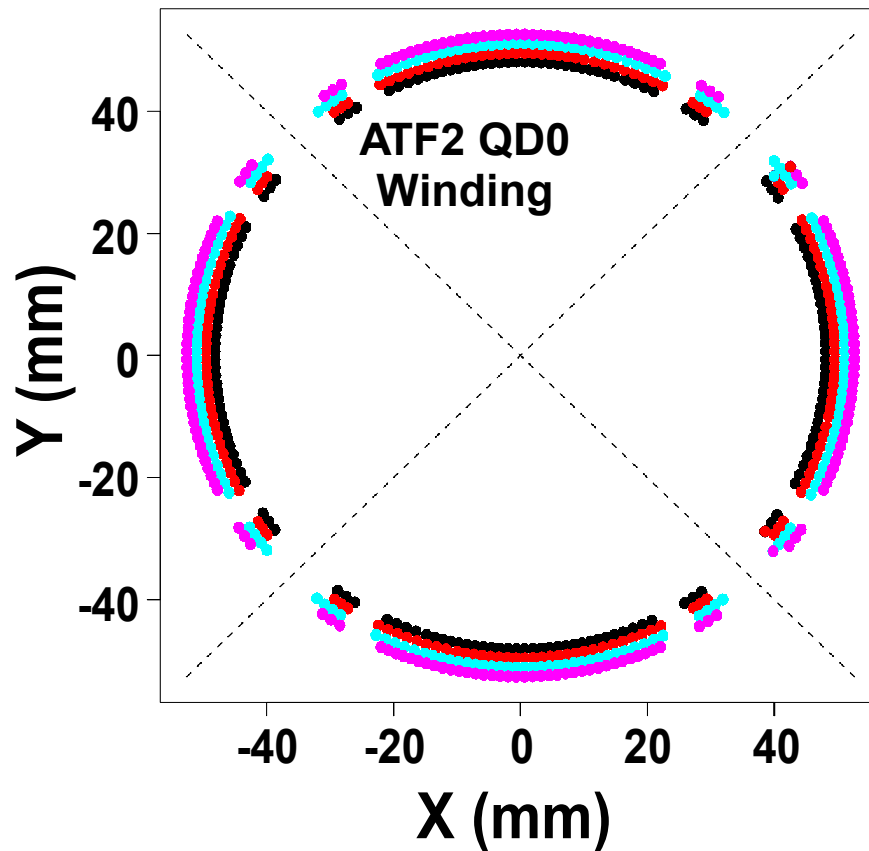
Presented by: Brett Parker (BNL-SMD)

Outline:

- Review design work done so far...
 - Define Coil Parameters & 3D CAD Model.
- Discuss some interface challenges...
 - Cryogenic, Beam-line, Support & Measurement.



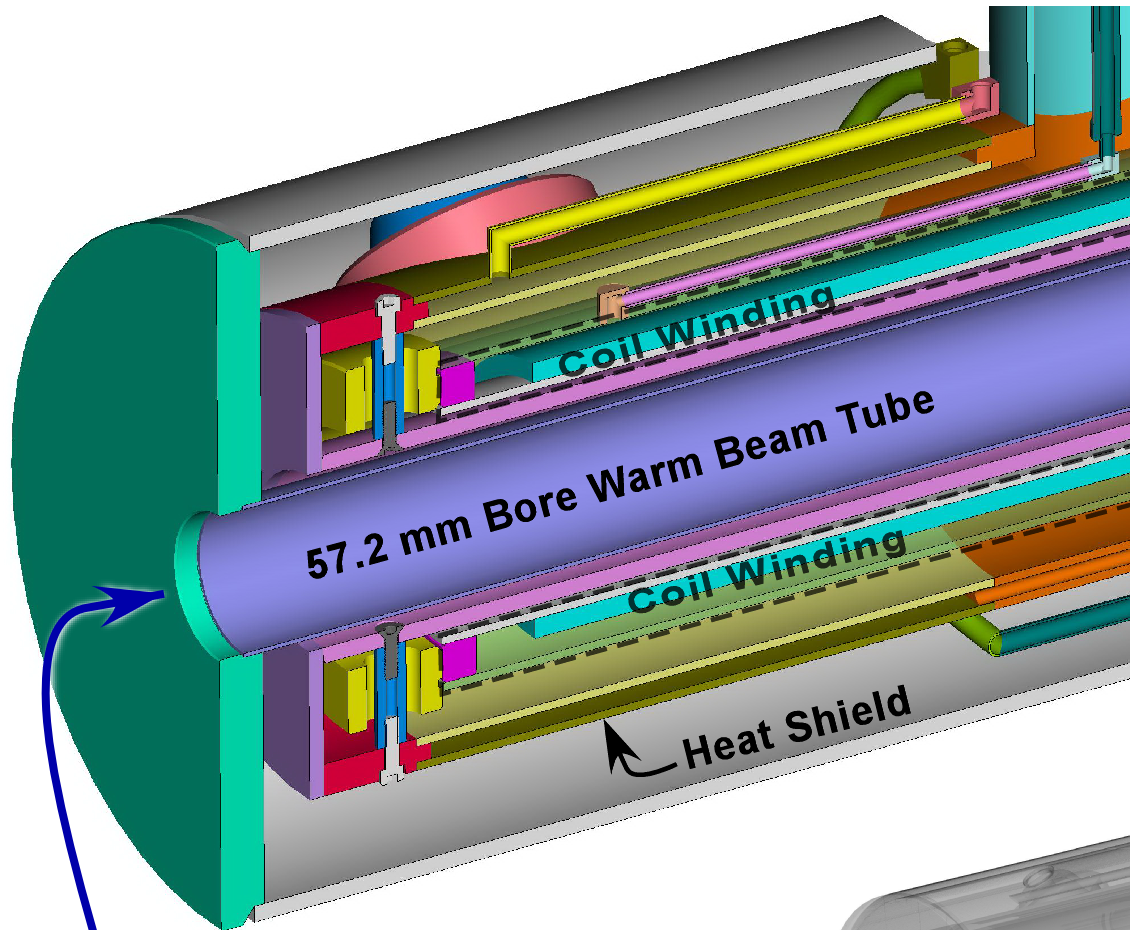
ATF2 Upgrade Superconducting Coil Design.



Wind two quadrupole coil sets (four layers) with a 536 mm pattern length and one 284 mm sextupole coil set (two layers, not shown).

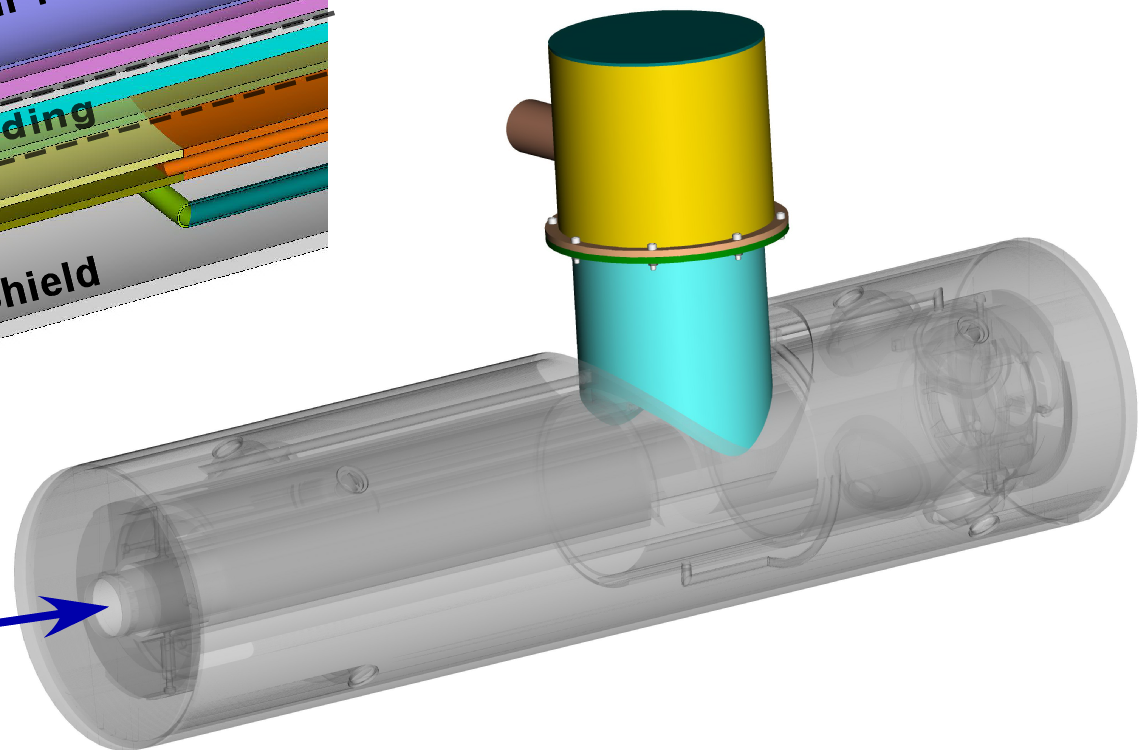


ATF2 Upgrade Superconducting Coil Design.



Coil diameters are sized so as to provide a warm beam tube a bit larger than the present magnets.

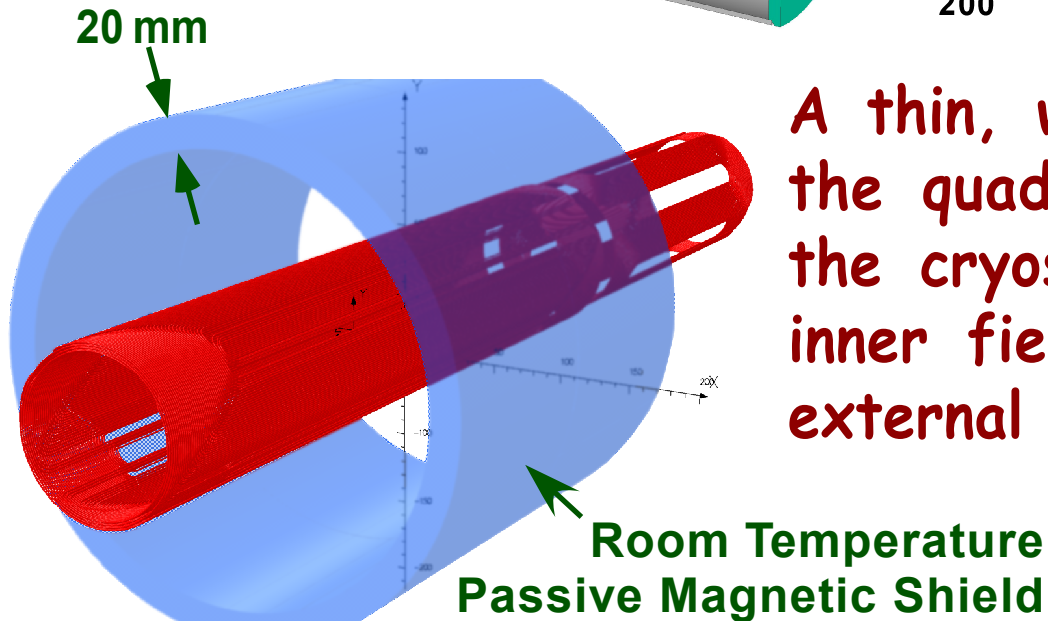
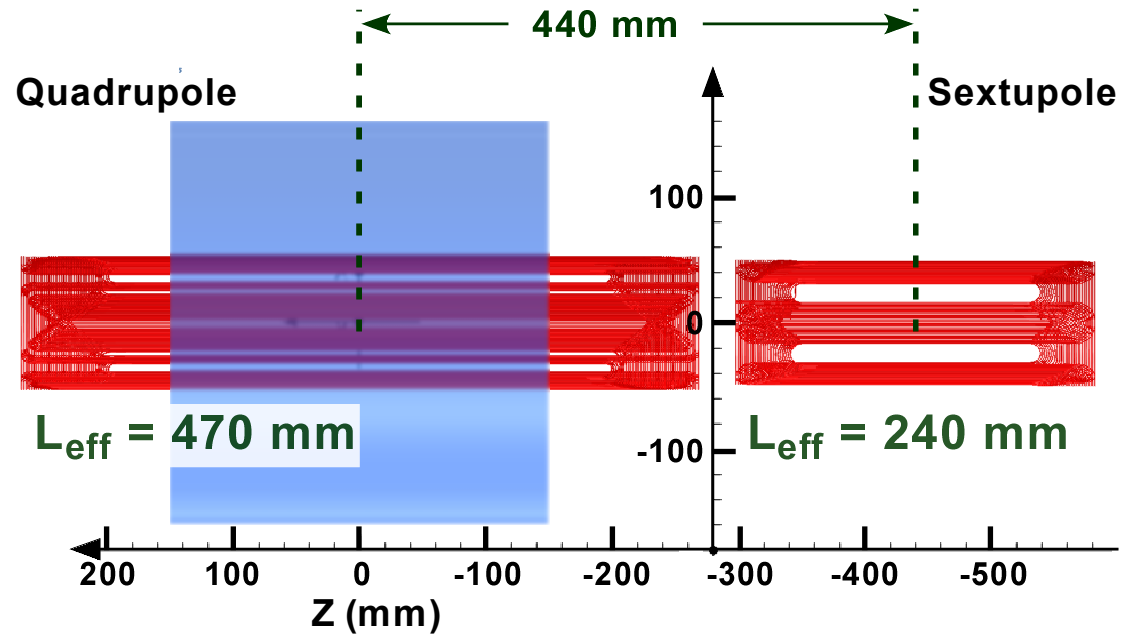
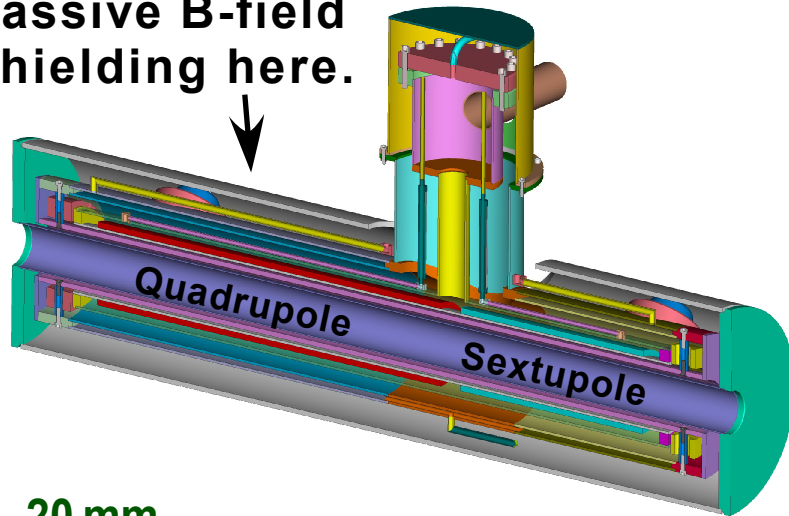
Interface 1: The Beam Tube and End-Flange Connections?





ATF2 Upgrade Superconducting Coil Design.

For the geophones we can provide passive B-field shielding here.

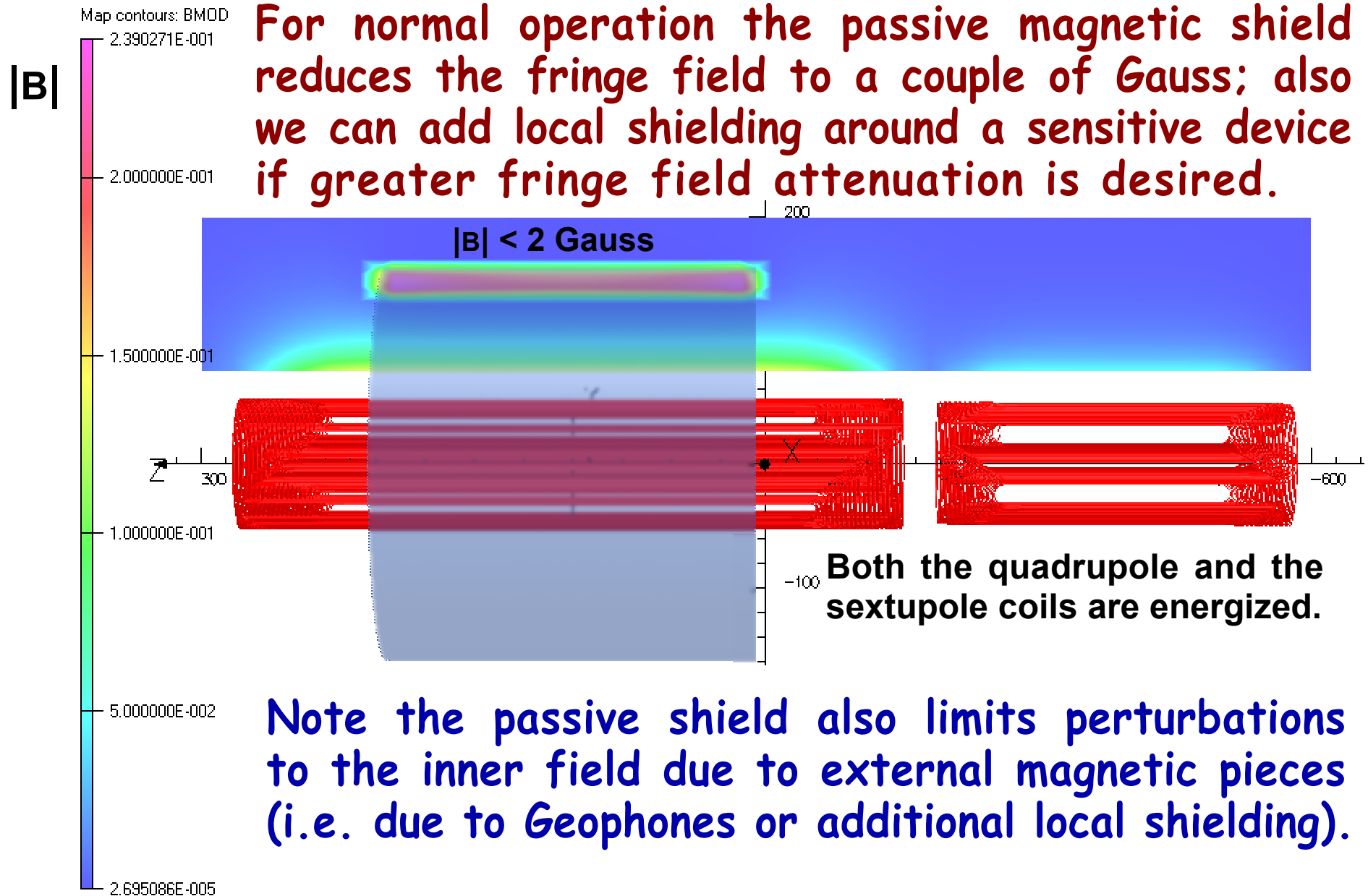


A thin, warm magnetic shell centered on the quadrupole coil, but located outside the cryostat, has minimal impact on the inner field and significantly reduces the external fringe field. Note the calculated magnetic lengths & field center separations are as shown above.



ATF2 Upgrade Superconducting Coil Design.

For normal operation the passive magnetic shield reduces the fringe field to a couple of Gauss; also we can add local shielding around a sensitive device if greater fringe field attenuation is desired.

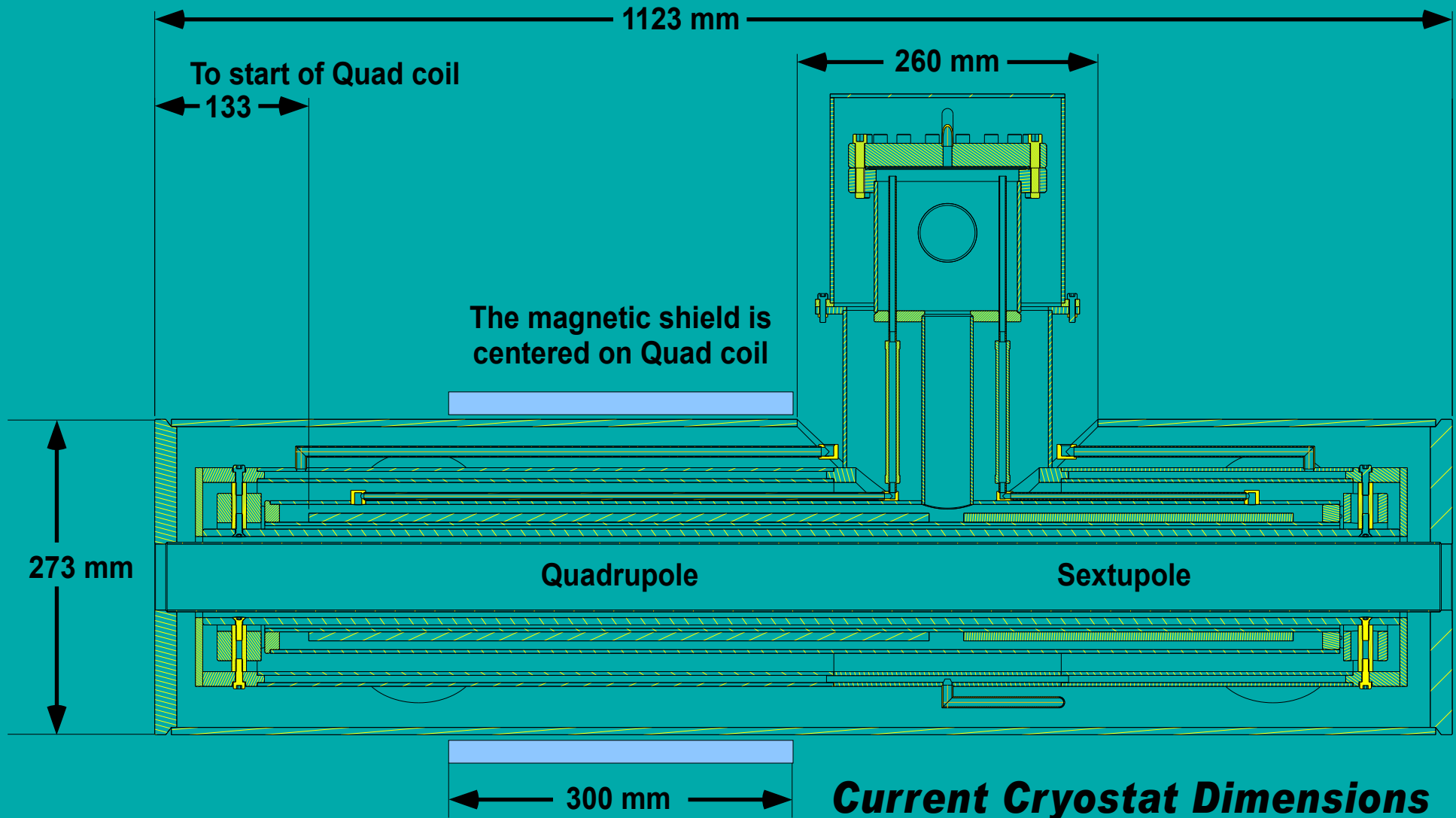


Both the quadrupole and the sextupole coils are energized.

Note the passive shield also limits perturbations to the inner field due to external magnetic pieces (i.e. due to Geophones or additional local shielding).

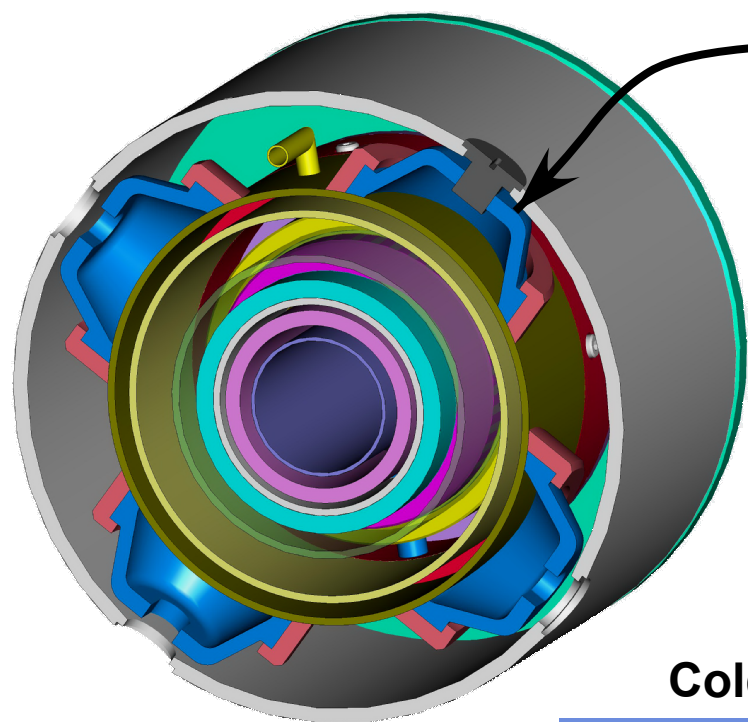


ATF2 Upgrade Cryostat Design Parameters.

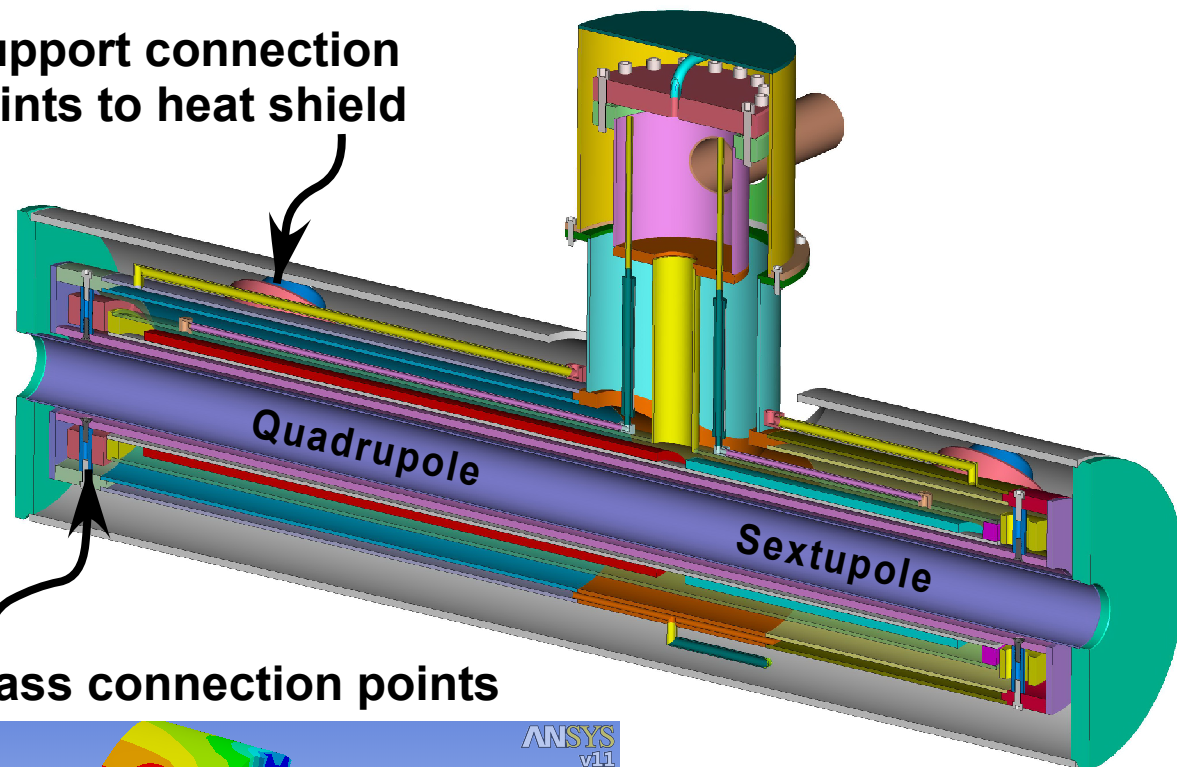




ATF2 Upgrade Cryostat Design Parameters.

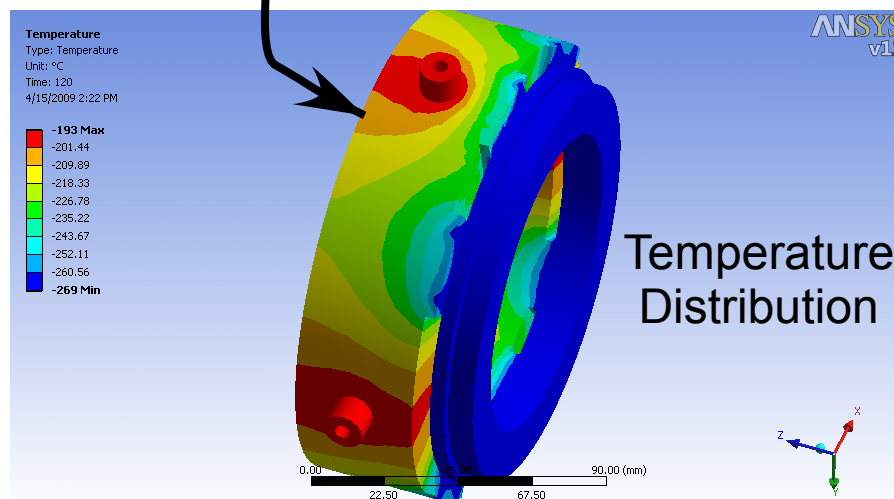


Support connection points to heat shield



Cold mass connection points

Interface 2: What are requirements for the cryogenic system and the current leads?

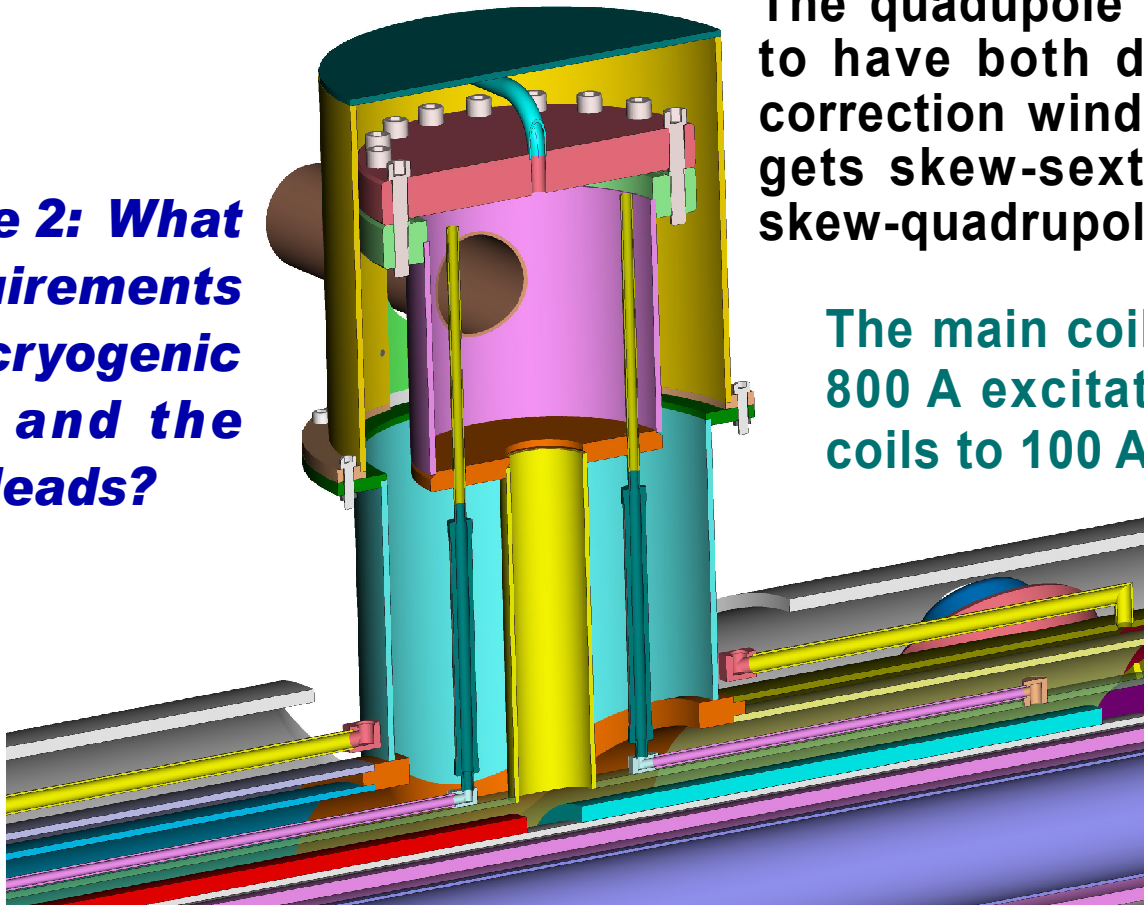


Heat leak to cold mass via the inner support structure is now quite low.



ATF2 Upgrade Cryostat Design Parameters.

Interface 2: What are requirements for the cryogenic system and the current leads?



The quadupole coil winding is planned to have both dipole and skew-dipole correction windings; the sextupole coil gets skew-sextupole, quadrupole and skew-quadrupole correction windings.

The main coils could be energized to 800 A excitation and the correction coils to 100 A.

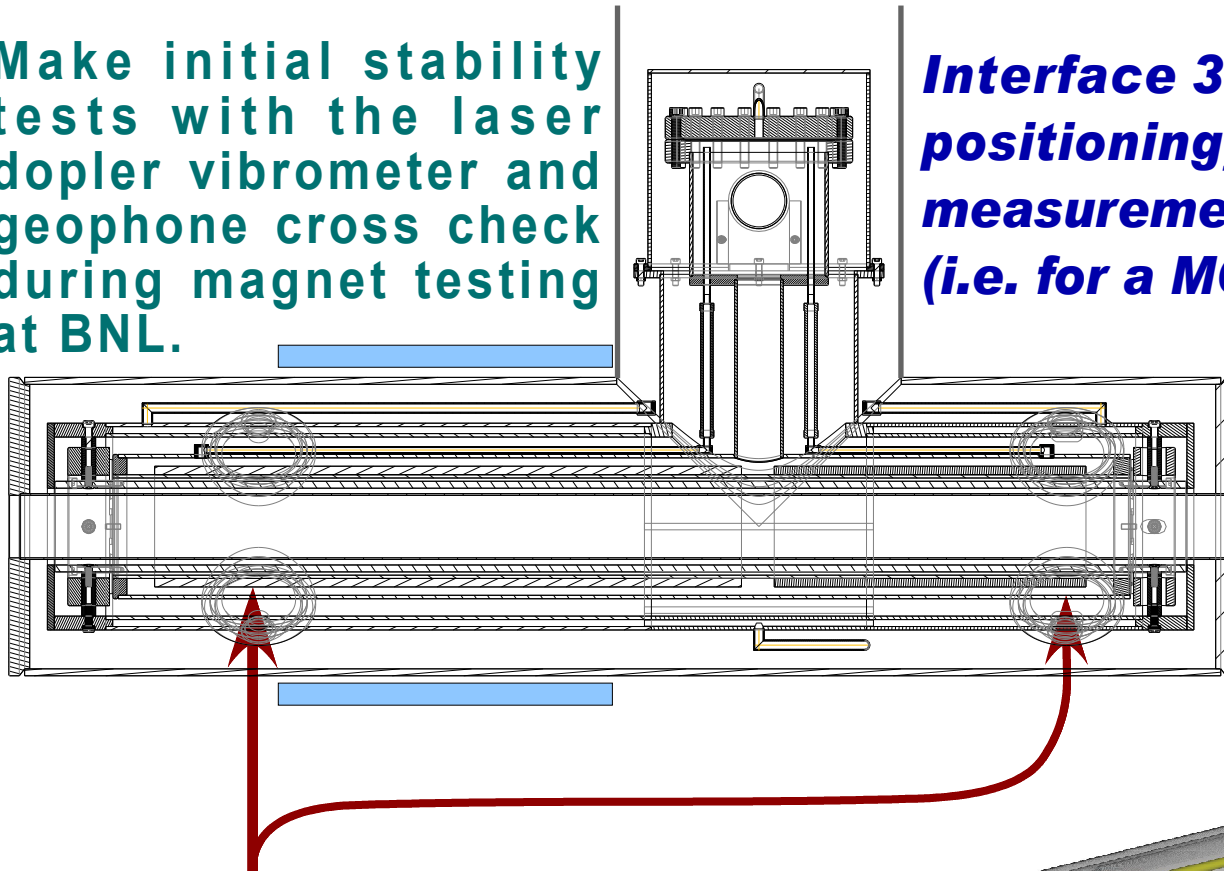
So we need four 800A and ten 100A current leads plus a number of instrumentation leads.

We are just beginning to get a handle on what the cryogenic connection might look like near the ATF2 magnet cryostat.



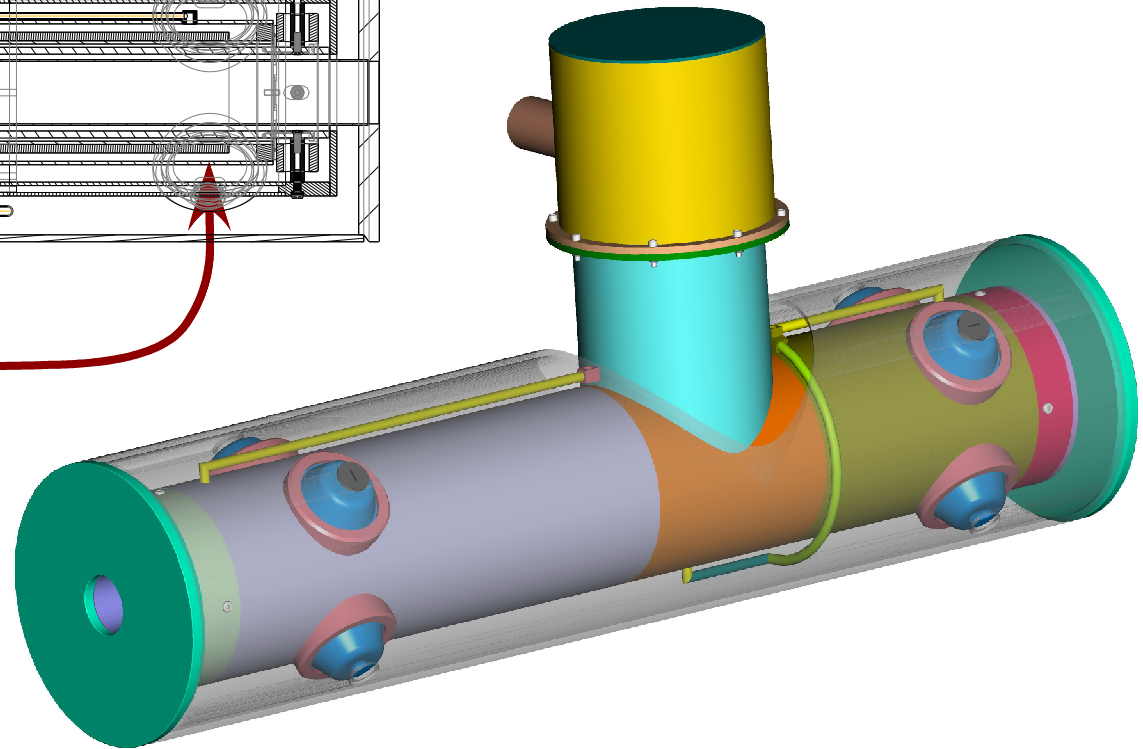
ATF2 Upgrade Cryostat Design Parameters.

Make initial stability tests with the laser dopler vibrometer and geophone cross check during magnet testing at BNL.



Interface 3: Support structure, active positioning, position/vibration stability measurements and laser access points (i.e. for a MONALISA-like system)?

While it is not implemented yet, it should be possible to have laser access through to the cold mass from the bottom at the two locations requested by Oxford folks.





Interface Issues & Some Questions at TILC09.

Interface 1: The Beam Tube and End-Flange Connections?

Interface 2: What are the requirements for the cryogenic system and the current leads?

Interface 3: Support structure, active positioning, position/vibration stability measurements and laser access points (i.e. for a MONALISA-like system)?

Do these coil parameters (esp. sextupole) meet optics needs?

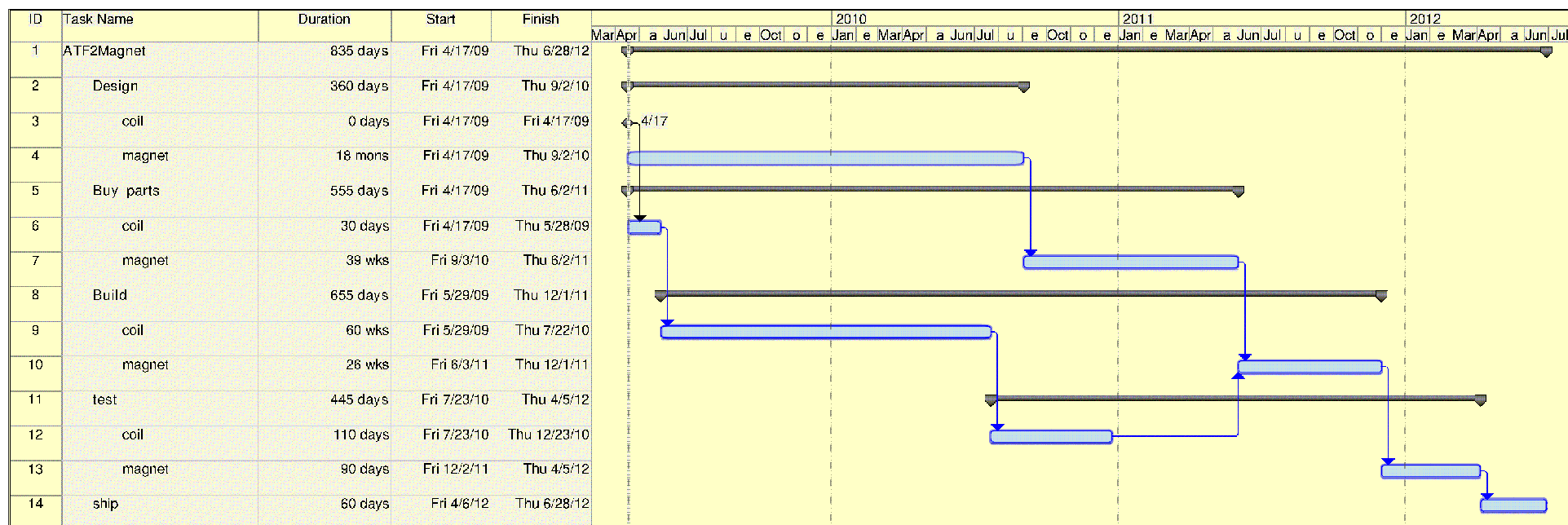
Can we start to specify the beam tube & flange connections?

“	“	“	“	cryostat support & alignment pieces?
“	“	“	“	cryo' operation (T 's, cryocoolers etc.)?
“	“	“	“	contact point for Japanese cryo' reg's?
“	“	“	“	current lead & power supply interface?
“	“	“	“	project schedule (including BNL tests)?
“	“	“	“	a list of future meetings, reviews etc.?
“	“	“	“	cryo' plumbing constraints (shielding)?
“	“	“	“	cryogenic system sharing with others?
“	“	“	“	quench prot' & other operational issues?

**Laundry
List for
TILC09**



ATF2 Magnet Preliminary Production Schedule.



First Look at a Schedule for Producing ATF2 Superconducting Upgrade Magnets

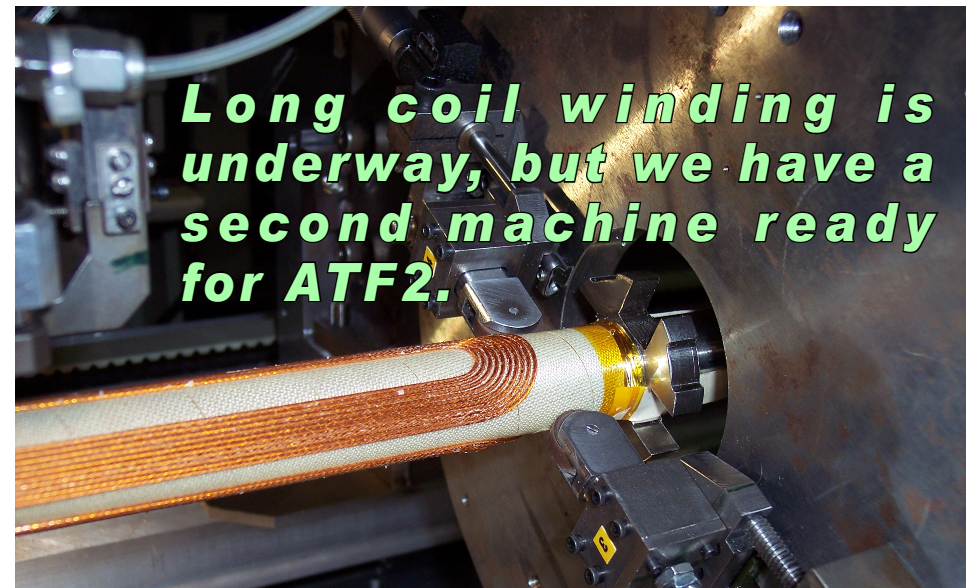
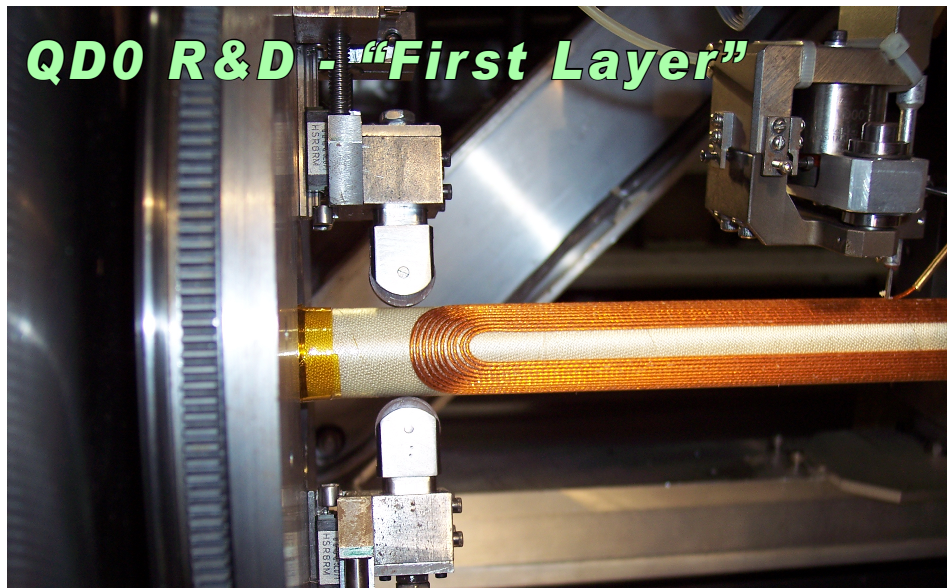
Project: ATF2 preliminary Date: Fri 4/17/09	Task		Milestone		External Tasks	
	Split		Summary		External MileTask	
	Progress		Project Summary		Split	

Page 1

Message: Time (and money) are tight, but it does seem doable to deliver the upgrade magnets in 2012.



Finish with a short BNL-SMD advertisement....



We look forward to starting ATF2 magnet coil winding soon.

Time spent in new software development should now pay off in other areas such as developing Anti-DID magnet designs in concert with the detector collaborations.