

High Field Magnet R&D at BNL in FY04

Expected High Field R&D Activities at BNL under LARP and Generic Funding

1. Develop an integrated design for open midplane dipole that
 - Has a support structure concept which can accommodate large forces in an open midplane design.
 - Has field harmonics at the level of 10^{-4}
 - Has an open midplane that is adequate for removing most spray particles from IP
 - Is technology independent (“React & Wind” Vs. “Wind & React”) in 2-d magnetic and mechanical design

The design will be developed in an iterative way, where the “magnetic”, “mechanical” and “energy removal” aspects are optimized together to achieve overall design goals. We hope that the work performed this year will demonstrate that there are no “show stoppers”.

High Field Magnet R&D at BNL in FY04 (contd.)

2. Significantly increase cable test to understand basic issues

- Develop a more robust Nb₃Sn cable test facility
- Study conductor instability issues
- Test cable made with 0.8 mm wire
- Study influence of sintering

3. Continue 10-turn common coil program under generic funding to further develop and evaluate “React & Wind” technology

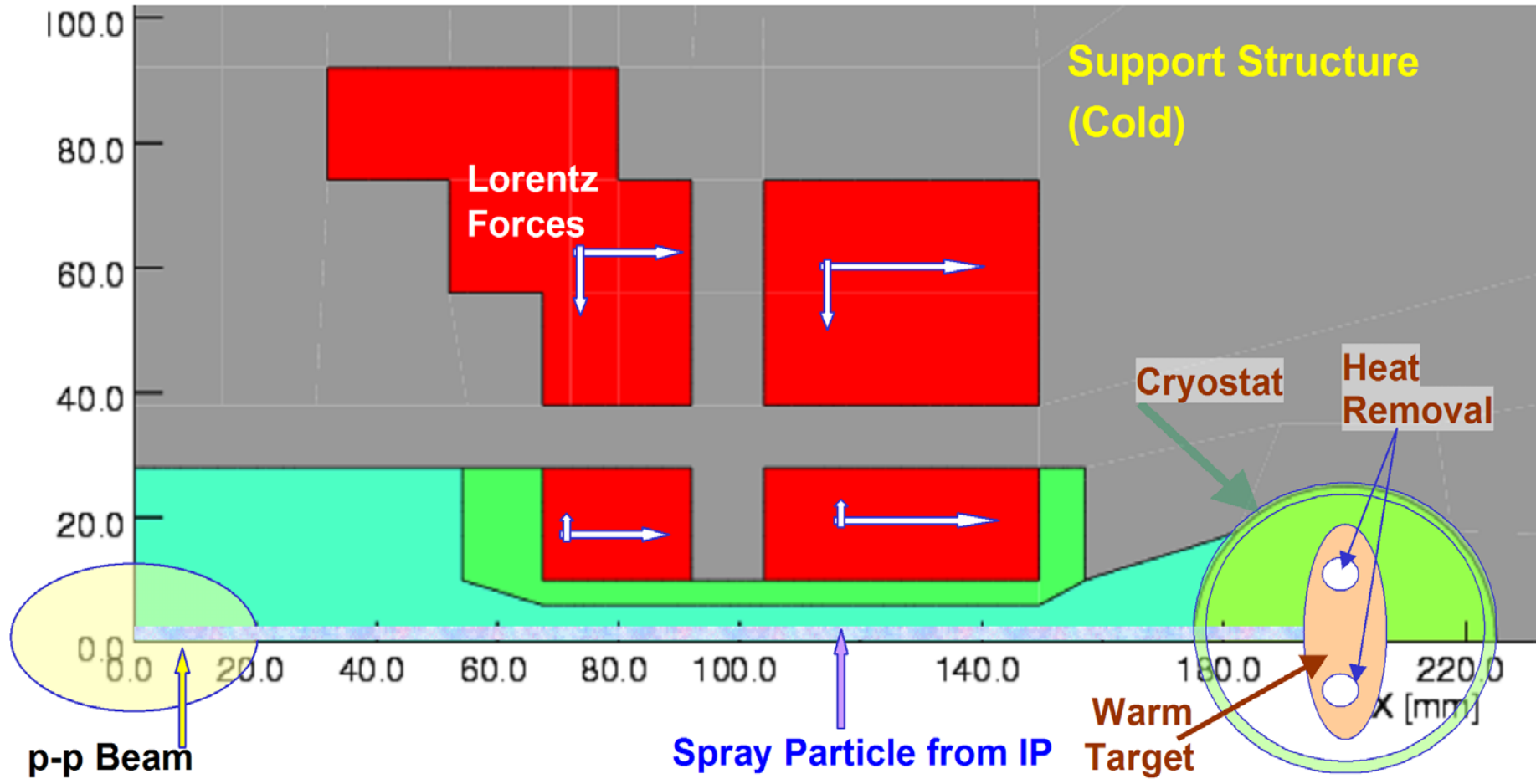
- Commission new coil winder
- Incorporate lessons learned from previous experience

LARP Magnet R&D at BNL in FY05

The R&D carried out in FY04 should help us choose the conductor and technology parameters for the LARP open midplane dipole design.

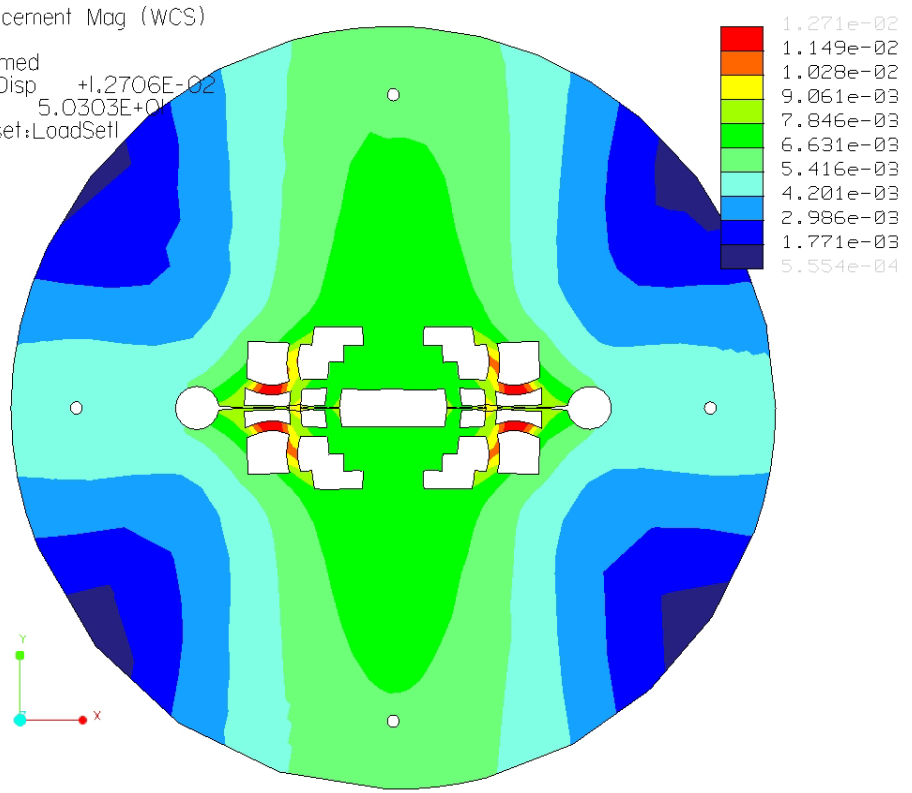
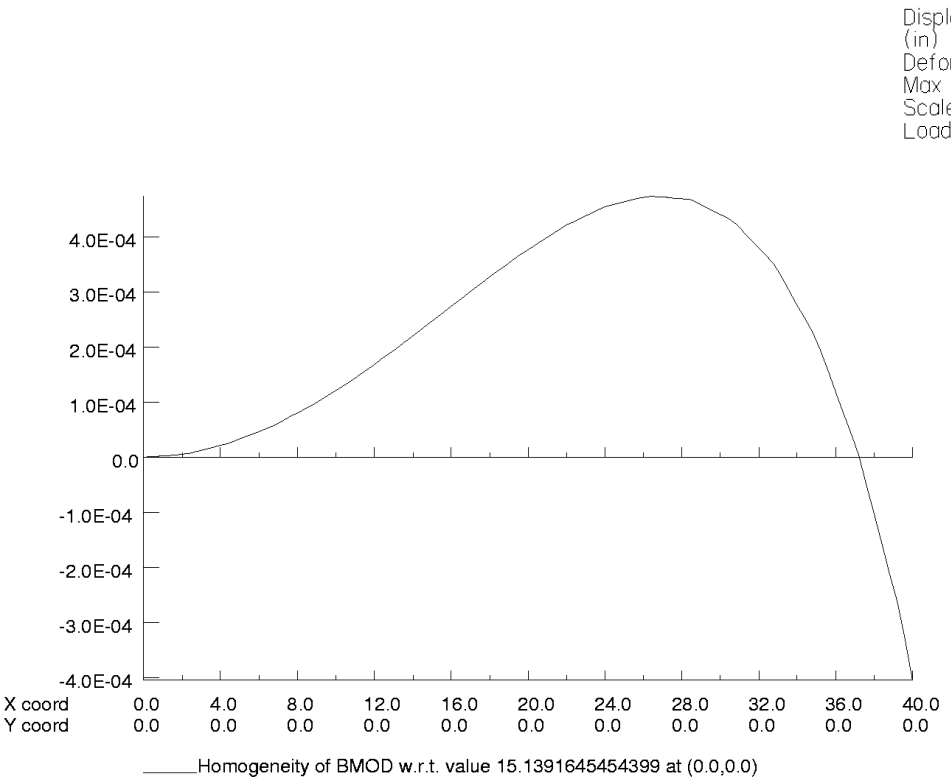
We expect that a detailed engineering design of the coldmass will be completed in FY05, depending on the level of funding.

**Current Status of the Design
(as presented at MT18)**



**Warm Intercept Design (80 K or room temp)
with 135 mm aperture**

Preliminary Magnetic and Mechanical Analysis



Relative field error on the X-axis.

Deflections in inches at the quench field in warm intercept in cold support structure.

