E161 Target Magnet

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Original Magnet Requirements:

1. 7 T Solenoid

2. Uniform Field (1 part in 10^4) over a 5 cm long x 1cm diameter space

3. 20 cm diameter warm bore

4. 0.5 T dipole for field reversal

This requires a custom magnet

Problems:

1. Too Expensive

2. Long lead time 18 – 24 months

3. Lack of suppliers (Oxford Instruments is less interested in custom orders)

Solution:

Give up the dipole requirement and use a standard Oxford NMR magnet

1. **Meets the solenoid field requirements**

2. **Meets the warm bore requirements (18.3 cm vs. 20 cm)**

3. **Exceeds the field homogeneity requirements**

3. **Less expensive and shorter delivery time (12 – 15 months)**

Problem: The coil supports can not withstand more than a 100 kg lateral load. Thus, understanding the interaction of the magnet with surrounding equipment is critical

Solution: Have LBL do detailed 3-D analysis of the magnet & spectrometer

Schedule

Now to 10/01/02 -	**Fix E161 experimental design and have LBL conduct analysis**
10/1/02	**Order magnet**
12/1/03	**Magnet arrives at UVa**
12/1/03 - 6/1/04	**UVa integration & testing**
6/1/04 - 12/1/04	**SLAC off line tests**
12/1/04 - 4/1/05	**Installation into ESA**
4/1/05	**Start E161 experiment**

Conclusions

- **A commercial product can most likely meet our needs**
- **A final experimental design and detailed analysis of the magnet environment is required by 10/02**
- **The magnet will be on the critical path but there is little technical risk**
- **However, ANY changes in the magnet design requirements after the order is placed will be very expensive and prevent us from meeting our schedule.**