The Polarized ^{3}He Target Status

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University of Kentucky

December 06, 2005

Outline

1. **The G_E^n Target**
2. **Hybrid Cell Technology**
   - The Hybrid High-Pressure Cells
3. **Optics**
   - Lasers and Fibers
4. **Polarimetry**
   - NMR
   - EPR
5. **Field Direction Measurement**
   - The Compass
6. **Summary**

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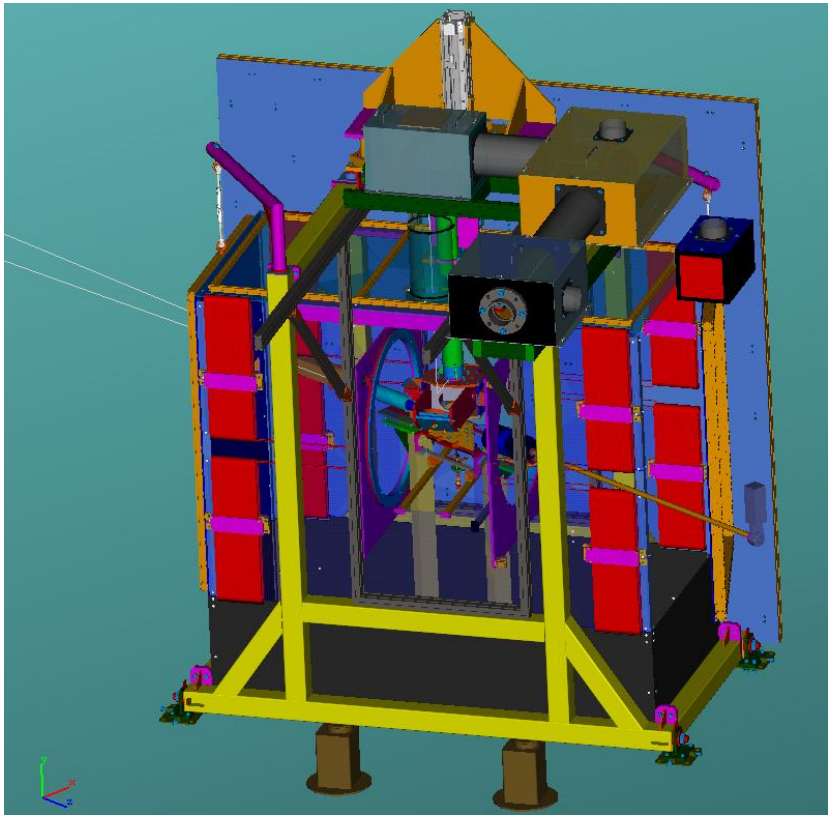

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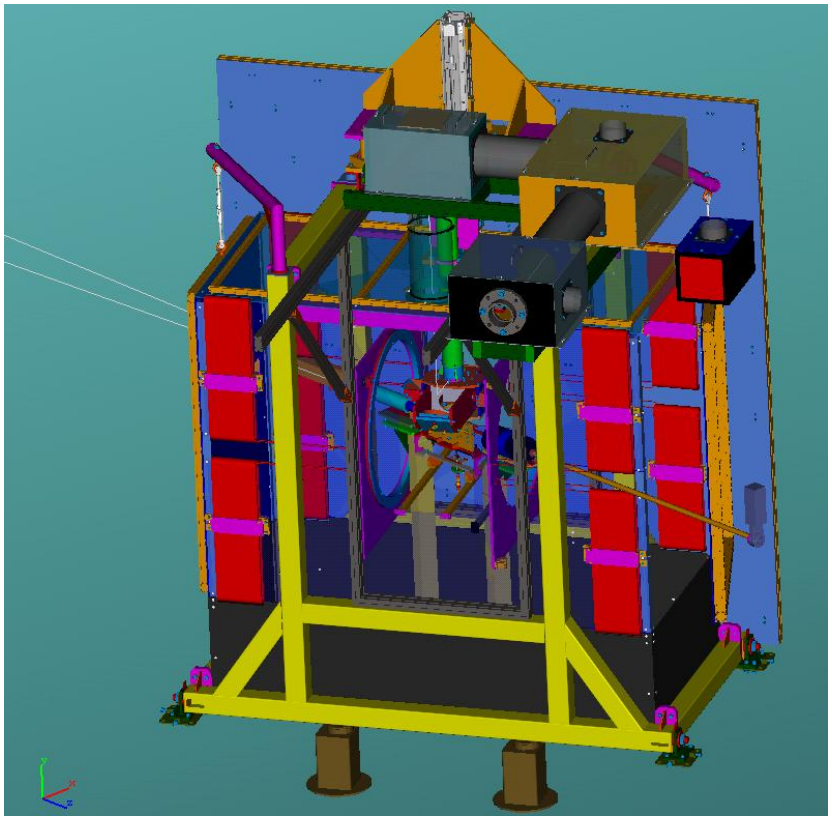

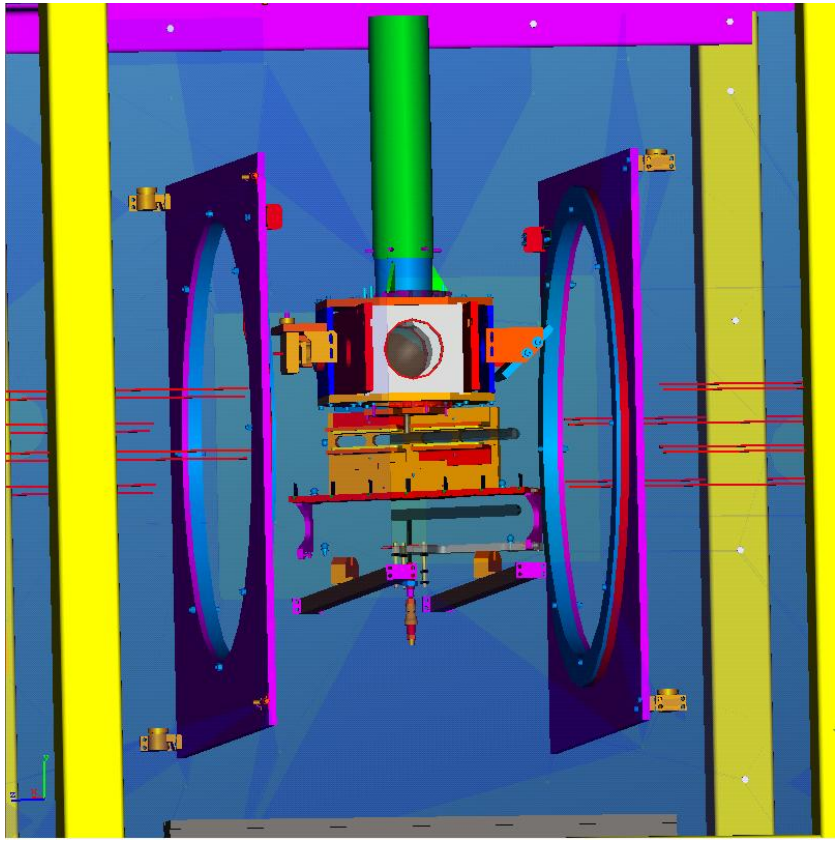

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The Concept of Hybrid Cells

1. A mixture of Rubidium and Potassium alkali metals
2. Higher polarization - greater than 50%
3. Faster spin-up – about 8 hrs compared to about 15 earlier, so more flexibility in cell-making/ glass-blowing.
4. Lesser polarization losses during polarimetry and in-beam.
5. At least 8 cells ready for use; and we have begun characterizing them.

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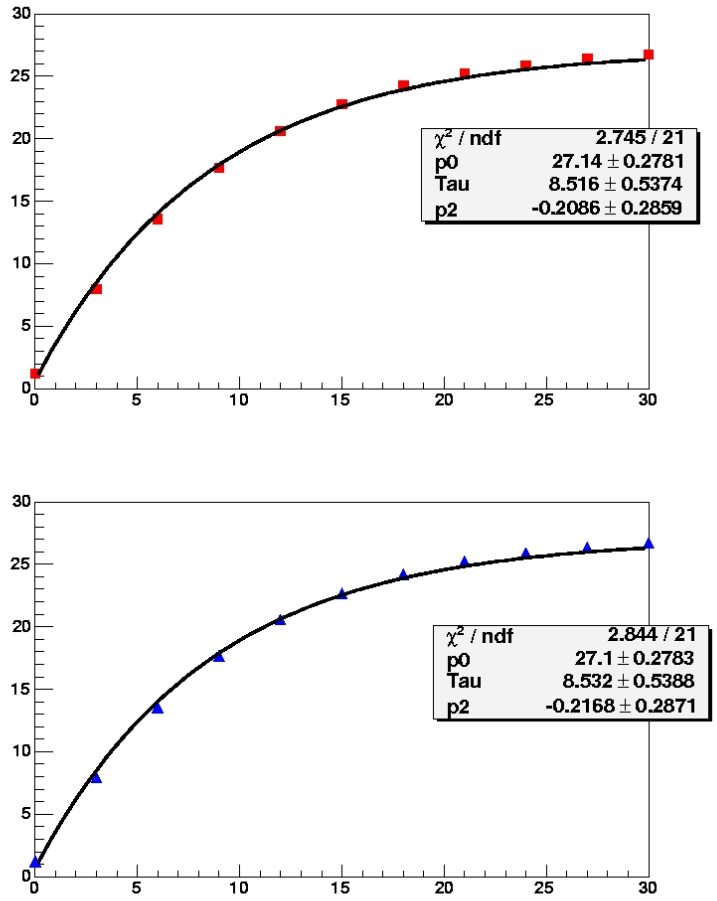

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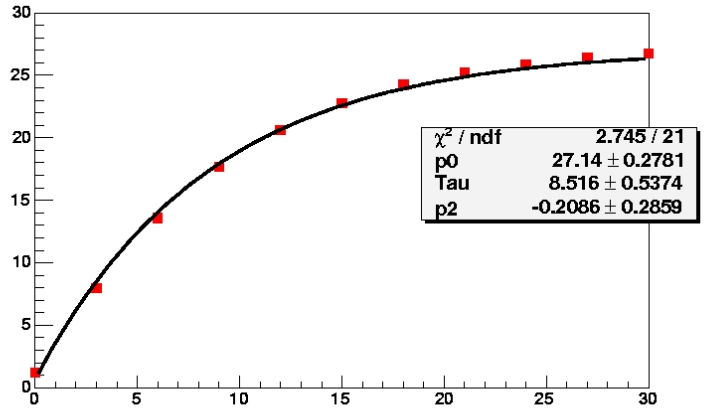

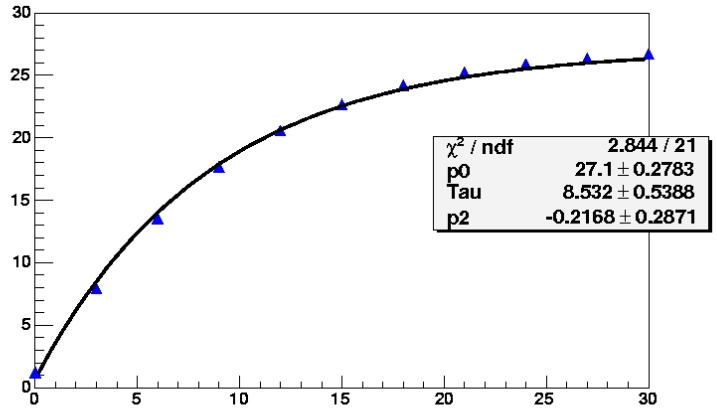

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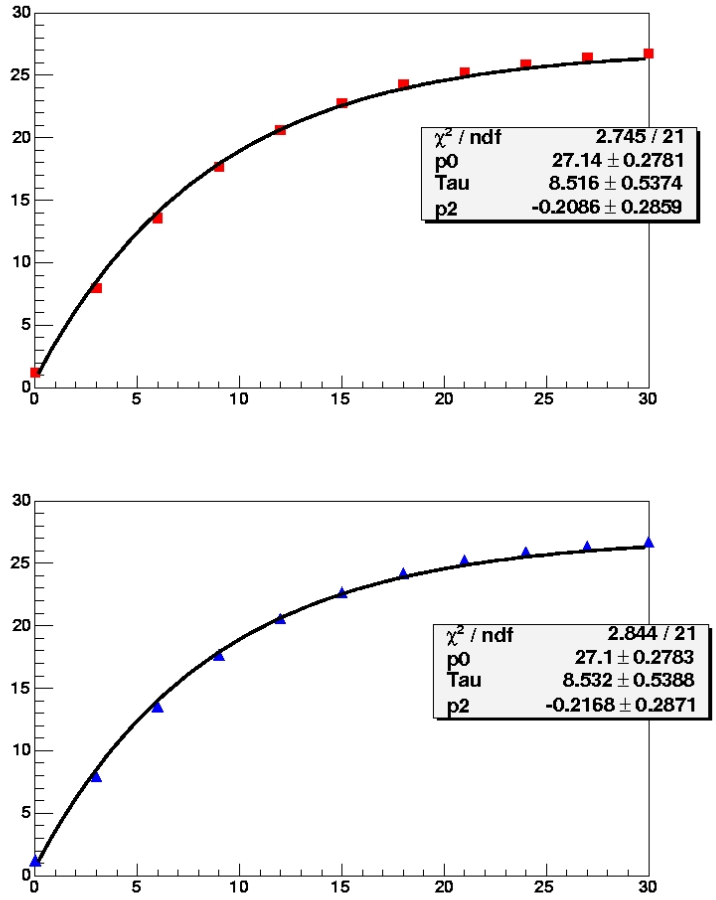

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Lasers and Optics Status

1. Use of 5-to-1 combiner (the Pentopus) successful, thus needing only one set of polarizing optics.
2. A two-lens solution was used to tackle the problem of diverging beams.
3. “Optics Box”, for all the polarizing optics, has been assembled, and all the 6” optics are here.
4. Interlock safety system for the Optics Box has been designed.
5. Cooling needs for the fibers have been addressed. Air cooling does the trick. Fibers also temperature interlocked.
6. Have two new “Duo-FAP” lasers i.e. two diode lasers (30W each) in one unit.
7. Currently pumping with good results.

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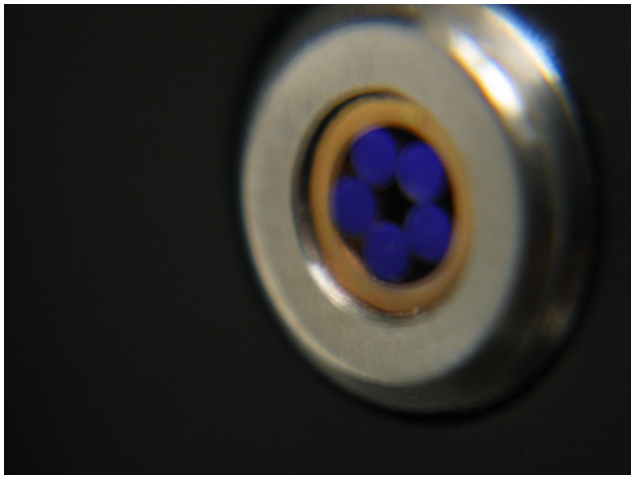

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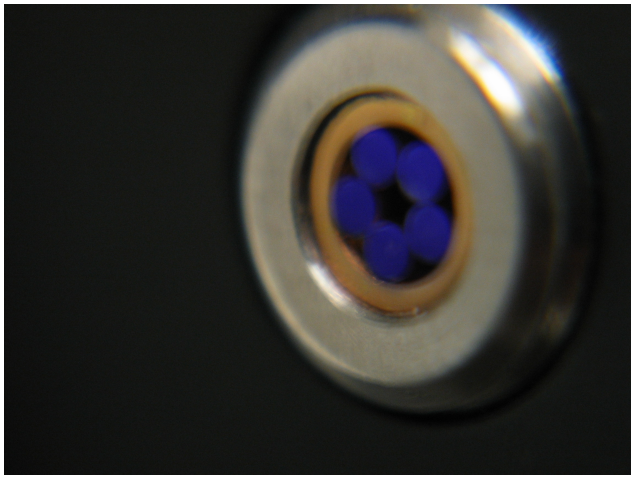

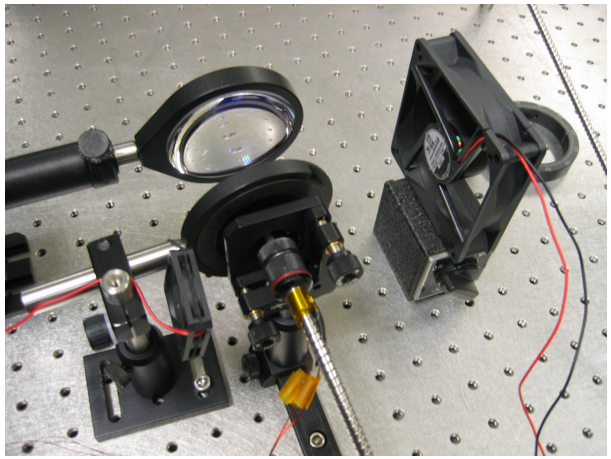

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Polarimetry

NMR

1. NMR on ^{3}He working well with Field Sweep. Water NMR still elusive.
2. Frequency sweep also works only with ^{3}He.
3. Might not do a water calibration – instead, rely entirely on EPR for absolute polarization.
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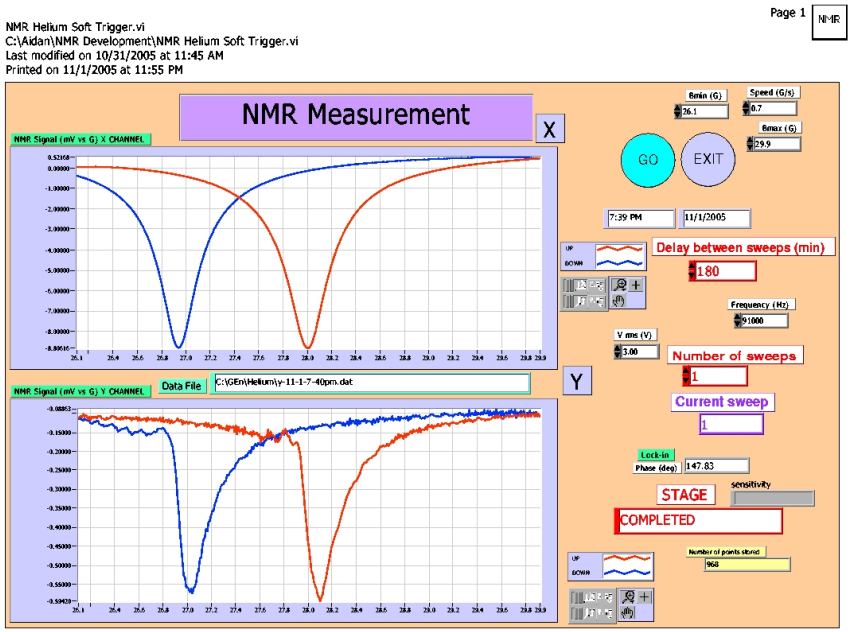

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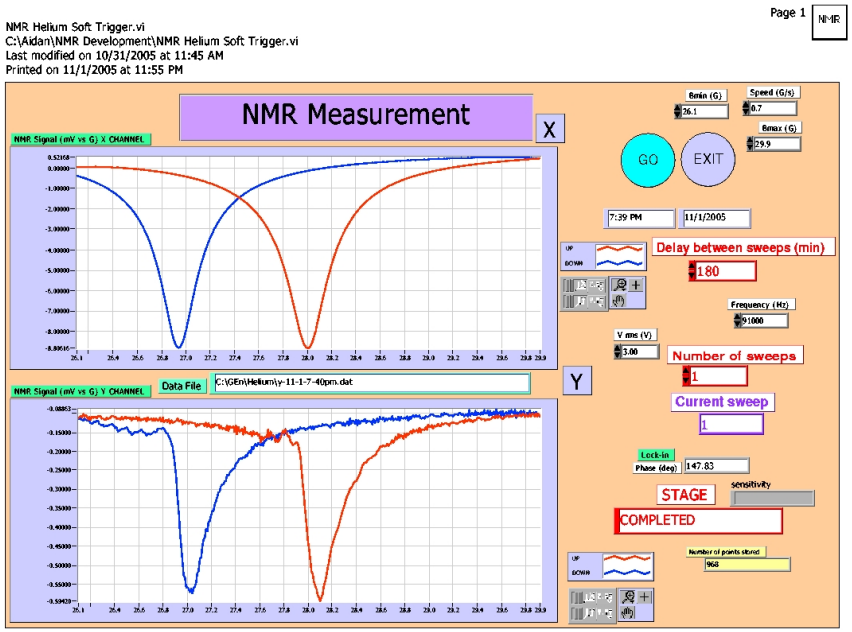

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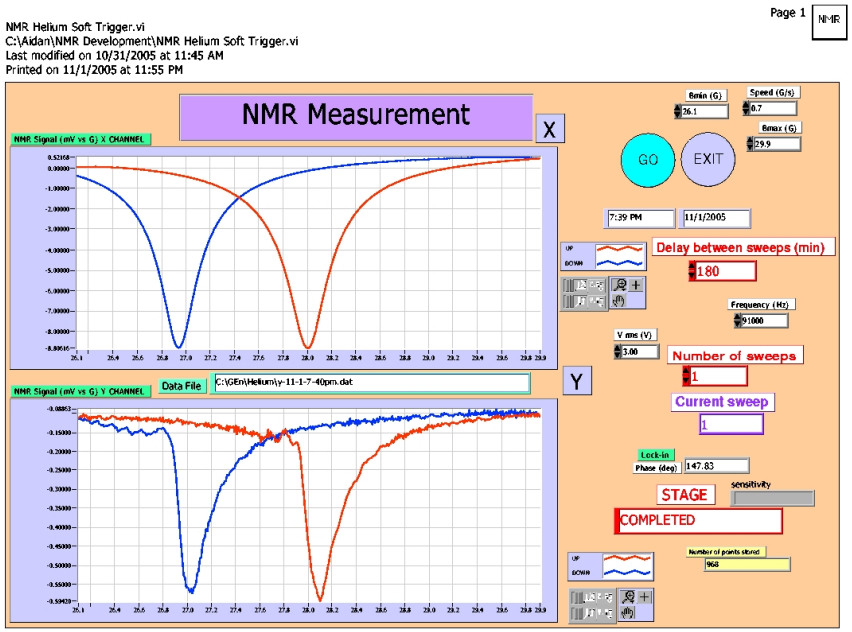

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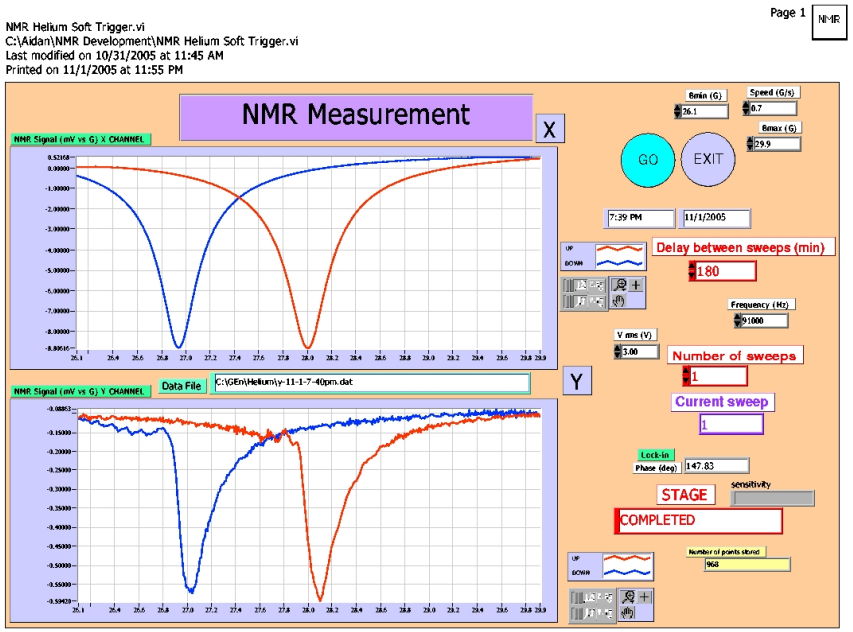

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EPR

1. EPR successfully performed on both Rb and K.
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3. K EPR seems more preferable at the high pumping temperatures of 230-235°C.
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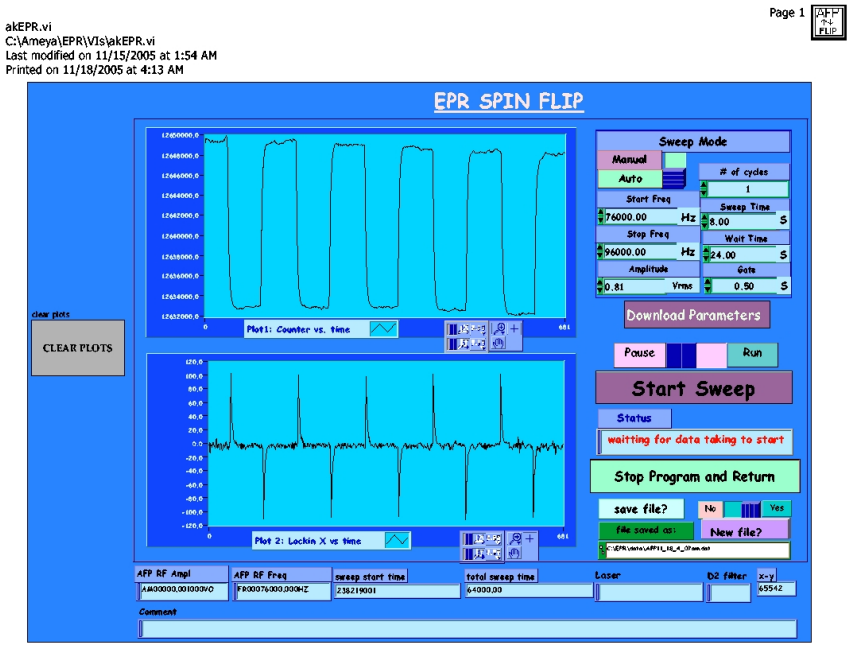

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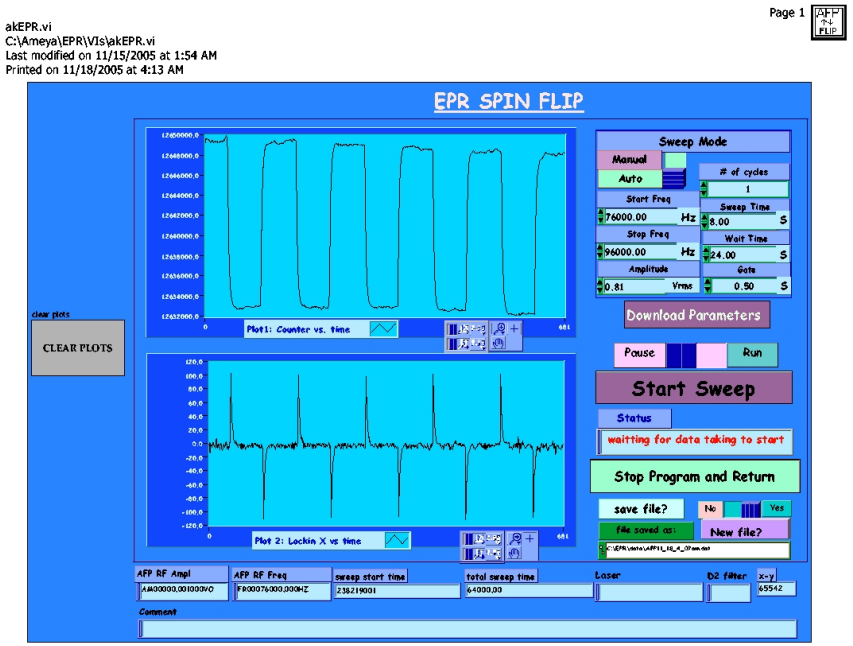

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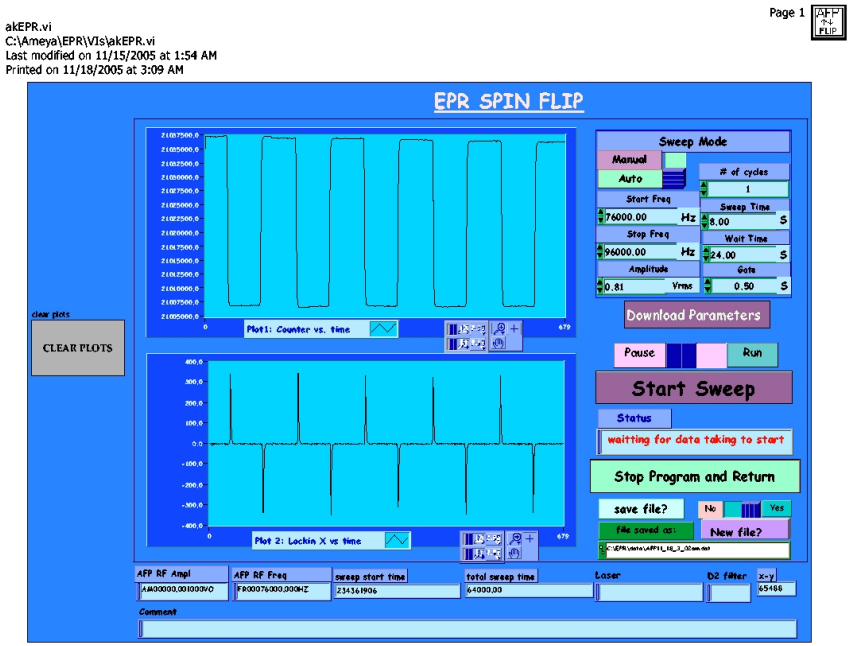

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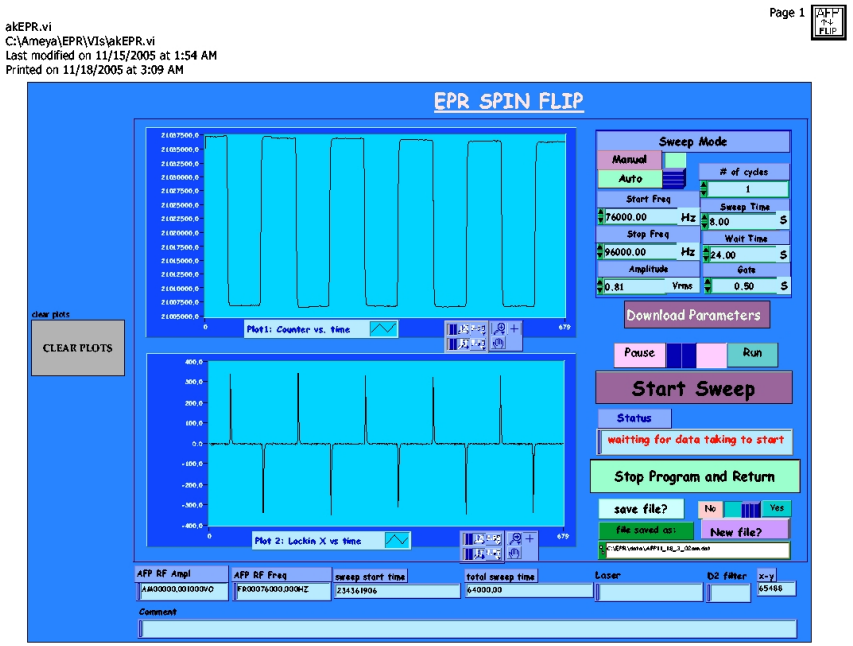

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Field Direction Measurement

Compass Status

1. Compass consists of a floating disk holding a soft iron rod.
2. Use of auto-collimator to get absolute angle.
3. Use of optical encoder to directly read angle change.
4. Second discussion with the survey people last Friday.
5. A working model being tested for stability; third iteration already ready.

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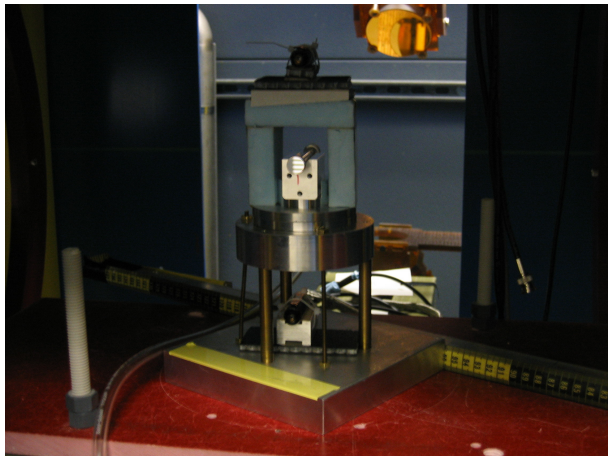

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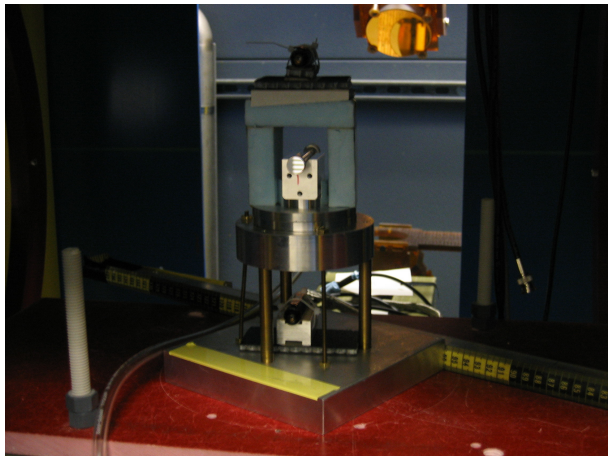

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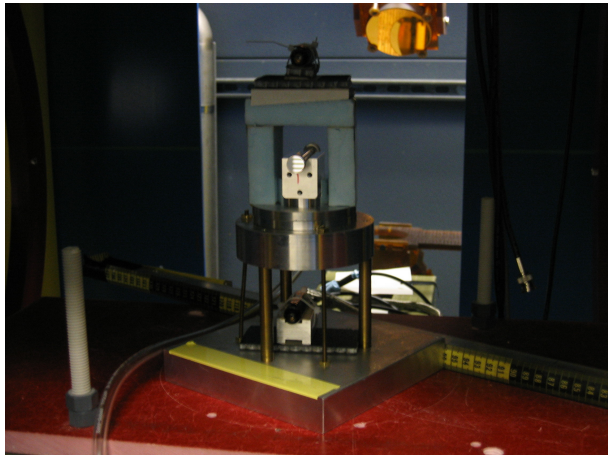

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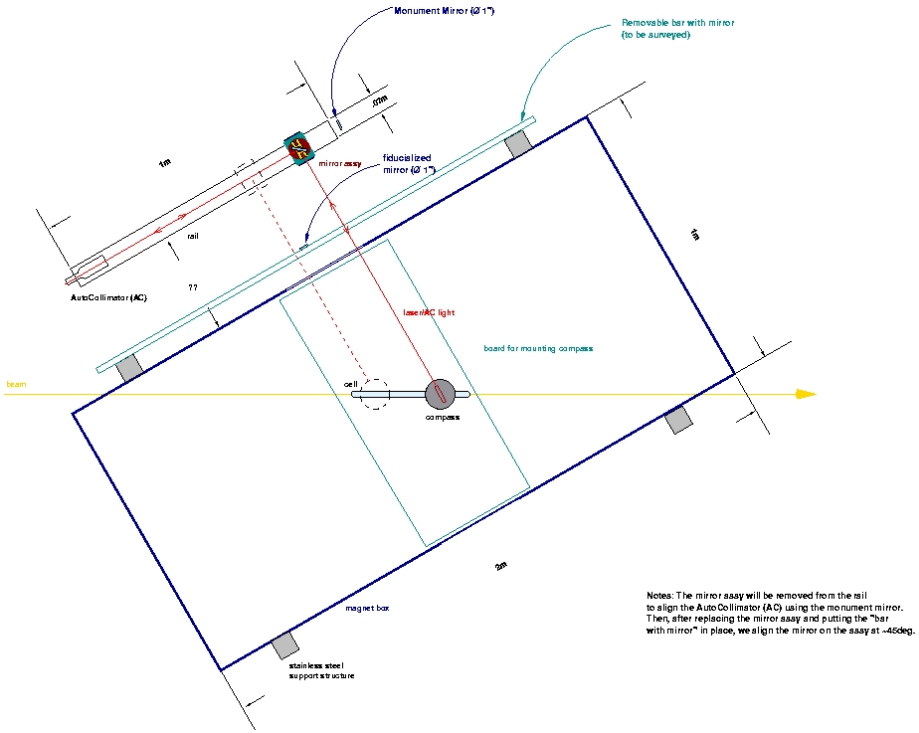

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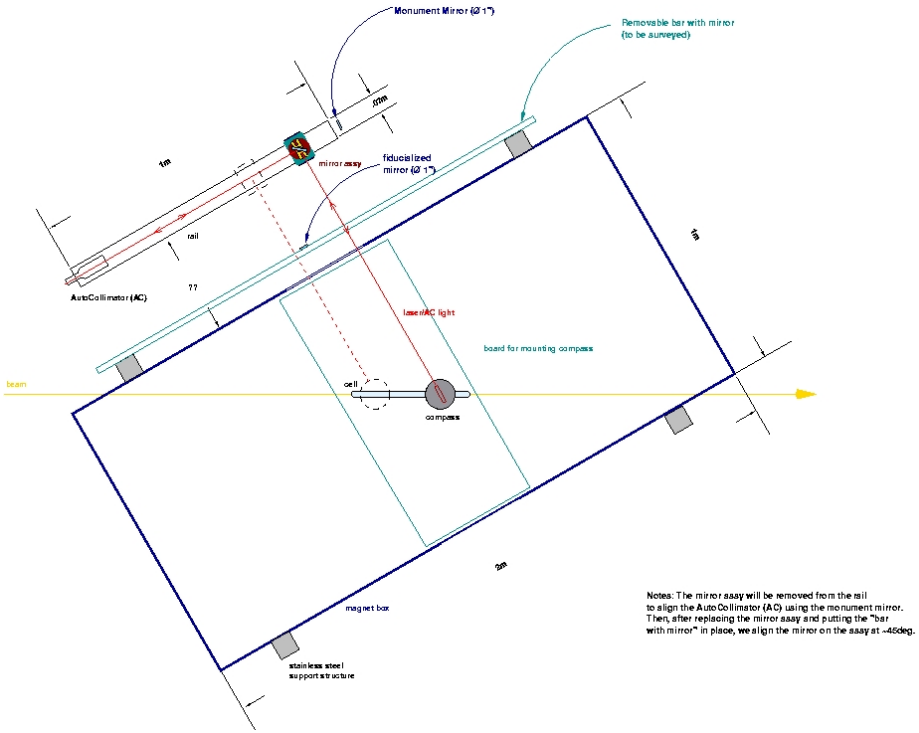

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1. The Magnet Box seems very stable.
2. Cell production going on well.
3. Optics/optics box almost assembled; all safety aspects considered.
4. Both polarimetries successfully performed.
5. Compass being thoroughly tested; measurement procedures finalized.
6. Beamline, target ladder components and slow-controls designed and ready to go.
7. Overall, the target is ready to go in the Hall as scheduled!