Target Lab Update

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Outline

1. August 1 Milestone

2. Current Status of Target Work

   (a) Compass

   (b) Optics

   (c) EPR

   (d) NMR

3. The Future (including Nov. 1 Milestone)

August 1 Milestone

What was the August 1 Milestone?

Did we meet it?

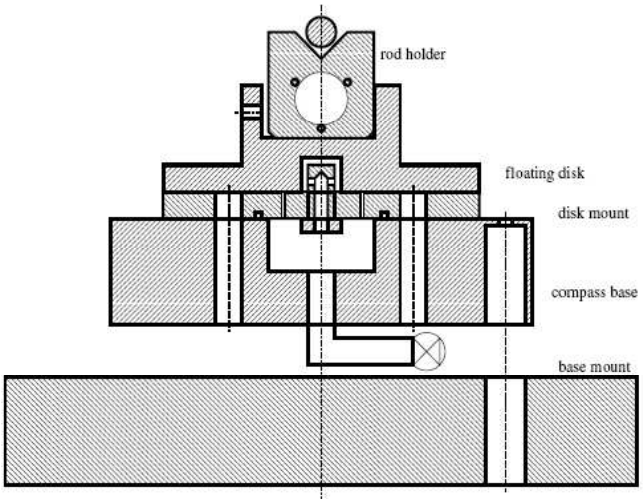
- Oven arrived just in time
- Acheived a weak polarized signal in the new magnet setup

Did we REALLY meet it?

- Polarizing light delivered in very different way compared to final
- Used frequency sweep NMR, which we are not likely to use for experiment
- Used standard Rb-only cell

Compass Status

- Design is nearly finalized



- Meeting this week to finish design for mount

Optics Status

1. 5–1 Combiner Tests (nearly done)

   (a) 5–1 heating tests indicate cooling is required

   (b) Air cooling is apparently sufficient

   (c) Spin-Up and Maximum Polarization tests underway

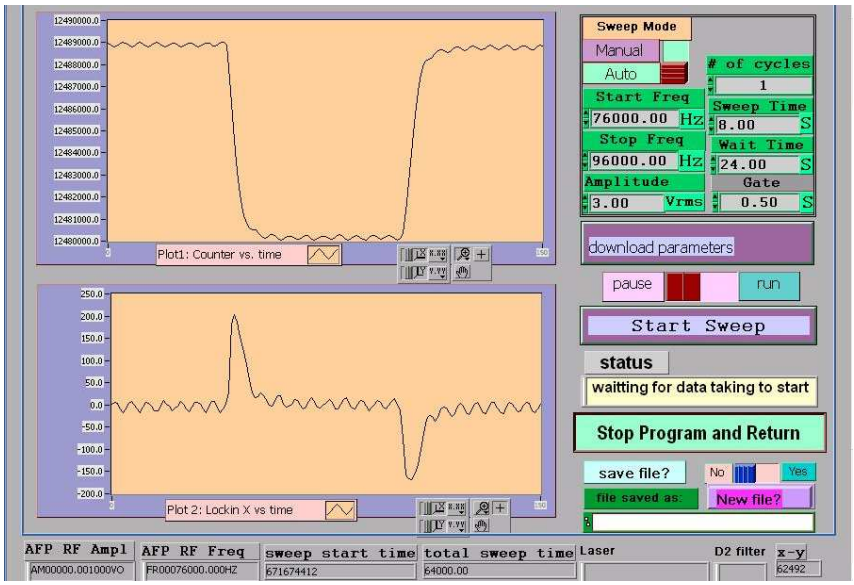
2. New Optics System

   (a) Design of optics is done, design of mounting to box ongoing, but nearly complete

   (b) Parts have started to arrive (rails, optics, mounts)

EPR

Wolfgang Korsch was here in August. Working with Ameya, he was able to measure an EPR signal in the new lab:



This corresponds to a polarization of about 10%.

NMR

Successful NMR test completed in first week of August.

- Very low polarization
  - 1/2 of 30W laser used
  - possible interference
- Frequency Sweep
  - Changing background
  - Necessary at time (couldn't control power supply)

NMR

Progress since then

- Can control power supply
- Worked closely with Gordon Cates to reduce noise
  - Better matched impedences (reduces effect of Shot noise)
  - Tuned to resonance (to boost signal, may change)
  - Electronic subtraction of RF signal
  - Results in incredibly low noise, but still no good water signal

The Future – November 1

Next week: All efforts focus on polarized signal

- Install hybrid cell "Carlos"
  - Maximum measured polarization in the 40's
  - Acceptable for G_E^n running, but not best cell
- Reinstall optics and laser
- Implement some of the recent changes to NMR system
- Reinstall EPR system

The Future – Past November 1

- As design continues and parts arrive, install in system
  - Optics in running configuration
  - Target ladder – including NMR coils
  - All beamline items
- Modify software to "running condition"
- Optimize system for running