Minutes of the bi-weekly Hall A G_E^n meeting
March 31, 2004

Present: J.P. Chen, Al Gavalya, Doug Higinbotham, Tim Holmstrom, Aiden Kelleher, Richard Lindgren, Kathy McCormick, Andrei Semenov, Albert Shahinyan, Bogdan Wojtsekhowski

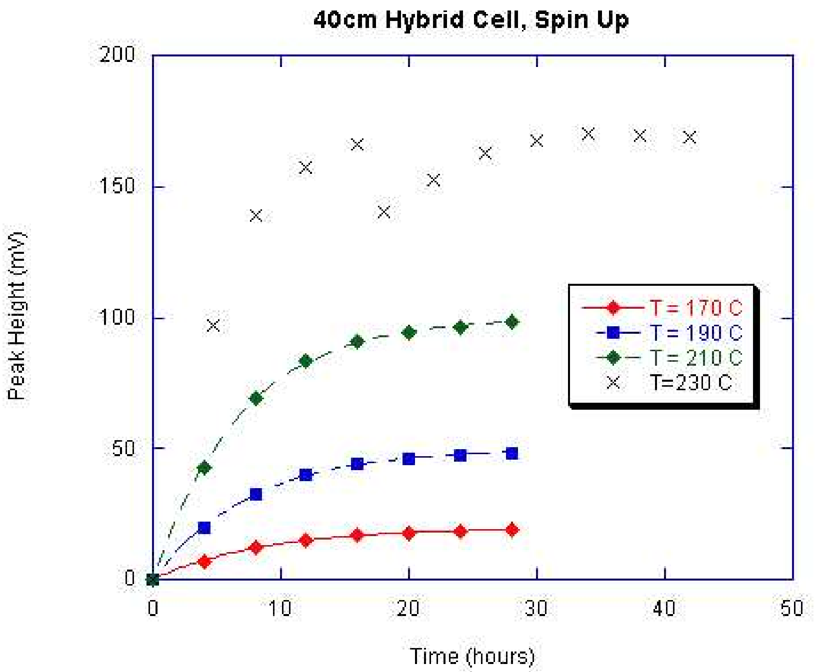
1. William and Mary Hybrid Cell Tests (Aiden)

   Our first attempt at developing Rb/K hybrid cell technology was a proof of principle test involving test cells. To test the principle we used 1" spherical cells. We filled the cells to 3 amagats (typically filled to 8.5 amagats for a production cell) using a roughly 1/99 mixture of Rb/K. We filled 4 cells and as of this writing we have tested 2 of the cells. One cell had a poor lifetime and was set aside in favor of a cell with more acceptable lifetime.

   Our first test was to determine if we could get an NMR signal. We tested the cell as we would have had it been a typical Rb cell. This involved heating the cell to 170C and characterizing the time it took to polarize (spin-up), followed by a measurement of the time it took to de-polarize (spin-down). The results we typical for a spherical Rb cell.

   To test for the effect due to K, we heated the cell to 220C and 230C, characterizing the spin-up and spin-down. We observed a remarkable change in the spin-up properties: the time required for polarization was less and the overall NMR signal height was greater. The higher temperatures allowed the K to vaporize and influence the cell polarization. A search of the literature indicates that the optimal temperature for a Rb/K hybrid is roughly 230C-240C.

   We repeated the test with a 40cm cell (identical to those currently in use, except for the change in alkali metals). The results were very encouraging (see figure). As we change the temperature (vaporize more K), the time required for spin-up is decreased and the overall signal height is increased.



   We just filled another hybrid cell (at a slightly lower density than usual), and will be characterizing it in the coming weeks.

2. G_E^n target design (Al)

   The target oven is in the process of being designed. Al found some high temperature glass, and is thinking of designing the oven as a glass tank. The problem is getting the RTD signal lines out of the oven. He is thinking about this.

3. Magnet Box

   What else needs to be done on the box?

   - Power supply for use in Hall
   - Interior lights
   - Painting
   - RF Coils
   - 3-D Magnetic Mapping

4. Neutron Arm Design (Bogdan)

   David Waldman has left JLab and Bill Chronis has taken over the neutron arm design. We have received a bunch of lead from Indiana to use in the detector shielding. It will be taken care of by Doug Tilles.

   Also, Hakob Voskanyan is coming for six months to work on building veto detectors.

5. Simulations (Andrei)

   Andrei has been busy generating $^3\vec{H}e(e,e'n)$ events in McCeep. Irina then put these events through her Geant-3 simulation of the neutron detector. She found large widths on the veto detector signals, "normal" widths on the neutron bar signals. She also put the neutron detector geometry into ROOT.