### Hall A Moller Update at the PREX Collaboration Meeting

### Simona Malace JLab

- → Target Magnet update
- → Target update
- → Detector update
- → DAQ update



 $\rightarrow$  Used to saturate the Fe foils; field up to 5 T





- → Magnet is working, has been tested/used in the ESB and then moved to the Hall in December (Ethan, Javier, Jack made this magnet work)
- → Installed in the beam line before the holiday shutdown and surveyed and aligned to 300 microns tolerance
- → It was cooled down during the last week of January (all good)
- → Javier and I ramped it up to max of 80 A or 4.3 T at the beginning of February
- $\rightarrow$  After some training it worked fine

#### Monitor the magnet/magnet system parameters



Results from testing the magnet in the Hall (first week of February)













### Hall A Moller Update: Target



Ladder with 3 Fe foils installed: 1, 4 and 10 microns (1 micron is 99.85 % purity while the other two are 99.99%) Jefferson Lab



Target motion system built by Temple U. (Jim and Bill)

### Hall A Moller Update: Target





- → Foils were installed on the ladder ~the day of survey; target was installed in magnet and vacuum pump down started within ~48 h from foil installation
- → The ladder and foils were surveyed w.r.t. the beam line
- → Once target was installed in the magnet very little adjustment was needed to position ladder perp to beam
- $\rightarrow$  Target motion software is ready



### Hall A Moller Update: Target





### Hall A Moller: Detectors



- $\rightarrow$  Scintillators: 4 paddles per side connected via light guides to Hamamatsu 1 inch PMTs (Hamamatsu R4124)
- $\rightarrow$  Calorimeter: lead+scintillating fiber, 2 bocks per side each block connected to two 2 inch PMTs (Photonis XP2282B) Jefferson Lab

### Hall A Moller Update: Detectors

- → Checked all PMTs few months ago and found that the PMTs attached to the scintillators exhibit behavior consistent with vacuum contamination (the calorimeter ones look good)
- → At the end of last year placed order for 9 R4124 PMTs (will replace before PREX)

#### Surveys:

To improve the accuracy of the simulation few surveys were done in December 2018/January 2019 this month – Bill and Sanghwa were in contact with the survey group about the interpretation of the survey results









#### **Detectors and DAQ Setup**

- 1. Moller DAQ: moller @ adaql1.
- 2. cd /home/moller/Java/msetting
- 3. Type ``mpc''
- 4. Load discriminator settings : DETSET.new
- 5. Default 49 needs to change on 1 and 2: Typically set to 270 and 300 for 1 and 2.
- 6. Check position of peak in ADC spectra to adjust threshold (see analysis below).
- 7. PLU module /out 2. Channels 0, 1, 3, 4, 12 should be selected with check box.
- 8. HV Settings Load Voltage Set: Select the file for correct beam energy.
- 9. Enable all HV settings for all energies (except channels 3 and 11 which are normally zero).

#### 10. Portserver Info

- $\circ~hatsv5~2003~for~HV$
- $\circ$  hatsv5 2004 for ROC11
- Might need to clear a port (telnet hatsv5; user=root, pw=dbps; kill tty=4).

#### 11. Starting the DAQ

- ∘ moller @ adaql1.
- $\circ~$  Do a ``kcoda'' to clean up processes.
- Type "start\_coda" to start all processes including runcontrol.
- Use the config "beam\_pol" (warning: it may not be the first config listed)
- Runs are normally 30000 events.
- 12. Raw data are stored in /adaql1/data1/moller
- 13. Settings are in /home/moller/daq/coda2/RunInfo

### Jefferson Lab



hatsv5:2003 S5 DV -1610.0 -1745.0 -1980.0 -1850.0 -1655.0 -1540.0 -1735.0 -1870.0 0.0 0.0 0.0 -1895.0 hatsv5:2003 S6 DV -930.0 -805.0 -1010.0 -790.0 -910.0 -828.0 -840.0 -852.0 -50.0 -50.0 -1200.0 -1200.0 adaq1.jlab.org>



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#### **High Voltages**



→ Calorimeter ADC distribution should peak around 300 per block



#### Thresholds





#### Thresholds

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5	5120	)	0		1	no	t(not	t(10)	+not	:(12)	)					
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# Hall A Moller Update: Hardware/DAQ To Do

- $\rightarrow$  Play with the target controls during APEX downs
- → Check on the scope that the scintillator PMTs are gain matched when using the 2.06 GeV HV file
- $\rightarrow$  Take a LED run
- After Commissioning:
- $\rightarrow$  Program a new PLU to have it as spare in case the existing one goes bad
- $\rightarrow$  Replace the scintillator PMTs
- $\rightarrow$  Add an ADC to read the scintillator channels
- → ....



# Hall A Polarimetry: Commissioning

### Looking forward to it, I wouldn't miss it for the world!

 $\rightarrow$  Scheduled at the end of the APEX running for 3 days

#### Moller Plans

- → Check alignment of the target magnet with beam: test developed right now by Yves
- $\rightarrow$  Detector gains and thresholds tuning
- $\rightarrow$  Check target foils centering
- $\rightarrow$  Check target saturation by varying the orientation of foils w.r.t. beam
- $\rightarrow$  Quads and Dipole scans
- $\rightarrow$  Holding field reversal study

