Install of Triplet Polarimeter in Hall D

- Set HV in hall (4/16)
- Reduce noise levels (4/17)
- Check noise without pump (4/20)

April 22, 2015
Kei Moriya, Michael Dugger
Motor Control GUI

- Open CSS, on the main button panel in the “BEAM” section select “MOTORS”, then in the new window click on “Polarimeter Converter”

- Buttons show converter positions in mm. Probably will be updated to show converter thicknesses
Noise Levels with HV

20mV/10μs division

0 V

20mV/10μs division

100 V
Noise Levels with HV

- 20mV/10μs division
  - 140 V

- 20mV/10μs division
  - 180 V

- 20mV/2μs division
  - 180 V
Noise Levels with HV

20mV/1μs division

20mV/400ns division
Surroundings

pumping down vacuum in beamline, pressure ~ 75 mTorr during noise tests

turbo pump by polarimeter was NOT on during noise tests
New LV Supply

- Borrowed from Fernando, Nick, Chris
- Should be clean
- We can use this supply if necessary

50mV/10ms division

60 Hz noise
current is determined by preamp

50mV/2μs division

200 kHz noise
New Scope

new scope from Nick

better LIMO cable

• Oscilloscope may have been picking up noise in cave

• Thicker coated LIMO also probably helps
Noise

Ground connection was picking up noise

Better ground

New ground position

- Even with better ground connection, if the ground cable is passed through the cable tray it picks up the 200 kHz noise
Noise Levels

10mV/10ms division

ASU LV supply

JLab LV supply
Signal, Background

20mV/4µs division

20mV/20µs division

both with JLab
LV supply
Background Rates

- Tested with scope connected to signal cables going into fADC
- Results will vary on channel
- Most channels have ground noise level of ~20 mV peak-to-peak
- Baseline oscillations are 10-20 mV, ~50 mV on sector 32

<table>
<thead>
<tr>
<th>threshold above baseline (mV)</th>
<th>rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;19</td>
<td>&lt;10 Hz</td>
</tr>
<tr>
<td>18</td>
<td>&lt;10 - 80 Hz</td>
</tr>
<tr>
<td>17</td>
<td>200-500 Hz</td>
</tr>
<tr>
<td>16</td>
<td>80 - 2000 Hz</td>
</tr>
<tr>
<td>14</td>
<td>12-23 kHz</td>
</tr>
</tbody>
</table>
Noise Levels

20mV/10ms division

0 V

20mV/10ms division

60 V

20mV/10ms division

40 V

20mV/10ms division

100 V
Noise Levels

20mV/10ms division
120 V

20mV/10ms division
180 V

20mV/10ms division
140 V

20mV/10ms division
200 V
Noise Scan

- Fernando had gadget to check noise levels against frequency

- Rather strong high frequency noise coming from turbo pump connected to polarimeter

- Strongest (?) noise coming from cable tray

- Also from front panel of pump
Noise With Turbo Pump On/Off

ON

10mV/10ms division

OFF
Noise With Turbo Pump On/Off

ON

10mV/10μs division

OFF
Noise With Turbo Pump On/Off

ON

10mV/40ns division

OFF
Summary

- All detector elements installed in hall, under vacuum, HV set
- Using LV supply from JLab
- Noise due to environment, may be better once we move things around
- New HV supply in summer should decrease HV noise
- Many many thanks to Tim, Mark, Keith (engineers), Fernando, Nick, Chris (electrical), Beni, Lubomir
fADCs...

- Talked to Alexander (Sasha) Somov today (April 22)
- No configuration yet, but we should be able to self-trigger fADCs
- Polarimeter will be read out with PS trigger
- Implementing scalers (no settings yet)
- Will be worked on tomorrow, hopefully before beam