New PMT Power Supply

Previously PMT power was supplied via the crate and controlled via the Labview program. Unfortunately, the crate was acting as an antenna for some background RF noise, which ultimately was penetrating the data signals collected on the oscilloscope. In order to eliminate this, a new power supply is being used for the PMT.

To use the new supply, flip the main power switch to “ON”, then set the dials to the desired HV setting. REMEMBER: the first dial must be moved from HV off to 0 or 1000V. The applied voltage is the sum of the settings on the four dials. DO NOT EXCEED A VOLTAGE SETTING OF 1150 V. Before powering off, turn all dials back to 0, and the first dial back to HV off. Remember, the PMT is NO LONGER controlled by the computer. Remember to turn off the power before exposing the PMT to light.

Labview monitoring of traces

While you are averaging your data on the digital oscilloscope, do not monitor real time in the Labview data collection software. After the averaging is complete, you can view data in Labview and save it (press the button to transfer the completed average from the scope to the computer). The real time updating of the Labview monitor takes valuable processor capacity, slowing down the averaging from the desired, real time 10Hz. In order to save the data from this program, you need to hit the run continuously button. After saving, press stop.

Oscilloscope Trigger

The trigger is connected to L4 (Channel 4 on the leftmost amplifier in the oscilloscope) with 1MΩ, 300 mHz settings, AC coupled setting (in waveform description). The high current associated with response to the 5V trigger signal with a 50Ω resistor (V=iR) in the oscilloscope can lead to a current sink, causing signal response to the PMT/amplifier signal to be distorted.

Efficient data collection parameters

<table>
<thead>
<tr>
<th>Time divisions</th>
<th>Sampling Rate</th>
<th>Net Window</th>
<th>Amplifier</th>
<th>Saved Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 µs</td>
<td>1 ns/pt</td>
<td>10 µs</td>
<td>Fast</td>
<td>1</td>
</tr>
<tr>
<td>2 ms</td>
<td>2 µs/pt</td>
<td>20 ms</td>
<td>Slow</td>
<td>2</td>
</tr>
</tbody>
</table>

10240 data points should always be collected. In order to collect data most efficiently, use the parameters listed in the table above. The two data sets can be used in conjunction for longer processes. Remember, you should always collect as much data as possible with each laser shot.
The parameters listed have been saved into stored settings 1 & 2 in the scope. To recall settings, hit the store/recall menu button. Then press the onscreen “recall setting” box, and select setting 1 or 2. The cables are already plugged into the scope. The trigger will always go into L4, the Fast amp will go into C1, the slow amp will go to L1, and the slow amp offset (see below) plugs into L2. There are enough cables that you do not need to unplug the cables that lead from the amplifiers to the scope. You will only need to re-link the cable from the PMT into the amplifier when switching amps.

When you are collecting data with these parameters, you may wish to zoom in to observe your signal, but still collect the full data set. To do this, make sure the ↔ box is selected at the top of your screen (which allows you to change the x axis time divisions). On the bottom right of the screen, select the box labeled pan/zoom. Once selected the box the left knob will allow you to zoom (Horizontal Magnify) in while the data is real time or averaging, without disturbing the processes. The right knob will allow you to pan (Horizontal Pos Gr) from left to right in the zoomed section. When your data average is complete, turn zoom off to automatically re-center and zoom out before transferring and saving your data on the computer in order to get the full data set!

$I_o$

I think most everyone, when recording transient absorbance, uses their pre-trigger value as the $I_o$ value. For short time scales this is appropriate, but at longer time scales, consider measuring a blank spectrum (trigger + probe light only, don’t excite your sample), and use the full trace as your $I_o$ value. This will help correct for any baseline drift. This is absolutely necessary when pulsing the arclamp, as the pulsed light does not have constant intensity over time.