

Message ID: 3 Entry time: **Wed Jul 6 14:40:33 2005**

Author:	Laura and Dan
Type:	Routine
Category:	General
Subject:	First Day of PMT Testing

We had data for the PMT without Mu Metal so we tested the same one with Mu Metal and found that the results were substantially different than without. Thus we decided to retest the PMT without the Mu Metal and found results that matched the results with the Mu Metal. The second testing of the PMT without the Mu Metal differend from the original by a power of 2, later we should investigate why this happened. The first was taken without the aid of a computer which found the mean current that could be a possible reason for the difference but we would not think it would make that great of a difference. We also tested the same PMT with a different base and found that the results compared to the original base were simmilar. Our data seems to suggest that changing the base does not affect the current, also our data suggests adding the Mu Metal to the PMT does not affect the current, we should run more trials to reach a more firm conclusion.

Message ID: 8 Entry time: **Fri Jul 8 14:56:27 2005**

Author:	Laura and Yuri
Type:	Routine
Category:	General
Subject:	PMTdata analysis

Laura: I took the data from PMTs with and without the mu metal that Dan and I recorded yesterday and analyzed them using excell graphs. Later we discovered that the pulse generator was set wrong yesterday so all our data is skewed. Though before this was dicovered I (with the help Mr. Thorley) compared the PMT data with and without the mu metal by dividing the current without the mu metal by the current with the mu metal for the different PMTs at different volatages. We could not directly compare the PMTs because the may run at different voltages originally. This ratio of current without and current with is relative so it can still be used. We discovered that the ratio was higher at lower voltages this is probably because at lower numbers a small difference can make the value larger. Though as the voltages and currents increased the ratios leveled out. There seems to be a range of diffences from 5% to 20% higher (which is good). Though it makes a small difference, for these four PMTs it does make a difference. Though we have to retest all the other PMTs to make comparisons within the PMTs without Mu metal.

Yuri: I took the PMT data that Dan and Laura obtained yesterday and averaged the net

current and the ratio for each voltage from the PMTs. I also consolidated this data onto one excel file. Then I gave this data to Laura to graph.

Message ID: 9 Entry time: **Fri Jul 8 14:56:56 2005**

Author:	Dan
Type:	Routine
Category:	General
Subject:	PMT Testing

After findind that the previous PMT testing was inaccurate, i retested two PMTs and found that the results were inconsistant. through various testing, i found that the dark current was affected by the turning on and off of the voltage, causing some inconsistancies because of the warming of the tube. i also tested to find any other variable which may affect the current, including extended exposure to both voltage and the light source, but found that neither affected the current substantially. i also rested a few tubes with the mu metal and found that the metal does affect the current, increasing it by about 10 percent. the major cause of inaccurate data was a change in the light source, which caused data to be off what it should be. i then fixed the problem, correcting the light source to the standard measurements, and furtherly all PMTs need to be retested without the mu metal.

Message ID: 14 Entry time: **Mon Jul 11 15:00:14 2005**

Author:	D Dub
Type:	Routine
Category:	General
Subject:	PMT TESTING

today i tested the PMTs connected to the small paddles. we found that there were extremely large coincidences in which the amperage increased to an unexplainably large amount. we further tested the pmt and paddles placing various items between the pmt and paddle such as white and black paper, cookies and moving the pmt a few inches away from the paddle. we found that the paper and moving the pmt away seems to make the data more consistant, although it would continually float toward or away from zero. this phenomenon is currently unexplainable.

Message ID: 15 Entry time: **Mon Jul 11 15:00:43 2005**

Author:	Laura
Type:	Routine
Category:	General
Subject:	PMT Graphing

Today was a day full of graphing the PMT data, I feel I have finally mastered the art of excell on a touch pad lap top. I found the mean of the Voltage gain and the Signal/Noise ration for each voltage. Then I made a graph for each individual PMT and graphed the means on it also to compare them. I had a problem with the scale so I had to go back and make a standard scale, along with a standard legend. It was a lot of tidying up but I feel confident that the data is now arranged in a neat and easy to compare way. This was all done so we can match PMTs to put on the paddles. One step closer to our Holy Grail, Muon Detection.


Attachment 1: [PMT_Graphs.xls](#) 71 kB

Message ID: 19 Entry time: **Wed Jul 13 10:56:08 2005**

Author:	Laura
Type:	Routine
Category:	General
Subject:	PMT Pairing

I looked at all 13 working PMTs that we tested and paired them into 6 pairs, 4 of which we will be using on the muon detectors. First, I categorized the PMTs qualativly referring to them as low, slightly low, average, slightly high and high for Voltage Gain and Signal/Noise. Then from that I picked out ones I thought would match and compared their graphs. To deterine which 4 PMT pairs should be used on the muon detectors, I used Signal/Noise as a main criteria because the Voltage Gain did not vary that much.

???

 Though I'm wondering if that was the right choice. It may not be because the Signal/Noise could vary greatly if the same PMT were to be tested again.

Attachment 1: [PMT_Pairing.doc](#) 41 kB

ELOG V2.6.0-beta

Message ID: 21 Entry time: **Wed Jul 13 11:35:13 2005**

Author:	Dan
Type:	Routine
Category:	General
Subject:	Mu Metal

Today we investigated how to put the mu metal shield over the PMT while being able to ground it. I took one of the unused shields to the shop and put a hole through the shield and a screw to put into the shield. I then soldered a wire to the base of the PMT which would then be connected to the screw in the shield, allowing it to be grounded. We will later solder wires to all the bases we plan to use as well as put holes into all the shields so that all the shields can be grounded.

Message ID: 30 Entry time: **Wed Jul 27 10:39:25 2005**

Author:	Laura
Type:	Routine
Category:	General
Subject:	Efficency Testing

We have been doing efficiency testing on the PMTs for a while. We had to change the voltage greatly (from 1400v to 1700v) because the panel was not detecting very much thus the efficiency was very low. The efficiency is calculated by taking the number of hits that take place (within 1000 ns) on the two small panels and the large panel and divide it by that same number plus the number of hits just on the small two panels. To those who are familiar with the system the formula would look like this $(1,2,3,-)/[(1,2,3,-)+(1,2,-,-)]$. This helps us to determine if the panel is working properly. Soon we will be running coincidence testing with these panels and getting down to buisness though, sadly, we only have 5 days left and poster still need to be made