

# Aerogel Tests

- Several Properties need to be looked at
- Measurements to verify Index of Refraction (see talk by A. Battle and D. Rice.)
- Experiments to test light output, signal strength, etc. (See talk by L. Rothgeb)
- Tests to investigate apparent yellowing of aerogel.

# Aerogel Coating/Yellowing

- There appears to be some yellowing of the aerogel tiles.
- Radiation Damage, Aging? Could tie into hydrophobic properties?
  - Tests on Hall A aerogel detectors showed yellowing due to sub-micron contaminants in air used to flush detector [S. Marrone, II Nuovo Cimento, Vol 24, N.1 (2009)]
- Chemical Testing will occur at CUA's Vitreous State Laboratory (VSL), courtesy Dr. Marek Brandys.
- Rayleigh scattering responsible for blue tint? Mie Scattering causes yellow tint? Baking seems to improve.
- Raman analysis upcoming.

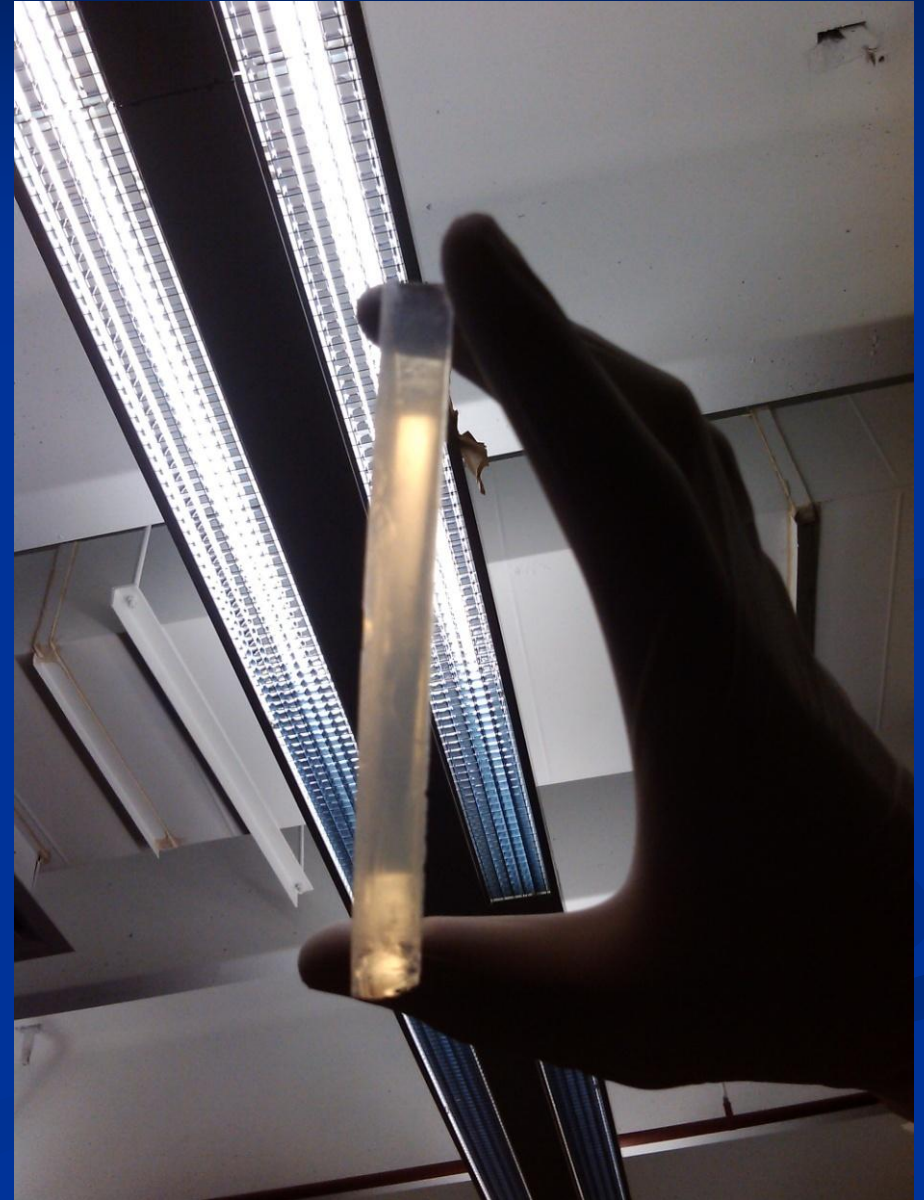


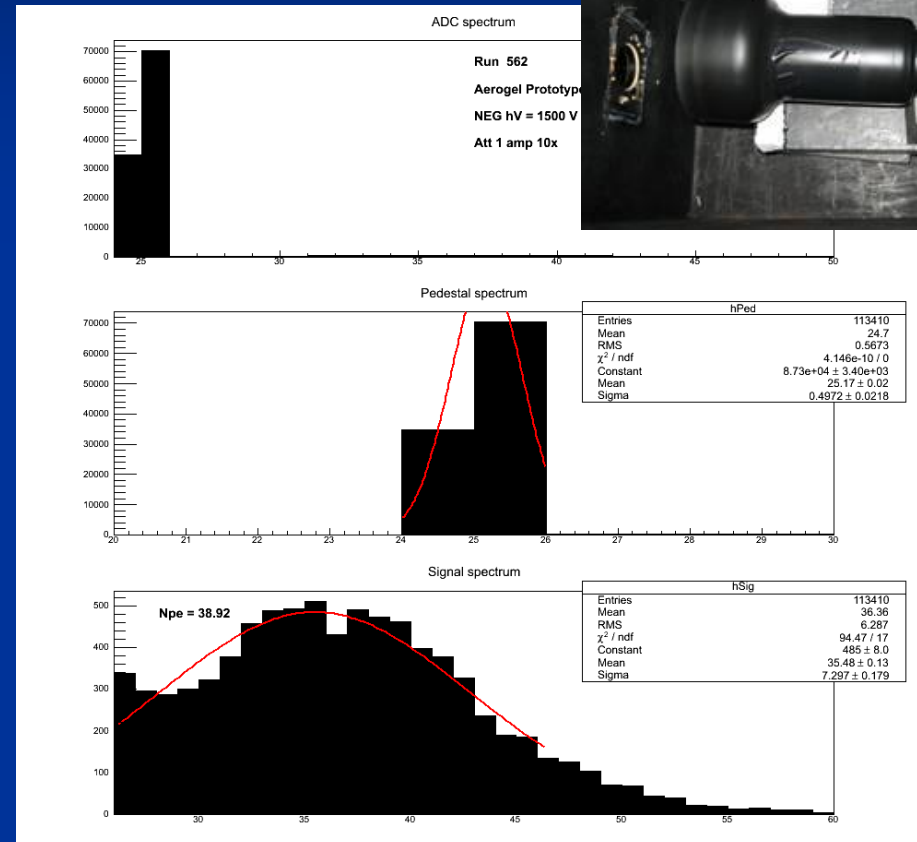
Photo credit: Daniel Rice

# PMT Testing

- Pulsing LED Used to test PMT Gain
- Gain: Amount of electrons output by PMT when single electron is emitted from photocathode window.
- The “multiplier” in photomultiplier tube.
- Another characteristic is Quantum Efficiency.
- That is, the efficiency of the photoelectric effect that converts photons to electrons.

# PMT Gain Testing

- ~70 5-inch PMTs have been tested for Gain with an LED over a range of high voltages.
- Primarily used ROOT scripts to analyze histograms.
- Data recorded in online catalog, which can be accessed from our wiki: [http://www.vsl.cua.edu/cua\\_phy/index.php/Main\\_Page](http://www.vsl.cua.edu/cua_phy/index.php/Main_Page)



PMT s/n	Base s/n	LED intensity (V)										
09592	76	2.5										
Run (#)	hV (V)	Pedestal (channel)	Pedestal Error	SEP (channel)	SEP Error	Pedestal Height	SEP Height	SEP Width	Gain	Statistical Gain Error	Statistical Gain Error	Gain Error
1881	1600	73.05	0.01	87.85	0.10	$6938 \pm 80.8$	$1339 \pm 14.8$	20	2.29E07	1.55E05	457122.807277642	4.83E05
1882	1700	73.05	0.01	97.08	0.16	$6800 \pm 78.4$	$806.1 \pm 8.3$	35	3.71E07	2.48E05	742206.82830282	7.82E05
1887	1800	72.96	0.01	111.7	0.3	$7000 \pm 78.0$	$504.7 \pm 5.0$	53	5.98E07	4.64E05	1196549.8347254	1.28E06
1888	1900	73.02	0.01	134.2	0.3	$6300 \pm 77.0$	$321.8 \pm 3.0$	80	9.45E07	4.64E05	1889646.84792204	1.95E06
1889	2000	72.79	0.01	164.8	0.5	$7426 \pm 78.4$	$213 \pm 2.0$	135	1.42E08	7.72E05	2841883.07416323	2.94E06
1890	2100	72.9	0.0	207.4	0.8	$6800 \pm 76.7$	$153.7 \pm 1.6$	200	2.08E08	1.24E06	4154257.94451641	4.33E06
1891	2200	72.8	0.0	265	1.0	$7452 \pm 79.0$	$113.5 \pm 1.3$	280	2.97E08	1.54E06	5936419.15937587	6.13E06
1892	2300	72.28	0.01	348.2	1.8	$7199 \pm 76.7$	$78.39 \pm 0.93$	380	4.26E08	2.78E06	8522251.68811128	8.96E06
1893	2400	71.72	0.01	459.2	2.6	$6614 \pm 73.5$	$57.67 \pm 0.73$	560	5.98E08	4.02E06	11967969.2813474	1.26E07

