SHMS Plastic Scintillators Operating Voltages

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General Considerations:

- The PMTs in SHMS S2Y operate under **positive** high voltage.
- There are 2 types of PMTs in S2Y: ET9814QB and XP2020QB. Most XP2020QB malfunctioned so of all 18 active PMTs in this detector, 17 are ET9814QB.

SHMS channel	PMT type	HV (V)	Drawn current (μA)	**Don't exceed (V)**	Hut SPE Amplitude (mV)
s1y-007T	ET9814QB	1710	347.5	1710	11.7
s1x-008T	ET9814QB	1420	289	1670	1.66
s1x-009T	ET9814QB	1720	350.5	1720	9.6
s1x-010T	ET9814QB	1600	325	1630	7.3
s1x-011T	ET9814QB	1490	303.5	1640	3.16
s1x-012T	ET9814QB	1410	287	1700	1.68
s1x-013T	ET9814QB	1390	280	1660	1.66
s1x-014T	ET9814QB	1425	289	1700	1.64
s1x-015T	ET9814QB	1540	311	1670	4.12
s1x-007B	ET9814QB	1430	289	1770	2
s1x-008B	ET9814QB	1560	315	1640	4.5
s1x-009B	ET9814QB	1415	286	1730	1.9
s1x-010B	ET9814QB	1620	329	1720	5.8
s1x-011B	ET9814QB	1580	320	1880	2.16
s1x-012B	ET9814QB	1430	290	1710	1.84
s1x-013B	ET9814QB	1445	294	1670	1.84
s1x-014B	ET9814QB	1470	298	1770	1.78
s1x-015B	XP2020QB	1730	301	1800	4.16

TABLE I: Operating voltages for SHMS S2Y. The gain matching will be done with beam by experts.

Detector Configuration

As built the SHMS quartz plane had 21 quartz bars with PMTs at both ends. The detector had a total of 24 XP2020QB PMTs and 18 ET9814QB PMTs. The XP2020QB PMTs malfunctioned (see report by Carl Zorn posted under Useful Links). For this reason the bars in the detector have been re-arranged so that the spectrometer acceptance of interest will be covered by bars that are served by ET9814QB PMTs. The table below outlines the current detector configuration. Some bars have been taken out and stored to have new PMTs attached to them when new PMTs will become available. Other bars, though served by non-functional PMTs, have been left in the detector but not cabled.

Cable Label	PMT/bar label
1	bar out
2	20
3	bar out
4	bar out
5	19
6	14
7	6
8	4
9	18
10	12
11	11
12	10
13	3
14	8
15	5
16	13
17	17
18	16
19	09
20	2
21	bar out

TABLE II: Detector configuration.