

μ Range Stack Update

Recap

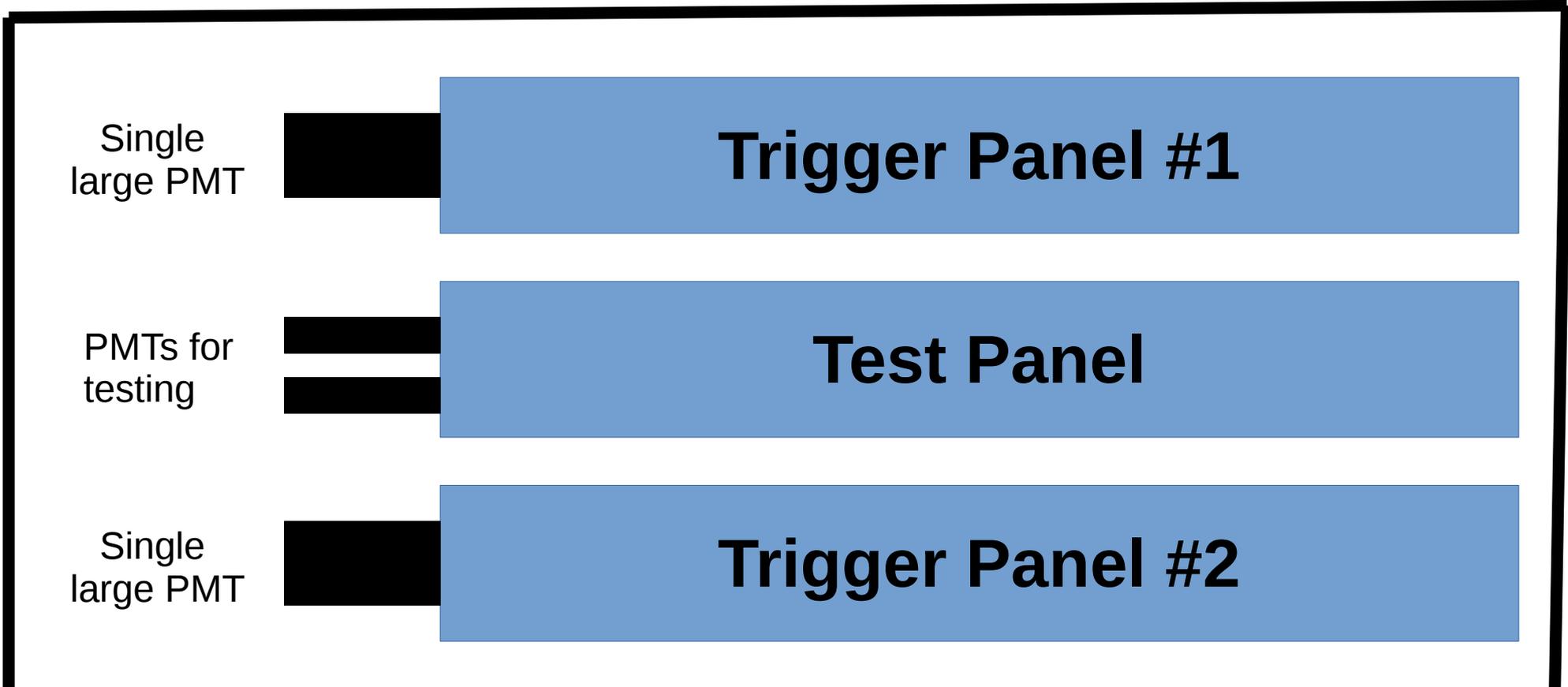
- Testing PMTs for use in the MuRS to determine correct operating voltages.
- Previous tests encountered problems:
 - Triple coincidence rate seemingly nonexistent.
 - Single rates not reproducible over long periods of time.
- Have improved the test setup to achieve more consistent results.

Triple Coincidence Problem Solved

- Problem observed by Tapasi: triple coincidence rate effectively = 0.
- Using scope, observed that the majority of pulses from the small PMTs were very low voltage ($\sim 7\text{mV}$).
 - Even with amplification, these fell below discriminator threshold on NIM crate.
- Putting the small PMT output through two stages of amplification and adjusting the discriminator threshold allows us to observe a sane rate of triple coincidence.
- However, still observed inconsistent/unreproducible readings of the triple:double ratio.
- To narrow down potential causes, set out to improve experimental setup.

Original Setup

Loose black sheet



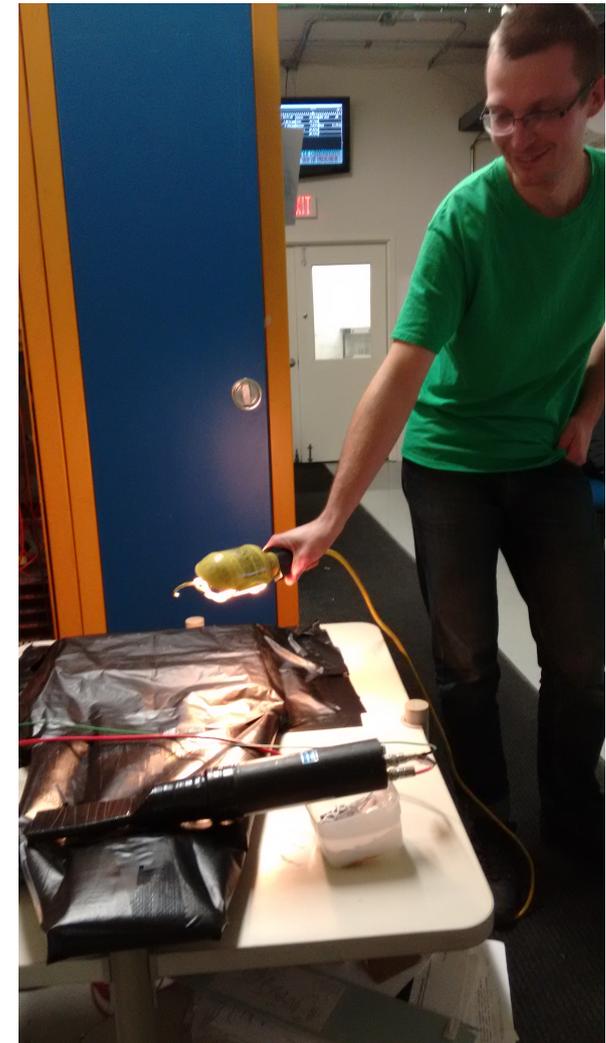
Improved Setup

Test PMTs enclosed in improvised dark box



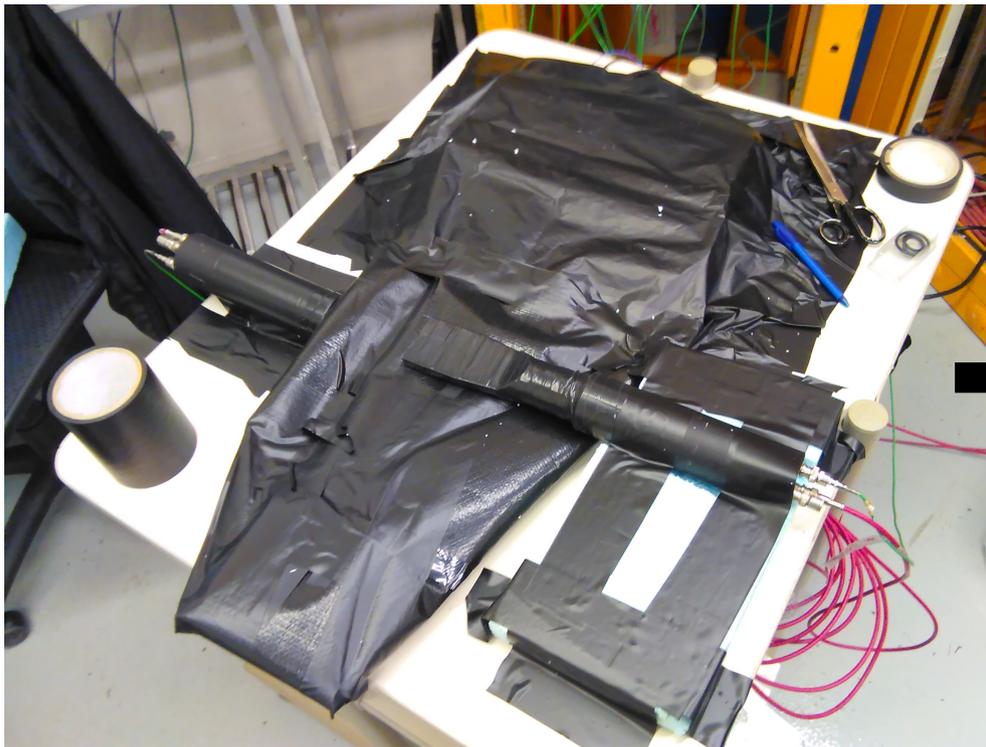
Improved Setup

No change in rate observed under different lighting conditions.



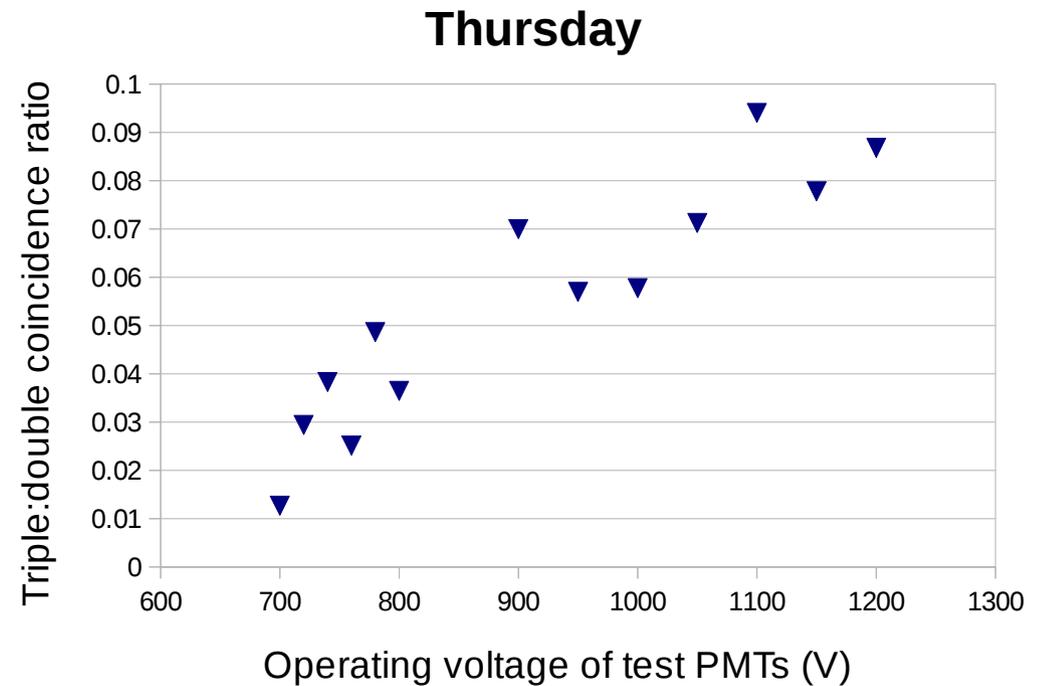
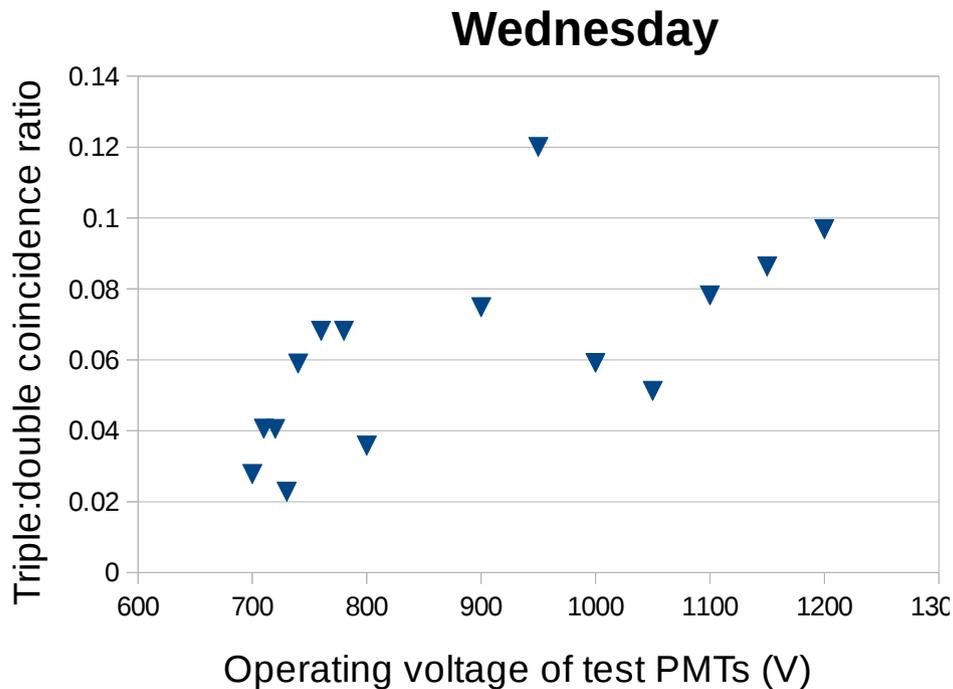
Improved Setup

Trigger paddles previously loose; now held in position with foam frame & included in “dark box”.



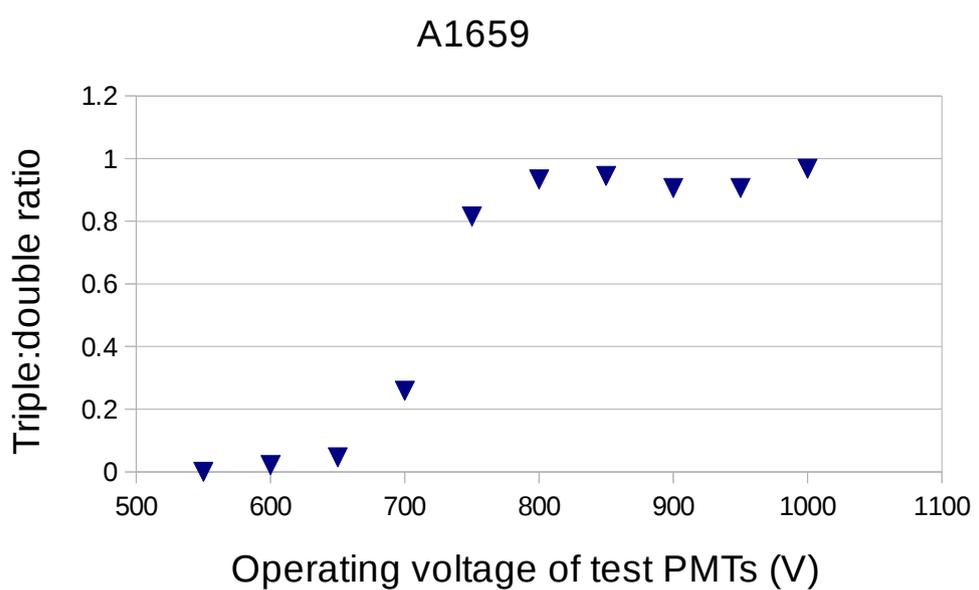
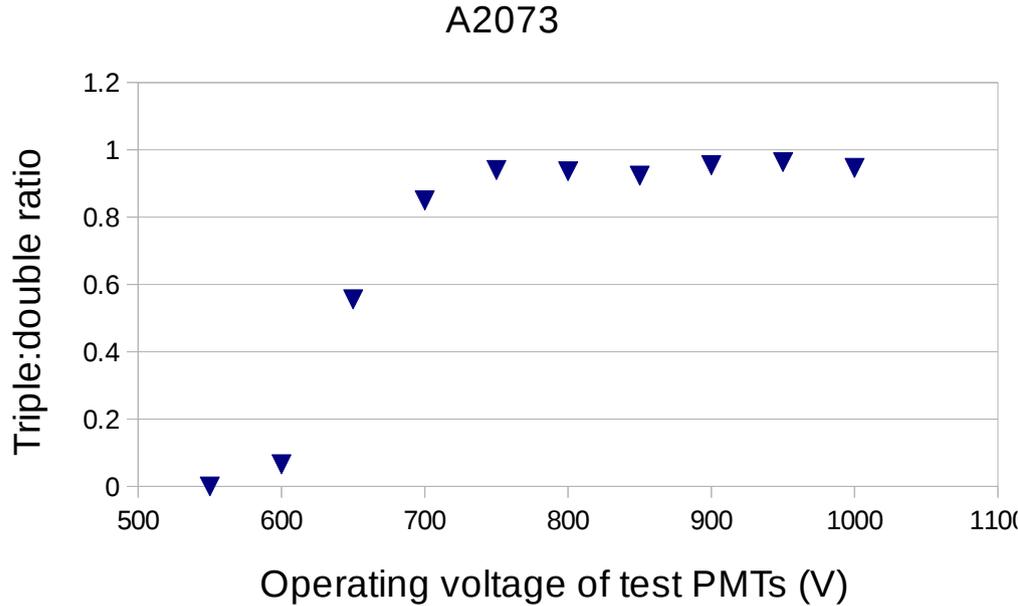
Readout Troubles

With new setup, **still** observed inconsistent readings of the double:triple coincidence ratio.



Turned out this was due to **loose pins** in the NIM crate logic gates (\Rightarrow nonsense reading for double coincidence rate)

Tests Now Working!



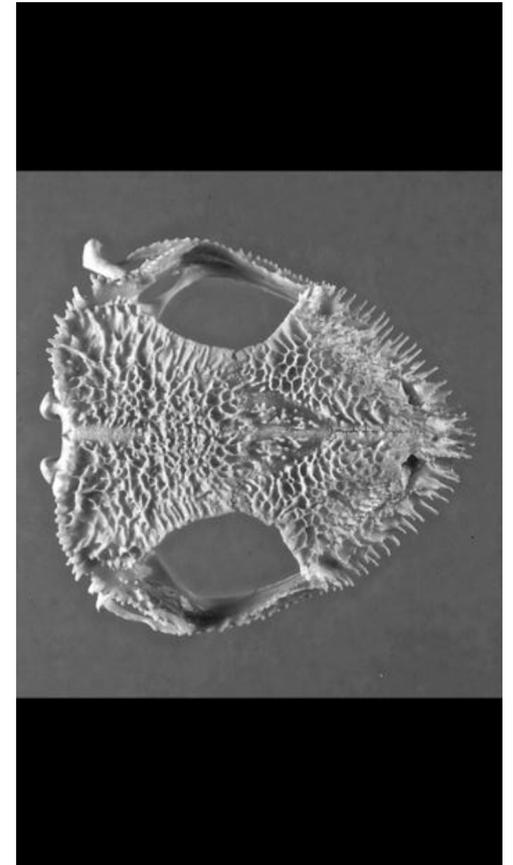
Tests now show triple:double ratio rising consistently to expected plateau.

Schedule

- Fabrication of the brackets should be complete by next Friday.
- There are 28 PMTs left to test in the new setup.
- Producing the curve for 1 PMT takes ~60 mins of measurements (not including dead time) \Rightarrow this is a 28-person-hr task.
- Only one test setup \Rightarrow this will take 3-4 working days.
- I am on μ BooNE shift today-Thurs, so either we need a volunteer to take over or this will have to wait until the week of the 22nd.
- All kinks in test setup worked out \Rightarrow all you need to do is turn up and take endless 5 minute readings.
- After PMT benchmarking is complete, will need some more time for installation of the instrumented scintillator panels in the MuRS.

Animal Facts Friday

Greening's Frog is one of only two species of frog that are venomous (not poisonous)



Its skull is covered in tiny spines that inject toxic mucus into predators' bloodstreams.