

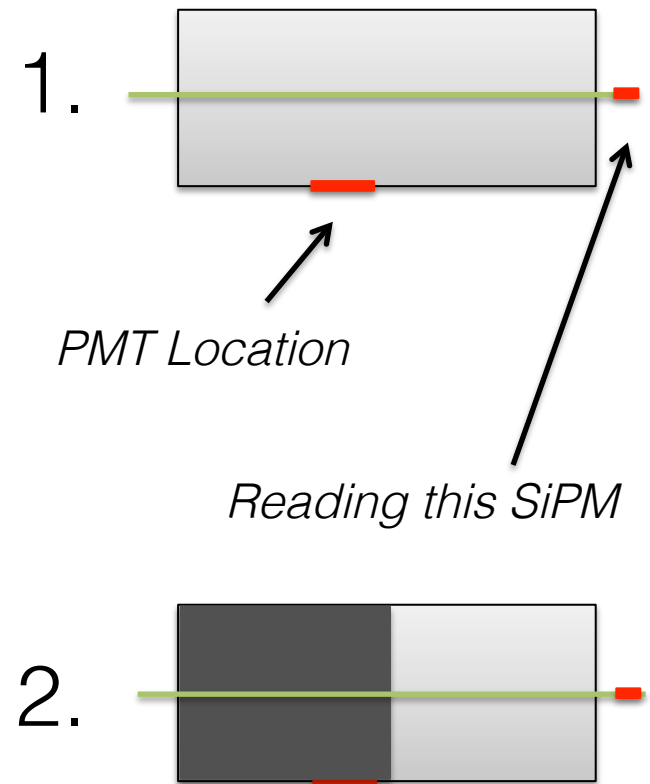
CU Boulder Test Stand Update

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04-13-15

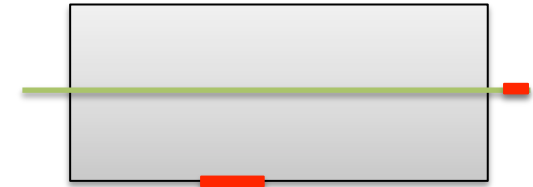
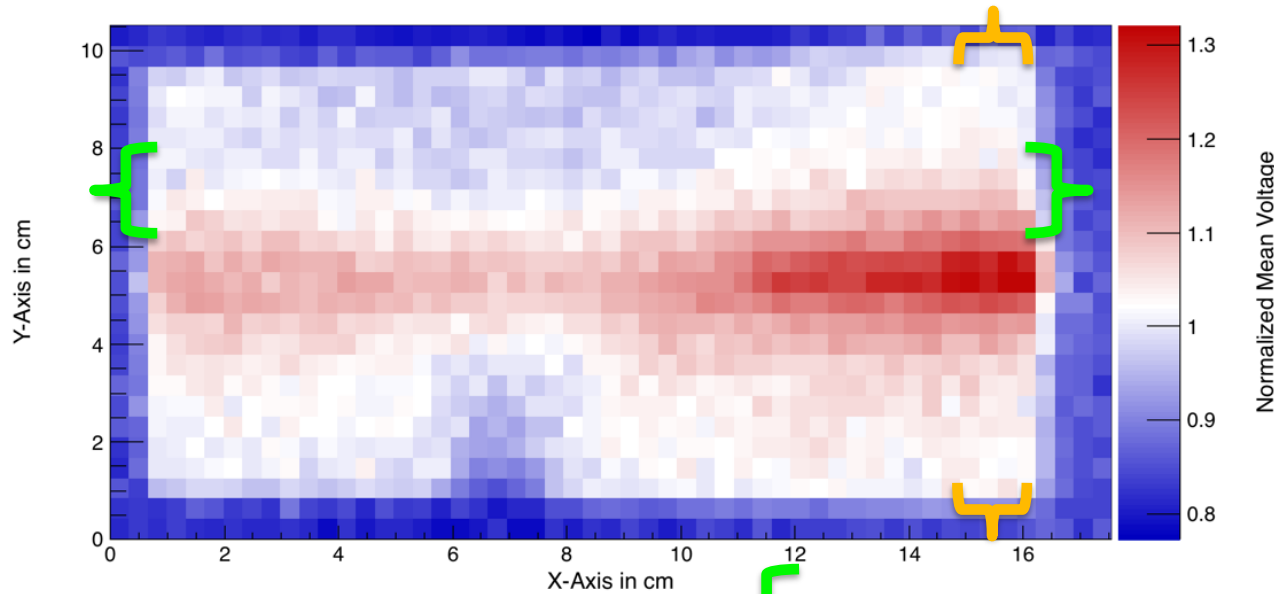
Understanding light absorption in scintillator tiles

- Tests utilize simple fiber layout, fiber epoxied in under vacuum, ends polished. Phototube coupled to side of tile, trigger on triple coincidence (2 SiPMs and 1 PMT)
- Sr90 source moved over tile surface, light yield measured at each point to create 2D histogram
- Averaging method – four tests (averages peak voltage value of 400k pulses and bins value to 2D histogram)
 1. Wrapped tile (1 layer of aluminized mylar)
 2. Black covers all sides of half of the panel width-wise



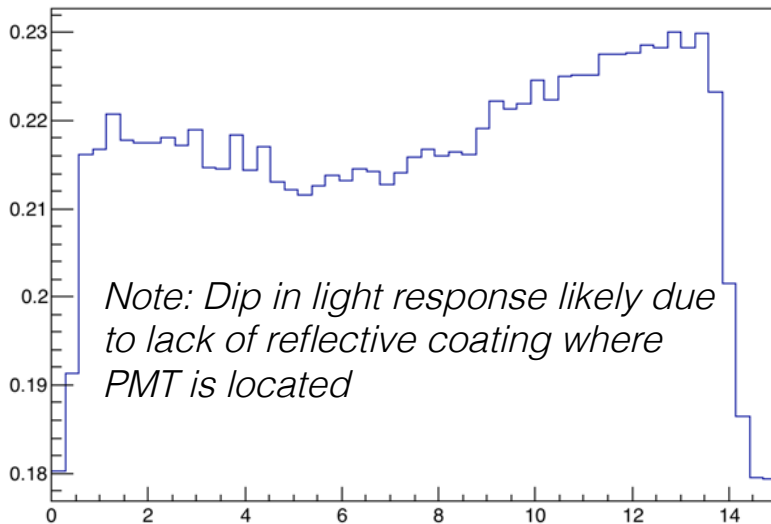
1. Mylar wrapped tile

Pulse Averaged Test Scan



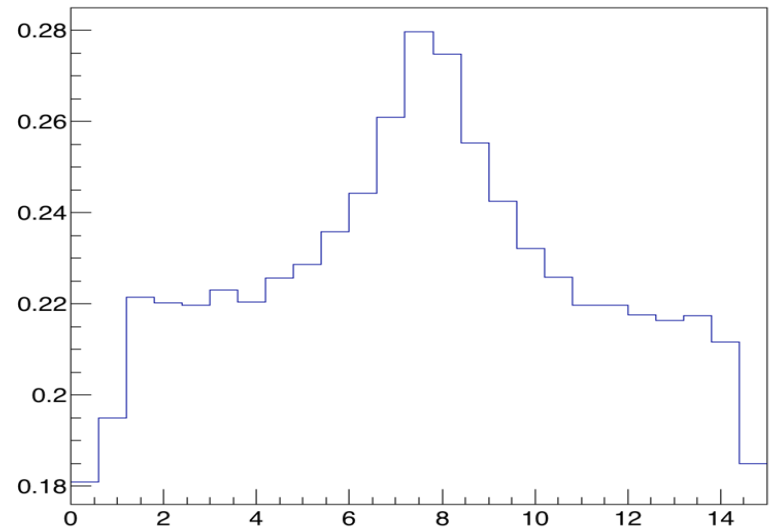
Averaged rows for 1D projection (x)

Y at bin 16



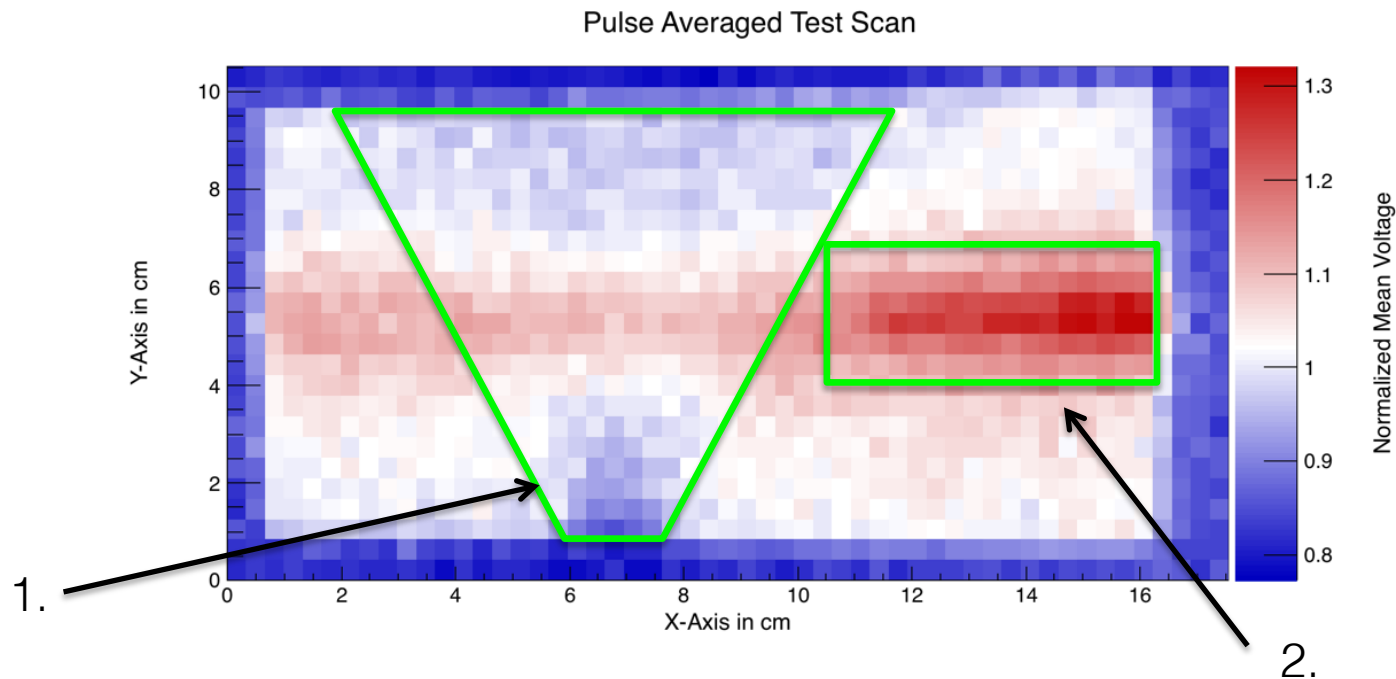
Averaged rows for 1D projection (y)

High at bin 45



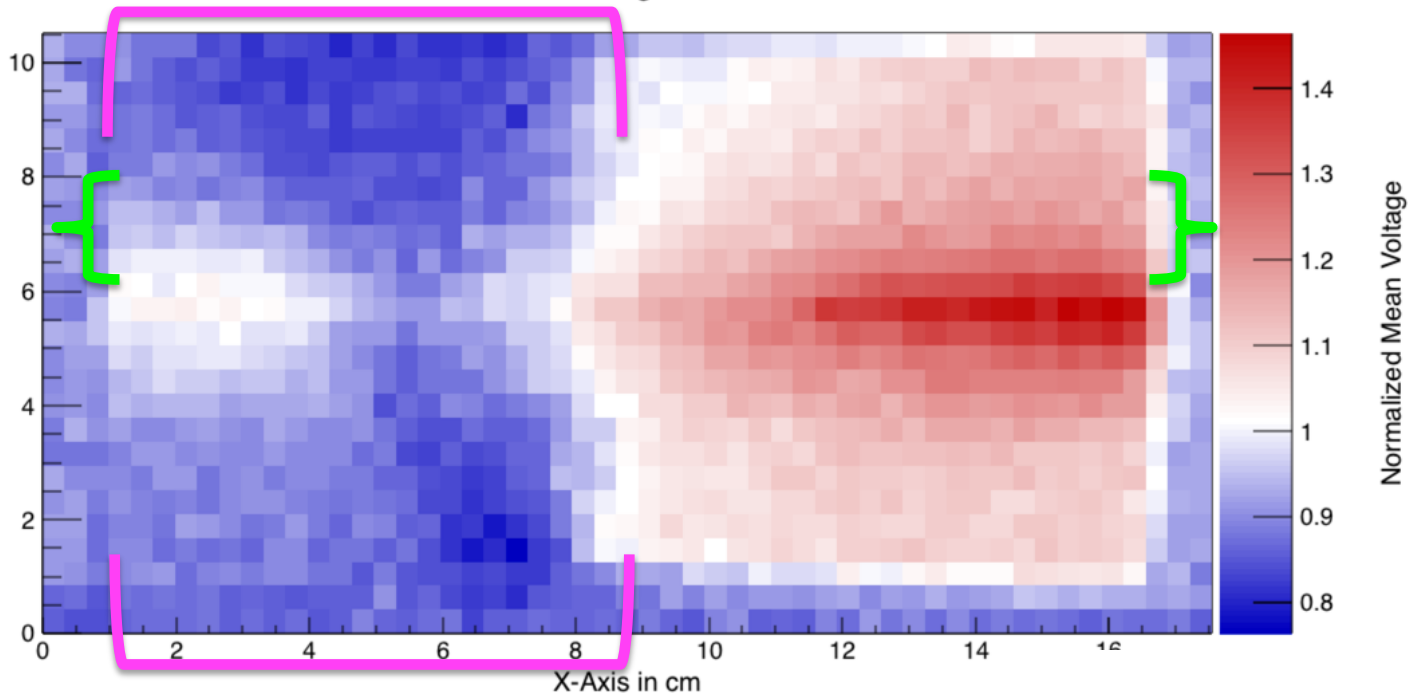
Notable Features

1. There is a cone-shaped region on that tile projected forward from PMT coupling region. Could be due to a trigger bias - PMT triggers more often in exposed window region, lower energy signals from SiPMs will bias the mean voltage value of the distribution (binned in 2D histogram). Future tests adjusting trigger threshold on PMT will help to diagnose/eliminate the issue.
2. There is a hot region in the middle of the right half of the tile, independent of which SiPM data is being taken on. Could be due to irregularities in panel or better coupling between fiber and panel on the right side.



2. Mylar wrapped, half black

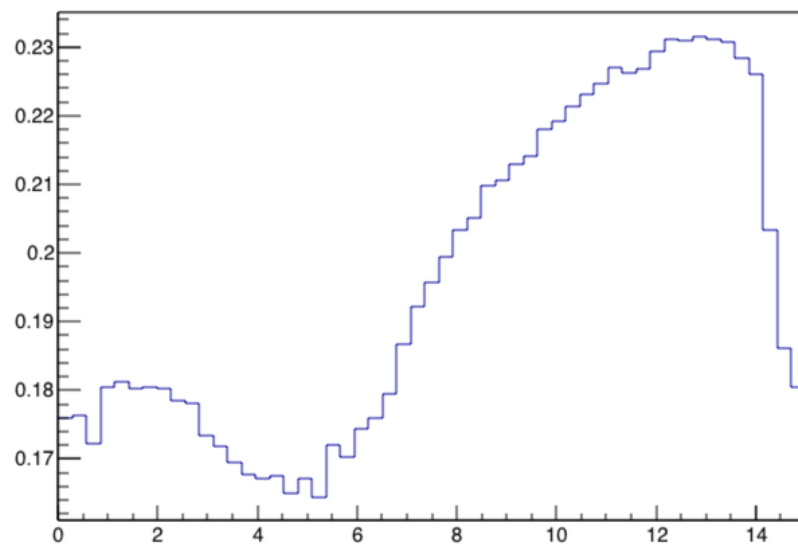
Pulse Averaged Test Scan



Averaged rows for 1D projection



Black covering



What's next:

- The new test stand is operational! We will be beginning initial tests this week.
- We are in the process of using SLitrani program to simulate light maps from scintillator tiles in order to verify current results. Will have initial results in the following weeks.
- We have procured samples of Kuraray multi-clad WLS fibers (15 m of S-type, 15 m of non S-type). We plan to test fibers in a blank panel (white coating) with identical geometry and fiber layout as the tile in the previous slides. We plan to test light yield from single vs. multi-clad fibers.

