MicroBooNE Vertical Slice Test

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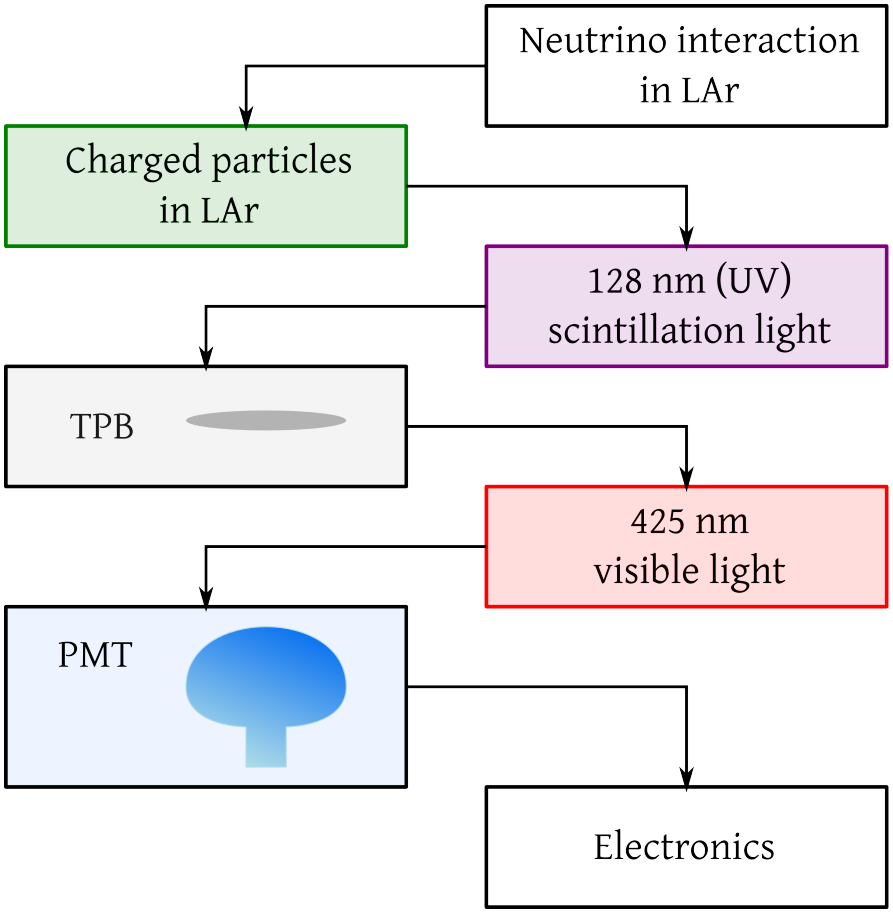
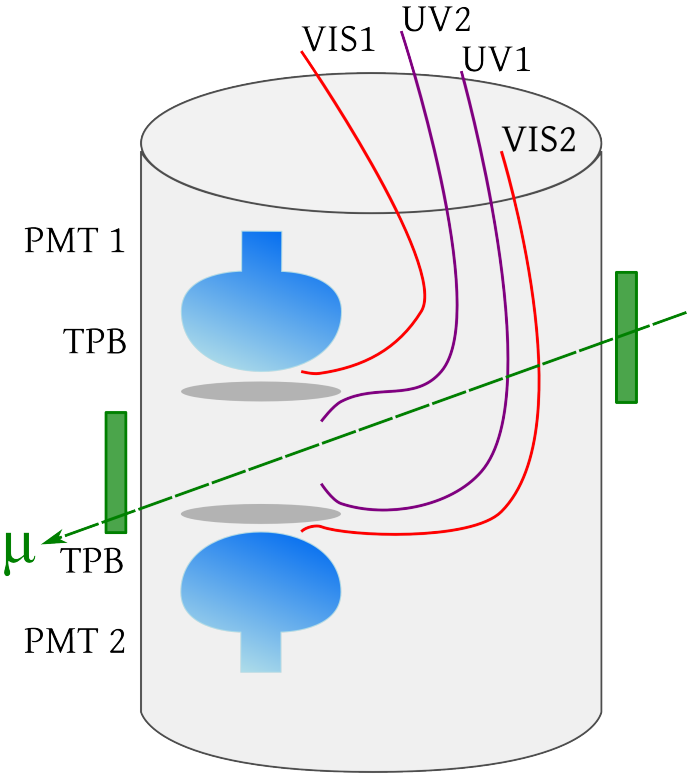
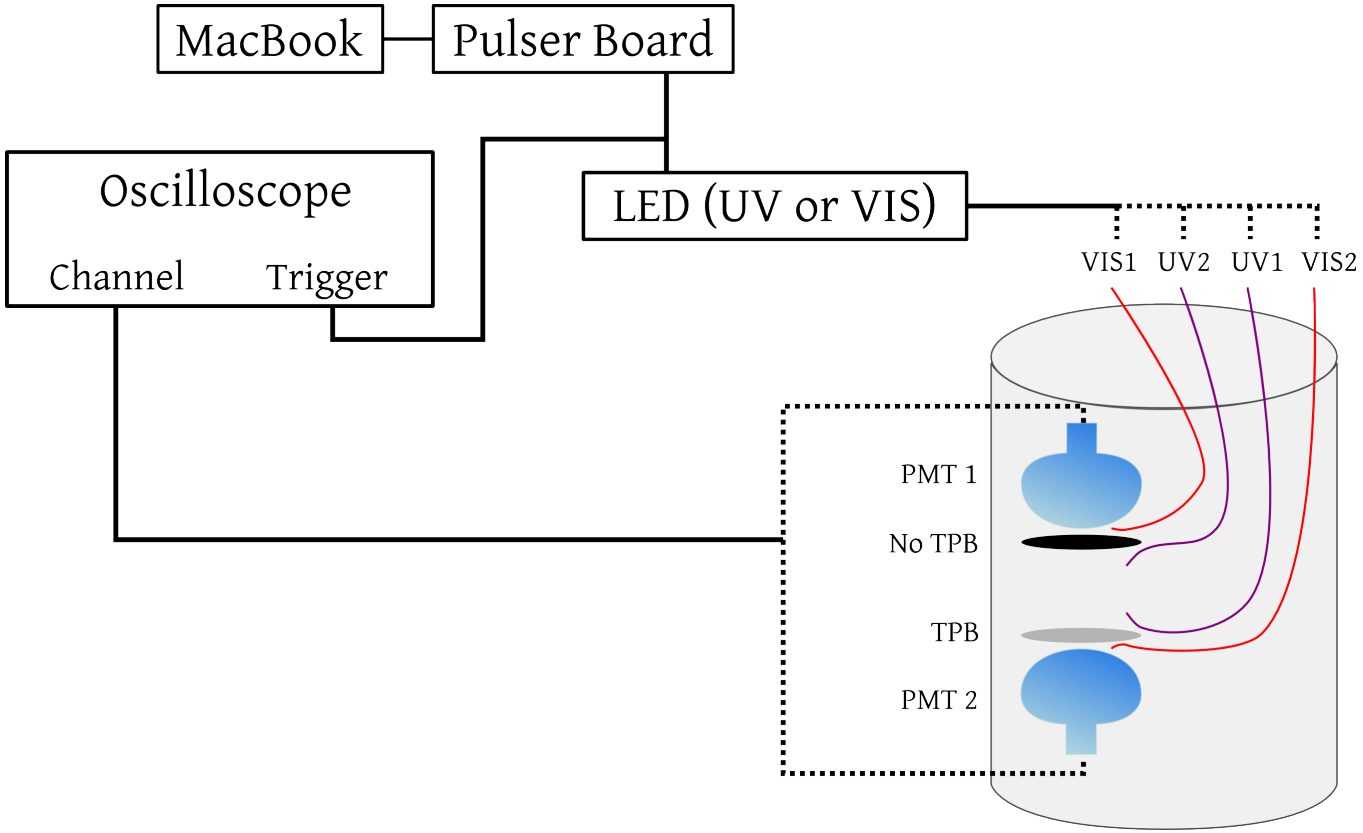
Light Collection in MicroBooNE



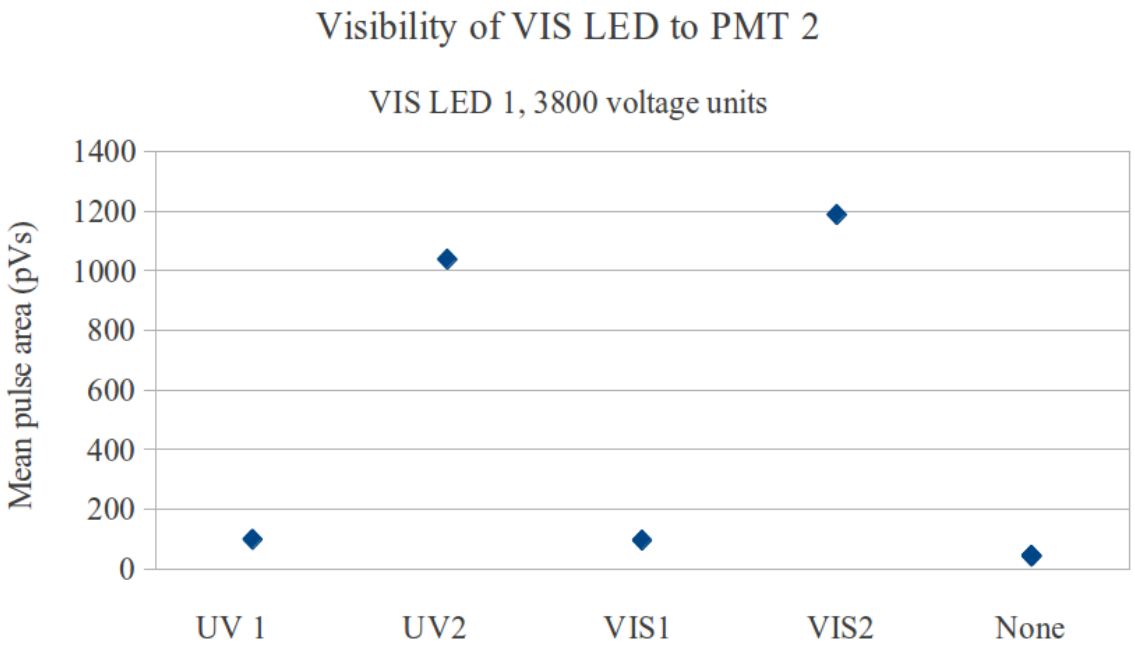


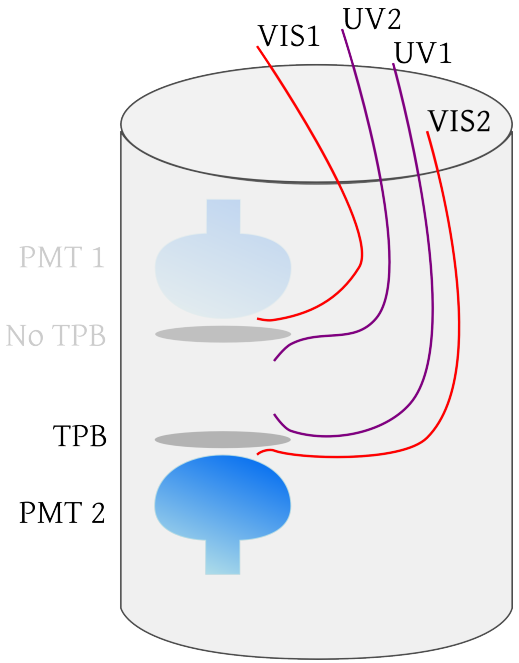
Examining LED visibility



- PMT 1 is a prototype
- PMT 2 is a MicroBooNE PMT

Revisiting visible light visibility (PMT 2)

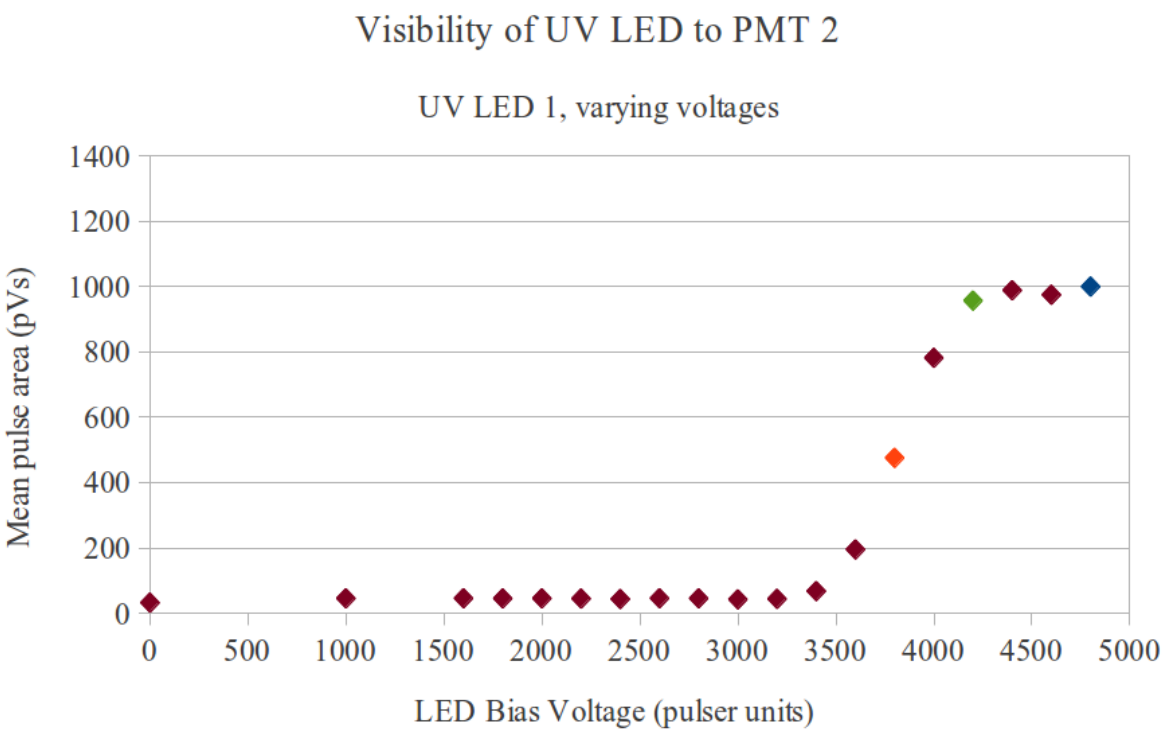


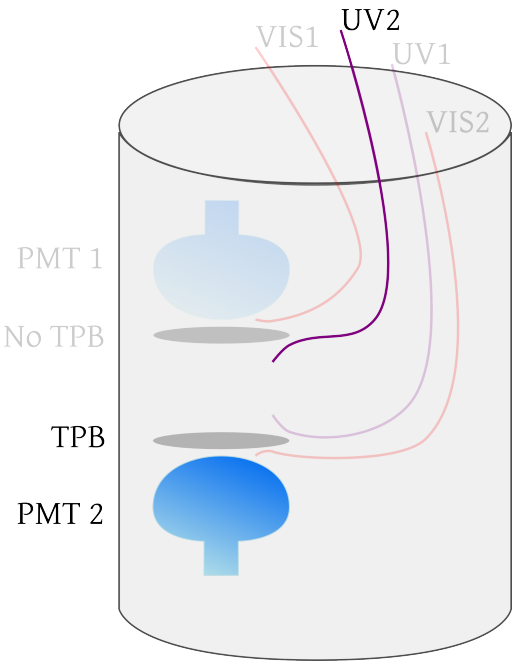


- PMT 2 sees visible light only when it is directed towards the PMT.

  → Light shielding may not be completely necessary.

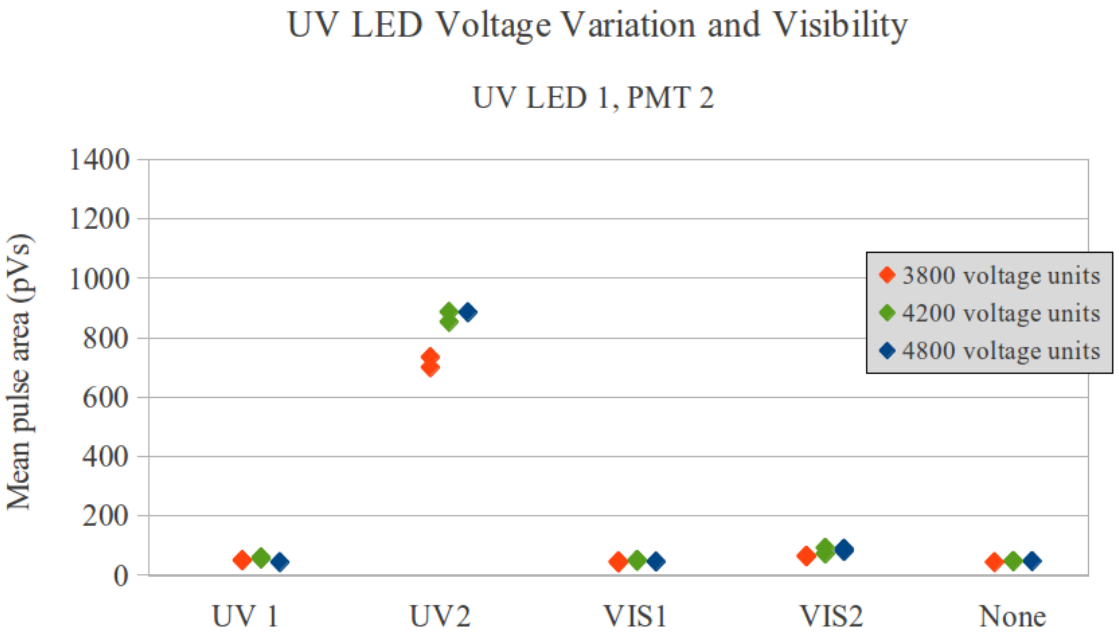
Characterizing UV LED with PMT 2

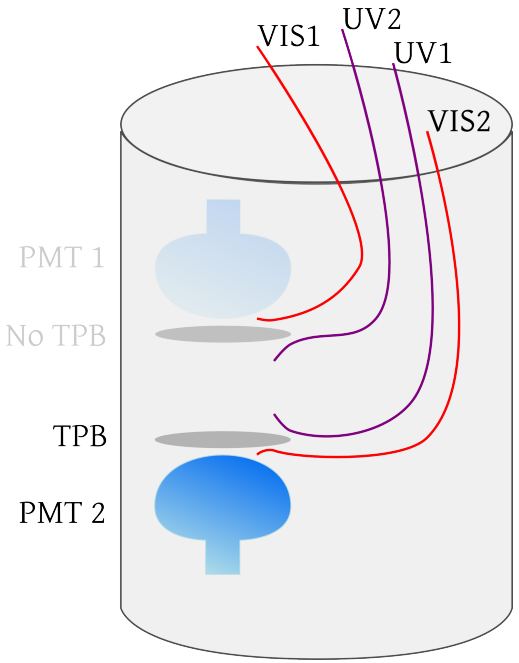




- Similar characterization curve as visible LEDs

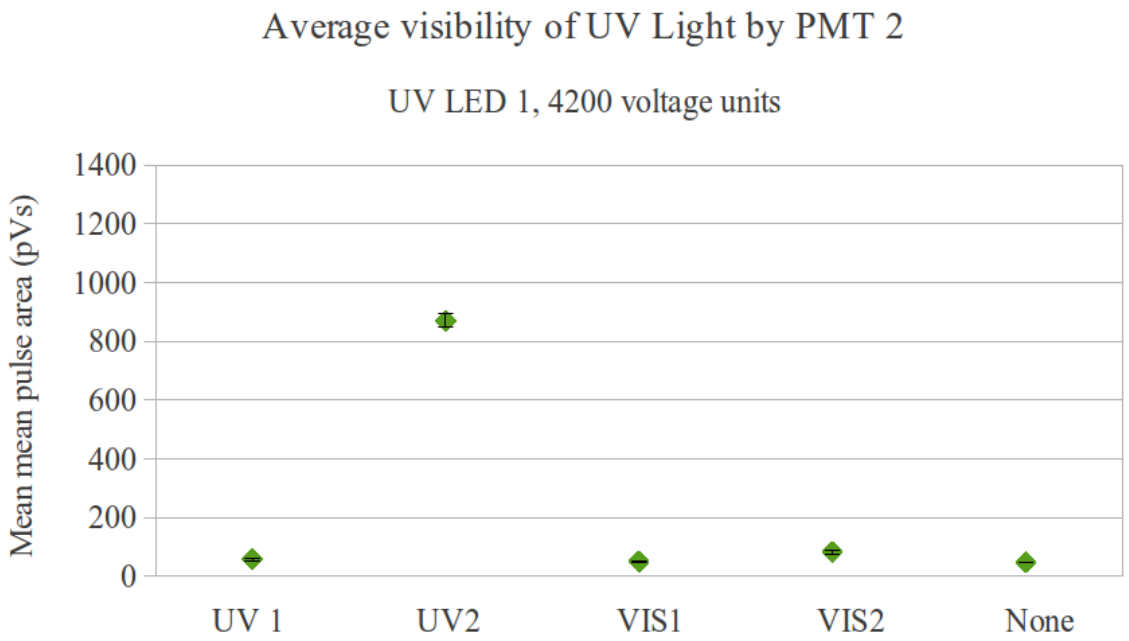
Visibility of UV LED to PMT 2

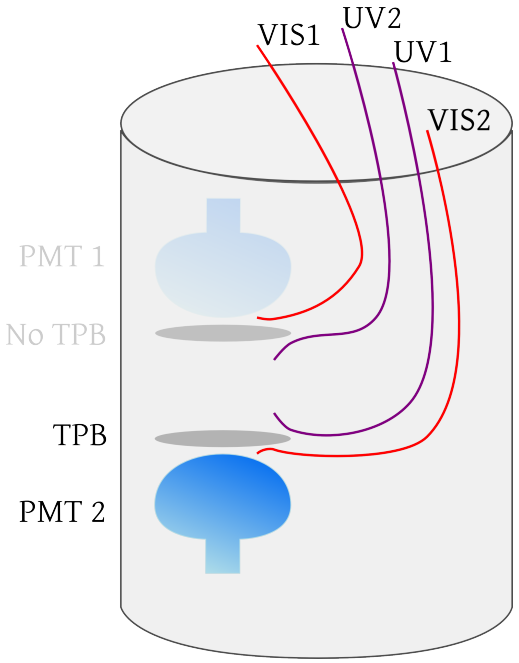




- UV light into fiber UV2: signal increases with LED voltage.
- UV light into fiber VIS2: small increase, however PMT 2 still cannot see much UV.

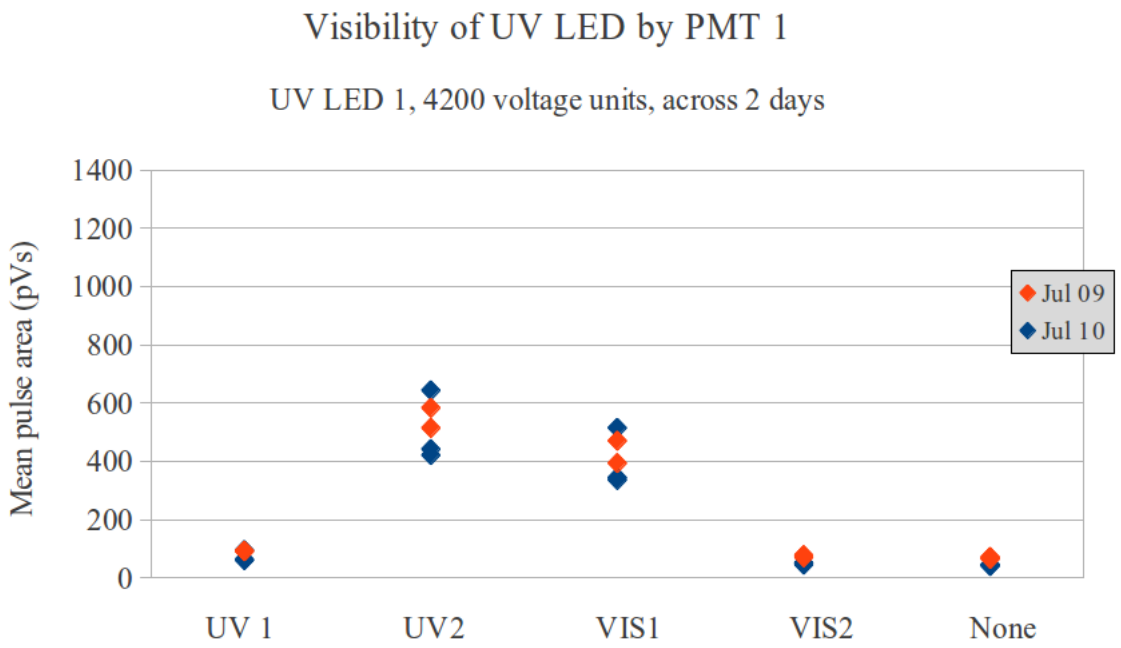
Systematics from reconnecting LEDs for PMT 2

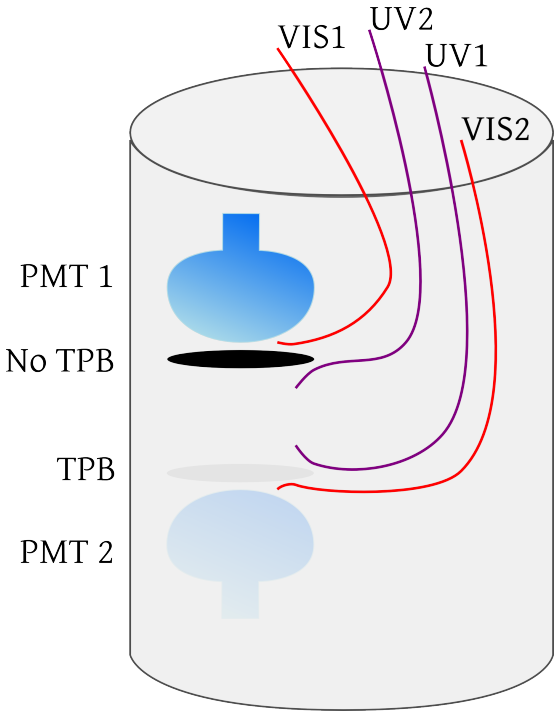




- Small error bars indicate high consistency between disconnecting and reconnecting light source.

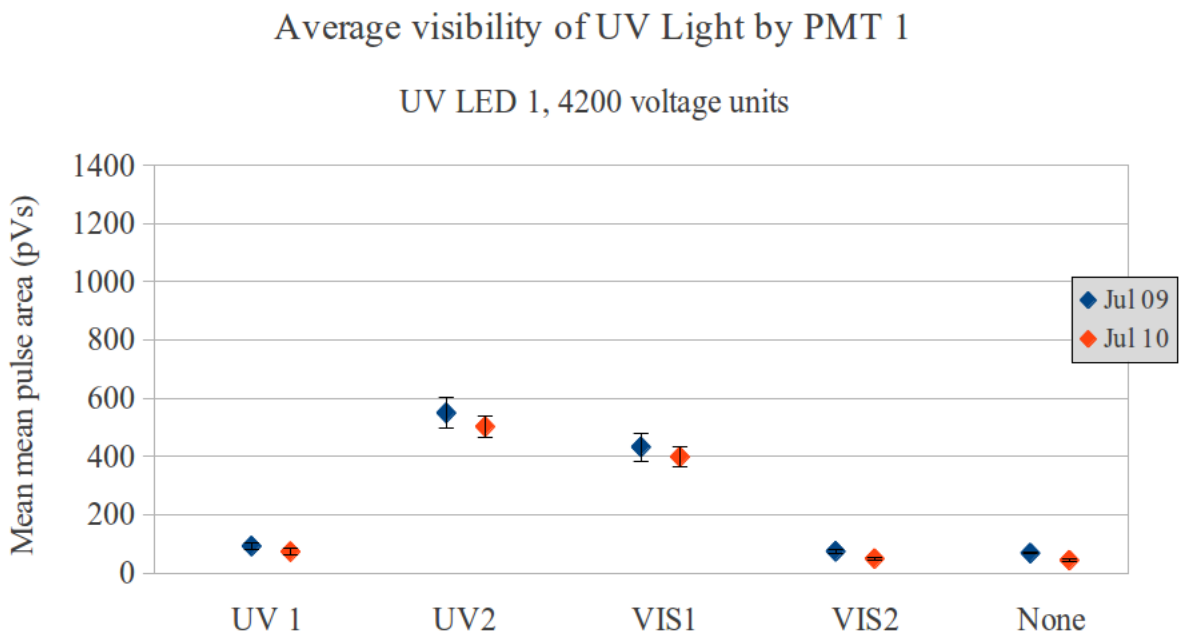
Visibility of UV LED to PMT 1

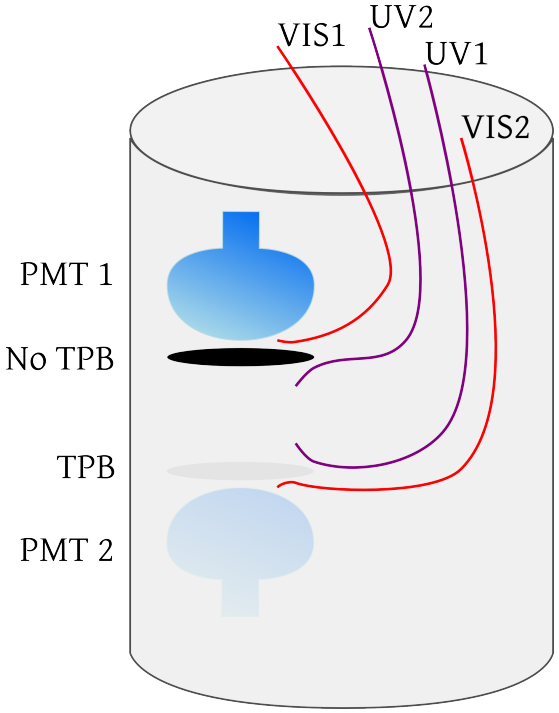




- UV2 fiber points to a TPB-coated plate; TPB reemits light isotropically
- Visibility of UV LED to PMT 1 through VIS1 fiber requires additional study
  - UV1 fiber farther from PMT 1 than UV2 fiber is from PMT 2
  - No noticible TPB on surface on PMT 1

Systematics from reconnecting LEDs (PMT 1)





- Similar consistency for PMT 1, including day-to-day.

Next studies

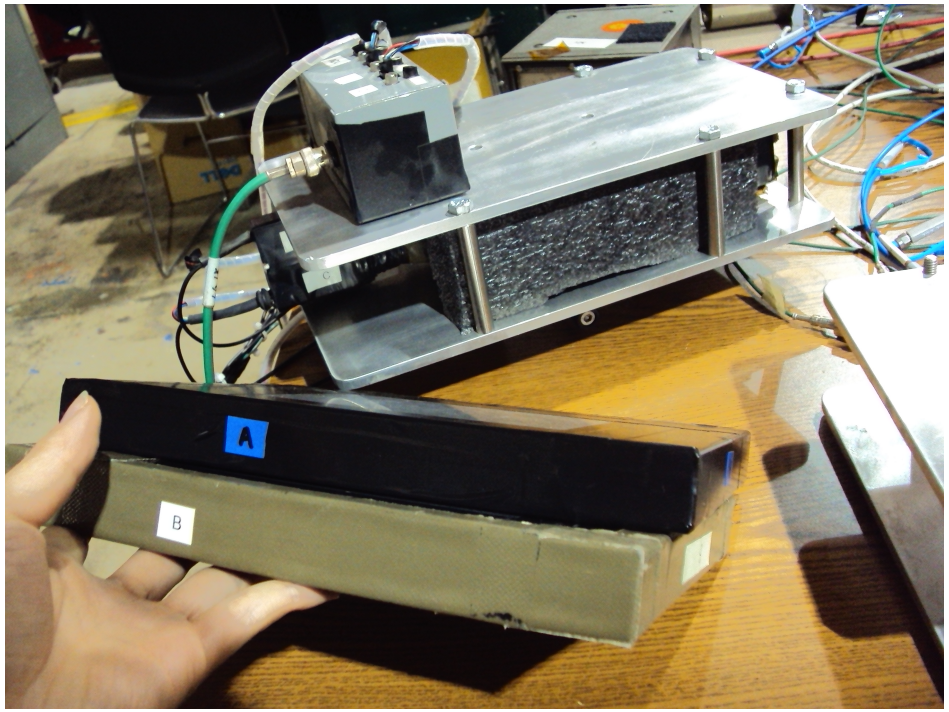
- Without moving fiber locations, place PMT 2 into PMT 1 slot and examine visibility to UV light

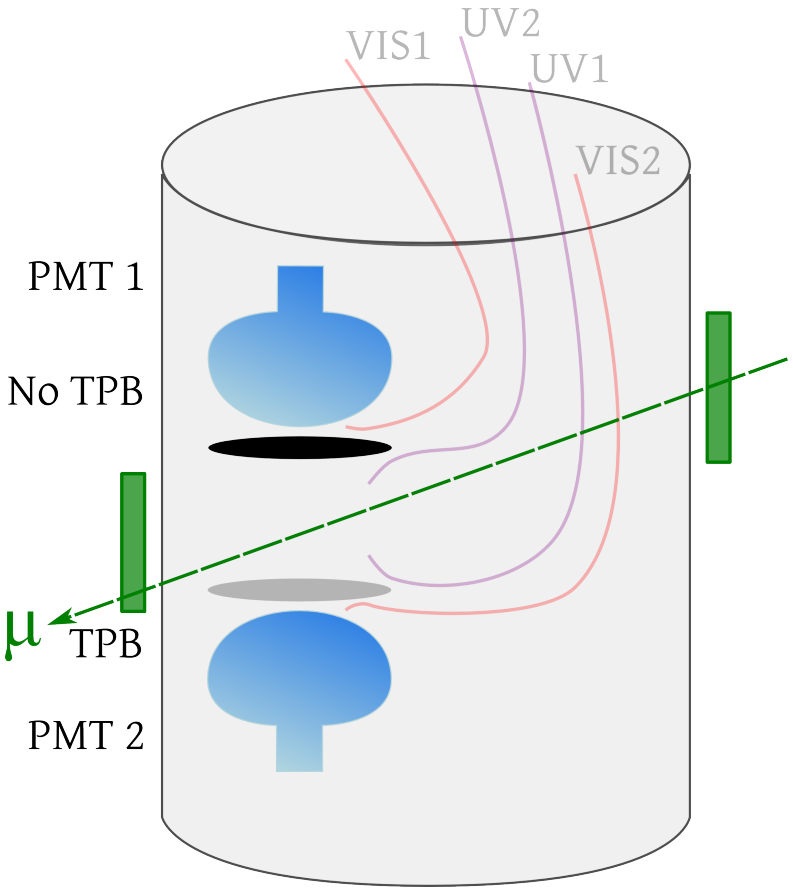
  $\rightarrow$ Determine whether UV visibility is PMT-dependent
- Connect one LED to its corresponding fiber, and measure PMT response hourly

  $\rightarrow$ Demonstrate level of consistency if optical connection is untouched

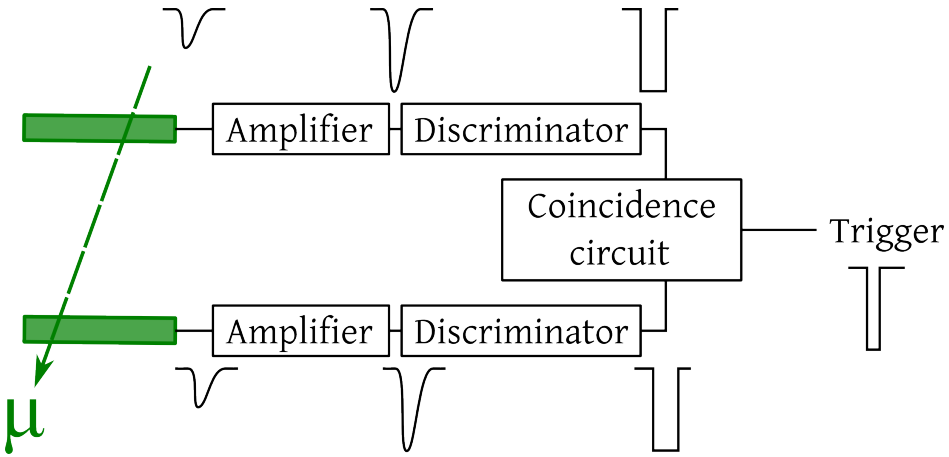
Installation of Cosmic Ray Trigger

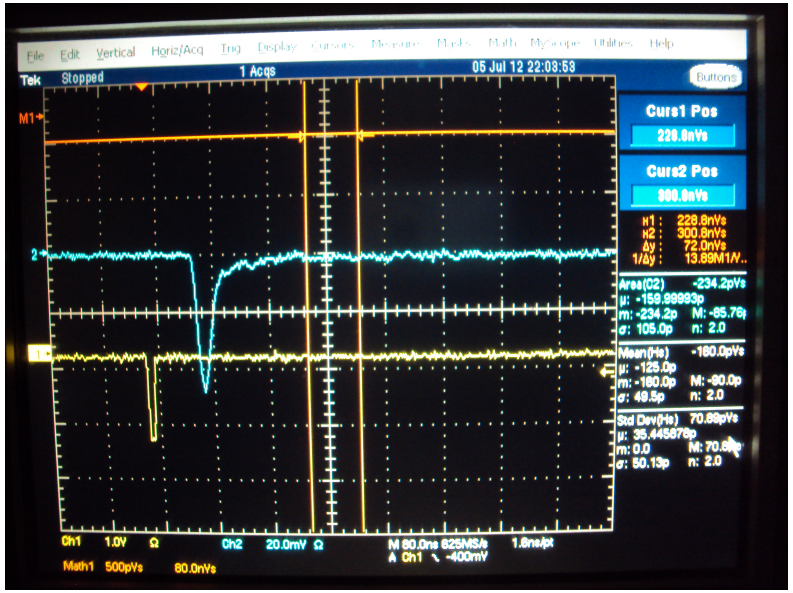
Paddle dimensions:
6"x 8" and 4"x 6"





Cosmic Ray Trigger





- We can trigger on cosmic ray muons and see PMT pulses
- Approximate rate of 1 every 3 minutes

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