SiPM-on-tile Light Yield Studies (Update)

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Outline

- The presentation during the last meeting about light yield measurements with cosmic rays included results with poor statistics.
- Today, I will be showing a follow-up presentation with high-statistics data collected using a beta source (strontium-90).

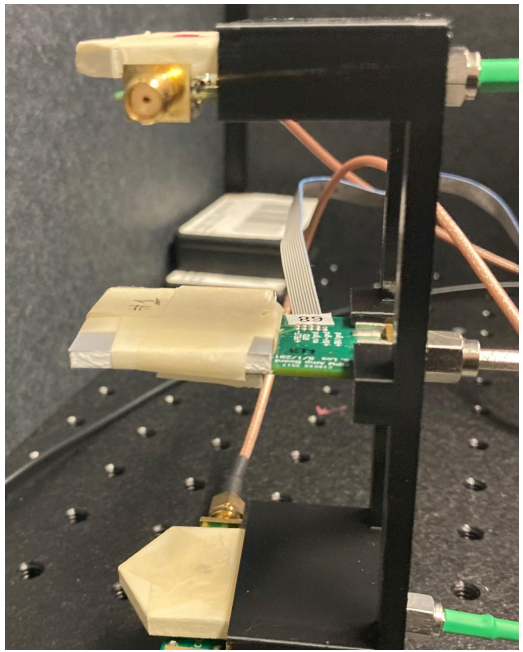
Cosmic Ray Setup

Three fold coincidence, SiPM on tile

Full-waveform digitizer readout with DRS4 board.

14160-1315PS SiPM operated at +2V

Data collected for middle SiPM and Scintillator.



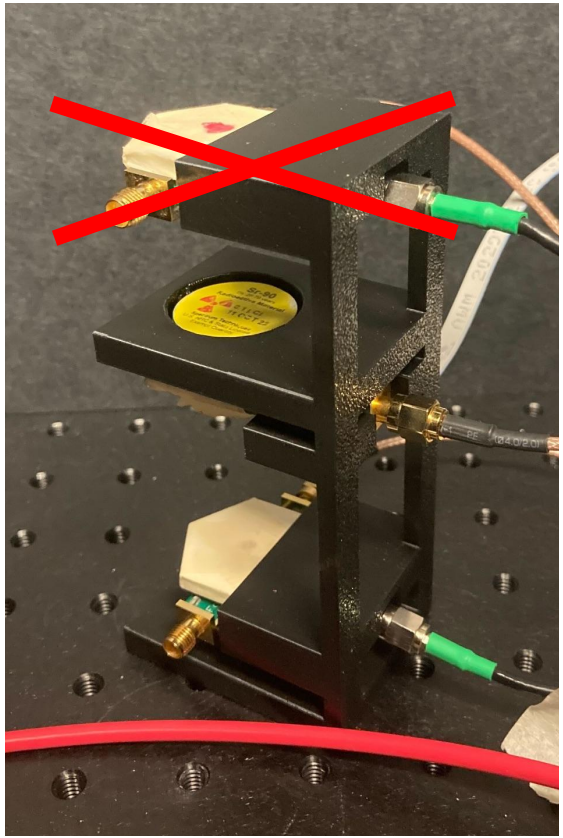
Sr-90 Source Setup Setup

Triggering on bottom SiPM on tile only.

Full-waveform digitizer readout with DRS4 board.

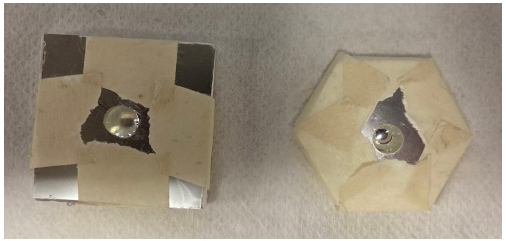
14160-1315PS SiPM operated at +2V

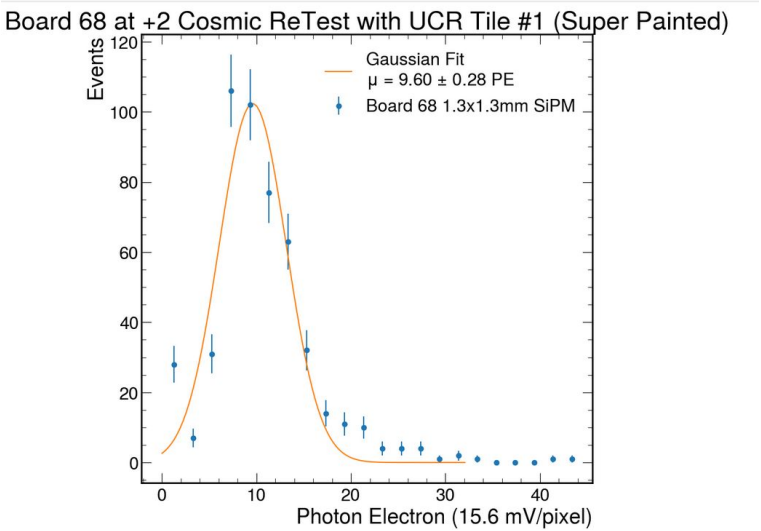
Data collected for middle SiPM and Scintillator.

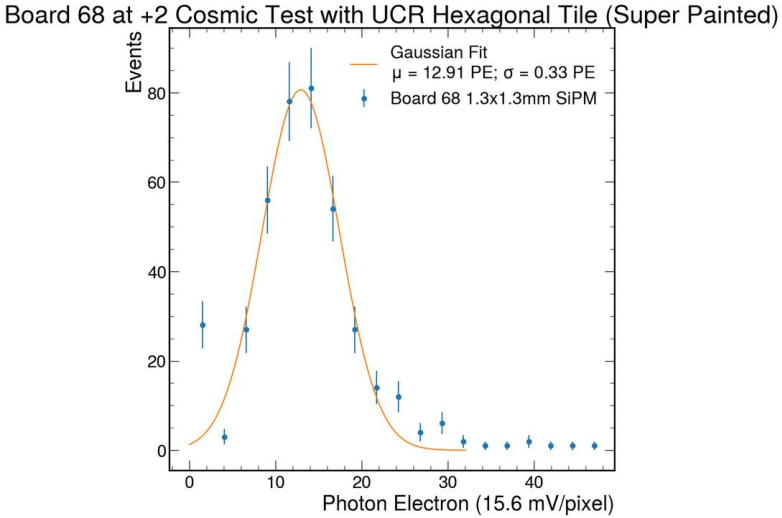


(Reminder: previous result with Cosmic Rays)

Hexagons Vs Squares (both UCR Manufactured)



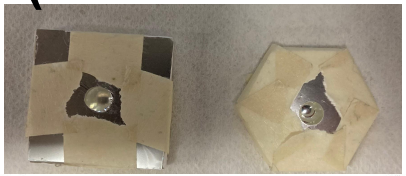


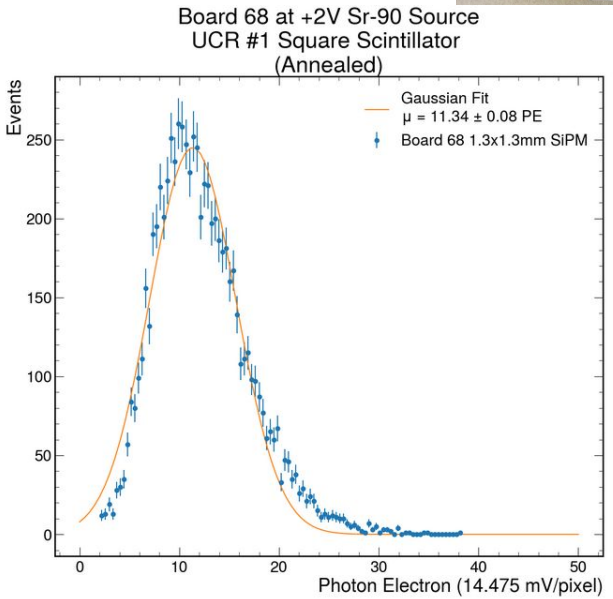


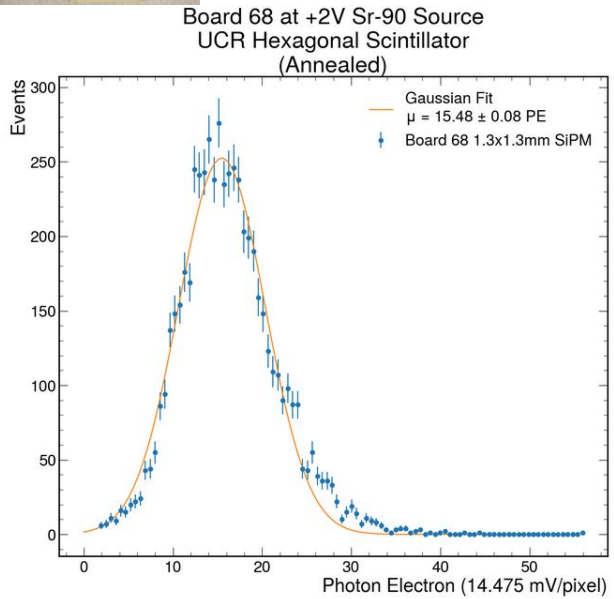
Hexagon ~34% higher light yield

(New results with Sr-90)

Hexagons Vs Squares (both UCR Manufactured)







Hexagon ~37% higher light yield, statistically compatible cosmic ray results

Summary

- **Sr-90 high-statistics results compatible with low-statistics cosmic ray result**

- **Hexagonal shape ~35% higher light yield wrt to squares (both machined scintillator).**
  This empirical result is compatible with expectation, since what matters is distance-to-SiPM.

  For a given area, hexagons have smaller max distance-to-SiPM -> larger yield