

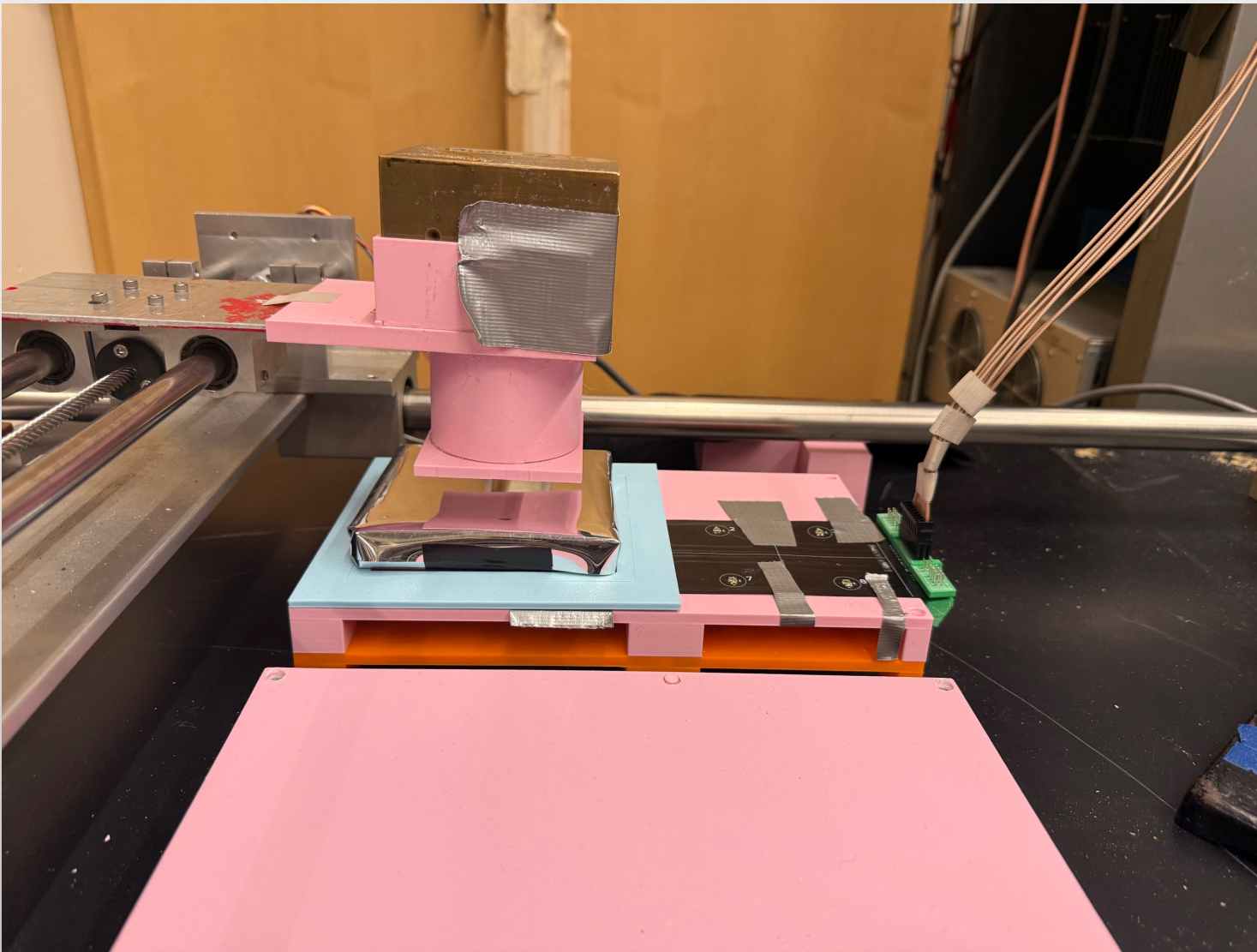
Tile Testing Summary

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Setup

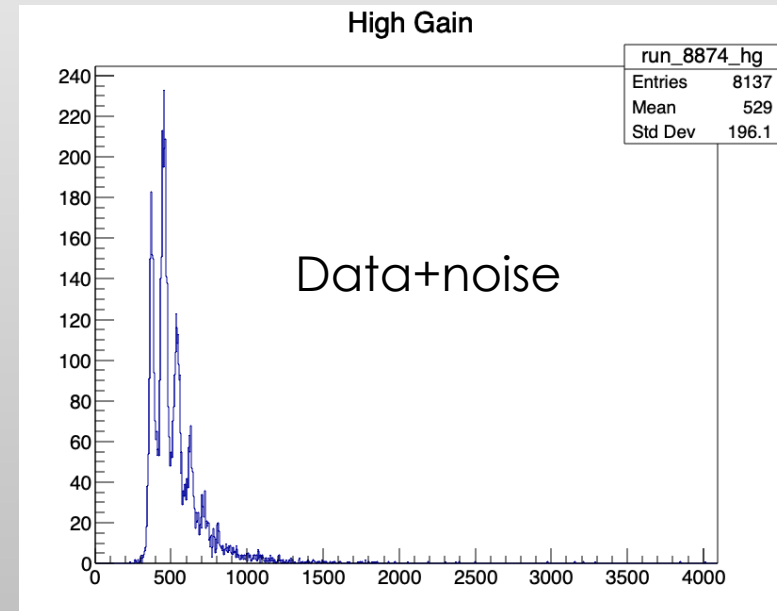
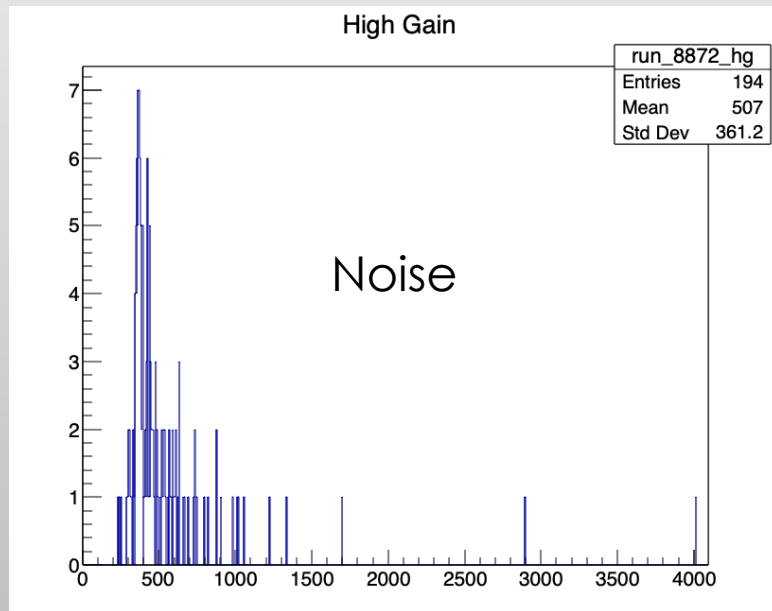


- Sr90 beta source
- Source moved through a list of positions via x-y table
- Tile centered over SiPM
- Readout through CAEN module

When running, lights are off and multiple layers of black felt is placed over the tile+PCB

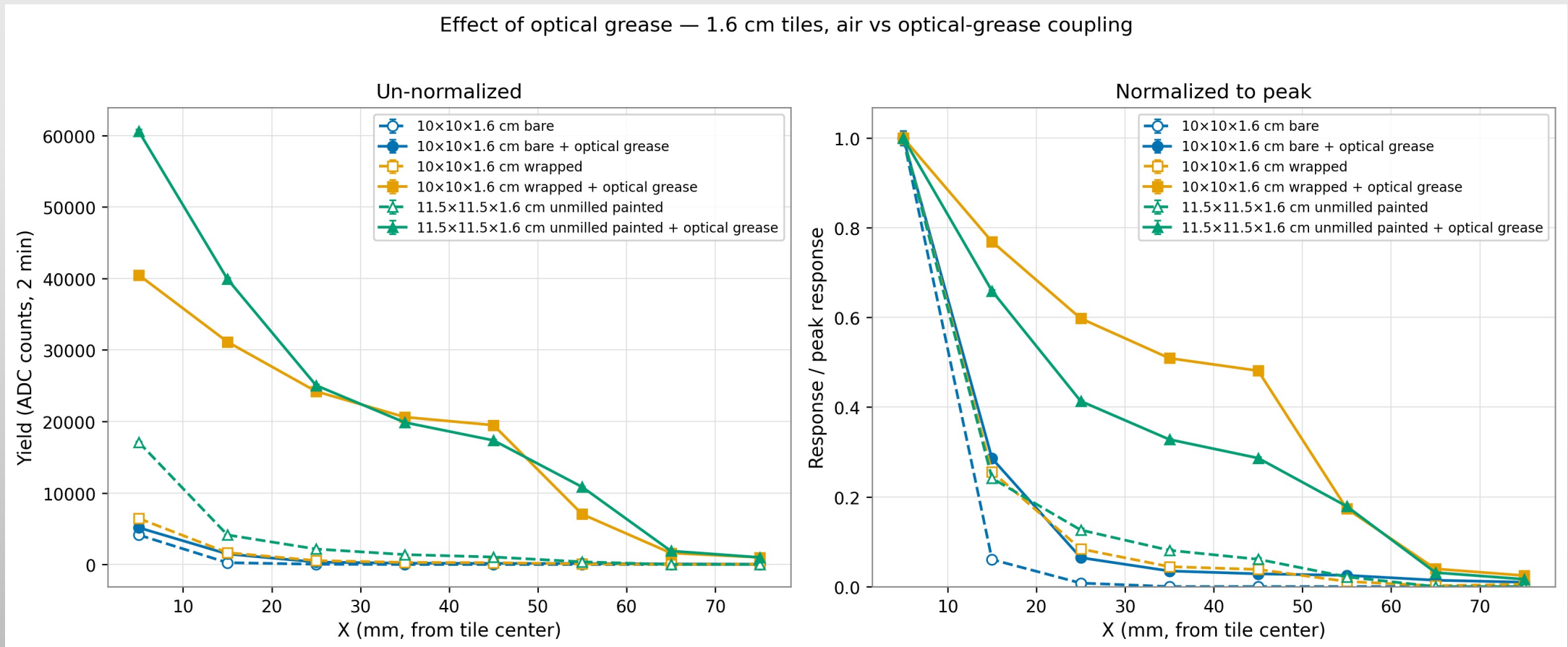
Note on data collection

- Note: all of the points in these plots are integrated over the ADC spectrum read out of the SiPM, and noise-subtracted.
- The noise is sampled at the start and end at each run, and generally is $< 5\%$ of the total yield.

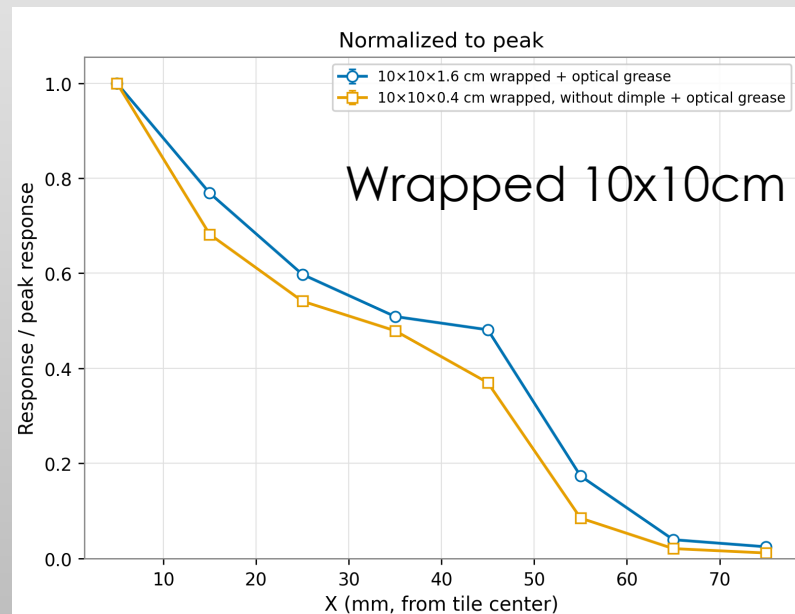
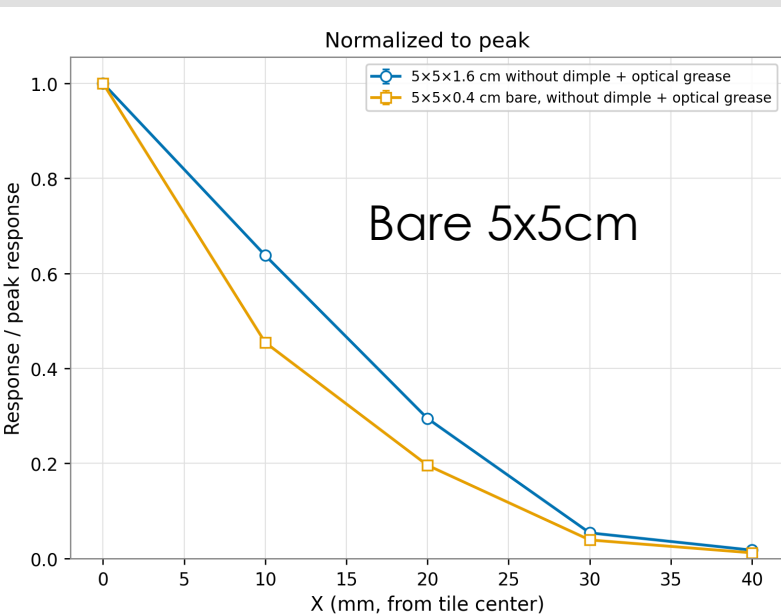
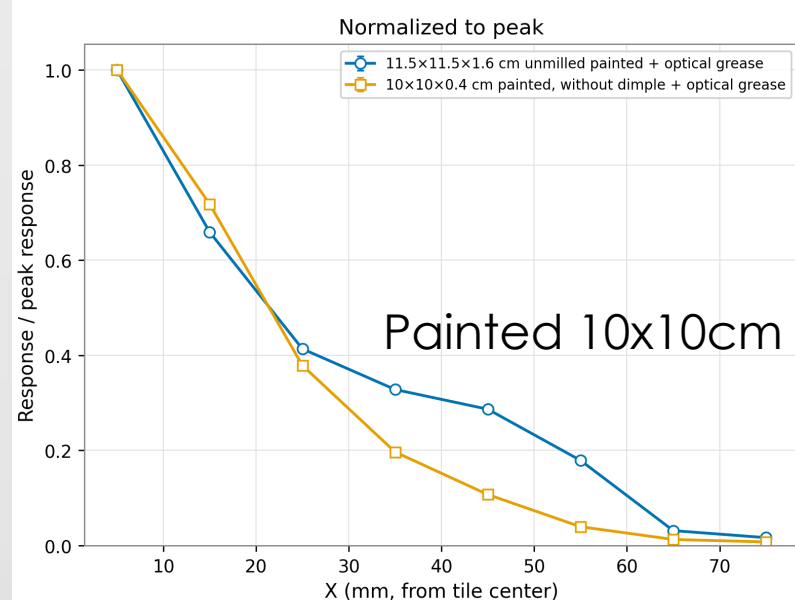
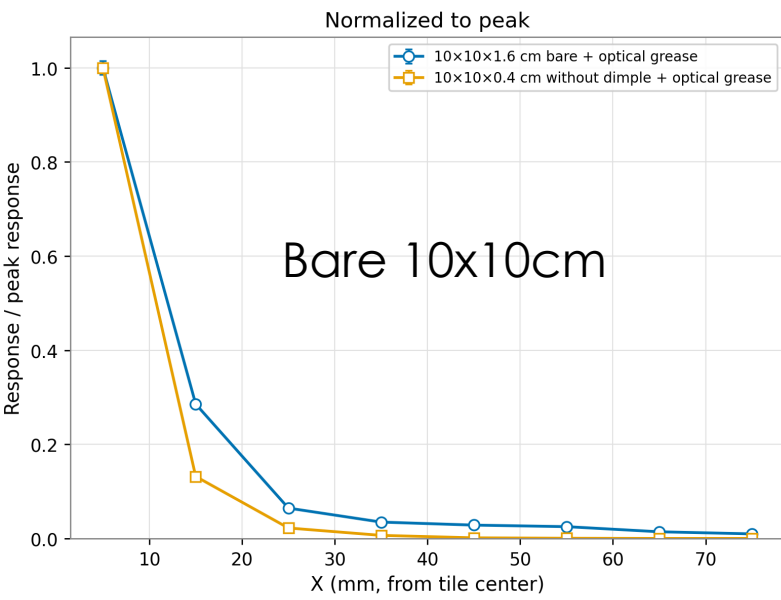


1. Effect of Optical Grease

- Optical coupling has a very strong effect: a factor of up to ~3.5 increase in yield, and up-to 45% improvement in uniformity at tile edges



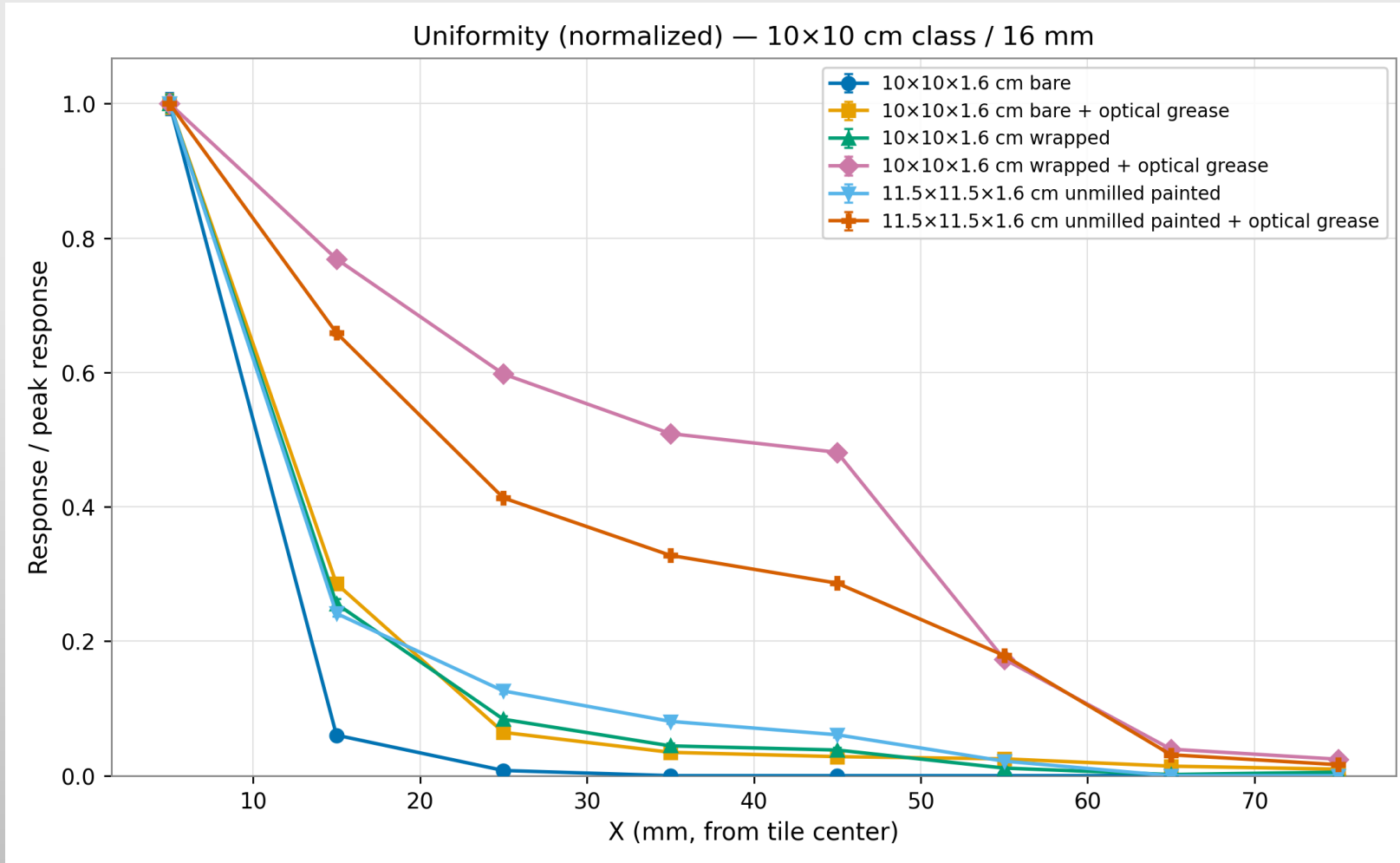
2. Thicker tiles are more uniform



- Thicker tiles seem to be uniform with all else the same.

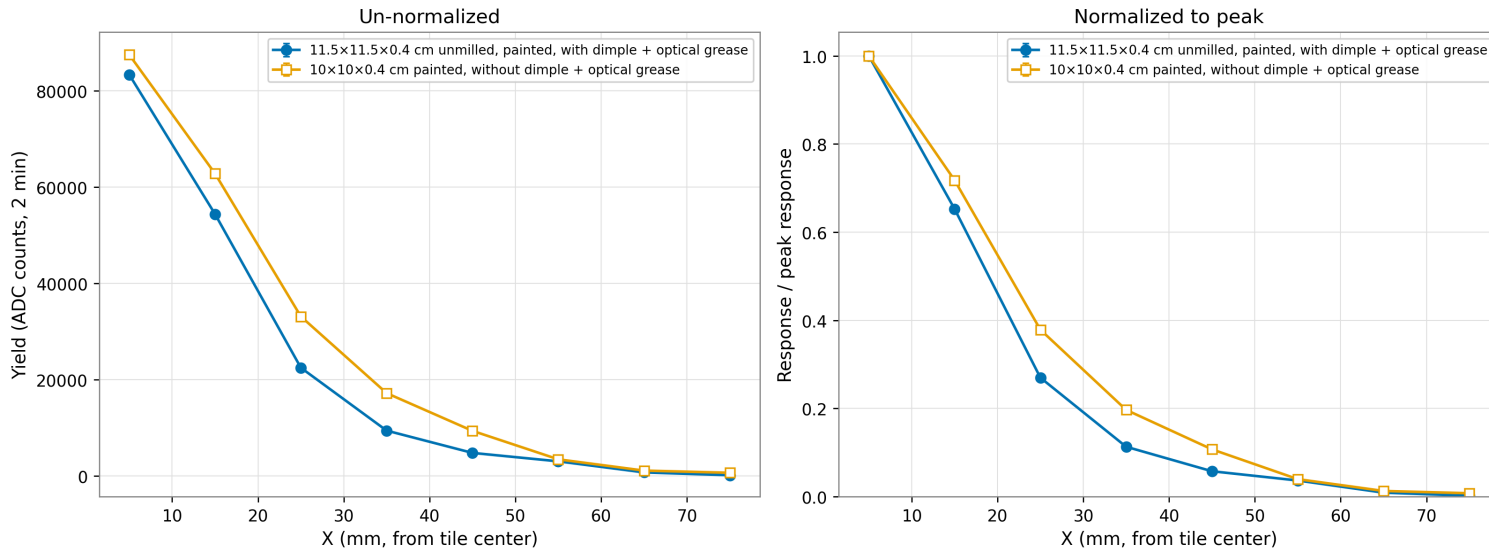
3. Wrapping>Painting>>Bare

- Wrapped tiles are more uniform than painted ones.
- Painted tiles are much more uniform than bare ones.

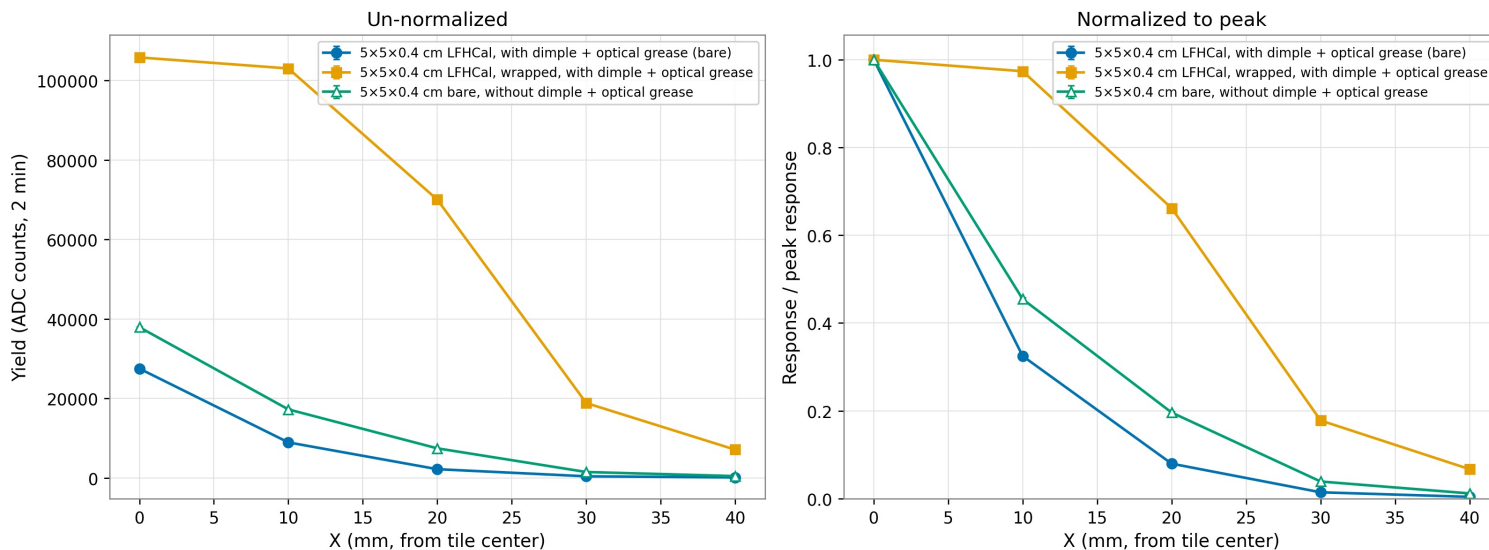


4. Dimple has small effect on uniformity

Effect of dimple — 4 mm painted + optical grease (unmilled 11.5 cm with dimple vs milled 10 cm without)



Effect of dimple — 5x5x0.4 cm LFHCal tiles vs 5x5x0.4 cm without dimple



- Tiles with dimples have are slightly lower yield and slightly less uniform.
- Bottom plot compares the bare and wrapped LFHCal tile in our setup as well.
- Unfortunately we don't have a wrapped comparison for no dimple 5x5x0.4cm (yet)

Backup

Day-to-Day and Run-to-Run variation

- There is significant run-to-run and day-to-day variation in absolute yield (re-seating tile on SiPM, bad coupling, genuine mistakes, etc)
- The uniformity, however, is more consistent than the yield

