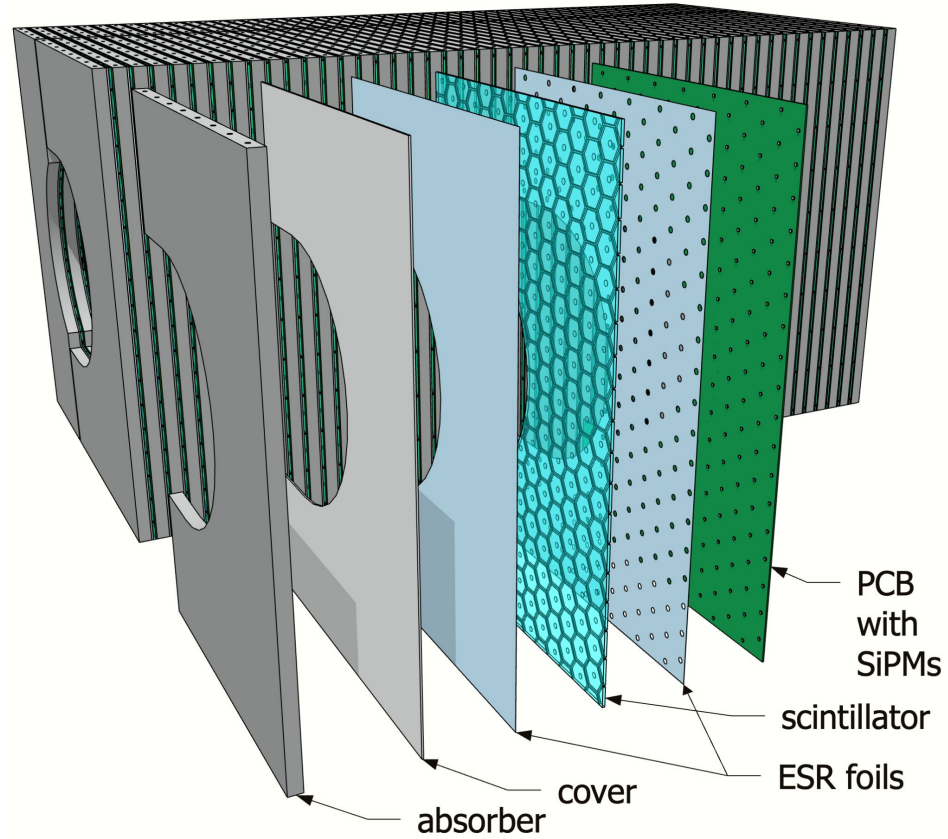


# Characterization of Scintillator Cells for Calorimeter Insert

Arratia Lab  
UCR  
Miguel Rodriguez

# Introduction

EIC Calorimeter Insert.

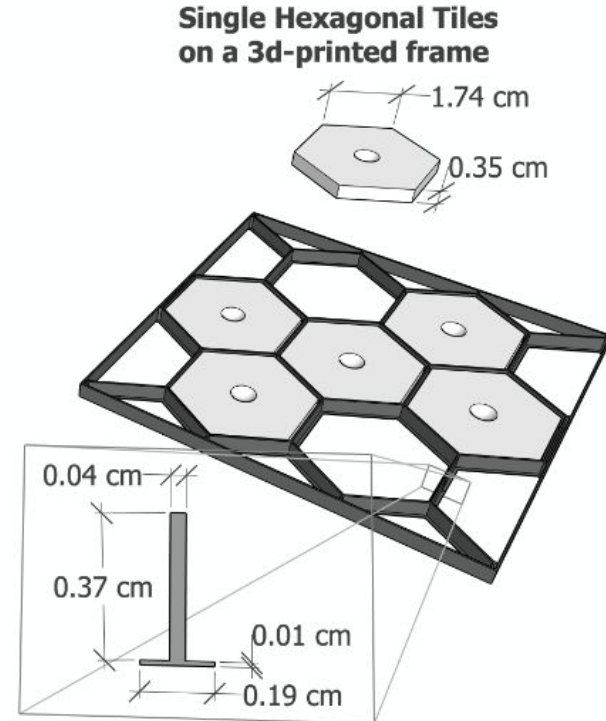
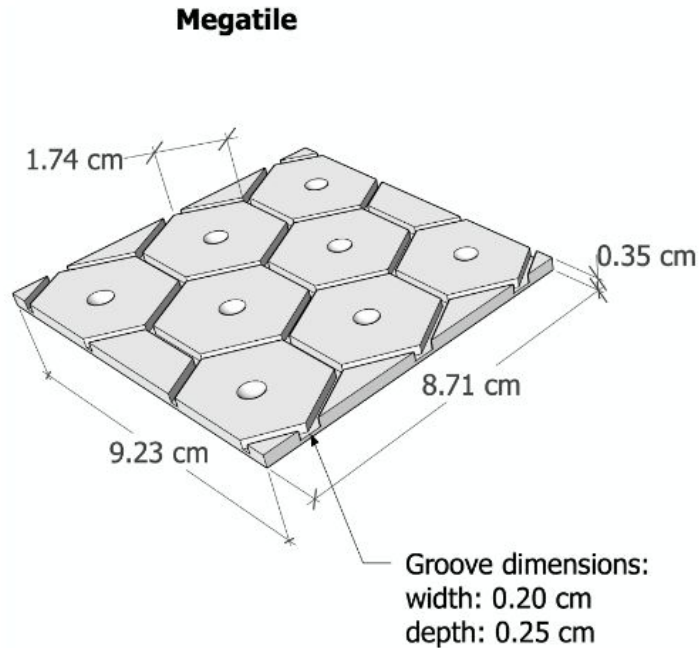


# Introduction

Scintillator Cells and Light Yield.

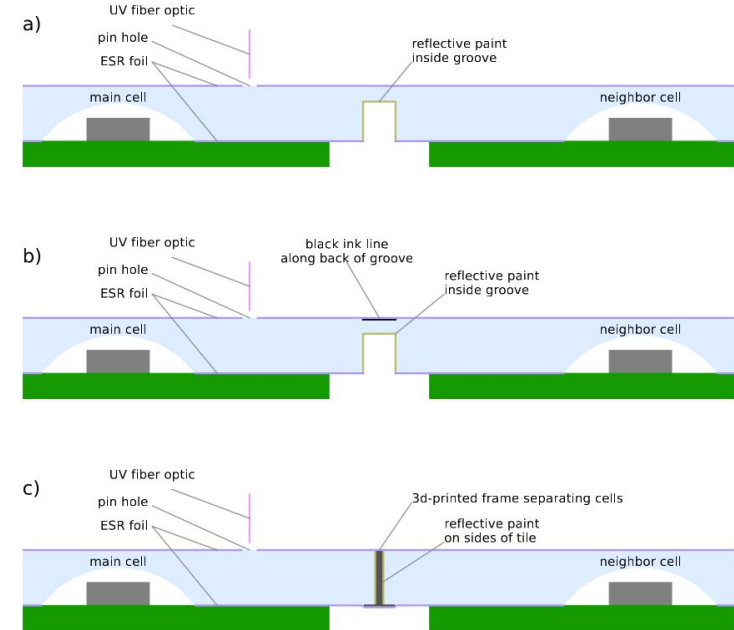
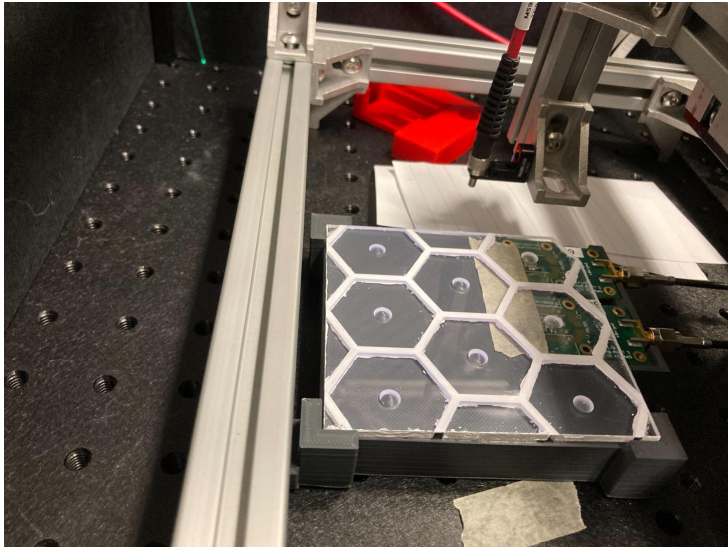


# Two Possible Arrangements Tested



# Cross Talk

Cross talk is checked to see how much light from a scintillator cell leaks into the neighboring cells.



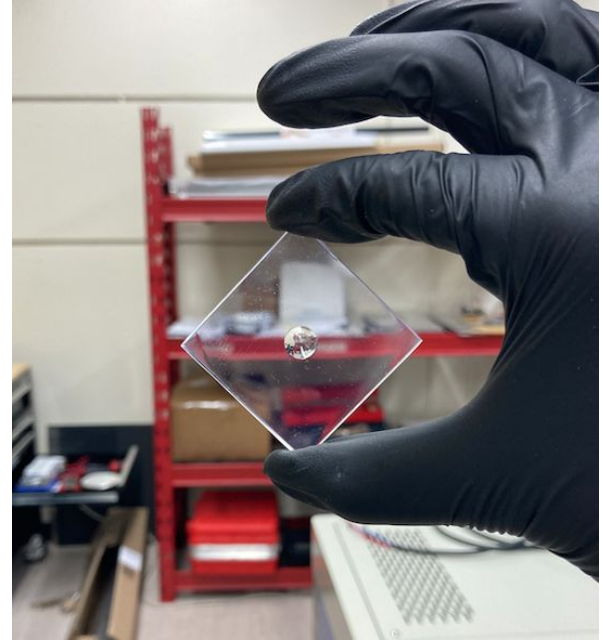
# Scintillators

Two types of Scintillators were used.

- Hexagonal

- Square

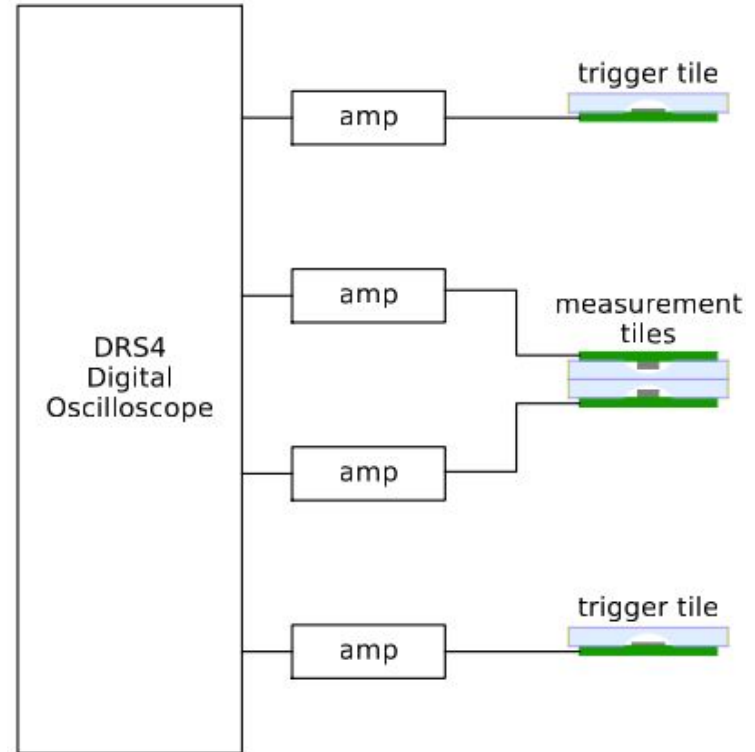
Scintillators were used so they had to be polished for better quality



# Light Yield Setup

Each SiPM is connected to an amplifier.

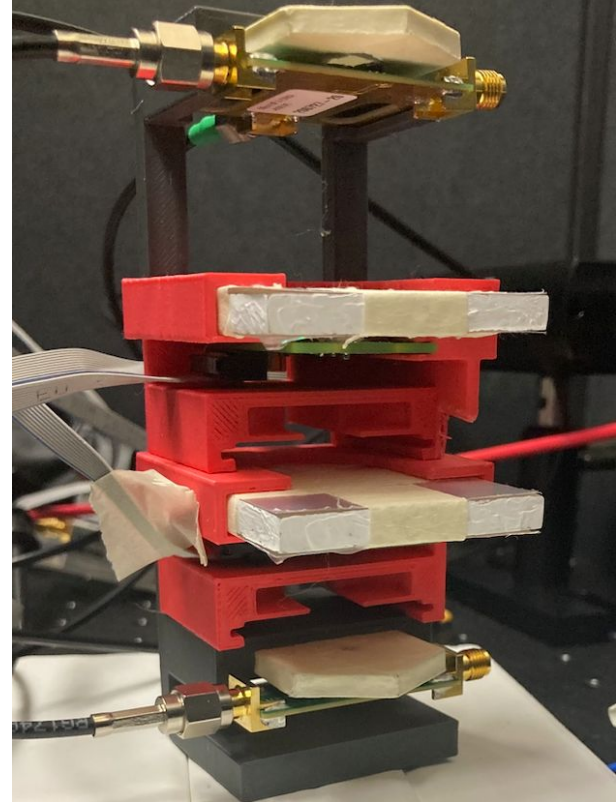
Signal is read into a Digital Oscilloscope.



# Light Yield Setup

Light Yield tests were done by using Cosmic-rays.

Sr-90 radioactive source was also used to quickly check the light source polished scintillators would emit.



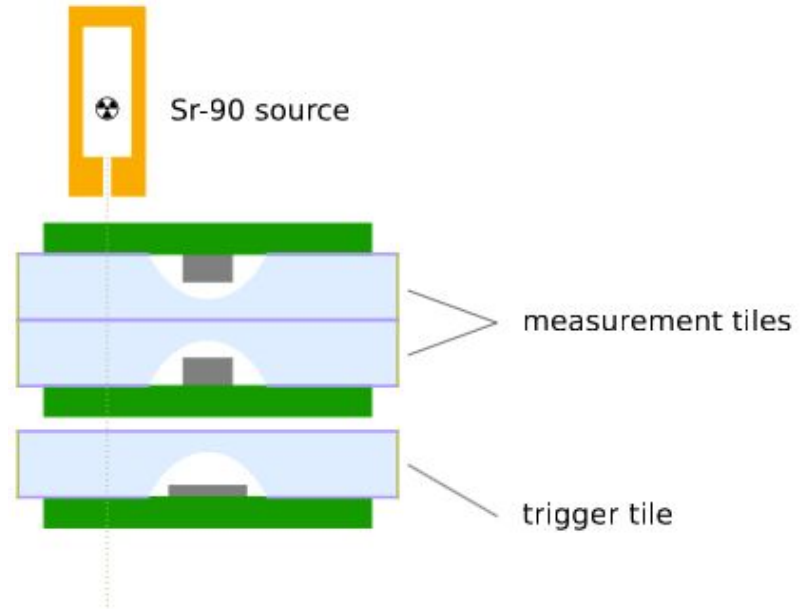


# Using Sr-90 Radioactive Source for Testing Light Yield

Sr-90 Source was placed above three SiPMs.

Used to measure light yield.

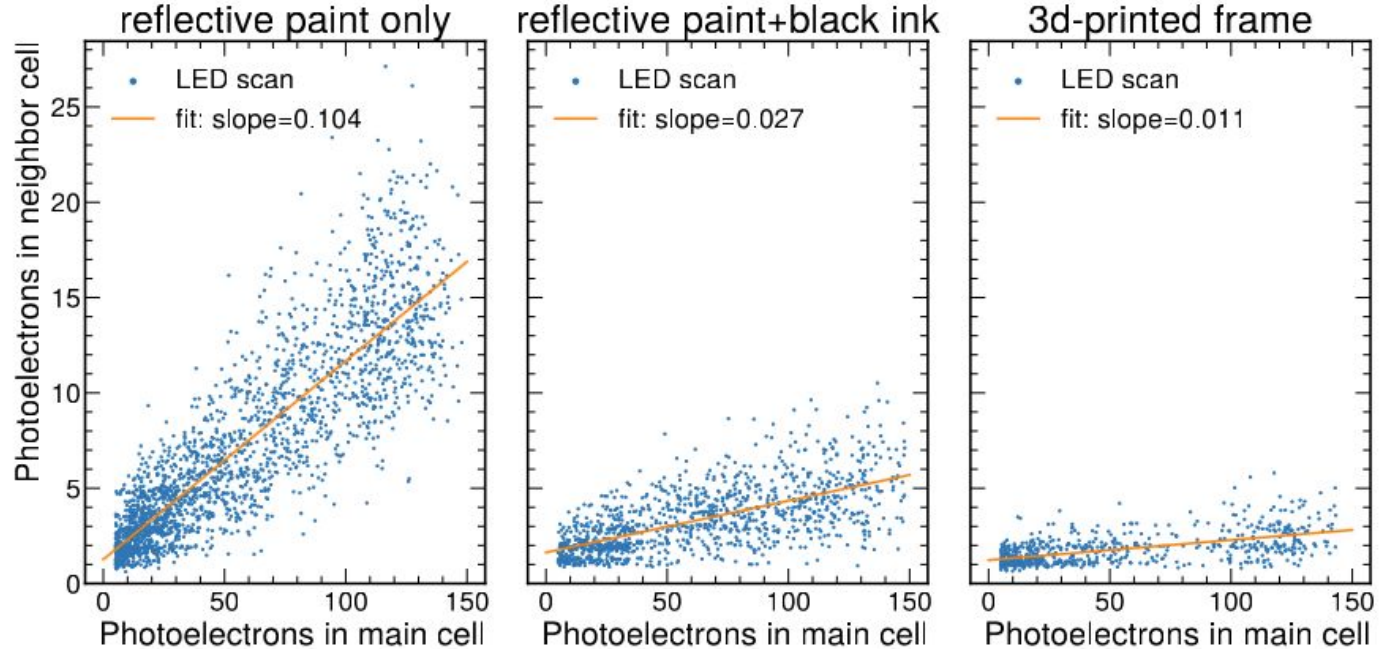
This setup was also used to find the timing resolution.



# Cross Talk Results

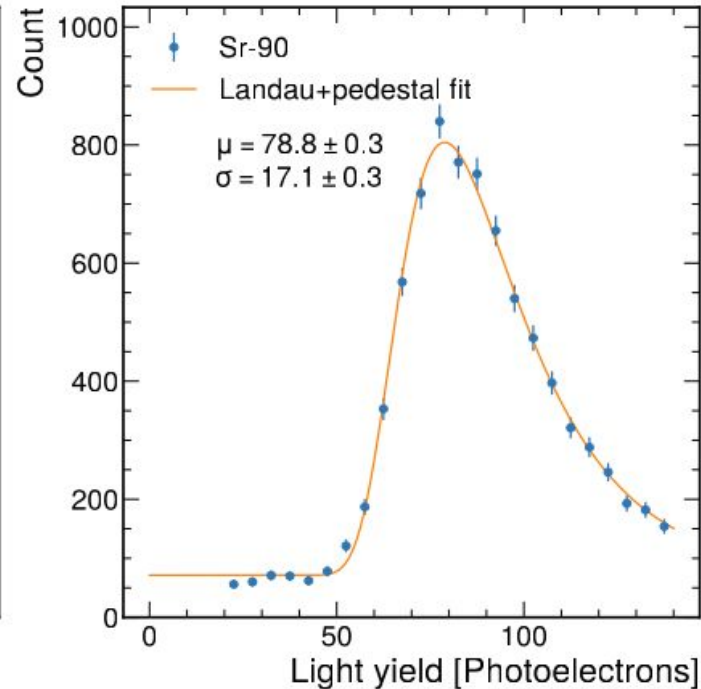
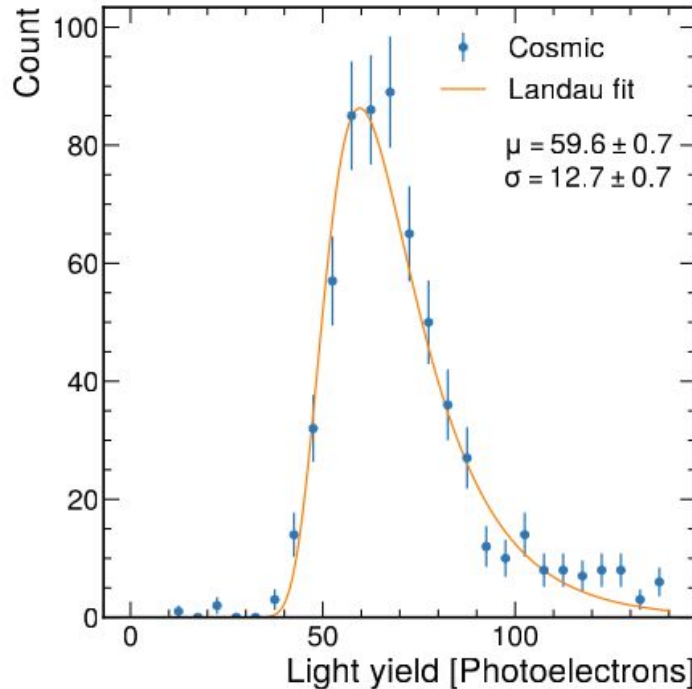
Results: The 3D printed frame had the least amount of cross talk,

3D printed frame suppresses cross talk.



# Cosmic Rays vs Sr-90 Radioactive Source

Cosmic Rays were recorded to create about 60PE. Sr-90 source was able to create a light yield at about 79PE

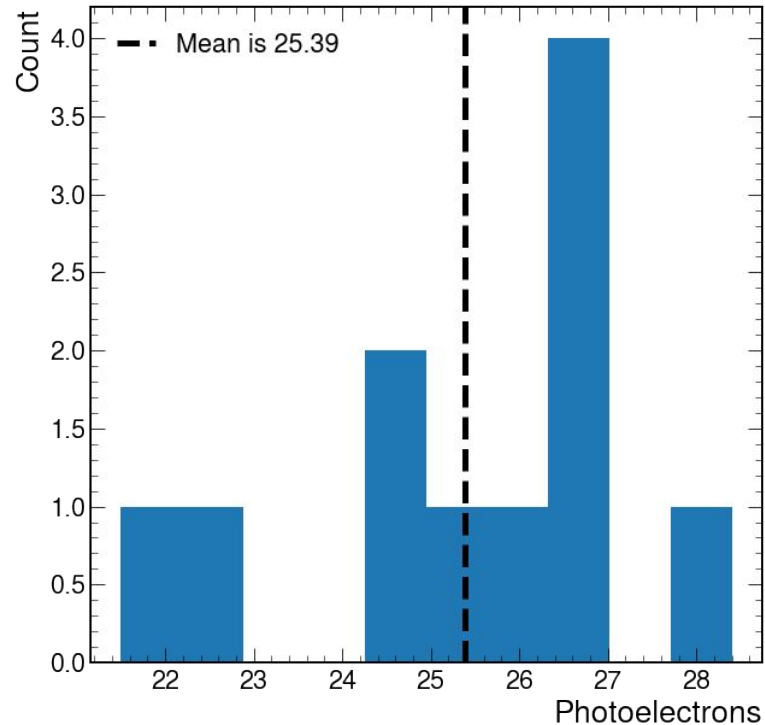


# Scintillators

Results of Scintillators that were polished in lab appeared to give off the following light yield with a mean of 25 Photoelectrons.

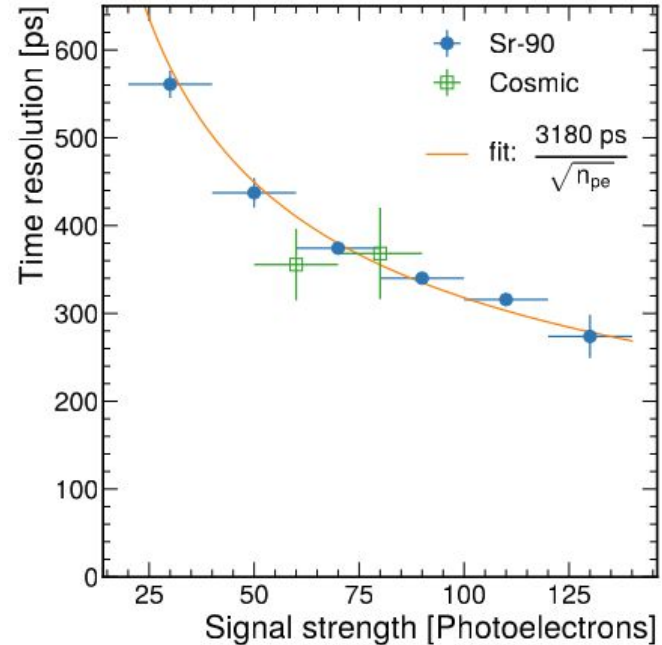
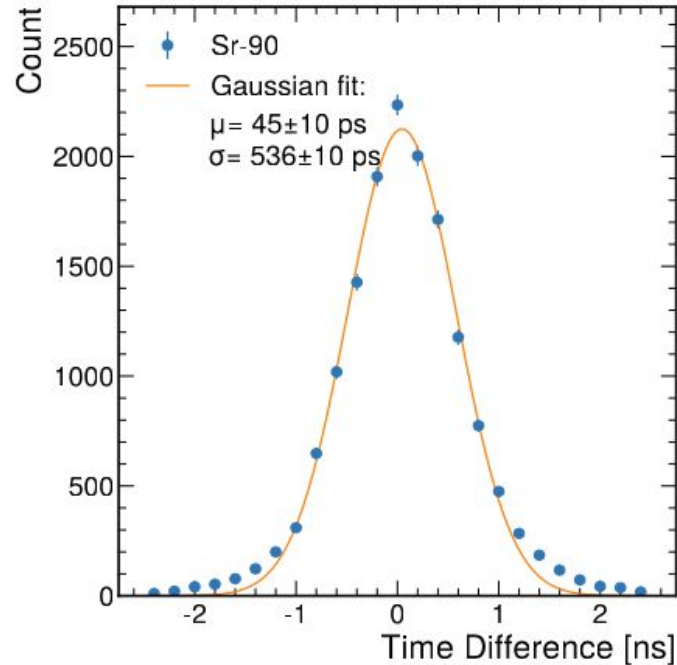
Cosmic-rays were used.

Light Yield From Polished Square Scintillators



# Timing Resolution

Time difference was found to be  $45 \pm 10$  ps



# To Summarize

Using a 3D Printed border creates the least amount of crosstalk.

Polishing scrap Scintillators created enough light yield to be used for experiments.

Using Sr-90 can be used continue checking the light yield and timing resolution that scintillators and SiPMs create.

These results will be published in a paper.

# Conclusion

Future plans.

Use and test newer Scintillators that are created in lab.