ePIC vs. sPHENIX SiPM Comparison

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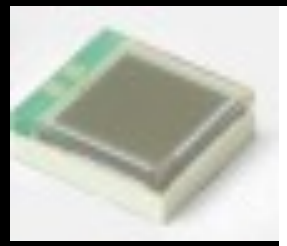
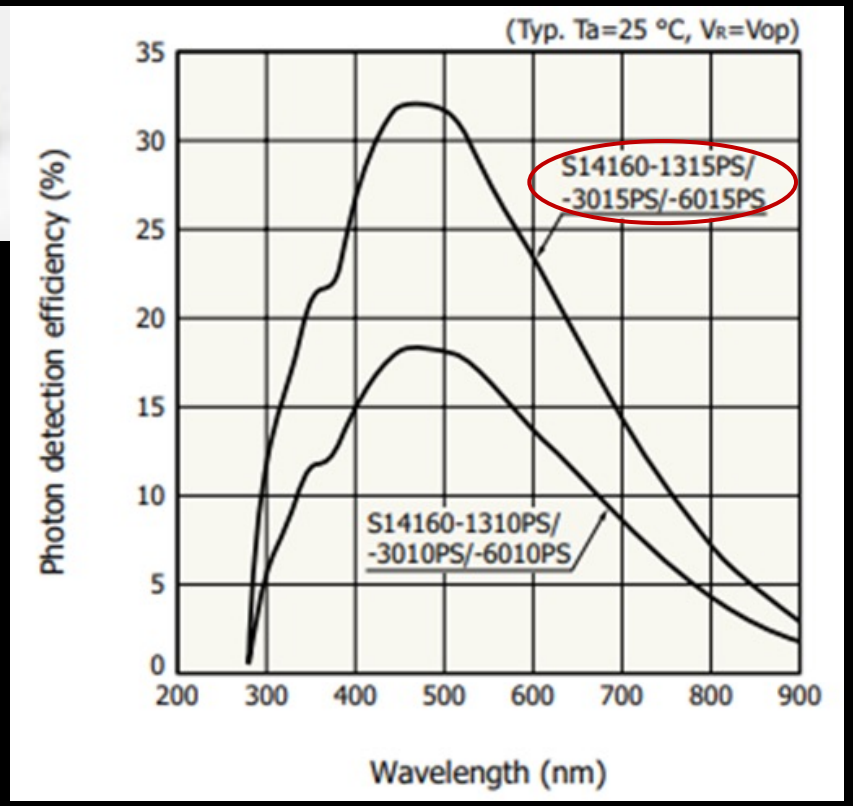
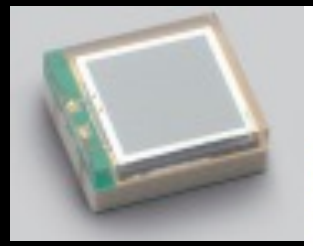
ePIC
Hamamatsu S14160-3015PS

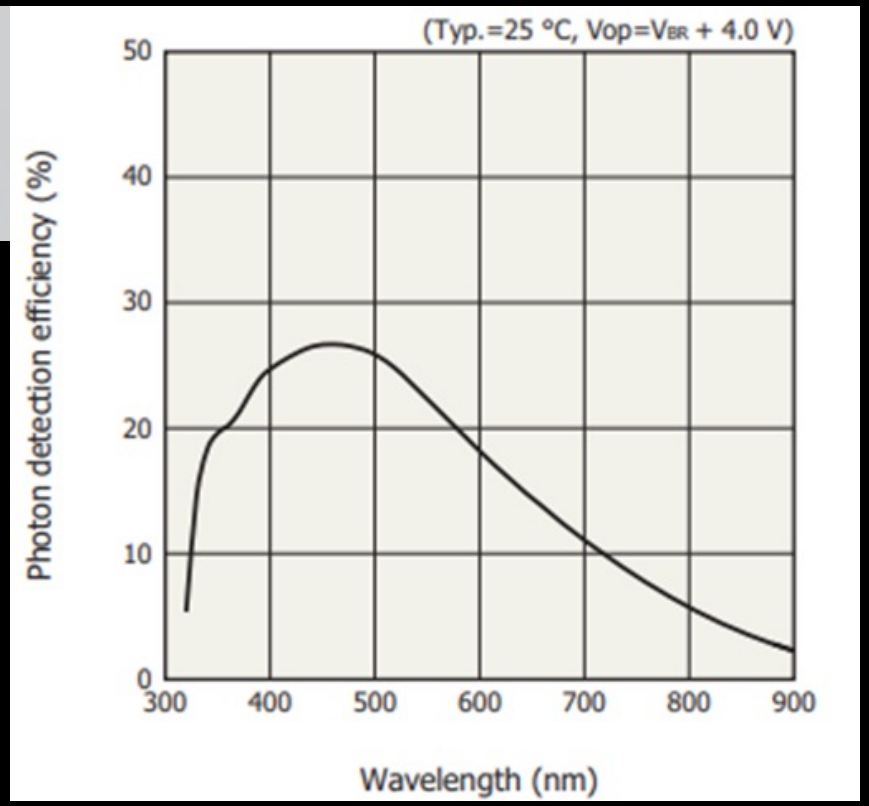




New Model
Breakdown Voltage: 38 ± 3V
Peak Sensitivity Wavelength: 460nm
Gain: 3.6×10^5

sPHENIX
Hamamatsu S12572-33-015P

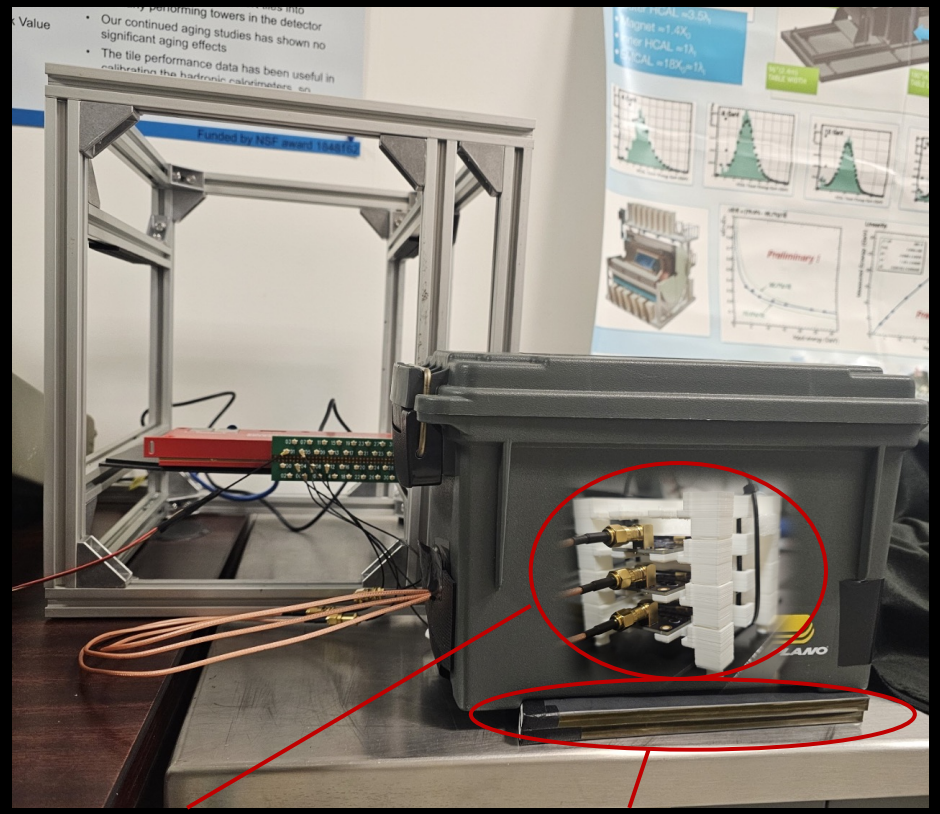




Discontinued
Breakdown Voltage: 65 ± 10V
Peak Sensitivity Wavelength: 460nm
Gain: 2.3×10^3

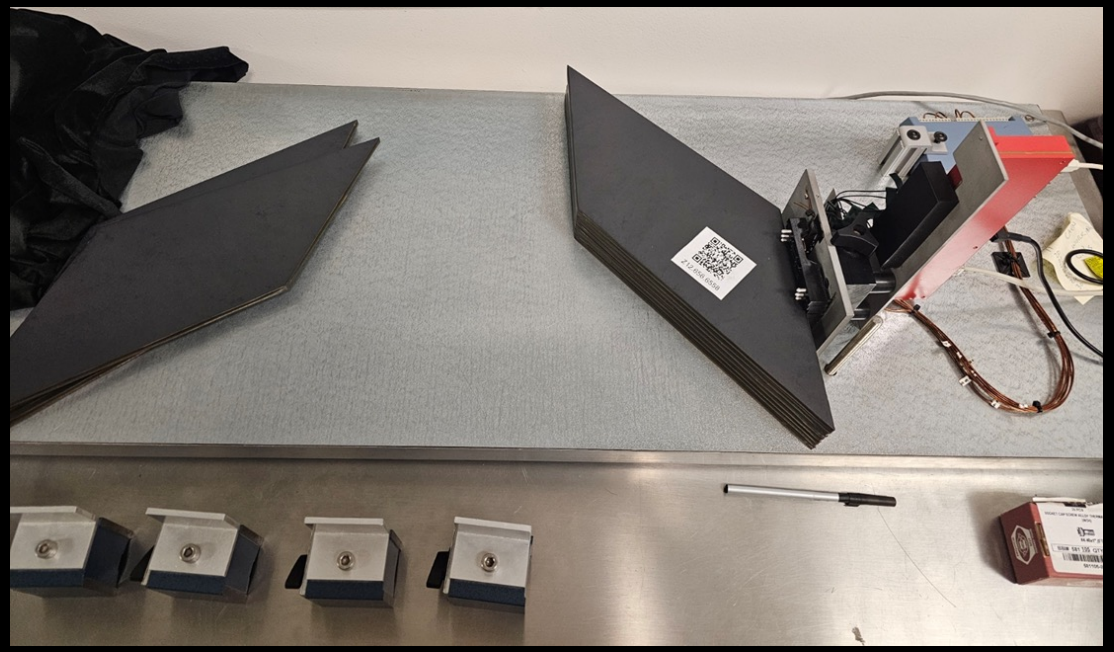
ePIC Test Bench

Breakdown Voltage set to 41.6V



sPHENIX Test Bench

Breakdown Voltage set to 68V



ePIC test average run time: 3 – 4 hours

sPHENIX test run time: 30 minutes

Both tests are covered to ensure no light leaks

ePIC Tile test

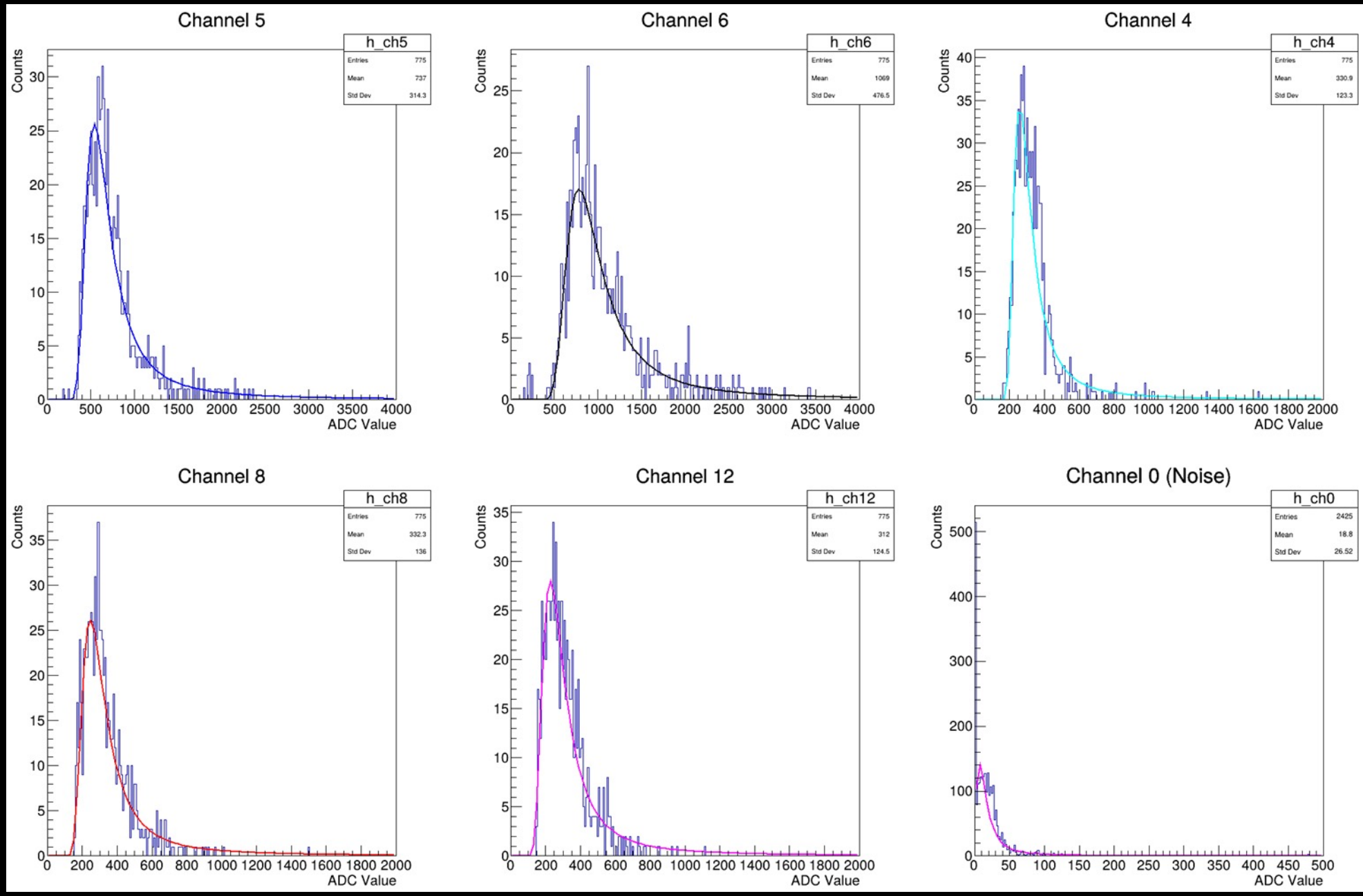
3hrs at 41.6V (recommended voltage)

Events: 2445

ePIC Tiles: ch4, ch8, ch12

sPHENIX Z04: ch5, ch6

ADC values below 150 have been cut.



ePIC vs. sPHENIX

sPHENIX tile test:

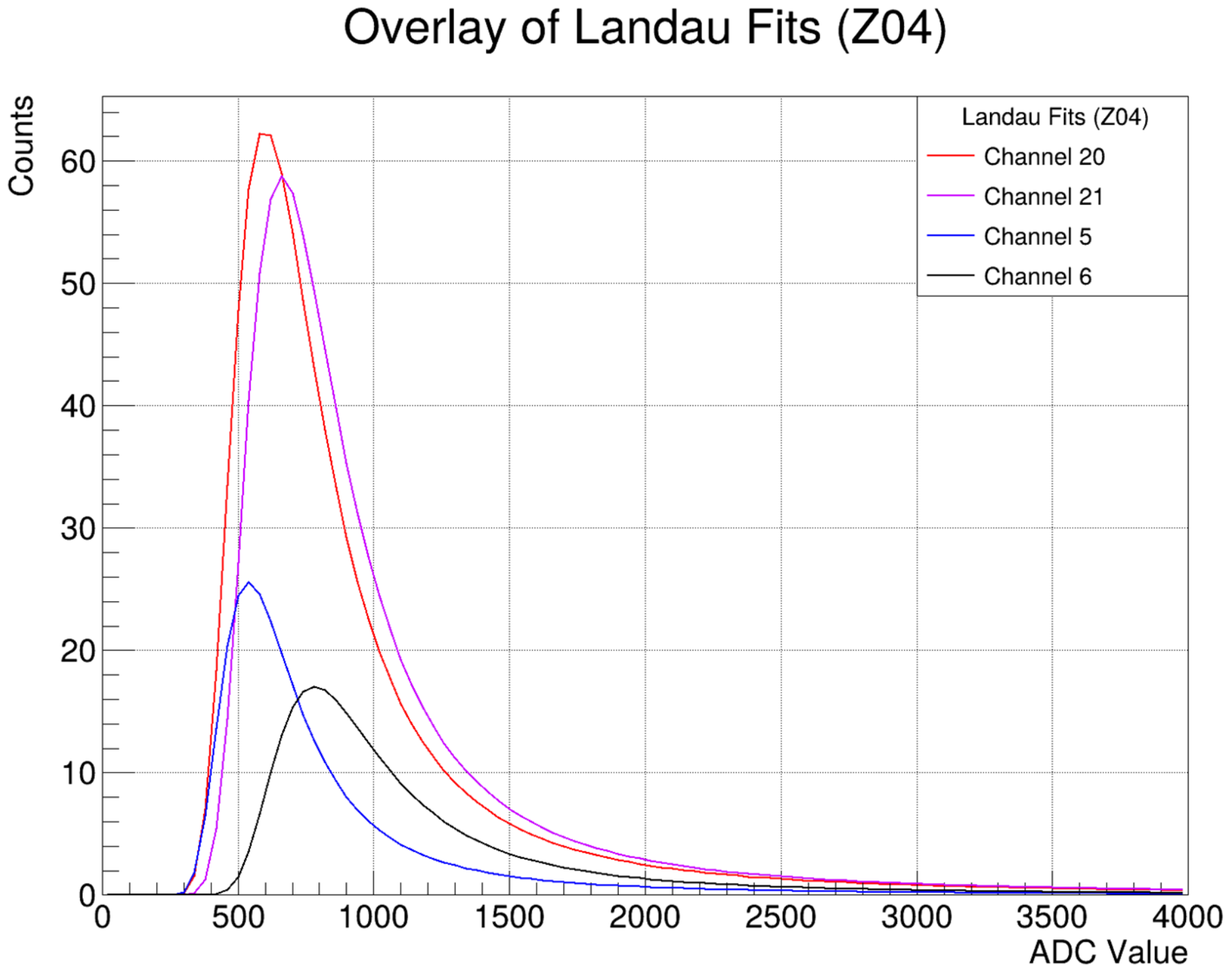
30min at 68V

Events: 2406

sPHENIX test: ch20, ch21

ePIC test: ch5, ch6

The same two Z04 tiles used on each test bench



Simultaneous Test

These tests were run simultaneously on both test benches

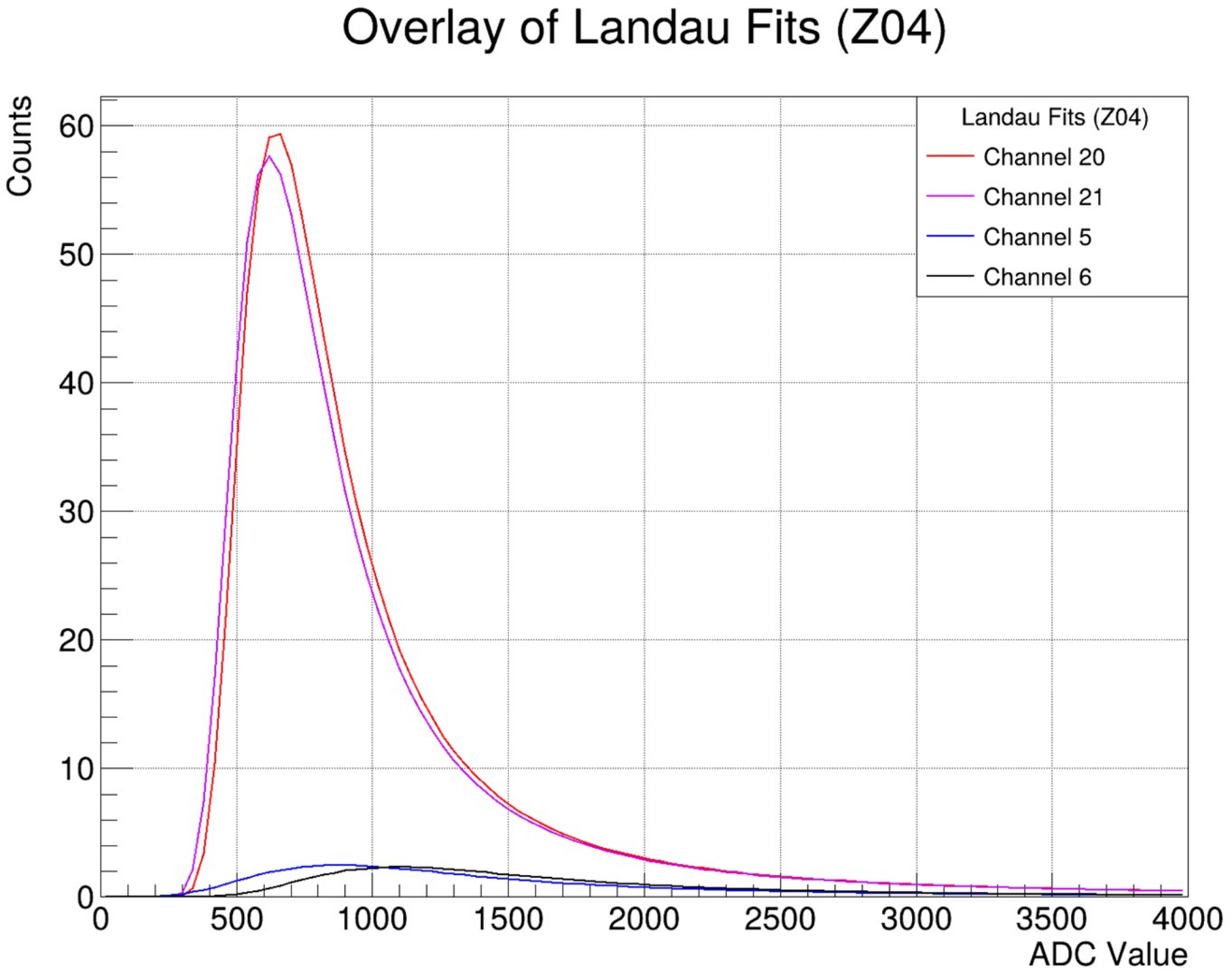
Different Z04 tiles are used for the comparison

Tests were run for 30 minutes

sPHENIX test: ch20, ch21

ePIC test: ch5, ch6

This shows the large discrepancy in events for each test bench corresponding to each type of SiPM



Summary

Despite the newer model SiPMs for ePIC having a higher photon detection efficiency at the same wavelength, they are showing drastically lower counts as compared to the sPHENIX SiPMs.

- Could this be caused by different DAQ offsets?

Another test is planned to run by stacking the ePIC Z04 tiles with the sPHENIX tiles while still using different SiPMs. This is to ensure the same particles are passing through all tiles in both tests.