Mainz [Dec/24] PSCAL Prototype Testing Data Analysis

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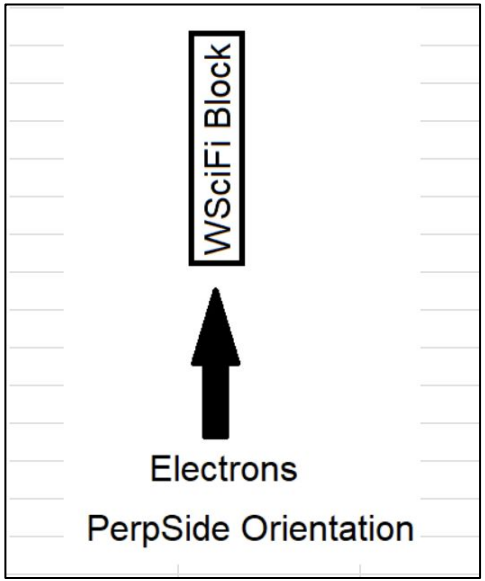
Data Details

1. Run 15, 16, 17, 18, 19
2. Perpside - Module perpendicular to beam
3. Location - Tagger
4. Beam Current - 1 nA
5. Readout - SiPM of 50 μm microcells
6. Each run has different SiPM offset voltage, and in each subrun has different threshold.

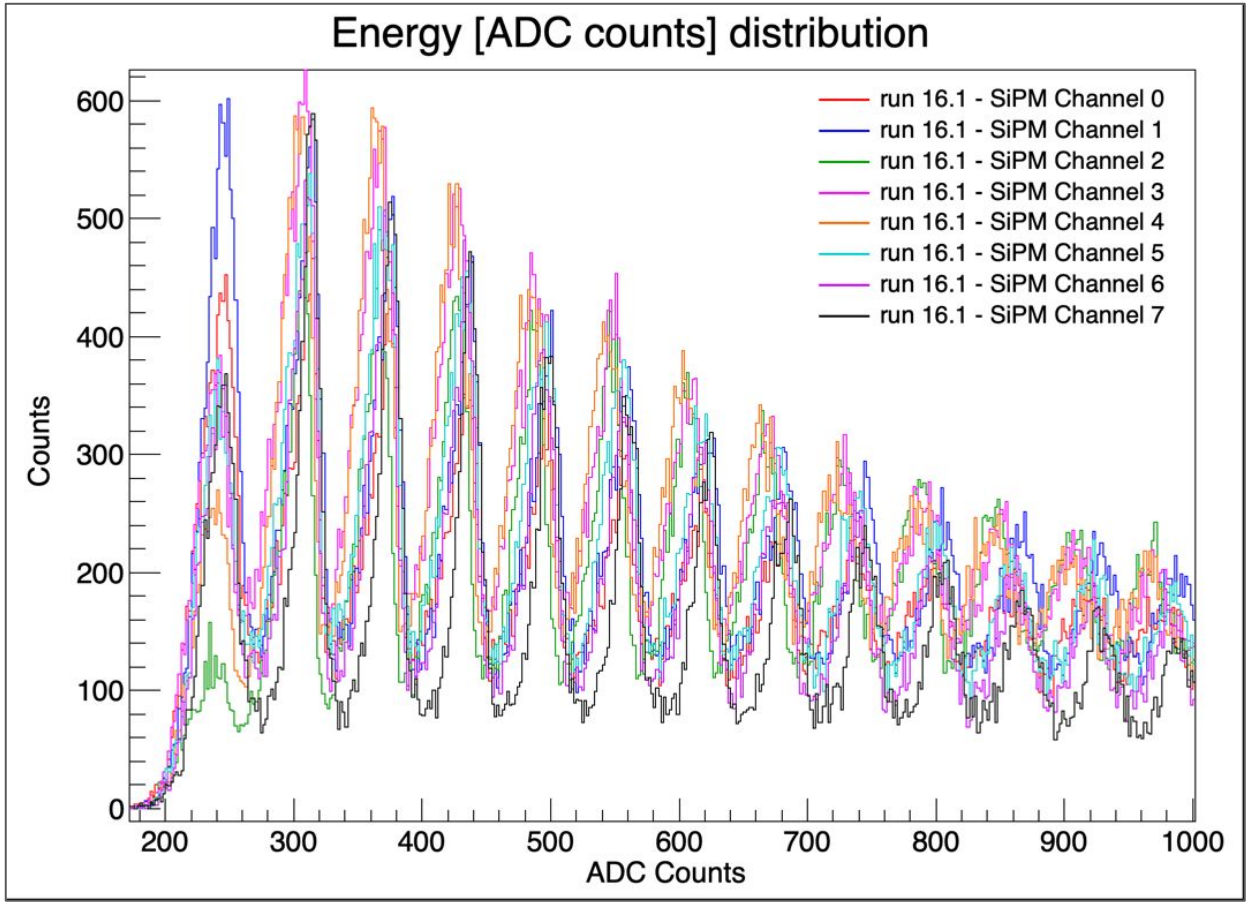


PCB Positions:

E0951.001

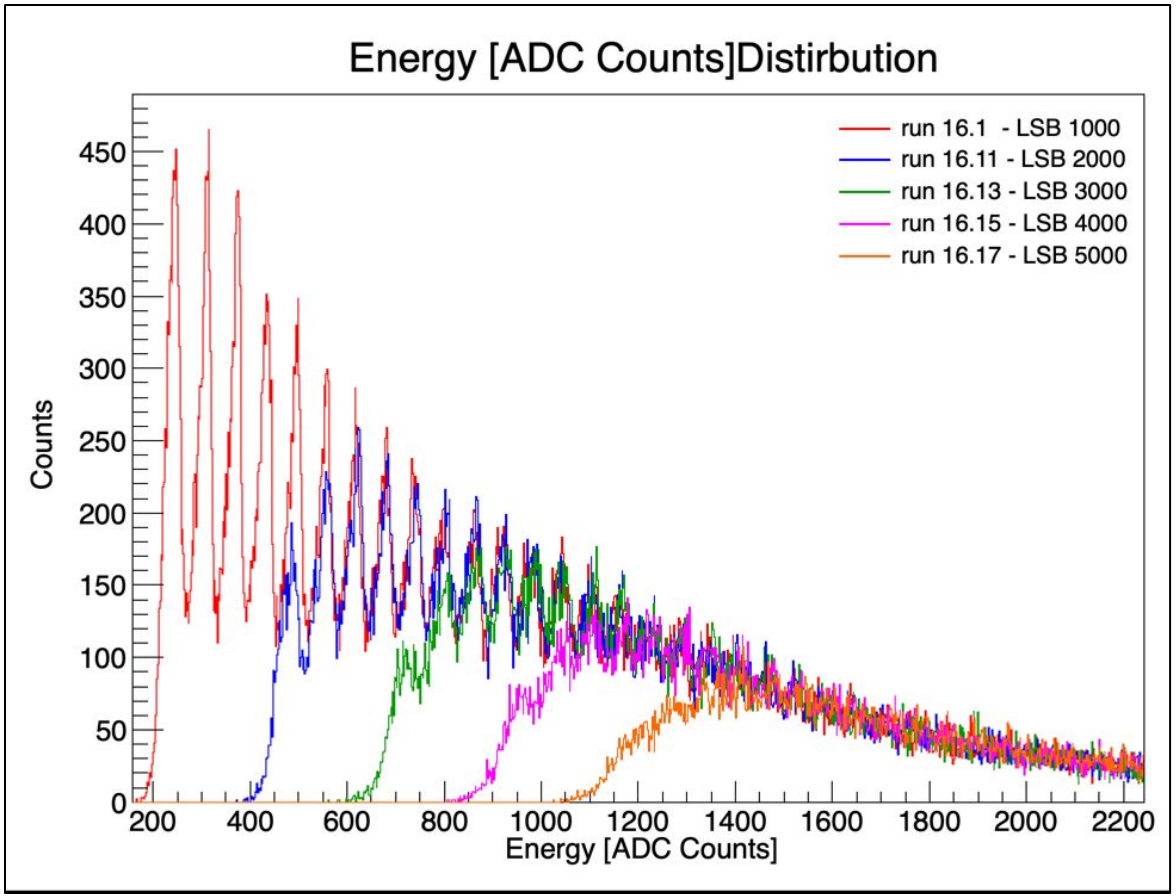
K8		K7		K6		K5	K4		K3		K2		K1
1	2	3	4	5	6	7	8	9	10	11	12	13	14
28	27	26	25	24	23	22	21	20	19	18	17	16	15

Energy Distribution for each channel



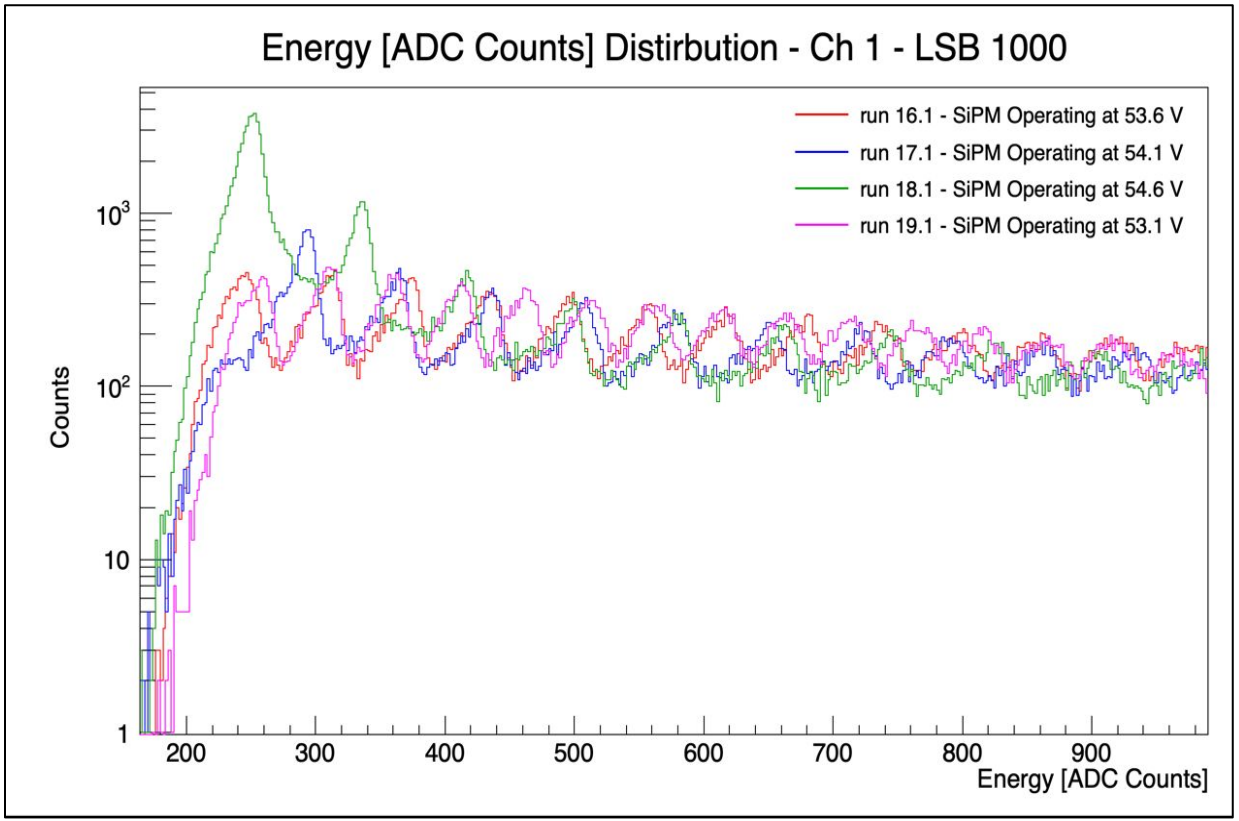
- The photoelectron peaks doesn't overlap completely for different channel.
- Can we add energy from different channels to find the overall energy measurement ?

Energy Distribution for increasing LSB Threshold



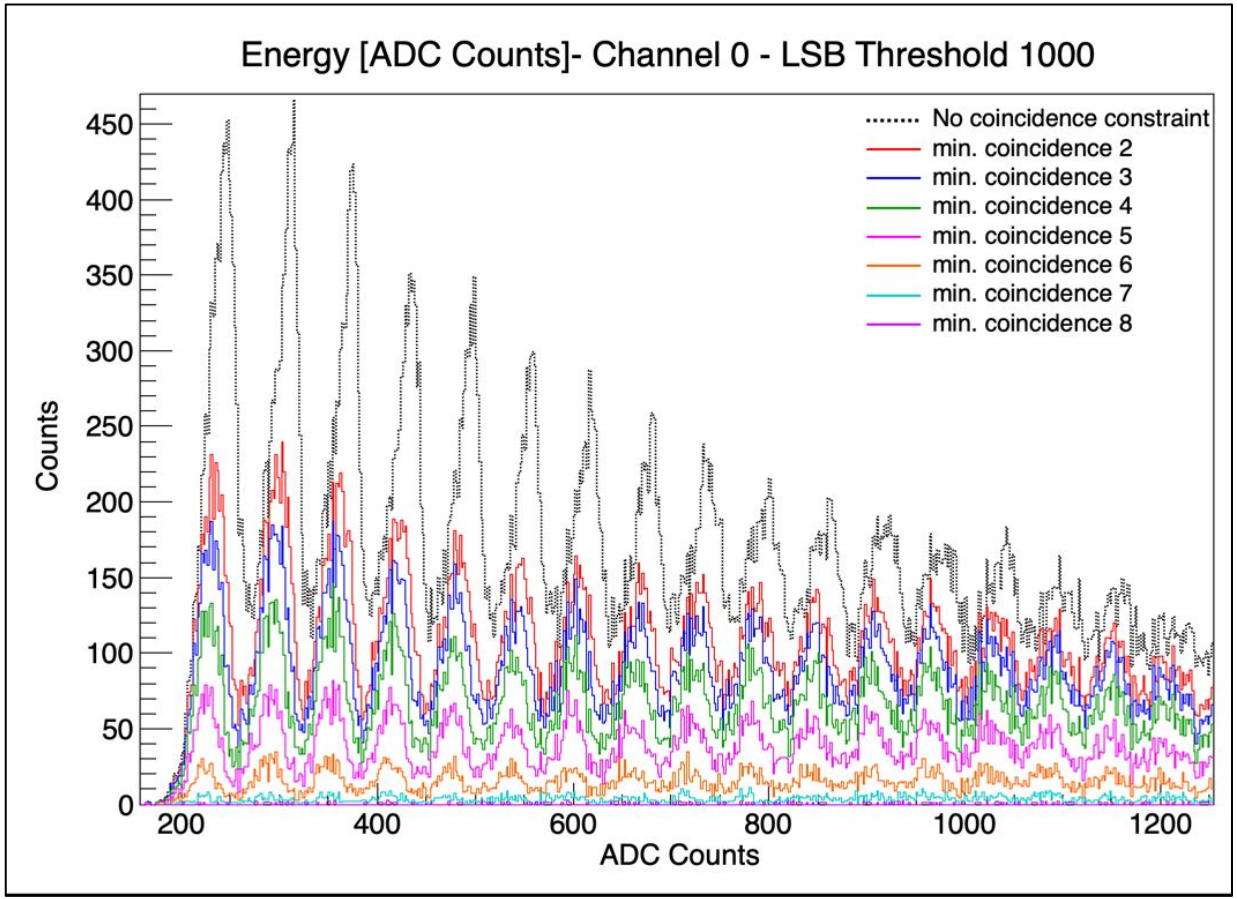
- The photoelectron peaks overlap for different LSB threshold [same channel]
- The start of the peak shifts towards right with increasing LSB threshold.
- Can we add energy from different LSB threshold to find the overall energy measurement ?

Energy Distribution for different SiPM operating Voltage



- Baseline for operating voltage of SiPM is 53.6 V.

Energy Distribution for different selection criteria



- Different selection criteria based on 50 ns coincidence window.
- The peaks overlaps quite well.
- Although the overall counts decreases with stricter criteria.

Summary

- The data from the first beam tests are not ideal
  - No information on the energy of hit particle.

- Still serves as a basis to learn the data analysis process for future prototype testings.
  - Required parameters like LSB Threshold, Operating Voltage can be optimised.