

Status Report

Ryotaro Tsuchii

CIDeR-ML collaboration meeting

October 2, 2025

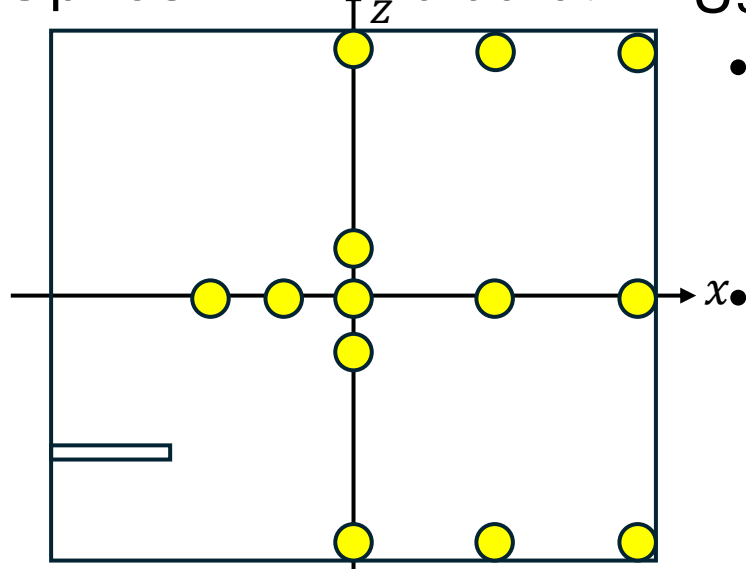
Taking over Nico's study

- Nico has checked the training performance of OpticSIREN if using isotropic calibration data (MC).
 - Evaluate dependences of source positions such as about distances from the wall.
- I tried to evaluate position dependence of OpticSIREN model output.
 - By comparing OpticSIREN outputs (visibility) with the data, I verified the extent to which the number of photons emitted by OpticSIREN depends on position of sources.

Evaluation of the number of photon

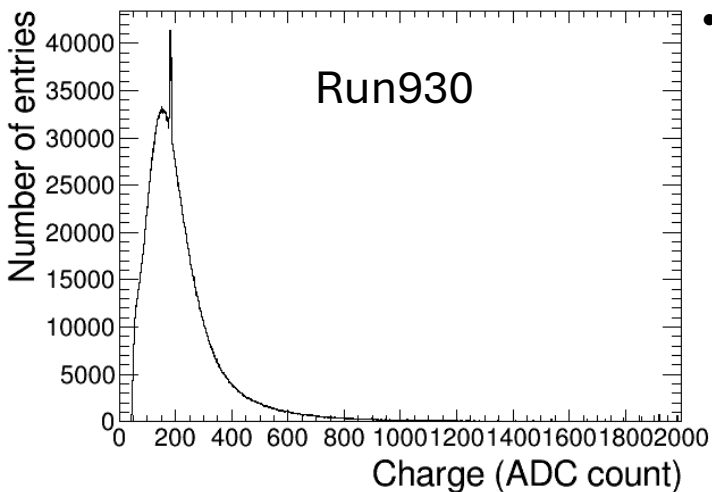
- Diffuser ball isotropically emits photons.
 - Trigger: ~ 2 kHz
 - # of hits per trg: ?
- visibility \times # of photon per trg \sim # of hits per trg
 - visibility: can be got from MC (OpticSIREN)
 - # of hits per trg: can be got from WCTE run data.

→ I evaluated # of photon per trg (source position dependence) by OpticSIREN and data. • Use 20 source positions.

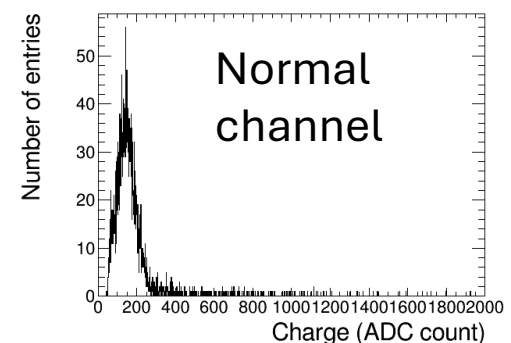
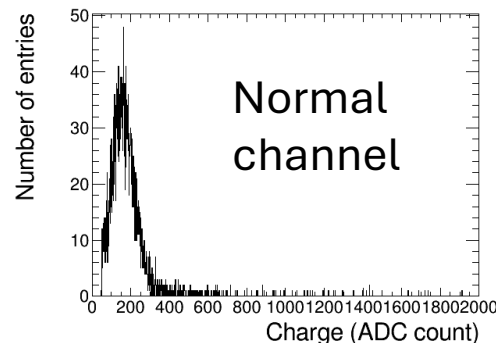
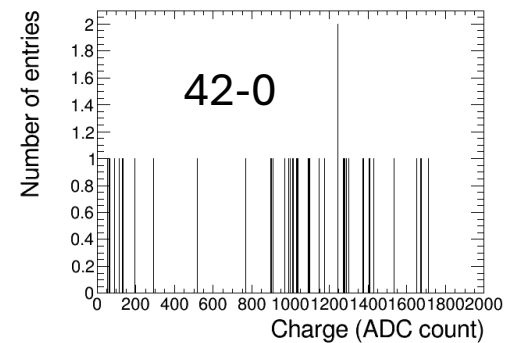
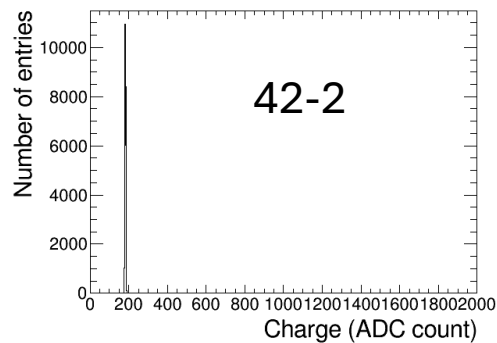
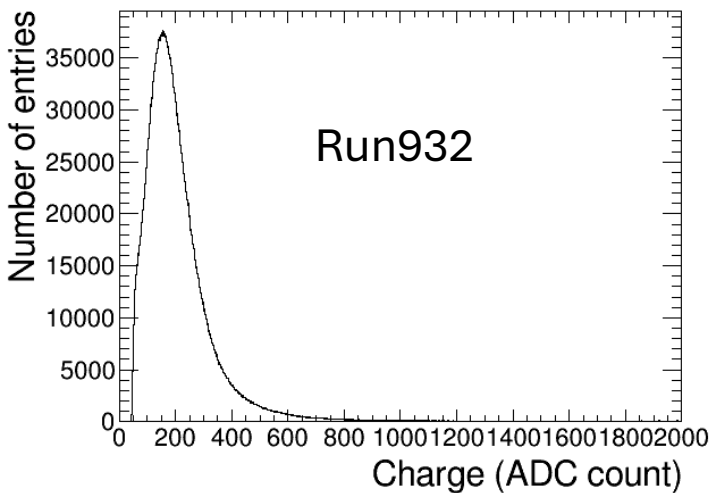


- Visibility: input 720 isotropic directions to OpticSIREN and use averaged output as visibility for each position
- # of hits: refer to data of the diffuser ball runs and count the PMT hits.
 - But the data have not been calibrated.

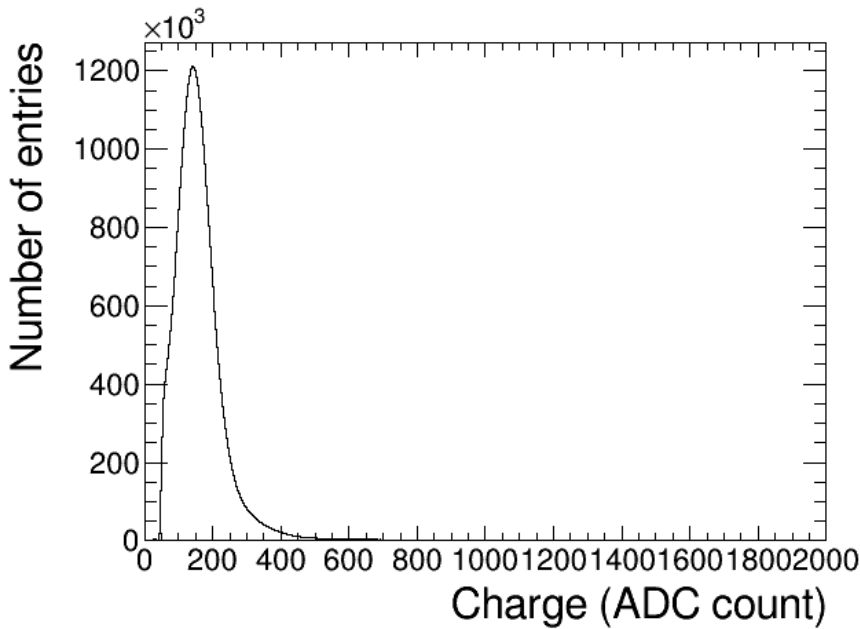
Data quality?



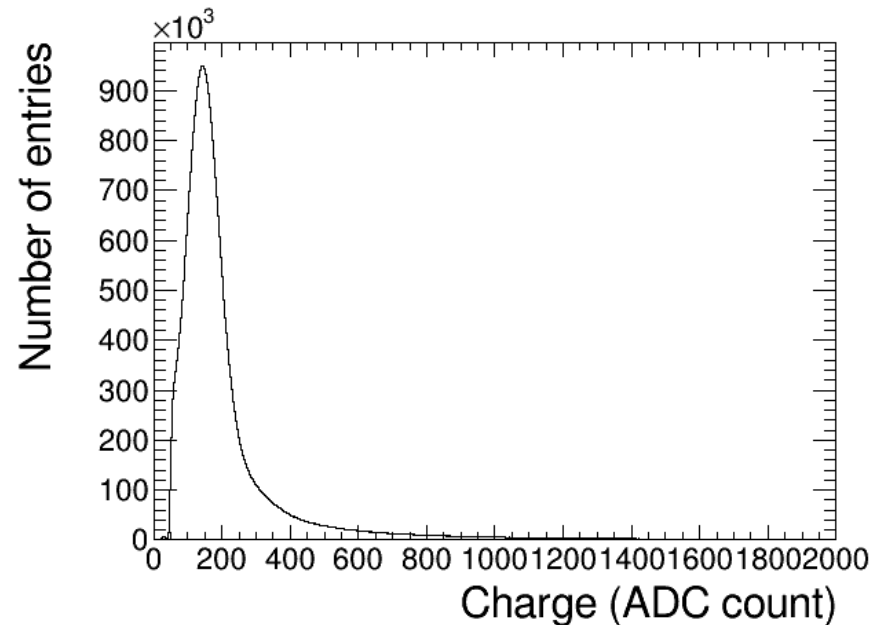
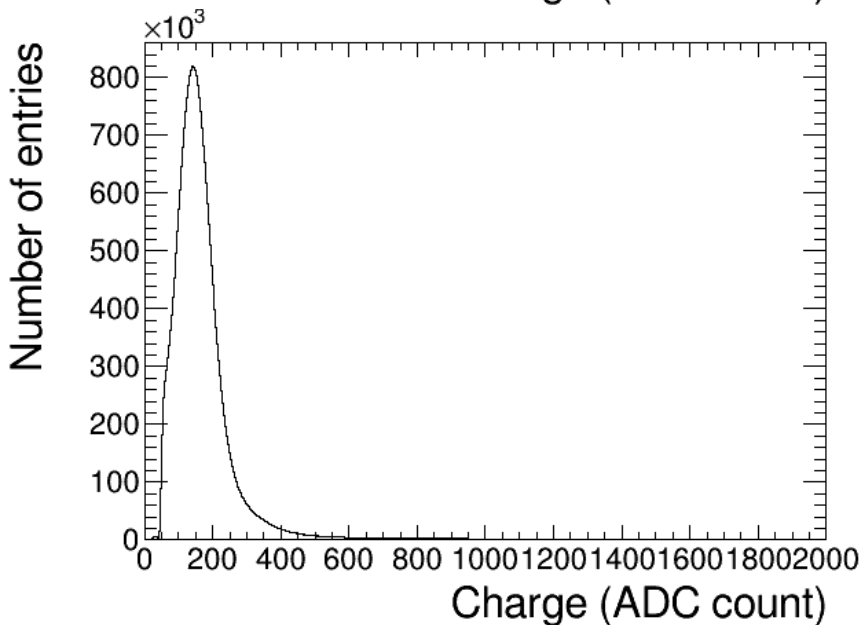
- I checked calibration data.
 - Run926, 927, 928, 930, 932, 934, 935 (12,13 Merch):
 - Self trigger.
 - Some runs have strange peak in hit_pmt_charges.
 - PMT2 in mPMT42 is so noisy.
 - mPMT42 is dead channel.
 - I heard some bugs were fixed at 2ndApr. (about this?)



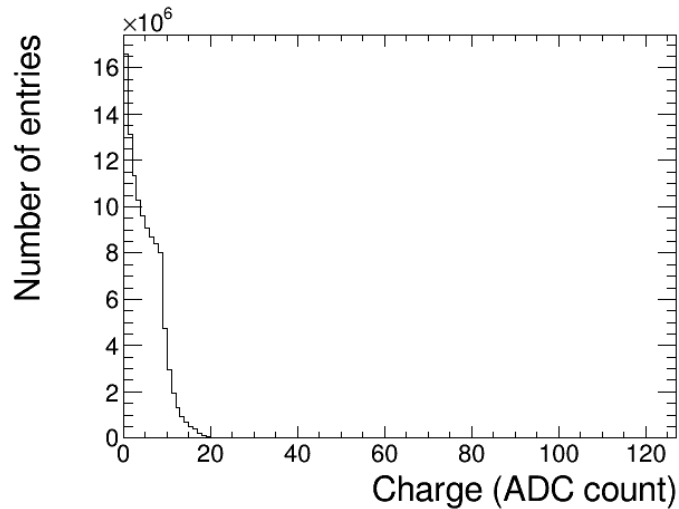
Data quality



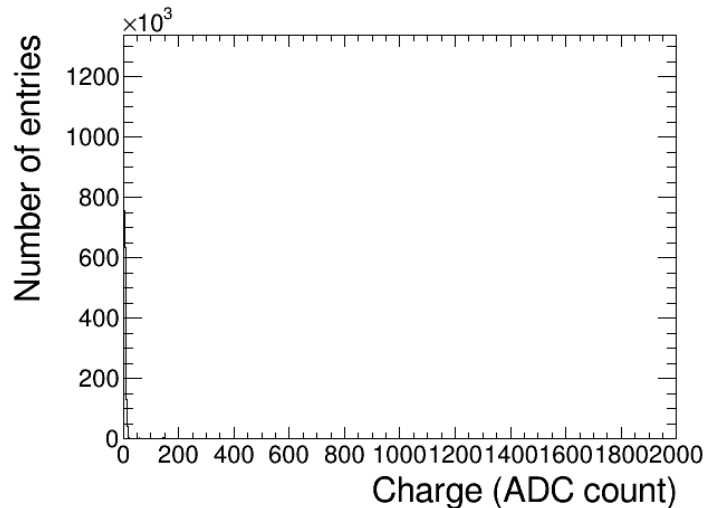
- Run 1731, 1734, 1735, 1736, 1738, 1740, 1742, 1744 (23rdApr.):
 - Self trigger.
 - No strange peak.



Data Quality



- Run2054, 2314 (8/5, 20/5):
 - Hardware trigger.
 - Lower peak than self-trg data.



Table

| run # | trigger | position(xyz)/cm | time(min) | #of hits | # of trg | hits/trg | Siren | rel # of hits/1photon | |
|-------|---------|--------------------------|-----------|----------|-----------|----------|-------------|-----------------------|-------------|
| 926 | self | (55, 0, 133.8) | | 5 | 10134087 | 100289 | 101.0488389 | 67.78 | 1.490835628 |
| 927 | self | (55, 0, -133.8) | | 5 | 10008743 | 101090 | 99.00824018 | 152.77 | 0.648086929 |
| 928 | self | (55, 0, 0) | | 5 | 11247049 | 103150 | 109.0358604 | 37.96 | 2.872388314 |
| 930 | self | (110, 0, 133.8) | | 5 | 6196803 | 91629 | 67.62927676 | 57.12 | 1.183985938 |
| 931 | self | (110, 0, -133.8) | | 5 | 4832788 | 94146 | 51.33290846 | 66.36 | 0.773551966 |
| 932 | self | (110, 0, 0) | | 5 | 8174770 | 96244 | 84.93797016 | 37.29 | 2.277768039 |
| 933 | self | (0, 0, 133.8) | | 5 | 6561546 | 87434 | 75.04570304 | 72.8 | 1.030847569 |
| 934 | self | (0, 0, -133.8) | | 5 | 7504133 | 77897 | 96.33404367 | 189.81 | 0.507528811 |
| 935 | self | (0, 0, 0) | | 5 | 9625150 | 96360 | 99.88740141 | 38.27 | 2.610070588 |
| 1731 | self | (0, 0, -25.6213) | | 10 | 137072851 | 1201934 | 114.0435756 | 38.86 | 2.934729171 |
| 1734 | self | (-55, -95.263, 133.8) | | 10 | 95101849 | 1271552 | 74.79194638 | 58.56 | 1.277184877 |
| 1735 | self | (-27.5, -47.631, 133.8) | | 10 | 117234653 | 1274872 | 91.95797931 | 69.52 | 1.322755744 |
| 1736 | self | (-27.5, -47.631, -133.8) | | 10 | 131559958 | 1356543 | 96.98178237 | 159.1 | 0.609564943 |
| 1738 | self | (-55, -95.26, -133.8) | | 14 | 125658379 | 1634826 | 76.86345764 | 79.24 | 0.970008299 |
| 1740 | self | (0, 55, 133.8) | | 10 | 124139854 | 1241588 | 99.98474051 | 66.35 | 1.50692902 |
| 1742 | self | (0, 110, 133.8) | | 30 | 138328944 | 1315975 | 105.1151762 | 55.21 | 1.903915526 |
| 1743 | self | (0, 55, -133.8) | | 20 | 140239956 | 1217975 | 115.1419003 | 122.98 | 0.936265249 |
| 1744 | self | (0, 110, -133.8) | | 10 | 67400425 | 675582 | 99.76646062 | 62.72 | 1.590664232 |
| 2054 | hard | (0, 0, 133.8) | | 3 | 108807763 | 139064 | 782.4294066 | 72.8 | 10.74765668 |
| 2314 | hard | (0, 0, 14.23) | | 5 | 326993410 | 215992 | 1513.914451 | 38.08 | 39.75615679 |

- If ADC counts > 100, pmt hits are counted as “these # of hits” on this table.