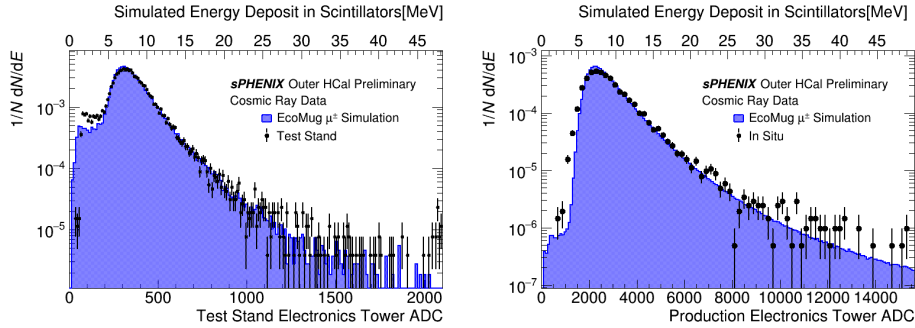# 912 and 1008 OHCal Cosmic Data Analysis Plots

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912(left) and 1008(right) outer hadronic calorimeters cosmic energy distribution compare with simulation. The 912 data was taken with 1 hour run for a single tower(tower with $\eta \approx 0.05$) while the 1008 data was combining 20 runs taken in 15 mins and combining all the towers.

This graph compares oHCal cosmic ray data measured in building 912 (left) and in building 1008 (right). Both datasets were collected using offline self-trigger cuts to select events that followed an approximately vertical trajectory. The results from both buildings are in strong agreement with our simulation. For the 912 setup, the data was collected using HBD electronics with an 11-bit ADC. Due to the individual sector configuration in the 912 test stand, the offline cut was limited to two adjacent towers. In contrast, the 1008 experiment employed production electronics with a more advanced 14-bit ADC, and the offline cut required muons to pass through three adjacent towers. This difference in tower adjacency requirements explains the variance in the lower energy distribution shapes.

It's also important to note that the difference in the ADC between the two test stands contributes to the discrepancy in the ADC/MeV ratio observed. The 912 setup with an 11-bit ADC offers a different resolution compared to the 14-bit ADC used in the 1008 setup.

Regarding data acquisition, the 1008 experiment implemented a clock trigger set at 1.5kHz with 31 time samples, resulting in an efficiency of approximately 0.1%. In comparison, the 912 data was self-triggered with the HBD electronics, leading to the difference in statistics. The 912 data was taken with 1 hour run for a single tower(tower with $\eta \approx 0.05$) while the 1008 data was combining 20 runs taken in 15 mins and combining all the towers.

Links to related notes:

Cosmic muon simulation

Cosmic muon 912 calibration

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Runs used

- /sphenix/lustre01/sphnxpro/rawdata/commissioning/HCal/cosmics/cosmics_East-00006246-∗.prdf
- /sphenix/lustre01/sphnxpro/rawdata/commissioning/HCal/cosmics/cosmics_East-00006255-∗.prdf
- /sphenix/lustre01/sphnxpro/rawdata/commissioning/HCal/cosmics/cosmics_East-00006258-∗.prdf
- /sphenix/lustre01/sphnxpro/rawdata/commissioning/HCal/cosmics/cosmics_East-00006263-∗.prdf
- /sphenix/lustre01/sphnxpro/rawdata/commissioning/HCal/cosmics/cosmics_East-00006265-∗.prdf
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