

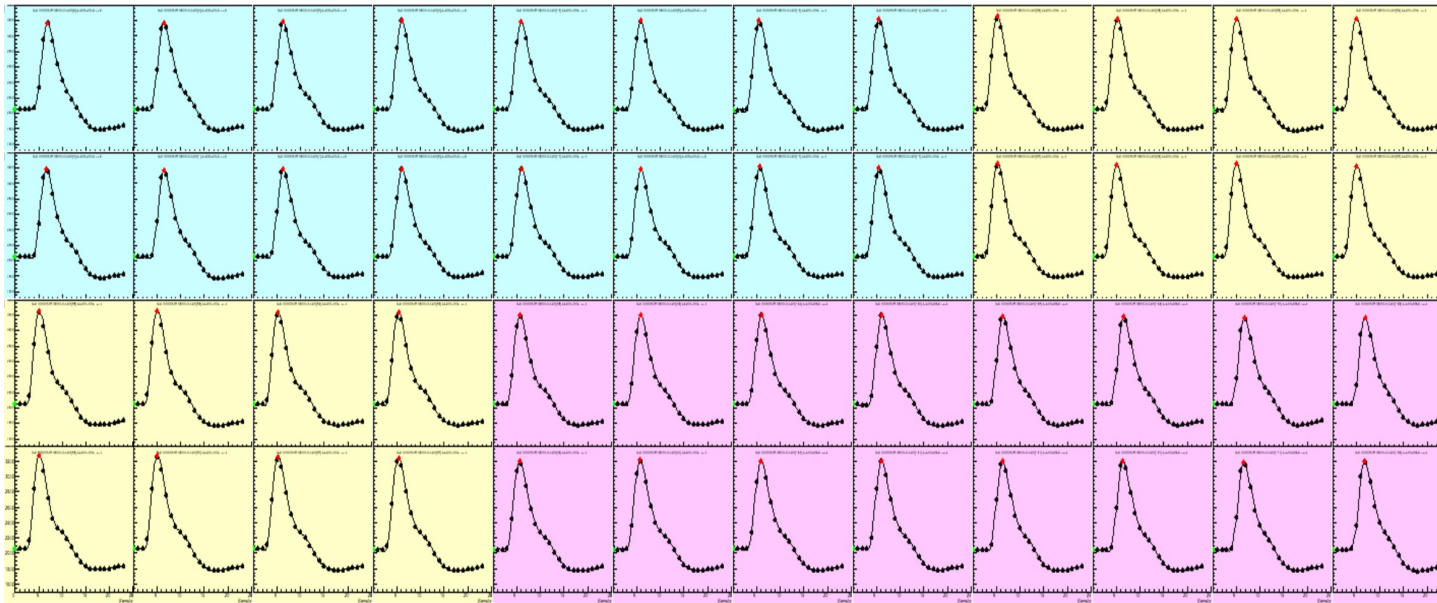
Built-in calibration systems/tools: barrel HCal

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Test Pulse

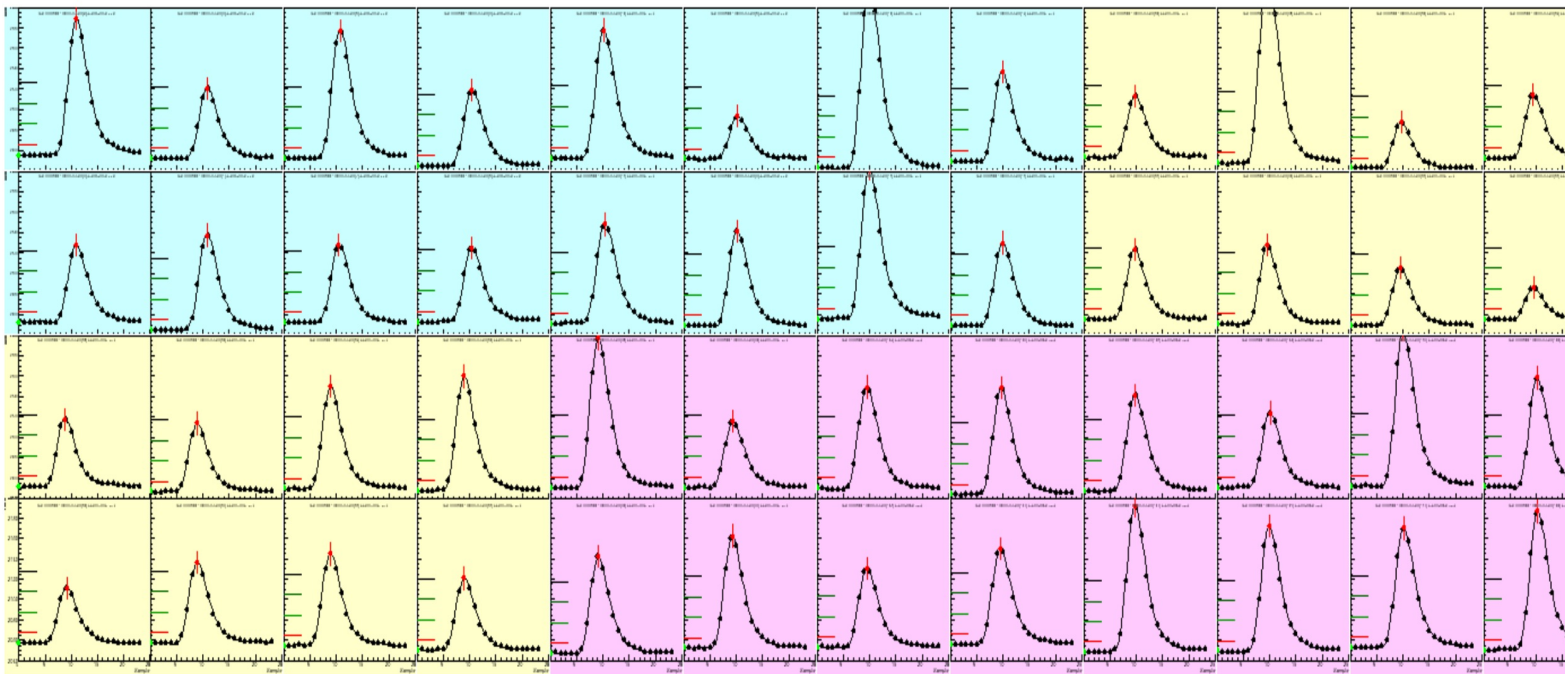
- Charge injected into preamplifier
- Tests entire LV power and read-out chain modulo SiPMs and bias
- Simple test; used to identify any hardware issues



sPHENIX
ADC vs time sample for single event;
one panel per channel;
one sector.

LED system

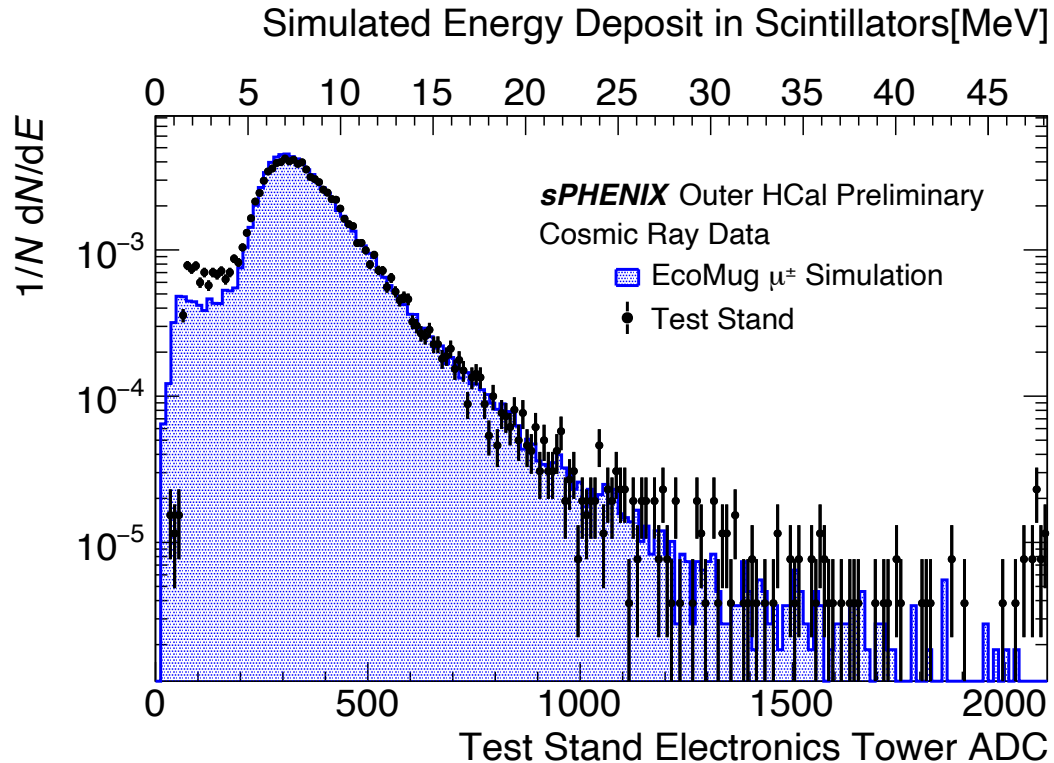
- plan to use LED system similar to the one used in sPHENIX
 - LED driver boards at end of sectors (serviceable location)
 - LED light routed to tiles through fibers
 - 5 LEDs per sector half to be able to illuminate each tile in a tower individually



- LED system used to track time dependent calibration changes
- absolute calibration from cosmic muons

sPHENIX
ADC vs time sample for single event;
one panel per channel;
one sector.

Cosmics Calibration



- Not built-in, but successfully used in sPHENIX for absolute calibration at EM scale
- Shape of measured tower ADC distribution matches distribution of deposited energy in Geant simulation with realistic muon angular and energy distribution