

ECAL COMMISSIONING

N. Baltzell

May 29, 2019

HPS Collaboration Meeting

PRE-BEAM (I)

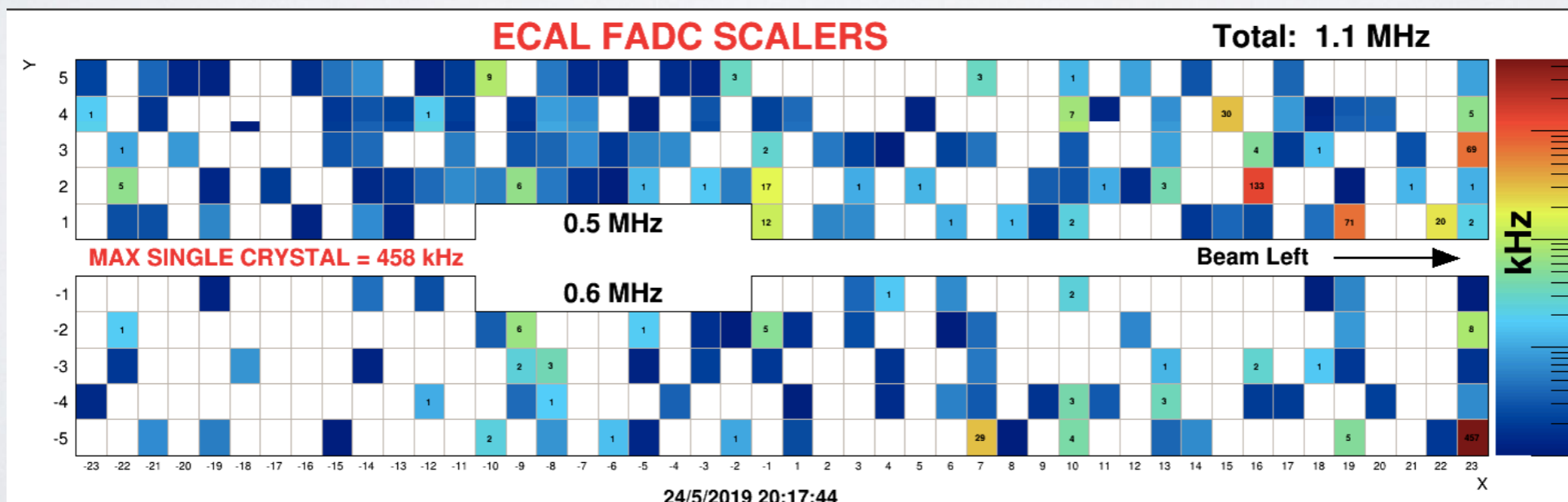
- Reconnections and Controls
 - HV/LV/chiller cables and checkout (signal cables and N2/cooling lines were never disconnected)
 - specially configured LV's network switch to avoid communications issues we used to live with
 - now can be alarmed on
 - and allows for a soft-interlock on temperatures, proven useful when no one is on shift (e.g. circuit breaker trip, someone turns off the chiller)
 - cleaned up alarm tree, now with more appropriate delays and hodoscope
 - reseated/resoldered cables/preamps to fix a few issues, some only appearing after couple weeks:
 - some maybe due to physical activity in the alcove, i.e. non-robust connections at patch panels and FADCs
 - and a preamp inside the calorimeter developed a dirty/shorted HV connection
 - see [logbook](#), [spreadsheet](#), and [Andrea's analysis work](#) for details



PRE-BEAM (2)

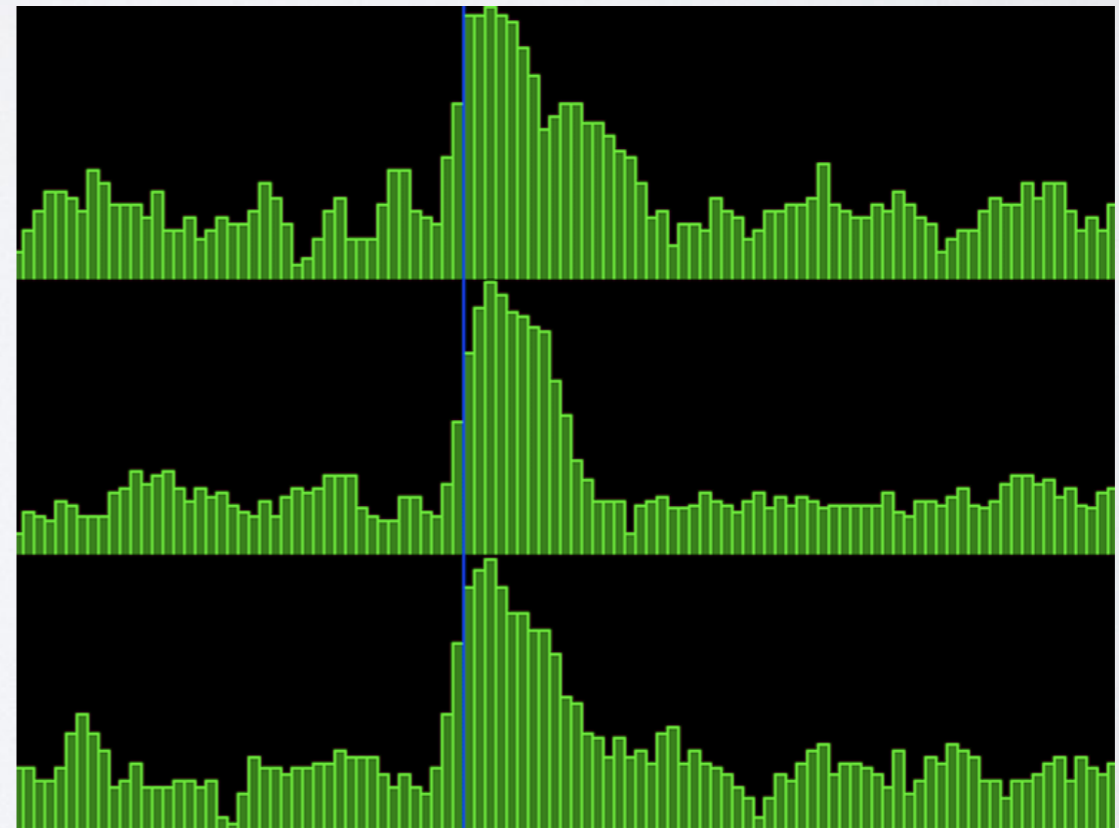
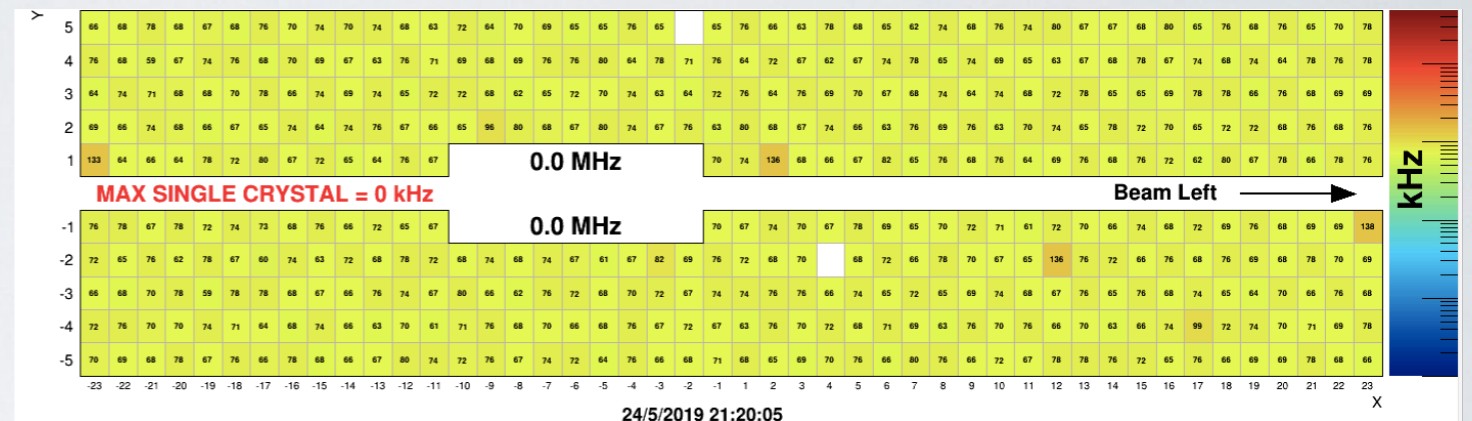
- DAQ

- acquire and monitor pedestals ongoing
- latency adjustments for new FADC firmware, to put cosmic/LED/beam signals in the time window done
- cleanup and preparation of config files in progress
- noise level a bit higher than previously
 - no quantitative statement on that yet, and it's evolving as environment changes (e.g. vacuum pump installation last week)
 - we might want to raise thresholds relative to 2 GeV running



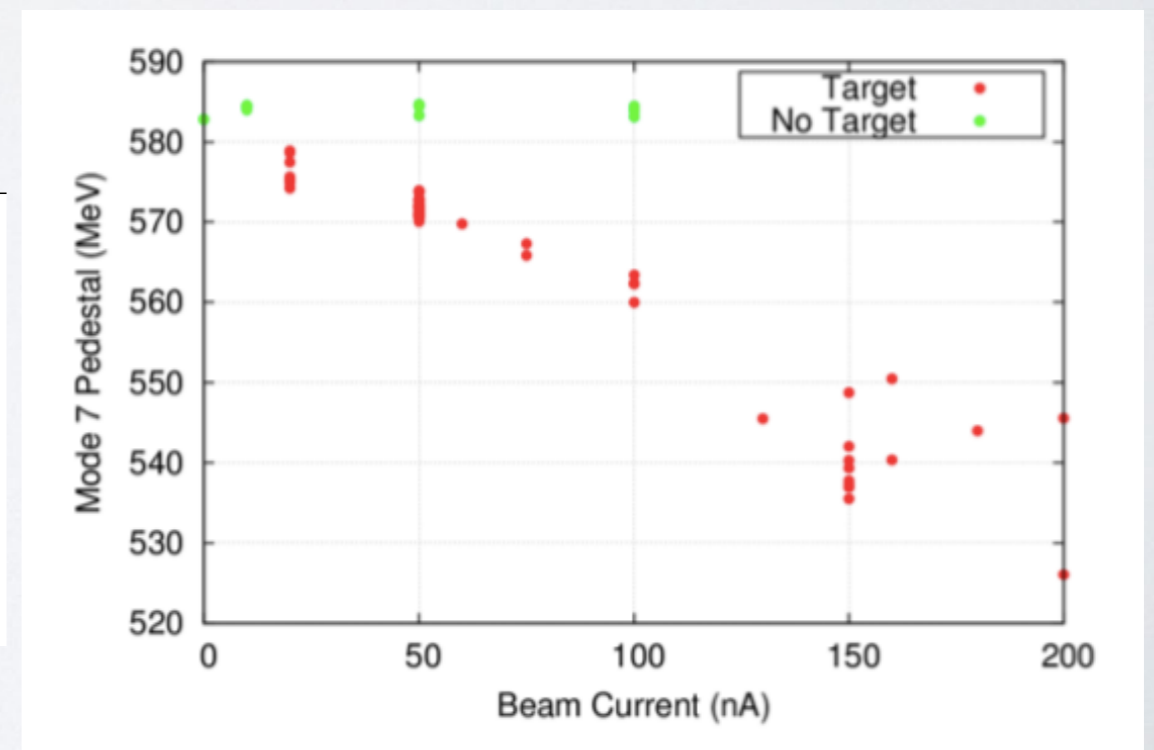
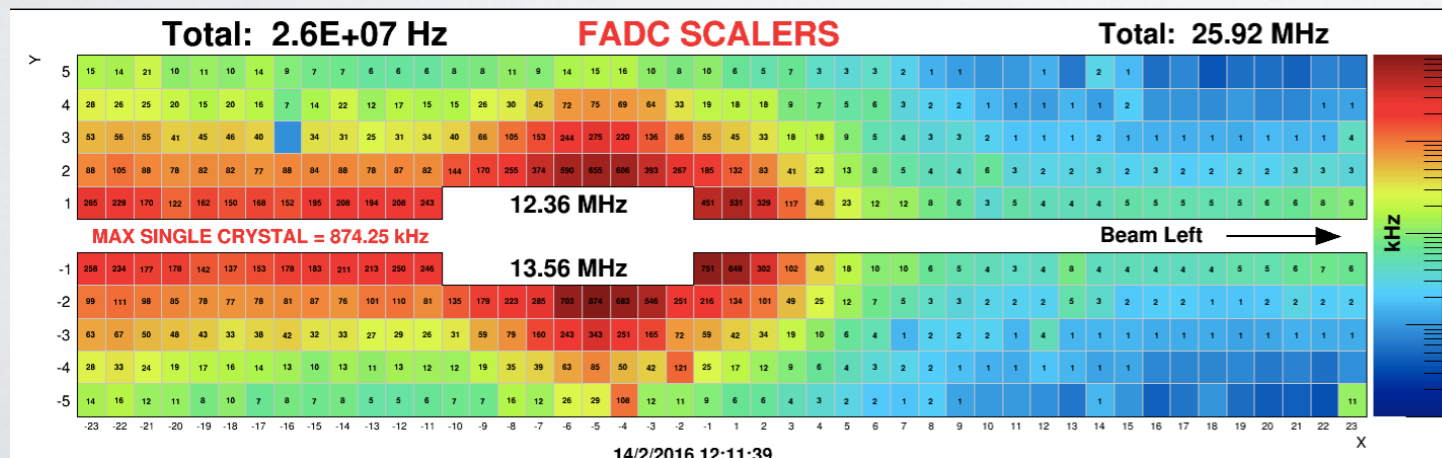
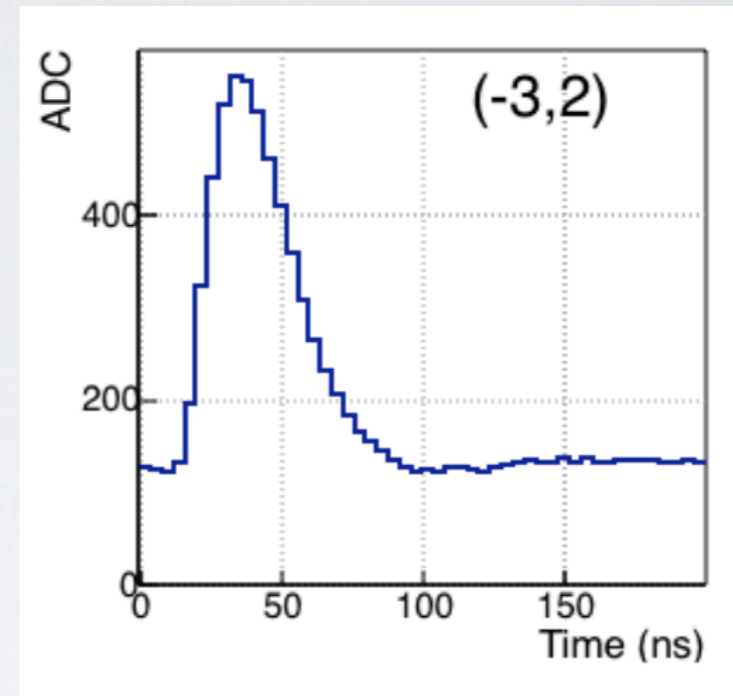
PRE-BEAM (3)

- LEDs
 - for single-channel status/integrity checks
 - recorded baseline runs for future system stability checks
- Cosmics
 - requires a *minimum* of one week of data for a gain calibration
 - need to compare against previous cosmic- and FEE-based gains
 - preliminary, low-statistics, results available, revealed one HV-swap which was fixed
 - in first week of June we should be able to have a good-quality cosmic gain calibration
- Runs recording on spreadsheet linked from the wiki
 - https://wiki.jlab.org/hps-run/index.php/The_HPS_Run_Wiki
 - relevant runs copied to /work/hallb/hps/data/cosmic for analysis



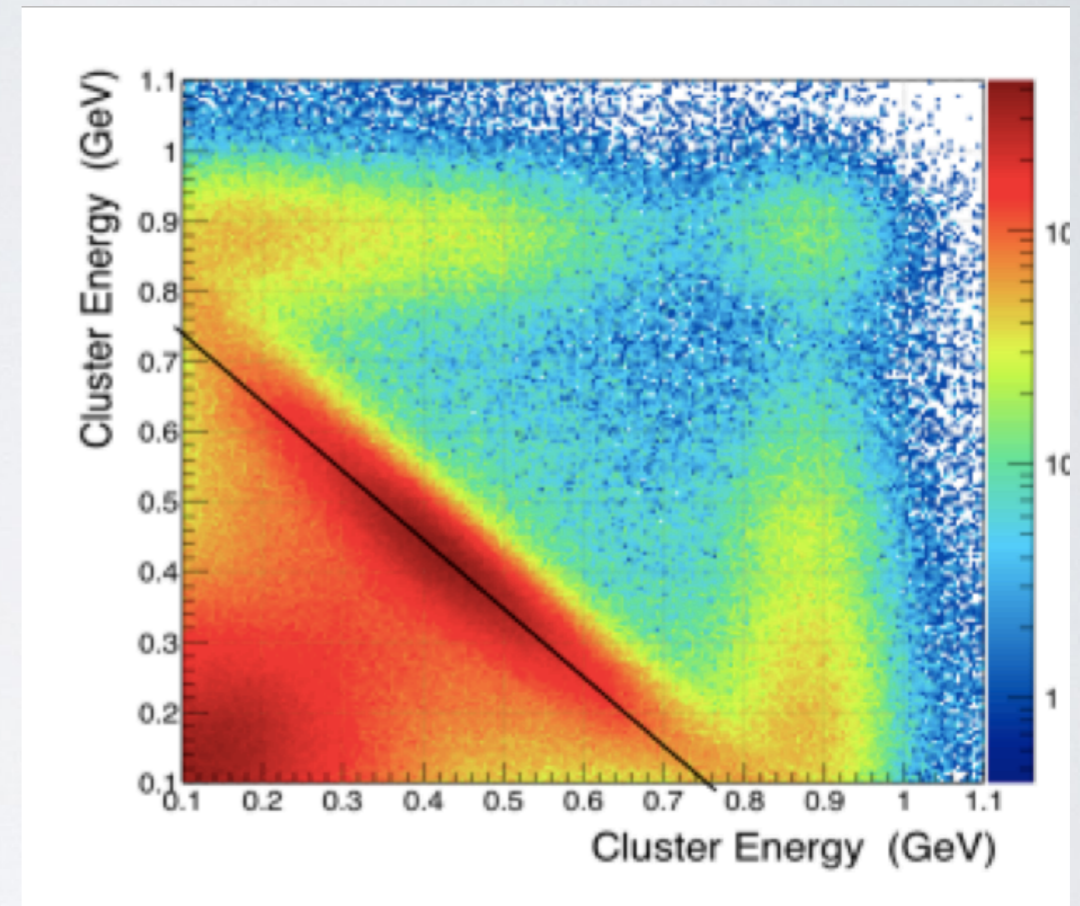
WITH BEAM (I)

- Confirm readout timing
 - 200-ns FADC window, with signals starting at about 50-ns
- Scaler rate/symmetry/luminosity-scaling checks
 - previously never above 1 MHz per crystal
- Take pedestal runs at luminosity
 - calorimeter and/or random trigger
 - setup config files for different beam currents



WITH BEAM (2)

- Check hit multiplicity
- Check data rates
- Check energy response
 - Full-energy electrons
 - online (ET-ring)
 - trigger diagnostics guis from Ben
 - ECAL-only reconstruction in hps-java monitoring suite
 - Tridents/Møllers in offline DQM plots
 - Møller acceptance is expected to be too small at 4 GeV
- Can we measure π^0 s?
 - acceptance was too small at previous 1 and 2 GeV
 - need to run rate estimates and see what to expect



WITH BEAM (3)

- Calibration triggers
 - dedicated runs and/or prescaled trigger bits
 - resurrect old FEE-trigger in new firmware
 - x-dependent prescales to cover acceptance with FEE more evenly
 - we used to run a Pair trigger for Mollers
 - think about a Pair trigger for π^0 s?

CONCLUSION

- ECAL commissioning well underway
- All 442 channels now functional, ready to button up and y-close on vacuum chamber
- All ECAL-calibration-related controls/DAQ/trigger/monitoring software tested and in heavy use
- Cosmic gain calibration results should be available next week
- Noise level appears to be higher than before, remains to be quantified/rectified, but manageable as-is
- Some decisions/studies to be done on new, possible calibration triggers, either as dedicated runs or parasitic, prescaled triggers