2019 ECAL/HODO Meetings

General Info

- Tuesdays at 11:00 (JLab time)
- Room B101 at JLab
- Bluejeans
  - Meeting ID: 729938404
  - https://bluejeans.com/729938404
  - Telephone
    - 888-240-2560
    - Global Numbers
- Confluence
  - How To Post Your Talk
  - Link to this page

Documents

- Surveys
  - 2021 post-run
  - 2019 pre-run, post-run
  - 2014/2015
  - 2021/2019 analysis (pdf) (xls)
  - 2019/2015 analysis
  - 2014/2015 analysis
- ECAL
  - Holly's 2015 timing calibration note
  - Holly's 2015 energy calibration note
  - Sebouh's time-dependent energy calibration note
  - Holly's MC position-correction note

Software

- ECAL
  - Holly's FEE calibration
  - Cosmic calibration
  - LED calibration
  - database channel mapping

Runs

- 2019 Run Spreadsheet
- FEE Runs: 9371, 9593, 9898, 9899, 9920, 9921, 10097, 10103, 10104, 10716, 10717, 10718

ECAL Calibration Tasks

- Alignment
  - [x] based on survey
  - [ ] based on tracking
- Energy
  - [ ] Gains
    - [x] Cosmics (Andrea/Luca, ~Oct 15)
      - relative, before and after the run
    - [x] FEE (Andrea/Luca)
      - dedicated FEE runs, singles triggers
    - [ ] WABs
    - [ ] Muons (Norman)
  - [ ] Sampling fractions
    - energy-dependent, simulation (Andrea)
  - [ ] Position/projection corrections
    - previously simulation based, no track information
  - [ ] Edge corrections (Andrea)
    - based on track-y at ECAL, simulation
- Time
  - [ ] RF (Nathan)
  - [ ] channel offsets
  - [ ] time-walk
    - [ ] current parameterization should be fine if convergent or cutoff above 2.2 GeV

HODO Calibration Tasks

- Gains
  - Calculated several time throughout the run, in the database
  - Observed dependence on luminosity, and a tiny bit on time
  - For production runs, a single run from every day (few days) can be used to calculate gains
  - For low-luminosity runs, a single run can be used to calibrate each
  - About 15-20 file will be needed
  - Format? Either hpstr/DST with hodo information should be available, or I have a simple ntuple that gives necessary information
- TIme
  - Currently hit time is defined as a threshold crossing time, should we use mode-7 timing algorithm?
- Alignment
  - Hodo acceptance is covering all the ECal/SVT acceptance
  - Efficiency studies during the run didn't show any efficiency loss close to edges of the calorimeter.

Software Tasks

- Generate aligned detectors (and track scoring plane(s))
  - [x] survey-based (Nathan)
  - [ ] track-based
- Simulation
  - [x] single-e^+/e^-/ events over entire kinematics for corrections
  - [ ] remove 2 dead crystals, e.g. set gains to zero in database

- [ ] Validating RF extraction

- Database
  - [x] Final ECAL gains
  - [x] Final HODO gains
  - [ ] ECAL Time offsets

- [ ] Add HODO to particle objects
  - [ ] Time/position HODO-ECAL coincidence

- [ ] Update ECAL corrections for 2019/4.4 GeV
  - [ ] sampling fraction
  - [ ] edge shower loss

Meeting Agendas/Minutes

October 1, 2019

- 2019/2015 survey analysis
- Task lists, priorities, assignments
  - cosmic gains (Andrea/Luca) and RF (Nathan) are first, ~2 weeks
  - followed by FEE gains (Andrea/Luca) and timing offsets
  - then higher order corrections
  - discussed simulation needs for corrections, added to task lists above

October 15, 2019

- ECAL
  - Energy calibration
    - First look at cosmics: https://docs.google.com/presentation/d/1P8Lieu-GPwxpCHZ4_IEryUGqJpv4RLHSb9WF68R7inU/edit?usp=sharing
  - RF calibration
  - Surveys before and after the 2019 run agree?
- HODO
- Simulations

October 29, 2019

- RF
  - found signals in data, looks good, extracting to LCIO
  - looks like old pulse fitting method will still work
- HODO
- ECAL
  - scoring plane is shifted in v1 detectors, 5 cm upstream of where it should be
  - survey detector ready in software, to PR
- Simulations
- Note, EVIO files for all FEE runs (2.4 TB) are pinned on /cache for 30 days as of 10/27

November 26, 2019

- ECAL
- HODO
- Data Processing / Simulations

December 10, 2019

- ECAL
- HODO
- WABs (Norman)

January 14, 2020

- ECAL (https://docs.google.com/presentation/d/1daLRXDrL77D-Q0blkXpDioTFKbnkjs0WJLtM0IUad9U/edit?usp=sharing)

February 4, 2020

- Temperature plots:ecal-temp-2019-A.png, ecal-temp-2019-B.png

February 18, 2020

- Andrea (https://docs.google.com/presentation/d/1daLRXDrL77D-Q0blkXpDioTFKbnkjs0WJLtM0IUad9U/edit?usp=sharing)

February 25, 2020

- Trigger bit EVIO skims going to /cache/hallb/hps/physrun2019/production/evio-skims
  - fee, mult2, mult3 bits

March 3, 2020

- Trigger bit skims done, for all production runs after the SVT was repositoned
  - FEE reconstructed files (no tracking) are here: /cache/hallb/hps/physrun2019/production/pass0.0/fee/

March 17, 2020

- Nathan:
  - Timing calibration
    - RF updates for 2019 ready to be merged to master: https://github.com/JeffersonLab/hps-java/tree/iss634
    - Software in progress on calibration procedure, should be done this week
  - Pending tracker geometry for merging ECAL geometry: https://github.com/JeffersonLab/hps-java/tree/iss628

March 31, 2020

- Temporary bluejeans: https://bluejeans.com/567426231

April 21, 2020

- ECAL FEE-based gains are now in the database for the golden run period.

June 30, 2020

- Crystal gain calibration using single-crystal MIP clusters from continuum muon production.

July 21, 2020

August 4, 2020

August 11, 2020

- Andrea's FEE-based gains, after correcting for 2019's higher threshold in MC, are in the database now.
  - the previous state of the database was tagged with physrun2019_ecal_fee_gains_v1
  - and the current state is tagged as physrun2019_ecal_fee_gains_v2

September 1, 2020

- Any looks at data reconstructed with latest gains in database.
  - FEE runs 717 & 718
    - /volatile/hallb/hps/ngraf/physrun2019/fee/recon/010717/
    - /volatile/hallb/hps/ngraf/physrun2019/fee/recon/010718/
  - WAB
    - /work/hallb/hps/ngraf/physrun2019/wab/
- Lower energy sampling fraction extraction from data with WABs.
- Extending gain coverage outside of FEE region with muons.
- Updated search for pi0 -> gamma gamma calibration peak (mass and resolution).
- Single-particle MC samples
  - /work/hallb/hps/ngraf/physrun2019/samplingFractionMC/recon/e-
  - /work/hallb/hps/ngraf/physrun2019/samplingFractionMC/recon/e+
  - /work/hallb/hps/ngraf/physrun2019/samplingFractionMC/recon/gamma
  - /work/hallb/hps/ngraf/physrun2019/samplingFractionMC/recon/muon

September 8, 2020

- ECAL muon/WAB energy updates

September 15, 2020

- ECAL muon energy response compared to FEEs
- WAB energy
- MC sampling fraction
  - scoring plane calculation

September 15, 2020

- ECAL muon energy response compared to FEEs
- WAB energy
- MC sampling fraction
  - scoring plane calculation

September 21, 2020

- MC sampling fraction
- WAB energy
- ECAL gains from muon MIP energy deposits

September 29, 2020

- MC sampling fraction
  - Andrea implemented the spline correction with resource files on branch iss732, Norman/Nathan will see about wrapping it with the old correction to be called the same from particle creation code
- WAB energies for full scale sampling fractions from data
- gains from muons versus FEE
  - Norman produced muon "gains" in most of the acceptance, Andrea to plot ratio to FEE gains to see if they track in FEE acceptance and can then be used outside FEE acceptance
- the 5 missing crystals
  - rediscussed that they have poor FEE signals, corrupting the gains of nearby crystals before being removed from the FEE-based calibration, and also poor cosmic signals after the run
  - conclusion was and is that the chance of doing anything useful with them is bad

October 6, 2020

- MC sampling fraction - software work
- WABs for data-MC sampling fraction adjustments
- Muon-based gains

October 13, 2020

- MC sampling fraction - software work ready
  - https://github.com/JeffersonLab/hps-java/commits/iss732-refactor
- WABs for data-MC sampling fraction adjustments
- Muon-based gains

October 20, 2020

- MC sampling fraction
- WABs for data-MC sampling fraction adjustments
- Muon-based gains

November 3, 2020

- Mid/Low-energy DATA sampling fraction exctracted from WABs and compared to MC
- Muon-based gains, performance relative to FEE gains outside of FEE region based on WABs
- Timing calibration

November 8, 2020

- Mid/Low-energy DATA sampling fraction exctracted from WABs and compared to MC
- Position corrections, followup on BaseCalorimeterHit "bug", copy constructor not preserving state
  - https://github.com/JeffersonLab/hps-java/pull/758
- Timing calibration
- Hardware stuck channel bit during 2019
  - probably affects ~10% of runs, and the 3 most positron-extremem columns on top
  - potential fix implemented, to be tested
    - https://github.com/JeffersonLab/hps-java/issues/759
    - https://github.com/JeffersonLab/hps-java/commit/f5e70b9259a219cbc20f3996e107a6ed0fd600e2

January 12, 2020

- Stuck FADC bits
- Timing
- Energy corrections
- Position corrections