

# SHMS Electromagnetic Calorimeter commissioning plan (December 2017)

It is assumed that prior to commissioning the calorimeter is energized and signals from all the channels are checked out. The experts in charge for commissioning will be Hamlet Mkrtchyan, Arshak Asaturyan and Vardan Tadevosyan.

## Initial Detector Checkout

Expected time: 1 hour

Goal: check signal timing and fADC thresholds

Conditions:

- Beam: 2.2 GeV, 5-20 mA, fast rater off
  - Target: 0.5% carbon
  - Collimator: SHMS collimator
  - Trigger: SCIN  $\frac{3}{4}$
  - SHMS angle:  $25^\circ$ ,
  - SHMS momentum: -1.6 GeV/c
- Establish last summer HVs in all the channels. Take a few 100k event run with fADCs in mode 9, look into the accumulated pulse spectra to ensure good timing and fADC thresholds. Note that signals in all the channels of Preshower are expected, while in the Shower only signals from modules within the “hour-glass” region will be present. Tune timings and thresholds in channels with signal present. Repeat if needed.

## Detailed Detector Checkout

Expected time: ? hour

Goal: gain matching, calibration

Conditions:

- Beam: 6.4 GeV, 5-20 mA, fast rater off
  - Target: 0.5% carbon
  - Collimator: centered sieve
  - Trigger: SCIN  $\frac{3}{4}$
  - SHMS angle:  $15^\circ$ ,
  - SHMS momentum: -3 GeV/c
- Take a run of a few 100k events. Analyze it. Identify m.i.p. pions by posing cuts on the Gas Cherenkov signals, and requesting single fired modules in Preshower and Shower.

Plot ADC signal spectra, locate m.i.p. peaks in each channel. Change HVs in order to equalize the peak positions (separately for Preshower and Shower). Repeat if needed.

- Take a run of a few 100k events. Analyze it and run the calibration code to get new gain constants and representative plots. Check if resolution of the electron peak in the plots is consistent with prediction.

#### Defocused run

Expected time: ?

Goal: gain matching in Shower

Conditions:

- Beam: 6.4 GeV, 5-20 mA, fast rater off
  - Target: 0.5% carbon
  - Collimator: SHMS collimator
  - Trigger: SCIN  $\frac{3}{4}$
  - SHMS angle:  $15^\circ$
  - SHMS momentum: -3 GeV/c
- 
- Take high statistics run(s) in order to elucidate Shower modules behind the “hour-glass” region. Gain match Shower PMTs by use of m.i.p. pions as described above.
  - Examine Y coordinate dependence of m.i.p. signals from PMTs in Preshower. The data can be used to revise Y-correction of the PMT signals in the analysis code.