



Hall B – CLAS12

KPP Run

February 6, 2017

Hall B Key Performance Parameters

KPP Beam Run Period: Feb. 3 – Feb. 6, 2017

Detector operational: events recorded with $a > 2$ nA electron beam at > 6 GeV beam energy (3 passes)

KPP Demonstration:

1. Detector running for 8 hours recording data from all subsystems.
2. Screenshots of beam status and/or accelerator e-log.
3. Plots showing relative timing of calorimetry, time-of-flight, and Cherenkov detectors.
4. Event displays showing correlated particle hits in the Forward Detectors.
5. Plots of reconstructed particle trajectories showing target position.
6. Particle identification plots using signals from calorimetry and Cherenkov detector.

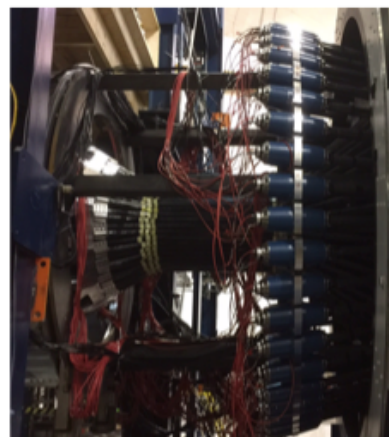
Hall B Glossary

Acronym	Detector
CTOF	Central Time-of-Flight
DC	Drift Chamber
EC	Electromagnetic Calorimeter
FTOF	Forward Time-of-Flight
HTCC	High Threshold Cherenkov Counter
LTCC	Low Threshold Cherenkov Counter
PCAL	Pre-shower Calorimeter
SVT	Silicon Vertex Tracker

1: Detector Running: Data Taking

Data taking with the full detector readout:

- 8 hr data taking on Feb. 3 10:00 p.m. – Feb. 4 6:00 a.m.
 - 5 nA electron beam
 - ECAL total energy trigger
 - 0.5 mm carbon wire
 - torus on

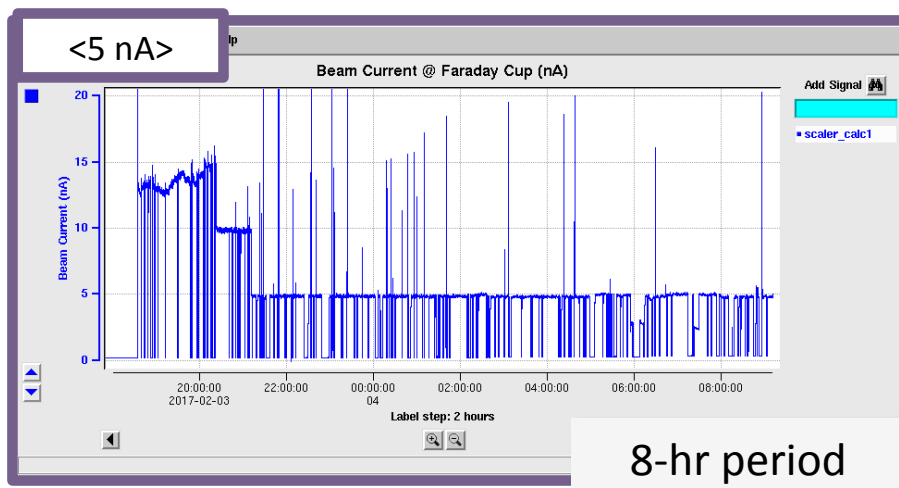


- All CLAS12 baseline detectors installed
- No solenoid magnet
- CTOF counters mounted on solenoid mockup

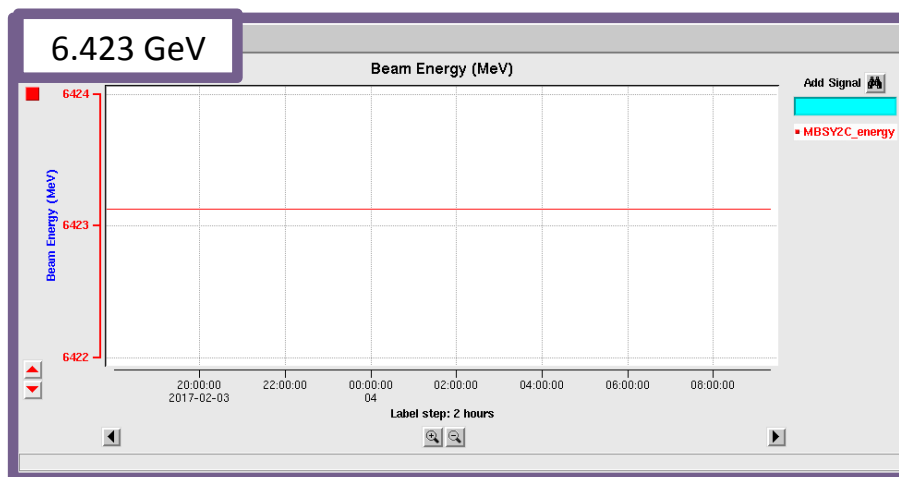
2: Running Conditions

5 nA, 6.423 GeV electrons

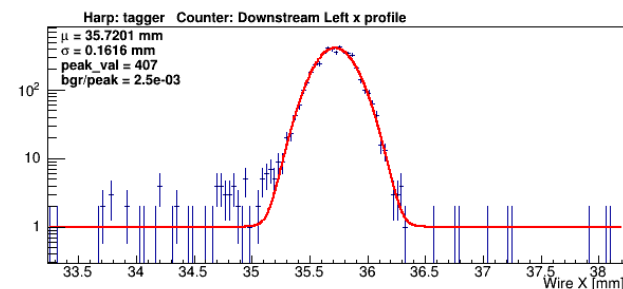
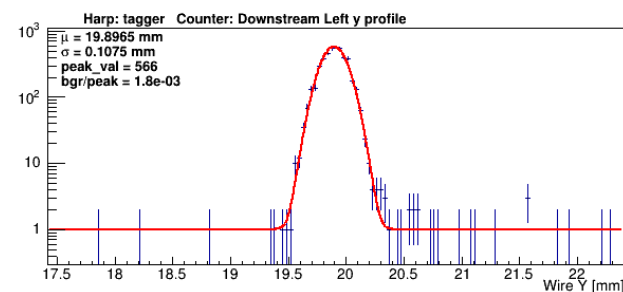
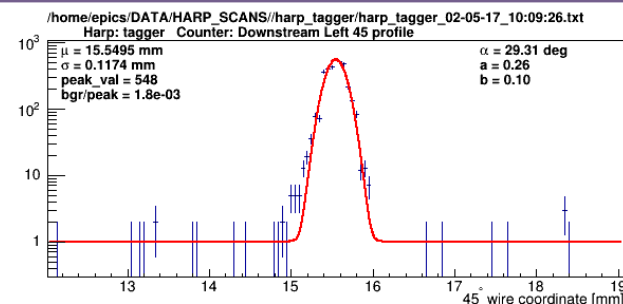
Beam Current, nA



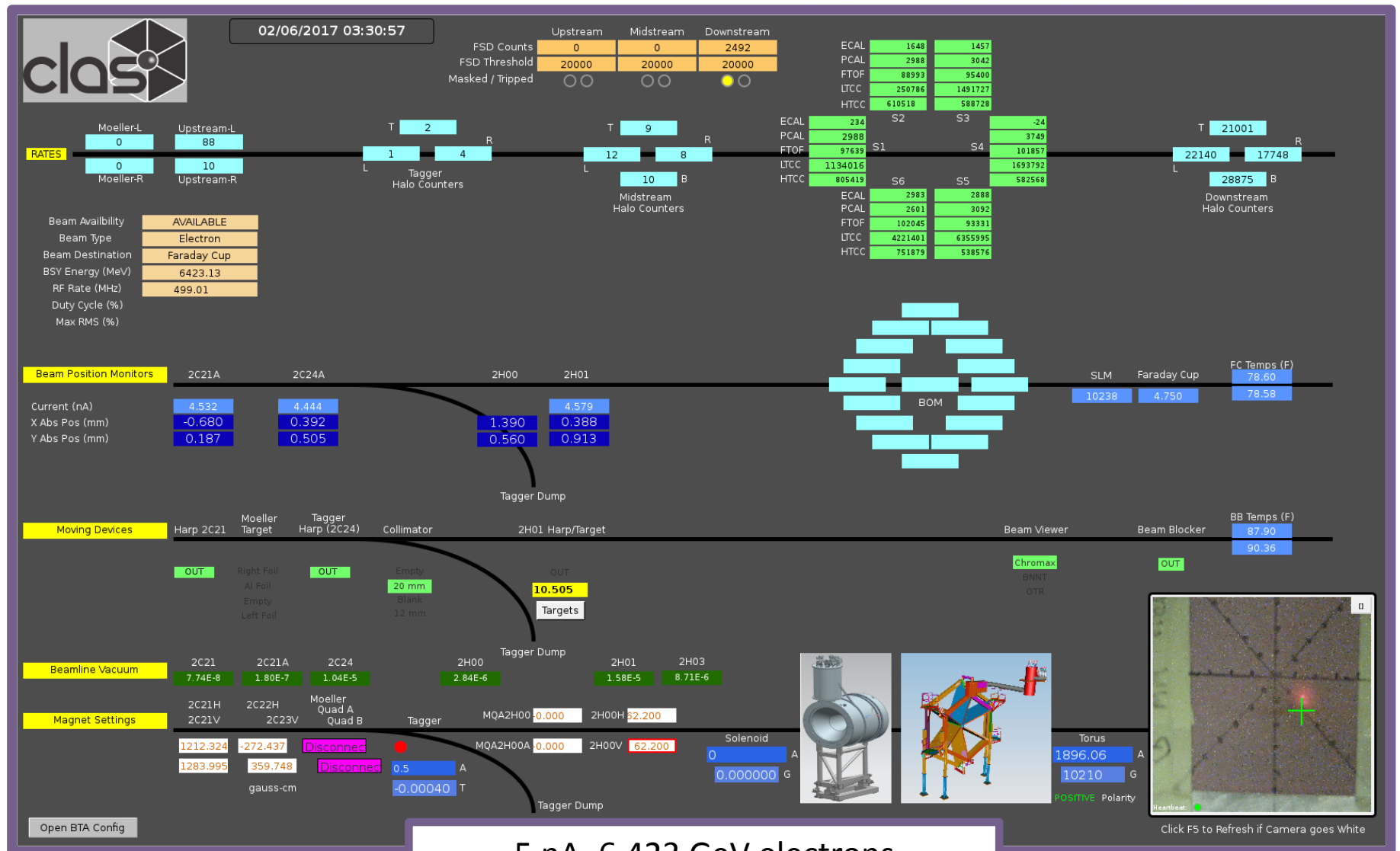
Beam Energy, MeV



Beam Profile – Harp Scan

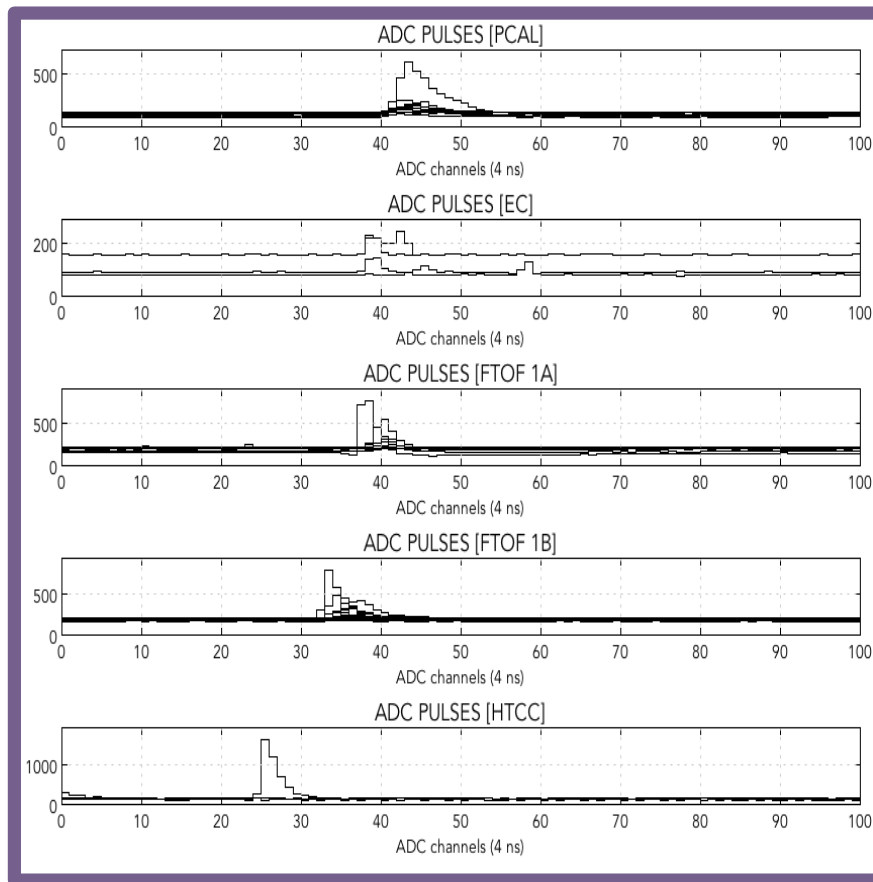


2: Running Conditions

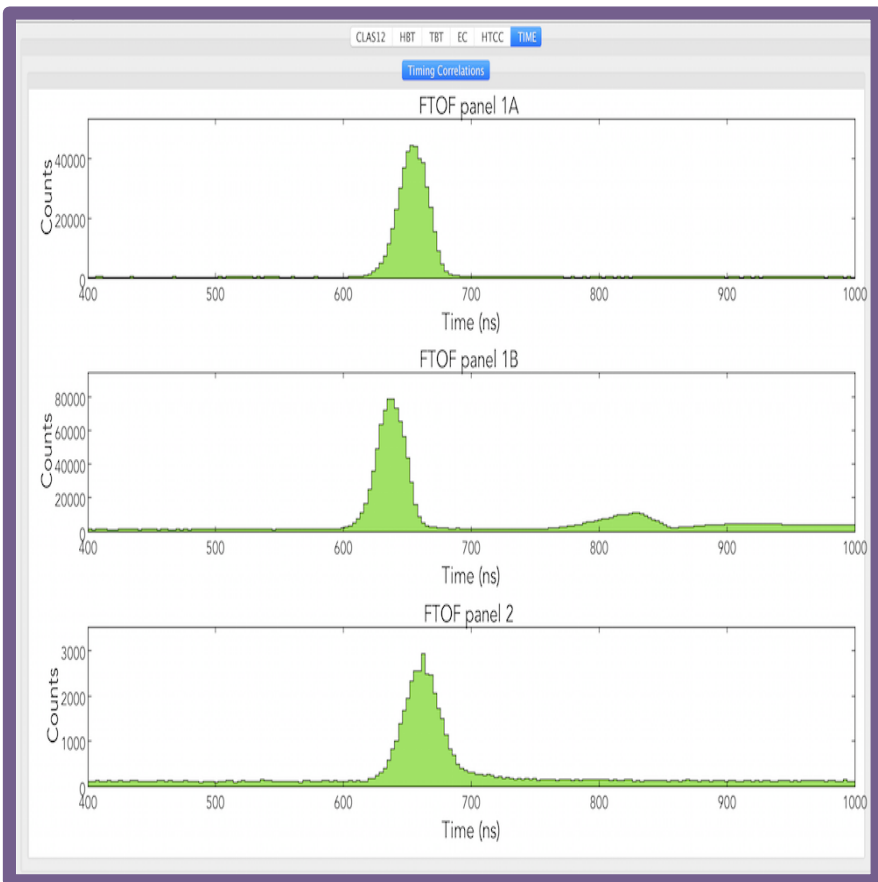


3: Relative Timing of Signals

Single event relative timing

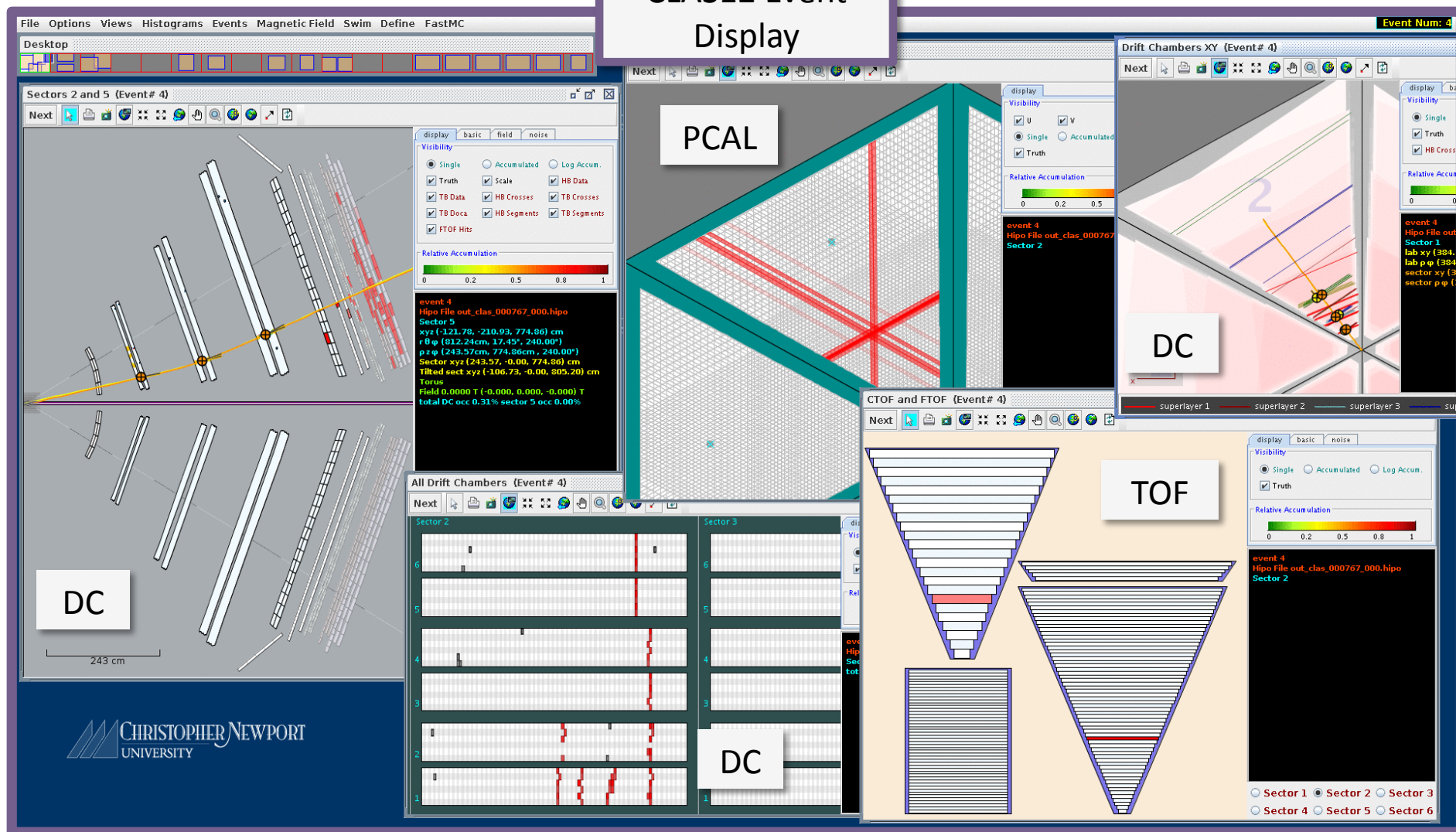


Full run FTOF timing relative to trigger



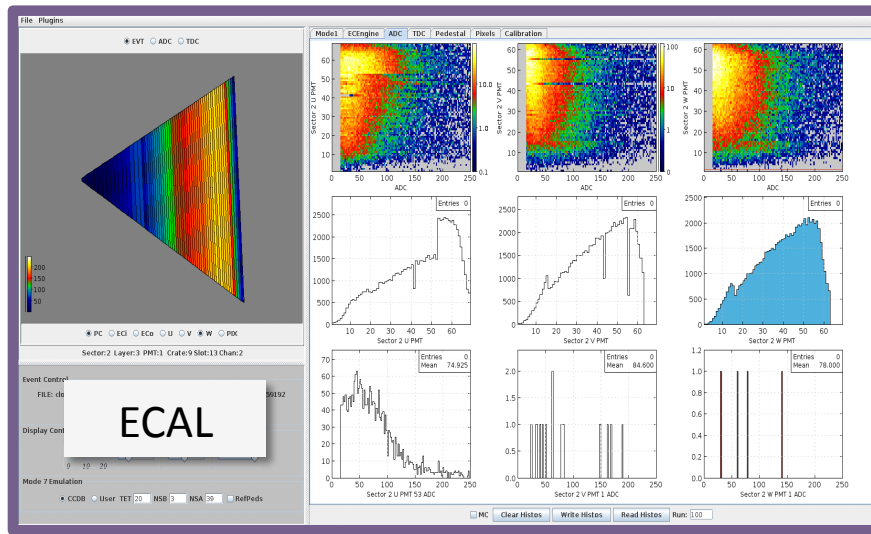
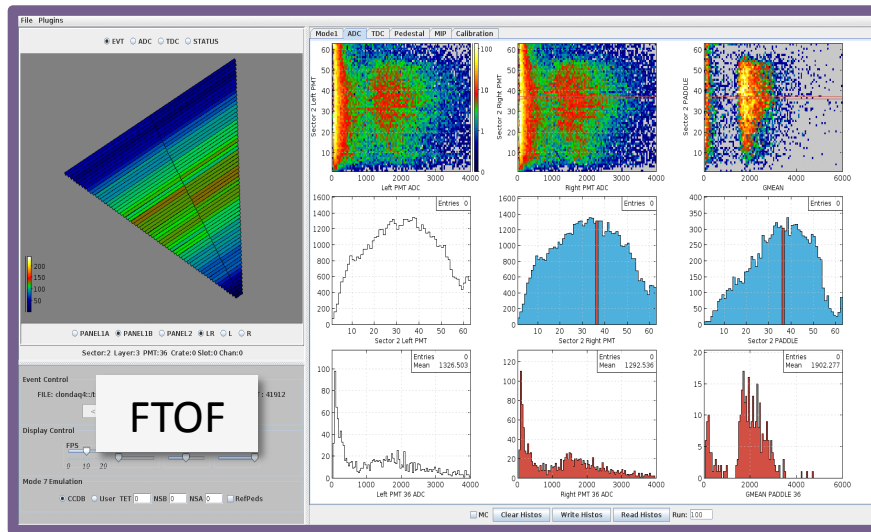
4: Event Displays

CLAS12 Event Display

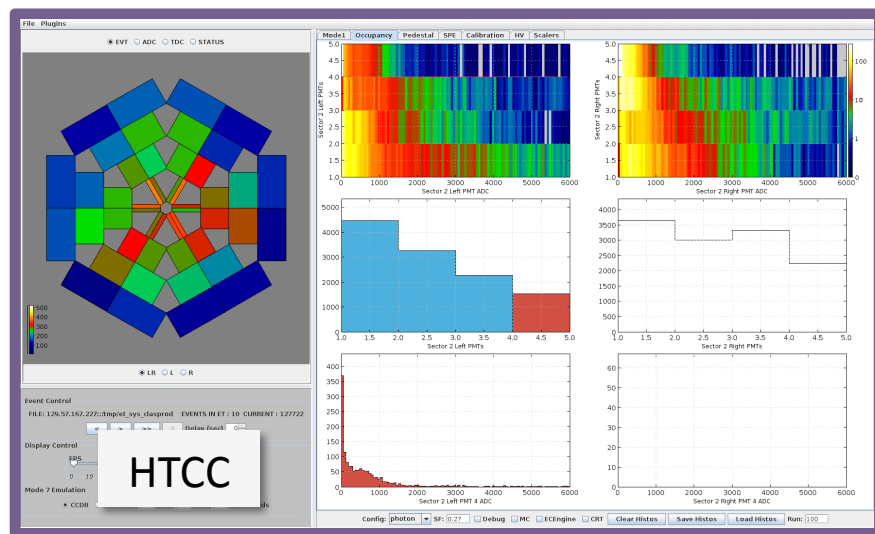


4: Event Displays

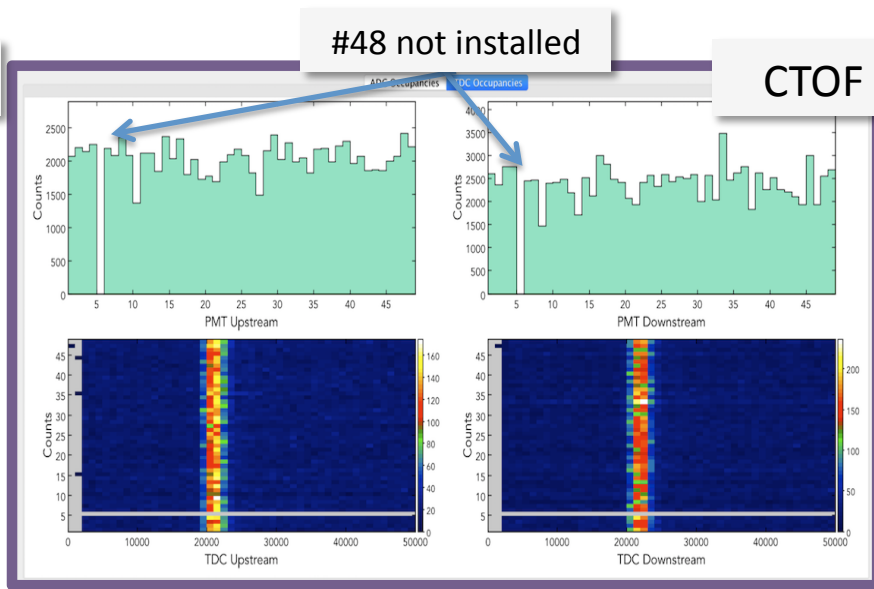
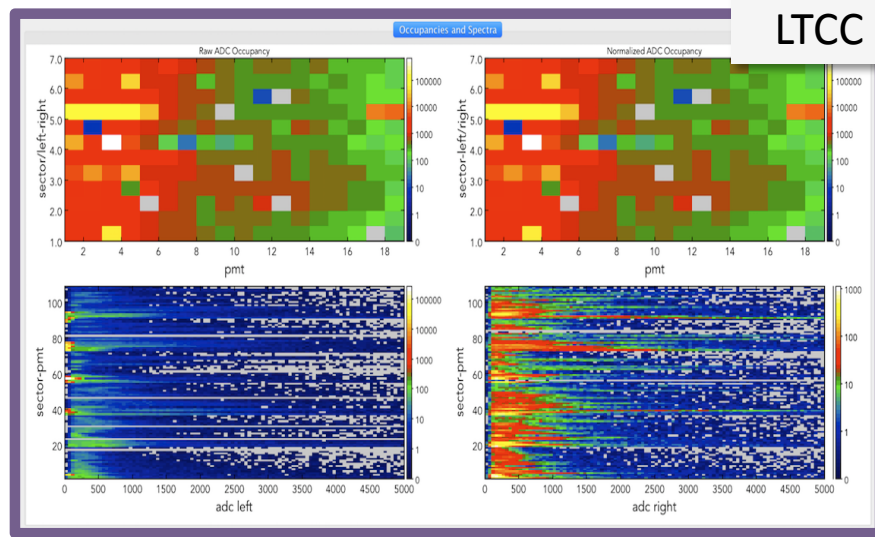
CLAS12 Monitoring Tools



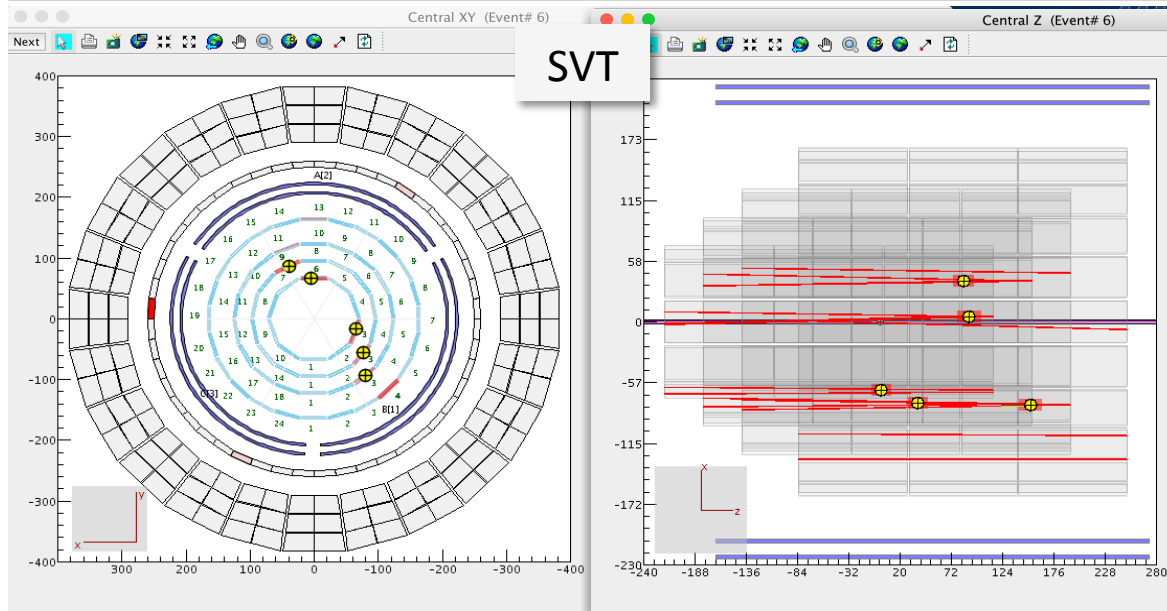
4: Event Displays



CLAS12
Monitoring Tools

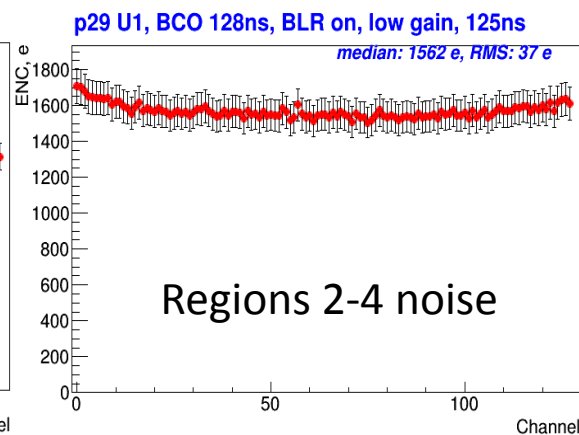
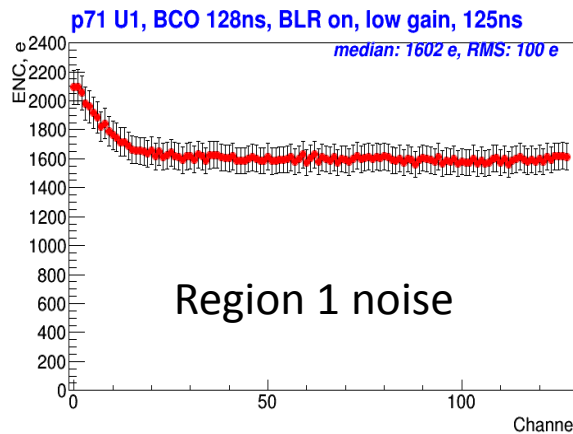
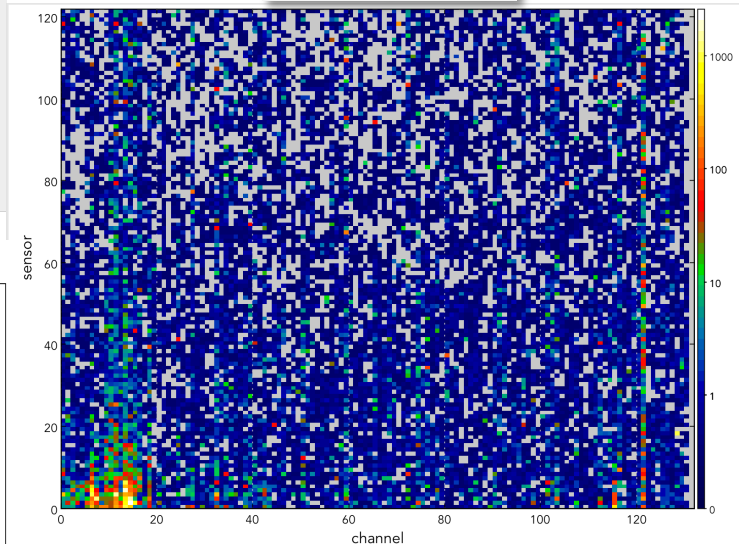


4: Event Displays



CLAS12
Monitoring Tools

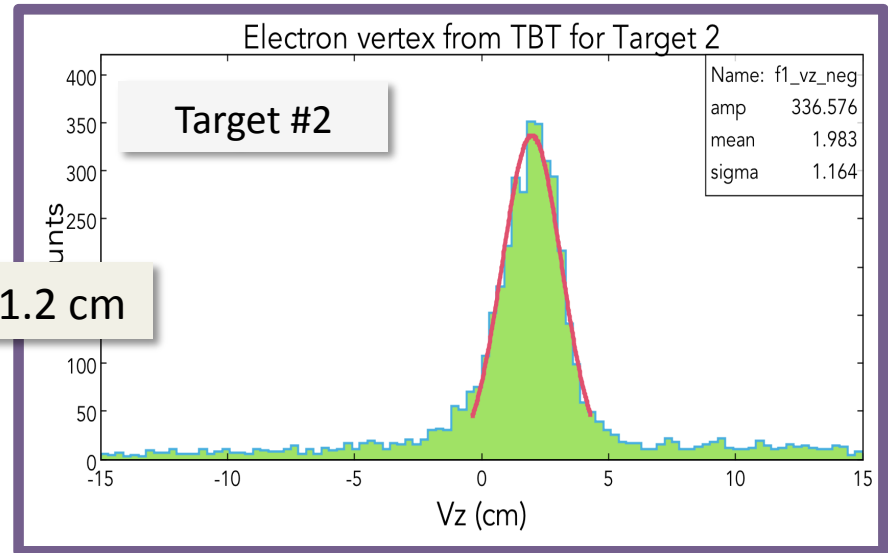
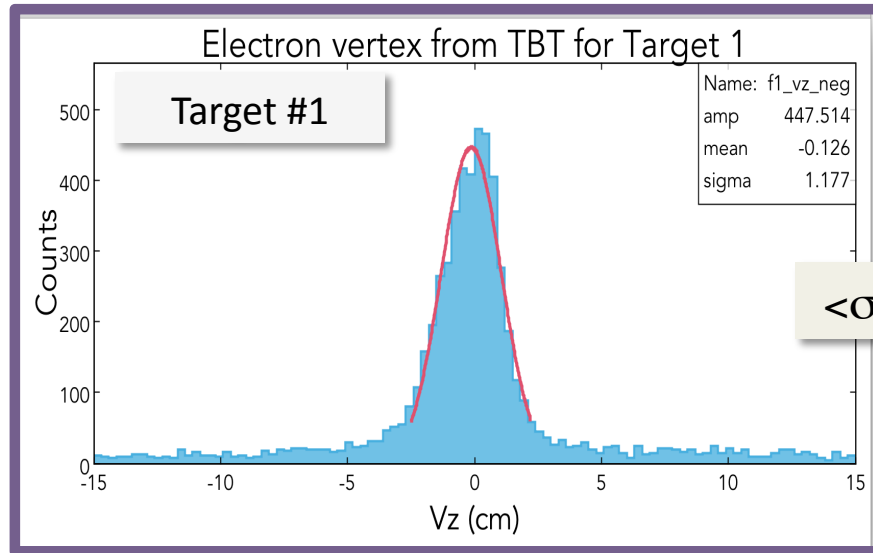
occupancy



99.9% channels
operational

Signal to noise ratio (>10) meets specs

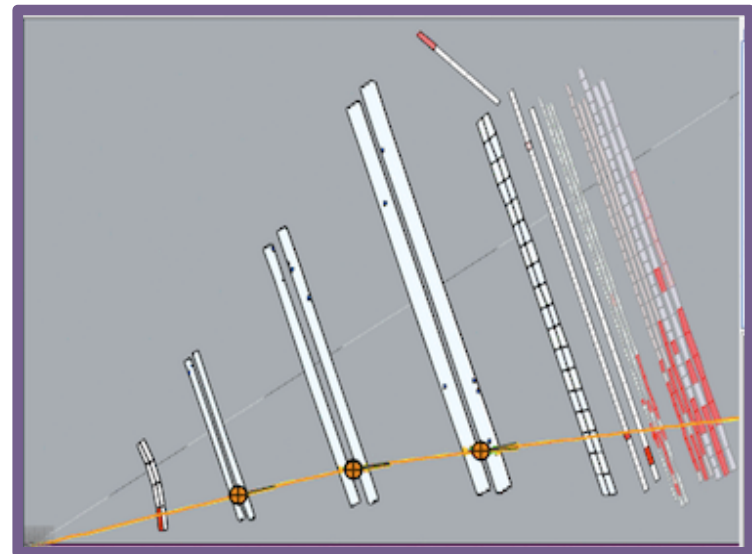
5: Reconstructed Particle Trajectories



$\langle\sigma\rangle=1.2$ cm

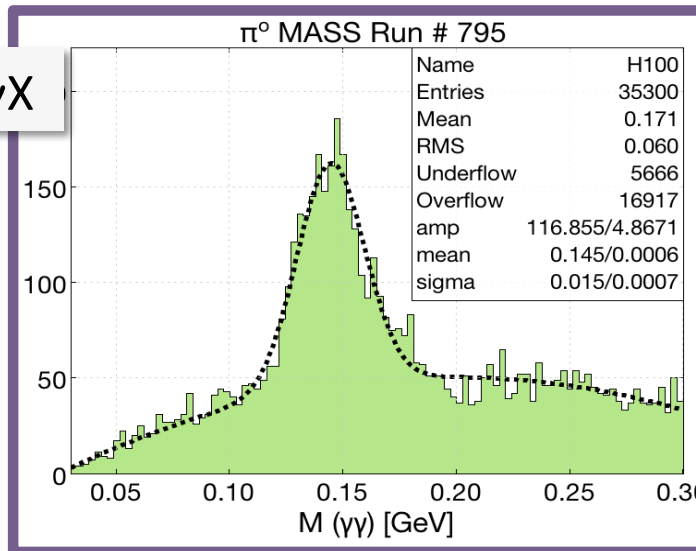


Two 0.5 mm ^{12}C wires mounted
2.1 cm apart along beamline (V_z)



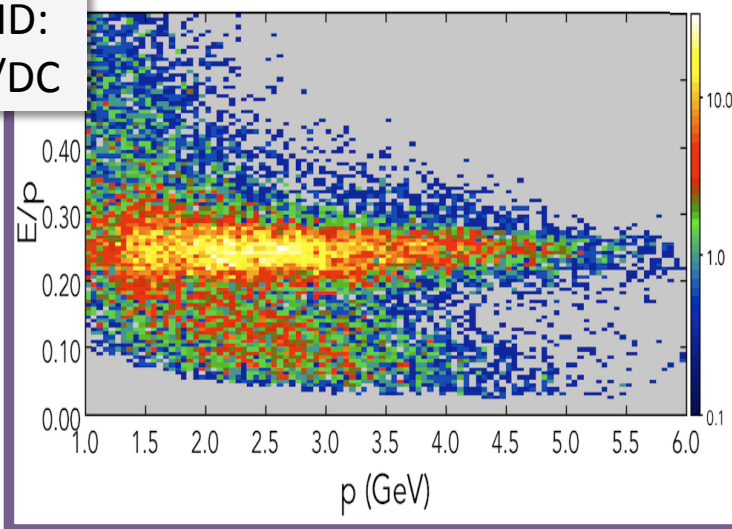
6. Particle Identification

$e\ ^{12}\text{C} \rightarrow \gamma\gamma X$



Neutrals ID:
EC/PCAL

Electron ID:
EC/PCAL/DC



Electron ID:
EC/PCAL/DC/HTCC

