

Testbeam monitoring

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Outline

- ▶ **General/Features**
- ▶ **Input/Output**
- ▶ **Classes**
- ▶ **Info displayed**
- ▶ **Remarks**

General

- ▶ "mission statement"

a self-contained, light and robust application to do reconstruction and first level analysis for comprehensive detector and data quality monitoring during or after data taking

General

- ▶ **application for testbeam monitoring**

- : code arranged in client-server parts (**GUI** and **SENDER**)

- : the different parts communicate through a socket
i.e. can live and run at the same pc or at different pc's

- ▶ **tasks**

- : **GUI's** task

- ▷ to provide a basic functionality through
entry fields and action buttons

- ▷ to display the info that the sender sends

- : **SENDER's** task

- ▷ to process the data and send plots and numeric info to gui

- ▷ to create persistent output (.root, .printout.ps, .log.txt, etc)

General features



- : requires ROOT 4.02/04 or higher and LCIO 01-04 or higher
- : communication through secure connection using ssh is possible
i.e. gui and sender running in pc's that are behind different firewalls
- : multiple types of transmission can occur,
currently one light and very frequent (say every 10events) and
one heavy and less frequent (say every 1000s events or some minutes)
- : modular arrangement of components/detectors
easy to add/handle new ones
- : gui's display pads invoke ROOT interactively
- : it is a light application, easy to install/run

General features

- ▶ **info transmitted and displayed**
 - ▷ numerical
 - : event labels
 - : counters per detector

 - ▷ graphical
 - : 3d event display
 - : daq rate, badreadout, time series ...
 - : tdc time signal, track coordinates
 - : Ecal hits, energy, pedestals/noise ...
Hcal hits, energy, pedestals/noise, leds ...
Tcmt hits, energy, pedestals/noise, leds ...
 - : particle id plots, veto signal
 - : cross check plots, Tracker vs Ecal vs Hcal ...

Input/Output

▶ **input**

- : .bin data files produced by daq
- + mapping files for Tdc, Ecal, Hcal, Tcmt
- + calibration constants for Ecal, Hcal, Tcmt

▶ **output**

- : Monitor<run>.<file>.root
- Monitor<run>.<file>.printout.ps
- Monitor<run>.<file>.log.txt
- + for Hcal Monitor<run>.<file>.HcalLed.dat, ..Ped.dat

Classes

▶ v00.09 (60+ classes)

EcalPcbPad	HcalProdTile	TcmtReadoutStrip	TriggerExtractor	DatMgr
EcalReadoutPad	HcalReadoutTile	TcmtPhysStrip	VetoRawAdcExtractor	RunMgr
EcalPhysicalPad	HcalPhysTile	TcmtMap	VetoMap	Handler
EcalMap	HcalMap	TcmtAdc	VetoHandler	MonitorMgr
EcalAdc	HcalAdc	TcmtEnergy	VetoMonitor	Monitor
EcalEnergy	HcalEnergy	TcmtCalibration	Tdc	SharedMonitor
EcalCalibration	HcalCalibration	TcmtRawAdcExtractor	TdcChannel	SocketClient
EcalRawAdcExtractor	HcalRawAdcExtractor	TcmtPedestalCalculator	Chamber	MyMainFrame
EcalPedestalCalculator	HcalPedestalCalculator	TcmtEnergyCalculator	ChamberChannel	MySpyMainFrame
EcalEnergyCalculator	HcalEnergyCalculator	TcmtHandler	TdcMap	MessageHeader
EcalHandler	HcalHandler	TcmtMonitor	TdcExtractor	MessageObj
EcalMonitor	HcalMonitor		Track	MyEventDisplay
			TdcHandler	
			TdcMonitor	

■ general analysis classes

■ gui related classes

Histograms

► v00.09 (100+ histos)

ECAL

hEcalTriggerEvents
hEcalBadReadout
hEcalHits
hEcalEnergy
hEcalEnergyPerLayer
hEcalHitsPerLayer
hEcalEnergyVsTime
hEcalPedChipAverage.slot7
hEcalPedRMSChipAverage.slot7
hEcalPedChipAverage.slot15
hEcalPedRMSChipAverage.slot15
hEcalPedChipAverage.slot17
hEcalPedRMSChipAverage.slot17
hEcalPedChipAverage.slot19
hEcalPedRMSChipAverage.slot19
...

HCAL

hHcalTriggerEvents
hHcalBadReadout
hHcalHits
hHcalEnergy
hHcalEnergyPerLayer
hHcalHitsPerLayer
hHcalEnergyVsTime
hHcalHitEnergy
hHcalHitAdc
hHcalLedPerLayer
hHcalPedPerLayer
hHcalPedRMSPerLayer
hHcalPedChipAverage.slot9
hHcalPedRMSChipAverage.slot9
hHcalPedPerChannel.slot9
hHcalPedRMSPerChannel.slot9
...

TCMT

hTcmtTriggerEvents
hTcmtBadReadout
hTcmtHits
hTcmtEnergy
hTcmtEnergyPerLayer
hTcmtHitsPerLayer
hTcmtEnergyVsTime
hTcmtHitEnergy
hTcmtHitAdc
hTcmtLedPerLayer
hTcmtPedPerLayer
hTcmtPedRMSPerLayer
hTcmtPedChipAverage.slot12
hTcmtPedRMSChipAverage.slot12
hTcmtPedPerChannel.slot12
hTcmtPedRMSPerChannel.slot12
...

Tracker

hTimeX0
hTimeY0
hTimeX1
hTimeY1
hTimeX2
hTimeY2
hTimeX3
hTimeY3
hTrackX0
hTrackY0
hTrackX1
hTrackY1
hTrackX2
hTrackY2
hTrackX3
hTrackY3
...

hTriggerRate
hBadReadout

ParticleID

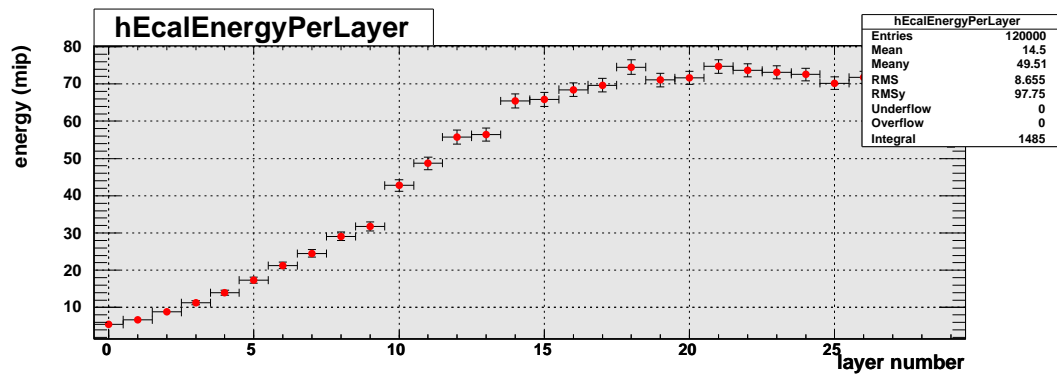
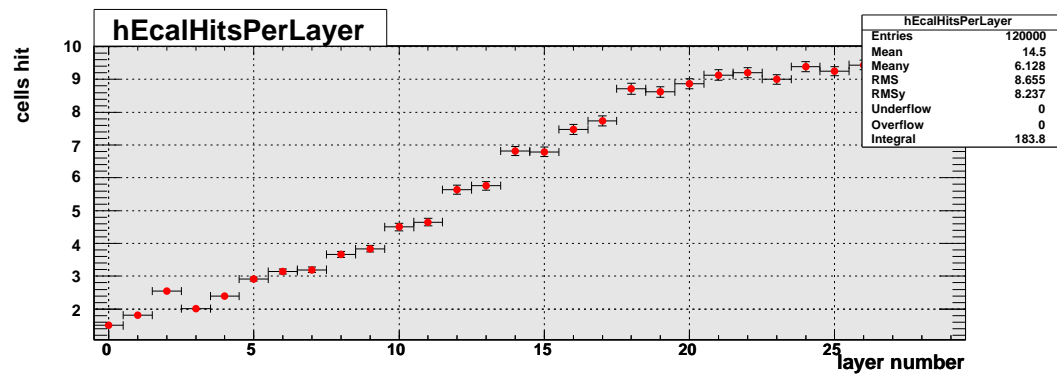
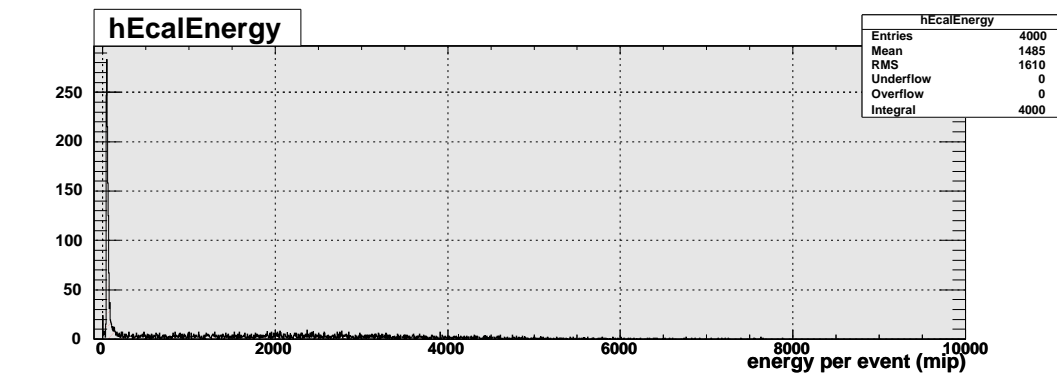
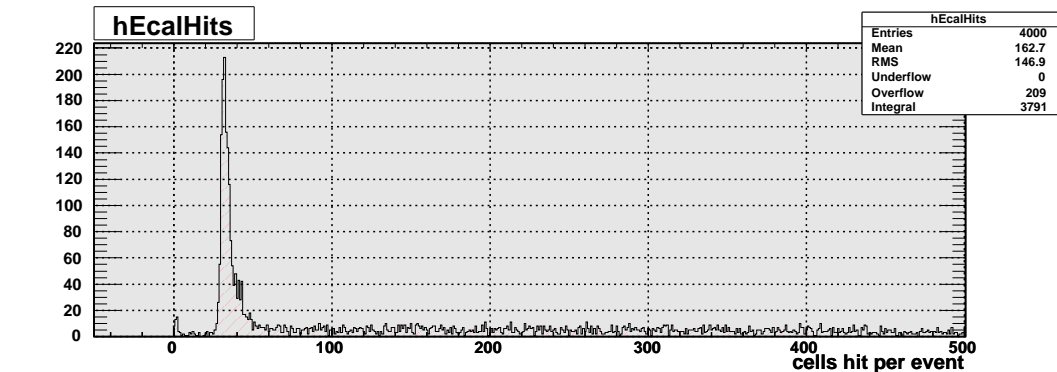
hEcalEnergyCherON/OFF
hEcalEnergyPerLayerCherON/OFF
hHcalEnergyCherON/OFF
hHcalEnergyPerLayerCherON/OFF

CrossChecks

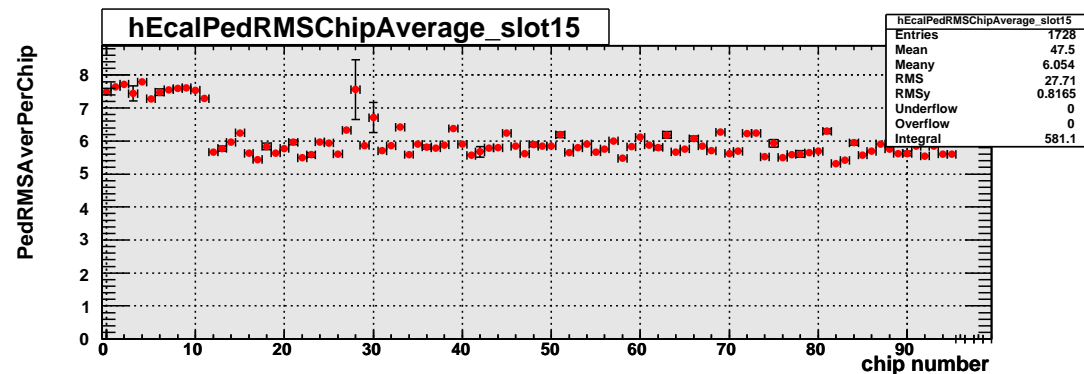
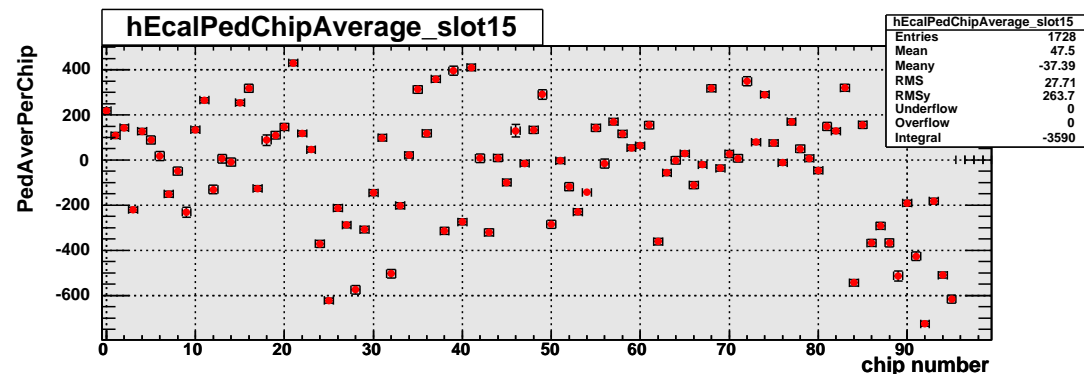
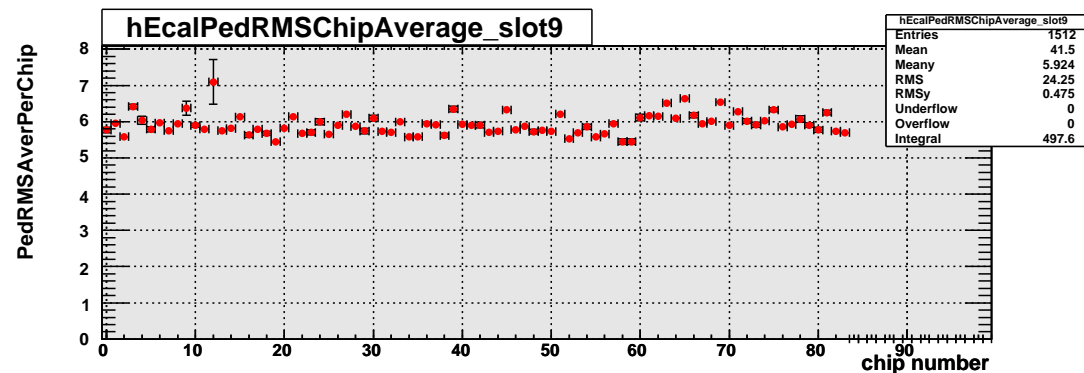
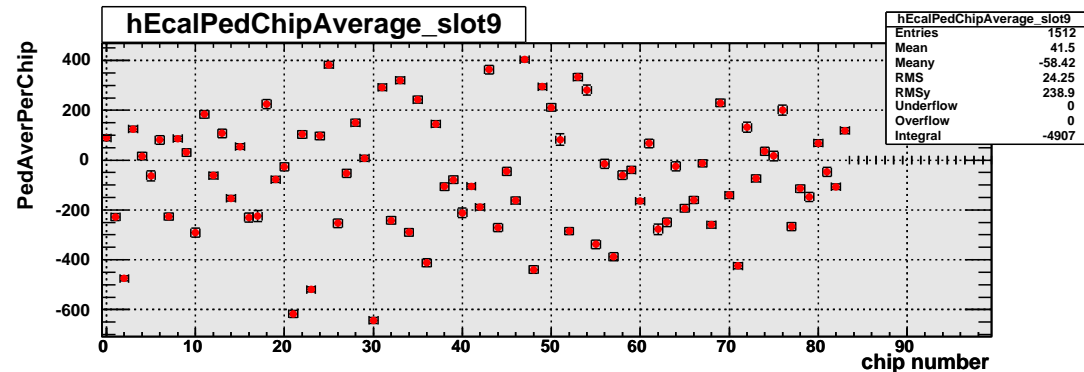
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hTrackBackY.vs.EcalFrontY
hTrackBackX.vs.HcalFrontX
hTrackBackY.vs.HcalFrontY
hHcalFrontX.vs.EcalBackX
hHcalFrontY.vs.EcalBackY
hHcalEnergy.vs.EcalEnergy
hHcalHits.vs.EcalHits
...

► arranged in 20 gui panels (=printout pages)

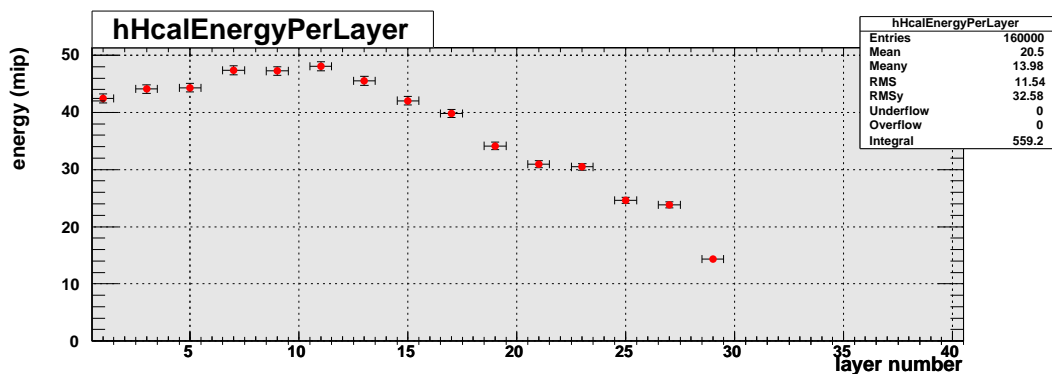
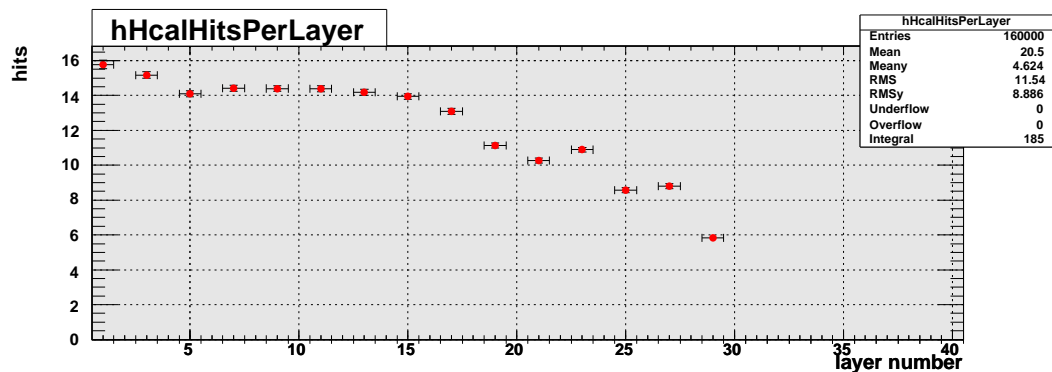
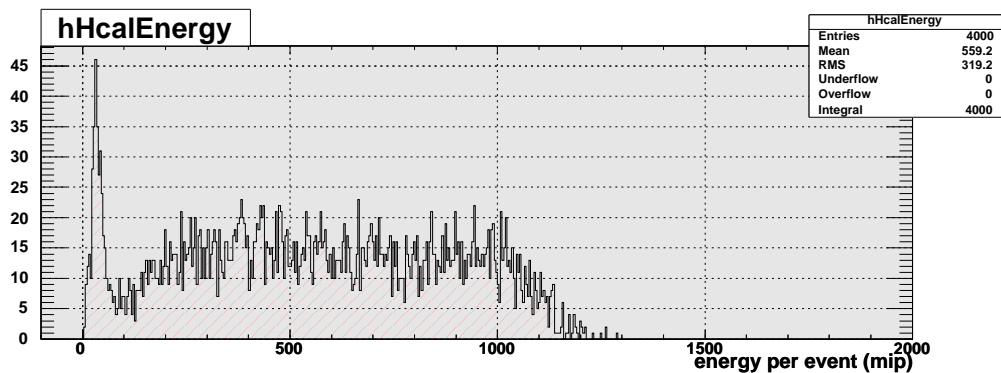
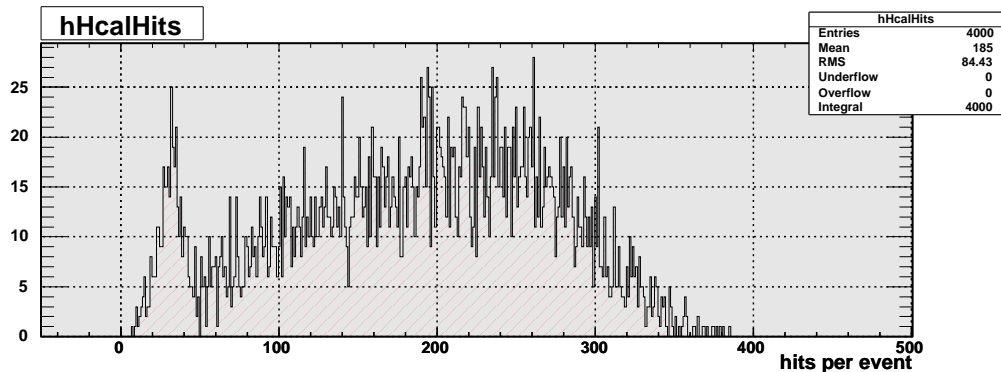
ECAL Response



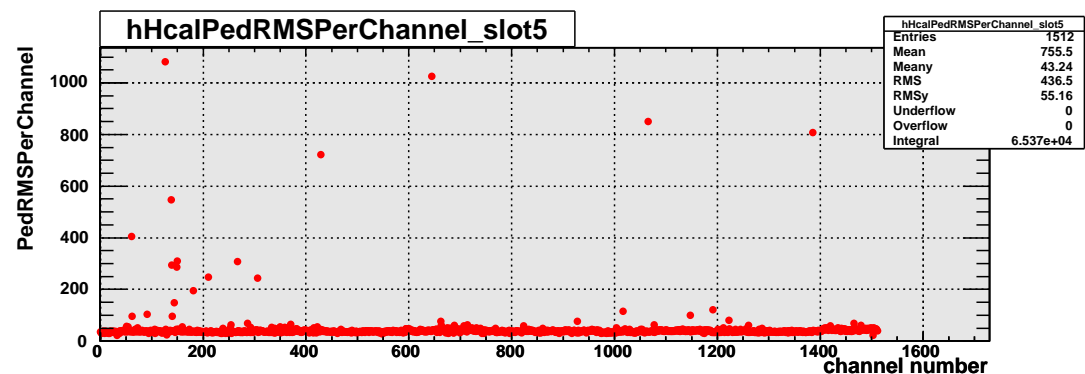
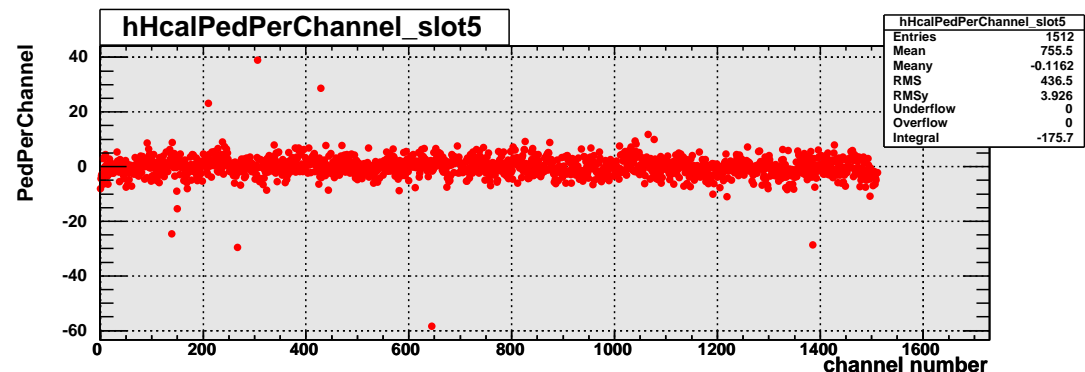
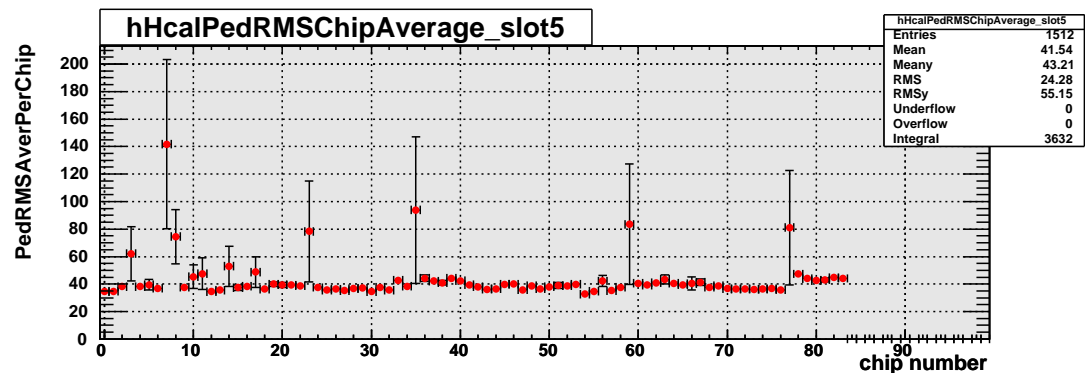
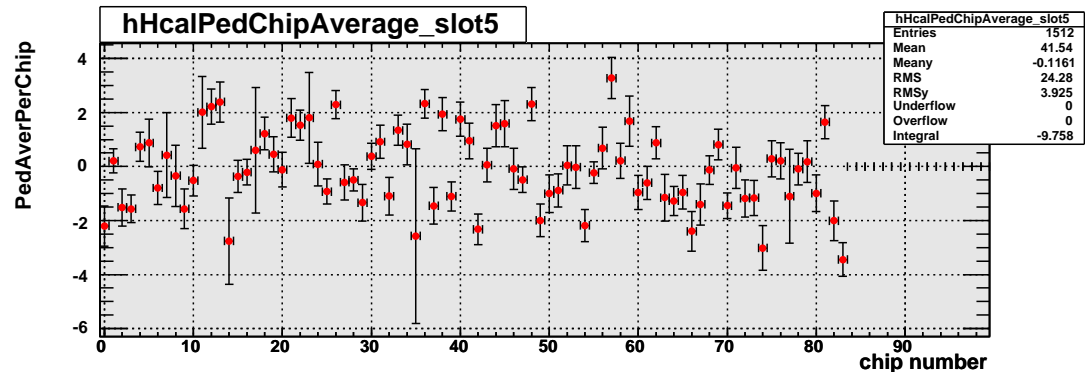
ECAL Pedestals/Noise



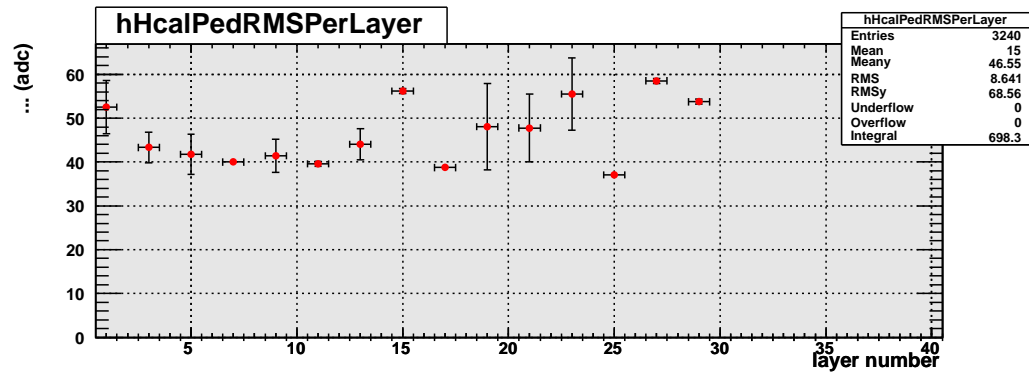
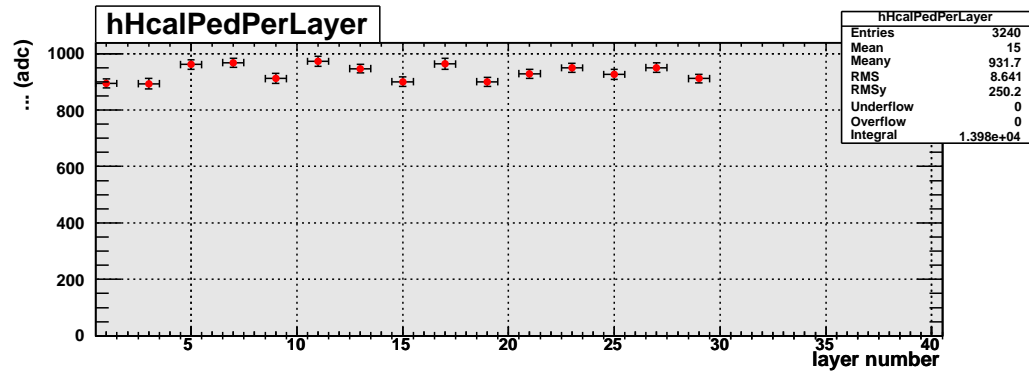
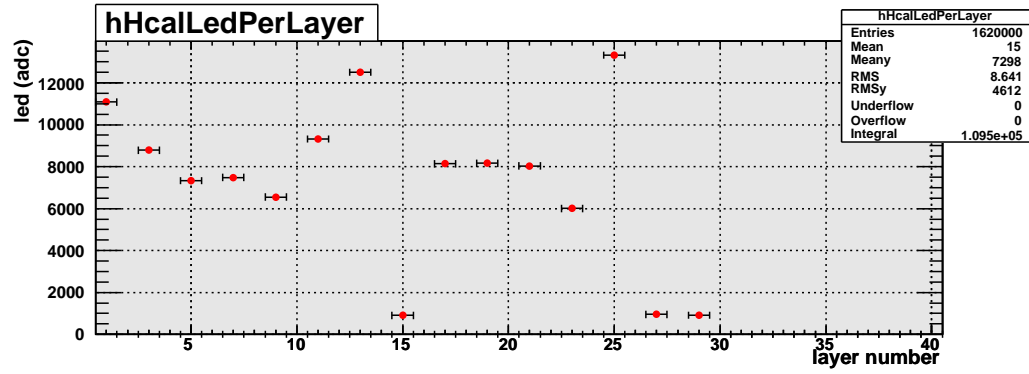
HCal Response



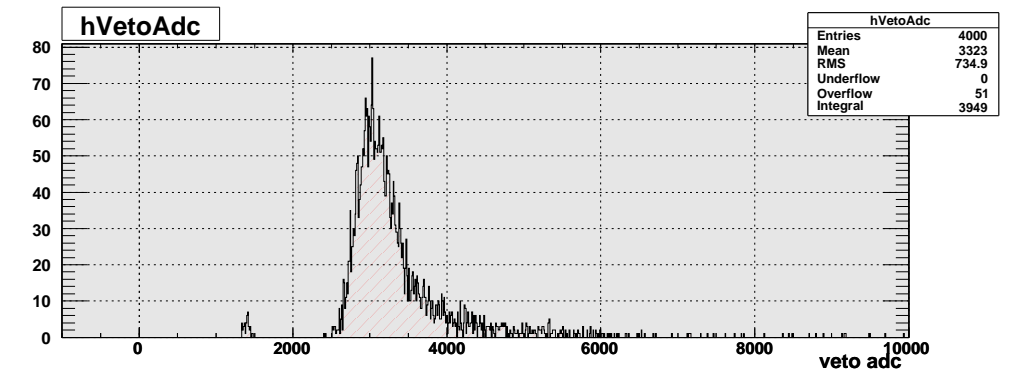
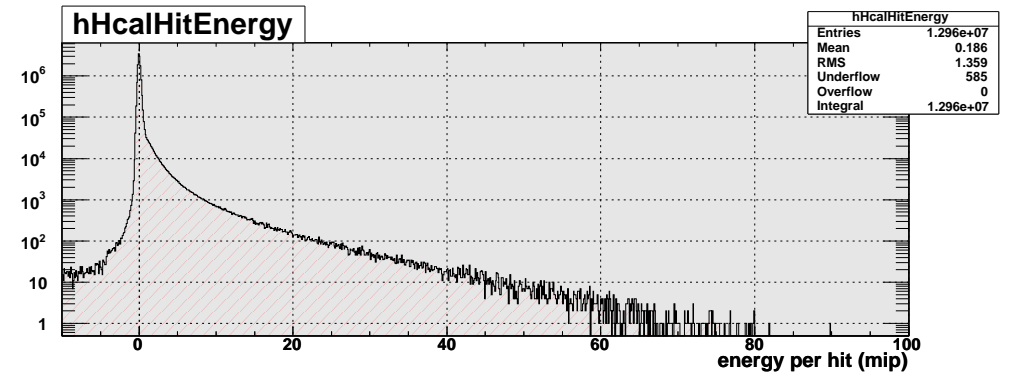
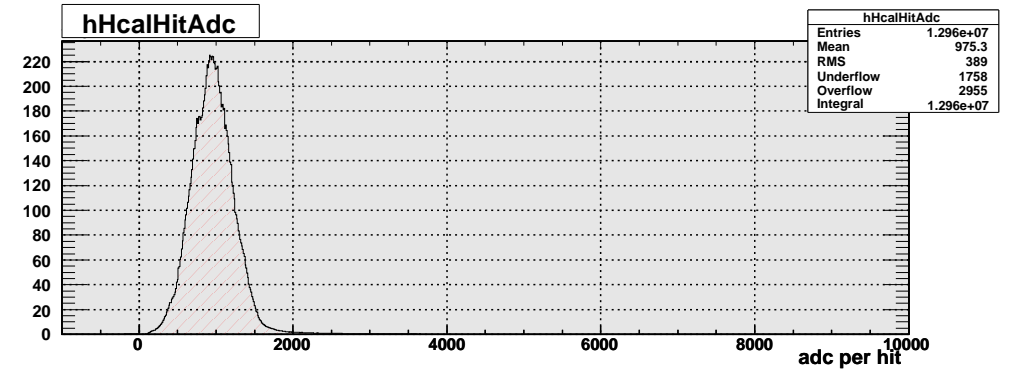
HCal Pedestals/Noise



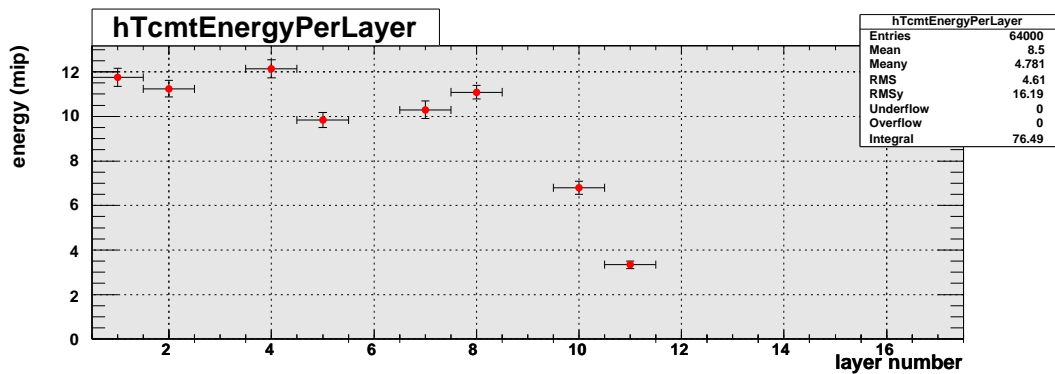
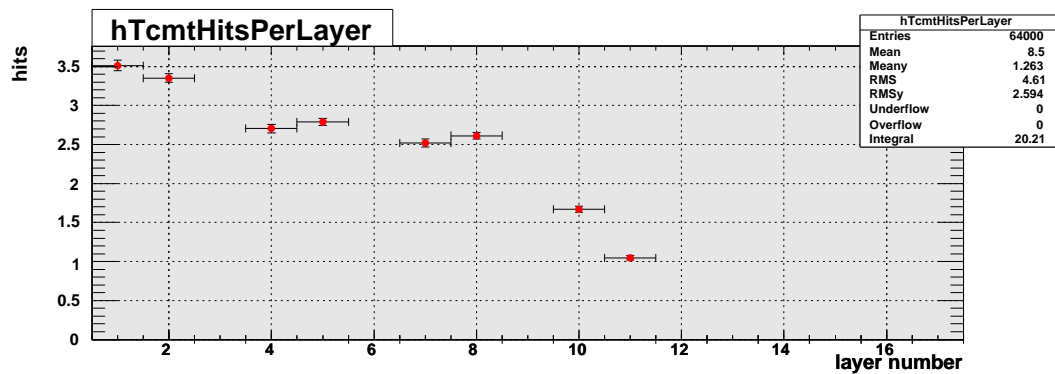
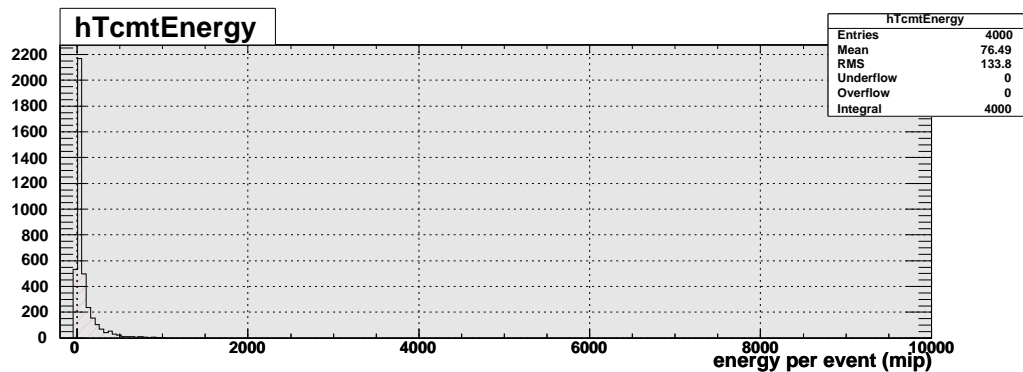
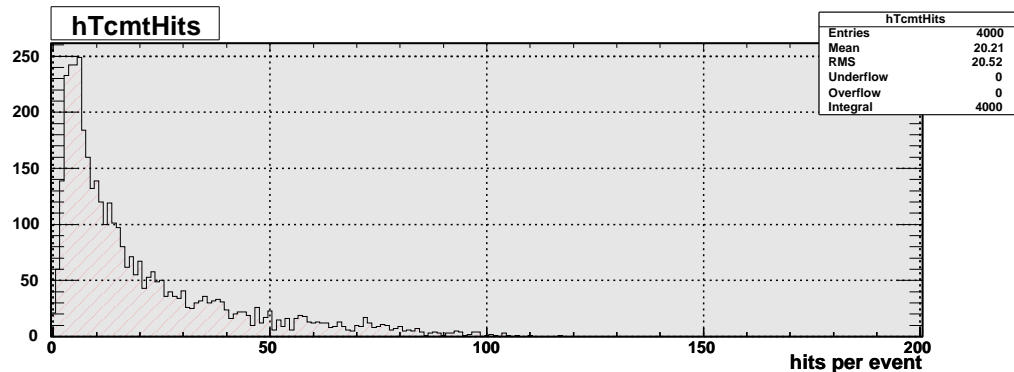
HCAL Leds



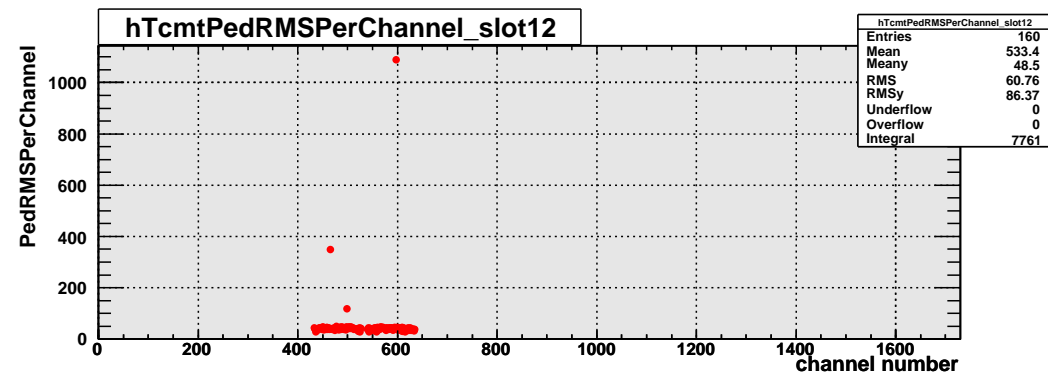
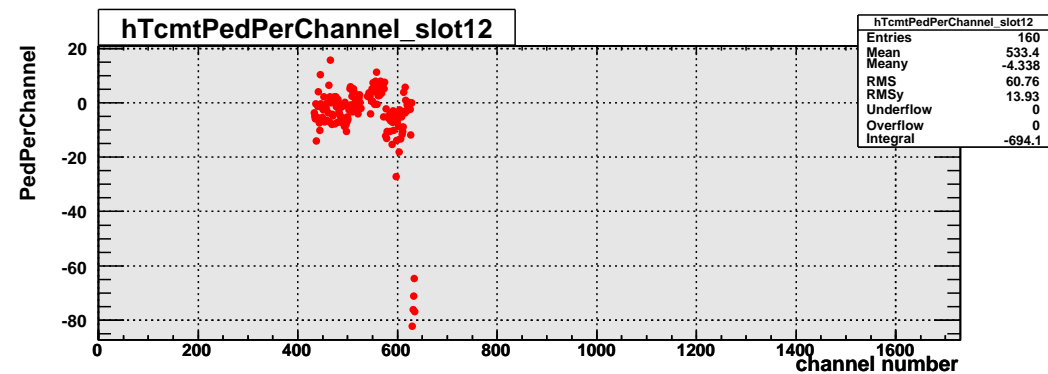
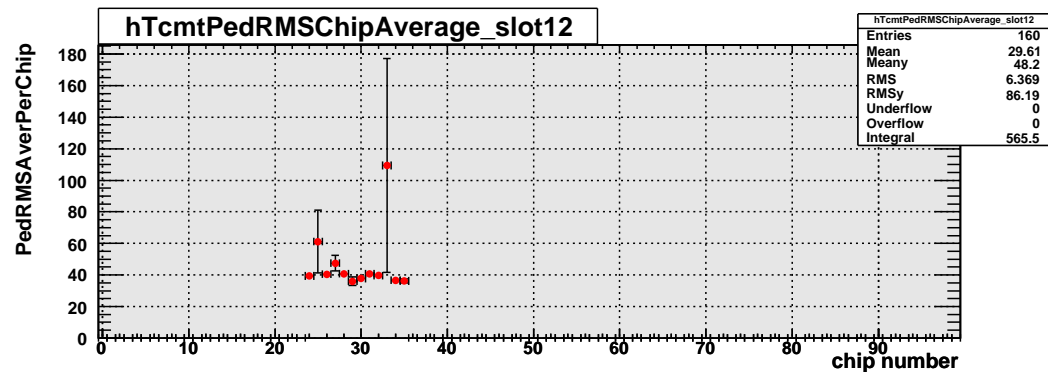
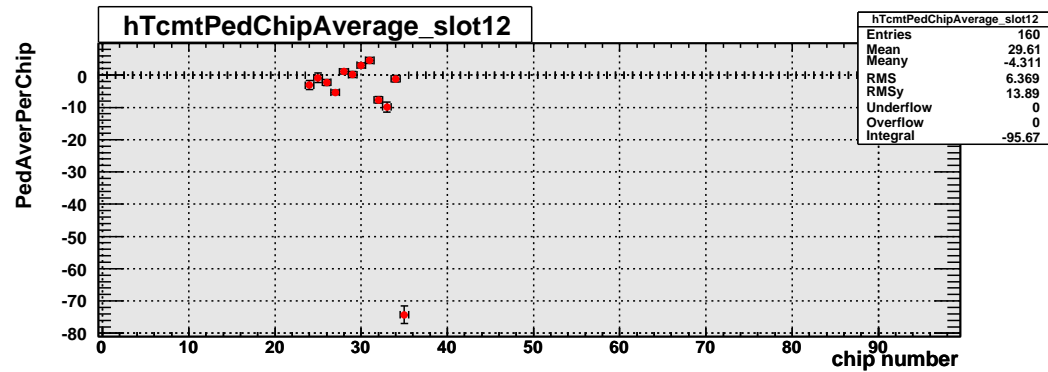
HCAL Misc



TCMT Response

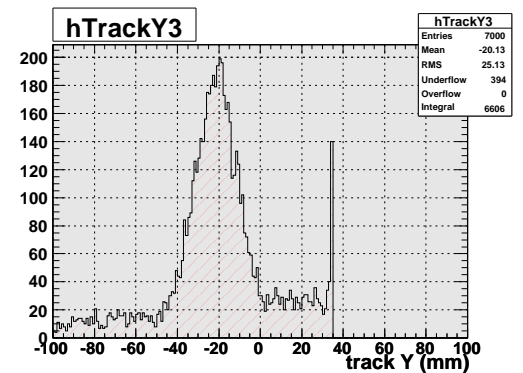
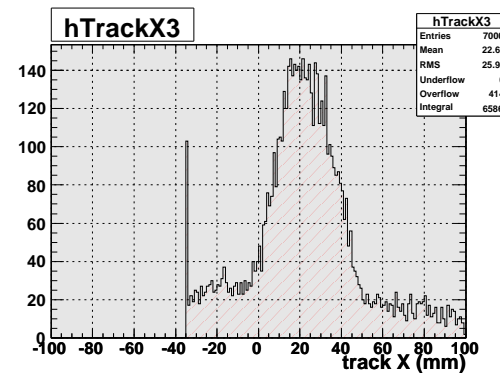
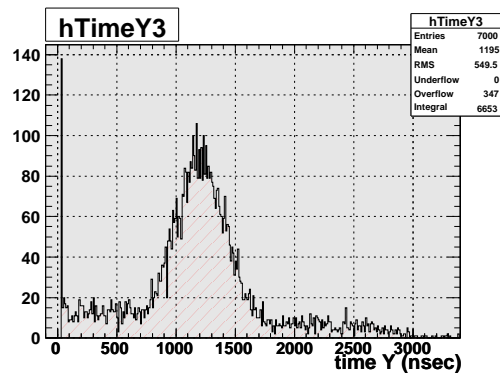
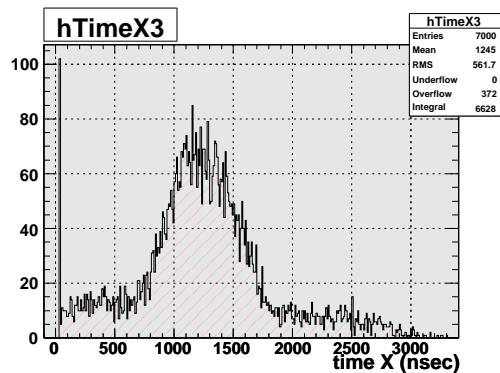
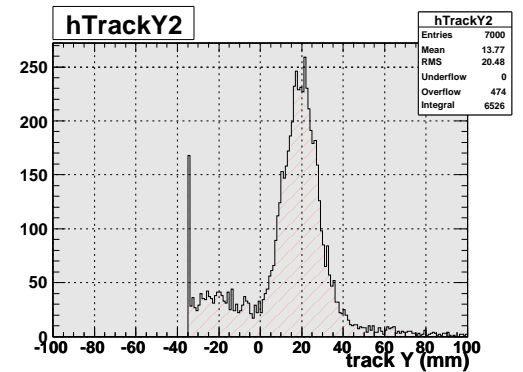
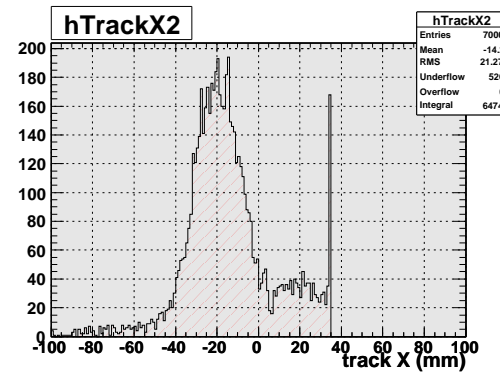
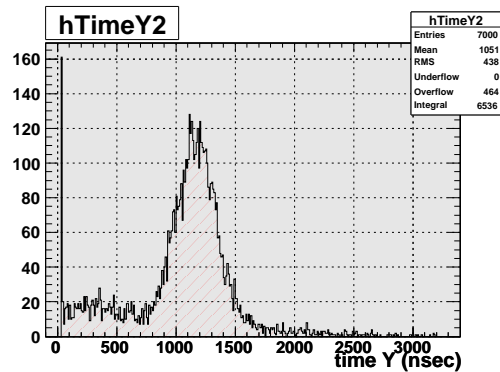
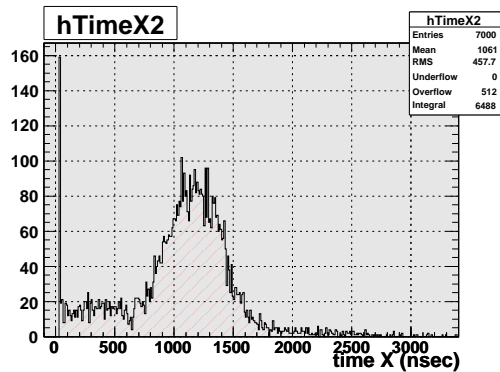
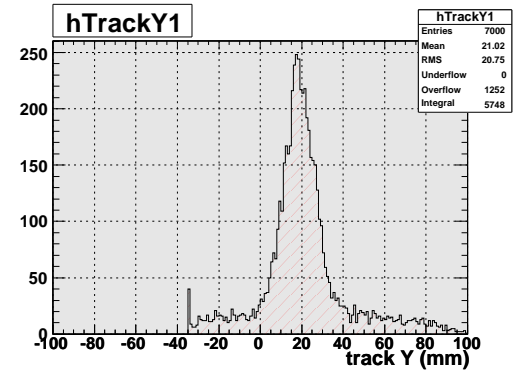
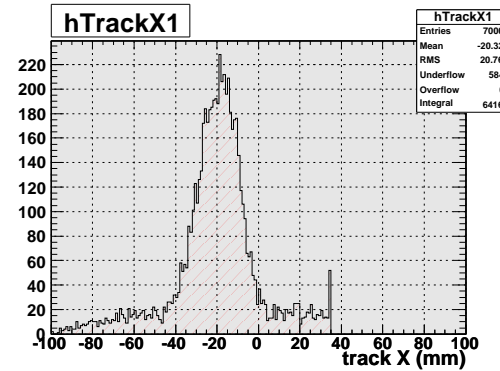
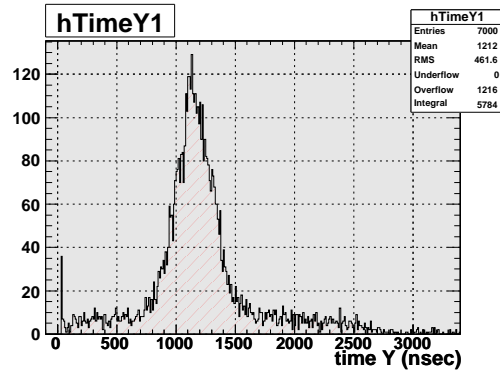
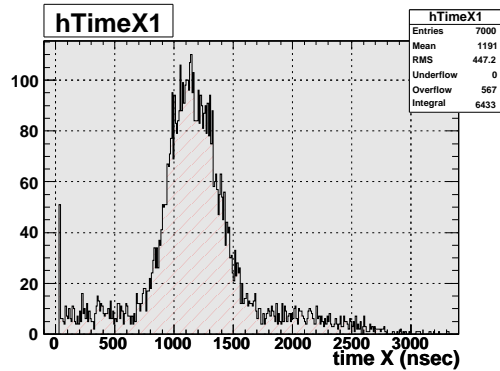
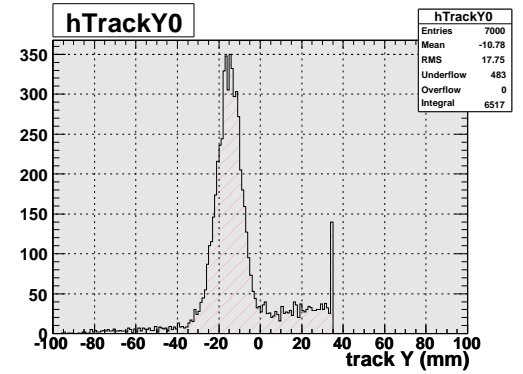
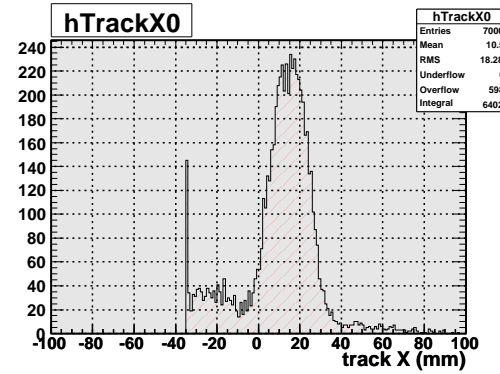
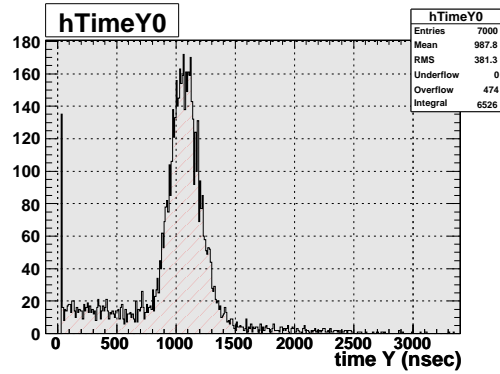
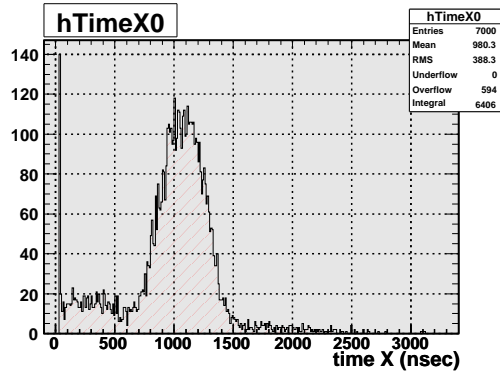


TCMT Pedestals/Noise



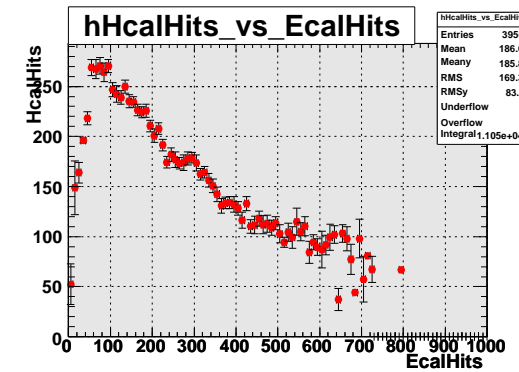
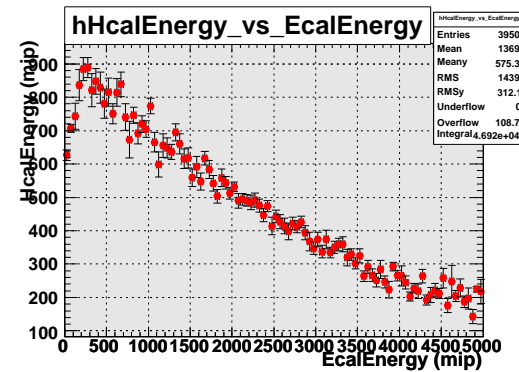
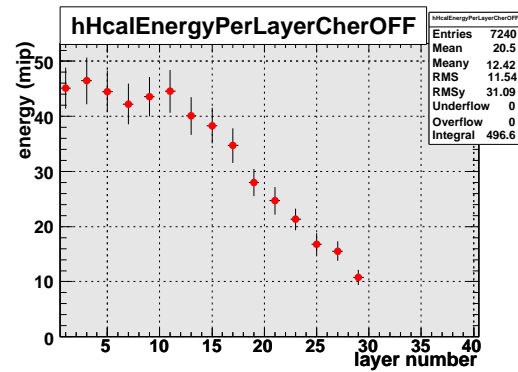
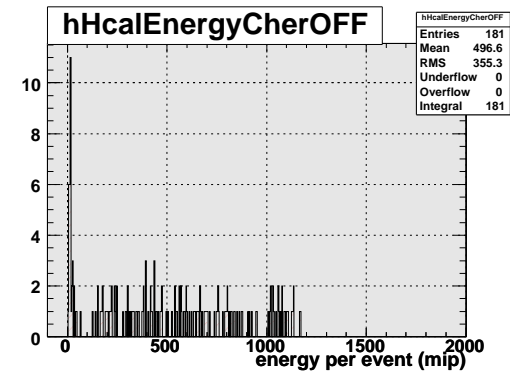
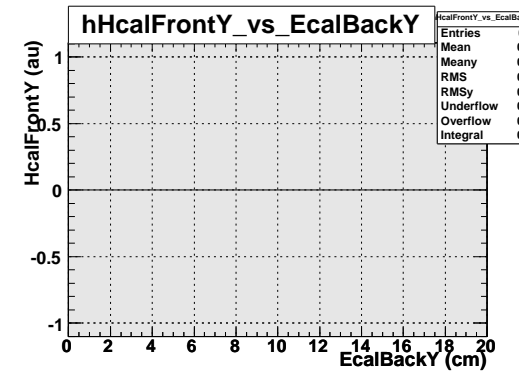
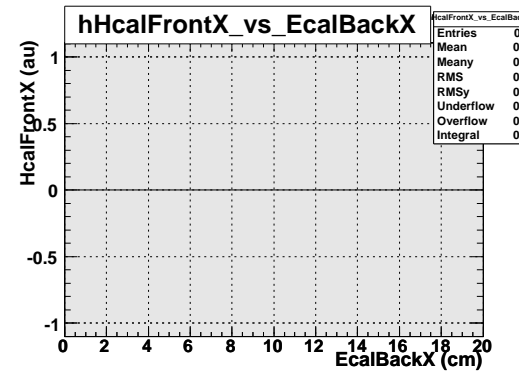
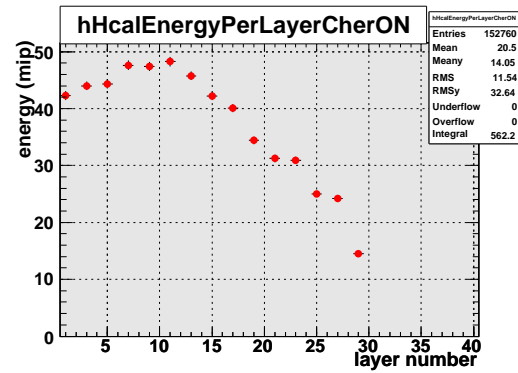
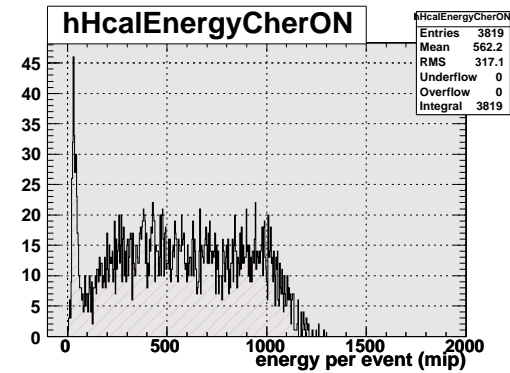
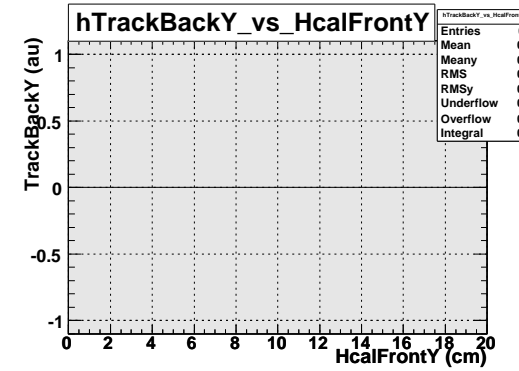
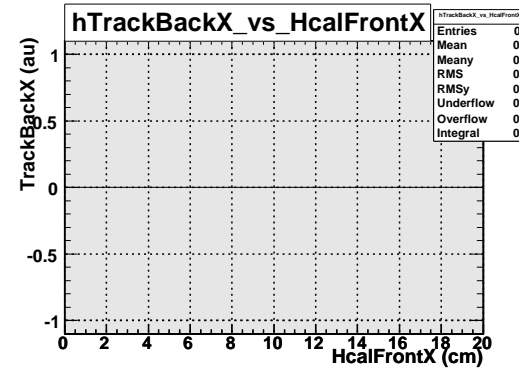
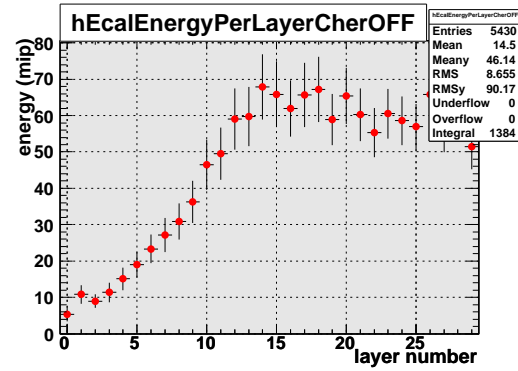
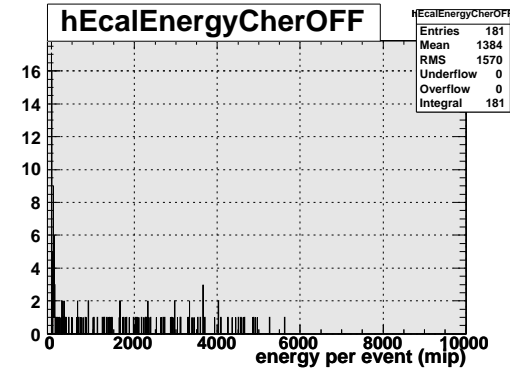
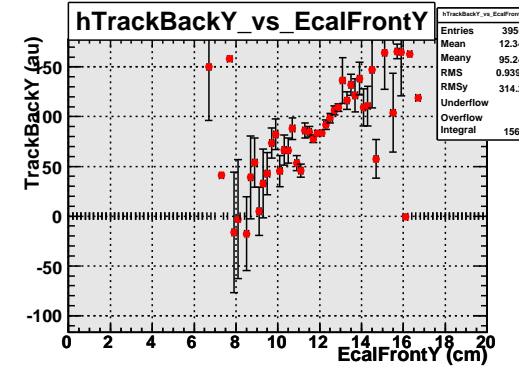
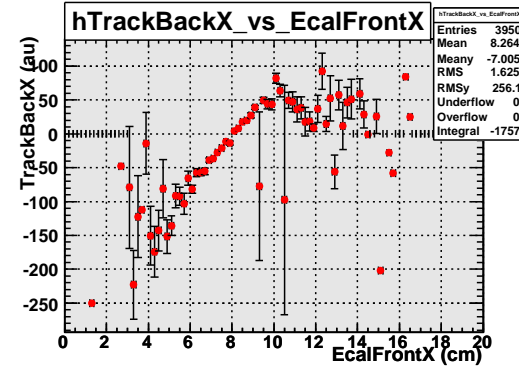
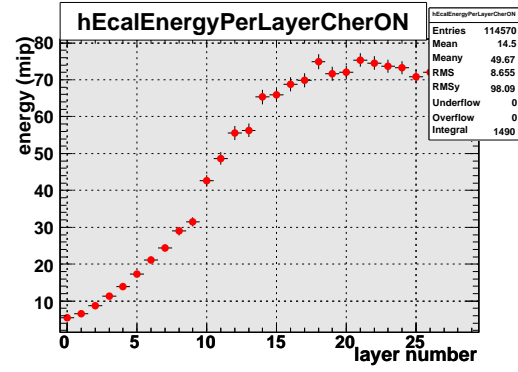
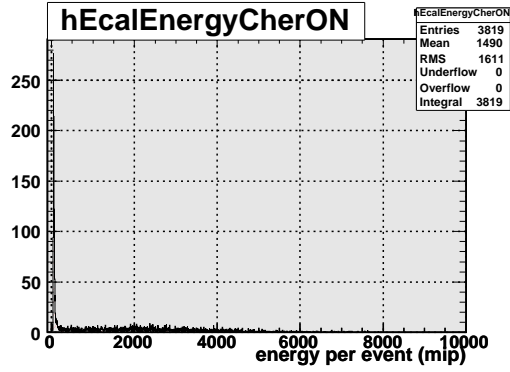
Tracker XY (time)

Tracker XY (space)

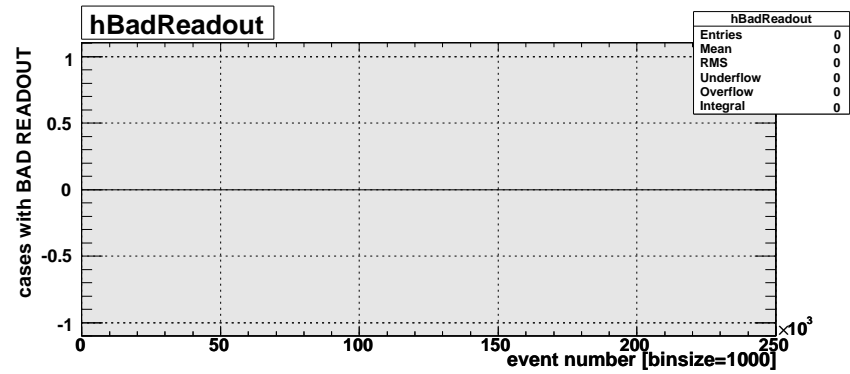
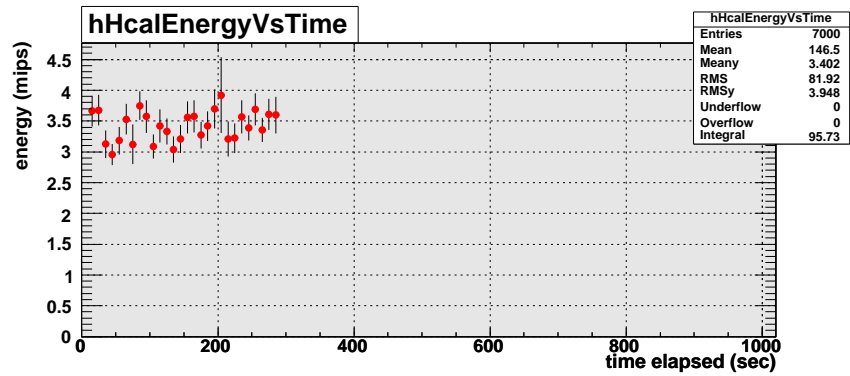
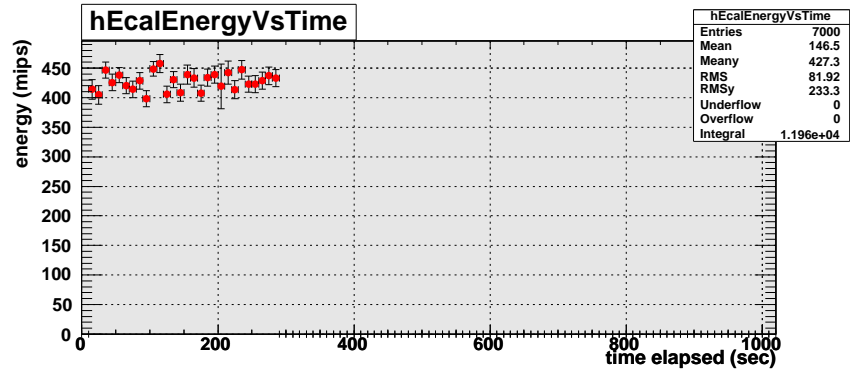
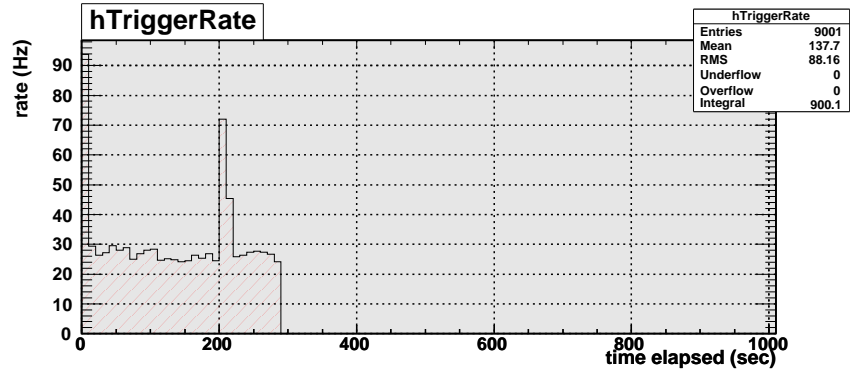


ParticleID

Cross checks



Main panel



Status table

Monitor
ECAL | HCAL | TCMT | Tracker | ParticleID | Display3D | CrossChecks | Status | Settings

hTriggerRate

Entries	1291
Mean	3.439
RMS	2.831
Underflow	0
Overflow	0
Integral	1091

hEcalEnergyVsTime

Entries	90
Mean	14.89
MeanY	1271
RMS	1.248
RMSy	1676
Underflow	0
Overflow	0
Integral	4768

hHcalEnergyVsTime

Entries	90
Mean	14.89
MeanY	589.7
RMS	1.048
RMSy	332.8
Underflow	0
Overflow	0
Integral	317.2

hBadReadout

Entries	0
Mean	0
RMS	0
Underflow	0
Overflow	0
Integral	0

Events processed

Total	1091
-------	------

Ecal counters

Total	1090
Pedestals	500
Leds	0
Triggers	90
BadReadout	0

Hcal counters

Total	1090
Pedestals	500
Leds	500
Triggers	90
BadReadout	0

Tdc counters

Total	90
NoTdc	0
TdcOverflow	0
BadTrack	0

TCMT counters

Total	1090
Pedestals	500
Leds	500
Triggers	90
BadReadout	0

Run

999

File From To

0 0

Threshold(mip)

0.5

EventSample

1091

Update(events)

1090

Update(sec)

100

Start

Exit

Help

Pause

Continue

Print

STOPPED

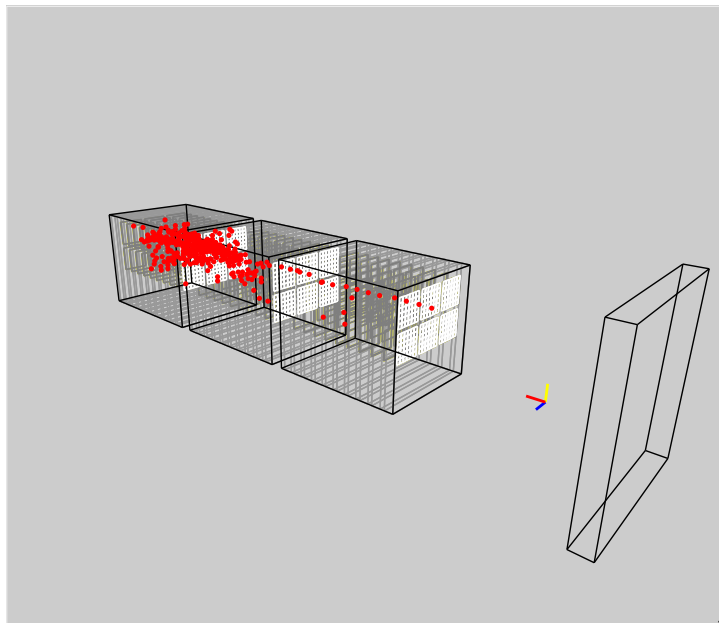
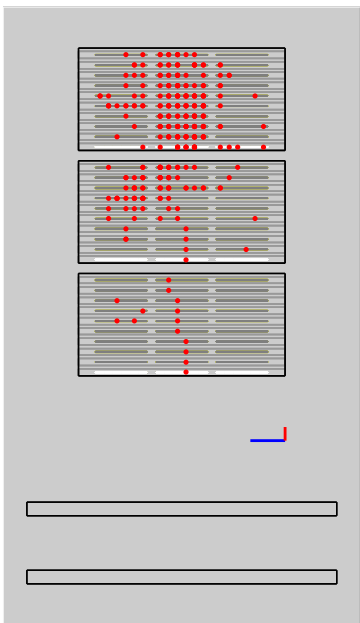
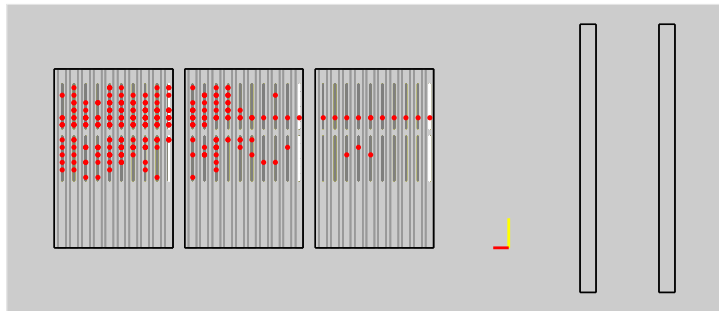
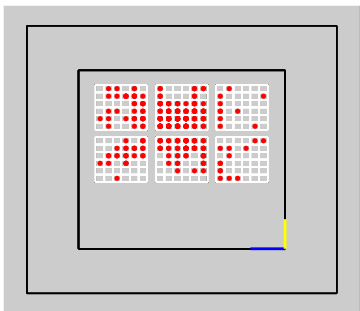
Time: 17:15:20:953.259 Mon Aug 28 200 Run: 300329.000 Events: 1090

ECAL Display

Run 300329:0 Event 1090

Time: 17:15:20:953:259 Mon Aug 28 2006

Hits: 311 Energy: 1930.61 mips

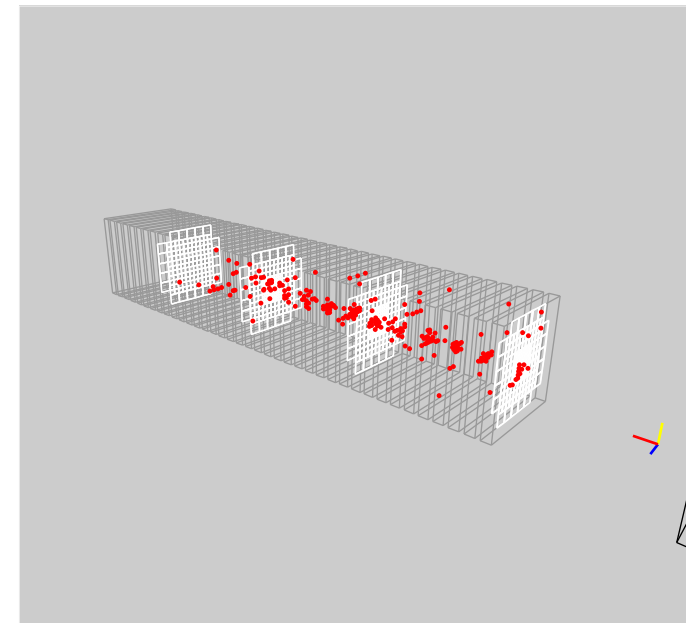
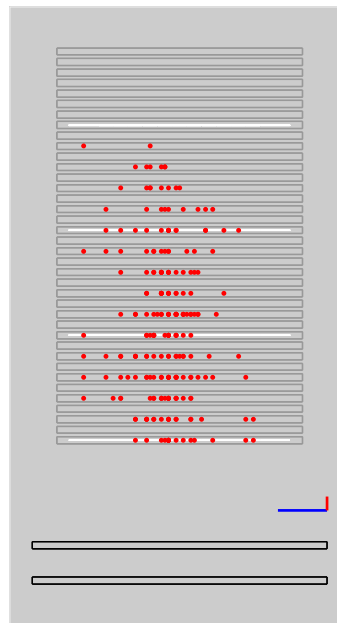
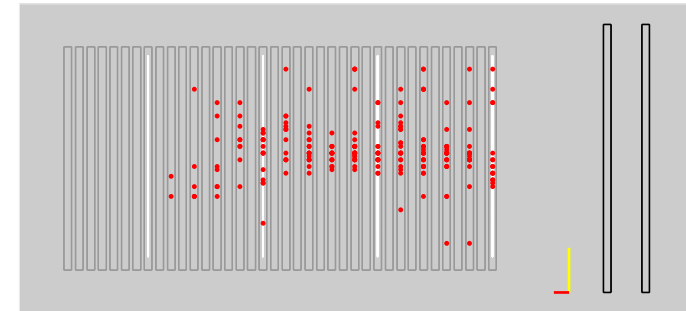
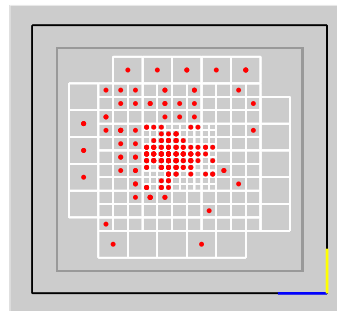


HCAL Display

Run 300329:0 Event 1090

Time: 17:15:20:953:259 Mon Aug 28 2006

Hits: 230 Energy: 566.372 mips

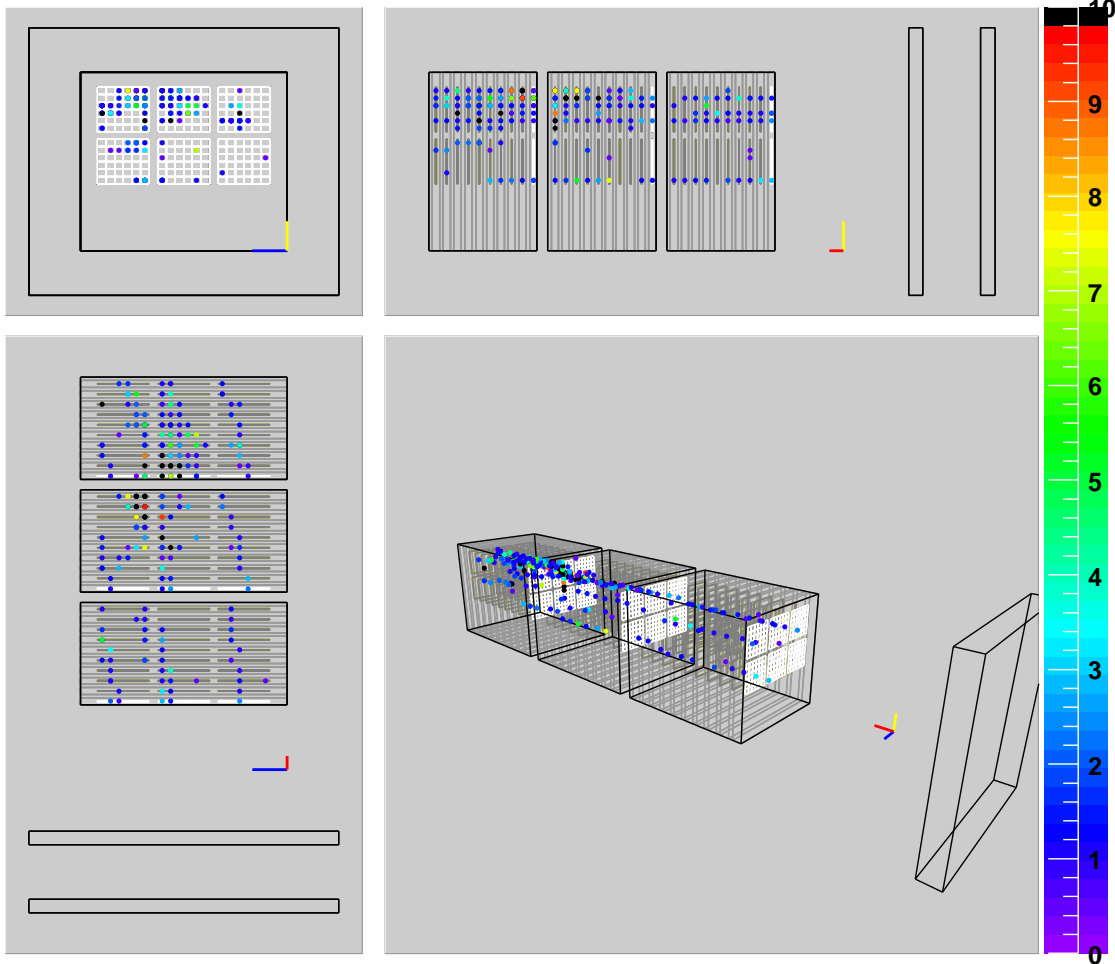


ECAL Display

Run 300329:0 Event 1240

Time: 17:15:21:676:663 Mon Aug 28 2006

Hits: 252 Energy: 1123.32 mips

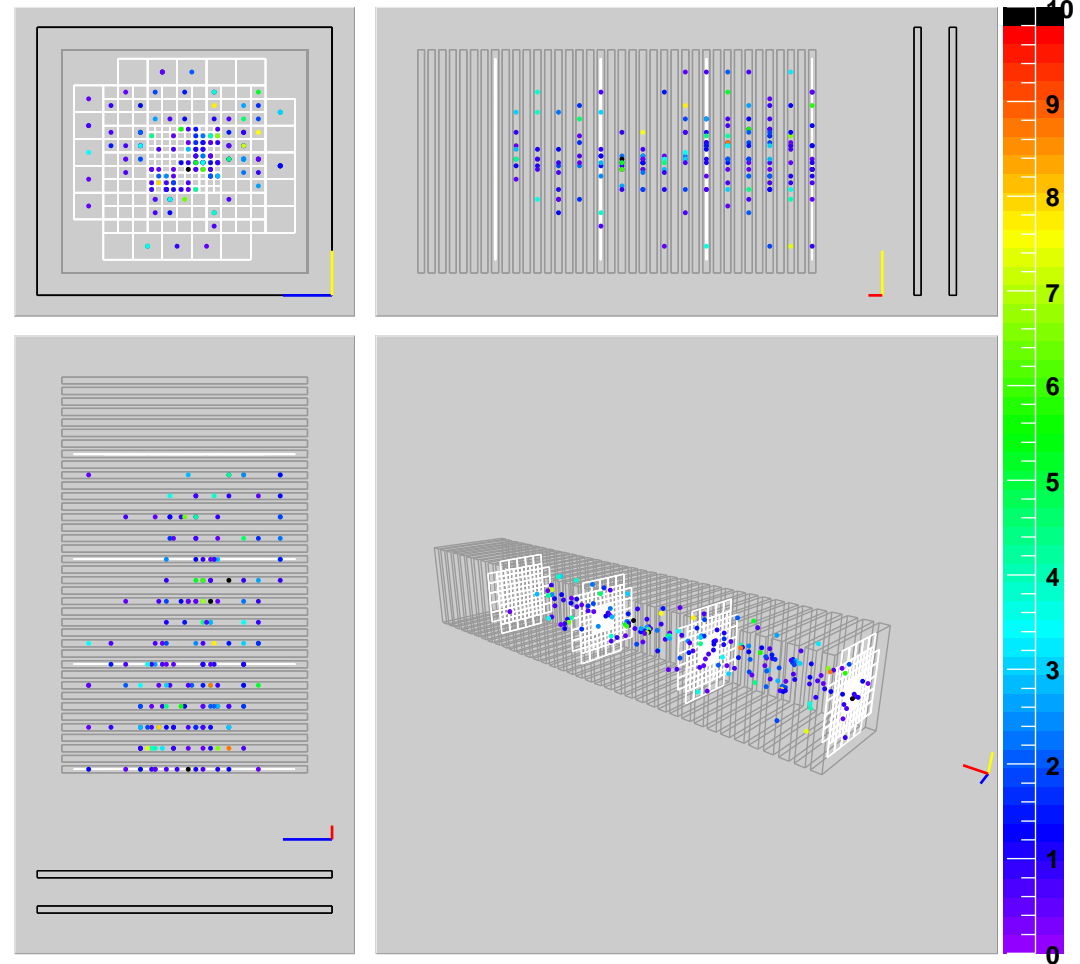


HCAL Display

Run 300329:0 Event 1240

Time: 17:15:21:676:663 Mon Aug 28 2006

Hits: 197 Energy: 431.805 mips

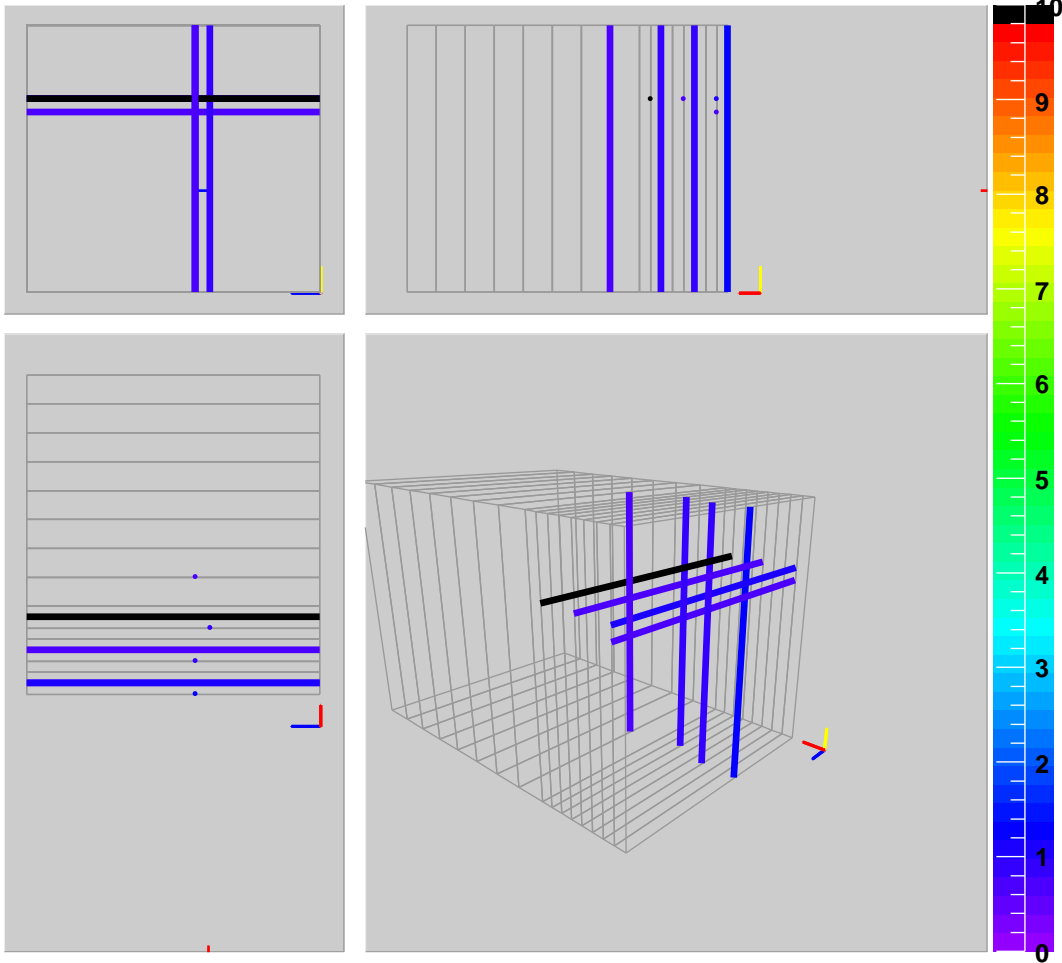


TCMT Display

Run 300329:0 Event 1240

Time: 17:15:21:676:663 Mon Aug 28 2006

Hits: 8 Energy: 20.9211 mips



Remarks/ToDo

- ▶ **documentation**
: basic technical documentation exists, needs substantial improvement
- ▶ **MonitorSpy**
: a first solution implemented but not developed further,
requires the monitor pc to be directly accessible through ssh

Thanks

- ▶
 - : to M.Groll for helping deciphering the Hcal layout/mapping
 - : to G.Lima for providing the code for the Tcmt
 - + to all who used the monitor on shifts and gave feedback for further improvements/corrections etc

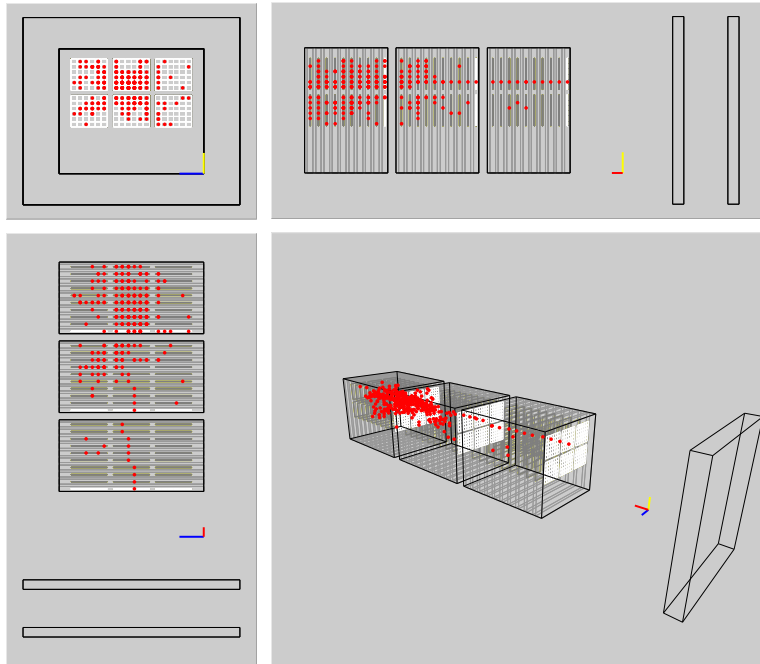
ECAL Display

HCAL Display

digital

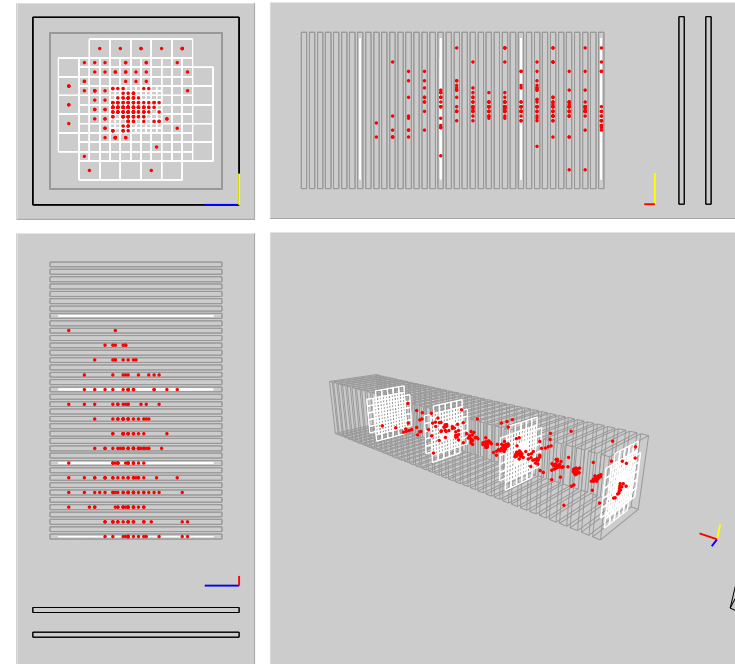
Run 300329:0 Event 1090

Time: 17:15:20:953:259 Mon Aug 28 2006
Hits: 311 Energy: 1930.61 mips



Run 300329:0 Event 1090

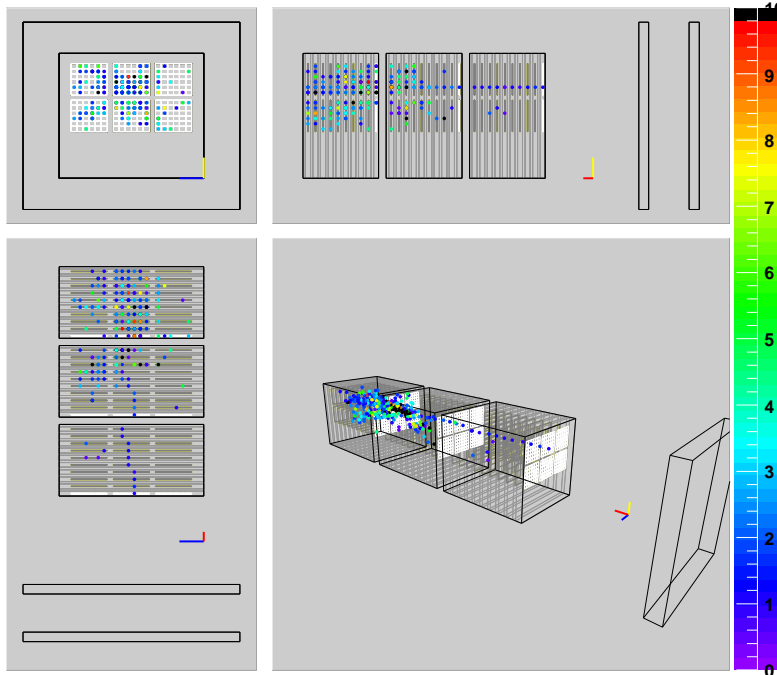
Time: 17:15:20:953:259 Mon Aug 28 2006
Hits: 230 Energy: 566.372 mips



analogue

Run 300329:0 Event 1090

Time: 17:15:20:953:259 Mon Aug 28 2006
Hits: 311 Energy: 1930.61 mips



Run 300329:0 Event 1090

Time: 17:15:20:953:259 Mon Aug 28 2006
Hits: 230 Energy: 566.372 mips

