

High-MET Event Scan

/Jet/, Run-2011B

26 January 2012

MET Working Group Meeting

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<https://indico.cern.ch/conferenceDisplay.py?confId=174689>

Texas A&M

Datasets

Datasets

/Jet/Run2011B-19Nov2011-v1/RECO (DAS)

13,371,032 events, 12,841,148,084,325 Bytes

Run range: 175832 - 180296

Release: CMSSW_4_4_2_patch2

JSON File

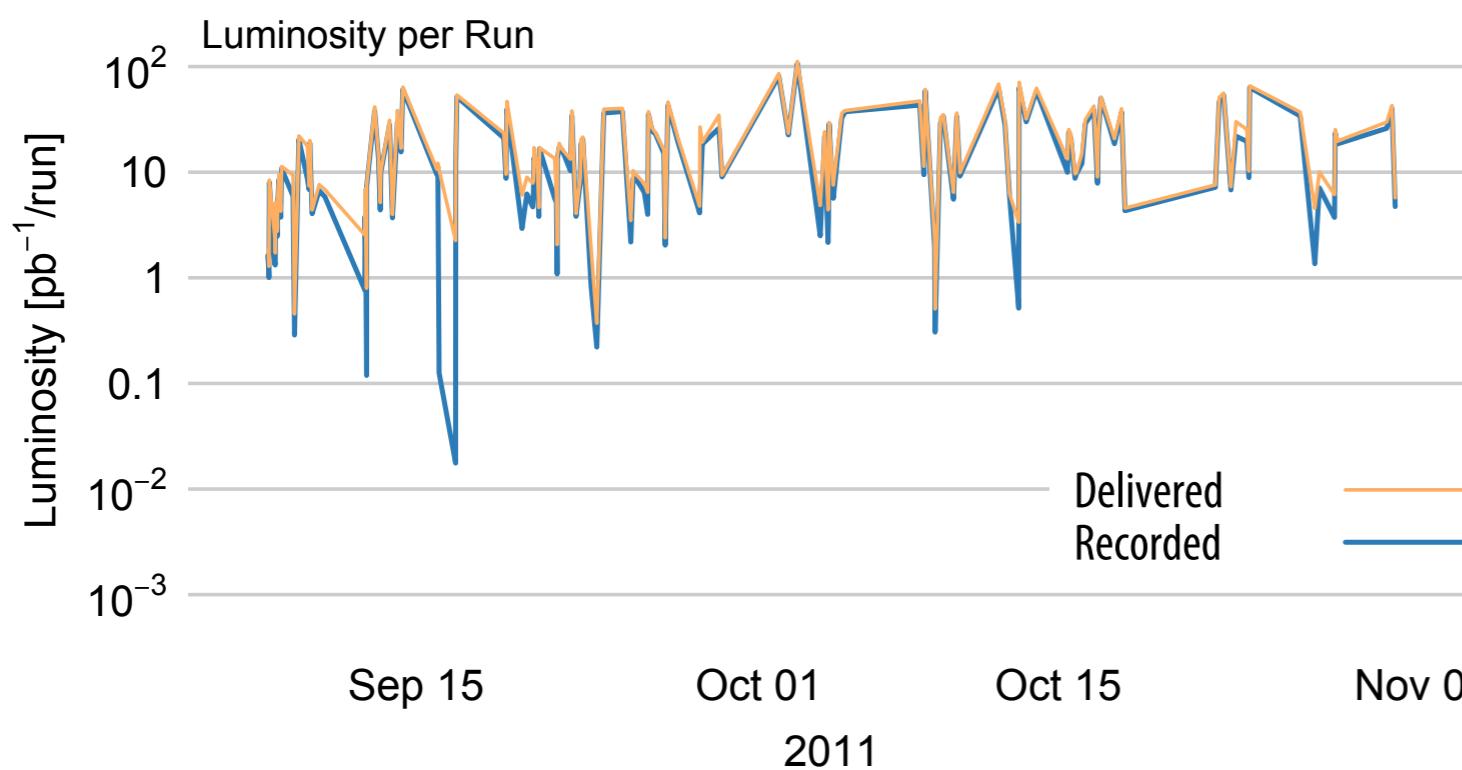
[Cert_160404-180252_7TeV_PromptReco_Collisions11_JSON.txt](#)

Luminosity

Delivered: 2913.559 pb-1, Recorded: 2579.073 pb-1

Trigger

HLT_DiJet*_*_v, HLT_Jet*_*_v



	# events
HLT_DiJetAve30_v6	617034
HLT_DiJetAve30_v9	308291
HLT_DiJetAve60_v6	483642
HLT_DiJetAve60_v9	217574
HLT_DiJetAve110_v6	119655
HLT_DiJetAve110_v9	253145
HLT_DiJetAve190_v6	714002
HLT_DiJetAve190_v9	199122
HLT_DiJetAve240_v6	591064
HLT_DiJetAve240_v9	296975
HLT_DiJetAve300_v6	401492
HLT_DiJetAve300_v7	1461669
HLT_DiJetAve300_v10	880436
HLT_DiJetAve370_v6	124389
HLT_DiJetAve370_v7	452034
HLT_DiJetAve370_v10	274799
HLT_Jet30_v6	580324
HLT_Jet30_v9	295121
HLT_Jet60_v6	542998
HLT_Jet60_v9	245719
HLT_Jet110_v6	122323
HLT_Jet110_v9	260554
HLT_Jet190_v6	671365
HLT_Jet190_v9	194729
HLT_Jet240_v6	577353
HLT_Jet240_v9	286541
HLT_Jet300_v5	770044
HLT_Jet300_v6	2799028
HLT_Jet300_v9	1684840
HLT_Jet370_v6	241023
HLT_Jet370_v7	871745
HLT_Jet370_v10	529526
HLT_Jet800_v1	5071
HLT_Jet800_v2	17039
HLT_Jet800_v5	9996

Filters

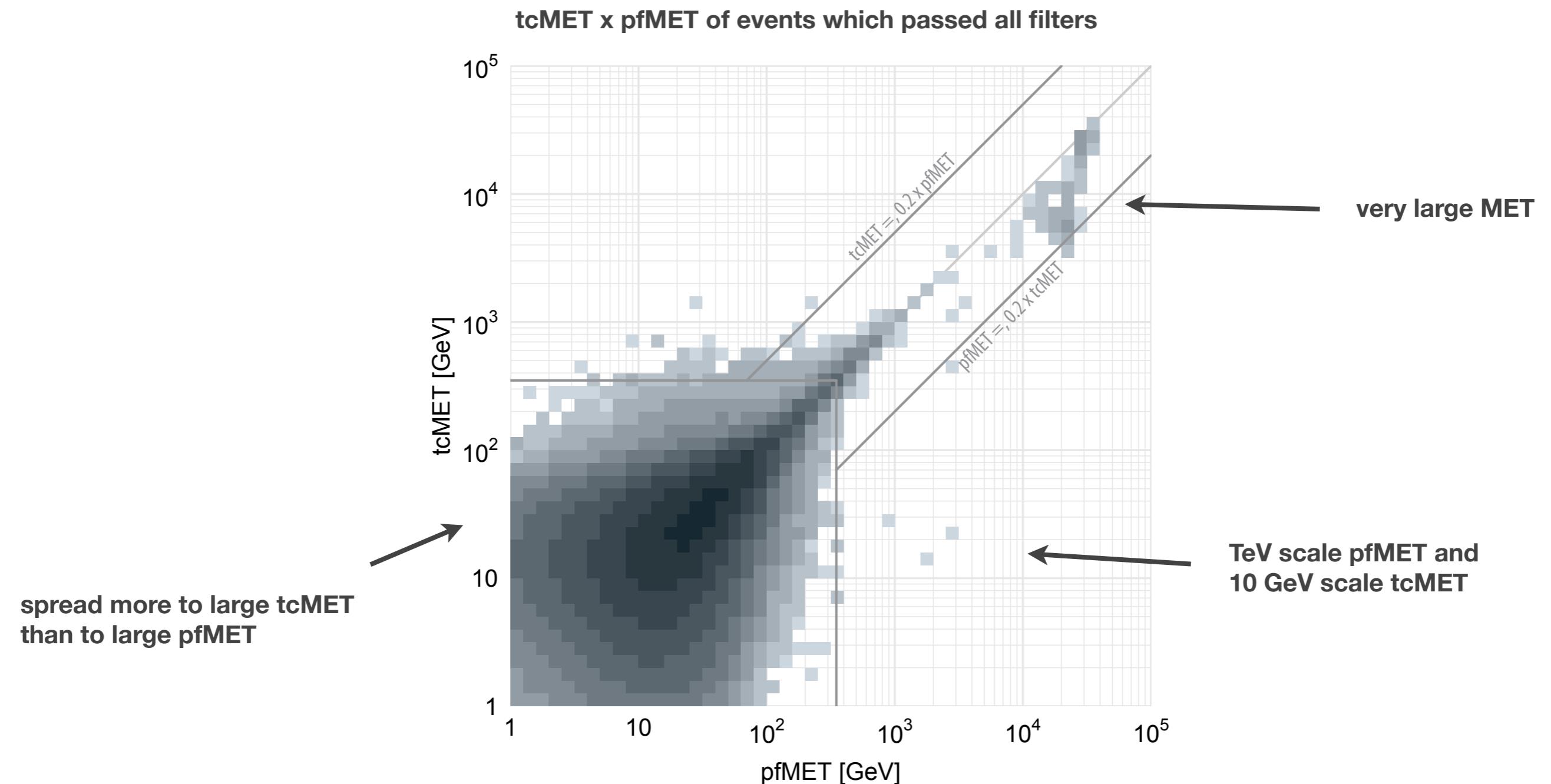
Configuration

```
## _____ |||  
process.primaryVertexFilter = cms.EDFilter(  
    "VertexSelector",  
    src = cms.InputTag("offlinePrimaryVertices"),  
    cut = cms.string("!isFake && ndof > 4 && abs(z) <= 24 && position.Rho <= 2"),  
    filter = cms.bool(True)  
)  
## _____ |||  
process.noscraping = cms.EDFilter(  
    "FilterOutScraping",  
    applyfilter = cms.untracked.bool(True),  
    debugOn = cms.untracked.bool(False),  
    numtrack = cms.untracked.uint32(10),  
    thresh = cms.untracked.double(0.25)  
)  
## _____ |||  
process.HBHENoiseFilter = cms.EDFilter(  
    'HBHENoiseFilter',  
    noiselabel = cms.InputTag('hcalnoise'),  
    minRatio = cms.double(-999.0),  
    maxRatio = cms.double(999.0),  
    minHPDHits = cms.int32(17),  
    minRBXHits = cms.int32(999),  
    minHPDNoOtherHits = cms.int32(10),  
    minZeros = cms.int32(10),  
    minHighEHitTime = cms.double(-9999.0),  
    maxHighEHitTime = cms.double(9999.0),  
    maxRBXEMF = cms.double(-999.0),  
    minNumIsolatedNoiseChannels = cms.int32(10),  
    minIsolatedNoiseSumE = cms.double(50.),  
    minIsolatedNoiseSumEt = cms.double(25.),  
    useTS4TS5 = cms.bool(True)  
)  
## _____ |||
```

```
## _____ |||  
process.load('RecoMET.METAnalyzers.CSCHaloFilter_cfi')  
process.load("jtemple.HcalLaserEventFilter.hcalLaserEventFilter_cfi")  
process.load('JetMETAnalysis.ecalDeadCellTools.EcalDeadCellEventFilter_cfi')  
## _____ |||  
process.load('PhysicsTools.EcalAnomalousEventFilter.ecalanomalouseventfilter_cfi')  
process.EcalAnomalousEventFilter.FilterAlgo = cms.untracked.string("FilterMode")  
process.EcalAnomalousEventFilter.cutBoundEnergyDeadCellsEB = cms.untracked.double(10)  
process.EcalAnomalousEventFilter.cutBoundEnergyDeadCellsEE = cms.untracked.double(10)  
process.EcalAnomalousEventFilter.cutBoundEnergyGapEB = cms.untracked.double(100)  
process.EcalAnomalousEventFilter.cutBoundEnergyGapEE = cms.untracked.double(100)  
process.EcalAnomalousEventFilter.enableGap = cms.untracked.bool(False)  
process.EcalAnomalousEventFilter.limitDeadCellToChannelStatusEB = cms.vint32(12,14)  
process.EcalAnomalousEventFilter.limitDeadCellToChannelStatusEE = cms.vint32(12,14)  
## _____ |||  
process.RecovRecHitFilter = cms.EDFilter(  
    "RecovRecHitFilter",  
    EERecHitSource = cms.InputTag("ecalRecHit:EcalRecHitsEE"),  
    MinRecovE = cms.double(30),  
    TaggingMode = cms.bool(False)  
)  
## _____ |||  
process.Vertex = cms.Path(process.primaryVertexFilter)  
process.Scraping = cms.Path(process.noscraping)  
process.HBHENoise = cms.Path(process.HBHENoiseFilter)  
process.CSCTightHalo = cms.Path(process.CSCTightHaloFilter)  
process.HCALLaser = cms.Path(process.hcalLaserEventFilter)  
process.ECALDeadCellTP = cms.Path(process.EcalDeadCellEventFilter)  
process.ECALDeadCellBE = cms.Path(process.EcalAnomalousEventFilter)  
process.RecovRecHit = cms.Path(process.RecovRecHitFilter)  
## _____ |||
```

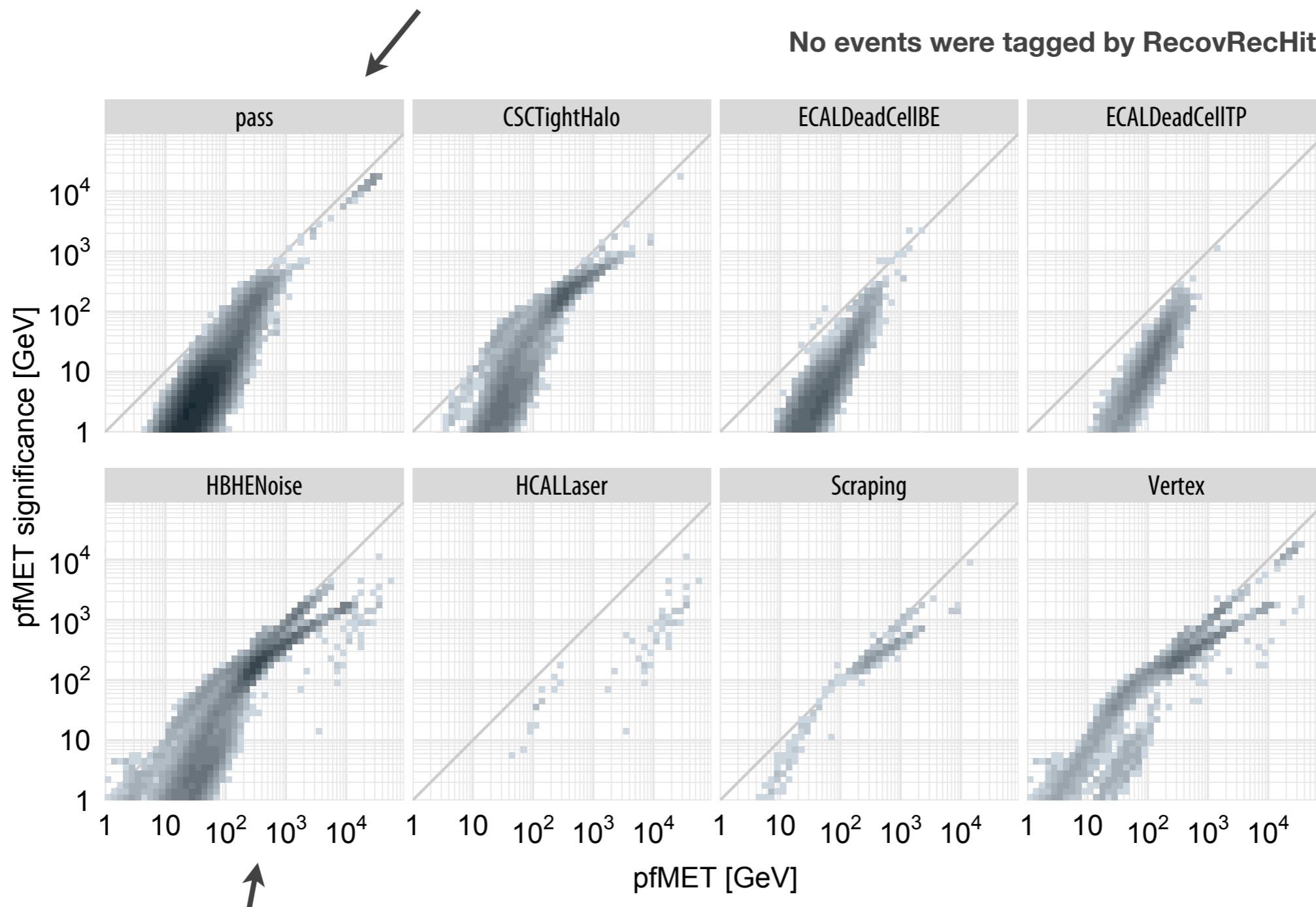
8 filters were ran in parallel

tcMET vs pfMET



pfMET Significance vs pfMET

This panel shows the events which passed all filters. The other panels show the events which were tagged by filters specified



Two bands at high MET: HE
noise at top, HB at bottom

MET Scan

the number of events scanned and
the smallest MET in each class

class	met.min	nevents
largeTCMetLargePFMet	30520	50
largePFMetSmallTCMet	350	11
largeTCMetSmallPFMet	410	50

the results

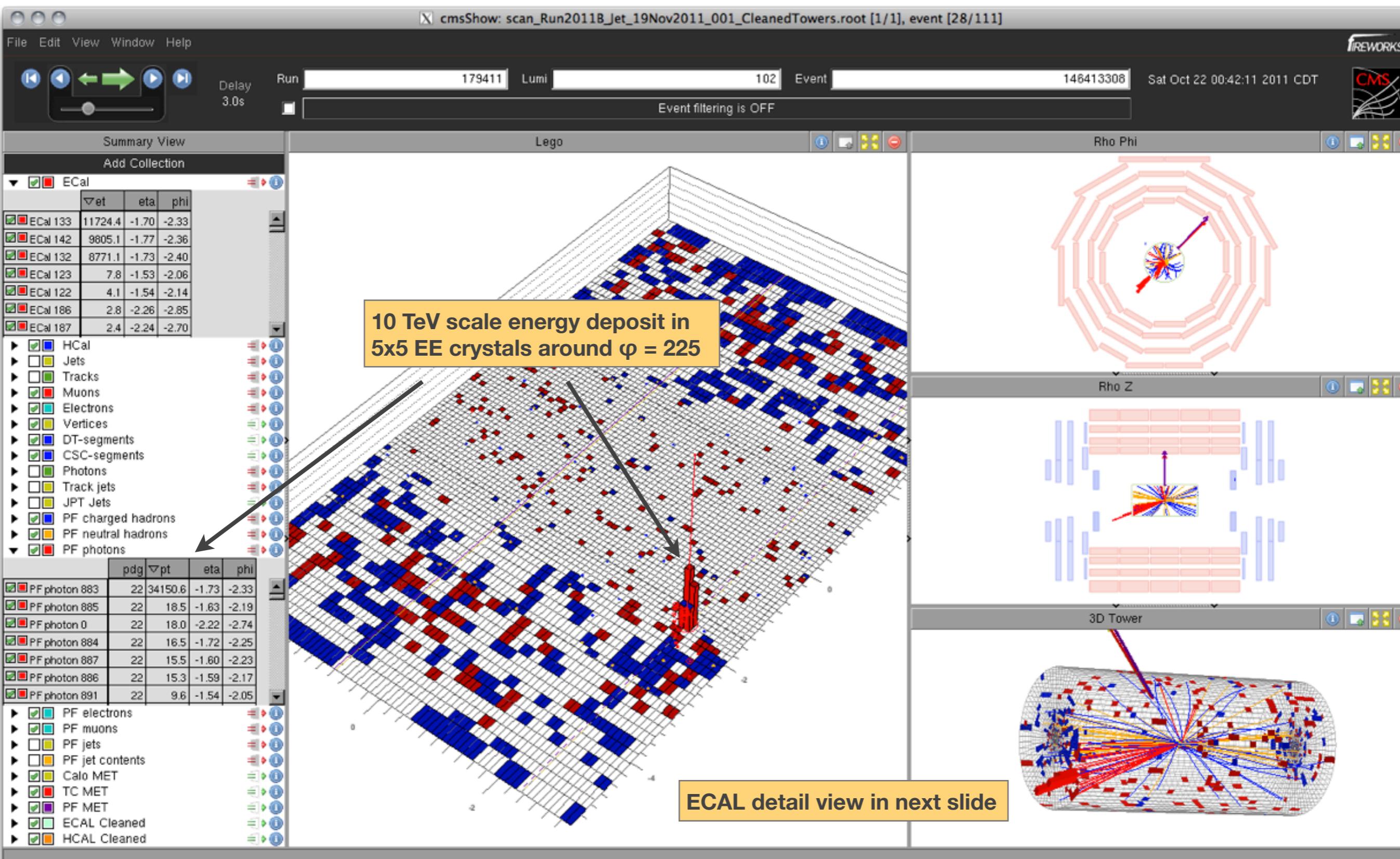
class	result	n
largeTCMetLargePFMet	EE10TeV5x5East225	48
largeTCMetLargePFMet	EETeVWest90	1
largeTCMetLargePFMet	PunchThrough	1
largePFMetSmallTCMet	CleanedEEWest240	3
largePFMetSmallTCMet	EE10TeV5x5East225	5
largePFMetSmallTCMet	EETeVWest90	1
largePFMetSmallTCMet	Muon	1
largePFMetSmallTCMet	PFPhotonEE	1
largeTCMetSmallPFMet	EBspikeInJet	2
largeTCMetSmallPFMet	HF	29
largeTCMetSmallPFMet	HFimmersed	4
largeTCMetSmallPFMet	Muon	11
largeTCMetSmallPFMet	PunchThrough	4

no clear physics, except potentially some HFs are

no events that were supported be tagged by the filters were found

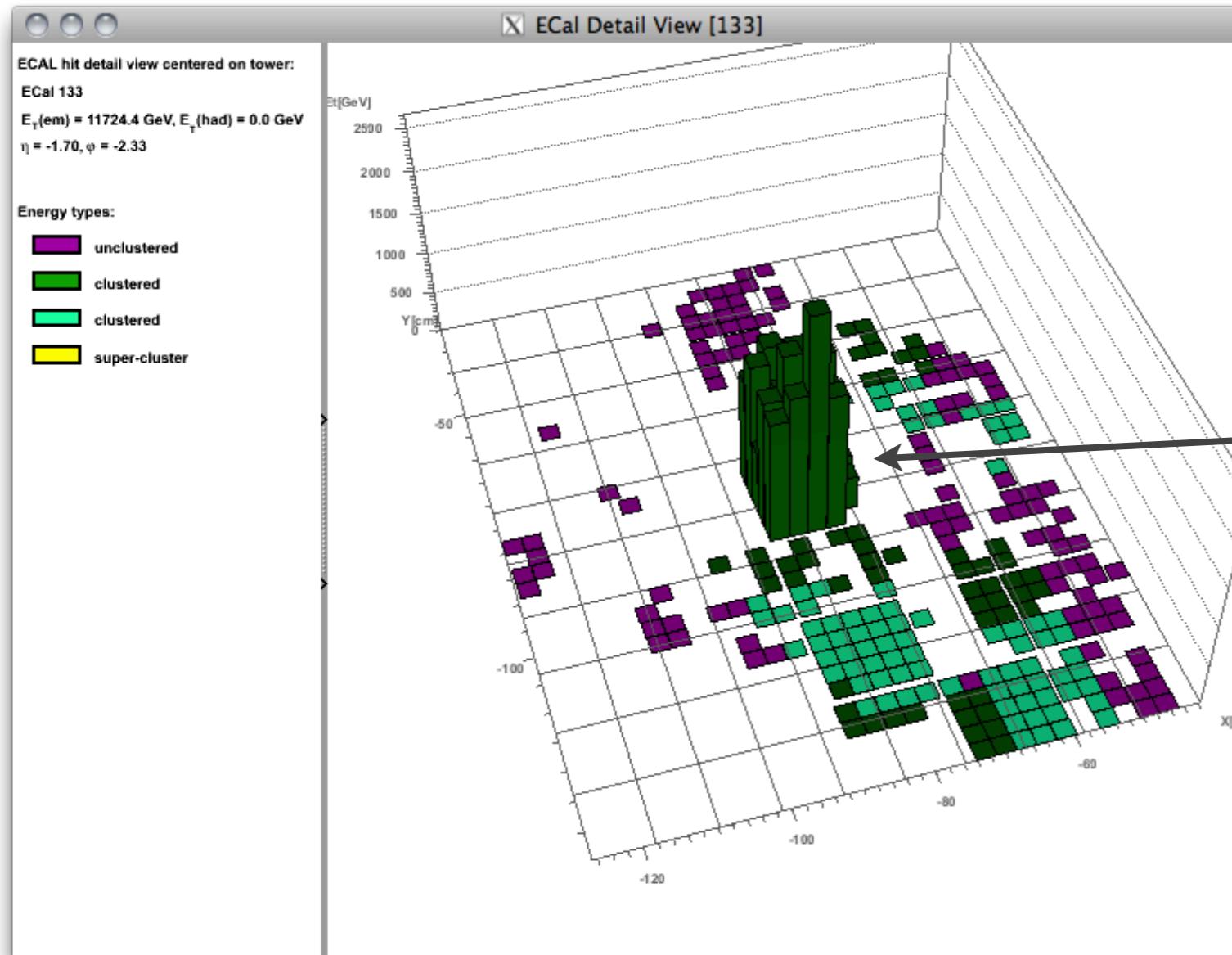
EE10TeV5x5East225

```
run lumiblock      event calomet      tcmet      pfmet significance
179411       102 146413308 30301.38 30320.09 34301.19    18413.85
```



EE10TeV5x5East225

run	lumiblock	event	calomet	tcmet	pfmet	significance
179411	102	146413308	30301.38	30320.09	34301.19	18413.85



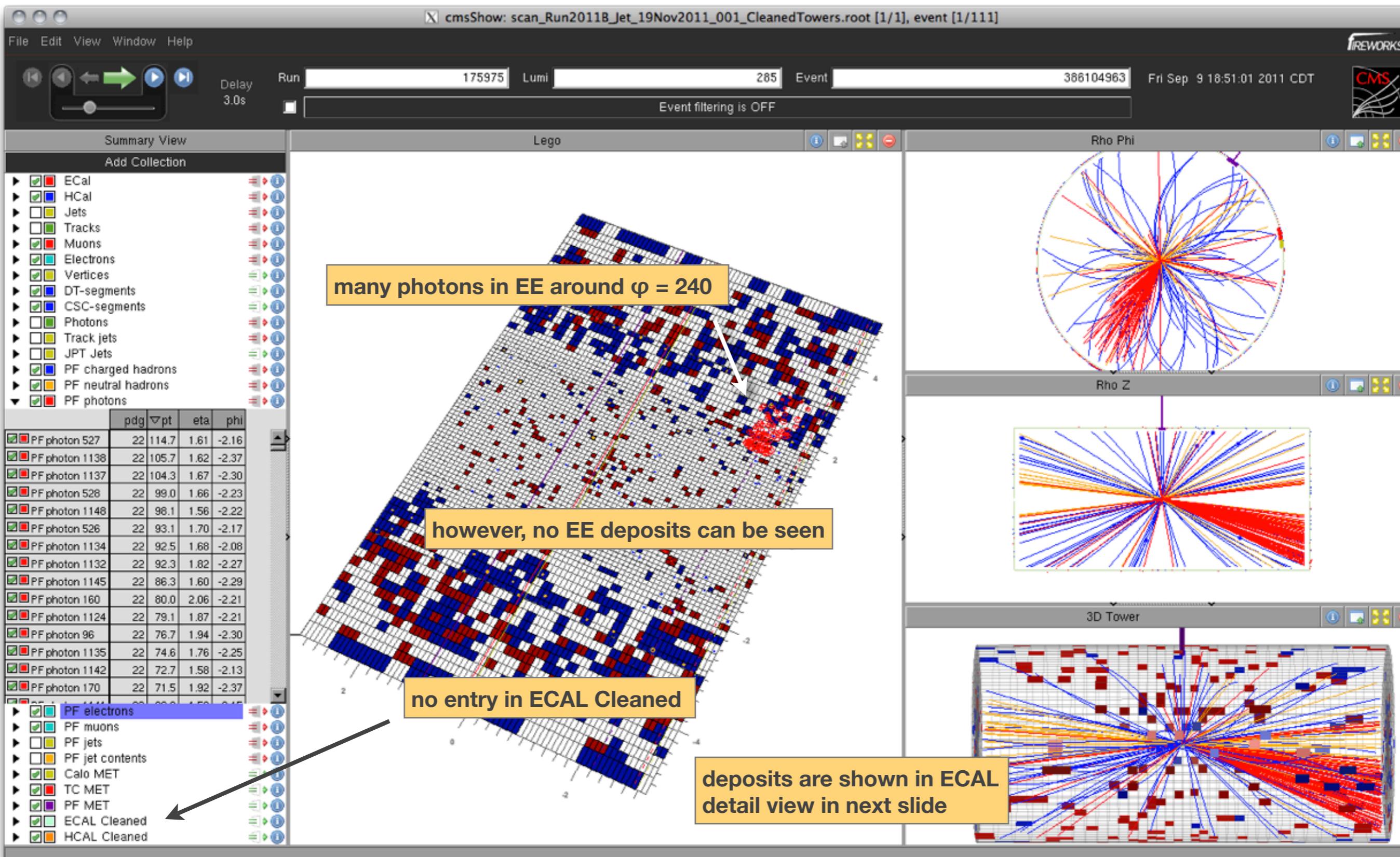
all large deposits are in the same 5x5 supercrystal

all 53 EE10TeV5x5East225's occurred in the same 5x5 supercrystal

see slide 13

CleanedEEWest240

run	lumiblock	event	calomet	tcmet	pfmet	significance
175975	285	386104963	25.54	22.27	3133.40	2357.06



CleanedEEWest240

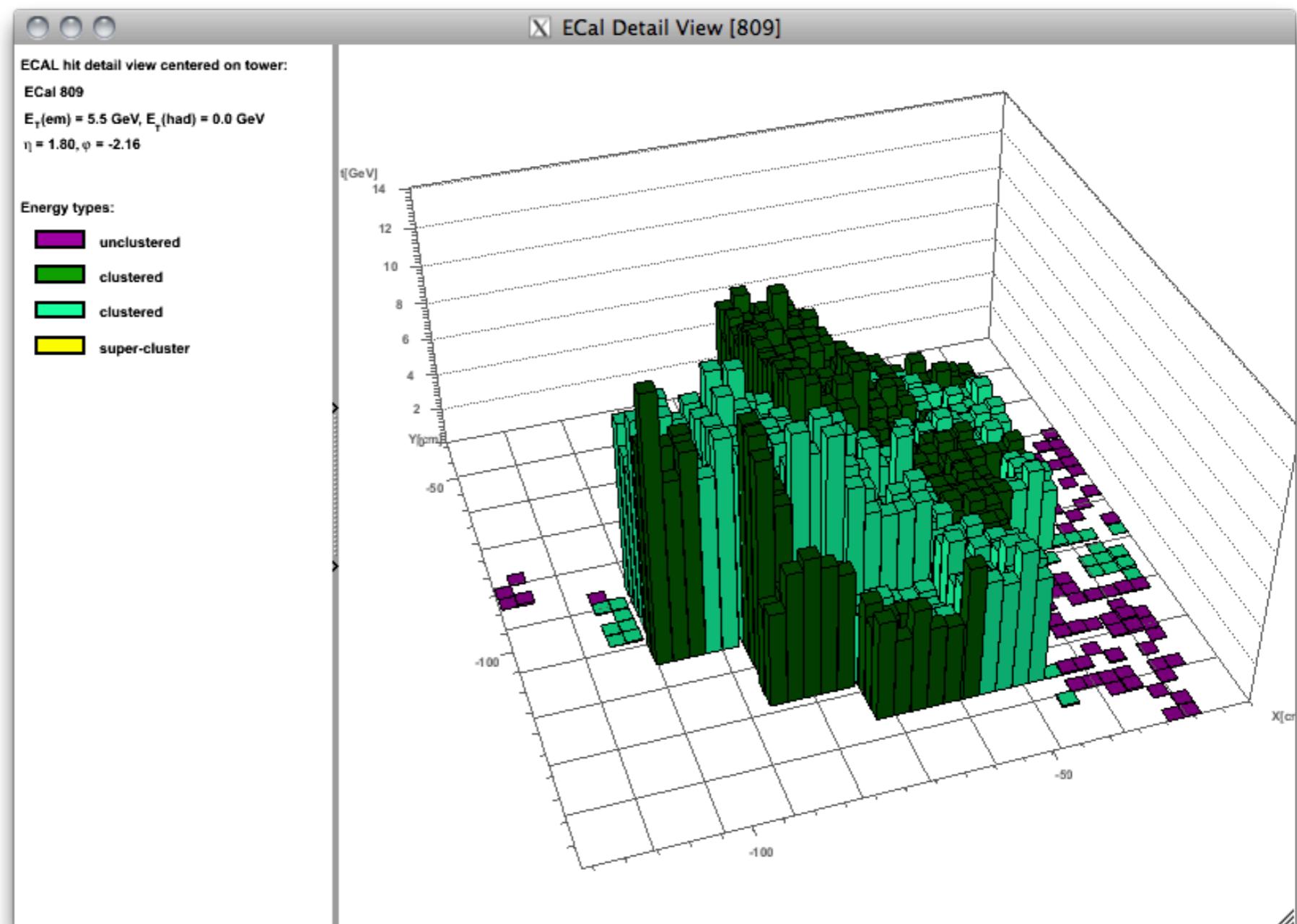
run	lumiblock	event	calomet	tcmet	pfmet	significance
175975	285	386104963	25.54	22.27	3133.40	2357.06

a large amount of energy deposits over many 5x5 supercrystal

these were cleaned for tcMET

many pf photons were reconstructed out of them, causing large pfMET

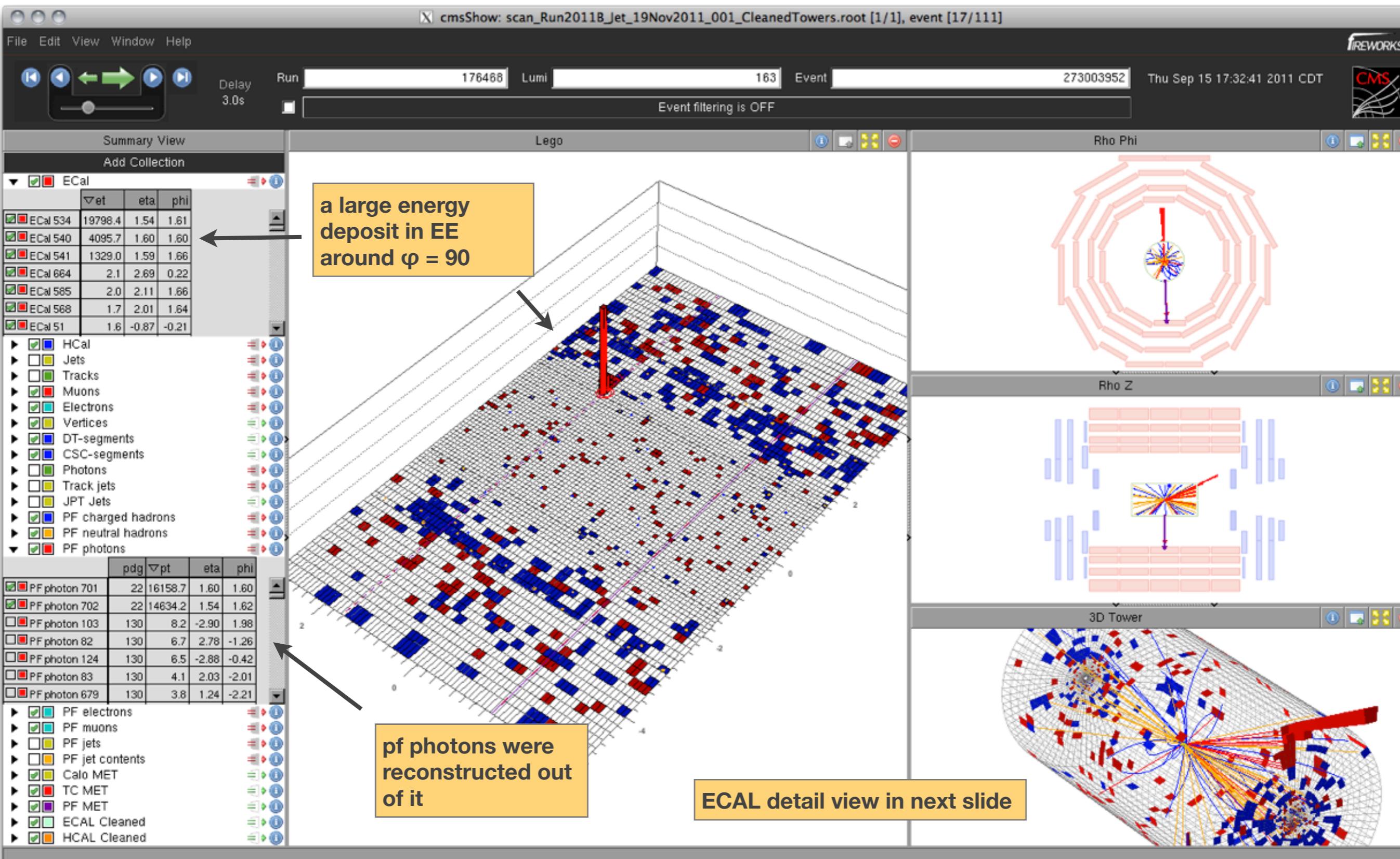
all three CleanedEEWest240's occurred at the same location



see slide 13

EETeVWest90

run	lumiblock	event	calomet	tcmet	pfmet	significance
176468	163	273003952	25226.42	25225.94	30803.56	16769.72



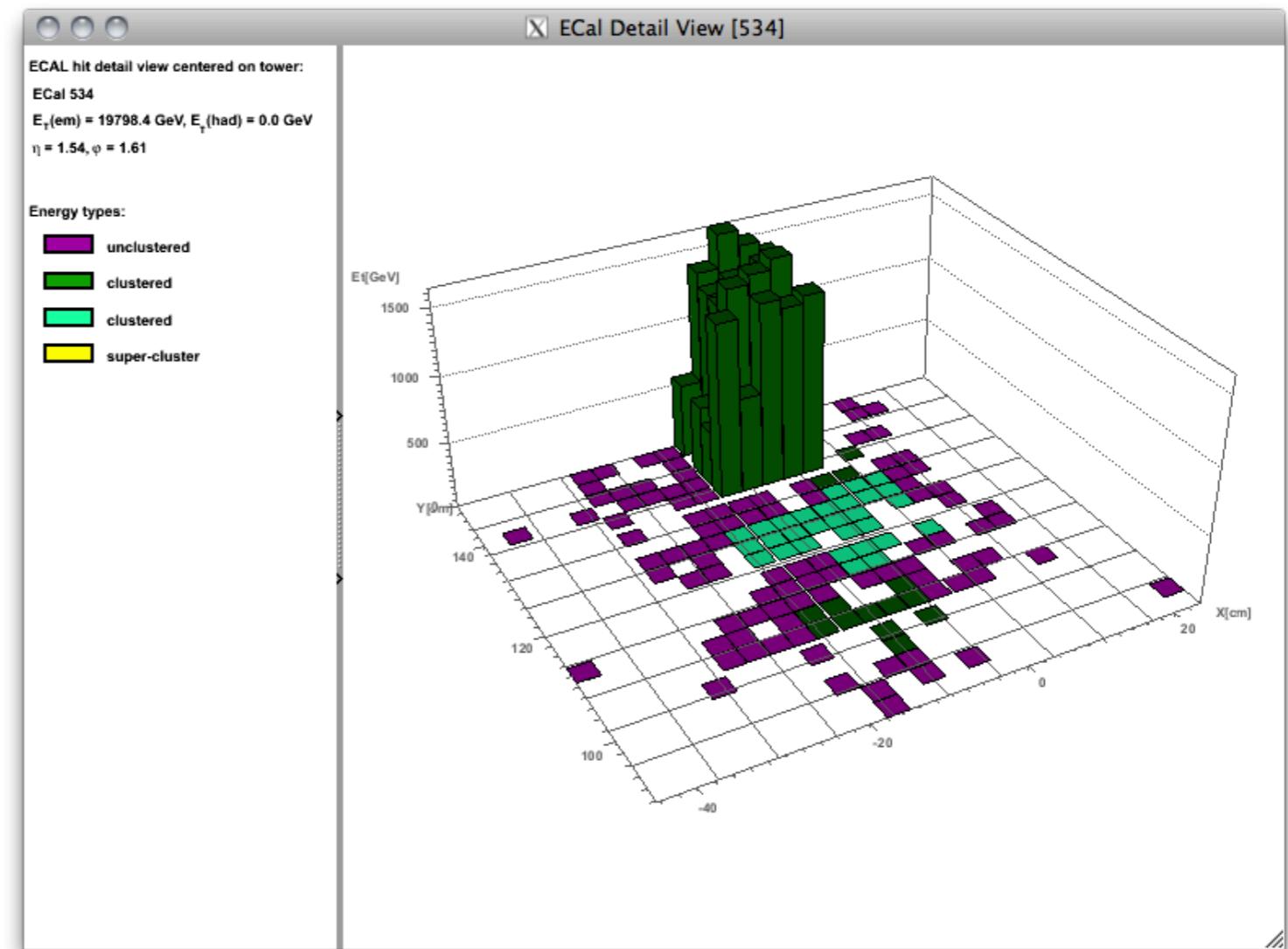
EETeVWest90

run	lumiblock	event	calomet	tcmet	pfmet	significance
176468	163	273003952	25226.42	25225.94	30803.56	16769.72

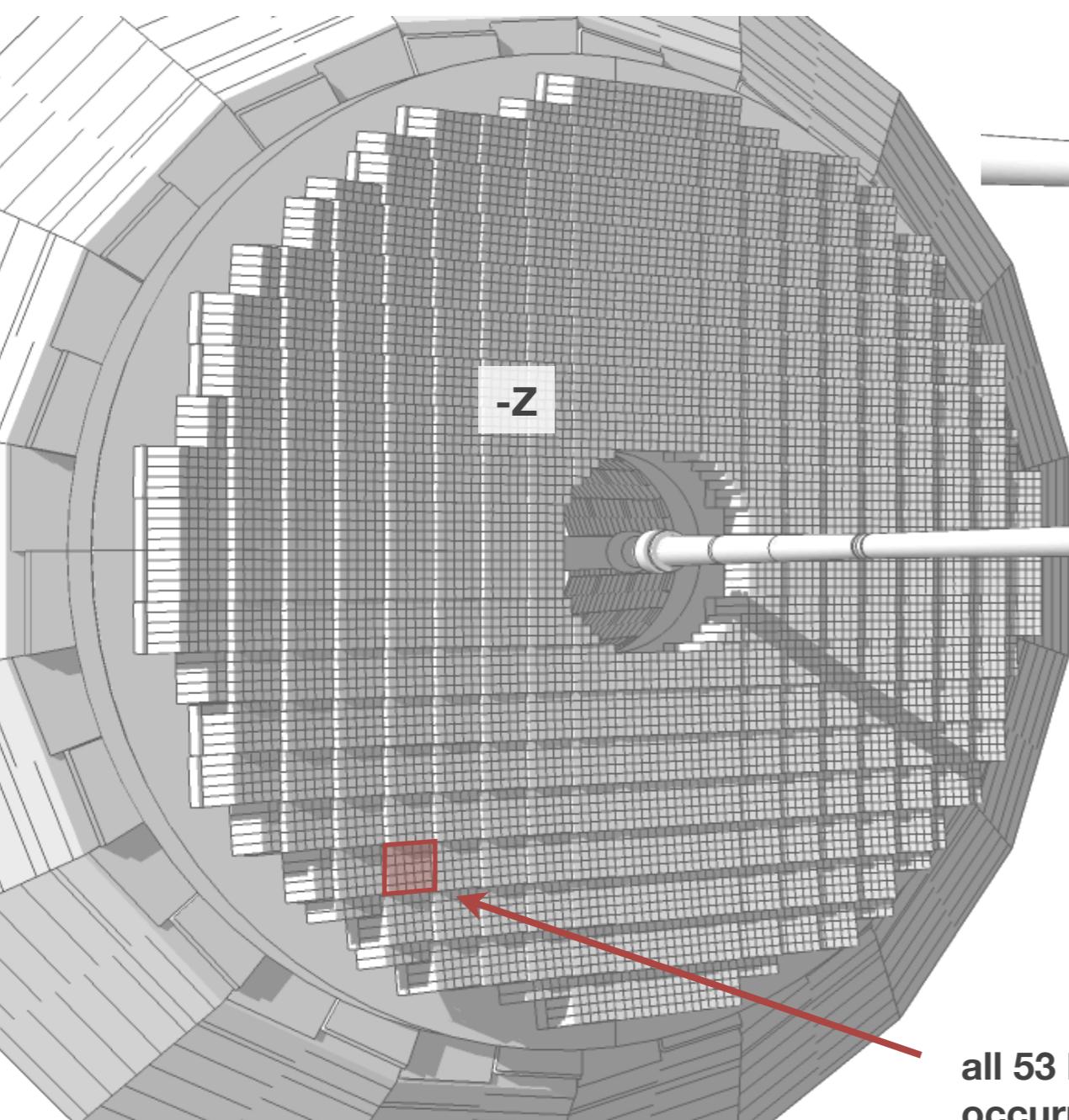
all large deposits are in the same 5x5 supercrystal

both EETeVWest90's occurred in the same 5x5 supercrystal

see slide 13

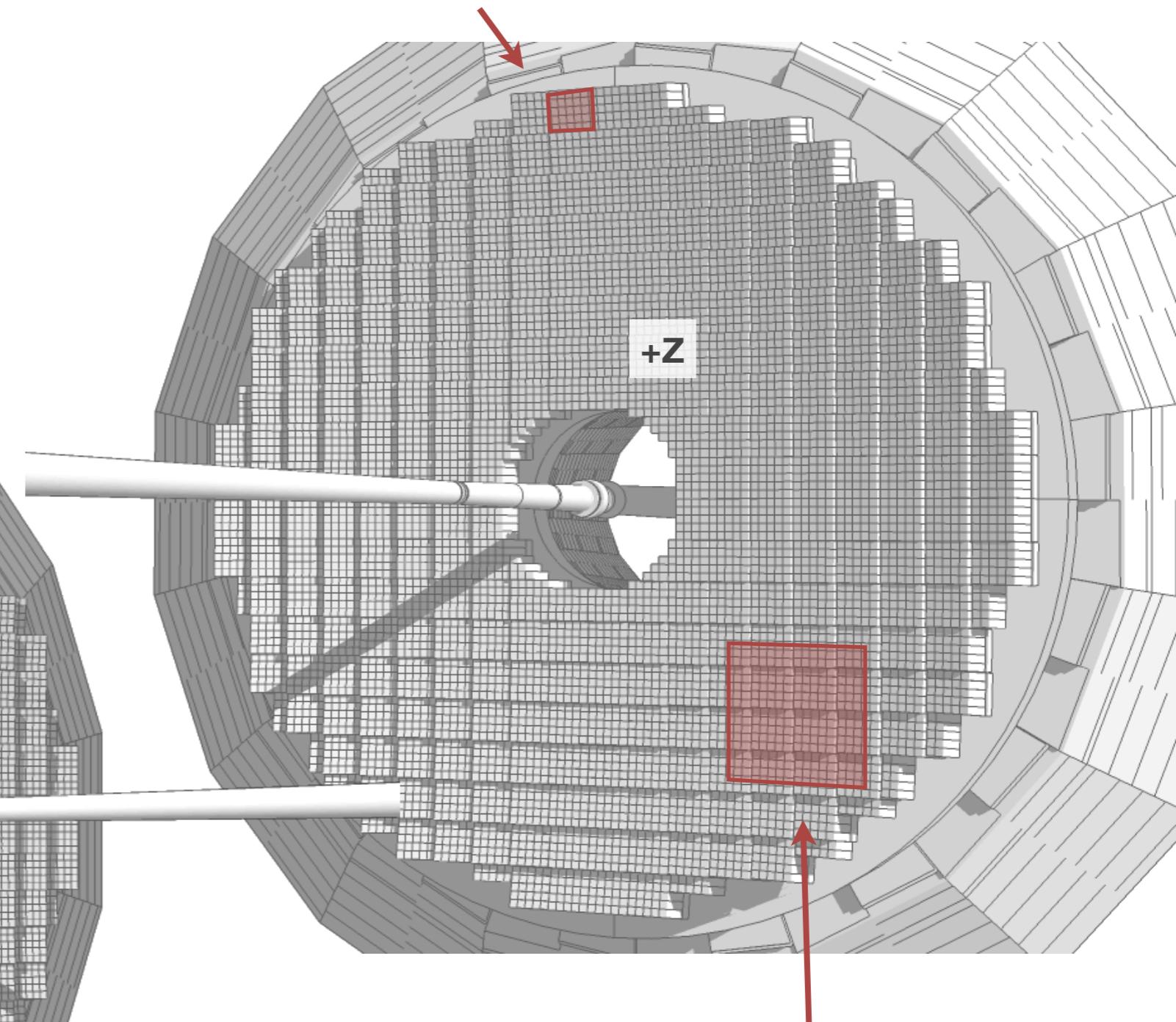


The locations of the problems



all 53 EE10TeV5x5East225's
occurred in this 5x5 supercrystal

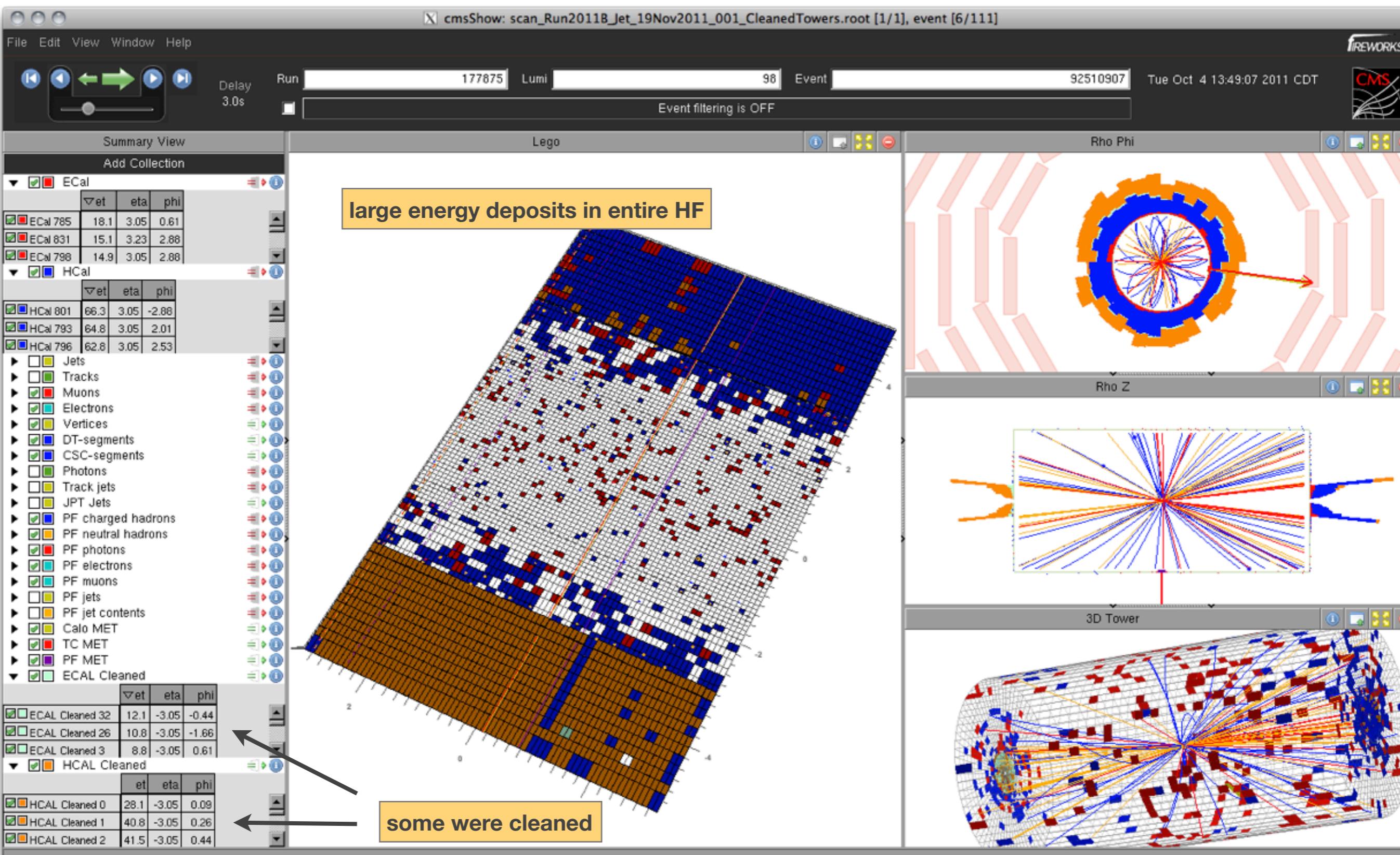
both EETeVWest90's
occurred in this supercrystal



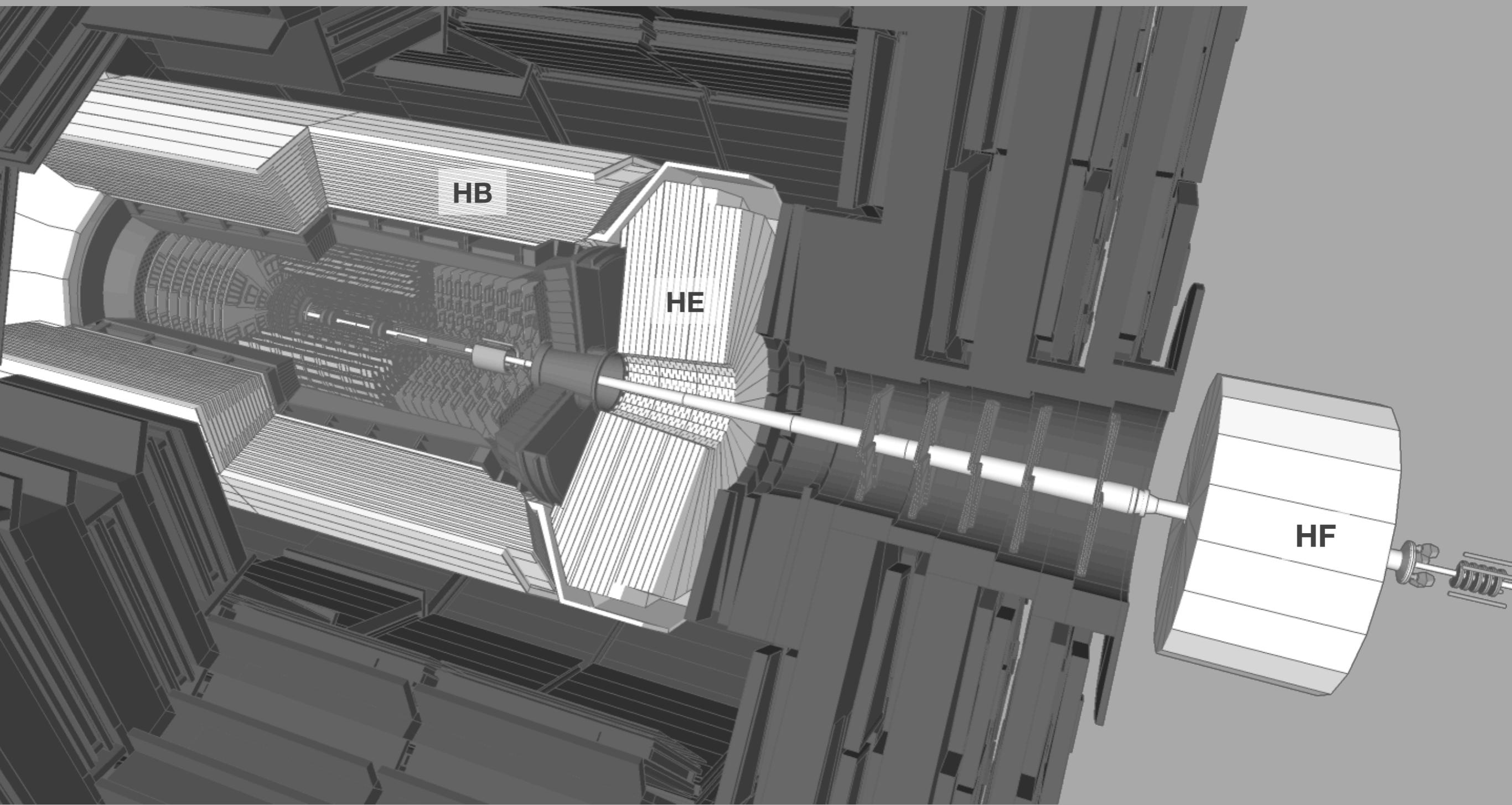
all three CleanedEEWest240's
occurred in this area

HFimmersed

run	lumiblock	event	calomet	tcmet	pfmet	significance
177875	98	92510907	459.37	471.90	0.35	0.00

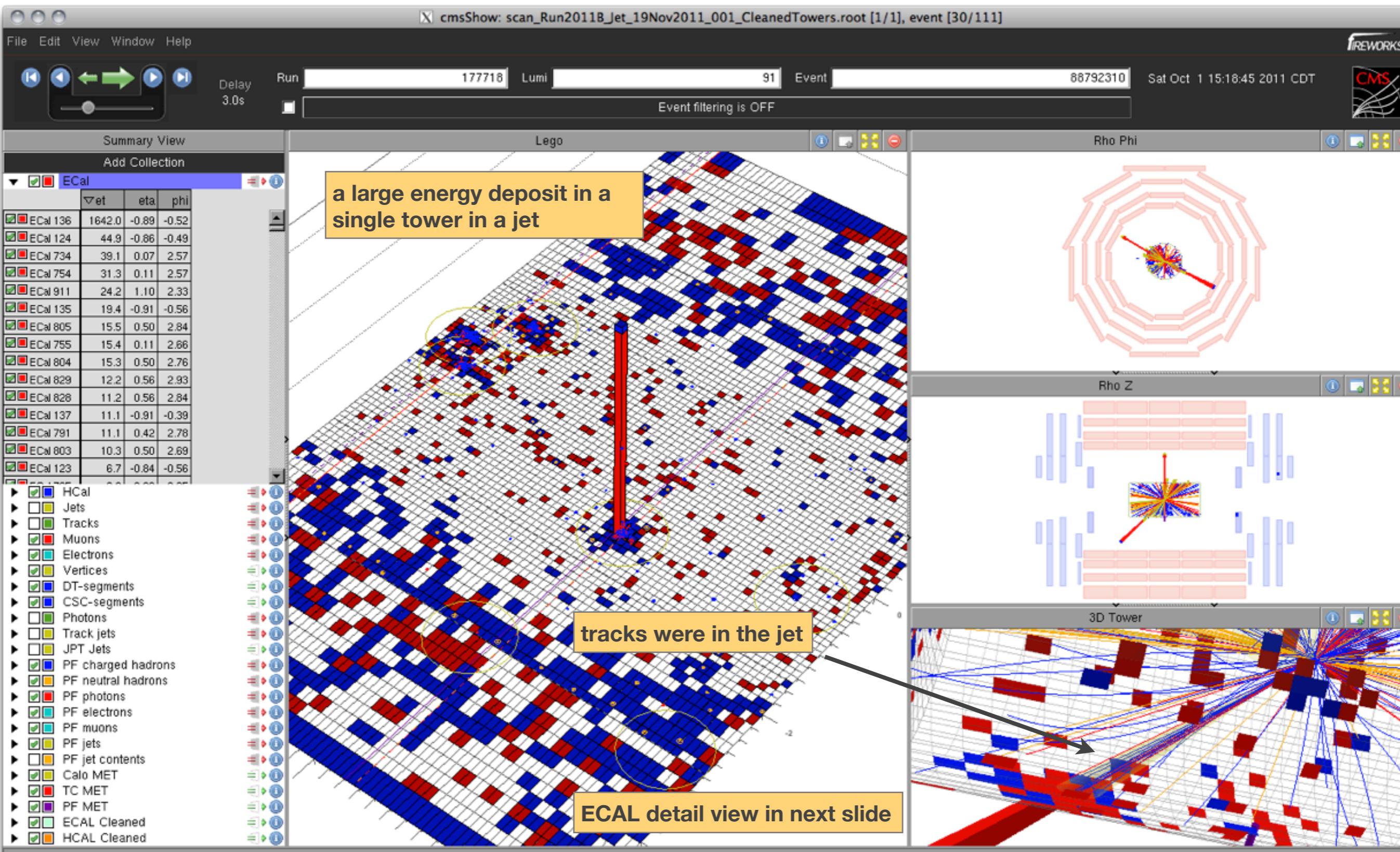


A reminder of HCAL geometry: HE and HF are physically far from each other although they appear right next to each other in cmsShow



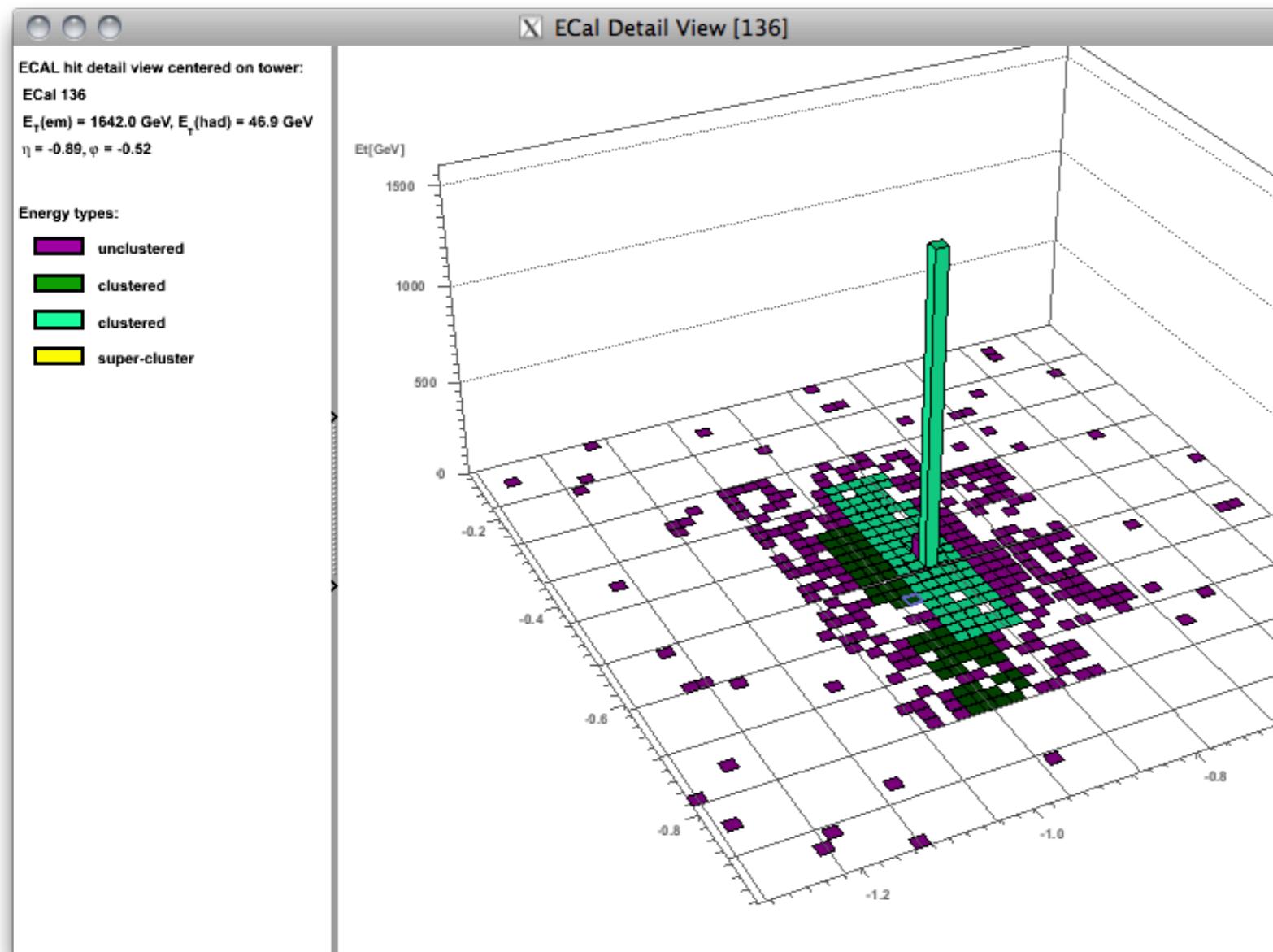
EBspikeInJet

run	lumiblock	event	calomet	tcmet	pfmet	significance
177718	91	88792310	1470.13	1370.74	234.95	46.11



EBspikeInJet

run	lumiblock	event	calomet	tcmet	pfmet	significance
177718	91	88792310	1470.13	1370.74	234.95	46.11



the large deposit in the jet was in a single crystal

End

Backup Slides

Filters

Filtering Rates



No events were tagged by RecovRecHit

MET Spectrums

