

DBSCAN's and  
MergeData's port to  
ART

Kinga Partyka  
Nov. 10th 2010

# T962\_MergeData

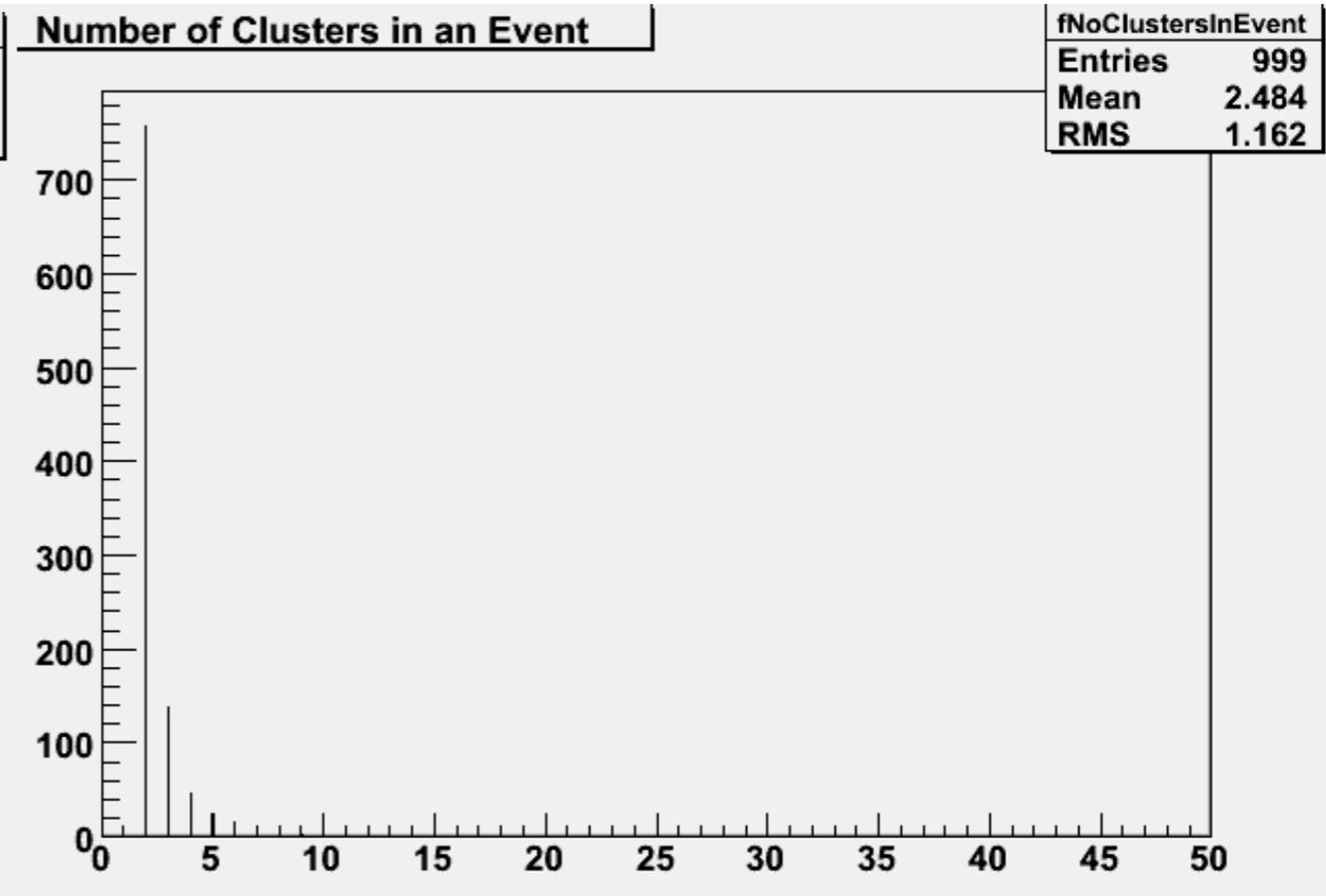
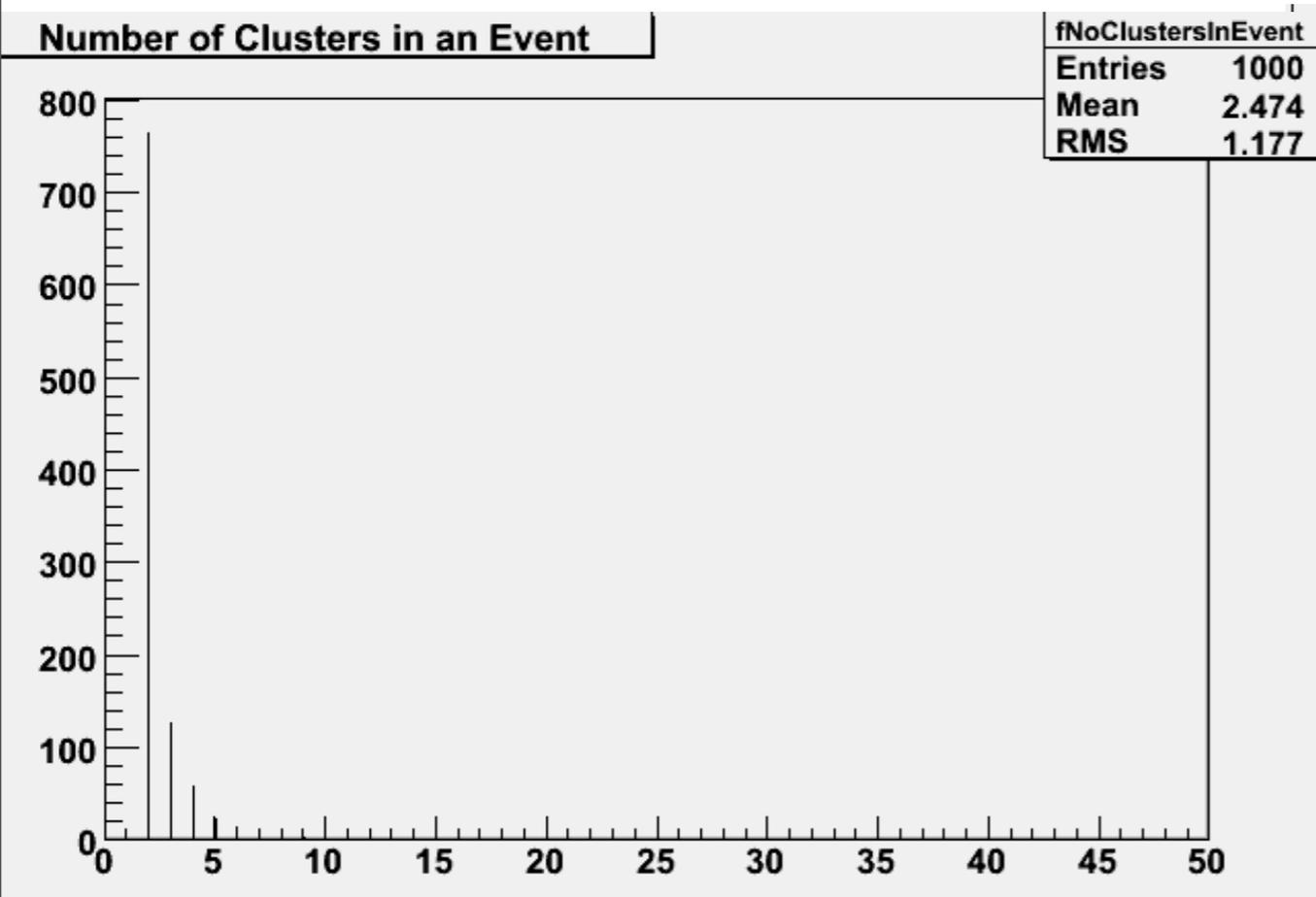
Tested on muon events: all histograms are identical to the ones in FMWK

# ClusterFinder

## No of Clusters in each Event

FMWK

ART



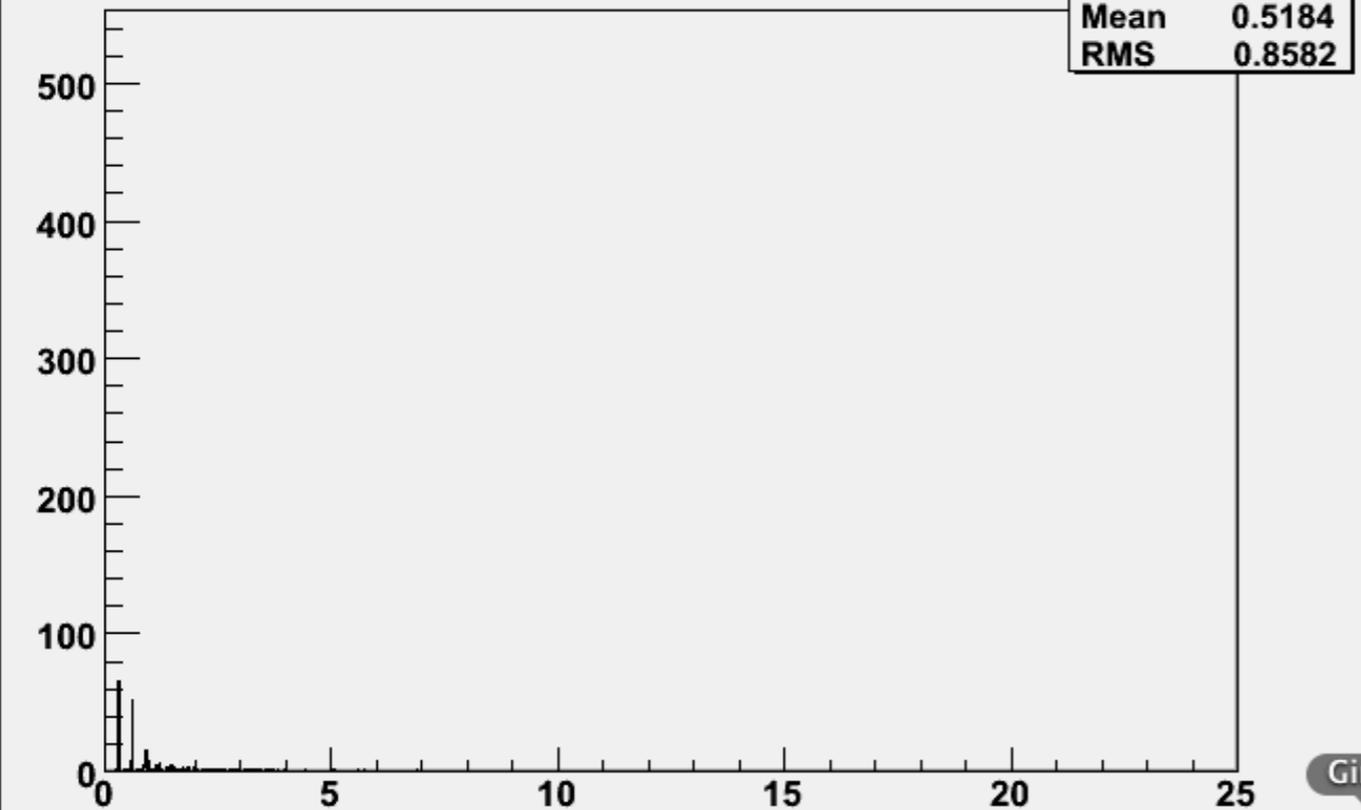
# % of Noisy HITS

FMWK

ART

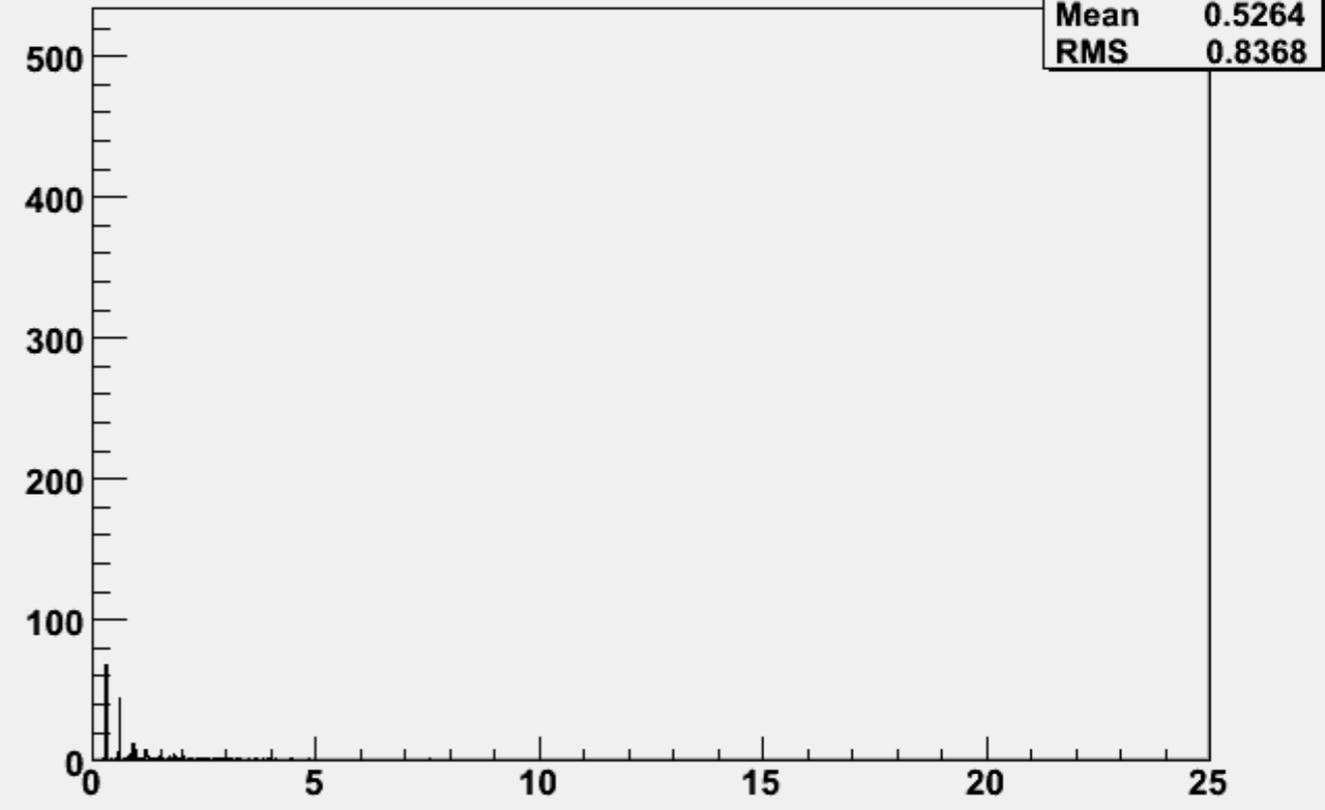
% of hits that were marked as Noise by DBSCAN

fPercentNoise	
Entries	1000
Mean	0.5184
RMS	0.8582



% of hits that were marked as Noise by DBSCAN

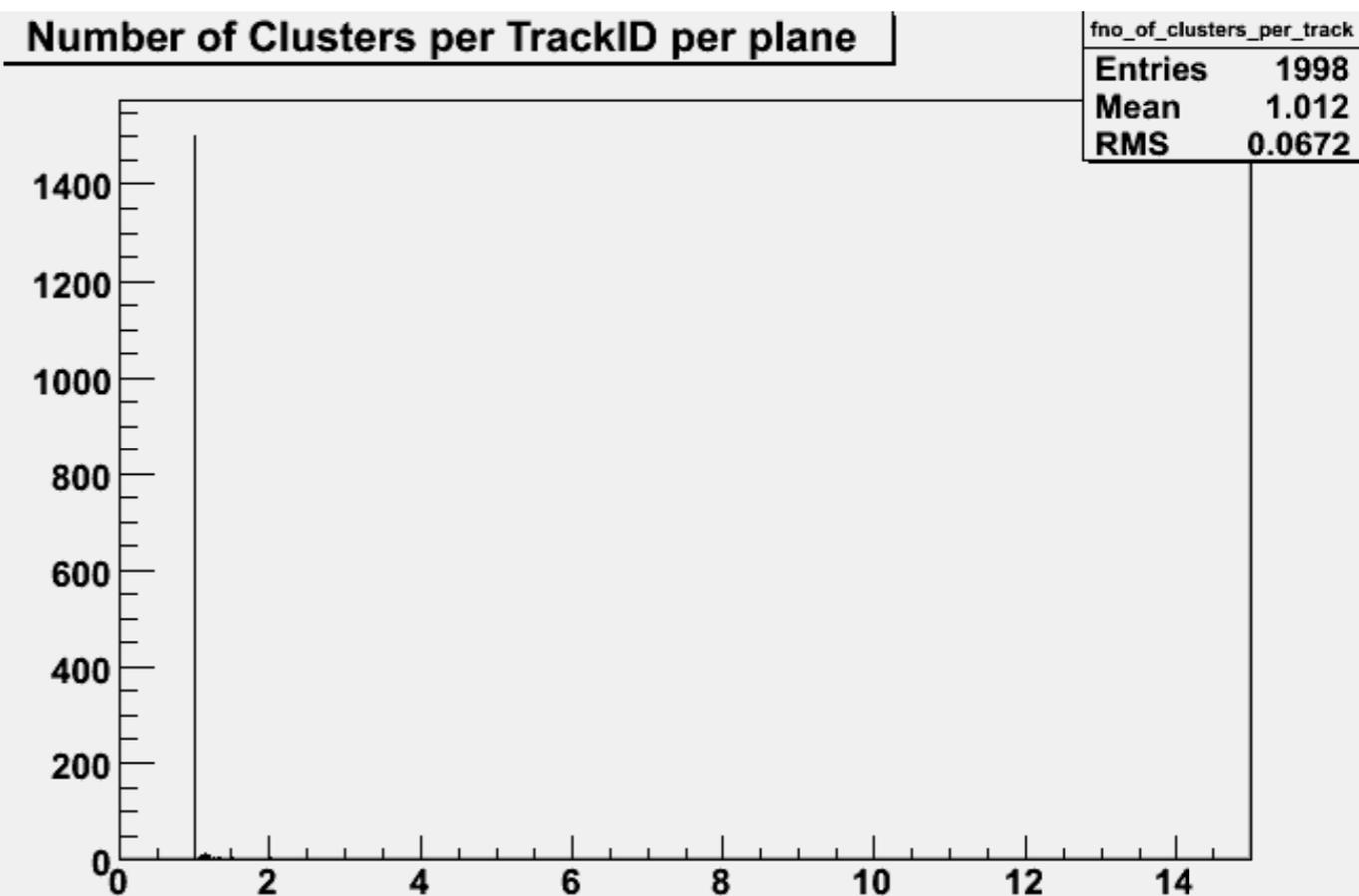
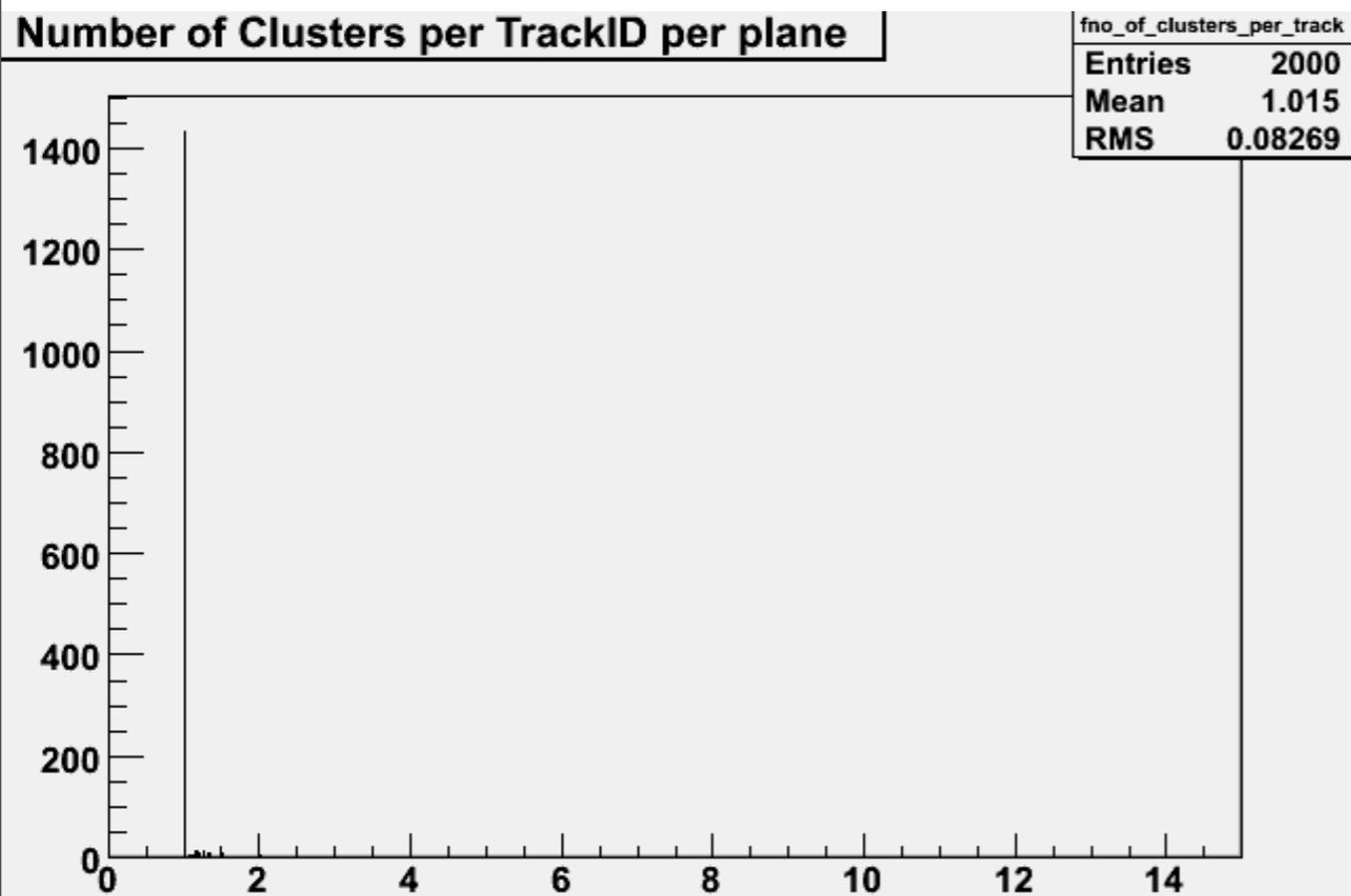
fPercentNoise	
Entries	999
Mean	0.5264
RMS	0.8368



# No of Clusters per TrackID per Plane

FMWK

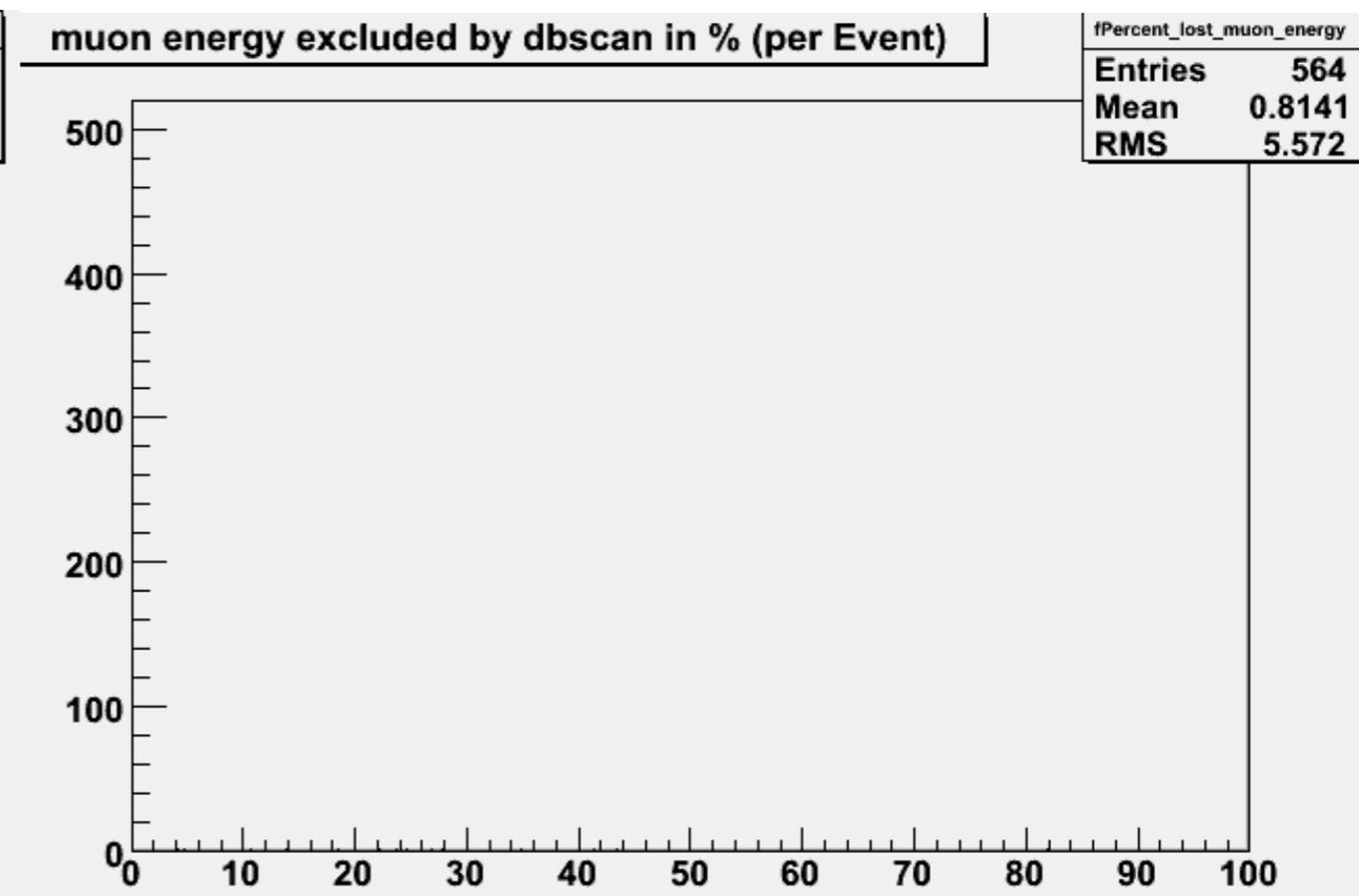
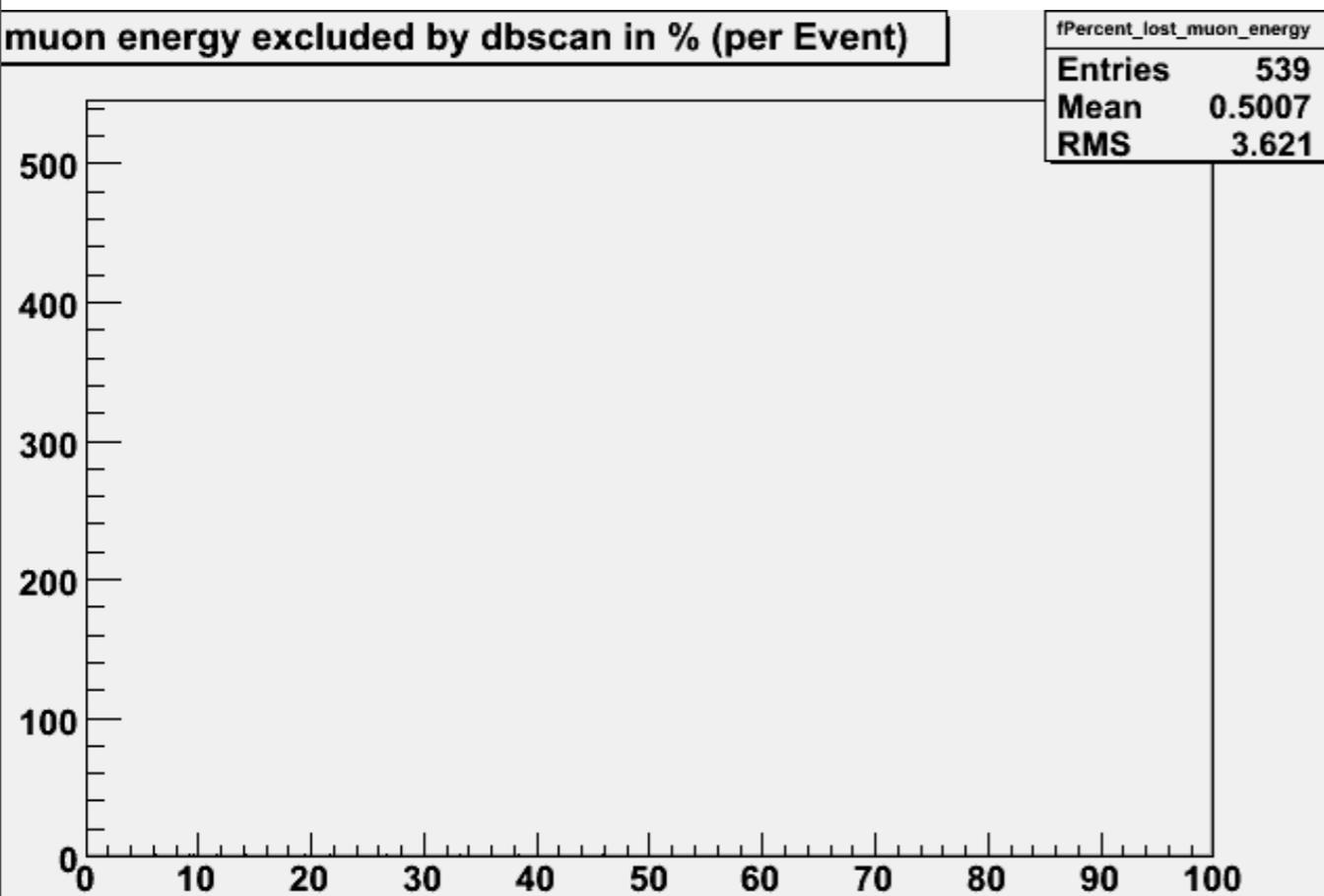
ART



# % muon energy excluded by dbscan

FMWK

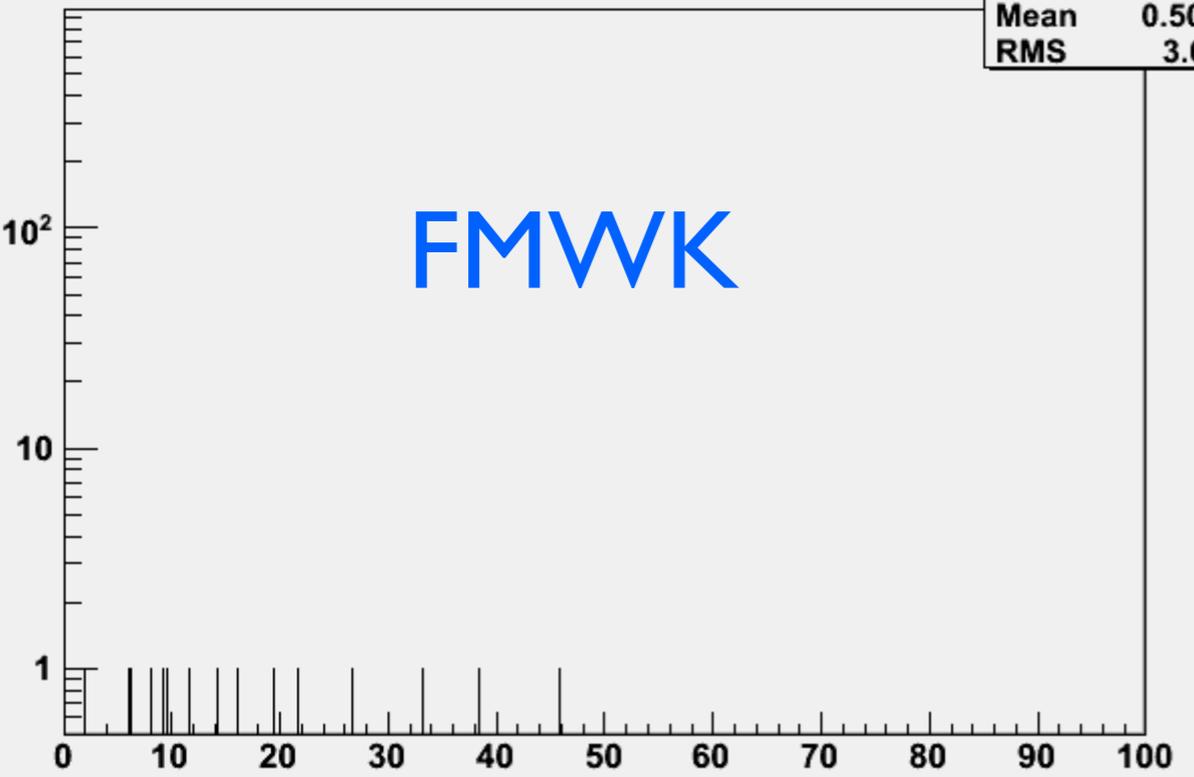
ART



muon energy excluded by dbscan in % (per Event)

fPercent_lost_muon_energy	
Entries	539
Mean	0.5007
RMS	3.621

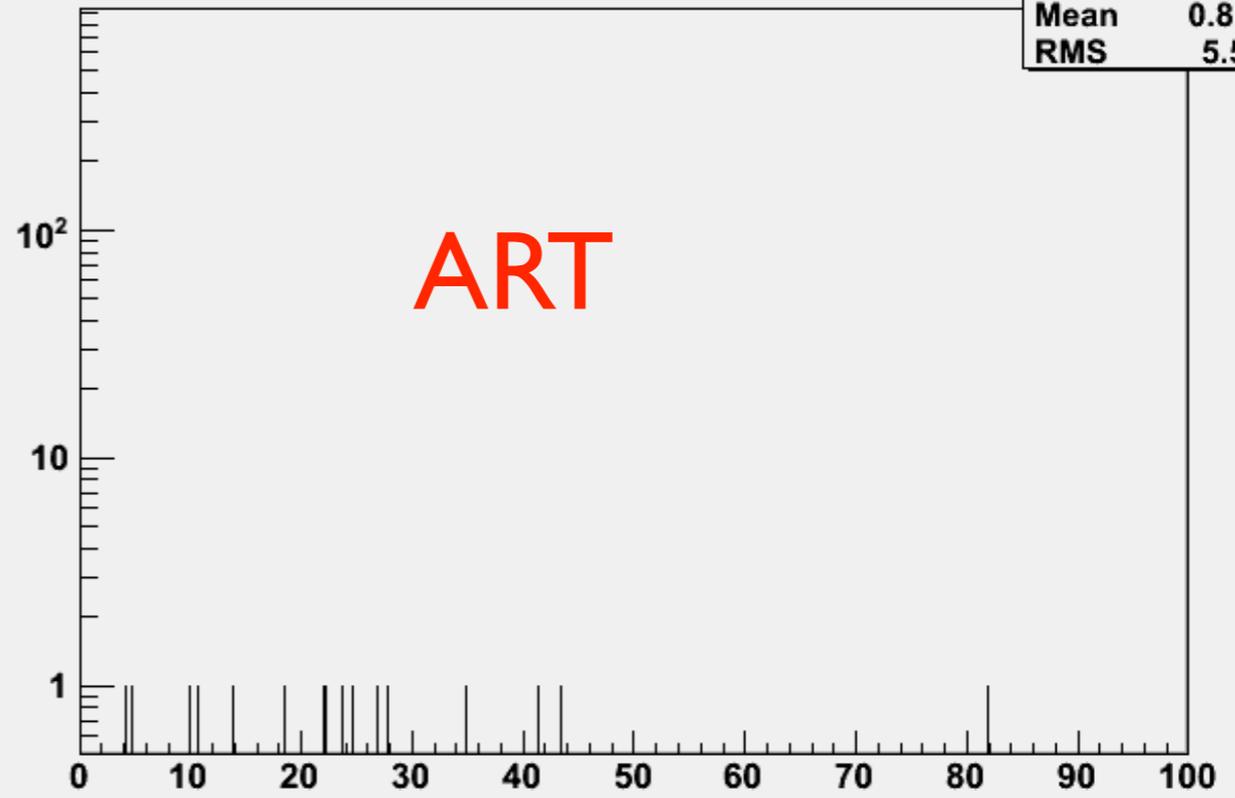
FMWK



muon energy excluded by dbscan in % (per Event)

fPercent_lost_muon_energy	
Entries	564
Mean	0.8141
RMS	5.572

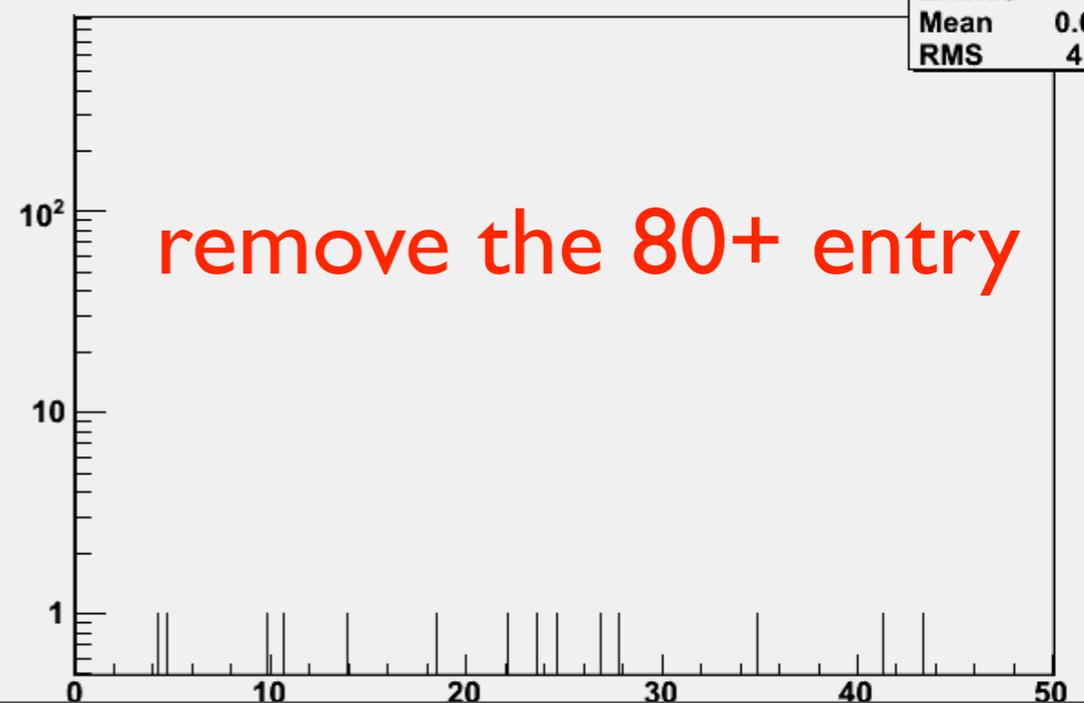
ART



muon energy excluded by dbscan in % (per Event)

fPercent_lost_muon_energy	
Entries	564
Mean	0.6601
RMS	4.266

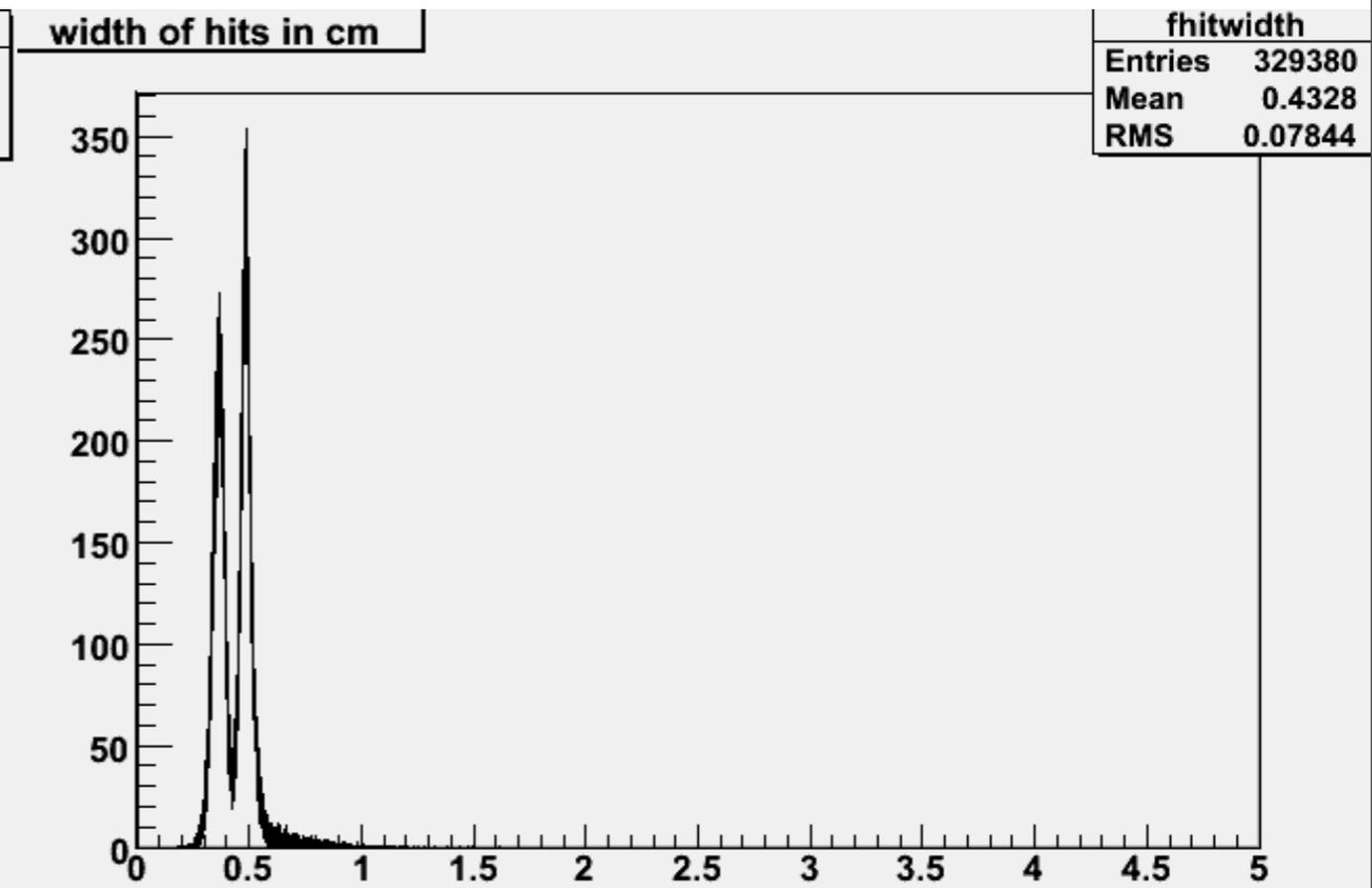
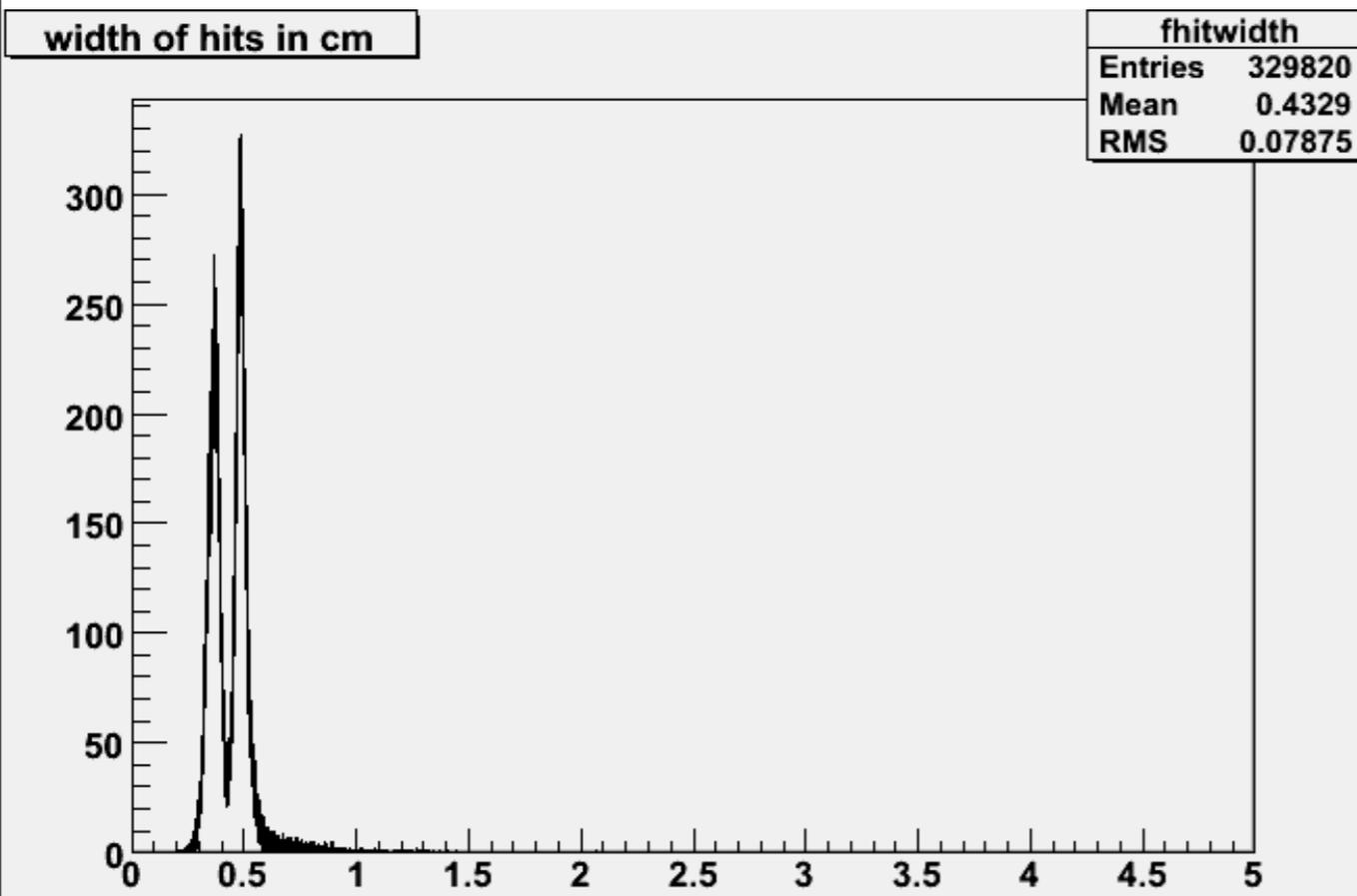
remove the 80+ entry



# hit widths in cm

FMWK

ART



# DBSCAN on DATA

Ran on 20 muon events

Looked at outputs:

## ART

```
event : 30014
$$$$ NO Hits= 269
NO OF HITS IS 269 , 17 is noise
THE CURRENT NOISE LEVEL IS: 6.3197 %
DBSCAN found 10 cluster(s).
no of hits for this cluster is 4
no of hits for this cluster is 5
no of hits for this cluster is 168
no of hits for this cluster is 5
no of hits for this cluster is 12
no of hits for this cluster is 12
no of hits for this cluster is 28
no of hits for this cluster is 3
no of hits for this cluster is 4
no of hits for this cluster is 11
$$$$ NO Hits= 171
NO OF HITS IS 171 , 10 is noise
THE CURRENT NOISE LEVEL IS: 5.84795 %
DBSCAN found 2 cluster(s).
no of hits for this cluster is 16
no of hits for this cluster is 145
```



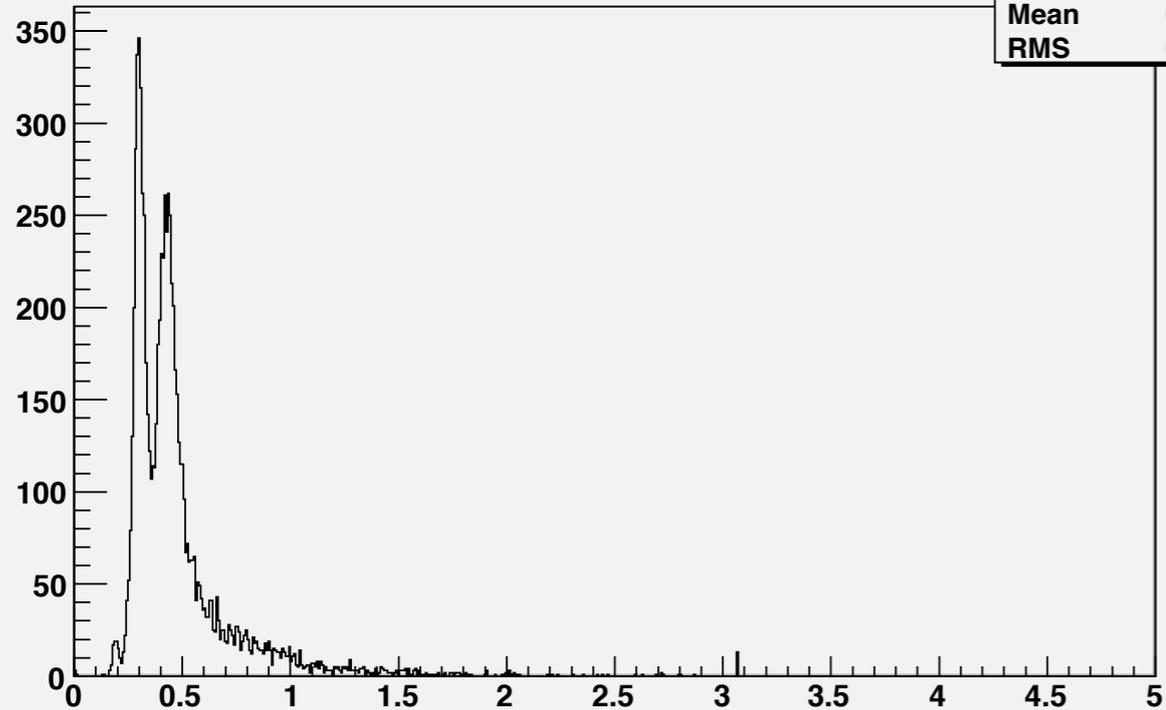
## FMWK

```
event : 30014
$$$$ NO Hits= 269
NO OF HITS IS 269 , 17 is noise
THE CURRENT NOISE LEVEL IS: 6.3197 %
DBSCAN found 10 cluster(s).
No of hits for this cluster is 4
No of hits for this cluster is 5
No of hits for this cluster is 168
No of hits for this cluster is 5
No of hits for this cluster is 12
No of hits for this cluster is 12
No of hits for this cluster is 28
No of hits for this cluster is 3
No of hits for this cluster is 4
No of hits for this cluster is 11
$$$$ NO Hits= 171
NO OF HITS IS 171 , 10 is noise
THE CURRENT NOISE LEVEL IS: 5.84795 %
DBSCAN found 2 cluster(s).
No of hits for this cluster is 16
No of hits for this cluster is 145
```

# Hit Widths

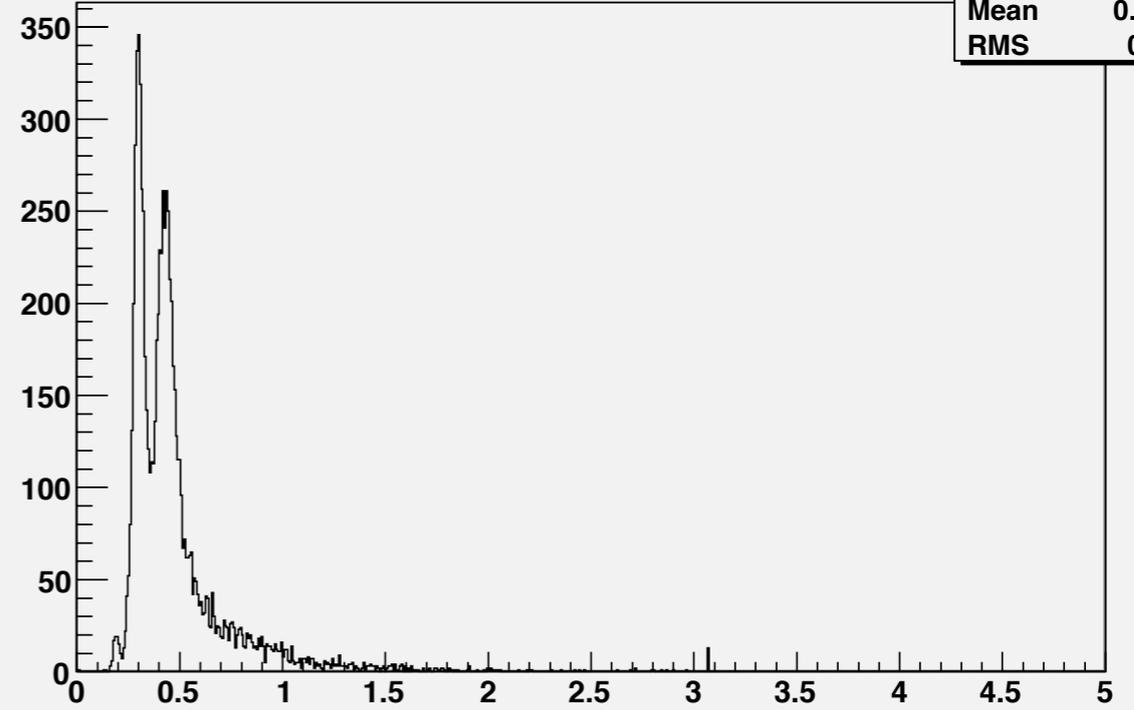
2 extra hits in FMWK

width of hits in cm



fhitwidth	
Entries	8380
Mean	0.4787
RMS	0.2758

width of hits in cm



fhitwidth	
Entries	8382
Mean	0.4787
RMS	0.276

# ART

```
event : 30195
$$$$ NO Hits= 75 ←
NO OF HITS IS 75 , 16 is noise
THE CURRENT NOISE LEVEL IS: 21.3333 %
DBSCAN found 2 cluster(s).
no of hits for this cluster is 17
no of hits for this cluster is 42
$$$$ NO Hits= 41
NO OF HITS IS 41 , 5 is noise
THE CURRENT NOISE LEVEL IS: 12.1951 %
DBSCAN found 1 cluster(s).
no of hits for this cluster is 36
```

# FMWK

```
event : 30195
$$$$ NO Hits= 77 ←
NO OF HITS IS 77 , 16 is noise
THE CURRENT NOISE LEVEL IS: 20.7792 %
DBSCAN found 2 cluster(s).
No of hits for this cluster is 19
No of hits for this cluster is 42
$$$$ NO Hits= 41
NO OF HITS IS 41 , 5 is noise
THE CURRENT NOISE LEVEL IS: 12.1951 %
DBSCAN found 1 cluster(s).
No of hits for this cluster is 36
```

## Check HitFinder parameters:

```
process.ffthit = clusterfinder.EDProducer(
  "FFTHitFinder",
  CalDataModuleLabel = clusterfinder.string("caldataCal"),
  MinSigInd          = clusterfinder.double(6.0),
  MinSigCol          = clusterfinder.double(11.0),
  IndWidth           = clusterfinder.double(5.0),
  ColWidth           = clusterfinder.double(7.5),
  Drift              = clusterfinder.double(0.03069),
  # TPC's drift Velocity in units cm/(ADC Sample Time)
  POffset            = clusterfinder.double(20.0),
  OOffset            = clusterfinder.double(24.0),
  MaxMultiHit        = clusterfinder.int32(3)
)
```

```
Set Induction Minimum Signal = 6
Set Collection Minimum Signal = 11
Set Induction initial width = 5
Set Collection initial width = 7.5
Set Maximum Multi-Hit = 3
Drift Velocity = 0.03069
Offset from Collection Plane to XYZ Origin = 24
Time offset between planes = 20
```

# Conclusion

- ✓ MergeData successfully ported
- ✓ DBSCAN successfully ported based on MC and DATA histograms