

# AMS Offline (Reconstruction) Software Status

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Available at:

[http://ams.cern.ch/AMS/vitali/ams02\\_ss\\_2008c.pdf](http://ams.cern.ch/AMS/vitali/ams02_ss_2008c.pdf)

- Data Production Results
- Data Access
- Offline Software Status
- Data Summary Files
- Monitoring Tools
- Visualization Tools
- Analysis Tools
- Summary

# Introduction

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Dedicated Software / Analysis Meeting Today, 2pm 160-1-009

## Data Production Results

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- SemiAutomatic mode, same as for MC production:
  - Allowed normally less than 24hrs between data taking and reconstructed data available for users;
  - Mean CPU time per fully reconstructed cosmic muon event per X5482 proc core was 0.1 sec, well in the desired time range ( $< 0.2$  sec);
  - Complete rerun of data using the latest software version took about 80 hours;

# Data Production Results

File Preferences Help About

Producer Processes
 Producer I/O
 Server
 DiskUsage
 Control

Producer\_ActiveHosts

HostName	Running Pr	Allowed Pr	Failed Pr	Ntuples	EventTags	Events	% of Total	Warnings	Errors	CPU/Event	Efficiency	Status
pcams13.cern.ch	6	6	0	55	0	31060494	6	361675	63084	0.0027	0.95	OK
pcamss0.cern.ch	6	6	0	58	0	26936781	5.2	319521	77491	0.0028	0.7	OK
pcamsp1.cern.ch	8	8	0	80	0	150100070	29	415748	83111	0.0004	0.91	OK
pcamsvc.cern.ch	2	2	0	19	0	7211612	1.3	100490	19242	0.0103	0.92	OK
pcamsr0.cern.ch	8	8	0	48	0	27891831	5.4	360799	86369	0.0022	0.95	OK
Total	80	80	1	520	0	353897455	67.8	2861785	745713	0.0002	1.07	0

Producer\_ActiveClients

ID	HostName	Mips	Process ID	Start Time	LastUpdate Time	TimeOut	Run	Name	Status
13584	pcamsp1.cern.ch	4628	25300	Tue Jul 8 07:19:58 2008	6 sec ago	300	1206793555	1206793555.120212440.root	Active
13715	pcamsf0.cern.ch	2445	23166	Tue Jul 8 09:28:20 2008	7 sec ago	300	1208947123	1208947123.00492426.root	Active
13757	pcamsd0.cern.ch	2452	10191	Wed Jul 9 11:24:24 2008	7 sec ago	300	1209369954	1209369954.00000001.root	Active
13780	pcamsr0.cern.ch	4339	12132	Tue Jul 8 18:34:47 2008	3 sec ago	300	1209478694	1209478694.00425655.root	Active
13789	pcamsf3.cern.ch	2699	311	Wed Jul 9 10:31:24 2008	7 sec ago	300	1209543336	1209543336.00000001.root	Active
13793	pcamsf2.cern.ch	2394	32208	Tue Jul 8 13:47:58 2008	7 sec ago	300	1209558943	1209558943.00617972.root	Active

Connected to Servers

## Data Access

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Data Access is provided by:

- Locally via NFS
- Remotely via xrootd
- Files Catalogs accessible via web interface  
<http://pcamss0.cern.ch/perl/rc.o.cgi?queryDB04=Form>

# Data Access

http://pcamss0.cern.ch/cgi-bin/mon/rc.o.cgi?queryDB04=Form

Shop Products Training

Mozilla Firefox Start Page Search

Continue

**Datasets (Data Production)**

data2007  
ANYDATA

Continued

**Find Job : (eg 805306383 or From-To)**

JobID :  Cite : Any

**Find Run : (eg 1073741826 or From-To)**

RunID :

MC  
Data

**Find DST(s) : (eg 1073741826 or From-To)**

RunID : [PutRunNumbers](#)

MC  
Data

**Find DataFile(s) : (eg 1073741826 or From-To)**

RunID : [PutRunNumbers](#)

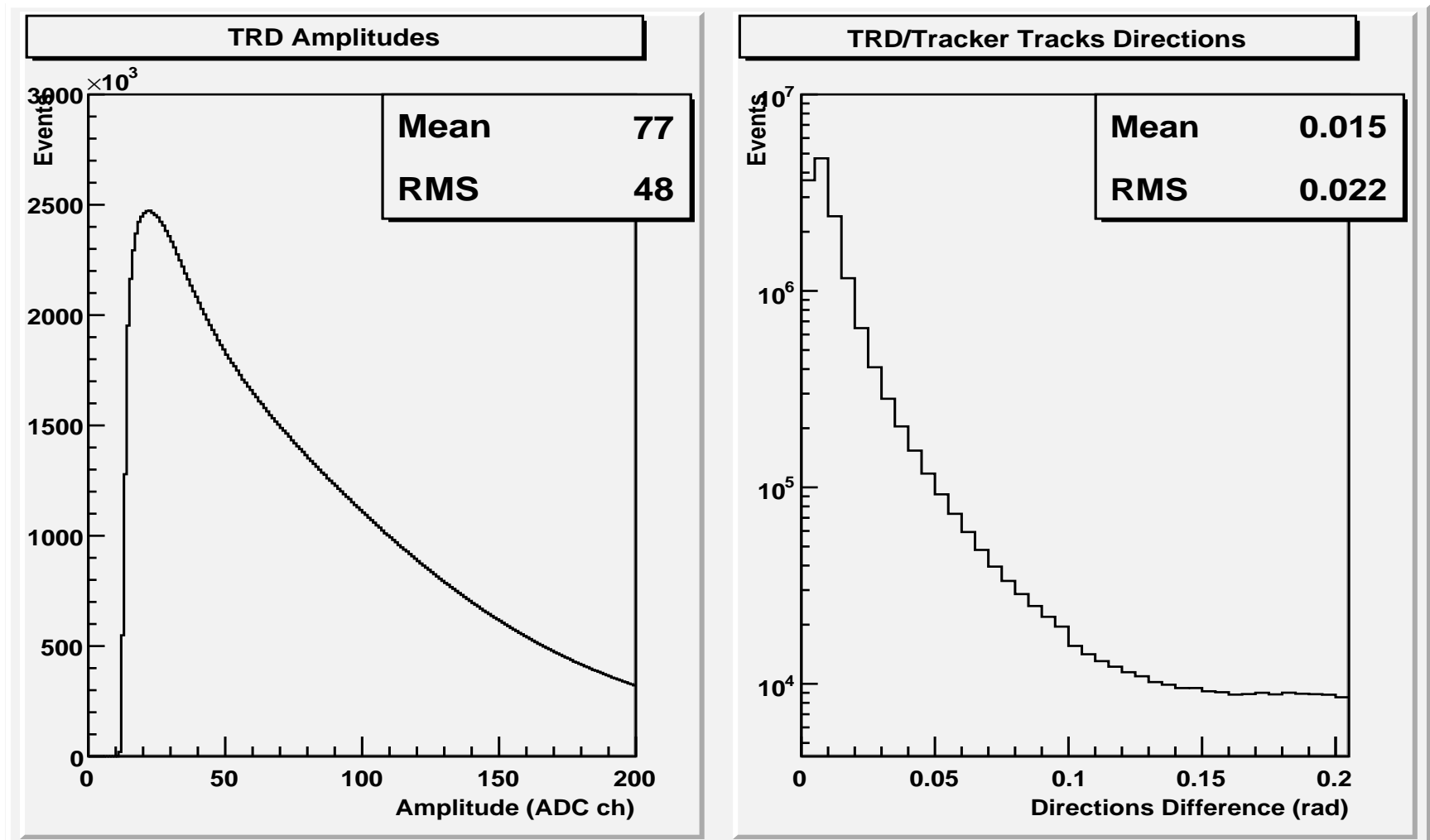
# Offline Software Status

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**No Major Issues**  
**A lot of room for improvements**

# Offline Software Status

- TRD Performance Example:



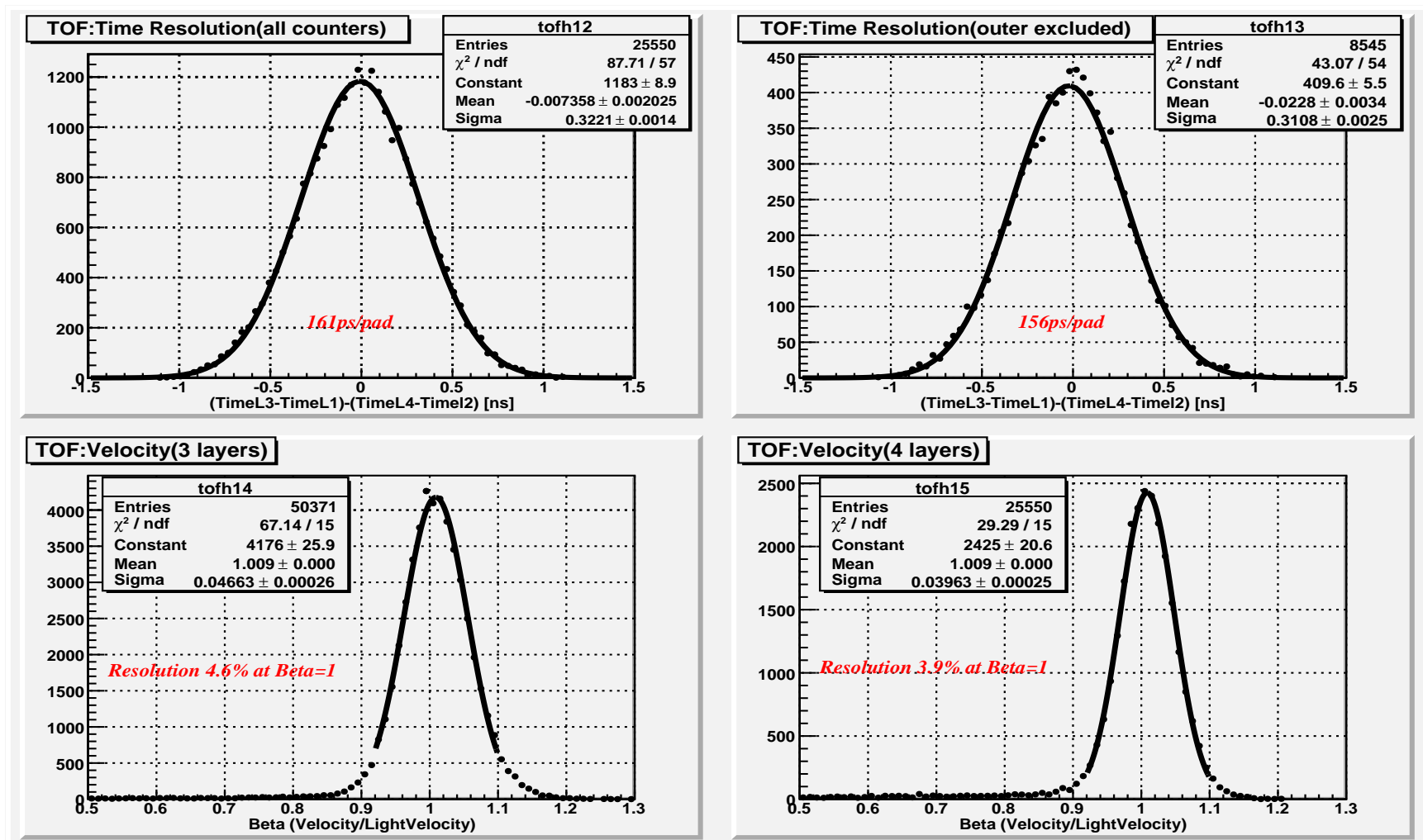
## Offline Software Status

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- TRD To Be Done:
  - Gain Correction vs TRD Temperature Measurements
  - Charge Magnitude Determination

# Offline Software Status

- TOF/ACC Performance Example:



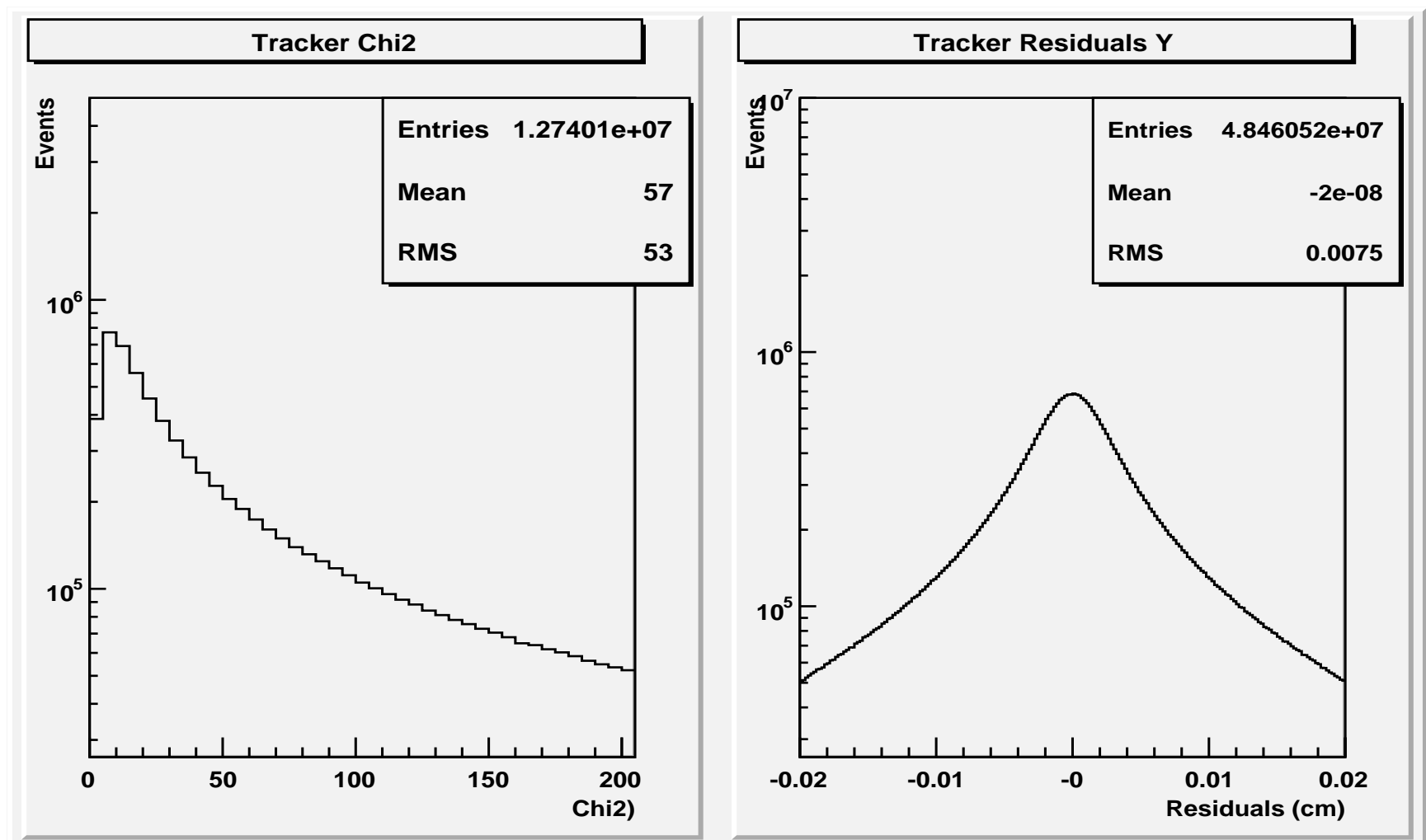
## Offline Software Status

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- TOF/ACC To Be Done
  - Compressed format: To Be Tested
  - Amplitude Calibration
  - Charge Magnitude Determination
  - Amplitude/Time Temperature Corrections

# Offline Software Status

- Tracker Performance Example:



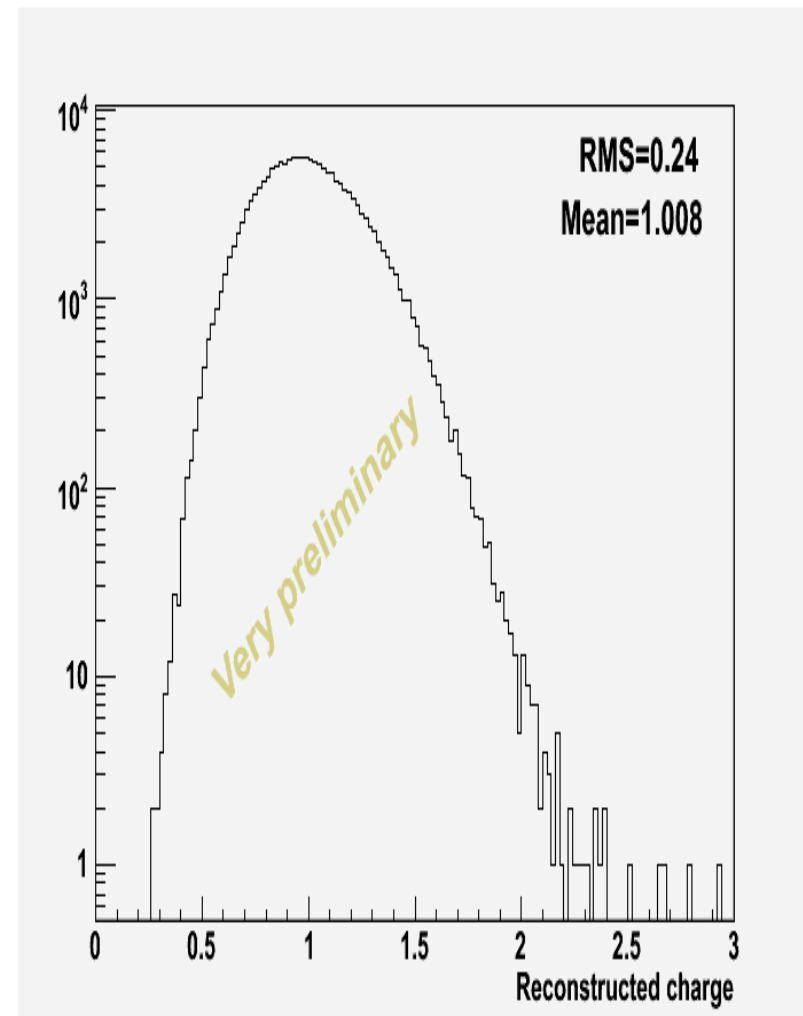
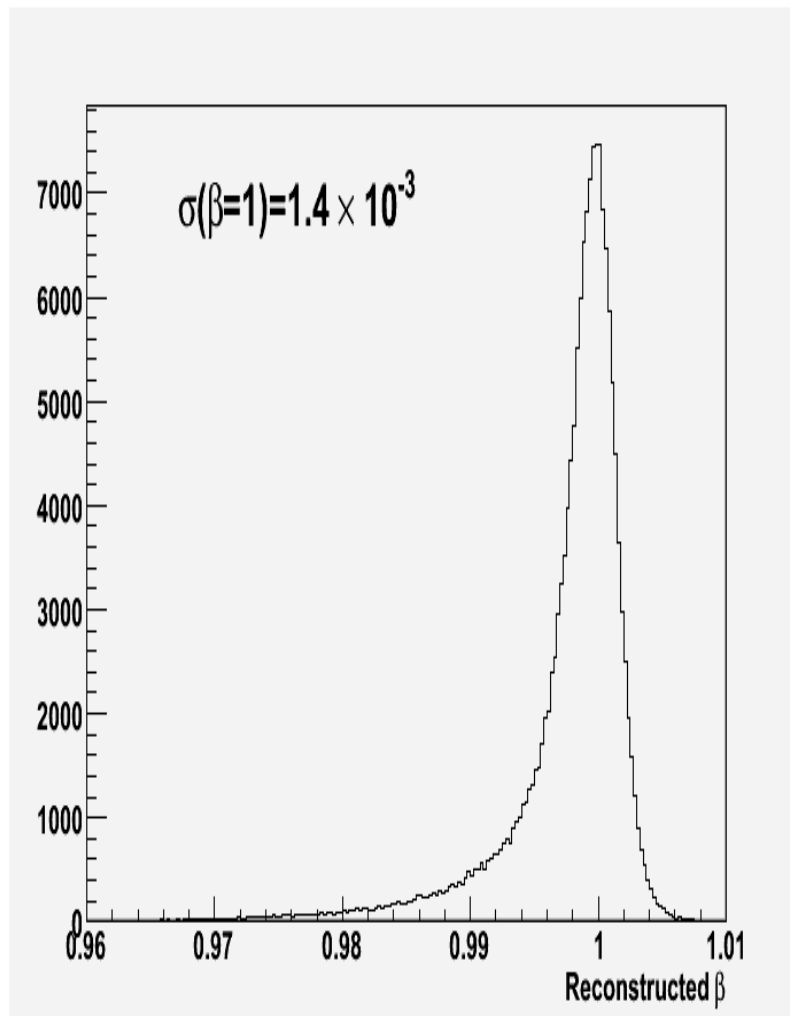
## Offline Software Status

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- Tracker To Be Done
  - Incorporate new version of reconstruction software into general framework
  - Charge Magnitude Determination

# Offline Software Status

- RICH Performance Example:



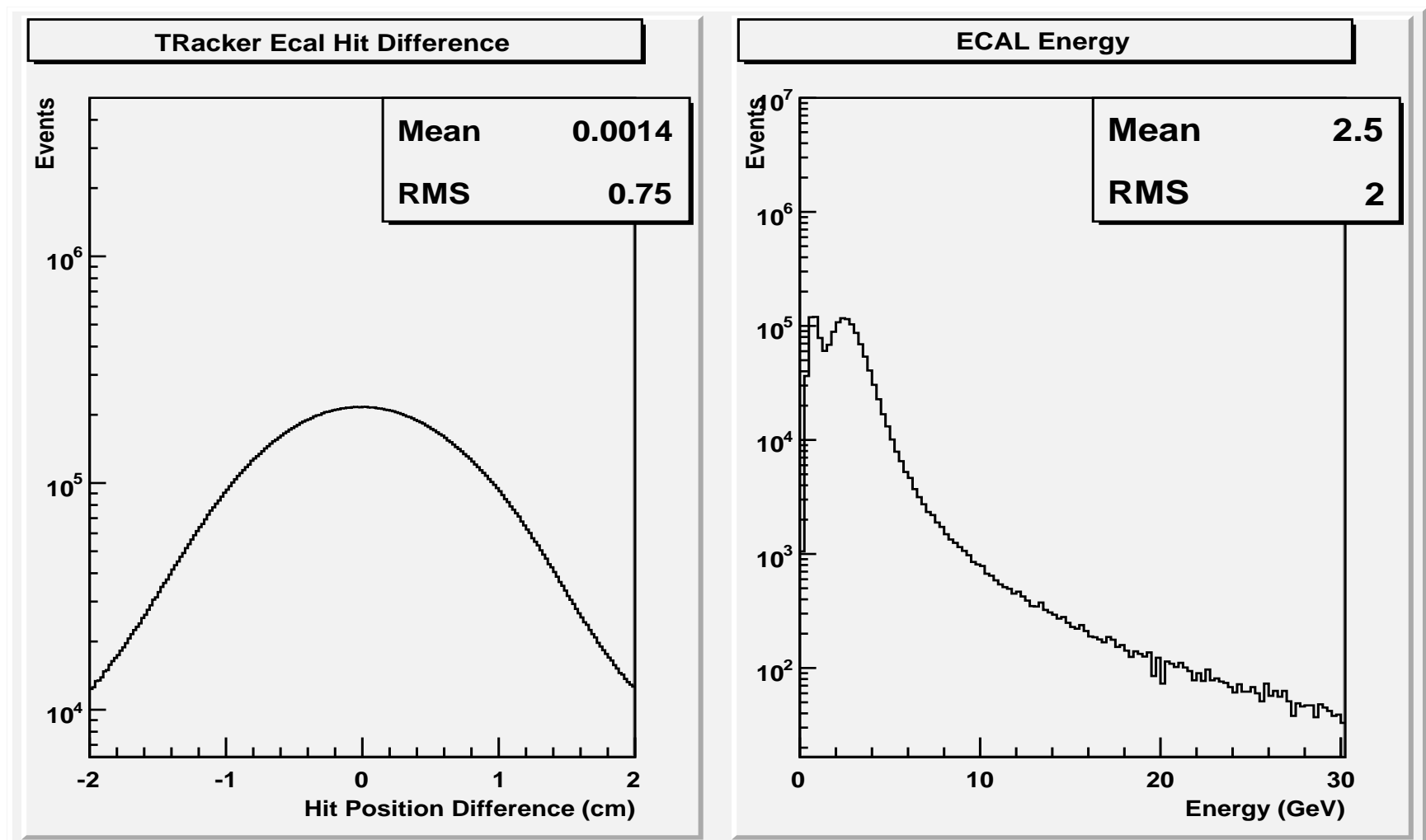
## Offline Software Status

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- To Be Done
  - Implement gain calibration and alignment routines in AMS software
  - Implement RICH-Tracker misalignment in the simulation.
  - Implement RICH internal alignment (mirror, radiator and detection plane)
  - Include gain and alignment parameters in TDV databases
  - Implement fine grain (sub-tile) radiator refractive index map

# Offline Software Status

- ECAL Performance Example:



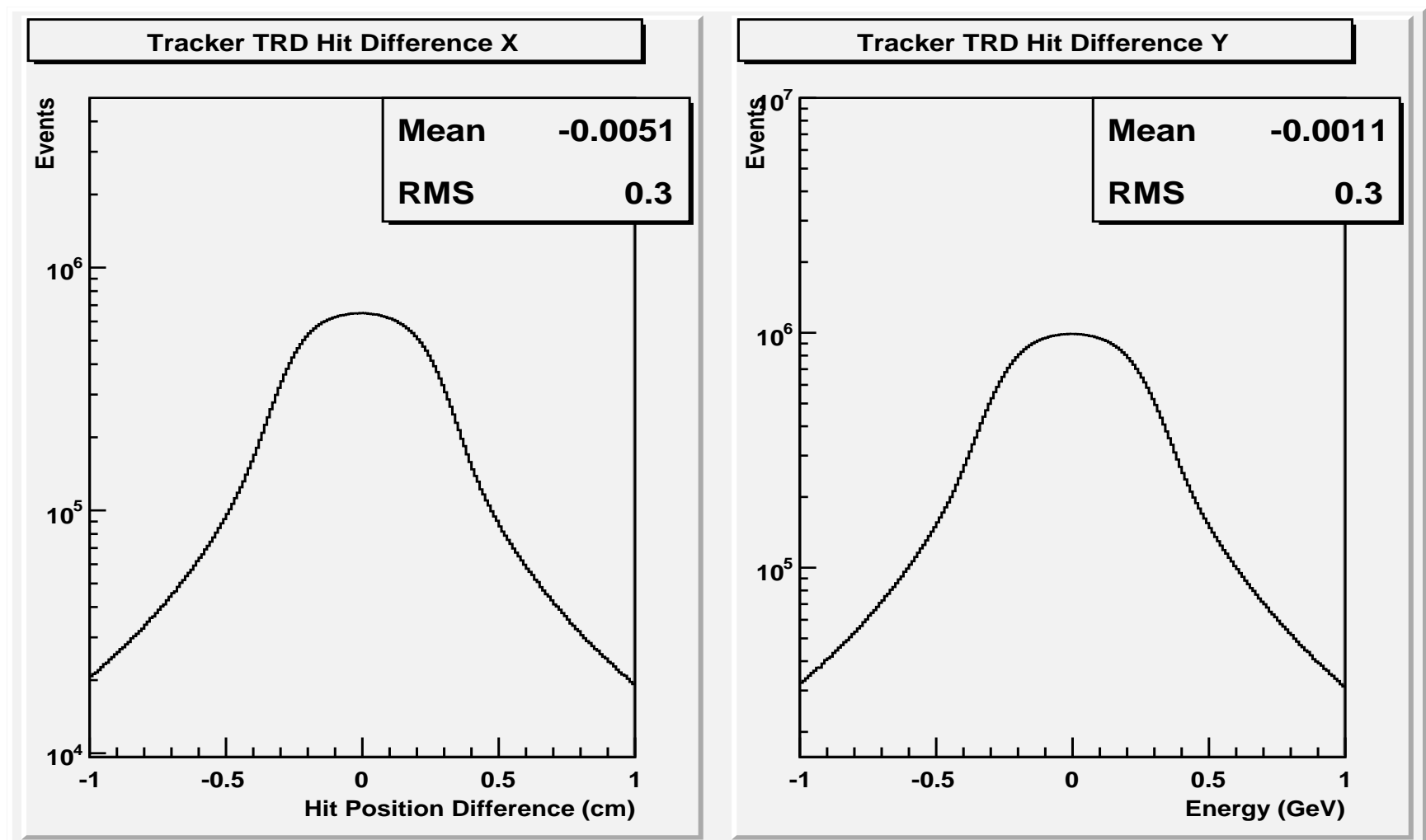
## Offline Software Status

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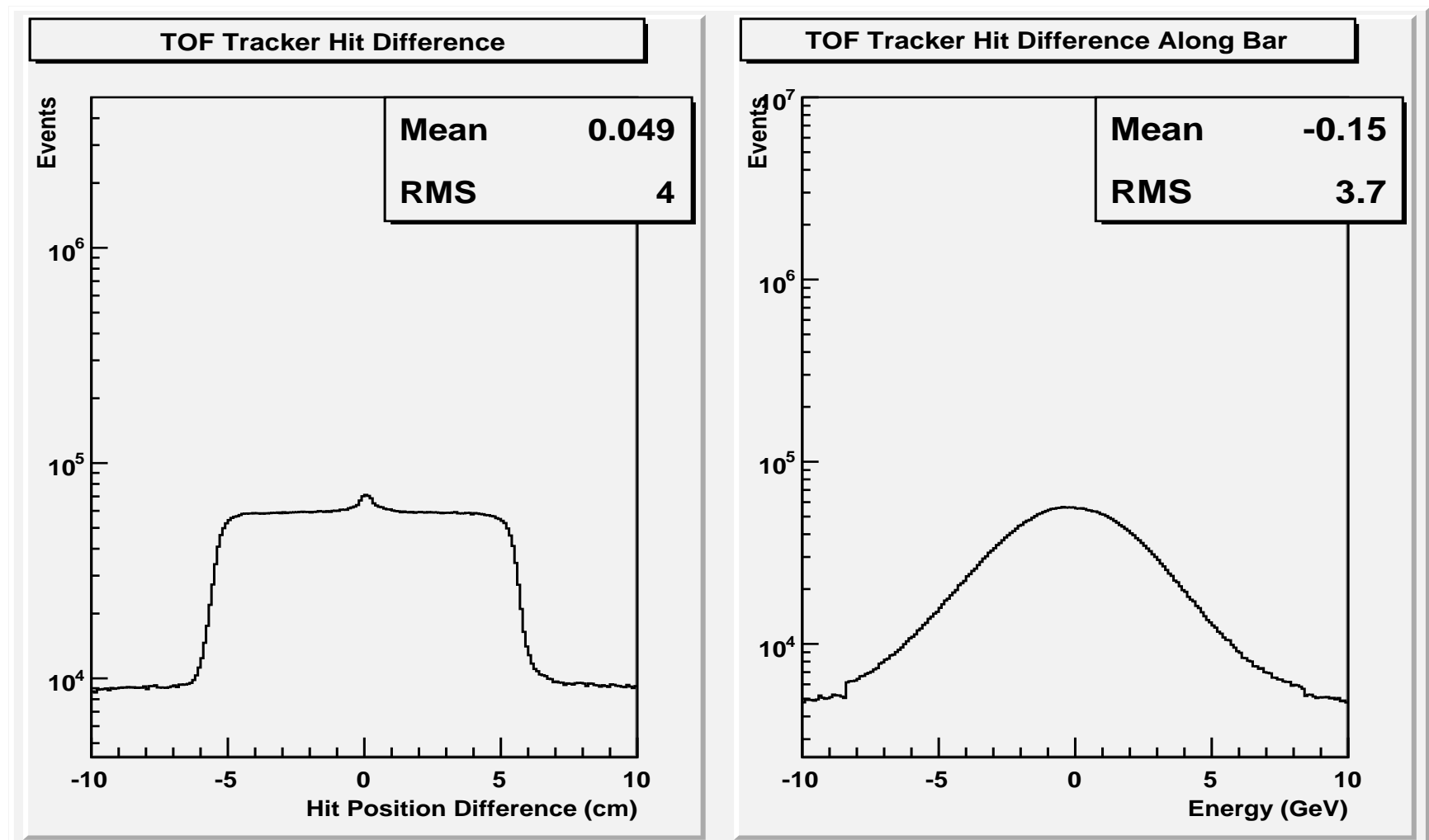
- To Be Done
  - Calibration readout: To Be Tested
  - Introduce response corrections following last test beam ideas;

# Offline Software Status

- AxAms Performance Example:



# Offline Software Status



## Offline Software Status

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- To Be Done, Reconstruction
  - Incorporate relevant slow control parameters /e.g. ECAL Temperature, TRD Temperature, etc / into the Offline program DB;
  - Develop consistent charge reconstruction thru all relevant subdetectors /TOF, Tracker, TRD, RICH/

- To Be Done, Simulation
  - Develop DAQ format for simulated data, which will allow their (multiple) reruns of with evolution of reconstruction program
  - Geant4 Development (?)

## Data Summary Files (DST) Format

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- Based On [ROOT](#) package developed at CERN;
- DST are written in compress mode using standard gzip compressor;
- Each event is represented by [Tree](#) Object
- Each event contains Header and arrays (Vectors) of reconstructed objects, such as “Particle”, ”Track”, ”Cluster” etc;
- The extensive set of automated documentation is available at <http://ams.cern.ch/AMS/Analysis/hpl3itp1/root02/AMSRoot/> or [.../root02/latex/refman.pdf](http://ams.cern.ch/AMS/Analysis/hpl3itp1/root02/latex/refman.pdf).
- AMS Root User Guide with complete analysis examples is available at <http://ams.cern.ch/AMS/Reports/Analysis/Notes/amsroot.pdf>

## Monitoring Tools

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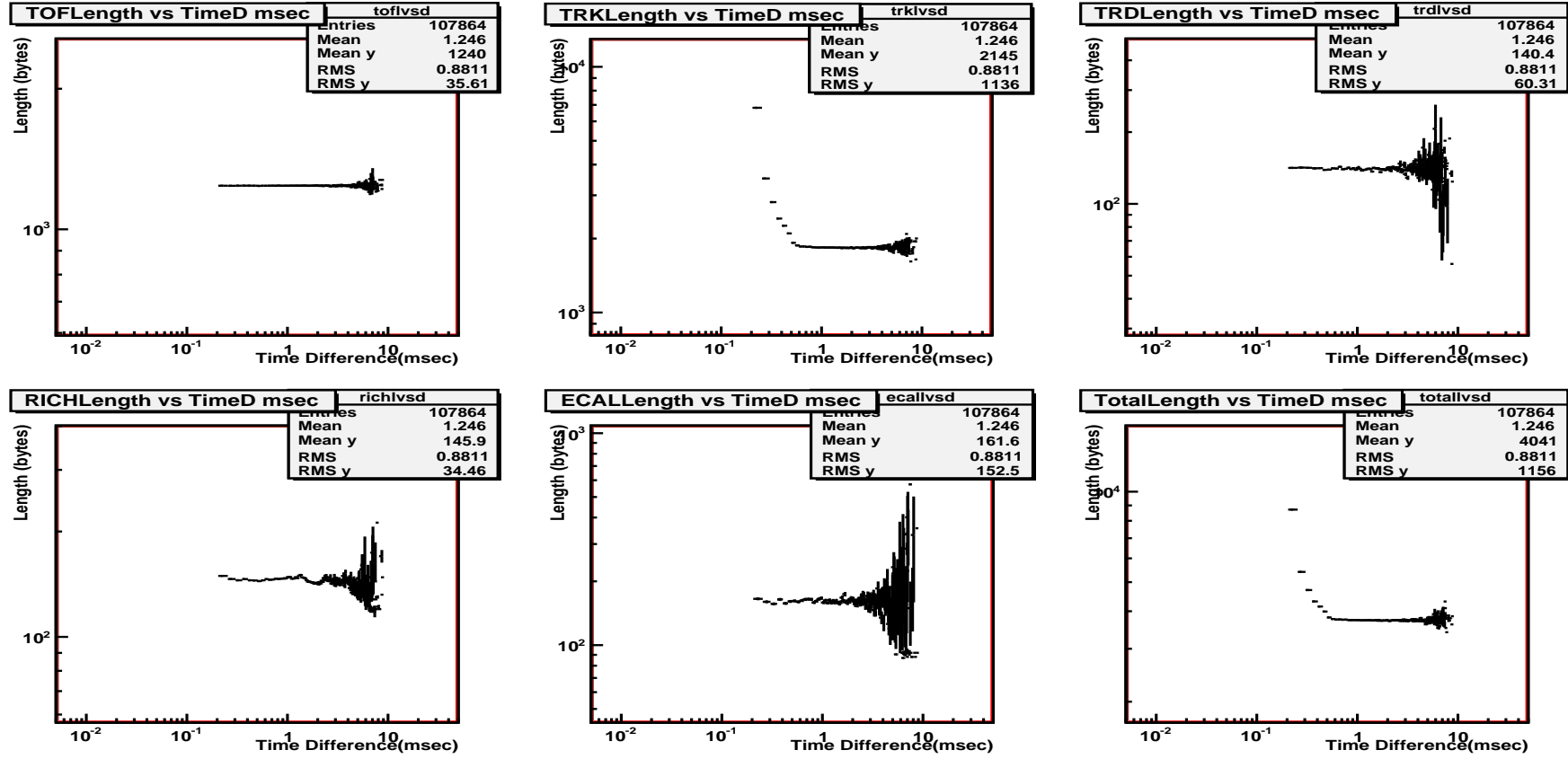
Features: Fills/Shows Various Histograms for Different Sub-detectors in Real Time To Develop/Add more histogram for subdetectors: There are (numerous) examples in /Offline/vdev/online/\*.cxx

To start from ams cluster

```
/Offline/vdev/online/offmon root_file
```

# Monitoring Tools

## Alpha Magnetic Spectrometer Online Display & General.Set\_1



Run 1212479283 EventsProcessed 107864 / 107864 / 635992 Tue Jun 3 10:01:14 2008

## Visualization Tools

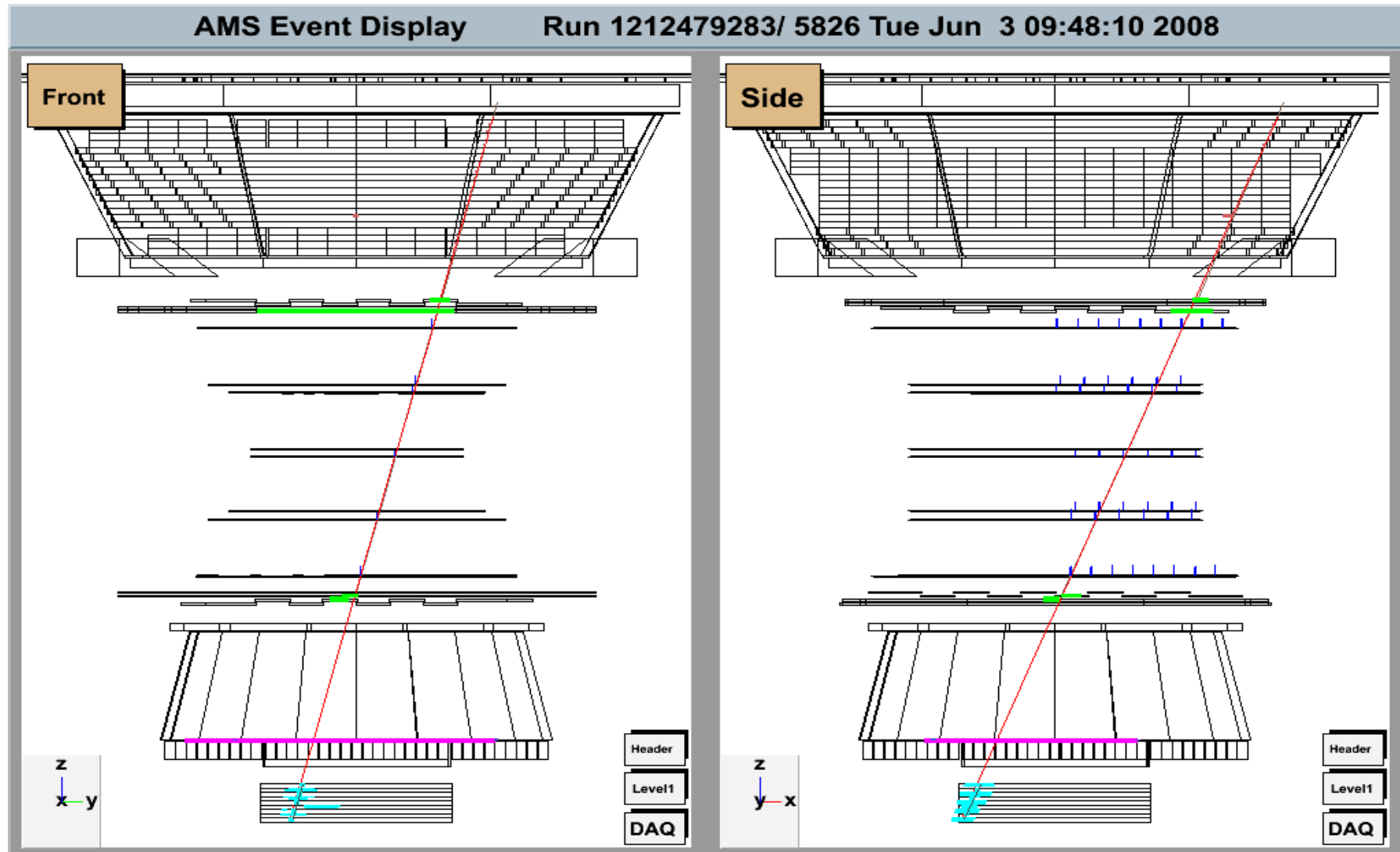
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Main Features: AMS Objects Browser, Zoom, AutoScan, Plug-  
gable Selection Function `amsed(4)/amsed(4)c` static/dynamic  
with loadable selection function (4) is for slc4 nodes

To Start:

```
/Offline/vdev/display/amsed(4)(c) root_file
```

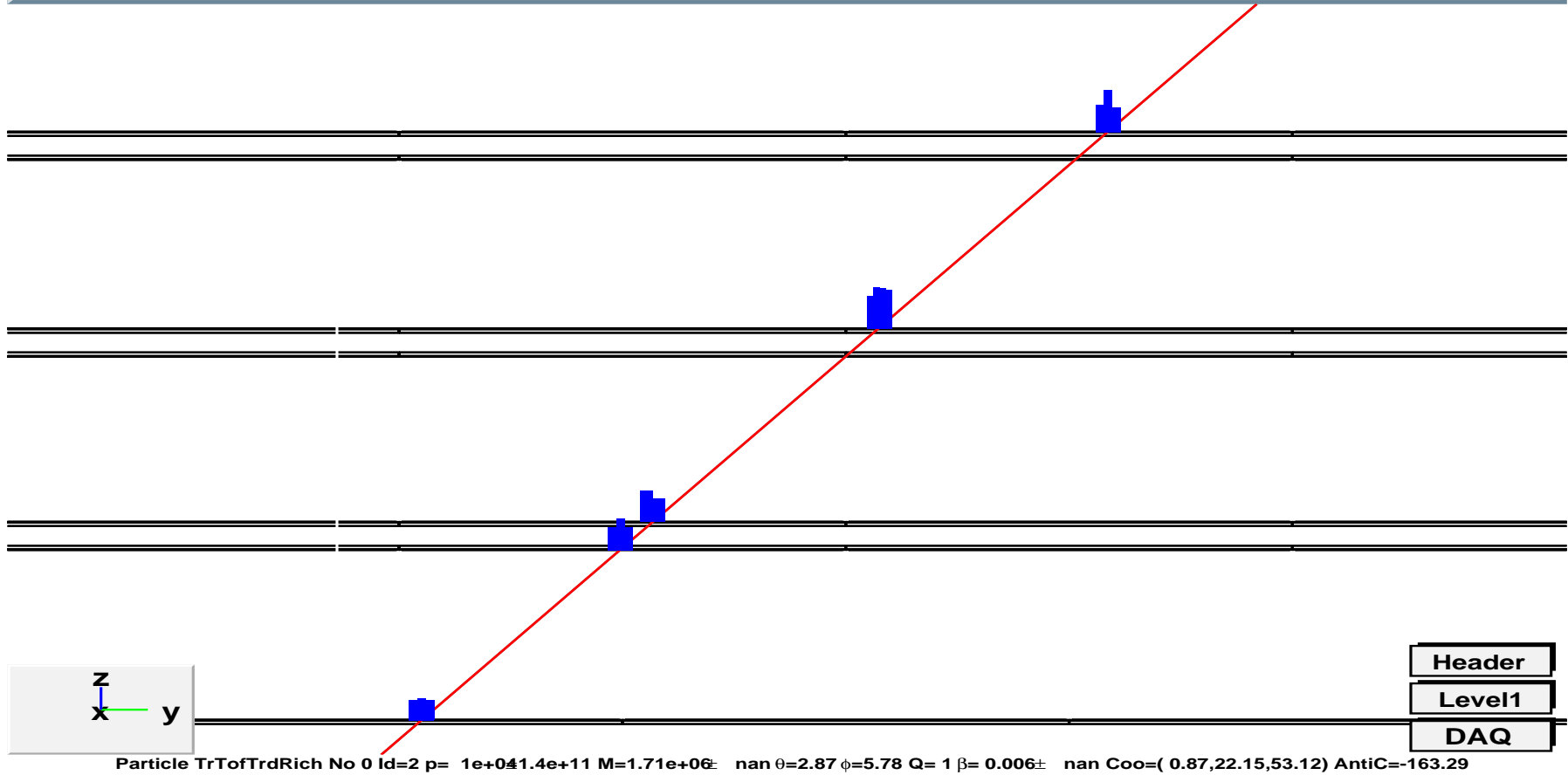
# Visualization Tools



# Visualization Tools

AMS Event Display

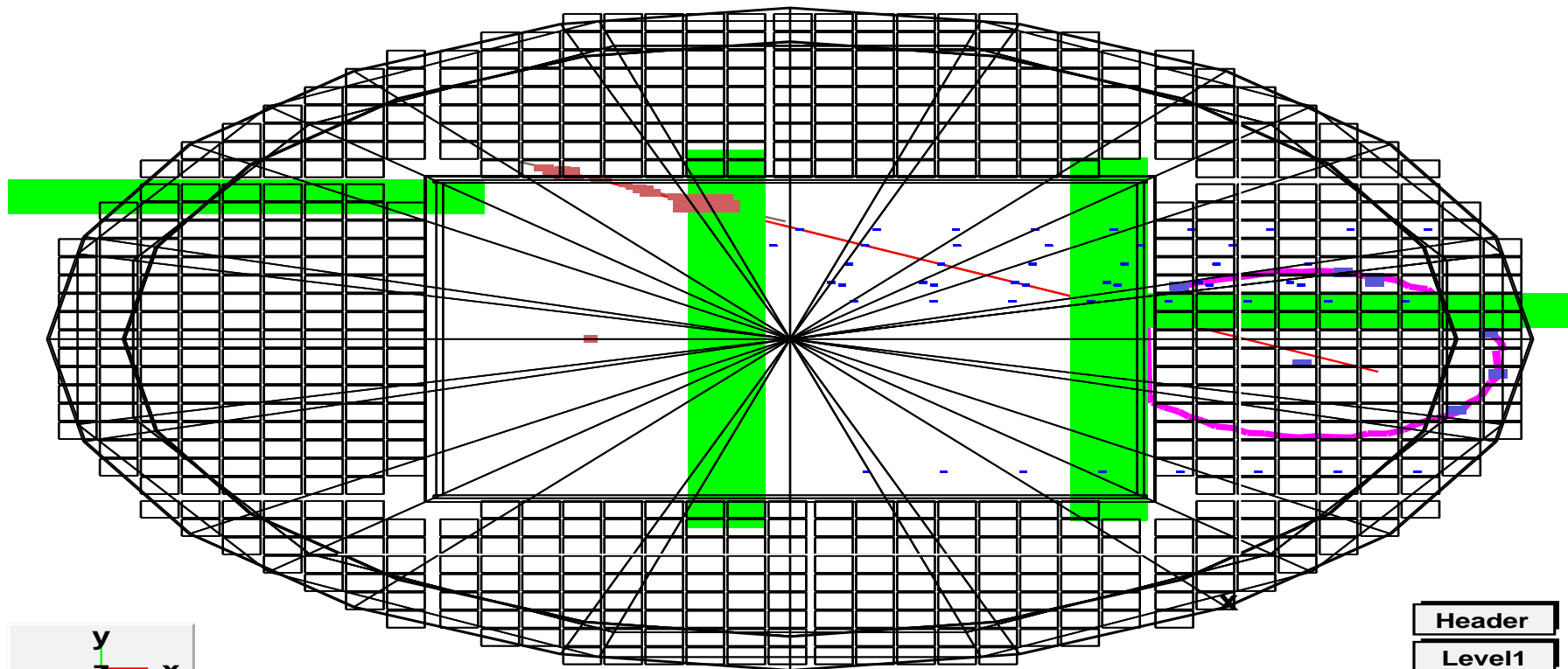
Run 1207839579/ 3 Thu Apr 10 16:59:39 2008



# Visualization Tools

AMS Event Display

Run 1207839579/ 3 Thu Apr 10 16:59:39 2008



y  
z — x

Header  
Level1  
DAQ

Particle TrTofTrdRich No 0 Id=2 p= 1e+04 1.4e+11 M=1.71e+06 nan  $\theta=2.87$   $\phi=5.78$  Q= 1  $\beta= 0.006\pm$  nan Coo=( 0.87,22.15,53.12) AntiC=-163.29

## Other Analysis Tools

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- Root Based Histograms and Cut Manager  
<http://ams.cern.ch/AMS/Reports/Analysis/Notes/HistoMan.pdf>;
- Hbook-like root histogramming package and Cut Manager  
[http://ams.cern.ch/AMS/vitali/ams02\\_hm.pdf](http://ams.cern.ch/AMS/vitali/ams02_hm.pdf)
- Fast Browser/Visualization tools [ams\\_inspect](#) and [JScan](#);
- [Tracking](#) and [Unfold](#) libraries

# Summary

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- Offline Software Performance OK
- Production Scheme OK
- Dats Files Format OK
- Data Files Access OK
- Data Distribution OK
- DataBase Performance OK
- A lot of improvements to be done concerning event reconstruction, simulation