Status of PHOS HLT

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Tasks for PHOS HLT

- Data compression

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- Event Reconstruction

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- Event selection

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- Region of interest
- Detector Algorithms
- Data for monitoring

Data compression

- Energy and timing extraction

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- Active channel selection

Energy and timing extraction

- Peak Finder algorithm

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Performance:

- In principle as accurate as fitting
- More than fast enough

Energy and timing extraction

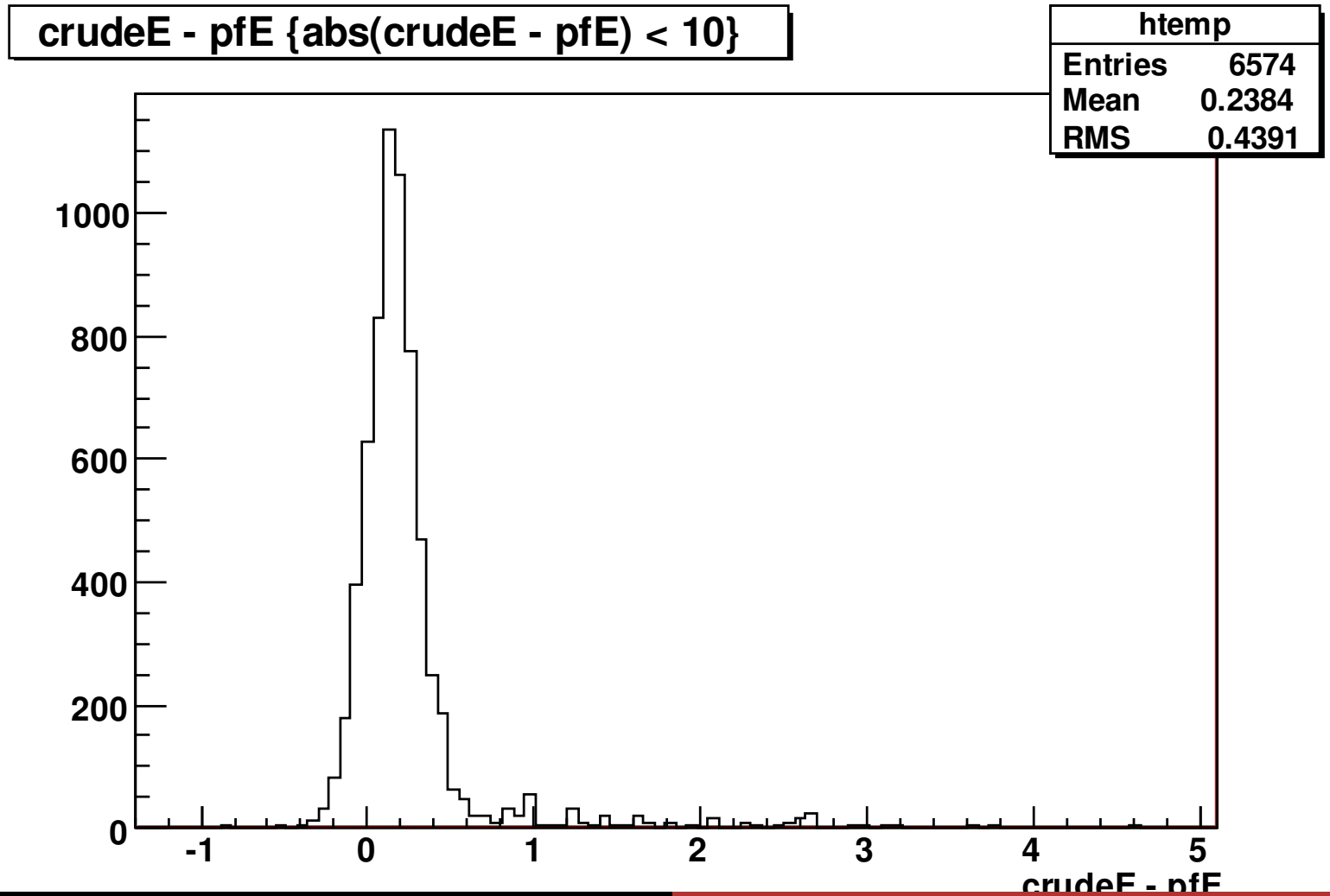
- Peak Finder algorithm
- Chi square and crude estimate for verification
- Implemented

Performance:

- In principle as accurate as fitting
- More than fast enough

In principle:

2 floats for each channel!


crudeE - pfE {abs(crudeE - pfE) < 10}
htemp
Entries 6574
Mean 0.2384
RMS 0.4391
1000
800
600
400
200
0
-1
0
1
2
3
4
5
crudeE - pfE

Active channel selection

- Software “zero suppression”

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- Channels only, not samples

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Active channel selection

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- Ready to be tested

Event reconstruction in PHOS HLT

- Energy and TOF extraction
- Clusterization
- Cluster analysis
- Filling ESDs

Event reconstruction in PHOS HLT

- Energy and TOF extraction OK!
- Clusterization
- Cluster analysis
- Filling ESDs

Event reconstruction in PHOS HLT

- Energy and TOF extraction OK!
- Clusterization OK?
- Cluster analysis
- Filling ESDs

Event reconstruction in PHOS HLT

- Energy and TOF extraction OK!
- Clusterization OK?
- Cluster analysis Incomplete
- Filling ESDs

Event reconstruction in PHOS HLT

- Energy and TOF extraction OK!
- Clusterization OK?
- Cluster analysis Incomplete
- Filling ESDs OK?

Conclusion:

Have full chain running, with limited writing of ESDs

Event Selection & Region of Interest

Status

- Event selection not very high on the list

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- Event selection not very high on the list
- Selecting DDLs is implemented for the HLT framework, not fully for PHOS

Calibration Data

- Energy and TOF histograms

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- Bad channel map

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- More advanced algorithms

Calibration Data

- Energy and TOF histograms
- Bad channel map
- More advanced algorithms
- Ship calibration data

Energy and TOF histograms

- Each crystal - 3 histograms

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- High gain / low gain ratio (TH1F)

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- Time vs Energy, one for both gains (TH2F)

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HLT & DAQ DA's

- Using same algorithm as the DAQ DA's
- Input - energy and time
- Output - ROOT histograms
- Need a function: TH1F* GetHistograms

Bad channel map

- Several types of badness

Bad channel map

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  - Dead

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HLT & DAQ

- Using same algorithm as the DAQ DA's

Also:

In HLT one has access to an event by event bad channel map

Advanced algorithms

π^0 mass peak

- Absolute calibration (implemented)
- Minimization of the peak (planned)

Shipping the Data

- Data is shipped to the File eXchange Server at EOR

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Shipping the Data

- Data is shipped to the File eXchange Server at EOR
- Implemented
- Not tested with the shuttle
  - Will be done at P2

Data for monitoring

What PHOS HLT can produce:

- Raw data from events

Data for monitoring

What PHOS HLT can produce:

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- Cluster information

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Data for monitoring

What PHOS HLT can produce:

- Raw data from events
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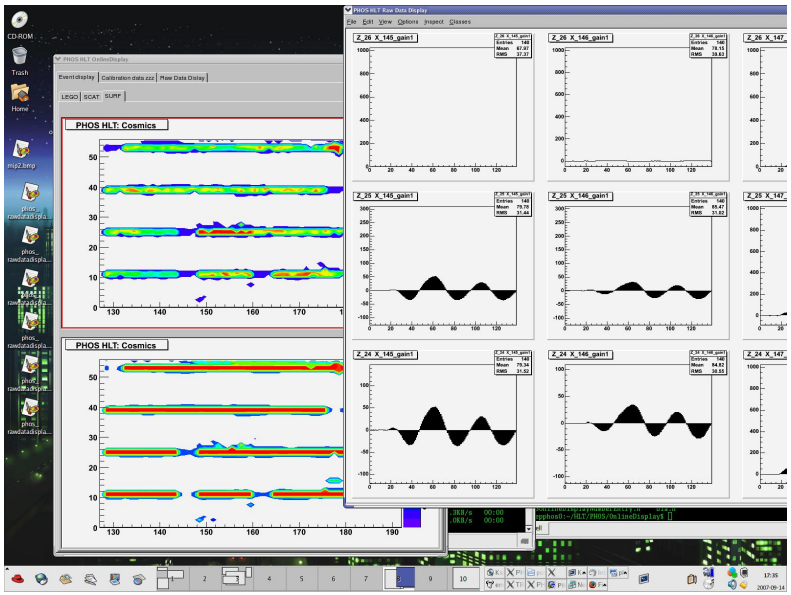
Shipping:

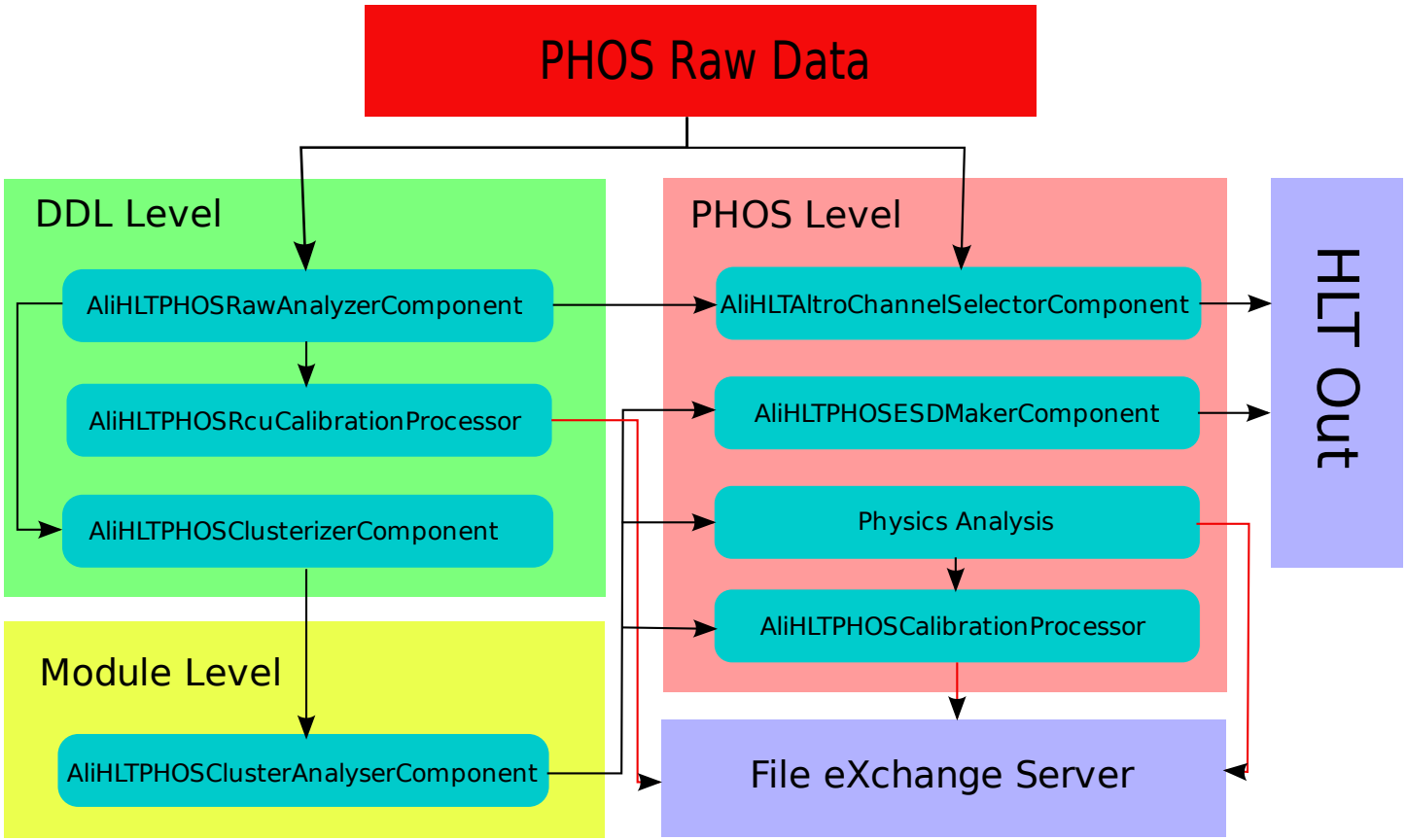
Anything created inside HLT can be shipped.

PHOS HLT Online Monitoring

- Displays DA histograms
- Raw data display (as shown)
- Event Display (as shown)



Data flow in PHOS HLT



Current Hardware

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- 5 PC's in total
  - 2 PC's in the PHOS lab
    - 2 dual core CPU's @ 2.0 GHz
    - 8 GB RAM
  - 3 PC's at point 2
    - 2 quad core CPU's @ 2.4 GHz
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- Cabling finished at P2, but not tested

Of course:

There is always room for more computers!

Setup in the PHOS Lab

- 2 machines - 4 H-RORC's + 1 special H-RORC for HLT-Out

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- FEP is connected with the DAQ machines

PHOS HLT in the cosmic runs

- Stable running during the runs

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But:

Things has improved since the cosmics

Pattern Validation Component

New HLT component:

`AliHLTPHOSRcuAltroPatternTestComponent`

Pattern Validation Component

Why:

- Need to verify the read out

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- Write a pattern to the FEC's
- Read it back
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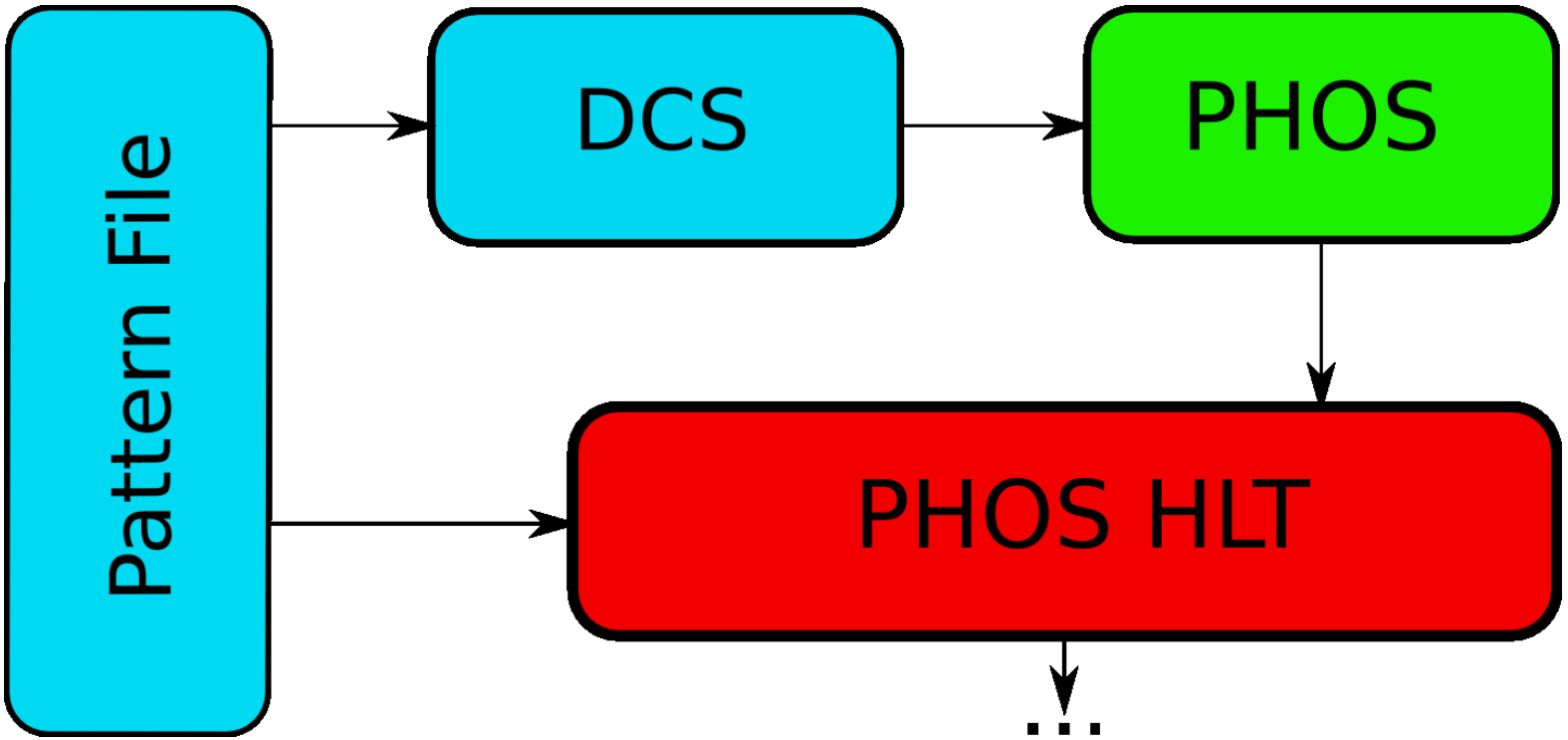
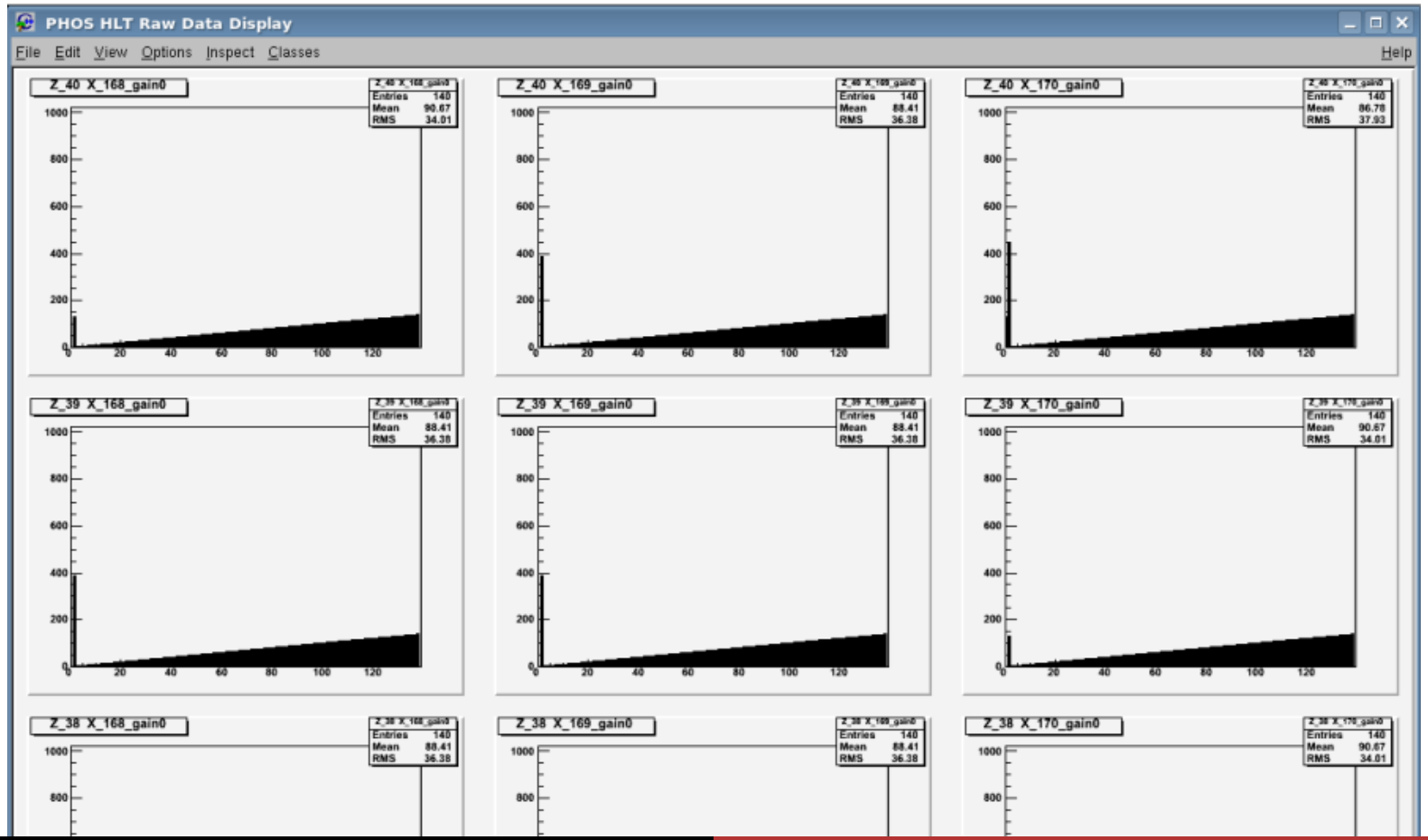

Pattern File
DCS
PHOS
PHOS HLT
...

Pattern Validation Component



Pattern Validation Component

```
there are 8.46494 percent corrupted data blocks
there are 8.46488 percent corrupted data blocks
there are 8.46483 percent corrupted data blocks
there are 8.46478 percent corrupted data blocks
there are 8.46472 percent corrupted data blocks
AliHLTPHOSRcuAltroPatternTest::countAllPatterns the total number of patterns found is12

************************************************************
***************PRINTING PATTERNS ***************************
************************************************************
1       2       3       4       5       6       7       8       9       10      11      12      13      14
0       1       2       3       4       5       6       7       8       9       10      11      12      13
0       1       386     3       4       5       6       7       8       9       10      11      12      13
0       1       450     3       4       5       6       7       8       9       10      11      12      13
0       1       130     3       4       5       6       7       8       9       10      11      12      13
0       1       450     7       4       5       6       7       8       9       10      11      12      13
0       1       454     7       4       5       6       7       8       9       10      11      12      13
0       129     454     7       4       5       6       7       8       9       10      11      12      13
0       1       386     7       4       5       6       7       8       9       10      11      12      13
0       129     450     3       4       5       6       7       8       9       10      11      12      13
0       129     386     3       4       5       6       7       8       9       10      11      12      13
0       129     450     7       4       5       6       7       8       9       10      11      12      13

z = 8 x 4 gain 1  Has   4 patterns
z = 8 x 5 gain 1  Has   4 patterns
z = 8 x 6 gain 0  Has   4 patterns
z = 8 x 7 gain 0  Has   3 patterns
z = 8 x 14 gain 0  Has   3 patterns
z = 9 x 4 gain 1  Has   4 patterns
```

Concluding Remarks

- The cosmic runs showed that PHOS HLT is operational

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- The cosmic runs showed that PHOS HLT is operational
- Improvements and additions since then
- HLT is used for debugging PHOS
- PHOS HLT is fully ready for the first run
- Requests and suggestions are welcome!

The End