

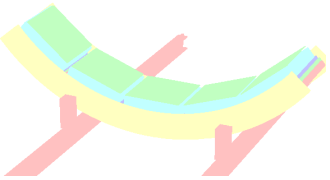


PHOS offline status report

Yuri Kharlov

ALICE offline week

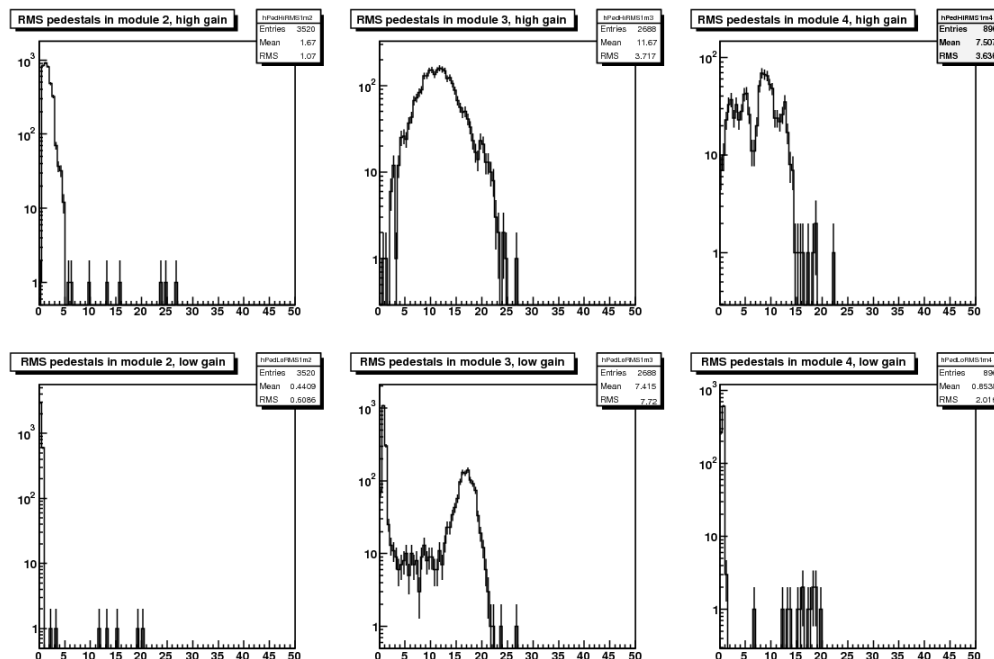
27 October 2009

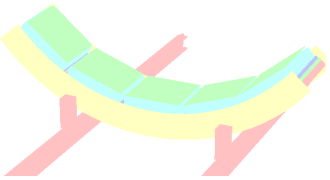


PHOS status in P2

- 3 modules (out of 5) are installed in positions 2, 3 and 4: $260^\circ < \varphi < 320^\circ$, $|y| < 0.12$.
- About 80% of FEE is alive and take data
- Noise conditions are different in different modules
- PHOS is in global PHYSICS_1 partition regularly since end of September, a lot of raw data has been acquired.

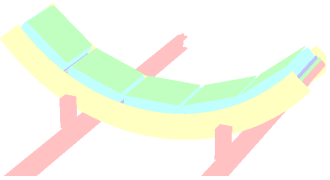
Pedestal RMS distribution in all 3 PHOS modules:
Status of 21.10.2009





PHOS QA in AMORE

- Amore agent PHSQA is installed in P2 environment.
- A new request to port changes in AliPHOSQADataMakerRec was submitted to savannah: bug # 57467:
 - Histogram ranges, titles changed, reshuffle between Shifter and Expert folders
- With new mods in AMORE, we shall have:
 - 8 histograms TH1 for shifters
 - 34 histograms TH1 and TH2 for experts



PHOS AMORE in PHYSICS run

Amore Agents Help

Files Amore

Draw Option:

Auto Layout

Macros

Agents

- amoreAgentTOF99
- amoreAgentV00Cosmic
- amoreAgentDAQ01
- amoreAgentTRDQAshifter
- amoreAgentTRD03
- amoreAgentSDD01
- amoreAgentDAQ_PHYSICS_1
- amoreAgentPHSQA
 - Default_hHGpedRMS
 - Default_hHighEtot
 - Default_hHighNtot
 - Default_hHighPHOSxyMod1
 - Default_hHighPHOSxyMod2
 - Default_hHighPHOSxyMod3
 - Default_hHighPHOSxyMod4
 - Default_hHighPHOSxyMod5
 - Default_hHighPhosModules
 - Default_hHighPhosRawEnergy
 - Default_hHighPhosRawtime
 - Default_hLGpedRMS
 - Default_hLowEtot
 - Default_hLowNtot
 - Default_hLowPHOSxyMod1
 - Default_hLowPHOSxyMod2
 - Default_hLowPHOSxyMod3
 - Default_hLowPHOSxyMod4
 - Default_hLowPHOSxyMod5
 - Default_hLowPhosModules
 - Default_hLowPhosRawEnergy
 - Default_hLowPhosRawtime
 - Default_hQualHGxyMod1
 - Default_hQualHGxyMod2

PHOS_HG

High Gain Energy of raw hits in PHOS

Default_hHighRawEnergy
Entries 14833
Mean 11.59
RMS 4.375

High Gain Total Energy of raw hits in PHOS

Default_hHighEtot
Entries 2547
Mean 160.9
RMS 350.8

High Gain Total Number of raw hits in PHOS

Default_hHighNtot
Entries 2547
Mean 6.37
RMS 10.02

High Gain Rows x Columns for PHOS module 2

Default_hHighPHOSxyMod2
Entries 14833
Mean x 37.0
Mean y 9.1
RMS x 11.1
RMS y 6.6

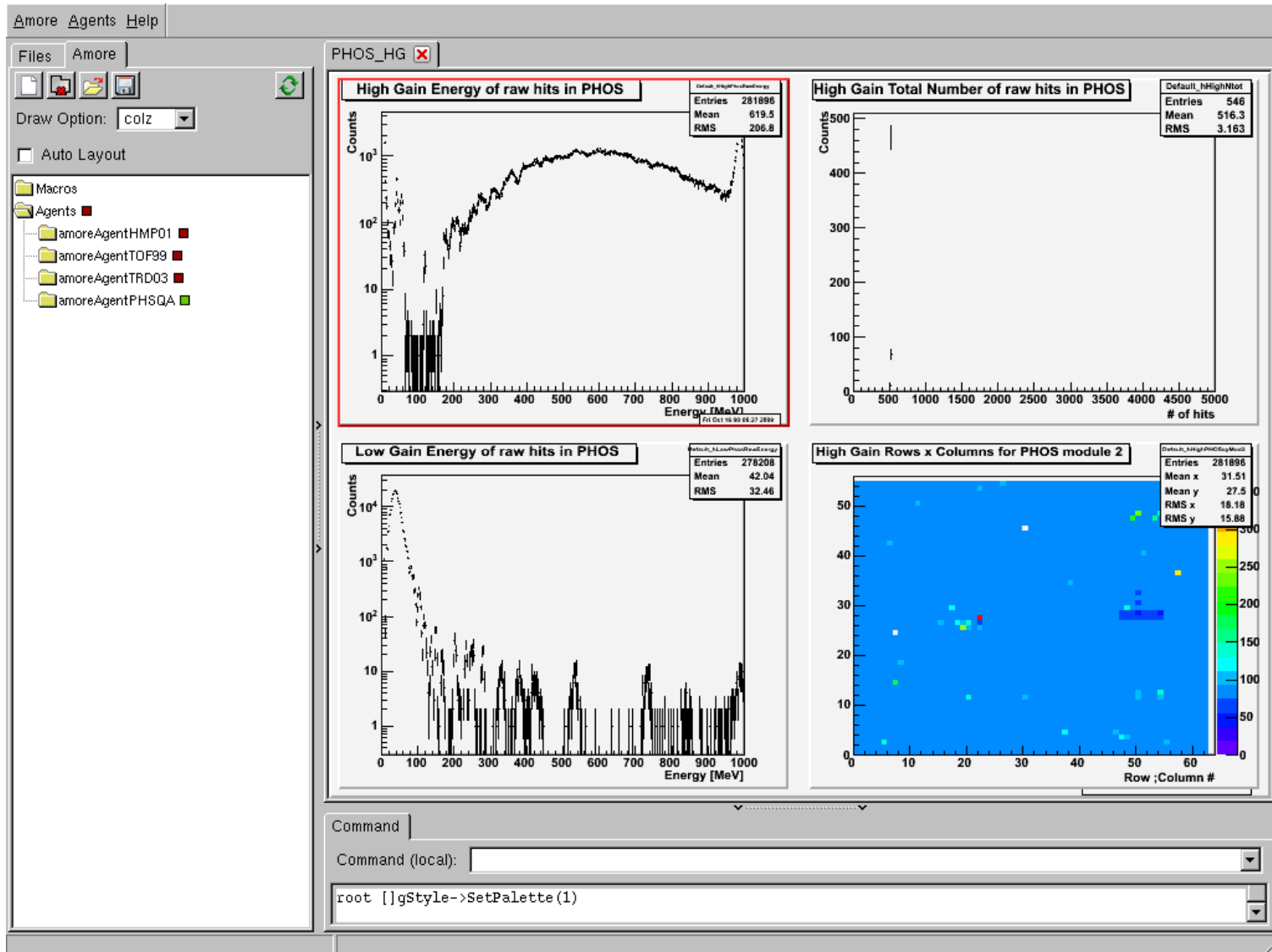
Command

Command (local):

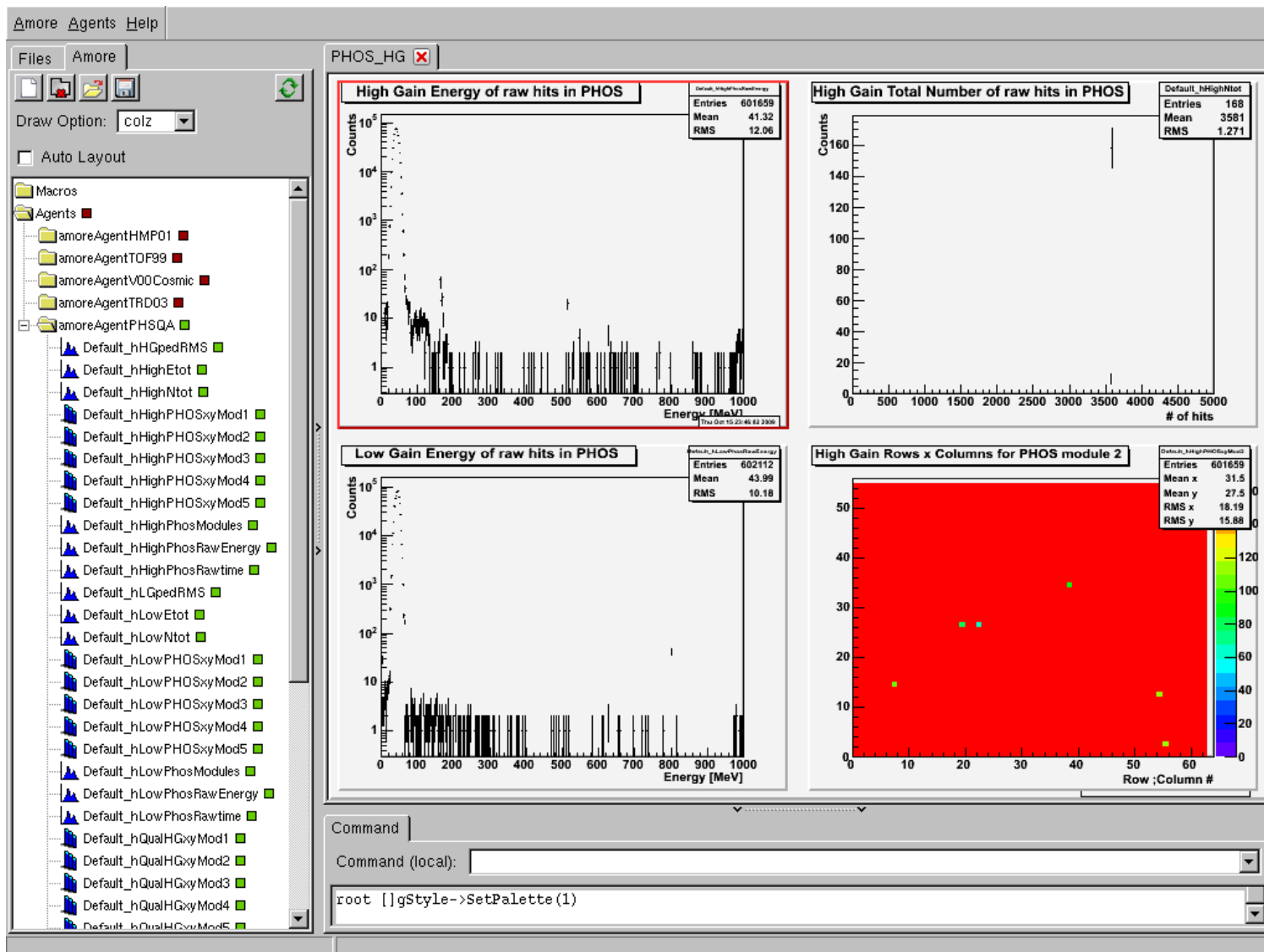
```
root [] gStyle->SetPalette(1)
```

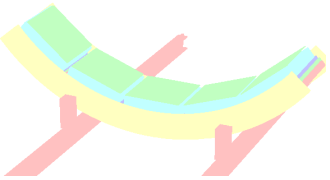
File /local/home/phos/PHOS_HG.xml Saved !

PHOS AMORE in LED run



PHOS AMORE in PEDESTAL run

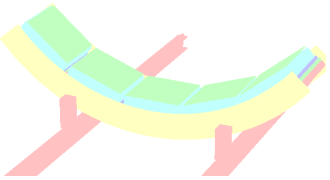




PHOS Das (1)

- **PHOSGAINda.cxx**

- runs at DQM machine in PHYSICS runs
- collects mean deposited energy per cell (>10 ADC) and sends them to FXS
- preprocessor calculates a set of calibration coefficients to equalize gains and store them to the central OCDB
- so far, with cosmic events, this DA has a limited usefulness. Waiting for pp events for real validation.
- currently, **PHOSGAINda** creates new histograms every new run. However, a good statistics is required for calibration parameters calculation: about 20M pp collisions (1 day at data taking rate 200 Hz). If a run is short, it should continue filling the histograms from the previous run.



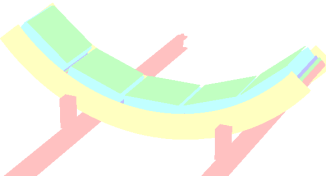
PHOS Das (2)

- **PHOSLEDda.cxx**

- runs at DQM machine in LED runs
- collects histograms with HG/LG amplitude ratio per cell and sends them to FXS
- preprocessor fits of HG/LG histograms and store results to the OCDB
- Infinite loop happened in very rare events. Fixed in aliroot trunk and deployed in P2 on 26.10.2009.

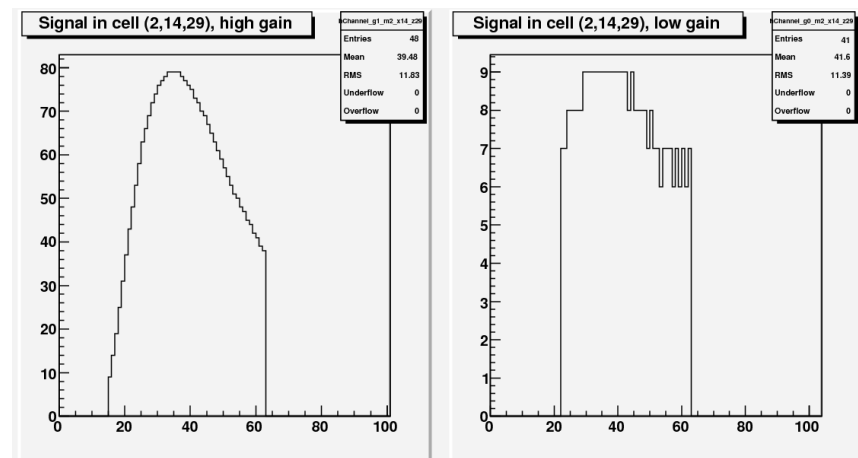
- **Shuttle issues**

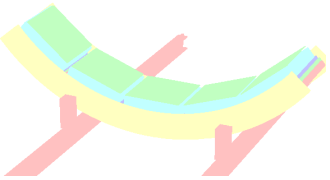
- Before aliroot v4-17-Rev-11 has been deployed in P2, PHOS preprocessor failed too often due to FPE in a fitting procedure. Now, with v4-17-Rev-11, it never happens.
- The only error messages sent by Shuttle are caused of missing files at FXS (due to short runs or to aborted DA).



Raw data (1)

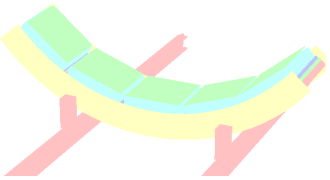
- PHOS has deployed RCU firmware v3. Raw data processing on-line and off-line uses AliCaloRawStreamV3 only.
- The contents of RCU trailer registers CFG1 and CFG2 are overridden in PHOS:
- ALTROCFG1:
 - ZS enabled – 1 bit
 - Auto Baseline Subtraction – 1 bit
 - Offset – 4 bits
 - Threshold – 10 bits
- ALTROCFG2:
 - N presamples – 4 bits
 - N of samples





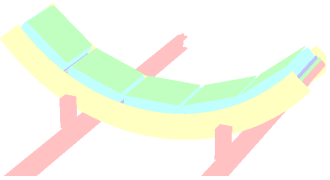
Raw data (2)

- Before the new PHOS RCU trailer registers, we had to read the ZS parameters (offset and threshold) from recoparams in OCDB.
- Now the ZS offset and threshold comes with raw data and no need to call OCDB anymore for this.
- Decoders of RCU trailers are implemented in the PHOS code. Would it be useful to migrate them to AliCaloRawStreamV3?
- TRU data are written to the raw data stream as fake ALTRO. However, this data format is not fully compliant with the real ALTRO: the data is decodable, but issues many warnings to stdout about mismatched bunch length.



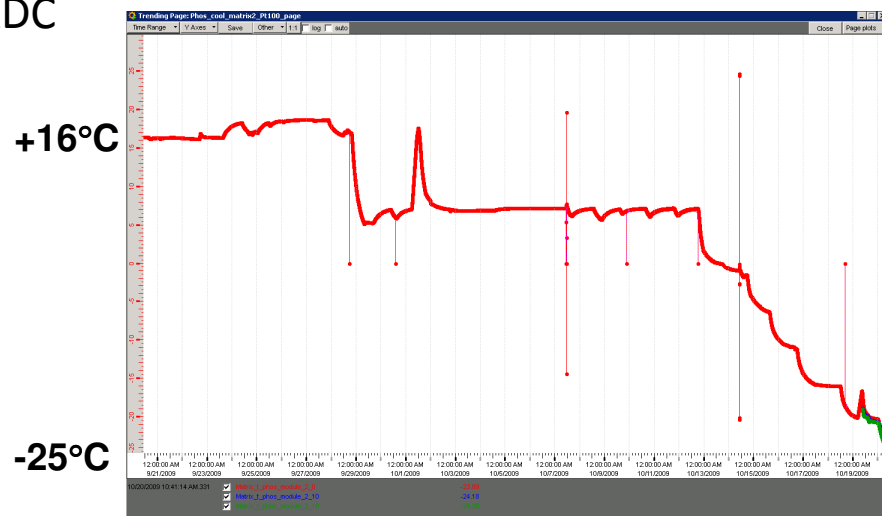
Mapping

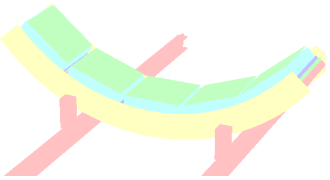
- Up to mid-2009 PHOS assumed that all 5 modules have the same mapping: 4 RCU mapping files were enough to describe the whole PHOS mapping.
- Apparently, 3 PHOS modules have 2 different mappings: module 2 and 3 have the one mapping, the module 4 has another mapping, and all three are different from the old mapping (used before 2009).
- A decision has been taken to provide 20 mapping files, each file per RCU.
- Modifications were made in AliCaloRawStreamV3 to apply mapping per module per RCU.
- Currently, only PHOS differentiate mapping for different modules. EMCAL still have the same mapping for all modules, but potentially it is easy for EMCAL to have different mapping per module (1 line of the code).
- The new PHOS mapping is available as ascii files in aliroot, as well as OCDB entries in the CDB storage used for central reconstruction.
- However, mapping studies are still going on. Very likely, the new OCDB mapping will change soon.



Offline reconstruction

- PHOS was cooling down from $+16^{\circ}\text{C}$ to -25°C during the whole October.
Crystal light yield and **APD gain** change a lot with temperature.
- A special set of recoparams was submitted to AliEn OCDB to reconstruct PHOS at moderate temperatures:
 - smaller threshold to start a cluster: $E > 0.05$ GeV
 - smaller energy to join a cluster: $E_{\text{min}} > 0.025$ GeV
 - unfolding off
 - non-linear energy correction off
 - ADC to GeV conversion: 0.005 GeV/ADC
- Most probably, PHOS recoparams should change soon





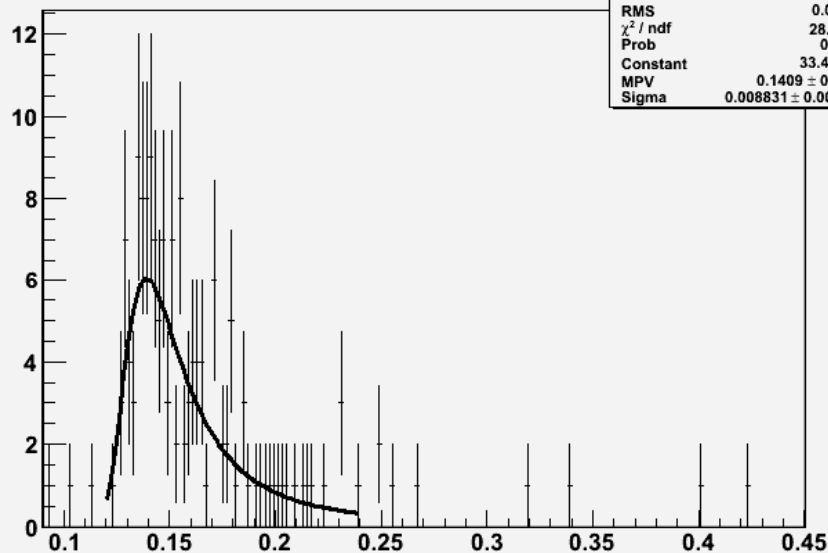
Results of recent cosmic runs

Run 91214, 17 Oct 2009:

T=-15°C

2.5 Mevents, trigger by ACORDE&TOF, HLT mode C

Spectrum of selected clusters (nCells=1)



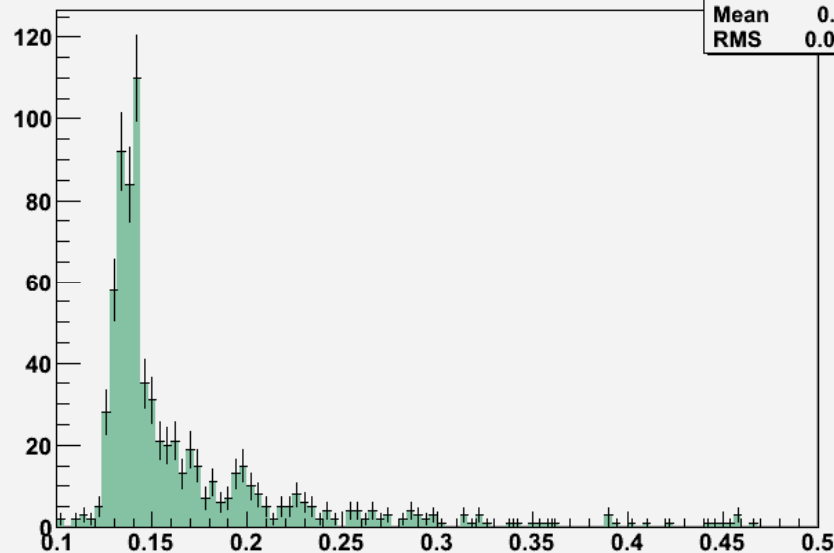
fEn_sel1	
Entries	4056
Mean	0.1636
RMS	0.04537
χ^2 / ndf	28.8 / 41
Prob	0.9243
Constant	33.4 \pm 5.0
MPV	0.1409 \pm 0.0020
Sigma	0.008831 \pm 0.001444

Run 91415, 18 Oct 2009:

T=-16°C

5.5 Mevents, trigger by ACORDE&TOF, HLT mode C

Spectrum of selected clusters (nCells=1)



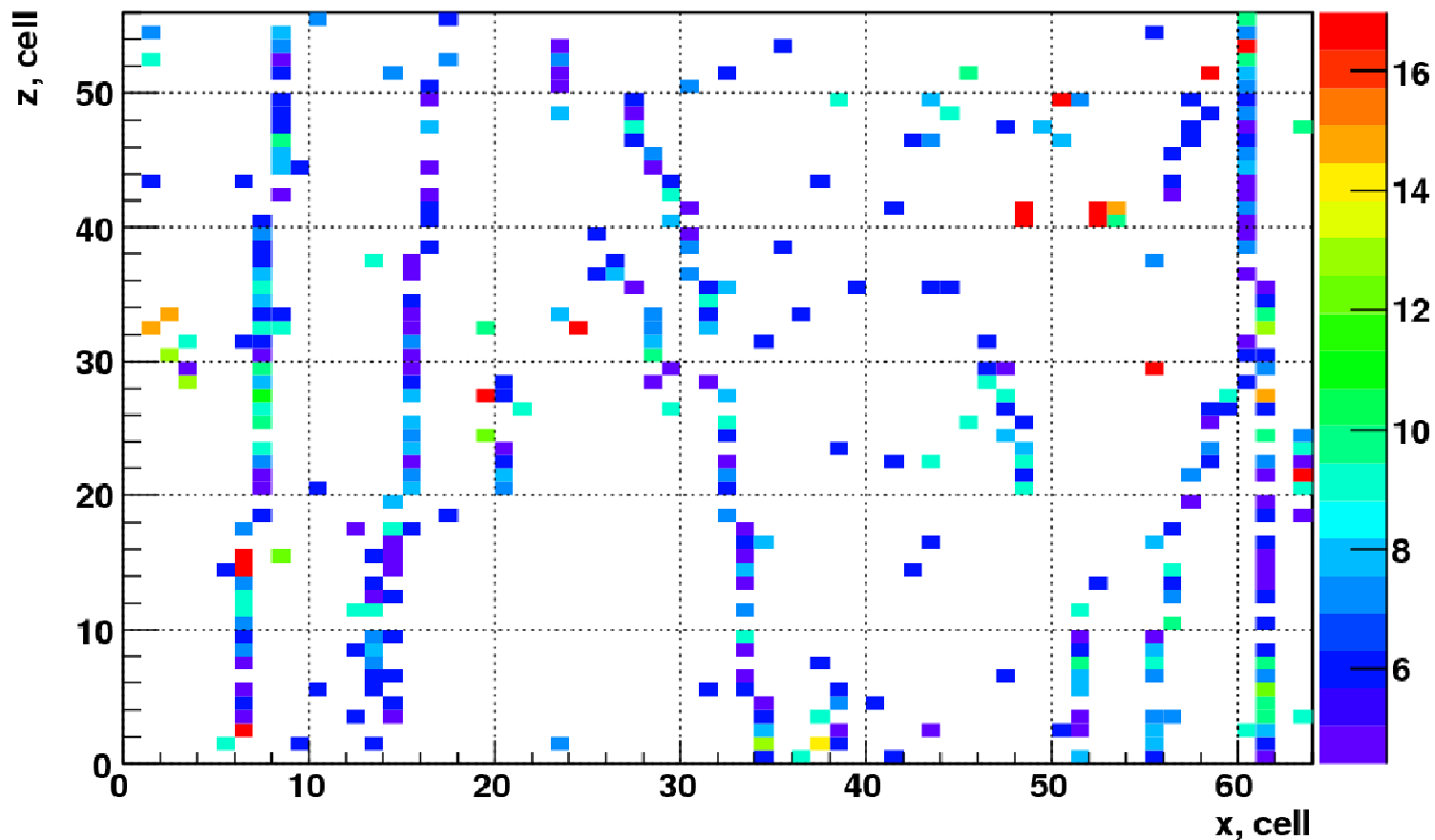
fEn_sel1	
Entries	10325
Mean	0.1678
RMS	0.05778

Reconstruction with AliRoot v4-17-Rev-11 in GRID with new mapping and new recoparams. Reconstruction can also run locally with raw data and OCDB read directly AliEn, using \$ALICE_ROOT/test/cosmic (thanks for Federico for pointing to it).

Raw data display from beam injection run

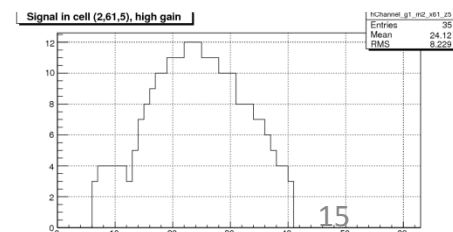
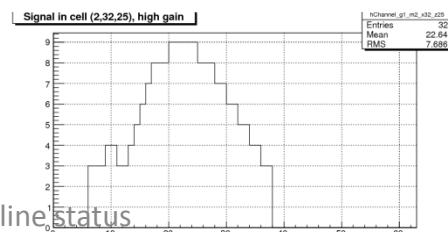
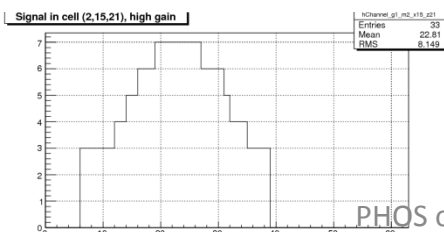
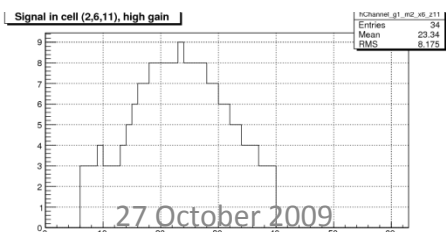
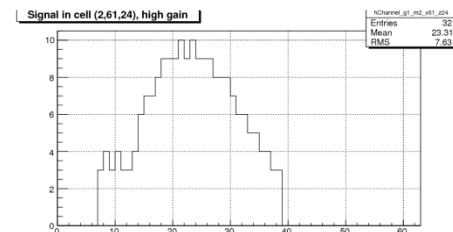
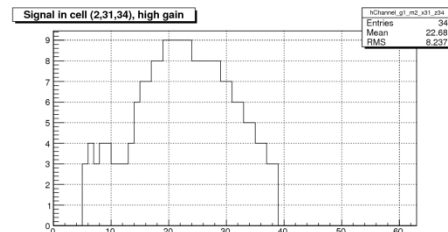
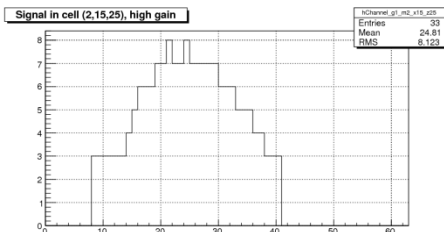
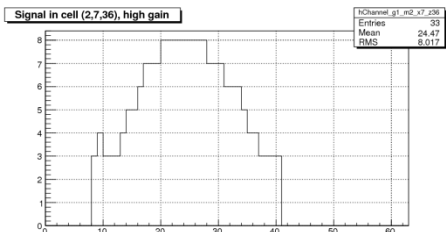
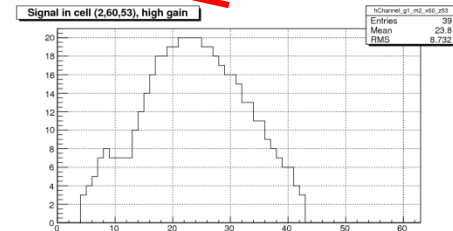
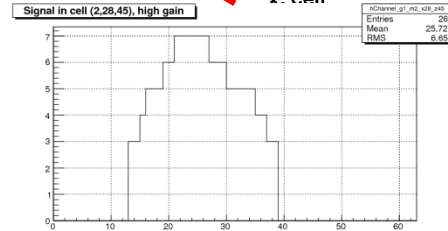
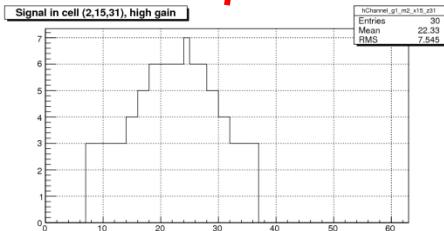
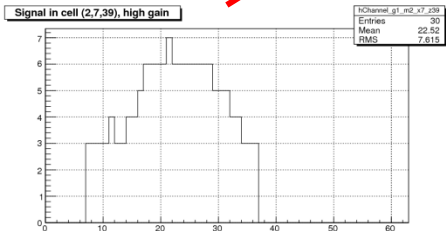
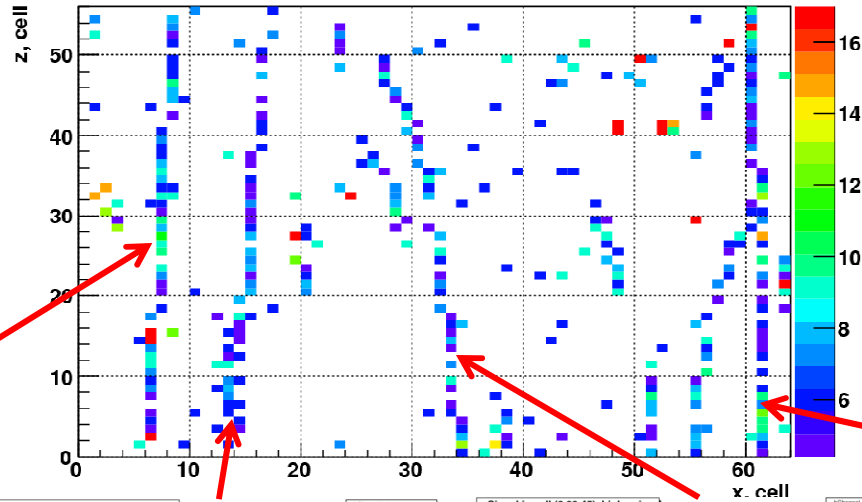
- Friday, 23 October: HI dump in TED
- Run 92888: 161 events, only 1 event of type “physics”:

Event, high gain, module 2



One beam-injection event in PHOS: raw signals

Event, high gain, module 2



27 October 2009

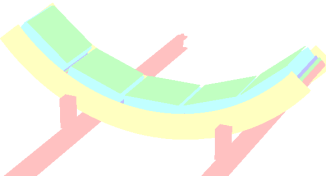
PHOS offline status

15



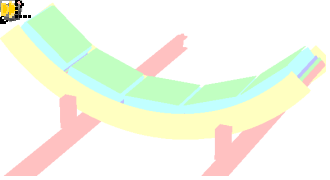
What do we see in beam-injection events

- About 5-6 particles (most likely muons) penetrate PHOS along z-axis, depositing energy in crystals along lines.
- Energy deposited in each crystal is about 20-50 MeV.
- Signal shape is good.
- Similar horizontal tracks through PHOS were observed in the files:
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866017.40.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866018.10.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866018.40.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866024.10.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866025.10.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866026.20.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092866/raw/09000092866026.30.root` – 1 event
 - `alien:///alice/data/2009/LHC09c/000092878/raw/09000092878017.10.root` – 7 events
 - `alien:///alice/data/2009/LHC09c/000092888/raw/09000092888017.10.root` – 1 event
- In total, we see 15 real physics events during the whole HI beam injection period on 23.10.2009.



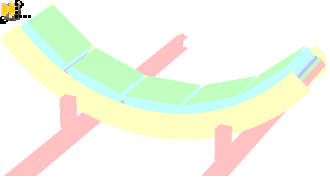
PHOS alignment

- Status has not changed since 2008
- Survey has provided the following data:
 - coordinates of the PHOS module(s) in the physicist reference system
- PHOS modules misalignment affects physics and will be provided to the official OCDB
- Misalignment object is created by MakePHOSFullMisalignment.C. It reads survey table (ascii file) and creates alignment objects.
 - The survey has been performed for all 3 newly installed PHOS modules.
 - The survey targets and the coordinate system have been changed.
 - New survey tables are not available yet in DCDB.
 - We should start implementation of creating the alignment objects from scratch.
- So far, misalignment has been overlaps-free: all modules were displaced coherently to avoid overlaps.
- Misalignment of PHOS modules leads to displacements of PHOS structures (cradle, wheels)



Planning: Calibration

<u>Finalization of Das: correction before deployment of the LED DA finding the bad channel map; (2409)</u>	<u>Boris.Polichtchouk</u>	01/11/2009
<u>Finalization of Das: implementation of the PULSER DA (2410)</u>	<u>Boris.Polichtchouk</u>	01/11/2009

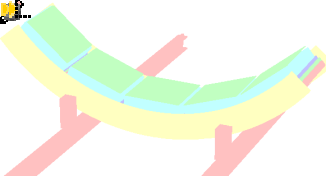


Planning: Reconstruction

<u>Verification of Reco Params for cosmic, high flux, low flux and calibration (2407)</u>	<u>Boris.Polichtchouk</u>	01/11/2009
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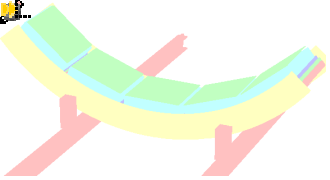
What is meant under “verification”?

For example, we verified to verify cosmic recoparams only we took these data.



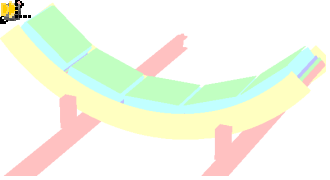
Planning: QA

<u>Reference distribution</u> (2318)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Implementation of run type</u> (2414)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Implementation of simulation in QA checker</u> (2415)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Implementation of reconstruction in QA checker</u> (2416)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Implementation of reference data</u> (2417)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Extract QA data from large Monte Carlo production</u> (2646)	<u>Yuri.Kharlov</u>	10/11/2009



Planning: Simulation

<u>Accounting for detector response in the time information stored in digits</u> (2399)	<u>Yuri.Kharlov</u>	31/10/2009
<u>Implementation of track references</u> (2401)	<u>Yuri.Kharlov</u>	10/11/2009
<u>Correct treatment of the detector signal in the sdigits for event merging</u> (2403)	<u>Yuri.Kharlov</u>	31/10/2009



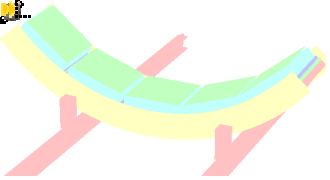
Planning: Geometry

Finalization of the detector geometry for 3/5 modules with detailed simulation of their inner structure (2397)

Yuri.Kharlov

31/05/2010

Only a small material budget is added in front of PHOS as the air-tight case. It does not deteriorate the PHOS performance. This task is considered as a low-priority one and the deadline is shift to far future.



Planning: Trigger

<u>Implementation of the code for trigger parameters for the simulation of the trigger input to the CTP (2412)</u>	<u>Yuri.Kharlov</u>	10/11/2009
<u>Simulation of the trigger input to CTP (2413)</u>	<u>Yuri.Kharlov</u>	10/11/2009