

# *CEM Timing System*



- ★ **Status of the Transition boards, ASD modules, harnesses, and long cables**
- ★ **What is installed by now**
- ★ **Checks: EMTiming System**
  - ◆ **Cosmic Rays**
  - ◆ **LEDs**
- ★ **Checks: Central Detector**
  - ◆ **LEDs**
  - ◆ **Pedestals**
  - ◆ **ShowerMax**
- ★ **Status**

# *CEM Timing Installation Status*

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Frascati and FNAL did an amazing job on the ASD's and TB's. Cordelli and DeMaat and their teams deserve our thanks for getting these done so quickly and efficiently! All pass mechanical and electrical specs (big thanks to Peter Wilson for his checkout work on the TB's!). VERY few problems on any boards, all easily fixed.

The central requires: 4 Boards/Rack x 8 Racks = 32 boards

**Status of TB's:** 32 boards finished and tested. 1 at Bob's office ready to be tested, one old-style board still in the collision hall to be pulled and re-habbed, 2 more to be stuffed by Bob's technicians => 4 spares.

**Status of ASD's:** 36 boards finished and tested => 4 spares.

**Harnesses:** all harnesses re-tested with higher standards. Potential problems fixed.

**Long cables:** 4 cables ordered and on schedule for a Nov 1st arrival date.

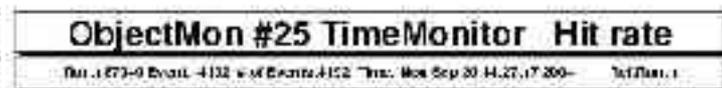
**TDCs:** all hooked up.

# LED: alive channels

Installed: all West side and all North-East arch,  
South-East side – wedges 17,16,15

Remaining: South-East arch wedges

CEM LED

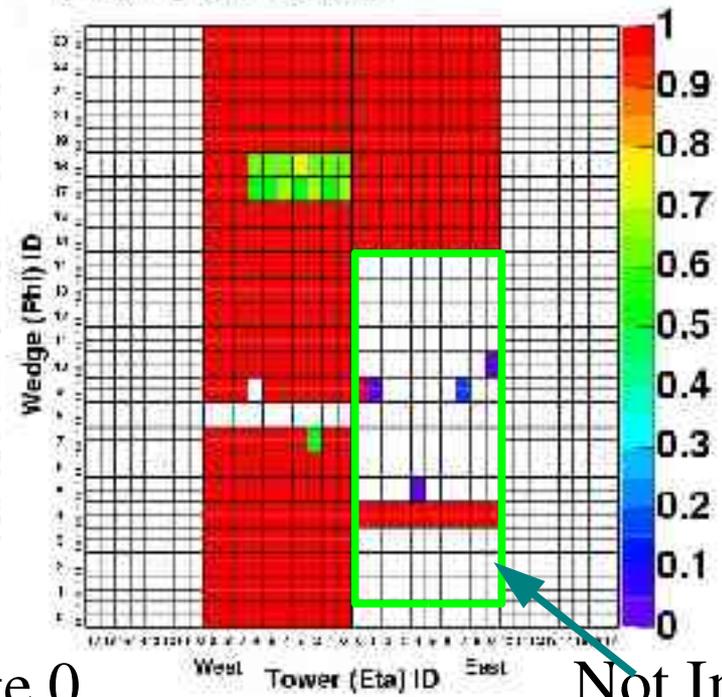
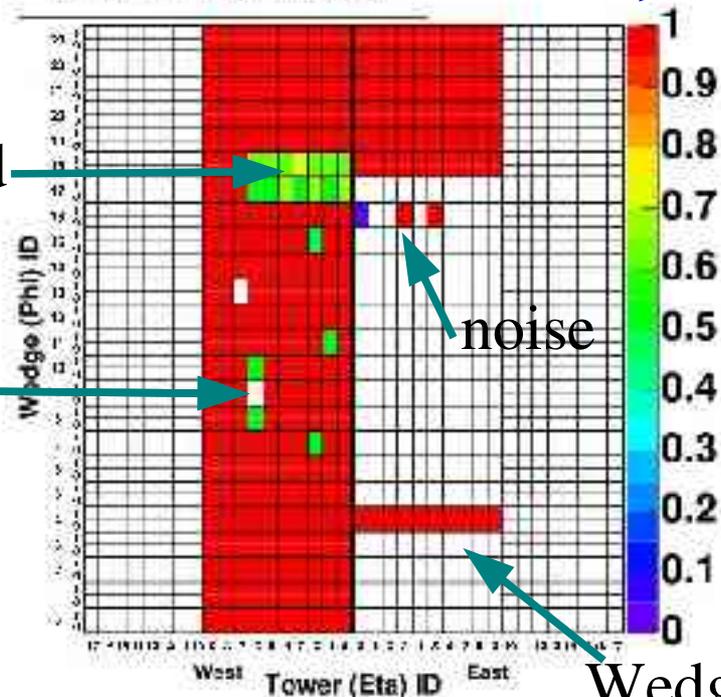


2D: Hit Rate

2D: Hit Rate

Half Plugged

Dead LED



Wedge 0

Not Installed

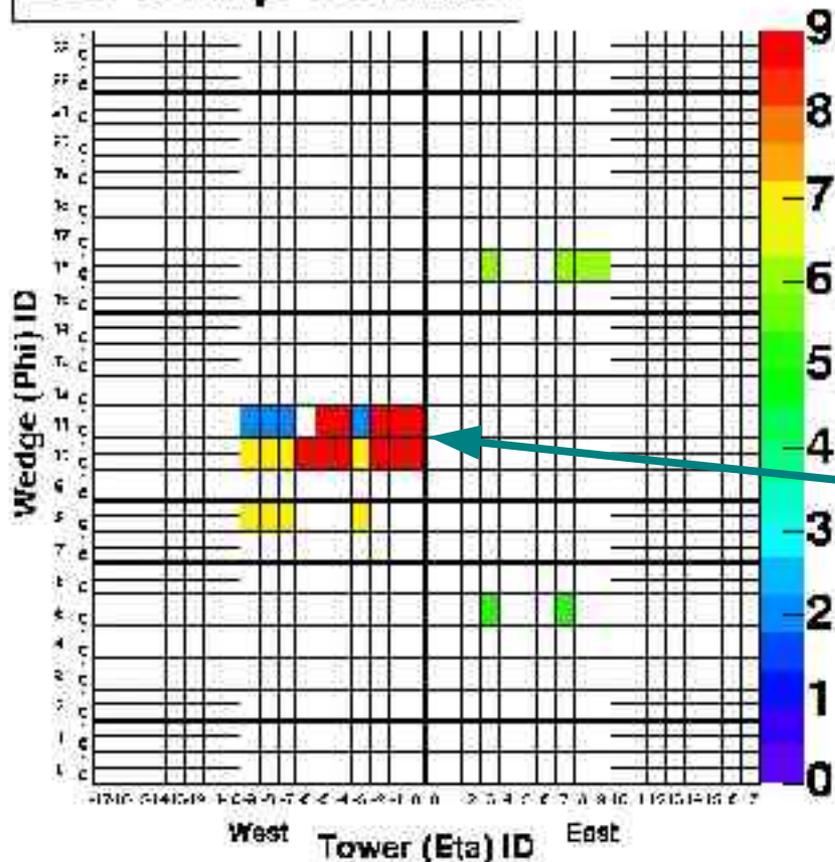
$$\text{HitRate} = \frac{N(\text{denom} + \text{TDC hit})}{N(E > 4.5 \text{ GeV})}$$

# LED: problem IDs

## ObjectMon #26 TimeMonitor Swaps

Run: 10/21/9 Lvert: 1120 of Events: 1120 - Trax: 11ra Sep 16 10:02:12 2001 Hel Run: 1

### 2D: Swap Towers



CEM LED

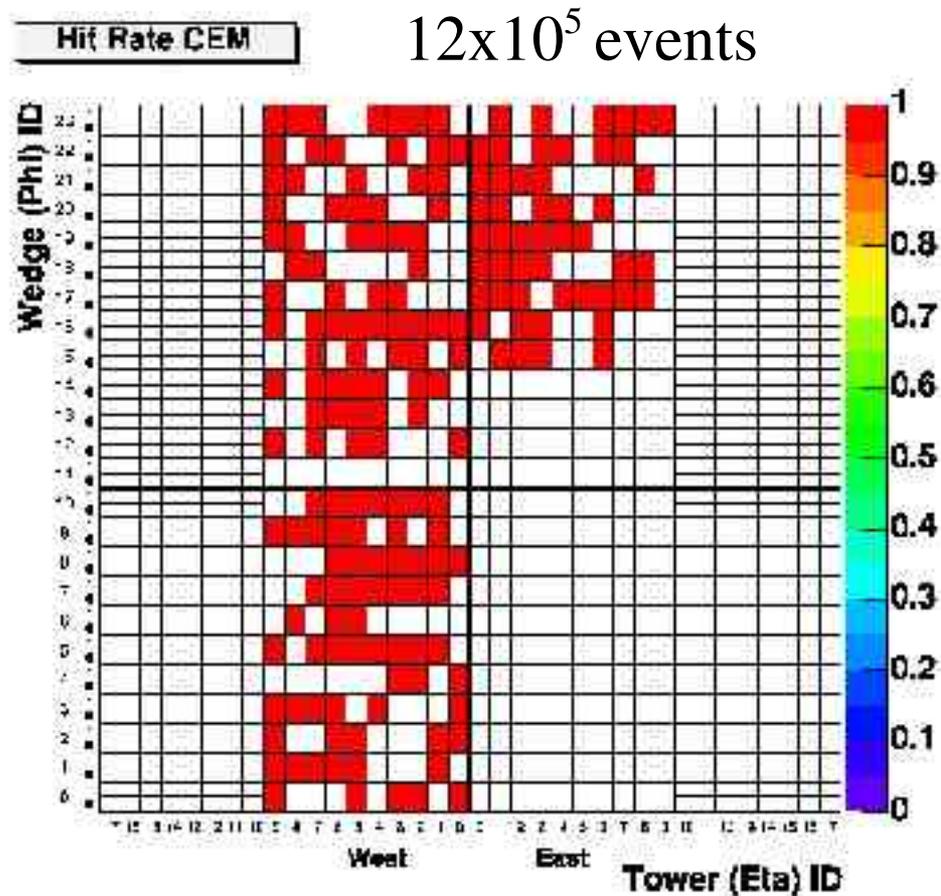
We use LED to ID problems  
Can see dead channels and swaps

Two towers in a wedge are swapped

# Cosmic Rays: Hit Rate

## Cosmic Rays

- Threshold – 4.5 GeV
- Need more statistics
- ADMEMS are up
- Timing System is up



$$\text{HitRate} = \frac{N(\text{denom} + \text{TDC hit})}{N(E > 4.5 \text{ GeV})}$$

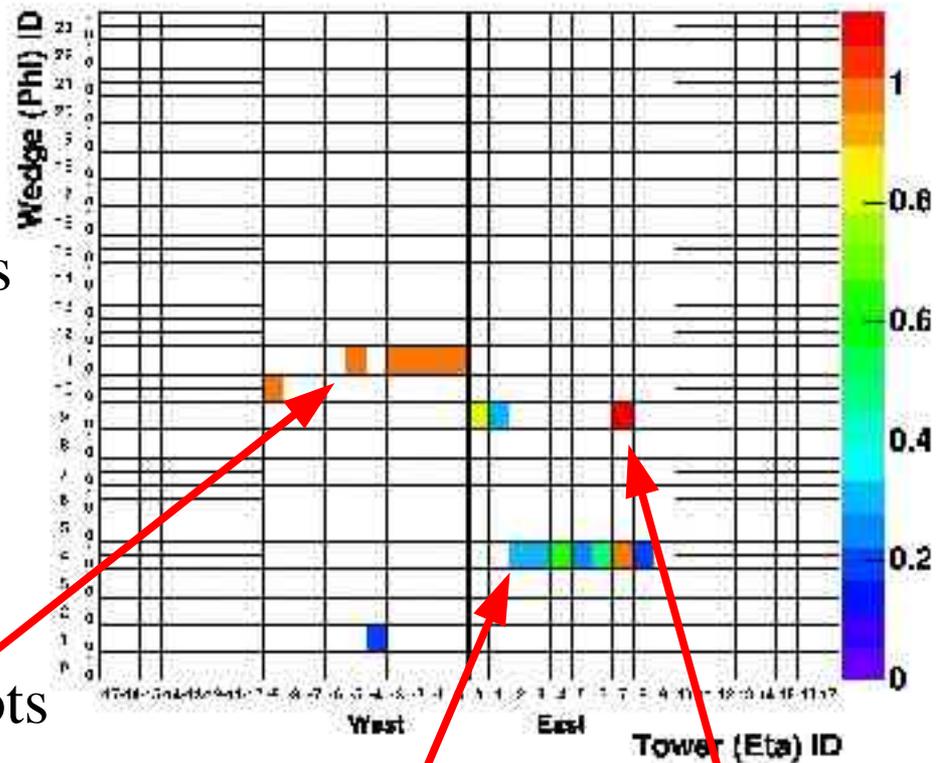
# Cosmic Rays: Noise

## Cosmic Rays

- Useful for noise check
- Noise  $< 10^{-6}$  level
- High Noise indicates swaps or mapping mistakes

12x10<sup>5</sup> events

$$\text{Noise} = N(\text{TDC Hit})/N(E < 200 \text{ Adcs})$$



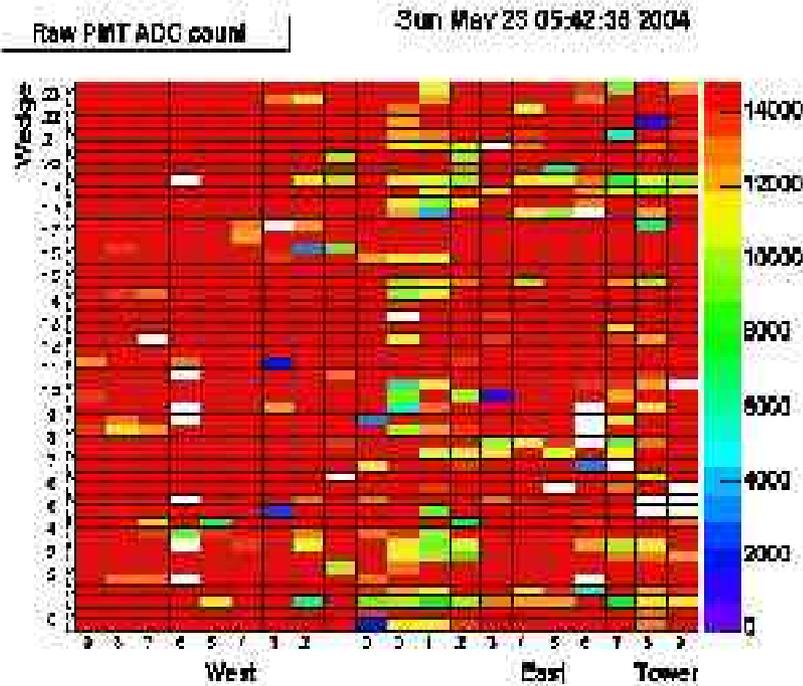
Swaps, see LED plots

New mapping, Floating TDC  
old setup

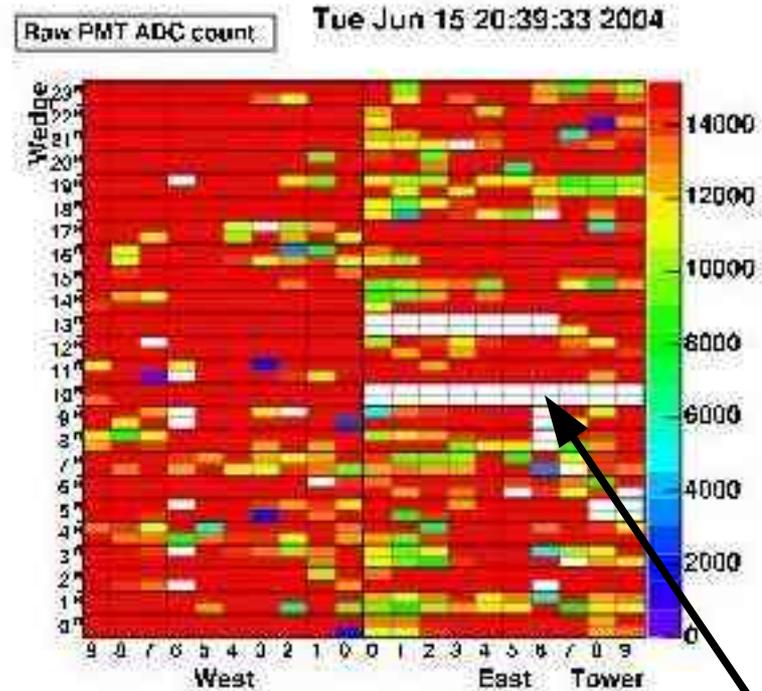
# LED Map

CEMLED (Single) Run 186609

CEMLED (Single) Run 187206



Before Shutdown



Recently

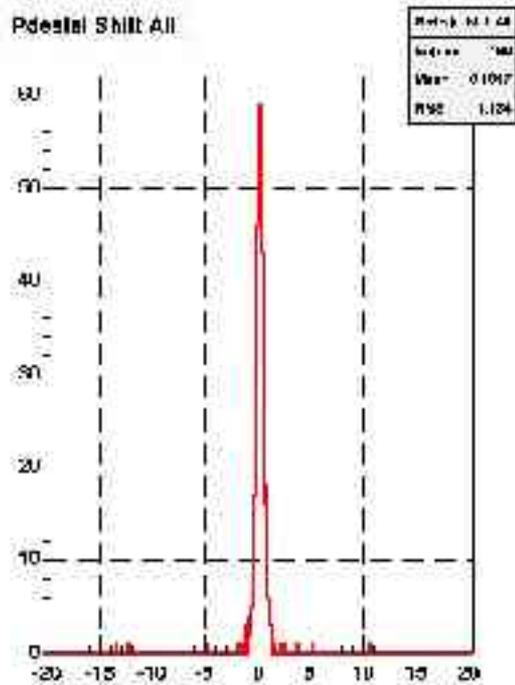
No installation yet

Did not break any single channel

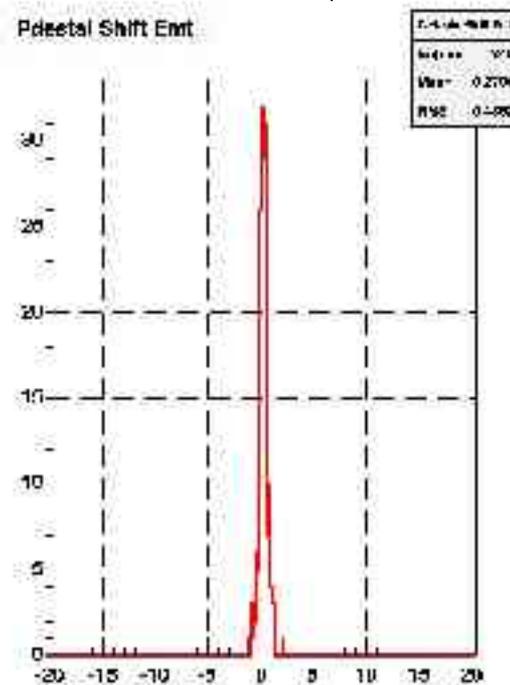
Energy mean and RMS for LED signal are the same

# Pedestals

All Towers



West Towers (EMTiming)

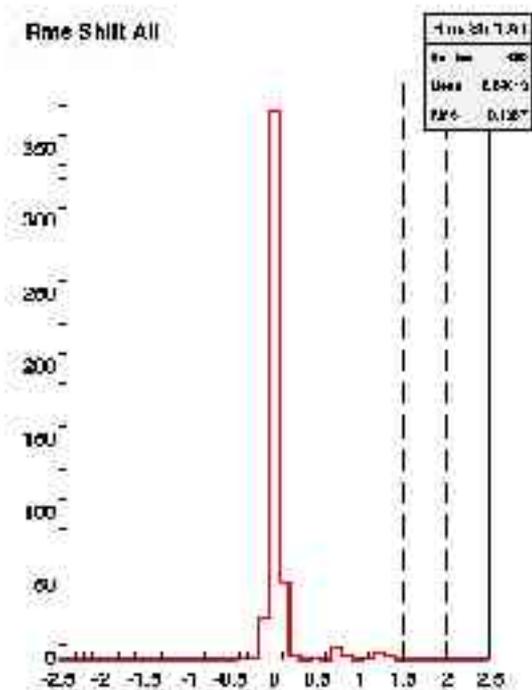


$\langle \text{ped} \rangle$  = averaged pedestals over many runs  
Each entry -  $\langle \text{ped} \rangle$  before -  $\langle \text{ped} \rangle$  after

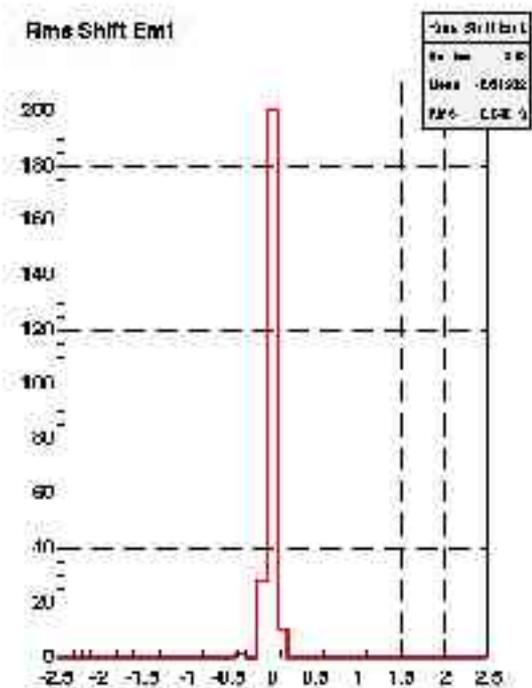
- No shift in EMTiming part
- Stable shifts in pedestals we can adjust for

# Pedestals

All Towers



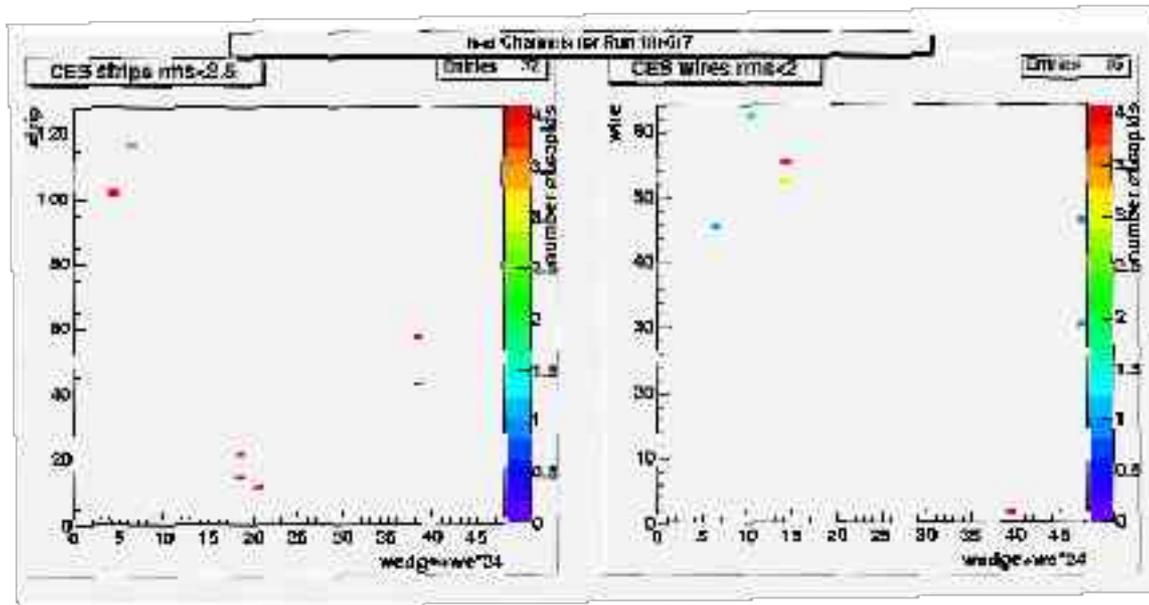
West Towers (EMTiming)



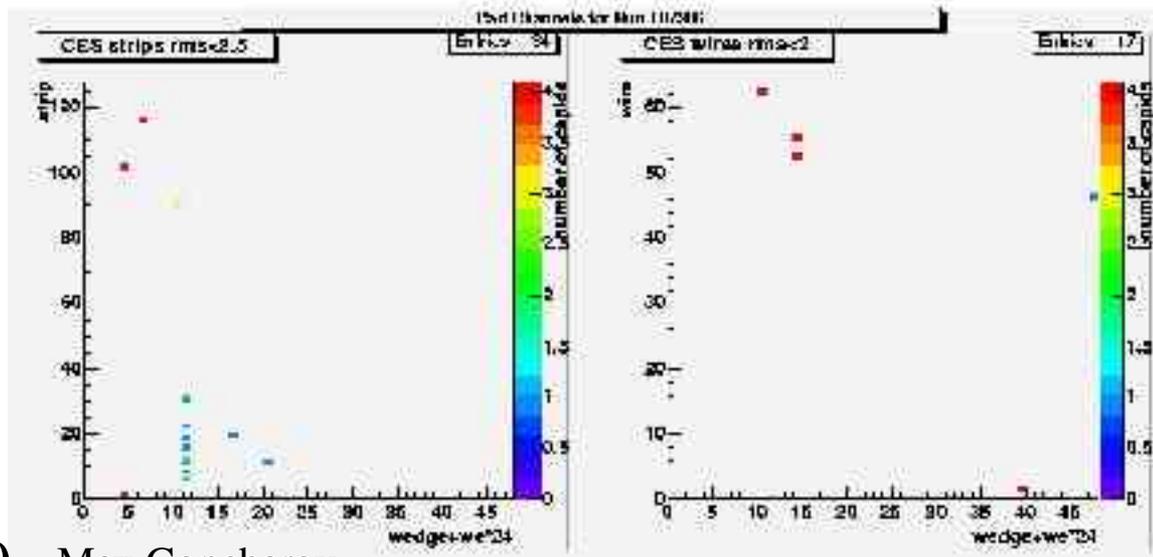
$\langle \text{rms} \rangle$  = averaged pedestal RMS over many runs  
Each entry -  $\langle \text{rms} \rangle$  before -  $\langle \text{rms} \rangle$  after

- No shift in EMTiming part
- Changes are inside 0.2 ADC counts

# ShowerMax: Pedestals



Bad channels before shutdown



Bad channels last week

# *Other Calibrations*



CEM Xenon – not available

CHA Laser – all experts are in Italy, Fabio promised to look at it when he is here

# Status



## Base Line:

- CEM PMTs are operational.
- CEM Pedestals did not change
- We did not detect any problems with other detector systems (ShowerMax?)
  
- Installed 340 (~70%) channels out of 480.
- Timing system looks good – all channels are 100% efficient, no detectable noise.
- The remaining hardware tested and available.

**Hope to finish installation by the end of the next week!**