“Cosmics” Data December 2005

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Calice ECAL Meeting, 6 March 2006

Outline

1. Summary of cosmics run January 2006
2. First results of cosmics run February 2006

Cosmics Test Setup

- **Cosmics Test December 2005/January 2006:**
  - 16 ECAL Layers on top of 4 HCAL layers.
  - Regulator boards for low voltage lines.
  - New low voltage power supplies.
  - Slow control for power supplies.

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- ECAL connected to prototype CRCs.
- DAQ was not ready for combined test.
  - Trigger distribution problem
    → signal in one or the other half of the detector.
  - bugs/features in DAQ control program
- Leakage current raised above threshold for $\sim$1 PCB (which?)
  → slow control switched ECAL off after a few days.
- One new PCB was not connected
  (was considered to be responsible for high leakage currents.)
- Two PCBs connected to broken FEs.

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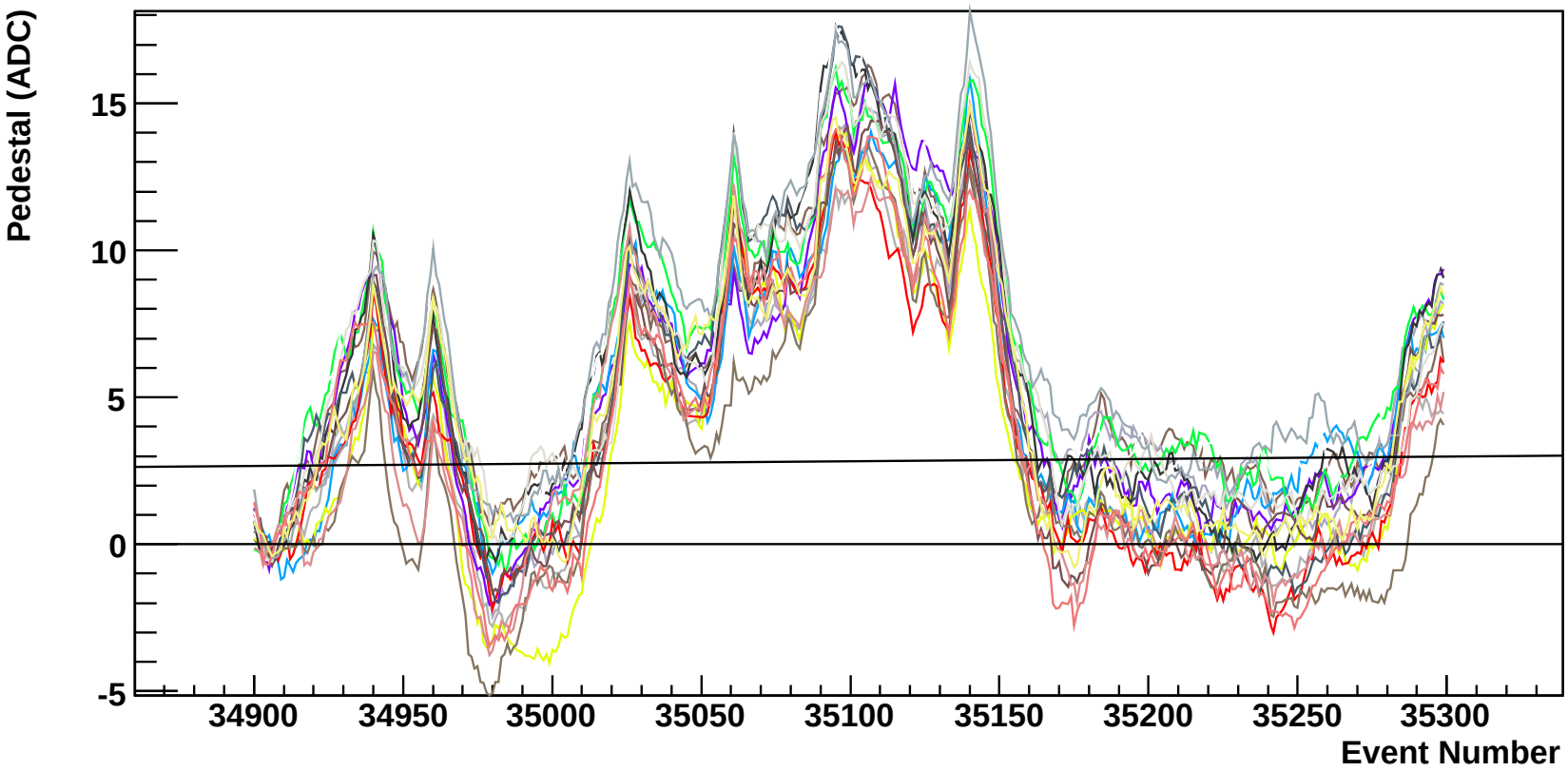
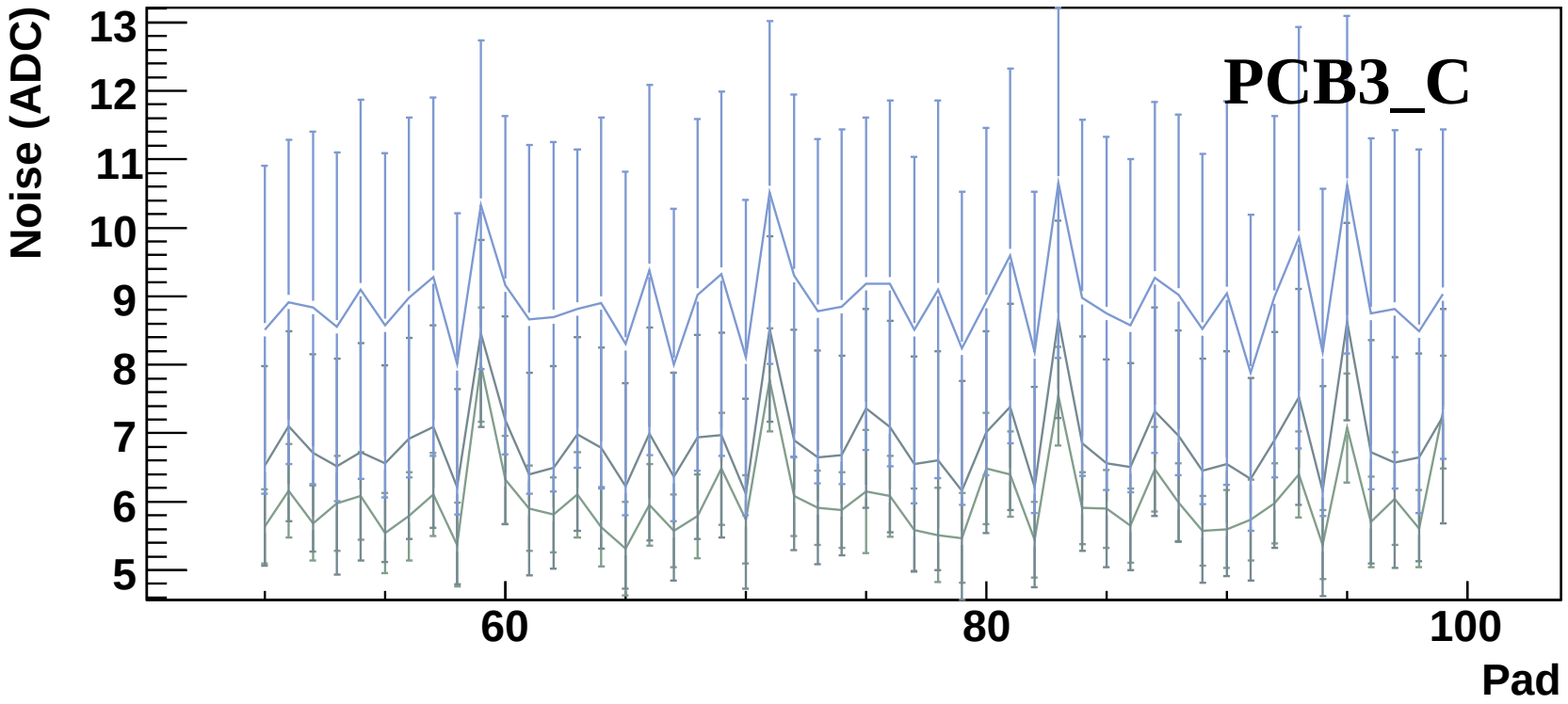
Pedestals – Cosmics 12/2005 - 01/2006



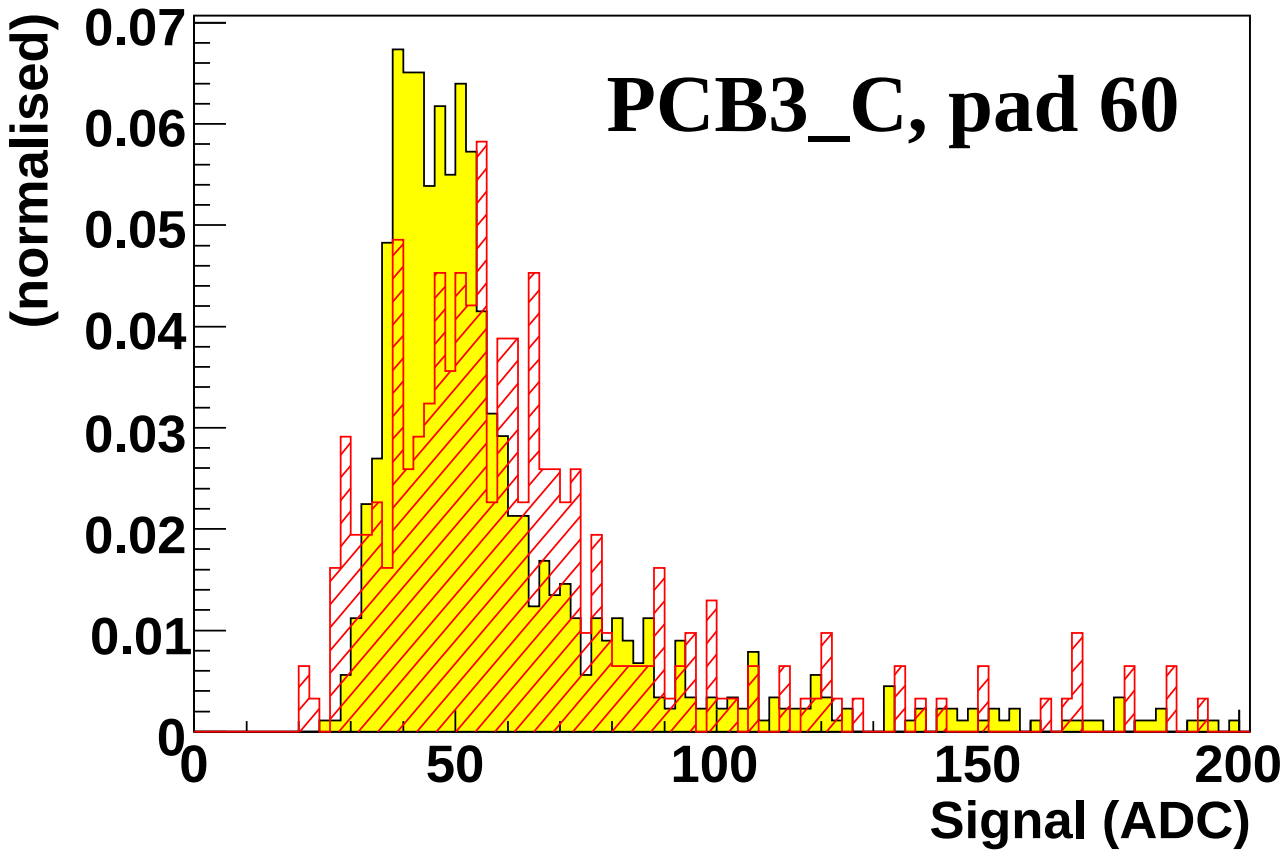
one readout chip, 5 events per second

Noise – Cosmics 12/2005 - 01/2006

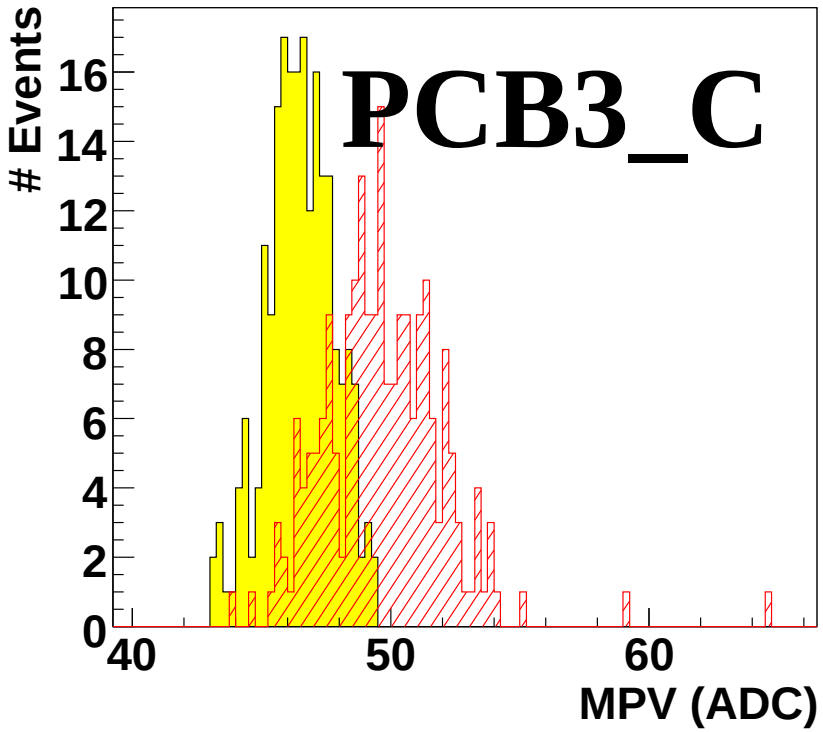


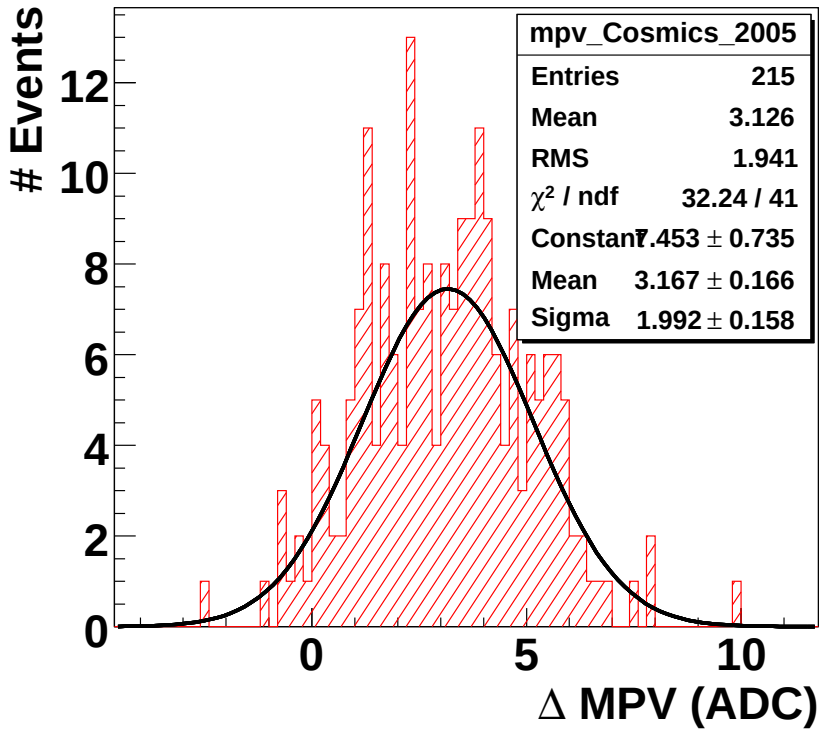
Noise of old and new cosmics runs.
(December 2004/January 2005 and December 2005)

Mip Signal


PCB3_C, pad 60
(normalised)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
50
100
150
200
Signal (ADC)

Mip MPV Shift





Problems:

- The regulator boards were noise sources. ($\rightarrow$Removed)
- PCB controlling was sub-optimal. ($\rightarrow$Read exactly 18 samples/chip.)
- One cable introduced noise.
- Some contacts were bad: cable – PCB / cable – Crc.

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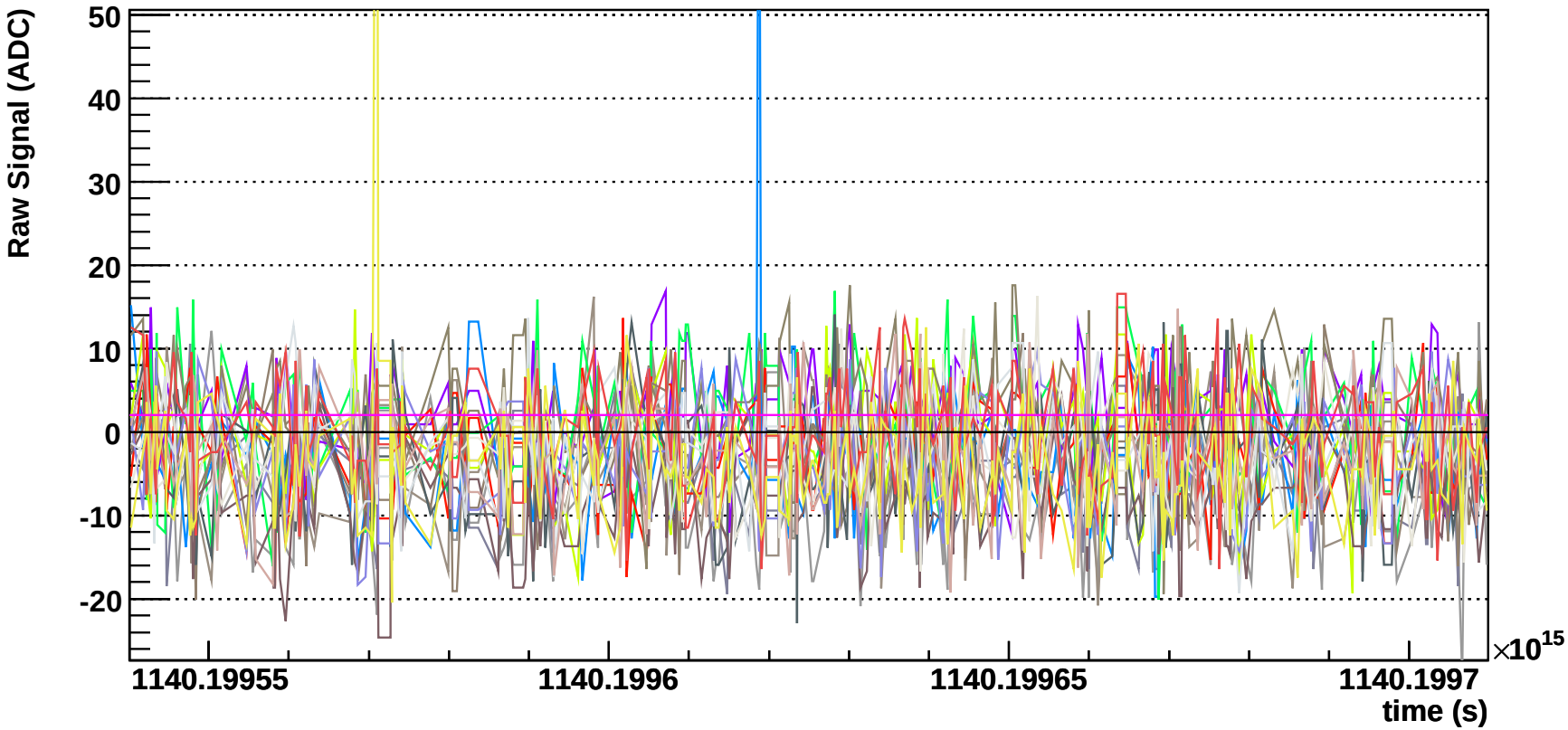
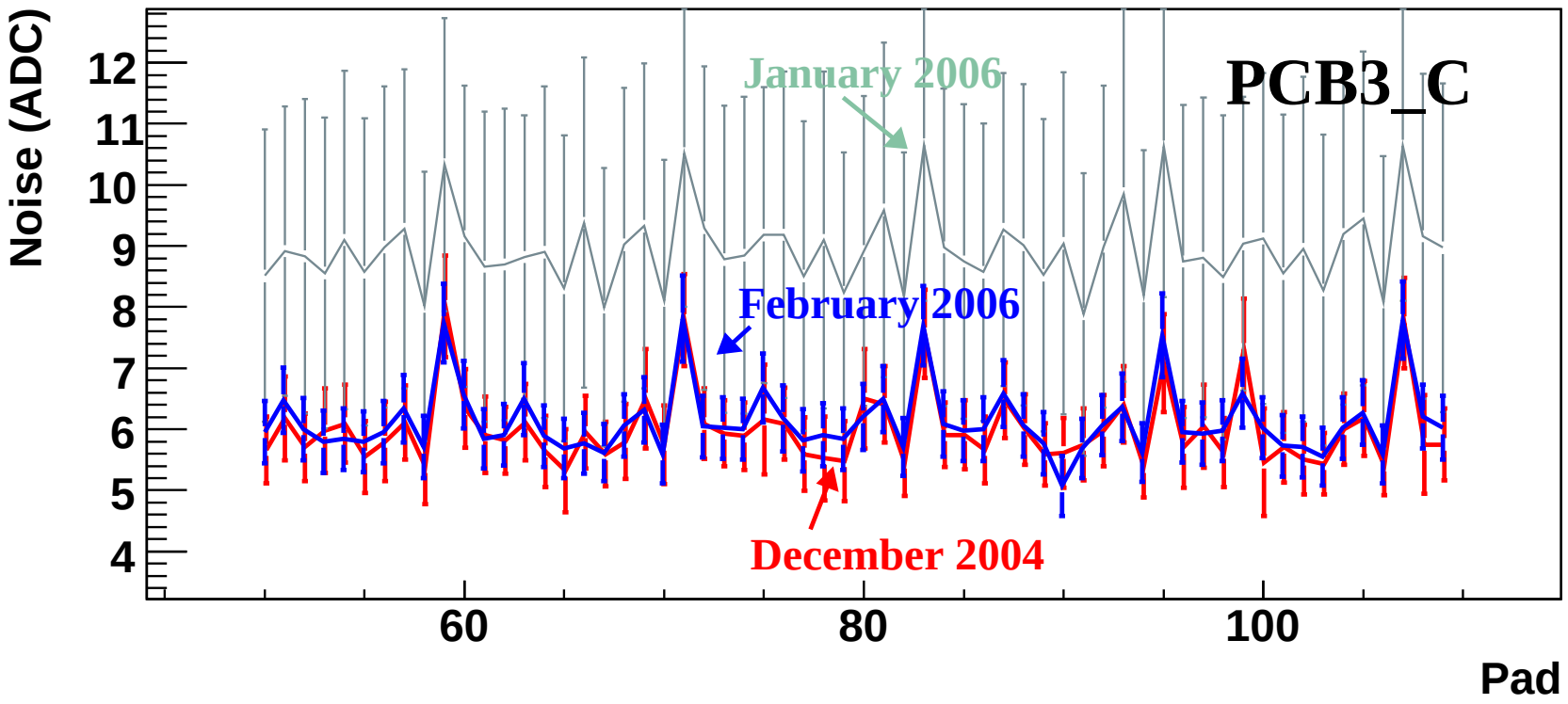
Pedestals – Cosmics February 2006



one readout chip, ADC minus mean of first 20 events.

Noise – Cosmics February 2006



Noise of old, previous and new cosmics runs.
(December 2004, January 2006 and February 2006)

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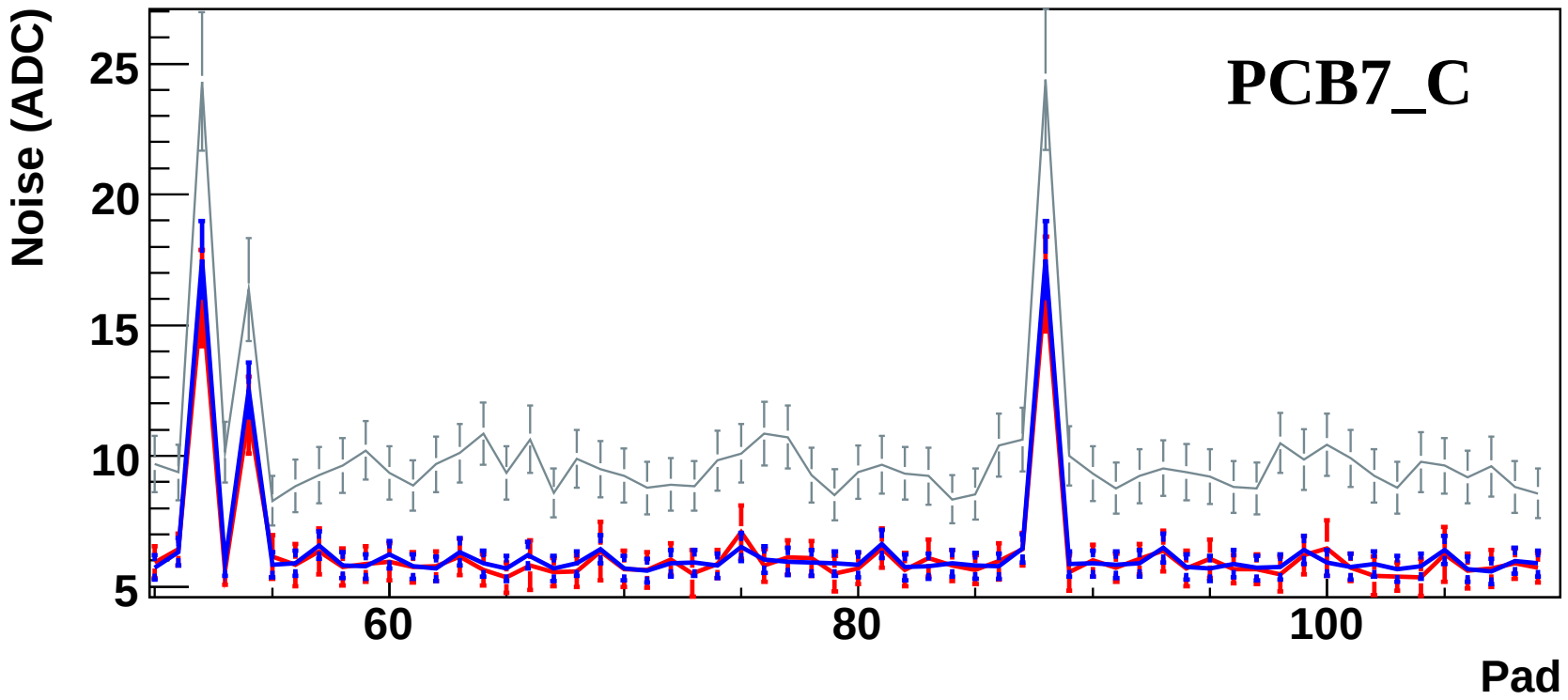

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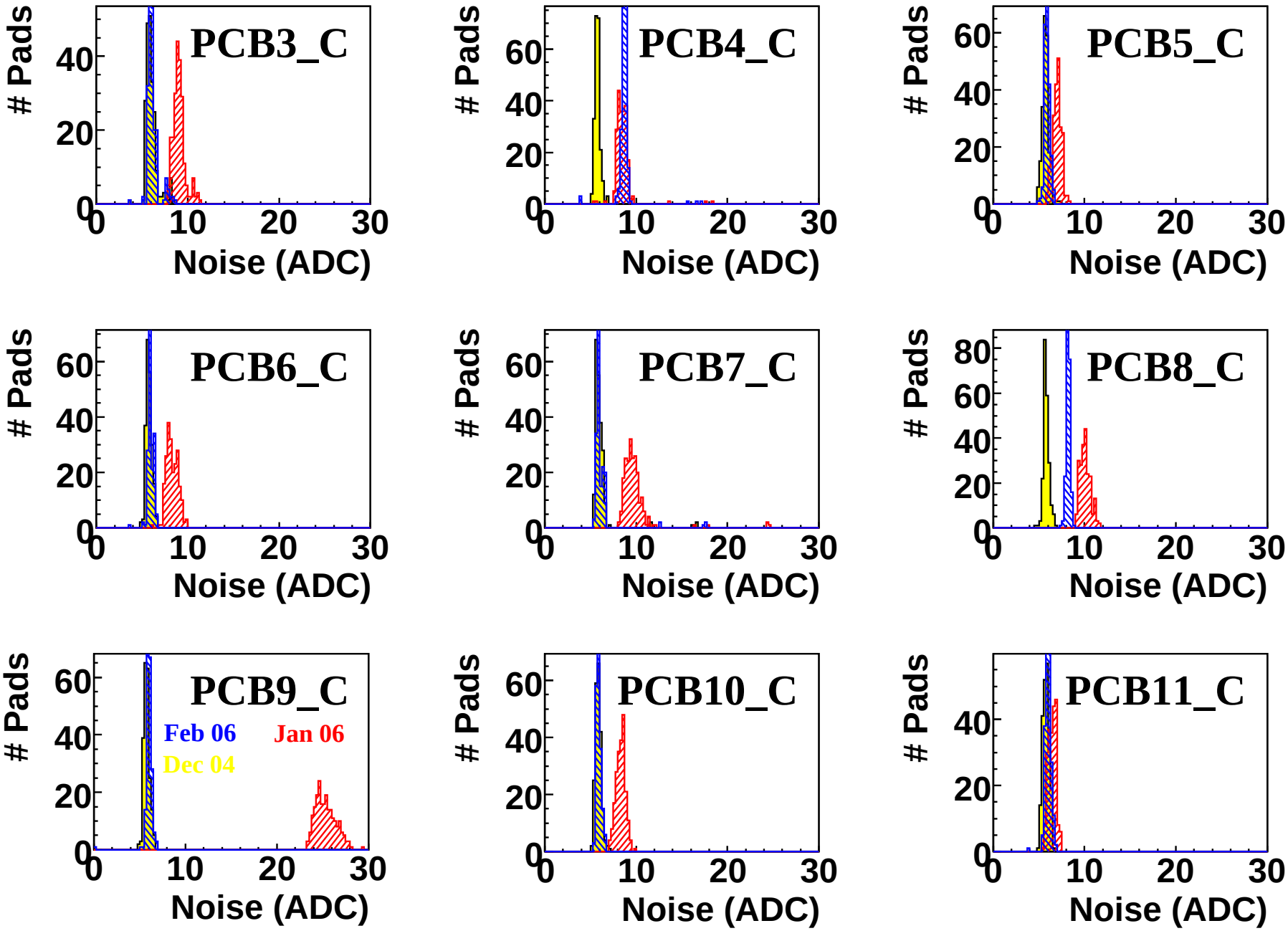
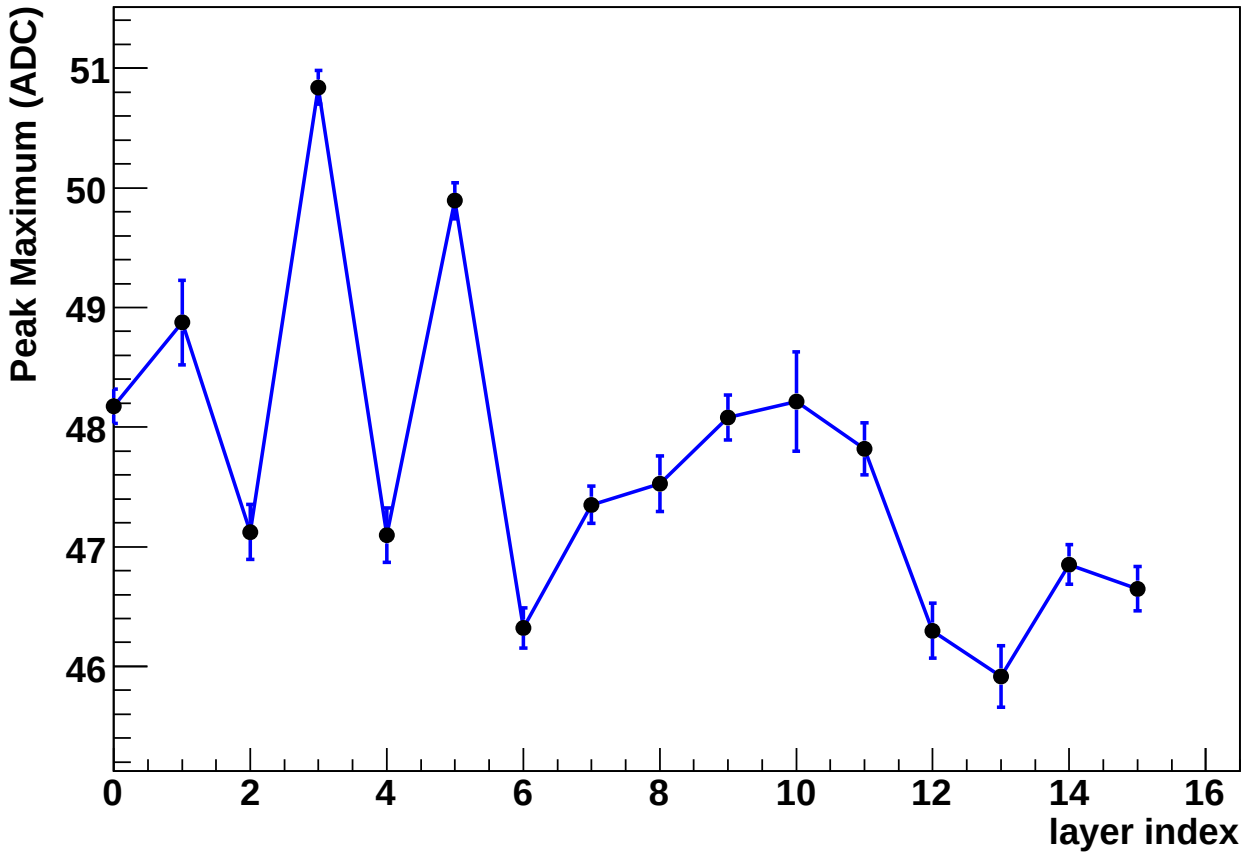

PCB3_C
PCB4_C
PCB5_C
PCB6_C
PCB7_C
PCB8_C
PCB9_C
PCB10_C
PCB11_C
Pads
Noise (ADC)
Feb 06
Jan 06
Dec 04

Signal – Cosmics February 2006



Gaussian fit to peak position.

(Maximum is shifted by Noise from Landau MPV $\pm$ 2ADC)

Summary

- Sub optimal PCB control $\rightarrow$ unstable pedestals.
  Solved.
- Noise back to normal level.
  Due to removal of regulators, correct PCB control.
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FIN

Mip Selection

- $\mathrm{S/N} > 3.5$
  (to take higher noise into account.)
- $3 \leq$ hits ≤ 10 with $< 20\,\mathrm{mm}$ distance.
- $\sum_i \mathrm{S_i} > 120\mathrm{ADC}$.
- $\chi^2/n.d.f. < 1.8$ of line fit through hits.