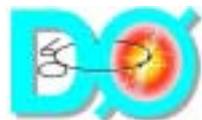


# ICD Status

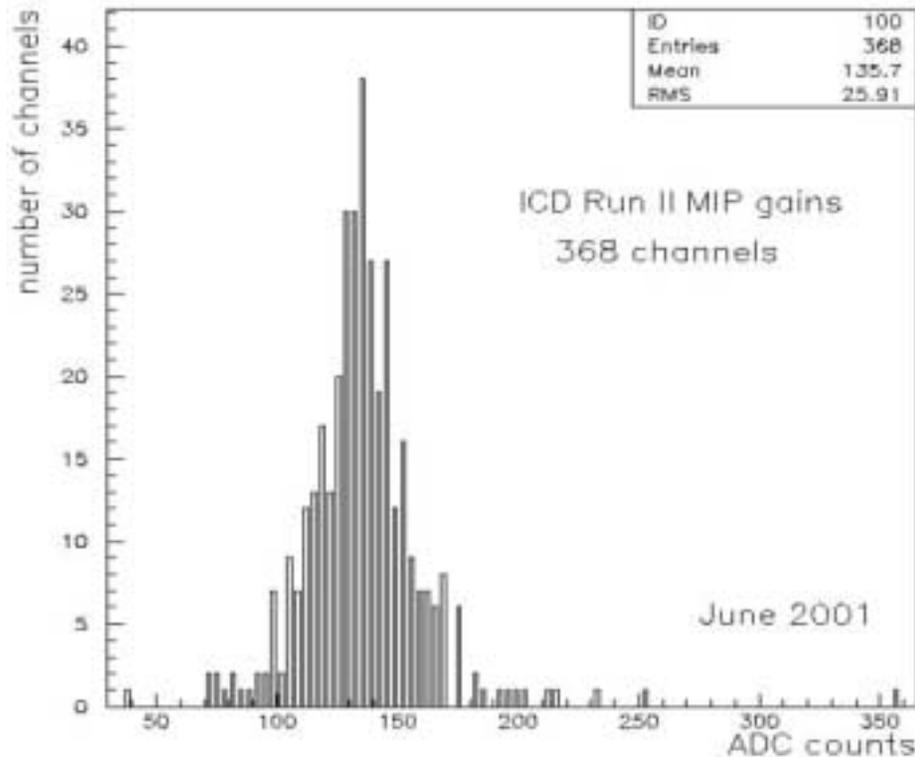
- ADC to GeV Conversion
- cal\_examine Plots
- Mapping
- Other issues

*Based on investigations by Alan Stone, Andy White, Leo Chan, Dean Schamberger, Lee Sawyer, Vishnu Zutshi and Bob Kehoe*

**Alan L. Stone**  
**Louisiana Tech University**  
**DØ Collaboration Meeting**

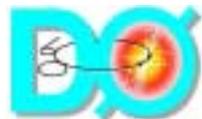


# ICD Cosmic Ray Test Stand Results



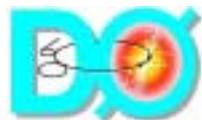
**Average MIP Peak (368 channels)  
from data taken in Spring 2001  
was 135.7 ADC Counts.**

- Convert Test Stand ADCs to DØ Calorimeter ADCs
  - Used CAL instead of ICD type preamps
    - Better separation between pedestal and MIP peak
  - Test stand signal boost by factor of 8.7
  - Least count of test stand ADC was 1 mV & for Calorimeter it is 0.1 mV



# ADC to GeV Conversion

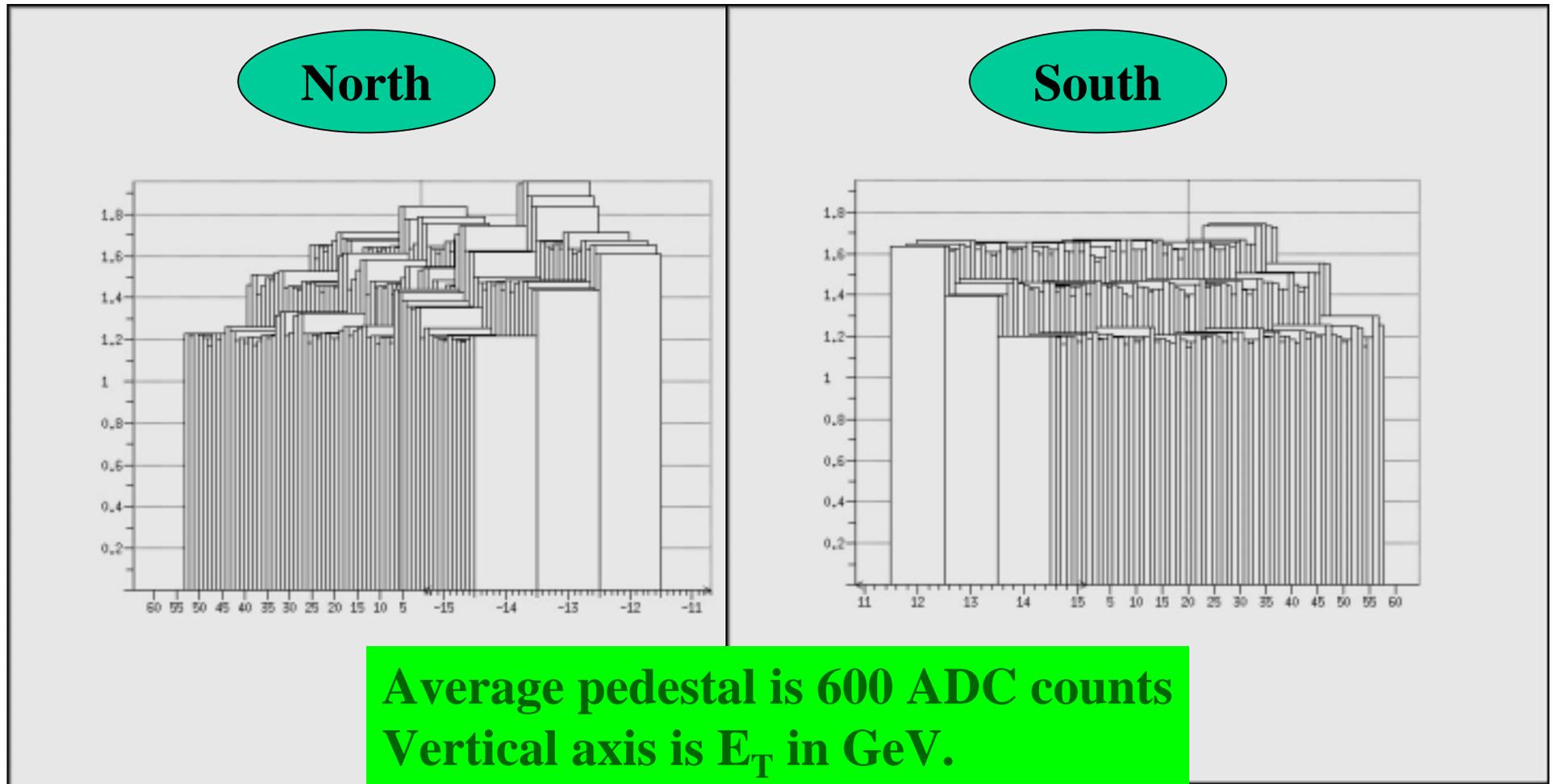
- Average MIP peak in Calorimeter ADCs
  - $[135.7 \times (1.0/0.1)] / [(22.5/5.5) \times 8.7] = 38.13$  ADC counts
- $dE/dx_{\min} = 2.02$  MeV/cm (*PVT Scintillator*)
- Energy deposition in ICD tile
  - $[(\text{CAL ADC counts}) / 38.13] \times (2.02 \text{ MeV/cm}) \times 1.27 \text{ cm}$
  - $(\text{CAL ADC counts}) \times (0.0000673) \equiv [\text{Energy in GeV}]$
- Correct for flipped resistors (*factor of 32/23*)
  - $(\text{CAL ADC counts}) \times (0.0000936) \equiv [\text{Energy in GeV}]$
  - Current factor in `plt_latest.rcp` is:
    - $(1/20000) \times (32/23) = 0.0000694$
    - Change would increase the ICD energy reconstructed by 35%!
- Current Reco version on farms is `p10.15.01`
  - *caltables*: `plt_latest.rcp`  $\Rightarrow$  tag `p10-15-01`



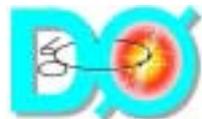
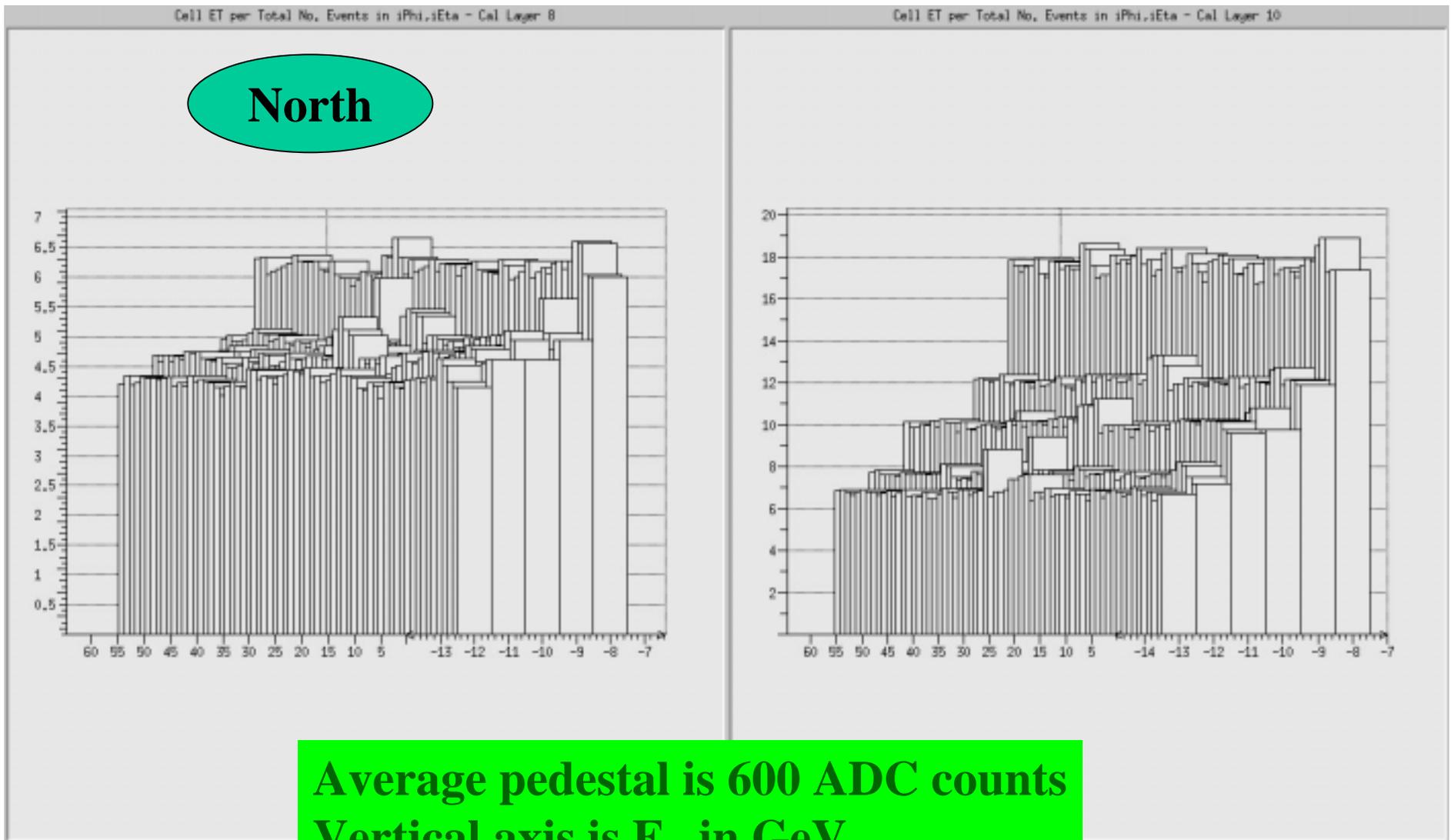
# What do we see in cal\_examine for ICD?

Current version is t02.08.00

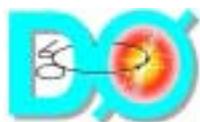
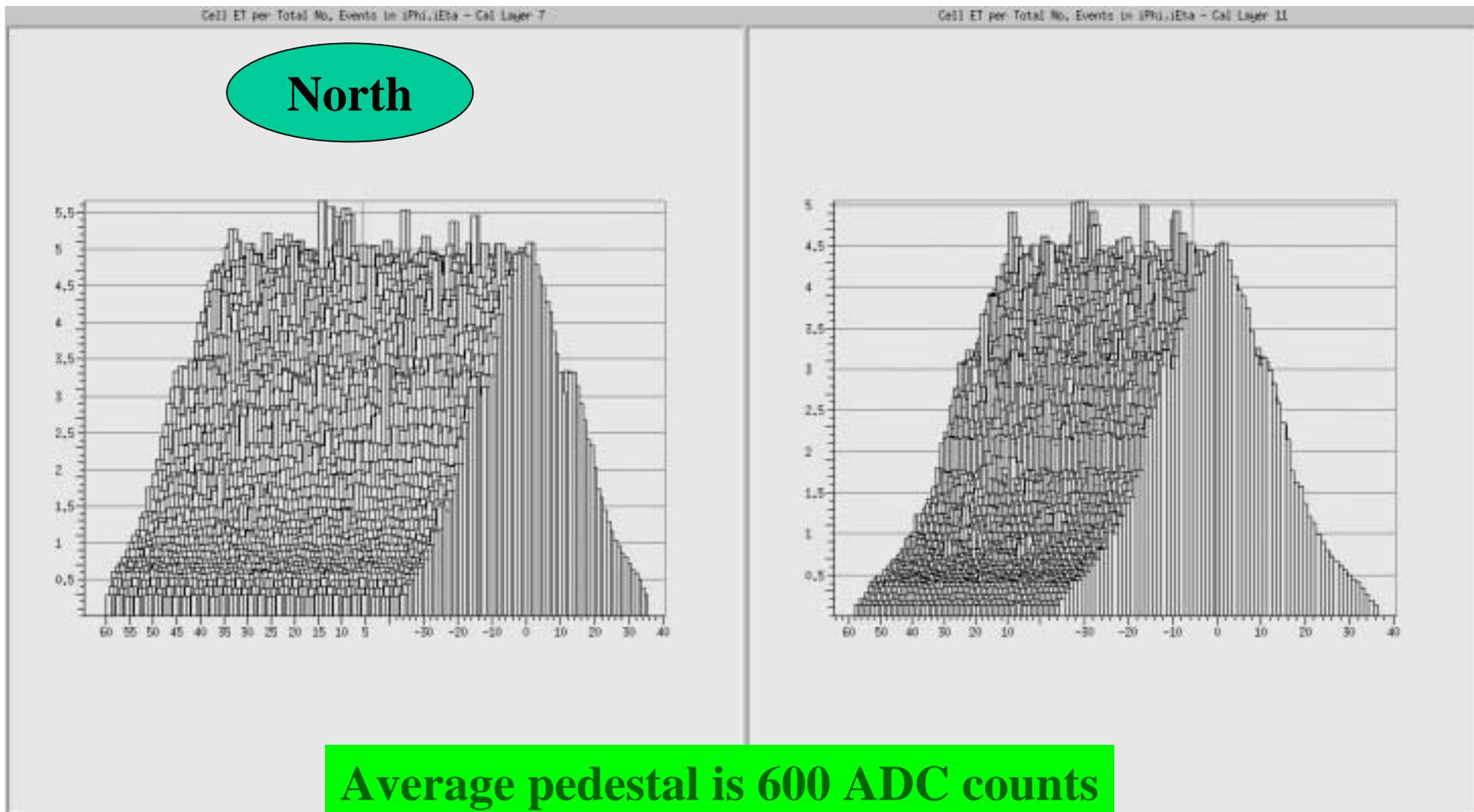
Took zero bias run, in normal, unsuppressed mode.



# What do we see in cal\_examine for MG?

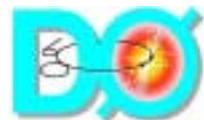
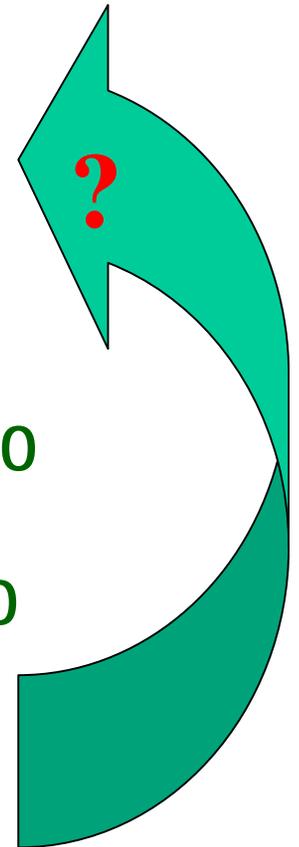


# And neighboring CAL layers...



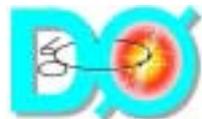
# Address Changes in Software

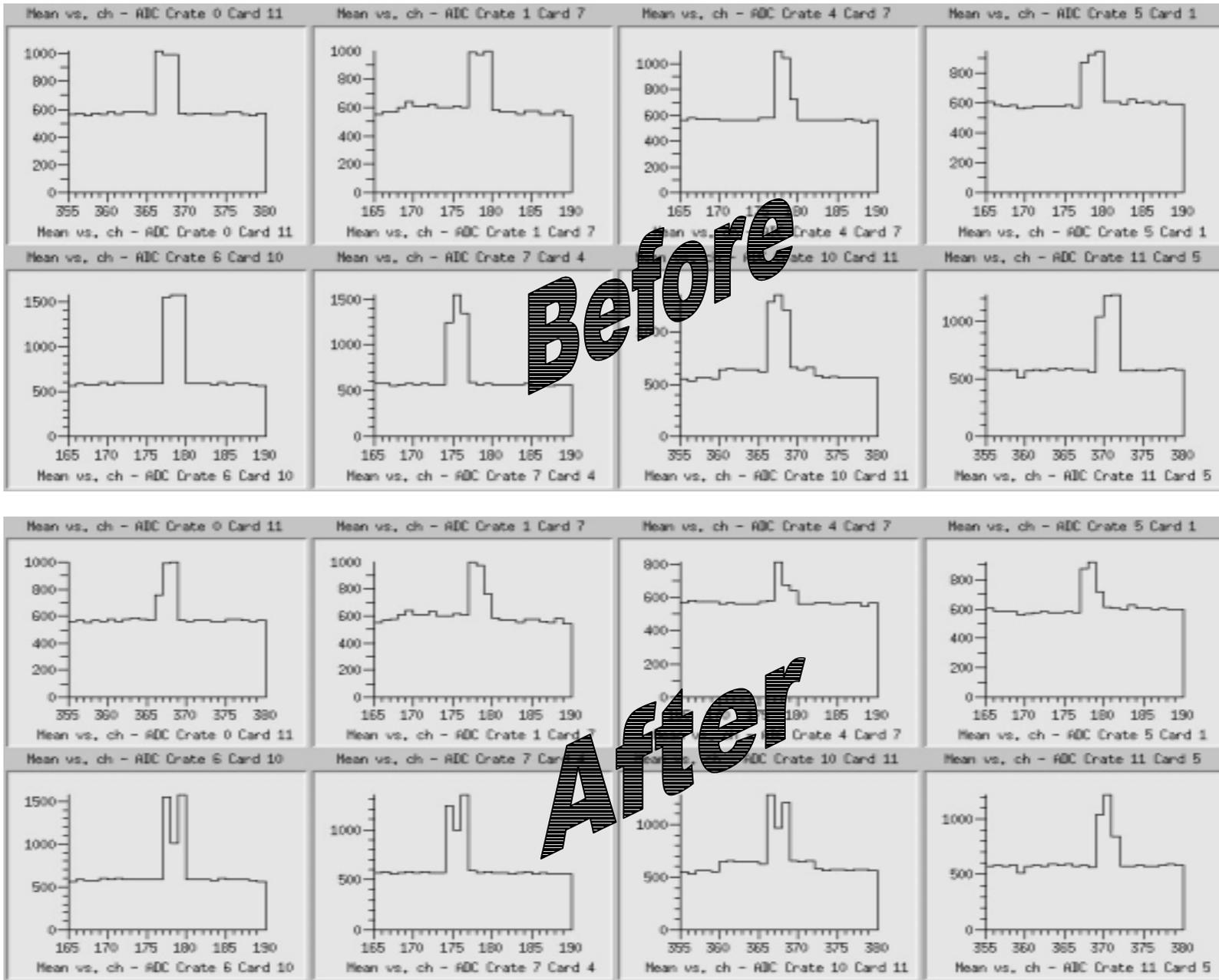
- *caladdress*: CalChan.cpp ⇒ tag p11-05-00
  - Correction to ICD fiber backplane miscabling not tagged for production release
    - Eta is swapped (12↔14) for the NE & SW quadrants
    - Code fix made between 8-18 March 2002
- However, we wanted to do test online with *cal\_examine* (*online version t02.08.00*)
  - 4 March: Call for release requests for t02.08.00
    - No caladdress in builds 1-4
  - 11 March: Call for release requests for t02.09.00
    - caladdress went from v00-03-06 to v00-03-07
  - 18 March: Call for release requests for t02.10.00
    - caladdress went from v00-03-07 to v00-03-08
      - This is the last tagged version by Bob Kehoe



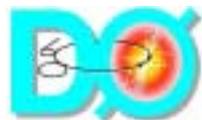
# New Address Feature

- New problem was found a few weeks ago
  - We looked at sets of 3 ICD channels from each CAL crate in which the ICD is readout
    - Crates 40,41,44,45,46,47,4A,4B
  - Turned off all HV except for these 24 channels
  - Took “snapshot” of output in ADC counts & transverse energy in GeV
    - Then lowered HV for 1 in each 3 channels by 50 V
  - All channels in West appear phi swapped in output of `cal_examine` (*but not in cal\_elec*)
    - Sent email to Bob Kehoe - not sure if this is a bug in `caladdress`, or if the problem is internal to the online version of `cal_examine`

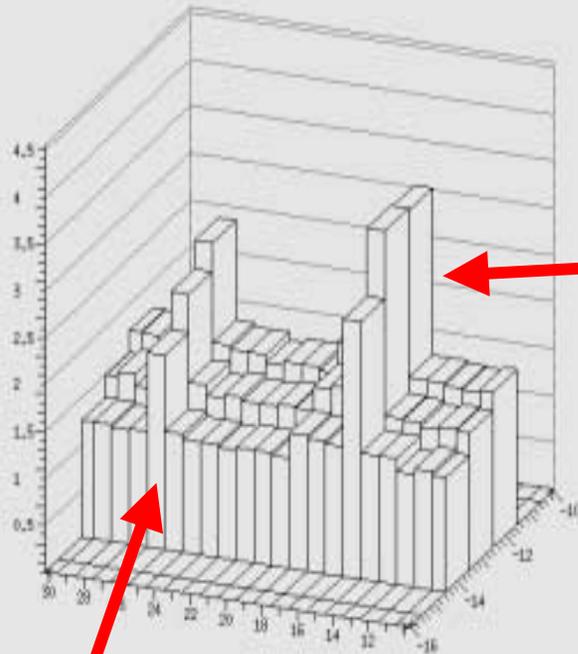




Turned on ICD LED pulser. Turned off all HV except for channels shown. Reduced by 50V for a single channel in each group of three (each Calorimeter readout crate in which the ICD resides). Referenced ICD channel map. cal\_elec is correct.



**Before**

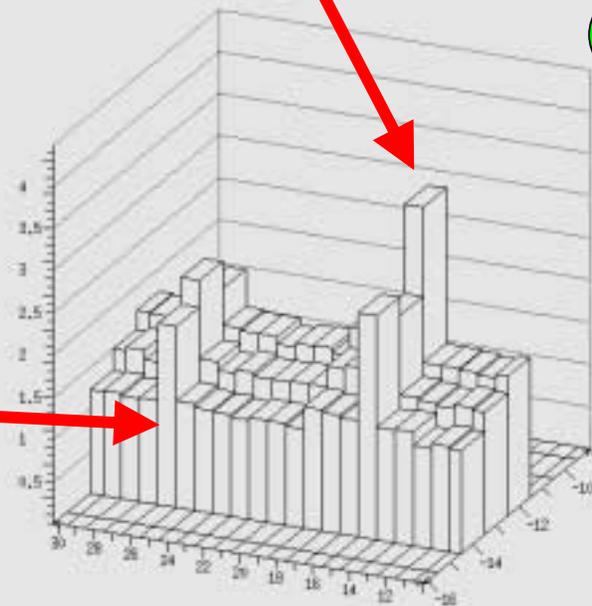


**CAL crate 1 (ICD NW12) &  
CAL crate 11 (ICD NE16)**

**cal\_examine gives  
correctly  $\phi = 15$ .**

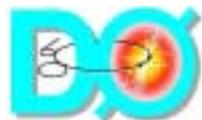
**cal\_examine gives  
incorrectly  $\phi = 26$   
Should be 25.**

**After**



# Other Issues That Need Attention

- Isolated muons tracked through ICD
  - Verify MIP response in ADC counts
    - Channel to channel correction
- SCA non-linearity effects
  - Small contributions from ICD tiles to jets
- Calorimeter geometry
  - ICDmodule.hpp/cpp last modified 9 Aug 2000
    - Has anyone independently checked on this?
  - D0scan - different color scheme for ICD
    - George Alverson is currently working on this



# Summary

- ICD electronic output is working well
  - cal\_elec addressing is as expected
    - Verified with LED pulser
  - Only a handful of weak or dead channels
    - New PMTs are on hand & being tested
    - New motherboards are also at D0
    - We need to wait for major shutdown to get time & access to the East/West platforms
- ICD response is at the mercy of the software
  - We need to get into p11 right away:
    - Corrected addressing
    - Corrected ADC to GeV conversion

All but  
one  
in the  
North

