

# MINOS Near Detector Commissioning

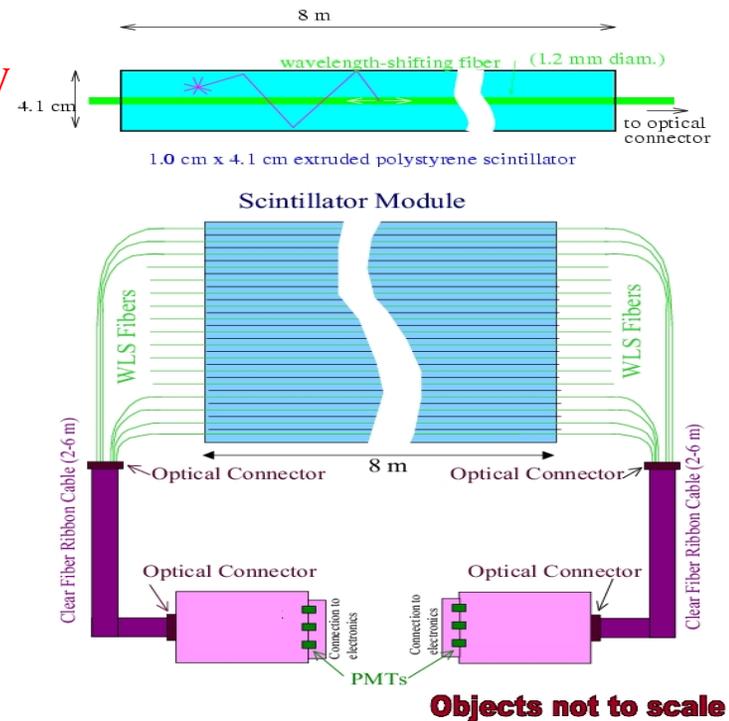
- Far Detector

- Near Detector



# MINOS Detectors

- Detectors:
  - 2.54cm magnetized Fe Planes/1cm Scintillator planes
  - 4.1cm wide scintillator strips read-out by WLS fibers into Multi-Anode PMTs
- Far Detector
  - 5kt, 485 planes
  - Double-ended readout
  - Sample-and-hold electronics
- Near Detector
  - 980 t, 281 planes
  - Single-ended readout
  - QIE-Based electronics – “53MHz” sampling = MI RF.



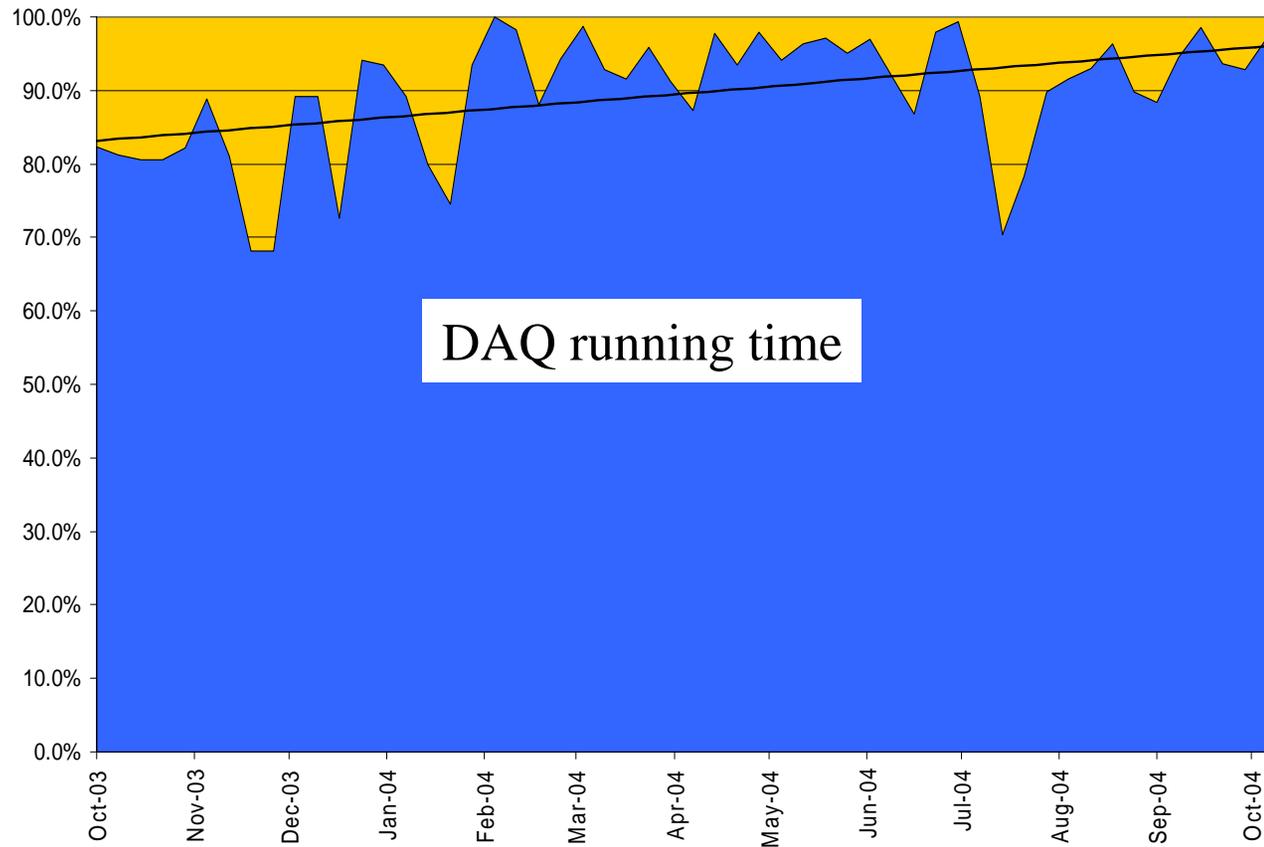
# MINOS Far Detector



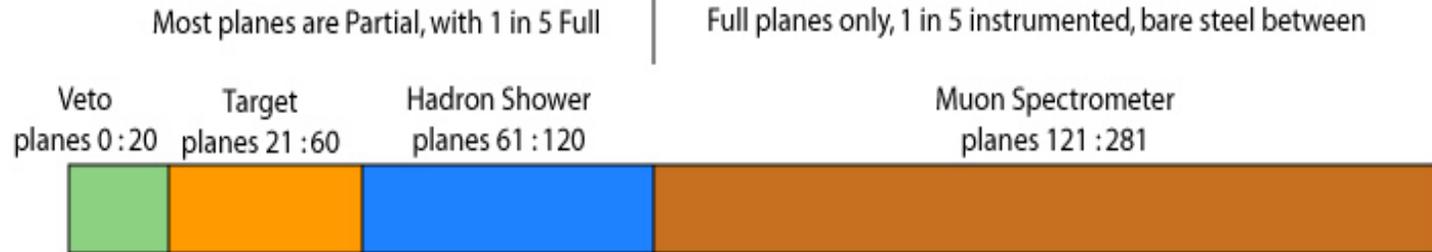
- Installation completed in summer 2003
- Commissioning and data taking have continued since then:
  - Atmospheric Neutrinos
  - Cosmic Muons

# FarDet Uptime

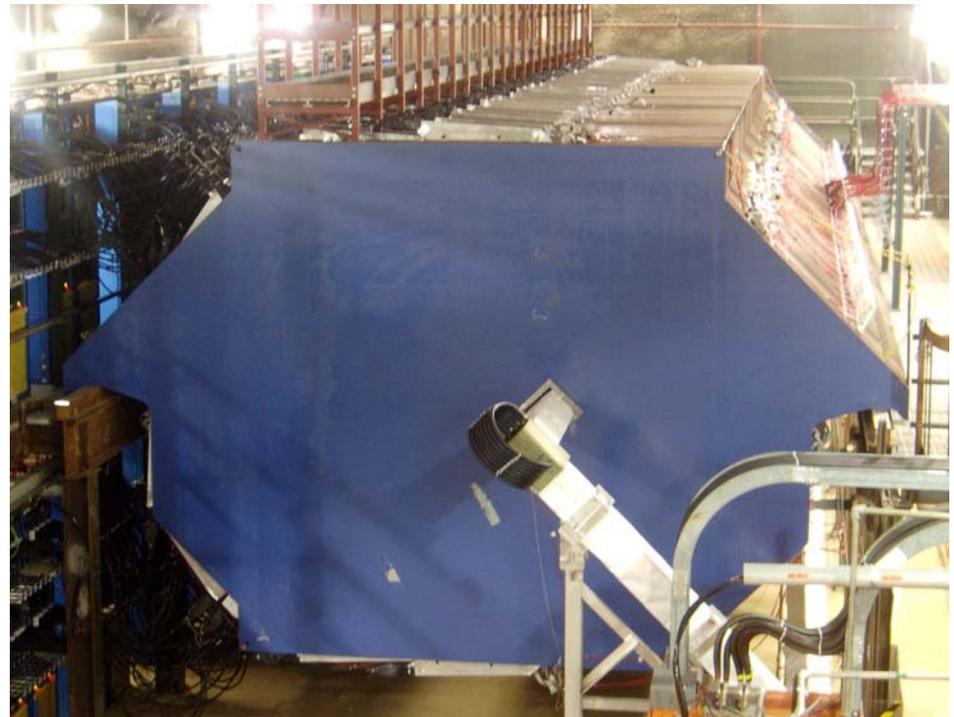
- Recent uptime is typically ~95%, even with debugging work
  - Debugging work is tailing off
  - Any maintenance during MI run will take place only during machine downtimes



# MINOS Near Detector



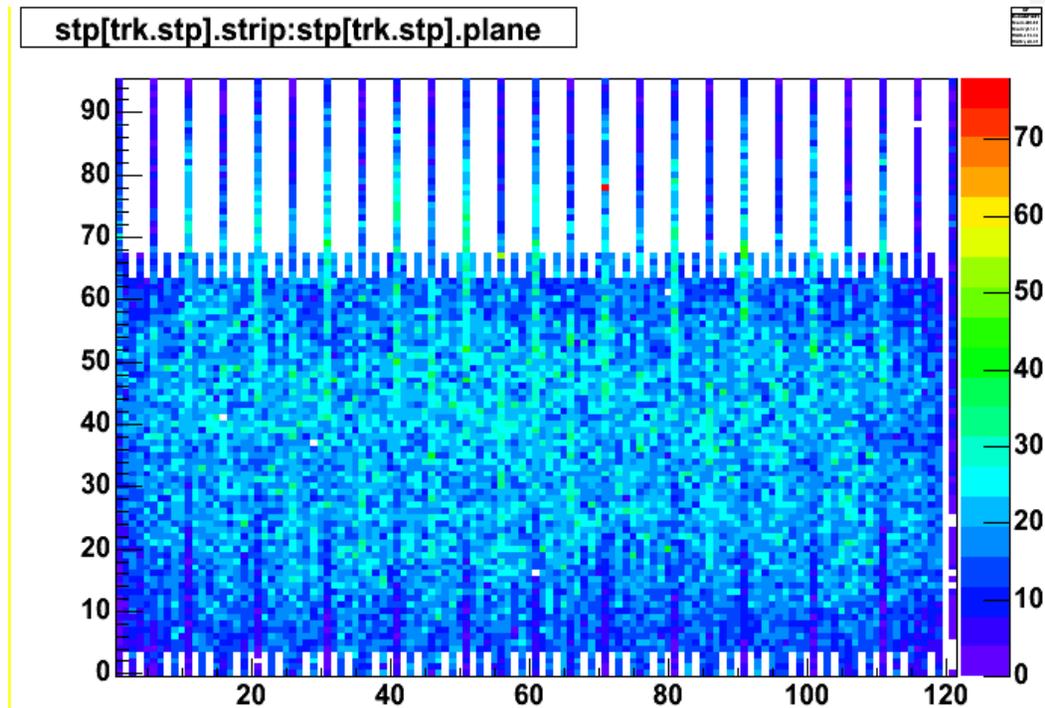
- Plane installation completed in August
  - Collaborators – mostly students and postdocs – were crucial part of effort
  - Plane and electronics checkout and commissioning during installation
  - Magnet coil installed in October



# Debugging/Commissioning

- Since installation was completed:
  - All but a handful of channels behaving well.
  - Holes in LED Light injection fixed.
  - Calibration underway with >5 million cosmics, preliminary alignment finished.

Calorimeter: hits on tracks mid-November

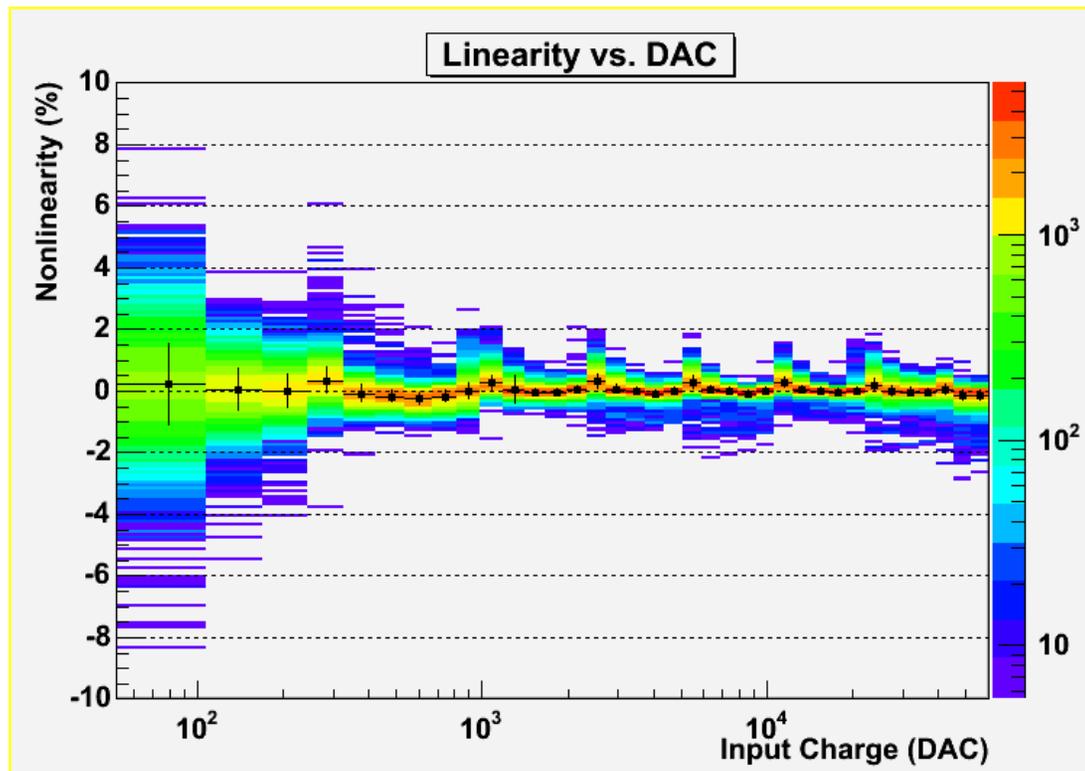


Track Occupancy vs. strip and plane

# NearDet Performance

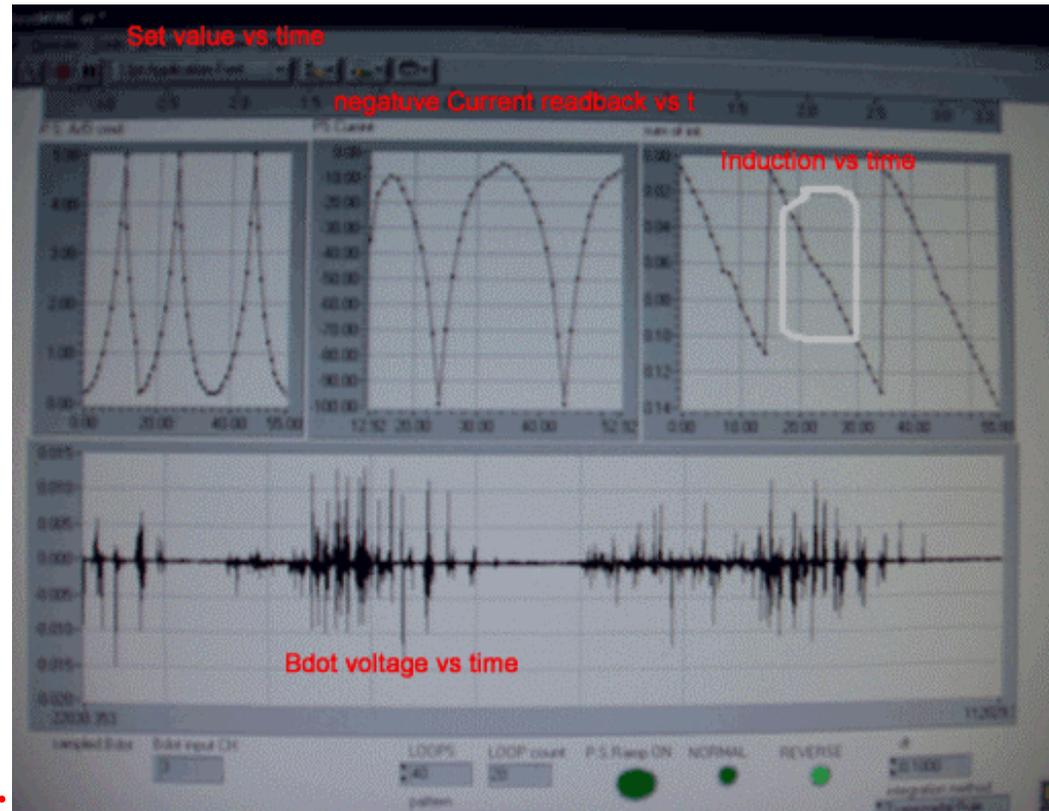
Color scale: 1 entry/channel/non-linearity/Input Charge value  
Error points: profile (mean nonlinearity of all channels)

- Electronics Linearity
  - Charge injection calibration
  - 99% of all channels included



# Magnet Commissioning

- 5kA x 8 Turns
  - 1.2 Tesla in fiducial region.
  - Normal polarity: Focus  $\mu^-$
- Installed in October, tested last Friday
  - Run at full current for 15 minutes
  - Temperatures and fringe fields within expectations.
  - B-dot control system tested at half current



# Ongoing work

- Far Detector
  - Continued fine tuning of detector performance
- Near Detector
  - Complete remaining debugging work
  - Fine tune operations parameters as needed:
    - e.g. PMT gains
    - Timing system
  - Debug beam-spill readout mode
    - Store data for every channel, for every RF bucket in spill
    - Tested successfully at Calibration Detector at CERN
    - Unacceptable voltage transients
      - Working with power supply vendor to resolve.

# Detection of $\nu$ events

- CD-4 commissioning goals
  - 1-2 e12ppp/2 minute rep  $\sim 4e14$  p.o.t, “pseudo-ME” target configuration
  - Expect  $\sim 25$  CC events in target/calorimeter region
- Nominal running
  - $2.5e13 / 2$  seconds, LE target/horn configuration
  - $\sim 30000$  CC events/day in NearDet target
  - $\sim 2$  CC per day in FarDet (SK oscillations)

# Summary

- Both Near and Far Detectors could take beam data this week:
  - With NearDet triggering on PMT thresholds
    - limited intensity due to  $5\mu\text{s}$  deadtime per PMT not present in Beam-Spill readout mode.