Fermilab

Muon Accelerator Program

Detector Summary
Tracker

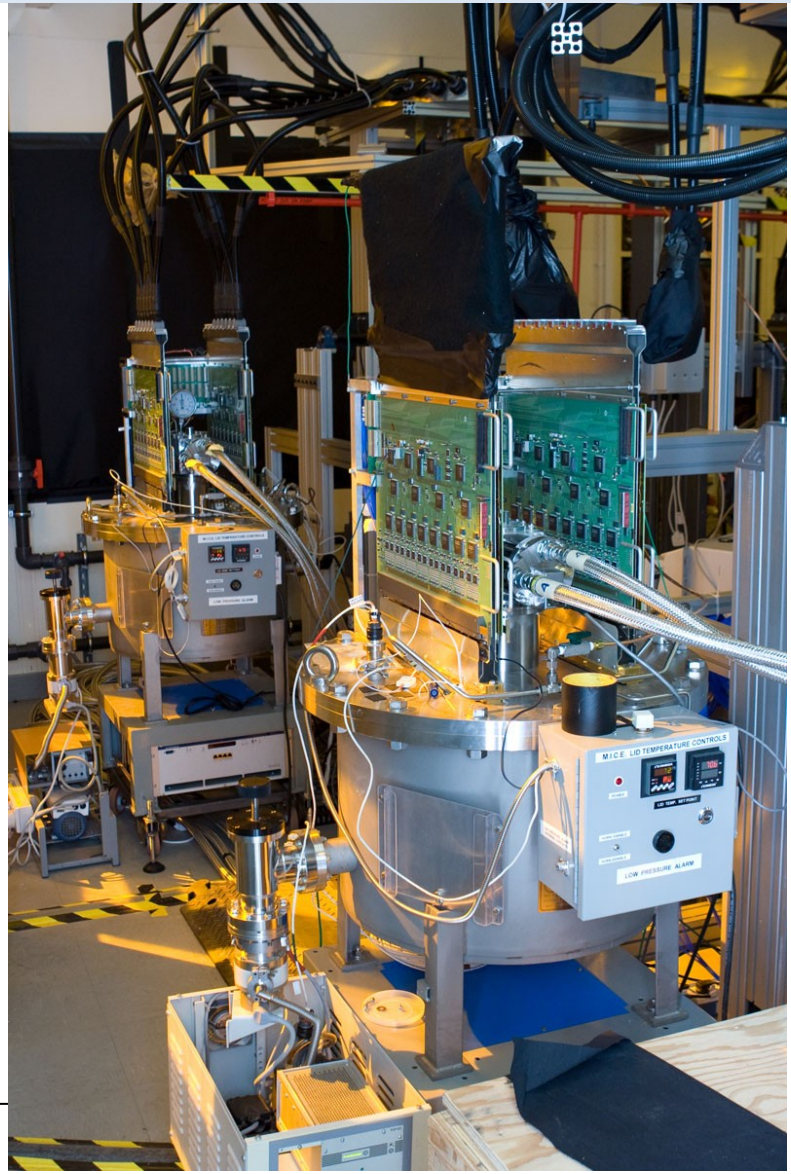
- Well, as far as the tracker hardware is concerned, we are done.
  - Need to do the system test to make sure nothing has degraded over the past 2 years
- Firmware development for the AFE IIt boards will continue, however.
- Software
  - Code Development
    - Unpacking
    - Reconstruction/Track fitting

2011 Cosmic Ray Test Plan

- **What do we want to do?**
  - Take more cosmic ray data with both trackers simultaneously
- **Why?**
  - Last time took data – 2009
  - Never satisfactorily set up and timed in trigger
  - Never before run both trackers at the same time
  - Tracker expertise leaving
  - Do this test → make detectors secure until installation in Hall
- **How long?**
  - Until we: enable two-tracker readout & verify tracker quality at least
    - Up to 3 months of CR data taking

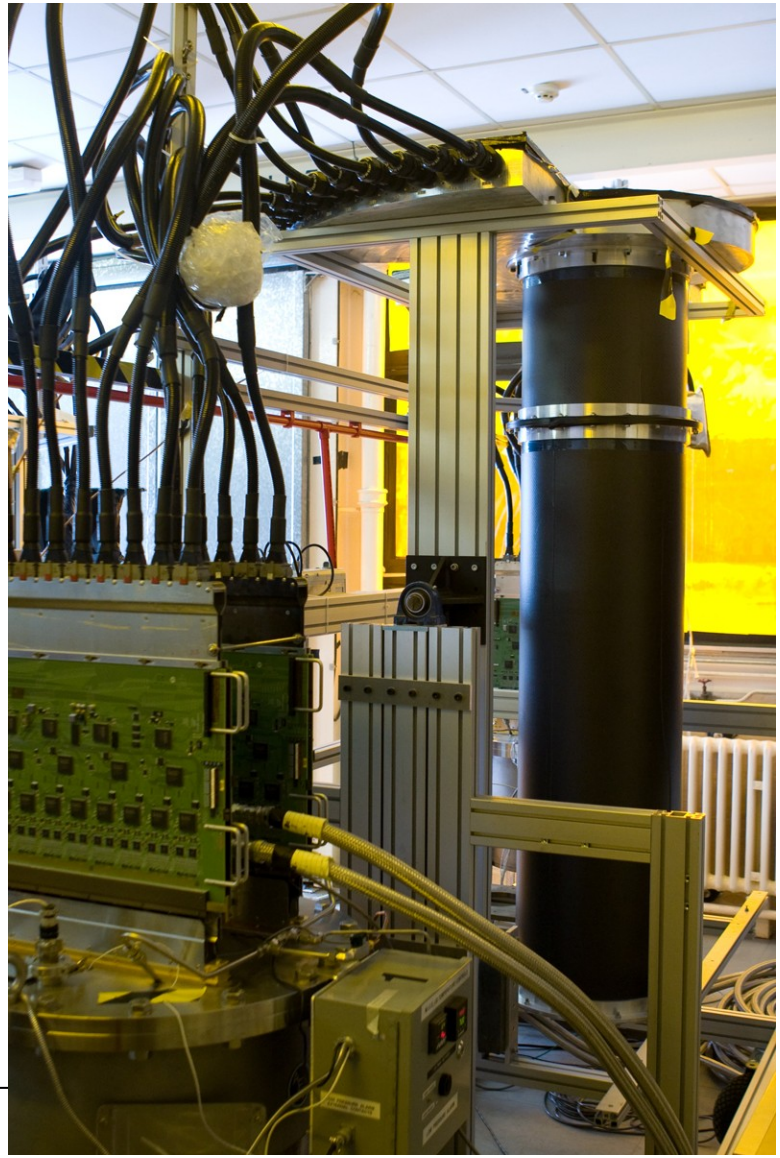
Tracker Hardware

- 2 trackers
- 4 cryostats
- 16 AFE-IIt boards
- Readout electronics
- Readout code
- Trigger
- Fake ISIS RF signal



Tracker Hardware Status

- Minimized He background in Lab7
  - Vent pumps outside
  - New He tank and regulator
- Vacuum pumps good
- New hoses on Cryo 2 & 4 to stop leaks
- All AFE boards cabled to VLSBs
- New trigger panels in Lab7
  - Need to mount
- All readout electronics modules in hand



Readout Board - AFEIIt Status

- Tried to simplify the data format and the firmware
- Current status is: 100% done, but continuing to test for more subtle problems (A-Team @FNAL: Paul Rubinov & Tom Fitzpatrick
- Caveat: we have one AFE board and one VLSB at Fermilab
  - Will test thoroughly at RAL next week

- Using Malcolm's Excel based readout
  - Initially, then move to DATE
- Capable of ~150 events per ms long spill, but this depends on trigger latency if it is greater than about one half of ISIS RF bucket

Readout

Readout functions for VLSBs implemented and integrated with MICE equipment list

Communication with VME/access of registers tested

New AFE and VLSB firmware will require some changes, primarily shift from cosmic to beam data and triggering

Unpacking also depends on new firmware and data format – work underway

Reconstruction

Cosmic ray reconstruction tested and will be used in upcoming test

Helical reconstruction working, but lacks efficiency (will not do 600/s) and has areas for improvement eg. scattering/energy loss in the Kalman noise

Improvements to space point level recon, fast helical fit and improvement of Kalman also in progress

Cosmic Ray Test Plan

- Hardware ready to go shortly
- Tom, Paul arrive Friday/Monday
- Upgrade firmware
- Test readout with new version of spreadsheet
- Test with internal fixed freq trigger, internal variable freq trigger, external mimic of ISIS RF signal (variable freq)
- Test readout with modified DATE - David