ArgoNeuT Test (PAB)

Start-Up Report

Preliminary Indications

ToDo List

Friday, Aug.1st

- Cryocooler Test in GAr: T_{cryo} is found to reach T_{LAr} only when $P<4$psig
- Vacuum (re)Pumping (down to 4×10^{-5} torr)

Monday, Aug.4th

- Slow Control (Cryogenics) final test and Display Screen updated (Heater not fully tested).
- Check Opening/Closing of Automatic valve.
- Vacuum check (inside Cryostat, vacuum jacket, flanges helicoflex, ...)
- h. 17.00 **Start Filling** (bypass closed, Purifier open, CryoCooler ON)
- **Note:** at beginning, relatively high pressure (10 psig) (though with Automatic Valve 100% OPEN) and very low LAr flow rate in the cryostat. After removing flow restrictor piece from filling line, LAr flow rate ~ 3 lt/min.
- 6 Ar storage dewars (160 lt) used over night (about 270 lt inside Cryostat).

Tuesday, Aug. 5th

- Filling temporary suspended for procedure adjustment/safety issues.
- Filling continued ... (LAr dewars 7th to 9th..)
- h. 20.12 Filling Completed (506 lt inside cryostat, LAr level at 4 " - nominal , P=5.6psig, T_{LAr}=94K .. rather hot liquid)
- Some problems with the Heater (associated to the CryoCooler) - Presumably not connected - T@cryocooler below solid-Ar

Wednesday, Aug. 6th

- CryoSystem:
  - Check Heater again (not responding)
  - Unstable conditions.
  - Recirculation Unit Closed - ByPass Open
  - Connection problem at the Heater found and solved (PID loop tested, OK).

Thursday, Aug.7th

- Cryogenics stabilizing (P and T decrease smoothly)
- .. start Detector test:
  - PurMon (external devices: Xe-lamp, quartz fiber, cabling, ...) put in place
  - Voltage Bias to Wire pLanes OK
  - Cathode HV: unexpected high current drain (@20 kV: 300 uA instead of 50 uA)

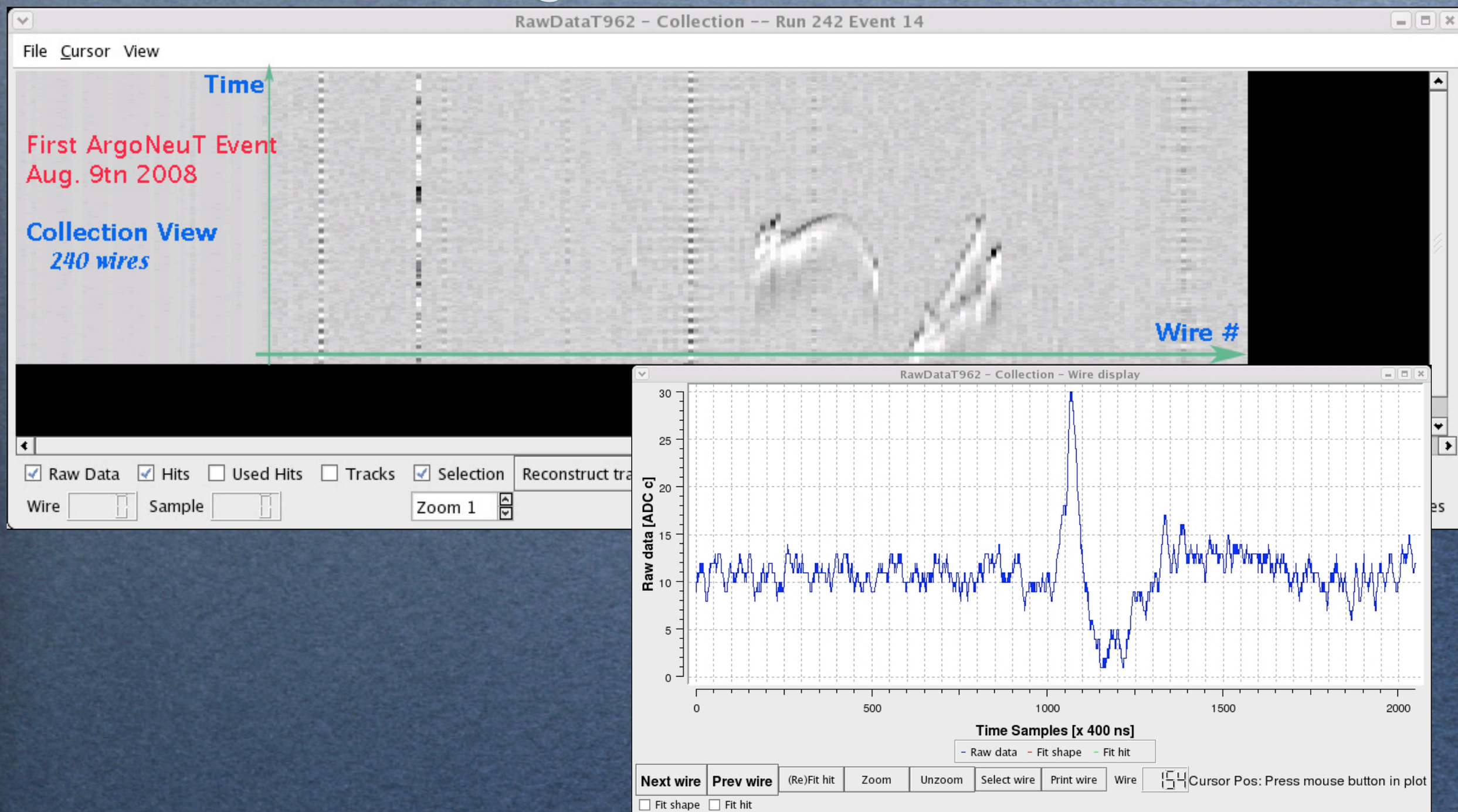
Friday, Aug. 8th

- An On-line Event Display installed and adjusted to read ArgoNeut Data.
- Electronics Boards installed and tested (Collection plane almost complete, Induction plane in part).
- CryoSystem runs stablely in automatic PID control: P=8 psig (@SetPoint), T_{LAr}=93.3 K, Heater ON at 55.5%. [P (and T) to be lowered during the w.e. by decreasing P_SP]

Saturday, Aug. 9th

- Set-Up for DATA Taking:
  - No External Trigger available yet --> Random Trigger in use.
  - TPC Settings:
    Cathode HV: - 5 KV (no current problem at this HV)
    Shield Plane Bias: +100V
    Induction Plane: +158V
    Collection Plane: +233V
    Fields:
    EF_{drift} = 100V/cm (very low field, therefore 2048 samples x 198ns correspond to about half of the drift length)
    EF (shield-induction) = 146V/cm
    EF (induction-collection) = 186 V/cm
    20 triggers have been collected and.....
  - the FIRST ArgoNeuT EVENT IS THERE!

First ArgoNeut Event recorded

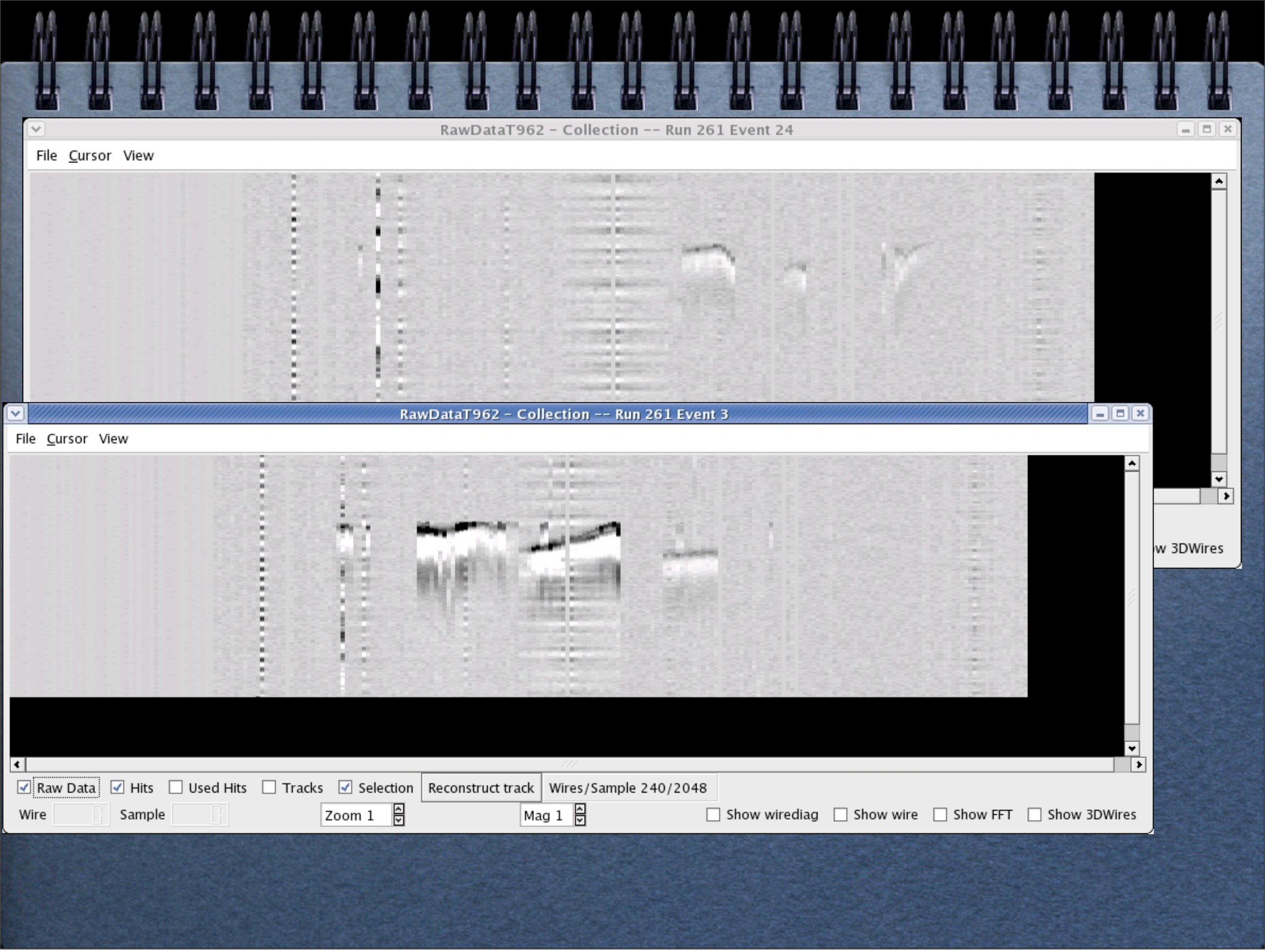


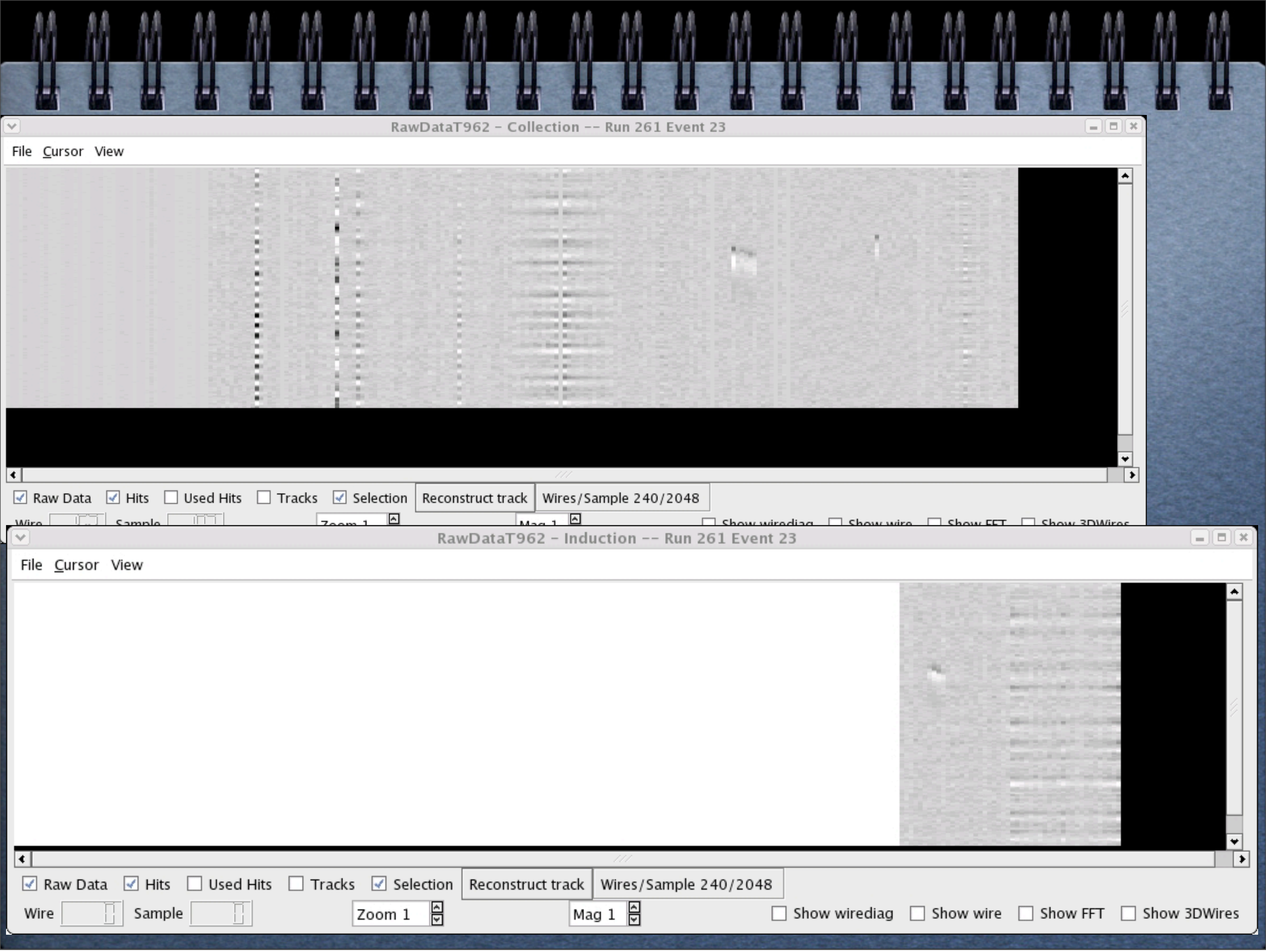
Sunday, Aug.10th

- Cryogenic system: Stable conditions achieved (with recirculation only through the bypass - purifier temporary excluded).
  - Pressure in the cryostat slowly lowered from 4.5 psig to 2.0 psig (nominal). Temperature in the cryostat follows the pressure decrease (from 92.2 K to 90.0 K respectively).
- External Cosmic ray Trigger System implemented (3 scintillator pads in .AND. logic positioned at the two ends of the cryostat)
  - Geometry of the trigger system has to be adjusted to ensure trigger muons X-ing the active volume of the detector.

Monday, Aug. 11th

- Cryogenics: Purification system activated (bypass closed)- Heater ON at 23.5%. P=2.0 psig, T_{LAr}=89.8K
- External Trigger: improved geometry, positioning, timing and connection to DAQ
- Some test Runs recorded: straight muon tracks not seen yet, but several events with visible tracks found.... (similar to the "First Event")
- Possible explanations:
  - Purity is low (and only tracks close to the wires are detected)
  - EF in the drift volume too low
  - External trigger pointing out of the recorded drift region


RawDataT962 - Collection -- Run 261 Event 24
File Cursor View
w 3DWires
RawDataT962 - Collection -- Run 261 Event 3
File Cursor View
Raw Data
Hits
Used Hits
Tracks
Selection
Reconstruct track
Wires/Sample 240/2048
Wire
Sample
Zoom 1
Mag 1
Show wirediag
Show wire
Show FFT
Show 3DWires


RawDataT962 - Collection -- Run 261 Event 23
File Cursor View
Raw Data
Hits
Used Hits
Tracks
Selection
Reconstruct track
Wires/Sample 240/2048
RawDataT962 - Induction -- Run 261 Event 23
File Cursor View
Raw Data
Hits
Used Hits
Tracks
Selection
Reconstruct track
Wires/Sample 240/2048
Wire
Sample
Zoom 1
Mag 1
Show wirediag
Show wire
Show FFT
Show 3DWires

RawDataT962 - Collection -- Run 261 Event 13
File Cursor View
RawDataT962 - Induction -- Run 261 Event 13
File Cursor View
Raw Data
Hits
Used Hits
Tracks
Selection
Reconstruct track
Wires/Sample 240/2048
Wire
Sample
Zoom 1
Mag 1
Show wirediag
Show wire
Show FFT
Show 3DWires

To Do List:

Adjust Ext. Trigger Geometry to pick up tracks crossing the wire plane

Try to raise cathode-HV (to be agreed) and check data quality

Measure LAr Purity

Complete installation of electronic boards