AGH University of Science and Technology

VELO GUI
present monitoring

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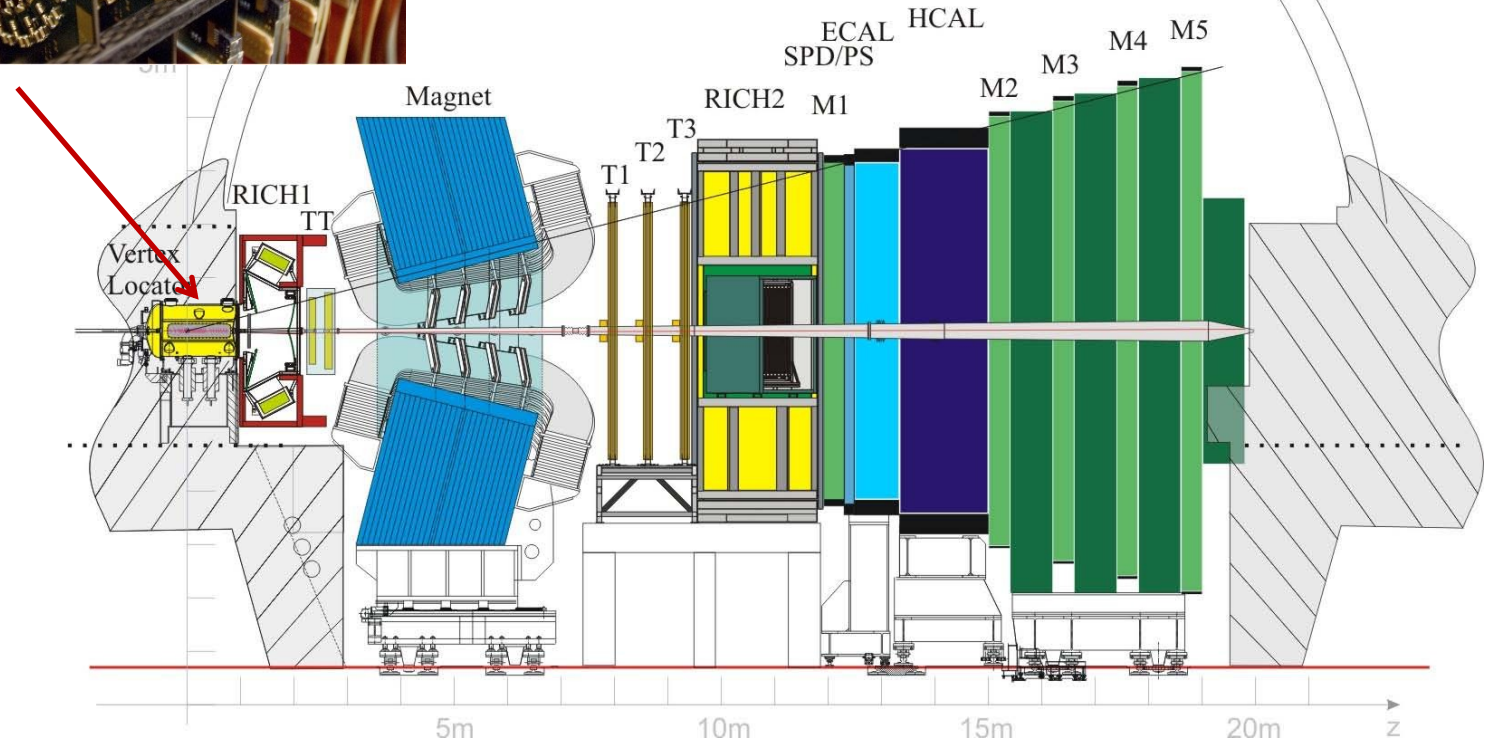
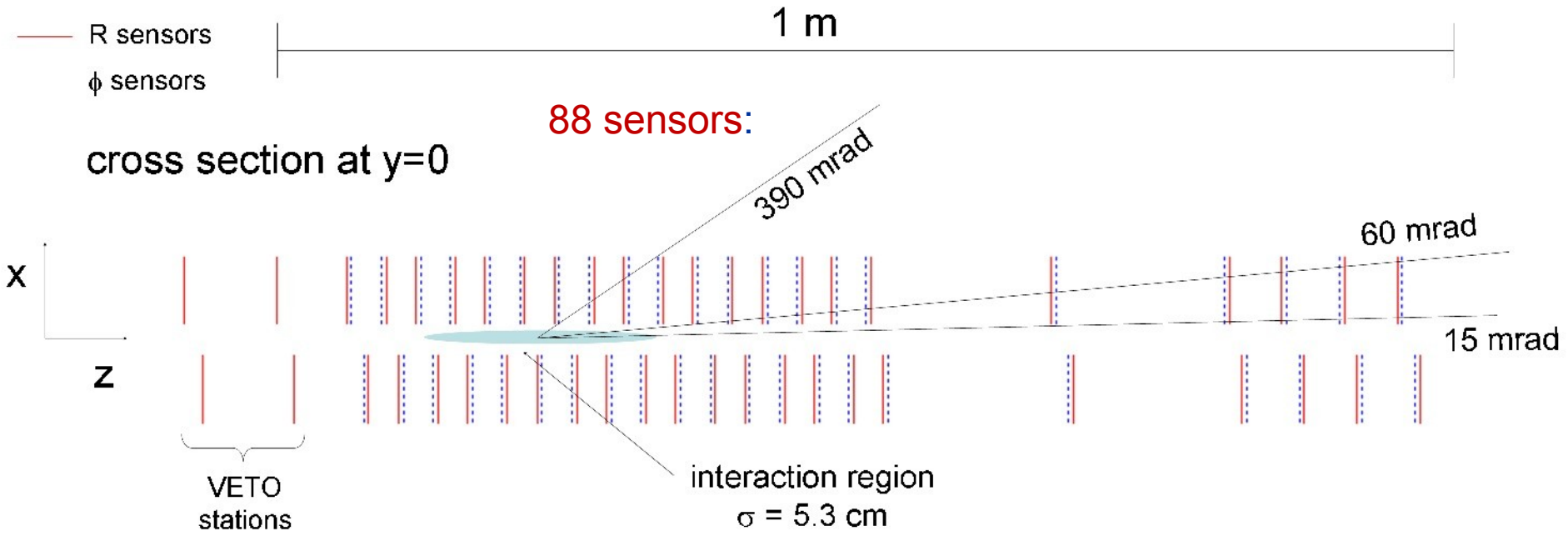
Workshop on Common ASIC for the LHCb Upgrade
5th of July 2012

LHCb spectrometer & VELO

VErtex LOcator



VELO monitoring



OFFLINE data quality monitoring

- Noise, error banks
- Bad channels
- Cross talk,
- Clusters,
- Occupancies
- TELL1 monitoring

VELO GUI

A friendly interference between the shifter and data.

New monitoring algorithm can be easily „plug in” .

All the analysis scripts can also be run in standalone.

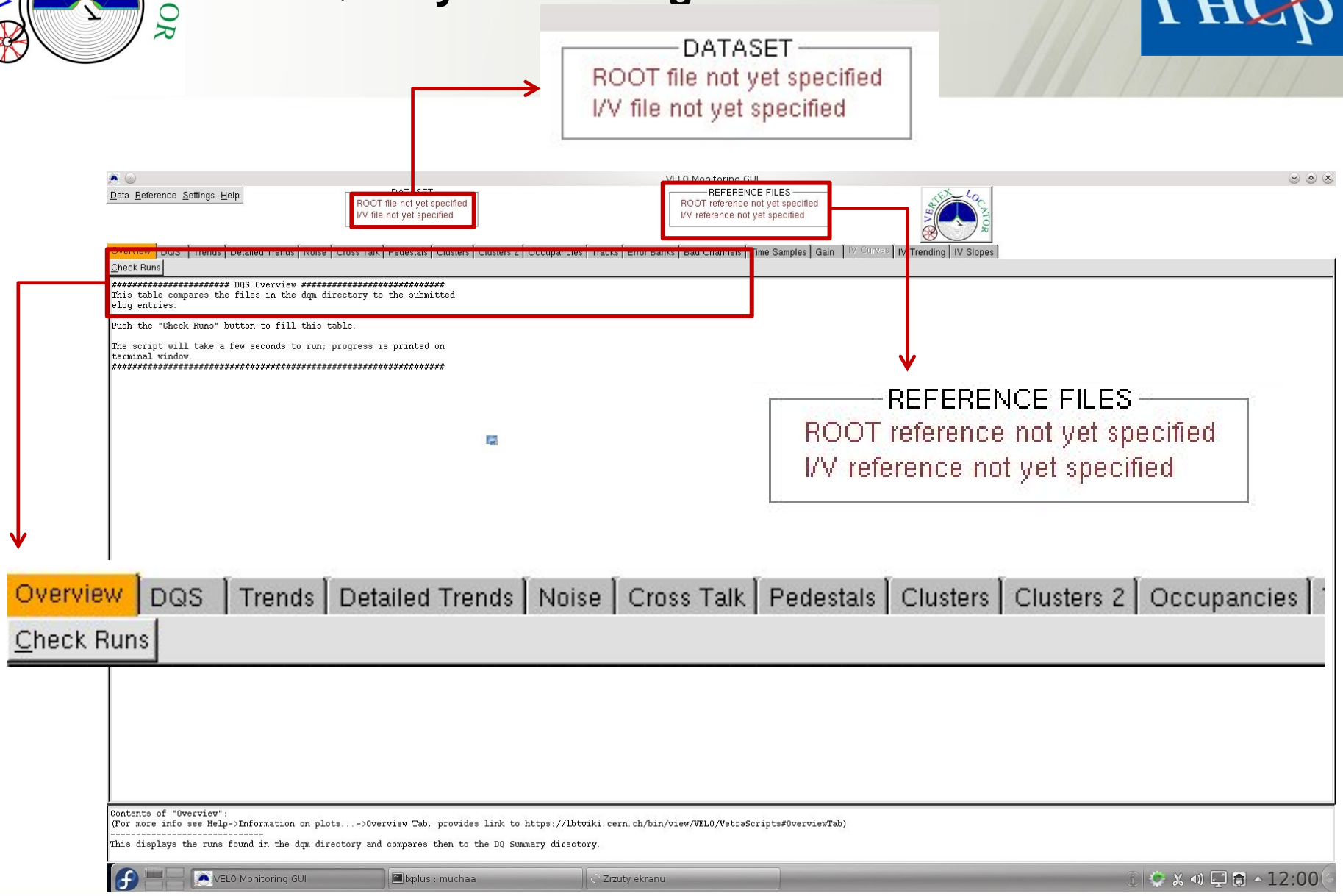
DATA SET:

Each run is moninitored.

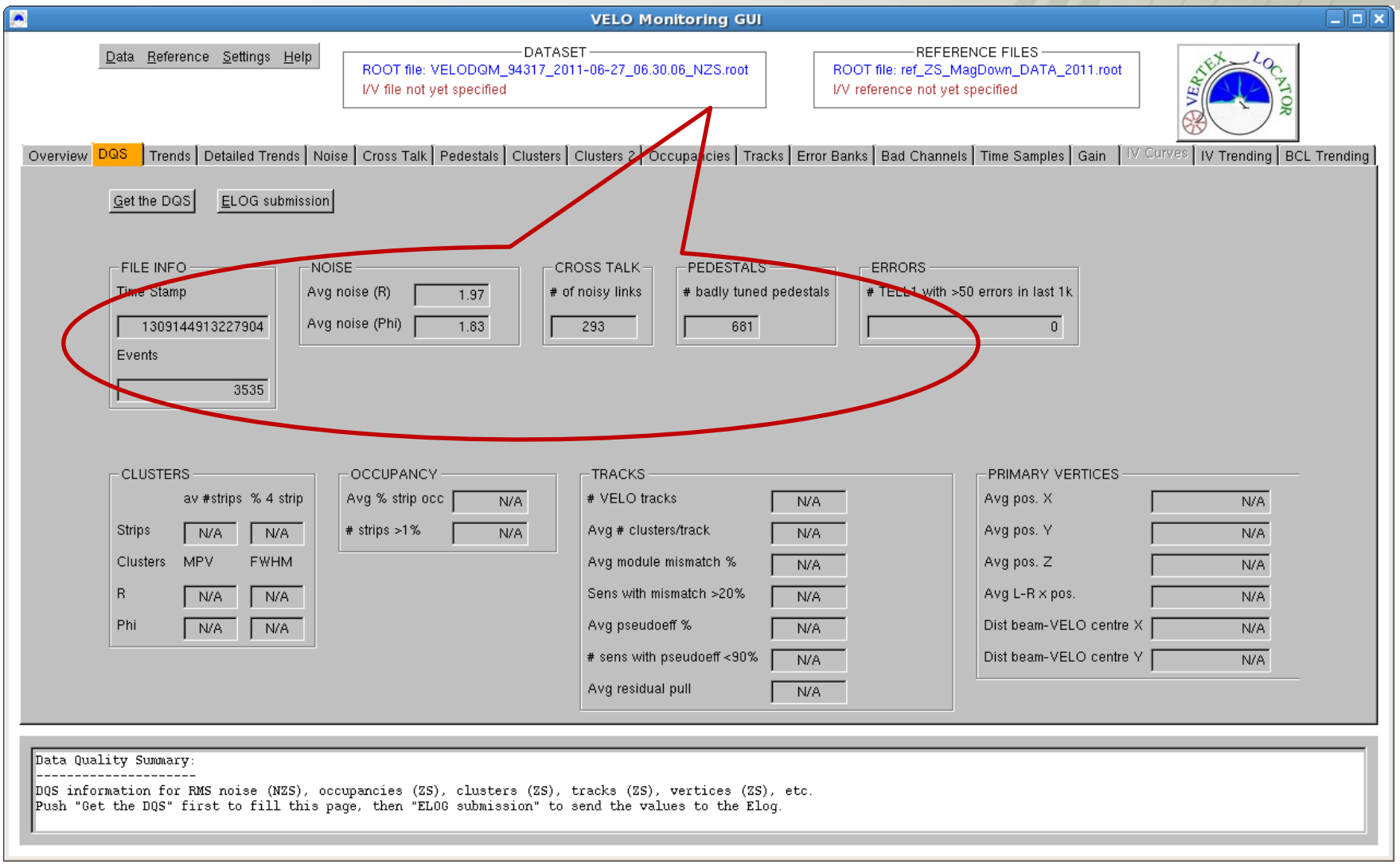
Calibration data are taken regularly,

- ROOT file (real data and references)
  - Non zero suppressed
  - Zero suppressed
- IV scans (data and references)
- IT scans (in progress)

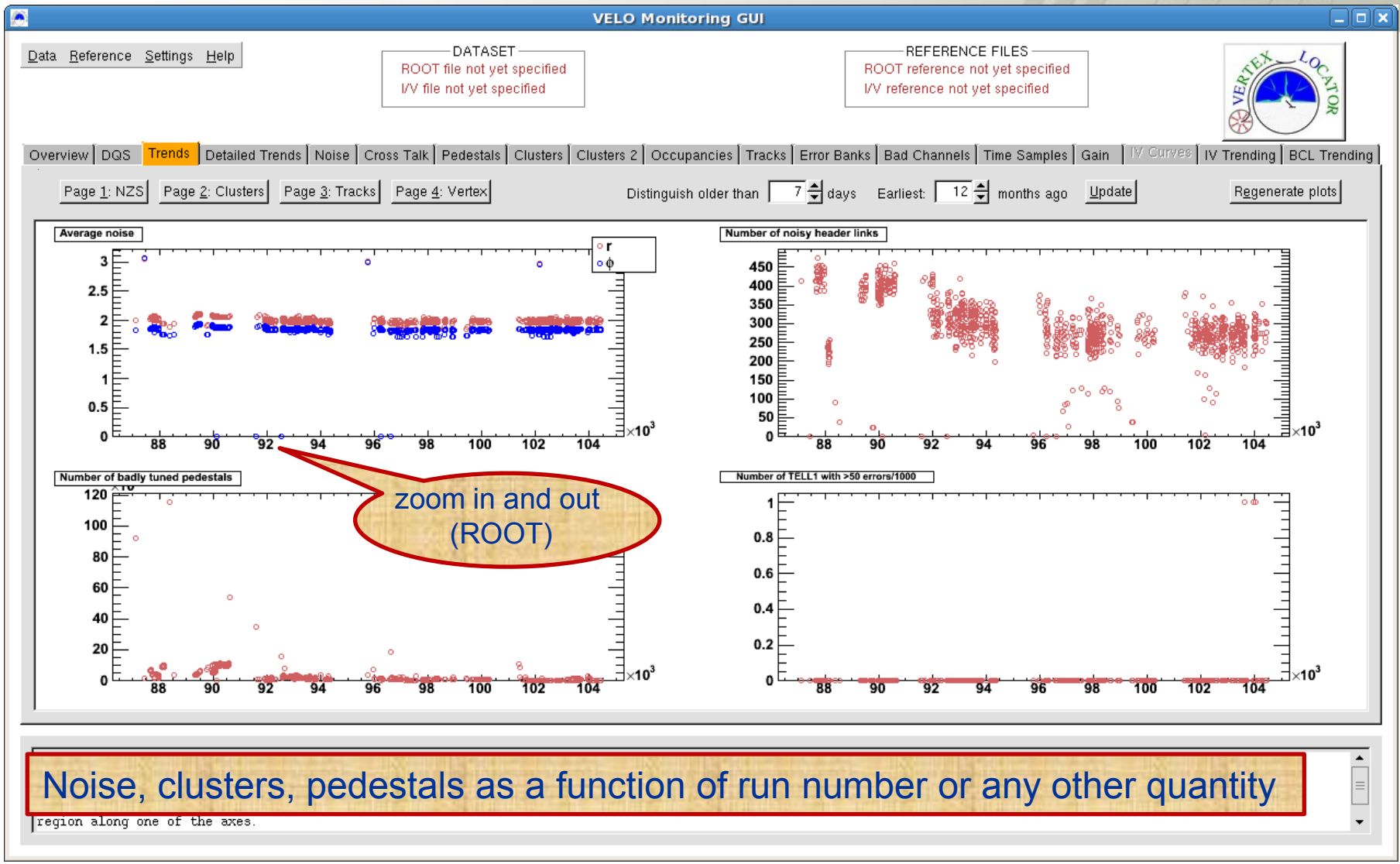
Data Quality Monitoring – VELO GUI



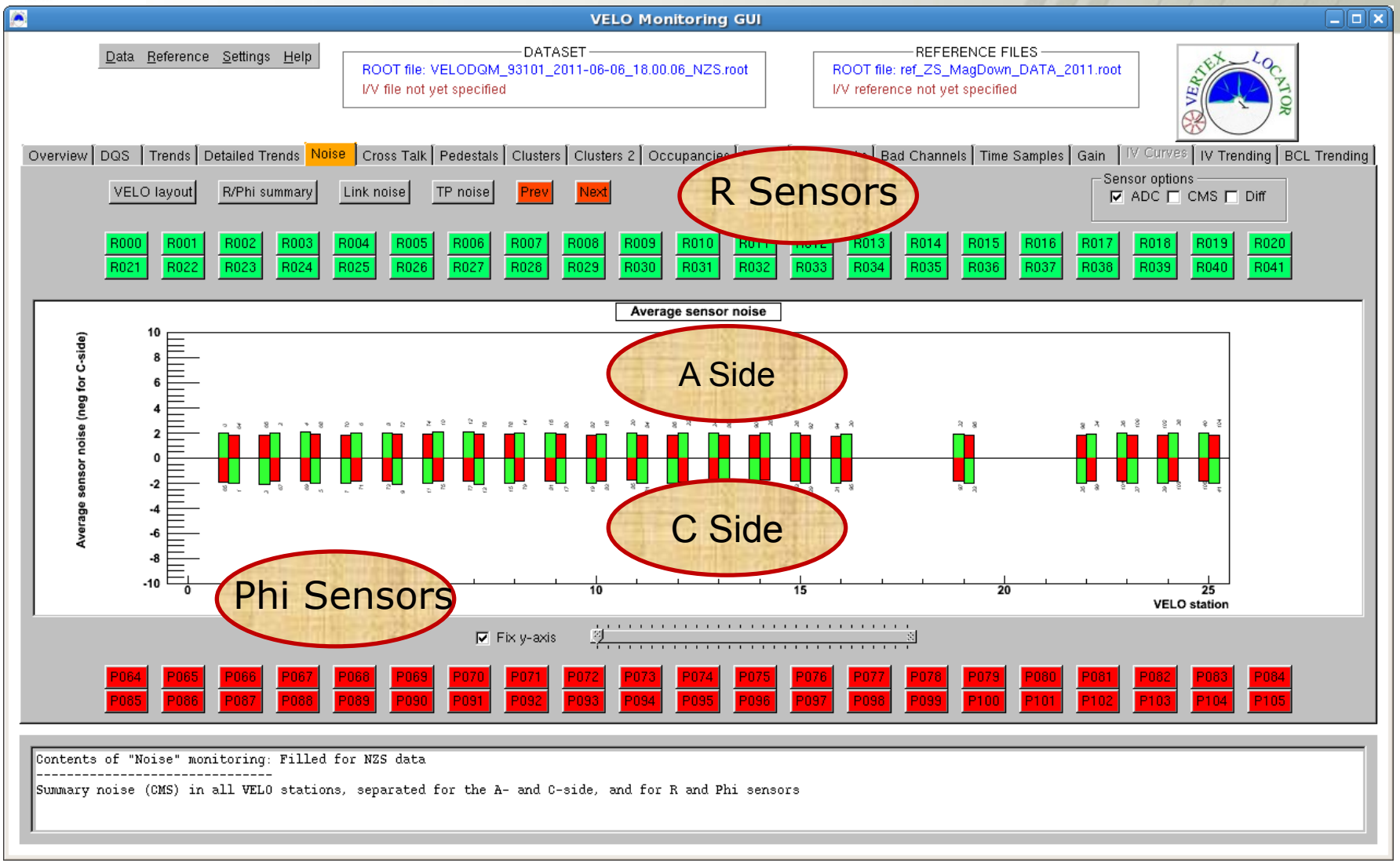
Data Quality Summary



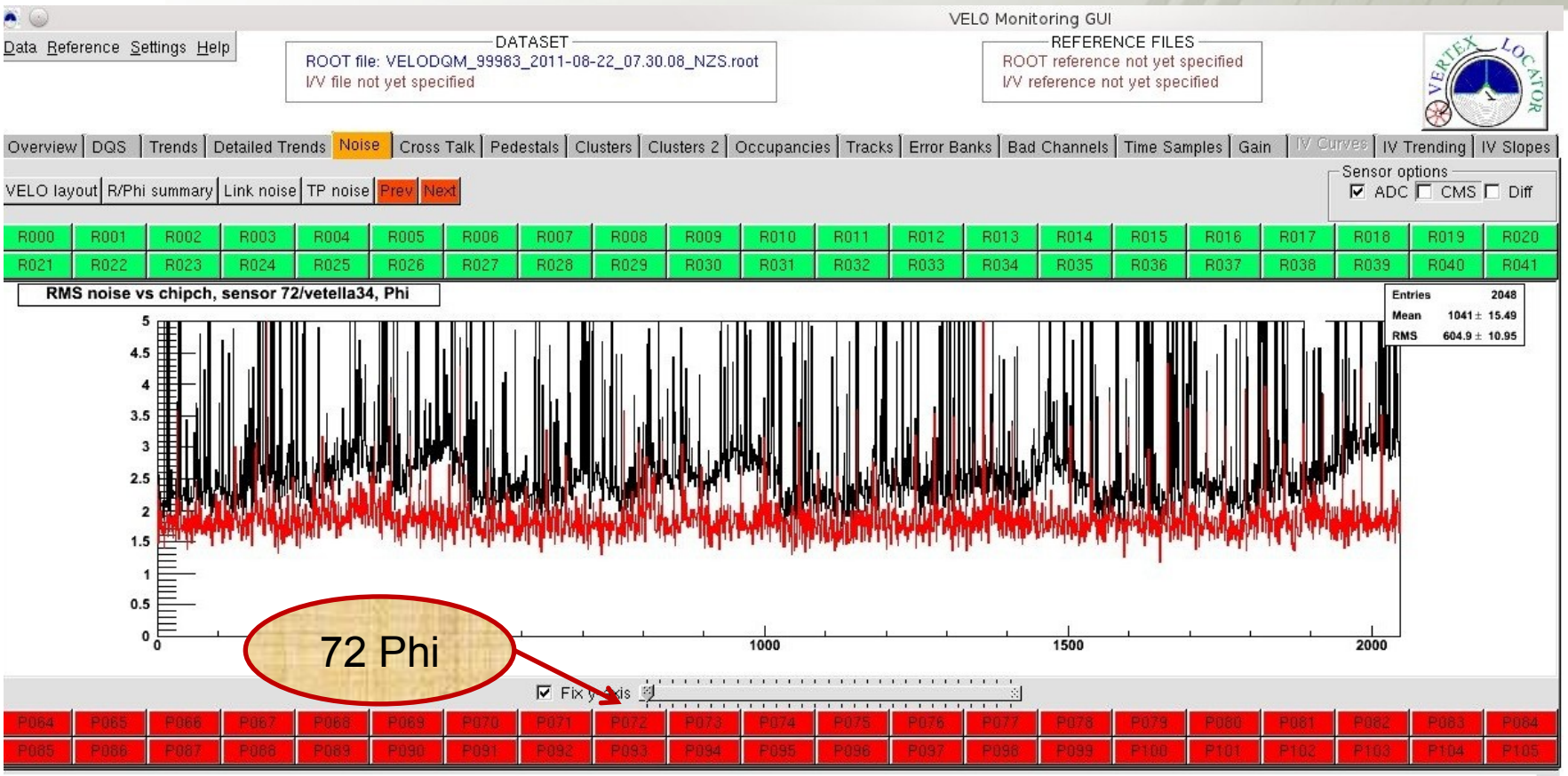
VELO Trends


VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file not yet specified
I/V file not yet specified
REFERENCE FILES
ROOT reference not yet specified
I/V reference not yet specified
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain IV Curves IV Trending BCL Trending
Page 1: NZS Page 2: Clusters Page 3: Tracks Page 4: Vertex
Distinguish older than 7 days Earliest: 12 months ago Update
Regenerate plots
Average noise
r
ϕ
Number of noisy header links
Number of badly tuned pedestals
Number of TELL1 with >50 errors/1000
zoom in and out (ROOT)
Noise, clusters, pedestals as a function of run number or any other quantity
region along one of the axes.

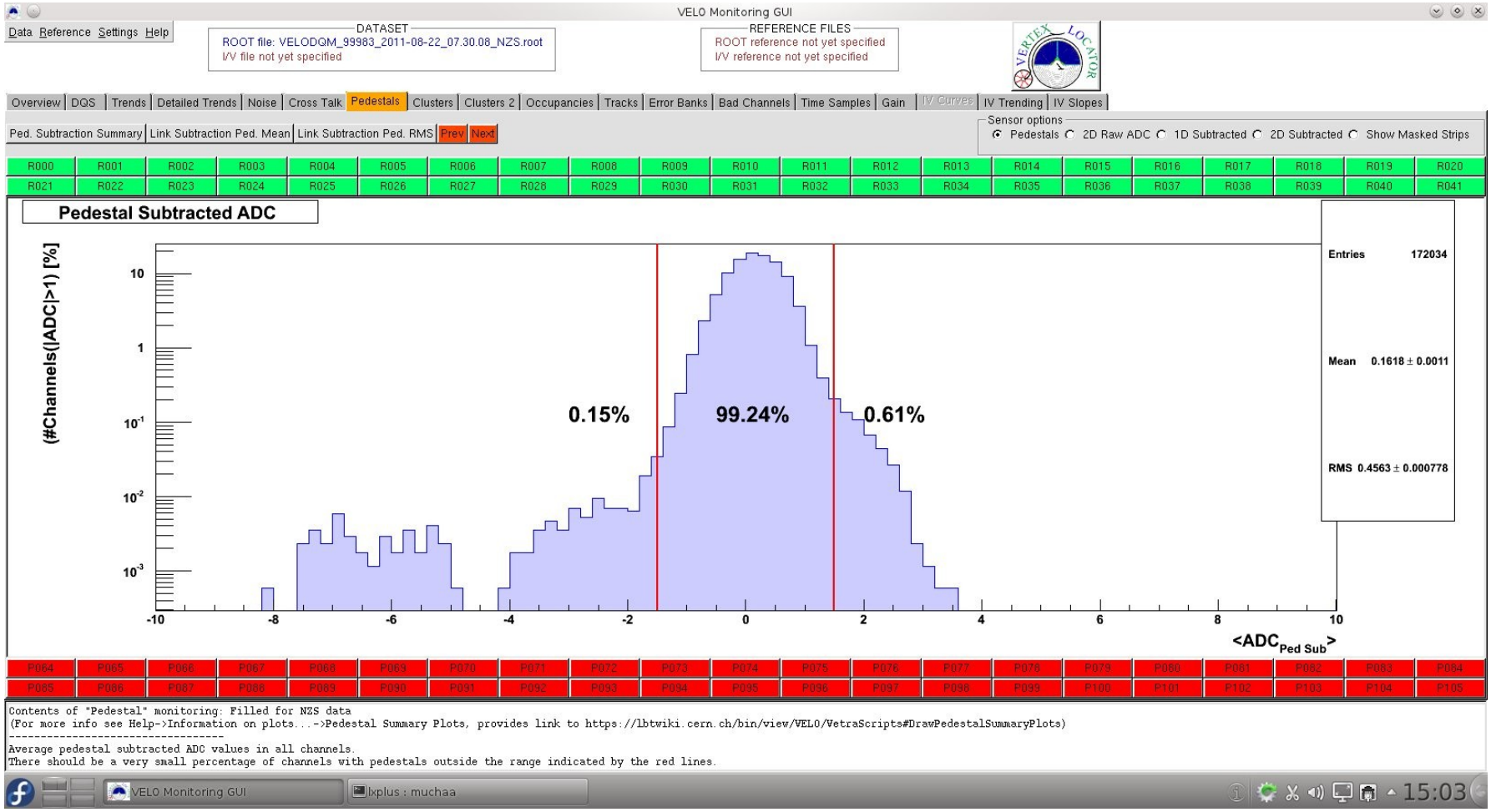
Noise


VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file: VELODQM_93101_2011-06-06_18.00.06_NZS.root
I/V file not yet specified
REFERENCE FILES
ROOT file: ref_ZS_MagDown_DATA_2011.root
I/V reference not yet specified
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Bad Channels Time Samples Gain IV Curves IV Trending BCL Trending
VELO layout
R/Phi summary
Link noise
TP noise
Prev
Next
R Sensors
Sensor options
ADC CMS Diff
R000 R001 R002 R003 R004 R005 R006 R007 R008 R009 R010 R011 R012 R013 R014 R015 R016 R017 R018 R019 R020
R021 R022 R023 R024 R025 R026 R027 R028 R029 R030 R031 R032 R033 R034 R035 R036 R037 R038 R039 R040 R041
Average sensor noise
Average sensor noise (neg for C-side)
A Side
C Side
Phi Sensors
VELO station
Fix y-axis
P064 P065 P066 P067 P068 P069 P070 P071 P072 P073 P074 P075 P076 P077 P078 P079 P080 P081 P082 P083 P084
P085 P086 P087 P088 P089 P090 P091 P092 P093 P094 P095 P096 P097 P098 P099 P100 P101 P102 P103 P104 P105
Contents of "Noise" monitoring: Filled for NZS data
Summary noise (CMS) in all VELO stations, separated for the A- and C-side, and for R and Phi sensors

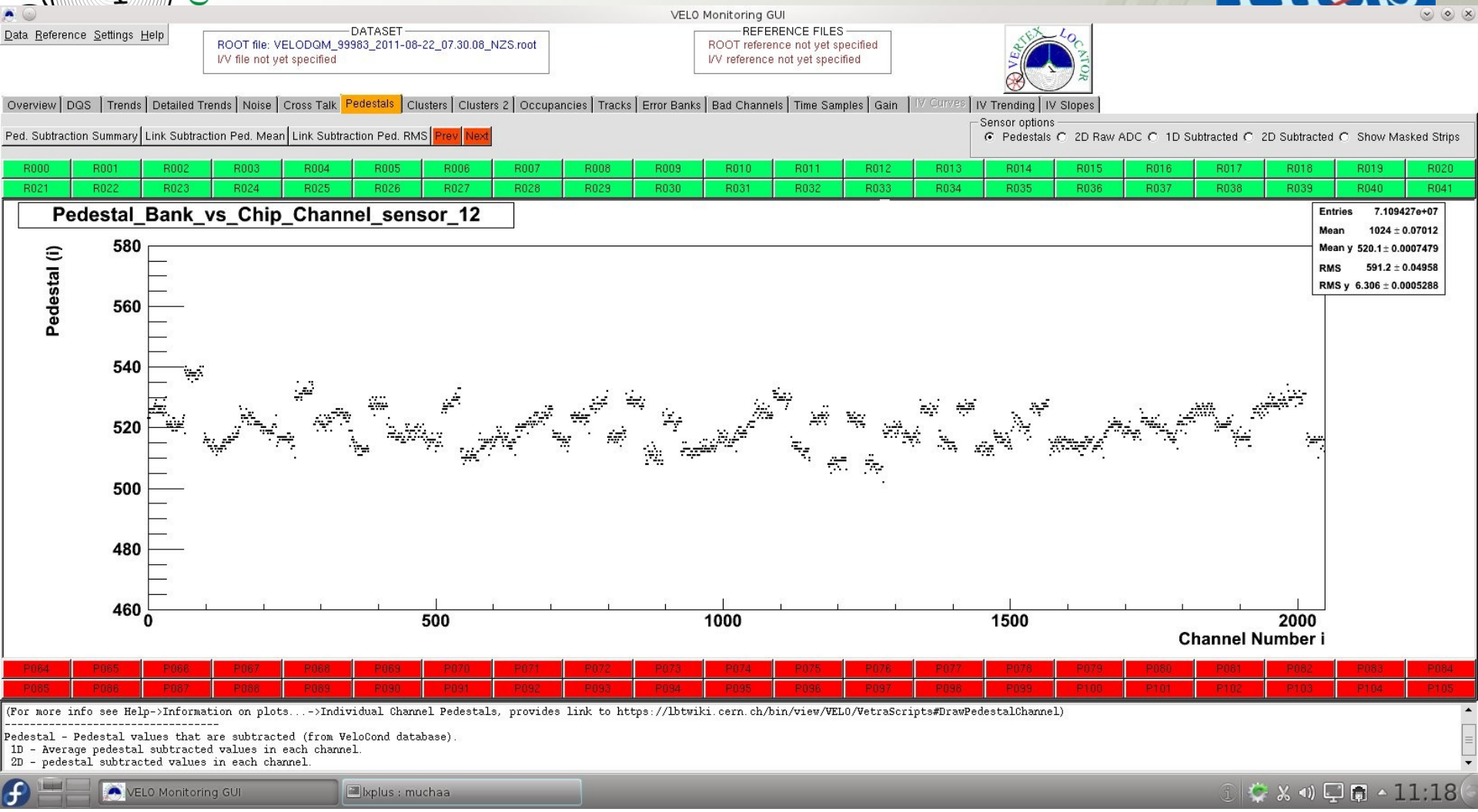
Noise for each sensor



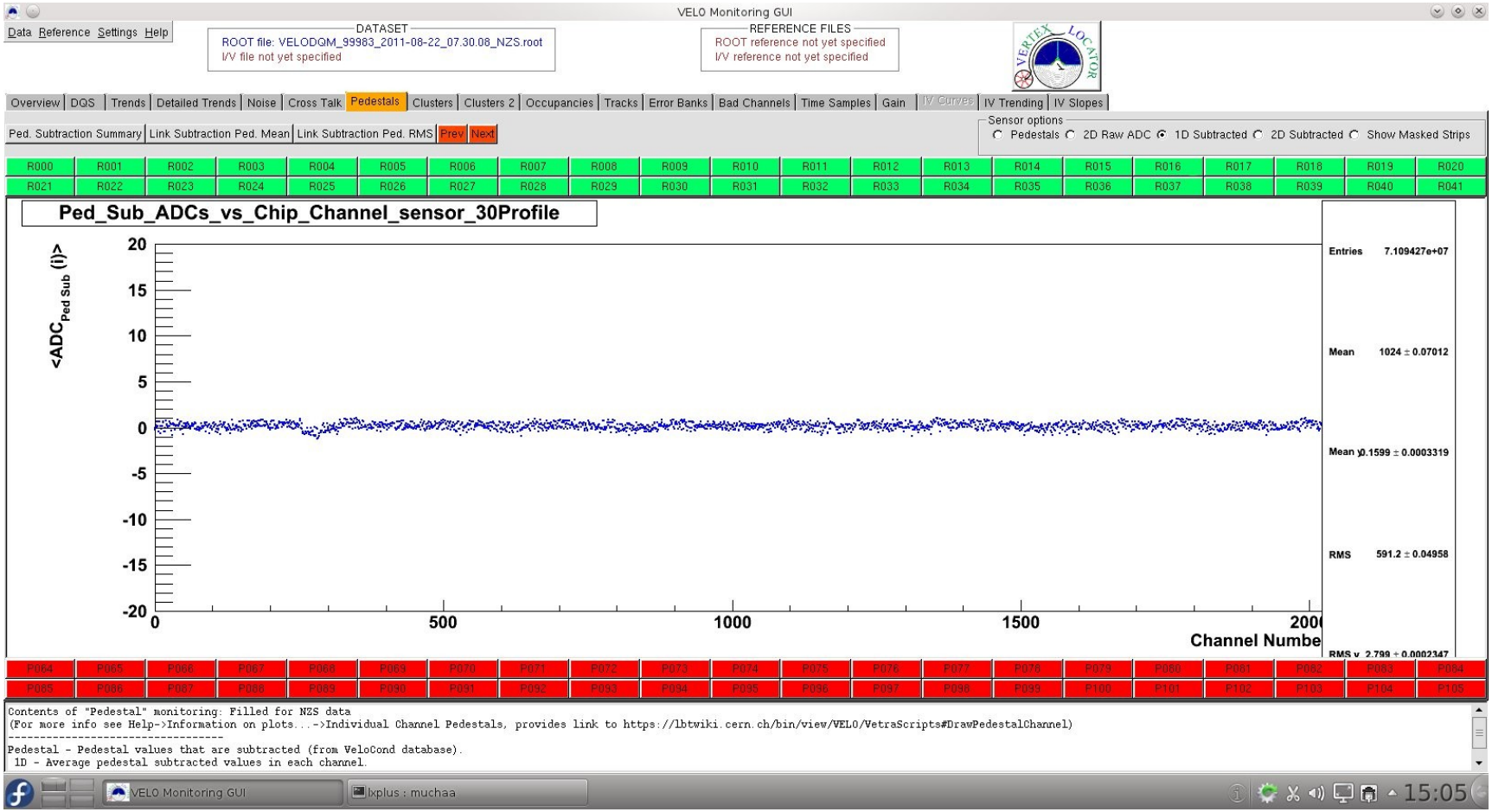
Pedestals – for each channel and sensor



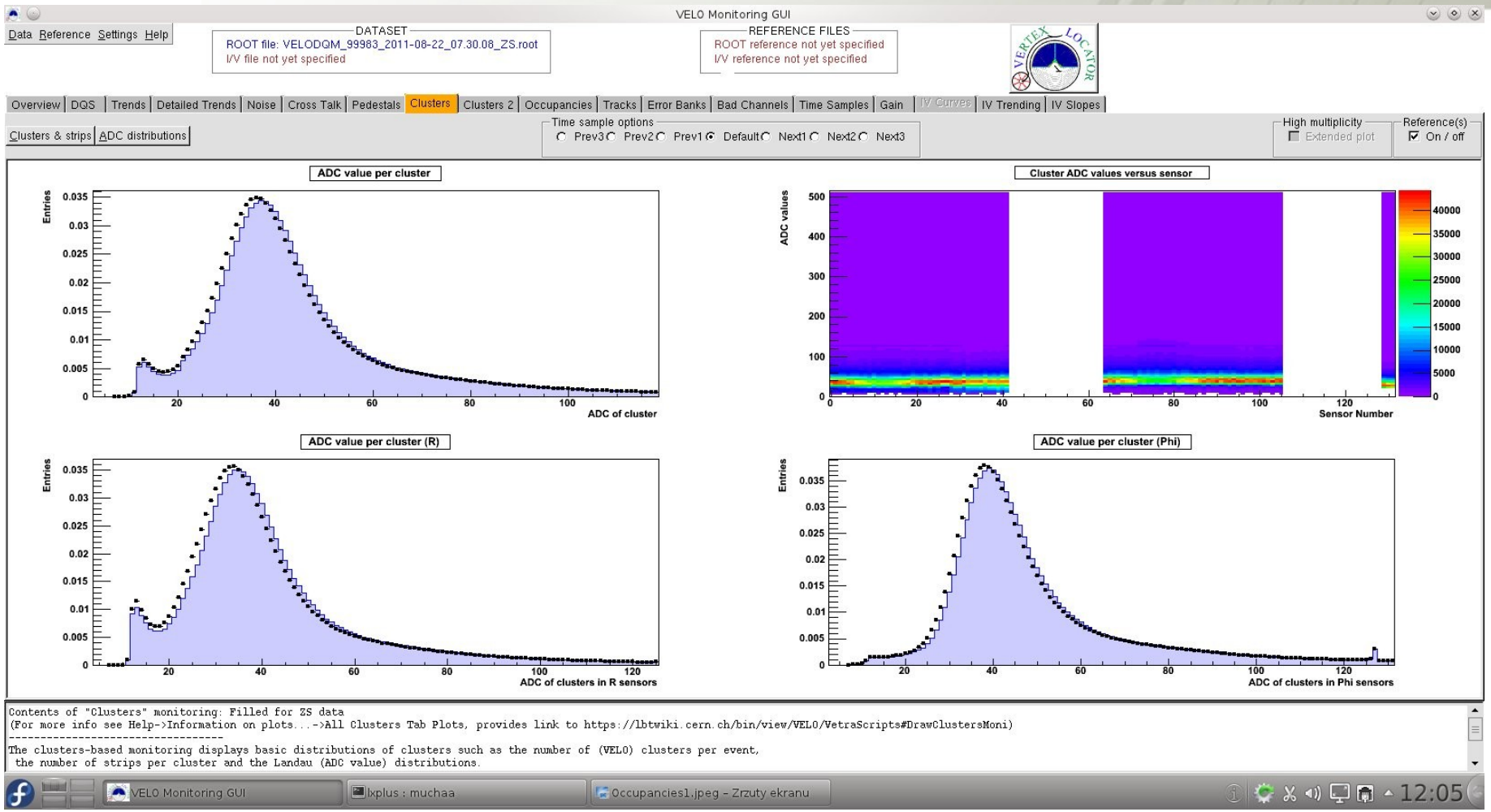
Pedestal for individual sensor



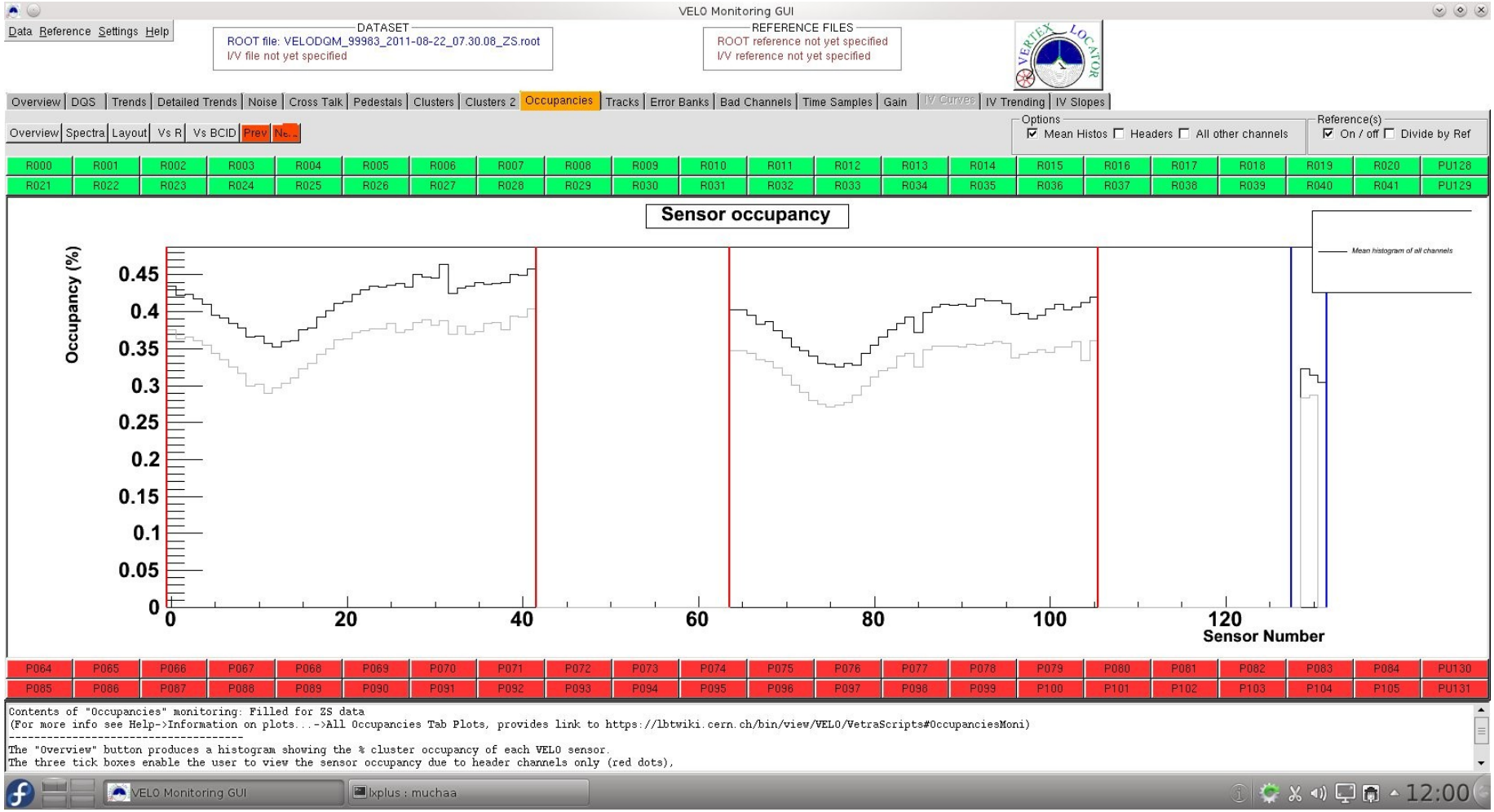
Pedestal subtracted



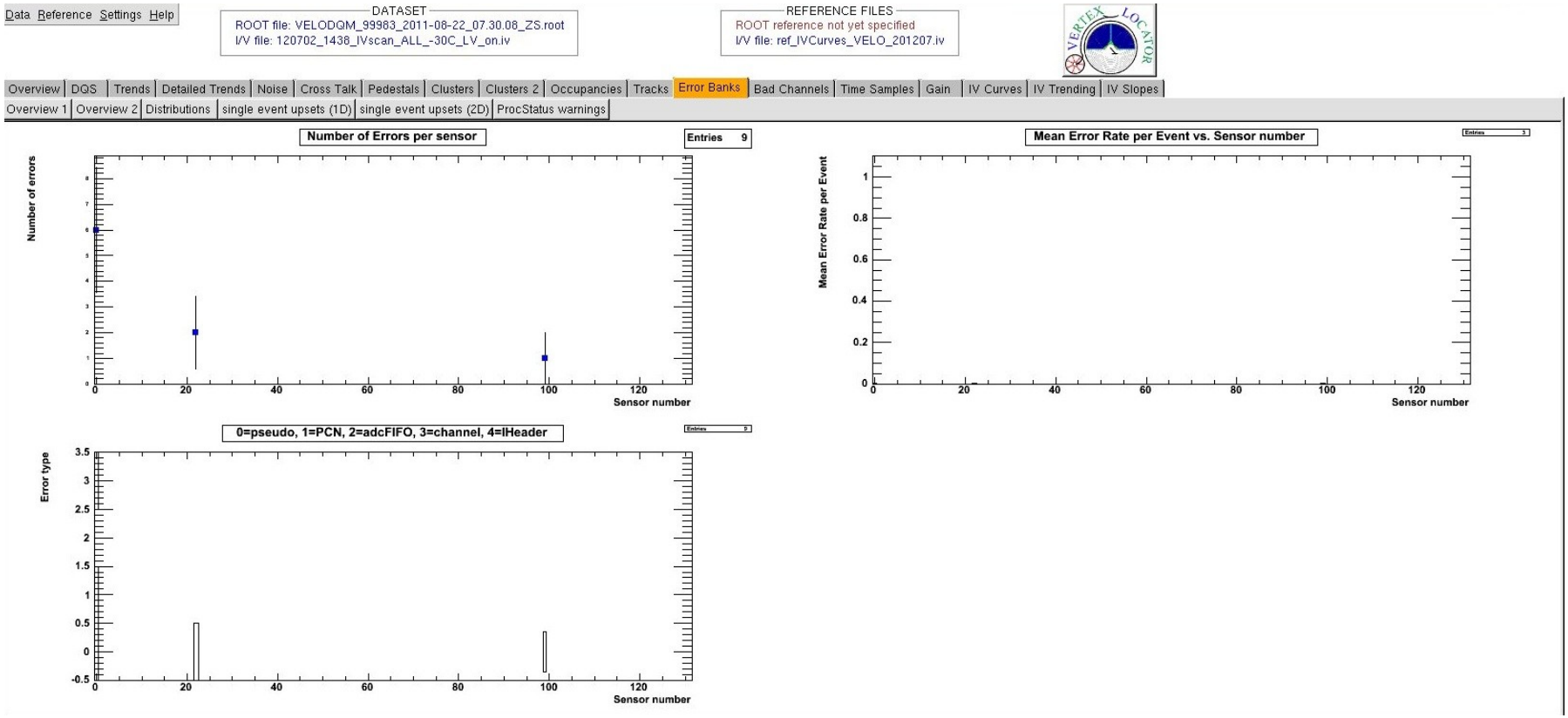
Clusters


VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file: VELODQM_99983_2011-08-22_07.30.08_ZS.root
I/V file not yet specified
REFERENCE FILES
ROOT reference not yet specified
I/V reference not yet specified
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain I/V Curves I/V Trending I/V Slopes
Clusters & strips ADC distributions
Time sample options
Prev3 Prev2 Prev1 Default Next1 Next2 Next3
High multiplicity
Extended plot
Reference(s)
On / off
ADC value per cluster
Entries
ADC of cluster
Cluster ADC values versus sensor
ADC values
Sensor Number
ADC value per cluster (R)
ADC of clusters in R sensors
ADC value per cluster (Phi)
ADC of clusters in Phi sensors
Contents of "Clusters" monitoring: Filled for ZS data
(For more info see Help->Information on plots...->All Clusters Tab Plots, provides link to https://lbtwiki.cern.ch/bin/view/VELO/VetraScripts#DrawClustersMoni)
The clusters-based monitoring displays basic distributions of clusters such as the number of (VELO) clusters per event,
the number of strips per cluster and the Landau (ADC value) distributions.
VELO Monitoring GUI
lxplus : muchaa
Occupancies1.jpeg – Zrzuty ekranu
12:05

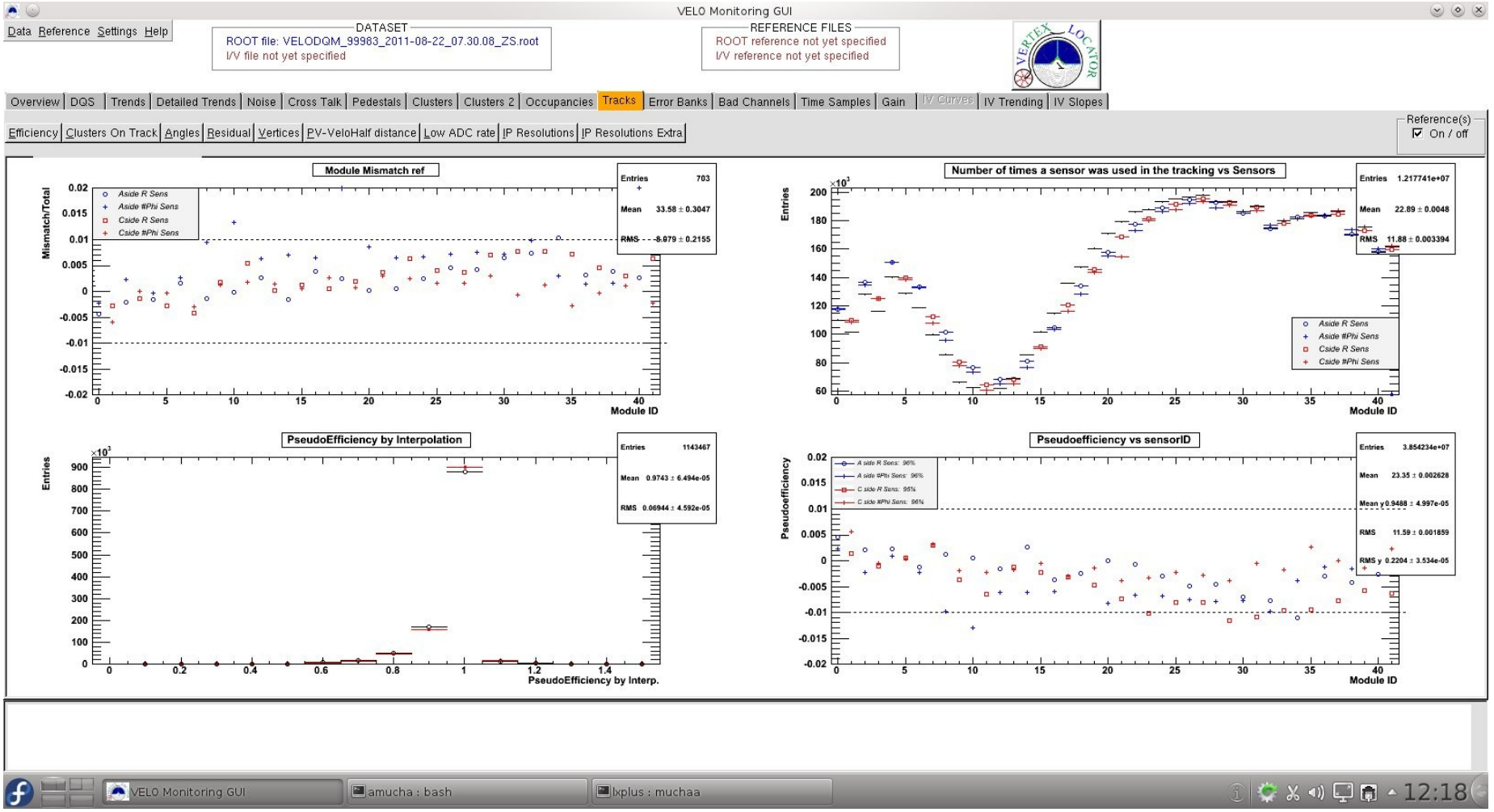
Occupancies



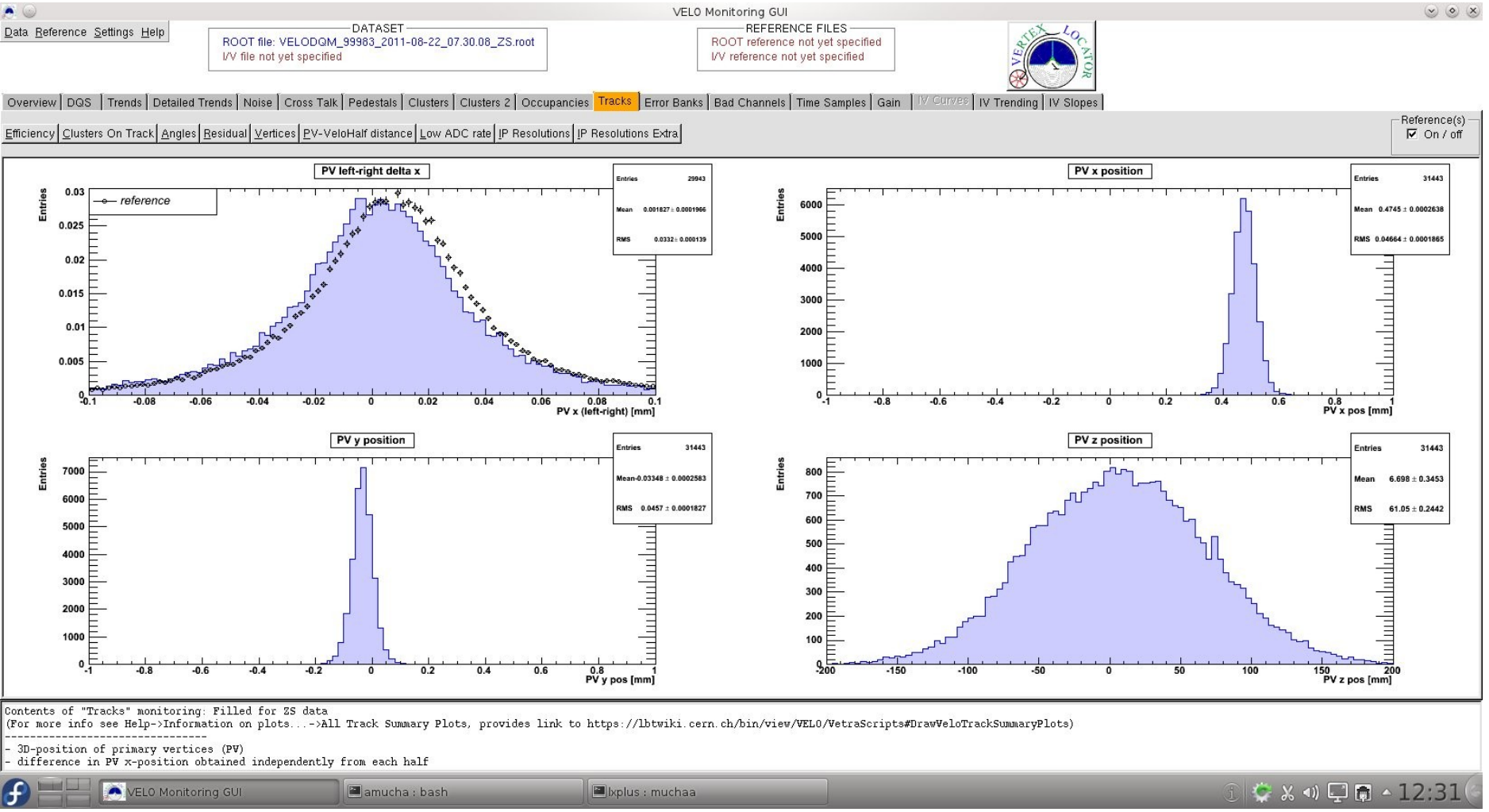
Error banks


Data Reference Settings Help
DATASET
ROOT file: VELODQM_99983_2011-08-22_07.30.08_ZS.root
I/V file: 120702_1438_IVscan_ALL_-30C_LV_on.iv
REFERENCE FILES
ROOT reference not yet specified
I/V file: ref_IVCurves_VELO_201207.iv
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain IV Curves IV Trending IV Slopes
Overview 1 Overview 2 Distributions single event upsets (1D) single event upsets (2D) ProcStatus warnings
Number of Errors per sensor
Entries 9
Number of errors
Sensor number
Mean Error Rate per Event vs. Sensor number
Mean Error Rate per Event
Sensor number
0=pseudo, 1=PCN, 2=adcFIFO, 3=channel, 4=lHeader
Error type
Sensor number

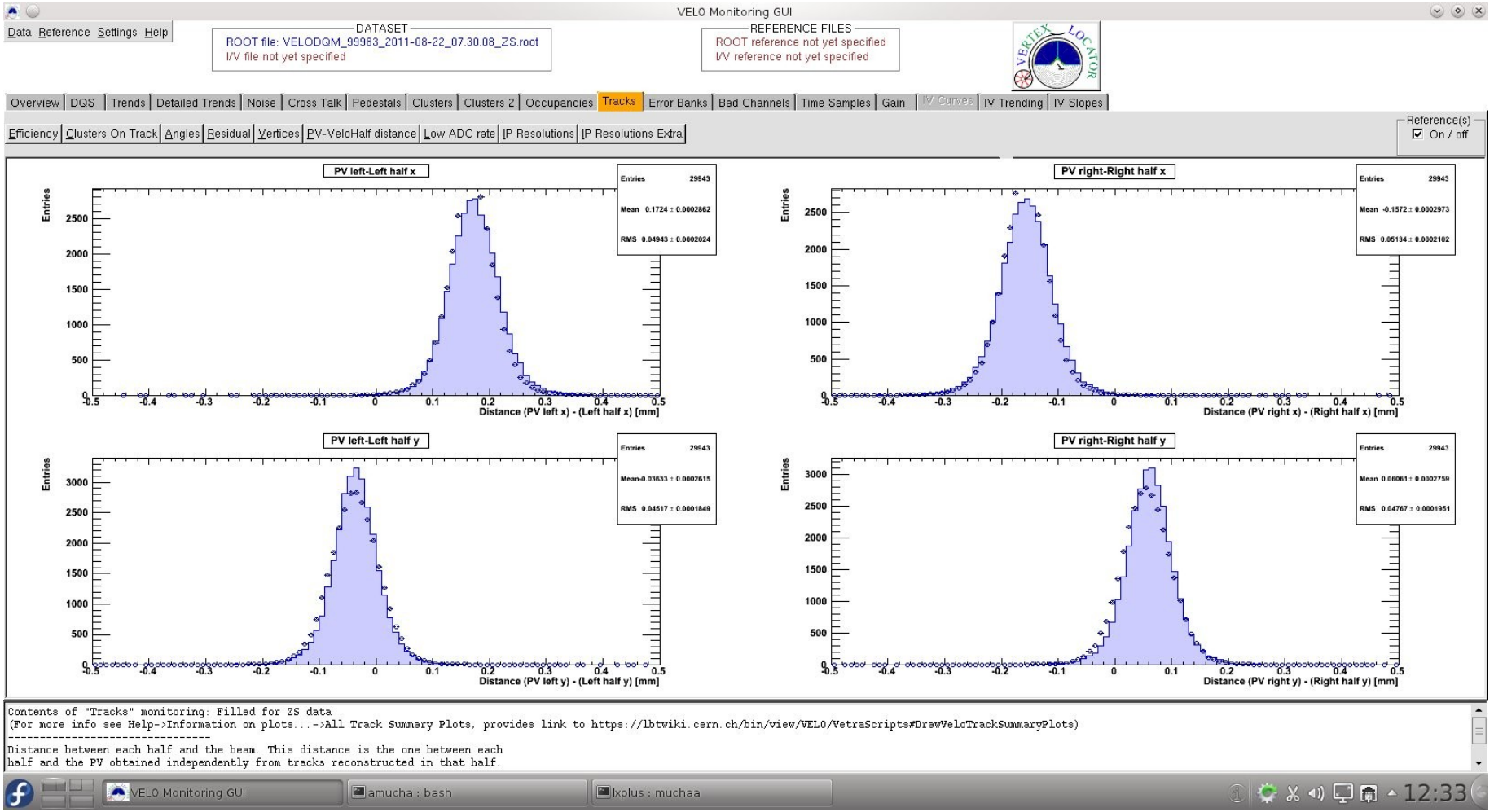
Tracks


VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file: VELODQM_99983_2011-08-22_07.30.08_ZS.root
I/V file not yet specified
REFERENCE FILES
ROOT reference not yet specified
I/V reference not yet specified
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain IV Curves IV Trending IV Slopes
Efficiency Clusters On Track Angles Residual Vertices PV-VeloHalf distance Low ADC rate IP Resolutions IP Resolutions Extra
Reference(s) On / off
Module Mismatch ref
Mismatch/Total
Module ID
Number of times a sensor was used in the tracking vs Sensors
Entries
Module ID
PseudoEfficiency by Interpolation
Entries
PseudoEfficiency by Interp.
Pseudoefficiency vs sensorID
Pseudoefficiency
Module ID
VELO Monitoring GUI
amucha : bash
lxplus : muchaa
12:18

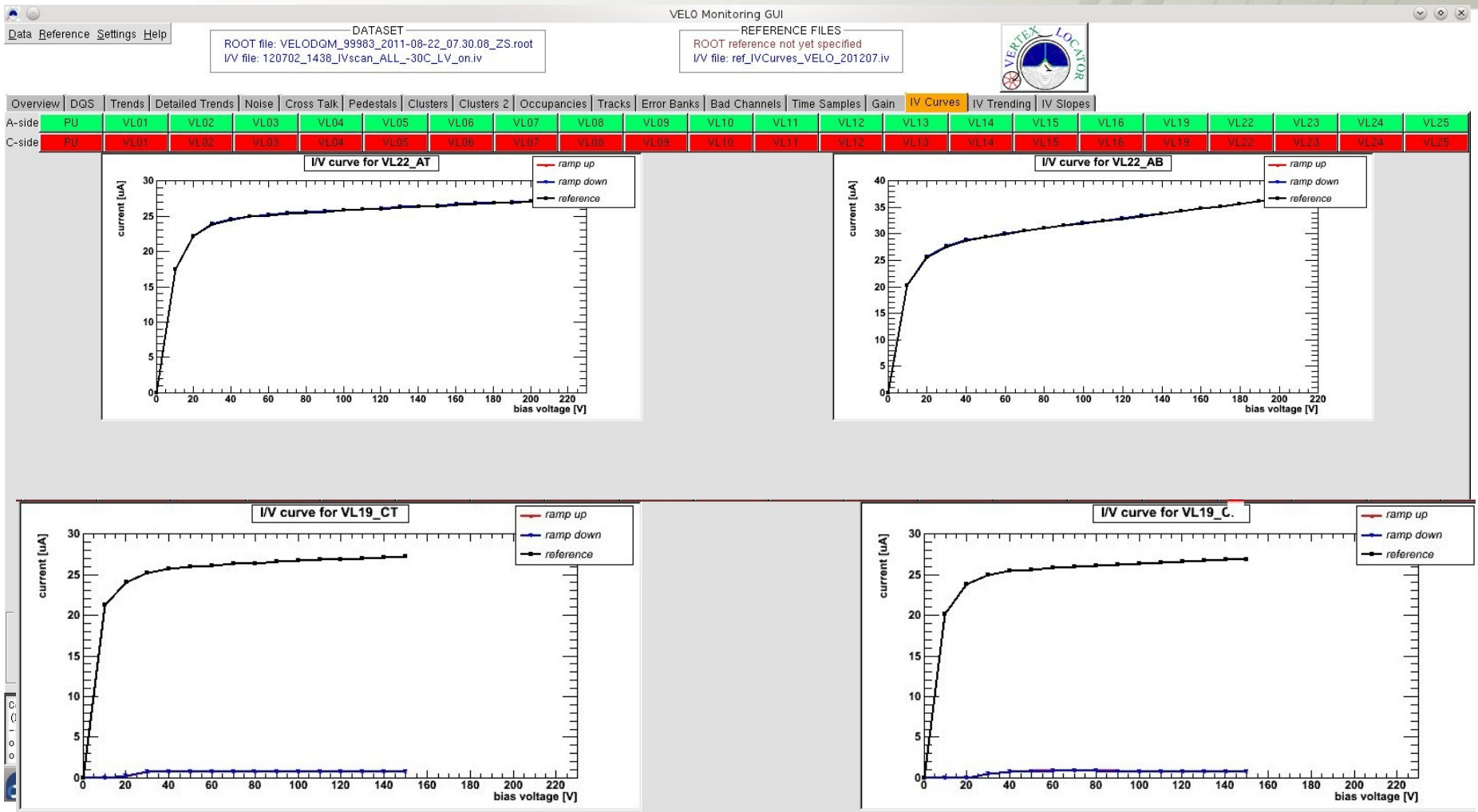
Tracks Vertices



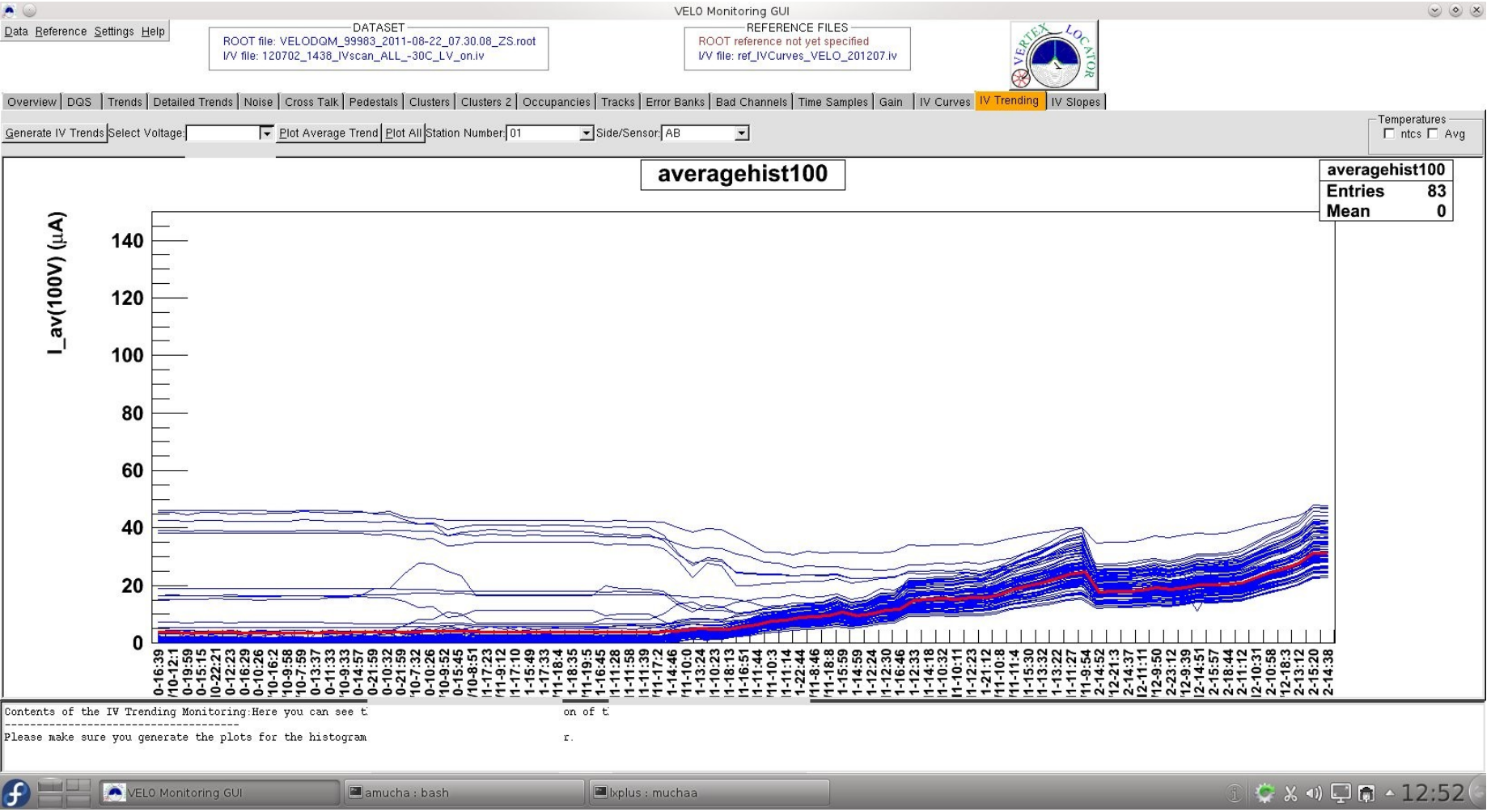
Tracks – PV quality



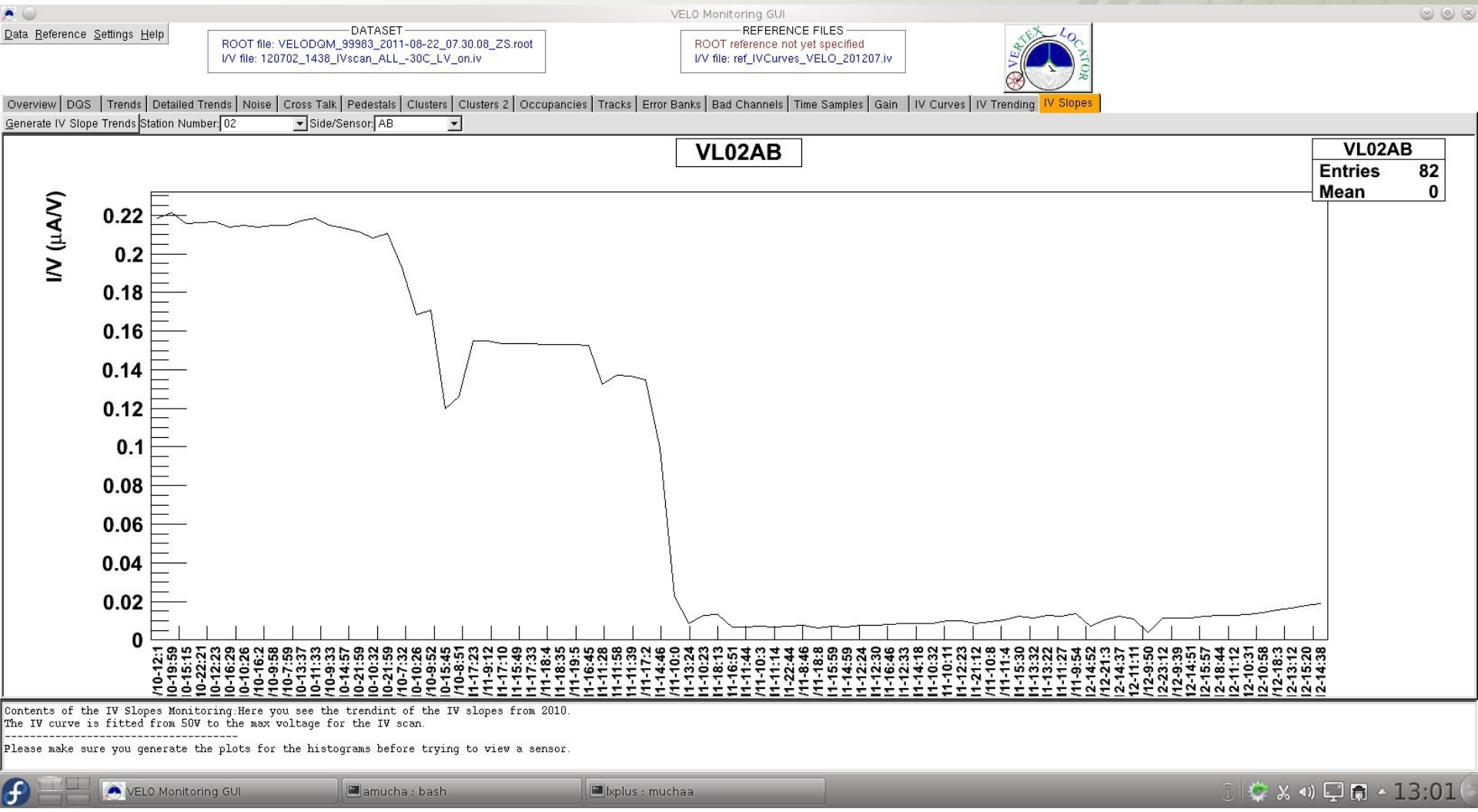
Current – Voltage (IV) scans



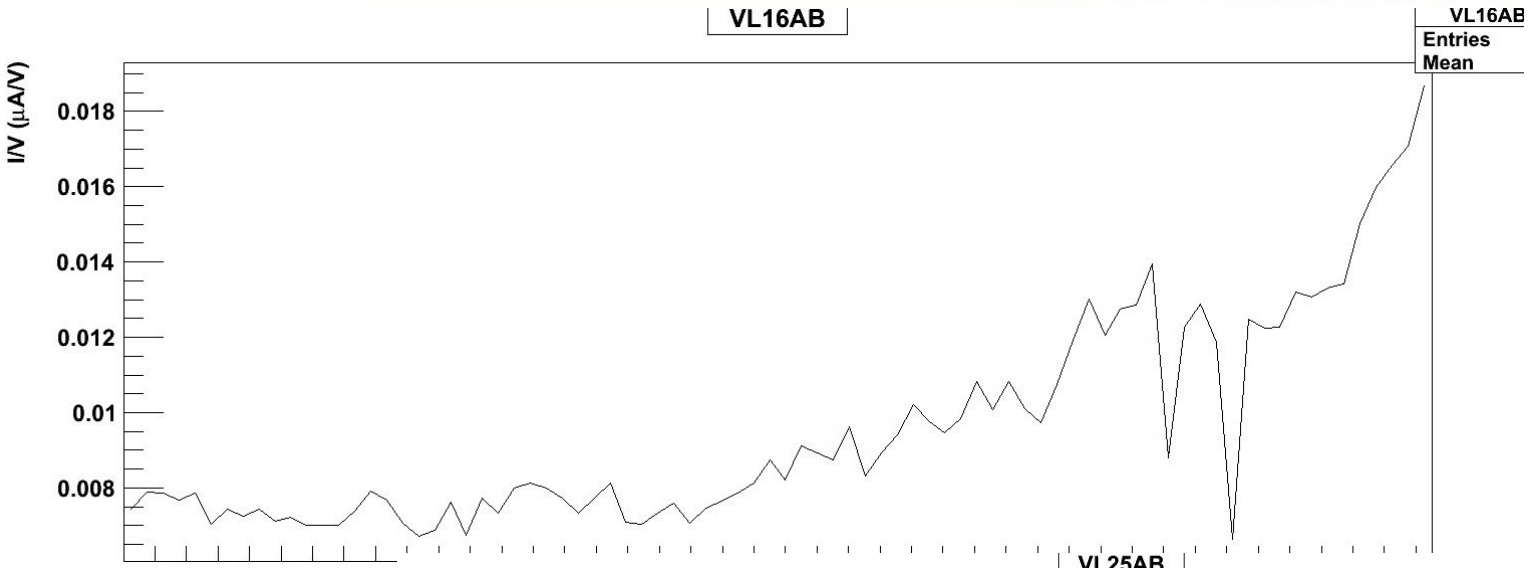
IV trending

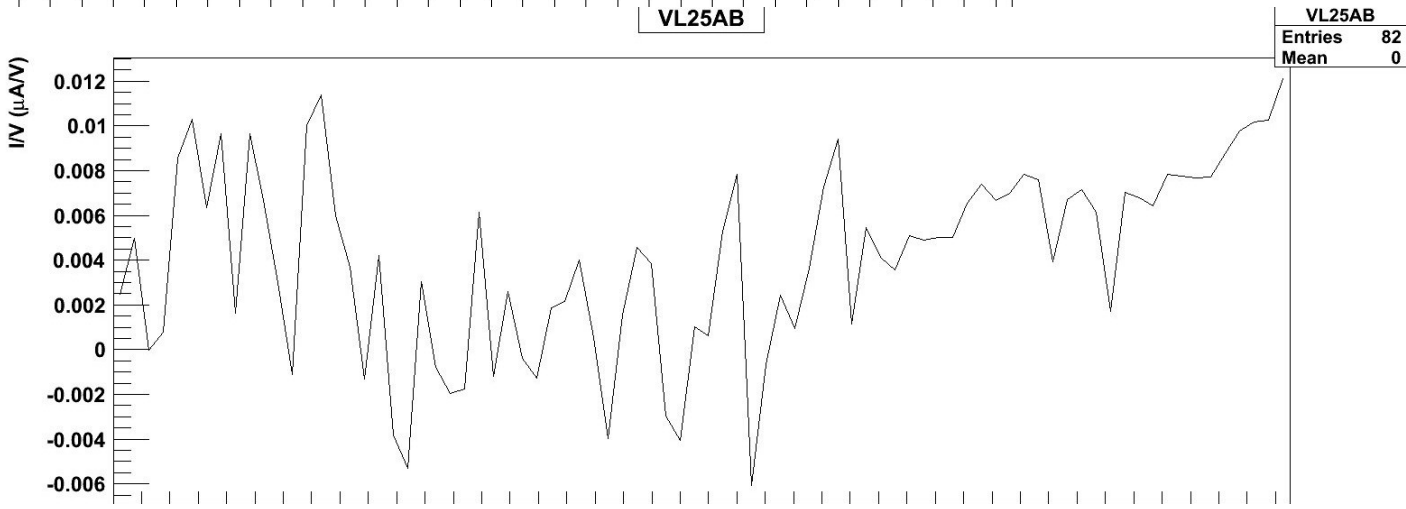

VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file: VELODQM_99983_2011-08-22_07.30.08_ZS.root
I/V file: 120702_1438_IVscan_ALL_-30C_LV_on.iv
REFERENCE FILES
ROOT reference not yet specified
I/V file: ref_IVCurves_VELO_201207.iv
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain IV Curves IV Trending IV Slopes
Generate IV Trends Select Voltage: Plot Average Trend Plot All Station Number: 01 Side/Sensor: AB
Temperatures ntcs Avg
averagehist100
averagehist100
Entries 83
Mean 0
I_av(100V) (μA)
140
120
100
80
60
40
20
0
Contents of the IV Trending Monitoring:Here you can see t
on of t
Please make sure you generate the plots for the histogram
r.
VELO Monitoring GUI
amucha : bash
lxplus : muchaa
12:52

IV slopes


VELO Monitoring GUI
Data Reference Settings Help
DATASET
ROOT file: VELODQM_99983_2011-08-22_07.30.08_ZS.root
I/V file: 120702_1438_IVscan_ALL_-30C_LV_on.iv
REFERENCE FILES
ROOT reference not yet specified
I/V file: ref_IVCurves_VELO_201207.iv
Overview DQS Trends Detailed Trends Noise Cross Talk Pedestals Clusters Clusters 2 Occupancies Tracks Error Banks Bad Channels Time Samples Gain IV Curves IV Trending IV Slopes
Generate IV Slope Trends
Station Number: 02
Side/Sensor: AB
VL02AB
VL02AB
Entries 82
Mean 0
I/V (μA/V)
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Contents of the IV Slopes Monitoring:Here you see the trendint of the IV slopes from 2010.
The IV curve is fitted from 50V to the max voltage for the IV scan.
Please make sure you generate the plots for the histograms before trying to view a sensor.
VELO Monitoring GUI
amucha : bash
lxplus : muchaa
13:01

IV slopes - examples





Summary

We have a tool for monitoring the VELO performance.

In graphical mode in a very quick and efficient way most of the parameters can be checked.

Decision is taken whether the data are of a good quality.

New algorithms are easily added when needed .