Advanced Virgo dataDisplay

D. Verkindt

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Basic requirements

- Read frame formatted data offline and online, whatever their source
- Input data types may be time series, camera images, spectra, DQ segments, triggers
- Computation and plots refresh must be as fast as possible (optimize the code)
- GUI based on a simple tool. GUI functionalities must be simple and intuitive (optionally: fancy interface)
- Provide channels combination and basic signal processing in addition to plots drawing
- Provide the possibility to rerun from a saved configuration
- Reliable online running, even when data are missing or corrupted

Many internal changes

- Central engine (how to get data, how to pass them to plots) fully changed
- No more frames reading, only data vectors (FrVect format)
- Large cleanup of the code
- Calls to Xforms APIs now regrouped into a single source code
- Use of the Frv library to do most of the signal processing (thus FFTW)
- Better management of plots list and channels list
- Simplified management of reference plots
- …

Use new libraries

- Use ROOT library v5r34p050
- Use Frame library v8r24
- Use Xforms library v0r9999p2
- Use Frv library v4r22p2 (thus FFTW v3r3p30)
- Run under SL6 64 bits
- Connects online via Cm to the FdIOServer processes that use Fd v8rXX

New features

- Possibility to read several data files at the same time
- Possibility to align plots in time (same time window, same refresh period)
- All channels listed in a single browser
- Use of anti-aliasing filter when resampling the data
- Possibility to apply pass-band filter on data (only for TIME plot for now)
- Slider available on the main panel to visit data along the X axis
- Tools menu giving access to options, checks, debug, etc…
- Keep waiting for new data when reading end of files
- Green-washed and simplified user interface
- **Configuration saved in dy.cfg (new format)**

Removed features

- No more « Edit Clone » button
- No more information about frame number
- No more dump of the data
- **No more dd.car (and no possibility to read back old configuration files)**

Old features kept but that you may have never used

- Write on disk the input data read by the dataDisplay
- Do a bi-coherence plot (coherence between signal 1 at freq1 and signal2 at freq2)
- Do time plot showing the bits of values of a signal
- Do 2D distribution plot with N samplings shift between the two signals
- Change color scale of the 2D or time-frequency plots
- Do the difference between a camera image and a reference one
- Use any ANSI C mathematical function in the « Channels Operation string »
- Buttons « Copy » and « Transform » for plots

Planned new features

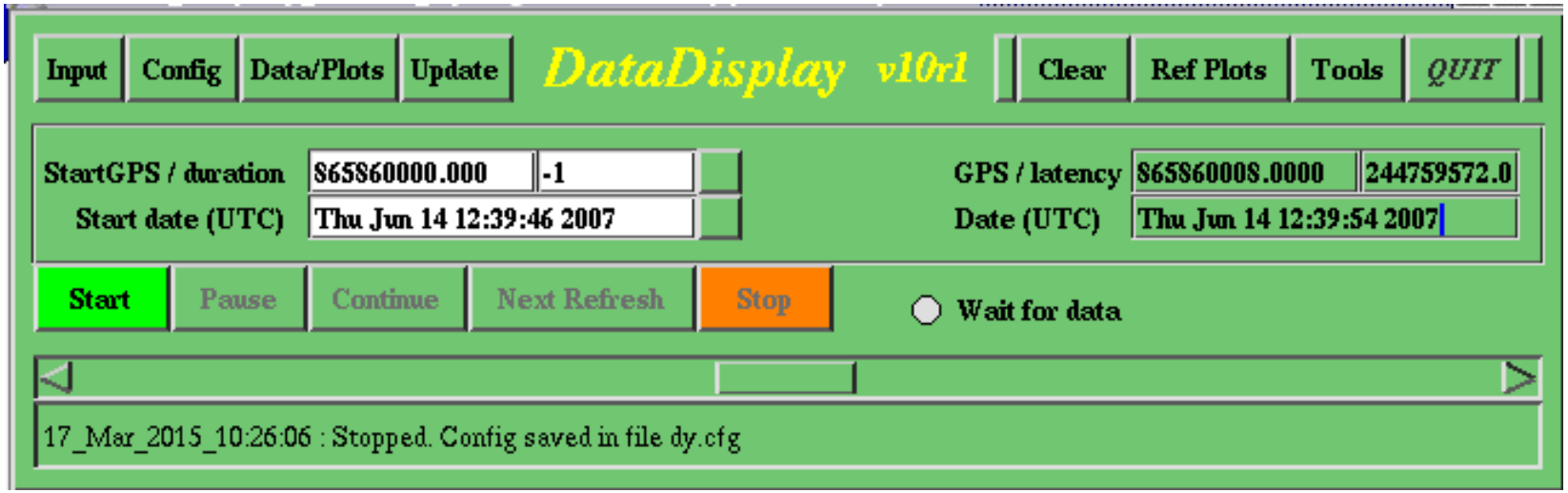
- Compute brms and pass-band filtered signals
- Define a trigger condition (based on channels or on DQ segments)
- Read FrEvents (MBTA) or ROOT files (Omicron)
- And do plots also on events (for instance glitchgrams)
- Take input data also from formatted ascii files
- Superpose to data the periods when Science_Mode flag (or any DQ flag) is ON
- Get information from channels database

Planned dataDisplay releases

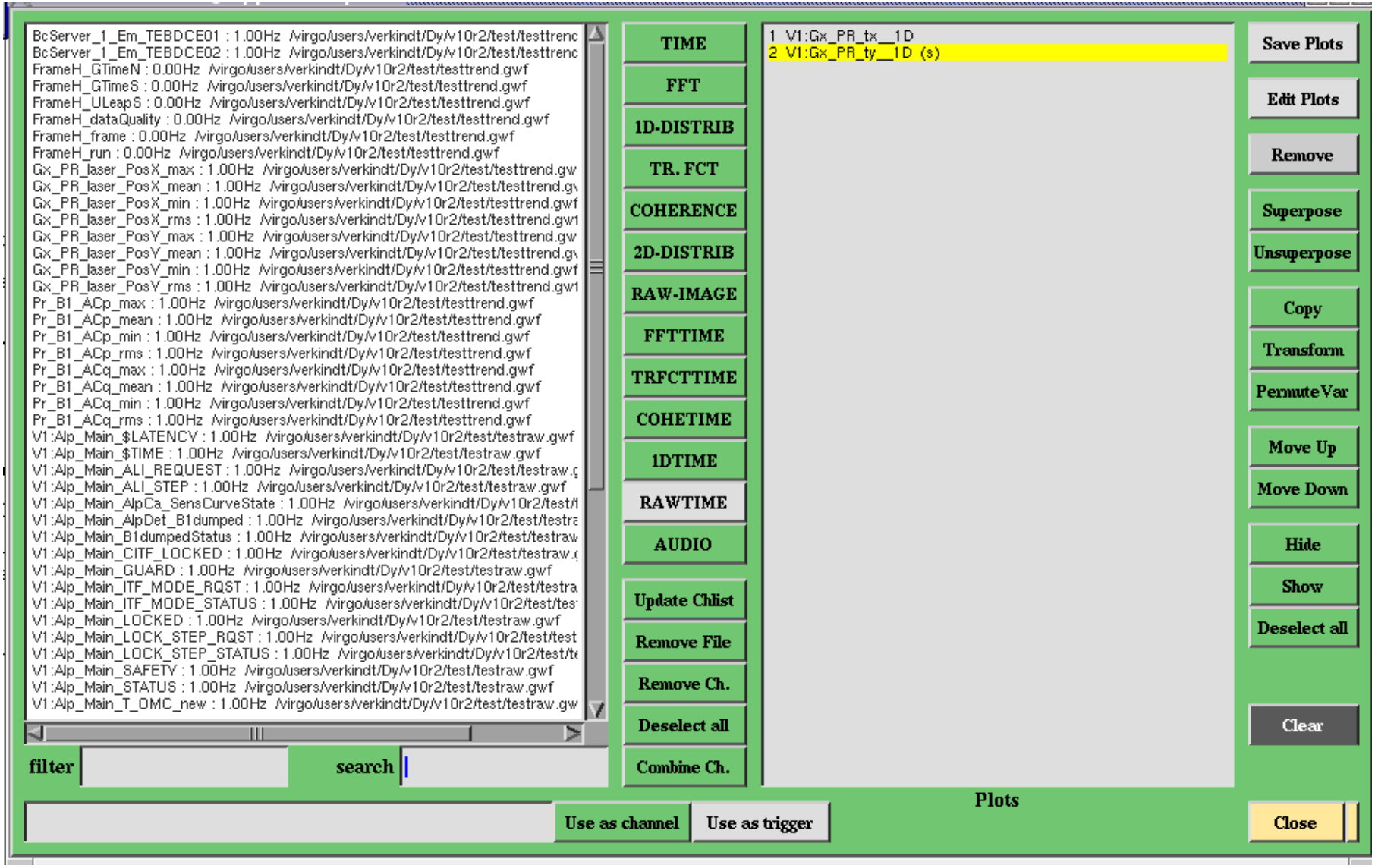
- Release a version Dy v10r1 in /virgoStaging area
- **Get users requirements and remarks, collect the discovered bugs**
- Do the easiest/fastest modifications and use latest release of ROOT v5 (v5r34p25)
- **Release a version Dy v10r2 in /virgoStaging area (in April)**
- Add first priority features and do mandatory fixes
- **Release a version v10r3 in /virgoStaging area (hopefully before june 2015)**

- Add other required features and fix other bugs (a never ending story…)

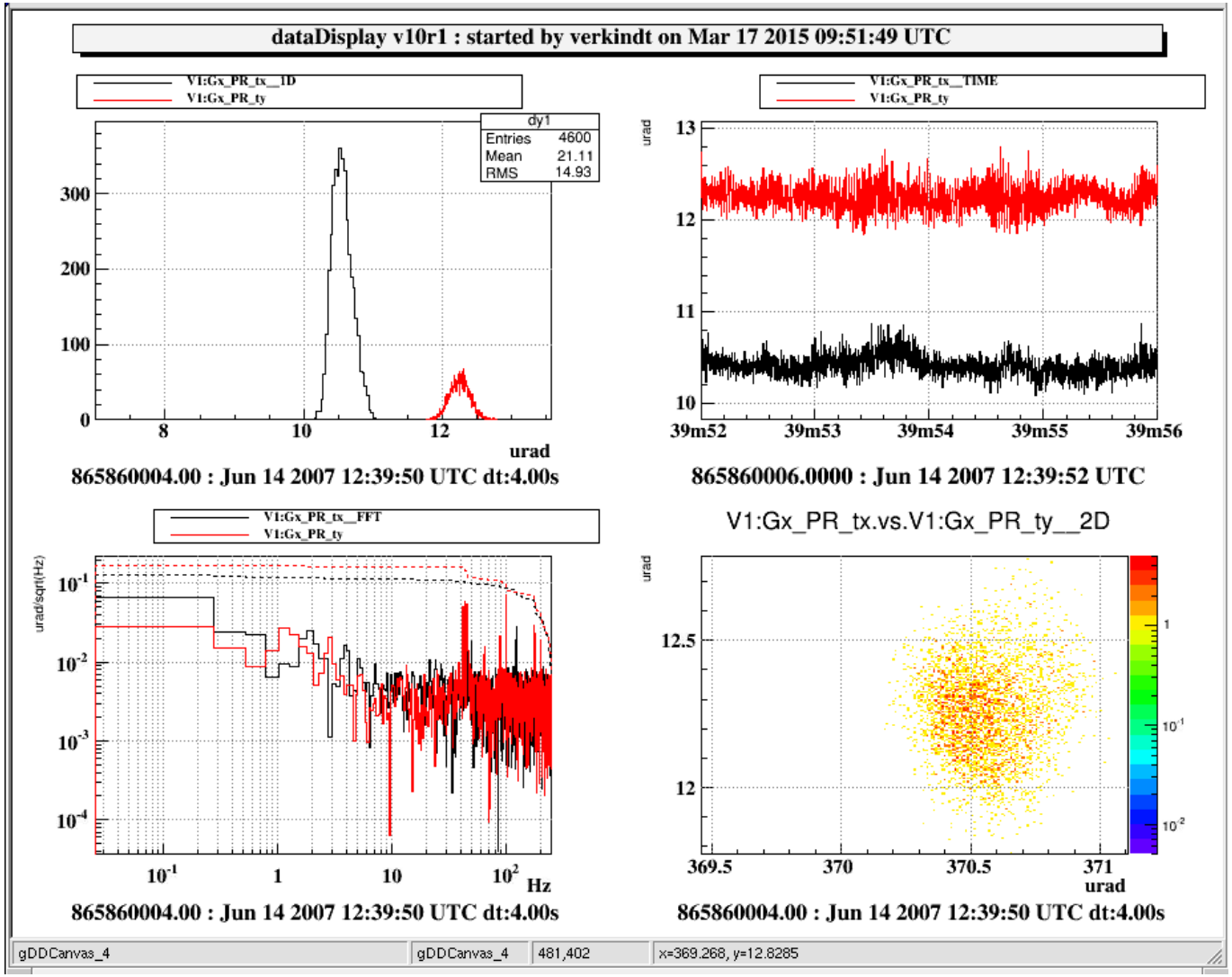
Snapshots


Input
Config
Data/Plots
Update
DataDisplay v10r1
Clear
Ref Plots
Tools
QUIT
StartGPS / duration
$65860000.000
-1
Start date (UTC)
Thu Jun 14 12:39:46 2007
GPS / latency
$65860008.0000
244759572.0
Date (UTC)
Thu Jun 14 12:39:54 2007
Start
Pause
Continue
Next Refresh
Stop
Wait for data
17_Mar_2015_10:26:06 : Stopped. Config saved in file dy.cfg

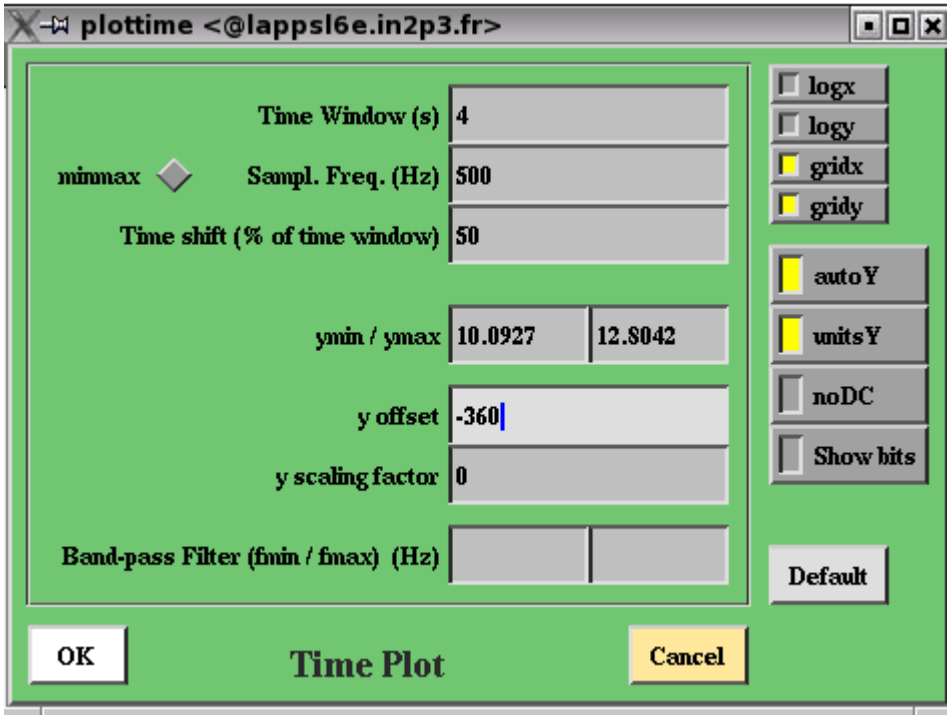
Snapshots

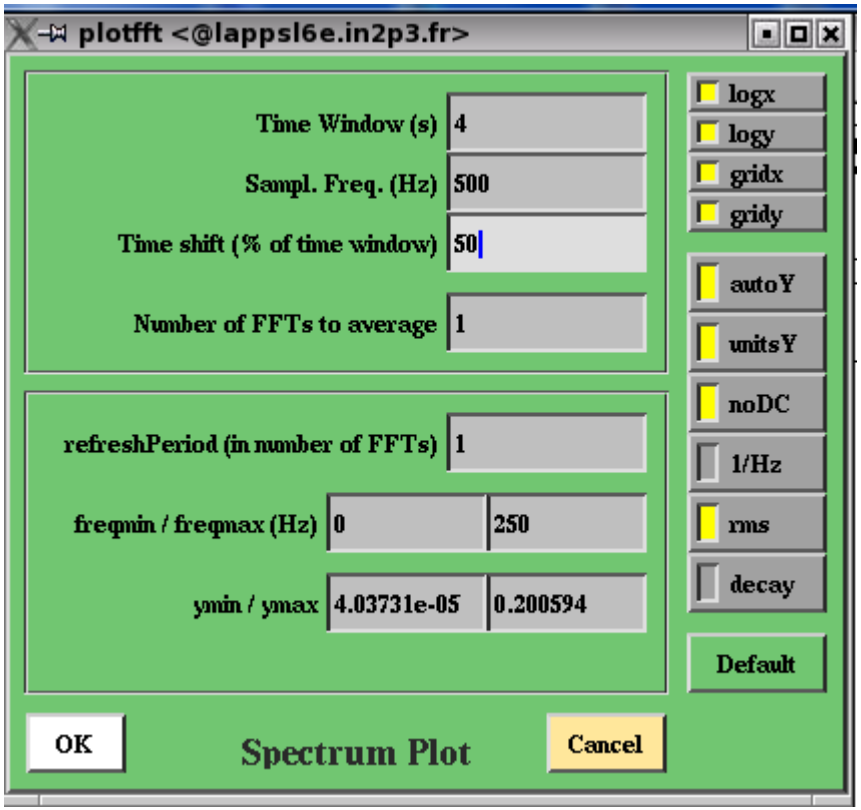

BcServer_1_Em_TEBDCE01 : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrenc
BcServer_1_Em_TEBDCE02 : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrenc
FrameH_GTimeN : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
FrameH_GTimeS : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
FrameH_ULeapS : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
FrameH_dataQuality : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
FrameH_frame : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
FrameH_run : 0.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Gx_PR_laser_PosX_max : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gw
Gx_PR_laser_PosX_mean : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.g
Gx_PR_laser_PosX_min : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Gx_PR_laser_PosX_rms : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gw
Gx_PR_laser_PosY_max : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gw
Gx_PR_laser_PosY_mean : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.g
Gx_PR_laser_PosY_min : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Gx_PR_laser_PosY_rms : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gw
Pr_B1_ACp_max : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACp_mean : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACp_min : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACp_rms : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACq_max : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACq_mean : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACq_min : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
Pr_B1_ACq_rms : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testtrend.gwf
V1:Alp_Main_$LATENCY : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_$TIME : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_ALI_REQUEST : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.g
V1:Alp_Main_ALI_STEP : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_AlpCa_SensCurveState : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/t
V1:Alp_Main_AlpDet_B1dumped : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testra
V1:Alp_Main_B1dumpedStatus : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw
V1:Alp_Main_CITF_LOCKED : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.g
V1:Alp_Main_GUARD : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_ITF_MODE_RQST : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testra
V1:Alp_Main_ITF_MODE_STATUS : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/tes
V1:Alp_Main_LOCKED : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_LOCK_STEP_RQST : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/test
V1:Alp_Main_LOCK_STEP_STATUS : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/te
V1:Alp_Main_SAFETY : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_STATUS : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gwf
V1:Alp_Main_T_OMC_new : 1.00Hz /virgo/users/verkindt/Dy/v10r2/test/testraw.gw
filter
search
TIME
FFT
1D-DISTRIB
TR. FCT
COHERENCE
2D-DISTRIB
RAW-IMAGE
FFTTIME
TRFCTTIME
COHETIME
1DTIME
RAWTIME
AUDIO
Update Chlist
Remove File
Remove Ch.
Deselect all
Combine Ch.
1 V1:Gx_PR_tx__1D
2 V1:Gx_PR_ty__1D (s)
Plots
Save Plots
Edit Plots
Remove
Superpose
Unsuperpose
Copy
Transform
PermuteVar
Move Up
Move Down
Hide
Show
Deselect all
Clear
Use as channel
Use as trigger
Close

Snapshots

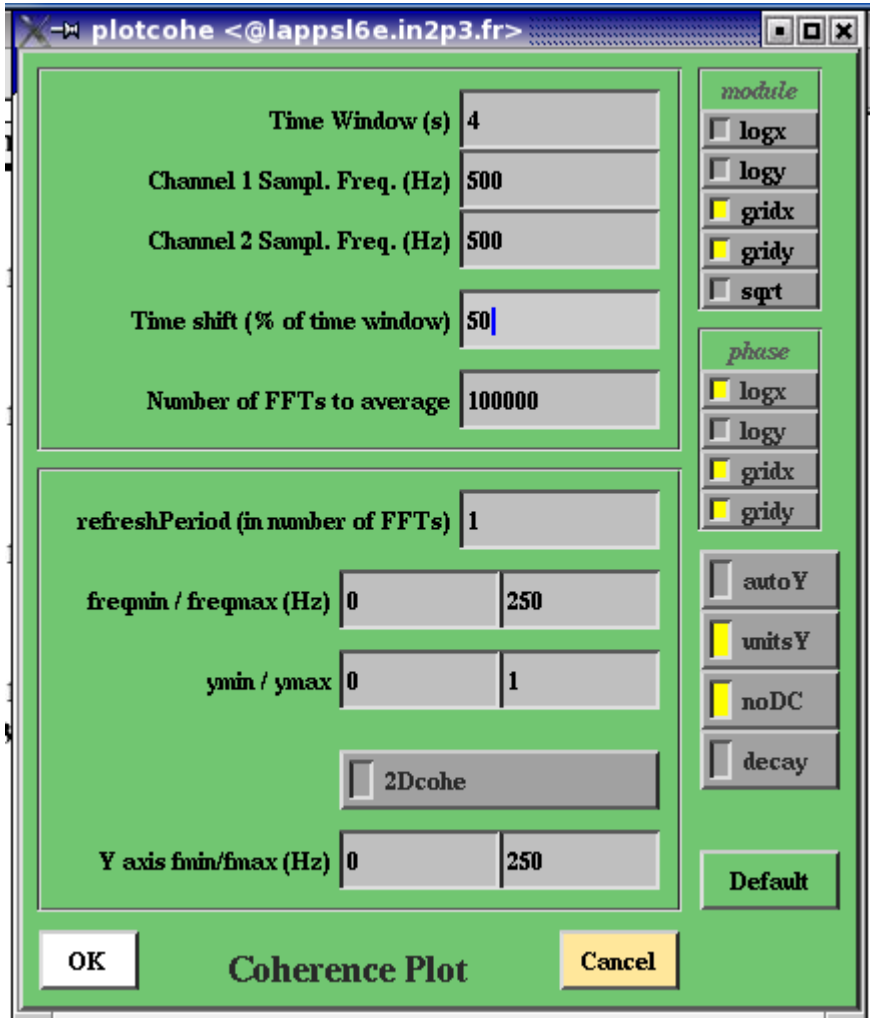

dataDisplay v10r1 : started by verkindt on Mar 17 2015 09:51:49 UTC
V1:Gx_PR_tx__1D
V1:Gx_PR_ty
dy1
Entries 4600
Mean 21.11
RMS 14.93
urad
865860004.00 : Jun 14 2007 12:39:50 UTC dt:4.00s
V1:Gx_PR_tx__TIME
V1:Gx_PR_ty
865860006.0000 : Jun 14 2007 12:39:52 UTC
V1:Gx_PR_tx__FFT
V1:Gx_PR_ty
urad/sqrt(Hz)
Hz
865860004.00 : Jun 14 2007 12:39:50 UTC dt:4.00s
V1:Gx_PR_tx.vs.V1:Gx_PR_ty__2D
urad
865860004.00 : Jun 14 2007 12:39:50 UTC dt:4.00s
gDDCanvas_4
gDDCanvas_4
481,402
x=369.268, y=12.8285

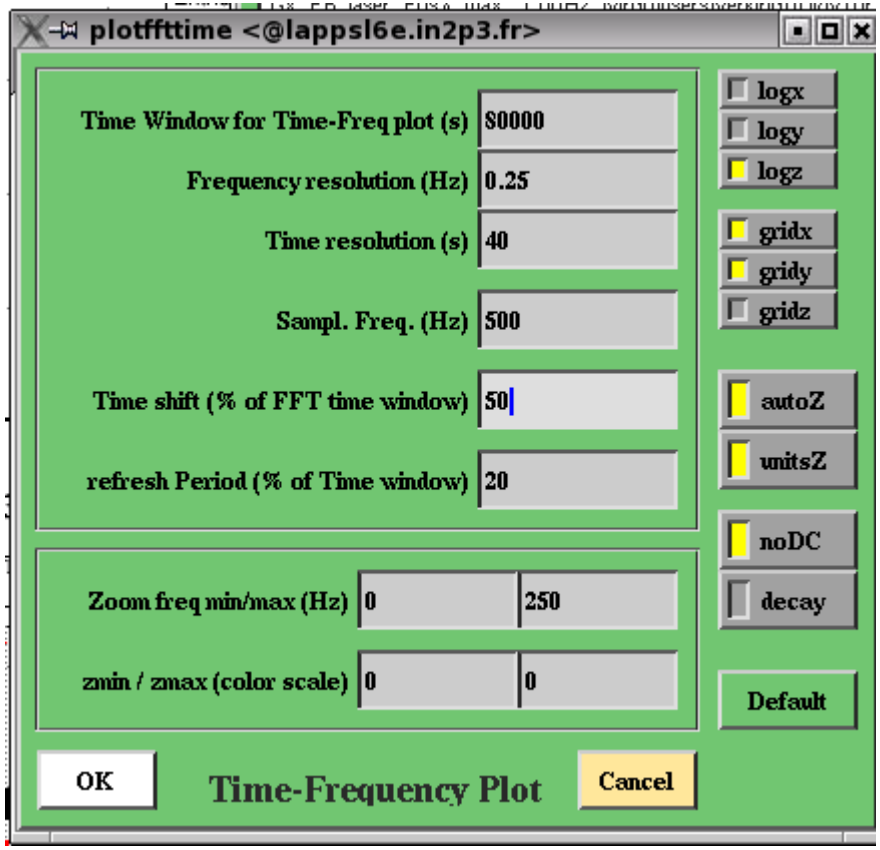
Snapshots


plottime <@lappsl6e.in2p3.fr>
Time Window (s) 4
minmax
Sampl. Freq. (Hz) 500
Time shift (% of time window) 50
ymin / ymax 10.0927 12.8042
y offset -360
y scaling factor 0
Band-pass Filter (fmin / fmax) (Hz)
logx
logy
gridx
gridy
autoY
unitsY
noDC
Show bits
Default
OK
Time Plot
Cancel

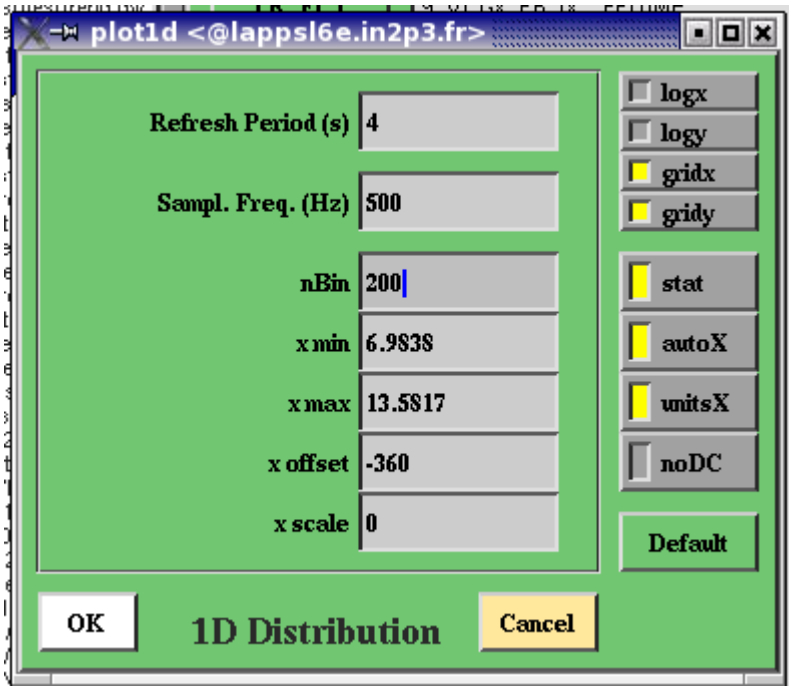

plotfft <@lappsl6e.in2p3.fr>
Time Window (s) 4
Sampl. Freq. (Hz) 500
Time shift (% of time window) 50
Number of FFTs to average 1
refreshPeriod (in number of FFTs) 1
freqmin / freqmax (Hz) 0 250
ymin / ymax 4.03731e-05 0.200594
logx
logy
gridx
gridy
autoY
unitsY
noDC
1/Hz
rms
decay
Default
OK
Spectrum Plot
Cancel

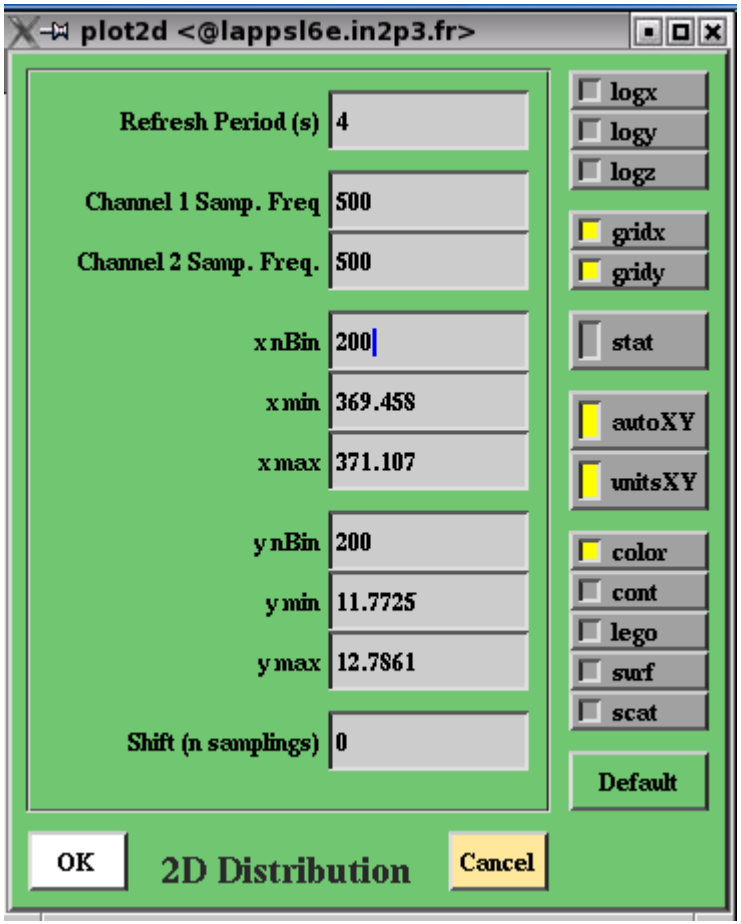
Snapshots


plotcohe <@lappsl6e.in2p3.fr>
Time Window (s) 4
Channel 1 Sampl. Freq. (Hz) 500
Channel 2 Sampl. Freq. (Hz) 500
Time shift (% of time window) 50
Number of FFTs to average 100000
refreshPeriod (in number of FFTs) 1
freqmin / freqmax (Hz) 0 250
ymin / ymax 0 1
2Dcohe
Y axis fmin/fmax (Hz) 0 250
module
logx
logy
gridx
gridy
sqrt
phase
logx
logy
gridx
gridy
autoY
unitsY
noDC
decay
Default
OK
Coherence Plot
Cancel

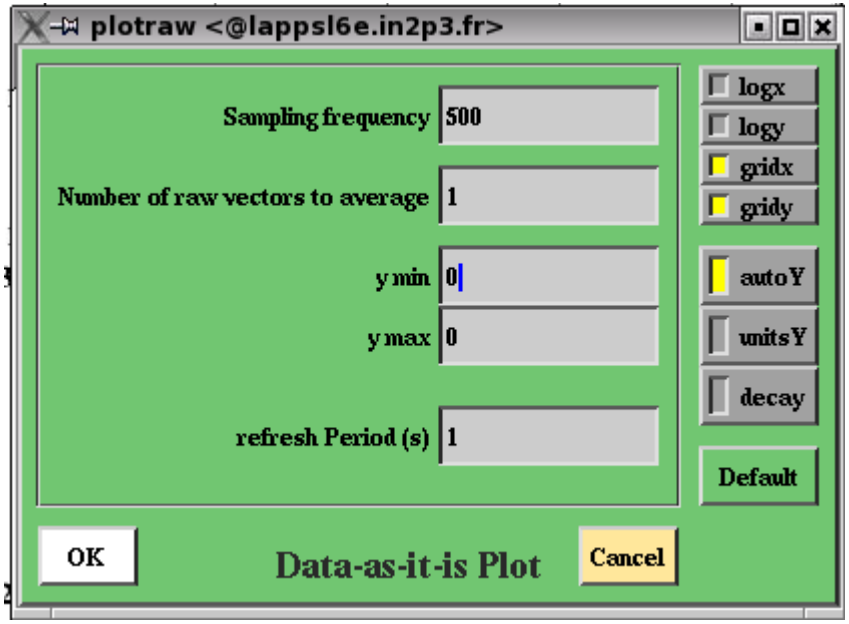

plotfftime <@lappsl6e.in2p3.fr>
Time Window for Time-Freq plot (s) 80000
Frequency resolution (Hz) 0.25
Time resolution (s) 40
Sampl. Freq. (Hz) 500
Time shift (% of FFT time window) 50
refresh Period (% of Time window) 20
Zoom freq min/max (Hz) 0 250
zmin / zmax (color scale) 0 0
logx
logy
logz
gridx
gridy
gridz
autoZ
unitsZ
noDC
decay
Default
OK
Time-Frequency Plot
Cancel

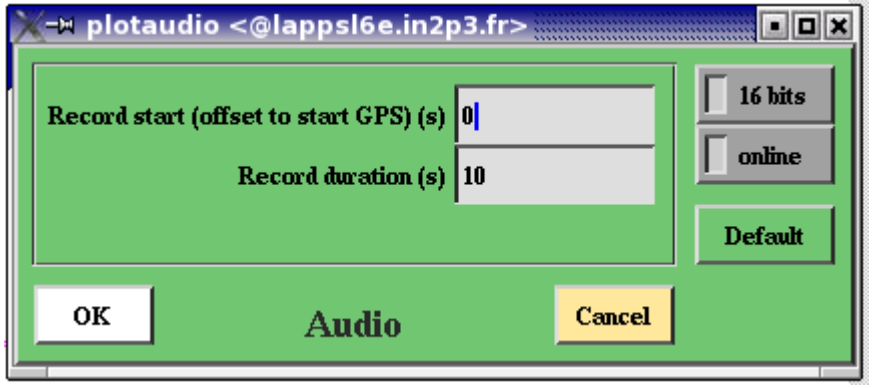
Snapshots


plot1d <@lappsl6e.in2p3.fr>
Refresh Period (s) 4
Sampl. Freq. (Hz) 500
nBin 200
x min 6.9838
x max 13.5817
x offset -360
x scale 0
logx
logy
gridx
gridy
stat
autoX
unitsX
noDC
Default
OK
1D Distribution
Cancel

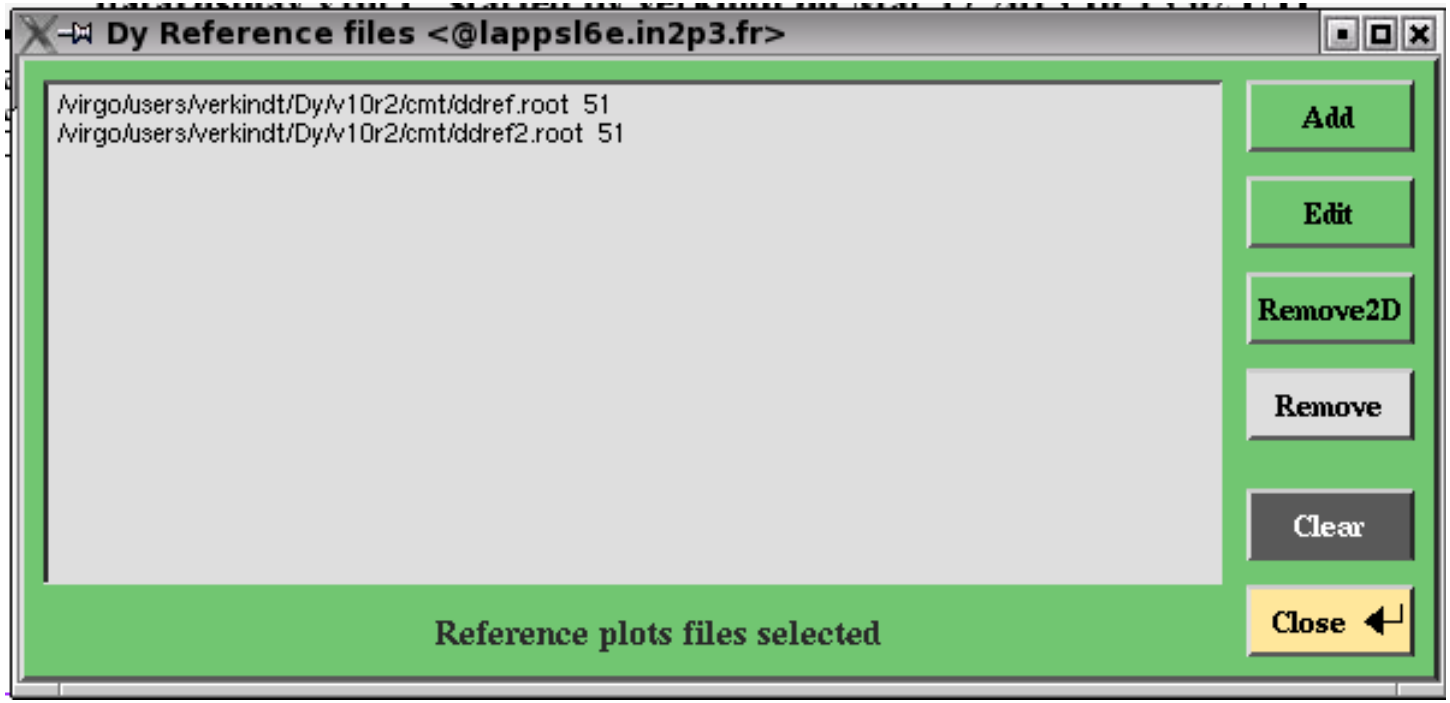

plot2d <@lappsl6e.in2p3.fr>
Refresh Period (s) 4
Channel 1 Samp. Freq 500
Channel 2 Samp. Freq. 500
x nBin 200
x min 369.458
x max 371.107
y nBin 200
y min 11.7725
y max 12.7861
Shift (n samplings) 0
logx
logy
logz
gridx
gridy
stat
autoXY
unitsXY
color
cont
lego
surf
scat
Default
OK
2D Distribution
Cancel

Snapshots

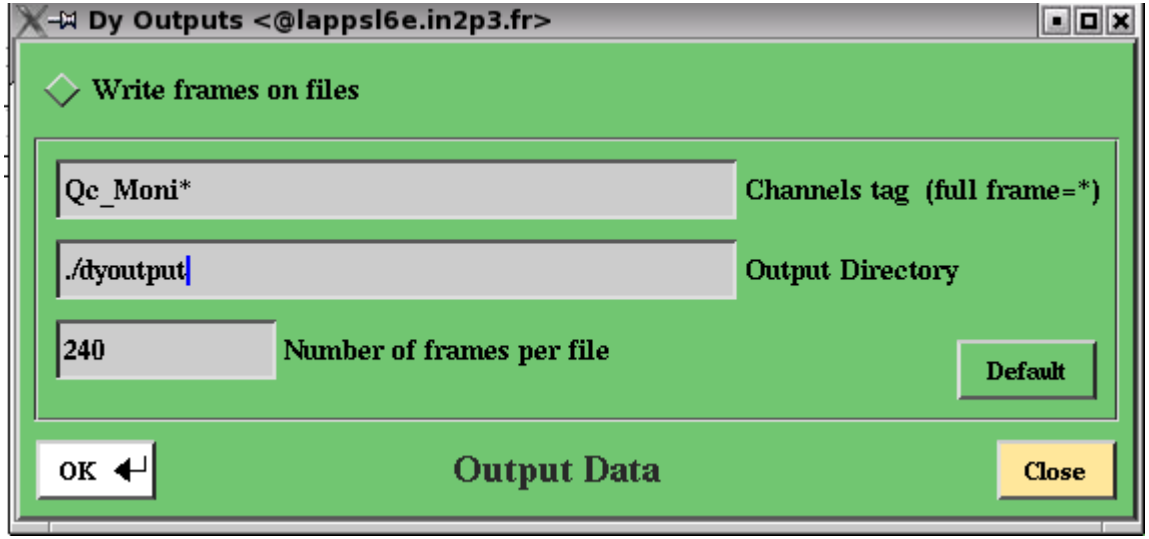

plotraw <@lappsl6e.in2p3.fr>
Sampling frequency
500
Number of raw vectors to average
1
y min
0
y max
0
refresh Period (s)
1
logx
logy
gridx
gridy
autoY
unitsY
decay
Default
OK
Data-as-it-is Plot
Cancel

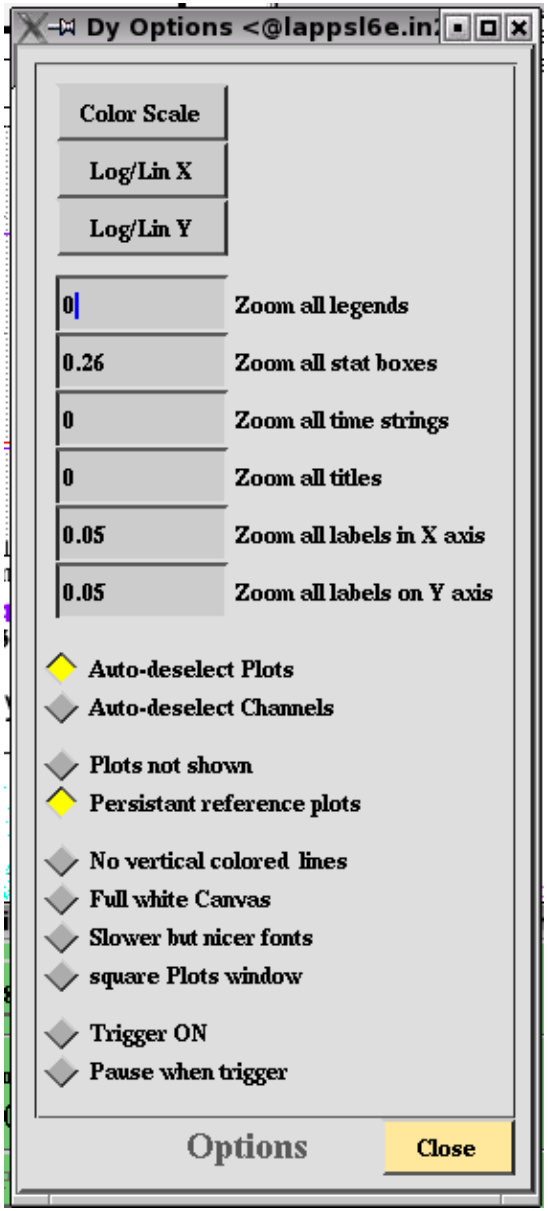

plotaudio <@lappsl6e.in2p3.fr>
Record start (offset to start GPS) (s)
0
Record duration (s)
10
16 bits
online
Default
OK
Audio
Cancel

Snapshots


Dy Reference files <@lappsl6e.in2p3.fr>
/virgo/users/verkindt/Dy/v10r2/cmt/ddref.root 51
/virgo/users/verkindt/Dy/v10r2/cmt/ddref2.root 51
Add
Edit
Remove2D
Remove
Clear
Close
Reference plots files selected

Snapshots


Dy Outputs <@lappsl6e.in2p3.fr>
Write frames on files
Qc_Moni*
Channels tag (full frame=*)
./dyoutput
Output Directory
240
Number of frames per file
Default
OK
Output Data
Close


Dy Options <@lappsl6e.in
Color Scale
Log/Lin X
Log/Lin Y
0
Zoom all legends
0.26
Zoom all stat boxes
0
Zoom all time strings
0
Zoom all titles
0.05
Zoom all labels in X axis
0.05
Zoom all labels on Y axis
Auto-deselect Plots
Auto-deselect Channels
Plots not shown
Persistant reference plots
No vertical colored lines
Full white Canvas
Slower but nicer fonts
square Plots window
Trigger ON
Pause when trigger
Options
Close