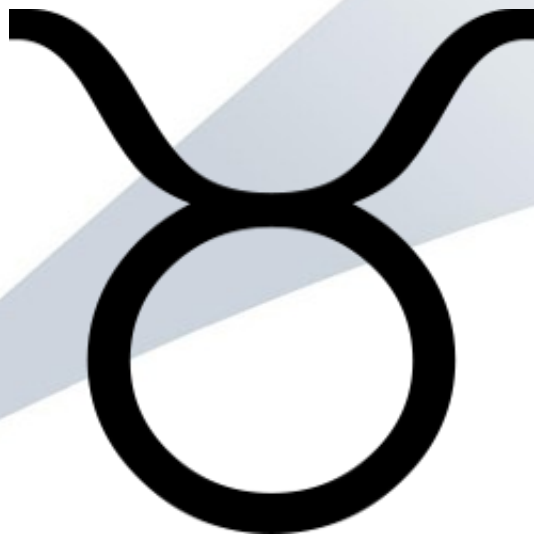


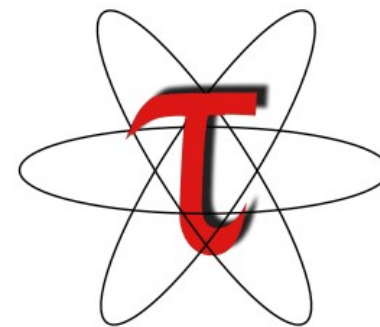
# Taurus

WP10, 13-14th Jan, 2011



## ❏ Problem:

Name conflict with an existing *Tau* package



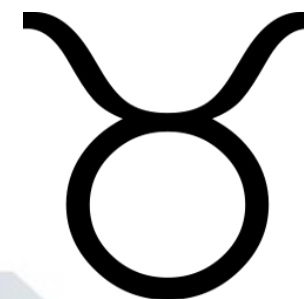
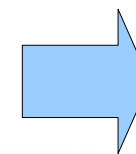
<http://www.cs.uoregon.edu/research/tau>

## ❏ Solution:

Rename **Tau** to **Taurus**  
(starting from version 2.0)

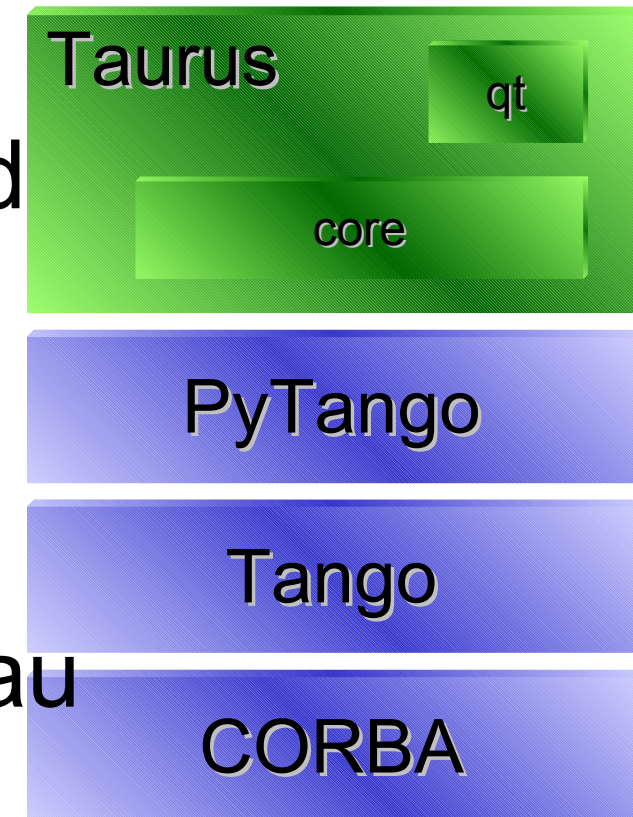


Tau  
(v1.2)



Taurus  
(v2.0)

- ❑ A framework for Tango CLIs and GUIs
- ❑ Based on Python and PyQt
- ❑ PyTango abstraction layer
- ❑ Available as a SVN branch of Tau [2]
- ❑ Will be available on the pink site [3]
- ❑ Documentation in [4]



(1) <http://www.tango-controls.org/Events/meetings/May-2010/SardanaTANGO2010.pdf>

(2) [http://tango-cs.svn.sf.net/viewvc/tango-cs/tau/branches/tau\\_restructure\\_01](http://tango-cs.svn.sf.net/viewvc/tango-cs/tau/branches/tau_restructure_01)

(3) <http://www.tango-controls.org/download>

(4) <http://www.tango-controls.org/static/taurus/latest/doc/html/index.html>

file:///home/tcoutinho/workspace/tau/build/sphinx/html/index.html

Projects | Dics | personal | Tango | Programming | Synch physics | SPEC | Lib. Math Funcs | Other Bookmarks

## tau

```
import tau
dev=tau.Device('B01/DI/FSOTR-01')
print dev["voltage"]
tr=tau.Attribute('B04/PS/BR-05/voltage')
```

home | examples | screenshots | documentation » next | modules | index


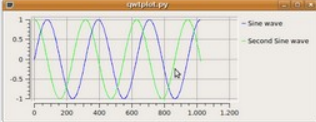

### Welcome to Taurus's 2.0 documentation!

Taurus is a python framework for both CLI and GUI tango applications. It is build on top of [PyTango](#) and [PyQt](#). Taurus stands for TAngo User interface 'R' US.

Taurus was originally known as Tau. Since version 2 the name as been changed to taurus.

An [Introduction](#) guide will help you getting started with the basic taurus concepts.

For sampling, see the [Screenshots](#) and [Examples](#) directory.

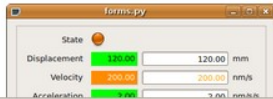
The goals of this library are:

- provide a simple Tango API to the end-user application
- speed up development of tango based applications
- provide a standardized look-and-feel

For example, to display the values of four attributes (state, position, velocity, acceleration) of a device (motor/icepap/01):

```
import sys
from PyQt4 import Qt
from taurus.qt.qtgui.panel import TaurusForm

attrs = ['state', 'position', 'velocity', 'acceleration']
model = ['motor/icepap/01/%s' % attr for attr in attrs]
app = Qt.QApplication([])
w = TaurusForm()
w.setModel(model)
w.setVisible(True)
sys.exit(app.exec_())
```



SardanaTANGO...pdf | qt-everywher...tar.gz | Show all downloads...

## ❏ Database

```
db = taurus.Database('machine:10000')
```

## ❏ Device

```
taurustest = taurus.Device('sys/taurustest/1')
```

## ❏ Attribute

```
position = taurus.Attribute('sys/taurustest/1/position')
```

## ❏ Configuration

```
pos_conf = taurus.Configuration('sys/taurustest/1/position?configuration')
```

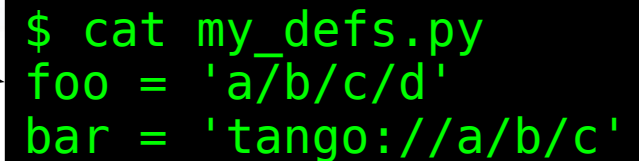


- ❑ Implicitly uses “tango://” scheme:
  - ❑ tango://domain/family/member/[attribute]

- ❑ Other schemes available:

- ❑ resource://[filename]/variable\_name

```
>>> rs = taurus.core.ResourceFactory()  
>>> rs.loadResource('mydefs.py')  
>>> f = TaurusForm()  
>>> f.setModel('res://foo')
```

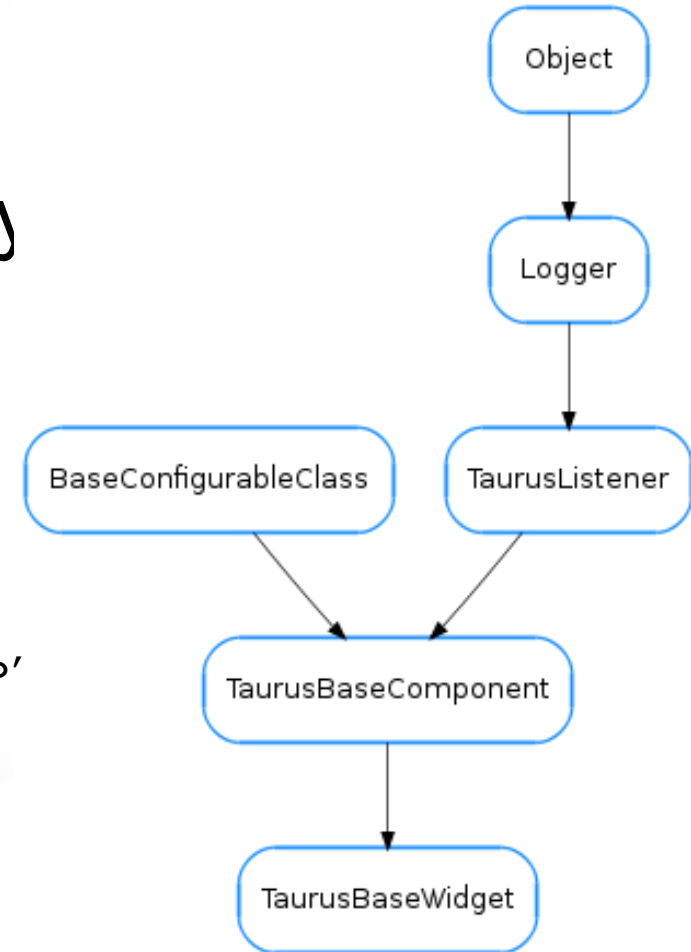
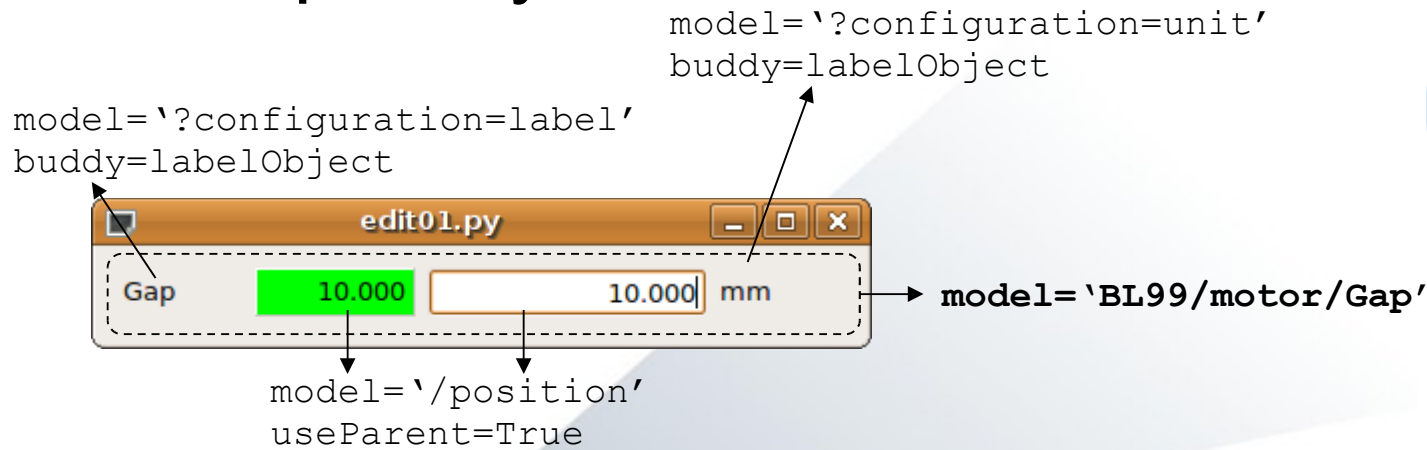


```
$ cat my_defs.py  
foo = 'a/b/c/d'  
bar = 'tango://a/b/c'
```

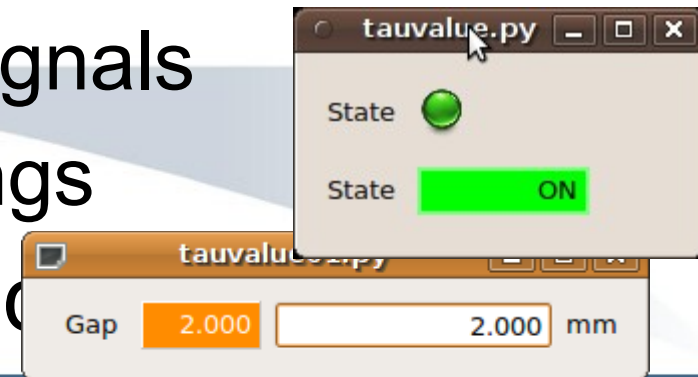
An arrow points from the 'mydefs.py' argument in the code above to this terminal screenshot.

- ❑ EPICS (epics://): any volunteers?

- Library of Qt widgets
- Each widget has a 'model' property
- Graphically hierarchical



- Handle events in the form of Qt signals
- Automatic save/restore GUI settings
- Automatic handle of states and



Extensive catalog of 'generic' widgets

Labels (attributes, configuration)

Editable widgets

- Line edit
- Spin box
- Arrow edit
- Combo box
- Check box



Leds

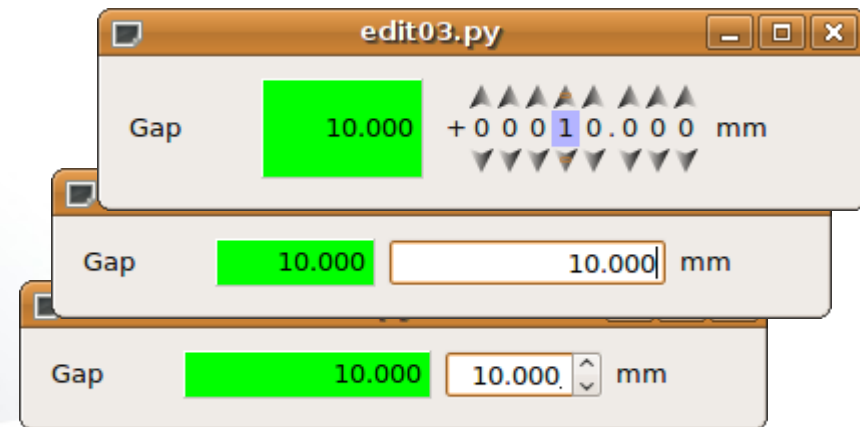
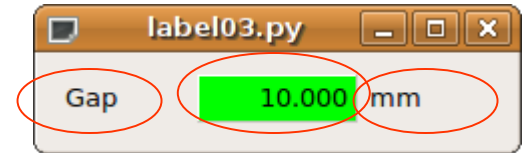
- State
- Boolean attributes



Push Buttons



Logos





## Containers

Transparent

Groupbox

Frame

Value

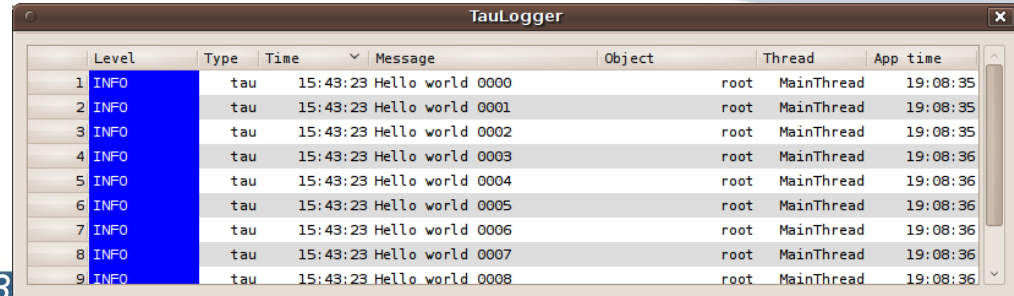
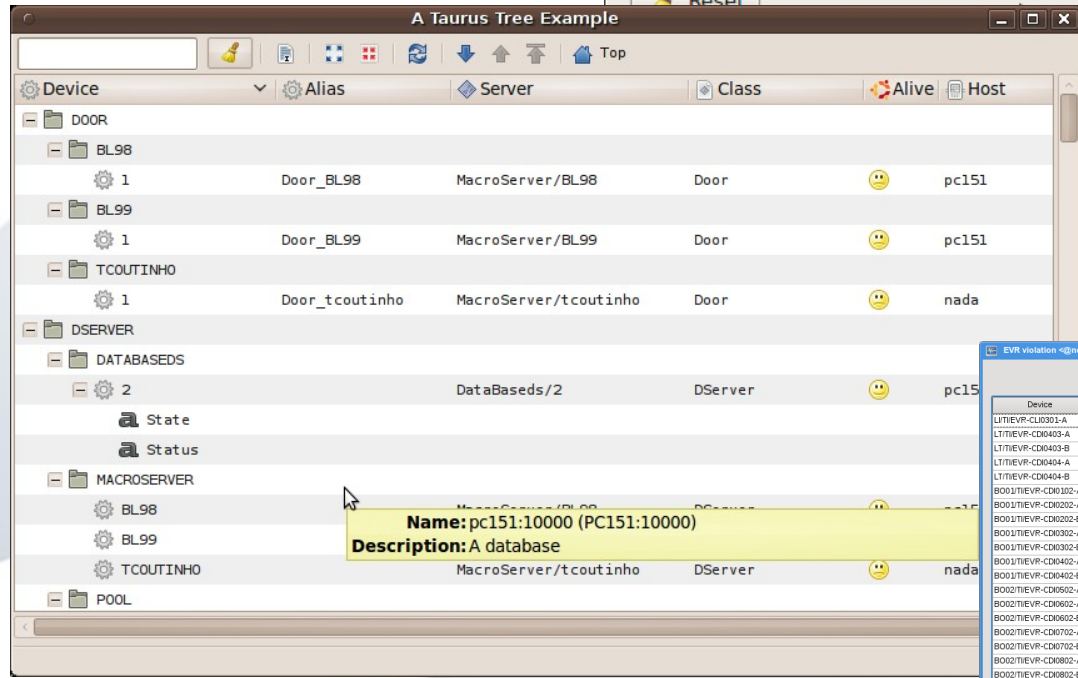
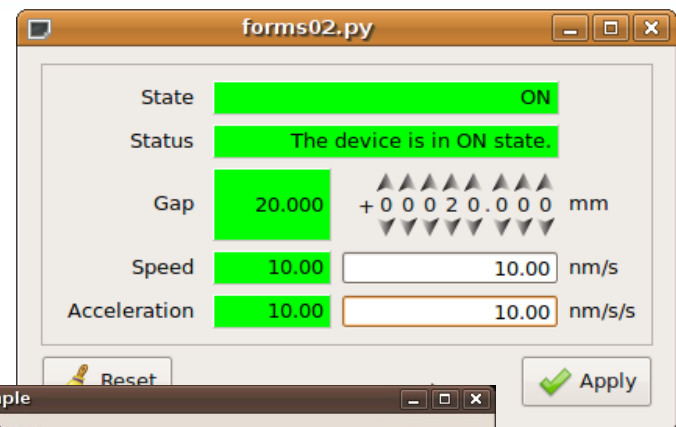
Forms

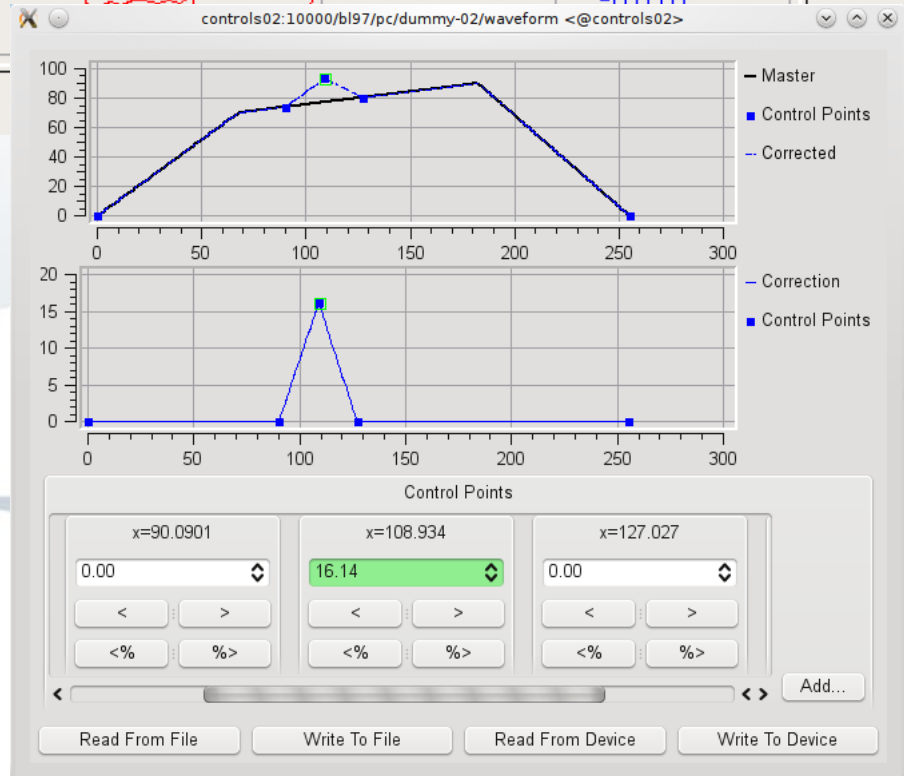
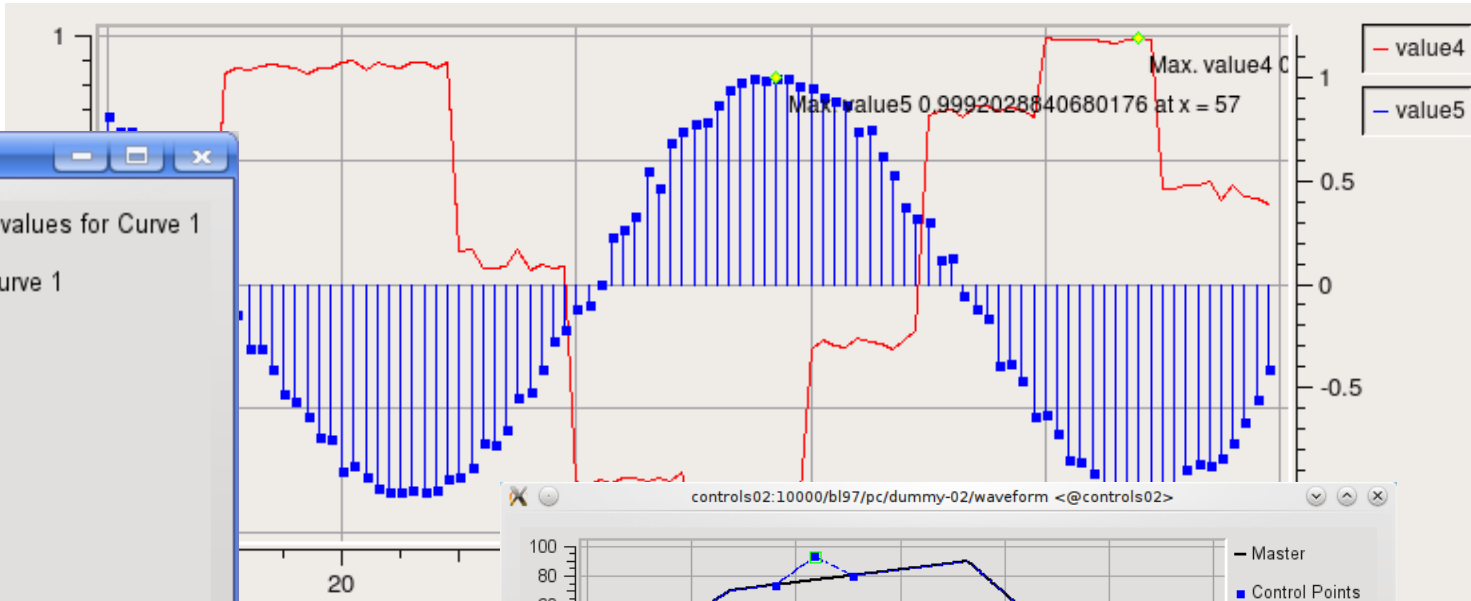
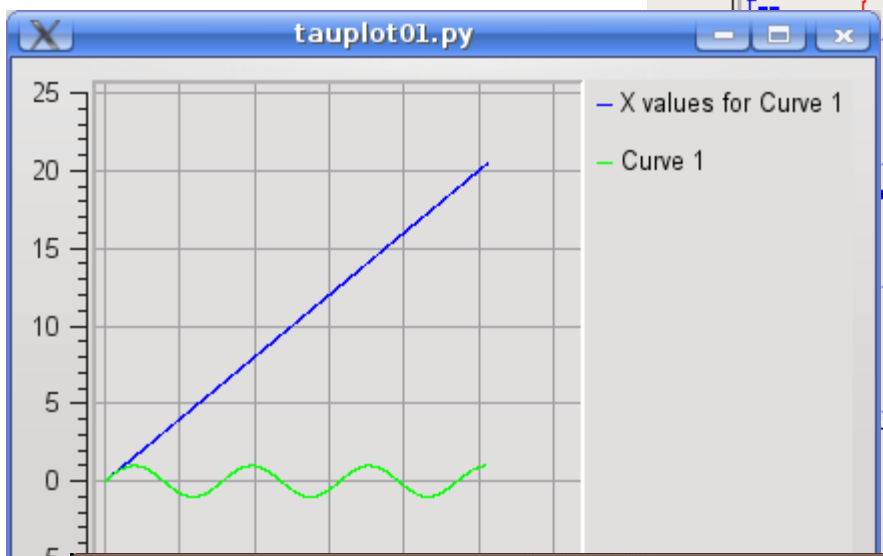
## Tables

Logging

Grids

Trees





Configure plot

**Curves Appearance**

Position

**Line**  
Style: [dropdown]  
Width: 2  
Color: [dropdown]  
Mode: Lines  
 Area Fill

**Symbols**  
Style: No symbol  
Size: 0  
Color: [dropdown]  
 Fill

**Other**  
Assign to axis: Y1 Y2  
Curve Title(s)...  
Background fill...

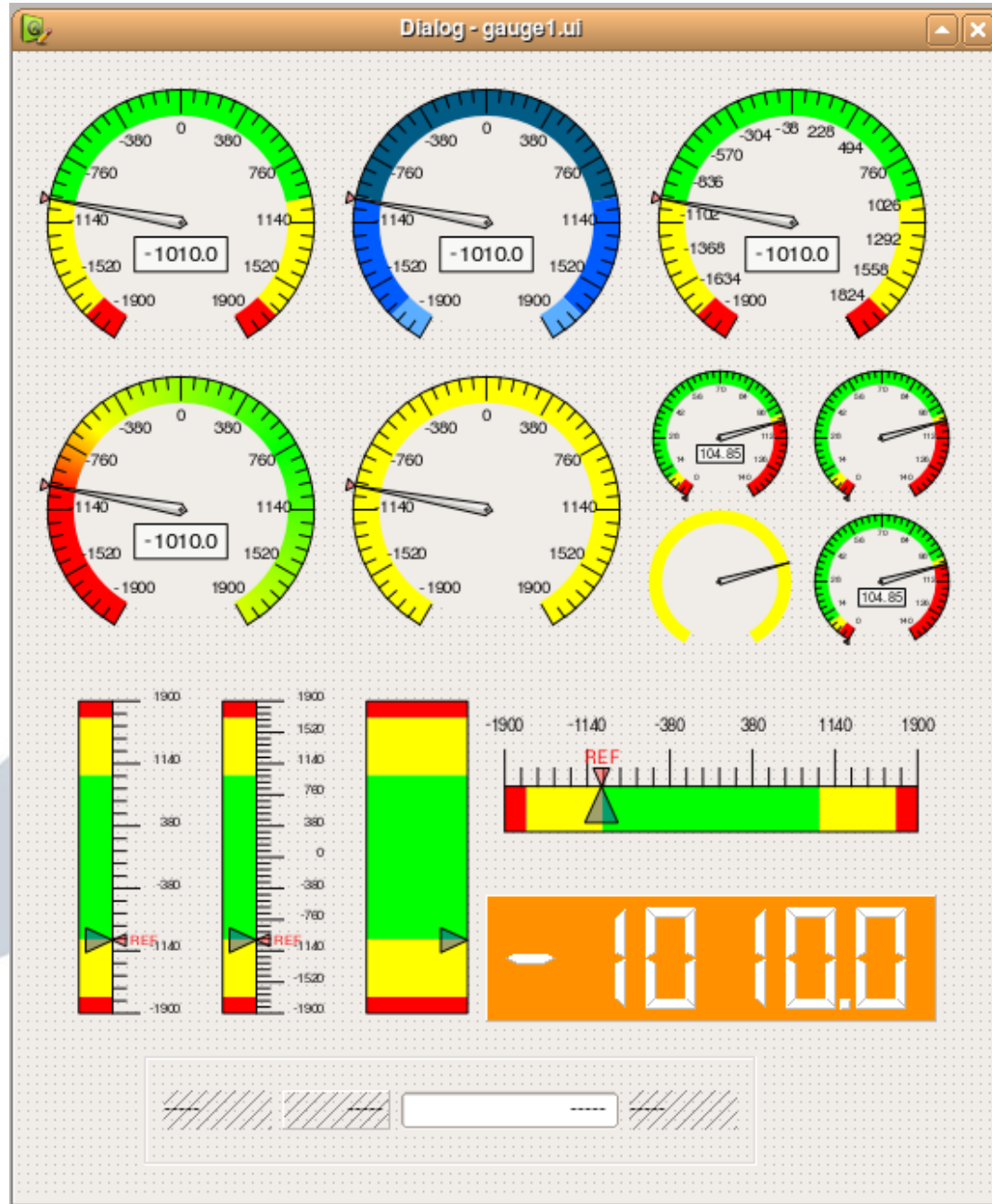
**X Axis**  
 Custom scale  
Min.: 0  
Max.: 7  
Mode: Linear

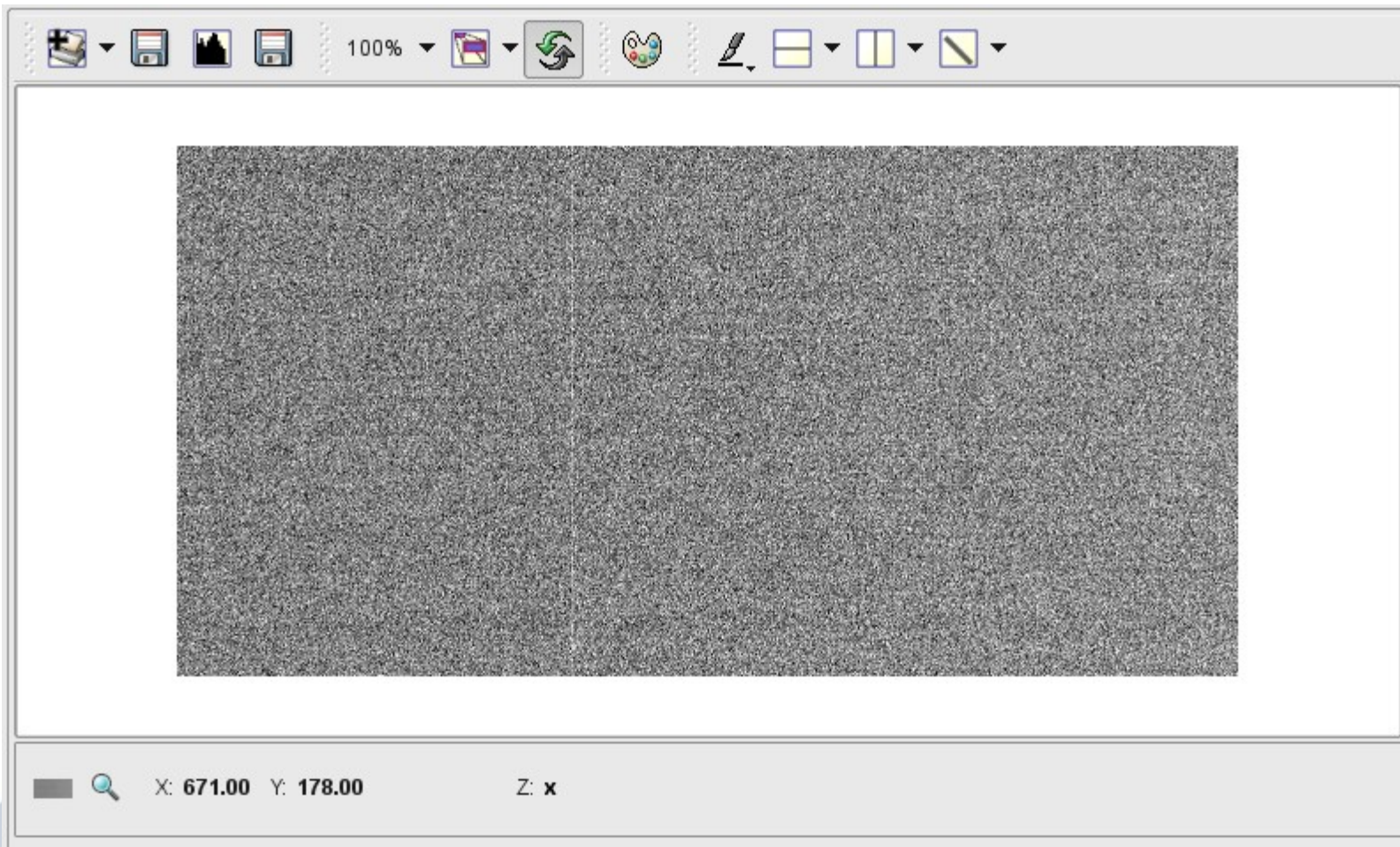
**Y1 Axis**  
 Custom scale  
Min.: -0.6  
Max.: 0.6  
Mode: Linear

**Y2 Axis**  
 Custom scale  
Min.: [input]  
Max.: [input]  
Mode: Linear

Peak Markers: None

Apply Close







## Simple API for auto-load/save settings

- Based on QSettings
- Uses ini files (platform-indep)
- Hierarchical delegation:

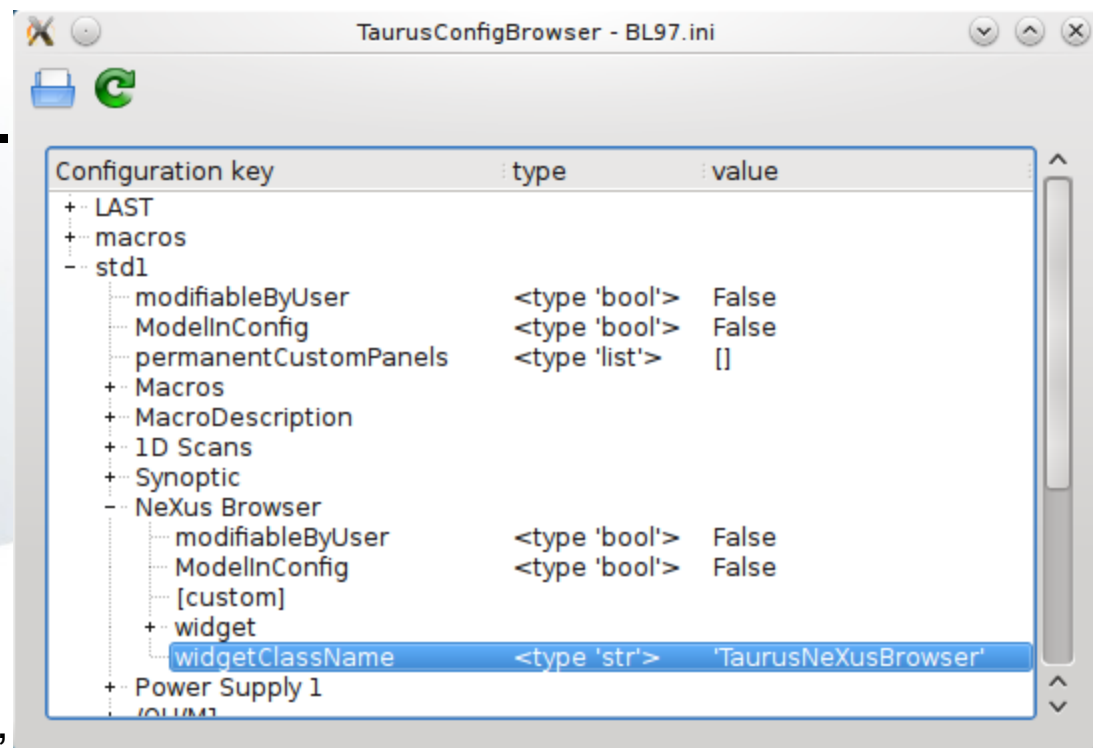
```
foo = TaurusWidget()
```

```
foo.bar = TaurusPlot()
```

```
foo.registerConfigProperty(getProp, setProp, 'name'):
```

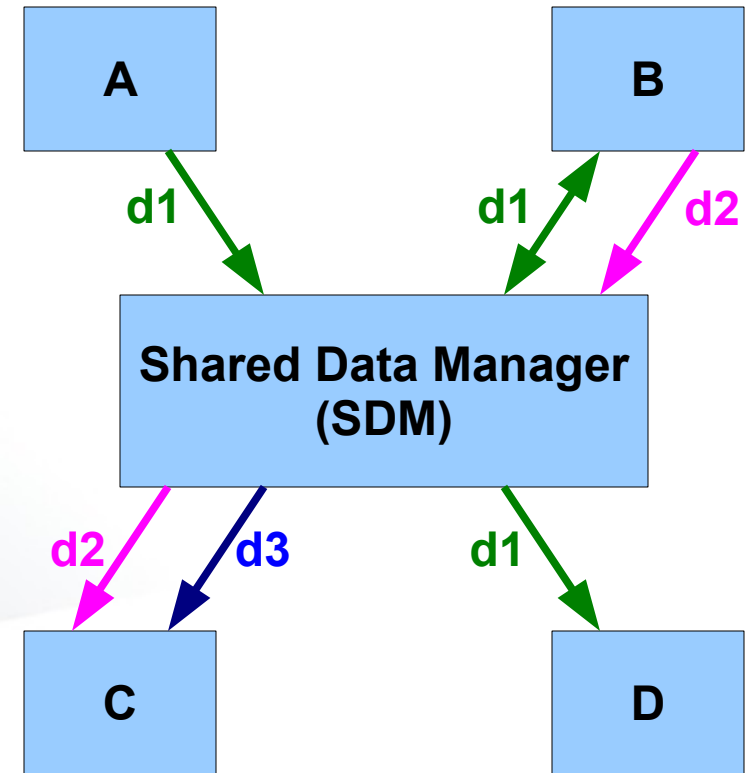
```
foo.registerConfigDelegate(foo.bar)
```

- TaurusMainWindow:



# An API for inter-widget communication

- Based on PyQt Signals... but decoupling emitter from slot
- Unique ID used to label each shared datum
- Widgets register at SDM as 'reader' and/or 'writer' of one or more data
- A, B, C, D do not need to know each other (and need not exist!)
- Useful for dynamical GUIs (like TaurusGUI)



	Writers	Readers
'd1'	A, B	B, D
'd2'	B	C
'd3'	-	C



## An API for icons

### ☒ Unified access to:

- ☒ theme-specific icons
- ☒ Tango-FreeDesktop icons
- ☒ Taurus specific resources

### ☒ See: [taurus/qt/qtgui/resource/catalog.html](http://taurus/qt/qtgui/resource/catalog.html)

```
>>> from taurus.qt.qtgui.resource import getThemeIcon, getIcon
>>> icon1 = getThemeIcon('folder-open')
>>> icon2 = getIcon('/:status/network-error.svg')
>>> icon2 = getIcon('/:institutes/logo_desy.gif')
```



## ❏ New/upgraded widgets:

- ❏ **TaurusDbTree**
- ❏ **TaurusAttrForm**
- ❏ **TaurusCommandForm**
- ❏ **TaurusNexusBrowser**
- ❏ **TaurusMacroExecutor**
- ❏ **TaurusPoolMotor**
- ❏ **TaurusMainWindow**
- ❏ ...

## ❏ New/upgraded widgets:

❏ **TaurusDbTree**

❏ **TaurusAttrForm**

❏ **TaurusCommandForm**

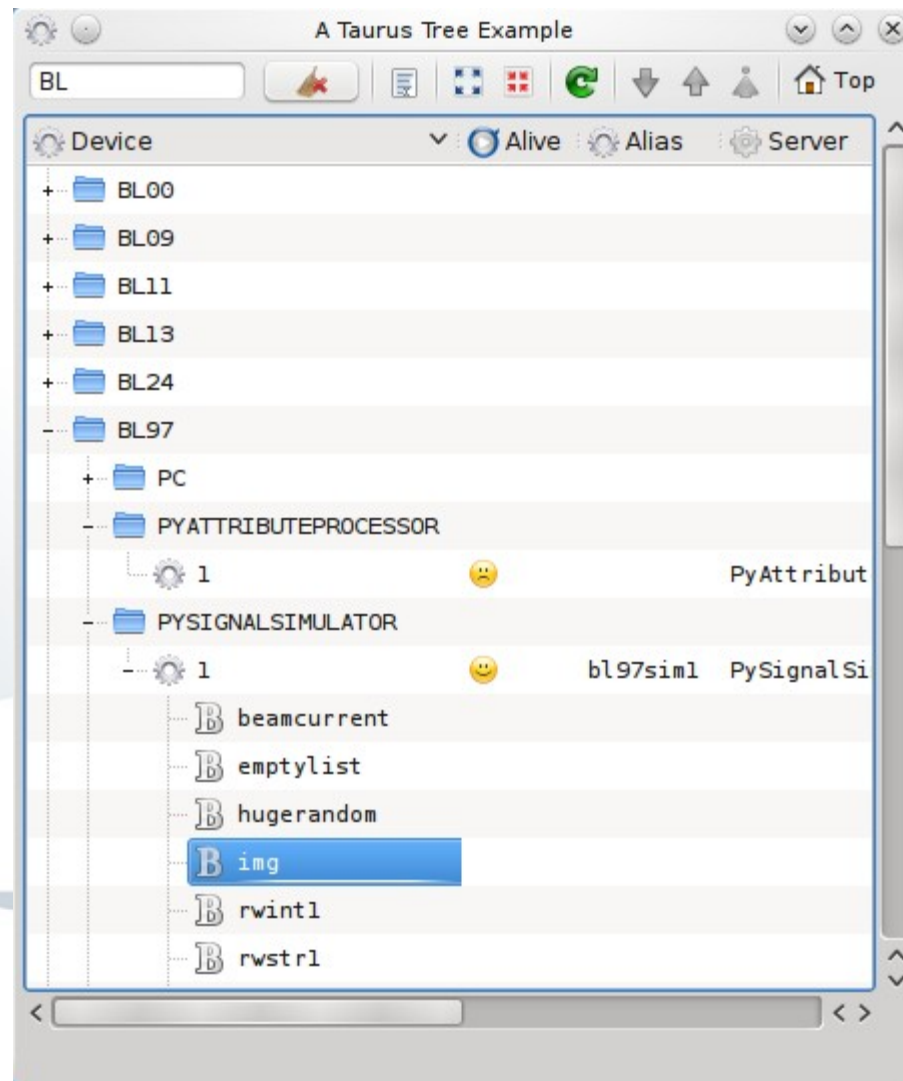
❏ **TaurusNexusBrowser**

❏ **TaurusMacroExecutor**

❏ **TaurusPoolMotor**

❏ **TaurusMainWindow**

❏ ...



## ❏ New/upgraded widgets:

❏ TaurusDbTree

❏ TaurusAttrForm

❏ TaurusCommandForm

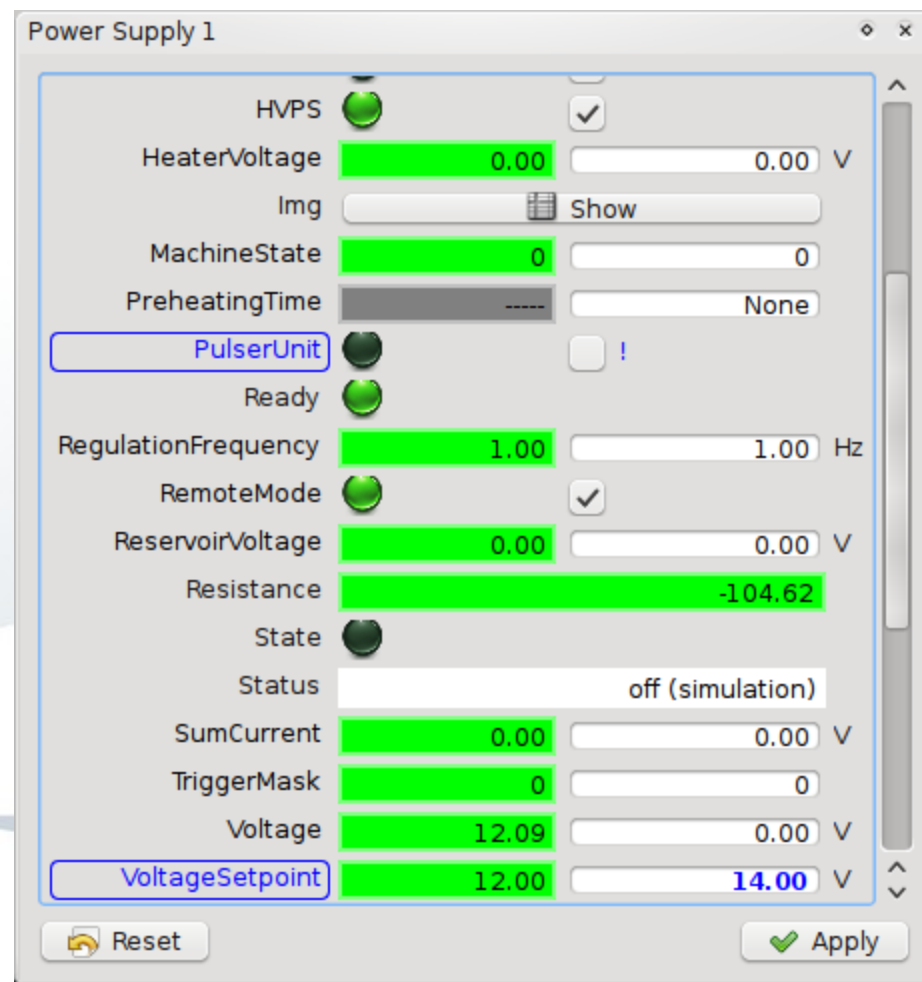
❏ TaurusNexusBrowser

❏ TaurusMacroExecutor

❏ TaurusPoolMotor

❏ TaurusMainWindow

❏ ...



## ❏ New/upgraded widgets:

❏ TaurusDbTree

❏ TaurusAttrForm

❏ **TaurusCommandForm**

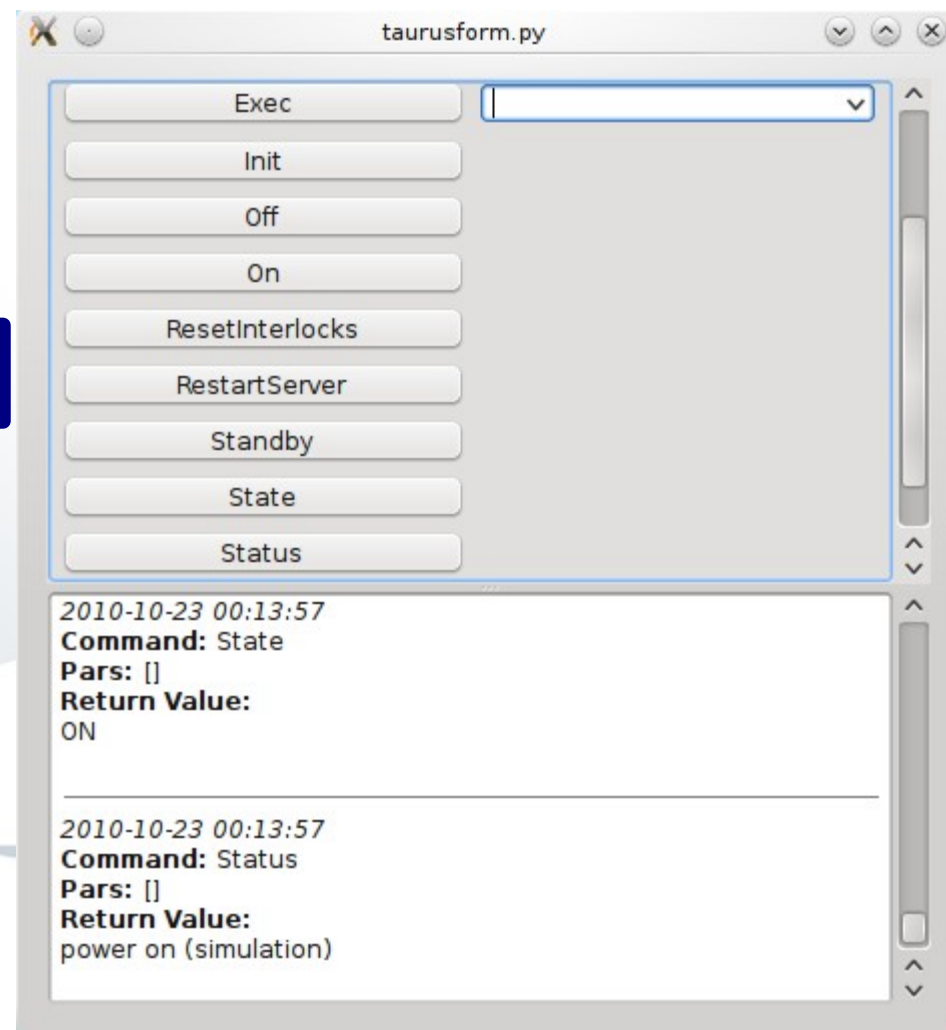
❏ TaurusNexusBrowser

❏ TaurusMacroExecutor

❏ TaurusPoolMotor

❏ TaurusMainWindow

❏ ...



## ❏ New/upgraded widgets:

- ❏ TaurusDbTree

- ❏ TaurusAttrForm

- ❏ TaurusCommandForm

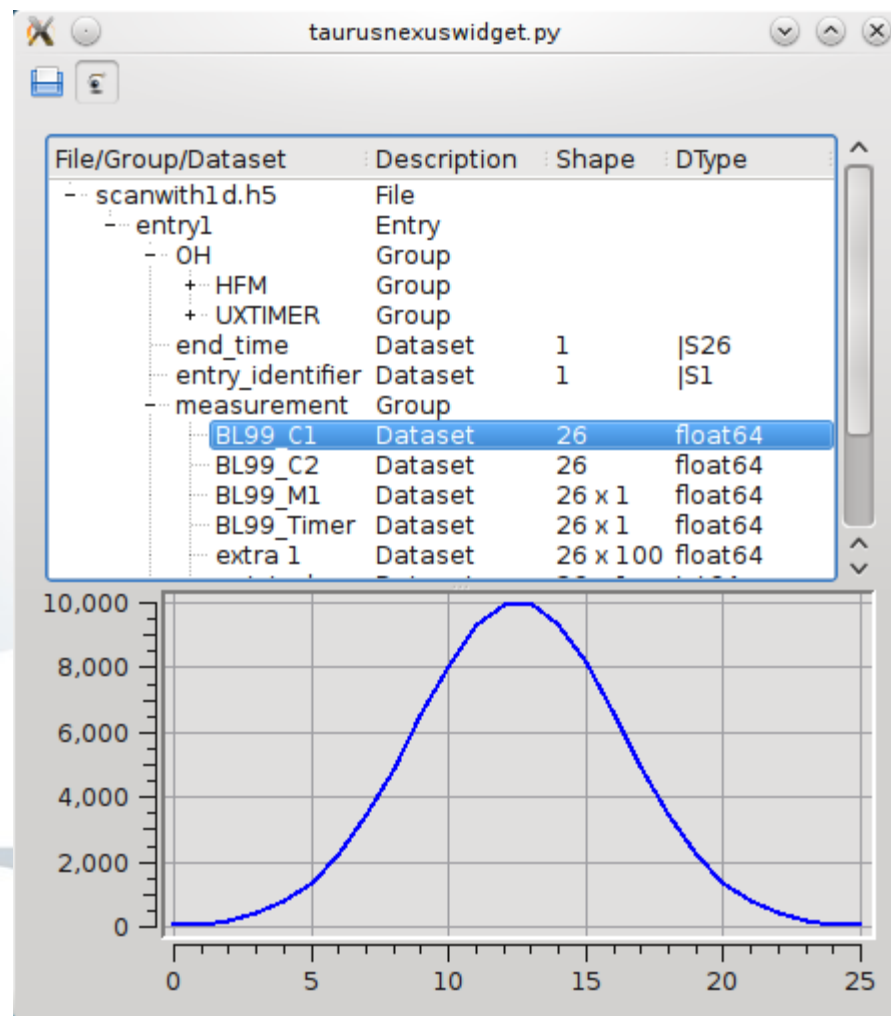
- ❏ **TaurusNexusBrowser**

- ❏ TaurusMacroExecutor

- ❏ TaurusPoolMotor

- ❏ TaurusMainWindow

- ❏ ...





## ❏ New/upgraded widgets:

❏ TaurusDbTree

❏ TaurusAttrForm

❏ TaurusCommandForm

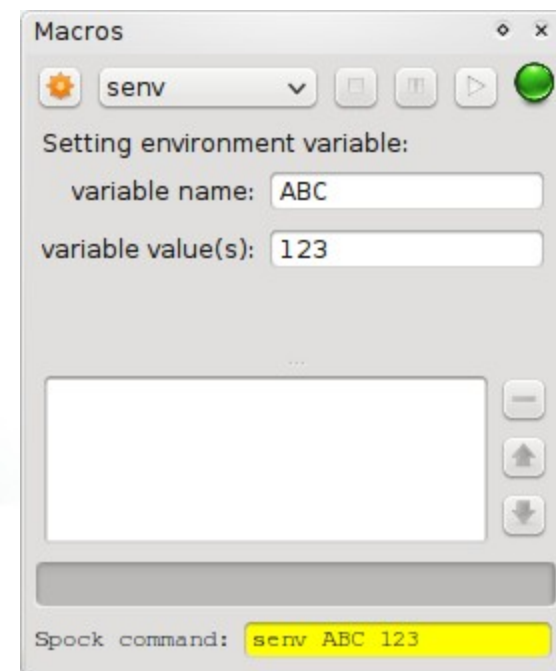
❏ TaurusNexusBrowser

❏ **TaurusMacroExecutor**

❏ TaurusPoolMotor

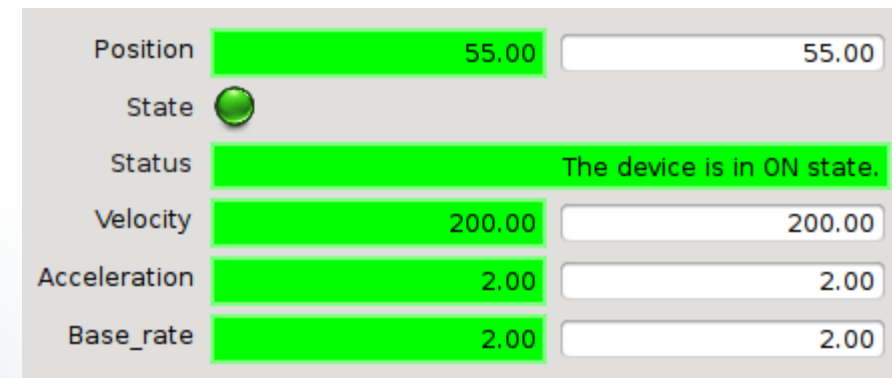
❏ TaurusMainWindow

❏ ...



## ❏ New/upgraded widgets:

- ❏ TaurusDbTree
- ❏ TaurusAttrForm
- ❏ TaurusCommandForm
- ❏ TaurusNexusBrowser
- ❏ TaurusMacroExecutor
- ❏ **TaurusPoolMotor**
- ❏ TaurusMainWindow
- ❏ ...



simumotor/bl97/motor01 55.00

simumotor/bl97/motor01 3.00 55.00

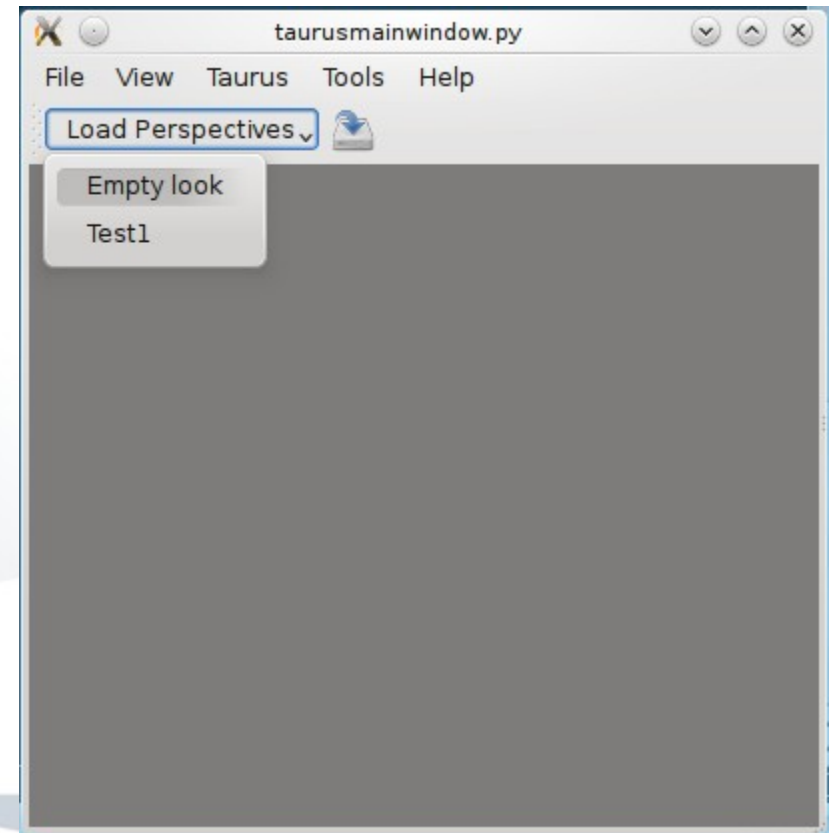
simumotor/bl97/motor01 3.00 55.00 1.00    
The device is in ON state.

## ❏ New/upgraded widgets:

- ❏ **TaurusDbTree**
- ❏ **TaurusAttrForm**
- ❏ **TaurusCommandForm**
- ❏ **TaurusNexusBrowser**
- ❏ **TaurusMacroExecutor**
- ❏ **TaurusPoolMotor**

❏ **TaurusMainWindow**

❏ ...



## ❏ New/upgraded widgets:

- ❏ TaurusDbTree
- ❏ TaurusAttrForm
- ❏ TaurusCommandForm
- ❏ TaurusNexusBrowser
- ❏ TaurusMacroExecutor
- ❏ TaurusPoolMotor
- ❏ TaurusMainWindow

❏ ...

## TaurusGUI

(live demo)



- ❑ Configuration file
- ❑ Run-time customization:
  - ❑ move panels
  - ❑ Create panels
  - ❑ Customize form panels (drag&drop and model chooser)
  - ❑ Customize TauValue subwidgets
- ❑ Selecting form via synoptic
- ❑ Perspectives
- ❑ Macro execution and custom macro (senv)
- ❑ PoolMotor (HideAll/ShowAll)

The screenshot displays the ALBA control interface with the following components:

- Top Panel:** Window titles include "LIB (Transfer Line) <@comodus>" and "MainWindow <@ctdevelsa>".
- Left Panel:** A vertical sidebar with the ALBA logo and status indicators for "BO4", "BO3", and "BO1". It shows "LT-01" and "LT-02" with green bars, and a 3D model of a beamline section.
- Main Window:**
  - Top Left:** A circular beamline layout diagram labeled "BL03" with sectors: BOREAS, MSPD, MISTRAL, NCD, XALOC, and CLAESS. It features numbered stations (00-16) and colored spheres (green, orange, blue).
  - Top Right:** A control panel for "SECTOR 9" (SR09/PC/CORV-02) with various control elements:
    - PC:** Controls for BEMO, CORV, CORV, OH, OV, SH, SV.
    - DI:** Controls for SPN, DI, BLM.
    - VC:** Controls for SPCT, VCCT, SPEN, CCG, PIR.
    - TI:** Control for TI.
    - PLC:** Control for PLC.
    - RF:** Control for RF.
  - Right Panel:** A "Processes" sidebar with buttons for PC, DI, VC, TI, PLC, and RF, each with "Process 1" and "Process 2" indicators.
  - Bottom Panel:** A 3D perspective view of the beamline with blue arrows pointing to "COR" stations.



X: 671.00 Y: 178.00 Z: x

CCD ROI

Exp. Time: 50.000

Gain: 511

BlackLevel: 32

Trigger: Automatic

Frame Rate: 6.0

Res. fps: [redacted]

Counter: [redacted]

Buttons: Init, Start, Stop, Reset

**LyrtechDLLRF GUI** <@ctdevelsa>

File Actions Tune Mode

Start Stop Load Save Reconfigure FPGA Open FDL Open VCXO

DC Ramping Pulse Mode

### Amp and Phase Loop

Write	Read Back
Cavity Voltage [-1000,1000] mV	200.00 200.00
Cavity Phase [0, 360] (°)	45.00 45.00
Apply	
Voltage Increase Rate (mV/s)	Immediately ap 0
PI Limit [0, 1000] (mV)	800.00 0.00
Ki [0, 32767]	10 0
Kp [0, 8]	0 0
Quadrant [1st, 2nd, 3rd, 4th]	1st Quadrant 0
Look Reference	OFF False
Loops Enable	OFF False
Reset Accumulator of PI	
Phase shift Enable	OFF False
Phase shift	0.00 45.00
Phase shift IOT Enable	OFF False
Phase shift IOT1 [0°, 360°]	0.00 45.00
Phase shift IOT2 [0°, 360°]	-7.00 45.00
Vacuum Interlocks	ON False
Moving Average [10,30000]	[redacted] 0

### Automatic Start Up

Readings	Read Back
Automatic Start Up Enable	OFF
Command Start [0,360]	[redacted]
StateStart	0.000

### Main Readings DC Ramping

#### Amp\_Phase Loop

I	Q	Amp	Phase	Warnings
CavityReference	0.00	0.00	----	----
Cavity Voltage	0.00	0.00	1.8e+161	
Error (Proportional)	0.00	0.00	0.00	
Error (Acumulated)	0.00	1.8e+161	8e+175	0.00
Control Action	0.00	0.00	7e+228	
Control Action iot1	0.00	1.9e+84	0.00	0.00
Control Action iot2	0.00	0.00	0.00	0.00
Forward Cavity	0.00	8.8e+178	0.00	0.00

#### Diagnostics

I	Q	Amp	Phase	Warnings
FwTx1	0.00	0.00	0.00	0.00
FwTx2/RvTx1	0.00	0.00	0.00	0.00
Fw Circ In	0.00	0.00	0.00	0.00
Rv Circ In	7.8e+218	1.8e+161	0.00	1.8e+161
Fw Circ Out	0.00	0.00	0.00	0.00
Rv Circ Out	0.00	0.00	0.00	0.00
Fw Load	0.00	0.00	0.00	0.00
Rv Load	0.00	0.00	0.00	0.00
Fw IOT1	0.00	0.00	7.8e+218	0.00
Rv IOT1	0.00	0.00	0.00	0.00
Fw IOT2	0.00	0.00	0.00	0.00
Rv IOT2	0.00	0.00	0.00	0.00
Rv Cav	0.00	0.00	0.00	0.00

### Tuning and FF

Manual Tuning Icepap

#### Tuning Loop

Write	Read Back
Tunig Enable	OFF False
Tuning Positive Enable	OFF False
Tuning Frequency	600 Hz 0
Margin Up [1°, 5°]	5.00 0.00
Margin Low [0°, 1°]	2.00 0.00
Forward Min	11.00 0.00
PhaseOffset [-180, 180]	-100.00 0.00
PhaseRangeCav [-180,18]	[redacted] 0
PhaseRangeFw [-180,18]	[redacted] 0

#### Field Flatness Loop

Write	Read Back
Field Flatness Enable	OFF False
Field Flatness Positive	OFF False
Field Flatness Max Error (0,100%)	1.00 0.00
AmpCell2Gain [0.0825, 16]	15.00 0.00
AmpCell4Gain [0.0825, 16]	15.00 0.00

Pulses

Icepap

### Tuning Loop

Readings	Warnings
Tuning Dephase	7.2e+199
FwAmplitude	0.00
Cavity voltage	
AngCav	0.00
AngFw	0.00

### Position Encoder

Readings	Warnings
Plunger1 Position (cm)	----
Plunge2 Position (cm)	----

### Master Oscillator

I	Q	Amp	Phase	Warnings
Master Oscillator	0.00	0.00	0.00	0.00

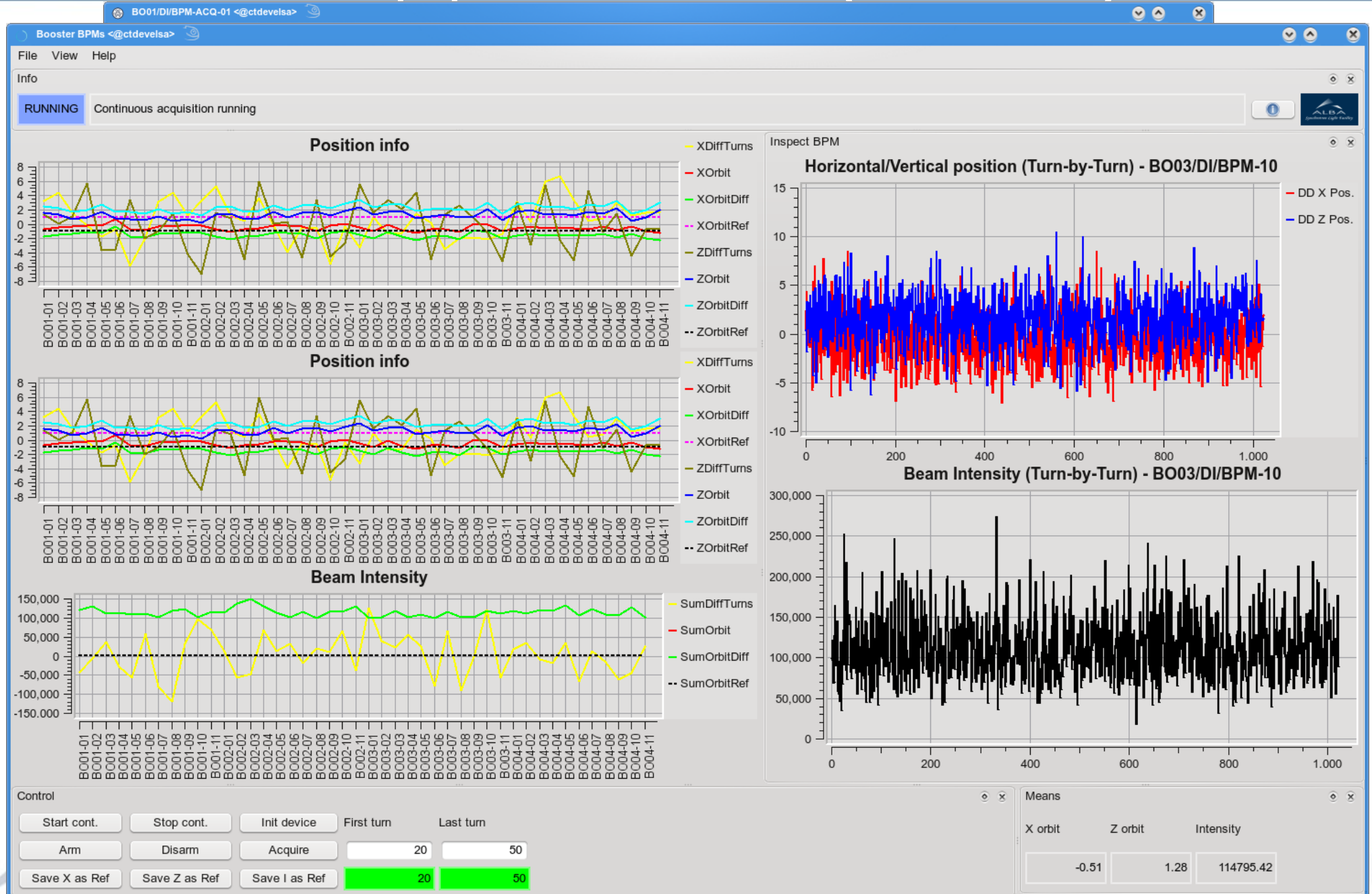
### Tuning Diagnostics

#### FF Diagnostics

Read Back	Warnings
Field Flatness Error	0.00
AmpCell2	6.1e+247
AmpCell4	0.00

#### Icepap

Readings	
Encoder Plunger1	14721714.00
Encoder Plunger2	11911508.00











```

#!/usr/bin/env python
"""
bl98.py:
"""
from gblgui_utils import PanelDescription, ExternalApp, Qt_Qt

#=====
# This configuration file determines the default, permanent, pre-defined
# contents of the BL GUI. While the user may add/remove more elements at run
# time and those customizations will also be stored, this file defines what a
# user will find when launching the GUI for the first time.
#=====
BL_NAME = 'BL98'
ORGANIZATION = 'ALBA'

#=====
# SYNOPTIC FILE (comment out or make it None to skip creating a synoptic panel)
#=====
SYNOPTIC = 'bl98/images/bl98.jdw'

#=====
# Define which External Applications are to be inserted. After defining them, add
# them to the EXTERNAL_APPS variable.
# See TauMainWindow.addExternalAppLauncher for valid values of ExternalApp
#=====
xterm = ExternalApp(cmdargs=['xterm','spock'], text="Spock", icon='utilities-terminal')
hdfview = ["hdfview"]
pymca = ['pymca']

EXTERNAL_APPS = [xterm, hdfview, pymca]

#=====
# Monitor widget
#=====
MONITOR = ['simulation/pysignalsimulator/01/beamcurrent']

#=====
# Macro execution configuration
# (comment out or make MACRO_SERVER=None to skip creating a macro execution
# infrastructure)
#=====
MACROSERVER_NAME = 'macroserver/bl98/1'
DOOR_NAME = 'door/bl98/1'
MACROEDITORS_PATH = '<tauruslib>/qt/qtgui/extra_macroexecutor/macroparameterseditor/customeditors'

```



```

=====
# Set INSTRUMENTS_FROM_POOL to True for enabling auto-creation of
# instrument panels based on the Pool Instrument info
=====
INSTRUMENTS_FROM_POOL = False

=====
# Define more panels to be shown. After defining them, add them to the
# CUSTOM_PANELS variable.
# To define a panel, instantiate a PanelDescription object (see documentation
# for the gblgui_utils module)
=====
m panel showing a Nexus browser
nxbrowser = PanelDescription('NeXus Browser',
                             classname = 'TaurusNeXusBrowser',
                             area = Qt_Qt.TopDockWidgetArea)

mirror1 = PanelDescription('Mirror1',
                           classname = 'TaurusForm',
                           area = Qt_Qt.LeftDockWidgetArea,
                           model = ['motor/bl98_dummymotorctrl1/1',
                                    'motor/bl98_dummymotorctrl1/2',
                                    'expchan/bl98_dummysctr1/1/value',
                                    'expchan/bl98_dummysctr1/2/value',
                                    'simulation/pysignalsimulator/01/movingsin' ])

mirror2 = PanelDescription('Mirror2',
                           classname = 'TaurusForm',
                           area = Qt_Qt.LeftDockWidgetArea,
                           model = ['motor/bl98_dummymotorctrl1/3',
                                    'motor/bl98_dummymotorctrl1/4',
                                    'expchan/bl98_dummysctr1/3/value',
                                    'expchan/bl98_dummysctr1/4/value' ])

endstation = PanelDescription('EndStation',
                              classname = 'TaurusAttrForm',
                              area = Qt_Qt.LeftDockWidgetArea,
                              model = 'sys/tg_test/1')

motions = PanelDescription('Motions',
                           classname = 'TaurusForm',
                           area = Qt_Qt.LeftDockWidgetArea,
                           model = ['motor/bl98_dummymotorctrl1/%d%i for i in range(1,5)] )

CUSTOM_PANELS = [mirror1, mirror2, endstation, motions]

```

```
Door_BL99 [27]: ascan bl99_ml 0 100 25 1
JsonRecorder is not defined. Use "senv JsonRecorder True" to enable it
SharedMemory is not defined.
SharedMemory is not defined.
Scan started at Tue Oct 19 11:01:21 2010.. It will take at least 0:00:00
Scan data will be saved in /home/tcoutinho/tmp/nexus_scan_with_2d.h5 (w5)
#Pt No      BL99_M1    BL99_Timer  BL99_C1    BL99_C2    MCA_1      CCD_1
  0     0         1           38         38         (100,)     (494, 659)
  1     4         1           91         38         (100,)     (494, 659)
  2     8         1          200         39         (100,)     (494, 659)
  3    12         1          405         38         (100,)     (494, 659)
  4    16         1          772         38         (100,)     (494, 659)
  5    20         1         1357         38         (100,)     (494, 659)
  6    24         1         2252         39         (100,)     (494, 659)
  7    28         1         3447         39         (100,)     (494, 659)
  8    32         1         4880         38         (100,)     (494, 659)
  9    36         1         6514         38         (100,)     (494, 659)
 10   40         1         8041         38         (100,)     (494, 659)
 11   44         1         9305         38         (100,)     (494, 659)
 12   48         1        10031         39         (100,)     (494, 659)
 13   52         1        10016         39         (100,)     (494, 659)
 14   56         1         9263         38         (100,)     (494, 659)
 15   60         1         8027         38         (100,)     (494, 659)
 16   64         1         6513         38         (100,)     (494, 659)
 17   68         1         4937         39         (100,)     (494, 659)
 18   72         1         3424         38         (100,)     (494, 659)
 19   76         1         2237         38         (100,)     (494, 659)
 20   80         1         1359         38         (100,)     (494, 659)
 21   84         1          772         38         (100,)     (494, 659)
 22   88         1          405         38         (100,)     (494, 659)
 23   92         1          201         39         (100,)     (494, 659)
 24   96         1           91         38         (100,)     (494, 659)
 25  100         1           38         38         (100,)     (494, 659)
Scan ended at Tue Oct 19 11:02:01 2010, taking 0:00:40.534879
Door_BL99 [28]: lsenv
```



/bin/bash

```

Door_BL99 [27]: ascan bl99
JsonRecorder is not defined
SharedMemory is not defined
SharedMemory is not defined
Scan started at Tue Oct 19 19:58:38 2010
Scan data will be saved in /home/tcoutinho/tmp/nexus_scan_with_2d.h5

```

#Pt	No	BL99_M1
0	0	0
1	4	4
2	8	8
3	12	12
4	16	16
5	20	20
6	24	24
7	28	28
8	32	32
9	36	36
10	40	40
11	44	44
12	48	48
13	52	52
14	56	56
15	60	60
16	64	64
17	68	68
18	72	72
19	76	76
20	80	80
21	84	84
22	88	88
23	92	92
24	96	96
25	100	100

Scan ended at Tue Oct 19 19:58:38 2010

Door\_BL99 [28]: lsenv

HDFView

File Window Tools Help

File/URL /home/tcoutinho/tmp/nexus\_scan\_with\_2d.h5

nexus\_scan\_with\_2d.h5

- entry1
  - OH
    - HFM
      - CCD
        - CCD\_1
      - MCA
        - MCA\_1
      - Pressure
        - BL99\_C2
      - Temperature
        - BL99\_C1
      - X
      - UXTIMER
        - BL99\_Timer
    - end\_time
    - entry\_identifier
    - measurement
    - start\_time
    - title
    - user

ImageView - CCD\_1 - /entry1/OH/HFM/CCD/ - /home/tcoutinho/tmp/nexus\_...

Image [Histogram] [Color] [Brightness] [Contrast] [Zoom In] [Zoom Out] [Previous] [Next] 19 26 [Refresh] [Close]

2.00E0  
6.13E1  
1.21E2  
1.80E2  
2.39E2  
2.98E2  
3.58E2

Lineplot - /entry1/OH/HFM/MCA/MCA\_1 - by row

6.000869  
4.800869  
3.600869  
2.400869  
1.200869  
0.000869  
-1.199131  
-2.399131  
-3.599131  
-4.799131  
-5.999131

1 10 20 30 40 50 60 70 80 90 100

Close

1.36E3

Lineplot - /entry1/OH/HFM/Temperature/BL99\_

10031  
9031.7  
8032.4  
7033.1  
6033.8  
5034.5  
4035.2  
3035.9  
2036.6  
1037.3  
38

1 3 6 8 11 13 16 18 21 23 26

Close

CCD\_1 (9728)  
16-bit unsigned integer, 26 x 494 x 659  
Number of attributes = 1  
target = /entry1/measurement/CCD\_1

Log Info Metadata

■ OLD SLIDES FROM TIAGO FOLLOW...

- ❑ Abstraction over PyTango
- ❑ Hide event/polling mechanism
- ❑ Auto recovery
  - ❑ DS shutdown/crash
  - ❑ Event system failure
- ❑ Ensure one object per tango name
  - ❑ `sys/taurustest/1 = tango://machine:1000/sys/taurustest/1`
- ❑ Allow multiple listeners to the same attribute
- ❑ Automatic handling of configuration parameters (label, format, units, ranges)
- ❑ Performance