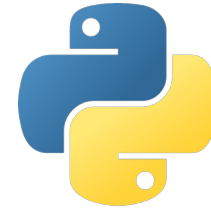
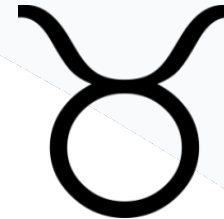




Operations made GUIs.

David Yépez
dyepez@cells.es

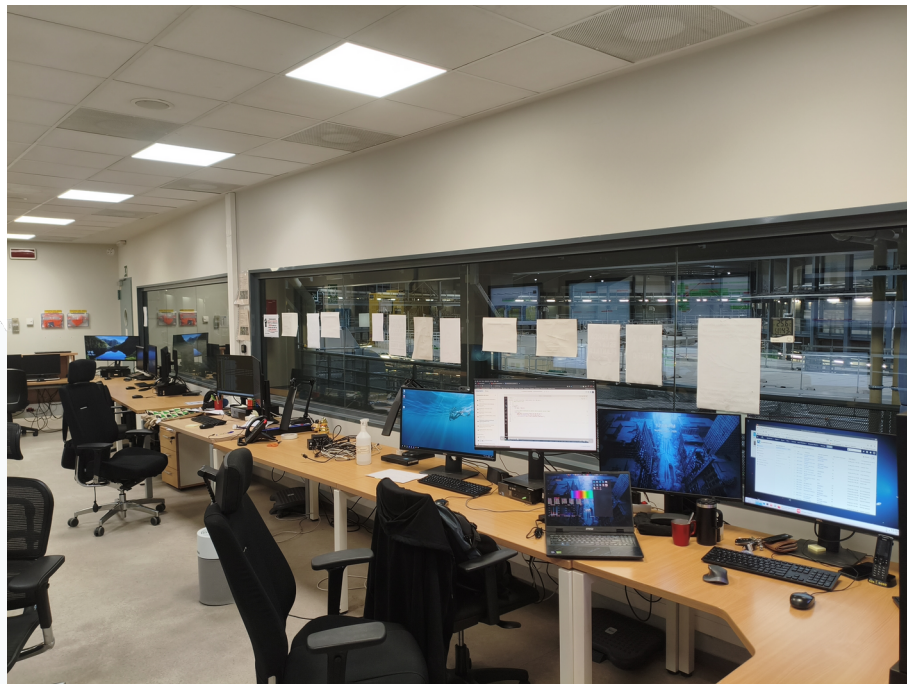
- ALBA control room.
- Accessing the machine.
 - PyTango
 - taurus.core
- Operations made GUIs.
 - Taurus.
 - taurus form, taurus trend.
 - taurus gui.
 - taurus designer + python3
 - PyQt5 + python3.
- Questions



ALBA Control Room



- 2x Workstations for operations.
- 5x Workstations for accelerators.
- 1x Workstation to display data in the wall monitors.
- 1x Workstation for Operations Frontpage

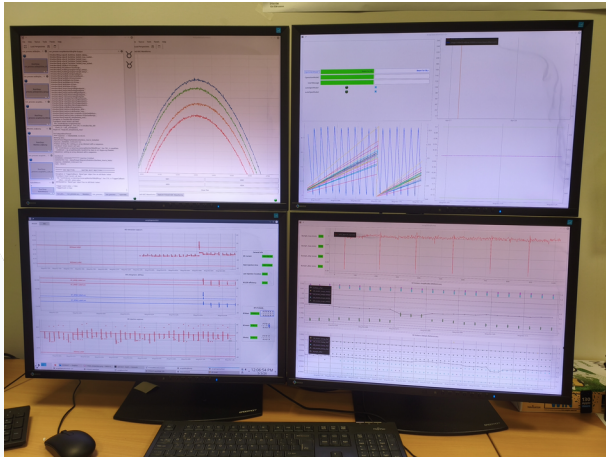


Taurus Workshop – SOLEIL 2026

12/05/2026 - 13/05/2026

The Operator's Lair

- Workstation with remote connection to office computer.
- Accelerators state workstation.
- Operations Frontpage computer.
- A windows computer connected to the world.



There are two ways to access device server at ALBA:

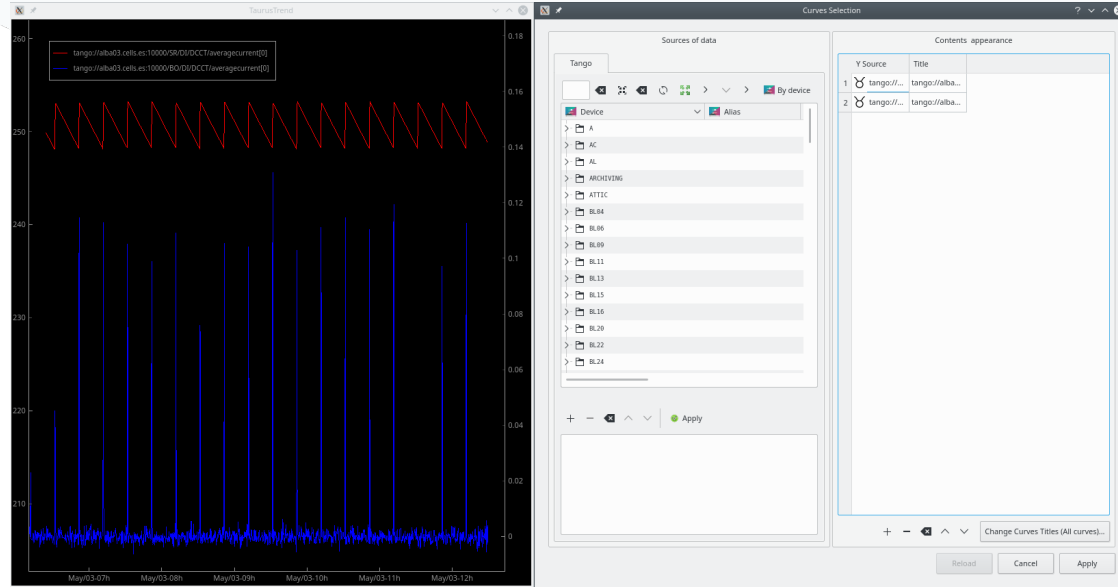
- PyTango:
 - The standard way of accessing tango device servers.
- Taurus:
 - From the user point of view taurus has the same functionalities than PyTango but adds another layer of security on top of it.

Example: A member of the accelerators group made a python script that try to read an attribute without any wait time between readings, with PyTango, the device hang, and a lot of secondary device servers depending on it fail, so we lost the beam.

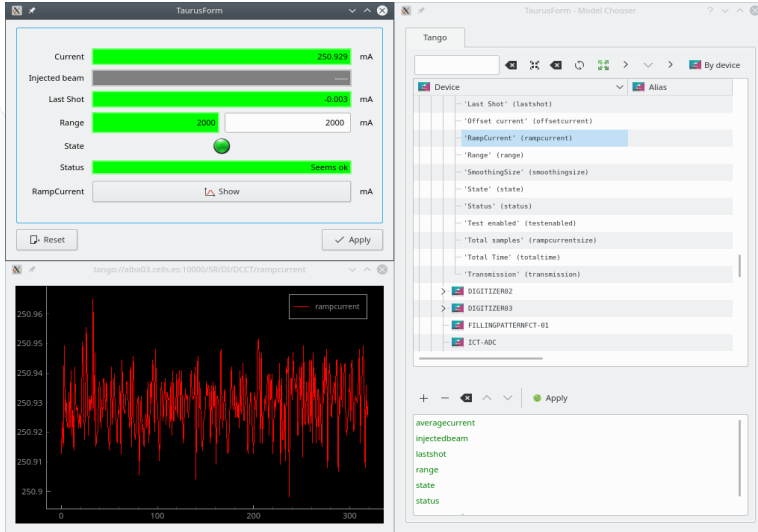
Just changing to taurus module instead of pytango solve the problem.

taurus form and taurus trend

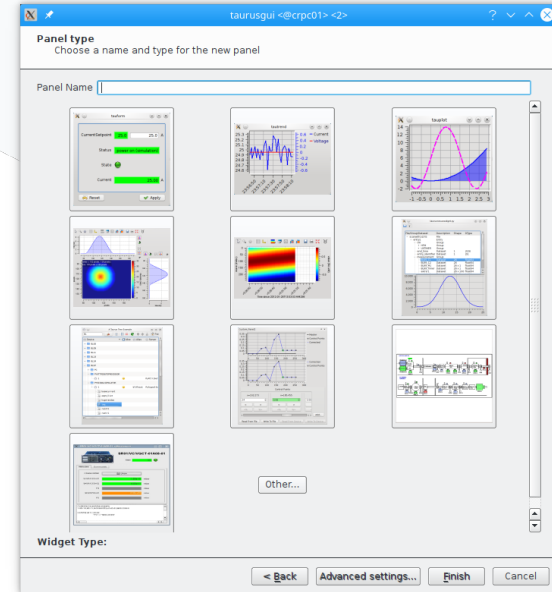
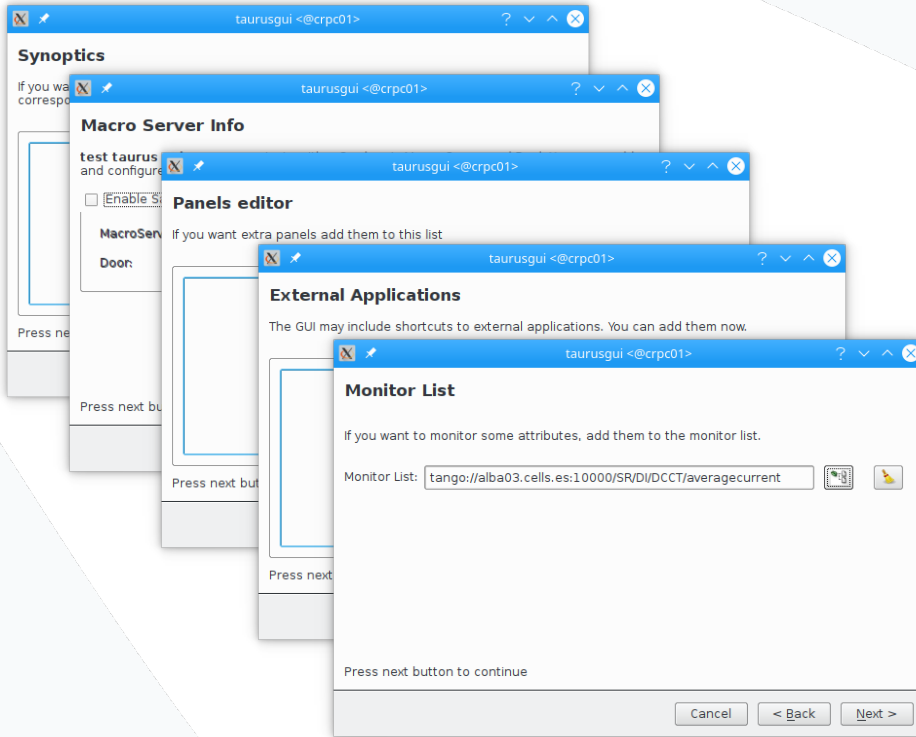
- Quick access to the device servers.



- This two utilities only need a 5 minutes training to use.

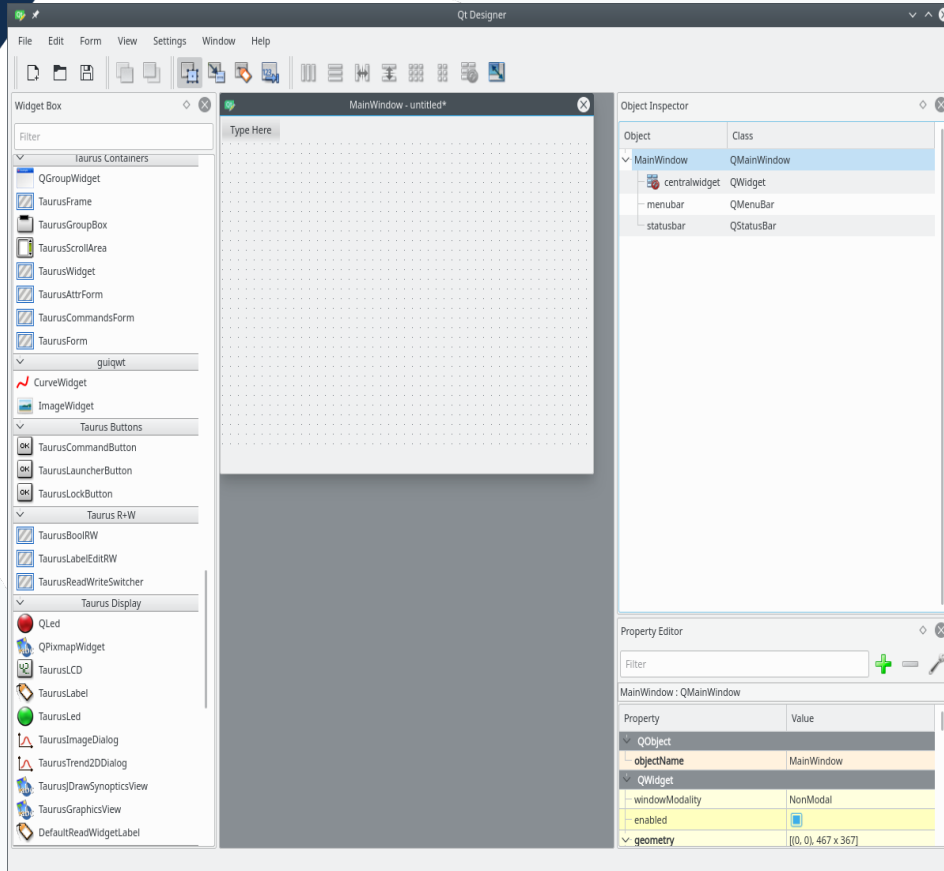


- Allows the creation of more complex GUIs, combining taurusforms, taurustrends and more widgets.



- Used extensively a few years ago, but now not so much.
- As Operators get better programming in python they shift to...

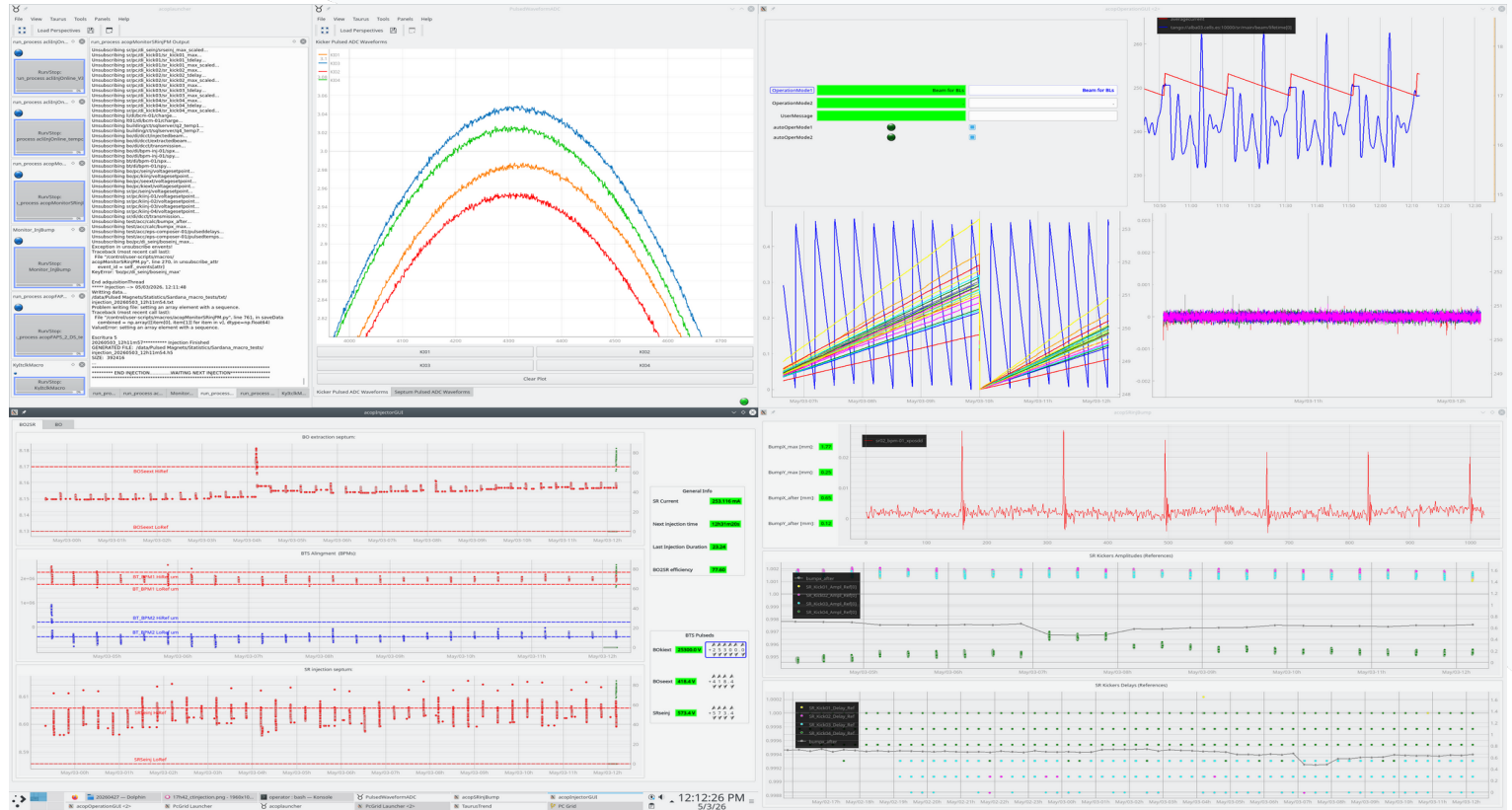
taurus designer + python3.



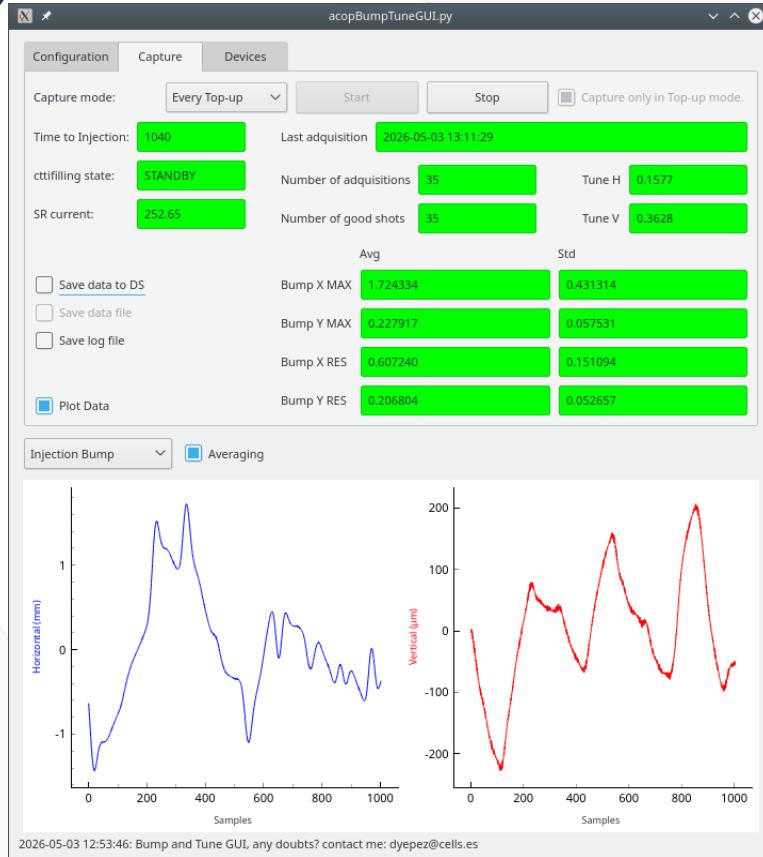
- taurus designer is a qtdesigner tuned to use taurus widgets in an easy way.
- It allows to link the widgets with tango device servers simplifying the GUI design process.

taurus designer + python3 GUIs.

5 GUIs with multiple Tabs in a 4 monitors workstation to check at first glance if something is wrong in the accelerator.



taurus designer + python3 GUIs.



- acopBumpTuneGUI.py it's made with taurusdesigner and python3.
- Used to calculate the storage ring perturbations due to the injection kickers.

taurus designer + python3 GUIs.



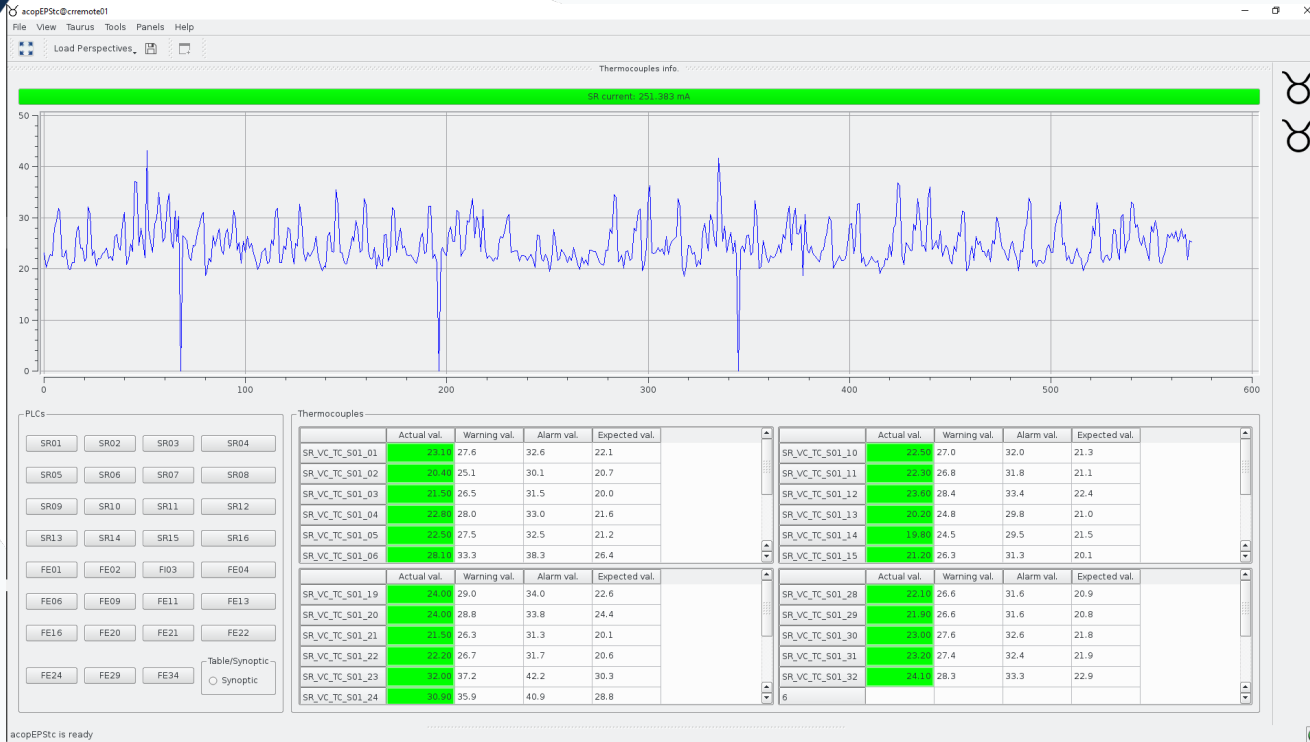
The screenshot displays the Taurus Designer GUI with the following sections:

- RF PLCs:** A grid of green status bars for various RF components.
- Bunker PSS system:** A panel for Bunker PSS info.
- POWERLINK:** A panel for POWERLINK STATUS.
- Tunnel PSS System:** A panel for Tunnel PSS info.
- Magnets and PS:** A grid of green status bars for magnet and power supply components.
- LINAC state:** A panel for LINAC status.
- Vacuum PLCs:** A grid of green status bars for vacuum components.
- FEs PLCs:** A grid of green status bars for FEs components, with some yellow warning bars.
- IDs PLCs:** A grid of green status bars for ID components, with some yellow warning bars.
- Interlocks viewer:** A table showing active interlocks.

	PLC	Signal	State/Value	Is First	Info
1	fe04/eps/plc-01	A02C1001SPBX_A02C1001_DI	LOCK	0	Info
2	fe11/eps/plc-01	A06C0701PI2_FEPShU_F1101_DI	LOCK	0	Info
3	fe09/eps/plc-01	A04D1002CC2_FEBRTU_F0901_DO	LOCK	0	Info
4	fe24/eps/plc-01	A11G0201SPBX_A11G0201_DI	LOCK	0	Info
5	fe29/eps/plc-01	A14D0502CC1_FEBRTU_F2901_DO	LOCK	0	Info
6	fe24/eps/plc-01	A11G0201PI1_FEFXMI_F2401_DI	LOCK	0	Info
7	fe24/eps/plc-01	A11G0201CC1_FEFXMI_F2401_DO	LOCK	0	Info
8	fe02/eps/plc-01	A02A0602CC2_FEBRTU_F0201_DI	LOCK	0	Info
9	fe09/eps/plc-01	A04D1001PI2_FEPShU_F0901_DI	LOCK	0	Info
10	fe24/eps/plc-01	A11G0202PI2_FEBRTU_F2401_DI	LOCK	0	Info
11	fe02/eps/plc-01	A02A0602CC1_FEPMP_T0201_DI	LOCK	0	Info

- main_EPS.py:
- This is a huge project, nearly 2 years in development, that simplifies the use of the Equipment Protection System.
- It uses a taurus designer gui as a base, with custom made pyqt5 Widgets that work inside different layouts.

taurus designer + python3 GUIs.



- main_EPS.py:
- This layout shows all thermocouples on the machine.

taurus designer + python3 GUIs.

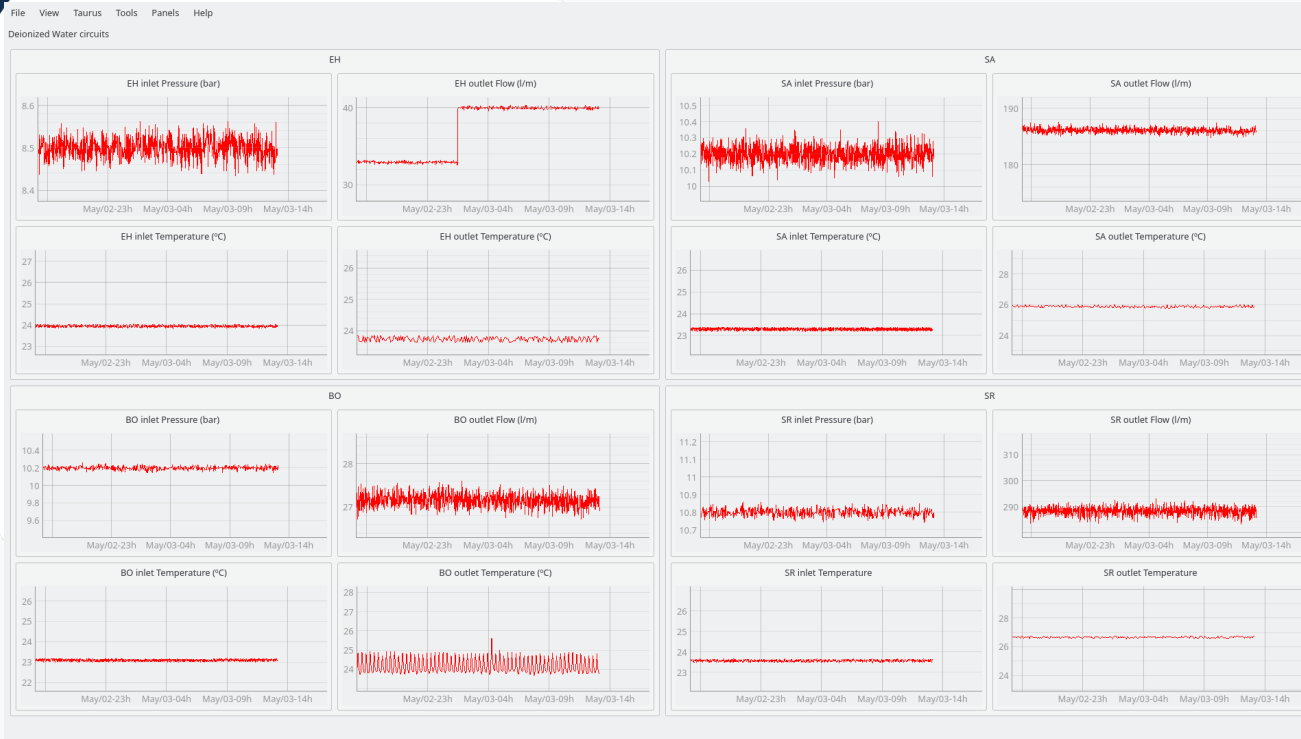


The screenshot displays the Taurus Designer GUI with several panels:

- tunnel_pss_review**: A table listing various RF permits (BO RF, SR RF, RF Shutters, BO & SR Bending magnets, BO & SR pulsed magnets) with columns for 'permitted' and 'enabled' status, all showing green bars indicating they are enabled.
- tunnel_pss status**: A 2x2 grid of status indicators: GREEN (black), RESTRICTED (black), INTERLOCKED (orange), and BEAM ON (red).
- tunnel_pss restricted**: Two panels for T1 and T3 Restricted keys, each showing 'Key In' and 'Key Locked' status with a row of six green indicator lights.
- tunnel_pss Radmon status**: A Radmon network status panel with a grid of indicator lights for various detector channels (eh01-eh34, sa04-sa15, IN01) and a 'Shift Accumulate dose (uSv) (4h)' row with numerical values.

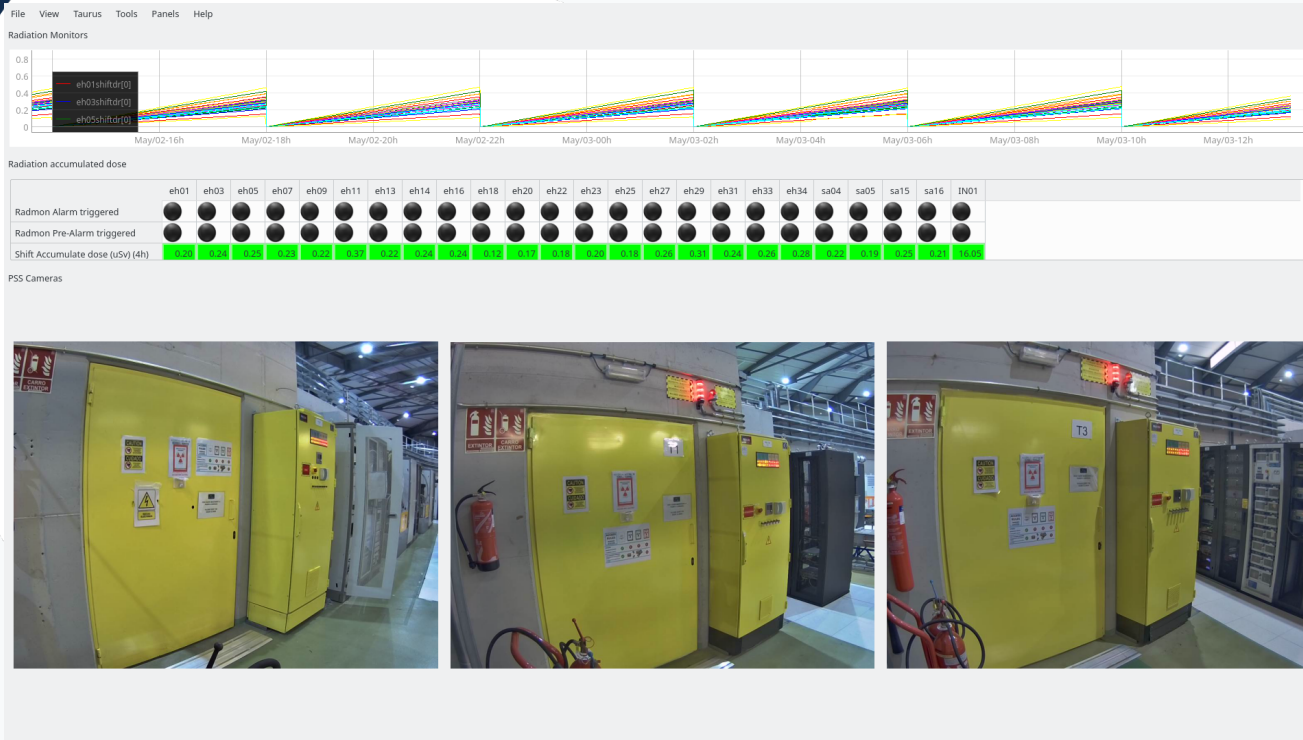
- main_EPS.py:
- This layout shows all data from the Personnel Safe System.

taurus designer + python3 GUIs.



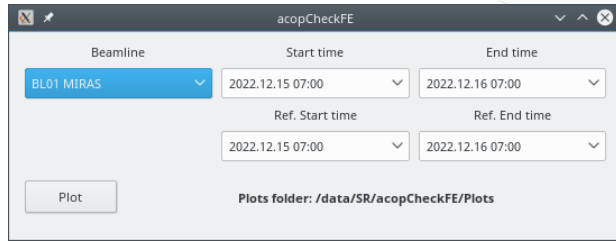
- `acopInfrGUI.py`.
- Water temperatures, pressures, flows.

taurus designer + python3 GUIs.



- acopPSS_GUI.py.
- Radiation monitors and access IPCams.

PyQt5 + Python3 GUIs



acopCheckFE.py:

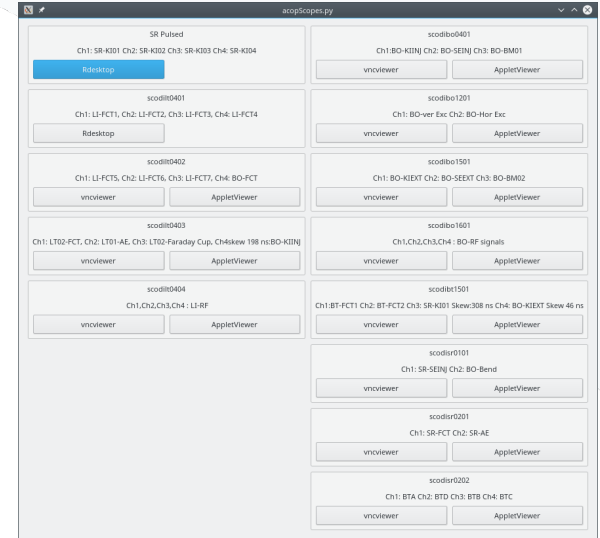
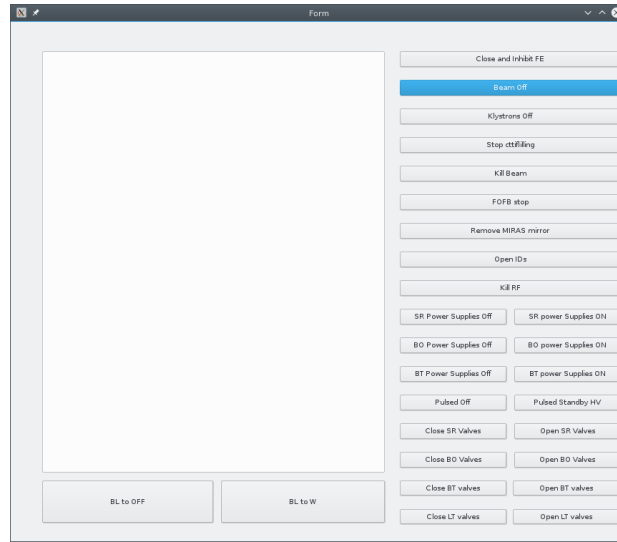
To compare the state of the FE diagnostics between two timespans.

acopScopes.py:

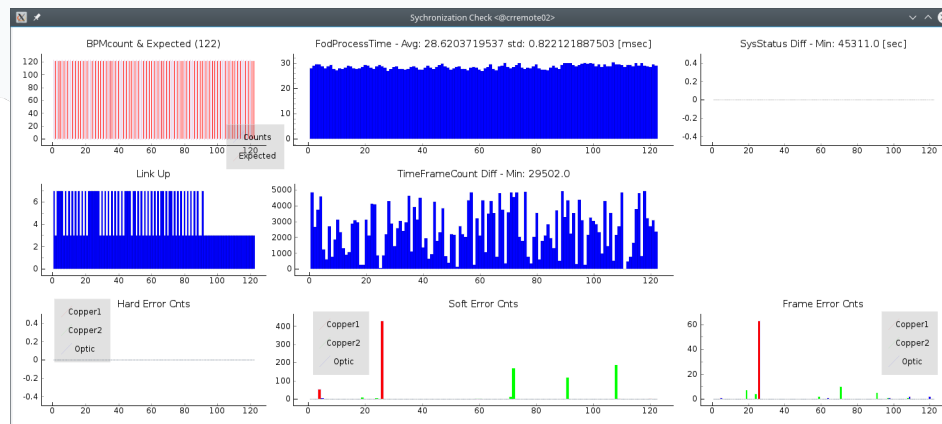
Used to launch the different scopes in the machine.

acopShutdown.py:

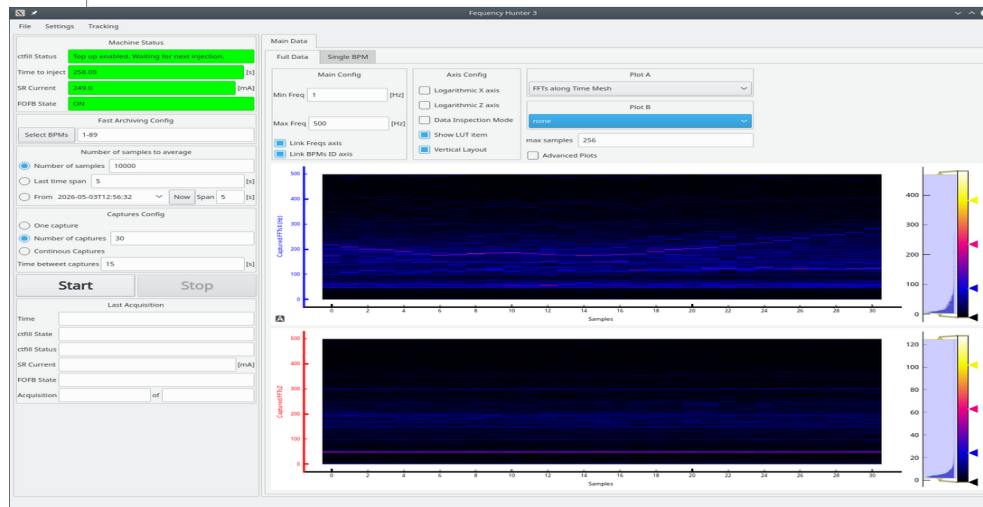
The shutdown of the machine automatized, step by step, with this GUI.



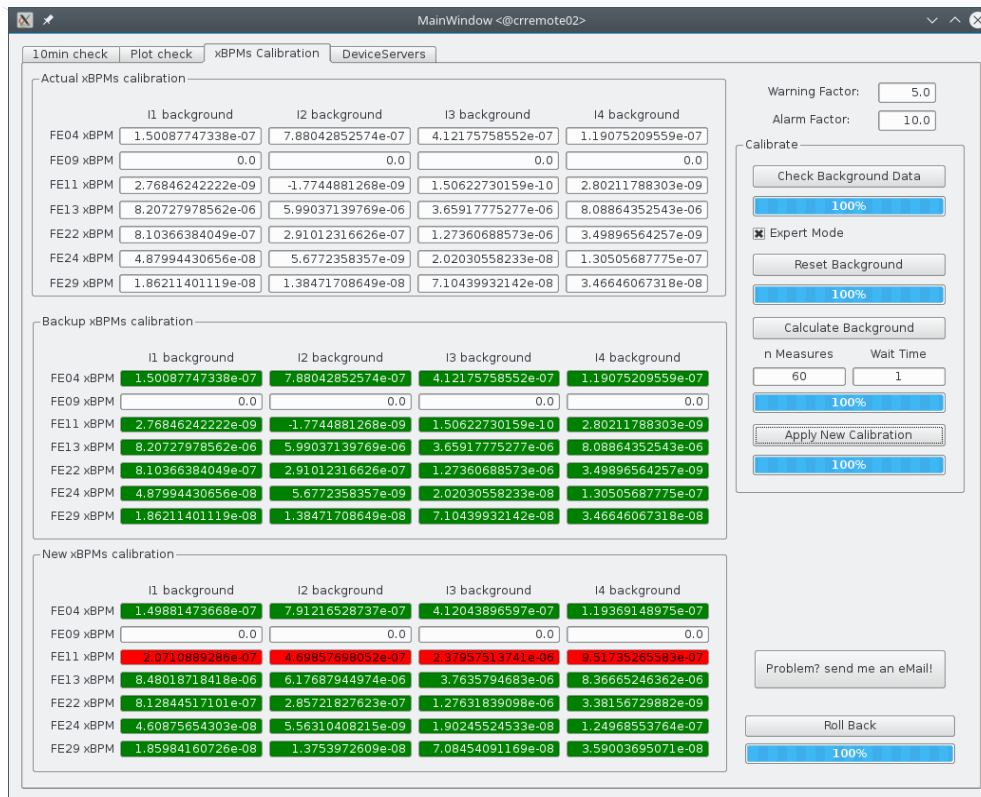
- `acopBPMsStatus.py`:
 - check and synchronize the BPMs



- `acopFrequencyHunter.py`:
 - uses the Fast Archiving data to look for instabilities of the beam



- `acopxbpmscheck.py`:
 - Check beam position at xBPMs and calibrates backgrounds currents from upstream bending magnets.



The screenshot shows a software window titled "MainWindow <@crrremote02>" with tabs for "10min check", "Plot check", "xBPMs Calibration", and "DeviceServers". The "xBPMs Calibration" tab is active and displays three tables of calibration data for various xBPMs (FE04, FE09, FE11, FE13, FE22, FE24, FE29) across four background regions (I1, I2, I3, I4).

Actual xBPMs calibration

	I1 background	I2 background	I3 background	I4 background
FE04 xBPM	1.50087747338e-07	7.88042852574e-07	4.12175758552e-07	1.19075209559e-07
FE09 xBPM	0.0	0.0	0.0	0.0
FE11 xBPM	2.76846242222e-09	-1.7744881268e-09	1.50622730159e-10	2.80211788303e-09
FE13 xBPM	8.20727978562e-06	5.99037139769e-06	3.65917775277e-06	8.08864352543e-06
FE22 xBPM	8.10366384049e-07	2.91012316626e-07	1.27360688573e-06	3.49896564257e-09
FE24 xBPM	4.87994430656e-08	5.6772358357e-09	2.02030558233e-08	1.30505687775e-07
FE29 xBPM	1.86211401119e-08	1.38471708649e-08	7.10439932142e-08	3.46646067318e-08

Backup xBPMs calibration

	I1 background	I2 background	I3 background	I4 background
FE04 xBPM	1.50087747338e-07	7.88042852574e-07	4.12175758552e-07	1.19075209559e-07
FE09 xBPM	0.0	0.0	0.0	0.0
FE11 xBPM	2.76846242222e-09	-1.7744881268e-09	1.50622730159e-10	2.80211788303e-09
FE13 xBPM	8.20727978562e-06	5.99037139769e-06	3.65917775277e-06	8.08864352543e-06
FE22 xBPM	8.10366384049e-07	2.91012316626e-07	1.27360688573e-06	3.49896564257e-09
FE24 xBPM	4.87994430656e-08	5.6772358357e-09	2.02030558233e-08	1.30505687775e-07
FE29 xBPM	1.86211401119e-08	1.38471708649e-08	7.10439932142e-08	3.46646067318e-08

New xBPMs calibration

	I1 background	I2 background	I3 background	I4 background
FE04 xBPM	1.49881473668e-07	7.91216528737e-07	4.12043896597e-07	1.19369148975e-07
FE09 xBPM	0.0	0.0	0.0	0.0
FE11 xBPM	2.0710889286e-07	4.69857699052e-07	2.37857513741e-06	8.51735265582e-07
FE13 xBPM	8.48018718418e-06	6.17687944974e-06	3.7635794683e-06	8.36665246362e-06
FE22 xBPM	8.12844517101e-07	2.85721827623e-07	1.27631839098e-06	3.38156729882e-09
FE24 xBPM	4.60875654303e-08	5.56310408215e-09	1.90245524533e-08	1.2496853764e-07
FE29 xBPM	1.85984160726e-08	1.3753972609e-08	7.08454091169e-08	3.59003695071e-08

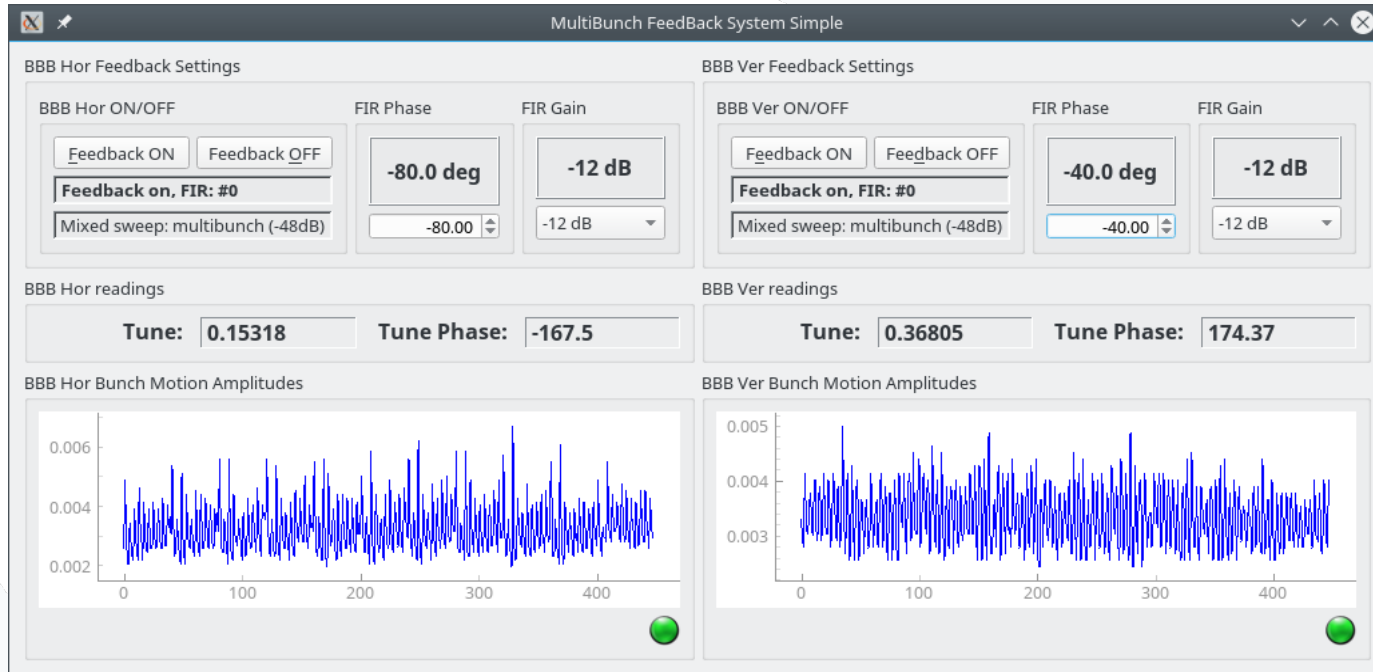
Control panel on the right includes:

- Warning Factor: 5.0
- Alarm Factor: 10.0
- Calibrate section:
 - Check Background Data (100%)
 - Expert Mode (checked)
 - Reset Background (100%)
 - Calculate Background
 - n Measures: 60, Wait Time: 1 (100%)
 - Apply New Calibration (100%)
- Problem? send me an eMail!
- Roll Back (100%)

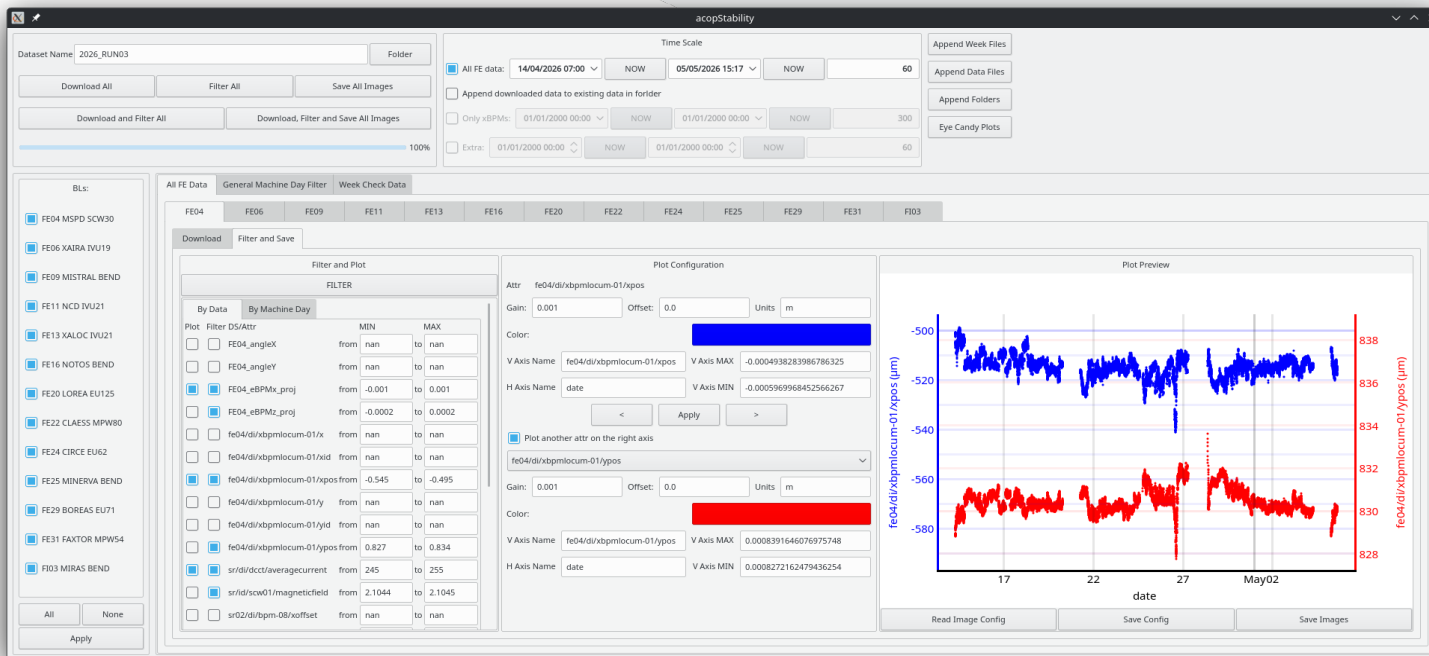
PyQt5 + Python GUIs



- `acdiBBBFE.py`:
 - Bunch By Bunch Feedback control.



- `acdiStability.py`:
 - Downloads, filters, plots and saves images for Machine Stability Studies.



Conclusions.



- Taurus has tools like taurus form, taurus trend and taurus gui that allow scientist and operations to make quick simple GUIs, leaving the controls group to work on more important projects.
- Taurus designer, for more advanced users, saves a lot of code, linking device server attributes and commands to taurus-widgets in an easy way.
- Qt5 is the ideal framework to create GUIs, as it is easy to use and has full integration with python, the programming language of choice at ALBA.
- Using Taurus maintains consistency between GUIs, all GUIs have the same look, feel, and behave in the same way.
 - For example the color coding for attributes:
 - Green: Stable.
 - Blue: Moving.
 - Yellow: Warning.
 - Red: Alarm.
 - Grey: Communication problem.
- Taurus as a way to access the device servers, on top of pytango, adds an additional safety layer to the code for advanced user.

Questions?

Taurus SIG – ESRF 2023.

12/05/2026 - 13/05/2026