

Operations made GUIs.

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TANG Q

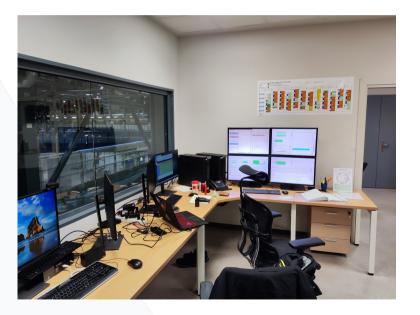
- ALBA control room.
- Accessing the machine.
 - PyTango
 - taurus.core
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 - Taurus.
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ALBA Control Room



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





PyTango and taurus.core



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.

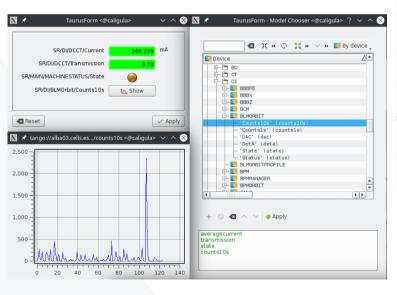
Example: A member of the accelerators group made a python script that try to read an attribute without any wait time between readings, with PyTango, the device hang, and a lot of secondary device servers depending on it fail, so we lost the beam.

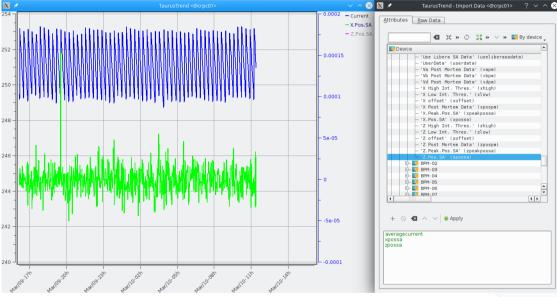
Just changing to taurus module instead of pytango solve the problem... with a quirk.

Taurusform and Taurustrend



• Quick access to the device servers.





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

Taurusgui



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

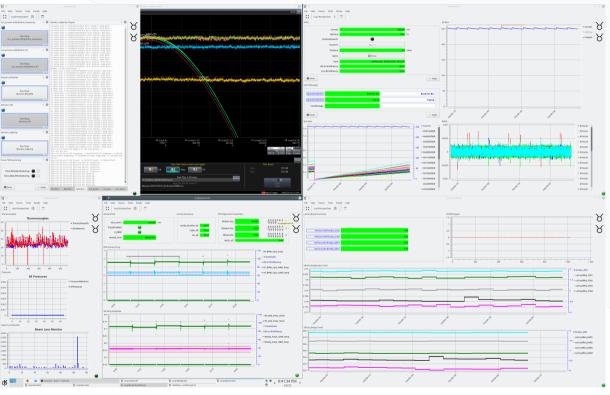
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Taurusgui examples.



• Operation Workstation crpc02 uses taurusguis.





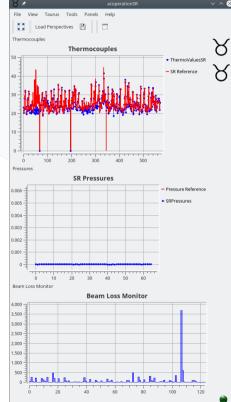
Taurus SIG – ESRF 2023.

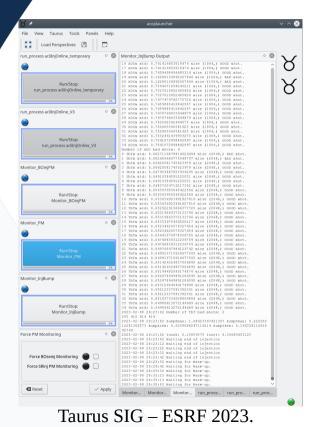
14/03/2023

Taurusgui examples.



- · acoplauncher.
 - This GUI launches scripts that are used during operation.
 - Uses a macro-server to control the scripts execution.
 - This allows to check the status of the scripts instead of having to navigate from terminal tab to tab.





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acoperationSR:

 Used to check vacuum pressures, SR temperatures and Beam Loss Monitors.

Taurusgui acosrinjbump.

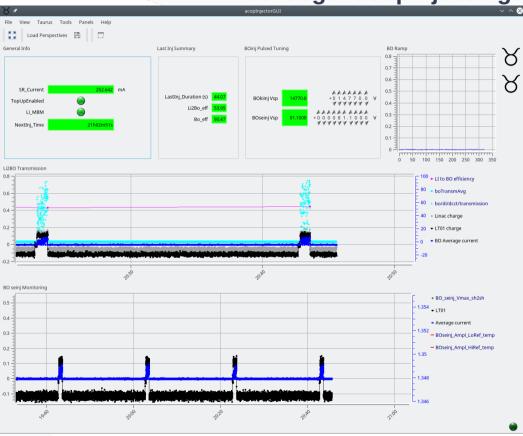




- acopsrinjbump.
 - This GUI is used to check the perturbation on the orbit that the pulsed magnets produce.

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Taurusgui acopinjectorgui.

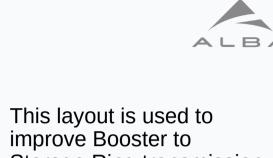


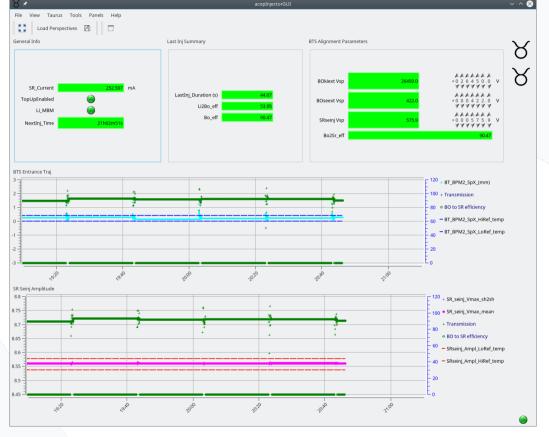


- Taurusgui also have the possibility of pre-save different lay-outs.
- acopinjectorgui has 3 layouts used in different operational situations.
- This layout is used to improve Linac to Booster transmission.

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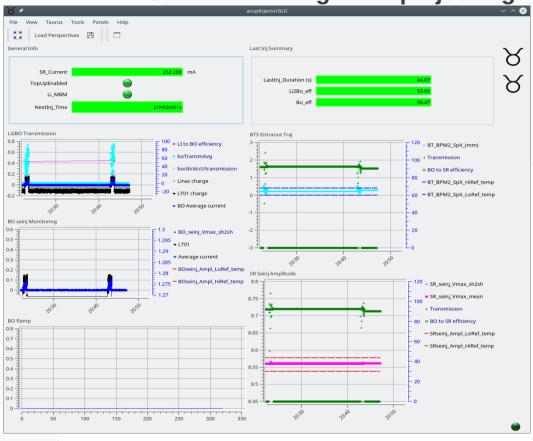
Taurusgui acopinjectorgui.





• Storage Ring transmission.

Taurusgui acopinjectorgui.



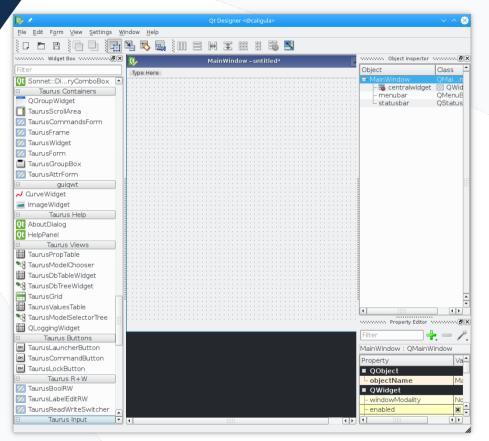


- This layout is used to check the machine during Top-Up mode.
- Taurusgui is ideal for users from basic to no programming experience.

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Taurusdesigner + python.





- Taurusdesigner 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.

acopBumpTuneGUI.py



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Save data file	Avg Bump X MAX 1.59	2515	Std 0.427461
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🗙 Plot Data		5915	0.068281
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23-03-11 19:57:03: Bump and Tune	GUL any doubte? o	optact may dyana	v@cells es

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

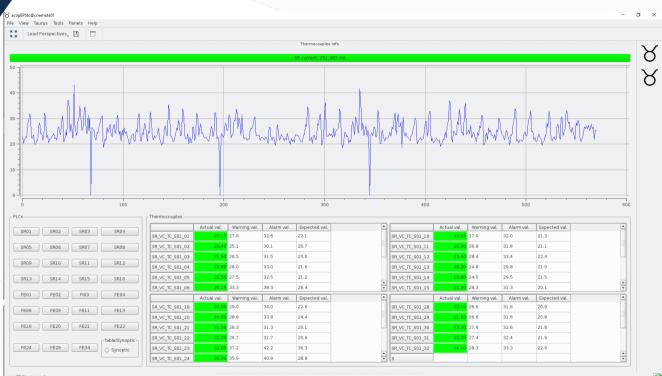
Taurus SIG – ESRF 2023.



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



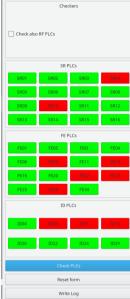


- main_EPS.py:
- This layout shows all thermocouples on the machine.

acopEPStc is ready



widget launcher.pv



Scann report: Attribute historics: EPS BKs: Test done on: 20221214 175325 All changes for each attribute since last BK update on date 2022-08-30 10:40:51 will be displayed. For more information about historical changes, check it at 'Attribute historics' tab above SR04: DI ACEL A04 01 OUTPUT AF changed parameter DISABLE from 1.00E+00 to 0.00E+00 by user msos on date 2022/11/22 at 04:34:17. SR04: DI ACEL A04 01 OUTPUT AF changed parameter DISABLE from 1.00E+00 to 0.00E+00 by user arubio on date 2022/12/02 at 14:40:32. SR04: DI ACEL A04 01 OUTPUT AE changed parameter ALARM UP from 1.40E+03 to 1.50E+03 by user arubio on date 2022/12/02 at 14:40:32. SR04: DI_ACEL_A04_03_OUTPUT_AF changed parameter ALARM UP from 1.45E+03 to 1.50E+03 by user arubio on date 2022/12/02 at 14:40:32. SR04: DI ACEL A04 03 OUTPUT AF changed parameter ALARM UP from 1.45E+03 to 1.50E+03 by user arubio on date 2022/12/02 at 14:40:32. 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SR10: A09B1002CC2_SR_VC_CCG_S1004A_AF changed parameter WARNING UP from 4.98E-08 to 4.98E-08 by user msos on date 2022/12/12 at 12:42:43 SR10: A09B1002CC2, SR, VC, CCG, S1004A, AF changed parameter WARNING UP from 4.98E-08 to 4.98E-08 by user msos on date 2022/12/12 at 12:42:43. SR10: A10C0801CC1 SR VC CCG S10 01 AF changed parameter WARNING UP from 4.98E-08 to 4.98E-08 by user msos on date 2022/12/12 at 12:42:43. SR10: A10C0801CC1 SR VC CCG S10 01 AF changed parameter WARNING UP from 4.98E-08 to 4.98E-08 by user msos on date 2022/12/12 at 12:42:43. SR10: A10C0801CC1_SR_VC_CCG_S10_01_AF changed parameter ALARM UP from 1.00E-07 to 1.00E-07 by user msos on date 2022/12/12 at 12:42:43. SR10: A10C0801CC1_SR_VC_CCG_S10_01_AF changed parameter ALARM UP from 1.00E-07 to 1.00E-07 by user msos on date 2022/12/12 at 12:42:43. SR10: A10C0801CC2 SR VC CCG S10 05 AF changed parameter WARNING UP from 4.98E-08 to 4.98E-08 by user msos on date 2022/12/12 at 12:42:43. 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• main_EPS.py:

- 0 X

 This layout check all changes on the EPS PLCs.

Scan finished. Press write log button for further info.

Taurus SIG – ESRF 2023.

14/03/2023

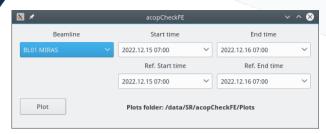


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) RF Permits:	IS FEVIEW	tunnel_pss status	X
BOOSTER RF permits enabled		OPEN	RESTRICTED
R RF permits: HVPS 06A01 permits enabled	IOT OF A01 permits applying		
HVPS 06A02 permits enabled	IOT 06A01 permits enabled		
HVPS 06801 permits enabled	IOT 06801 permits enabled	INTERLOCKED	BEAM ON
HvPS 06802 permits enabled	IOT 06802 permits enabled		
HVPS 10A01 permits enabled	IOT 10A01 permits enabled	tunnel_pss restricted	
HVPS 10A02 permits enabled	IOT 10A02 permits enabled	T1 Restricted keys	
HVPS 10801 permits enabled	IOT 10801 permits enabled		
HVPS 10B02 permits enabled	IOT 10802 permits enabled	01 02 03 04 05 06 CR	
HVPS 14A01 permits enabled	IOT 14A01 permits enabled	Key In	
HvPS 14A02 permits enabled	IOT 14A02 permits enabled	Key Locked	
HVPS 14B01 permits enabled	IOT 14B01 permits enabled		
HvPS 14802 permits enabled	IOT 14B02 permits enabled		
F Shutters/ RF detectors:			
Shutter 06_14 permits enabled	RF det. 06_14 permits enabled		
Shutter 06_24 permits enabled	RF det. 06_24 permits enabled		
Shutter 10_14 permits enabled	RF det. 10_14 permits enabled		
Shutter 10_24 permits enabled	RF det. 10_24 permits enabled		
Shutter 14_14 permits enabled	RF det. 14_14 permits enabled	T3 Restricted keys	
Shutter 14_24 permits enabled	RF det. 14_24 permits enabled	01 02 03 04 05 06 CR	
Shutter 16_24 permits enabled	RF det. 16_24 permits enabled	000000	
0 & SR Bending magnets:			
B0 BEND 15A02 permits enabled	SR BEND 01A01 permits enabled	Key Locked	
B0 BEND 15A03 permits enabled			
0 & SR pulsed magnets:			
B0 PULS 04D01 permits enabled	SR PULS 01B01 permits enabled		
B0 PULS 04002 permits enabled B0 PULS 15B01 permits enabled	SR PULS 01802 permits enabled		
B0 PULS 15801 permits enabled B0 PULS 15802 permits enabled	SR PULS 01803 permits enabled SR PULS 01804 permits enabled		
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	tunnel_pss Radmon status		
Radmon network			
ab01 ab02 ab05 ab07 ab08 ab11 ab	13 eh14 eh16 eh18 eh20 eh22 eh23 eh25 eh27 eh29 eh31	ah22 ah24 s204 s205 s215 s216 IN01	
Radmon Alarm triggered			
Radmon Pre-Alarm triggered 🛛 🜑 🜑 🜑 🜑			
Shift Accumulate dose (uSv) (4h) 0.05 0.06 0.06 0.05 0.06 0.09 0	06 0.09 0.06 0.06 0.05 0.05 0.05 0.04 0.07 0.08 0.11	0.05 0.06 0.08 0.07 0.05 0.06 5.59	

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

14/03/2023





acopCheckFE.py:

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

*	Form		~ ^ (
		Close and	Inhibit FE
		Bear	n Off
		Klystr	ons Off
		Stop c	ttifiiling
		Kille	leam
		FOFE	3 stop
		Remove M	IRAS mirror
		Ope	n IDs
		Kil RF	
		SR Power Supplies Off	SR power Supplies ON
		BO Power Supplies Off	80 power Supplies ON
		BT Power Supplies Off	BT power Supplies ON
		Pulsed Off	Pulsed Standby HV
		Close SR Valves	Open SR Valves
		Close B0 Valves	Open B0 Valves
		Close BT valves	Open BT valves
BL to OFF	BL to W	Close LT valves	Open LT valves

acopScopes.py:

Used to launch the different scopes in the machine.

1	acopSo	opes.py	✓ ^ ⊗		
SR Pulse	d	scodibe0401			
Ch1: SR-KI01 Ch2: SR-KI02 Ch	3: SR-KI03 Ch4: SR-KI04	Ch1:BO-KIINJ Ch2: BO-SEINJ Ch3: BO-BM01			
Rdesktop		vncviewer	AppletViewer		
scodilt04	01	scodibo1201			
Ch1: LI-FCT1, Ch2: LI-FCT2, Ch	3: LI-FCT3, Ch4: LI-FCT4	Ch1: BO-ver Exc Ch2: BO-Hor Exc			
Rdesktop		vncviewer	AppletViewer		
scodiit04	02	scodib	01501		
Ch1: LI-FCT5, Ch2: LI-FCT6, Ch	3: LI-FCT7, Ch4: BO-FCT	Ch1: BO-KIEXT Ch2: BO	-SEEXT Ch3: BO-BM02		
vncviewer	AppletViewer	vncviewer	AppletViewer		
scodilt04	scodiit0403		scodibo1601		
1: LT02-FCT, Ch2: LT01-AE, Ch3: LT02-Far	aday Cup. Ch4skew 198 ns:BO-KIINJ	Ch1,Ch2,Ch3,Ch4 : BO-RF signals			
vncviewer	AppletViewer	vncviewer	AppletViewer		
scodilt04	04	scodibt1501			
Ch1,Ch2,Ch3,Cl	14 : LI-RF	Ch1:BT-FCT1 Ch2: BT-FCT2 Ch3: SR-KI01	Skew:308 ns Ch4: BO-KIEXT Skew 46 ns		
vncvlewer	AppletViewer	vncviewer	AppletViewer		
		scodis	r0101		
		Ch1: SR-SEINJ	Ih2: BO-Bend		
		vncviewer	AppletViewer		
		scodisr0201			
		Ch1: SR-FCT Ch2: SR-AE			
		vncviewer	AppletViewer		
		scodis	r0202		
		Ch1: BTA Ch2: BTD	Ch3: BTB Ch4: BTC		
		vncviewer	AppletViewer		

acopShutdown.py:

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



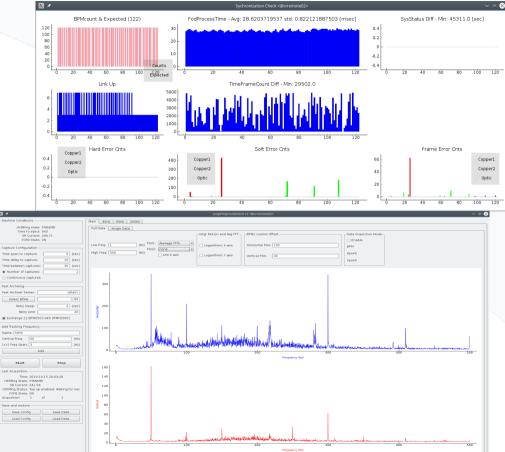


• check and synchronize the BPMs

• acopFrequencyHunter.py:

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 uses the Fast Archiving data to look for instabilities of the beam



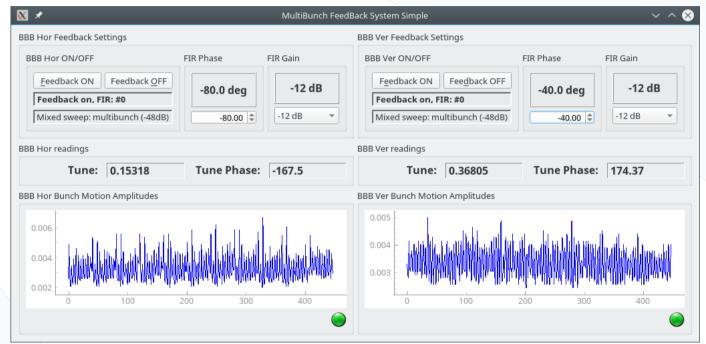


- acopxbpmscheck.py:
 - Check beam position at xBPMs and calibrates backgrounds currents from upstream bending magnets.

§ 🗶			MainWindow <@crremote	02>	~ ^ 😣	
10min check Plot check xBPMs Calibration DeviceServers						
_Actual xBPMs	calibration					
					Warning Factor: 5.0	
FEO 4 VEDM	Il background	12 background	13 background	14 background	Alarm Factor: 10.0	
FE04 xBPM	1.50087747338e-07	7.88042852574e-07	4.12175758552e-07	1.19075209559e-07	Calibrate	
FE09 xBPM	0.0	0.0	0.0	0.0	Check Background Data	
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	100%	
FE22 xBPM	8.10366384049e-07	2.91012316626e-07	1.27360688573e-06	3.49896564257e-09	🕱 Expert Mode	
FE24 xBPM	4.87994430656e-08	5.6772358357e-09	2.02030558233e-08	1.30505687775e-07	Reset Background	
FE29 xBPM	1.86211401119e-08	1.38471708649e-08	7.10439932142e-08	3.46646067318e-08	100%	
	14				100%	
Backup xBPM	s calibration				Calculate Background	
	11 background	12 background	13 background	14 background	n Measures Wait Time	
FE04 xBPM	1.50087747338e-07	7.88042852574e-07	4.12175758552e-07	1.19075209559e-07	60 1	
FE09 xBPM	0.0	0.0	0.0	0.0	100%	
FE11 xBPM	2.76846242222e-09	-1.7744881268e-09	1.50622730159e-10	2.80211788303e-09	Apply New Calibration	
FE13 xBPM	8.20727978562e-06	5.99037139769e-06	3.65917775277e-06	8.08864352543e-06	Apply New Calibration	
FE22 xBPM	8.10366384049e-07	2.91012316626e-07	1.27360688573e-06	3.49896564257e-09	100%	
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		
L						
New xBPMs c	alibration				ך	
	11 background	12 background	13 background	14 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	4.69857698052e-07	2.37957513741e-06	9.51735265583e-07		
FE13 xBPM	8.48018718418e-06	6.17687944974e-06	3.7635794683e-06	8.36665246362e-06	Problem? send me an eMail!	
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	1.24968553764e-07	Roll Back	
FE29 xBPM	1.85984160726e-08	1.3753972609e-08	7.08454091169e-08	3.59003695071e-08	100%	



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



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Conclusions.



- Taurus has tools like taurusform, taurustrend and taurusgui that allow scientist and operations to make quick simple GUIs, leaving the controls group to work on more important projects.
- Taurusdesigner, for more advanced users, saves a lot of code, linking device server attributes and commands to taurus-widgets in an easy way.
- Qt 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?

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