

Drag and drop creation of Bluesky GUIs

ESM monitor Cameras ESM scans Data Display

Sh/VSL

<input checked="" type="checkbox"/> SH1	Beam Parameters <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>				Branch <input type="checkbox"/> RE	
<input checked="" type="checkbox"/> GV2	I	x	Y	dX	dY	A go
<input checked="" type="checkbox"/> V		1.86	41.1	0.3	13.1	8.5
<input checked="" type="checkbox"/> M1	EPU			Diagnostics		
<input checked="" type="checkbox"/> V	EPU105	76.10	0.00	xqem0:	1	.1.12e-04
<input checked="" type="checkbox"/> SH2	<input checked="" type="checkbox"/>	< 0.1 >	< 0.1 >	paran	scanM3	M3U ES
<input checked="" type="checkbox"/> PGM	M1.X	-0.411	M3.X	2.500	M4A.HFM_Z	0.500
<input checked="" type="checkbox"/> V	M1.Ry	-3990.172	M3.Ry	-0.694	M4A.HFM_X	-2.310
<input checked="" type="checkbox"/> V	<input checked="" type="checkbox"/>	< 1 >	<input checked="" type="checkbox"/>	< .00005 >	<input checked="" type="checkbox"/>	< 0.1 >
<input checked="" type="checkbox"/> M3	M4A.VFM_Z	0.500	M4A.VFM_Y	-1.065	Photon_Energy <input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/> V	PGM.Focus_Cc	1.975	PGM Slits		A	105 300
<input checked="" type="checkbox"/> SH3	PGM.Energy	50.000	ExitSlitA.v_gap	10.0	<input type="checkbox"/> go	LH 400.c
<input checked="" type="checkbox"/> V	<input checked="" type="checkbox"/>	< 1 >	ExitSlitA.h_gap	10.0		
<input checked="" type="checkbox"/> KB	LT.X				LT.Y	
<input checked="" type="checkbox"/> RPE	-0.003	515.060	0.000	-0.001	LT.Z	
	< 0.01 >	< 0.01 >	< 0.01 >	< 0.1 >	LT.Ry	
					S T O P	

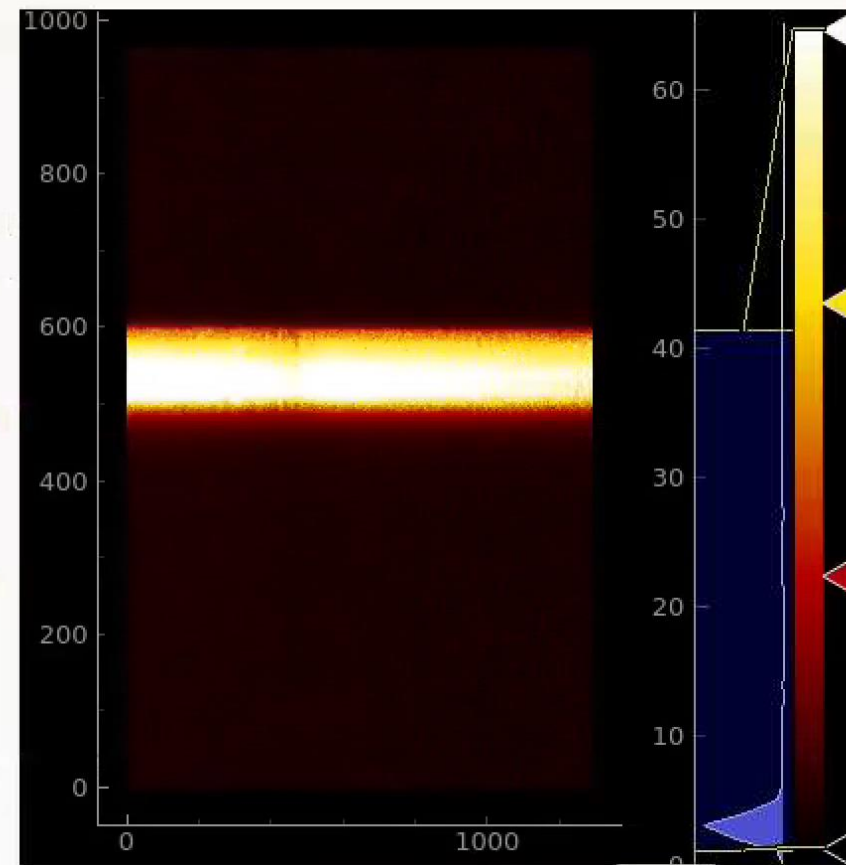
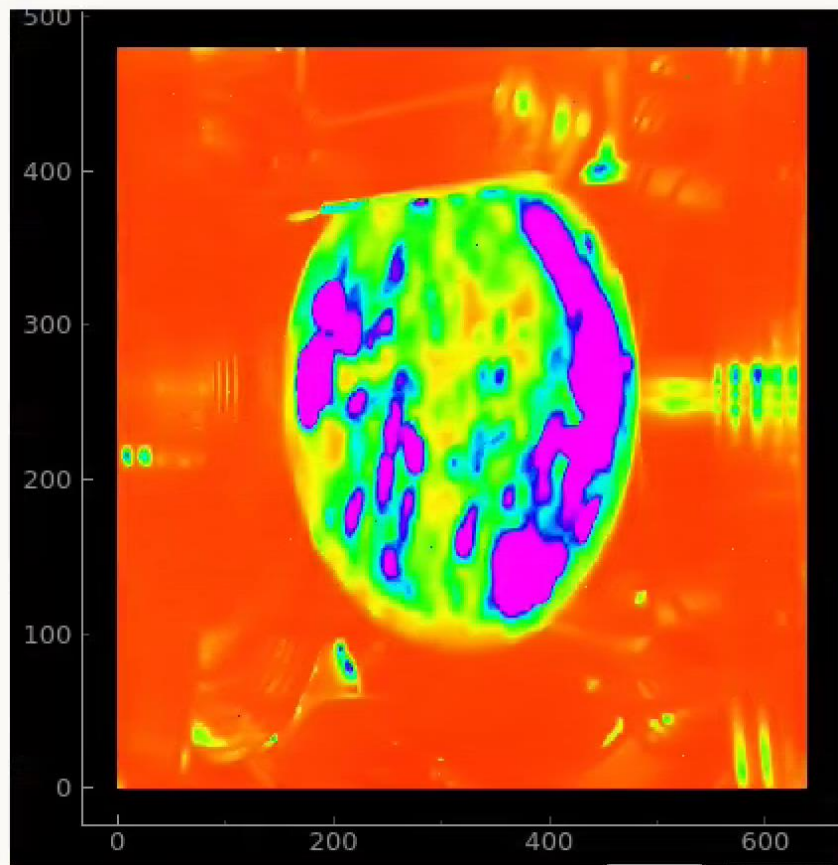
1.40E-09

6.30E-10

6.30E-10

1.50E-10

2.00E-09



ESM monitor

Cameras

ESM scans

Data Display

Scan Constructor

xqem01 ▾		EPU57.gap ▾		- ▾	
scan_1D	ch. 1 ▾	220.0009			
multi_1D		start 10	start 20		
scan_2D		stop 20	stop 25		
		step 1	step .5		
		RE <input type="checkbox"/>	clear suspenders	Abort	

Macro Editor

```
#print_summary(mv(BTA2diag.trans,-63))
#qem07.em_range.put('100 pC')
#print_summary(scan_1D('qem07@1', ExitSlitA.h_gap, 10, 15, 1))
grating='800'
EPU='105'
print_summary(Eph.move_to(400,grating=grating,EPU=EPU,branch='A',shutter='open'))
Photon_list=(40,50,60)
Erange=[0.75,6.5] #the photon energy %range for the scans, in the form [x,y] where the start
for i in Photon_list:
```

save

load

run

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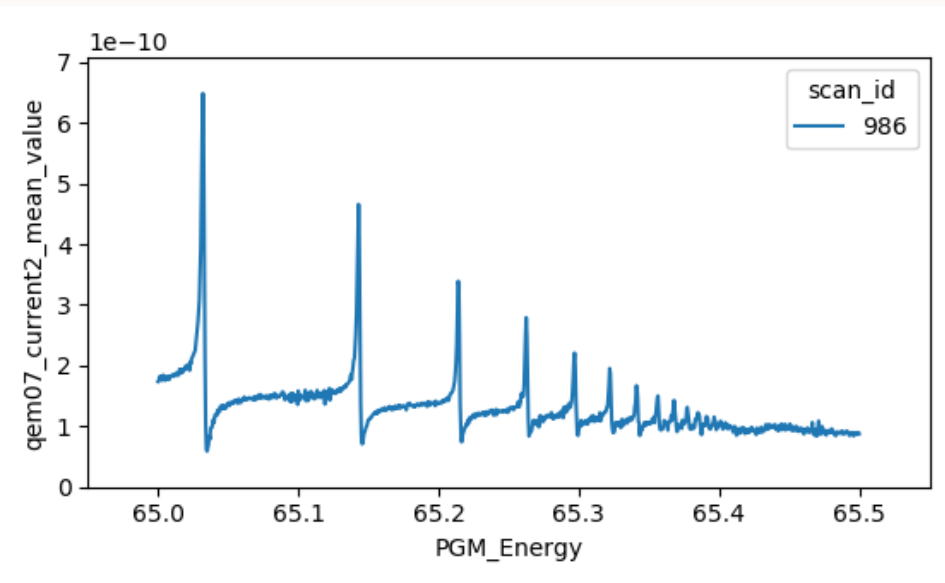


2/15/20 1:23 PM

7/15/20 1:23 PM

Load Scans

scan_id	
234	989
235	988
236	987
237	986
238	985



GUIs

- ▶ GUIs are essential because the easiest way to run an experiment is through a GUI
- ▶ GUIs should be tailored to the beamline, because every beamline is different.
- ▶ Problem: Because of threading issues, writing even a basic GUI from scratch that interfaces with bluesky can take months for an experienced person to develop

BS Studio

- ▶ BS Studio is a tool, based on Qt Designer, for creating Bluesky GUIs by dragging and dropping.
- ▶ A novice can create a sophisticated GUI in 30 minutes using BS Studio, without writing a single line of code
- ▶ BS Studio can be used to create GUIs that can run bluesky scans, and do almost anything else that can be done in a Bluesky terminal
- ▶ Easy to integrate with existing GUIs (we have a button to open ESM's ARPES Viewer from the GUI)

File Edit Form View Settings Window Help



Widget Box

- Filter
- Calendar Widget
 - LCD Number
 - Progress Bar
 - Horizontal Line
 - Vertical Line
 - OpenGL Widget
 - QQuickWidget
 - QWebView
 - group1
 - CodeButton
 - TextUpdate
 - MplWidget
 - Scan1DButton
 - EmbedFrame
 - LineInput
 - RECustomPlan
 - CodeContainer
 - DataBrowser
 - OphydProperties
 - OpenWindowButton
 - ArrayImage
 - BooleanLED

Form - esm_usr1.ui

ESM monitor Cameras ESM scans Data Display

Sh/VSL

Beam Parameters

EPU

Diagnostics

PGM Slits

Photon_Energy

LT.X LT.Y LT.Z LT.Ry

Property Editor

Filter

embedframe_7 : EmbedFrame

Language English

Country UnitedStates

inputMethodHints ImhNone

QFrame

frameShape Box

frameShadow Plain

lineWidth 1

midLineWidth 0

EmbedFrame

id 25

code self.ui\nself.updateUi()\n

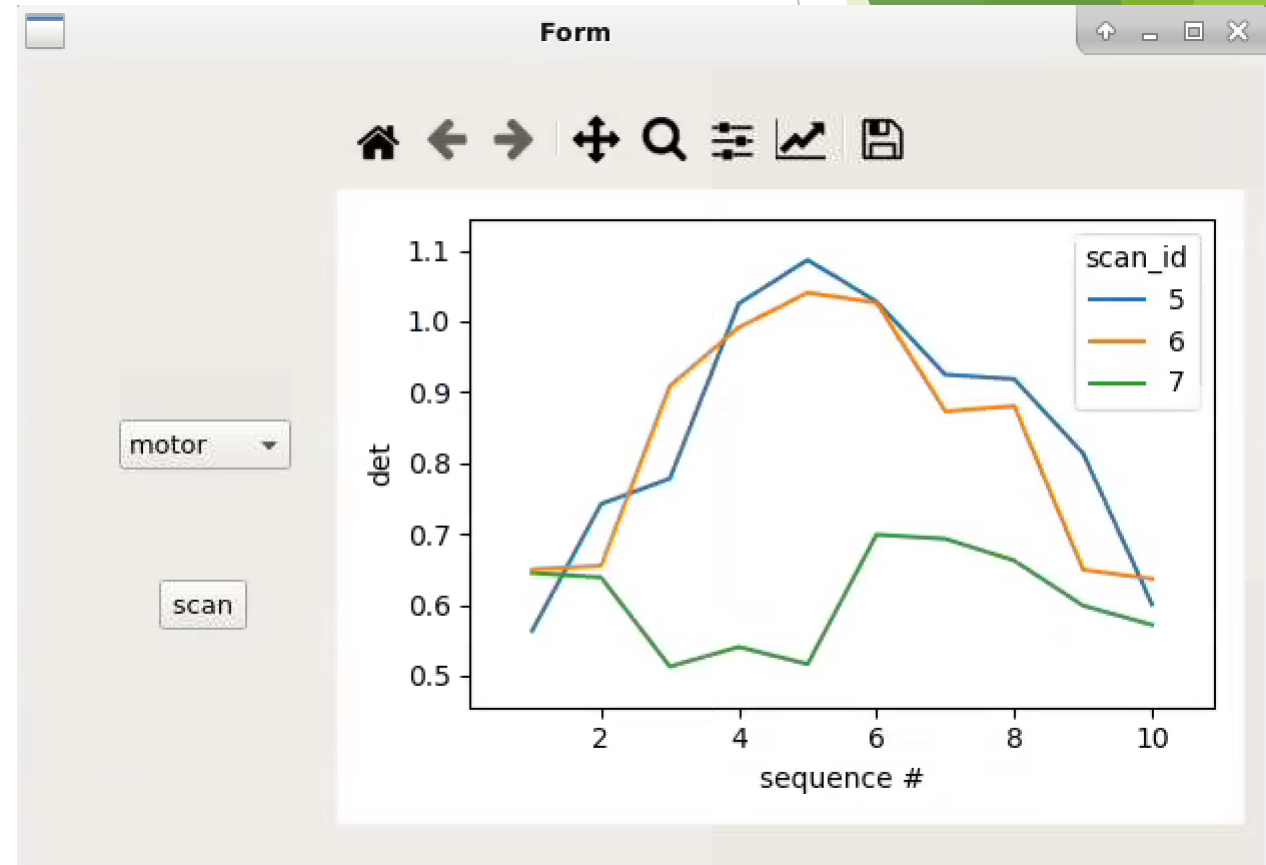
macros Change String List

fileName file:../common/EPU.ui

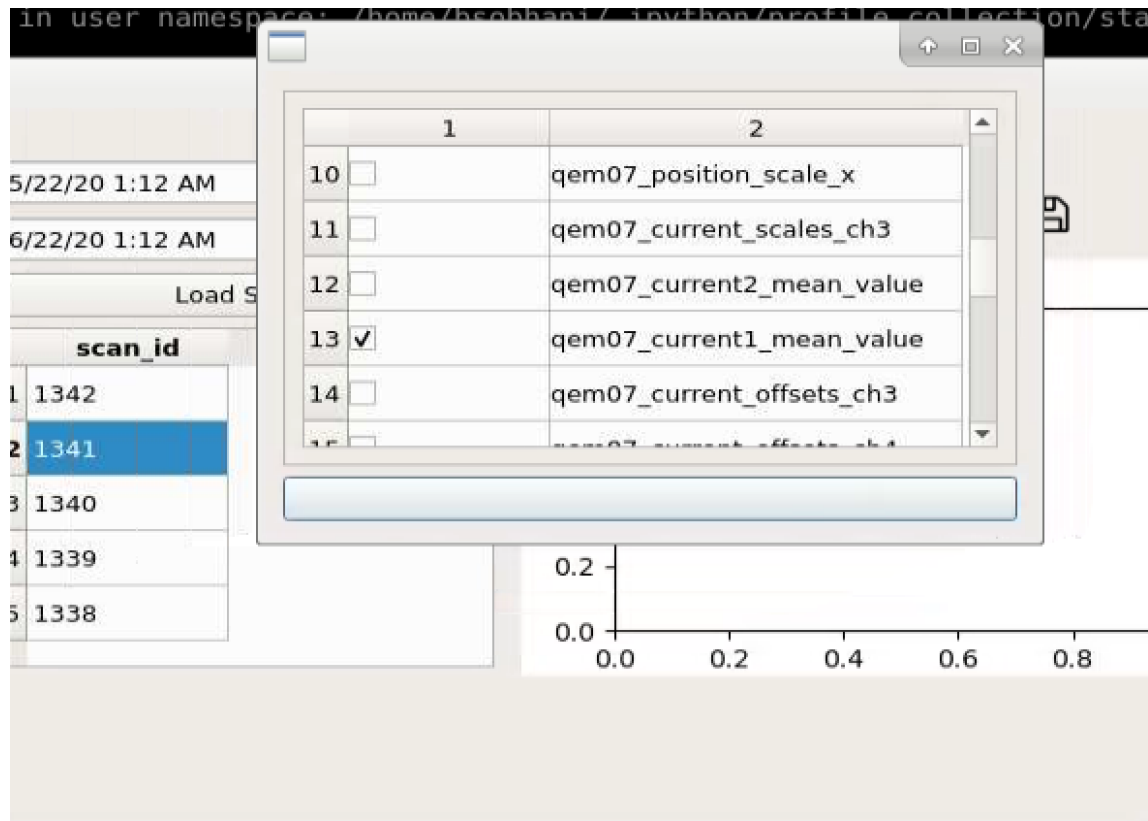
useRelativePath

Demos

- ▶ Demo 1: Brief demo of ESM GUI
- ▶ Demo 2: Brief tutorial, making a GUI that runs scans



Future Plans



- ▶ Channel selector - user-specified channels for databrowser plotting

Contact

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- ▶ <https://github.com/bsobhani/bsstudio>