

# MXCuBE Qt4

Ivars Karpīčs

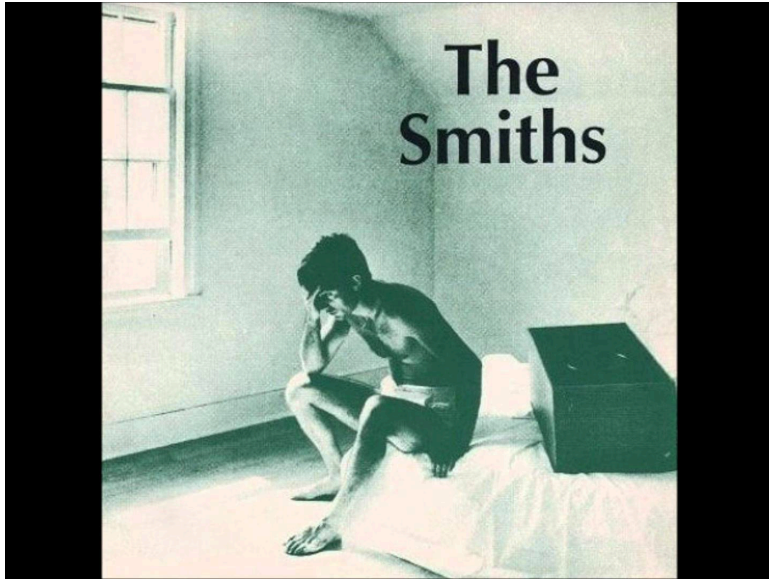


I've been to the dark side...



**THEY LIED ABOUT THE  
COOKIES**

memegenerator.net



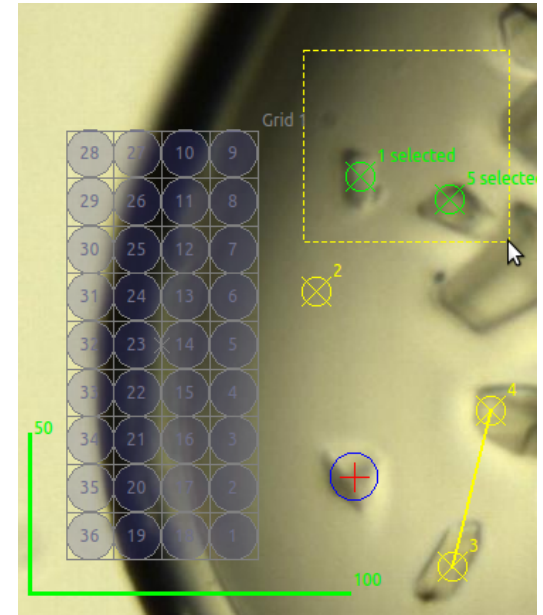


# Content

- Current status
- Updated bricks, widgets and features
- Grids scans and overlays
- Conclusions

## Current status

- Work just on Qt4 version (in 2016: 64 commits, 24k++, 18k--).
- Used at both beamlines in the production mode.
- Graphics part split in two modules (both 1.5k lines of code):
  1. Qt4\_GraphicsManager (pylint score 8.63),
  2. Qt4\_GraphicsLib (pylint score 7.71).
- Documentation for developers is available.
- Implemented objects and features:
  1. Static objects: centering points, lines, grids with overlays.



# Current status

2. Dynamic objects: centering lines, distance and angle measurement tools, omega rotation axis, message box.
3. Graphical beam size definer\* \*\*.
4. Saving and loading graphical objects from file.
5. Graphic item manager.
6. Keyboard shortcuts.

X: 579 Y: 588

Graphics items

All shapes

Display  Points  Lines  Grids Display all Hide all Clear all

No.	Type	Visible	Selected	Used for collection
1	Point 1	True	True	False
2	Point 2	True	True	False
3	Line 1	True	True	True
4	Grid 1	True	True	0

Selected: Change color

Points

Lines

Grids

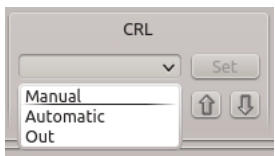
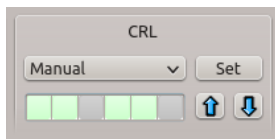
\* Loop: beam\_size\_definer.ogv

\* Plate: beam\_size\_definer\_2.ogv

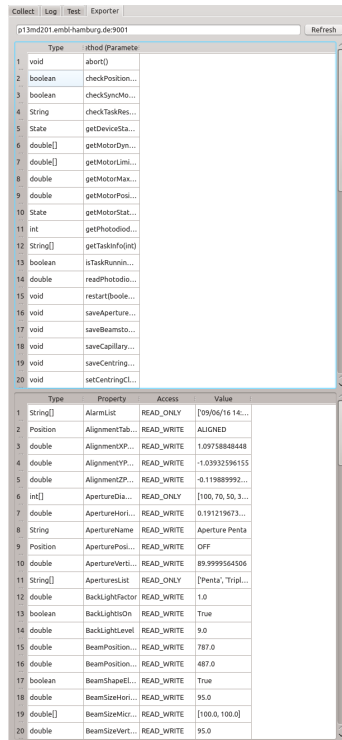


# Updated bricks, widgets and features

## 1. CRLBrick



## 2. ExporterBrick



Type	Property	Access	Value
String[]	AlarmList	READ_ONLY	[19/06/16 14...
Position	AlignmentTab...	READ_WRITE	ALIGNED
double	AlignmentKP...	READ_WRITE	1.0975848448
double	AlignmentYP...	READ_WRITE	-1.03932596155
double	AlignmentZP...	READ_WRITE	-0.119889992...
int[]	ApertureDia...	READ_ONLY	[100, 70, 50, 3...
double	ApertureKori...	READ_WRITE	0.191219073...
String	ApertureName	READ_WRITE	Aperture Penta
Position	AperturePosi...	READ_WRITE	OFF
double	ApertureVert...	READ_WRITE	89.9999564506
String[]	AperturesList	READ_ONLY	[Yenta', 'Tripl...
double	BacklightFactor	READ_WRITE	1.0
boolean	BacklightsOn	READ_WRITE	True
double	BacklightLevel	READ_WRITE	9.0
double	BeamPosition...	READ_WRITE	787.0
double	BeamPosioun...	READ_WRITE	487.0
boolean	BeamShapeE...	READ_WRITE	True
double	BeamSizeHor...	READ_WRITE	95.0
double[]	BeamSizeMic...	READ_WRITE	[100.0, 100.0]
double	BeamSizeVert...	READ_WRITE	95.0

## 3. LogBarBrick

	Properties	Values
1	appearance	tabs

Level	Date	Time	Message
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/detector/simdetector frame-rate
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/detector/simdetector beam-xy
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /PETRA/ARCHIVER/keyword MachineStateText
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /PETRA/ARCHIVER/keyword curDC
DEBUG	2016-06-23	08:42:44	MachineInfo: Cryojet channel not defined
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/transmission/attenuators transmission
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/transmission/attenuators status
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/transmission/attenuators limits
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/collection/mx-standard frame
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/collection/mx-standard status
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/collection/mx-standard error
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/fluorescence-scan/fls-scan status
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/fluorescence-scan/fls-scan calibration-consts
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/fluorescence-scan/fls-scan start
DEBUG	2016-06-23	08:42:44	Attaching TINE channel: /TEST/fluorescence-scan/fls-scan status
INFO	2016-06-23	08:42:44	connectNotify statusChanged
INFO	2016-06-23	08:42:44	connectNotify stateChanged
INFO	2016-06-23	08:42:44	connectNotify infoChanged
INFO	2016-06-23	08:42:44	connectNotify selectionChanged
INFO	2016-06-23	08:42:44	connectNotify loadedSampleChanged

Errors and warnings	Information (58)	Debug (17)	Submit feedback
Level	Date	Time	Message
ERROR	2016-06-23	08:45:34	Cannot load Hardware Object "/": file not found.
WARNING	2016-06-23	08:45:34	BeamlineTest: Beam Focusing hwobj is not defined
WARNING	2016-06-23	08:45:34	BeamlineTest: PPU control hwobj is not defined
ERROR	2016-06-23	08:45:34	BeamlineTest: no intensity ranges defined
ERROR	2016-06-23	08:45:34	Cannot load Hardware Object "/door-interlock": file not found.
ERROR	2016-06-23	08:45:34	Cannot load Hardware Object "/door-interlock": file not found.
ERROR	2016-06-23	08:45:34	Cannot load Hardware Object "/": file not found.

# Updated bricks, widgets and features

## 4. Qt4\_dc\_tree\_widget.py

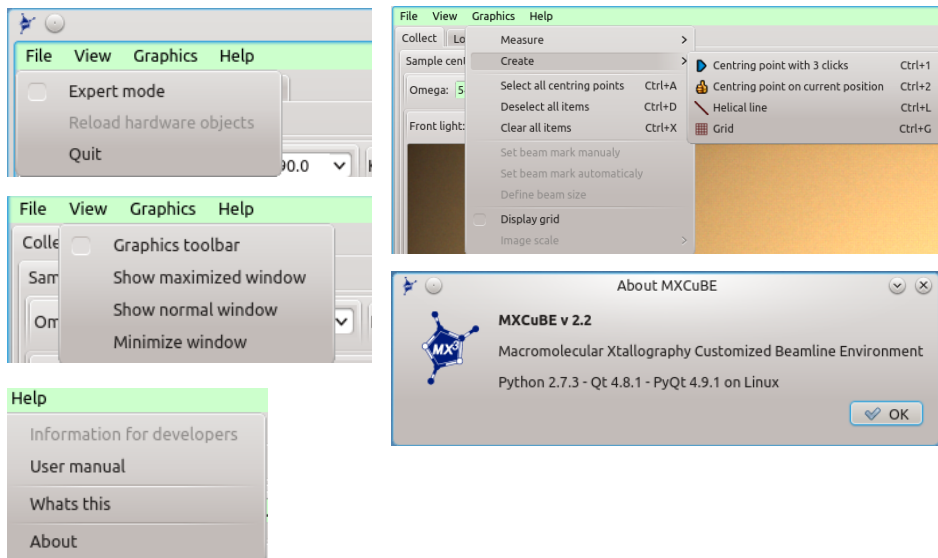
- Disable mount modes if just Manually mounted mode is available.
- Choose mount mode based on mounted sample (sample changer or Plate).
- Filter sample list based on sample name, puck, collection method, etc.
- Link ISPyB sample with manually mounted sample.
- TODO. Add history view.

The image displays three screenshots of the ISPyB software interface, illustrating the updated features and workflow:

- Left Screenshot:** Shows the 'ISPyB proposal' window with the 'Sample tree' section. The 'Mode' is set to 'Manually mounted'. A red circle highlights the 'ISPyB' button, which is used to link the manually mounted sample to the ISPyB sample.
- Middle Screenshot:** Shows the 'ISPyB proposal' window with the 'Sample tree' section. The 'Sample' is set to 'testCr-p01s01 (0001)'. A red arrow points from the 'ISPyB' button in the left screenshot to this sample, indicating the linking process. The 'Centring' is set to 'Manual'.
- Right Screenshot:** Shows the 'Data location' window. The 'Folder' is set to '/dataInt/p14/10736\_206/karpics/20160621/RAW\_DATA'. The 'File name' is 'testCr-p01s01\_1\_#####.cbf', the 'Prefix' is 'testCr-p01s01', and the 'Run number' is '1'. A red arrow points from the selected sample in the middle screenshot to the 'File name' field, indicating the automatic population of the file name.

# Updated bricks, widgets and features

- Menu tool brick to add shortcuts to procedures (intensity measurement, beam alignment).
- Minimize, maximize window, help and about.
- New splash image.



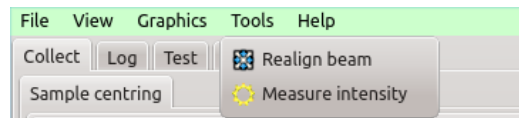
# Updated bricks, widgets and features

Qt4\_ToolsBrick to call methods from hardware objects.

- BeamlineTools and beamline-tools.xml used to define available methods.
- Similar to the command previously in the HutchMenuBrick.
- No need to create bricks for single commands.
- In xml define hardware object, method name, menu caption and icon to display.
- If method not found then menu is not populated.

```
<object class="BeamlineTools">
  <object href="/beamline-test" role="beamline_test"/>
  <object href="/mach-info" role="machine_current"/>

  <tools>
    <tool>
      <hwobj>beamline_test</hwobj>
      <display>Realign beam</display>
      <method>align_beam_test</method>
      <icon>QuickRealign</icon>
    </tool>
    <tool>
      <hwobj>beamline_test</hwobj>
      <display>Measure intensity</display>
      <method>measure_intensity</method>
      <icon>Sun</icon>
    </tool>
  </tools>
</object>
```



# Updated bricks, widgets and features

Ready

Ready

Sample changer can load/unload

Minidiff motors can move

Switch to Sample Transfer mode

Test sample changer

Current basket

Position: 0

Current sample

No mounted sample

Position: 10

Holder length: 22

Contents

Double-click loads the sample

Basket 0

1 2 3 4 5 6 7 8 9 10

Basket 1

1 2 3 4 5 6 7 8 9 10

Basket 2

1 2 3 4 5 6 7 8 9 10

Basket 3

1 2 3 4 5 6 7 8 9 10

Basket 4

1 2 3 4 5 6 7 8 9 10

Sample centring Plate manipulator

Plate barcode: TTP3000807

	1	2	3	4	5	6	7	8	9	10	11	12
A												
B												
C												
D												
E												
F												
G												
H												

Current location: Col: 2 Row: 0 X: 0.50 Y: 0.50

Element	Label	Login	Row	Col	Comment
▼ TTP3000... IQ_3_flat_uv					
DZAZ...	toto	miaursen	C	8	

Move to crystal  Use crystal repositioning

manually-mounted

Helical - 2

mx0006\_3 (Line 1:2) 63/100

History

1 16:47:05

2 16:46:23

Data collection 63%

Confirm collection

Summary

Collecting 3 collection(s) on 1 sample(s) resulting in 4 image(s).

Method	Sample	Directory	Filename	Images	Osc	Exposure time	Total osc	Total exposure time
▼ C1:3								
Sample mo...								
▼ Standard - 1								
sample-centring (kappa: 45.00, phi: 10.12)								
mx0006_1 (Point not defined)		/tmp/1073...	mx0006_1_...	1	0.1	0.04	0.1	0.04
▼ Characterisation - 1								
sample-centring (kappa: 45.00, phi: 10.12)								
ref-mx0006_1 (Point - not defined)		/tmp/1073...	ref-mx0006...	2	1.0	0.04	2.0	0.08
▼ Advanced - 1								
mx0006_2 (Mesh 1 - 11 x 10)		/tmp/1073...	mx0006_2_...	110	1.0	0.04	110.0	4.4

Existing files that will be overwritten (first 20 images are checked):

Sample	Directory	File name
--------	-----------	-----------

Interleave

Interleave subwedge size:

Other

Force dark current

Skip already collected images

Number of crystal snapshots: 1 -

# MeshScan and overlays

- Added overlay with possibility to change transparency\*.
- Mesh and scan feature. Available also for plates\*\*.
- Added more information about processing parameters and results.
- Added possibility to relaunch parallel processing.
- Processing is based on EDNA Dozor plugin.

\*mesh\_scan.ogv

\*\*mesh\_and\_scan\_plates.ogv

# Conclusions

- Some of mxcube3 ideas (categorized log, etc) implemented in the Qt4 version.
- Would be good to provide similar features for both GUI versions (to keep users happy).
- Would be not difficult to include PySide, PyQt5 (not a priority now).
- At one point remove Qt4\_prefix.
- Save gui file as yaml for easy editing.
- Add beam shape markers to keep a record of exposed areas of a crystal.
  
- Provide (announce) features when they are fully tested.

**Thank you for your attention!**