Mask Editor for LCLS-II

Mask Editor GUI is intended to manually create/edit mask of bad pixels and save it as 2-d image and 3-d array shaped as data.

Content

- Content
- Launch Mask Editor
- Mask Editor GUI main window
 - Image with axes and cursor info panel
 - Spectrum with statistical data
 - Color bar selection
 - Logger
 - Control panel
 Selection
 - Select DB parameters
 - Select detector
 - Select files
 - More fields
 - ROI control buttons
 - Translate and zoom imageAdd ROI
 - Add ROI
 Adding ROI
 - Add/Remove PIXEL and PIXGROUP
 - Button Cancel
 - Button Compl.
 - Select and Delete ROIs
 - Invert bad pixel region
 - Edit mode
 - Save/restore ROI constantsMask
- References

Launch Mask Editor

Mask Editor GUI can be launched in Icls2 software release (>ps-4.6.0) by command

masked

with(out) optional parameters as explained in help

masked -h

masked -h command dump on 2023-10-01

```
ps-4.6.0 [dubrovin@sdflogin002:~/LCLS/con-lcls2/lcls2]$ masked -h
usage: Usage:
 masked -a <fname-nda.npy> -k <DataSource-kwargs> -d <detector> -g <fname-geometry.txt> [-L <logging-mode>]
[...]
Help:
 masked -h
Examples:
 masked # set all parameters using GUI
 masked -d epix10ka_000001
                                                     # takes geometry from detector DB
 masked -d epix10ka_000001 -k exp=ueddaq02,run=569 # takes geometry from experiment DB
 masked -g /sdf/group/lcls/ds/ana/detector/data2_test/geometry/geo-epix10kaquad-tstx00117.data # takes
geometry from file
 masked -a /sdf/group/lcls/ds/ana/detector/data2_test/misc/epix10kaquad-meclv2518-0101-Ce02-ave.npy # takes
array for image from file
 masked -a /sdf/group/lcls/ds/ana/detector/data2_test/misc/epix10kaquad-meclv2518-0101-Ce02-ave.npy -g /sdf
/group/lcls/ds/ana/detector/data2_test/geometry/geo-epix10kaquad-tstx00117.data
 masked -d epix10ka_000001 -a /sdf/group/lcls/ds/ana/detector/data2_test/misc/epix10kaquad-meclv2518-0101-Ce02-
ave.npy
 masked -d epix10ka_000001 -k exp=ueddaq02,run=569 -a /sdf/group/lcls/ds/ana/detector/data2_test/misc
/epix10kaquad-meclv2518-0101-CeO2-ave.npy
masked - command opens mask editor GUI
positional arguments:
                       list of positional arguments: [<fname-nda.npy>] [<fname-geometry.txt>], default = []
 posargs
optional arguments:
 -h. --help
                       show this help message and exit
 -a NDAFNAME, --ndafname NDAFNAME
                       image array file name*.nda, default = Select
 -d DETNAME, --detname DETNAME
                       detector name, default = Select
  -k DSKWARGS, --dskwargs DSKWARGS
                       string of comma-separated (no spaces) simple parameters for DataSource(**kwargs), ex:
exp=<expname>,run=<runs>,dir=<xtc-dir>, ..., or <fname.xtc> or
                       files=<fname.xtc> or pythonic dict of generic kwargs, e.g.: "{'exp':'tmoc00318', 'run':
[10,11,12], 'dir':'/a/b/c/xtc'}", default = Select
 -g GEOFNAME, --geofname GEOFNAME
                       geometry description constants file name *.txt, *.data, default = Select
 -L LOGMODE, --logmode LOGMODE
                       logging mode, one of CRITICAL, FATAL, ERROR, WARN, WARNING, INFO, DEBUG, NOTSET,
default = INFO
  -o DIRREPO, --dirrepo DIRREPO
                      repository for files, default = ./repo-masked
  --ctab CTAB
                       color table index in range [1,8], default = 3
  --dirmode DIRMODE
                       directory access mode, default = 0o2775
  --filemode FILEMODE file access mode, default = 00664
                       group ownership for all files, default = ps-users
  --group GROUP
                       On/Off saving log file, default = 1
  --savelog
```

Mask Editor GUI main window

Mask Editor main window consists of sub-panels listed in this section with brief description of their functionality.



Image with axes and cursor info panel

Image nested in center of the main window.

Displays assembled image of the detector or stack of panels if geometry constants are not available. Click and drag or scroll mouse on image to translate or zoom-in/out desired part of the image. At mouse release spectrum will be updated. for visible part of the image. The same operation on axis works for appropriate transformation of its dimension, changing aspect ratio.



Spectrum with statistical data

Spectral widget is displayed on the right side of the image.

It shows spectral histogram of the visible part of the image, color bar, two axes, and statistical panel on the top.

Click and drag or scroll mouse on spectrum to select its part projected on color map on image. The same works for vertical axis. Horizontal scale does the same things for histogram scale. At mouse release image will be updated.



Color bar selection

Color bar maps intensity values to color map used on image. There are eight pre-defined color maps currently available.

To change color map - click on color bar and select color map/bar from pop-up window. The color bar and Image will be updated after selection is done.



Logger

Most important info messages are displayed in the logger window located in the bottom part of the main window. By default it has low profile, but can be expanded by mouse using expansion mark on the top boarder of the logger window.

PROEDE0004002 TUDE TNY 54 7501/0100/01/05/05/404/0PIPETO//04142 TPSU/015/201X10K40040-mPC/V251K-0101-EPD/2-AVE 00V	
saved in file: /sd/faroup//cls/sd/sna/detector/logs/atstart/2023/2023 [cls2 masked.txt	
[1] T09:43:35 psana.graphgt.MEDUtils:L0125 ndarray of shape (4, 352, 384) for image is loaded from file: /sdf/group/lcls/ds/ana/detector/data2 test/misc/	1
epix10kaquad-meclv2518-0101-CeO2-ave.npy	
[]] T09:43:35 psana.graphqt.MEDUtils:L0134 geometry text is loaded from DB for exp: ueddaq02 det: epix10ka_000001 run: 1	
[I] T09:43:35 psana.graphqt.MEDUtils:L0134 geometry text is loaded from DB for exp: ueddaq02 det: epix10ka_000001 run: 1	//

Control panel

Control panel with multiple fields allows to set imaging array and geometry constants from DB or files.

• • • Image Viewer	
DataSource: exp=ueddaq02,run=569 Detector: epix10ka_000001 geo DB: Select array DB: Select	Settings
File array: sc/epix10kaquad-meclv2518-0101-CeO2-ave.npy geo: test/geometry/geo-epix10kaquad-tstx00117.data	Test Less

Select DB parameters

After click on the button next to **DataSource:** label a bunch of sequentially pop-up windows for instrument, experiment, and run number allows to set DB parameters. To terminate selection - click on highlighted-yellow title.

Instruments:		
amo		
asc		
rix		
tmo		
tst	Select experiment:	
ued	uedcom103	
XCS	ueddag02	569
хрр	uedv00003	Cancel Apply

Select detector

After click on the button next to Detector: label pop-up menu window allows to select detector from specified DB

Select detector:
epix10ka 000001
epix10ka_000002
epixquad
epix_000001
epix_000001

If geometry is available for specified DataSource and Detector the field next to geo DB will be filled out automatically.

If many geometry constants available for specified detector, click on button next to geo DB: label and select desired constants from pop-up menu window.



Select files

Use standard dialog to select I/O files

Lock in Mytolyscophilophysicalise institutize justimise C O O O Fill Fill 3 Amer Size institution Size instititution		X Input fi					
Kore Sol No Inter Sol No Inter No abdre	look in:	🔲 /sol@group/bls/ds/smapletector/data2	Justanisa	- 0	0 0	💰 🗄	
• ope-scalit (1-legal-rgp) 1461 appl. MA21 93 41 49 • ope-scalit (1-legal-rgp) 1461 appl. MA21 93 41 49 • ope-scapacities	L conor	Name	Size.	type	Delle Mod	ified	
epis10ka2m-mfac5=6000-max.npy 8.25 Mitt npy He = 6/23/21 8/28 PM	in skalaur	cqueic juli (1 degin try) cqueic quarks thedtBMD34-ext 13 cqueic quarks thedtBMD34-ext 13 cqueiz 0 z enderab1 34 obt10.00 cqueiz 0 z enderab 400 obt10.00	17Niu 13Niu 15Niu 560Kiu 560Kiu 560Kiu 179Niu 129Niu 13Niu 13Niu 13Niu 13Niu 13Niu 13Niu 12Niu 12Niu 12Niu 12Niu	repy the bat the bat the spy the spy the spy the bat the spy the bat the spy the bat the spy the bat the spy the bat the spy the	N2421 - N2421	5877 PM 5577 AM 5567 AM 5567 AM 5567 AM 5567 PM 5578 PM 5578 PM 5578 PM 5578 PM 5578 PM 5578 PM 5578 PM 5578 PM	

More fields

Switching button **More/Less** shows more or less control field between default and advanced modes. It adds fields to load geometry constants from file (button next to label **geo:**) and array (button next to label **array DB:)** for image from DB constants.

ROI control buttons

Control buttons for ROI are stacked in menu on the left side of the main window. Their functionality is described below.

Image
Add
Compl.
Cancel
Edit
Select
Delete
Invert
Save
Load
Mask

Translate and zoom image

Click on Image mode button, then click and drag or scroll mouse for translation or zooming image, respectively. At release mouse button spectrum will be updated for visible part of the image.

Add ROI

Click on Add button and select ROI type from pop-up menu:

ROI name: NONE PIXEL LINE RECT SQUARE POLYGON POLYREG ELLIPSE CIRCLE ARCH PIXGROUP

Available shapes of ROIs are self-explaining in this pop-up menu.

Adding ROI

Right after selected ROI type click on image to mark ROI control point locations as many times as it is necessary to define particular ROI shape.



Add/Remove PIXEL and PIXGROUP

Right after click on **Add** button and selection of **PIXEL** or **PIXGROUP** ROI, start clicking on desired pixels or click-hold-and-pan. Added pixels will be marked by color. Double click removes appropriate pixel. Input of the PIXGROUP is compleated by the click on Compl.(ete) button.



Button Cancel

Button Cancel cancels adding of non-compleated ROI if it is not too late ...

Button Compl.

Button Compl. completes adding of ROI with multi-point definition like PIXGROUP and POLYGON.

Select and Delete ROIs

Currently Select mode is used in combination with Delete in order to preview deleting ROI.

Click on Select button, then on ROIs to select. Selected items will change color.

PIXEL type ROI will be selected one-by-one. PIXGROUP ROI will be selected as whole by a single click.

Invert bad pixel region

Click on button **Invert** then select ROIs to invert region of good/bad pixels. By default internal region of each ROI is marked as bad pixels. Operation Invert inverts this definition.

Edit mode

Click on **Edit** button, then on ROIs to edit. Selected for edition ROI changes color and shows control handle. Then, click and pan control handles to translate, resize or rotate ROIs.





Save/restore ROI constants

Current ROIs parameters can be saved in json file by clicking on Save button and selecting output file name

[I] T09:55:17 psana.graphqt.GWViewExt:L0400 GWViewImageROI.save_parameters in file /sdf/home/d/dubrovin/LCL5/con-lcls2/repo-masked/roi_parameters.json ROI_0000: {'roi_name': 'LINE', 'roi_type': 2, 'points': [(63.55, 80.49), (248.68, 144.1)]} ROI_0001: {'roi_name': 'RECT', 'roi_type': 3, 'points': [(287.36, 73.99), (516.69, 146.69)], 'angle': -9.992074539790755} ROI_0002: {'roi_name': 'ROUYGON', 'roi_type': 8, 'points': [(74.6, 264.82), (167.17, 368.68), (216.9, 315.45), (247.29, 377.76), (292.89, 299.87), (379.92, 270.02), (280.45, 242.76), (248.68, 202.51), (219.66, 255.74), (166.55, 193.43), (147.82, 250.54), (147.82, 250.54)] ROI_0003: {'roi_name': 'ROUYGON', 'roi_type': 21.9.66, 255.74), (166.55, 193.43), (147.82, 250.54), (147.82, 250.54)] ROI_0003: {'roi_name': 'LLIPSE', 'roi_type': (24.'points': [(74.6, 545.23), (269.4, 469.93)], 'angle': 13.773114386507924} ROI_0006: {'roi_name': 'CLRCLE', 'roi_type': 128, 'points': [(522.29, 411.62), (470.47, 556.8)]} ROI_0007: {'roi_name': 'ARCH', 'roi_type': 256, 'points': [(522.29, 502.39), (607.87, 450.46), (729.45, 582.87)]}

Button Load loads constants from json file and draws ROIs on image.

Mask

Button Mask creates mask for drawn ROIs and save it in files for 2-d image (with suffix "-2d") and 3-d array (for panels like in data).

References

- Mask Editor for LCLS(1)
- Mask Editor Development Notes
- Detector Calibration Constants Deployment
- Detector geometry constants deployment
- Bad Pixel Status
- LCLS-II Calibration DB
- Private Calibration Constants
- cdb CLI for management of calibration DB
- calibman
- Calibration Scripts Repository and Logging