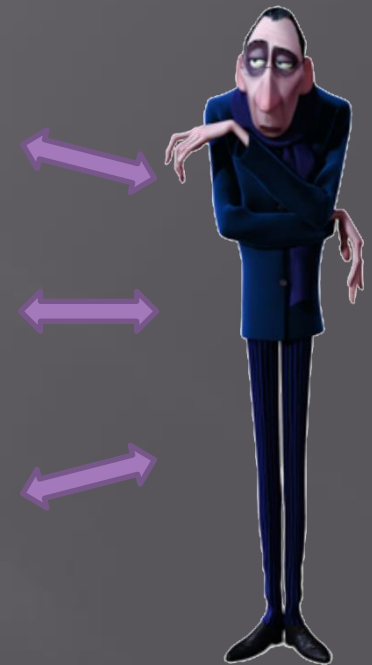
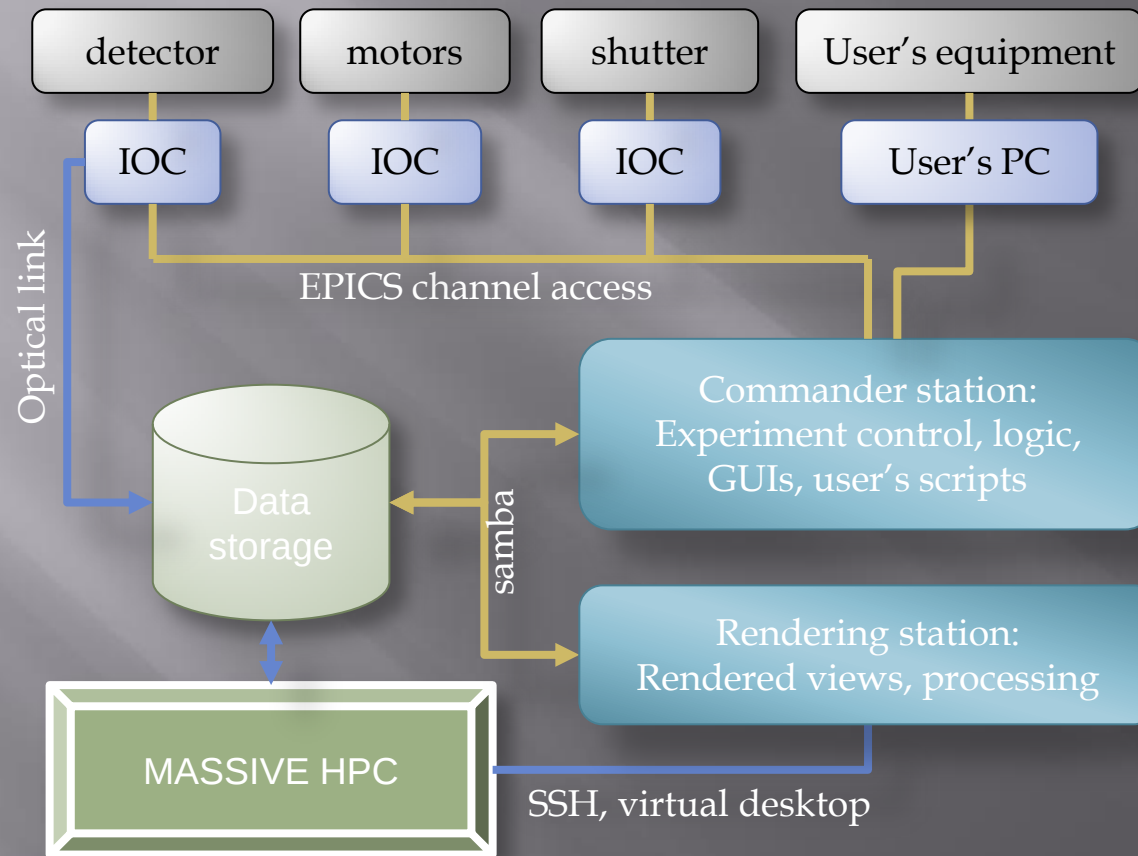


WAYS TO COLLECT CT DATA SETS ON IMBL

Anton Maksimenko

Basic concepts



CTgui

When you start CTgui it restores previous settings.



General | Serial | Scan | Flat field | Detector

Working directory:

☐ Synchronize detector save directory with the working directory

Acquisition mode:

Features: ☒ Serial scans ☒ Flat field

Pre-run command

Post-run command

Description:

Energy: 81keV
Objective to detector 525mm
Max pixel size 7.65 micron per pixel

Configuration

When you start the data acquisition all parameters are automatically saved in the working directory in the **acquisition[.number].configuration** file.

General Serial Scan Flat field Detector

Working directory:

☐ Synchronize detector save directory with the working directory

Acquisition mode:

Features: ☒ Serial scans ☒ Flat field

Pre-run command

Post-run command

Description:

Energy: 81keV
 Objective to detector 525mm
 Max pixel size 7.65 micron per pixel

Start CT

Save Load

```
[General]
description=Energy: 81keV\nObjective to detector 525mm\nMax pixel size 7.65
micron per pixel
workingdir=/home/imbl/temp
syncdetectordir=false
acquisitionmode=On-the-fly (software)
doserialscans=true
doflatfield=true
dodyno=false
domulti=false
prerun=
postrun=
```

```
[serial]
endCondition=number
number=3
time=@Variant(\0\0\0\xf\0\0\x3\xe8)
script=
ongoingseries=false
ffoneachscan=false
scandelay=@Variant(\0\0\0\xf\0\0\0\0)
serialmotor=SR08ID01SST24:SAMPLEV
serialstep=1
serialirregularstep=false
```

```
[scan]
motor=SR08ID01SST24:ROTATION
```

click

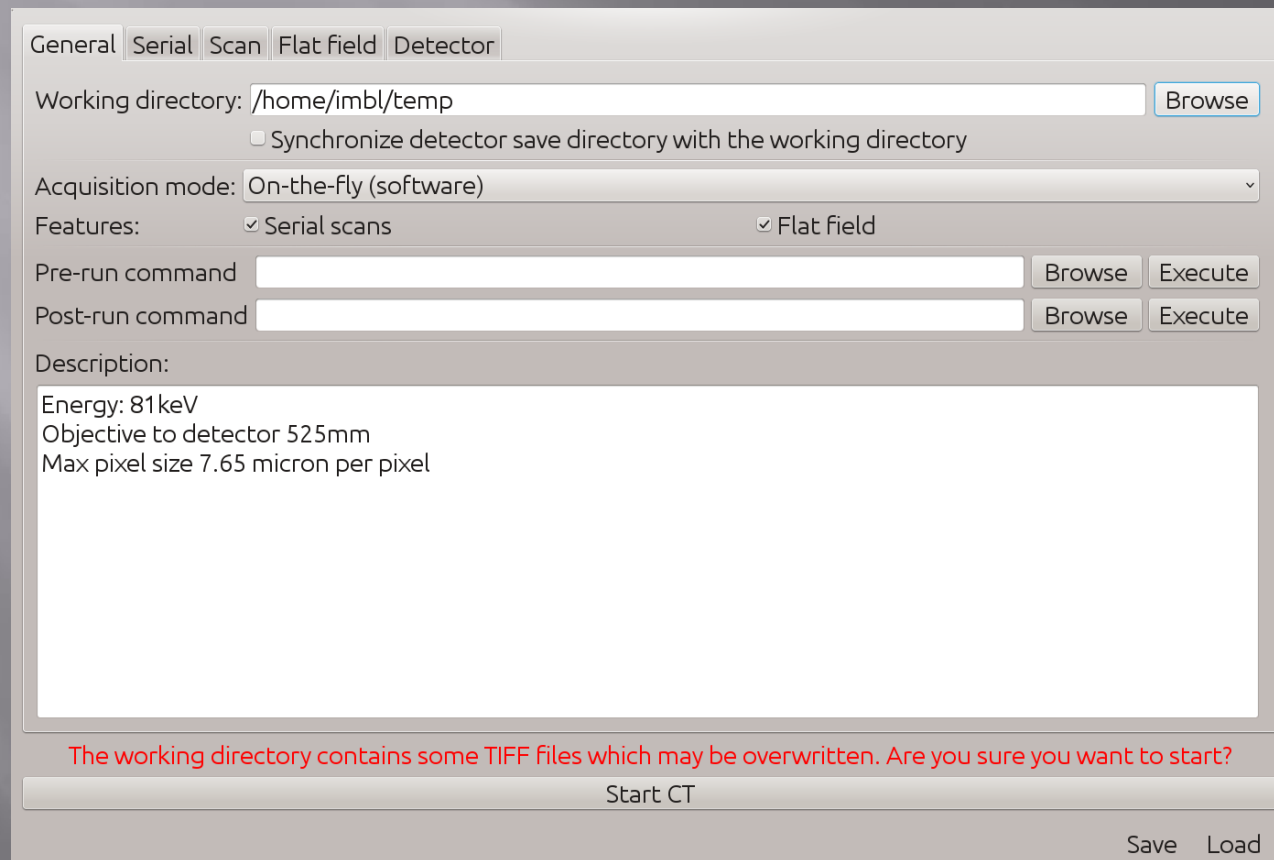
Logging

- The data collection is logged into **acquisition.[number].log** file.

Time stamp	Counter	Rotation position
2015-11-04_11:51:08.283653	Acquisition started with the image filename prefix "DF_Z0_BEFORE".	
2015-11-04_11:51:08.947105	0	0.001
2015-11-04_11:51:09.072739	1	0.001
...	...	...
2015-11-04_11:51:11.434004	19	0.001
2015-11-04_11:51:11.434074	Acquisition finished.	
2015-11-04_11:51:16.456792	Acquisition started with the image filename prefix "BG_Z0_BEFORE".	
2015-11-04_11:51:17.081726	0	0.001
2015-11-04_11:51:17.213108	1	0.001
...	...	...
2015-11-04_11:51:19.669598	19	0.001
2015-11-04_11:51:19.669624	Acquisition finished.	
2015-11-04_11:51:23.873773	Acquisition started with the image filename prefix "SAMPLE_Z0_T".	
2015-11-04_11:51:24.550976	0	0.298
2015-11-04_11:51:24.777280	1	0.588
2015-11-04_11:51:24.812643	2	0.588
2015-11-04_11:51:24.983257	3	0.687
2015-11-04_11:51:25.186077	4	0.924
2015-11-04_11:51:25.246472	5	0.924
2015-11-04_11:51:25.397815	6	1
2015-11-04_11:51:25.599135	7	1.209
...	...	...
2015-11-04_11:55:51.797736	1850	185.45
2015-11-04_11:55:51.797773	Acquisition finished.	
2015-11-04_11:58:50.348342	Acquisition started with the image filename prefix "SAMPLE_Z1_T".	
2015-11-04_11:58:50.998557	0	0.408
2015-11-04_11:58:51.153026	1	0.501
...	...	...
2015-11-04_12:06:35.443674	Acquisition finished.	

CTgui - data saving

Any pre-existing data in the directory are **overwritten**.



The image shows the CTgui software interface with the 'General' tab selected. The 'Working directory' is set to '/home/imbl/temp' with a 'Browse' button. There is a checkbox for 'Synchronize detector save directory with the working directory' which is unchecked. The 'Acquisition mode' is set to 'On-the-fly (software)'. Under 'Features', both 'Serial scans' and 'Flat field' are checked. There are input fields for 'Pre-run command' and 'Post-run command', each with 'Browse' and 'Execute' buttons. The 'Description' section contains the following text: 'Energy: 81keV', 'Objective to detector 525mm', and 'Max pixel size 7.65 micron per pixel'. At the bottom, a red warning message states: 'The working directory contains some TIFF files which may be overwritten. Are you sure you want to start?'. Below this message is a 'Start CT' button. In the bottom right corner, there are 'Save' and 'Load' buttons.

General Serial Scan Flat field Detector

Working directory: /home/imbl/temp Browse

☐ Synchronize detector save directory with the working directory

Acquisition mode: On-the-fly (software) ▾

Features: ☒ Serial scans ☒ Flat field

Pre-run command Browse Execute

Post-run command Browse Execute

Description:

Energy: 81keV
Objective to detector 525mm
Max pixel size 7.65 micron per pixel

The working directory contains some TIFF files which may be overwritten. Are you sure you want to start?

Start CT

Save Load

Warning!



Error reporting and debugging

Red labels indicate an impossible parameter and prevent execution.

There is something wrong in two tabs

click

General Serial **Scan** Flat field Detector

Backgrounds

Number 20

Interval ☒ Before ☒ After

2B CT Y 677mm

Distance 7000mm

Dark fields

Number 20

Interval ☒ Before ☒ After

Shutter closed ☒ Do not use shutter (test mode)

Test

The working directory contains some TIFF files which may be overwritten. Are you sure you want to start?

Start CT

Save Load

Comfortable

Move to: 677.277mm

<< UNDO >>

|< Move relatively >|

< 50mm >

1/10 1/2 2 10

There are problems with two parameters

Limit is active

Start is disabled

Acquisition modes

- ▣ Stop-and-shot
- ▣ On the fly – software implementation
- ▣ On the fly – hardware triggered



General | Serial | Scan | Flat field | Detector

Working directory:

☐ Synchronize detector save directory with the working directory

Acquisition mode:

Features: ☒ Serial scans ☒ Flat field

Pre-run command

Post-run command

Description:

Energy: 81keV
Objective to detector 525mm
Max pixel size 7.65 micron per pixel

Flat field acquisition

On-the-fly mode

General Serial Scan Flat field Detector

Backgrounds

Number 20

Interval ☒ Before ☒ After

2B CT Y 676mm

Distance 1mm

Dark fields

Number 20

Interval ☒ Before ☒ After

Stop-and-shot mode

General Serial Scan Flat field Detector

Backgrounds

Number 20

Interval 50

2B CT Y 676mm

Distance 1mm

Dark fields

Number 20

Interval on start only

Serial scans

- ▣ Scan counter
 - Regular step or manual positioning
- ▣ Time counter
- ▣ Conditional completion

The screenshot shows a software window with tabs: General, Serial, Scan, Flat field, and Detector. The 'Scan' tab is active. The interface includes the following controls:

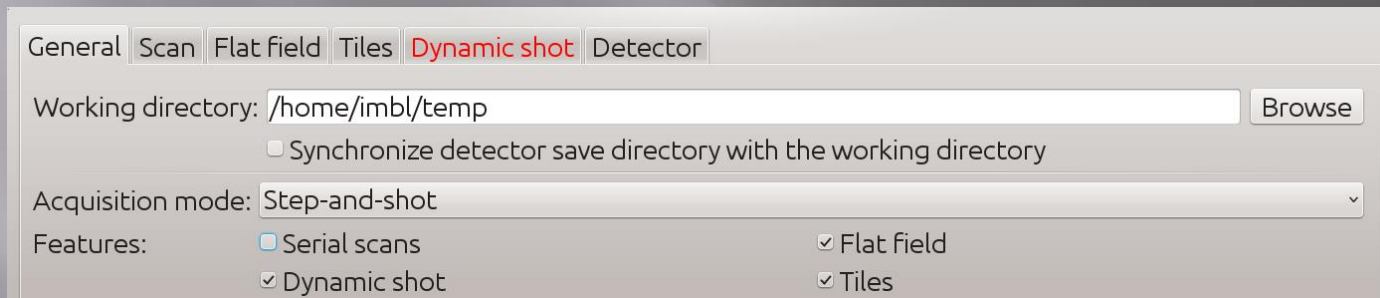
- End the experiment on:** Three radio buttons: ☒ number of scans, ☐ elapsed time, and ☐ conditional.
- Scans:** A dropdown menu showing the value '3'.
- ☐ Non-stop series
- ☐ Acquire flat field on each scan
- Delay between scans:** A text field containing '00:00:00.0' followed by a unit label 'hours:minutes:seconds.milliseconds'.
- Step to move:** A dropdown menu showing '1.000mm'.
- ☐ Irregular step

Below these controls is a table titled 'Positions' with three rows of data:

	Positions
1	-200.001
2	-199.001
3	-198.001

Imaging techniques

Available only in step-and-shot mode



General | Scan | Flat field | Tiles | **Dynamic shot** | Detector

Working directory:

☐ Synchronize detector save directory with the working directory

Acquisition mode:

Features:

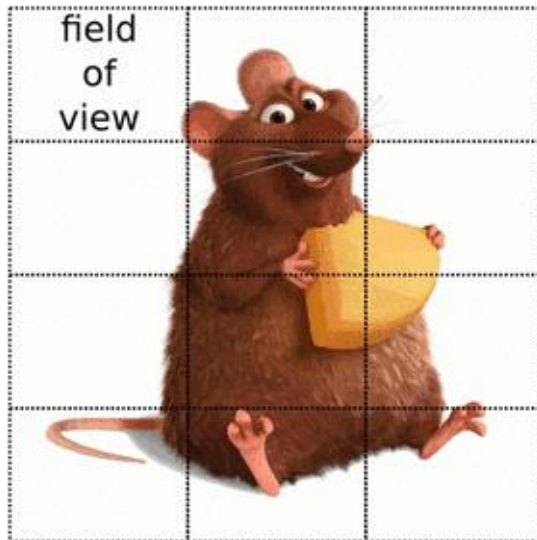
☐ Serial scans	☒ Flat field
☒ Dynamic shot	☒ Tiles

Dynamic shot



General		Scan		Flat field		Tiles		Dynamic shot		Detector	
2B CT Table Z		91.4mm									
Normal speed		0.5mm/s									
Speed in acquisition		0.400mm/s									
Travel direction		☐ Positive ☒ Negative									
☒ Use Second motor											
2B Detector Table Z		-20.1mm									
Normal speed		1.16mm/s									
Speed in acquisition		☒ as first 0.400mm/s									
Travel direction		☒ as first ☐ Positive ☒ Negative									

Tiles



General Scan Flat field Tiles Dynamic shot Detector

☒ Same background for all images in loop(s).

Loop

2B CT Z -200mm

Shots 4

Step 3mm

pre-loop script

post-loop script

☒ Sub-loop

2B CT Y 676mm

Shots 3

Step 10mm

pre-subloop script

post-subloop script

File naming

Stop-and-shot template

<type>[_Z<series>]_T<projection>[_L<loop>][_S<sub-loop>][_<image>].tif

Examples: SAMPLE_T0278_L02_S1.tif, BG_Z02_T035_5.tif

On-the fly template

<type>[_Z<series>][_T<projection>][_<before/after>[_<image>]].tif

Examples: SAMPLE_Z1_T567.tif, DF_AFTER_05.tif

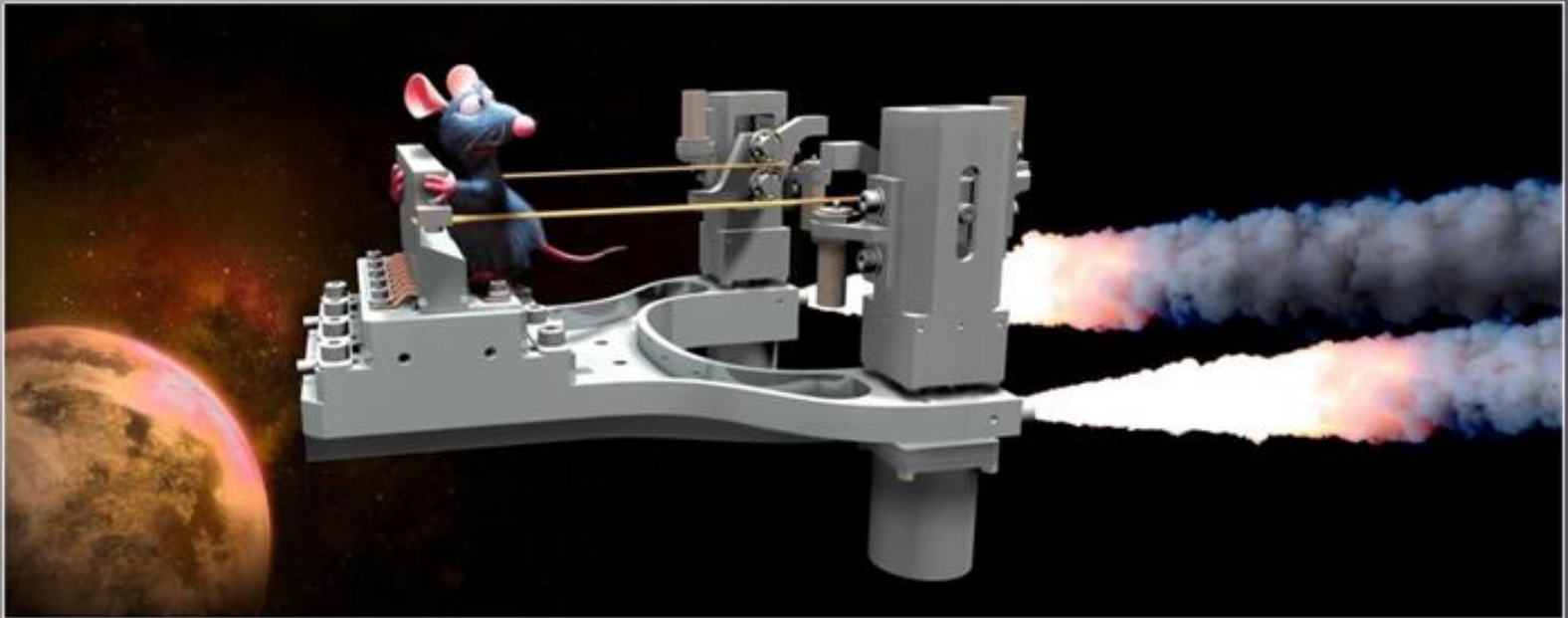
Expandability

Pre-run command		Browse	Execute
Post-run command		Browse	Execute

Script execution is available before and after

- ▣ Whole acquisition procedure
- ▣ Each independent scan
- ▣ Each loop in the tiled mode
- ▣ Each frame

Thank you



IMBL - Boldly sending rats where no rat has gone before

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