# MXCuBE status at SOLEIL

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**Proxima 1**

Source: U20 in vacuum undulator

Focussing: KB

Tunable: 5.5 - 15.5 keV

Flux: 2.0e12 ph/s  @ 500mA @ 12.65keV

Beam size: 20x40 µm

Detector: Pilatus 6M

Goniometer: SmarGon

Sample Changer: CATS

MXCuBE: Qt3 v 2.1

**Proxima 2**

Source: U24 in vacuum undulator

Focussing: KB, HPM

Tunable: 5.5 - 18.5 keV

Flux: 1.6e12 ph/s @ 500mA @ 12.65keV

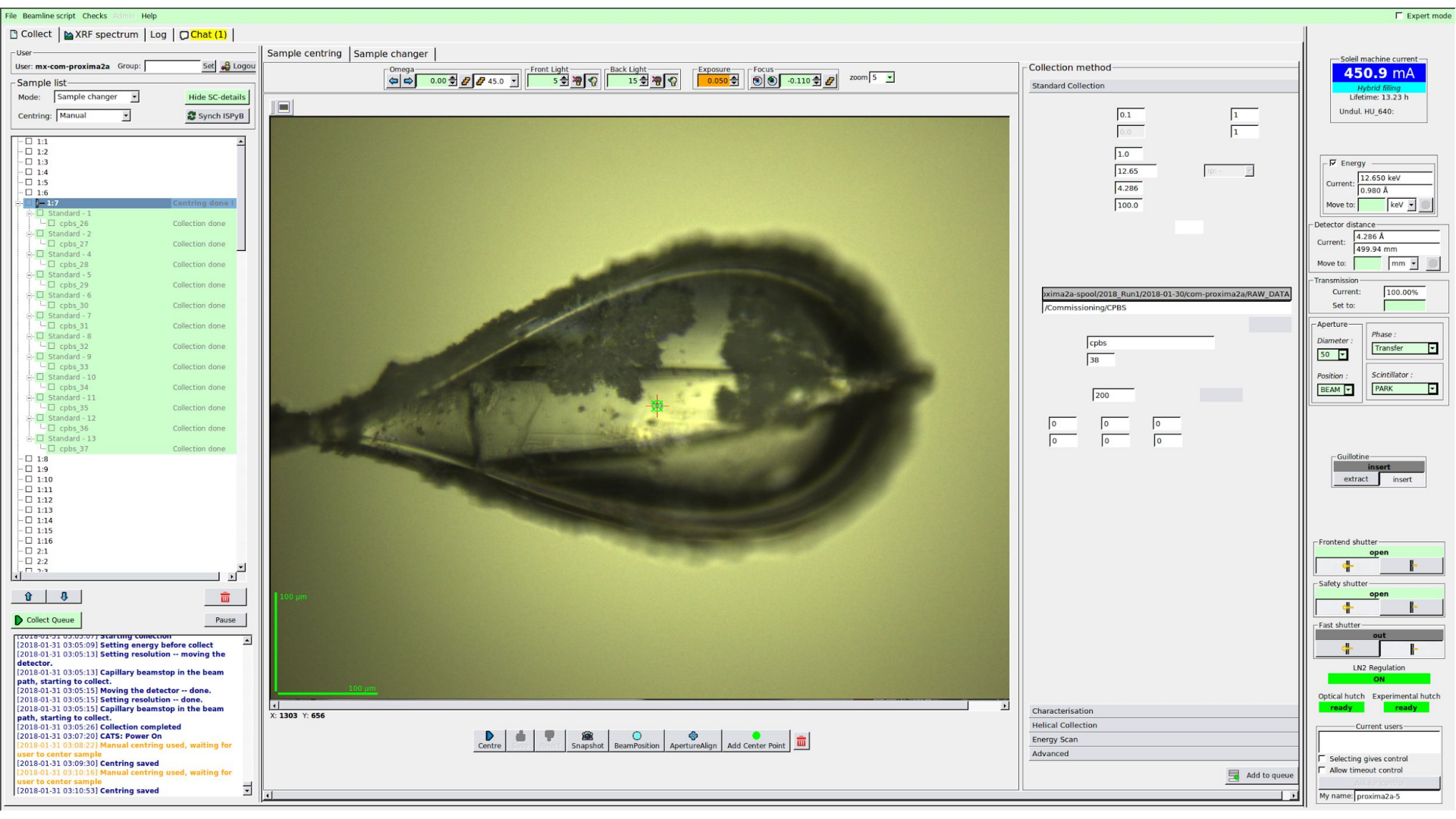
Beam size: 5x10 µm

Detector: Eiger X 9M

Goniometer: MD2 with MK3

Sample Changer: CATS

MXCuBE: Qt3 v 2.1

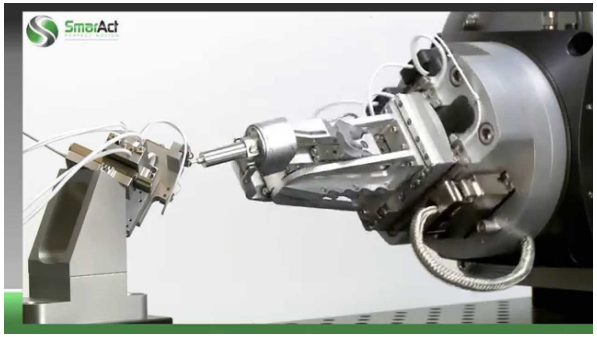

File Beamline script Checks Admin Help
Expert mode
Collect XRF spectrum Log Chat (1)
User
User: mx-com-proxima2a Group: Set Logou
Sample list
Mode: Sample changer Hide SC-details
Centring: Manual Synch ISPyB
1:1
1:2
1:3
1:4
1:5
1:6
1:7 Centring done
Standard - 1
cpbs_26 Collection done
Standard - 2
cpbs_27 Collection done
Standard - 4
cpbs_28 Collection done
Standard - 5
cpbs_29 Collection done
Standard - 6
cpbs_30 Collection done
Standard - 7
cpbs_31 Collection done
Standard - 8
cpbs_32 Collection done
Standard - 9
cpbs_33 Collection done
Standard - 10
cpbs_34 Collection done
Standard - 11
cpbs_35 Collection done
Standard - 12
cpbs_36 Collection done
Standard - 13
cpbs_37 Collection done
1:8
1:9
1:10
1:11
1:12
1:13
1:14
1:15
1:16
2:1
2:2
Collect Queue
Pause
[2018-01-31 03:05:09] Setting energy before collect
[2018-01-31 03:05:13] Setting resolution -- moving the detector.
[2018-01-31 03:05:13] Capillary beamstop in the beam path, starting to collect.
[2018-01-31 03:05:15] Moving the detector -- done.
[2018-01-31 03:05:15] Setting resolution -- done.
[2018-01-31 03:05:15] Capillary beamstop in the beam path, starting to collect.
[2018-01-31 03:05:26] Collection completed
[2018-01-31 03:07:20] CATS: Power On
[2018-01-31 03:08:22] Manual centring used, waiting for user to center sample
[2018-01-31 03:09:30] Centring saved
[2018-01-31 03:10:16] Manual centring used, waiting for user to center sample
[2018-01-31 03:10:53] Centring saved
Sample centring
Sample changer
Omega 0.00 45.0
Front Light 5
Back Light 15
Exposure 0.050
Focus -0.110
zoom 5
100 µm
X: 1303 Y: 656
Centre
Snapshot
BeamPosition
ApertureAlign
Add Center Point
Collection method
Standard Collection
0.1
1.0
12.65
4.286
100.0
oxima2a-spool/2018_Run1/2018-01-30/com-proxima2a/RAW_DATA
/Commissioning/CPBS
cpbs
38
200
Characterisation
Helical Collection
Energy Scan
Advanced
Add to queue
Soleil machine current
450.9 mA
Hybrid filling
Lifetime: 13.23 h
Undul. HU_640:
Energy
Current: 12.650 keV
0.980 Å
Move to: keV
Detector distance
Current: 4.286 Å
499.94 mm
Move to: mm
Transmission
Current: 100.00%
Set to:
Aperture
Diameter: 50
Position: BEAM
Phase: Transfer
Scintillator: PARK
Guillotine
insert
extract insert
Frontend shutter
open
Safety shutter
open
Fast shutter
out
LN2 Regulation
ON
Optical hutch ready
Experimental hutch ready
Current users
Selecting gives control
Allow timeout control
Ask for control
My name: proxima2a-5

# Detectors

- Eiger X 9M on Proxima 2
  - In operation since 2015
- Pilatus 6M on Proxima 1
  - In user operation since mid 2011
  - Passing to Eiger X 16M mid 2018

# Multiaxis goniometry

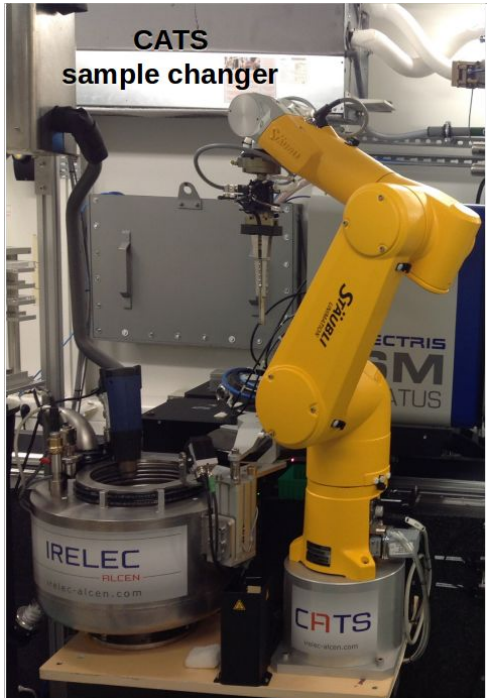
- Smargon goniometer on Proxima 1 (SmarAct)
  - SmarAxis Tango Device Server (C++) developed at SOLEIL




- Minikappa MK3 on Proxima 2 (Arinax)
  - JLIB software accessed through Tango Device server

# Sample changers

- CATS robots on both beamlines. Control via PyCats Tango Device Server
- Mature integration
  - Automated resolution of occasional problems
  - Failure rate below 1 per 1000
  - Ready for remote access



# Processing infrastructure

- Huawei FusionServer RH8100 V3 Rack Server *
  - 8 x XEON E7-8890 v3 @ 2.5GHz
  - 144 cores, 288 threads
  - 2.56 TB RAM (DDR4 1866MHz)
  - 4 x 10GBe
  - 5.76 TFlops (estimated)
  - 8U form factor
- System dedicated to a single beamline
  - large memory -- data for on-line processing will be kept in ramdisk
  - spot finding with dials.find_spots at 80Hz
  - processing with XDS

```
MAXIMUM_NUMBER_OF_JOBS= 10
MAXIMUM_NUMBER_OF_PROCESSORS= 32
```

* http://e.huawei.com/en/products/cloud-computing-dc/servers/rh-series/rh8100-v3y

# Remote access

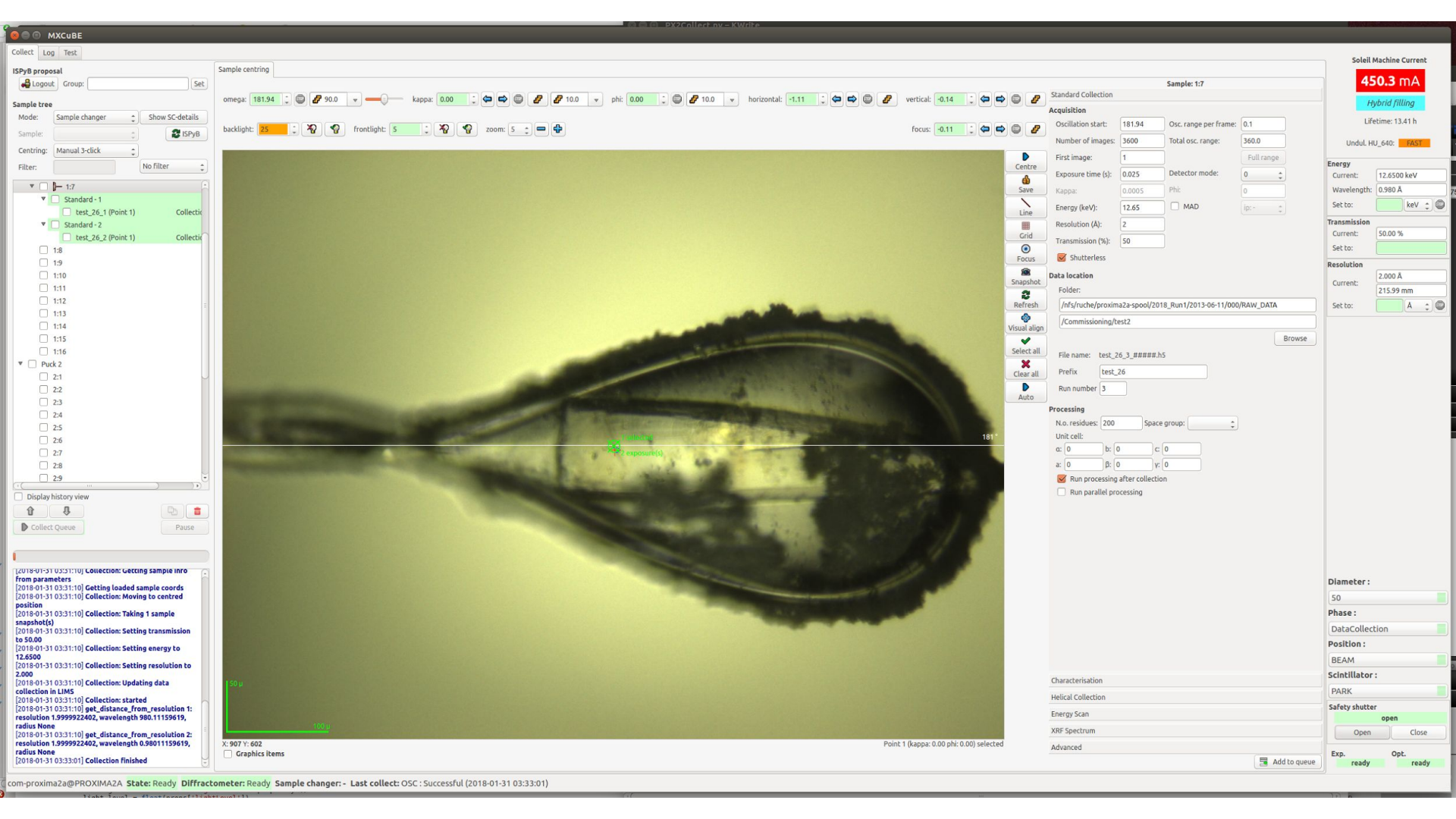
- NoMachine Enterprise servers installed on beamline control computers.
- External users on Proxima 1 and Proxima 2 since Autumn 2017.
- Regularly scheduled on Proxima 1 for the next proposal period.

# Autoprocessing (on going work)

- Collaboration with Olof Svensson (ESRF)
- Passerelle EDM server based solution (both Proxima 1 and Proxima 2)
- Local adaptations by Frederic Picca
- Analysis via MXCuBE controlled scripts where real time processing required

# Passing to Qt4 version, groundwork for MXCuBE3

- Finishing port of complete functionality Qt3 version
  - Tests ongoing on both beamlines
- Code cleanup
  - Inheriting from Abstract and Generic classes
    - GenericDiffractometer (Smargon and MD2+MK3)
    - AbstractCollect
    - AbstractMotor (TangoDCMotor, MicrodiffMotor)
  - Following master, v 2.3 of HardwareObjects
- Testing during Run 1 2018, production for Run 2 (Mid March)


MXCuBE
Collect
Log
Test
ISPyB proposal
Logout
Group:
Set
Sample tree
Mode:
Sample changer
Show SC-details
Sample:
ISPyB
Centring:
Manual 3-click
Filter:
No filter
1:7
Standard - 1
test_26_1 (Point 1)
Standard - 2
test_26_2 (Point 1)
1:8
1:9
1:10
1:11
1:12
1:13
1:14
1:15
1:16
Puck 2
2:1
2:2
2:3
2:4
2:5
2:6
2:7
2:8
2:9
Display history view
Collect Queue
Pause
[2018-01-31 03:31:10] Collection: Getting sample info from parameters
[2018-01-31 03:31:10] Getting loaded sample coords
[2018-01-31 03:31:10] Collection: Moving to centred position
[2018-01-31 03:31:10] Collection: Taking 1 sample snapshot(s)
[2018-01-31 03:31:10] Collection: Setting transmission to 50.00
[2018-01-31 03:31:10] Collection: Setting energy to 12.6500
[2018-01-31 03:31:10] Collection: Setting resolution to 2.000
[2018-01-31 03:31:10] Collection: Updating data collection in LIMS
[2018-01-31 03:31:10] Collection: started
[2018-01-31 03:31:10] get_distance_from_resolution 1: resolution 1.9999922402, wavelength 980.11159619, radius None
[2018-01-31 03:31:10] get_distance_from_resolution 2: resolution 1.9999922402, wavelength 0.98011159619, radius None
[2018-01-31 03:33:01] Collection finished
Sample centring
omega: 181.94
90.0
kappa: 0.00
10.0
phi: 0.00
10.0
horizontal: -1.11
vertical: -0.14
backlight: 25
frontlight: 5
zoom: 5
focus: -0.11
Centre
Save
Line
Grid
Focus
Snapshot
Refresh
Visual align
Select all
Clear all
Auto
181°
2 exposure(s)
50 µ
100 µ
X: 907 Y: 602
Graphics items
Point 1 (kappa: 0.00 phi: 0.00) selected
Sample: 1:7
Standard Collection
Acquisition
Oscillation start: 181.94
Osc. range per frame: 0.1
Number of images: 3600
Total osc. range: 360.0
First image: 1
Full range
Exposure time (s): 0.025
Detector mode: 0
Kappa:
0.0005
Phi:
0
Energy (keV): 12.65
MAD
Resolution (Å): 2
Transmission (%): 50
Shutterless
Data location
Folder:
/nfs/ruche/proxima2a-spool/2018_Run1/2013-06-11/000/RAW_DATA
/Commissioning/test2
Browse
File name: test_26_3_#####.h5
Prefix
test_26
Run number
3
Processing
N.o. residues: 200
Space group:
Unit cell:
Run processing after collection
Run parallel processing
Characterisation
Helical Collection
Energy Scan
XRF Spectrum
Advanced
Add to queue
Soleil Machine Current
450.3 mA
Hybrid filling
Lifetime: 13.41 h
Undul. HU_640:
FAST
Energy
Current: 12.6500 keV
Wavelength: 0.980 Å
Set to:
keV
Transmission
Current: 50.00 %
Set to:
Resolution
Current: 2.000 Å
215.99 mm
Set to:
Å
Diameter :
50
Phase :
DataCollection
Position :
BEAM
Scintillator :
PARK
Safety shutter
open
Open
Close
Exp.
ready
Opt.
ready
com-proxima2a@PROXIMA2A State: Ready Diffractometer: Ready Sample changer: - Last collect: OSC : Successful (2018-01-31 03:33:01)

# Passing to Qt4 version, groundwork for MXCuBE3

- Finishing port of complete functionality Qt3 version
  - Tests ongoing on both beamlines
- Code cleanup
  - Inheriting from Abstract and Generic classes
    - GenericDiffractometer (Smargon and MD2+MK3)
    - AbstractCollect
    - AbstractMotor (TangoDCMotor, MicrodiffMotor)
  - Following master
- Testing during Run 1 2018, production for Run 2 (end of February)
- New features
  - Mesh scan integration
  - X-ray centring integration
  - Alignment of beamline components

## Proxima 1

Source: U20 in vacuum undulator

Focussing: KB, **CRL**

Tunable: 5.5 - 15.5 keV

Flux: 2.0e12 ph/s  @ 500mA @ 12.65keV

Beam size: 20x40 µm

Detector: **Eiger X 16M**

Goniometer: SmarGon

Sample Changer: CATS

MXCuBE: **Qt4 v 2.3**

## Proxima 2

Source: U24 in vacuum undulator

Focussing: KB + pre focussing mirror

Tunable: 5.5 - 18.5 keV

Flux: 1.6e12 ph/s @ 500mA @ 12.65keV

Beam size: 5x10 µm

Detector: Eiger X 9M

Goniometer: MD2 with **MK3**

Sample Changer: CATS

MXCuBE: **Qt4 v 2.3**

# Acknowledgements


- Leo Chavas
- Bill Shepard
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