

MXCuBE at LNLS/Sirius

Laís Pessine do Carmo

Beamline Operation Software Group (SOL)

29th RAU - LNLS/CNPEM
November, 2019

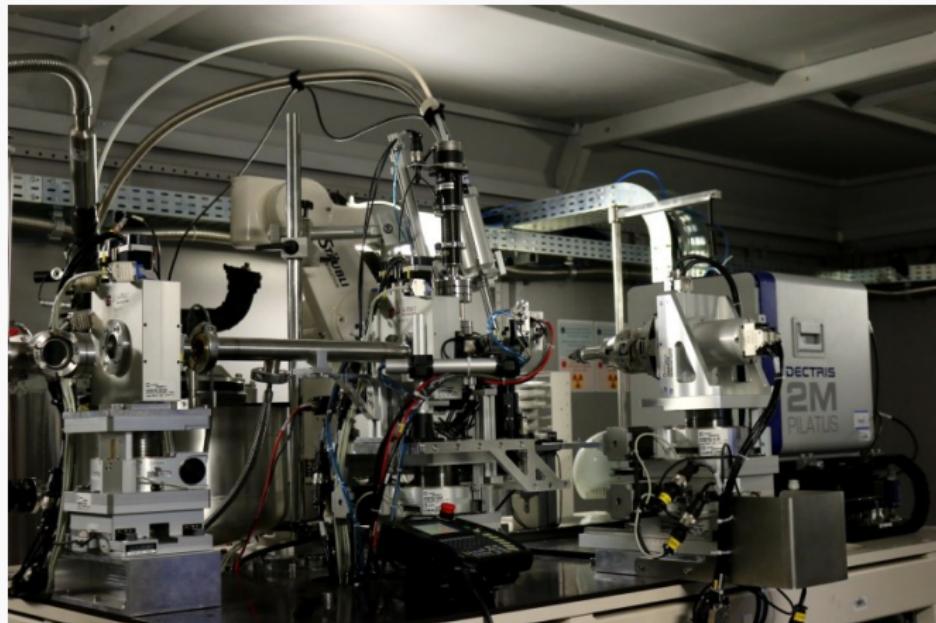
Presentation at:

bit.ly/rau-mxcube-2019

Summary

- ▶ Experiment control software on MX beamlines
 - MX2 (UVX)
 - MANACÁ (Sirius)
- ▶ MXCuBE
 - Background
 - Status
- ▶ Future work

MX2 Beamlne (UVX)



MX2 experimental station

MX2 Beamline (UVX)

Energy:	5 - 15 keV
Beam size:	150 x 500 μm
Source:	Wiggler
Area detector:	Dectris Pilatus 2M
XRF detector:	Amptek X-123SDD
Sample changer:	G-Rob
Cryostat:	Oxford Cryojet XL
Camera:	IDS UEye
Goniometer:	Huber air bearing stage + ARINAX mini-kappa (in house)

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MX2 Beamline (UVX)



MX2 control station

Distributed control framework:

EPICS

Experimental GUI:

MXCuBE 2 (Qt4)

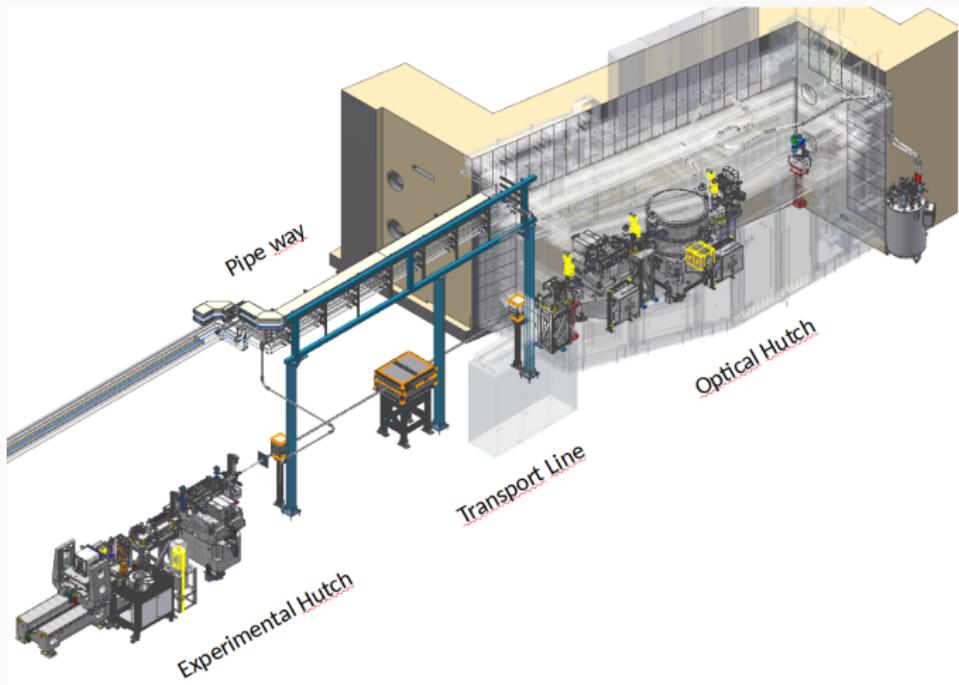
OS:

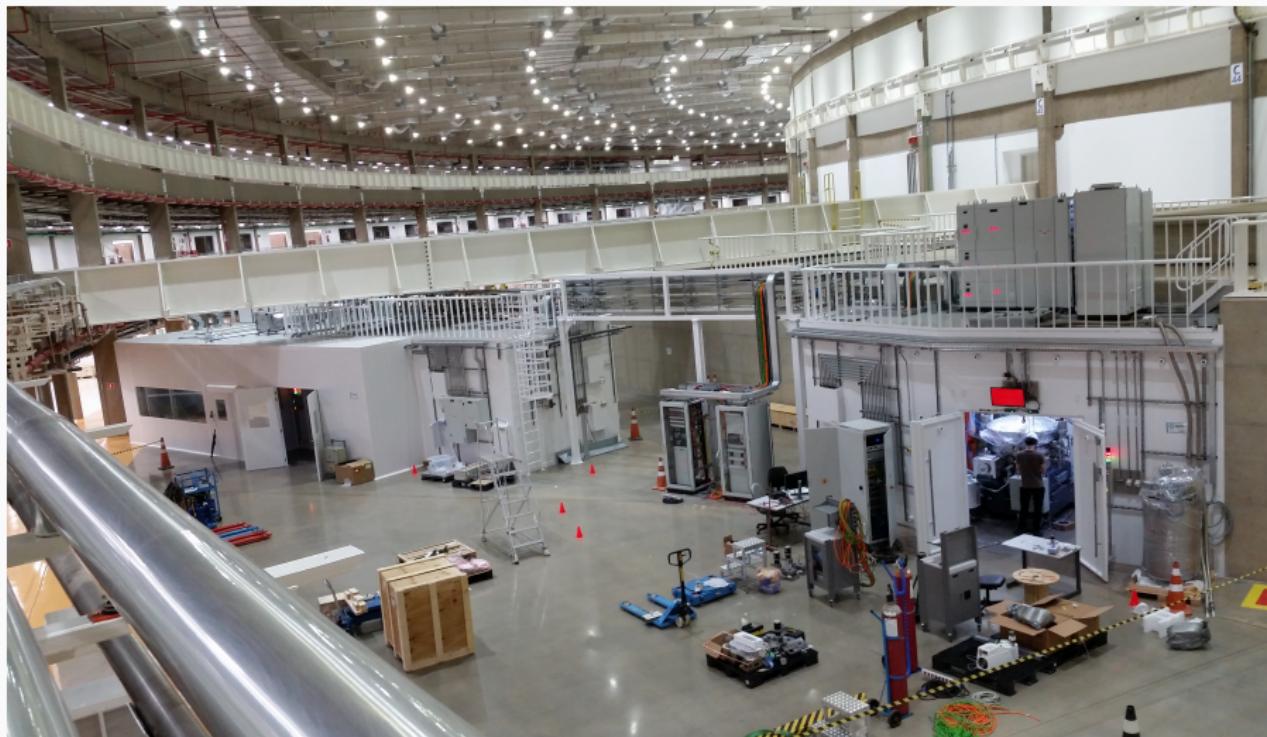
Linux (CentOS 7)

Other UIs:

CS-Studio, Py4Syn [2]

MANACÁ Beamline (Sirius)





MANACĀ overview



Experimental Hutch (Table and Mirror 2)

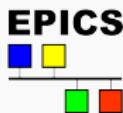
MANACÁ Beamline (Sirius)

Energy:	5 - 20 keV
Beam size:	10 x 7 μm (focused) 100-10 x 80-7 μm (adjustable) 0.5 x 0.5 μm (nano station)
Source:	Ondulator
Area detector:	Pi-Mega (based on Medipix chip) [3]
XRF detector:	Amptek Fast SDD
Sample changer:	Stäubli TX60 (Unipuck + Plate Gripper)
Cryostat:	Oxford Cryojet
Camera:	ARINAX B-Zoom
Goniometer:	Huber air bearing stage + ARINAX mini-kappa (in house)

Sirius - MANACÁ Beamline

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Sirius - MANACÁ Beamline



Distributed control framework:
Experimental GUI:
OS:
Other UIs:

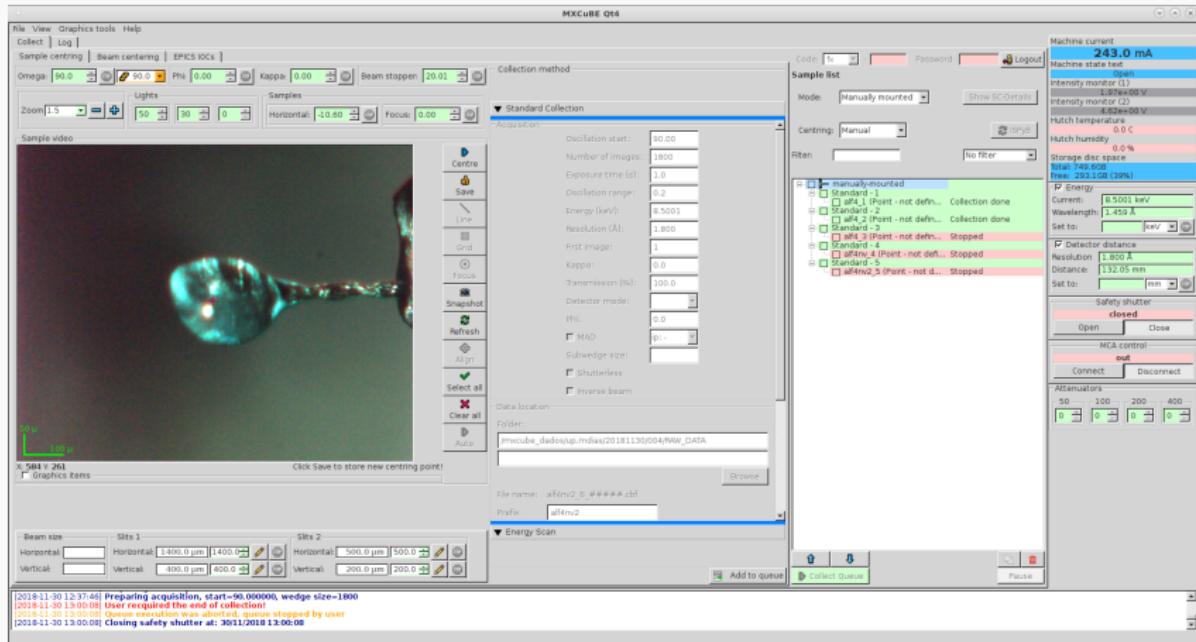
EPICS
MXCuBE 3 (Web)
Debian 9
PyQt, PyDM, Py4Syn

MXCuBE - Background

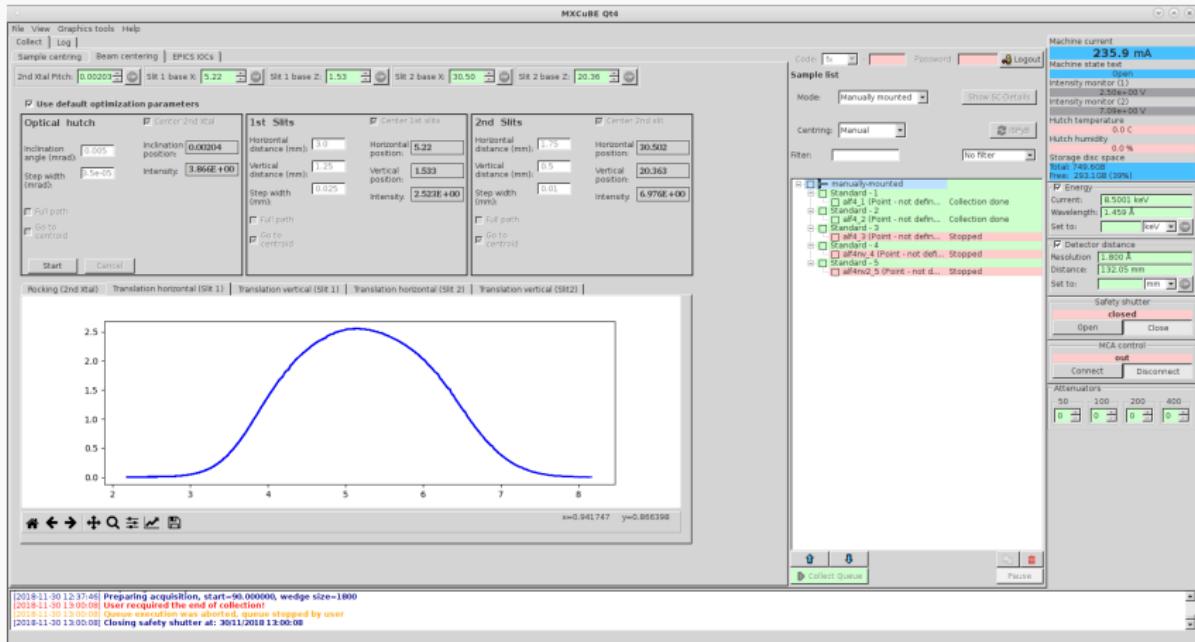
UVX

- ▶ 2016: **MXCuBE 2 (at MX2)**
Reasons: Python, EPICS, community support
LNLS HOs classes dev, commissioning (Python 3.4, Py4Syn)

- ▶ Mid 2017: Operation with MXCuBE2 open to the first users



MXCuBE 2 (with EPICS) at MX2



Beam Centering widget at MX2 [1]

MXCuBE - Background

Sirius

- ▶ Good feedback from users (and staff) about MXCuBE
- ▶ 2018: Online meetings, remote test with ESRF,
Meeting at Elletra
- ▶ MXCuBE 3 (Web) + EPICS for MANACÁ
Interest to adopt ISPyB too
- ▶ 2019: LNLS joins MXCuBE collaboration,
Meeting at HZB/BESSY

MXCuBE - Status

Focus on MANACÁ

- ▶ **MXCuBE 3 + HR 2.2 + EPICS + Docker**
(Dev / Test)

- ▶ **Migration of LNLS Hardware Objects (control classes)**
to this setup

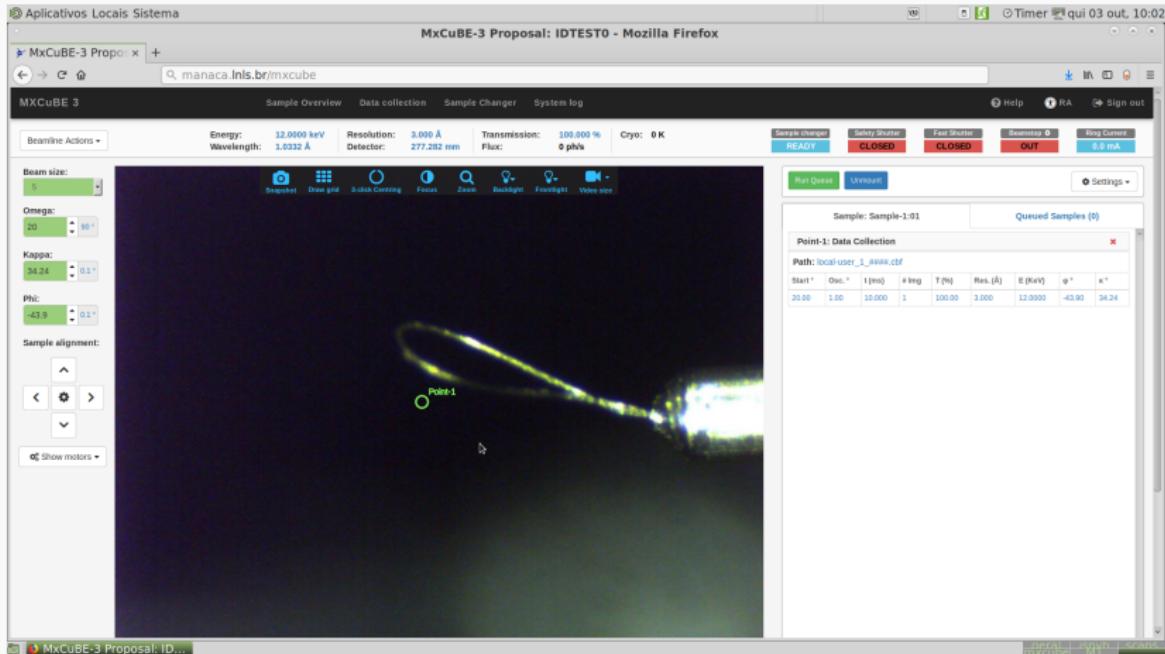
- ▶ **EPICS IOCs developments:**
Motor (Delta Tau), Camera (Arinax B-Zoom), Det (Pi-Mega)

MXCuBE - Status

Done:

Tested classes for MXCuBE3 + EPICS:

- ▶ Epics Command
- ▶ LNLS Motor
- ▶ LNLS Camera (UEye, B-Zoom)
- ▶ Machine info (e.g.: ring current and similar PVs)



MXCuBE 3 developments at MANACÁ

MXCuBE - Status

Done:

ISPyB:

- ▶ Docker container for learning and testing
- ▶ Improvements discussed with the community
- ▶ All merged and available at:

<http://github.com/ispyb/ispyb-docker>

MXCuBE - Status

Doing (WIP):

Rebase our code to **MXCuBE3 (master)** + HR 3.0

- ▶ Align with upstream
- ▶ Python 3 compatibility

More dev/tests on MXCuBE3 + EPICS:

- ▶ LNLS Detector (Pilatus, Pi-Mega)
- ▶ LNLS MultiCollect

MXCuBE - Status

Repositories?

- ▶ <http://github.com/lnls-sol/mxcube3>
- ▶ <http://github.com/lnls-sol/HardwareRepository>
- ▶ <http://github.com/lnls-sol/mx3docker>

Stable code on branch: [lnls-manaca](#)

Future Work

MXCuBE

- ▶ Auto centering routines
- ▶ Cateretê beamline also interested (see BSXCuBE)
- ▶ Serial MX
- ▶ Remote access

ISPyB

- ▶ 2020: Developments and tests for MANACÁ

Future Work

MXCuBE & ISPyB Meeting in Brazil? :)



Acknowledgments

Beamline Operation Software (SOL group)

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MX Group

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Andrey Fabricio Ziem Nascimento

Carlos Yujiro Hagio

Evandro Ares de Araujo

MXCuBE and ISPyB community

References



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MXCuBE at LNLS/Sirius

Thank you!

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Questions?