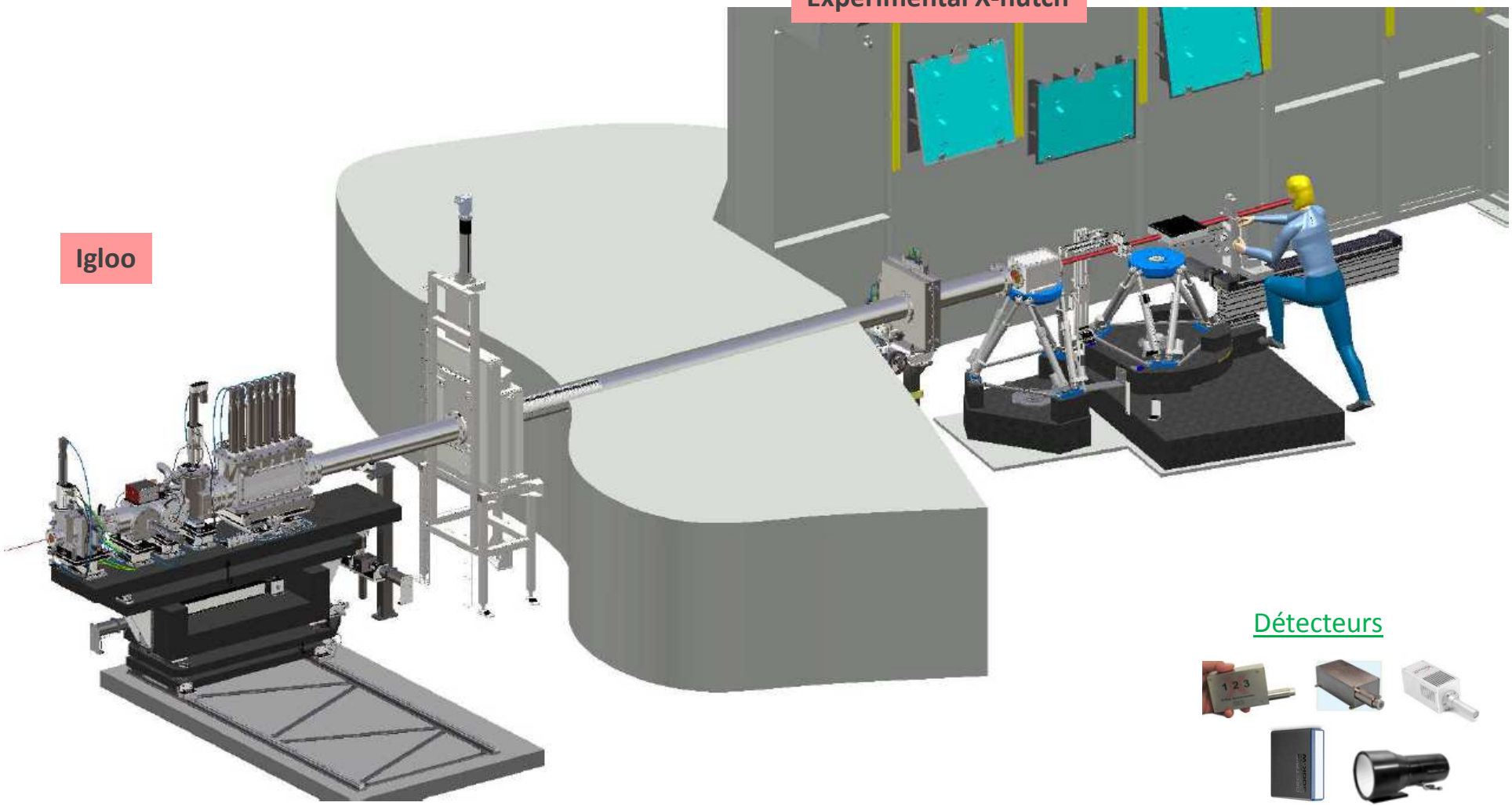
The ThomX X-line

Experimental X-hutch

Igloo



Détecteurs

Beam monitoring area
- Beam shutter
- Slits 1
- « Fluo » detector
- « 2 diodes » detector
- Wire detector

→ Currently in Grenoble
→ Tested

Beam size selection and cleaning
- Slits 2 et 3

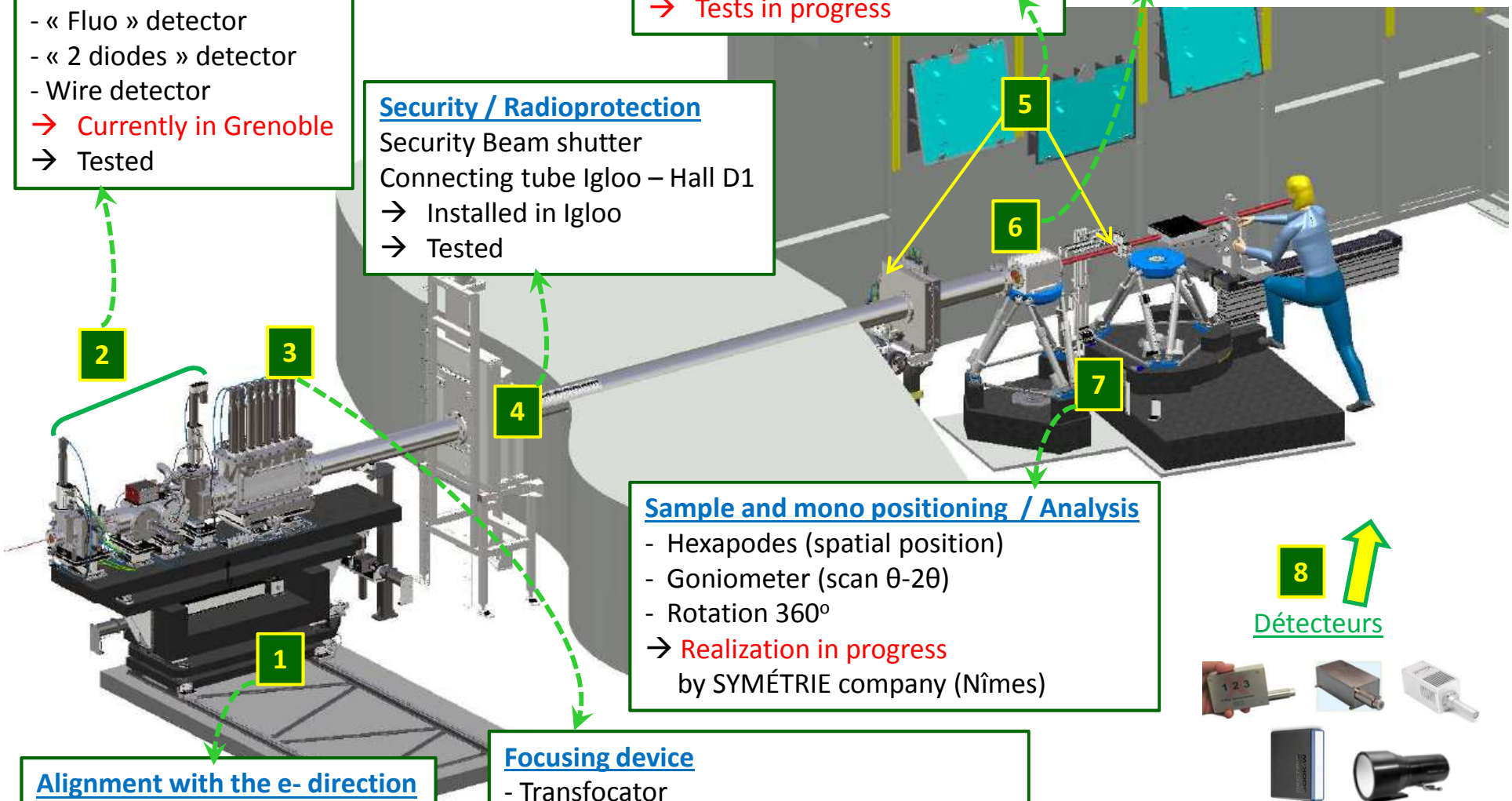
→ Currently in Grenoble
→ Tests in progress

Spectral selection
- Monochromator

→ To be designed and realized

Security / Radioprotection
Security Beam shutter
Connecting tube Igloo – Hall D1

→ Installed in Igloo
→ Tested



Sample and mono positioning / Analysis
- Hexapodes (spatial position)
- Goniometer (scan θ-2θ)
- Rotation 360°

→ Realization in progress
by SYMÉTRIE company (Nîmes)

8 Détecteurs

Alignment with the e- direction
- Motorized Table
- Floor rails for retraction Table1

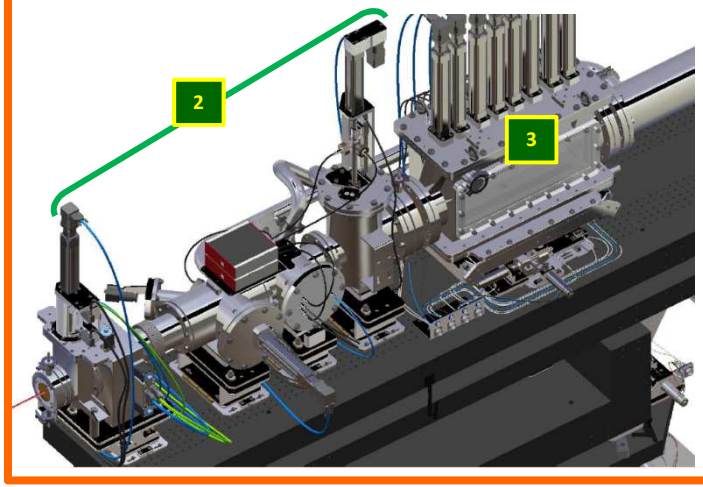
→ Installed in Igloo
→ Almost fully tested

Focusing device
- Transfocator

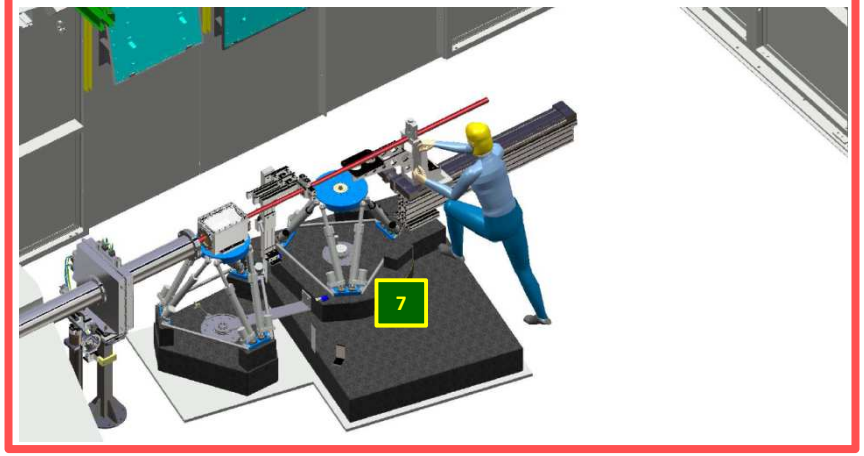
→ Currently in Grenoble
→ Assembly in progress (almost finished)

Technical aspects

Around January 2019, bring back the material 2 and 3 from Grenoble to Orsay, install it, connect it and test again, in situ, the vacuum and the control/command.

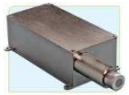


June 2019, delivery of the system 7 at Orsay. SYMÉTRIE will install the device in the X-hutch adjust it, train the staff .



8

1 CdTe detector
(25mm², integrated electr.)
→ At Orsay
→ Tested



1 calibrated Si diode
→ **To be ordered** (Canberra)

Beam characterization (spectral flux)

2 SDD detectors
(25 mm² + FalconX electr.)
→ Currently 1 in Grenoble
1 at LAMS
→ Tested

Fluorescence (high count rate)

288 K pixels
250x33 mm²

1 CdTe 2D pixel detector
→ Realized (Dectris)
→ Problem of power supply during the commissioning end of May in Grenoble
→ **Back to Dectris for fixing**

Diffraction θ-2θ

16 M pixels
55x55 mm²

1 médical 2D detector
(scintill + CMOS camera)
→ **Realization in progress**
(Photonic Science)

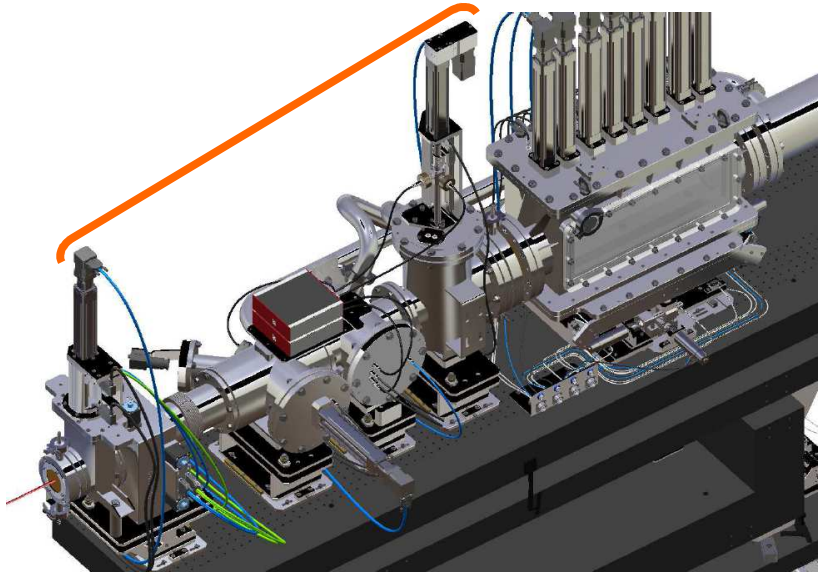
Imaging (small spatial resolution)

Commissioning

1.

During the **e- commissioning** (LINAC, Trans. line and SR) (**without e-/laser interactions**), we will study the **background signals in our three detectors**.

We will perform these background studies for different openings of the **entrance slits** and/or with the X-line **beam shutter** closed or open.



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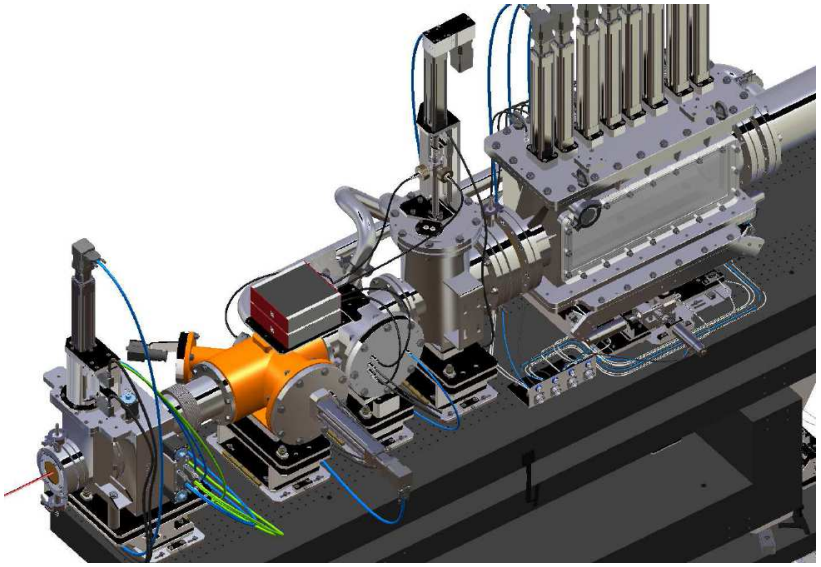
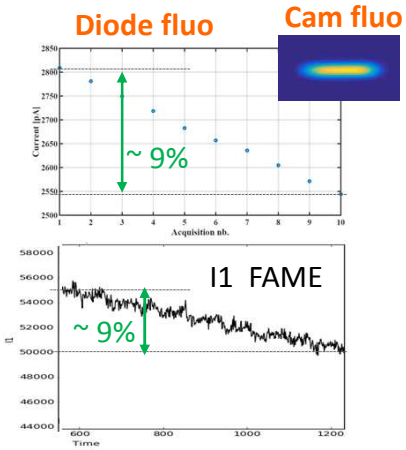


2.

Once both **e-** and FP cavity **laser** will be **ready** for Compton interactions, we will constantly survey the **Si-PIN diode signal of the "Fluo detector"** during the phase of **spatial and temporal matching of the e- and laser**. As soon as we will see an **increase of the current**, we will sabre the champagne and optimize the matching by looking for the machine operating point giving the maximum diode current.



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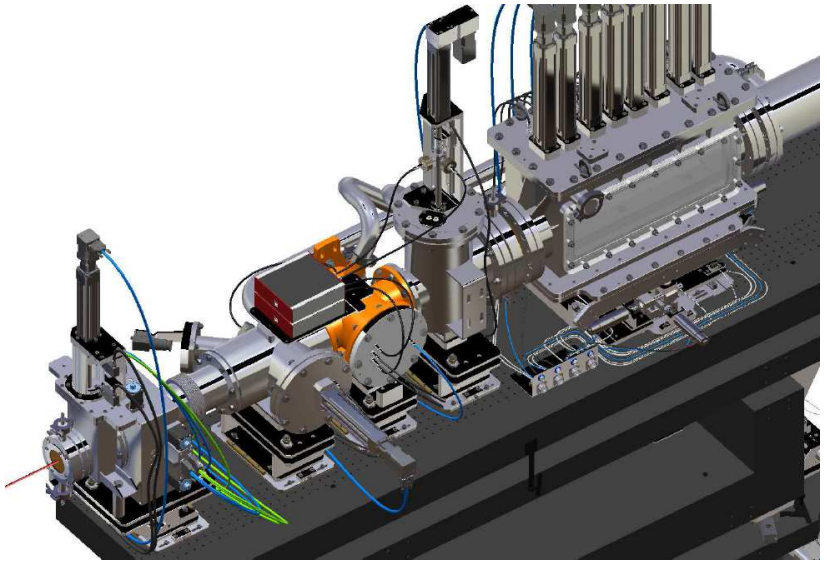

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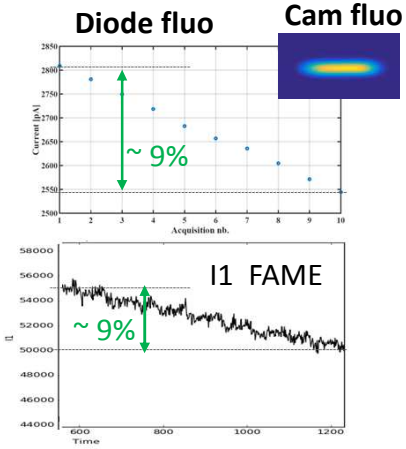
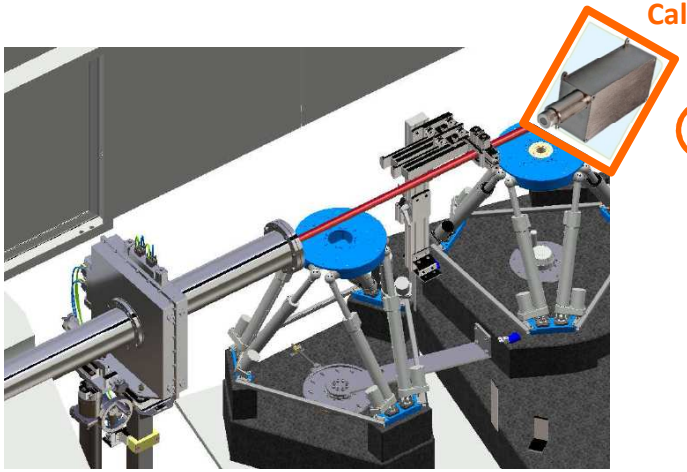




3.

Finally, when **e-/laser interactions** will occur in **stable conditions**, the last phase will be to **measure the delivered total flux**: we will **retract the fluorescent screen**, select a **small given solid angle** with the entrance slits and measure the **current in the Si calibrated diode** located in the X-hutch. In the same time, we will follow the relative **currents in the "2-diodes detector".**

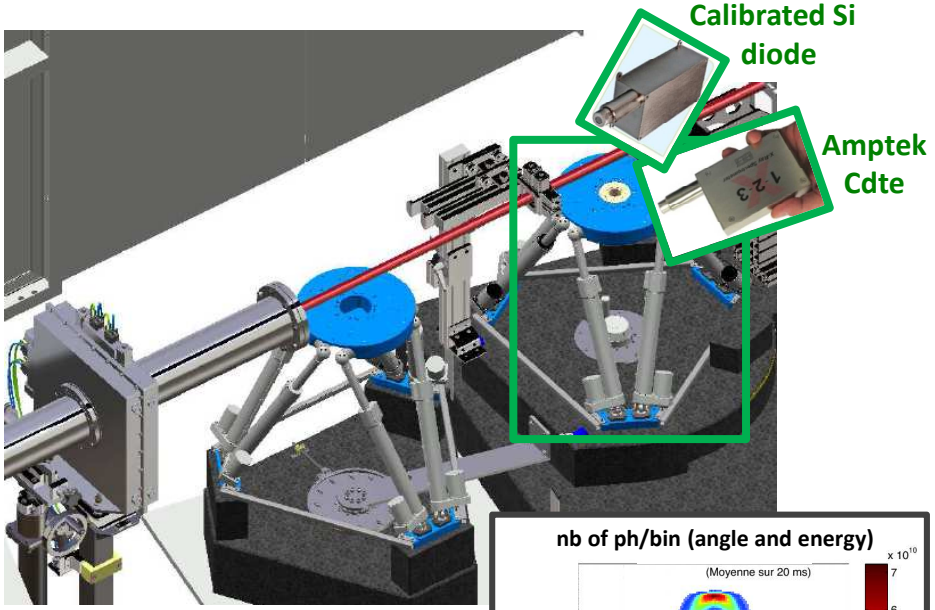
The basic commissioning is valided once the previous stages ① , ② , and ③ achieved,

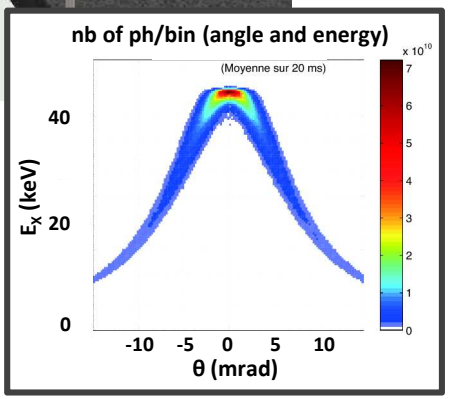
… then, the following enters in the field of full-fledged physic analyses.

A.

Make the **characterization of the X-ray beam**:
Scan the X-ray cone beam
- with the **CdTe detector** to measure the energy
- and with the **calibrated diode** to measure the flux.

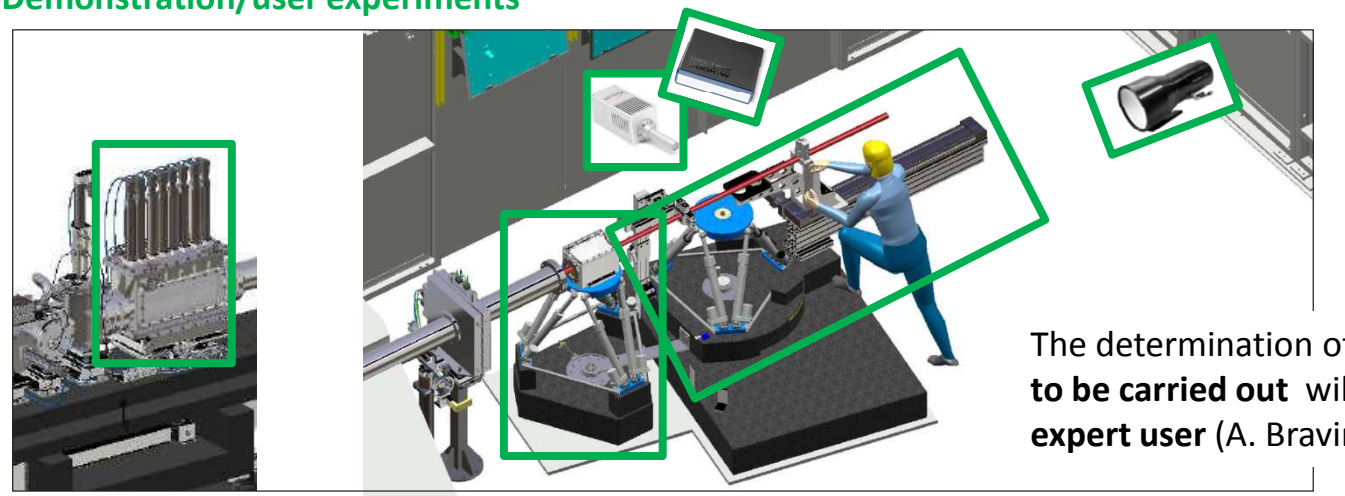
The measured angular spectral flux and its broadening will be **correlated** with the **transverse emittance** and the **energy spread** of the **e- bunch.**





B.

Demonstration/user experiments



The determination of the **first experiments to be carried out** will be coordinated by an **expert user** (A. Bravin, ID17 ESRF).