EUROPEAN SYNCHROTRON RADIATION FACILITY
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ID31 – A new high energy beamline for buried interface structures and materials processing

Mechanical design challenges

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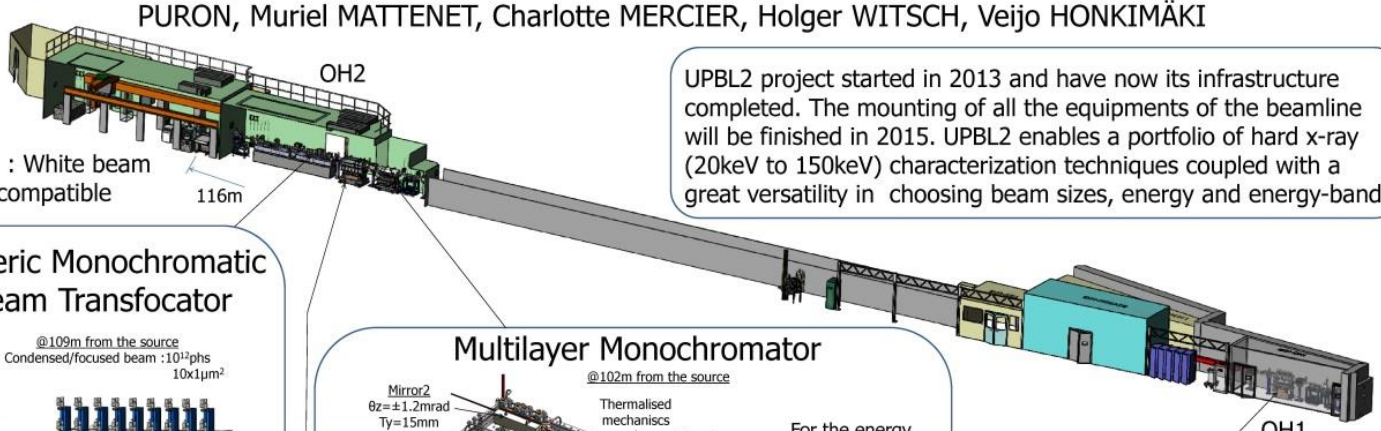
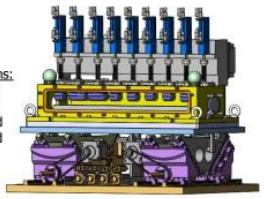


UPBL2 project started in 2013 and have now its infrastructure completed. The mounting of all the equipments of the beamline will be finished in 2015. UPBL2 enables a portfolio of hard x-ray (20keV to 150keV) characterization techniques coupled with a great versatility in choosing beam sizes, energy and energy-band.

Generic Monochromatic Beam Transfocator

@109m from the source
Condensed/focused beam :10^{12}phs
10x1µm²

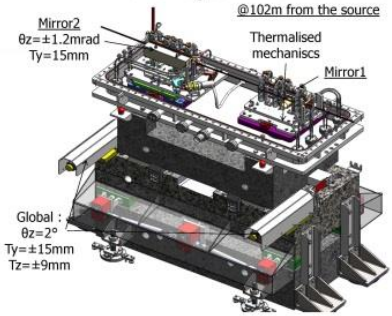


Specifications:
Ty=4mm
Tz=4mm
Θy=4mrad
Θz=4mard

Set of lenses :
1, 2, 4, 8, 16, 32 Al lenses with R=200µm
32 Al lenses with R=100 µm
32 Al lenses with R=50 µm
2Be lenses with R=500 µm

Multilayer Monochromator

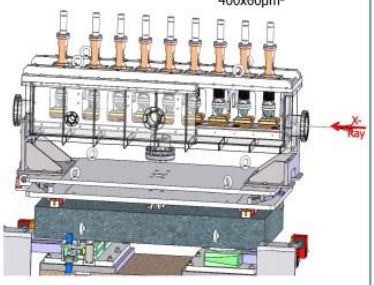
@102m from the source



For the energy range 20keV to 70keV
Two water cooled 300mm long multilayers in horizontal scattering with gap adjustment

Generic water cooled White Beam Transfocator

@31m from the source
Condensed/focused beam :10^{14}phs
400x60µm²



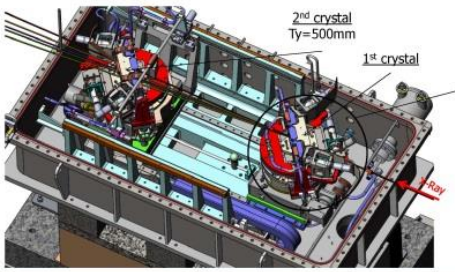
Specifications:
Ty=4mm
Tz=4mm
Θy=4mrad
Θz=4mard

Set of lenses :
1, 2, 4, 8, 16, 32 Be lenses
32 and 64 Al lenses

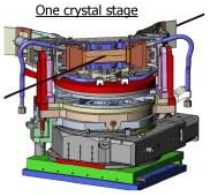
Laue-Laue Monochromator

@105m from the source

For the energy range 50keV to 150KeV
Two Laue bent Si(111) crystals with asymmetric cut of 36° in non dispersive geometry
The two crystals are Cryo cooled



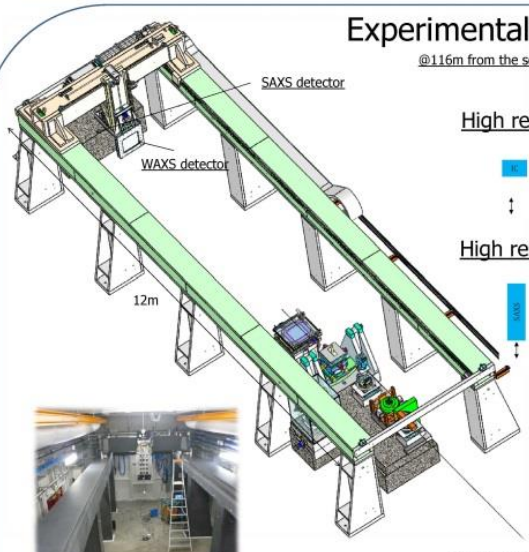
One crystal stage



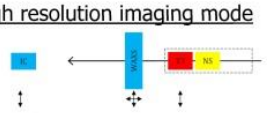
Specifications
Θx=7mrad
Θy=7mrad
Θz_{coarse}=±40°
Θz_{fine}=1.2mrad
T_{bender}=±1.2mm
Ty=30mm

Experimental station

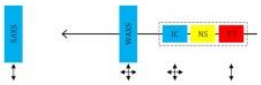
@116m from the source

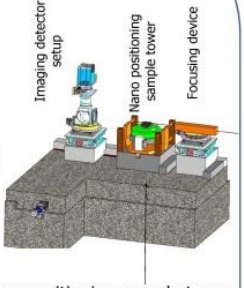


High resolution imaging mode



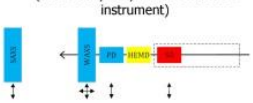
High resolution diffraction mode

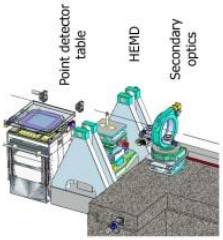




Nanopositioning sample tower
(work in progress)
Heavy loads : up to 50Kg
Nanometer scale positioning

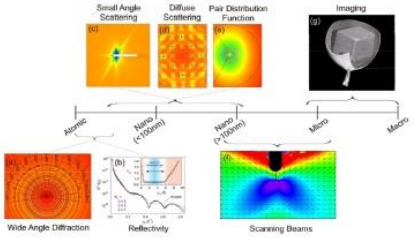
Reflectivity mode
(with Heavy duty micro diffraction instrument)





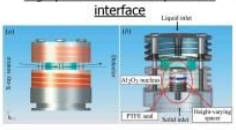
Experiments

Examples of devices studied at ID31
-Fuel cells -Solar cells
-Rechargeable batteries -Catalytic materials etc...

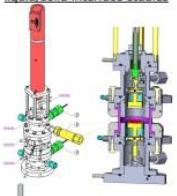


Examples of sample environments

High pressure cell for liquid solid interface



High pressure – temperature chamber for liquid/solid interface studies



Kelvin probe