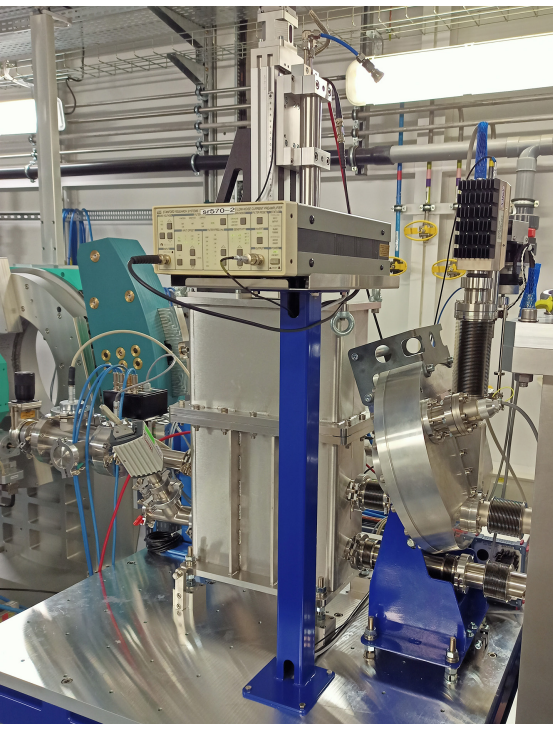
XMaS Reborn!

Panoramic view of the new experimental hutch (EH1).

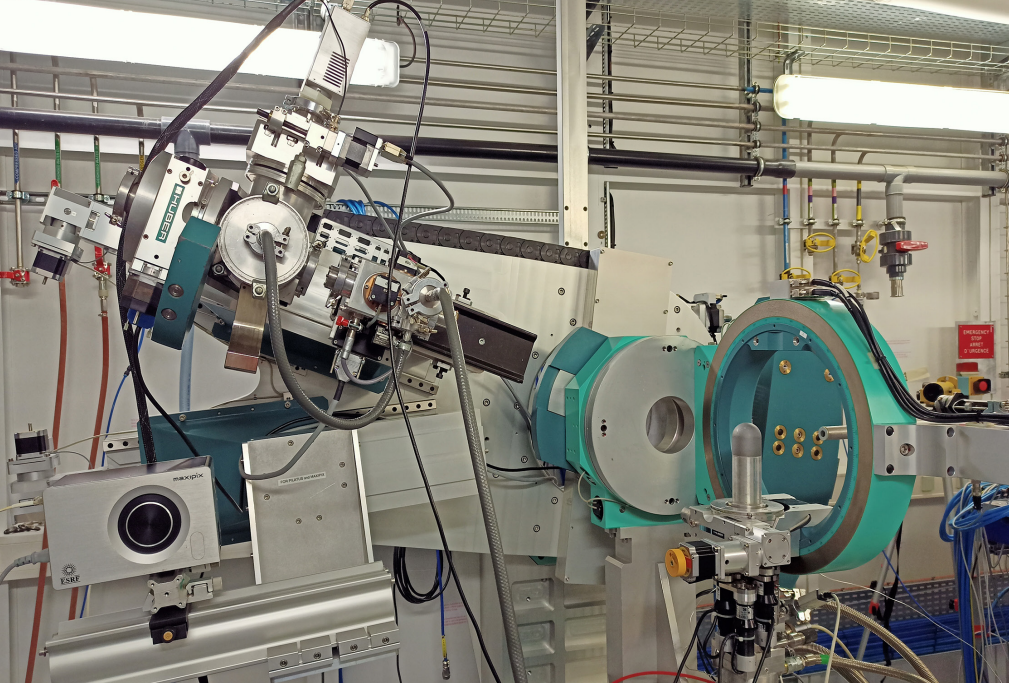


Filter wheel (right) and retractable in-vacuum ion chamber with current amplifier (middle).

A newer and brighter XMaS/BM28 is back in operation after what has amounted to a comprehensive rebuild of the entire beamline. This rebuild was necessary to take full advantage of the ESRF-EBS upgrade but also to update many of the beamline components, which dated from the original construction phase (1994-97).

The beamline now delivers a focal spot, which is some 25 times smaller than previously and contains at least as much flux, if not more than before - exact comparisons depend on the experimental configuration. XMaS can do everything it could before in an improved manner with the exception of the white beam mode, which will not be available before a few years (subject to ESRF Safety approval). The energy range has doubled: energies up to 40 keV can now be reached opening up new exciting possibilities.

The beamline has been back into a rather unusual 'User Operation' since January as all the experiments have been running with no users physically present on the beamline but rather driving their experiment in a remote way whenever possible. We hope that the pandemic situation settles down soon allowing our user community to return to XMaS.



Huber diffractometer with its double 2θ arm.

CHANGES TO AND NEW SPECIFICATIONS OF THE BEAMLINE

- Longer EH1 to accommodate the change of the source point several metres upstream and preserve the 1:1 focussing; all the beamline components moved sideways between 100 mm at the front end up to ~204 mm at the sample position.
- Cryogenically cooled mono enabling access to 2.035 keV.
- Double focusing mirror system with Cr (2 - 12 keV) and Pt (2 - 40 keV) coatings.
- 70 µm (H) x 140 µm (V) spot, i.e. 25 times smaller than before.
- Similar flux, or more, depending on the energy range and the technique used.
- Wider suite of detectors (new Pilatus3 S 1M and Lambda 750k CdTe).
- Retractable in-vacuum ion chambers allowing rapid switching between low energy (fluorescence yield) and high energy XAS (transmission) setups.
- In-vacuum filter wheel containing up to 30 reference foils ideal for spectroscopy calibration.
- In-vacuum phase-plate chamber with 4 crystals permanently mounted to produce circularly polarised x-rays between 2.4 and 13 keV.
- Refurbished Huber diffractometer with a double 2θ arm allowing rapid switching between measurements using point detectors (Vortex, APD) — e.g. high resolution XRD or HERFD with an analyser crystal, magnetic reflectivity, X-ray Resonant Magnetic Scattering with polarisation analysis, — and techniques using 2D detectors (Lambda 750k CdTe, Maxipix, Pilatus3 300k) e.g. (GI)-WAXS, time resolved XRD.
- Upgraded SAXS capabilities with Pilatus3 S 1M and extended Q-range down to ~ 0.013 $Å^{-1}$ corresponding to real space length scales ~ 50 nm with a longer SAXS rail of ~ 2.6 m.

PROPOSAL SUBMISSION DEADLINES

XMaS provides 2/3rd of available synchrotron beam time to UK based researchers (national research facility or CRG time) with the remaining 1/3rd to wider ESRF's user community (ESRF time). Two proposal submission deadlines occur one month after the March and September ESRF deadlines. Applications for the same experiment may be made through both routes for UK based researchers as the Principal Investigator only.

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@XMaSBeam

New double focusing mirror system with Cr and Pt coatings.

XMaS the UK-CRG

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