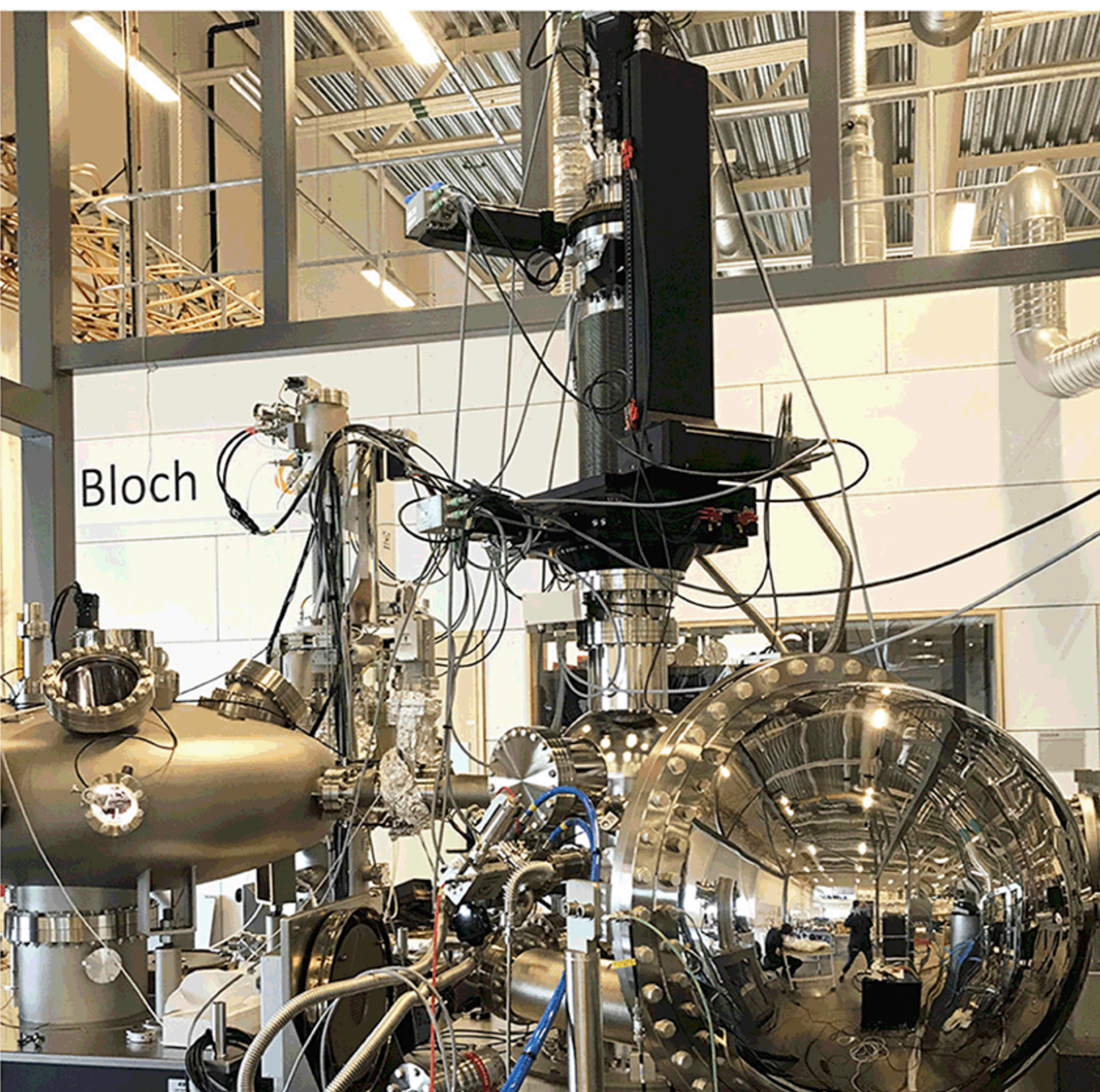
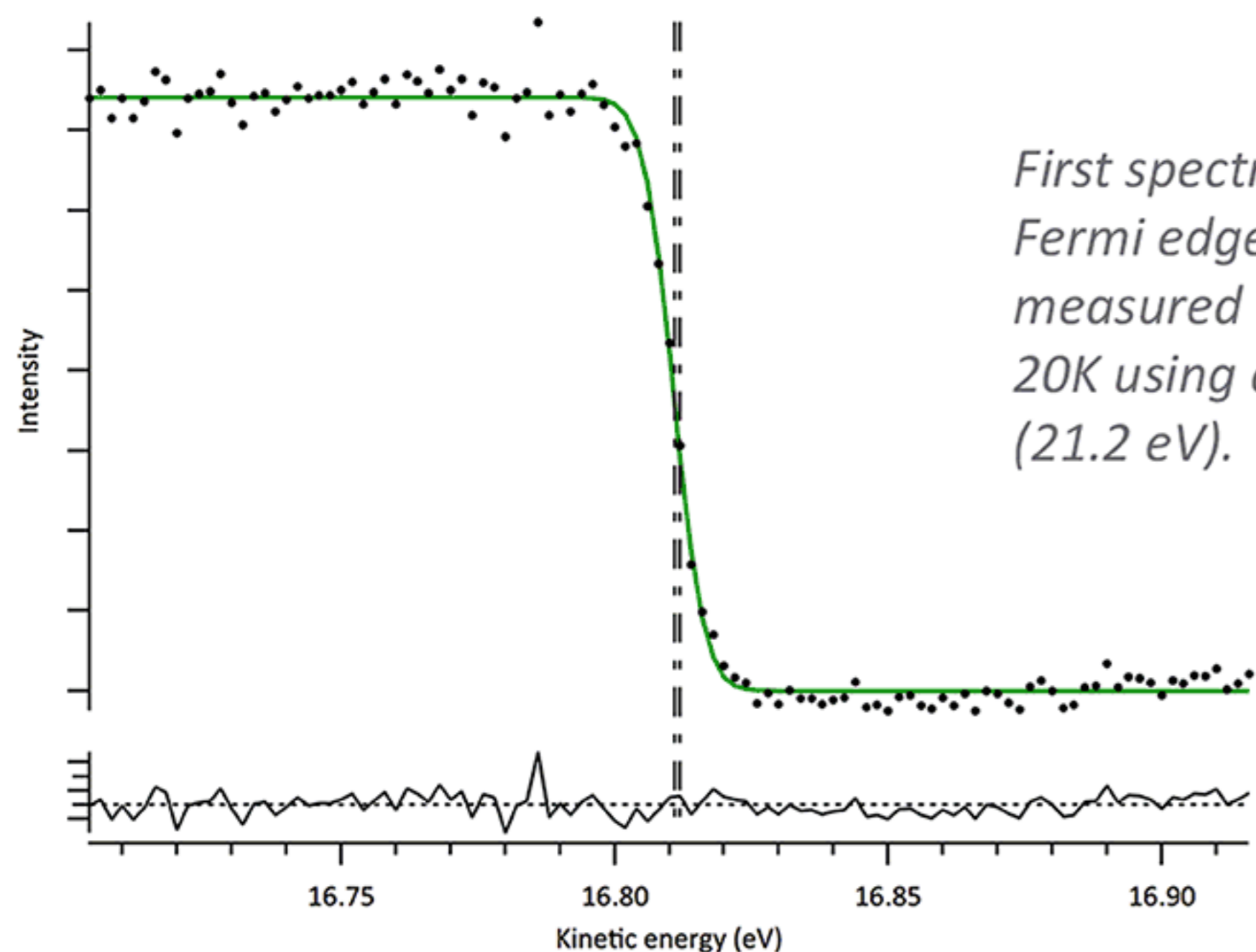


Facility Update



Research on novel materials such as graphene, topological insulators, Weyl semi-metals, surface alloys, superconductors and quantum wells is heavily reliant on detailed knowledge of the electronic structure as it dictates important properties such as magnetism, conductivity, and optical activity. Angle resolved photoelectron spectroscopy (ARPES) and Spin-ARPES are direct and powerful tools to measure the electronic structure of surfaces.

The Bloch beamline with ARPES and Spin-ARPES branch-lines at the 1.5 GeV ring of MAX IV is designed for the preparation of novel materials and studies of them with a powerful combination of ARPES, Spin-ARPES, core-level spectroscopy, low energy electron diffraction and scanning tunneling microscopy (STM). The light is produced by an in-house built Apple II type, quasi-periodic, elliptically polarizing undulator (qEPU) with full control of the polarization, to be installed in Q4, 2017.



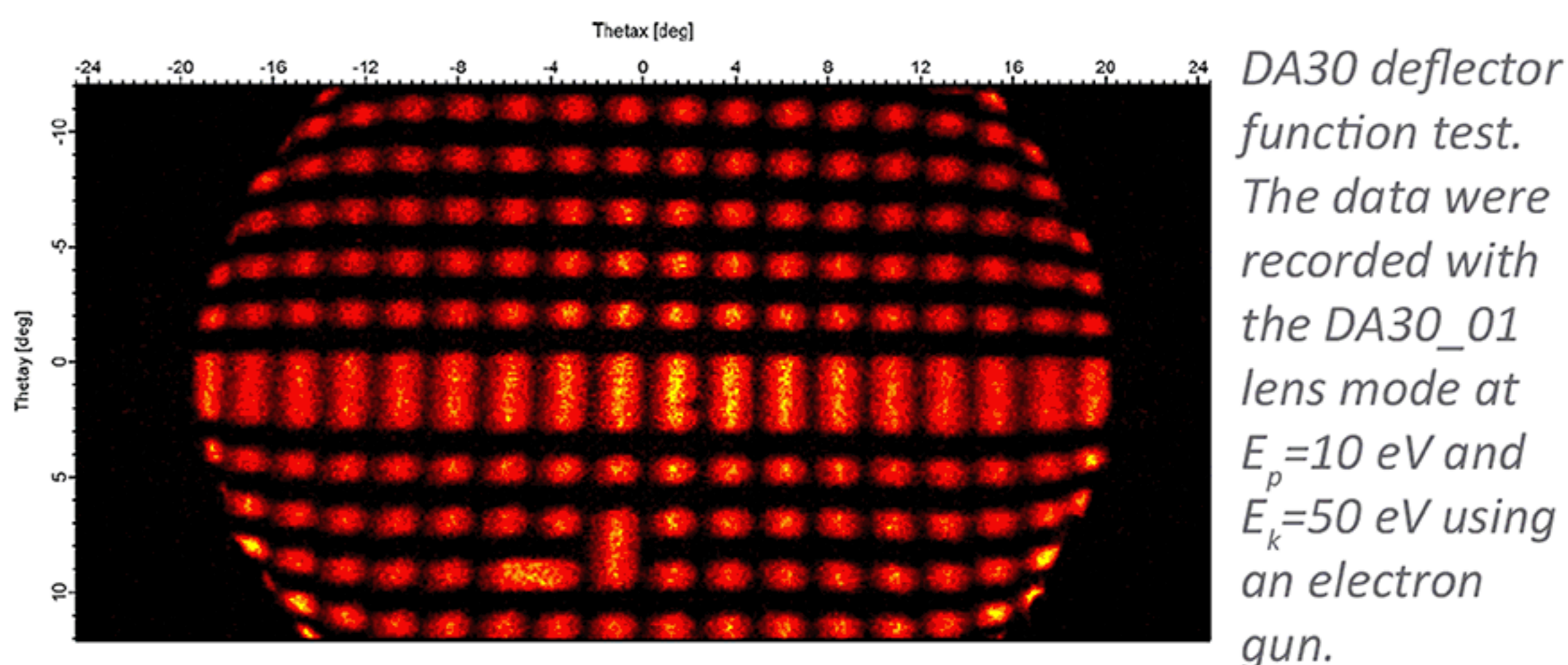
First spectrum of the Fermi edge from Au measured at around 20K using a UV-lamp (21.2 eV).



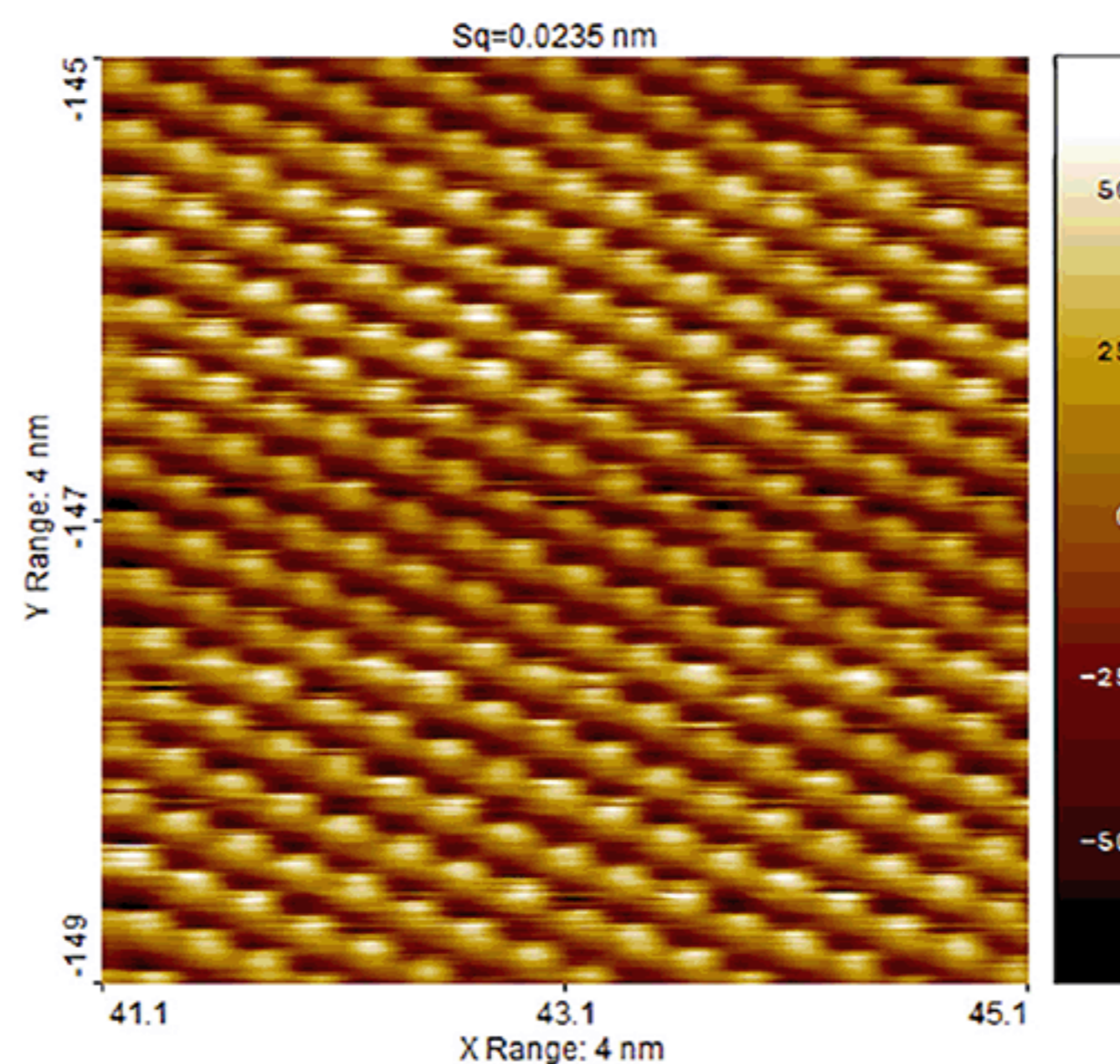
A combination of a cNIM and a cPGM monochromator (Toyama) with 4 interchangeable gratings results in a photon energy range of 10-1000 eV.

Presently, an 800 lines/mm grating (cPGM) and a 4000 lines/mm grating (cNIM) are installed. The two remaining cPGM gratings, a 92 lines/mm for high flux and a 2400 lines/mm for ultimate energy resolution (1 meV below 100 eV) will be installed in Q1, 2018. The expected size of the light spot at the sample position is 30×10 μm (H×V). Higher order light suppression is achieved by a combination of a gas filter, solid state filters and a qEPU.

The ARPES end station of the Bloch beamline has been delivered and site acceptance tests (SAT) have been done. The main parts included in the SAT are the deflector based electron analyzer (Scienta DA 30), the 6-axis LHe cooled manipulator (Carving, Specs), the two preparation chambers and sample transfer system (Prevac), and the STM (Scienta Omicron VT-STM XA). The Spin-ARPES end station is in the procurement stage and is expected to be commissioned in Q3, 2018.



DA30 deflector function test. The data were recorded with the DA30_01 lens mode at $E_p=10$ eV and $E_k=50$ eV using an electron gun.



STM image of HOPG recorded during SAT.

