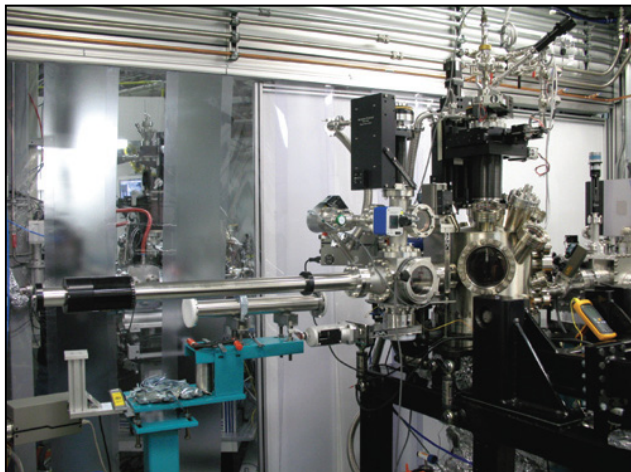


Resonant Elastic and Inelastic Soft X-Ray Scattering (REIXS) Beamline

This beamline is a state-of-the-art soft X-ray scattering facility dedicated to the studies of novel and advanced materials, including strongly correlated electron systems, nanoscale biomaterials, spintronics materials, etc. The beamline is designed to achieve high flux, high brightness, moderate resolution and full polarization control, covering the entire energy range from 80 to 2000 eV. The source of the beamline is an Elliptically Polarizing Undulator (EPU) that will produce photons of linear polarization in any direction, as well as of circular or elliptical polarization. The REIXS beamline has the capability to accept light from two EPUs. The two beams are spatially separated by magnets. All of the downstream optical elements are capable of handling two beams; therefore, the two beams have equivalent high performance. In the two-beam mode, a rotary chopper is used to select which beam reaches the sample in the endstation. When the two EPUs are generating light with different polarizations, rapid switching of the polarization can be realized. The REIXS beamline has two endstations: RSXS and XES.

The Resonant Soft X-ray Scattering (RSXS) technique combines diffraction methods with spectroscopic techniques to develop a new structural characterization method in the soft X-ray regime. The highly monochromatic, coherent, polarized and variable energy X-ray radiation allows us to zoom in on a particular atom in a specific local environment. The extreme sensitivity to local charge, spin and structural changes will allow us to study the interplay of charge, spin, orbital and lattice degrees of freedom in strongly correlated electron systems, and to investigate phenomena such as superconductivity, charge order, orbital order and various types of magnetism. The use of circularly polarized X-rays will enable a nanometre-scale study of magnetic structure in materials such as monolayer films and multilayers, the formation of magnetic domains and domain walls.

The X-ray Emission Spectroscopy (XES) endstation (below) is a synchrotron-based tool to study the electronic structure of new materials. Along with the spectrometer for soft X-ray emission spectroscopy (XES) and Resonant Inelastic X-ray Scattering (RIXS), the endstation also includes instrumentation for soft X-ray Absorption Spectroscopy (XAS). It will allow access to new information on chemical state, electronic structure or best possible synthesis of



experimental systems. This research will ultimately lead to novel devices like sensors with advanced and tailored optical, electronic, magnetic and catalytic properties.

The XES endstation sample chamber and load lock.



The RSXS Endstation Scattering Chamber