

X-ray Instruments in Space and on the Ground

Researchers at the Open University's Centre for Electronic Imaging (CEI) routinely apply their space instrumentation expertise to complex terrestrial applications.

The Paul Scherrer Institute (PSI) in Switzerland is one of Europe's largest research centres for natural and engineering sciences. Every year PSI's complex and large-scale research facilities support over 2200 scientists in their quest to better understand the structure and properties of matter and materials from the world around us.

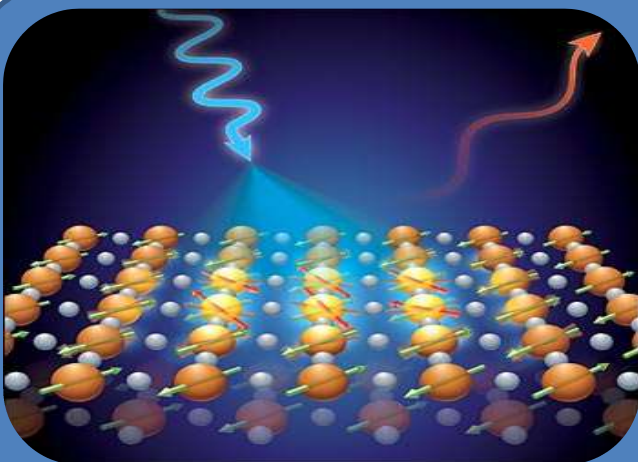
A world-leading facility at PSI is the Super Advanced X-ray Emission Spectrometer (SAXES) that uses a Charged-Coupled Device (CCD) camera to perform Resonant Inelastic X-ray Scattering (RIXS), a technique that probes the electronic and magnetic properties of materials.

A desire by PSI researchers to increase the performance of SAXES led to collaboration

with OU researchers who were able to do just that, using know-how developed through years of instrument development for space-based X-ray astronomy missions.

Following proof of principle experiments, a 200% performance boost to the spectrometer is predicted by applying new Electron Multiplying-CCD (EM-CCD) technology in combination with advanced data processing techniques. This will result in researchers getting a much 'clearer' image of the processes occurring in the materials that they are investigating.

With OU researchers having demonstrated these improvements, PSI has initiated an upgrade of the SAXES camera system with UK companies selected to develop and supply it.



Resonant Inelastic X-ray Scattering (RIXS)

RIXS is a powerful measurement technique used to probe the structure of matter. X-rays illuminate and interact with the material under investigation. By analysing how the X-rays change after scattering through the material, scientists can understand more about the underlying structure of the material.