



# Condensed Matter Physics Institute Seminar

13:00 | Friday 22nd April | P/T/111

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## Surface Analysis at Newcastle University: Past, Present and Future of the EPSRC XPS Mid-Range Facility

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Newcastle University hosts the EPSRC Mid-Range Facility for X-ray Photoelectron Spectroscopy (XPS), the National EPSRC XPS Users' Service (NEXUS). Since 2011 we have provided access to XPS instrumentation and support for UK academia and industry in all fields of science and engineering. We cover almost all aspects of photoelectron spectroscopy; X-ray, UV, angle-resolved, cryo and heating, imaging/mapping and more, with instruments that are very flexible towards different sample and surface sizes and geometries. Recently we have expanded to include time-of-flight secondary ion mass spectrometry (ToF-SIMS) and helium ion microscopy (HIM). HIM is a scanned ion probe technique that in many respects is very similar to that of the well-established scanning electron microscope (SEM). Fundamentally, however, the two differ by the fact that the HIM utilises a beam of He<sup>+</sup> ions generated from a gas field ion source (GFIS). This affords beam characteristics superior to that of an electron source; very low chromatic aberration, orders of magnitude higher brightness, greater depth of field, and an ultimate imaging resolution that is not diffraction limited. We are using the recently installed Zeiss ORION NanoFab HIM in conjunction with XPS and SIMS at NEXUS. This combination will enable an unprecedented view of the nanoscale surface, from the broad chemical functionality of the top 10 nm in XPS, to the highly spatial and surface sensitive molecular information from SIMS, and finally the sub-nanometre resolution images of the same surfaces from HIM.

This seminar will cover what techniques and instruments are available at NEXUS, some of the research we perform in-house, some of our collaborative research work, and the future for NEXUS and the Mid-Range Facility.