Phd Studentship in manipulating charge and spin ordering in quantum materials

Quantum materials exhibit novel phenomena arising from highly-correlated electron interactions. Among the emergent phenomena that arise from strong electronic interactions, the charge and spin ordering in doped Mott insulators has attracted great interest because of its relevance to colossal magnetoresistance and instabilities leading to metal to insulator transitions (MIT). Controlling the MIT in quantum materials holds great promise for a new generation of devices featuring higher energy efficiency and faster switching speeds.

In this project, the successful candidate will use resonant x-ray scattering (RXS) to explore and control charge and spin ordering in 3*d* Mott insulators. The student will have the exciting opportunity to develop an advanced instrumentation to control the properties of quantum materials using strain/current/voltage whilst concomitantly studying the spatial modulations of charge, spin and orbital degrees of freedom in these materials on the nanoscopic length scale. The PhD is to investigate how the fundamental properties of quantum materials, such as directionality of the charge/spin ordering, pinning properties, phase separation in thin film nickelates relates to the MIT close to a phase boundary.

In this collaboration with Dr Larissa Ishibe-Veiga at I06 Nanoscience beamline in Diamond Light Source (DLS) and Dr Robin Perry at the University College London, the student will be based full time at the Harwell campus in South Oxfordshire and will benefit from exceptional facilities of both DLS and UCL Crystal Growth laboratory situated at the ISIS neutron and muon spallation source. The position would benefit a highly motivated student with good understanding of condensed matter physics and an interest in developing advanced experimental skills.

Informal enquiries regarding the vacancy can be made to Robin Perry (robin.perry@ucl.ac.uk) or Larissa Ishibe-Veiga (larissa.ishibe-veiga@diamond.ac.uk)