

Understanding and utilising lattice mode couplings in perovskites

Nicholas Bristowe

Imperial College, in London

Perovskite-based materials exhibit a fascinating range of physical properties, including ferroelectricity, (anti)ferromagnetism, superconductivity and magnetoresistance. Many of these properties manifest due to the complex and subtle interplay between spin, charge, orbital and lattice degrees of freedom inherent to perovskites. Through the combination of symmetry analyses with first principles calculations, a microscopic understanding can help design perovskites with enhanced or even emergent properties. This talk will highlight a few examples where the coupling between lattice modes can play a major role in understanding structural, dynamical and electronic properties of perovskites for potential applications in ferroelectric and multiferroic memories, solar cells, or controllable thermal expansion ceramics.