

Resonant and non-resonant x-ray scattering studies of multiferroics

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Multiferroics are a class of strongly correlated electron systems that exhibit more than one primary ferroic order parameter simultaneously in a single phase [1]. Multiferroics have potential applications as actuators, switches, magnetic field sensors and high-density electronic memory devices [2]. In such materials there are strong correlations between the crystalline lattice, charge disproportionation, magnetism and orbital occupancy.

In this talk I will introduce the technique of resonant x-ray scattering in which resonantly enhanced scattering can be observed of superlattice reflections by tuning to appropriate absorption edges. Measurements using polarised x-rays can provide information about both the charge [3] magnetic [4] and orbital ordering [5], as well as minute atomic displacements [6]. More recently, magnetic scattering has been directly observed using non-resonant x-ray scattering [7], which is a more direct probe of magnetism. The talk will conclude with a discussion of how polarised non-resonant soft x-ray scattering can be used to determine the spin and orbital components of the magnetic moment in a complex solid.

References

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