

The role of high magnetic fields in understanding magnetoelectric coupling

I will review the work we've done at the NHMFL to explore and understand how magnetism and (ferro)electric polarization can couple together. This is most commonly studied in inorganic oxides and I will give a few examples. However recently we have explored new avenues towards creating magnetoelectric coupling in metal-organic frameworks, molecular compounds, and spin crossover complexes. I will review the intriguingly different types of magnetic order that are enabled by soft lattices and how they can be coupled to ferroelectricity. I may say something about superconductivity.