



Contribution ID: 353

Type: Poster

Magnetic structure and spin waves of the doped cobalt oxide $\text{La}_{2-x}\text{Ba}_x\text{CoO}_4$

Tuesday 21 March 2023 16:00 (2 hours)

The role of charge stripes in cuprate superconductors is not yet understood. The undoped cuprates are antiferromagnetic Mott insulators. A simple model is that doping disrupts the AFM order and the introduced holes form stripes, with the periodicity and values of charge stripes affected by dopant concentration x [1,2]. There is competition between different forms of charge and magnetic order, manifesting in tension between the pseudogap and superconducting phases. Insights into the spin and charge stripes may be gleaned from studying isostructural compounds that share the same parent phase as the cuprates, but remain insulating at low temperatures and over a wide range of dopant concentrations, such as the cobalt oxides [3]. Stripes in superconducting $\text{La}_{2-x}\text{Ba}_x\text{CuO}_4$ have been shown to be more stable than those found in $\text{La}_{2-x}\text{Sr}_x\text{CuO}_4$; hence, we have investigated $\text{La}_{2-x}\text{Ba}_x\text{CoO}_4$ as a candidate striped insulator. We studied crystals of $\text{La}_{2-x}\text{Ba}_x\text{CoO}_4$ at two dopant concentrations $x = 1/2$ and $x = 1/3$ using neutron scattering. We will present single crystal diffraction data from ILL D10 highlighting magnetic and possible charge order. Neutron time-of-flight data from the ISIS MERLIN instrument displays strong spin wave dispersion and we will compare this to the characteristic hour-glass dispersion of other cobalt oxides [3]. Finally, we will discuss the connection between charge stripes and hour-glass spin wave spectra.

References

- [1] Tranquada, J.M., Adv. Phys. 69 437 (2020)
- [2] Emery, V.J., Kivelson, S.A., and Tranquada, J.M., PNAS 96 8814 (1999)
- [3] Boothroyd, A.T. et al., Nature 471 341 (2011)

Author: TOBIN, Siobhan (University of Oxford)

Presenter: TOBIN, Siobhan (University of Oxford)

Session Classification: Poster session TUESDAY

Track Classification: Magnetism, Superconductivity, Topological Systems, Magnetic Thin Films and other electronic phenomena