

# Oral Contributions

## **[MS35] Magnetic materials and in-situ studies under magnetic fields**

***Co-Chairs: Roger Johnson (UK), Jörg Stempfer (DE)***

### **[MS35-01] Direct observation of charge density wave order, competing with superconductivity in YBCO, revealed by high magnetic fields**

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The  $\text{YBa}_2\text{Cu}_3\text{O}_y$  family of high temperature superconductors (HTSs) is a very well-studied materials known. Despite this, YBCO and other HTSs have proven frustratingly hard to understand. Not only the mechanism of superconductivity, but also the origin of properties such as the “pseudogap” phase remaining unresolved. The notion of competing order is central to many theories of unconventional superconductivity, where superconductivity emerges on tuning between phases governed by much larger energy scales. An example of this is the widely-discussed “stripe order” observed in some HTSs and related compounds [1]. It is important to know if this tendency towards stripes is a generic property of cuprates. In the last year or two, evidence has emerged of an incommensurate charge density wave (CDW) lattice modulation in  $\text{YBa}_2\text{Cu}_3\text{O}_y$ , initially from NMR in high fields [2], and then by direct observation with hard [3,4] and soft x-rays [5,6]. In this talk, I will present recent results on the hard x-ray diffraction studies of the CDW, discuss the relationship with other experimental probes, including quantum oscillation and ultrasound measurements, and consider the relationship between charge and spin order.

#### **References:**

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[5] G. Ghiringhelli et al., Science 337, 821 (2012).

[6] S. Blanco-Canosa et al., arXiv:1212.5580.