

Poster-1-16

**Weak ferromagnetism linked to the high-temperature spiral phase of
YBaCuFeO5**

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Frustrated magnets with spiral magnetic phases are currently intensively studied owing to their ability for inducing ferroelectricity. This could potentially be exploited in spintronics and low power memories devices.[1-2] However, the low magnetic order temperatures (typically < 100 K) in most of frustrated magnets greatly restrict their fields of application. An additional disadvantage is that most of them are antiferromagnetic, making the reading and controlling the spiral chirality directly related to the electric polarization quite challenging. Recently, materials design strategies based in the chemical disorder and lattice control of the magnetic interactions lead to spectacular progress in this direction, allowing to tune the stability range of the spiral phases in Cu/Fe layered perovskites AA'CuFeO5 far beyond RT.[3-5] However, the influence of magnetic field on the magnetic structures especially spiral phases, imperative for further cross-control of the magnetic and ferroelectric orders, is barely known. Here, we report a comprehensive description of the evolution of magnetic order in the layered perovskite YBaCuFeO5 under the application of magnetic fields up to 9 T and at temperatures between 1.5 K and 300 K. Using bulk magnetization measurements and neutron powder diffraction we could reveal the presence of three distinct magnetic phases within this H-T range. More importantly, our investigation uncovers the presence of weak ferromagnetism exclusively that coexists with the spiral modulation, suggesting a significant degree of coupling between the two types of orders. Given that the weak ferromagnetism component can be switched with modest magnetic fields, this result offers new perspectives for the manipulation of the spiral orientation, directly linked to the polarization direction, as well as a possible future use of this material in technological applications. [6]

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