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Multiferroicity in Cu_2OSeO_3?[1] EUGEN RUFF, STEPHAN KROHNS, Experimental Physics V, Center for Electronic Correlations and Magnetism, University of Augsburg, 86159 Augsburg, Germany, HELMUTH BERGER, Institute of Physics of Complex Matter, EPFL, CH-1015 Lausanne, Switzerland, PETER LUNKENHEIMER, ALOIS LOIDL, Experimental Physics V, Center for Electronic Correlations and Magnetism, University of Augsburg, 86159 Augsburg, Germany
— Topological spin textures in solids are in the focus for applications in future spin-electronic technology, like high-density magnetic storage devices. Prominent materials are metallic alloys with B20 structure, such as MnSi [1], where skyrmions, vortex-like objects of nanometer scale, have been experimentally detected. In these materials, it is well known that low currents can drive skyrmion switching. In contrast, the discovery of magnetoelectric skyrmions in an insulating chiral-lattice magnet Cu_2OSeO_3 leads to another promising route to electric control [2]. This system is suggested to carry a local electric dipole, which implies that the skyrmions should be controllable by the external electric field without losses due to joule heating. Here we provide a thorough analysis of the magnetic and polar phases, using SQUID and pyrocurrent measurements. In order to investigate the possible ferroelectric properties of Cu_2OSeO_3, we have performed dielectric spectroscopy in various magnetic fields in a broad frequency range below 70 K. Combining all these different techniques, we address the question whether Cu_2OSeO_3 is magnetoelectric or multiferroic.

[1] S.Mühlbauer *et al.*, Science **323**, 915 (2009).
[2] S.Seki *et al.*, Science **336**, 198 (2012).

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