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Cu3Nb2O8: A Multiferroic with Chiral Coupling to the Crystal Structure ROGER JOHNSON, Clarendon Laboratory, Department of Physics, University of Oxford, Oxford, OX1 3PU, United Kingdom, SUNIL NAIR, IISER Pune, Sai Trinity Building, Garware Circle, Sutarwadi, Pashan, Pune, Maharashtra 411021, India, LAURENT CHAPON, Institut Laue-Langevin, BP 156X, 38042 Grenoble, France., ALESSANDRO BOMBARDI, CARLO VECCHINI, Diamond Light Source, Harwell Science and Innovation Campus, Didcot, OX11 0DE, United Kingdom, D. PRABHAKARAN, ANDREW BOOTHROYD, PAOLO RADAELLI, Clarendon Laboratory, Department of Physics, University of Oxford, Oxford, OX1 3PU, United Kingdom — We will present recent bulk properties, neutron powder diffraction, and non-resonant x-ray diffraction measurements on a new multiferroic material, $Cu_3Nb_2O_8$. We demonstrate than an electric polarization evolves simultaneously with a generalised helicoidal magnetic ordering. Contrary to conventional models of multiferroicity, the electric polarization was found to lie perpendicular to the common rotation plane of the magnetic moments. We present a new model applicable to a specific class of crystals; those that support a macroscopic "ferroaxial" vector and adopt a helicoidal magnetic structure. Our new interpretation, which may explain the multiferroic properties of a number of systems reported in recent literature, is based upon the well-understood inverse Dzyaloshinskii-Moriya interaction, but requires an altogether different interpretation.

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