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Title

Low-temperature evolution of the modulated magnetic structure in the ferroelectric antiferromagnet BiFeO₃

Source

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Abstract

High-resolution time-of-flight neutron diffraction studies of the magnetic ordering in the multiferroic BiFeO₃ are presented. Our results show that the cycloidal modulated ordering proposed earlier [I. Sosnowska, T. Peterlin-Neumaier, and E. Steichele, J. Phys. C 15, 4835 (1982)] is stable between 10 and 295 K. The concept of the anharmonic character of the magnetic modulation in BiFeO₃ that was used for the interpretation of NMR, Raman, and THz spectroscopy studies of BiFeO₃ is discussed. The influence of the anharmonic modulation on the magnetic contributions to the BiFeO₃ neutron diffraction patterns is presented. Our experimental data can be described by assuming anharmonic effects with m<0.25. We propose a method for the anharmonicity strength evaluation based on neutron diffraction data. (31 References).