

Abstract Submitted
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Anomalous low-temperature magnetic ordering and spin-phonon coupling in BiFeO₃ thin films MANOJ SINGH, Department of Physics and Institute of Functional Nano Materials, University of Puerto Rico, PR,USA , RAM KATIYAR, Department of Physics and Institute of Functional Nano Materials, University of Puerto Rico, PR, USA , W. PRELLIER, Laboratoire CRISMAT, CNRS , ENSICAEN, Caen Cedex, France, H.M. JANG, Department of Materials Science and Engineering , Pohang University of Science and Technology, Pohang, Korea, W. PRELLIER COLLABORATION, H. M. JANG COLLABORATION, RAM S. KATIYAR TEAM — Low-temperature magnetic properties and Raman spectra of epitaxial BiFeO₃ (BFO) thin films grown on (111) SrTiO₃ substrates have been studied. Zero-field-cooled (ZFC) and field-cooled (FC) magnetization curves showed a large discrepancy beginning at a characteristic temperature which did depend on the magnetic-field strength, suggesting a spin-glass-like behavior of the epitaxial BFO film with R3c symmetry. For all three major A₁-symmetry Raman modes (138, 170, and 214 cm⁻¹), there was a good linear correlation between the mode-frequency softening and the square of the in-plane magnetization in the temperature range between 80 and 300 K. These observations were ascribed to the spin-phonon coupling below the Néel temperature ($T_N = 643$ K).

Manoj Singh
Dept. of Physics and Institute of Functional Nano Materials,
University of Puerto Rico, PR,USA

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