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### Title

X-ray Dichroism Studies of Multiferroic BiFeO<sub>3</sub> (110) Thin Films

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### **X-ray Dichroism Studies of Multiferroic BiFeO<sub>3</sub> (110) Thin Films.**

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BiFeO<sub>3</sub> (BFO) has attracted a great deal of recent attention due to the fact that it is the only single phase room temperature multiferroic currently known. Not only does it have applications as a lead-free replacement for ferroelectric memory cells and piezoelectric sensors, but its interactions with other materials are now attracting a great deal of attention. Its multiferroic nature has potential in the field of exchange bias, where it could allow electric-field control of the ferromagnetic (FM) magnetization. In order to understand this coupling, an understanding of the magnetization in BiFeO<sub>3</sub> is necessary. Temperature dependent x-ray absorption measurements allow decoupling of the two order parameters, ferroelectric and magnetic, contributing to BFO's dichroic signal. Careful analysis of the angular dependence of linear spectra allow determination of magnetic directions in BiFeO<sub>3</sub> (110) films, which feature only one or two polarization directions.

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