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Scanning probe imaging of coexistent ferroelectricity and ferromagnetism in thin films of room temperature multiferroics. V.R. PALKAR, S.C. PURANDARE, J. JOHN, S. GOHIL, S. BHATTACHARYA, Tata Institute of Fundamental Research, Mumbai-5, India, DEPARTMENT OF CONDENSED MATTER PHYSICS AND MATERIALS SCIENCE COLLABORATION — Scanning probe imaging methods, both piezoresponse and magnetic force types, are used to study domain patterns in thin films of room temperature multiferroics. The results demonstrate coexistence of the two order parameters in microscopic scale and rules out macroscopic phase separation. Furthermore, a tapping mode technique is shown to yield information of both order parameters allowing simultaneous observation of both types of domain structures. Prospects of imaging possible coupling between the two order parameters, as seen in bulk measurements, will be discussed.

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