

# **Spatially Resolved Spectroscopic Mapping of Polarization Reversal in Polycrystalline Ferroelectric Films: Crossing the Resolution Barrier**

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Abstract: The mesoscopic reversible and irreversible polarization dynamics in polycrystalline PZT thin film capacitors are studied using local spectroscopic mapping and macroscopic first-order reversal curve measurements. The transition from a regime of short range domain wall motion to the formation of mesoscopic clusters to complete switching is observed. The fractal dimension of the clusters is consistent with the random-bond disorder model. The combination of macroscopic and local measurements allows the characteristics length scales corresponding to the transition from Rayleigh to Preisach behaviors and onset of macroscopic averaging to be determined.