

## **Domain Wall Motion Across Various Grain Boundaries in Ferroelectric Thin Films**

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Domain wall movement at and near engineered 10°, 15°, and 24° tilt and 10° and 30° twist grain boundaries was measured by band excitation piezoresponse force microscopy for Pb(Zr,Ti)O<sub>3</sub> films with Zr/Ti ratio of 45/55 and 52/48. A minimum in nonlinear response was observed at the grain boundary for the highest angle twist and tilt grain boundaries, while a maximum in nonlinear response was observed at the 10° tilt grain boundaries. The observed nonlinear response was correlated to the domain configurations imaged in cross section by transmission electron microscopy.