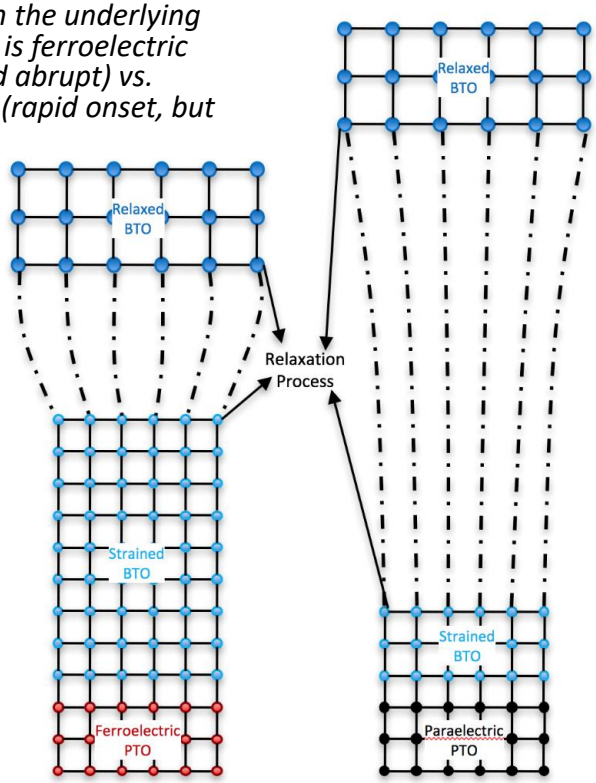
A New Approach To Engineering Thin Films

The schematic depicts the modified relaxation of strain in $BaTiO_3$ when the underlying $PbTiO_3$ layer is ferroelectric (delayed and abrupt) vs. paraelectric (rapid onset, but gradual).



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Work was performed in part at Brookhaven National Laboratory

Scientific Achievement

Scientists used polarization to engineer the properties of ferroelectric thin films during growth.

Significance and Impact

Ferroelectric thin films have applications in ferroelectric memory based on a capacitor or ferroelectric field effect transistor; this work offers a complementary pathway to engineer these films.

Research Details

- *In situ* x-ray diffraction was performed at the ISR beamline at NSLS-II to gain insights into the mechanism of growth through polarization.
- Thin films characterization was also performed with piezoforce microscopy and electrical characterization.
- Experimental data and modelling of the changes in growth suggest that changes are driven by the energy cost for the top layers to sustain the polarization induced by the underlying layers.