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Magnetic Field Control of Ferroelectric Domain Memories in Multiferroic BTO/CFO Janus Nanofibers. SABA ARASH, BRYAN CHAVEZ, Department of Physics and Astronomy, University of South Carolina, MATTHEW BAUER, JENNIFER S. ANDREW, Department of Materials Science Engineering, University of Florida, THOMAS CRAWFORD, YANWEN WU, Department of Physics and Astronomy, University of South Carolina — Composite multiferroic (MF) materials such as BTO-CFO Janus nanofibers with high magnetoelectric coupling coefficient at room temperature are potentially promising candidates for a new generation of memory devices. To perceive how the memory evolves in each constituent phase of this specific geometry, it is crucial to develop an understanding of the magnetoelectric coupling dynamics in these composite MF materials. Here we demonstrate and analyze the optical read-out of electric domains in non-magnetic BTO using a magnetic polarization-resolved second harmonic generation measurement technique. We also propose a physical interpretation explaining how the electric domains can be well predicted and controlled by a magnetic field. The demonstration of these memory dependent changes in these nanofiber ensembles represents a major step toward the practical nanoscale MF memory devices.

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