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**Epitaxial Growth and Characterization of Iron Chalcogenide/Bismuth Chalcogenide Heterostructures** THOMAS FLANAGAN, ABHINAV KANDALA, JOON SUE LEE, SUSAN E. KEMPINGER, ANTHONY RICHARDELLA, NITIN SAMARTH, Pennsylvania State University — Heterostructures consisting of topological insulators (TIs) interfaced with superconductors and with ferromagnets have been predicted to give rise to phenomena of both fundamental and applied interest. With superconductors, the region of proximity-induced superconductivity should have $p_x+ip_y$ symmetry, and vortices in this region have been predicted to host Majorana modes, which may be useful as quantum bits. With ferromagnets, such phenomena as the topological magnetoelectric effect have been predicted. Iron chalcogenides, such as iron selenide and iron telluride, are ideal candidates for combining with TIs, since, with only minor changes to growth conditions, they can be superconducting, ferromagnetic, or antiferromagnetic. We describe the growth and characterization of heterostructures that combine thin films of the iron and bismuth chalcogenides, focusing on low temperature magnetoresistance measurements. Our measurements reveal a transient hysteretic magnetoresistance with surprisingly long relaxation times (minutes). This phenomenon appears to be a generic characteristic of all heterostructures that interface TIs with magnetic spins, albeit with structure-specific relaxation times. We discuss possible origins of this unusual phenomenon. Funded by ARO/MURI.

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