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Magnetic Force Microscopy of Magnetite Thin Films with Transition Metal Buffer Layers[1] ALFRED KH. LEE, MARK C. MONTI, JOHN T. MARKERT, ALEX DE LOZANNE, Department of Physics, The University of Texas at Austin, PRIYANGA B. JAYATHILAKA, CHRIS A. BAUER, CASEY W. MILLER, Physics Department, University of South Florida — Magnetite (Fe_3O_4) has been the subject of interest as a material for use in spin devices. Its ideal properties for this application break down in thin film morphologies due to the occurrence of antiphase boundaries (APBs). The density of APBs can be adjusted to some degree via film strain. This is accomplished in this work by including a variety of transition metal buffer layers between Fe_3O_4 and its MgO substrate. We investigate the microscale magnetic domain structure via magnetic force microscopy of Fe_3O_4 films on MgO with no, a Mo, or an Fe buffer layer across a temperature range surrounding the Verwey temperature ($T_V \sim 120$K) and compare to bulk measurements from a SQUID magnetometer.

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