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Sliding friction of thick and thin oxygen layers on spin crossover materials[1] ZACHARY B. FREDRICKS, K. M. STEVENS, DANIEL DOUGHERTY, JACQUELINE KRIM, North Carolina State University — Friction at the nanoscale is known to encompass phononic, electrostatic, conduction electronic and magnetic effects [1], with relatively little known about magnetic contributions to friction [2]. To probe such effects we have employed a quartz crystal microbalance technique to record the sliding friction associated with thin and thick films of solid and liquid oxygen, a paramagnetic material, atop nanoscale films of the spin-crossover material Fe[$(H_2Bpz_2)_2$bpy], which is diamagnetic at cryogenic temperatures and paramagnetic at room temperature. Previously these systems have been shown to be frictionally sensitive to the application of small fields, for Pb(111) substrates [3]. We observe changes in dissipation as well for Fe[$(H_2Bpz_2)_2$bpy], in response to externally applied magnetic fields. We will report our efforts to model the frictional interaction, which is reduced in the presence of a weak applied magnetic field, and is also observed to be temperature dependent. [1] I. Altfeder and J. Krim, J. Appl. Phys. (2012) [2] B. Wolter et al., PRL (2012) [3] M. Highland et al., PRL (2006)

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