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Tip-Sample Interactions in Magnetic Force Microscopy

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Poster Presentation 3

TIP-SAMPLE INTERACTIONS IN MAGNETIC FORCE MICROSCOPY

Bill Murphy and Gabriel Spalding*, Department of Physics, IWU

This project presents approaches to studying the characteristics of interactions between magnetically polarized tips and ferromagnetic samples in magnetic force microscopy. The effects of the field emanating from the tip on the sample have been studied extensively. My work presents quantitatively the effect of the field emanating from the sample on the polarization of the tip, a novel approach to the study of tip-sample interaction. I consider several geometric models for the tip. The magnetic field that I am considering is emanating from samples of different geometrical shape and varying magnetic properties. I present results for different directions of sample magnetization and also different directions of initial tip magnetization. I demonstrate the change in magnetic polarization of the tip due to the sample stray field using a method of successive approximations and present a quantitative model to be explored experimentally. I also present images displaying magnetic force interactions between a magnetically polarized tip and a ferromagnetic sample.