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Magnetic Anisotropy of GaAs/Fe/Au Core-Shell Nanowires Grown by MBE KRITSANU TIVAKORNSASITHORN, RICHARD PIMPINELLA, VU NGUYEN, XINYU LIU, MALGORZATA DOBROWOLSKA, JACEK FURDYNA, Department of Physics, University of Notre Dame — In order to increase the storage density of magnetic memories while maintaining thermal stability, new types of recording media and technologies need to be explored. In this context, perpendicular recording geometry is among the most attractive ideas. In this work we demonstrate a novel method of fabricating such perpendicular media, in the form of GaAs/Fe/Au core-shell nanowires (NWs) grown by molecular beam epitaxy on GaAs(111)B substrates. Scanning electron microscopy images show that the Fe shell has successfully coated the sidewalls of GaAs nanowires. Magnetic anisotropy of GaAs/Fe core-shell NWs was studied by ferromagnetic resonance and by superconducting quantum interference device (SQUID) magnetometry. Our results show that the magnetic anisotropy of this novel core-shell NW system cannot be simply described by any known theory, as revealed by our attempts to perform micromagnetic simulation using the object oriented micromagnetic framework (OOMMF). The observed features thus suggest the existence of a domain structure that is specific to this new system. We will now attempt to identify the domain structure of this complex system by magnetic force microscopy.

Kritsanu Tivakornsasithorn
Department of Physics, University of Notre Dame

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