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**Magnetic properties of nano-patterned GaMnAs films grown on ZnCdSe buffer layers**[1] SINING DONG, XIANG LI, VASILY KANZYUBA, TAE-HEE YOO, XINYU LIU, MALGORZATA DOBROWOLSKA, JACEK FURDYNA, Physics Department, University of Notre Dame — Magnetic semiconductor nanostructures are attracting intense attention, both because of their fundamental physical properties, and because of the promise which they hold for building smaller, faster and more energy-efficient devices. In this study we report successful MBE growth of GaMnAs films on the GaAs (100) substrates with ZnCdSe buffer layers, which results in perpendicular magnetic easy axis in the GaMnAs films. The GaMnAs/ZnCdSe films have been etched into nano-stripe shapes with various widths below 200nm by e-beam lithography, which resulted in a new geometry of interest for perpendicular magnetic recording. Magnetic anisotropy of as-grown GaMnAs films and nano-stripes was then studied by SQUID magnetometry. The results indicate that the GaMnAs films consist of magnetic domains with magnetization normal to the film plane, having rather high coercivety, which survives after nanofabrication. This is also confirmed by the dynamics of the domain motion as shown by AC susceptibility measurements. These findings are of interest for understanding the magnetic anisotropy mechanisms in GaMnAs and its domain structures, as well as for designing of nano-sized spintronic devices which require hard ferromagnetic behavior with perpendicular easy axes.

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Xiang Li
Physics Department, University of Notre Dame

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