

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

2D patterned ferromagnetic semiconductors for planar spintronics ROUIN FARSHCHI, IAN SHARP, MIKE SCARPULLA, EUGENE HALLER, OSCAR DUBON, Univ. of California, Berkeley, CA 94720, Berkeley Lab, Berkeley, CA 94720, JEFFREY BEEMAN, Berkeley Lab, Berkeley, CA 94720, SOONJOO SEO, PAUL EVANS, Univ. of Wisconsin, Madison, WI 53706 — Fabrication of III-Mn-V ferromagnetic semiconductors by way of Mn ion implantation followed by pulsed laser melting (II-PLM) allows for the unique possibility of lateral patterning using optical and e-beam lithography. We have performed II-PLM on resist patterned substrates to create isolated ferromagnetically active $\text{Ga}_{1-x}\text{Mn}_x\text{As}$ regions embedded in a GaAs substrate. We have prepared a uniform $\text{Ga}_{1-x}\text{Mn}_x\text{As}$ film as well as a sample patterned with an array of Mn^+ -implanted $100\mu\text{m} \times 100\mu\text{m}$ squares that covers the equivalent of one-quarter the sample. The saturation magnetization of the patterned sample reflects this one-quarter implant area, and both samples display a T_C of ~ 100 K suggesting a similar maximum Mn concentration. The electrical and magnetic properties of this and other lateral structures consisting of sub-micron spaced active regions will be presented. This work was supported by the U.S. Department of Energy under contract No. DE-AC02-05CH11231.

Rouin Farshchi
Dept. of Materials Science and Engineering, Univ. of California, Berkeley, CA 94720

Date submitted: 30 Nov 2005

Electronic form version 1.4