

Abstract Submitted  
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**Magnetic patterning of GaMnAs layers by hydrogen passivation**

L. THEVENARD, A. LEMAITRE, G. FAINI, Lab. Photonique et Nanostructures, N. VERNIER, J. FERRE, Lab. Physique des Solides, S. FUSIL, UMR CNRS Thales — In order to study the magnetic switching behavior of diluted magnetic semiconductor (DMS) microstructures, we have patterned thin layers of (Ga,Mn)As by an original method. We have used local hydrogen passivation to locally suppress the carrier-mediated ferromagnetic phase. This purely diffusive process maintains the continuity of the film and smoothes border effects. Two types of structures were examined by Kerr microscopy, and their magnetic behavior compared to that of structures made by dry etching<sup>1</sup>. On hydrogenated arrays of micron-sized magnetic dots, the switching fields were closer to the continuous film coercivity, and with a smaller dispersion. On micron-wide magnetic stripes, current-induced domain wall (DW) propagation was observed with typical currents as low as  $j = 4 \cdot 10^5 \text{ A.cm}^{-2}$ , a result of the low edge roughness induced by the patterning, and the low density of magnetic atoms. Local hydrogen passivation therefore appears as a viable route towards lower injection currents in DMS spintronics devices based on DW manipulation. <sup>1</sup>L. Thevenard et al., Appl. Phys. Lett. 91, 142511 (2007)

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