MAGNETIC ANTIDOTS: FABRICATION, CHARACTERIZATION AND APPLICATIONS

José Miguel García-Martín

IMM-Instituto de Microelectrónica de Madrid CNM-CSIC Isaac Newton 8, PTM,

E-28760 Tres Cantos Madrid, Spain

Magnetic Antidots, i.e. arrays of nanoholes in ferromagnetic thin films, have attracted a great deal of interest over the last few years due to their peculiar magnetic behavior. There are three properties that make these systems exceptional: i) the magnetic material is continuous, i.e. there is no isolated magnetic volume, and as a consequence no superparamagnetic limit would appear that would limit the capability of these systems for applications in for magnetic storage of information; ii) the hole diameter is of the same order of magnitude than the domain walls that separate regions with uniform magnetization (the so-called magnetic domains), therefore the holes (antidots) pin such walls and finally determine the magnetization reversal (i.e. coercivity) mechanism; iii) surface plasmon resonances associated to the holes can be excited, strongly localizing the electromagnetic field and as a result increasing the magneto-optical activity. From an industrial viewpoint, these fundamental properties can be exploited in several applications: high-density storage media [1,2], magnonic crystals with potential application in microwave devices [3,4], advanced sensors based in magneto-resistance [5] and magnetically-active plasmonics [6,7].

In the *Magnetic Antidots* project (ref.: i-Link 0783) we prepare magnetic antidot arrays by using two different routes based on Physical Vapor Deposition (PVD) techniques (mainly magnetron sputtering and thermal evaporation).

Short CV

Dr. **José Miguel García-Martín** received his PhD from the Complutense University (Madrid, Spain) in 1999, for his work on magnetic nanowires and microtubes. He then moved to the Solid -State Physics Laboratory (Orsay, France) with an individual Marie Curie fellowship, where he studied magnetic nanostructures using magnetic force microscopy (MFM) and micromagnetic simulations. He joined the Institute of Microelectronics (Madrid, Spain) in 2003 with a "Ramon y Cajal" contract, where he became in 2006 a Tenured Researcher of the Spanish Research Council (CSIC) working within the “Fabrication and characterization of nanostructures” department. He has wide experience in sample growth using physical deposition techniques such as e-beam deposition and magnetron sputtering. He is an expert in scanning probe microscopy techniques, especially AFM and MFM, and in magnetic characterization and modeling. He is now leading the international project “Magnetic Antidots” with partners in Chile (USACH), Brazil (UNICAMP) and Greece (Demokritos Institute). He has co-authored 67 articles and one book chapter, with about 1800 citations to his works, and has given 14 invited conferences. His h-index is 23.

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