Abstract Submitted for the MAR12 Meeting of The American Physical Society

Effect of the exchange bias field on the magnetoimpedance response in multilayered FeNi-IrMn films and CoFeSiB-IrMn ribbons KERIM TURE, MEHMET YUMAK, GULEN AKTAS, Bogazici University, Department of Physics, JUAN MANUEL FLOREZ, Department of Materials Science and Engineering, MIT, PATRICIO VARGAS, Departamento de Fisica, Universidad Técnica Federico Santa Mara, CAROLINE A. ROSS, Department of Materials Science and Engineering, MIT, CARLOS GARCIA, Bogazici University, Department of Physics — The magnetoimpedance effect (MI) has been widely used in sensitive magnetic field (MF) sensors, but its intrinsic nonlinear properties are disadvantageous for sensor applications near zero field. The combination of ferromagnetic (FM) and antiferromagnetic (AFM) layers produce an asymmetrical MI (AMI) peak positions which are shifted to higher MF as the probe frequency increases, so linear MI behavior can be obtained around zero external field by tuning the frequency. Here, AMI was extensively studied in multilayer strips of exchange-coupled FeNi-IrMn. The effect of the thickness of the FM layer and the angle dependence in three stripe samples with EB induced; parallel, perpendicular and forming an angle of 45 with the direction of the wire were studied. MI ratio raise with increasing thickness of the FM layer is attributed to the stronger pinning of the FM adjacent to the IrMn. Also, a combination of the EB angle affects and direction of the applied MF can tune; the number of peaks in the MI response, the asymmetry between peaks and the shift of the MI response. Besides, an antiferromagnetic layer was deposited on the top of CoFeSiB amorphous ribbons enhancing the MI effect at low frequencies and shifting the MI response at higher frequencies.

> Kerim Ture Bogazici University, Department of Physics

Date submitted: 08 Dec 2011

Electronic form version 1.4