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Spin-Diffusion Lengths in Ag(4%Sn) and Cu(2%Ge) alloys¹

AMIT SHARMA, BRANDON RICHARD, QUINTON FOWLER, REZA LOLOEE, WILLIAM PRATT JR., JACK BASS, Michigan State University — Alloying Ag with a little Sn, or Cu with a little Ge, greatly increases elastic scattering of electrons—i.e., greatly decreases the electron mean-free-path (mfp), but does not produce much spin-flipping—i.e., leaves the electron spin-diffusion length, l , relatively long. Thus, dilute AgSn and CuGe alloys were used to study effects of changing the mfp on current-perpendicular-to-plane (CPP) magnetoresistance [1] and current-induced magnetization switching (CIMS) [2], while leaving spin-flipping weak. Published transport data in dilute AgSn and CuGe alloys give only lower bounds for l [3-5]. We find $l = 34 \pm 4$ nm for Ag(4%Sn) and $l = 125 \pm 10$ nm for Cu(2%Ge). [1] K. Eid et al., *J. Magn. Magn. Mat.* **224**, L205 (2001). [2] N. Theodoropoulou et al., *Phys. Rev. B* (rapid comm.) in press. [3] S.-F.Lee et al., *J. Magn. Magn. Mat.* **118**, L1 (1993). [4] J. Bass et al, *Mat. Sci. and Eng.* **B31**, 77 (1995). [5] J. Bass and W.P. Pratt Jr., *J. Phys. Cond. Matt.* **19**, 183201 (2007).

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