Abstract Submitted
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Point-contact study of soft magnetic CoSiBFeNb amorphous alloys[1] HEIDI SEINIGE, CHENG WANG, University of Texas at Austin, USA, VALERII TSOI, Institute of Solid State Physics, Chernogolovka, Russia, MAXIM TSOI, University of Texas at Austin, USA — We study magnetotransport in nanoscale point contacts to soft magnetic CoSiBFeNb ribbons. Such ultrasoft amorphous alloys attracted considerable attention previously because they exhibit Giant Magnetoimpedance (GMI) effect - large variations in the electrical impedance as a function of an external magnetic field [see, for instance, M.-H. Phan, H.-X. Peng, Prog. Mater. Sci. 53, 323 (2008) and references therein]. GMI is attributed to the field-induced variations in alloy permeability and has been established through ac measurements on bulk samples which revealed a strong dependence on ac frequency and amplitude but did not show any variations in dc resistance at all. In our experiments, we use nanocontacts to probe magnetotransport in amorphous CoSiBFeNb at the nanoscale. We use point contacts to inject both ac and dc currents into the alloy ribbons prepared by a melt-spinning technique. Measurements with ac currents revealed GMIs similar to those in macroscopic samples. Interestingly, we also observe a dc magnetoresistance which may be attributed to magnetic domain reorientations in a small contact region. Effects of high dc densities on the magnetoresistance are discussed in terms of spin-transfer torque (STT) effect. We thank A. Serebryakov for providing ribbon samples.

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