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Current-induced magnetization switching of a three terminal perpendicular magnetic tunnel junction by spin-orbit torque[1] MURAT CUBUKCU, MARC DROUARD, OLIVIER BOULLE, SPINTEC, UMR CEA/ CNRS, Grenoble, F-38054, KEVIN GARELLO, Departement of Materials, ETH Zurich, Switzerland, IOAN MIHAI MIRON, SPINTEC, UMR CEA/ CNRS, Grenoble, F-38054, JUERGEN LANGER, BERTHOLD OCKER, Singulus technologies, Germany, PIETRO GAMBARDELLA, Departement of Materials, ETH Zurich, Switzerland, GILLES GAUDIN, SPINTEC, UMR CEA/ CNRS, Grenoble, F-38054
— A current flowing in the plane of a magnetic multilayer with structural inversion asymmetry, such as $Pt/Co/AlO_x$, creates a torque on the magnetization [1]. This torque is due to the strong spin-orbit interaction present in such multilayers and can lead to fast magnetization reversal with a low writing energy [2]. We will present the first proof of concept of a perpendicular spin-orbit torque magnetic random access memory (SOT-MRAM) cell composed of a Ta/FeCoB/MgO/FeCoB magnetic tunnel junction. The basic write and read operations, i.e., the magnetization reversal by current injection in the Ta track and its detection using the high TMR signal, are demonstrated [3]. Our results open a path for the development of a novel class of three terminal MRAM combining fast, reliable and low energy writing. [1] I. M. Miron et al. Nature 476, 189 (2011) [2] K. Garello et al arXiv:1310.5586 (2013) [3] M. Cubukcu et al., arXiv:1310.8235 (2013)

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