Abstract Submitted
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Spin torque resonant vortex core expulsion for an efficient radio-frequency detection scheme V. CROS, A.S. JENKINS, R. LEBRUN, P. BORTOLOTTI, E. GRIMALDI, Unit Mixte de Physique CNRS/Thales, Univ. Paris-Sud, Univ. Paris-Saclay, S. TSUNEGI, H. KUBOTA, K. YAKUSHIJI, A. FUKUSHIMA, S. YUASA, Spintronic Research Center, AIST — It has been proposed by Tulaparkur et al.[1ref] that a high frequency detector based on the so called spin-diode effect in spin transfer oscillators could eventually replace conventional Schottky diodes, due to their nanoscale size, frequency tunability, and large output sensitivity. Although a promising candidate for ICT applications, the output voltage generated from this effect is consistently low. Here we present a scheme for a new type of spintronics-based high frequency detector based on the expulsion of the vortex core of a magnetic tunnel junction. The resonant expulsion of the core leads to a large and sharp change in resistance associated with the difference in magnetoresistance between the vortex ground state and the final C-state, which is predominantly in either the parallel or anti-parallel direction relative to the polariser layer [2]. Interestingly, this reversible effect is independent of the incoming rf current amplitude, offering a compelling perspective for a fast real-time rf threshold detector. REF : EU FP7 grant (MOSAIC No. ICT-FP7-317950 is acknowledged. [1] Tulapurkar et al. Nature 438, 339, [2] A.S. Jenkins et al., Nat. Nanotech (2015)

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