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Current-driven excitations in symmetric magnetic nanopillars M. TSOI, The University of Texas at Austin, J. Z. SUN, IBM T. J. Watson Research Center, S. S. P. PARKIN, IBM Almaden Research Center — An electrical current was shown to induce spin waves and reversal of magnetization in a ferromagnet. A typical experiment on current-driven excitation of a ferromagnet involves two single-domain thin film magnets separated by a nonmagnetic spacer. One magnet is hard and used to polarize the current while the spacer is thin enough for the polarized current to get through and excite the second free magnet. The free layer is generally thin compared to the hard one thus marking an intrinsic asymmetry of the phenomenon, i.e., for initially parallel magnetizations of the two magnets the current-driven excitation occurs only when electrons flow from the free magnet to the fixed one. In the present work we study experimentally the current-driven excitations in symmetric Co/Cu/Co nanopillars. In contrast to all the previous observations where current of only one polarity is capable of exciting a multilayer system saturated by an externally applied magnetic field, we observe that both polarities of the applied current trigger excitations in a symmetric multilayer [Phys. Rev. Lett. 93, 36602 (2004)]. This may indicate that in symmetric structures the current propels high-frequency magnetic oscillations in all magnetic layers. We argue, however, that only one layer is excited in our multilayers but, interestingly, currents of opposite polarities excite different layers. This hypothesis is supported by modeling the spin accumulation in symmetric magnetic multilayers.

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