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Switching behavior of a Stoner-Wohlfarth particle subjected to spin-torque effect[1] HUY PHAM, Advanced Materials Research Institute, University of New Orleans, DORIN CIMPOESU, AMRI, University of New Orleans, ALEXANDRU STANCU, "Al. I. Cuza" University, Faculty of Physics, Iasi 700506, Romania, LEONARD SPINU, AMRI, University of New Orleans — The concept of the "spin-transfer torque" proposed by Slonczewski and Berger offers a new way of controlling the magnetization reversal in ferromagnetic multilayer systems, which replaces the conventional method utilizing magnetic field. The novel technology is expected to reduce the switching time of magnetization as well as to increase the recording density of the magnetoresistive random access memories. In this paper the switching properties of a Stoner-Wohlfarth magnetic particles, subject to a continuous or short magnetic field pulses, and to a short current pulse are presented. The theoretical investigation of precessional motion is described by using phenomenological modified Landau-Lifschitz-Gilbert equation with a spin-transfer torque term included. The switching under the influence of spin transfer torque is discussed as a function of the applied field strength and direction, and also as a function of the length of the current pulse. The main goal is to determine the parameters of field pulse for that the fast and stable switching can be achieved.

[1]DARPA No. HR0011-07-1-0031/ Calculations performed on LONI

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