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Current dependence of spin-wave excitation by spin transfer in magnetic point contacts TUCKER HARTLAND, ANDREI ZHOLUD, RYAN FREEMAN, SERGEI URAZHDIN, Emory University — Spin transfer torque (STT) effect enables generation of spin waves in nanomagnetic systems, due to the transfer of angular momentum from spin-polarized electrical current to magnetization. The existing models are generally based on the assumption that all the spin wave modes can be excited by STT, irrespective of the energies of the scattered electrons [1]. We present low-temperature electronic spectroscopy measurements in various geometries of point contacts based on the GMR magnetic multilayers. Our measurements show anomalous dependence of resistance on the electrical current and on the magnetic field, indicative of the dependence of magnon generation rates on the energies of electrons involved in STT. This conclusion is further supported by the temperature dependence: the observed features disappear with increasing temperature, which is consistent with the thermal broadening of the electron energy distribution. We discuss the dependence of the observed effects on the geometry and structure of the magnetic systems, and the implications of these observations for our understanding of the current-induced magnetization dynamics in nanomagnetic systems. [1] J.C. Slonczewski Current-driven excitation of magnetic multilayers, J. Magn. Magn. Mat. 159, L1-L7 (1996)

Tucker Hartland
Emory University

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