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**Zero and low field magnetization dynamics in tapered nanopillar spin valves caused by micromagnetic structure** P.M. BRAGANCA, O. OZATAY, O.J. LEE, D.C. RALPH, R.A. BUHRMAN, Cornell University — Exciting spin-torque driven magnetization dynamics in a uniformly magnetized nanomagnet typically requires large magnetic fields and electric currents, both of which are undesirable for practical applications. Here, we show that by combining an angled sidewall and a low saturation magnetization material, such as permalloy (Py), in a simple nanopillar spin valve structure, a micromagnetic configuration can be established which is conducive to spin-torque excitation of magnetization dynamics in the absence of an external magnetic field. As verified by micromagnetic simulations, these magnetization oscillations occur in both nanomagnet layers of the spin valve due to a substantial out of plane magnetization component that is located at and near the ends of the tapered elliptical disks. For magnetic fields close to zero, the resultant giant magnetoresistance spectra show oscillations with peak frequencies between 5.2-6.5 GHz, and minimum linewidths on the order of 50 MHz.

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