SPIN TORQUE EFFECTS IN SPINVALVE NANO-CONTACTS WITH DIFFERENT FREE LAYERS

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In this work we will report on spin torque experiments on point contact devices patterned by a combination of UV and e-beam lithography on top of spin valve multilayers. These were sputter-deposited and have the following structure: Cu(25)/$Ir_{17}Mn_{83}$(15)/$Co_{70}Fe_{30}$(5)/ Cu(5)/free layer/Ta(2)/Au(3). Various free layers were used, namely $Co_{70}Fe_{30}$(2)/$Ni_{80}Fe_{20}$(5), $Co_{70}Fe_{30}$(5) and $Co_{40}Fe_{40}B_{20}$(5). The magnetic properties of the spin valves were optimized for large exchange bias of the bottom hard electrode and minimum magnetostatic coupling. The magnetoresistance in the current perpendicular-to-plane geometry is measured approximately 1 %. The magnetization precession is studied upon dc current excitation and applied magnetic field in the frequency domain, up to 20 GHz, as a function of the free layer composition and the shape and size of the contacts. The latter consist of single ellipses with an aspect-ration of 1 to 3 and short axis length of 10-100 nm, as well as arrays of ellipses. The results are compared with micro magnetic simulations using the OOMMF code.