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**Theory of spin Hall magnetoresistance and spin pumping in magnetic trilayers** SABURO TAKAHASHI, TAKAHIRO CHIBA, IMR, Tohoku University, Sendai 980-8577, Japan, YAN-TING CHEN, Delft University of Technology, 2628 CJ Delft, The Netherlands, GERRIT BAUER, IMR, Tohoku University, Sendai 980-8577, Japan; Delft University of Technology, 2628 CJ Delft, The Netherlands, — A theory of spin Hall magnetoresistance (SMR) and spin pumping in a trilayer system made from a metal N sandwiched between two ferromagnetic insulators FI is presented. The SMR, which is induced by the simultaneous action of spin-Hall and inverse spin-Hall effects, is sensitive to the relative orientation of magnetizations of the two FI layers. We demonstrate that SMR in the slightly canted magnetization configuration is greatly enhanced compared with SMR in the parallel configuration. Spin pumping is caused by applying an ac current to the N layer along the direction of parallel magnetizations, thereby generating the out-of-phase precession motion of magnetizations driven by out-of-phase ac magnetic fields. We demonstrate a giant enhancement of spin pumping induced by the out-of-phase precession motion of magnetizations, in which the pumped spin accumulation is greatly enhanced compared to that in the in-phase precession motion. The giant enhancement of spin pumping is discussed in relation to enhanced Gilbert damping.

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