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Detection of the spin injection into silicon by broadband ferromagnetic resonance spectroscopy RYO OHSHIMA, SERGEY DUSHENKO, YUICHIRO ANDO, Kyoto University, MATHIAS WEILER, STEFAN KLINGLER, HANS HUEBL, Walther-Meissner-Institute, TERUYA SHINJO, Kyoto University, SEBASTIAN GOENNENWEIN, Walther-Meissner-Institute, MASASHI SHIRAISHI, Kyoto University — Silicon (Si) based spintronics was eagerly studied to realize spin metal-oxide-semiconductor field-effect-transistors (MOSFETs) since it has long spin lifetime and gate tunability. The operation of n-type Si spin MOSFET was successfully demonstrated [1], however, their resistivity is still too low for practical applications and a systematic study of spin injection properties (such as spin lifetime, spin injection efficiency and so on) from the ferromagnet into the Si with different resistivity is awaited for further progress in Si spintronics. In this study, we show the spin injection by spin pumping technique in the NiFe(Py)/Si system. Broadband FMR measurement was carried out to see the enhancement of the Gilbert damping parameter with different resistivity of the Si channel. Additional damping indicated the successful spin injection by spin pumping and observed even for the Si channel with high resistivity, which is necessary for the gate operation of the device.
[1] T. Sasaki, M. Shiraishi et al., Phys. Rev. Appl. 2, 034005 (2014).

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