

Development of a Very High Sensitivity Magnetic Field Sensor Based on Planar Hall Effect

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Abstract : Hall bar magnetic field sensors based on planar hall effect were fabricated from permalloy (Ni-80Fe20) thin films grown by pulsed laser ablation. As large as 400% planar Hall voltage change was observed for a magnetic field sweep within ± 4 Oe, a value comparable with present day TMR sensors at room temperature. A very large planar Hall sensitivity of 1200 Ω/T was measured close to switching fields, which was not obtained so far apart from 2DEG Hall sensors. In summary, a highly sensitive low magnetic field sensor has been constructed which has the added advantage of simple architecture, good signal to noise ratio and robustness.

Keywords : planar hall effect, permalloy, NiFe, pulsed laser ablation, low magnetic field sensor, high sensitivity magnetic field sensor

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