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【836】Magneto-optical detection of the spin Hall effect in Pt and W thin films

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A charge current flowing through a nonmagnetic conductor induces a spin current perpendicular to both the current direction and the spin polarization due to the spin Hall effect (SHE). Due to the nature of the SHE, most spin accumulation detection methods rely on the utilization of adjacent ferromagnets. We report here the first direct measurement of the current-induced interfacial spin accumulation due to the SHE in Pt and W thin films by magneto-optical scanning Kerr microscopy. Our measurements, combined with first principle electronic structure calculations of the SHE and magneto-optic response of Pt and W, yield quantitative estimates of the spin Hall angle and spin diffusion length in nonmagnetic conductors.

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