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A voltage probe of the spin Hall effect[1] YURIY PERSHYN, MASSIMILIANO DI VENTRA, Department of Physics, University of California, San Diego, La Jolla, California 92093-0319, USA — The spin Hall effect does not generally result in a transverse voltage. We predict that in systems with inhomogeneous electron density in the direction perpendicular to main current flow, the spin Hall effect is instead accompanied by a transverse voltage. We find that, unlike the ordinary Hall effect, this voltage is quadratic in the longitudinal electric field for a wide range of parameters accessible experimentally. We also predict spin accumulation in the bulk and sharp peaks of spin Hall induced charge accumulation near the edges. Our results can be readily tested experimentally, and would allow the electrical measurement of the spin Hall effect in non-magnetic systems and without injection of spin-polarized electrons.
[1] Yu. V. Pershin and M. Di Ventra , J. Phys.: Cond. Matt. (in press), arXiv:cond-mat/0703310.

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