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Spin Hall Current Induced Edge-Spin Accumulation in Two-Dimensional Electron and Hole Systems KENTARO NOMURA, Department of Physics, University of Texas at Austin, JAIRO SINOVA, NIKOLAI SINITSYN, TOMAS JUNGWIRTH, JOERG WUNDERLICH, BERND KAETSNER, ALLAN MACDONALD — In spintronic devices, spin densities have traditionally been generated by external magnetic fields, circularly polarized light sources, or by spin injection from ferromagnets. Recently there has been considerable interest in a new strategy in which edge spin densities are generated electrically via the spin Hall effect. We have performed numerical studies on spin transport in two-dimensional systems with various spin-orbit interactions including both intrinsic and extrinsic effects. We find that the spin Hall current strongly depends on the character of the spin-orbit interactions. We address the relation between bulk spin currents and edge spin accumulations, and compare our results with recent experimental observations. K. Nomura, J. Sinova, N. A. Sinitsyn, A. H. MacDonald, Phys. Rev. B 72 165316 (2005). K. Nomura, J. Wunderlich, J. Sinova, B. Kaetsner, A. H. MacDonald, T. Jungwirth, to appear in Phys. Rev. B 72. J. Wunderlich, B. Kaetsner, J. Sinova, T. Jungwirth, Phys. Rev. Lett. 94, 047204 (2005).

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