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A differential spin current detection scheme[1] BRYAN HEMINGWAY, IAN APPELBAUM, Department of Physics and Center for Nanophysics and Advanced Materials, University of Maryland, College Park — We offer an alternative scheme to detect spin polarization of conduction electrons injected into a nonmagnetic metal or degeneratively doped semiconductor using transport to two oppositely polarized ferromagnetic metal contacts. We show that, as in the well-known spin injection problem, detection efficiency can be amplified by the addition of spin-selective tunneling barriers. Considering the appropriate geometry and achievable injection rates, we estimate that the differential current can be as high as 1-10?nA for reasonable design parameters. We will also discuss the realization of this detection scheme in laboratory set-ups.

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