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Tunneling planar Hall effect induced by Rashba states[1] TIMOTHY LEENEY, CHENGHAO SHEN, ALEX MATOS-ABIAGUE, State University of New York at Buffalo, BENEDIKT SCHARF, University of Regensburg, JONG E. HAN, IGOR ZUTIC, State University of New York at Buffalo — We investigate the effects of Rashba spin-orbit coupling (SOC) on tunneling across a magnetic barrier deposited on top of a two-dimensional electron gas. By performing numerical simulations of both longitudinal and transverse transport in tunneling four-terminal devices we show that the interplay between magnetism and SOC results in a sizable tunneling anisotropic magnetoresistance. The numerical calculations reveal that although considerable smaller, the recently proposed tunneling planar Hall effect [1] is not exclusive to topological insulators but can also emerge from topologically trivial Rashba states. Complementary model calculations are performed for a better physical understanding of the main trend observed in the numerical results.
[1] B. Scharf, A. Matos-Abiague, J. E. Han, E. M. Hankiewicz, and I. Zutic, Phys. Rev. Lett. 117, 166806 (2016).

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