

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin Resonance and dc Current Generation in a Quantum Wire¹

WAYNE SASLOW, VALERY POKROVSKY, Texas A&M University — In a quantum wire of degenerate semiconductor the effective spin-orbit field due to the Rashba and Dresselhaus interactions is independent of direction. A consequence is that at low temperatures there is a narrow spin resonance at low temperatures, even in the absence of an external magnetic field. Resonance absorption by linearly polarized radiation gives a dc spin current; resonance absorption by circularly polarized radiation gives a dc electric current or magnetization on the order of a pA. The resonance is typically in the terahertz region. Its heating effects may be observable if the wire is thermally isolated from the substrate. The amplitude of these effects is sensitive to the external magnetic field and to the gate voltage, thus suggesting technological applications.

¹This work was supported by the Department of Energy under grant DE-FG02-06ER46278.

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Date submitted: 29 Nov 2009

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