

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Spin relaxation near the metal-insulator transition: dominance of the Dresselhaus spin-orbit coupling PABLO I. TAMBORENEA, Universidad de Buenos Aires, GUIDO A. INTRONATI, Universidad de Buenos Aires, IPCMS U. Strasbourg, CEA Saclay, DIETMAR WEINMANN, RODOLFO A. JALABERT, IPCMS U. Strasbourg — We identify the Dresselhaus spin-orbit coupling as the source of the dominant spin-relaxation mechanism in the impurity band of a wide class of n-doped zincblende semiconductors. The Dresselhaus hopping terms are derived and incorporated into a tight-binding model of impurity sites, and they are shown to unexpectedly dominate the spin relaxation, leading to spin-relaxation times in good agreement with experimental values. This conclusion is drawn from two complementary approaches: an analytical diffusive-evolution calculation and a numerical finite-size scaling study of the spin relaxation time. Reference: G. A. Intronati, P. I. Tamborenea, D. Weinmann, and R. A. Jalabert, Phys. Rev. Lett. vol. 108, 016601 (2012).

Pablo I. Tamborenea
Universidad de Buenos Aires

Date submitted: 05 Nov 2012

Electronic form version 1.4