

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Selection rules of intervalley spin scattering in silicon and germanium JIAN-MING TANG, University of New Hampshire, MICHAEL E. FLATTE, University of Iowa, BRIAN T. COLLINS, University of New Hampshire — Manipulation of carrier spins in semiconductor devices requires long spin transport lengths and coherence times. The spin coherence times in silicon are known to be long at low temperature. Near room temperature, the intervalley spin scattering due to spin-orbit interaction becomes important relative to the intravalley acoustic scattering. We study spin flip processes in silicon and also in germanium. The selection rules for various intervalley scattering processes are analyzed. The spin-flip rate from the f processes is an order of magnitude larger than from the g processes.

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Date submitted: 20 Nov 2009

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