

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Tunability of spin lifetimes in strained silicon and germanium JIAN-MING TANG, BRIAN T. COLLINS, University of New Hampshire, MICHAEL E. FLATTE, University of Iowa — The spin lifetimes due to electron-phonon interactions in silicon and germanium are calculated using a sp^3 tight-binding model. Despite of the strong spin-orbit interaction in germanium, the spin lifetime in germanium is only about one order of magnitude shorter than what is in silicon. Near room temperature, the spin-flip scattering is dominated by the inter-valley f processes in silicon and by the inter-valley X processes in germanium. The inter-valley scattering processes can be suppressed by shifting the valley minima with strain. We show that the spin lifetimes can be enhanced by about an order of magnitude in both materials.

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Date submitted: 19 Nov 2010

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