

Abstract Submitted  
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**Theory of Temperature-dependent Spin Dynamics with Electron-Phonon Interaction** JIMMY HUTASOIT, TUDOR STANESCU, West Virginia University — We develop a theory of temperature-dependent spin dynamics in spin-orbit coupled semiconductors that includes the effects of electron-phonon interaction. A set of coupled kinetic equations for the spin density matrix are derived starting from the quantum Liouville equation. The spin-conserving and spin-flipping scattering terms due to electron-phonon interaction in the presence of spin-orbit coupling are derived explicitly using an effective low-energy Hamiltonian for the conduction and valence bands. From the solution of the kinetic equations, we extract the temperature dependence of spin transport and relaxation in various parameter regimes. In particular, we discuss the effect of electron-phonon interaction on the persistent spin helix lifetime.

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