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Spin-orbit interaction from low-symmetry localized defects in semiconductors[1] OLEG CHALAEV, G. VIGNALE, University of Missouri, MICHAEL FLATTÉ, University of Iowa — The presence of low-symmetry impurities or defect complexes in the zinc-blende direct-gap semiconductors (e.g. interstitials, Jahn-Teller distortions) results in a novel spin-orbit term in the effective Hamiltonian for the conduction band. The new spin-orbit interaction is proportional to the matrix element of the defect potential between the conduction and the valence bands. Because this interaction arises already in the first order of the expansion of the effective Hamiltonian in powers of $\Delta/E_g \ll 1$ (where Δ is the valence band spin-orbit splitting, and E_g is the band gap), its contribution to the spin relaxation time may exceed that of previously studied contributions, such as the Rashba term, even for moderate concentrations of low-symmetry impurities.

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Oleg Shalaev
University of Missouri

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