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Phonon-assisted coherent control of injected carriers in indirect bandgap semiconductors JULIEN RIOUX, FRED NASTOS, JOHN E. SIPE, Department of Physics and Institute for Optical Sciences, University of Toronto — Charge and spin currents can be generated in direct semiconductors by quantum interference between one- and two-photon absorption[1]. For semiconductors such as Si and Ge, optical injection of carriers over the indirect bandgap must be assisted by momentum transfer from phonon scattering. We consider the optical properties for such 1+2 photon processes in the presence of the electron-phonon interaction. The latter is modelled by acoustic deformation potential. Indirect transitions involve double Brillouin zone integrations, which are computed by a linearized tetrahedron method. We compare our results to those for bulk GaAs.

[1]M.J. Stevens, R.D.R. Bhat, A. Najmaie, H.M. van Driel, J.E. Sipe and A.L. Smirl, in *Optics of Semiconductors and Their Nanostructures*, edited by H. Kalt and M. Hetterich (Springer, Berlin, 2004), vol. 146 of Springer Series in Solid-State Sciences, p. 209.

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