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Indirect Optical Injection of Carriers and Spin in Silicon¹ JINLUO CHENG, Hefei National Laboratory for Physical Sciences at Microscale, University of Science and Technology of China, JULIEN RIOUX, JOHN SIPE, Department of Physics and Institute for Optical Sciences, University of Toronto — Degenerate two-photon indirect absorption in silicon is an important limiting effect on the use of silicon structures for all-optical information processing at telecommunication wavelengths. Optical injection of spins in silicon is potentially important for spintronics applications. We theoretically investigate one- and two-photon indirect absorption in silicon, using a pseudopotential description of energy band and the adiabatic bond charge model to describe phonon dispersion and polarization. Spin injection is calculated as well. We compare our results with experiments.

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John Sipe
Department of Physics and Institute for Optical Sciences, University of Toronto

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