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Optical orientation due to phonon-assisted indirect transitions in Silicon PENGKE LI, HANAN DERY, Department of Electrical and Computer Engineering, University of Rochester — We study the circular polarization of the photoluminescence due to phonon-assisted indirect optical transitions in Silicon. The band structure is calculated by empirical pseudopotential method with the spin-orbit interaction. Phonon modes are obtained by the adiabatic bond charge model and the Δ - Γ electron-phonon matrix elements are calculated within the rigid-ion approximation. We quantify the circular polarization of various phonon-assisted optical transitions and we show that the circularity of the dominant transverse phonon peaks is due to electrons from valleys perpendicular to light propagation.

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