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Effects of spin–orbit interaction on optical properties of narrow-band semiconductor quantum wells LEONID ISAEV, ARKADY SATANIN, YONG JOE, Department of Physics and Astronomy, Ball State University, Muncie, IN 47306 — We study effects of strong spin–orbit interaction on optical properties of narrow–gap semiconductor quantum films. Electron states in such materials (*e.g.*$Pb_xSn_{1-x}(S,Se,Te)$) are well described by the two–band Kane model with the Dirac–type effective Hamiltonian [1]. It may be shown that electron dispersion in a film with identical boundaries still keeps spin degeneracy. In the present work we consider two types of (asymmetric) films with broken mirror symmetry: *i*) with nonequivalent boundaries, and *ii*) with a linear spatial variation of the forbidden band in the direction of epitaxial growth. It was shown that in both cases there is a noticeable spin–splitting of size–quantized subbands, strongly dependent on parameters in boundary conditions on film's surfaces. Under external illumination this results in an asymmetric distribution of photoexcited carriers in **k**–space, and therefore, in spin–polarized photocurrents. We also show that measurement of optical absorption coefficient may give direct information about the film surface structure. [1] J. O. Dimmock, G. B. Wright, Phys. Rev. **135**, A821 (1964). This work is supported by the Indiana 21^{st} Century Research and Technology Fund.

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