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Generation of shift currents in GaAs/AlGaAs quantum wells MARK BIELER, NORMAN LAMAN, HENRY VAN DRIEL, University of Toronto, Canada, ARTHUR SMIRL, University of Iowa, USA — Resonant, band-band optical excitation of certain non- centrosymmetric semiconductors produces a change in the electron centre of charge leading to a shift current. Such a current can be described in terms of a nonlinear optical process involving a divergent part of a $\chi^{(2)}$ susceptibility. For zincblende semiconductors this current is nonzero only if a component of the optical electric field exists along two different crystal cubic directions. Here we demonstrate shift currents in (110)- grown GaAs/AlGaAs multiquantum well samples using 60 fs 810 nm pulses and detect them via their emitted terahertz radiation. Due to the reduced symmetry the quantum wells exhibit shift currents for different optical polarizations/crystal orientations than the bulk materials. The shift current varies linearly with laser pulse intensity up to 100 MW cm^{-2} beyond which high density carrier effects induce a sublinear response. Research is funded by PRO and SERC (Canada) and DARPA (USA).

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