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**Phase coherent photorefractive effect in ZnMgSe/ZnSe quantum wells using ultrashort light pulses** PRADEEP BAJRACHARYA, AMIN KABIR, HANS - PETER WAGNER, Department of Physics,University of Cincinnati, OH 45221 — We report on an efficient exciton resonant phase coherent photorefractive (PCP) effect in ZnMgSe/ZnSe single quantum wells (QWs) using ultrashort light pulses that do not overlap in time. The diffraction efficiency as well as the electron grating dynamics that is responsible the PCP effect is studied in a four-wave-mixing (FWM) configuration using 90 and 30 fs pulses. Experiments with significantly reduced repetition rate of subsequent pulse pairs reveal an electron grating lifetime of greater 10 $\mu$s at 55 K. For spectrally broad 30 fs pulses when both excitons and electron-hole-pairs are excited in the QW the PCP signal is strongly reduced. The PCP signal reappears at higher pulse energies when ZnMgSe barrier excitons are additionally excited. The observation of PCP at incident light intensities as low as $100\mu\mathrm{Wcm}^{-2}$ has potential for optical coherence imaging. This work is supported by the National Science Foundation (DMR 0305076).

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