Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Optical coherence imaging using the phase coherent photorefractive effect in ZnSe quantum wells A. KABIR, M. AJWARD, S. TRIPATHY, H.P. WAGNER, Department of Physics, University of Cincinnati, OH 45221, U.S.A. — We have performed depth-resolved optical coherence imaging (OCI) of both stationary and moving objects using the exciton resonant phase coherent photorefractive (PCP) effect in ZnSe quantum wells (QWs). PCP QWs operate without electrical contacts thus avoiding elaborate sample processing and avoiding sample destruction due to Joule heating. In addition, the PCP effect exploits the coherence of excitons in OCI experiments thus enabling 3D images of reflecting objects with a depth resolution of $\sim$15 μm using 90 fs pulses. Due to the high diffraction efficiency of $\eta = 5\text{x}10^{-4}$ in our PCP ZnSe QWs we are able to record still images at very low intensities ($\sim$500 $\mu\text{W/cm}^{-2}$). The OCI movies of moving objects were recorded using a camcorder with frame rates of 60 and 180 Hz. The shortest possible time resolution in these experiments is determined by the decay time of the PCP electron grating being in the $\sim$10 μs range.

V. R. Gangilenka
Department of Physics University of Cincinnati

Date submitted: 29 Nov 2007 Electronic form version 1.4