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Ultrafast carrier capture dynamics in laterally ordered InGaAs/GaAs quantum wires F.A. HEGMANN, D.G. COOKE, Department of Physics, University of Alberta, Canada, YU.I. MAZUR, W.Q. MA, X. WANG, Z.M. WANG, G.J. SALAMO, M. XIAO, Department of Physics, University of Arkansas, USA, G.D. LIAN, J. KAEY, M.B. JOHNSON, Department of Physics and Astronomy, University of Oklahoma, USA — Carrier capture into semiconductor nanostructures has been a popular research area in recent years, in part due to efforts to improve the efficiency of nanoscale devices which require carrier capture into an active region after optical or electrical injection. Terahertz (THz) pulse spectroscopy is a powerful tool for investigating this capture process due to its sensitivity to free carriers, sub-picosecond time resolution and non-contact nature. In this talk, we present results of recent time-resolved THz pulse spectroscopy experiments investigating carrier capture into a single layer of strain-induced laterally-ordered InGaAs quantum wires on a [311] GaAs substrate after photoexcitation by 400 nm, 100 fs pump pulses. The temperature and fluence dependence of the carrier capture process is examined both perpendicular and parallel to the wires by using the polarization of the THz probe pulse. The authors acknowledge financial support from NSERC, CIPI, iCORE, NSF, and DMR-0080054 (C-SPIN).

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