Abstract Submitted
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Transient optical response of quantum well excitons to intense narrowband terahertz pulses ANDREW JAMESON, JOSEPH TOMAINO, YUN-SHIK LEE, Department of Physics, Oregon State University, Corvallis, OR 97331, J.P. PRINEAS COLLABORATION[1], J.T. STEINER, M. KIRA, AND S.W. KOCH COLLABORATION[2] — We demonstrate experimental observations and theoretical calculations of strong interactions between THz light and the $1s$-to-$2p$transition of the excitonic polarization in resonantly driven GaAs/AlGaAs QWs, using our novel tabletop THz source of high intensity and continuous tunability. The strong narrowband THz pulses are used to modify excitonic transitions in the semiconductor QWs and to study the dephasing properties of the optically dark $2p$states. Time-resolved THz-pump and optical-probe measurements exhibit strong nonlinear optical transients of the $1s$heavy-hole and light-hole exciton resonances when the THz radiation is tuned near the $1s$to $2p$intraexciton transition. A microscopic theory attributes the observed nonlinearities to Rabi sidebands showing that the $2p$-dephasing time is three times that of the $1s$-state.

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