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Ultrafast Exciton-Polariton Bleaching and Recovery in a Quantum-Well Microcavity Induced by Strong Terahertz Pulses ANDREW JAMESON, JOSEPH TOMAINO, YUN-SHIK LEE, Oregon State University, Corvallis, OR 97331, GALINA KHITROVA, HYATT GIBBS, University of Arizona, Tucson, Arizona 85721, A.C. KLETTKE, MACK KIRA, STEPHAN KOCH, Philipps-University, 35032 Marburg, Germany — We present a study of the quantum coherent transients of exciton-polaritons in a quantum-well (QW) microcavity driven by strong THz pulses. The optical response of a QW microcavity exhibits pronounced cavity polariton modes in the strong-coupling regime. We observed the time-resolved optical reflectivity of the lower and higher exciton-polariton (LEP and HEP) modes in the presence of strong THz fields. The two polariton modes are a manifestation of the periodic process in which excitons emit and reabsorb photons a number of times during the cavity lifetime, typically ∼10 ps. Consequently, THz-induced excitonic nonlinear effects can be multiplied during this process. The small mass and the large size of these quasi-particles imply that polaritons are susceptible to THz fields. Our experiments uncover the nature of the THz interaction with this system showing heavily modulated polariton modes and revealing the time resolved dynamics of the quantum coherence between the LEP and HEP modes.

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