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标题: Terahertz-Induced Optical Modulations in Quantum-Well Microcavity
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摘要: Strong exciton-photon coupling in a high-Q microcavity leads to the formation of two new eigenstates, called exciton-polaritons. We present the quantum dynamics of exciton-polaritons driven by strong few-cycle THz pulses. Our study focuses on an intriguing question of how THz radiation interacts with the strongly coupled light-matter system. We performed THz-pump and optical-probe experiments to answer the question: we observed the time-resolved optical reflectivity of the lower and higher exciton-polariton (LEP and HEP) modes in a QW microcavity in the presence of strong few-cycle THz pulses. In a previous study with a bare QW, a strong THz field tuned to the 1s-to-2p intraexciton transition induced an excitonic Rabi splitting. Since THz radiation interacts only with the excitonic components of exciton-polaritons and has no impact on cavity modes, it is an interesting question how THz radiation drives the exciton-polariton states to higher energy states in the microcavity system. Our study shows that THz radiation resonantly drives the exciton-polariton polarizations giving rise to LEP-to-2p or HEP-to-2p transitions. LEP-to-HEP transition is forbidden because they have the same symmetry. Our experimental and theoretical investigations demonstrate that LEP, HEP, and 2p-exciton states form a three-level. system in an optically excited QW microcavity.
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