

标题: Study of lifetimes and photoconductivity relaxation in heterostructures with Hg (x) Cd_{1-x} Te/Cd (y) Hg_{1-y} Te quantum wells

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摘要: Carrier lifetimes in the continuum of the quantum well of a Hg (x) Cd_{1-x} Te/Cd (y) Hg_{1-y} Te hetero-structure were studied by terahertz pump-probe spectroscopy. It is found that the relaxation duration of the transmission signal is similar to 65 ps and is independent of the pump power. Such rapid relaxation in these structures is most likely determined by the interaction of holes with acoustic phonons due to a high density of states in the valence band and a larger effective mass compared with electrons. By the obtained data, the times of the interband nonradiative recombination of holes are determined. In this publication, we report the results of numerical calculation of the energy spectrum of the model structure, in which the possibility of obtaining population inversion at specified concentrations of nonequilibrium carriers is analyzed.

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