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Title

Behaviours of excitonic optical nonlinearity associated with a large detuning rate photonic echo in biased asymmetric coupled quantum well structure

Source

Optical and Quantum Electronics, vol.42, no.14-15, Dec. 2011, 863-72. Publisher: Springer Netherlands, Netherlands.

Abstract

The third-order optical nonlinear susceptibility $\chi^{(3)}$ responsible for phase-conjugate beam in non-degenerate four-wave mixing for a biased asymmetric coupled quantum well (ACQW) structure are given by the doubled-side Feynman diagram technique. It is shown that the photonic echo (PE) in excess of one terahertz pump-probe detuning rate can be achieved under low temperature condition due to electronic wavepacket oscillation when two laser beams interacts with the delocalized excitons in the ACQW structure. Also, the resonant peak position in the frequency domain of the large detuning rate PE depends strongly on an external inverse electric field strength but its peak intensity is insensitive to this one, resulting in the frequency conversion peak maintains a constant in a small bias range. (20 References).