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Third-Order Nonlinear Optical Susceptibility of Special Asymmetric Quantum Wells

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Abstract: A detailed procedure for the calculation of the third-harmonic-generation susceptibility tensor is given in special asymmetric quantum wells, and an analytic formula for the third-harmonic-generation susceptibility is obtained by the compact density matrix approach and the iterative procedure. Finally, the numerical results are presented for typical GaAs/AlGaAs asymmetric quantum wells. The calculated results show that the origin of the large third-harmonic-generation susceptibility is due to the increase in asymmetry of the quantum well.

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Key words: third-harmonic generation, asymmetric quantum well, density matrix approach

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