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标题: Wavefunction and Fourier coefficients of excitons in quantum wells: computation and application
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摘要: Excitonic dynamic equations, which are derived from the quasi-Boson approach, are useful tools in investigating the ultrafast optical responses of semiconductor nanostructures. To apply these equations to the exciton dynamics in semiconductor quantum wells, we need exciton wavefunctions and their representations in momentum space to obtain the coefficients in the excitonic dynamic equations. By discussing in detail the exciton wavefunctions and, their momentum-space representations, we present a method of obtaining the essential coefficients in the excitonic dynamic equations. We finally use these coefficients to understand the nonlinear effects in the terahertz-pulse-induced intraexcitonic transitions caused by high exciton densities. The obtained theoretical results are in good agreement with recent experimental results.
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