

Phonon-Assisted Photoluminescence in a Spherical Nanocrystal

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R sum  en anglais Using the matrix density in the representation of path integrals for an electron, the multiphoton nonlinear absorption light coefficient in the second order of interaction energy with polar optical phonons is derived. This coefficient describes any electron interaction mechanism with phonons. From the interaction mechanism, the main role is played by dimensional resonance when the electron continuously absorbs energy from the field as a result of synchronizing its oscillation with the field. This dimensional resonance is possible when the frequency characterizing the laser field is a multiple of the phonon frequency. Whether a photon is absorbed or emitted, the initial level from where the transition occurs defines the temperature dependence. The absorption spectrum has the form of stripes whose intensity depends on the resonance character. The most pronounced absorption is at the triple resonance, where values of radiation and oscillatory and optical phonon frequencies are equal.

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