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Photoionization cross section of hydrogen-like donor impurity in CdSe nanoplatelets

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In this paper the hydrogen-like donor impurity states in CdSe nanoplatelet have been studied using the approximation and numerical methods. The impact of polarization effects caused by a significant mismatch of dielectric constants between the nanoplatelet and the surrounding medium is considered within the framework of the Ritova-Keldysh theory and the Takagahara model. The interaction between the electron and the impurity is taken into account by averaging the Coulomb potential. The binding energy (energy difference without and with impurity), photoionization (optical transition, which takes place from the impurity ground state to the conduction sub-band (excited states without impurity) under the influence of optical excitation) cross section dependencies from nanoplatelet sizes, monolayers number and incident photons light energy (Fig.1) have been investigated.

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