Resonant Stokes Shift in CdS QD

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In the past two decades, artificial structures with reduced size and dimensions have been fabricated successfully due to advance of material science technologies. Those structures, especially solid solutions A_2B_6 are very good and perspective materials for creation of the new elements of nonlinear optics.

The large attentions of reseachers are to paid heed to study of *CdS* quantum dot (QD). The most simplify and informative methods which give possibilities to study the electron structure are light absorption and photoluminescence.

The series of works are dedicated to experimental study of optical properties of *CdS* QDs in colloidal solutions. Besides that there are a lot of theoretical works, which describe optical properties. In particular, the resonant Stokes shift was calculated for different nanocrystals [1-3]. But in those works [2-3] were studied crystals which have a large spin-orbital coupling. Therefore the 4-band model of the valence band was used. But in [1] the density functional was applied to calculation. Since the *CdS* has a small value of spin-orbital interaction the abovementioned methods are not valid. That is why in this work we used the 3x3 model of valence band to describe hole levels and to calculation the exchange interaction which caused the resonant Stokes shift in *CdS* QD. The obtained results show that this approximation is appropriate for this QD. The proof of that are good qualitative and quantitative agreements of obtained results with experimental data.

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