

# Calculating the influence of external charges on the photoluminescence of a CdSe quantum dot

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## **Abstract**

The influence of external charges on the radiative recombination rate of an electron-hole pair in a CdSe quantum dot is investigated via atomistic empirical pseudopotential calculations. It is found that, when a negative external charge is near the surface of a CdSe quantum dot, its Coulomb potential could be strong enough to pull the hole away from the electron, and results in a reduction of the radiative recombination rate by a factor of 70. Distance, direction, charge number and charge type dependences of this effect are investigated.