

Multi-excitonic structure of type-II quantum dots

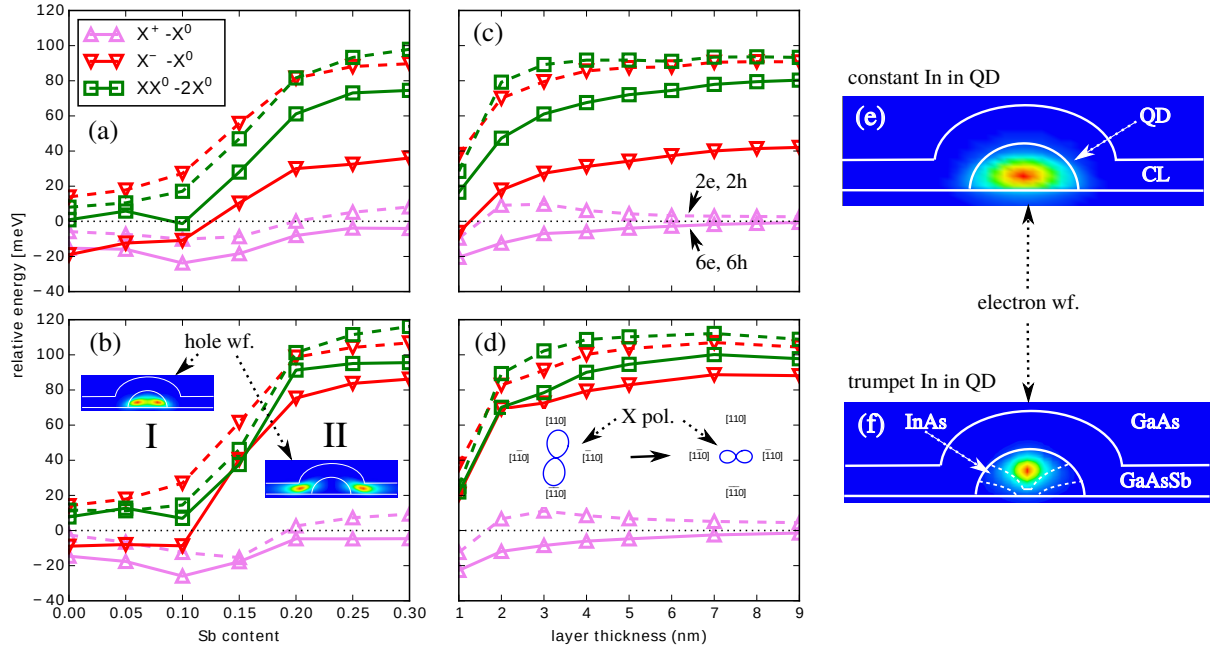
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We study the multi-particle structure of quantum dots with spatially separated electrons and holes, usually termed type II. Our calculations based on customarily developed full-configuration interaction approach reveal that exciton complexes consisting of more electrons than holes are enormously antibinding in type II making those the hallmark of that kind of confinement. By an extension of our model we obtain approximate self-consistent solution of the multi-exciton problem and we explain the elusive blue-shift of the emission with pumping as well as the reason for the large inhomogeneous spectral broadening seen for type-II systems as an effect of trap filling.

The results are confirmed by detailed intensity and polarization resolved photoluminescence measurements on large number of samples.



[1] P. Klenovsky, P. Steindl, D. Geffroy, *Scientific Reports* (in print).