

Abstract Submitted
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Statistical properties of electron levels in quantum dot¹
BRANISLAV VLAHOVIC, SERGEI MATINYAN, IGOR FILIKHIN, North carolina central university — Spherical shaped Si quantum dots (QDs) embedded into the SiO₂ substrate are considered in the single sub-band effective mass approach. The electron and heavy hole sub-bands are taken into account. The energy dependence of electron effective mass is applied for small size QD (I. Filikhin et al. PRB 73, 205332 (2006)). Calculations of low-lying single electron and hole energy levels are performed. The PL exciton data are reproduced well by our model calculations for QD with diameter $D < 6$ nm. For weak confinement regime (size $D > 10$ nm), when the number of confinement levels is limited by several hundred, we considered the statistical properties of the electron confinement. Distribution function for the electron levels is calculated for various QD shapes. Evidence of chaotic properties is discussed.

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