

# Analysis of symmetry in the graphene quantum dots and artificial graphene quantum dots

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We investigate the optical properties of symmetric graphene quantum dots (GQD) [1] and artificial graphene quantum dots (AGQD) using the theory of representation of point groups. We classify symmetry of electronic states in the energy spectra obtained within tight-binding model (TB) of GQD (AGQD) with different sizes and edge termination. This enables us to determine allowed optical transitions. Next, we analyze the influence of edge effects on optical properties by studying structures with similar sizes, and zigzag and armchair edges. Optical transitions between edge-type and bulk-type states are investigated and compared with two types AGQD. A comparison between analytical and numerical results is presented. Absorption spectra for symmetric GQD (AGQD) for different sizes and edges are shown.

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