Contribution ID: **4** Type: **Poster**

RESEARCH OF THE ELECTRON STATE IN A PRISMATIC QUANTUM DOT WITH A SHELL

Saturday, 26 September 2020 15:06 (4 minutes)

In the element base of modern information technologies (monitors, lasers, sensors) use quantum dots that have extremely small sizes. Therefore, the development of mathematical models of various quantum dots (spherical, cylindrical, prismatic, conical), which allow to determine the eigenvalues of energy, is an urgent task. The results of the study of the dependence of the shape and parameters on the energy spectrum of the electron state are used in the development of technologies for obtaining and applying quantum dots.
Mathematical computer modeling of the state of electrons at a prismatic shell quantum dot was considered. The Schrödinger wave equation for steady states and the corresponding boundary conditions are used to determine the wave numbers and eigenvalues of energy. The dependence of the type of electron density density in a given region on the parameters of a quantum point is investigated: a, H is the edge length, d is the shell thickness.
3D graphics are constructed using structured discrete grids. To solve the Schrödinger equation, we use the Fourier method of separation of variables, as well as the numerical method of successive approximations (iterations). The wave function must be continuous and smooth at the core-shell boundary. The results of calculations of natural energy for two states of an electron are presented: ground and excited in the case of even and odd wave functions for horizontal and vertical modes.
The results are compared with the case of a spherical quantum dot and experimental data.

Topics

Session A. Physics of condensed matter and spectroscopy

Primary authors: Mr MOROZOV, Mykola (Dmytro Motornyi Tavria State Agrotechnological University); Mrs DOMINA, Natalia (Dmytro Motornyi Tavria State Agrotechnological University); Mrs KHALANCHUK, Larysa (Dmytro Motornyi Tavria State Agrotechnological University)

Presenter: Mr MOROZOV, Mykola (Dmytro Motornyi Tavria State Agrotechnological University)

Session Classification: Poster session