Abstract

One of the most actual problems in atomic and nuclear physics is calculation of the energy spectrum of a particle in a spherically symmetric potential, i.e. potential that depends only on the distance between the particle and the force center.

During the working on this task various numerical methods were implemented to calculate the particle spectrum in spherically symmetric potentials. Specifically the following potentials were used: potential of the infinite and the finite spherical wells; potential of the isotropic harmonic oscillator; the Coulomb potential; potentials of Woods-Saxon, Hulthen, Morse and Yukawa. The spherically symmetric potential of the strong neutron-proton interaction in the deuteron model was also investigated.

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