



Семинар
«МАЛОЧАСТИЧНЫЕ СИСТЕМЫ»
вторник, 21 апреля 2015 г., 11:00
аудитория им. Д.И.Блохинцева (IV этаж)

1. THE ENERGY LEVELS OF HELIUM ATOM

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The three-body quantum problem with Coulomb interaction is one of the most known non-integrable problems of quantum mechanics. On the other hand, the bound state problem for a system of three charged particles allows for very precise numerical solutions on modern computers.

In our work the nonrelativistic ionization energies of helium atom are calculated for S , P and D states. The calculations are based on the variational method called "exponential" expansion. Convergence of the numerical values of variational energies is studied by increasing a number of the basis functions, N . This permits to claim that the computed values of energy have 20 significant digits, including as well the states with nonzero angular momentum.

2. METASTABLE STATES OF COMPOSITE SYSTEM TUNNELING THROUGH REPULSIVE BARRIERS

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The method of solution of quantum tunneling problem of composite system of several identical particles with pair oscillator-type interactions through the repulsive barriers in the oscillator representation of the symmetrized coordinates is considered. Efficiency of the proposed approach is demonstrated by analysis of metastable states of composite systems in an s -wave approximation leading to a quantum transparency effect of the repulsive barriers.