Abstract to degree work of 626-group student Abramov I.E.

Influence of Hyperfine interaction effects on emission spectrum of atomic system

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The hyperfine structure of the hydrogenic spectra associated with the orbital, spin-orbital, and spin-spin interactions is investigated. The calculations are based on the non-relativistic Hamiltonian for the two-particle problem in the two cases of spin and spinless particle. The boundary value problem has been solved numerically with the help of FEMLAB package. The results of the computer calculations have been compared with the results of perturbation theory calculations. The scaling laws of the perturbation theory are completely agreed with the computer calculations for the case of the spinless particles. The disagreement between the computer and perturbation theory calculations is explained for the case of the particles with spin. The influence of the hyperfine interactions on the magnitude of the dipole matrix elements has been studied.