# ADVANTAGES OF A REPRESENTATION WITHOUT USE OF THE ISOSPIN FORMALISM, AND PRECISE STUDY OF FEW-NUCLEON SYSTEMS

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The analysis of the isospin formalism is carried out in order to study a few-nucleon system with high and controlled precision. The commonly used isospin formalism is shown to give the unreasonable complication of the total wave function and to increase the number of equations for spatial components. Using the example of three nucleons with the general central exchange NN-interaction potential, the complete equivalence is grounded for two approaches with and without the isospin formalism. New sets of equations are obtained for the systems of three nucleons with total spin $S = 1/2$ and four nucleons with total spin $S = 0$. Optimal variational schemes are developed with the use of the Gaussian basis for a precise studying of the main properties of a few-nucleon system. For the three-nucleon systems, the binding energies, r.m.s. radii, density distributions, and formfactors are calculated with high and controlled precision within the proposed approach. The qualitative detailed analysis is carried out for the structure peculiarities of the three-nucleon systems. Advantages of the proposed approach without use of the isospin representation are demonstrated. The obtained results are of superior accuracy in comparison with the known ones and give new possibilities for constructing the realistic variants of nuclear potentials for a complete description of all the main low-energy parameters of few-nucleon systems.