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RELATIVISTIC INVESTIGATION OF LOW NUCLEON SYSTEMS IN THE FORMALISM OF BETE-SALPETER-FADDEEV

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The relevance of the study of few-nucleon systems is motivated by the fact that there is a large amount of experimental data for the reactions of nucleon scattering on deuterons, both elastic and inelastic. New corresponding experiments with increased accuracy and at high energies are also planned (JLab, NICA). Accordingly, a theoretical study is required. There are a large number of theoretical studies of three-nucleon systems, but at low and medium energies. Most of them are based on the Faddeev equation and its modifications. One of the main problems of modern physics of low-nucleon systems is their theoretical study at high energies. One of the approaches used in this paper to study few-nucleon systems (primarily three-nucleon nuclei) is the Bethe-Salpeter-Faddeev (BSF) formalism [1-2]. Within the framework of this approach, the binding energy of three-nucleon nuclei and their electromagnetic form factors were calculated [3-6]. The calculations were carried out using various nucleon-nucleon interaction potentials and various models of nucleon form factors. Comparison of these calculations with calculations within the framework of other approaches and with experimental data shows that these studies are in good agreement with experiment. So for the binding energy of the triton, the experiment gives the value 8.48 MeV, the solution of the nonrelativistic equation - 11.55 MeV, the calculation using the BSF equation - 8.44 MeV, which is much closer to the experiment. Based on this, one can reasonably assume that this approach will lead to valuable results in the case of scattering reactions as well.

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The speaker is a student or young scientist

Yes

Section

1. Nuclear structure: theory and experiment

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