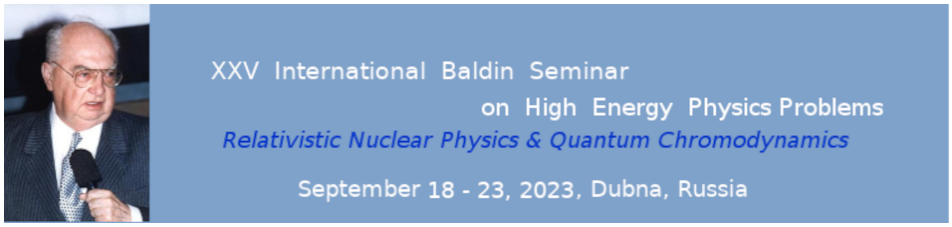

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Relativistic Faddeev-Yakubovsky equation for the helium-4 nucleus

Friday, 22 September 2023 09:00 (20 minutes)

Progress in applying the Bethe-Salpeter equation to study relativistic two-particle systems, in particular the deuteron at high energies [1] as well as recent successes in the application of the Bethe-Salpeter-Faddeev formalism for the study of three-nucleon nuclei (helion and triton) (binding energy, state amplitudes and electromagnetic form factors)[2] give a reason to assume that relativistic generalization of the Faddeev-Yakubovsky equation will be just as successful in describing relativistic four-nucleon systems.
The nonrelativistic Faddeev-Yakubovsky equation [3] in integral form for the components of the full four-particle T-matrix is taken as a basis.
This formalism has developed at a fairly good level from a theoretical point of view and was successfully applied, in particular, to the helium-4 nucleus.
In our work, the binding energy of helium-4 is calculated using the relativistic generalization of the Faddeev-Yakubovsky equation with the simplest one-rank separable NN interaction kernel (Yamaguchi).
The results of the calculation are compared with nonrelativistic ones.

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