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Equivalency of mass and energy in bound three-nucleon systems[1]
IGOR FILIKHIN, VLADIMIR SUSLOV, BRANISLAV VLAHOVIC, North Carolina Central University — The mass defect of a nucleus reflects the equivalence of mass and energy of bound nuclear systems. The bound three-nucleon systems, ^{3}H and ^{3}He, have been studying within the isospin formalism, taking into account the identity of neutron and proton (AAA model). The averaged nucleon mass is used in corresponding three-body calculations that lead to the deviation of the mass of the nucleus (^{3}H or ^{3}He) on $\pm$0.6 MeV from the experimental value, according to the mass defect formula. The relative error is reasonably small. However, using the average mass will have an impact on the accuracy of the rigorous 3N calculations [1], and for that reason, calculations should be done taking into account corresponding masses for neutrons and protons. To achieve that, we consider an "isospinless" AAB model based on the Faddeev equations in configuration space. To show another evidence of the equivalence of mass and energy, we present the realistic calculations for ^{3}H nucleus with AV14 NN potential within the AAA model. The attractive contribution of a three-nucleon potential, needed to reach the experimental value for the binding energy, can be effectively simulated by a renormalization of the nucleon mass to a larger value. [1] Navarro Perez R et al. 2014 PRC 90, 047001

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