ЛАБОРАТОРИЯ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ

Wednesday, 15 May 2019, at 15:00

Room 310

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On possibility of observing quark oscillator excitations in deuteron nucleus

There are at least three independent experimental signs of existence of oscillator excitation levels in deuteron nucleus. The first one is contained in paper (1973) of A.M. Baldin's team where d-d scatterings at 8.9 GeV/c momentum of primary deuterons and big transfer momenta were studied. Usually it is taken for granted that two distinct peaks observed there correspond to elastic d-d and d-N scatterings. Our calculations revealed that it is definitely not the case. Additional study shows that the experimental peaks may be described perfectly well if one assumes that they correspond to transitions between different levels of 2-D quantum oscillator with 10.08 MeV quantum leap. The second experimental evidence for existence of these levels is given in paper by Yu. A. Troyan (1993). Here dibaryons appearing after "deep cooling" of highly excited n-p systems were registered. All masses of the observed dibaryons also coincide with 2-D oscillator levels with the same step between them, although not all the levels were recognized due to a background contribution of events of a different nature. The third experimental indication of existence of the oscillator excitations in n-p system was found in EVA experiment in BNL (2003). Here coherent states which are the quantum superposition of dibaryons with definite masses might be excited. In such a case, nucleons-to-quarks phase transitions in the EVA experiment were observed. All conclusions of the present paper are preliminary due to significant uncertainties of the considered experimental data. The aim of the paper is to point out possible "points of increase" of the future theory.