

SHAKE AS THE PREDETERMINING MECHANISM OF THE NEUTRINOLESS DOUBLE ELECTRONIC CAPTURE

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The process of double neutrinoless e-capture is of great interest as a test of the Majorana nature of neutrino. This process is traditionally considered as a resonance one, since not a single particle is emitted as a result of the nuclear transformation [1]. In contrast, we performed calculations of the probability of shake off and shake up, with the ionization or excitation of the electron shell during the nuclear transformation. ^{164}Er nucleus is one of the main candidates for discovering the neutrinoless mode of the process [2]. As a result, the contribution of the new mechanism turns out to be three times stronger than that of the traditional resonance mechanism [3]. It rapidly increases with the increasing resonance defect, thus becoming the main mechanism of the double neutrinoless electron capture. One can conclude that account of the shake mechanism generally increases the decay rate by an order of magnitude. Therefore, the double neutrinoless e-capture appears not to be a resonance process at all. This considerably increases the chance for successful experimental research of the process.

References:

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