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ON DETERMINATION OF 82Se TWO-NEUTRINO DOUBLE BETA DECAY MECHANISM AND STERILE NEUTRINOS CONTRIBUTION

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It is presented the calculation of the amplitude of 2⊠2⊠ decay of 82Se on the basis of High-States Dominance (HSD) and Single-State Dominance (SSD) mechanisms [1]. The ground state of the intermediate nucleus 82Br for 2⊠2⊠ decay of 82Se has quantum numbers 5-, so contribution of this state in the transition amplitude is very suppressed hence it is needed to take into account exited 1+ states of 82Br [2]. In 82Se decay the excited state of the bromine-82 (82Br*, 11+) with Ex = 75 keV offers a large strength of the Gamow-Teller transition B(GT)=0.338, while high-lying exited 1+ states of the bromine-82 with Ex < 2 MeV exhibit transition strength of order of magnitude lesser. As a consequence one can assume that the SSD hypothesis holds. The alternative is when a transition occurs through a large number of intermediate high excited states then the HSD mechanism takes place and choosing of the mechanism has influence on differential intensities of the decay. The SSD mechanism is supported by measurement data for the electron energy distribution gained at the NEMO-3 [3]. Measurements obtained in the CUPID-0 experiment also point to the SSD superiority for the total electron energy distribution as compared with HSD [4]. Experimental investigation of an electron energy distribution, which is sensitive to a nuclear mechanism, can be used for differentiation of these theoretical approaches [3]. It is found the dependences for the differential intensity of the decay on an electron energy corresponded to HSD and SSD mechanisms. Possible presence of sterile neutrinos also affects a phase factor value [5, 6] that should be taken into account for computation of a no removal background and sensitivity evaluation for experiments in the search for 82Se neutrinoless double beta decay.

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