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Gamow-Teller decay studies with the 2p-2h configurations

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The β-decay properties are very important for understanding the nuclear structure evolution at extreme N/Z ratios, for analysis of radioactive ion-beam experiments, and modeling of the astrophysical r-process. For this reason, the theoretical calculations of the β-decay properties of the "waiting-point nuclei"129Ag, 130Cd, and 131In provides the valuable information. One of the successful tools for nuclear structure studies is the quasi-particle random phase approximation (QRPA) with the self-consistent mean-field derived from the Skyrme energy density functional (EDF). The framework allows to relate the properties of the ground states and excited states through the EDF. There is the discrepancy between the QRPA predictions and the measurements for low-energy 1+ spectrum of the daughter nucleus, see as an example [1]. The number of low-lying 1+ states and the corresponding Gamow-Teller fragmentation are naturally reproduced by the inclusion of the tensor correlations and the coupling between one- and two-phonon terms in the 1+ wave functions [2-4]. We applied the influence of the phonon-phonon coupling on the probability of the neutron emission occurring at very small quantity of energy available in β-decay. Onset of delayed neutron emission in Cd isotopic chain is discussed.

Primary author: SEVERYUKHIN, Alexey (BLTP, JINR)

Presenter: SEVERYUKHIN, Alexey (BLTP, JINR)

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