Contribution ID: **13** Type: **Semi-plenary talk (30 min + 5 min questions)**

STUDY OF THE BETA DECAY STRENGTH FUNCTION STUCTURE BY TAGS AND HIGH RESOLUTION NUCLEAR SPECTROSCOPY METHODS

Thursday, 14 July 2022 13:00 (30 minutes)

The β-decay strength function $S_\beta(E)$ governs [1-3] the nuclear energy E distribution of elementary charge-exchange excitations and their combinations like proton particle (πp)-neutron hole (νh) coupled into a spin-parity I^π: $[\pi p \otimes \nu h]I^\pi$ and neutron particle (νp)-proton hole (πh) coupled into a spin-parity I^π : $[\nu p \otimes \pi h]I^\pi$. The strength function for the Gamow–Teller (GT) β-transitions describes $[\pi p \otimes \nu h]1^+$ or $[\nu p \otimes \pi h]1^+$ excitations. Successful applications of the total absorption γ-spectroscopy $(TAGS)$ for the $S_\beta(E)$ resonance structure study and methods of $TAGS$ spectra analysis were summarized in [1]. Development of the experimental technique allows application of methods of nuclear spectroscopy with high energy resolution for the $S_\beta(E)$ fine structure measurement [2-5]. It was demonstrated [2-6] that the high-resolution nuclear spectroscopy methods give conclusive evidence of the resonance structure of $S_\beta(E)$ for GT and First Forbidden (FF) β-transitions. High-resolution nuclear spectroscopy methods [3-6] made it possible to observe the reveal splitting of the peak in the $S_\beta(E)$ for the GT β^+/EC-decay of the deformed nuclei into two components. Resonance structure of the $S_\beta(E)$ for β-decay of halo nuclei was analyzed in [7-9]. It was shown that when the parent nucleus has *nn* Borromean halo structure, then after GT β^- - decay of parent state or after M1 γ-decay of Isobar Analogue Resonance (IAR) the states with *np* tango halo structure or mixed *np* tango + *nn* Borromean halo structure can be populated.
In this report the fine structure of $S_\beta(E)$ is analysed. Resonance structure of $S_\beta(E)$ for the GT and FF β^- – decays, structure of $S_\beta(E)$ for halo nuclei, quenching [9] of the weak axial-vector constant ${g_A}^{eff}$, and splitting of the peaks in $S_\beta(E)$ for deformed nuclei connected with the anisotropy of oscillations of proton holes against neutrons (peaks in $S_\beta(E)$ of GT β^+/EC–decay) or of protons against neutron holes (peaks in $S_\beta(E)$ of GT β^- – decay) are discussed.

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3. I.N. Izosimov, et al, Phys. Part. Nucl., 42,1804(2011). DOI:10.1134/S1063779611060049
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5. I.N. Izosimov, et al,Phys.Part.Nucl.Lett.,15,298(2018). DOI:10.1134/S1547477118030081
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8. I.N. Izosimov, Phys. Part. Nucl. Lett., 15,621(2018). DOI:10.1134/S1547477118060092

The speaker is a student or young scientist

No

Section

1. Nuclear structure: theory and experiment

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