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Structure of beta-decay strength function and quenching of axial-vector weak interaction constant g(A) in halo nuclei and in some neutron rich nuclei

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The information on how the nuclear structure effects the beta-decay or charge-exchange reactions is most conveniently expressed by a strength function. The beta-decay probability is proportional to the product of the lepton part described by the Fermi function and the nucleon part described by beta-decay strength function. Beta-decay strength function reflects the distribution of the squared beta-decay matrix elements with respect to the excitation energy of the nuclear states of the daughter nucleus [1,2].
In the case of precise Wigner's SU(4)symmetry Isobar Analog Resonance (IAR) and Gamow-Teller Resonance(GTR) energies are degenerate and we may expect that E(IAR) = E(GTR). From our estimation follows [3] that the value Z/N = 0.6 corresponds to the SU(4) region. The quenching of g(A) can be observed in GT beta-decay of halo nuclei and of some neutron rich nuclei, where E(GTR) < E(IAR) [4] and GTR (or low-energy super Gamow-Teller phonon [5]) may be observed. Method of g(A) determination by comparison of experimental value of total beta-decay strength for GT beta-transitions with the Ikeda sum rule is the model-independent method and it may be applied for some halo nuclei and neutron rich nuclei [4].
Possible experiments on beta-decay strength function study in halo and in neutron rich nuclei are discussed.

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