

ANALOG RESONANCES AND LOCAL INTERACTION PARAMETERS

Friday 24 September 2021 13:50 (25 minutes)

Isobaric analog resonances (AR) are investigated within the framework of the microscopic theory of finite Fermi systems (TFFS) and in an approximate approach. These studies began about 50 years ago [1–3] and are currently being successfully continued in the self-consistent TFFS approach [4].

The calculations were performed for a large number of spherical and deformed nuclei, and the calculated energies E_{AR} are in good agreement with the experimental data. Since the E_{AR} energies are linearly related to the Coulomb energies Q_{EC} and, in the model approximation, to the charge radii R_C of atomic nuclei, the corresponding recalculations for Q_{EC} and R_C were carried out and good agreement with the experimental data was obtained.

The most complete experimental studies of charge-exchange excitations in 9 tin isotopes with $A = 112 - 124$ were carried out [5] in the Sn(^3He , t)Sb reaction. Recently, studies have been carried out on charge-exchange resonances in the neutron-rich isotope ^{132}Sn [6] in the $^{132}\text{Sn}(p, n) ^{132}\text{Sb}$ reaction. Comparison of the obtained data with calculations by TFFS made it possible to determine the parameter of the local isospin –isospin interaction [7] and demonstrated a linear dependence of the energy E_{AR} on the isotopic parameter $(N-Z)/A$. Calculations for Sn isotopes were carried out up to the value $A = 140$.

The work was done under financial support of Russian Scientific Foundation (project RSF № 21-12-00061).

1. D. F. Zaretskii, M. G. Urin, Sov. Phys. JETP, **26**, 34 (1968).
2. Yu. S. Lyutostansky, Yad. Phys., **10**, 198 (1969).
3. Yu. V. Gaponov, Yu. S. Lyutostansky, Yad. Phys., **16**, 484 (1972).
4. N. Borzov, S.V. Tolokonnikov, Phys. At. Nucl., **82**, 560 (2019).
5. K. Pham et al., Phys. Rev. C **51**, 526 (1995).
6. J. Yasuda et al., Phys. Rev. Lett. **121**, 132501 (2018).
7. Yu.S. Lutostansky, Phys. At. Nucl., **83**, 33 (2020)..

Authors: FAZLIAKHMETOV, Almaz (MIPT, INR RAS, NRC "Kurchatov Institute"); KOROTEEV, Grigory (Moscow Institute of Physics and Technology); Prof. TIKHONOV, Viktor (National Research Center Kurchatov Institute, Moscow, Russia); Prof. LUTOSTANSKY, Yuri (National Research Center; Kurchatov Institute, Moscow, Russia)

Presenter: KOROTEEV, Grigory (Moscow Institute of Physics and Technology)

Session Classification: Section 1. Experimental and theoretical studies of the properties of atomic nuclei

Track Classification: Section 1. Experimental and theoretical studies of the properties of atomic nuclei.