SHAPE COEXISTENCE IN ^{96,98}SR STUDIED BY LOW-ENERGY COULOMB EXCITATION

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Neutron-rich A∼100 nuclei are among the best examples of interplay of microscopic and macroscopic effects in nuclear matter. A dramatic onset of quadrupole deformation is observed in the neutron-rich Zr and Sr isotopes at N=60, making this region an active area of experimental and theoretical studies. This rapid shape transition is accompanied by the appearance of low-lying 0^+_2 states that, for N<60, can be interpreted as a deformed configuration that becomes the ground state at N=60, while the spherical ground-state configuration of the isotopes with N<60 becomes non-yrast for those with N≥60.

Neutron-rich ^{96,98}Sr isotopes (N=58,60) were investigated by safe Coulomb excitation of radioactive beams at the REX-ISOLDE facility. Reduced transition probabilities and spectroscopic quadrupole moments were extracted from the measured differential Coulomb excitation cross sections [1]. The results support the scenario of shape transition at N=60 giving rise to coexistence of two very different configurations in ^{96,98}Sr. In ^{96}Sr, the spectroscopic quadrupole moment of the first 2^+ state was found to be small and negative, corresponding to a weak prolate deformation. In ^{98}Sr, the large and negative spectroscopic quadrupole moments in the ground state band prove its well-deformed prolate character, while the value close to zero obtained for the 2^+_2 state confirms that a spherical configuration coexists with the deformed configuration of the ground state. The comparison of the B(E2) values and the spectroscopic quadrupole moments between the 2^+_1 state in ^{96}Sr and the 2^+_2 state in ^{98}Sr underlines their similarity and further supports the shape inversion when crossing the N=60 line. Furthermore, a very small mixing between the coexisting structures was determined from measured intra-band transition probabilities in ^{98}Sr. This effect has been attributed to the rapidity of the shape change at N=60: a larger mixing would give rise to a more gradual transition from spherical to deformed ground state in Sr isotopes, like what is observed in other areas of shape coexistence, for example neutron-deficient Kr [2] and Hg [3] isotopes.

Experimental results will be compared to beyond-mean-field calculations using the Gogny D1S interaction in a five-dimensional collective Hamiltonian (5DCH) formalism, which reproduce the shape change at N=60.

REFERENCES

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