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Shape Coexistence in Sr isotopes

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The shape of nuclei is determined by a fine balance between the stabilizing effect of closed shells and the pairing and quadrupole force that tends to make them deformed. As other well known cases, located in the A = 100 mass region, as Yb, Zr or Nb for example, Sr isotopes are good candidates to study the existence of this nuclear deformation. In particular in this case, particle-hole excitations are favored because of the presence of the proton subshell closure Z = 40, resulting in low-lying intruder bands.

The aim of this contribution is the study of the nuclear structure of 92-102 Sr even-even isotopes using the Interacting Boson Model with configuration mixing to reproduce excitation energies, B(E2) transition rates, nuclear radii and two-neutron separation energies.

For the whole chain of isotopes analyzed, good agreement between theoretical and experimental values of excitation energies, transition rates, separation energies, radii and isotope shift has been found. Furthermore, the wave functions, together with the mean field energy surfaces and the value of nuclear deformation have been analyzed.

This study will clarify the presence of low-lying intruder states in even-even Sr isotopes and the way it connects with the onset of deformations. Lightest Sr isotopes considered present a spherical structure while heaviest one are clearly deformed. The onset of deformation at N = 60 is induced by the crossing of the regular and intruder configuration, furthermore, both families of states present an increase of deformation with the neutron number.

Primary authors: MAYA BARBECHO, Esperanza (Universidad de Huelva); Prof. GARCÍA-RAMOS, José Enrique (Universidad de Huelva)

Presenter: MAYA BARBECHO, Esperanza (Universidad de Huelva)

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