

Shapes and Shape Phase Transitions in Even-Even *sd*- and *pf*-Shell Nuclei within the Algebraic Microscopic Pairing-plus-Quadrupole Shell Model

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We present results for the ground- and excited-state energies as well as the shapes in some even-even *sd*- and *pf*-shell nuclei obtained from calculations performed in the symmetry-adapted basis of the Algebraic Microscopic Pairing-plus-Quadrupole Shell Model. We further studied the signatures of the existence of phase transitions in these isotopes. The Hamiltonian includes the quadrupole and the pairing (isoscalar plus isovector) interactions, and the spin-orbit interaction as single-particle terms for the studied systems. Besides comparison with available experimental data, we also weigh the differences between the one- and two-oscillator-shell description of the observables as well as when full or restricted model space is used.