

SHAPE EVOLUTION IN NEUTRON-DEFICIENT CR ISOTOPES: A COVARIANT DENSITY FUNCTIONAL THEORY STUDY

Fatima-zahra **EL OUARDI**^{1,*}, Alaaeddine **LAHBAS**¹

¹ ESMaR, Department of Physics, Faculty of Science,
Mohammed V University in Rabat, Morocco

Abstract

We present a microscopic study of shape evolution, shape coexistence, and ground-state properties of the even-even ^{42,44,46}Cr isotopes within covariant density functional theory. Triaxial relativistic Hartree–Bogoliubov calculations are performed with the DD-ME2 and DD-PCX interactions and a separable pairing force, and compared with PC-PK1 and with Gogny D1S HFB results. Potential energy surfaces in the (β_2, γ) plane reveal the evolution of nuclear shapes with neutron number. Shape coexistence is suggested in ⁴²Cr, where prolate and oblate minima are separated by less than 1 MeV. Binding energies, two-neutron separation energies are in good agreement with available data, and the consistency between DD-ME2 and DD-PCX supports the robustness of the predictions.

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