

Nuclear Structure Evolution in Mg Isotopes between Proton and Neutron Drip Lines

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A comprehensive study of various ground-state properties of proton- and neutron-rich Mg isotopes with $A=20-36$ is performed in the framework of the self-consistent Skyrme-Hartree-Fock plus BCS method [1–3]. The correlation between the skin thickness and the characteristics related with the density dependence of the nuclear symmetry energy is investigated for the same isotopic chain following the theoretical approach based on the coherent density fluctuation model and applied in Refs. [4, 5]. The results of the calculations show that the behavior of the nuclear charge radii and the nuclear matter properties in the Mg isotopic chain is closely related with the nuclear deformation. A particular attempt is made to understand the most recent signatures for existence of "island of inversion" at neutron-rich ^{32}Mg nucleus ($N=20$) from the spectroscopic measurements of its low-lying energy spectrum [6] and the charge rms radii of all magnesium isotopes in the *sd* shell [7].

References

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