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Erosion of N = 28 Shell Closure in Light Nuclei

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The development of deformation in proton deficient N = 28 isotones is analyzed by employing relativistic Hartree-Bogoliubov (RHB) model based on recently introduced energy density functional DD-PCX. The calculations are performed by imposing constraints on axial and triaxial mass quadrupole moments. The regions of low-level density in neutron and proton single-particle states, around the Fermi level, favor the onset of deformation and shape coexistence. The relativistic functional DD-PCX provides a good description of the reduction of N = 28 spherical shell gap, the evolution of shapes, and disappearance of N = 28 shell closure, that occur due to quadrupole excitations across it. The results are compared with previous studies based either on the mean-field approach or the shell-model approach.

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