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Isocranking calculation with proton-neutron mixed energy density functionals KOICHI SATO, RIKEN Nishina Center, JACEK DOBACZEWSKI, University of Warsaw/University of Jyvaskyla, TAKASHI NAKATSUKASA, University of Tsukuba/RIKEN Nishina Center, WOJCIECH SATULA, University of Warsaw — We present results of calculations based on the Skyrme energy density functional that include arbitrary mixing between protons and neutrons. In this framework, single-particle states are superpositions of proton and neutron components and the energy density functional is fully invariant with respect to three-dimensional rotations in the isospin space. In this proton-neutron (p-n) mixing calculation, the isospin of the system is controlled by means of the isocranking method, which carries the standard tilted-axis cranking approach over to isospin space. By adjusting the isocranking frequency, we can control the size and direction of isospin of the system. We show selected numerical results of the p-n mixed Hartree-Fock calculations including those for the T=4 isobaric analogue states in A=40-56 nuclei and demonstrate that this approach is capable of describing quantitatively the isobaric analogue excited states. We also present the results of a systematic calculation for T = 1 triplets in the A = 10-66 region, and discuss a possible extension of the p-n mixed energy density functionals including the isospin breaking interaction.

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