

## Island of inversion by microscopically derived shell-model Hamiltonian

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We present the first application of the newly developed theory, EKK, of effective nucleon-nucleon interactions to the structure of exotic nuclei. This theory, a novel revision of many-body perturbation theory, enables us to perform shell-model calculations with several major shells (for instance, sd+pf shells). Using the Entem-Machleidt QCD-based chiral EFT interaction and the Fujita-Miyazawa three-body force, exotic neutron-rich Ne, Mg and Si isotopes are studied systematically, with a good description of ground-state energies, first 2+ and 4+ levels, and E2 transitions, as the first shell-model calculation for the island of inversion without two-body matrix elements fitted to experiment. The drip lines are predicted. We show effective single-particle energies from this interaction, exhibiting the shell evolution produced by the chiral EFT interaction + three-body force. Obviously, proposed configuration patterns can be exciting objects of direct reaction studies.

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