Ground-State Properties of C, O, and Ne Isotopes in Hartree-Fock-Bogoliubov Calculation with Gogny Interaction

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Abstract: Ground-state properties of C, O, and Ne isotopes are described in the framework of Hartree-Fock-Bogoliubov theory with density-dependent finite-range Gogny interaction D1S. We include all the contributions to the Hartree-Fock and pairing field arising from Gogny and Coulomb interaction as well as the center of mass correction in the numerical calculations. These ground-state properties of C, O, and Ne isotopes are compared with available experimental results, Hartree-Fock plus BCS, shell model and relativistic Hartree-Bogoliubov calculations. The agreement between experiments and our theoretical results is pretty well. The predicted drip-line is dependent strongly on the model and effective interaction due to their sensitivity to various theoretical details. The calculations predict no evidence for halo structure predicted for C, O, and Ne isotopes in a previous RHB study.

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