Investigation of ground State Properties of Even-Even and Odd Pb Isotopes within Hartree-Fock-Bogoliubov Theory

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In this work, we have investigated the nuclear structure of even-even and odd lead isotopes ($^{178-236}$Pb) within the Hartree-Fock-Bogoliubov theory. The SkP Skyrme interaction has been used and the pairing strength has been generalized with a new proposed formula which is more precise for this region of nuclei. The approach we have followed is somewhat similar to the one we did in our previous works in the regions of Neodymium (Nd, Z=60) [http://www.worldscientific.com/doi/abs/10.1142/S0218301315500731 Int. J. Mod. Phys. E 24, 1550073 (2015)] and Molybdenum (Mo, Z=42) [http://www.sciencedirect.com/science/article/pii/S0375947416301762 Nuc. Phys. A 957 22-32 (2017)]. Ground-state properties such as binding energy, two-neutron separation energy, quadrupole deformation, quadrupole moment, and rms-radii for protons and neutrons are discussed and compared with experimental data and some estimates of other nuclear models like Finite Range Droplet Model (FRDM), Relativistic Mean Field (RMF), Density-Dependent Meson-Exchange Relativistic Energy Functional (DD-ME2) and results of Hartree-Fock-Bogoliubov calculations based on the D1S Gogny effective nucleon-nucleon interaction (Gogny D1S).