

OPTICAL POTENTIAL BASED ON SKYRME FORCES FOR DESCRIBING THE ELASTIC NUCLEON-NUCLEUS SCATTERING

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The model of microscopic optical potential based on calculations of the one-particle Green function mass operator using the effective Skyrme nucleon-nucleon forces has been applied for describing cross sections and analyzing powers of the elastic nucleon-nucleus scattering. The Skyrme force parameters have been optimized by fitting a chosen angular distribution of the elastic neutron-nucleus scattering with simultaneous control of main characteristics of the nuclear matter and the binding energy and rms charge radius of the target nucleus. The found Skyrme forces have been used to analyze differential cross sections and analyzing powers of elastic neutron scattering by nuclei in a wide range of mass numbers. The calculations have given a satisfactory description of experimental data on elastic neutron-nucleus scattering and reasonable values of the main parameters for the symmetric nuclear matter and even-even nuclei. Analogous calculations have been performed for describing experimental data on the elastic proton-nucleus scattering, which have yielded encouraging results.

Keywords: Green function, Skyrme nucleon-nucleon forces, elastic neutron scattering, analyzing power, elastic proton scattering.