PROTONS SCATTERING ON ^{9}B, ^{9}Be ISOTOPES WITHIN THE DIFFRACTION THEORY

Ibraeva E.T., Burtebaev N.T., Krassovitskiy P.M.
Institute of Nuclear Physics RK, Almaty, Kazakhstan
E-mail: ibr@inp.kz

An important trend in the field of fundamental nuclear physics at the present time is the study of nuclear reactions that occur in the nuclear reactors of new generation. Such challenges include the study of structure and properties of the isotopes of boron and beryllium, which are used in the reactors as the absorbent. Theoretical treatment of the experimental results of the processes of their interaction with protons and neutrons at intermediate energies may significantly broaden the base of nuclear data.

We study the scattering of protons on ^{9}B and ^{9}Be nuclei within the Glauber theory of multiple diffraction scattering. The wave functions (WF) of nuclei are calculated in the three-particles 2α+N-model [1] with the paired αN- and $\alpha\alpha$-interactions involving the states prohibited by the Pauli principle.

Using the WFs of ^{9}B, ^{9}Be nuclei in the calculation as an expansion by gaussoids and representation of the multiple scattering operator in the form, conjugates with three-particle WFs, make it possible to calculate the matrix elements analytically, without the loss of precision that occurs in case of multiple scattering series cutoff and calculation of multidimensional integrals.

The performed study has demonstrated a sensitivity of the differential cross sections of elastic scattering to the structure of nuclei and to the contribution of multiple collisions processes with the α-clusters and nucleon, being in their composition. Calculations were made at the energies E_{p} = 0.22 and 1.04 GeV, for which (for ^{9}Be nucleus) experimental data are available [2, 3]. The comparison with the calculation results of other authors was made which helped us to make conclusion about WFs quality and the benefits of the used method, it showed that the quality of the experiment description in the Glauber theory is of the same order as in the optical model.

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3. G.D.Alkhasov *et al.* // Phys. Atom. Nucl. 1985. V.42. P.6.