

Study of the deuteron scattering on ${}^7\text{Li}$ nuclei

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New data of the differential cross section of the elastic and inelastic scattering of deuterons has been measured at energies 14.5 MeV on the isochronous cyclotron U-150M (Institute of Nuclear Physics, Almaty). The differential cross sections of the scattering were obtained for the ground state and the following excited states of the ${}^7\text{Li}$: $1/2^-$ (0.478 MeV), $7/2^-$ (4.68 MeV) in the angular range 180 - 1400 in laboratory system. The angular distribution showed the diffraction structure of the elastically and inelastically scattered deuterons.

The optimal values of the potential parameters were established for the system “d + ${}^7\text{Li}$ ” as a function of the energy from the joint analysis of the literature data at the energy range 7 - 25 MeV [1-4] within the framework of the optical model. Previously, the analysis of scattering process was performed at energies 14.7 MeV [3] and 25 MeV [4], while at energy 14.7 MeV [3] the experimental data were obtained at the forward hemisphere. The analysis of differential cross sections of elastic and inelastic scattering of deuterons on ${}^7\text{Li}$ at energy 14.5 MeV were performed within the framework of the coupled channel method for the negative parity levels that constitute the rotational band on the ground state of the nucleus using the FRESKO program. The value of the quadrupole deformation parameter β_2 determined from the analysis of the inelastic scattering and is in agreement with the values established from the analysis of the scattering data for deuterons [4].

References:

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Summary

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