

**STUDY OF ELASTIC AND INELASTIC SCATTERING  
OF ALPHA PARTICLES BY  ${}^9\text{Be}$  NUCLEI  
AT ENERGY  $E_\alpha=29$  MeV**

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The angular distributions of elastic and inelastic scattering of alpha particles by  ${}^9\text{Be}$  nuclei have been measured at the U-150M cyclotron of the Institute of Nuclear Physics (Almaty, Kazakhstan) at energy  $E_{\alpha,\text{lab}} = 29$  MeV. The following measured excited states of the  ${}^9\text{Be}$  nucleus have been measured:  $1/2^+$  ( $E_x = 1.68$  MeV),  $5/2^-$  ( $E_x = 2.43$  MeV) and  $5/2^+$  ( $E_x = 3.05$  MeV). The error of the obtained data does not exceed 10%.

The levels of the main band  $3/2^-$  (ground state) and  $5/2^-$  ( $E_x = 2.43$  MeV) were analyzed within the framework of the coupled channels method using the FRESKO computer code [1]. The global values of the optical potential from [2] were taken as starting parameters. In the process of fitting, only the depths of the real and imaginary parts of the potential were varied, and only a small correction was made for radii and diffusions. The levels of positive parity  $3/2^+$  (neutron halo) and  $5/2^+$  were analyzed using the single-particle model and the modified diffraction model (MDM). The obtained optical potentials, deformation parameters, spectroscopic amplitudes and radii (MDM) [3] are in good agreement with the literature data.

1. I.J.Thompson // *Comput.Phys.Rep.* 1988. V.7. P.167.
2. Ashok Kumar, S.Kailas, Sarla Rathi, K.Mahata // *Nucl. Phys. A.* 2006. V.776. P.105.
3. A.A.Ogloblin *et al.* // *Nucl. Phys. A.* 2010. V.834. P.143.