

ELASTIC AND INELASTIC SCATTERING OF ^3He IONS ON ^{16}O NUCLEUS AT 60 MeV

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The differential cross-sections of elastic and inelastic scattering of ^3He ions with $E=60$ MeV on ^{16}O nucleus in angular range of $11\text{--}148^\circ$ were measured on the U-150M Kazakh isochronous cyclotron.

The analysis of cross-sections of elastically scattered nuclides ^3He on studied nucleus was performed using standard optical model (by code SPI-GENOA [1]) with Woods-Saxon potential with separated form-factors of real and imaginary parts. The optimal values of inter-nuclear interaction potentials are obtained. As a criterion for matching the results of theoretical calculations with experimental data the minimization of the χ^2 values and the values of the volume integrals of the real part of the optical potential were used. The results are presented in Fig. 1 where points are experiment, solid curve are results of theoretical calculation.

Analysis of cross sections of inelastic scattered ions of helium nuclei ^{16}O was carried out using the distorted wave Born approximation (by code DWUCK4 [2]) with form-factor of a macroscopic collective excitation using optimal optical potential parameters obtained from elastic scattering. The results are presented in Fig. 2. The quadrupole deformation parameter $\beta_2 = 0.46$ of nucleus ^{16}O was defined.

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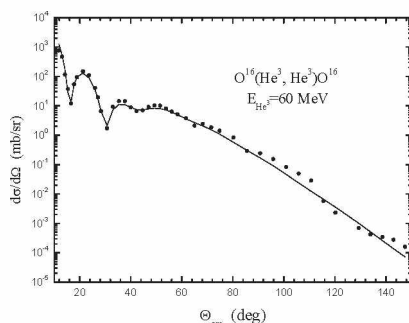


Fig. 1. Differential cross-sections of elastic scattering of ^3He ions on ^{16}O nucleus.

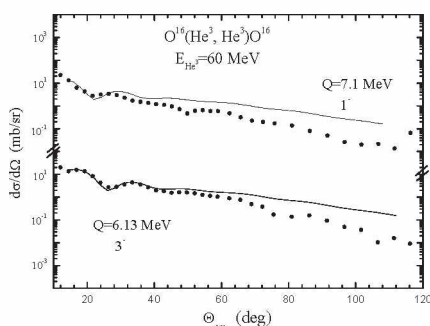


Fig. 2. Differential cross-sections of inelastic scattering of ^3He ions on ^{16}O nucleus at excited state 6.13 and 7.1 MeV.

1. F.G.Perey // NBI version, 1976.
2. P.D.Kunz. University of Colorado, Boulder, Colorado, USA (unpublished).