

## ENERGY DEPENDENCE OF TOTAL REACTION CROSS SECTIONS FOR ${}^6,8\text{He} + \text{Si}$ AND ${}^9,11\text{Li} + \text{Si}$ COLLISIONS

Penionzhkevich Yu.E.<sup>1,2</sup>, Sobolev Yu.G.<sup>1</sup>, Bezbakh A.A.<sup>1</sup>, Kugler A.<sup>3</sup>,  
Lashmanov N.A.<sup>1</sup>, Maj A.<sup>4</sup>, Maslov V.A.<sup>1</sup>, Naumenko M.A.<sup>1</sup>,  
Samarin V.V.<sup>1</sup>, Sivacek I.<sup>3</sup>, Slepnev R.S.<sup>1</sup>, Smirnov V.V.<sup>1</sup>,  
Stukalov S.I.<sup>1,5</sup>, Fomichev A.S.<sup>1</sup>, Zernyshkin V.A.<sup>1</sup>

<sup>1</sup> *Joint Institute for Nuclear Research, Dubna, Russia;*

<sup>2</sup> *MEPhI, National Research Nuclear University, Moscow, Russia;*

<sup>3</sup> *Nuclear Physics Institute ASCR, Řež, Czech Republic;*

<sup>4</sup> *Institute of Nuclear Physics PAN, Krakow, Poland;*

<sup>5</sup> *Voronezh State University, Voronezh, Russia*

E-mail: sobolev@jinr.ru

A series of experiments on measurement of total cross sections for reactions  ${}^6,8\text{He} + \text{Si}$  and  ${}^9,11\text{Li} + \text{Si}$  in the beam energy range 5–50 A·MeV was performed at Flerov Laboratory of Nuclear Reactions (FLNR), Joint Institute for Nuclear Research (JINR). The transmission method based on registration of energy loss in the material of  $\Delta E$  detector (natural Si target) as well as registration of n- $\gamma$  radiation by the  $4\pi$  spectrometer was used.

The interesting results were the unusual wide enhancement of total cross section for  ${}^9\text{Li} + \text{Si}$  reaction in the energy range  $\sim 10\text{--}30$  A·MeV as compared with  ${}^6,7\text{Li} + \text{Si}$  reactions. The similar weaker behavior was found for  ${}^6\text{He} + \text{Si}$  reaction as compared with  ${}^4\text{He} + \text{Si}$  reaction.

The microscopic approach based on the numeric solution of the time-dependent Schrödinger equation for the external neutrons of weakly bound projectile nuclei combined with the optical model is used for description of the observed effects. The calculated cross sections are in agreement with the experimental data on the total reaction cross sections for the studied nuclei.

This work was supported by the Russian Science Foundation (RSF), research project 17-12-01170.