Contribution ID : **51** Type : **Plenary/section talk**

Energy dependence of total cross sections for reactions with 6He, 6,9Li nuclei

Wednesday, 4 October 2017 08:30 (15)

A series of experiments has been performed at Flerov Laboratory of Nuclear Reactions (JINR) on measurement of total cross sections for reactions 4,6He+28Si and 6,7,9Li+28Si in the beam energy range 5-40 A·MeV. The transmission method based on registration of energy loss in the material of ΔE detector (Si target) as well as registration of n-γ radiation by the 4π spectrometer was used. The interesting results were the unusual wide enhancement of total cross section for 9Li+28Si reaction in the energy range ˜10-30 A·MeV as compared with 6,7Li+28Si reactions. The similar weaker behavior was found for 6He+28Si reaction as compared with 4He+28Si 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 proposed for description of the observed effects. These are explained by the rearrangement of external neutrons and thus the increase of neutron probability density in the region between the two nuclei during their collision in the energy range ˜10-30 A·MeV. The corrections to the nucleus-nucleus potential associated with the rearrangement of external neutrons were determined by integration of their probability density over the region between the two nuclei. The probability of leaving the elastic channel was calculated within the optical model. The calculated cross sections are in agreement with the experimental data on the total reaction cross sections for the studied nuclei.

Primary author(s) : NAUMENKO, Mikhail (Joint Institute for Nuclear Research); Prof. SAMARIN, Viacheslav (Joint Institute for Nuclear Research); Dr. SOBOLEV, Yuri (Joint Institute for Nuclear Research); Prof. PENIONZHKEVICH, Yuriy (JINR, NRNU MEPhI)

Presenter(s) : NAUMENKO, Mikhail (Joint Institute for Nuclear Research)

Session Classification : Nuclear physics - 1

Track Classification : Nuclear physics