



Contribution ID: 93

Type: Poster

## Peculiarities of interaction of weakly bound lithium nuclei at low energies

The review presents the latest experimental data on the total reaction cross sections ( $\sigma_R$ ) and elastic scattering angular distributions of light weakly bound nuclei  $6-9, 11\text{Li}$  [1].

A review of papers on the interaction of weakly bound  $6-9\text{Li}$  and  $11\text{Li}$  nuclei published so far and their analysis shows that there are no experimental data on  $\sigma_R$  and it is necessary to measure it for Li-isotopes at energies from the Coulomb barrier  $B_c=3-4$  MeV up to  $10-40$  MeV/A on  $^{28}\text{Si}$ ,  $^{27}\text{Al}$ ,  $^9\text{Be}$ , and  $^{12}\text{C}$  nuclei.

The new data on  $\sigma_R$  for reactions  $8,9\text{Li}+^{28}\text{Si}$  in the energy range  $5-30$  MeV/A with their analysis are presented in [2]. In the  $\sigma_R$  energy dependence of  $9\text{Li}+^{28}\text{Si}$  reaction, a “bump”, i.e., a local increase in the cross section in the energy interval  $10-30$  MeV/A, was first observed. Therefore, this dependence requires further theoretical analysis and experimental study.

Large  $\sigma_R$  values detected in the  $\sigma_R(E)$  dependence, as well as their rapid increase in a short energy interval in the low-energy region, can lead to a release of a large amount of energy, which is interesting in terms of search for new energy sources of the future.

The obtained new data (the existence of an anomalous increase in the  $\sigma_R$ ) in a narrow energy range  $10-30$  MeV/A in the  $(^6\text{He}, ^9\text{Li})+^{28}\text{Si}$  reactions at  $B_c$  energies will enable scientists to explain important questions of nucleosynthesis (nuclear astrophysics).

One of the most important features explaining why light elements are abundant in the universe is the increase in the interaction cross sections in the sub-barrier energy region in nuclear reactions with weakly bound nuclei. This effect is especially strongly manifested for light cluster nuclei  $6,9,11\text{Li}$  and nuclei with a neutron halo  $6,8\text{He}$  and  $11\text{Li}$ . The main channels of interaction of such nuclei are transfer, breakup and complete-fusion reactions.

1 Kuterbekov K.A. et.al. Chinese Journal of Physics (2017) 55 2523.

2 Kabyshev A.M. et al. J.Phys.G (2018) 45 025103.

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