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Compilation activity

In 2005 there was successfully finished the project # RP2-2403-SR-02 "Compilation and Evaluation of Alpha-Induced Nuclear Reaction Cross Sections for Astrophysics" of the U.S. Civilian Research and Development Foundation (CRDF). The final report on the project was approved in July. Compilation of data on the project was finished completely. Three transmission tapes TRANS (F020, F021, F022) were prepared and included into the EXFOR data library.

The materials are prepared to prolong the project. It is assumed to continue in the new project the works on getting parameters of the Woods – Saxon potential for the $^{12}C + \alpha$, $^{16}O + \alpha$, $^{20}Ne + \alpha$ systems in order to calculate radiation capture cross-sections for this chain of nuclear reactions. For this purpose it is planned to compile and present for general use the complete sets of all available experimental data for α-induced reactions within the energy range of interest.

Today the works on modifying software on processing and introduction of experimental information to EXFOR library are being carried out. A complex of programs using a single interface and including procedures of introduced data editing, sorting and processing is being created.

Evaluation activity

Within the frames of ISTC Project # RP2-2403-SR-02 for the $^{24}Mg+\alpha$, $^{28}Si+\alpha$, $^{32}S+\alpha$, $^{36}Ar+\alpha$ and $^{40}Ca+\alpha$ systems there were obtained parameters of the optical potential aimed at calculating cross-sections of nuclear reactions using Hauser-Feshbach statistical model. To determine parameters of the Woods – Saxon potential with surface absorption a system approach, whose basic principles are described in a final report, was used. The SCAT2 program code was used in this work to describe the differential cross-sections of elastic scattering to find parameters of the optical potential.

A modern version of the program using the possibilities of the Windows graphic interface was created by the Center programmers. This made it possible to essentially simplify the work with the application and make it more efficient. The input and output of results in SCAT2 changed considerably: today all the results of program operation are displayed in the form of tables and plots. There appeared the possibility of introducing experimental data and finding their deviation from the calculated ones. The real part of potential can be introduced to the table or plot.

Data base development

A new SaBa database version – the library of evaluated and experimental data on charged particles interaction with light nuclei – is now available for Russian users.

The development of SaBa library is going on. Within the frames of ISTC Project K-1128 "Experimental and Theoretical Researches of Nuclear Reactions Induced by Protons and α-particles on Light Nuclei for Astrophysics" the introduction of new modes related to data processing on differential cross-sections is planned.

After a big repair an electrostatic tandem accelerator of ions EGP-10 was put into operation in INRR. A new mode allowing operation with a micro-beam is introduced. Putting into operation of this accelerator will make it possible to renew investigations in studying interaction of charged particles with light and medium nuclei.