

Development of Service Software Package for Experimental Nuclear Data Compilation into the EXFOR Format

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The CNPD-developed and supported EXFOR-Editor software is a service software package for experimental nuclear data compilation into the EXFOR format.

The compilers of CNPD and some other NRDC centres make active use of the EXFOR-Editor to prepare data for the EXFOR library. The software takes into account strict requirements and limitations of the EXFOR format and simplifies the entering of structured information. The EXFOR-Editor is easy to learn and use. It effectively and quickly helps beginning specialists to master the compilation of nuclear data. [2].

We have been developing the EXFOR-Editor software package since 2005. There are four updated versions of the ExfData specialized editor for managing the EXFOR files and three updated versions of the InpGraph program for processing graphic information. Each of these versions includes up to ten subversions. In the course of development, we take into account feedbacks and requests from users, changes in the EXFOR coding rules adopted by NRDC Technical Meetings, modern software possibilities. This paper contains the description of the ExfData 4.01 new functions.

The EXFOR format is a constantly developing format. The EXFOR format makes it possible to include as appropriate new keywords, codes and data types. It is one of the main principles of the EXFOR long existence. At the NRDC technical meeting in 2019 there were approved the new input EXFOR rules of experimental numerical data on incident neutron spectra. We implemented the tools for input of structured information of SUBENTRY with the SUPPL-INF keyword and numerical data on incident neutron spectra, resolution or response function into the ExfData 4.01 according to these rules. The SUBENTRY template with supplementary information (SUPPL-INF) provides for the input of the permitted (for such a subentry) keywords only. We propose to use the DataTable mode to input the numerical data under SUPPL-INF. In addition, the dialog window for the STATUS keyword contains the tools to organize cross-reference for the subentry with supplementary information.

Now the ExfData program contains a new tool for processing the EXFOR exchange files (TRANS files). From the very beginning, the ExfData provides the compilation of nuclear data into the EXFOR format in the frame of one EXFOR entry that contains the experimental results obtained in a scientific laboratory with the aid of specific facility. A compiler should combine several ENTRY files into an exchange file (TRANS file) to transmit data into the EXFOR library (NDS IAEA). To compose such files, compilers use different text editors. Additional errors may be introduced while creating and editing the TRANS file. It is difficult to find them as usually the TRANS file is of great size (several thousand lines).

The ExfData provides users with all existing checking programs (ZChex, TransChecker) and with its own checking services to check input data on correspondence to the EXFOR format under the integrated user's environment. We decided to insert the possibility of TRANS file processing and checking into the ExfData. So, now a user can switch between two edit modes (TRANS mode or ENTRY mode) in the main program window without closing the ExfData. We informed of the development of beta-version ExfData 4.0 at the NRDC meeting in 2019. Now we have issued the final version 4.01 for TRANS file processing.

The ExfData provides the creation of a new TRANS file on the base of entries opened in the ENTRY mode, the addition of new entries from the external files appending them to the end of TRANS file or inserting into the current position. All functions of the ExfData data processing and checking are available for the TRANS file now. There are available the specialized text editor, the tree structure presentation of file context, the editing of keywords information, the access to the EXFOR dictionaries, the numerical data processing, the plotting and so on.

The CNPD has been supporting the internal database of all compiled entries. This is a table that contains the ENTRY number, the alteration flag (first transmission or changed ENTRY), the first author, the reference (article, report or book), the TRANS file number, comments. The ExfData 4.01 automatically creates a service file containing brief information on entries of TRANS file. A user can edit this information and export it into database or save it to a text file.

So, we are planning further development of the EXFOR-Editor software on the base of adjusted algorithm library and familiar user's interface and functional tools adding new possibilities and inserting new subroutines.