New EXFOR editor: a review of recent developments

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EXFOR[1] is an experimental nuclear reaction data library maintained by the IAEA on behalf of the International Network of Nuclear Reaction Data Centres (NRDC)[2]. It is accessible publically and is widely used in fields of scientific research such as nuclear physics, design and operation of nuclear power plants, medical isotopes, and radiotherapy. Currently, 14 data centers of the NRDC are present worldwide, and they collaborate mainly for collection, dissemination, compilation, and exchange of experimental data using the EXFOR format. The Hokkaido University Nuclear Reaction Data Centre (JCPRG, formerly Japan Charged-Particle Nuclear Reaction Data Group) became a member of the NRDC Network in the early 1980s[3]. JCPRG compiles and accumulates charged particle nuclear reaction data produced in accelerator-based facilities in Japan. A web-based Hyper Editor for Nuclear Data Exchange Libraries (HENDEL) was adopted to compile experimental nuclear reaction data in Nuclear Reaction Data File (NRDF) and EXFOR formats[4]. In an EXFOR compilation workshop (6-10 Oct. 2014, Vienna), EXFOR compilers emphasized that it is important to develop an OS independent EXFOR editor system[5]. In order to establish an OS independent EXFOR editor system, Java was selected as a programming language. A stand-alone type application for compiling experimental nuclear reaction data For EXFOR (ForEX) is being developed.

When we started the development of the program, our goal was to develop a fast, light, and user-friendly editor to compile nuclear reaction data with maximum flexibility. To achieve user-friendliness, we implemented the following functions: 1) collapsible/expandable items, 2) add/remove buttons, 3)a filterable suggestion field, 4) text filtering for a table, and 5) a dynamic suggestion field. In addition to the new functions, some external tools such as DANLO and CHEX can be executed in ForEX. DANLO is a tool to extract a dictionary of codes in EXFOR and is utilized for ForEX. CHEX is a checking program for the EXFOR format.

(1) Collapsible/expandable item
Many types of information and data are required as input for each keyword. For instance, the reaction information consists of information about the projectile, target, emitted particles, and so on. However, while inputting other data, it is unnecessary to view the reaction information. Therefore, the collapsible/expandable function is implemented for each item.

(2) Add/remove buttons
Similar to the concept of collapsible/expandable items, the number of input areas must be minimum at first. These areas can be added/removed interactively by buttons.

(3) Filterable suggestion field
Since there are several codes for some keywords, compilers often find it very difficult to select the correct code. Therefore, filterable suggestion fields were implemented to allow compilers to save time and avoid mistakes.

(4) Text filtering for a table
Similar to the concept of filterable suggestion fields, codes can be suggested by a keyword input. In particular, there are several codes related to reactions that are similar; therefore, with text filtering, an appropriate list of reaction codes can be obtained easily.

(5) Dynamic suggestion field
The purpose of a dynamic suggestion fields is to make data input easier and more reliable. For example, the compiler chooses an input from one list, which restricts the related contents of another list. The dynamic suggestion field presents two suggestion fields working in conjunction with one another, prompting end users with only relevant data.

A new EXFOR editor system, ForEX, is being developed in Java as a stand-alone application. ForEX can provide an environment for compiling numerical data with its bibliographic and experimental information in the EXFOR format. The input part of the program has been developed and tested on Linux and Windows platforms; however the output and import functions of the program are still under development. Testing on the Mac OS is in progress.

References
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