

Report on EXFOR Compilation 2017

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Abstract

In this report, we present our recent activities of the compilation of experimental nuclear reaction data. In the fiscal year from April 2017 to March 2018, we compiled 3 entries and transmitted 4 TRANS files.

1 Introduction

Nuclear reaction data are used in various fields, such as nuclear physics, engineering and medicine. The data can be accessed using a nuclear database through the Internet. The database is constructed in a special format called EXFOR (EXchange FORmat for experimental nuclear reaction data) [1]. The format is designed to accommodate experimental data with corresponding bibliographies and experimental details including error analysis for proper interpretation of the stored experimental data.

EXFOR is maintained by the International Network of Nuclear Reaction Data Centres (NRDC) coordinated by the International Atomic Energy Agency (IAEA) [2]. The NRDC collaborates in the compilation of experimental data and development of related software for compilation and dissemination. The Hokkaido University Nuclear Reaction Data Centre (JCPRG) [3] is a member of NRDC and has contributed about 10% of the charged-particle nuclear reaction data in the EXFOR library. JCPRG provides the compiled nuclear reaction data in both the international (EXFOR) and domestic (NRDF) [4] formats through an online search system.

In this report, we presented our compilation activities of the fiscal year from April 2017 to March 2018.

2 Activity progress

The main task of the JCPRG is to compile charged-particle induced reaction data obtained in Japanese facilities. The following steps are carried out to achieve the task.

- Survey of papers to be compiled from scientific journals
- Compilation of papers in EXFOR format
- Transmission of TRANS files (sets of compiled entries) to IAEA

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2.1 Journal Survey

Under collaboration with the NRDC network, experimental data published in scientific journals are continuously surveyed. Sometimes we find some published papers that are not in the scope of EXFOR but are as of NRDF. The lists of the surveyed journals are as follows:

- Journal of Nuclear Science and Technology (NST)
- Journal of Physics G (JP/G)
- Journal of Physical Society of Japan (JPJ)
- Nuclear Instruments and Methods in Physics Research A (NIM/A)
- Nuclear Instruments and Methods in Physics Research B (NIM/B)
- Nuclear Physics A (NP/A)
- Nuclear Science and Engineering (NSE)
- Physical Review C (PRC)
- Physical Review Letters (PRL)
- Physics Letters B (PL/B)
- Progress of Theoretical Physics (PTP)
- The European Physical Journal A (EPJ/A)

2.2 Compilation

In the fiscal year 2017, we compiled 3 new papers and revised 17 entries reporting on nuclear reaction experimental data obtained in Japan. Each new paper is assigned to a compiler. The compiled entries are peer-reviewed by other compilers. For a higher quality of contents and the accuracy of data in the NRDF and the EXFOR library, we contact authors to obtain original numerical data plotted in each figure. In case that the original data cannot be obtained from the corresponding author, we digitize numerical data from the plotted figures with the digitization software GSYS [5].

We have also cooperated with the RIKEN Nishina Center for compilation since 2010. The purpose of the cooperation is to increase the availability of the nuclear reaction data produced at the RIBF. The compiled files of nuclear data produced at the RIBF are translated into the EXFOR format for the benefit of nuclear data users. In the fiscal year 2017, 3 papers including the RIBF data were compiled. Therefore, most of the recent experimental nuclear reaction data from the RIBF have successfully been compiled in the EXFOR database.

2.3 Transmitted File in 2017

The most important work is to open EXFOR entries including the experimental nuclear reaction data worldwide. Our compiled entries are transmitted to the NRDC to upload into their servers to public. The transmission includes the new compiled entries as well as the modified entries. In 2017, 4 TRANS and PRELIM files: E108, E109, E110 and E111 are submitted to the IAEA. Table 1 represents the TRANS and PRELIM files that include the new as well as modified entries with their accession number. These 4 TRANS and PRELIM files contain 3 EXFOR new entries and 17 modified entries.

Table 1: The list of transmitted new and revised entries in 2017

TRANS	Prelim	Final	Entry New	Entry Rev
E108	2017.03.21	2017.05.29	E2506 E2518	E2494
E109	2017.09.28	2018.01.18	E2539	E0030 E0087 E1406 E1756 E1810
E110	2017.09.28	2018.01.25		E1920 E2055 E2083 E2388
E111	2017.09.28	2018.02.26		E1701 E1852 E1855 E1877 E1964 E2052 E2326
Total			3	17

3 Summary

We have established an effective procedure to compile all of the new publication reporting experiments performed in Japan. We reported recent compilation work in the JCPRG in this article and summarized the status of the EXFOR file transmission: the 4 TRANS files, named as E1108, E109, E110 and E111 were transmitted in fiscal year 2017.

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References

- [1] <http://www.jcprg.org/exfor/>
- [2] <http://www-nds.iaea.org/>
- [3] <http://www.jcprg.org/>
- [4] <http://www.jcprg.org/nrdf/>
- [5] <http://www.jcprg.org/gsys/>