

2013 Progress Report on EXFOR compilation by JCPRG

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Abstract

This report summarizes the activities of the Hokkaido University Nuclear Reaction Data Centre (JCPRG) in FY2013: such as staff members, their work and strategy for the compilation. We present the status of the transmitted entries of the EXFOR: 10 TRANS files were transmitted from April 2013 to March 2014. All works were carried out in close cooperation with the Nuclear Data Section, the International Atomic Energy Agency and the International Network of Nuclear Reaction Data Centres.

1 Brief History of JCPRG and its Activities

The Hokkaido University Nuclear Reaction Data Centre (JCPRG) [1] compiles and accumulates charged-particle induced nuclear reaction data obtained in the Japanese facilities in the own data format (Nuclear Reaction Data File: NRDF) and international format (EXchange FORmat: EXFOR). The compiled nuclear reaction data are available on the online search system of NRDF [2] and EXFOR [3]. As a member of the International Network of Nuclear Reaction Data Centres (NRDC), JCPRG has contributed about 10 percent of the charged-particle induced nuclear reaction data in EXFOR. The data compiled in JCPRG are registered to the EXFOR Library for the transmission of the experimental nuclear reaction data among national and international nuclear data centers for the benefits of nuclear data users worldwide. The data can be easily accessed in the EXFOR search system [3] on the JCPRG website. This write up accentuate a brief overview of the JCPRG compilation activities in fiscal year 2013: JCPRG transmitted 13 TRANS files which includes eleven E-entry (E074, E075, E076, E077, E078, E079, E080, E081, E082, E084) and two K-entry (K013, K014).

2 Organization

The total staff includes the centre head (Masayuki Aikawa), two JCPRG staff (Ayano Makinaga, Naoya Furutachi), two researchers (Kiyoshi Katō, Masayuki Fujimoto) and four MML researchers (Shuichiro Ebata, Myagmarjav Odsuren, Dagvadorj Ichinkhorloo, Vidya Devi).

3 Strategy for the compilation activities

- Compilation of the data in the new and old published papers which include charged-particle induced nuclear reaction data obtained in Japanese facilities.
- Digitization of the numerical data in some papers.

The main task of the JCPRG is to compile charged-particle induced reaction data obtained in Japanese facilities in our database NRDF. Every week we assign one compiler and checker for each paper. The main priorities are given to the new published papers which are finalized as for compilation by the all the members in the compilation meeting held every week. For better quality of the database, we ask the article author(s) to provide their original data that are plotted in each figure in the published paper to ensure the accuracy of the data compiled into the NRDF and the EXFOR library. In some cases when the original data could not be obtained from the author(s) we have to digitize numerical data from the plotted figure in the paper with the help of the GSYS [5] software. If, in future, the original numerical data is sent from the author(s) then we replace the digitized data with the original ones. We also correspond with the author(s) about particular matters like data of itself, error analysis, experimental conditions, etc., deal with in the paper that needs to be discussed. The numerical data of the compiled EXFOR entries are also proof read by the authors, and are to be revised according to their comments.

4 Journal Survey

We regularly carried out the journal survey of published papers in parallel with the IAEA-NDS survey that fulfill the scope of EXFOR. This survey is carried out monthly on the published papers in journals. Sometimes we found some published papers that are not necessary for the EXFOR but are in the scope of NRDF. The list of the surveyed journals are as following:

a) Journals for Survey

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

Table 1: The list of transmitted new and revised entries in 2013 with their accession number [5]

TRANS	Prelim	Final	Entry New	Entry Rev
E074	2013.03.11	2013.04.15		E1533 E1575 E1713 E1793 E1901 E1926 E1937 E1985 E1986 E2135 E2140 E2167 E2297 E2352
E075	2013.04.12	2013.06.13	E2401 E2405 E2406	E1787 E1788 E2267
E076	2013.05.10	2013.06.13	E2389 E2402 E2407	E2282 E2287
E077	2013.06.28	2013.09.06	E2409 E2410 E2416	E2361 E2405
E078	2013.07.12	2013.09.06	E2273 E2430	
E079	2013.09.21			E0249 E1988 E2121
E080	2013.09.25		E2434 E2435	E2117
E081			E2414 E2431 E2436 E2437 E2438 E2441	E2080 E2157 E2178 E2402
E082			E0736	
E083				E2135 E2355 E2382
E084	2013.09.25		E2439 E2440 E2442 E2443	
K013	2013.05.21	2013.09.06	K2316 K2385 K2404 K2408 K2299	
K014	2013.11.27		K2320 K2433	K2028
Total			31	33

5 Overview of Transmitted files in 2013

After the compilation of the entries in NRDF format, the most important work to come next is to translate those entries into the EXFOR format for the transmission of the experimental nuclear reaction data worldwide. The transmission includes the new compiled entries as well as the modified entries.

For the transmission of the compiled files, first we prepare PRELIM version and send to the IAEA-NDS for comments and suggestions. After modifying the entries of transmitted files according to the comments and suggestions from IAEA-NDS and other nuclear data centres, we send the final version of TRANS files to IAEA. In 2013, thirteen TRANS files: E074, E075, E076, E077, E078, E079, E080, E081, E082, E083, E084, K013 and K014 are submitted to the IAEA. Table 1 represents the TRANS files that include the new as well as modified entries with their accession number.

These 13 TRANS files, contain 31 EXFOR new entries and 33 modified entries. There are frequent transmissions of the new entries, in which 11 registered entries contain the RIBF data. During this period we participated in compilation of 35 old entries. These papers will be transmitted soon. Figure 1(a) represents the number of old compiled papers, new compiled papers, the cumulative number of new compiled papers and the total number of old and new compiled papers in each month of 2013. Figure 1(b) represents the cumulative number of new E-Entries and K-Entries

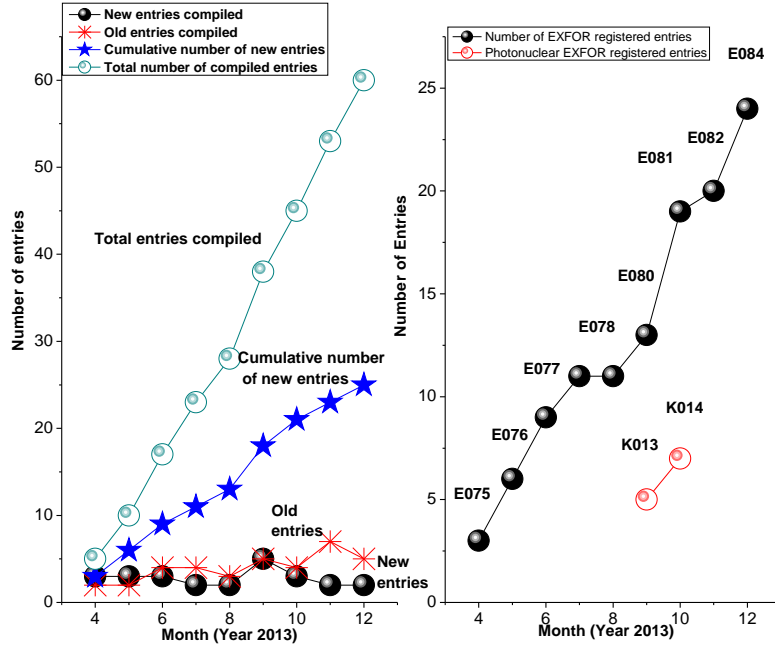


Fig. 1: The number of new and old entries compiled in 2013. (b) The Cumulative number of transmitted new and revised entries in 2013.

in each month of 2013.

6 Overview of registered data produced at RIBF

In addition to the collaboration with the NRDC network, the JCPRG established a collaborative research contract with the RIKEN Nishina Center in 2010, to advance the availability of the nuclear reaction data produced at RIBF.

We have addressed a smooth and quality compilation of the RIBF data as one of the important task in the collaboration. The number of registered papers by JCPRG are eight in 2010, seven in 2011 and nine in 2012. For the papers compiled in 2013, eleven papers containing the RIBF data in the compilation scope of the EXFOR library were found, out of which ten papers in 2013 have already been registered in the EXFOR library. One paper published in 2012 which was compiled in 2013 has also been registered on the EXFOR library. The list of the RIBF data compiled into the EXFOR library is also available on the JCPRG website with additional information [6]. Figure 2 represents the number of compiled entries and cumulative number of entries from 2010 to 2013.

In August 8-9, 2013, the 1st JCPRG-RNC Joint Workshop on Nuclear Data was held. One of the main purposes of this workshop was to discuss the data file format for the RIBF experiments, such as the SAMURAI experiments, the electron scattering experiment. The workshop was helpful to know the present and future status of the RIKEN-JCPRG research collaboration and related nuclear data activities and to discuss the possible efforts to make the collaboration more deepen.

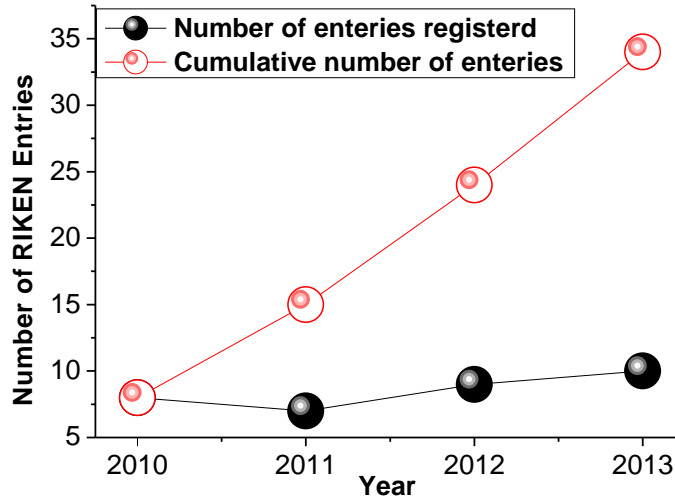


Fig. 2: Number of registered data entries produced at RIBF from 2010 to 2013.

7 Proceeding Checking

In this fiscal year 2013 we also participated in the survey of proceeding in the EXFOR Compilation Control System [7]. We found that fifteen conference proceeding papers were published in Journals and already compiled by JCPRG (see Table 2).

8 Future Plans

- JCPRG is continuously putting its efforts to improve the completeness and usability of the experimental nuclear reaction data produced at RIBF.
- In future JCPRG will try to increase the transmission of entries, because we still have many old compiled entries for transmission.
- Journal survey will be performed at regular intervals.
- Proceeding survey will also be done once in a year.

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References

- [1] <http://www.jcprg.org/>

Table 2: List of proceeding papers already published in Journal and compiled by JCPRG

Proceeding	Corresponding paper	Entry	Comment
IAEA Conf. 2006-009, 78	NST,49(2012)571	E2110	All data compiled
IAEA Conf. 2011-002, 113	KPS,59(2011)1725	E2367	5MeV and Nb data not included
IAEA Conf. 2011-002, 119	KPS,59(2011)2035	E2340	H ₂ O data compiled
IAEA Conf. 2012-001, 111	KPS,59(2011)1725	E2367	All data compiled
NP/A 788, 53c	NIM/A,605(2009)326	E2150	All data compiled
NP/A 788, 76c	PR/C,85(2012)061301	E2379	All data compiled
NP/A 790, 446c	TOKYO2(2007)458	E2159	All data compiled
EPJ/S 25, 217	PR/C79(2009)061601	E2149	All data compiled
EPJ/S 25, 221	PR/C82(2010)044309	E2290	All data compiled
EPJ/S 25, 221	PR/C82(2010)044309	E2290	All data compiled
EPJ/S 27, 233	PR/C84(2011)035808	E2359	All data compiled
NP/A 758, 761c	JP/G31(2005)S1517	E2144	All data compiled
J,KPS 59, 1836	NST,47(2010)367	K2199, K2348	All data compiled
NP/A 788, 153c	PRL,101(2008)212503	E2127	All data compiled
C,Conf-ce 2008, 153	PR/C,85(2012)015805	E2369	All data compiled

[2] <http://www.jcprg.org/nrdf/>

[3] <http://www.jcprg.org/exfor>

[4] <http://jcprg.org/gsys/gsys/>

[5] <http://www.jcprg.org/master/trans.html>

[6] <http://www.jcprg.org/riken/ribf-data/>

[7] <http://www-nds.iaea.org/exfor-master/>