

Hokkaido University Nuclear Reaction Data Centre (JCPRG)

Progress Report

*Nuclear Reaction Data Centre (JCPRG),
Faculty of Science, Hokkaido University*

IAEA's Technical Meeting on the
"International Network of Nuclear Reaction Data Centres"
June 7-10, 2016

0. General

In this report, we review the activities of Japan Nuclear Reaction Data Centre (JCPRG) since the last NRDC meeting in 2015. Our main objectives are as follows:

- a) Compilation of nuclear reaction data for two databases, NRDF and EXFOR
- b) Evaluation of nuclear reaction data
- c) Development of software and systems
- d) Promotion of collaboration among Asian countries

0.1 Staff

We had 6 core members (1 Associate professor, 1 Assistant professor, 2 seniors and 2 postdoctoral researchers) to perform our activities. The activities are supervised by the JCPRG Steering Committee consisting of 6 professors at Hokkaido University. JCPRG is advised and assessed by the JCPRG Advisory Board consisting of 5 members external to the university.

0.2 Budget

We receive an annual budget for research and education from Hokkaido University. In addition, Japan Society for the Promotion of Science allocates annual grant of 0.8 million JPY for compilation for five years between Apr. 2013 and Mar. 2018.

0.3 Collaboration

JCPRG has collaborations with institutes, both inside and outside of Hokkaido University. We collaborated with Meme Media Laboratory in the university to develop some software. As for the collaboration with RIKEN, we advance the compilation of RI beam data performed in RIKEN.

Under the collaboration with JAEA, we cooperate to educate graduate school students and to evaluate nuclear reaction data. The collaboration with ATOMKI has been started from April 2014. In this collaboration, we performed nuclear experiments for medical purposes at RIBF.

1. Compilation

1.1 NRDF

From April 2015 to May 2016, 94 new papers of charged-particle and photonuclear reaction data have been compiled for NRDF.

1.2 EXFOR

Since the last NRDC meeting, we have transmitted 94 new and 13 revised/deleted entries as 12 trans files (E095-E103, K015,016, R028) to the NDS open area.

JCPRG is grateful to NRDC colleagues for the valuable comments and suggestions.

Table 1. EXFOR E-entries transmitted from JCPRG to NDS IAEA.

TRANS	TRANS Status	ENTRY Tot.	ENTRY New	ENTRY Rev.
E095	Final (2015/4/29)	4	0	4
E096	Final (2015/4/29)	6	4	2
E097	Final (2015/6/26)	6	5	1
E098	Final (2015/9/26)	4	4	0
E099	Final (2015/9/26)	4	3	1
E100	Final. (2016/2/7)	27	27	0
E101	Final. (2016/4/30)	10	10	0
E102	Final. (2016/5/11)	6	2	4
E103	Prelim. (2016/5/25)	32	32	0

Table 2. EXFOR K-entries transmitted from JCPRG to NDS IAEA.

TRANS	TRANS Status	ENTRY Tot.	ENTRY New	ENTRY Rev.
K015	Final. (2016/6/25)	3	2	1
K016	Prelim. (2016/5/20)	4	4	0

Table 3. EXFOR R-entries transmitted from JCPRG to NDS IAEA.

TRANS	TRANS Status	ENTRY Tot.	ENTRY New	ENTRY Rev.
R028	Final. (2015/4/29)	1	1	0

2. Evaluation

We evaluate nuclear reaction data, such as ${}^6\text{Li}+n$ reaction data using Continuum-Discretized Coupled-Channels Method (CDCC) and photonuclear reaction data using a time-dependent mean-field theory. The nuclei (${}^8\text{Be}$, ${}^{12}\text{C}$, etc.) in which the alpha-cluster structure is developing are investigated by the complex scaled orthogonal condition method.

3. System Development

3.1 Data Retrieval System

We have 3 data retrieval systems mentioned below.

- NRDF (<http://www.jcprg.org/nrdf/>)
- NRDF/A (<http://www.jcprg.org/nrdfa/>)
- EXFOR/ENDF (<http://www.jcprg.org/exfor/>)

The relational database management system MySQL has been adopted for the databases to search and retrieve NRDF, EXFOR and ENDF data. For EXFOR, new trans files are copied from the NDS open area, and the MySQL database is updated periodically.

3.2 Coding Software

We have a coding editor and digitizing software applicable for the coding purpose

- Coding editor "HENDEL" (<http://www.jcprg.org/manuals/hendel/>)
- Digitization software "GSYS" (<http://www.jcprg.org/gsys/>)
- New original editor under construction (stand-alone type)

4. Others

4.1 Publication of Annual Report

The "JCPRG Annual Report 2014" had been published and is available on our website.

4.2 JSPS Bilateral Program

The JSPS Bilateral Program "Measurement and Evaluation of Important Nuclear Data for Diagnosis and Therapy Treatments" with ATOMKI has been implemented from Apr. 2014(until Mar. 2016).

4.3 ImPACT project

JCPRG participates in a project which is promoted by Cabinet Office, Government of Japan. The title of the project is “Reduction and Resource Recycle of High Level Radioactive Wastes with Nuclear Transmutation” which is one of ImPACT (Impulsing PARadigm Change through disruptive Technology) projects. The role of JCPRG in the project is mainly to compile new data. A member of JCPRG is employed by the budget from ImPACT project.