

Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

Executive Committee

Progress Report to the NRDC Meeting
June 17-19, 2003

General

In 2002, we have carried out the following activities:

1. Compiling CPND (Charged-Particle Nuclear Reaction Data) (26 entries) produced in Japan with the NRDF (Nuclear Reaction Data File) format.
2. Transmitting CPND into the EXFOR data (79 entries, including 75 new).
3. Improving an web-based system, so-called HENDEL an online editor-compiler for both NRDF and EXFOR.
4. Disseminating CPND and promoting its utilization in Japan.
5. Developing a new retrieval system, named DARPE (DAta Retrieval and Plotting Engine) for NRDF.
6. Designing a new retrieval system for EXFOR and JENDL (in collaboration with JAERI and SAE).
7. Researching recent trends of the nuclear reaction data production in the world.
8. Investigating titles of journals which will be scanned by JCPRG for compilation of the CPND bibliographic information to CINDA.

The regular JCPRG budget has ended at March 2001. Starting from 2002, the budget was drawn on a competitive basis. The budget of 2002 was accepted to be almost the same as 2001. However the budget of 2003 was not accepted.

NRDF Data Compiling Activity

In 2002 we newly compiled 26 entries (717 tables, 3.23 MB) based on CPND obtained with the accelerators in Japan and published in NP/A, PR/C, PRL, PL/B, NIM/A, NST, EPJ/A, PTP and JP/G. One of important progresses in this year is found in quality of numerical data according to the following reason: With the cooperation of experimentalists, we received many numerical data from authors of references. The data of 520 tables (72.5%) among 717 tables were obtained from authors directly, while data of 38 tables (5% of total table number) were taken by scanning figures.

Transmission to EXFOR

Sine the last NRDC meeting (May 2002, Paris), 4 files E021, E022, E023 and R013 have been transmitted to IAEA-NDS. E021, E022 and R013 were accepted and added into the EXFOR master. Preliminary trans files of these were corrected based on comments from NDS, CAJaD and NNDC. Many new codes proposed through 17 CP-Memos promote the transmission of Japanese CPND.

Recent CPND sent to the NDS open area are summarized in the following table (June 2002 to May 2003):

TRANS	TRANS-Flag	Entr-Tot	Entr-New	Entr-Rev	DSub-Tot	DSub-New	DSub-Rev
E020		30	30	0	197	197	0
E021		28	25	3	308	295	13
E022	Prelim.	21	20	1	760	709	51
Sum		79	75	7	1265	1201	64

The number of newly transmitted entries is remarkably increased in comparison with results of the last year (Last year, we transmitted one entry E019 which includes 12 new entries).

E1706, E1717 and E1751 are now pending because these data contain inclusive reaction data (production cross sections of elementary particles). These will be therefore transmitted after getting an agreement about the elementary particles code scheme in EXFOR.

In order to solve the duplication problem shown in WP2002-17, we deleted 18 E-library entries (which are duplications of E1790 to E1799), and also deleted 3 R-library entries, R0002, 0023 and R0024 (which are duplications of A0161, A0175 and A0265). There are still 6 duplication pairs between E-library and O-library.

All E-entries after E1700 have been compiled by HENDEL (web-based editor for NRDF and EXFOR). Using this editor, we can compile CPND in both formats of NRDF and EXFOR quite efficiently. Now we are working on the compilation of data published in the first quarter of 2003 (and some old references which should be in but lacked in the E-library).

Web-Based Editor "HENDEL"

Since July 2001, JCPRG has compiled all NRDF and EXFOR entries using the web-based editor HENDEL (Hyper Editor for Nuclear Data Exchange Language) as reported in WP2002-31. This editor is a very useful tool for us to compile CPND in both formats of NRDF and EXFOR simultaneously. HENDEL has been improved to cover completely CPND which JCPRG compiled, but it does not yet include whole part of EXFOR System Manual (e.g. pointer). We will further improve the HENDEL system and open website of HENDEL to the other centers for testing and comments in near future (see Action 29 of the NRDC meeting 2002).

Customer Services

Now the retrieval services of NRDF are available via web-server of JCPRG (<http://www.jcprg.org/>) and customers can access to NRDF data for 1213 references. In order to improve the retrieval environment, we are developing a new NRDF retrieval system DARPE (DATA Retrieval and Plotting Engine), by which we can compare many data from various entries on the same panel. This system is now on the step of the final test and will be released on the third quarter of 2003. We are also developing a retrieval system based on the IntelligentPad in order to extend the NRDF data service.

Other development started at the last winter in collaboration with JAERI and SAE. In this project, the new system for retrieval, plot and utilization of EXFOR and JENDL (Japanese Evaluated Nuclear Data Library) is being developed.

Recent Trend of Nuclear Reaction Data

We studied recent trends of neutron and charged-particle induced nuclear reaction data published in 2002 by taking statistics for 8 major journals (PR/C, PRL, PL/B, NP/A, EPJ/A, JP/G, JPJ and PAN). In total, 614 papers were screened. These papers are categorized by journal, area, incident energy, induced particle, target and detected particle. We compared the results with a similar research which was done in 1992 (751 papers). The main trends found in this research are as follows:

- **Journal:** The majority of the papers, both in 1992 and in 2002, were published by PR/C, although their number has slightly decreased. The number of papers in NP/A has also decreased, whereas EPJ/A published more paper in 2002. Numbers of papers published in PRL and PL/B are almost the same as a decade ago.
- **Area:** According to the location of accelerators, we categorized papers by 5 areas (EU, US-Canada, CIS, Japan, Others). Accelerators in EU countries published the most papers, with US and Canada following them (as in 1992). The combined number of papers with the data produced in the CIS countries was reduced by about half. The number of papers reporting on the data obtained at Japanese accelerators is almost the same as in 1992.
- **Incident energy:** The number of papers reporting on thermal and low energy ($\leq 15\text{MeV/A}$) reactions is the largest. The number of higher energy experiments is less than that of thermal and low energy experiments, but increased in comparison with that of 1992 (130% for 15-150MeV/A, 100% for 150 MeV-1 GeV/A and 150% for 1- GeVA).
- **Induced particle:** The number of neutron induced experimental data is reduced to 25% of the previous result, while the total number of π and K meson induced experiments is now larger than that of neutron induced experiments.
- **Target:** Experiments with heavy nuclei ($A > 40$) contributed to the major part of the papers both in 2002 and in 1992. Light target ($A \leq 4$) experiments are not frequently reported, although the number of papers on them increased about fourfold.
- **Detected particle:** In the most experiments, the detected particle is Gamma. Next, hadrons, light nuclei ($A \leq 4$) and heavy nuclei ($A > 4$) are detected in a similar number of papers.

CINDA entries for Japanese Journal

We have discussed the Japanese journals which should be scanned by JCPRG for compilation of the CPND bibliographic information to CINDA. We planned to scan JPJ, PTP, NST, and NSTS regularly. (This is a subject to be discussed in NRDC.)

ANNEX: Organization and members of JCPRG

Advisory committee :

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(6) IntelligentPad-based database development :

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(7) Editor-compiler development :

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