

# **Japan Nuclear Reaction Data Center (JCPRG)**

## **Faculty of Science, Hokkaido University**

### **Steering Committee**

Progress Report to the  
IAEA Technical Meeting on the Network of Nuclear Reaction Data Centres  
25-29 May, 2009

#### **0. General**

The “Japan Nuclear Reaction Data center (JCPRG)” started at April, 2007. The center has three main tasks: 1) Database activities, 2) Data evaluations and 3) Asian network activities. Since the last NRDC meeting (September 2008, 22-25), we have worked on the following main tasks: We had a workshop on a development of EXFOR, inviting V. Zerkin and N.Otsuka to Hokkaido university in Sapporo. In order to proceed the evaluation of the light-nuclear reactions, we made a new database (NRDF/A) of experimental data for astrophysical nuclear reactions with the support of Japan Society for the Promotion of Science (JSPS). As one of Asian network activities, we invited a young researcher from Mongolia to have a chance of training for the nuclear data compilation in EXFOR.

At the beginning of 2008, N. Otsuka who has been the most active member of our group moved to IAEA. We engaged three young colleagues to cover the activities of N. Otsuka. However, they are not regular staffs, and are limited by three years. In order to establish the activity of JCPRG, we are hoping to have regular staff positions and submitted our plan of the new center to Hokkaido University and the Japanese Government.

We are writing the manuscripts of “NRDF Annual Report 2009” which will be published in June.

#### **0.1 Staff**

Our activities have been carried out by 9 members (3 postdoctoral researchers, 4 graduate students and 2 technical staff). They have been supervised by the NRDF Steering Committee, which consists of 10 senior researchers (9 nuclear physicists and 1 information scientist). All activities have been coordinated by 1 secretary. Three

researchers in the JAEA Nuclear Data Center (Drs. J. Katakura, K. Shibata and S. Chiba) are invited to become the visiting professors of the Faculty.

One of the graduate students is a visiting trainee from the Nuclear Research Center, National University of Mongolia. We have trained her on the data compiling since November 2008 and she has got a certain skill.

## **0.2 Budget**

Since the regular JCPRG budget ended at March 2001, we have no regular budget. In 2009, 9 million JPY was allocated for Astrophysical nuclear data by Japan Society for the Promotion of Science (JSPS).

# **1. Data Compilation**

We are continuing data compilation for charged-particle nuclear reaction data obtained in Japan.

We are scanning 17 journals for Japanese charged-particle and photo-nuclear nuclear reaction data compilation: PR/C, PRL, PL/B, EPJ/A, NST, NIM/A, NIM/B, JPJ, ARI, RCA, JRN, KPS, NSTS, CPL, ZP/A, PAN and JNRS.

## **1.1 NRDF**

From April 2008 to March 2009, CPND and PhND in **49 references (343 records, 1.29MB)** have been newly compiled for NRDF. Usually new data are released at the JCPRG web site several months prior to EXFOR.

## **1.2 NRDF/A**

Construction of a new database for the evaluations of astrophysical nuclear reactions based on theoretical calculations is in progress. We call this database as Nuclear Reaction Data Files for Astrophysics (NRDF/A). In the previous version of NRDF/A (2006), we have assembled only 31 reactions for nuclei from C to Mg. In the present new version (2008), the astrophysical important light nuclei up to Si are included to achieve the coverage for NACRE. As a result, the number of reactions to be compiled is about 200. At the present stage, the bibliographic information of these reactions have been compiled.

### **1.3 EXFOR**

Since the 2008 NRDC meeting, we have made **33 new entries** and have revised or deleted **11 old entries**. These were transmitted as **5** trans files (E056-E058, K005, R023) to the NDS open area. JCPRG is grateful for valuable comments from Svetlana Dunaeva (NDS), Stanislav Maev and Marina Mikhaylyukova (CJD), Vladimir Varlamov (CDFE) and many members of the international nuclear data centers on our transmissions as always.

### **1.4 CINDA**

We have prepared CINDA batches for CPND published in Japan every half year. Each batch covers 6 issues of each of 4 Japanese journals JPJ, PTP, NST and JNRS. Since the 2008 NRDC meeting, one regular batch (7 added lines and 0 deleted lines) were prepared and sent to NEA-DB (Reader code J).

## **2. Data Correction**

After Memo CP-E No.136, we newly found up 6 mistakes (Memo CP-E No.137) of the CINDA master file in bibliographic information. These 2 memos were reviewed at NEA Data Bank (A45, NRDC 2008). Cooperating with them, we verified error propagation from EXFOR to CINDA. Actually that had happened in the 34 lines (Memo CP-D No.561).

## **3. Data services and Software**

### **3.1 Database Search System**

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

### **3.2 Cording Software**

- NRDF/EXFOR editor – HENDEL (<http://www.jcprg.org/manuals/hendel/>)
- Digitization System – GSYS (<http://www.jcprg.org/gsys/>)

## **4. System Development**

### **4.1 XML format for nuclear reaction data**

Current EXFOR or NRDF Format is specific to itself. We suppose that a nuclear data exchange format of the next generation should be defined based on XML. If the exchange format was redefined based on XML, the data available from libraries (EXFOR, NRDF, etc.) would enable us to have wider common bases for our various software applications.

We highly appreciate the presentation of Viktor Zerkin and discussions held in Sapporo, on March, 2009. To achieve an exchange format agreed, we will continue to gain various experiences with using XML and to apply the IntelligentPad technology for EXFOR systems.

### **4.2 New version of the digitization system GSYS (<http://www.jcprg.org/gsys/>)**

User-friendliness is a notable advantage of the GSYS system. Strengthening this advantage, we are now developing the new version of GSYS.

## **5. Meetings and Public Relation**

### **1. Sapporo-IAEA Nuclear Data Meeting 2009**

Inviting Viktor Zerkin and Naohiko Otsuka from IAEA, we had a workshop on the development of EXFOR and future exchange formats in Sapporo, March 16-19, 2009. (<http://www.jcprg.org/symposium/viktor-2009.html/>)

### **2. Other meetings and publications**

The first international Ulaanbaatar conference on nuclear physics and application was held in Ulaanbaatar, Mongolia on September 8-11, 2008. Kato had a talk of “Nuclear Reaction Data Network; International and Asia”, which was published as a paper in the AIP Conference Proceedings, volume 1109 (2009).

Kimura had a poster presentation of “Recent Activity in JCPRG” in Nuclear Data Conference which was held at JAEA (Tokai, Japan) on November 20-21, 2008. The proceedings will be published.

On March 25-26, 2009, the workshop on nuclear data and nuclear physics was held at RIKEN (Wako, Japan). Kato presented a talk about the recent activities of Hokkaido Nuclear Data Center, and Otsuka had a report on the international nuclear data activities.

## **ANNEX: Organization and members of JCPRG**

### **NRDF Advisory Committee**

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