

「Technical Meeting of the Nuclear Reaction Data Centers and EXFOR Editor Workshop」報告

Workshop Report on “Technical Meeting of the Nuclear Reaction Data Centers and EXFOR Editor Workshop”

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Abstract

“The IAEA Technical Meeting of the Nuclear Reaction Data Center and EXFOR Editor Workshop” was held at IAEA, Vienna, Austria 25-26 and 27- 29 May 2009, respectively. The meeting was attended by 23 participants from 13 cooperating data centers of China, Hungary, India, Japan, Korea, the Russian Federation, Ukraine, USA, NEA and IAEA. S. Kopecky from EC-JRC-IRMM Geel, Belgium, attended the meeting as an observer.

1 Introduction

The main aim of the Technical Meeting [1] was to discuss about 1) EXFOR quality control, 2) EXFOR compilation completeness and transmission statistics, 3) first experiences with modified distribution of compilation responsibilities, 4) updates to the EXFOR/CINDA dictionaries 5) new formats for reporting experimental uncertainties and covariance information and for bibliographic information and 6) compilation software, including a new EXFOR Wizard and digitizing software.

The main objectives of the Workshop was to deal with the EXFOR data library, to acquire analytical techniques and to go through rapid and complex transfer procedures for the correct compilation of nuclear cross-section data from the wide range of publications, laboratory reports and other types of publications.

2 Contents of the meeting

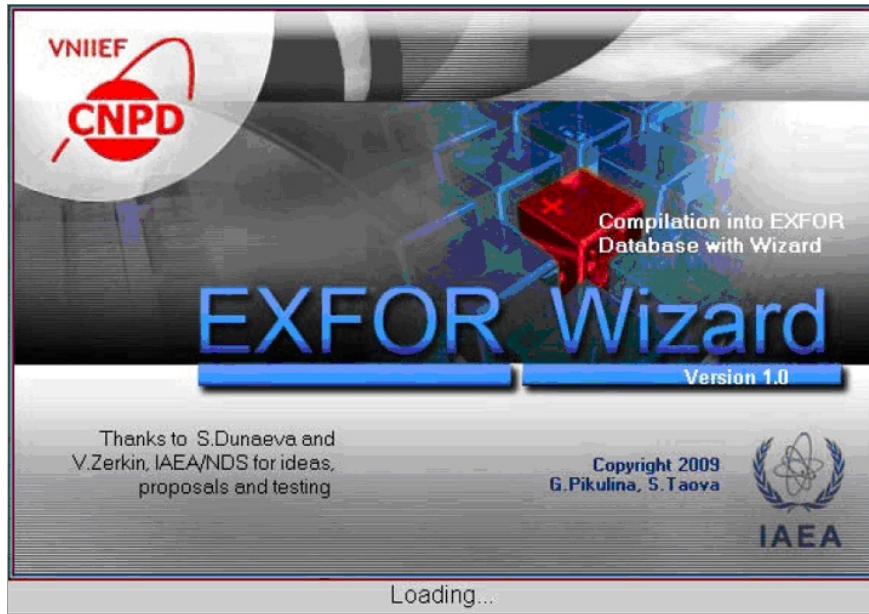
Meetings of this network are held annually with center heads and technical staffs. In this meeting JCPRG emphasized its responsibility for the compilation of the nuclear reaction data produced in Japan [2]. Our opinion was viewed in Summary Report on Technical Meeting [1] as the following: “H. Noto presented a summary on the compilation responsibilities and policies in Japan. Major experimental groups and facilities in Japan have issued guidelines saying that their data are to be delivered to JCPRG. Moreover, communications and exchanges with authors are mainly happening in Japanese. Therefore, and because compilation of data produced in Japan is the main objective and *raison d’etre* of JCPRG, and for reasons of efficiency, JCPRG should keep the responsibility for all data produced in Japan.”

In the meeting, two new techniques of compilation softwares were demonstrated by two presenters, one of which is our member. First, G. Pikulina (Russian Federal Nuclear Center All Russian Scientific Research Institute of Experimental Physics) presented the “EXFOR Wizard”, a new application developed in Sarov. Secondary, N. Furutachi (Hokkaido University) presented the current status of GSYS, a general purpose digitizing software usable for EXFOR compilation as well as other applications.

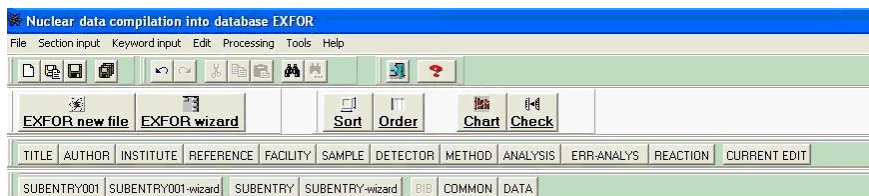
During the meeting, 31 working papers were presented and the results of the discussions were summarized in 19 Conclusions and 57 Actions.

In the workshop the participants got down to manipulating EXFOR Wizard and GSYS with the help of the “tutors” from Sarov and Sapporo, respectively. The findings from the workshop training were as follows:

- EXFOR Wizard (an application for creation of EXFOR files with patterns Center of Nuclear Physical Data (CNPD), RFNC-VNIIEF, presented by G.N. Pikulina) [3]
 - The beta-version of an application of EXFOR Wizard was presented (see Fig. 1). EXFOR Wizard is intended to create a new file in EXFOR format for novice users of EXFOR compilation. It can also be used by experienced compilers to create patterns of EXFOR files for further editing the files by using EXFOR editors (see Fig. 2).
 - The main implemented functions of the program EXFOR Wizard are the followings.
 - * Creation of a new ENTRY.
 - * Editing of entries created before by application EXFOR Wizard and saved in the internal data base.
 - * Creation, editing and deletion of a new SUBENTRY.
 - * Input and editing of the main keywords.
 - It also takes into account the type of source data presentation which can be specified in the form of tables or graphs.
 - The application EXFOR-Wizard works under WINDOWS Operation System of 2000/XP version or under higher version.
- Japanese Digitizer GSYS (JCPRG, presented by Naoya Furutachi) [4]
 - GSYS is the Web-based tool for digitizing- and displaying data figures on the academic journals which facilitates numerical data taking from the printed media. GSYS has been developed and updated by some researchers in Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)



☒ 1: Starting window of EXFOR Wizard



☒ 2: Tool bar of EXFOR-Editor

and is used in the process of NRDF (Nuclear Reaction Data File) and EXFOR data compilation in JCPRG.

Main features of GSYS are listed below and are shown in Fig. 3.

- * Cross-platform window application which only requires Java Runtime Environment.
 - * Intuitive and light GUI.
 - * Supports PNG, GIF, and JPEG image formats.
 - * Flexible input and output that are compatible with many data formats.
 - * Feedback function which enables to reuse former data easily.
 - * Easy set-up of X-axis and Y-axis with automatic axis detection.
- The details of each function are explained in the available manuals of JCPRG web page.

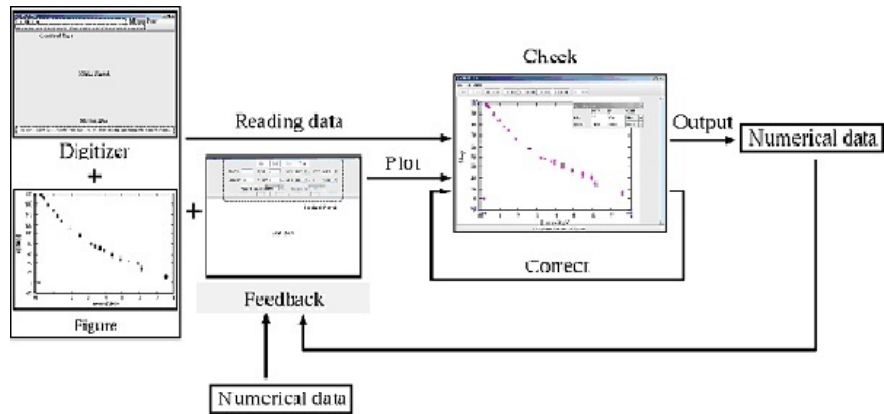


図 3: Data reading process and feed back function of Digitizer GSYS



図 4: Group photo of participants

参考文献

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- [2] WP2009-26, NRDC Technical Meeting 5/20/2009 JCPRG.
- [3] EXFOR-Editor manual, A tool for inputting and editing experimental data in the EXFOR format, G.N. Pikulina, S.M. Taova, 2007.
- [4] GSYS2.4 manual, ITO, Shinya, SUZUKI, Ryusuke, Hokkaido University Faculty of Science.

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 April1, 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.icprg.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

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