Report on the 2018 Technical Meeting on International Network of Nuclear Reaction Data Centres

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Abstract

In this report, the contents of the 2018 Internationl Atomic Energy Agency Technical Meeting on the International Network of Nuclear Reaction Data Centres held at the Global Centre for Nuclear Energy Partnership, Bahadurgarh, India from 1 to 4 May 2018 are discussed. This meeting aims to discuss the various statistics, manuals and dictionaries, compilation needs, quality control, coding rules as well as software and dissemination related to the EXFOR compilation.

1 Introduction

The 2018 - Internationl Atomic Energy Agency (IAEA) Technical Meeting on the International Network of Nuclear Reaction Data Centres was held at the Global Centre for Nuclear Energy Partnership (GCNEP) in Bahadurgarh, Haryana, India from 1 to 4 May 2018 [1]. The meetings of this network are held every year and with full meetings involving center heads and technical staff bi-annually. The 2018 meeting was attended by about 20 participants representing different Centers from the eight Member States (China, Hungary, India, Japan, Korea, Russia, Ukraine and USA), two International Organisations (NEA, IAEA) and also a participant from Kazakhstan (for participant list see Appendix I). Main topics of the present meeting were annual reports of different centers, various statistics, manuals and dictionaries, compilation needs, quality control, coding rules as well as software and dissemination (for detailed program see Appendix II). The report is organized as follows: section 2 lists the objectives of meeting. Section 3 describes the main topics of the Agenda. Section 4 presents the closing of the meeting. Finally, section 5 reports summary.

2 Objectives

- Annual reports of Nuclear Reaction Data Centers.

- Various statistics, manuals and dictionaries related to EXFOR-compilation.

- Quality control, coding rules, software and dissemination.

Figure 1: Group photo of participants NRDC-2018.

3 Main Topics of the Agenda

3.1 Opening

In the opening session, **A. Saxena**, Head of Nuclear Physics Division of Bhabha Atomic Research Centre (BARC) welcomed the participants, and followed by the self introduction of all the participants. The election of the chairperson was conducted and **A. Saxena (BARC)** was elected as the chairperson.

3.2 Progress Reports

Progress reports from all 13 attending centers were presented by center representatives, where they discuss their staff strengths, compilation, dissemination and other nuclear data related activities of interest to the network.

3.3 EXFOR General

- **N. Otsuka** reported the statistics of transmissions, journal scanning and preliminary tape checking. He reported that 521 new entries and 996 revised entries have been newly finalized since the last NRDC meeting.

- **N. Otsuka** presented his analysis of compilation time (time of transmission - time of publication) for seven selected journals. Average time interval between the preliminary and final transmission, for the period from May 2017 - April 2018, for all centers was also reported. It was advised that this time not to be longer than reasonable time *i.e.* 2 months.

- **N. Otsuka** reported there was neither a comment nor a proposal on the draft of the EXFOR reference paper ($WP2017 - 07$) from the centers until the end of 2017. It was concluded that the ND2013 article (Nucl. Data Sheets 120(2014)272) should be cited by EXFOR users.

3.4 Manuals and dictionaries

N. Otsuka (on behalf of N. Soppera) presented the result of assessment on ambiguous REFERENCE keyword coding form. It was concluded that the absence of the page number must be indicated by including a separating comma for the reference types A, B, C, J and K.

3.5 CINDA

N. Otsuka (on behalf of V. Zerkin) reported that automatic updates of CINDA database using the EXFOR and NSR databases have been performed 12 times (from May 2017 to April 2018).

3.6 EXFOR compilation needs

N. Otsuka presented a summary of the EXFOR completeness checking for neutron, proton and alpha induced reaction data performed by **V. Semkova**. It was reported that at least 3% of proton induced reaction experimental works and 20% of alpha induced reaction experimental works are still missing in EXFOR.

3.7 EXFOR quality needs

N. Otsuka reported the situation of english translation of the Russian articles published in FCY, KSF,and ZTF, and asked the originating centers to add the bibliographies of English translations missing in EXFOR.

3.8 EXFOR coding rules

1. **N. Otsuka** proposed two points as follow:

   - Shall we introduce a new modifier when the quantity is for a natural sample divided by the isotopic abundances of the target isotopes contributing to the reaction, or use the existing generic modifier FCT ?
     It was concluded to use FCT without introducing a new modifier.
   - Shall we use the REACTION sum when the quantity is partial for unresolved two secondary energies from several product nuclides ?
     It was concluded that the process code X will be used without REACTION sum.

2. **N. Otsuka** also proposed

   - Need of indicating a fragment separator for separation of reaction products under DETECTOR ?
     It was accepted by all.
   - Need of description for the use of a secondary beam originated from projectile fragmentation under INC-SOURCE with a new incident source code FRAGM ?
     It was also accepted by all.

3.9 Tools for Compilation and Dissemination

1. **S. Taova** presented that the EXFOR Leaflet was revised as per comments from the other centers since the last meeting. It was proposed that for publicizing the EXFOR, leaflet can be distributed and displayed at relevant conferences and notice boards.

2. **G. Pikulina** reported the new upgrades in InpGraph. It is possible to generate DATA section and COMMON section of a subentry completely by the digitizer.

Figure 2: Sessions in progress during NRDC-2018.

3.10 Other topics covered

- **T. Zholdybayev** reported progress in EXFOR compilation at his institute. He discussed the possibility of digitizing data from the the preprints and logbooks for updating the seven existing EXFOR entries.

- **B. Pritychenko** provided a review of compilation effort in the Area 1. He also explored the EXFOR compilation HISTORY field for 2012-2016 time span, and provided a rough estimate of individual productivities in the NRDC network.

4 Closing

N. Otsuka proposed the dates and places for the next technical NRDC meeting (Vienna, Austria, 9 to 12 April 2019) and the next full NRDC meeting (Vienna, 2nd quarter of 2020), and they were approved. **A. Saxena** made closing addresses. **S. Taova and N. Otsuka** thanked **A. Saxena and D. Raj** for their excellent local arrangement.

5 Summary

The results of the discussions were summarized in 23 conclusions and 83 actions. For details see the full proceedings of the meeting [2].

Acknowledgment

References

[1] `https://www-nds.iaea.org/nrdc/nrdc_2018/`.

[2] Proceedings of the NRDC 2018, Technical Meeting on International Network of Nuclear Reaction Data Centres, INDC(NDS)-0762 (2018). `https://www-nds.iaea.org/publications/indc/indc-nds-0762.pdf`

Annex. I: List of participants

Country	Name	Affiliation
Austria	N. OTSUKA	Nuclear Data Section (NDS), Vienna
China	J. WANG	China Nuclear Data Centre (CNDC), Beijing
	Z. GE	CNDC, Beijing
France	K. SUYAMA	Nuclear Energy Agency Data Bank (NEA DB), Paris
Hungary	S. TAKÁCS	Nuclear Research Institute (ATOMKI), Debrecen
India	D. RAJ	Bhabha Atomic Research Centre (BARC) , Mumbai
	A. SAXENA	BARC, Mumbai
	U. KANNAN	BARC, Mumbai
	B. K. NAYAK	BARC, Mumbai
	G. MOHANTO	BARC, Mumbai
Japan	O. IWAMOTO	Japan Atomic Energy Agency (JAEA), Tokai
	J. SINGH	Nuclear Reaction Data Centre (JCPRG), Sapporo
Kazakhstan	T. ZHOLDYBAYEV	Institute of Nuclear Physics, Almaty
Korea	S. C. YANG	Nuclear Data Center, KAERI (KNDC), Daejeon
Russian Federation	V. VARLAMOV	Centr Dannykh Fotojad. Eksp. (CDFE), Moscow
	S. TAOVA	Centre of Nuclear Physics Data (CNPD), Sarov
	G. PIKULINA	CNPD, Sarov
	M. MIKHAILIUKOVA	Russian Nuclear Data Centre, IPPE (CJD), Obninsk
Ukraine	O. GRITZAY	Ukraine Nuclear Data Centre (UkrNDC), Kyiv
United States of America	A. SONZOGNI	National Nuclear Data Center (NNDC), BNL, Upton
	B. PRITYCHENKO	NNDC, BNL, Upton

Annex. II: PROGRAM

May 01	Tuesday
$09:30-09:40$	Welcome address by A. Saxena
$09:40-09:50$	Introduction from NDS by A. Koning via Skype
$09:50-10:00$	Self-introduction by All
$10:00-10:05$	Annoucement by D. Raj
$10:05-10:35$	Introduction to GCNEP by A. Sharma
$10:35-11:05$	Introduction to the IUAC New Delhi by D. Kanjilal
$11:05-11:10$	Election of chairperson, adoption of the agenda... by N. Otsuka
$11.10-11:30$	Tea/Coffee break
Progress Reports	
$11.30-11:45$	ATOMKI (Debrecen, Hungary)
$11.45-12:00$	JAEA (Tokai, Japan)
$12.00-12:15$	CNPD (Sarov, Russia)
$12.15-12:30$	UkrNDC (Kyiv, Ukraine)
$12:30-14:00$	Lunch break
$14:00-14:15$	CDFE ((Moscow, Russia)
$14:15-14:30$	NDS (Vienna, Austria)
$14:30-14:45$	CJD (Obninsk, Russia)
$15:00-15:15$	JCPRG (Sapporo, Japan)
$15:15-15:30$	NDPCI (Mumbai, India)
$15:30-16:00$	Tea/Coffee break
$16:00-16:15$	NEA DB (Paris, France)
$16:15-16:30$	KNDC (Daejeon, Korea)
$16:30-16:45$	CNDC (Beijing, China)
$16:45-17:00$	NNDC (Upton, USA)

May 02	Wednesday
EXFOR General	
$09:30-09:40$	Transmission statistics since NRDC 2017 meeting by N. Otsuka
$09:40-09:50$	Status of new article compilation by N. Otsuka
$09:50-10:00$	Journal coverage (scanning of new publications) by N. Otsuka
$10:00-10:10$	Completeness checking for articles in JEL by S. Selyankina
$10:10-10:20$	Statistics of review & finalization of preliminary tapes by N. Otsuka
$10:20-10:30$	Correction of entries in Feedback List by N. Otsuka
$10:30-10:40$	Other actions by A. Saxena
$10:40-11:10$	Tea/Coffee break
Mannuals and Dictionary	
$11:10-11:20$	Revision of LEXFOR Multilevel Resonance Parameters by N. Otsuka
$11:20-11:30$	Revision of EXFOR Formats Manual "Reference" by N. Otsuka
$11:30-11:40$	EXFOR Formats Manual "BIB section" by N. Otsuka
$11:40-11:50$	Expansion of the status code SPSDD by N. Otsuka
$11:50-12:00$	LEXFOR "Thermonuclear reaction rate" by N. Otsuka

Annex. II: PROGRAM

$12:00 - 12:20$	EXFOR Formats Manual Reaction specification by N. Otsuka
$12:20 - 12:30$	Ambiguous REFERENCE keyword coding forms by N. Otsuka
$12:30 - 12:40$	Other actions by A. Saxena
$12:40 - 14:00$	Lunch break
CINDA	
$14:00 - 14:10$	Status of CINDA database by V. Zerkin
EXFOR Compilation Needs	
$14:10 - 14:20$	Compilation of articles with priority by N. Otsuka
$14:20 - 14:30$	Compilation of articles from completeness checking by N. Otsuka
$14:30 - 14:40$	Completeness checking for neutron induced data by V. Semkova
$14:40 - 14:50$	Completeness checking for proton induced data by V. Semkova
$14:50 - 15:00$	Completeness checking for alpha induced data by V. Semkova
$15:00 - 15:10$	Pn values adopted in Rudstam's review (1979) by N. Otsuka
$15:10 - 15:20$	Delayed neutron energy spectra measurements by V. Semkova
$15:20 - 15:30$	Other actions by A. Saxena
$15:30 - 16:00$	Tea/Coffee break
EXFOR Quality Control	
$16:00 - 16:10$	Pending corrections by N. Otsuka
$16:10 - 16:20$	Duplications by N. Otsuka
$16:20 - 16:30$	English translation journals from USSR by N. Otsuka
$16:30 - 16:40$	Detection of obsolete data type code EXP by N. Otsuka
$16:40 - 17:00$	Other actions by A. Saxena

May 03	**Thrusday**
EXFOR Coding Rule	
$09:30 - 09:40$	Deletion of publication year ... by M. Mikhailiukova
$09:40 - 09:50$	Coding of VMU/MUPB by S. Taova
$09:50 - 10:10$	Cross section per equivalent quantum by N. Otsuka
$10:10 - 10:30$	REACTION sum by N. Otsuka
$10:30 - 10:50$	Coding of fragment separator (FRS, PRJFS, by N. Otsuka
$10:50 - 11:00$	Other actions by A. Saxena
$11:00 - 11:30$	Tea/Coffee break
Software and Dissemination	
$11:30 - 11:50$	INPGRAPH3.4 by G. Pikulina
$11:50 - 12:00$	EXFOR Leaflet by S. Taova
$12:00 - 12:30$	Recent development of EXFOR-ENDF-CINDA... by V. Zerkin
$12:30 - 12:40$	Other actions by A. Saxena
$12:40 - 13:30$	Lunch
$13:30-$	Scientific visit (Inter-University Accelerator Center, New Delhi)

Annex. II: PROGRAM

May 04	Friday

Other items

$09:30-09:45$	Compilation of experimental nuclear reaction data... by T. Zholdybayev
$09:45-10:15$	Report Existing and upcoming particle accelerators in India by A. Saxena
$10:15-10:45$	Technical aspects of compilation and dissemination of the U.S... by B. Pritychenko
$10:45-11:15$	Perspectives on basic nuclear cross section measurements... by U. Kannan
$11:15-11:40$	Tea/Coffee break

Closing

$11:40-11:50$	Dates and places of next meetings by N. Otsuka
$11:50-12:50$	Review of actions and conclusions by A. Saxena
$12:50-13:00$	Closing address