



IAEA

60 Years

Atoms for Peace and Development

IAEA Nuclear Data Section

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NRDC Meeting, June 14-17 2022, IAEA, Vienna

Number of new entries transmitted by final tapes since the NRDC 2021 meeting
(TZ: Timur Zholdybayev, MO: Myagmarjay Odsuren)

	NDS	ATOMKI	CNDC	KNDC	NDPCI	UkrNDC	TZ	MO	Sum
Neutron	20		19	4	23	1			67
CPND	30	7		6	32	7	3	11	96
PhND				3	0	10			13
Sum	50	7	19*	13	55	18	3	11	176

* Area S entries are transmitted by CNDC and therefore not included in these statistics.

Special mention

- Stanislav Simakov (NDS consultant) extracted neutron elastic scattering angular differential and integrated cross sections which may include contribution of inelastic scattering to lower excitation levels, and reviewed each case by checking the source article. See Memo 4C-3/0420 for further details.
- Ryosuke Shimizu (NDS intern) extracted questionable energies coded under the heading E-LVL, and reviewed each case by checking the source article and ENSDF library. See Memo CP-D/1043 for further details.

Lidija Devi found several compilation errors for p, d and alpha reactions by scanning a large amount of EXFOR vs. TENDL plots.

Valentina Semkova was at NDS from Sep - Dec 2021

Data libraries and software

- ENDF (Evaluated Nuclear Data Files):
 - new and updated evaluated libraries in the ENDF database:
 - JENDL-5 Japanese evaluated nuclear data library 2021 (incl. Errata March-2022)
 - JENDL/DDF-2015 JENDL Decay Data File 2015, Japan
 - FENDL-3.2b Fusion Evaluated Nuclear Data Library, IAEA, 2022
 - IRDFF-II/DD: decay data sub-library of International Reactor Dosimetry and Fusion File, IAEA 2019
 - INDEN-Feb2022: evaluations produced by International Nuclear Data Evaluators Network (coordinated by the IAEA)
 - IAEA-Std17: IAEA Standard and Reference Cross Sections, 2017
 - UKDD-2020 : UK Decay Data Library, UK, 2020
 - software news:
 - radioactive decay data (MF8.MT457): output to JSON, plot, comparison data of different libraries from ENDF database and LARA files from DDEP-2021 and ENSDF-2021
 - plotting ~~groupwise~~ data running GROUPIE code on the fly on 175, 640, 725, 765 groups
 - API for search and download data of MF4, MF5, MF6 in JSON

Consultant's Meeting on Decay Data for Decay heat Applications, 8-10 Dec 2021



- Exhaustive study of decay heat properties of a variety of fuel systems
- Thorough assessment of the decay data of 120 most important fission products contributing to the decay heat
- Comprehensive priority lists for total absorption gamma spectroscopy (TAGS) and high-resolution gamma spectroscopy (GS)
- Study of impact of all published TAGS data on decay heat and anti-neutrino spectra compared with current evaluated libraries (ENDF/B-VIII.0, JEFF-3.3, JENDL-5)
- Review article coordinated by IAEA (P. Dimitriou)

Eur. Phys. J. C manuscript No.
(will be inserted by the editor)

Improving Fission-product Decay Data For Reactor Applications: Decay Heat

A.L. Nichols^{a,b}, A. Algora^a, P. Dimitriou^{a,c}, M. Fallot^a, L. Giot^a,
F.G. Kondev^a, T. Yoshida^a, G. Mukherjee^a, K. Rykaczewski^a,
A.A. Sonzogni^{a,d}, J.L. Tain^a

Technical Meeting on (alpha,n) data evaluation and data needs cont'd

- 60 registered participants from 15 countries
- 22 presentations on fission & fusion reactor technologies, nonproliferation, low-background experiments and nuclear astrophysics

Webpage: <https://conferences.iaea.org/event/283/>

Report: [INDC\(NDS\)-0836](#)

IAEA Technical Meeting on (alpha,n) nuclear data evaluation and data needs

8–12 Nov 2021
Virtual
Europe/Vienna timezone

Enter your search term

- Overview
- Registration
- Call for Abstracts
- Book of Abstracts
- Timetable
- Contribution List
- Participant List
- Contact

The IAEA held a Technical Meeting on (alpha,n) data needs for various applications. The meeting reviewed the current status in (alpha,n) measurements, models, codes and evaluated libraries with a view to identifying the gaps in all above areas and proposing the necessary actions to address the gaps and produce reliable (alpha,n) data for the applications.

The focus was on (alpha,n) reactions at low energies up to 10 MeV relevant for applications in (i) nuclear fuel cycle, (ii) spent fuel management, nonproliferation, (iii) low background experiments and (iv) nuclear astrophysics.

Presentations covered:

- measurements,
- theory, models and codes,
- evaluations and evaluated libraries.


The meeting was virtual and was held from Monday to Friday from 15:00 to 18:00 CET.

The summary report of the meeting is available in INDC(NDS)-0836.

Starts 8 Nov 2021, 15:00
Ends 12 Nov 2021, 18:00
Europe/Vienna

Virtual

[INDEN-LE webpage](#)
[Summary report of the meeting](#)

 IAEA
International Atomic Energy Agency

INDC(NDS)-0836
Distr. G,IBA,J,MP

INDC International Nuclear Data Committee

(alpha,n) Nuclear Data Evaluations and Data Needs
Summary Report of the Technical Meeting
8-12 November 2021
(virtual event)

S.S. Westerdale
Princeton University
Princeton, NJ, USA

A. Junghans
Helmholtz-Zentrum Dresden Rossendorf
Dresden, Germany

R.J. deBoer
University of Notre Dame
Notre Dame, IN, USA

M. Pigni
Oak Ridge National Laboratory
Oak Ridge, TN, USA

P. Dimitriou
IAEA
Vienna, Austria

March 2022

IAEA Nuclear Data Section
Vienna International Centre, P.O. Box 100, 1400 Vienna, Austria

INDEN CM on Structural Materials (IV)

- The International Nuclear Data Evaluation Network (INDEN) organized by the IAEA aims to improve evaluations (light nuclei, structural materials, resonant absorbers and actinides)
- 4th consultants' meeting on structural materials (virtual) took place in December 2021
- 12 presentations from 10 participants from 7 Member States
- Meeting website online:

<https://www-nds.iaea.org/index-meeting-crp/CM-INDEN-structmat-2021-12/>

Meeting of INDEN International Nuclear Data Evaluation Network on the Evaluated Nuclear Data for Structural Materials

13-16 December 2021, IAEA, Vienna (virtual meeting)

Data Evaluation Network is an activity aimed at streamlining the evaluation activities, taking into account the resources of the laboratories in Member States. The activities would follow the pattern of the highly successful NEA Data Bank. The aim is to minimise duplication of work, except for the testing of different data files with a broad consensus that can be adopted fully or in parts by the

(but not strictly limited to) the structural materials Fe, Cr, Ni, Cu, including the resonance parameters in different nuclides and peculiarities specific to certain nuclides. Of special interest is the assessment of the resonance range, the treatment of the fluctuating cross sections above the resonance range and the covariance information. It is assumed that the covariance information is an integral part of the

is available [here](#).

Title

Benchmarking of the Evaluations in ⁵⁶Fe Resolved Resonance Range

Analysis of the Post-CIELO Fe-56 evaluation

Comments on Fe fast region evaluations

TM on Neutron Data Standards 2021

- The neutron data standards (NDS) are evaluations of important neutron-induced reactions many experiments rely on
- The NDS project is coordinated by the IAEA
- Last release of the Neutron Data Standards in 2017
- The Technical Meeting in December 2021 was the second one since then to discuss new experiments and evaluations
- 18 presentations from 17 participants and 7 Member States
- Meeting website available at: <https://www-nds.iaea.org/index-meeting-crp/TM-NDS-2021-12/>

Technical Meeting on Neutron Data Standards
6-10 December 2021, IAEA Headquarters, Vienna, Austria (virtual meeting)

Purpose
The purpose of this technical meeting is to review new experimental data, to discuss changes in the evaluation methodology and uncertainty to quantify differences between new evaluations and the IAEA standards issued in 2017.

Agenda
The adopted agenda is available [here](#).

Presentations

#	Author	Title	Link
1	A. Carlson	History of the standards evaluation process	PDF
2	V.G. Pronyaev	Problems of neutron data standards evaluation and their possible solution	PDF
3	G. Schnabel	GMA modernization and new possibilities	PDF
4	P. Schillebeeckx	$^{235}\text{U}(n,f)$ cross section measurements for $E_n < 12$ eV by Deruytter and Wagemans	PPTX
5	I. Duran	Integral references for ToF (n,f) measurements in fissile targets reactions and its relations with the standard TNC	PDF
6	Z. Ren	Measurement of the U-238/U-235 fission cross section ratio at CSNS-Back-n	PDF
7	L. Snyder	FissionTPC cross-section ratio results	PDF
8	D. Neudecker	Absolute measurements of $^{239}\text{Pu}(n,f)$ and $^{235}\text{U}(n,f)$ cross sections in the GMA database	PDF
9	R. Casperson	The benefit of adjusting with criticality and reaction rate data	PDF
10	N. Otsuka	Evaluation of fission cross section of major actinides	PDF
11	R. Capote	Standard evaluation potential issues? SACS and absolute cross sections	PPTX
12	G. Hale	Progress on light-element standard cross sections at Los Alamos	PDF

Consultants' Meeting of the International Nuclear Data Evaluation Network (INDEN) on Actinide Evaluation in the Resonance Region

1-4 November 2021, Vienna, Austria

Hybrid event

Scientific Secretary: R. Capote Noy

23 participants and IAEA staff



Technical Meeting on Nuclear Data Processing

18-22 October 2021, Vienna, Austria

Hybrid event

Scientific Secretary: R. Capote Noy

43 participants and IAEA staff

Third Research Coordination Meeting on Recommended Input Parameter Library (RIPL-4) for Fission Cross Section Calculations

20-23 December 2021, Vienna, Austria

Hybrid event

Scientific Secretary: R. Capote Noy

19 participants and IAEA staff

Joint ICTP-IAEA Virtual Workshop on Atomistic Modelling of Radiation Damage in Nuclear Systems

4-8 October 2021

Virtual event

Directors: K. Heinola, C. Hill, J.-C. Sublet (IAEA)

Local organizer: N. Seriani

Technical Meeting on Nuclear Heating Theory and Data

19-22 Apr 2022

Vienna International Centre

UTC timezone

Er

EXFOR and/or ENDF GUI's and API's



Request #2269 www.nds.iaea.org 2021-03-24,11:46:09
 Access-Level=2 /pdf/ /db/ [11]
 Results: Reactions: 7 Datasets: 41

Data Selection

Retrieve Selected Unselected All

Output: X4+ EXFOR Bibliography TAB C4 PlotC4

Plot: Quick-plot (cross-sections) Ungroup /product: Advanced plot [how-to] using C5 and convert ratios to

Narrow incident energy (optional), eV: Min: Max:

Apply Data re-normalization (for advanced users, results in: C4, TAB and Plots)

n	Display	Year	Author-1	Energy range, eV	Points	Reference	Subentry#P	NSR-Key	Info+
1	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1999	E.G.Christodoulou+	1.40e7	16	[pdf]+ J, NSE, 132, 273, 1999	13804008 [4]	R33/0	1999CH27 An[16]=16:161
2	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1992	A.Takahashi+	1.41e7	16	[pdf]+ R, OKTAV-A-92-01, 1992	22136016 [2]	R33/0	An[16]=15:160
3	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1991	R.S.Pedroni+	7.95e6 1.69e7	148	[pdf]+ J, PR/C, 43, 2336, 9105	12995002 [4]	R33/0	1991PE02 An[140]=18:162
4	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1991	R.Finlay+	2.00e7	15	+ W, FINLAY, 9111	13532002 [4]	R33/0	An[15]=15:154
5	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1991	Wan Dairong+	1.47e7	6	+ W, WANDAIRONG, 199101	32523003 [8]	R33/0	An[6]=3:14
6	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1988	Cao Jianhua+	1.47e7	28	+ R, INDC (CPR) -011, 125, 198803	32521003 [8]	R33/0	An[28]=6:151
7	<input type="checkbox"/> + <input type="checkbox"/> X4 <input type="checkbox"/> X4+ <input type="checkbox"/> X4± <input type="checkbox"/> T4	1987	X.Wang+	7.00e6	9	[pdf]+ J, NP/A, 465, 483, 8704	12892003 [4]	R33/0	1987WA08 An[9]=30:140

Web interface very complete and detailed

X4PRO!

But also API's under development for automated use

Goal: release command-line API's (also for use in WPEC SG50)

 Nuclear Data Section International Atomic Energy Agency Wagramer Strasse 5, P.O.Box 100, A-1400 Vienna, Austria Tel: (+43 1) 2600-21714; Fax: (+43 1) 26007		2020-04-07 International Atomic Energy Agency Nuclear Data Services 2004-2020 for Windows, Linux, Mac SQLite	
<h2>EXFOR for Applications</h2> EXFOR-CINDA databases, retrieval systems, Endver/GUI package for Linux, Windows and MacOSX using SQLite Run software packages:			
Preparation: Install JDK "1.7" or higher; + on MacOSX: install XQuartz			
Download: https://www.nds.iaea.org/cdroms/#x4app2 ==> x4app-2020-04-07.tar.gz Un-compress:			
Windows: → Run → cmd.exe	Linux: → Terminal		
> cd c:\x4app	MacOSX: → Finder → Applications → Utilities → Terminal		
> "c:\program files\7-zip\7z.exe" x x4app-2020-04-07.tar.gz	\$ tar xvfz x4app-2020-04-76.tar.gz		
> "c:\program files\7-zip\7z.exe" x -r x4app-2020-04-07.tar	\$ cd x4app-2020-04-07		
> cd x4app-2020-04-07			
Run:	Windows	Linux	MacOSX
1 Interactive EXFOR retrieval system	run_x4cd.bat	./run_x4cd.sh	./run_x4cd-mac.sh
2 EndVer/GUI	run_endver.bat	./run_endver.sh	./run_endver-mac.sh
3 Non-interactive retrieval utility	cd app_example runme.bat	cd app_example ./runme.sh	cd app_example ./runme-mac.sh
4 EXFOR retrieval and converters	cd app_example2020 ./runme.sh	cd app_example2020 ./runme.sh	cd app_example2020 ./runme.sh
General description: readme.txt How to use and setup: setup.txt IAEA Nuclear Data Services: http://www.nds.iaea.org/			
<h2>EXFOR for Applications</h2> EXFOR-CINDA databases and retrieval systems, ENDVER/GUI integrated tools for ENDF-Evaluators (Windows, Linux, MacOSX) Version 2.1.1. April 2020			
✓ Does not need installation ✓ Integrated CINDA and EXFOR ✓ Advanced interactive search ✓ Help based on Dictionaries ✓ Interactive graphics with ZVView		✓ Can work with local and remote databases ✓ Non-interactive EXFOR retrievals ✓ Converter from EXFOR to C4, C5, X4+, JSON, XML ✓ Examples of retrieval and converter scripts ✓ Real application: ENDVER/GUI package + EXFOR	
EXFOR is a comprehensive library of experimental nuclear reaction data induced by neutrons, charged particles and photons. Contents (2020-03-05): 23038 Entries, 33092 publications, 158739 data tables			
CINDA library contains bibliographical references to experimental nuclear reaction data and to calculations, reviews, compilations and evaluations of neutron, charged particle reactions and spontaneous fission data. Includes import from EXFOR. Contents (2020-03-09): 497717 lines, 68261 publications, 209927 blocks			
Retrieval Systems on Java2: v1=2.1.1 (2020-04-02)			
© The data on this CD are a product of the Network of Nuclear Reaction Data Centers.			

Coming in 2022

- International Nuclear Data Evaluation Network, INDEN meetings
 - Light nuclides
 - Structural materials
 - Actinides
- Nuclear Reaction Data Centre Network, NRDC meeting
 - EXFOR
- Nuclear Structure and Decay Data network meeting
- ICTP Workshop on nuclear structure and decay data
- Technical meeting on nuclear data needs for antineutrino spectra applications
- Second Research Coordination Meeting of the CRP on Updating Fission Yield Data for Applications
- Workshop on compilation of experimental nuclear reaction data
- Technical meeting on decay data for monitoring applications
- Technical meeting on nuclear data processing
- International Nuclear Data Committee meeting (Mar 6-9 2023)



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Thank you!

