

International Atomic Energy Agency

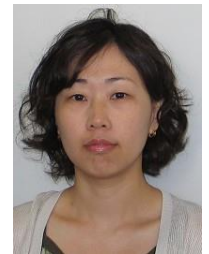
**IAEA Nuclear Data Section
Progress Report for Period 2017/2018**

Naohiko Otsuka

on behalf of IAEA Nuclear Data Section

Staff Changes

- 12 Professionals + 4.25 Support Staff
- **Valentina Semkova** (Nuclear Physicist) resigned on 11 Oct. 2017.
- Hyun Kyung Chung (Head of Atomic Data and Molecular Data Unit) resigned on 30 Sept. 2017.
- Christian Hill (Head of Atomic Data and Molecular Data Unit) joined on 1 Oct. 2017.
- Kalle Heinola (Atomic Physicist) joined on 1 May 2018.



EXFOR Transmission after NRDC 2017

- 7 neutron final TRANS tapes (3177 – 3182, V035) containing **61 new entries** and 55 revised entries;
- 10 CPND final TRANS tapes (B026, D109 - D115, S022 - S023) containing **144 new entries** and 72 revised entries;
- 3 PhND final TRANS tapes (G038 - G040) containing **9 new entries** and 25 revised entries.
- These include contributions from **ATOMKI, CNDC, KNDC, NDPCI, UkrNDC** as well as two compilers (Nurzat Kenzheybayev, Myagmarjav Odsuren).



EXFOR Transmission after NRDC 2017 (cont)

- **Nurzat Kenzheybayev** (Almaty) is compiling of data measured in Central Asia in collaboration with Timur Zholddybayev (Almaty).



- **Myagmarjav Odsuren** (Ulaanbaatar) is compiling heavy-ion data measured in West European countries.



- **Svetlana Selyankina** (Sarov) was contracted from 18 Dec. 2017 to 21 Mar. 2018 to support EXFOR activities.



- Three regular transmissions of the EXFOR/CINDA dictionaries (TRANS.9116 – 9117) were done.



New Entries Transmitted in Final Tapes

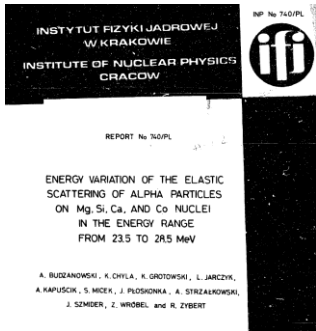
	NDS	ATOMKI	CNDC	KNDC	NDPCI	UkrNDC	NK	MO	Sum
Neutron	12	-	25	5	16	3	0	-	61
CPND	47	21	8	4	42	7	8	7	144
PhND	3	-	0	3	0	3	0	-	9
Sum	62	21	33	12	58	13	8	7	214

NK: Nurzat Kenzhebeyev

MO: Myagmarjav Odsuren

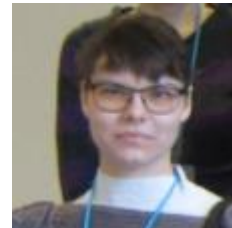


Author's Tabulated Data in Old Reports (Krakow)



Małgorzata Zelek
(Biblioteka, IFJ Krakow)

θ_{CM} deg.	$\sigma_{CM}(\theta)$ mb/sterad		$\sigma_{CM}/\sigma_{R CM}$	
15.0	2.565 ± 0.079	+5	1.00	0
20.0	8.341 ± 0.217	+4	1.02	0
25.0	3.692 ± 0.070	+4	1.09	0
30.0	1.615 ± 0.027	+4	9.75	-1
35.0	8.489 ± 0.119	+3	9.30	-1



	A	B	C	D	E	F	G
1	15.0	2.565	0.079	+5	1.00	0	
2	20.0	8.341	0.217	+4	1.02	0	
3	25.0	3.692	0.070	+4	1.09	0	
4	30.0	1.615	0.027	+4	9.75	-1	
5	35.0	8.489	0.119	+3	9.30	-1	

```

SUBENT      D0560039   20180305
BIB         6         10
REACTION    (92-U-0 (A,EL) 92-U-0,,DA)
...
STATUS      (TABLE) Table from INP-347,1964 report.
            (COREL,D0560020) Rutherford ratio is given.
HISTORY     (20180305C) SS+LV+On. Differential cross section data
            from INP-347,1964 report were added.
ENDBIB      10
...
DATA        3         32
ANG-CM      DATA-CM  DATA-ERR
ADEG        MB/SR     MB/SR
            15.0    2.565E+05  0.079E+05
            20.0    8.341E+04  0.217E+04
            25.0    3.692E+04  0.070E+04
            30.0    1.615E+04  0.027E+04
    
```

INP-347, 613, 624, 699, 740, 778, 805
 →
 EXFOR D0560, D0875, D0877, D0878,
 (also F0591, F0594 by CNPD)

EXFOR Quality Control

- During the reporting period, 74 preliminary tapes (PRELIM) were received, and **reviewed with NEA DB**.
- The **finalized tapes are also checked** against comments from centres before uploading to the NDS open area.
- NDS also registers comments on EXFOR entries from users and centres to the **EXFOR Feedback List** and monitors the correction process.



EXFOR Coverage Control

- NDS usually scans 56 journals, and registered EXFORable articles in **X4CoCoS**. (But it is now for 20 journals due to lack of resource.)
- Send **Lidija** entry numbers assigned to articles for your compilation.
- **EXFOR completeness checking** for n-, p- and α -induced reaction data against **NSR/CINDA** (lead by Valentina!).

The screenshot shows the 'EXFOR Work Flow' software interface. It has a 'Properties' section at the top with 'Frag scan' and 'Query' tabs. Below that is a 'Publication' section with a dropdown menu showing 'PRC - Physical Review, Part C, Nuclear Ph...' and a 'Comment' field with 'Vol. 65 (2002)'. There are also fields for 'Last Volume', 'Last Issue', and 'Last Scan'. The main part of the interface is a table with columns for 'Volume', 'Issue', 'Published', 'Covered', 'Info', and 'Comments'. Below this is a 'References' section with a table containing columns for 'Page', 'Work type', 'Hierarchy', 'Laboratory', 'Quality', 'Quantity', and 'Projectile'.

Volume	Issue	Published	Covered	Info	Comments
97	2	01-Mar-2018	01-Apr-2018	✓	
97	2	01-Feb-2018	14-Feb-2018	✓	
97	1	01-Jan-2018	02-Feb-2018	✓	
96	6	01-Dec-2017	11-Dec-2017	✓	
96	5	01-Nov-2017	30-Nov-2017	✓	
96	4	01-Oct-2017	31-Oct-2017	✓	
96	3	01-Sep-2017	18-Sep-2017	✓	
96	2	01-Aug-2017	28-Aug-2017	✓	
96	1	01-Jul-2017	17-Jul-2017	✓	
95	6	01-Jun-2017	14-Jun-2017	✓	

Page	Work type	Hierarchy	Laboratory	Quality	Quantity	Projectile
035896	2 - EXFOR relevant - experimental	3 - Regular publication	ZRCATH - NCSR Demokritos, A...	1 - table	CS - Cross section	cp - charg...
035901	2 - EXFOR relevant - experimental	3 - Regular publication	ICANTME - Tri University Mess...	1 - table	BP - Resonance parameter	cp - charg...
034629	2 - EXFOR relevant - experimental	3 - Regular publication	3BLUSP - Univ.de Sao Paulo, S...	3 - graphic, useful for digitizing	CS - Cross section	cp - charg...
034618	2 - EXFOR relevant - experimental	3 - Regular publication	IUSALAS - Los Alamos National L...	3 - graphic, useful for digitizing	CS - Cross section	n - neutron
034615	2 - EXFOR relevant - experimental	3 - Regular publication	ZRCATH - NCSR Demokritos, A...	1 - table	CS - Cross section	n - neutron
034612	2 - EXFOR relevant - experimental	3 - Regular publication	ZSRGOS - Gesellschaft für Sch...	3 - graphic, useful for digitizing	DE - Differential d/dE	n - heavy ...
034607	2 - EXFOR relevant - experimental	3 - Regular publication	3INDTRM - Bhabha Atomic Res. ...	3 - graphic, useful for digitizing	DAE - Double differential d/dAngle/dE	n - heavy ...
034603	2 - EXFOR relevant - experimental	3 - Regular publication	3INDTRM - Bhabha Atomic Res. ...	3 - graphic, useful for digitizing	DA - Differential d/dAngle	n - heavy ...
034320	2 - EXFOR relevant - experimental	3 - Regular publication	2ITYNAP - Dtp.d Sol.Fische, Uni...	3 - graphic, useful for digitizing	DA - Differential d/dAngle	cp - charg...
031601	2 - EXFOR relevant - experimental	3 - Regular publication	IUSANSU - Michigan State Univ...	3 - graphic, useful for digitizing	CS - Cross section	n - heavy ...



Article Collection

- NDS is continuing systematic upgrade of pdf files in our internal collection to make them text searchable.
- Masahiro Wakukawa (Univ. Tokyo) collected **3,100 pdf files** from 71 journals and two Conf. Proc. (82ANTWER and 91JUELIC) during his 3-month internship.
- **Lidija** helps you when you have difficulty to obtain articles for your compilation.



Search for CS-3471 (EXFOR 12576, A50 to NNDC)

Involving IAEA Library, NNDC (JoAnn), U. Chicago, ANL, LLNL, ...

Good morning Naohiko,
Maybe we will be lucky with this one.

Naohiko,
Maybe we will be lucky with this one.
Lidija

No luck. Our library is damaged - making Chicago-library-hiss

We are getting closer to finding this document. (LLNL)

No luck. Card is damaged - making the content illegible (ANL)

Dear Madam,
I am writing to you from the Nuclear Data Section of the IAEA...
For a very long time we have been searching for an old report from the Chicago University Metallurgical Laboratory report, namely CS-3471, from 1946 for the compilation of the experimental data for our Experimental Nuclear Reaction Data database: <https://www.nndc.iaea.org/exfor.htm> which our Section maintains. In particular we are looking for an article (or perhaps it is even the whole report) written by G.T. Seaborg as the first author on [U-235 fission and the release of energy from the fission of U-235 for the production of plutonium](#).

Thanking you in advance,
Sincerely,
Lidija Vrapcenjak

Ms Lidija VRAPCENJAK | Nuclear Data Services Assistant | Nuclear Data Section
Division of Physical and Chemical Sciences | Department of Nuclear Sciences and Applications
International Atomic Energy Agency
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Lidija

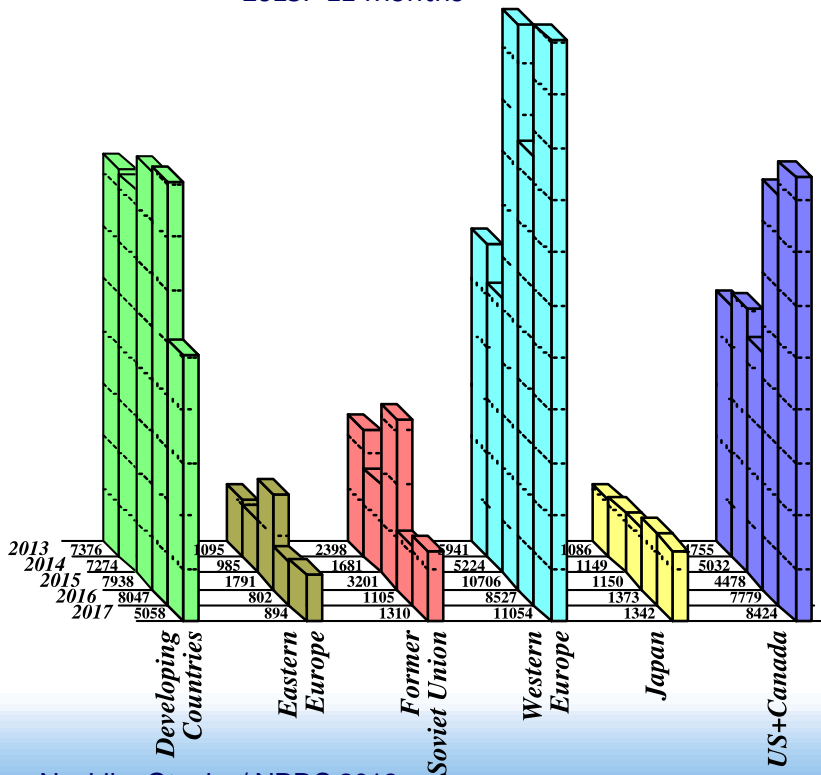


IAEA Nuclear Data Services: Web statistics

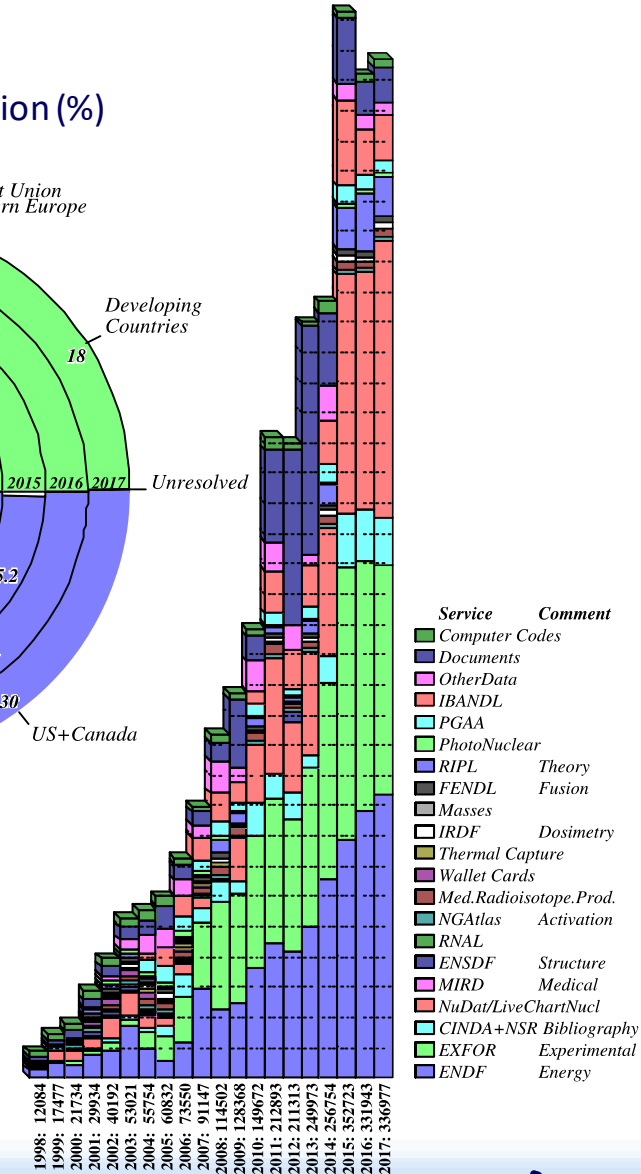
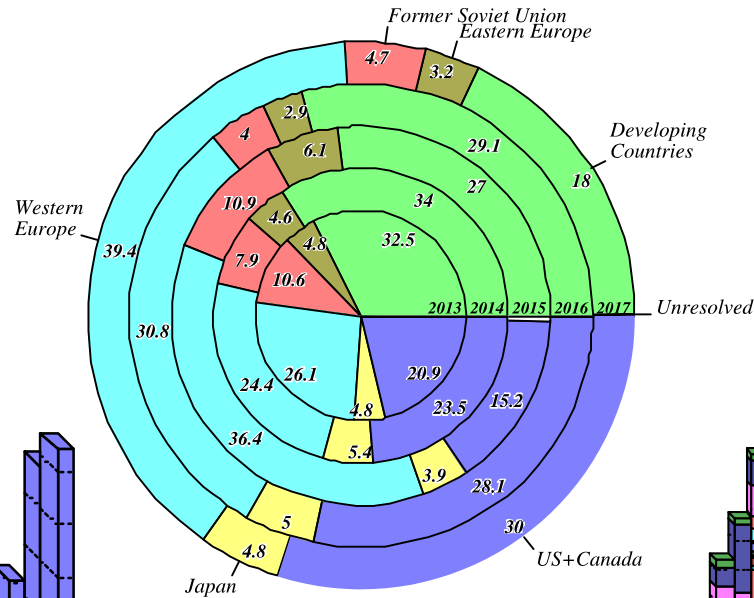
Total per Year*
(Number of accesses + retrievals)

*2013: 11 Months

Average per Month
(Number of accesses + retrievals)
*2013: 11 Months



Geographical Distribution (%)
2013-2017



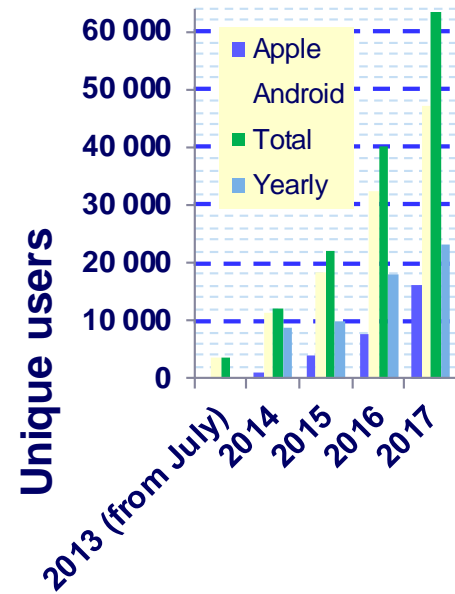
- | Service | Comment |
|-------------------------|--------------|
| Computer Codes | |
| Documents | |
| OtherData | |
| IBANDL | |
| PGAA | |
| PhotoNuclear | |
| RIPL | Theory |
| FENDL | Fusion |
| Masses | |
| IRDF | Dosimetry |
| Thermal Capture | |
| Waller Cards | |
| Med. Radioisotope Prod. | |
| NGAtlas | Activation |
| RNAL | |
| ENSDF | Structure |
| MIRD | Medical |
| NuDat/LiveChartNucl | |
| CINDA+NSR Bibliography | |
| EXFOR | Experimental |
| ENDF | Energy |

Isotope Browser


- IAEA's first mobile App.
- Provide nuclear properties for 4,000 nuclides and isomers (from ENSDF etc.)
- Android, Apple and Kindle
- Support 6 UN languages + Italian, Japanese, Slovenian, traditional Chinese



- **~68 k unique users!**



Coordinated Research Project (CRP)

- ND for **charged-particle monitor reactions and medical isotope production** (2012-2017): *Finished.* 
- Testing and improving **IRDFF** (2013-2018): *Finished.*
- Primary radiation **damage cross sections** (2013-2018): *Finished.*
- Reference DB for **beta-delayed neutron emission** (2013-2018): *Finished.*
- Updating **PhND library** and generating a reference DB for **photon strength functions** (2016-2020): *Ongoing.*
- **RIPL** for fission cross section calculations (2016-2021): *Ongoing.*



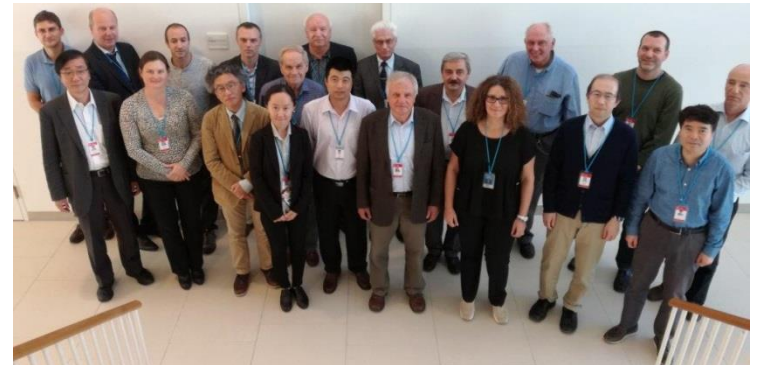
Data Development Project (DDP)

- Maintain the international **neutron cross section standards** file and evaluation techniques
- Development of evaluation methodology and nuclear **reaction modelling** systems (*EMPIRE, TALYS*).
- Evaluation of **charged-particle-induced reaction data in the resolved-resonance region** for applications
- **CIELO** collaboration: coordination and technical work (concluded)
- **INDEN** collaboration (International Nuclear Data Evaluation Network)



Data Development Project (DDP, cont)

- Improvement of analysis **codes for nuclear structure and decay data** evaluations
- **Stopping power** DB
- Different data **processing** routes (NJOY, PREPRO and other methods)
- Total absorption γ -ray spectroscopy (**TAGS**): Decay data for decay heat calc. and other appl.
- Nuclear data for **safeguards**
- **FENDL-3**
- Thermal scattering law (**TSL**) data



Training (Joint ICTP-IAEA Workshop)

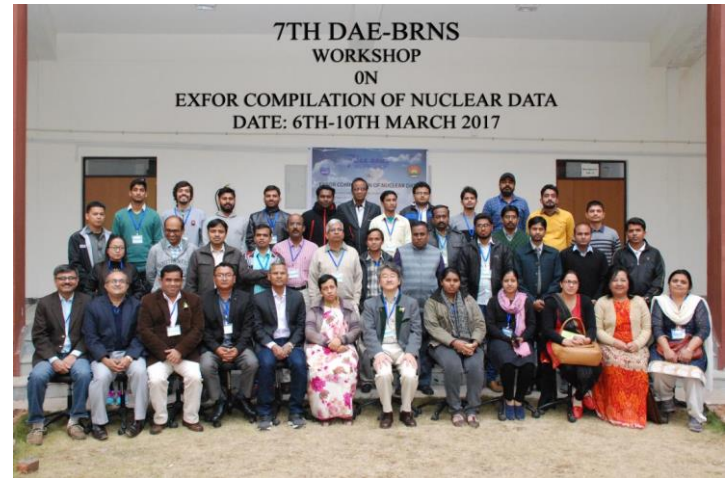
- “Monte Carlo Radiation Transport and Associated Data Needs for Medical Applications”, 18 - 29 Sept., 2017, Trieste.
- “Evaluation of Nuclear Reaction Data for Applications”, 2 - 13 Oct. 2017, Trieste.
- “Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Theory, Experiment and Evaluation”, 15 - 26 Oct. 2018, Trieste.
(Appl. Deadline: 30 June)



Inter-Centre Visits for EXFOR Collaboration



Almaty (Sept. 2017)



Shillong (Mar. 2017)



Beijing (Oct. 2017)



Aizawl (Mar. 2017)



8th Workshop on Asian Nuclear Reaction Database Development (AASPP)

- 9-13 Oct. 2017
- China, India, Japan, Kazakhstan, Korea, Mongolia (+IAEA)
- Hosted by National Univ. of Mongolia
- Proceedings: INDC(MGL)-0001



Thank You!



First harvest of NDS banana developed at IAEA Seibersdorf Lab. (Feb. 2018)