

Nuclear Data at the IAEA

Paraskevi (Vivian) Dimitriou

Nuclear Data Section

International Atomic Energy Agency

International Atomic Energy Agency



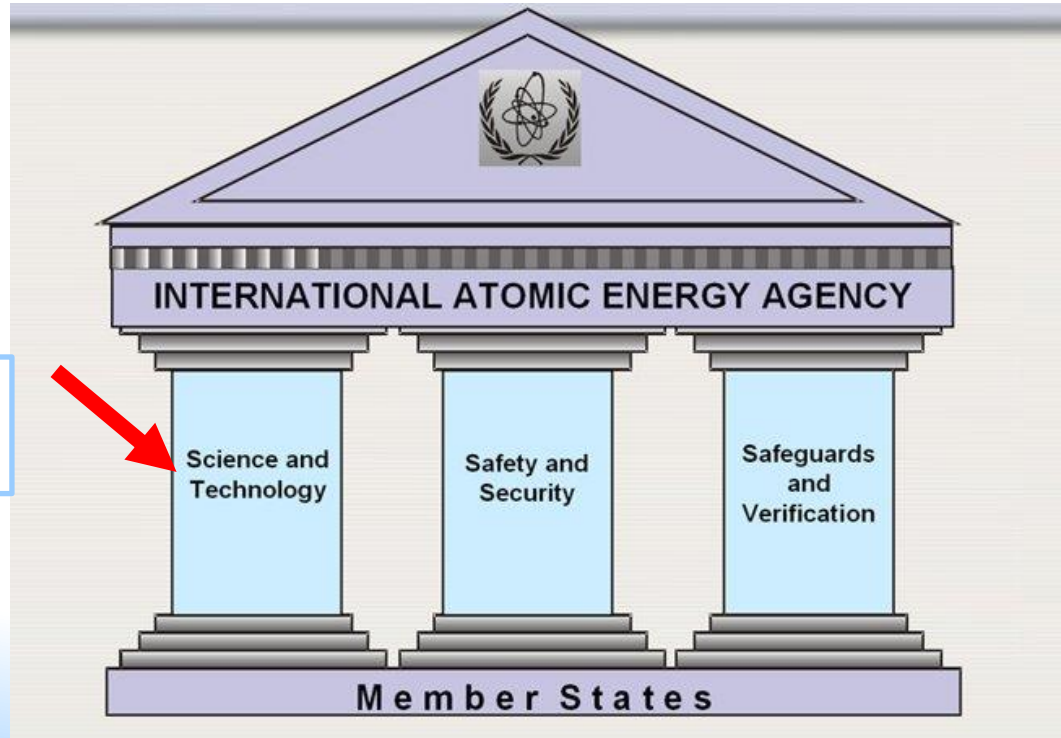
The world centre for cooperation in the nuclear field

Promotes the safe, secure and peaceful use of nuclear technologies

Total of 176 Member States

About 2500 personnel

Promoting and supporting safe, secure and peaceful application of nuclear technologies



Nuclear Energy

Nuclear Applications

Promoting Nuclear Sciences and Applications for humanity and the planet

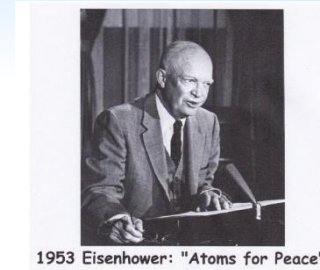
Assists member states in the use of nuclear and isotopic techniques science to meet their development objectives in areas of human health, food production, water management and environmental protection.

UN 2030 Agenda for Sustainable Development

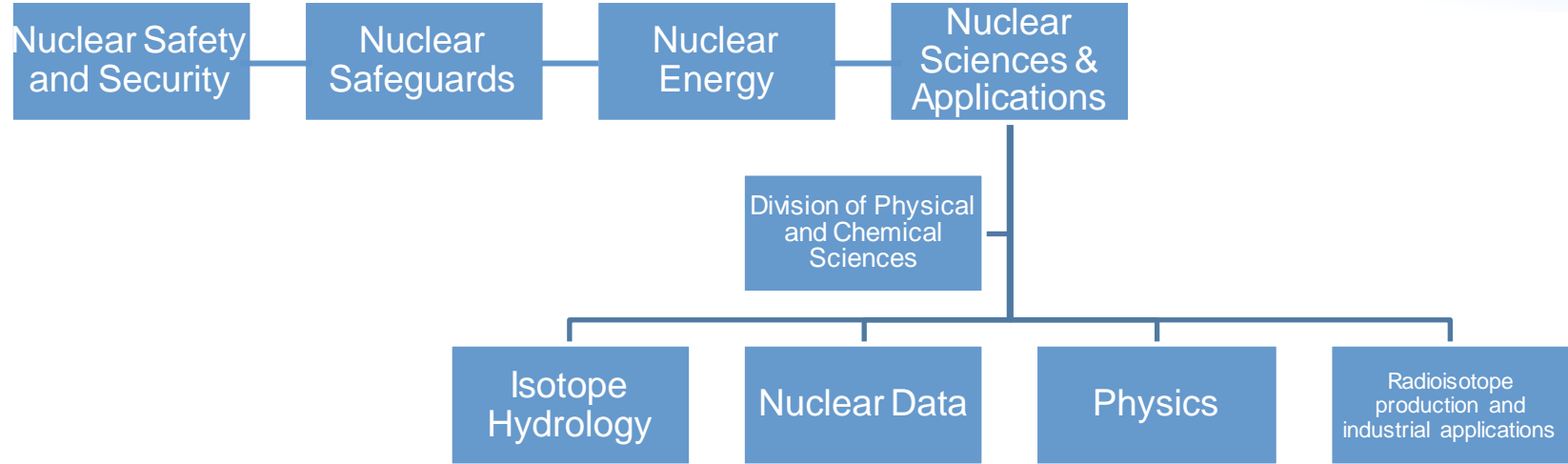


How did it all start?

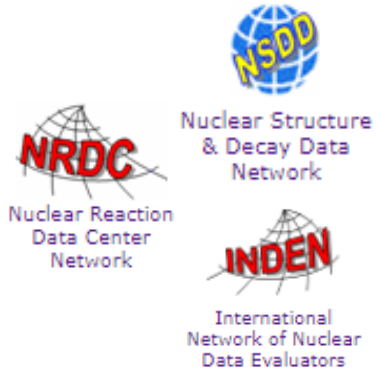
- Eisenhower's historical speech "Atoms for Peace" on 8 December 1953
- First International Conference on **Peaceful Uses of Atomic Energy**, Geneva, 1955
- IAEA is founded in 1957
- **UK, USSR and US discuss making nuclear data public** at Geneva conferences 1955, 1958
- Carl Westcott was hired in 1963 by the Agency to oversee the Nuclear Data Program
- Nuclear Data Section is created in 1965 - International Nuclear Data Committee advises on **promoting research and exchange of data among member states**



IAEA organisation



Nuclear Data Section



Develops nuclear data through data development projects and international networks

Promotes research through international coordinated research projects & technical meetings

- Reference Database for beta-delayed neutrons
- Photonuclear Data and Photon Strength Functions
- Fission Yield Data
- Decay Data for Antineutrino Spectra and Applications

Enhances capacity building via training workshops and mentoring schemes

Provides services in dissemination of databases, web tools and technical documents

LiveChart of Nuclides
Interactive Chart of Nuclides
Mobile App: Isotope Browser

Isotope Browser for mobile

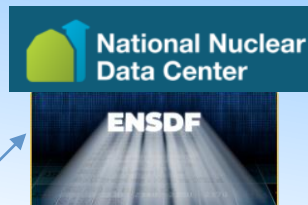
Medical Isotopes
Accelerator simulations

Beta-delayed neutrons
Reference Database for Beta-Delayed Neutron Emission

-
- The Abdus Salam
**International Centre
for Theoretical Physics**
-
- Joint ICTP-IAEA Workshops on:
- Nuclear Structure and Decay Data
 - Nuclear Data Measurements for Science and Applications
 - Nuclear Reaction data for Applications

Nuclear Data Services

<https://www-nds.iaea.org/>



International Atomic Energy Agency
Nuclear Data Services
Sección Datos Nucleares, OIEA

IAEA.org | NDS Mission | Mirrors: India | China | Russia

Search..

Hot Topics » IAEA-CIELO • TENDL-2021 • JENDL-5 • ENDF/B-VIII.0 News » Pointwise2020//TENDL-2019

Download
Download data, codes, packages

Quick Links

- ADS-Lib
- Atomic Mass Data Centre
- Beta-delayed neutrons
- CINDA
- Charged particle reference cross section
- CoNDERC
- DICEBOX
- DROSG-2000
- DXS
- Decay Data Library for Actinides
- EMPIRE-3.2
- ENDF Archive
- ENDF Retrieval
- ENDF-6 Codes
- ENDF-6 Format
- ENDVER
- ENSDF
- ENSDF ASCII Files
- ENSDF programs
- EPICS Electron & photon interaction data
- EXFOR

NEW

TENDL-2021 TALYS-based Evaluated Nuclear Data Library, 2021: [page] [list] [retrieve]
JENDL-5 Japanese evaluated nuclear data library, 2021: [page][errata][list][retrieve]
 β -delayed neutrons reference database for beta-delayed neutron emission [page]

Main All Reaction Data Structure & Decay by Applications Doc & Codes Index Events Links News

EXFOR
Experimental nuclear reaction data

LiveChart of Nuclides
Interactive Chart of Nuclides
Mobile App: Isotope Browser

CINDA
Nuclear reaction bibliography

ENDF
Evaluated nuclear reaction libraries

ENSDF
evaluated nuclear structure and decay data (+XUNDL) **

NSR
Nuclear Science References *

NuDat-3
selected evaluated nuclear structure data **

RIPL
reference parameters for nuclear model calculations

IBANDL
Ion Beam Analysis Nuclear Data Library

Charged particle reference cross section
Beam monitor reactions

PGAA
Prompt gamma rays from neutron capture

FENDL
Fusion Evaluated Nuclear Data Library

Photonuclear
- IAEA Photonuclear Data Library, 2019
- EPICS Electron & Photon Interaction Data, 2017

IRDF-II
International Reactor Dosimetry and Fusion File

NAA
Neutron Activation Analysis Portal

Safeguards Data
Last updated: May 2021

Medical Portal
Medical Portal

Standards
- Neutron cross-sections, 2017
- Decay data, 2005

*Database at the IAEA, Vienna **Database at the US NNDC

IAEA Nuclear Data Section

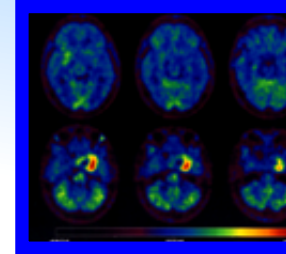
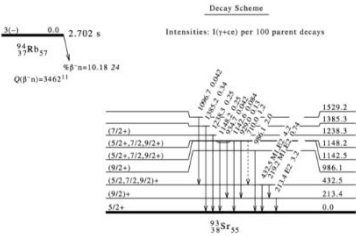
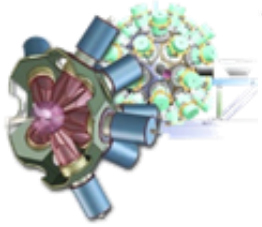


Mirrors

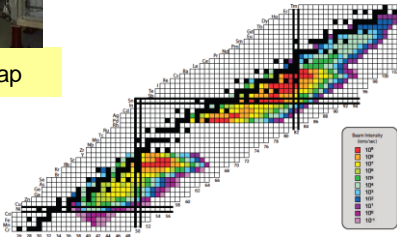
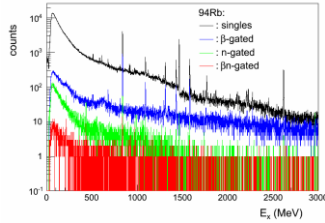
Partners

Events <2:3>

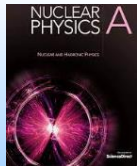
Nuclear physics research: experiment + theory



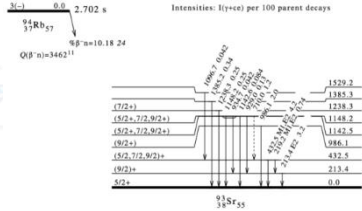
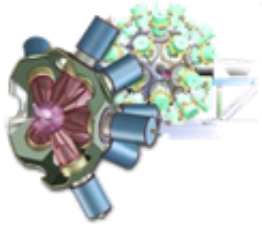
JYFLTRAP Penning trap



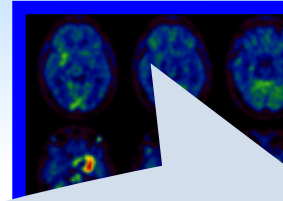
Applications:
organised
complete
recommended
traceable
easily retrievable



Nuclear Data



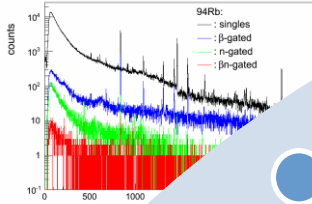
Verification/
Validation



Dissemination



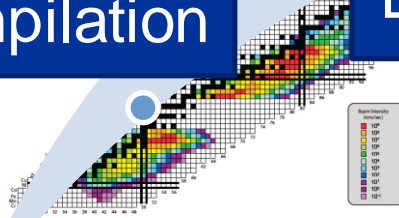
Evaluation



Compilation

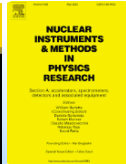
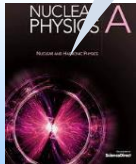


JYFLTRAP

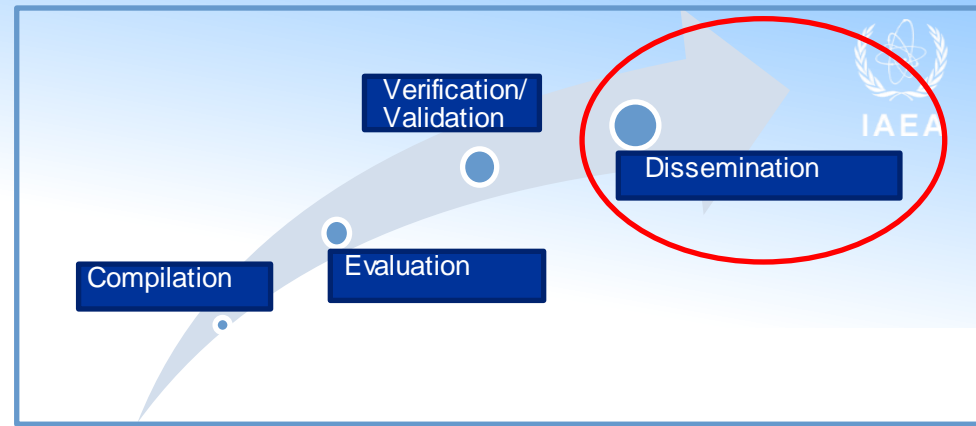


Applications:

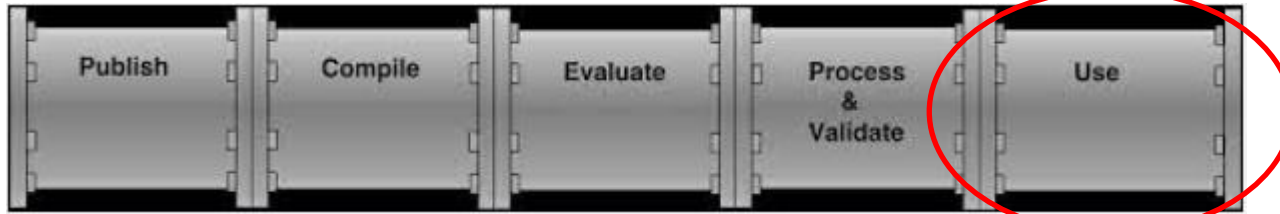
- organised
- complete
- recommended
- traceable
- easily retrievable



Nuclear Data



Nuclear Data Pipeline



D. Brown, JEFF Stakeholders Meeting, 2019

Unless measurements go through the nuclear data pipeline and are incorporated in the nuclear databases they ARE NOT USED

IAEA Networks



Experimental Nuclear Reaction Data (EXFOR)

Database Version of 2022-11-08

Software Version of 2022-10-20

- Nuclear reaction data – **compilation**

Nuclear Reaction Data Centers (NRDC) – since 1975:

13 data centers maintain EXFOR database – hosted at IAEA

USA/BNL, NEA Data Bank, IAEA, Russia (3), China, Hungary, Japan (2), Korea, India, Ukraine

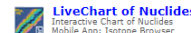
- Nuclear Structure and Decay Data – **compilation & evaluation**



Nuclear Structure and Decay Data network (NSDD) – since 1976:

17 data centers contributing to ENSDF database – hosted at NNDC/BNL

USA (ANL, BNL, FRIB/MSU, LBNL, ORNL, TAMU, TUNL), Australia, Bulgaria, Canada, China (2), Hungary, India, Japan, Romania, Russia



- Nuclear reaction data – **evaluation & validation**



INDEN - International Nuclear Data Evaluation Network

Network managed by the International Atomic Energy Agency

Coordinators: [R. Capote](#), [P. Dimitriou](#), and [G. Schnabel](#)

Evaluated Nuclear Data File (ENDF)

Database Version of 2022-10-07

Software Version of 2023-04-19

International Nuclear Data Evaluation Network (INDEN) – since 2018:

international cooperation on nuclear reaction data evaluation

USA (BNL, LANL, LLNL, Notre-Dame, ORNL, RPI), IAEA, JRC/EU, Austria, Czech Rep., China, France, Germany, Greece, Japan, Slovenia, Spain, Switzerland, Romania, Russia

International networks & databases



Nuclear Reaction
Data Center
Network



Nuclear Structure
& Decay Data
Network



International
Network of Nuclear
Data Evaluators

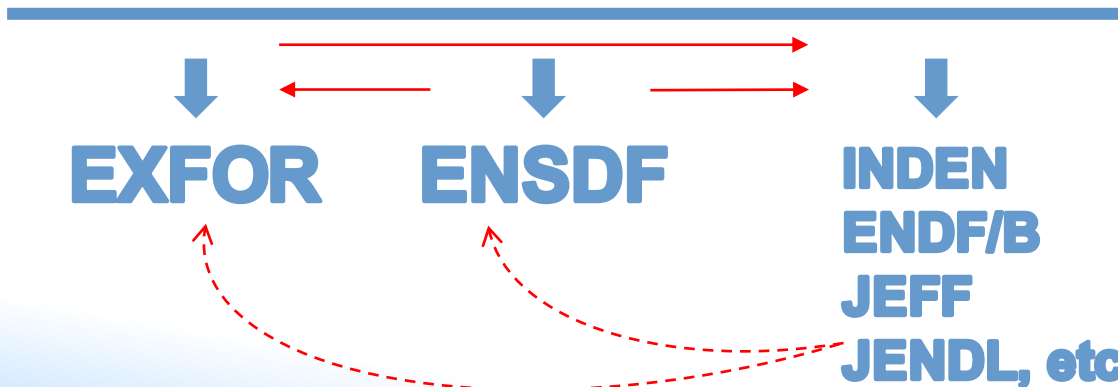
→ direct input

--- feedback

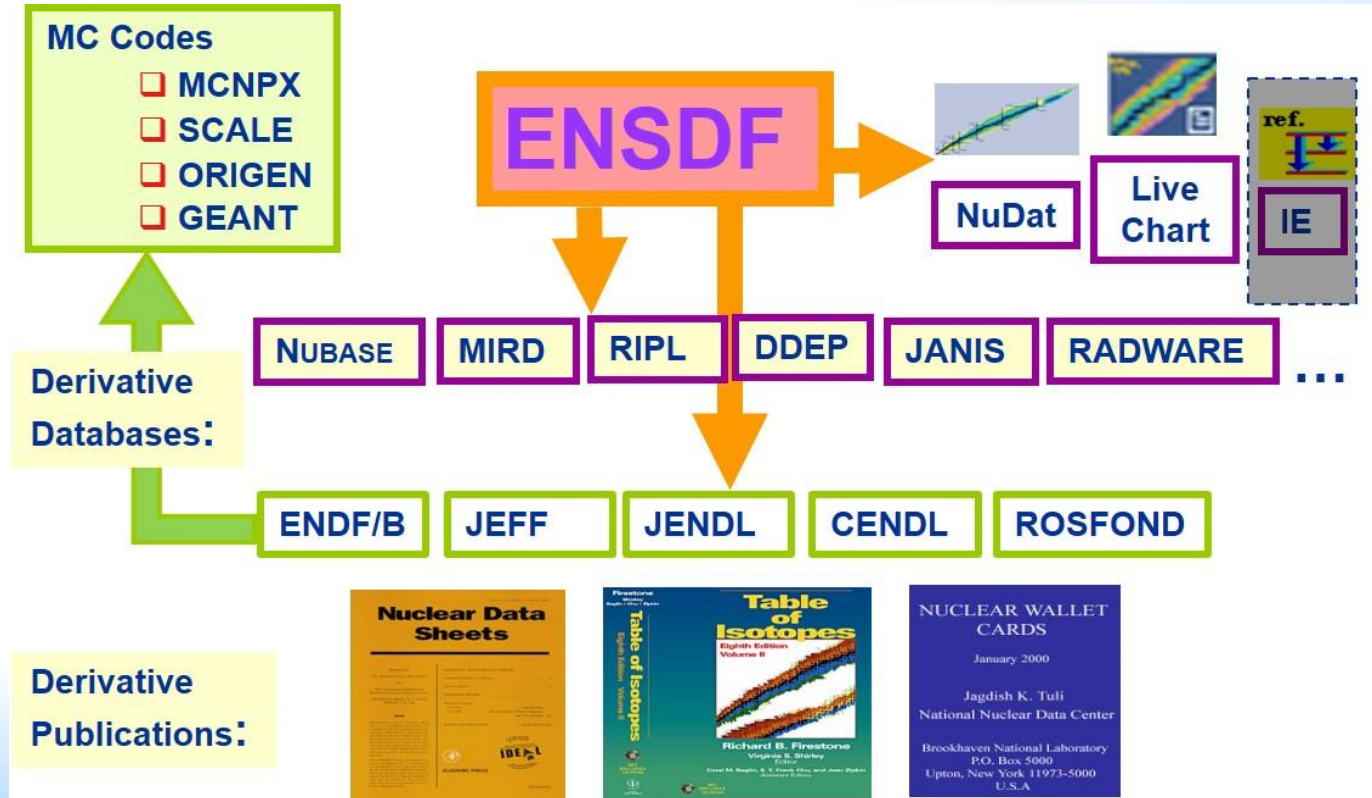
↓
EXFOR

↓
ENSDF

↓
INDEN
ENDF/B
JEFF
JENDL, etc.



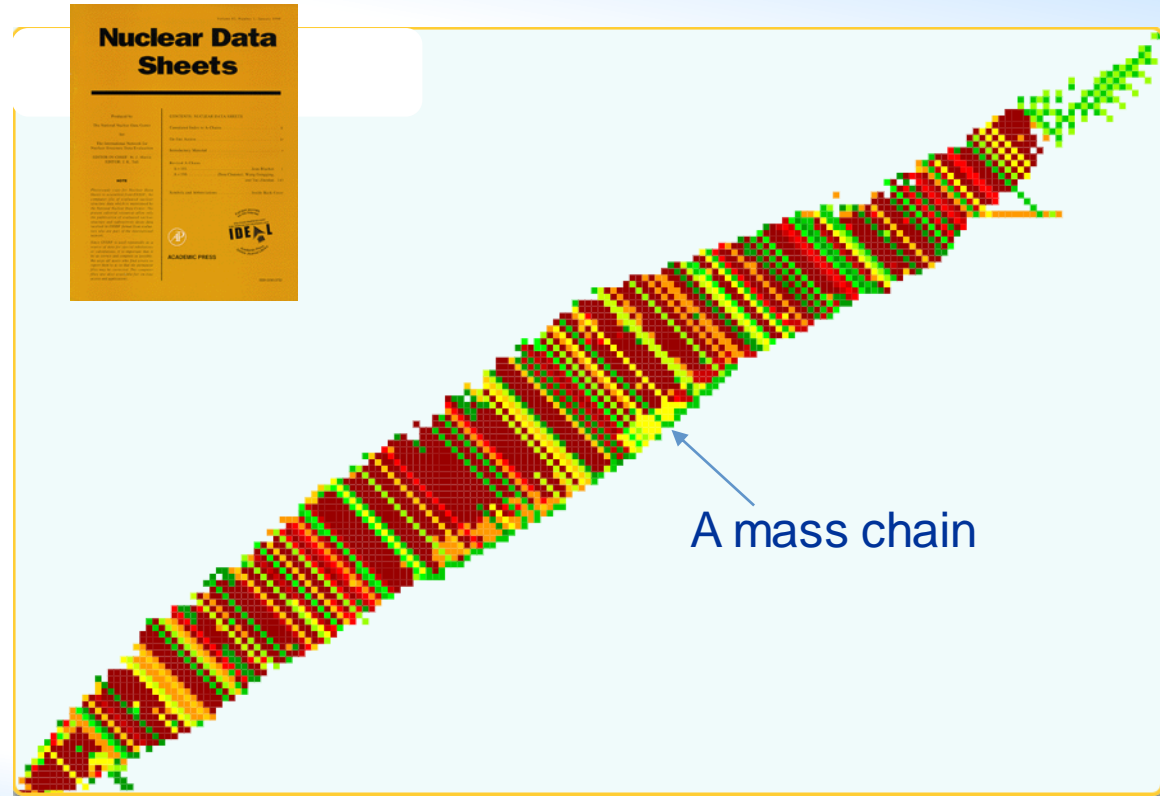
ENSDF: Major Source for other Derivative Products



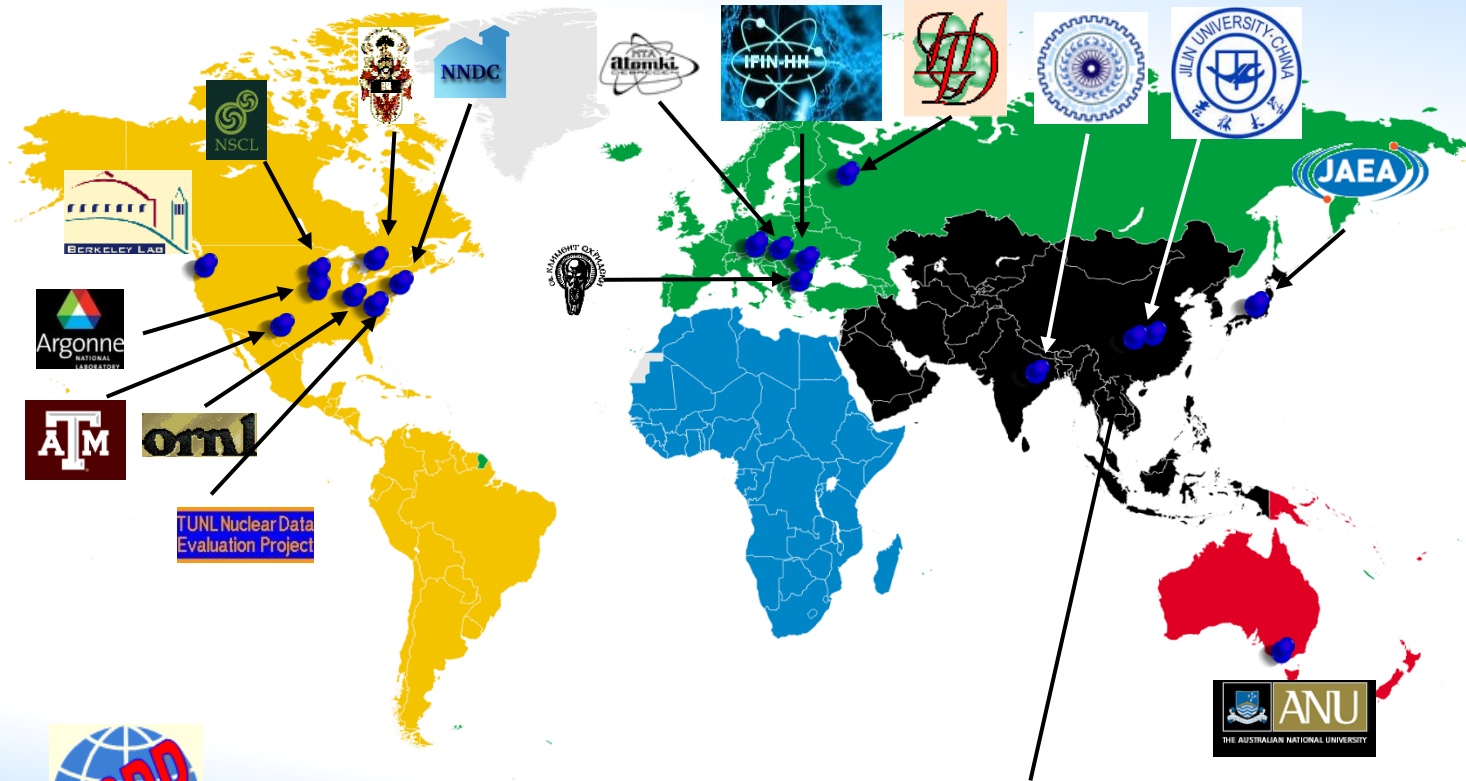
Evaluated Nuclear Structure Data File (ENSDF)

- 298 mass chains
- 3421 nuclides
- 19697 datasets

- Levels, spins, parities, band structure
- Multipolarities, mixing ratios, conversion coefficients
- Half-lives, transitions strengths, emission energies and probabilities
- Level schemes



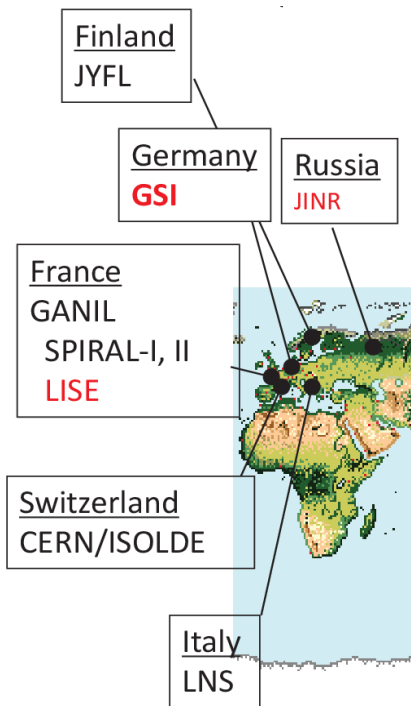
International Network of Nuclear Structure and Decay Data Evaluators



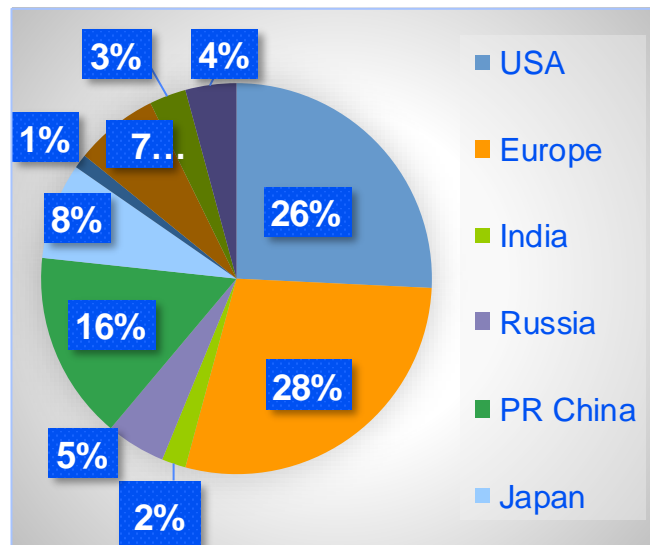
17 NSDD centres



European contribution

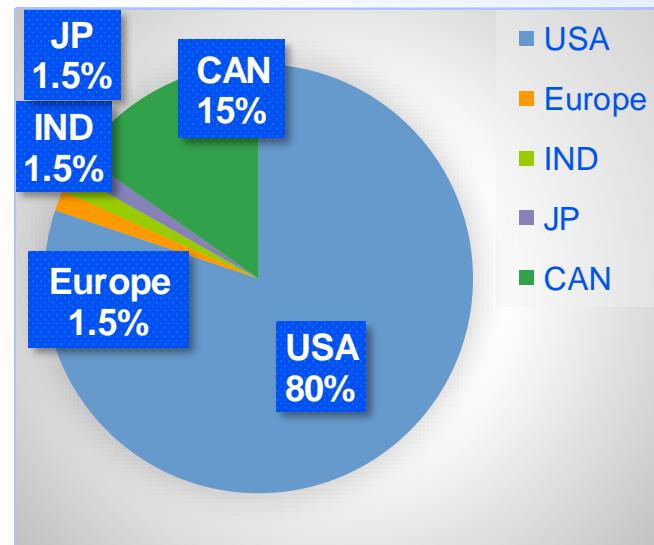


Major producer of nuclear structure and decay data



Major user of nuclear structure and decay data

2018-2022



Minor contributor to evaluated nuclear structure and decay data

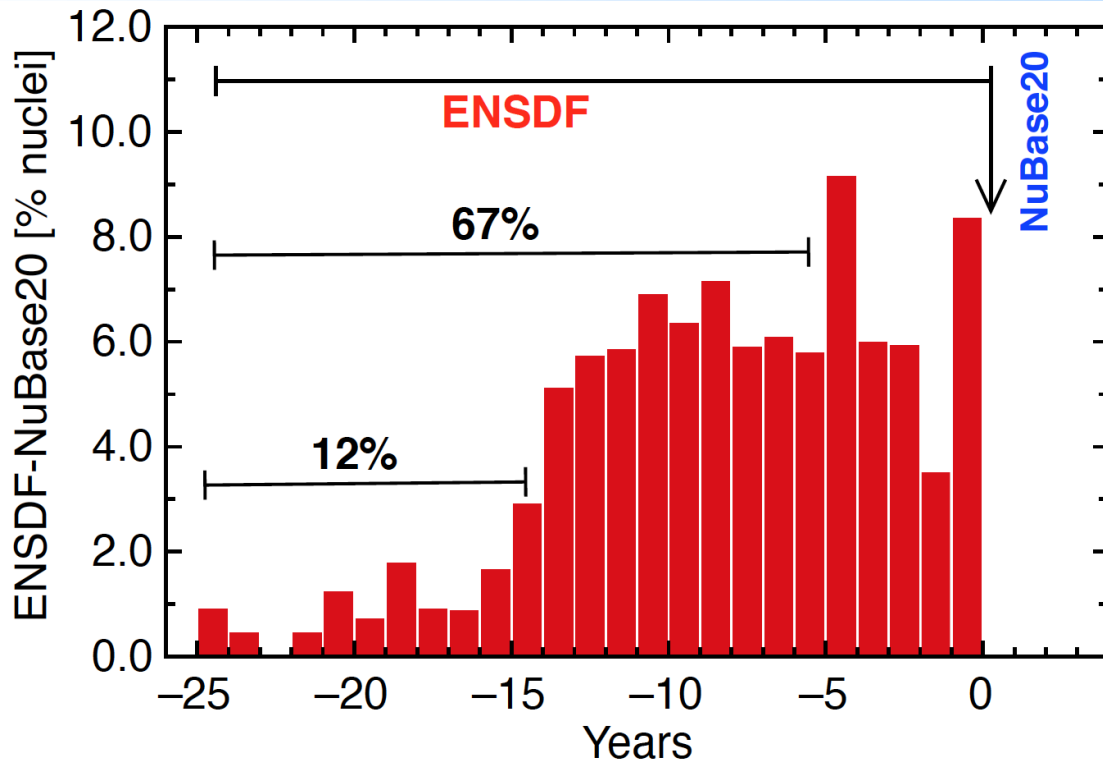
Present status

ENSDF is invaluable to the nuclear physics community but it is

- becoming increasingly outdated
- non-uniform in coverage & subjectivity

3558 ground states: 256 not in ENSDF

1983 isomers: 241 not in ENSDF





Evolution in period 1981 - 2022

Data Center	1981		1986	1996		2008	2015		2022	
	DC	FTE	DC	DC	FTE	DC	DC	FTE	DC	FTE
North America	6	9.5	6	6		6	7	6.9	8	5.64
Europe	6	6.33	5	4		2->0	2	0.9	3	0.95
	NL, UK, FRG, SWD, FRA, B		NL, FRG, SWD, FRA, B	NL, SWD, FRA, B	FRA, B	HUN, ROM	BUL, HUN, ROM			
Russia	2	5	2	2		1	1	0.2	1	0.2
Japan	1	1	1	1		1	1	0.2	1	0.2
China	-		1	1		2	2	0.4	2	0.45
Rest	1	1	1	1		3	2	0.8	2	0.64
Total	16	23.3	15	15	6	14	15	9.4	17	8.08

10-year recycling of mass chains: need FTE=12 (12 full-time evaluators)

History

Data Center	1981		1986	1996		2008
	DC	FTE	DC	DC	FTE	DC
North America	6	9.5	6	6		6
Europe	6	6.33	5	4		2->0
	NL, UK, FRG, SWD, FRA, B		NL, FRG, SWD, FRA, B	NL, SWD, FRA, B	FRA, B	
Russia	2	5	2	2		1
Japan	1	1	1	1		1
China	-		1	1		2
Rest	1	1	1	1		3
Total	16	23.3	15	15	6	14

Mass Chain Evaluations for the Evaluated Nuclear Structure Data File (ENSDF)—An Urgent Appeal for European Participation

F. G. KONDEV,¹ A. L. NICHOLS,² AND J. K. TULI³

¹*Nuclear Engineering Division, Argonne National Laboratory, Argonne, IL 60439, USA*

²*Nuclear Data Section, Department of Nuclear Sciences and Applications, International Atomic Energy Agency, Wagramer Strasse 5, A-1400 Vienna, Austria*

³*National Nuclear Data Center, Brookhaven National Laboratory, Upton, NY 11973-5000, USA*

IAEA initiatives II



Table 2. Multinational mass chain evaluations for ENSDF – numbers of responsible laboratories/institutes.

	Year			
	1981	1986	1996	2008
North America	6	6	6	6
Europe	6	5	4	1(→ 0)
Russia	2	2	2	1
Japan	1	1	1	1
China	-	-	1	2
Rest of the World	1	1	1	3
	16	15	15	14(→ 13)

10-11 November 2008

IAEA Technical Meeting on Reference Data Libraries for Nuclear Applications - ENSDF

Meeting report: INDC(NDS)-0543

editorial

together with the equivalent efforts of the United States and the rest of the world under the umbrella of the International Atomic Energy Agency, to constitute co-members of the International Network of Nuclear Structure and Decay Data Evaluators. All efforts will be made to achieve these goals during the course of 2009. On a two- to three-year timescale, the collaborative initiative within Europe should be adopted and fall within the auspices of NuPNET (Nuclear Physics NETwork—new European coordinating body) to recommend the necessary support from the national funding agencies, with a long-term aim to make these arrangements permanent beyond three years.

IAEA and NNDC staff agreed to explore the feasibility of holding a one-week workshop within Europe for would-be mass-chain evaluators already possessing nuclear structure expertise; see, for example, the IAEA/ICTP April/May 2008 NSDD Workshop webpage: <http://www-nds.iaea.org/workshops/smr1939/>.

The International Network of Nuclear Structure and Decay Data Evaluators is scheduled to assemble at the IAEA Headquarters from March 23–27, 2009 for their biennial technical meeting, and arrangements will also be made for European nuclear structure experts to attend who have expressed a strong interest in the evaluation of nuclear structure data for ENSDF.

Considered in a more general context, any nuclear physicists interested in contributing to the multinational

efforts to maintain and develop the ENSDF database are warmly encouraged to contact Jagdish Tuli (NNDC, BNL, USA), who is the technical coordinator of the project. In summary, the worldwide nuclear physics community would warmly welcome significant European input to support the ENSDF database commensurate with the region's highly respected expertise. During the course of the meeting of European specialists held at IAEA Headquarters, much interest and commitment was expressed by potentially new nuclear structure evaluators. Inevitably, a major issue in moving this European commitment

forward is one of financial support, and NuPNET is believed to be an appropriate vehicle for aligning and generating national support for this type of evaluation work.

Reference

1. F. G. Kondev, A. L. Nichols, and J. K. Tuli, "Mass chain evaluations for the Evaluated Nuclear Structure File (ENSDF)—An urgent appeal for European participation," *Nuclear Physics News* 17(4), 19–23 (2007).

ALAN L. NICHOLS
Department of Nuclear Sciences
and Applications, International
Atomic Energy Agency



Group photo at IAEA Headquarters, November 10, 2008.


New DC – increased declared FTE

Data Center	1981		1986	1996		2008	2015	
	DC	FTE	DC	DC	FTE	DC	DC	FTE
North America	6	9.5	6	6		6	7	6.9
Europe	6	6.33	5	4		2->0	2	0.9
	NL, UK, FRG, SWD, FRA, B		NL, FRG, SWD, FRA, B	NL, SWD, FRA, B	FRA, B	HUN, ROM		
Russia	2	5	2	2		1	1	0.2
Japan	1	1	1	1		1	1	0.2
China	-		1	1		2	2	0.4
Rest	1	1	1	1		3	2	0.8
Total	16	23.3	15	15	6	14	15	9.4

2 new DCs:
HUN (ATOMKI):
FTE~0.45
ROM (IFIN-HH)
FTE~0.45

European NSDD Effort 2014+

Recommendation of 21st NSDD Meeting 2015: European NSDD members and advisors should hold a special meeting to discuss possible actions

**A Workshop
for Nuclear Structure and
Decay Data Evaluation in Europe**

Cd102 54 M	Cd103 73 M	Cd104 57.7 M	Cd105 55.5 M	Cd106 5.25	Cd107 6.57	Cd108 0.89	Cd109 60.42	Cd110 12.62	Cd111 12.80	Cd112 24.15	Cd113 12.22	Cd114 28.75
Ag101 11.1 M	Ag102 12.9 M	Ag103 67.7 M	Ag104 69.2 M	Ag105 41.29 D	Ag106 25.96 M	Ag107 5.879	Ag108 2.37 M	Ag109 38.16	Ag110 24.63	Ag111 7.25 D	Ag112 51.92	Ag113 157.7
Pd100 85.0	Pd101 64.7	Pd102 1.2	Pd103 1006.2	Pd104 11.4	Pd105 29.35	Pd106 60.00	Pd107 66.46	Pd108 59.24	Pd109 11.71	Pd110 25.4 M	Pd111 24.8 M	Pd112 24.8 M
Rh99 61.2	Rh100 20.8	Rh101 1.7	Rh102 107.2	Rh103 10	Rh104 42.3	Rh105 153.0	Rh106 290.3	Rh107 37.7 M	Rh108 16.8	Rh109 85.3	Rh110 15.2	Rh111 11.4

Workshop Program

Program

09'00 - 11'00 (Chairperson: P. Dimitriou)

J. Timár / Opening remarks

Zs. Fülöp / Introduction of Atomki [-talk]

P. Dimitriou / Nuclear Data Activities in Europe (from the IAEA perspective) [-talk]

A. Negret / ENSDF evaluation activities at IFIN-HH [-talk]

S. Ertürk / Up to Date Evaluation on ^{173}Lu , ^{173}Yb , ^{173}Hy and ^{173}Ho (absent)

T.J. Mertzimekis / The nuclear moments database [-talk]

D. Balabanski / Photonuclear Data at ELI-NP [-talk]

S. Pascu / RoSphere, the gamma array at the Tandem accelerator of IFIN-HH [-talk]

11'00 - 11'30 Coffee Break

11'30 - 12'30 Round Table Discussion I. (Chairperson: D. Balabanski)

12'30 - 14'00 Buffet Lunch at ATOMKI

14'00 - 16'00 Round Table discussion II. (Chairperson: T.J. Mertzimekis)

16'00 - 16'30 Coffee Break

16'30 - 18'30 Round Table discussion III. (Chairperson: A. Negret)

19:00 - Workshop dinner in a local restaurant

Effort to expand NSDD in Europe



- ✓ Collaboration with ESF Nuclear Physics European Collaboration Committee (NuPECC) to promote NSDD evaluation in Europe

NSDD Secretary invited to NuPECC meeting (Vienna, Oct.2016):
Agreement to include IAEA contribution to the new NuPECC
Long Range Plan

- ✓ Promotion of European NSDD at international conferences

European NSDD effort presented at ND2016 (Negret et al.)

INPC2016 (Dimitriou et al.)

UK CARM2016 –Launch of new UK Nuclear Data Network (Dimitriou)

Applications and societal benefits – WG6

NuPECC Liaisons: Ioan Ursu, Jan Dobeš, Nicolas Alamanos ; Conveners: Marco Durante – Alain Letourneau

WG6 members : Eduardo Alves, Christoph Bert, Adrien Bidaud, Nicola Colonna, Daniel Cussol, Sergey Dmitrev, Xavier Doligez, Tobias Engert, Gilles de France, Carlos Granja, Ferid Haddad, Laura Harkness-Brennan, Sebastien Incerti, Jacek Jagielski, Maelle Kerveno, Ulli Koester, Franco Lucarelli, Ismael Martel, Christian Morel, Dénes Lajos Nagy, Dana Niculae, Alan Owens, Katia Parodi, Daniel Primetzhofer, Paddy Regan, Michael Scholz, Thomas Stöhlker, Zita Szikszai, Olof Tengblad, Vladimir Wagner

The compilation, evaluation and dissemination of nuclear data are laborious tasks that rely heavily on contributions from experts in both the basic and applied science research communities. Efforts carried out at national and international levels benefit from the coordination provided by international organisations such as the International Atomic Energy Agency (IAEA) in Vienna and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (NEA-OECD) in Paris. The development and maintenance of nuclear data libraries, and dissemination of nuclear data to various user communities constitute major goals of the international networks associated with these agencies: the Nuclear Reaction Data Centres Network (NRDC/IAEA), the Nuclear Structure and Decay Data evaluators (NSDD/IAEA), and NEA Data Bank. The challenge facing the nuclear research and applications communities is to ensure that the new measurements performed in the European facilities are

incorporated promptly into the available databases and are therefore used in both reaction modelling and evaluations that are important for energy and non-energy applications.

6. Summary and recommendations

- *Support activities related to the compilation, evaluation and dissemination of nuclear structure and decay data in Europe*
- *Maintain a high level of expertise in nuclear data evaluation to meet the requirements of a continuously developing European research and applied sciences landscape through targeted training and mentorship schemes*

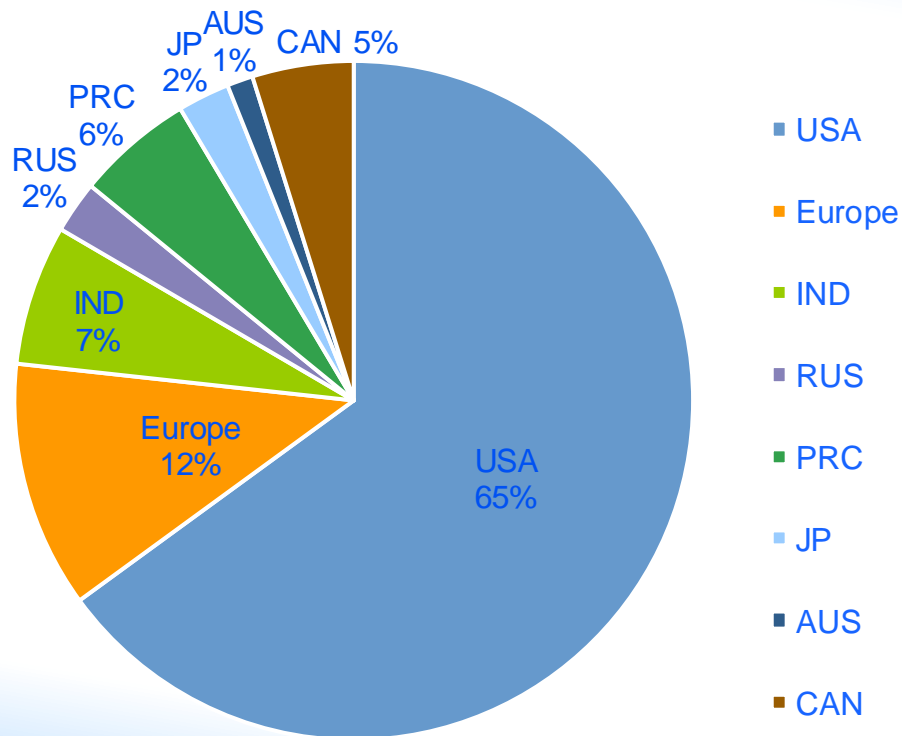


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	NL, UK, FRG, SWD, FRA, B		NL, FRG, SWD, FRA, B	NL, SWD, FRA, B	FRA, B	HUN, ROM	BUL, HUN, ROM			
Russia	2	5	2	2		1	1	0.2	1	0.2
Japan	1	1	1	1		1	1	0.2	1	0.2
China	-		1	1		2	2	0.4	2	0.45
Rest	1	1	1	1		3	2	0.8	2	0.64
Total	16	23.3	15	15	6	14	15	9.4	17	8.08

10-year recycling of mass chains: need FTE=12 (12 full-time evaluators)

Data Center **declared** contribution (2020-2022)



DC	FTE
USA	5.25
Europe	0.95
IND	0.54
RUS	0.2
PRC	0.45
JP	0.2
AUS	0.1
CAN	0.39
Total	8.08

NSDD Data Center contribution

declared

DC FTE

USA 5.25

Europe 0.95

IND 0.54

RUS 0.2

PRC 0.45

JP 0.2

AUS 0.1

CAN 0.39

Total 8.08

Productivity metrics:

1 FTE ~ 2 mass chains per year

BUL: 0.4, HUN: 0.4,
ROM: 0.15

SANDA project: Wp4. Evaluation of nuclear structure and decay data
20kEuro per Data Center or 5 PM/Data Center

Real / effective

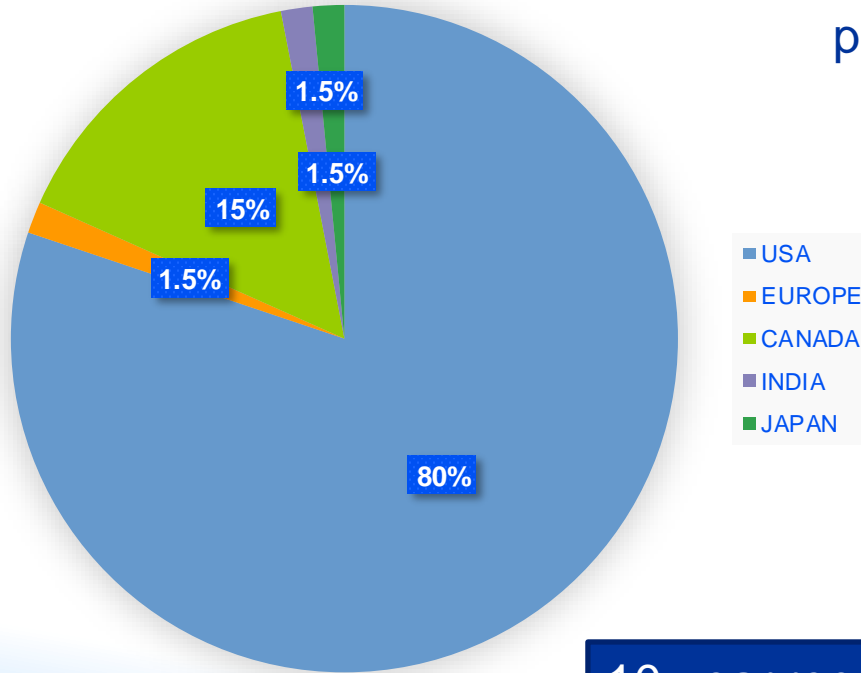
2018-2022 (5 yrs): 1 mass chain (BUL+HUN)

2013-2022 (10 yrs): 6 mass chains (BUL; HUN: ROM)

Cumulating small fragmented effort is not as efficient or productive as full-time effort

Data Center *real* contribution

real: based on mass chain production in 2018-2022



DC	FTE
USA	5.25
EUROPE	0.1(0.95)
CANADA	1.0(0.39)
CHINA	0.25(0.45)
INDIA	0.1(0.54)
JAPAN	0.1(0.2)

Total 6.80

10-year recycling of mass chains: need FTE=12
(12 full-time evaluators)

Key take-aways

- Declared non-US effort is ~20-30%
- Real non-US effort is much less
- Reduced and fragmented effort currently funded in Europe is not efficient or effective
- The trend in the total NSDD effort is downward: 6-8 FTE (full-time evaluators) whereas
- Total required effort to keep ENSDF re-cycling period of 10 yrs is 12 FTE

Key questions

- What are the data needs of the European nuclear physics community? Are there gaps in the nuclear databases?
- Are the nuclear physics measurements having an impact on the applications?
- How are the new measurements going to be incorporated in the databases in a timely manner?
- What is the European nuclear physics community going to do to
 - Address the gaps in the databases
 - Incorporate new measurements in the databases in a timely manner
 - Ensure that nuclear physics measurements **ARE USED** in applications

LRP 2024: opportunity to address these questions

- Support and promote activities related to the compilation and evaluation of the basic nuclear structure, decay and reaction data relevant to basic research and applications
- Support, promote and fund efforts to create a **critical mass** of nuclear data experts in Europe to contribute to the maintenance of the curated databases
- Support and fund training of nuclear data experts to maintain expertise in Europe

How can the IAEA-NDS help?



- International coordination (networks, meetings, town hall meetings)
- Training (ICTP-IAEA workshops, IAEA workshops)
- Outreach on nuclear data evaluation, evaluation tools and dissemination tools
- Seed funds to support mentorship schemes



Joint ICTP-IAEA Training Workshops



Objectives of the ICTP-IAEA workshop

- Introduce nuclear structure and decay data databases
- Familiarize with ENSDF evaluation methodology
- Attract new evaluators

Topics

- Experimental techniques
- Nuclear theory
- Evaluation methodologies and policies
- Formats and codes
- Statistical methods

Workshops on NSDD: Theory and Evaluation

IAEA-ICTP 2018

IAEA-ICTP 2016

IAEA-ICTP 2014

IAEA-ICTP 2012

IAEA-ICTP 2010

IAEA-ICTP 2008

IAEA-ICTP 2006

IAEA-ICTP 2005

Workshop 2003-part 2

Workshop 2003-part 1

Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Experiment, Theory and Evaluation

3 - 14 October 2022
Trieste, Italy

Further Information:
http://www.iaea.org/News/Events/2022/08/22-nsdd-workshop-2

The workshop offers an introduction to evaluated nuclear structure and decay data, by providing an overview of experimental and theoretical nuclear techniques and basic hands-on training in the evaluation procedures employed to produce the Evaluated Nuclear Structure Data File (ENSDF).

Description:
Reliable, evaluated nuclear structure and decay data are of vital importance for basic nuclear physics and astrophysics, as well as for applications in the fields of energy, cultural heritage, environmental, nuclear forensics and space exploration. The worldwide requirements for nuclear structure and decay data are covered by the International Network of Nuclear Structure and Decay Data (INSDD) Evaluation, an international group of evaluators created in 1976 under the auspices of the IAEA. The main output of the network is the online ENSDF database and publications in Nuclear Cross-Sections.

Topics:
• Nuclear experimental techniques
• Nuclear structure theory
• ENSDF compilation
• ENSDF evaluation methodology procedures
• Data formats
• Analyze code utility codes
• Database and online software

Local Organiser:
RALF KÄSSLER, ICTP Italy

Call for Papers:
A session will be held for participants to present their own research related to nuclear structure and decay data.

How to apply:
Online application:
http://indico.ictp.it/event/19887/

Grants:
A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries. There is no registration fee.

Deadline:
30 June 2022

NSDD logo, IYBSSD2022 logo, IAEA logo, ICTP logo, International Centre for Theoretical Physics logo

Compilation & evaluation at ICTP-IAEA workshops

- Mass chain evaluation: published in Nuclear Data Sheets
 - 2012: A=211, *Nuclear Data Sheets 114, 661 (2013)*
 - 2014: A=227, *Nuclear Data Sheets 132, 257 (2016)*
 - 2016: A=217, *Nuclear Data Sheets 147, 382 (2018)*
 - 2018: A=218, *Nuclear Data Sheets 160, 405 (2019)*
 - 2022: A=222, *in preparation*
- XUNDL compilation
 - 2016, 2018, 2022: 40 XUNDL datasets were uploaded into XUNDL

Seed funds (2009+)



- 3-4 yr grants to establish ENSDF evaluations at home institute
 - 11 grants: Argentina, Bulgaria, Jordan, Poland, Hungary, Romania, India, Turkey, Ukraine
 - 45% success
- Mentorship scheme in cooperation with US Data Centers

Conclusions

- Enhanced ENSDF effort is needed in Europe
- Effort should be sustainable:
 - Career path in ENSDF evaluation
- Stakeholders, nuclear physics research community and nuclear data community should work together towards a comprehensive European plan to acquire and curate nuclear data



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

Thank you!

