

Introduction to the Nuclear Data Section

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Nuclear Data Section

Division of Physical and Chemical Sciences

International Atomic Energy Agency



International Atomic Energy Agency

Founded in 1957: world centre for cooperation in the nuclear field

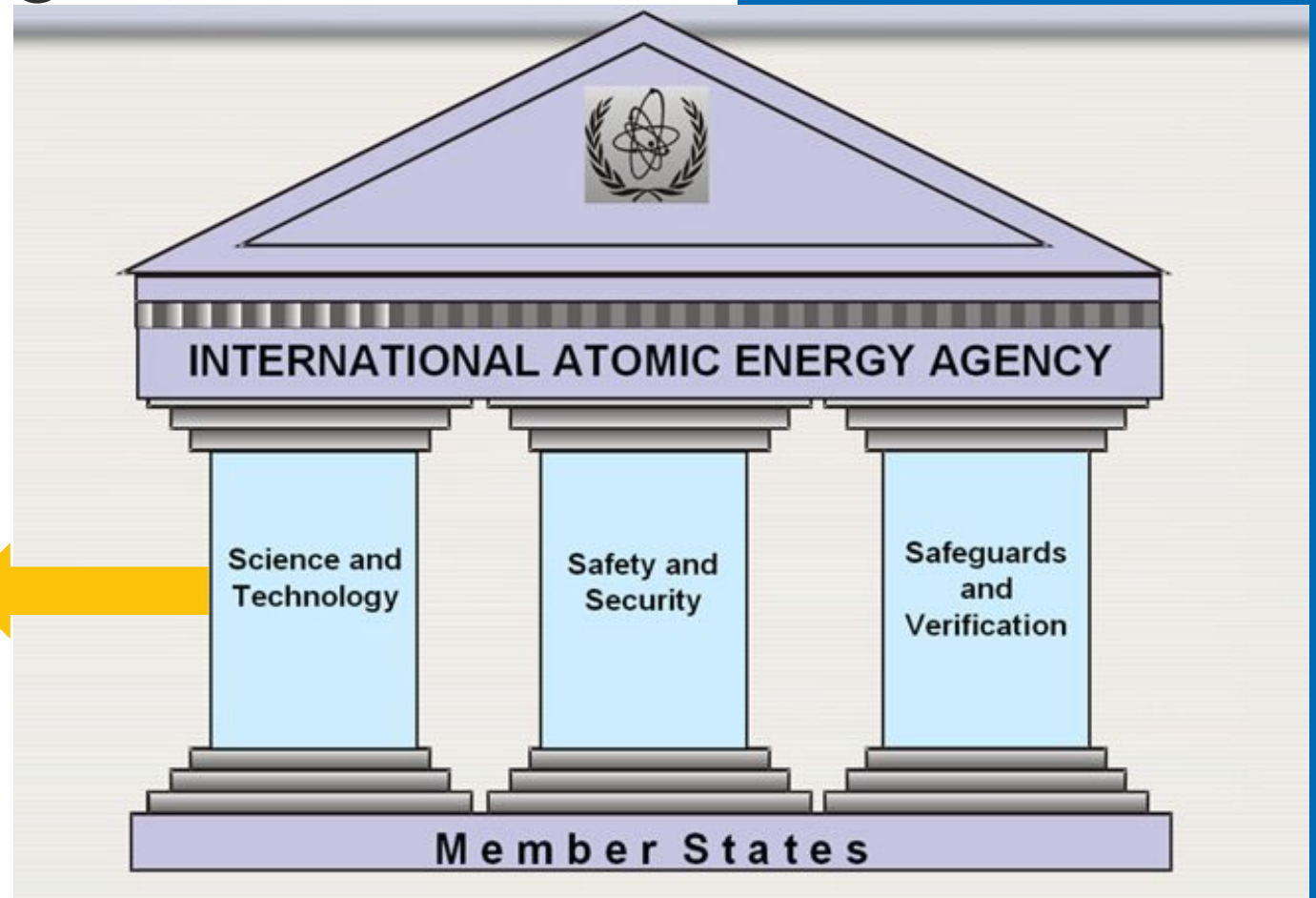
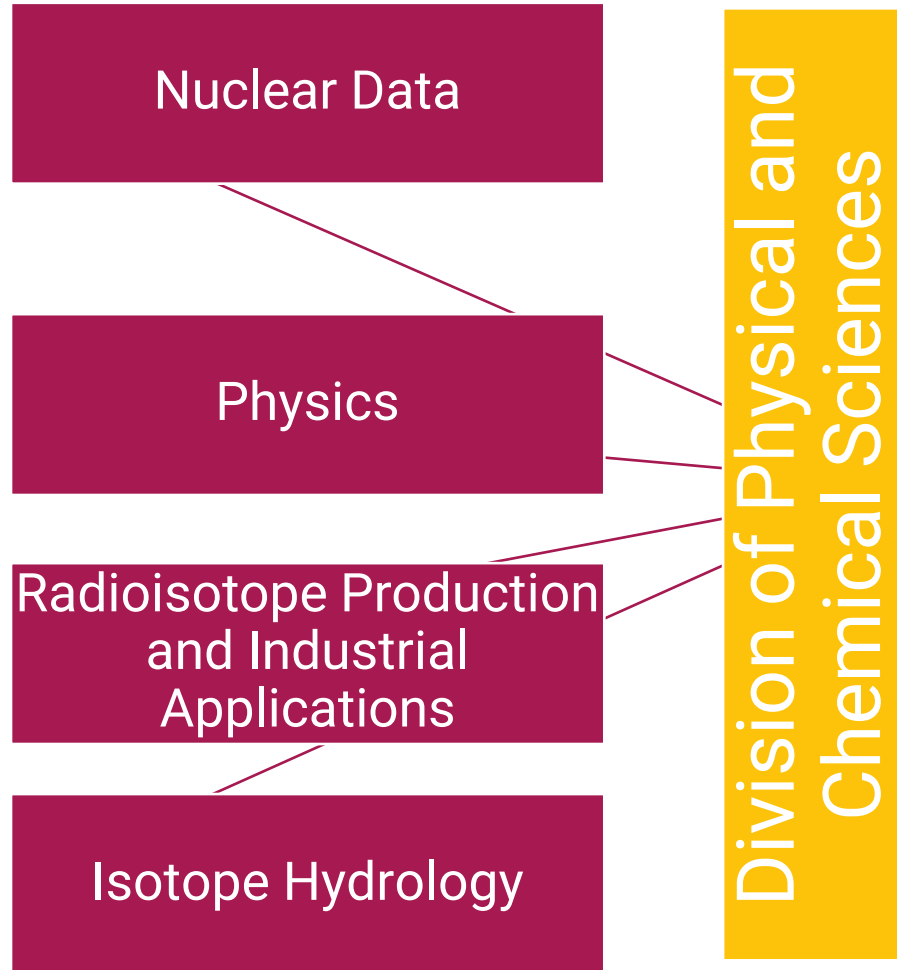
Promotes the safe, secure and peaceful use of nuclear technologies

Total of 179 Member States

Over 2500 personnel



safe, secure and peaceful application of nuclear technologies



How did it all start?

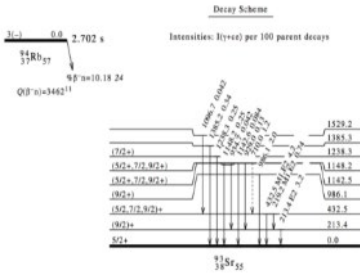
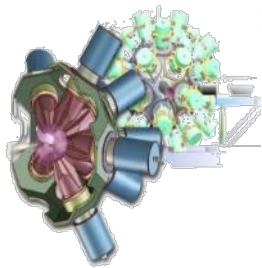
- Eisenhower's historical speech "Atoms for Peace" on 8 December 1953
- First International Conference on Peaceful Uses of Atomic Energy, Geneva, 1955
- IAEA is founded in 1957
- UK, USSR and US discuss making nuclear data public at Geneva conferences 1955, 1958
- Carl Westcott was hired in 1963 to oversee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



1953 Eisenhower: "Atoms for Peace"

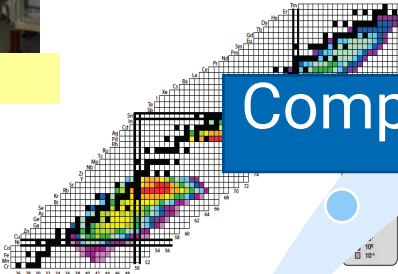
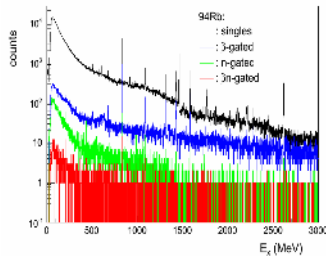


Nuclear physics research: experiment + theory



JYFLTRAP

Penning trap



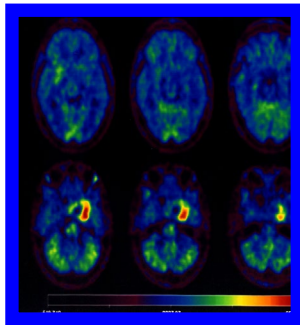
Verification/
Validation

Dissemination

Evaluation

Compilation

Nuclear Data



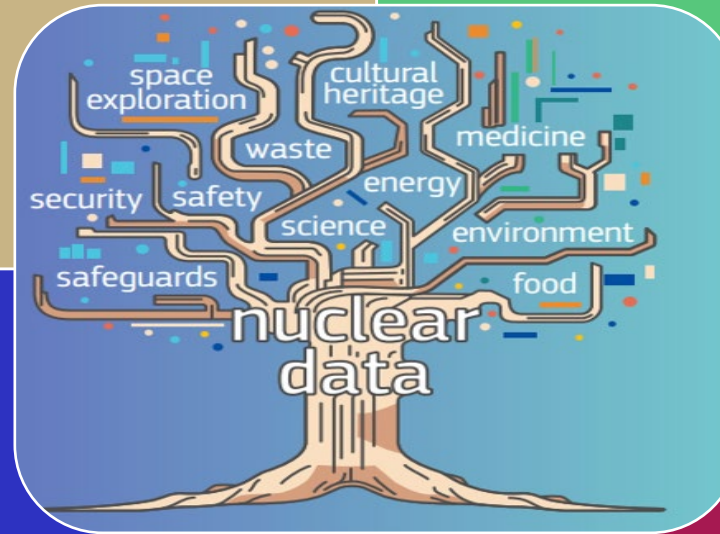
Applications:
organised
complete
traceable
easily retrievable

International Networks

- Nuclear Reactions – EXFOR → NRDC
- Nuclear Structure and Decay – ENSDF → NSDD
- Nuclear Reactions Evaluation – ENDF/B, JEFF, → INDEN

Coordinated Research Projects

- Beta-delayed neutrons
- Photonuclear data and Photon Strength Functions
- Fission Yields
- Nuclear Level Densities - new



Meetings

- (alpha,n) reactions for basic and applied research
- Nuclear data needs for Reactor Antineutrino Spectra
- Nuclear data needs for medical applications
- Thermal capture and gamma emission
- Neutron capture reactions on short-lived nuclei - new

Training

- Joint IAEA-ICTP workshops on Nuclear Structure and Decay Data
- Joint IAEA-ICTP Workshop on Nuclear Reaction Data
- IAEA Workshops on EXFOR Compilation
- IAEA Workshop on EMPIRE code/Talys code

Networks



**Nuclear Reaction Data
Centers**

Experimental Nuclear
Reaction Data

EXFOR



**Nuclear Structure and
Decay Data evaluators**

Recommended Nuclear
Structure and Decay Data

ENSDF

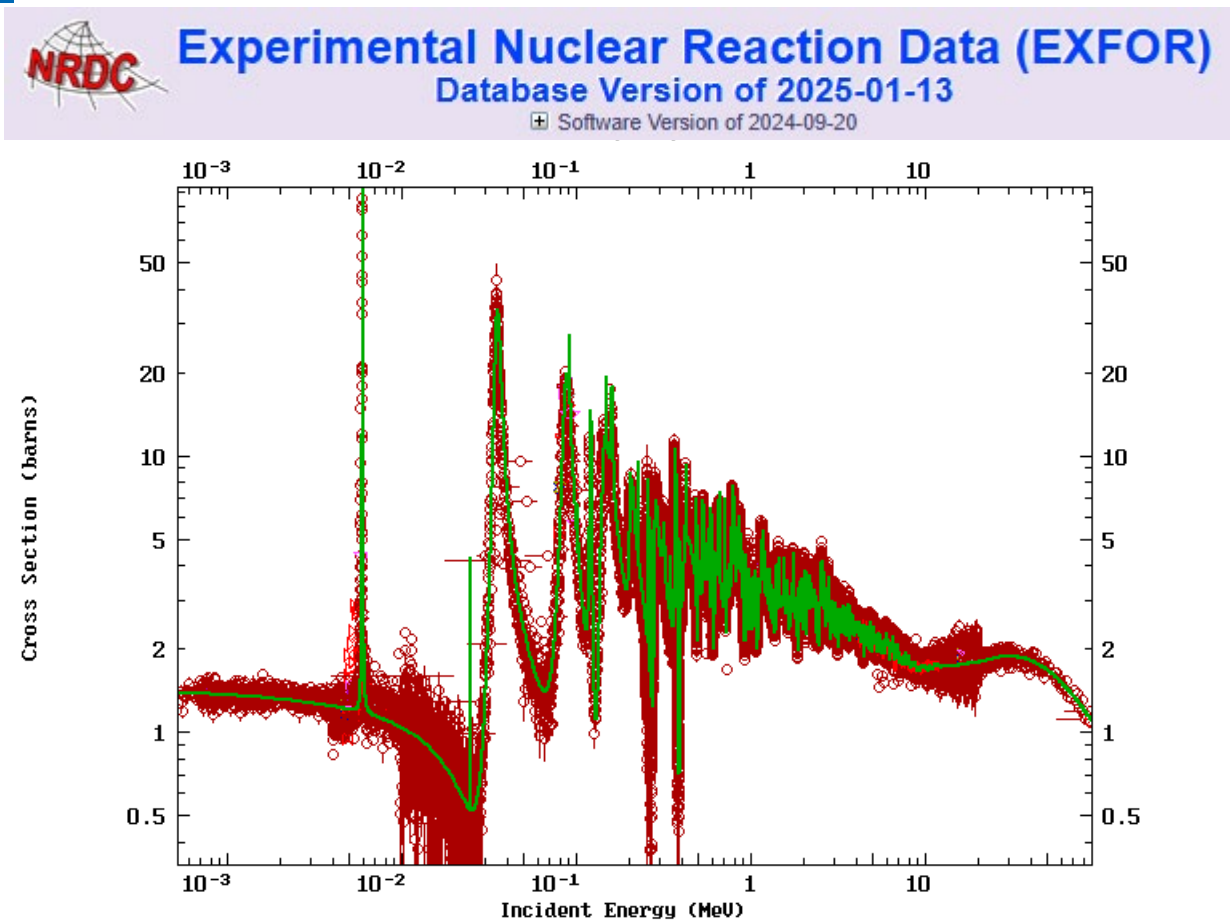


**International Nuclear
Data Evaluation Network**

Recommended Nuclear
Reaction Data

ENDF

EXFOR



EXFOR is a unique and comprehensive low- and intermediate-energy nuclear reaction database

nds.iaea.org/exfor

nds.iaea.org/endl

Evaluated Nuclear Data File (ENDF)
Database Version of 2025-01-29
Software Version of 2024-10-08

News & History

- 2024/10 New library: **ENDF/B-VIII.1**, U.S. Evaluated Nuclear Data Library, 2024 [page]
- 2024/06 New library: **TENDL-2023** TALYS-based Evaluated Nuclear Data Library, 2023 [page]
- 2023/10 New software feature: plot fission product yield from EXFOR and ENDF as a function of energy [howto]
- 2023/08 Updated **JENDL-5** Japanese evaluated nuclear data library (2021) Errata including update-13, August 10, 2023 [page]
- 2023/08 New library: **INDEN-Aug2023** evaluations produced by International Nuclear Data Evaluators Network (coord. by the IAEA) [page]

Standard Request Examples: 1 2 3 4 5 6 7 Go to: [Advanced Request](#); [ENDF-Database Explorer](#); [EE-View: CS](#)

Parameters: Submit Reset

Target ☐

Reaction ☐

Quantity ☐

[More Parameters...](#)

Submit

Libraries: ☐ All ☒ Selected(15) [Check](#) [Reset](#)

☒ **Major Libraries**

- ☐ 1) ENDF/B-VIII.1 (USA,2024)
- ☐ 2) JEFF-3.3 (Europe,2017)
- ☐ 3) JENDL-5 (Japan,2021)
- ☐ 4) CENDL-3.2 (China,2020)
- ☐ 5) BROND-3.1 (Russia,2016)
- ☐ 6) TENDL-2023 (TALYS, 2023)

☒ **IAEA Project Libraries**

- ☒ 7) FENDL-3.2b, Fusion, 2022
- ☒ 8) INDEN-Aug2023
- ☒ 9) IAEA-Med radioisot.prod.2019
- ☒ 10) IAEA-Med diagnostic ri.prod.2001
- ☒ 11) IAEA-Med therapeutical ri.prod.2009
- ☒ 12) IAEA-Photonuclear, 2019
- ☒ 13) IAEA Standards, 2017
- ☒ 14) IAEA Reference cross sections, 2017
- ☒ 15) IAEA High-Energy fission ref., 2015
- ☒ 16) ADS-HE High energy, 2013
- ☒ 17) IRDFF-II Dosimetry, 2019
- ☒ 18) INDL/TSL Thermal Scattering Law, 2006
- ☒ 19) IBA-EVAL diff.data for ion beam analysis, 2013
- ☒ 20) Wind, U,Np,Pu (up to 100 MeV), 1996
- ☒ 21) HE fission by Yashits for Pb-Pu, 2000

☐ **Special Libraries**

- ☐ [Archival](#)
- ☐ [Derived](#)

As of September 2024 EXFOR includes:
25,096 experiments,
167,425 data tables,
184,837 datasets,
and 20,348,339 data points.

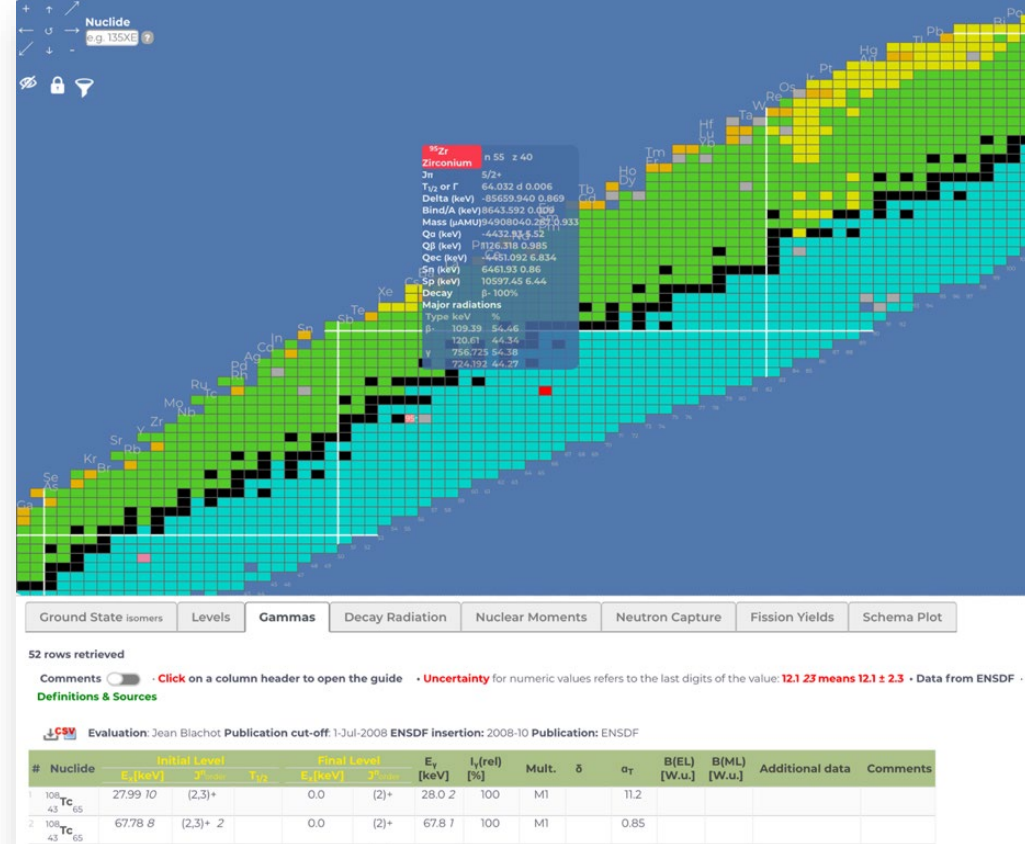
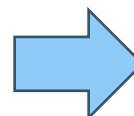
Live Chart (ENSDF)

nds.iaea.org/livechart

Evaluated Nuclear Structure Data File:

Unique and comprehensive database of all measured nuclear structure properties

- Nuclear levels, energies, spins and parities
- Gamma energies and intensities
- Multipolarities, mixing ratios, and conversion electrons
- Decay modes



Quick Search By Reaction By Decay

Nuclide, Mass, or Symbol: Search

(208Pb, pb-208, 144, 1n (neutron), C, Ca, etc.)

ENSDF

Evaluated Nuclear Structure Data File

273 new datasets added within the last month!

About ENSDF ENSDF Archives List of All Evaluations

Contact Us

National Nuclear Data Center

Volume 109, Number 10, November 2008

Nuclear Data Sheets

A Journal Devoted to Compilation and Evaluation of Experimental and Theoretical Results in Nuclear Physics

J.K. Tuli, Editor
National Nuclear Data Center, Brookhaven National Laboratory, Upton, NY 11973-5000, USA
www.nndc.bnl.gov

Special Issue on
Workshop on Neutron Cross Section Covariances
June 24-28, 2008, Fort Jefferson, New York, USA
www.nndc.bnl.gov/ncsc08

Special Issue Editor: P. Obložinský

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Available online at
ScienceDirect
www.sciencedirect.com

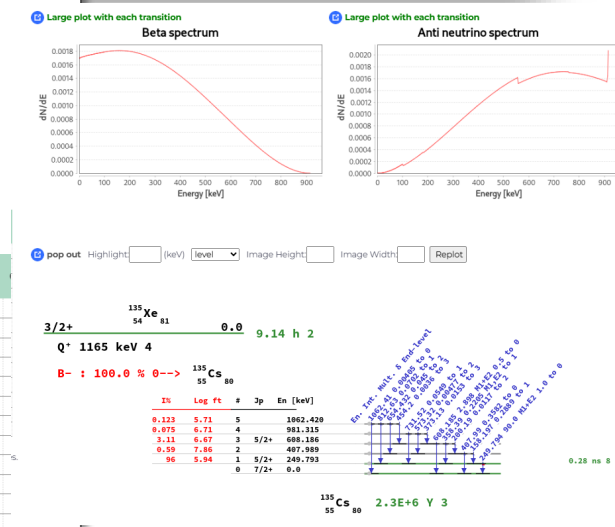
Beta - CSV Data API

#	<E _β > [keV]	I _β (abs) [%]	Daughter level [keV]	J ^π	E _{β, max} [keV]	log ft	Transition type	Comments
1	26.9 17	0.123 6	1062.420 74	(103)	5.71 6			
2	50.0 12	0.075 5	981.315 22	(184)	6.71 5			
3	173.3 15	3.11 14	608.186 14	5/2+	(557)	6.67 3	allowed	
4	248.1 16	0.59 3	407.989 13	(757)	7.86 3			
5	310.2 16	96 4	249.793 12	5/2+	910 10	5.94 2	allowed	

Warning
γ without initial level have not been placed in the level schema
γ without intensity are expected but not observed

Gamma CSV Data API

#	E _γ [keV]	I _γ (abs) [%]	Initial level [keV]	J ^π	Final level [keV]	J ^π	Mult.	δ	σ _T	I _{Tot} [%]
1	158.197 18	0.289 14	407.989 13		249.793	5/2+				
2	200.19 10	0.012 5	608.186 14	5/2+	407.989					
3	249.794 15	90 3	249.793 12	5/2+	0.0	7/2+	M1(+E2)	<1.0	0.0737 20	97 3
4	358.39 3	0.221 17	608.186 14	5/2+	249.793	5/2+	M1,E2		0.0265 17	0.226 11
5	373.13 10	0.015 3	981.315 22		608.186	5/2+				
6	407.99 2	0.358 17	407.989 13		0.0	7/2+				
7	454.2 2	0.0036 7	1062.420 74		608.186	5/2+				
8	573.32 9	0.0048 7	981.315 22		407.989					
9	608.185 15	2.90 13	608.186 14	5/2+	0.0	7/2+	M1(+E2)	<0.5	0.00730 22	2.92 13
10	654.432 16	0.045 2	1062.420 74		407.989					
11	731.52 2	0.055 3	981.315 22		249.793	5/2+				
12	812.63 3	0.070 3	1062.420 74		249.793	5/2+				
13	1062.41 2	0.0041 8	1062.420 74		0.0	7/2+				



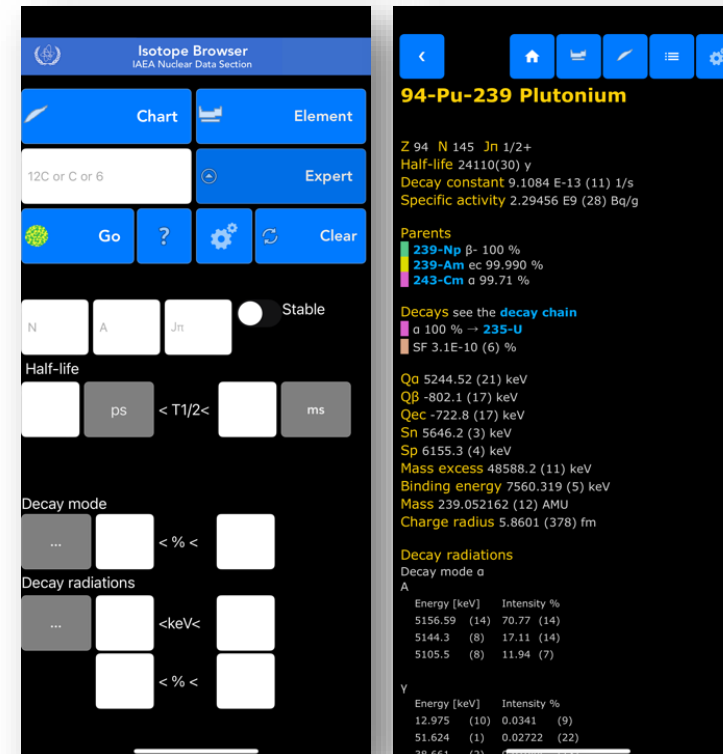
Isotope Browser – for Mobile Devices

- App for Mobile Devices

- Properties of over **4,000 isotopes**
- **No internet** connection needed
- **~180,000** downloads, **4.8** ★
- **11 languages** (Arabic, Chinese, English, French, Spanish, Russian, Japanese, Slovenian, Italian, Trad. Chinese, German)
- **Regularly updated** with new features and data



Available for both
- Android
- Apple



Medical Portal

nds.iaea.org/medportal

Handbooks
IAEA TRS 473
IAEA TECDOC 1211
Reference Data
Monitor Reactions
MIRD
Production Data
Therapeutic
Diagnostic
Gamma emitters
Positron emitters
Related Reports
INDC(NDS)-0638
INDC(NDS)-0535
INDC(NDS)-0560
INDC(NDS)-0523
On-going Project
INDC(NDS)-0675
INDC(NDS)-0630
INDC(NDS)-0591
Links
NAHU
DMRP Section
Previous version



Decay data of nuclides denoted by green band were evaluated within IAEA CRPs.

Nuclide	Half-life	Decay %	Emission	Target	Reaction	Product	MIRD	Production Yield
$^{11}_{6}\text{C}_5$	20.364 min 14	ec β+ 100 (β+ ≈ 99.8)	e ⁺	$^{14}_{7}\text{N}_7$	$^{14}\text{N}(p,\alpha)^{11}\text{C}$	$^{11}_{6}\text{C}_5$	mird	MIB
$^{13}_{7}\text{N}_6$	9.965 min 4	ec β+ 100 (β+ ≈ 99.8)	e ⁺	$^{16}_{8}\text{O}_8$	$^{16}\text{O}(p,\alpha)^{13}\text{N}$	$^{13}_{7}\text{N}_6$	mird	MIB
$^{15}_{8}\text{O}_7$	122.24 s 16	ec β+ 100 (β+ ≈ 99.9)	e ⁺	$^{15}_{7}\text{N}_8$	$^{15}\text{N}(p,n)^{15}\text{O}$	$^{15}_{8}\text{O}_7$	mird	MIB
				$^{14}_{7}\text{N}_7$	$^{14}\text{N}(d,n)^{15}\text{O}$	$^{15}_{8}\text{O}_7$	mird	MIB
$^{18}_{9}\text{F}_9$	109.77 min 5	ec β+ 100 (β+ ≈ 96.7)	e ⁺	natNe	$^{18}\text{Ne}(d,x)^{18}\text{F}$	$^{18}_{9}\text{F}_9$	mird	MIB
				$^{18}_{8}\text{O}_{10}$	$^{18}\text{O}(p,n)^{18}\text{F}$	$^{18}_{9}\text{F}_9$	mird	MIB
$^{22}_{11}\text{Na}_{11}$	2.6018 y 22	ec β+ 100 (β+ ≈ 90.0)		$^{27}_{13}\text{Al}_{14}$	$^{27}\text{Al}(p,x)^{22}\text{Na}$	$^{22}_{11}\text{Na}_{11}$	mird	MIB
				$^{27}_{13}\text{Al}_{14}$	$^{27}\text{Al}(^3\text{He},x)^{22}\text{Na}$	$^{22}_{11}\text{Na}_{11}$	mird	MIB
				$^{27}_{13}\text{Al}_{14}$	$^{27}\text{Al}(d,x)^{22}\text{Na}$	$^{22}_{11}\text{Na}_{11}$	mird	MIB

The **MIB** link opens the Medical Isotope Browser for the calculation of production yields

You can adjust the parameters, e.g. beam energy, to test different scenarios



Medical Portal

Parent	T _{1/2} or Width	E _γ [keV]	J ^π order	Decay	Q _{decay} [keV] see the note	Daughter	Comments	Total energy by radiation type, per 1 decay of the parent [keV]						
								Alpha	Beta	CE & Auger	γ & X	Recoil	Neutrino	Total
¹¹ ₆ C	1221.8 ± 8	0.0	3/2-	ec β+	100 %	1982.4 10			384.8 4		1019.62 3		578.3 6	1982.7 7
														1982.4 10
														0 %

ENSDF source Compare decay libraries (allow pop-up)

Electron Capture and Beta+						
#	<E _{β+} > [keV]	I _{β+} (abs) [%]	E _{EC} [keV]	I _{EC} (abs) [%]	Daughter level [keV]	J ^π Log ft Transition type Comments
1	385.7 4	99.767 3	(1982.3)	0.233 3	0	3/2- 3.5921 19 allowed

511 keV 199.534 5 % γ[±] annihilation radiation

pop out Highlight: (keV) level Image Height: Image Width: Replot

¹¹₆C
3/2- 0.0 1221.8 s 8
Q+ 1982.4 keV 10

B+ : 100.0 % 0--> ¹¹₅B

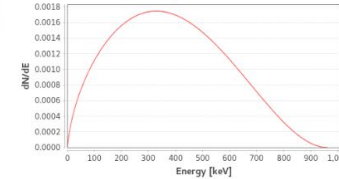
TV IB % Log ft # Jp En [keV]

100 99.7669 3.5921 0 3/2- 0

¹¹₅B STABLE

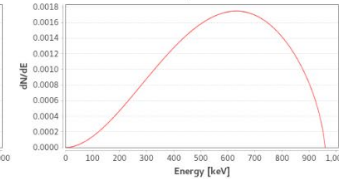
Large plot with each transition

Beta spectrum



Large plot with each transition

Neutrino spectrum



Medical Radiois

Nuclide
e.g. ¹³⁵Xe

- Use the numeric keypad to zoom and move
- Use the mouse wheel to zoom

Details

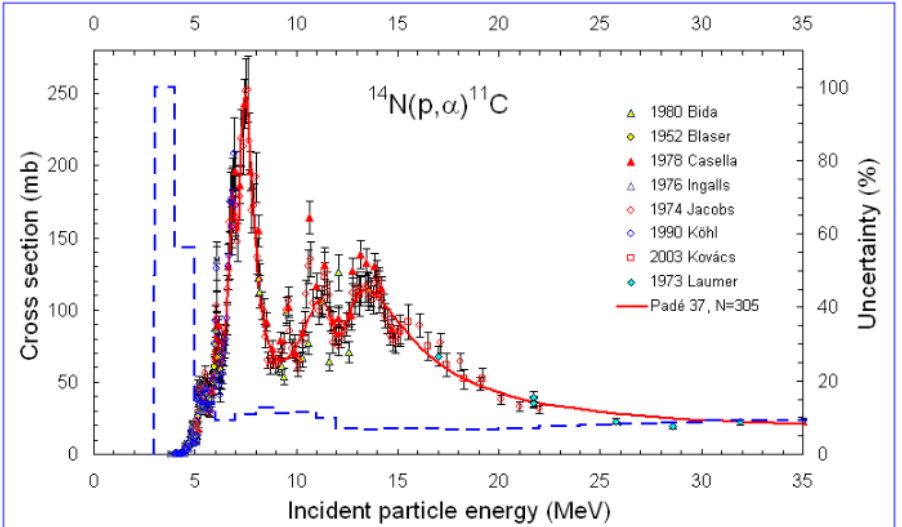


diagnostic e+ emitters for diagnosis

within IAEA CRPs.

Nuclide	Half-life	Decay %	Emission	Target	Reaction	Product	MIRD	Production Yield
¹¹ ₆ C	20.364 min 14	ec β+ 100 (β+ ≈ 99.8)	e+	¹⁴ ₇ N	¹⁴ N(p,α) ¹¹ C	¹¹ ₆ C	mird	MIB
¹³ ₇ N	9.965 min 4	ec β+ 100 (β+ ≈ 99.8)	e+	¹⁶ ₈ O	¹⁶ O(p,n) ¹³ N	¹³ ₇ N	mird	MIB
¹⁵ ₈ O	122.24 s 16	ec β+ 100 (β+ ≈ 99.9)	e+	¹⁵ ₇ N	¹⁵ N(p,n) ¹⁵ O	¹⁵ ₈ O	mird	MIB
				¹⁴ ₇ N	¹⁴ N(d,n) ¹⁵ O	¹⁵ ₈ O	mird	MIB
¹⁸ ₉ F	109.77 min 5	ec β+ 100 (β+ ≈ 96.7)	e+	natNe	natNe(d,x) ¹⁸ F	¹⁸ ₉ F	mird	MIB
				¹⁸ ₈ O	¹⁸ O(p,n) ¹⁸ F	¹⁸ ₉ F	mird	MIB
²² ₁₁ Na	2.6018 y 22	ec β+ 100 (β+ ≈ 90.0)		²⁷ ₁₃ Al	²⁷ Al(p,x) ²² Na	²² ₁₁ Na	mird	MIB
				²⁷ ₁₃ Al	²⁷ Al(³ He,x) ²² Na	²² ₁₁ Na	mird	MIB
				²⁷ ₁₃ Al	²⁷ Al(d,x) ²² Na	²² ₁₁ Na	mird	MIB

Recommended cross sections for the ¹⁴N(p,α)¹¹C reaction



Updated: May 2021.


The **MIB** link opens the Medical Isotope Browser for the calculation of production yields

You can adjust the parameters, e.g. beam energy, to test different scenarios



Medical Isotope Browser

nds.iaea.org/mib

**Medical Isotope Browser**
IAEA Nuclear Data Section

Examples 1 Incident - Exit energies
2 Incident energy - Thickness, and user σ
3 Energy scan 4 Composite target

Previous run:

Product ?

☐ all products

Thickness ? [mm]
☐ [mg/cm²] ?

Current [μA]

Projectile ?
☒ p ☐ D ☐ α ☐ T ☐ ³He

Exit energy [MeV] ?

Irradiation T ?
 d h m

Target ? composition

Incident energy [MeV] ?

Post EOB T ?
 d h m

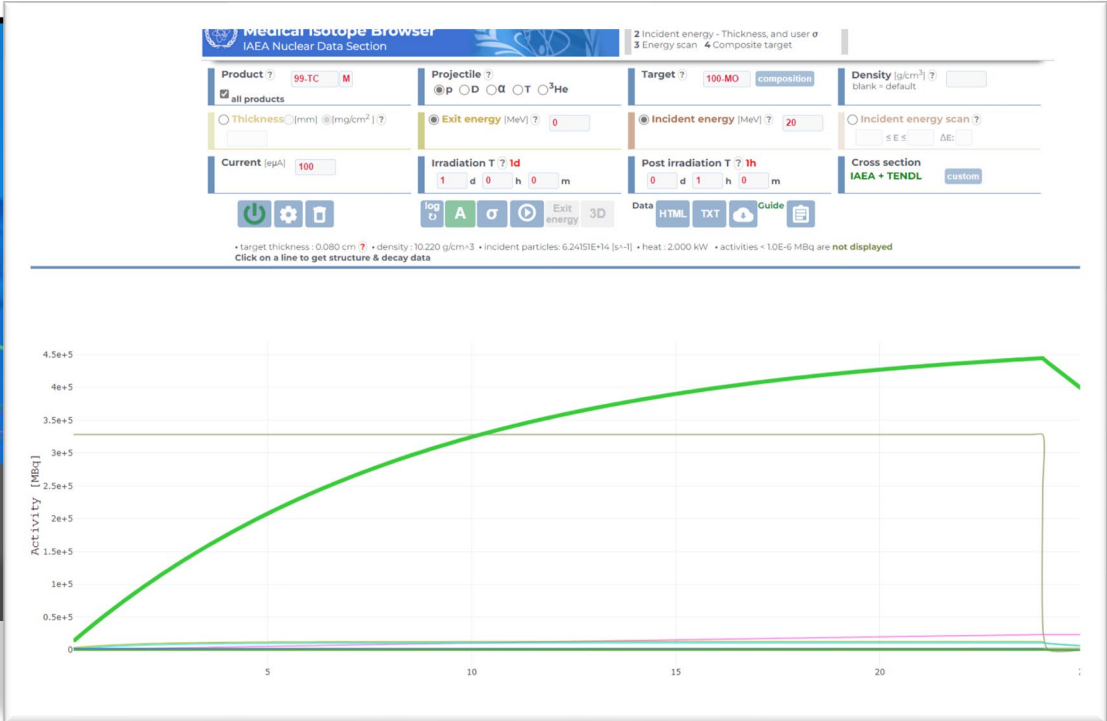
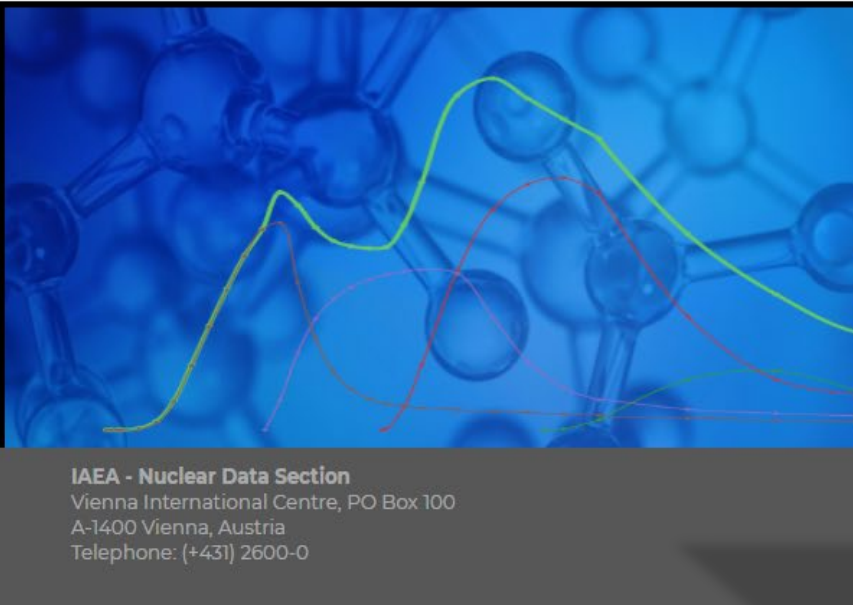
Density [g/cm³] ?
blank = default

Incident energy scan ?
 ≤ E ≤ ΔE:

Cross section
IAEA + TENDL

Data

Guide



Beta-delayed neutron database



IAEA Nuclear Data Section

Reference Database for Beta-Delayed Neutron Emission Data

Search

Nuclide

$\leq Z \leq$ $\leq N \leq$ $\leq T_{1/2} [\text{ms}] \leq$
 $\leq P(1n)\% \leq$ $\leq P(2n)\% \leq$ $\leq P(3n)\% \leq$



Search Nuclides found:665



Clear

Data plotting

X Axis ☐ A ☐ Z ☐ N ☐ $T_{1/2}$ ☐ P1n ☐ P2n ☒ QBn

Y Axis ☐ A ☐ Z ☐ N ☒ $T_{1/2}$ ☐ P1n ☐ P2n ☐ QBn

Numerical data



Evaluation



Theory



Spectra

Published tables

Range Evaluation Compilation

$Z \leq 28$

$29 \leq Z \leq 87$



Copyright
Disclaimer



nds.connect-point@iaea.org

Tables with all the comments on the evaluation method

Click a label to show/hide table columns Legend & References Last updated February 2022

Compilations Comments Qvalues

Systematics

Miernik 14

Theory

Moeller et al. 03

Marketin et al. 16

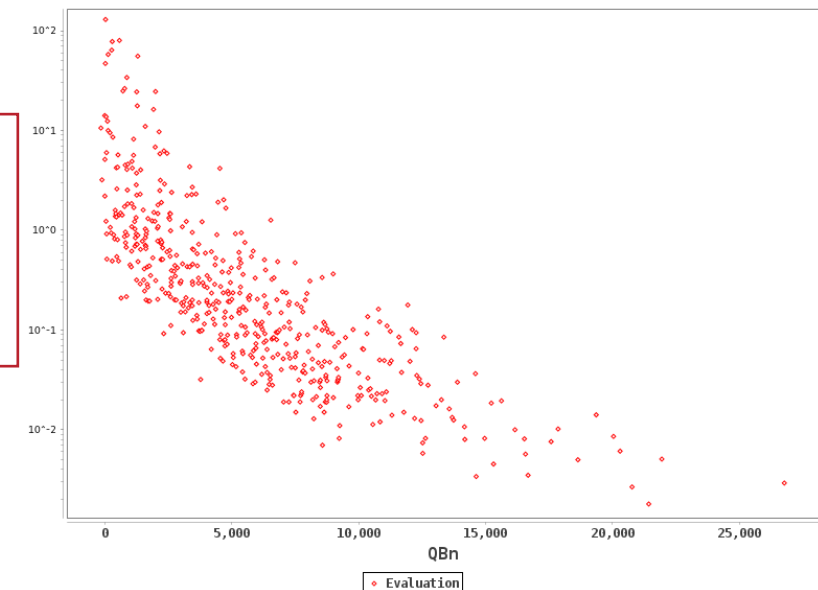
Moeller et al. 19

Recommended values

Nuclide	Isomer	$T_{1/2}$	%P(1n)	%P(2n)	%P(3n)	# of neutrons per decay	Reference	Spectra
$^8_2\text{He}_6$		119.4(15) ms	16 (1)	—	—	0.16	2015BI05	1
$^9_3\text{Li}^*_6$		178.2(4) ms	50.5 (10) ^a	—	—	0.505	2015BI05	2
$^{11}_3\text{Li}_8$		8.58(32) ms	86.6 (13)	4.2 (4)	1.9 (2)	1.007	2015BI05	5
$^{11}_4\text{Be}_7$		13740(80) ms	—	—	—	—	2015BI05	—
$^{12}_4\text{Be}_8$		21.47(4) ms	0.50 (3)	—	—	0.005	2015BI05	—
$^{14}_4\text{Be}_{10}$		4.53(27) ms	86 (6)	5 (2)	—	0.96	2015BI05	1
$^{13}_5\text{B}_8$		17.16(18) ms	0.266 (36)	—	—	0.00266	2015BI05	—
$^{14}_5\text{B}_9$		12.36(29) ms	6.04 (23)	—	—	0.0604	2015BI05	—
$^{15}_5\text{B}_{10}$		10.18(35) ms	99.68 (+8-158)	<1.5	—	—	2015BI05	2

Numerical data file for computational use

$T_{1/2}$ vs QBn



nds.iaea.org/beta-delayed-neutrons/database.html

This is the new website for the Stopping Power Database. The legacy website is still available for a limited time [here](#).

Search the database

The database can be searched only by Ion, or only by Target, or by both an Ion and a Target.

He

Search by Target (E.g: Au, Air, Polyvinyl toluene, ..)

Check the [Target Glossary](#) for a full list of Target names and formulas.



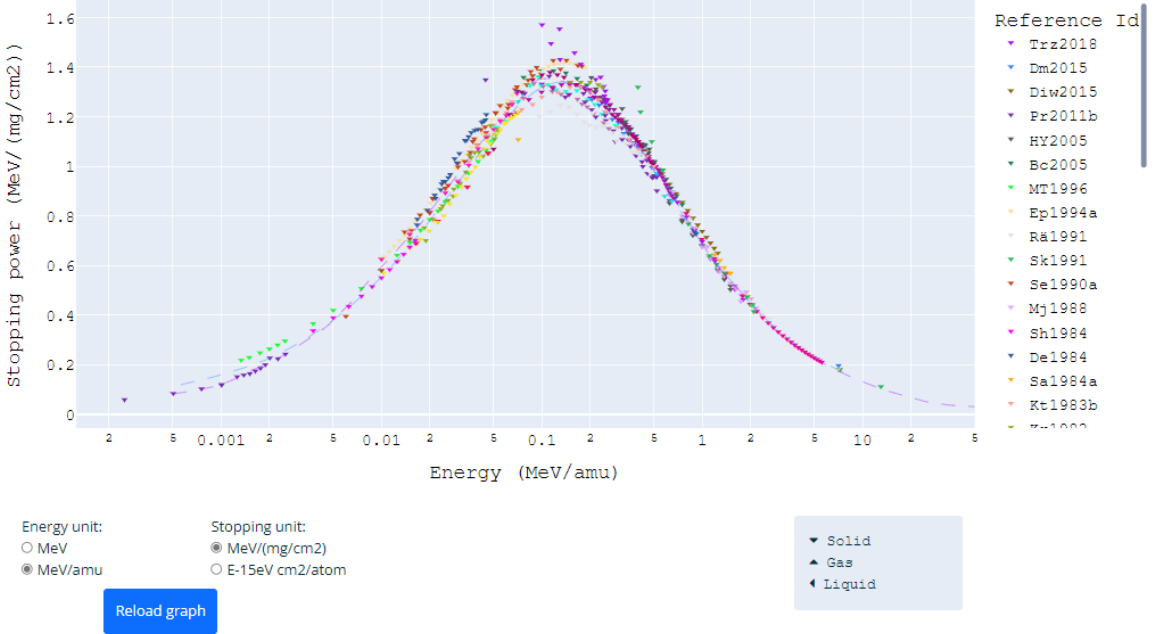
Results for Ion: He

Download data for Ion: He
Version 2023-11
206 Targets | 826 Experiments | 13,898 Datapoint

Show 10 entries

Search:

Ion	Target	Datapoints Measured		Experiments	Last Publication Year	Detailed Information
He	2-Butanone	18		1	1978	He - 2-Butanone
He	3-Pentanone	54		3	1985	He - 3-Pentanone
He	Acetaldehyde	18		1	1978	He - Acetaldehyde
He	Acetone	18		1	1978	He - Acetone
He	Acetylene	60		4	1984	He - Acetylene
He	Ag	609		43	2018	He - Ag
He	Air	118		7	2022	He - Air
He	Al	606		44	2018	He - Al
He	Al2O3	221		9	2012	He - Al2O3
He	Allene	33		2	1974	He - Allene



*Data has been converted to the same units for plotting purposes. Data last updated: Nov. 27, 2023, 12:18 p.m.

Experimental Data 43

Download all

Trz2018	W.H.Trzaska,G.N.Knyazheva,J.Perkowski,J.Andrzejewski,S.V.Khlebnikov, E.M.Kozulin,T.Malkiewicz,M.Mutterer, E.O.Savelieva Nucl.Instrum.Methods Phys.Res. B 418, 1-12 (2018).	[csv] [txt]
Diw2015	P.K.Diwan,S.Kumar, Nucl. Instrum. Methods B 359 (2015) 78	[csv] [txt]
Dm2015	D.Moussa, S.Damache, S.Ouichaoui Nucl. Instrum. Methods B 343, 44-47 (2015)	[csv] [txt]
Pr2011b	D.Primetzhofe,S.Rund,D.Roth,D.Goebl,P.Bauer Phys. Rev. Lett. 107, 163201	[csv] [txt]
Bc2005	M.Bianconi,N.P.Barradas,L.Correra Nucl.Instrum.Methods B239, 127	[csv] [txt]
HY2005	J.Y.Hsu,Y.C.Yu,J.H.Liang,K.M.Chen Nucl.Instrum.Methods B 241, 155 (2005)	[csv] [txt]
MT1996	G.Martinez-Tamayo,J.C.Eckardt,G.H.Lantscher,N.R.Arista Phys.Rev. A54, 3131	[csv] [txt]
Ep1994a	Chr. Eppacher Ph.D.Thesis, Univ. of Linz, Austria, Schriften der Johannes-Kepler- Universität Linz, Universitätsverlag Rudolf Trauner (1995).	[csv] [txt]

Theoretical Data 2

ESPNN	Electronic Stopping Power Neural Network (ESPNN). Part I: atomic targets, https://pyipi.org/project/ESPNN/ , J. Appl. Phys. 132, 245103 (2022)
SRIM2013	The stopping and range of ions in matter, J.F. Ziegler, M.D. Ziegler, J.P. Biersack, Nucl. Instr. and Meth. B 268 (2010) 1818-1823

Databases and Web Applications

Application	Content
Live Chart of Nuclides/Isotope Browser Mobile App	Recommended nuclear structure and decay data (ENSDF), graphical interface, Python API, mobile app
Atomic Mass Data (AME & Nubase)	Basic nuclear properties (masses, spins, parities, half-lives, isomers, decay modes)
Nuclear Electromagnetic Moments	Compiled and evaluated experimental nuclear magnetic and electric quadrupole moments
EXFOR	Experimental nuclear reaction database
Neutron Standards	Neutron cross-section standards
Photonuclear Data Library	Recommended photonuclear reaction data
ENDF	Interface to evaluated nuclear reaction data: ENDF/B, JEFF, JENDL, CENDL, ROSFOND
Neutron Activation Analysis	Neutron activation and Prompt-Gamma Activation Analysis (PGAA) database and Evaluated Gamma Activation File (EGAF) for non-destructive analytical methods
Ion Beam Nuclear Data Library (IBANL)	Experimental charged-induced cross sections for ion beam analytical methods
Electronic Stopping Power of Ions in Matter	Compilation of stopping power experiments
International Reactor Dosimetry and Fusion File (IRDFF)	Reaction cross sections, fission yields and decay data for dosimetry applications
Beta-Delayed Neutron Emission Database	Experimental beta-decay half-lives, beta-delayed neutron emission probabilities, and emission spectra
Compilation of Nuclear Data Experiments for Radiation Characterisation (CoNDERC)	Decay Heat, incident particle spectra used world-wide, origin Input for shielding calculation, thermal resonance data
Medical Radioisotopes Production Portal	Therapeutic Radionuclides, Gamma Emitters, Positron Emitters
Medical Isotope Browser	Medical radioisotopes production simulator
International Database of Reference Gamma Spectra (IDB)	In collaboration with IAEA-SG
IAEA Handbook of Nuclear Data for Safeguards	A set of recommended nuclear data for safeguard (decay data, thermal neutron capture cross section, resonance integrals, fission product yield ..etc)

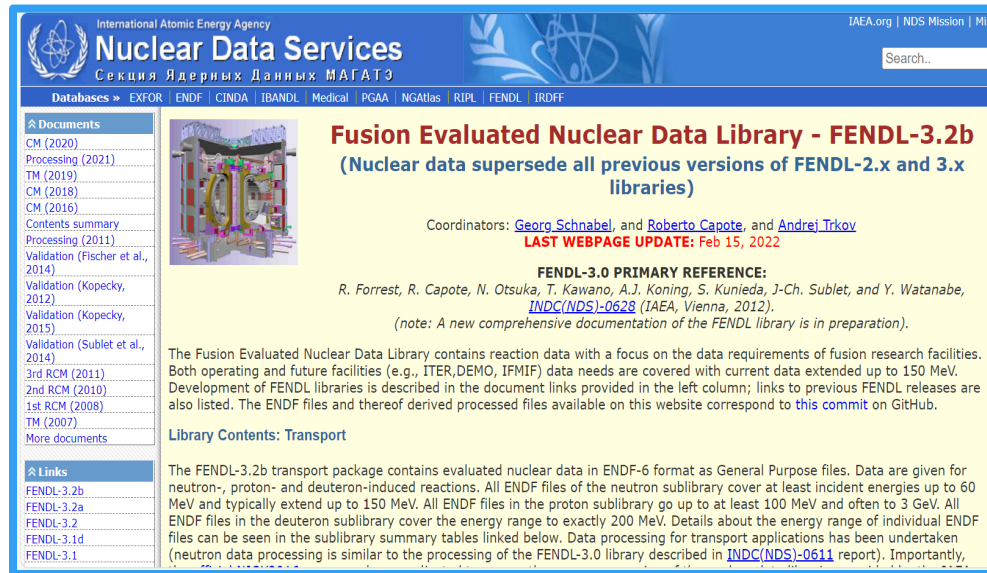
Meetings - Reports

	INDC(NDS)-0903	The Upbend in the (n,gamma) ^{57}Fe Photon Strength Function Data Revisited	J. Kopecky, I. Tomandl	Aug 2024
	INDC(NDS)-0902	International Network of Nuclear Reaction Data Centres Summary report of the Technical Meeting, 14-17 May 2024, Vienna, Austria	Naohiko Otuka and Boris Pritychenko	Aug 2024
	INDC(NDS)-0901	International Network of Nuclear Structure and Decay Data (NSDD) Evaluators Summary Report of the 25th Technical Meeting, 15-19 April 2024, Vienna, Austria	J. Chen, A. Negret, P. Dimitriou	Dec 2024
	INDC(NDS)-0900	Updating of the ENDF/B-VIII.1b2 Candidate Evaluations with Reaction Cross Sections from IRDFF-II	A. Trkov, R. Capote	Feb 2024

1	11-15 November 2024	S. Okumura and A. Koning	TM on Nuclear Data Retrieval, Dissemination and Data Portals	Webpage
2	7-11 October 2024	R. Capote Noy	TM on Thermal Capture and Gamma Emission	Webpage
3	8-12 July 2024	P. Dimitriou	TM on Compound Nuclear Reactions and Related Topics (CNR*24)	Webpage
4	14-17 May 2024	N.Otsuka	TM of the International Network of Nuclear Reaction Data Centres (NRDC)	Webpage
5	15-19 April 2024	P. Dimitriou	25th TM of the Nuclear Structure and Decay Data (NSDD) Network	Webpage
6	16-18 January 2024	P. Dimitriou	CM on Inter-comparison of PIGE codes (Phase II): depth-profiling	Webpage
7	15-18 January 2024	S. Okumura	CM on Information Exchange on Developments and Operations of Nuclear Data Dissemination Services	
8	18-21 December 2023	G. Schnabel	CM of INDEN on Structural Materials (VI)	Webpage
9	27 November - 1 December 2023	P. Dimitriou	TM on (alpha,n) Reaction Nuclear Data Evaluations and Data Needs	Webpage
10	20-23 November 2023	R. Capote Noy	TM of of INDEN on Nuclear Data Evaluation of Fissile Actinides	Webpage
11	30 October - 2 November 2023	G. Schnabel	CM on Further Development of the Fusion Evaluated Nuclear Data Library (FENDL)	Webpage
12	23-25 October 2023	R. Capote Noy	CM on Thermal Capture and Gamma Emission	Webpage
13	23-25 October 2023	P. Dimitriou	TM on Decay Data for Monitoring Applications	INDC(NDS)-0890
14	9-13 October 2023	G. Schnabel	TM on Neutron Data Standards	Webpage
15	9-11 October 2023	P. Dimitriou	CM on the Evaluation of Photon Strength Function Data	Webpage
16	20-22 September 2023	R. Capote Noy	CM on the Improvement of Major Actinide Evaluations	Webpage
17	20 August - 1 September 2023	P. Dimitriou	CM of INDEN on Light Elements (V)	Webpage

NDS Fusion Databases and Networks

FENDL Fusion Evaluated Nuclear Data Library



The screenshot shows the FENDL-3.2b website. The header includes the International Atomic Energy Agency logo and the text 'Nuclear Data Services' and 'Секция Ядерных Данных МАГАТЭ'. A search bar is present. The main content area features a large image of a fusion reactor and the title 'Fusion Evaluated Nuclear Data Library - FENDL-3.2b (Nuclear data supersedes all previous versions of FENDL-2.x and 3.x libraries)'. Below this, it lists coordinators: Georg Schnabel, Roberto Capote, and Andrej Trkov, and a 'LAST WEBPAGE UPDATE: Feb 15, 2022'. A 'FENDL-3.0 PRIMARY REFERENCE' section lists authors: R. Forrest, R. Capote, N. Otsuka, T. Kawano, A.J. Koning, S. Kunieda, J-Ch. Sublet, and Y. Watanabe, with a reference to 'INDC(NDS)-0628 (IAEA, Vienna, 2012)'. A note mentions that a new comprehensive documentation of the FENDL library is in preparation. The text describes the library's focus on fusion research facilities and its coverage of neutron, proton, and deuteron-induced reactions. A 'Library Contents: Transport' section is also visible.

<https://nds.iaea.org/fendl/>

Atomic and Molecular Databases and Networks



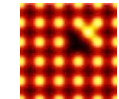
AMBDAS

ALADDIN



CollisionDB

CascadesDB



DefectDB



Data Centres Network
Code Centres Network
Global Network for the Atomic
and Molecular Physics of
Plasmas



<https://amdis.iaea.org/>

NEW

Data Explorer - Nuclear Reaction Data Explorer [page]
TALYS-2.0 - Nuclear reaction model code and related packages [page]
IDB - An International Database of Reference Gamma Spectra [page]
Stopping Power - Electronic Stopping Power of Matter for Ions [page]
Web-API for EXFOR/ENDF/IBANDL - software search/download for EXFOR/ENDF/IBANDL [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

IRDFF-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



Meetings Workshops

Newsletters

Coordinated Research Projects

Nuclear Reaction Data Center Network


Nuclear Structure & Decay Data Network

International Network of Nuclear Data Evaluators

Technical Documents
INDC Reports

Co

nds.iaea.org



Nuclear data needs for reactor antineutrino research and applications

Purpose:

- Bring together experts from different fields associated with reactor antineutrino research and applications
- Discuss cross-cutting needs in measurements, models-methods, nuclear data, reactor data
- Promote joint analyses, standardization of information, open and easy access to nuclear data and web applications
- Recommend priorities and future a

1st IAEA Technical Meeting

23-26 April 2019, IAEA; Summary report INDC(NDS)-0786

In person only - 37 participants – 11 countries

- Neutrino experiments : anomalies and sterile hypothesis; uncertainties-systematic-non-linearity; short vs long-baseline exps; agreement and discrepancies; perspectives
- Conversion method: uncertainties of integral beta spectra; impact of forbidden transitions; impact of weak magnetism; recommendations for uncertainties; corrections; new measurements
- Summation method : impact of latest decay data measurements; uncertainties from experiment and theory; uncertainties in TAGS data; evaluated nuclear data libraries
- Reactor monitoring: data needs and perspectives
- Recommendations : what neutrino experimental data to trust; what nuclear models and corrections to adopt; what nuclear data to use; what needs to be done to solve the outstanding issues;



IAEA
International Atomic Energy Agency

INDC(NDS)-0786
Distr.

INDC International Nuclear Data Committee

Antineutrino spectra and their applications

Summary of the Technical Meeting

IAEA Headquarters, Vienna, Austria

23-26 April 2019

Prepared by

M. Fallot
Laboratoire SUBATECH-University of Nantes
Nantes, France

B. Littlejohn
Illinois Institute of Technology
Chicago, USA

Paraskevi Dimitriou
IAEA
Vienna, Austria

June 2019

2nd IAEA Technical Meeting

16 – 20 January 2023, IAEA

In person only - 56 participants/18 in person – 8 countries

Purpose:

- follow up on progress
- revise status and data needs
- address data preservation and dissemination
- needs for coordination – working group
- Summary report: draft available on <https://conferences.iaea.org/event/402/>



2nd IAEA TM: conclusions

Basic science goals: high precision data - almost there

Applications: identify use cases – R&D needed – resources limited

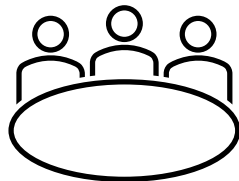
Modeling: improve nuclear theory (beta decay) – validation by new integral data – open computational tools

Nuclear data: more TAGS – uncertainty quantification/covariances – beta spectra – beta-delayed neutrons

Data preservation and dissemination: standardisation of information – centralised repository



Working Group (under the auspices of the IAEA)





3rd IAEA Hosted TM

7 – 11 April 2025, Seoul National University, Korea

52 participants – 23 in person - 11 countries

Main goals:

- Review status of reactor antineutrino experiments – new and completed
- Review status of reactor antineutrino developments for applications
- Review status of calculation methods (Summation method, Conversion method)
- Assess status and needs for nuclear theory and nuclear data
- Assess needs for standardization of information, central repositories
- Review needs for coordination (Working Group or IAEA meetings etc)



Talks

Experiments

RENO, RENE, NEON

JUNO, TAO

PROSPECT

DOUBLE CHOOZ, Antimatter-
Ocloud

DANSS

CONUS+

ANGRA

Models/methods

SUMMATION METHOD

NEW MODEL GEO-NEUTRINOS

NUCLEAR THEORY

CONFLUX

Nuclear data

BETA DECAY – TAGS

BETA SPECTRA

FISSION YIELDS



Thank you!
