Evaluated Nuclear Structure Data File
ENSDF

History and Introduction

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ENSDF – History - 1

The idea of a publishable evaluation of nuclear data originated with Katharine Way. Kay worked on the Manhattan project in the late 1940's, first in Chicago and then in Oak Ridge.

In 1948 after a move to Washington, she initiated the Nuclear Data Project at the U.S. National Bureau of Standards, renamed in 1988 as the National Institute of Standards and Technology (NIST).

The first "Nuclear Data" report was published in 1950.

ENSDF – History - 2

In 1953 the Nuclear Data Project moved from NIST to the U.S. National Academy of Sciences – National Research Council.

The first data sheets were published as AEC reports in the form of loose leaf pages called *Nuclear Data Sheets*.

In 1964 the Nuclear Data Project moved from its home in Washington D.C. to the Oak Ridge National Laboratory in Oak Ridge Tennessee. Kay felt that the project needed to be situated in an active physics environment.

ENSDF – History - 3

Kay negotiated with Academic Press to publish the evaluation work in a journal rather than as loose leaf sheets of data.

February, 1966, saw the first publication of the Nuclear Data Sheets published by Academic Press as Section B of the journal *Nuclear Data.* Section A had begun a year earlier as *Atomic Data Tables.*

In August, 1973, the two journals Atomic Data and Atomic Data A merged to become Atomic and Nuclear Data Tables with Kay Way as the editor for both.

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At this time the evaluation effort was centered at the Nuclear Data Project (NDP)at ORNL.

Initially the data were entered by hand on large squared sheets of paper and the drawings were done by hand. These sheets were then typed and photographed with the drawings turned over to a draftsman to create a publishable product.

ENSDF – History - 5

The 80-column format for ENSDF was designed in 1977 by Bruce Ewbank and Marcel Schmorak of the NDP staff and published in February 1978 as an ORNL report, 5054/R1. This 80-column format is still used today with some changes introduced at NNDC.

In this same report are descriptions of the original Logft, Alpha HF, GTOL, HSICC (Hager-Selzer), Medlist, and plot computer programs. These have since been modified at NNDC, with many additional analysis and utility programs added.

ENSDF – History - 6

The evaluation activity became international with the establishment in 1974 of the Nuclear Structure and Decay Data Network, NSDD, under the auspices of the IAEA, Nuclear Data Section.

NNDC at BNL coordinated the national effort (USNDP) and the international (NSDD) effort for the US/DOE, but the lead role in editing and processing of the evaluation effort continued at Oak Ridge.

ENSDF – History - 7

In 1981, the NNDC took over production of *Nuclear Data Sheets,* and completely computerized the entire operation.

NDP and NNDC jointly edited the journal, with Murray Martin as Editor-in-Chief and Jag Tuli as Editor. In June 1988, when Martin retired, the editing responsibility shifted to the NNDC with Tuli taking over as sole Editor.

The present editor is E. A. (Libby) McCutchan who took over upon Tuli's retirement in April, 2016.

ENSDF – Introduction - 1

Rounding-off policies

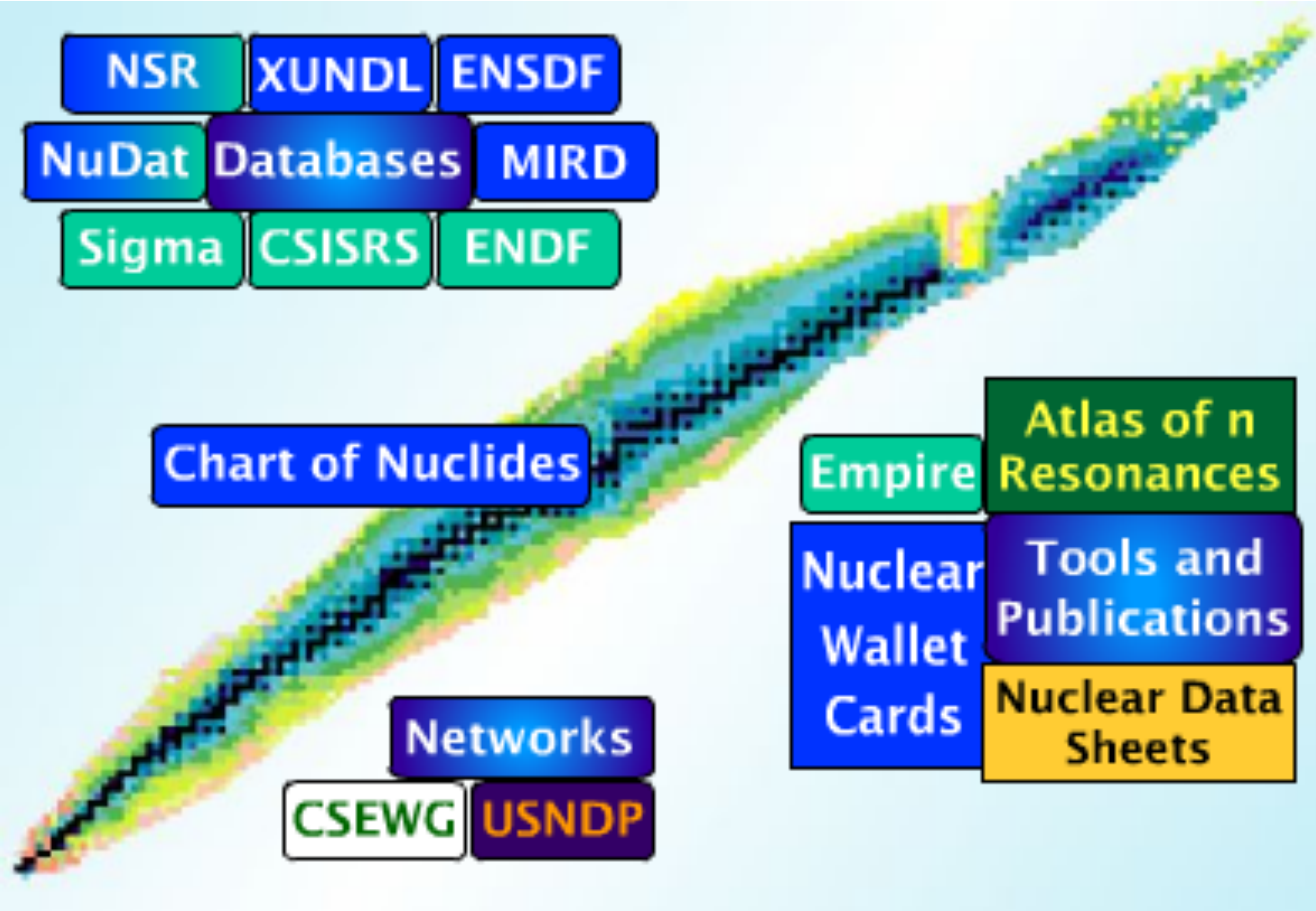
Uncertainties: It is recommended that uncertainties be rounded up whenever the relevant digit in the uncertainty is ≥3. For example, for a value of 23.28 with an uncertainty of 0.173, the uncertainty should be rounded up to 0.18 rather than down to 0.17. It is better to overstate an uncertainty than to understate it.

Rounding of numbers ending in "5": It is the usual practice in numerical analysis, when rounding a final digit, to round up odd digits but not even digits, thus "25" round to "2" while "55" rounds to "6". The reason usually given for this policy is that in cases where one is averaging a set of values, this procedure avoids biasing the answer either up or down. Values of 834.85 *40* and 1009.15 *30* should thus be rounded to 834.8 *4* and 1009.2 *3*, respectively.

ENSDF – Introduction - 2

The Evaluated Nuclear Structure Data File, ENSDF, is maintained by the National Nuclear Data Center (NNDC) at Brookhaven National Laboratory (BNL) for the international Nuclear Structure and Decay Data Network (NSDD)

ENSDF is made up of a collection of datasets which contain evaluated structure information for every known mass number (presently up to A=294).


NSR
XUNDL
ENSDF
NuDat
Databases
MIRD
Sigma
CSISRS
ENDF
Chart of Nuclides
Empire
Atlas of n Resonances
Nuclear Wallet Cards
Tools and Publications
Nuclear Data Sheets
Networks
CSEWG
USNDP

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in | Structure & Decay | Reactions | Bibliography | Networks & Links | Publications | Meet

C Atomic Mass Data er, *Q-value Calculator*	Atlas of Neutron Resonances Parameters & thermal values	CapGam Thermal Neutron Capture γ-rays	Chart of Nuclides Basi properties of atomic nucl
ariances of Neutron ctions	CSEWG Cross Section Evaluation Working Group	CSISRS alias EXFOR Nuclear reaction experimental data	Empire Nuclear reactio code system, *Reference*
F Evaluated Nuclear tion) Data File, *Sigma*	ENSDF Evaluated Nuclear Structure Data File	IRDFF IRDFF International Reactor Dosimetry and Fusion File	MIRD Medical Internal Radiation Dose
ISS & DoE NMIRDC guards & inventory decay standards	NSR Nuclear Science References	Nuclear Data Sheets Nuclear structure & decay data journal, *Special Issues on reaction data*	Nuclear Wallet Cards & isomeric states propert *Homeland Security vers*
Rates MACS & Astro- ical reaction rates	NuDat Nuclear structure & decay Data	USNDP U.S. Nuclear Data Program	USNDP/CSEWG GForge Collaboration Server
DL Experimental Un- ated Nuclear Data List			

ENSDF – Introduction - 5

Q-value Calculator (QCalc)

ions or decays. It uses mass values from the 2016 Atomic Mass Evaluation by M. Wang *et al*,

Target(s)
56fe, Fe56, 26056, cr50-fe56
use dash for range only

Projectile
4He, He-4, 2-he-4, a, alpha, 2004

E_{lab} (MeV)

Ejectile
g, n, n+p, 2n+a, 2a+12c (reaction)
b-, ec, 2b-, b-n, ecp, 18O (decay)

Uncertainties
- Standard style
- Nuclear Data Sheets style

Submit Reset

ENSDF – Introduction - 6

Q-value Calculator (QCalc)

Mass and decay Q-values for ^{208}Pb

Quantity	(keV)
Mass Excess	-21748.6 *1.15*
Binding Energy/A	7867.453 *0.006*
Atomic Mass (AMU)	207.97665 *0.00123* *
Atomic Mass/neutron Atomic Mass	206.19003 *0.00122* **
$Q_{\beta-}$	-2878.37 *2.01*
Q_{EC}	-4998.47 *1.67*
$Q_{\beta+}$	-6020.67 *1.67*
Q_n	-7367.87 *0.05*
Q_p	-8003.12 *5.4*
Q_{2n}	-14105.65 *0.11*
Q_{2p}	-15380.7 *20.4*
Q_α	516.63 *1.18*
$Q_{2\beta-}$	-4279.0 *1.31*
$Q_{\beta-n}$	-9765.29 *2.12*
Q_{ECp}	-12550.1 *29.8*
Q_{2EC}	-8483.2 *30.8*
$Q_{2\beta+}$	-10527.6 *30.8*
$Q_{\beta-2n}$	-17862.95 *7.72*
$Q_{EC\alpha}$	-3524.0 *200.0*
$Q_{\beta-\alpha}$	172.63 *1.63*

*: Atomic Mass units, **: Dimensionless quantity

ENSDF – Introduction - 7

Main | **Structure & Decay** | Reactions | Bibliography | Networks & Links | Publications | Meetings

Databases

- Chart of Nuclides Basic Properties of Atomic Nuclei
- ENSDF Evaluated Nuclear Structure Data File
- MIRD Medical Internal Radiation Dose
- NuDat Nuclear Structure & Decay Data
- XUNDL Experimental Unevaluated Nuclear Data List

Codes

- BrIcc Band-Raman Internal Conversion Coefficents
- ENSDF Codes Analysis and Utility Programs
- HSIcc Hager-Seltzer Internal Conversion Coefficients
- LOGFT Analysis Program

Evaluations

- Atomic Mass Evaluation
- ββ-decay Double Beta Decay Data
- B(E2) Reduced Transition Probabilities
- DDEP Decay Data Evaluation Project
- Evaluators' Corner Nuclear Structure and Decay Data Network
- Nuclear Wallet Cards Ground & Isomeric States Properties

Manuals

- ENSDF Manual Data Sets Preparation

Tools

- CapGam Thermal Neutron Capture γ-rays
- Q-value Calculator
- USNDP/CSEWG GForge Collaboration Server
- Web tools for ENSDF evaluators
- Gamma Ray Atlas Following Inelastic Scattering of Fast Neutrons Downloadable Software Platform

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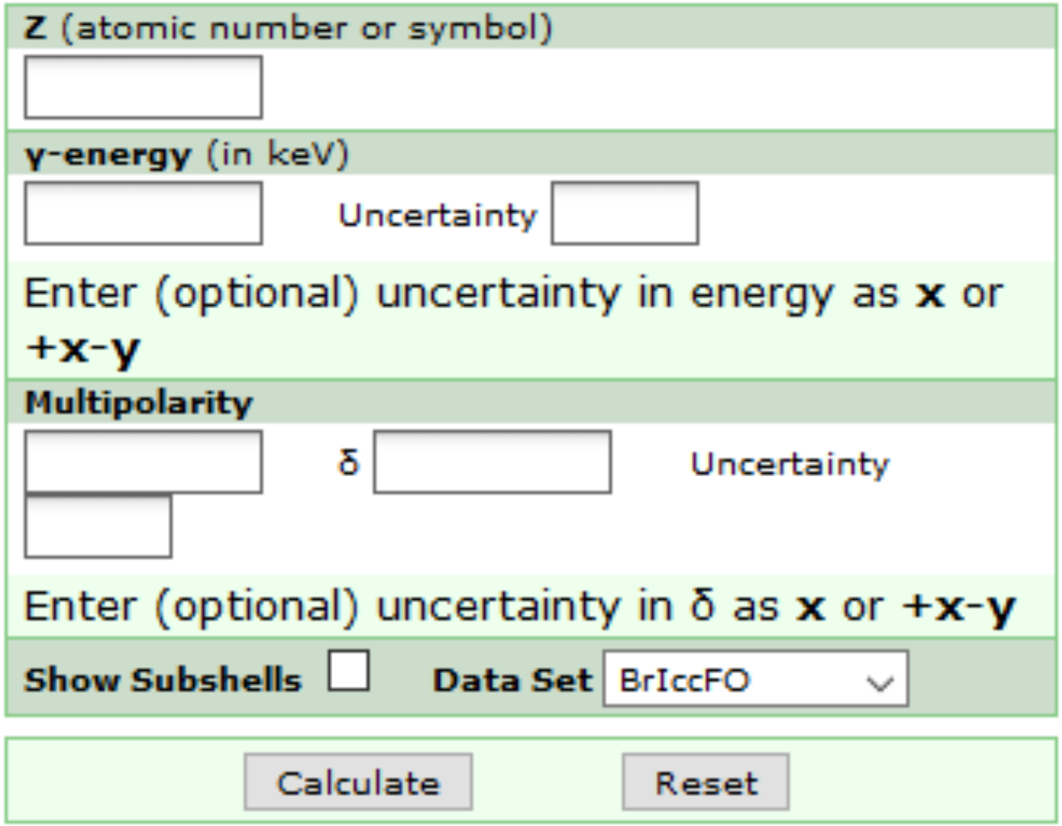

Reference:

2008Ki07 T. Kibédi, T.W. Burrows, M.B. Trzhaskovskaya, P.M. Davidson, C.W. Nestor, Jr.
'Evaluation of theoretical conversion coefficients using BrIcc'
Nucl. Instr. and Meth. A 589 (2008) 202-229

BrIcc was developed in an ANU - NNDC - Petersburg - ORNL collaboration for the

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ENSDF: Evaluated Nuclear Structure Data File Search and Retrieval

Last updated 2018-10-05

ENSDF provides recommended nuclear structure and decay information.

For more recent nuclear data which has not yet been evaluated, please visit XUNDL.

190 new datasets added/modified in the last month!

Suggestions or comments? Please let us know!

Quick Search | **By Nuclide** | **By Reaction** | **By Decay** | **Recently Added**

Nuclide or mass: [ ] **Search**

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

You can also **browse** ENSDF datasets by element or mass, at a glance.

ENSDF – Introduction - 10

Nuclear Science References (NSR)

NSR Reference Paper NIM **A 640**, 213 (2011)

Database version of October 5, 2018

base is a bibliography of nuclear physics articles, indexed according to content and spanning more than 100 years of research. Over 80 journals are checked on a regular basis for articles to be included. For more information,
R database schema and Web applications have undergone some recent changes. This is a revised version of the NSR Web Interface.

h | Text Search | Indexed Search | Keynumber Search | Combine View | Recent References

Author *Brown or B.A.Brown*

Nuclide *31Na or ca-38*

Reaction *n,g or (n,g) or (16O,16O)*

Publication Year *from* 1896 *to* 2018

Reference Type ◉ All ○ Experiment ○ Theory

Output Format ◉ HTML ○ BibTex ○ Text

Search Reset

Database Manager: Boris Pritychenko, NNDC, Brookhaven National Laboratory
Web Programming: Boris Pritychenko, NNDC, Brookhaven National Laboratory
Data Source: NNDC, Brookhaven National Laboratory,
NDG, McMaster University

XUNDL: Experimental Unevaluated Nuclear Data List Search and Retrieval

Last updated 2018-10-05

ntains compiled experimental nuclear structure data from more than 3500 recent papers. For evaluated nuclear data, see ENSDF.

114 new datasets added/modified in the last month!

Suggestions or comments? Please let us know!

Quick Search | By Nuclide | By Reaction | By Decay | Recently Added

Nuclide or mass: Search

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

- **Browse** datasets by element and mass.
- Listing by mass
- Expanded list (includes individual nuclides and update dates).

Compilers continuously monitor journals pertinent to nuclear data and compile new experimental measurements into ensure the available data are as up-to-date as possible. XUNDL includes new results from Physical Review C, Physica Letters, Nuclear Physics A, European Physical Journal A, Physics Letters B, Journal of Physics G, and many more.

ENSDF Standard 80-character Formated Records

Record	1–5	6	7	8	9	10–19	20–21	22–29	30–31	32–39	40–41	42–49	50–55	56–62	63–64	65–74	75–76	77	78	79	80
IDENT	NUCID	&	blank			<—DSID—>					DSREF					<—PUB—>	<—DATE—>				
XREF	NUCID	blank		X	!	<—DSID—>					blank										
REF	AAA	blank		R	bl	KEYNUMBER	REFERENCE														
HIST	NUCID	&	bl	H	bl	<—HTEXT—>															
Q-VALUE	NUCID	blank		Q	bl	Q-	DQB	SN	DSN	SP	DSP	QA	DQA	QREF							
G COMM	NUCID	&	†	#	bl	CTEXT															
F/R COMM	NUCID	&	†	#	‡	SYM(FLAG)	CTEXT														
PARENT	NUCID	blank		P	š	E	DE	<—J—>			<—T—>		DT	blank		QP	DQP	<–ION–>			
NORM	NUCID	blank		N	š	NR	DNR	NT	DNT	BR	DBR	NB	DNB	NP	DNP	blank					
P NORM	NUCID	&	P	N	š	NR*BR	UNC	NT*BR	UNC	blank		NB*BR	UNC	NP	DNP	blank					
LEVEL	NUCID	&	bl	L	bl	E	DE	<—J—>			<—T—>		DT	<—L—>		<—S—>	DS	F	MS		Q
BETA	NUCID	&	bl	B	bl	E	DE	IB	DIB	blank		LOGFT	DFT	blank				F	UN		Q
EC	NUCID	&	bl	E	bl	E	DE	IB	DIB	IE	DIE	LOGFT	DFT	blank				F	UN		Q
ALPHA	NUCID	&	bl	A	bl	E	DE	IA	DIA	HF	DHF	blank							F	bl	Q
PART	NUCID	&	bl	¶		E	DE	IP	DIP	ED	<—T—>		DT	<—L—>		blank		F	C	bl	Q
GAMMA	NUCID	&	bl	G	bl	E	DE	RI	DRI	<—M—>		MR	DMR	CC	DCC	TI	DTI	F	C	bl	Q

Notes:

- blank — These fields must be blank.
- & — Primary record must have a blank or "1" in this field. Continuation records should have any printable ASCII character except for blank or "1" (one).
- ! — Unique alphanumeric character identifying the source data set.
- † — Allowed characters for this field are C, c, D, d, T, and t.
- # — Character identifying the record being commented on. Allowed characters for this field are N, P, Q, L, G, B, E, A, D, and blank.
- ‡ — Must be blank except for: 1) Particle code for a (delayed-)particle record. 2) Sequence number for normalization and parent records.
- š — Must be blank except when there are multiple parent records then this field should contain an integer relating the parent record to the related normalization record.
- ¶ — Byte 8 must either be blank for a prompt particle radiation or D for a delayed particle radiation. Byte 9 identifies the particle (N, P, D, or T).

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- Examples of Identification records

126RH	ADOPTED LEVELS	
126TE	ADOPTED LEVELS, GAMMAS	
126SB	126SN B- DECAY	1976SM01
126TE	COULOMB EXCITATION	1970LAZM
126PR	92MO(40CA,APNG)	2002HA20,2001PE17

Note that these entries must be all caps, and that the references are separated only by a comma, with no space. These records must have a capital C in column 7. This indicates to the editing program that it must translate all relevant characters. The above entries then become Adopted Levels, ^{126}Sn β^- decay, ^{92}Mo(^{40}Ca,$\alpha p n \gamma$), 1976Sm01, 1970LaZM, 2002Ha20, 2001Pe17.

Comment records

Comment records must have a lower-case c or an upper case C in column 8. When using an upper-case C, the comment is written in all caps and, as discussed in the previous slide, tells the editing program to translate the appropriate characters. For example, “THE EG ARE FROM 2005SA26 IN (A,NG)” will be translated as “The Eγ are from 2005Sa26 in (α,n γ)”.

If the lower case c alternative is used then the entry must make use of the alternate character set given in the ENSDF manual. The above comment would then be entered as “The E|g are from 2005Sa26 in (|a,n|g) where the |a and |g are translated as α and γ, respectively.

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The use of the lower-case format is highly recommended. It allows the evaluator to accurately control how the input will appear. The automatic editor cannot distinguish, for example, whether “BE” should be translated as the word “be” or the element “Be”. Similarly it cannot distinguish whether “GE” is meant to be “≥ “ or the element “Ge”. Alternatives such as these take time and effort to resolve at both the BNL end and the evaluator’s end.

- Java-nds allows the evaluator to see how the output will appear, and to make any necessary changes. The use of lower-case “c” allows the evaluator to send in a mass-chain evaluation that is in a publishable form.

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Character Set

The base character set is the standard 7-bit ASCII character set up to octal 173. Characters with octal values of 173 and greater are used as control characters. An alternate character set consists primarily of the Greek alphabet and some special symbols. The backslash character (octal 134) is interpreted as a backspace command. An alternate character in the input file consists of two characters, a control character and the standard character equivalent of the alternate character. All available alternate characters and their standard equivalents are given in the table on the follwing page.

There are four control characters, | (octal 176), ~ (octal 176), { (octal 173), and } (octal 175). The vertical bar and the tilda are used to shift the next character into the first and second alternate character sets, respectively. The entire string of characters may also be modified from their standard form. In this case the string to be modified is enclosed by the open and close brace control characters. The character immediately following the open brace is interpreted as a control character. The available control character values and their meanings are given below. The modified character strings may be nested. The control characters may be in either upper or lower case.

Examples

|*g* will be displayed as γ

{B{+238}Pu} will be displayed as **^{238}Pu**

String Control Characters

- | first alternate character
- ~ second alternate character
- + superscript
- − subscript (Note: + and − are mutually exclusive)
- I italic
- B bold
- U underline

Note: The symbol ˆ (caret) may be used before a character or a word to preserve its case, *e.g.*, ˆA for A (and not a).

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Alternate Character sets

Standard	1st alt.	2nd alt.	Standard	1st alt.	2nd alt.
!	©	!	N	N	N
"	[illegible]	"	O	O	Ö
#	§	⊗	P	Π	P
$	e	$	Q	Θ	Õ
%	√	%	R	P	R
&	≡	&	S	Σ	S
'	°	Å	T	T	T
(	←	(	U	Υ	Ü
)	→	)	V	∇	V
*	×	·	W	Ω	W
+	±	+	X	Ξ	X
,	½	,	Y	Ψ	Y
–	∓	–	Z	Z	Z
.	∝	.	[	{	[
/	÷	/	]	}	]
0	(	0	^	↑	^
1	)	1	_	↓	_
2	[	2	‘	′	‘
3	]	3	a	α	ä
4	⟨	4	b	β	b
5	⟩	5	c	η	c
6	√	6	d	δ	d
7	∫	7	e	ε	é
8	∏	8	f	φ	f
9	∑	9	g	γ	g
:	†	:	h	χ	ħ
;	‡	;	i	ι	i
<	≤	<	j	∈	j
=	≠	=	k	κ	k
>	≥	>	l	λ	λ
?	≈	?	m	μ	m

In addition to the letter "C" for comments, the letters "T" and "D" are also allowed. The letter "T" indicates to the output programs that the record should be reproduced "as is", and any blanks in the record should not be removed. This alternative is useful for creating tables where the spacing is important.

The letter "D" indicates to the output program that the comment is a documentation record and can be ignored.

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126SB5tG	electron line	intensity	electron line	intensity
126SB6tG	--			
126SB7tG	k42.6	3.3	l42.6	0.29
126SB8tG	l17.7	10.7	k86.9+k87.6	28
126SB9tG	l21.6+(M+N)17.7+		l64.3	0.66
126SBAtG	l22.7+l23.3	90	l86.9+87.7	8.5
126SBCtG	(M+N)21.6+(M+N)22.7+		(M+N)86.9+	
126SBDtG	(M+N)23.3	24	(M+N)87.6	2.1
126SBEtG	k64.3	5.4		

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```
126TE2tG                         |g|g(|q) data
126TE3tG
126TE4tG                          1975Ba17
126TE5tG   cascade         A{-2}       A{-4}           cascade       A{-2}
126TE+tG   A{-4}
126TE6tG  -------------------------------------------------------------------
126TE7tG   224-990      0.13 {I5}   -0.01 {I4}      278-857    -0.10 {I6}
126TE+tG 0.10 {I5}
126TE8tG   297-857      0.16 {I4}    0.01 {I2}      593-857    -0.08 {I3}
126TE+tG 0.03 {I3}
126TE9tG   857-696     -0.04 {I2}    0.03 {I2}      587-667    -0.08 {I2}   -
126TE+tG 0.01 {I2}
```

“T” and “t” have the same distinction as “C” and “c”

126XE L 0.0+X

126XE DL E LEVEL ENERGY HELD FIXED IN LEAST-SQUARES ADJUSTMENT

Unlike “c” and “t”, the letter “D” must be in caps.

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The author's measured quantities should be quoted as given except as noted.

1. An author's units should be converted to units used by convention in ENSDF, for example mean-life should be converted to half-life, and B(E2) should be converted from fm^4 to $barns^2$.
2. Give what was actually measured in an experiment, not what the authors quote, in cases where these differ. A measurement of $I_\gamma/\Sigma I_\beta$ might be quoted by the author as I_β(gs) which, for the authors' decay scheme should be equivalent to the $\%I_\gamma$ determination; however, it is not as fundamental a quantity since the decay scheme might change.

From angular correlation and angular distribution measurements the resulting gamma character can be determined only as dipole, quadrupole, dipole + quadrupole etc. Authors sometimes show these as (M1), (E2), (M1+E2) etc. based just on their proposed level scheme, or a theoretical model. It is important to retain the D, Q assignments in these source datasets. This can be important in spin assignments since a mult=D argument is strong whereas an (M1) argument is weak, and sometimes mult=D is all that is needed as part of an assignment.

An exception here would be a case where the level halflife is known and an M2 assignment can be ruled out by RUL, in which case one can assign a Q as E2.

Document any changes made in data quoted from an author.

When correcting an authors' value, for example a misprint, put the corrected value in the appropriate field and give the original value in a comment. Don't give the incorrect value in the field and rely on the comment to explain what the correct value is.

Note any assumptions, standards, etc., that enter into derived values and, if possible, correct for more recent values of these quantities.

1. A branching ratio in alpha decay, given as Iε/Iα, might depend on the branching for the daughter. If a better value for the daughter is available, the parent branching should be corrected.

2. A conversion coefficient, α_k(exp), might be given relative to a standard value. If that standard should change, then α_k(exp) should be corrected.

Check the bibliography in each paper to be sure that all the relevant references have been included in NSR. Try to track down any private communications that might be given.

Do not rely on an author to extract older data correctly. This is especially important in view of the point just mentioned regarding assumptions and standards.

Be sure to distinguish between values measured by an author and those assumed or taken from other work.

1. In a transfer reaction, an author might adopt L values for some levels based on known Jπ or on L values from other work in order to determine standard shapes for σ(θ) as a function of L.

2. In determining Eγ, or E(level), an author might adopt values from other sources as internal standards. These should be noted and corrections made if possible.

Experimental Unevaluated Nuclear Data List
XUNDL

History and Introduction

XUNDL – History - 1

c. 1996, in response to recommendations of a DOE review panel concerned with the currency of the ENSDF evaluations, a new file consisting of compilations of recently published experimental nuclear physics articles entered the planning stage. Providing such papers to the users in a timely fashion would make up somewhat for the delay in the appearance of these papers in a full evaluation in ENSDF.

In 1998 Balraj Singh, head of a participating USNDP Data Center at McMaster University, Canada, headed up the project with the aid of undergraduate students. The database and its web interface were developed and set up at the NNDC by David Winchell.

XUNDL – History - 2

Until 2008 the XUNDL compilation effort was carried out at McMaster university.

In 2008 Filip Kondev from the Argonne National Lab (ANL) joined the effort followed by John Kelley and Grace Sheu from the Triangle Universities National Laboratory (TUNL) in 2009.

In about 2014 Caroline Nesaraja at ORNL and Shamsuzzoha Basunia at the Lawrence Berkeley National Laboratory (LBNL) joined the effort, with another major contributor being Jun Chen at the National Superconducting Cyclotron Laboratory (NSCL) at Michigan State University.

XUNDL – History - 3

The coordinator and manager of XUNDL is Libby McCutchan at NNDC. She is also a major compiler of data for XUNDL.

The XUNDL database was initially limited to papers on high spin, but since 2003 low-spin papers have also been included.

The journals covered include Physical Review C, Physical Review Letters, Nuclear Physics A, European Physical Journal A, Physics Letters B, Journal of Physics G, and many more.

As of August 31, 2018, XUNDL contained 7958 datasets for 2586 nuclides.

XUNDL – Introduction - 1

In general, the information in a given XUNDL dataset comes from a single journal article, or from a set of closely related articles from the same experimental group.

The datasets are entered in the ENSDF format which allows the evaluators to make use of them as a first step potentially allowing them to speed up their mass chain evaluation process.

Since the XUNDL datasets are compilations, the data contained in them must be evaluated before being entered into ENSDF.

XUNDL – Introduction - 2

In some cases an XUNDL compilation may not need any additional work, or perhaps needs just a minimal amount of evaluation. In such a case, the evaluator should give credit to the XUNDL compiler(s).

A credit such as “The evaluator has made use of the XUNDL dataset compiled by B. Singh (McMaster university) Nov. 25, 2010. Changes are noted” has been used in a case where the levels, gammas, and band assignments in an in-beam reaction could be taken as entered by the compiler, with only a few changes required to reconcile data with other datasets.

XUNDL – Introduction - 3

Active interaction between the data compilers and the original authors of publications is encouraged.

Since entry of data into XUNDL is done very soon after publication, consultation with the authors to resolve issues that may arise, or to request additional information has worked well, with the response rate being almost 95%. These responses are documented in the XUNDL dataset and can add to the dataset's usefulness to the evaluator.

Such interactions have been a major factor in the successful functioning of this database.