



**The Abdus Salam
International Centre for Theoretical Physics**



2358-2

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

6 - 17 August 2012

ENSDF Format

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Evaluated nuclear Structure Data File

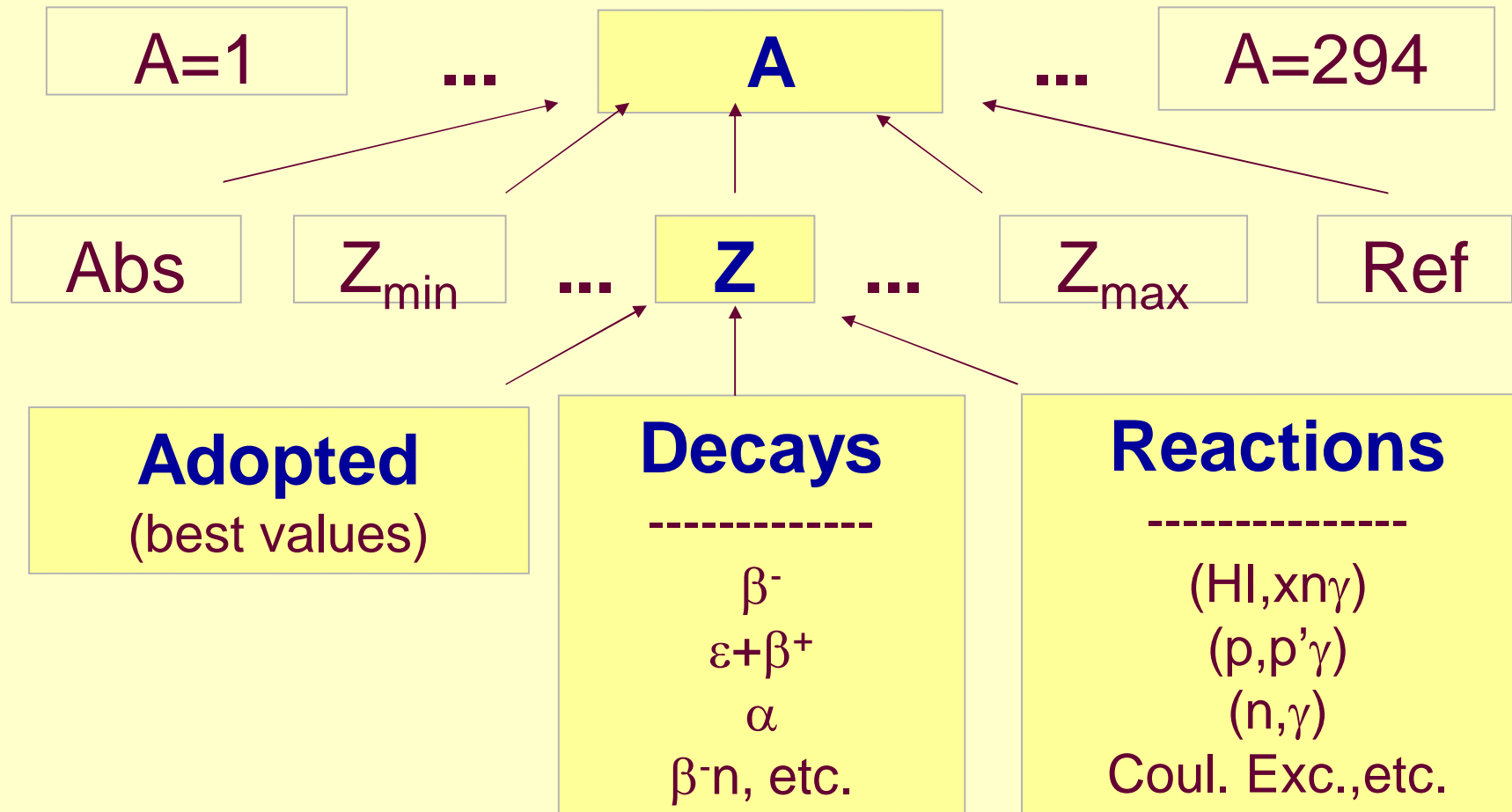
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ENSDF

- Source For
 - Table of Isotopes
 - Nuclear Data Sheets
 - Nuclear Wallet Cards
 - NUDAT
- Update – continuous
- Distributed – six monthly

ENSDF Schematic



General

- Evaluated results of a single experiment or combined results of a number of experiments yielding basically the same kind of information, e.g., (HI,xng), or Coulomb Excitations. The collection is called a Data Set.
- The adopted Properties of the nucleus.

GS Properties

- Q(beta-)
- N-Separation Energy
- P-Separation Energy
- Alpha-Decay Q value
- Half-life
- Spin-parity
- Decay Modes
- Static Moments

Level Properties

- Spin-parity
- Half-life
- Angular Momentum transfer
- Spectroscopic Factor
- Decay branching
- Static Moments
- Configuration
- Experiments in which level is seen

Level Properties –Special Cases

- Configuration assignments
- Band Assignments, Parameters
- Isomer Shifts, isotope shifts
- Charge distribution of gs, often only a reference
- Deformation parameters of gs (model dependent)
- Excitation Probabilities (BEL, BML) when the $T_{1/2}$ and gs branching are not known

Radiation Properties

- Placement in level scheme
- Energy
- Intensity –Relative and Absolute through Normalization. Per 100 decay modes for Alphas. Transition Intensity. EC, B+ decay (theory). Partial EC probabilities.
- Multipolarity and Mixing Ratios
- Total internal Conversion Coefficients
- Logft values/ Hindrance Factors
- Reduced Transition Probability-down –W.u.

ENSDF Content

- Collection of Data Sets by A and Z

Abstract (Comments)

Adopted Levels, Gammas

Experimental Data Sets

- Radioactive Decay
- Nuclear Reactions

Record Type

ID Record

History

XREF

Comments

Q-value

Parent

Normalization

Level

BETA

EC

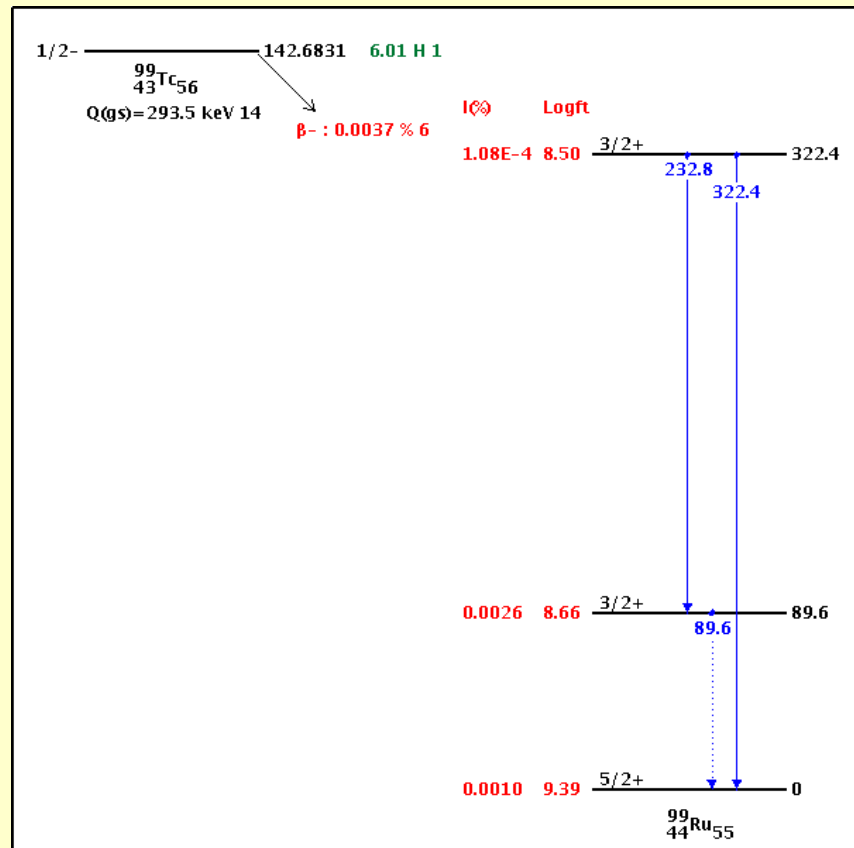
ALPHA

PARTICLE

GAMMA

END

99Tc decay Scheme



99Tc decay ENSDF data set

```
99RU      99TC B- DECAY (6.01 H)
99RU  N  1.0                1.0
99TC  P 142.6831  111/2-
99RU  L      0          5/2+
99RU  L   89.60      213/2+
99RU  B 346.7        20  0.0026
99RU  G  89.6         3
99RU  L  322.40     183/2+
99RU  B                0.000108  5
```

Identification Record

Required for all data sets. Must precede all other records.

99RU 99TC B- DECAY (6.01 H)

Field (Col.)	Name
1-5	NUCID
10-39	DSID
40-65	DSREF
66-74	PUB
75-80	DATE (year/month)

The History Record

99RU H TYP=FUL\$AUT=L. K. PEKER\$

Field (Col.)	Name
1-5	NUCID
6	Blank
7	Blank
8	H
9	Blank
10-80	History

The Q-value Record

99RU Q -2103 107464 7 8478

Field (Col.)

Name

1-5

NUCID

8

Q Letter 'Q' is required

10-19

Q- 20-21 DQ-

22-29

SN 30-31 DSN

32-39

SP 40-41 DSP

42-49

QA 50-55 DQA

56-80

QREF

The Cross-Reference Record

99RU XA99TC B- DECAY (2.111E+5 Y)

Field (Col.) Name

1-5 NUCID

8 X Letter 'X' is required

9 DSSYM Any ASCII character

10-39 DSID *Must* exactly match one of ID's

The Comment Record

99RU C Isomeric shift : 1971Po02

99RU CG E,RI\$ Weighted average

99RU CL E(A),J(A) Band J=5/2+

Field (Col.)	Name
1-5	NUCID
7	Letter 'C', 'D', or 'T' is required
8	RTYPE Blank or record type
9	PSYM Blank, or symbol
10-80	CTEXTText of the comment.

The Parent Record

99TC	P	142.6831	111/2-
Field	Name		
1-5	NUCID		
8	P (required)		
9	Blank or integer		
10-19	E Energy	20-21 DE	
22-39	JPI		
40-49	T	50-55 DT	
65-74	QP	75-76 DQP	
77-80	Ionization State		

The Normalization Record

99RU	N	1.0	1.0
Field	Name		
8	N (required)		
10-19	NR	20-21	DNR
22-29	NT	30-31	DNT
32-39	BR	40-41	DBR
42-49	NB	50-55	DNB
56-62	NP	63-64	DNP

The Prod Normalization Record

Field	Name	
8	N (required)	
10-19	NR*BR	20-21 DNR
22-29	NT*BR	30-31 DNT
42-49	NB*BR	50-55 DNB
56-62	NP	63-64 DNP
77	Blank or C	78 Opt (1-7)

The Level Record

99RU	L	0	5 / 2+
Field	Name		
1-5	NUCID		
8	L (required)		
10-19	E Energy	20-21 DE	
22-39	JPI		
40-49	T	50-55 DT	
56-64	L (angular momentum transfer)		
65-74	S (spect at)	75-76 DS	
77	Flag	78-79 MS	80 Q

The Beta Record

99RU	B	346.7	20	0.0026
Field	Name			
1-5	NUCID			
8	B (required)			
10-19	E Energy		20-21	DE
22-29	IB Intensity		30-31	DIB
42-49	Logft		50-55	DFT
77	Flag			
78-79	Forbiddenness 80 Q			

The EC Record

Field	Name		
1-5	NUCID		
8	E (required)		
10-19	E Energy	20-21	DE
22-29	IB Intensity	30-31	DIB
32-39	IE Intensity	40-41	DIE
42-49	Logft	50-55	DFT
65-74	TI	75-76	DTI 77 Flag
78-79	Forbiddenness	80	Q

The Alpha Record

Field	Name	
1-5	NUCID	
8	A (required)	
10-19	E Energy	20-21 DE
22-29	IA Intensity	30-31 DIA
32-39	HF	40-41 DHF
77	Flag	
80	Q	

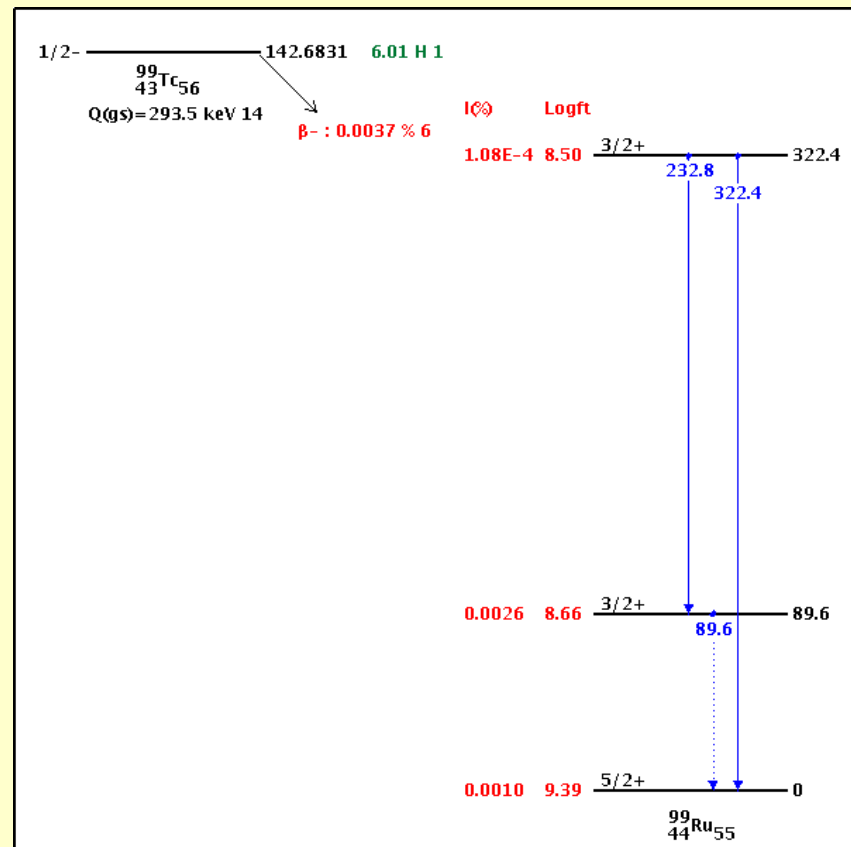
The Gamma Record

99RU	G 89.6	3
Field	Name	
8	G (required)	
10-19	E Energy	20-21 DE
22-29	RI rel Intensity	30-31 DRI
32-41	M multipolarity	
42-49	MR mix ratio	50-55 DMR
56-62	CC total CC	63-64 DCC
65-74	TI	75-76 DTI
77	Flag	78 COIN 80 Q

The (Delayed-) Particle Record

Field	Name
8	D (for delayed) 9 particle (N,P,..)
10-19	E Energy 20-21 DE
22-29	IP % Intensity 30-31 DIP
32-39	EI lev en int nuc
40-49	T Width 50-55 DT
56-64	L angular momentum transfer
77	Flag 78 COIN 80 Q

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99RU      G 89.6        3
99RU      L   322.40    183/2+
99RU      B           0.000108 5
```