



International Atomic Energy Agency

IAEA's Nuclear Data Program

D. Abriola

Nuclear Data Section

Department of Nuclear Sciences and Applications

USNDP Meeting, BNL, Nov. 2011

Nuclear Data Section

Organization Chart (April 2011)

Section Office (and INDC Secretariat)

Section Head: R.A. Forrest
Nuclear Data Physicist
(21709/21710)

Deputy Section Head: D. Abriola
Nuclear Data Physicist
(21712/21711)

Section Secretary: L. Vrapcenjak
(21710)

Nuclear Data Services Unit	Nuclear Data Development Unit	Atomic & Molecular Data Unit
<u>S. Simakov</u> Unit Head (21717)	<u>D.H. Abriola</u> Unit Head (21712)	<u>B.J. Braams</u> Unit Head (21731)
<u>V. Zerkin</u> Software Engineer (21714)	<u>R. Capote Nov</u> Nuclear Physicist (21713)	<u>W.M. Costello</u> (IT Systems Analyst) (21724)
<u>V. Semkova</u> Nuclear Physicist (21727)	<u>M.A. Kellett</u> Nuclear Physicist/Programmer (21708)	<u>H.-K. Chung</u> Atomic Physicist (21729)
<u>N. Otsuka</u> Nuclear Data Physicist (21715)	<u>K. Nathani</u> Clerk (21711)	<u>Marco Verpelli</u> (from 23 May 2011) Systems Analyst/Programmer (21723)
<u>J. Roberts</u> Nuclear Data Services Assistant (21725)		<u>K. Sheikh</u> Database Assistant (21730)
<u>A. Oechs</u> Clerk (21716)		<u>M. O'Connell</u> (25%) Applications Programmer (21722)



IAEA Activities Relating to NSDD

- Coordinated Research Projects (CRPs)
- ENSDF evaluations / NSR compilations
- Financial support for ENSDF evaluators and horizontal evaluation/compilation activities
- Coordination of the NSDD network
- Workshops
- Dissemination



Nuclear Data Development

Nuclear Data Projects – Status, Nov 2011

Coordinated Research Projects

- 6 completed
- 6 active

Data Development Projects + additional tasks

- 10 active



Completed CRPs

No.	Short title	Duration	Participants (contracts)
1	Nuclear data for Th-U fuel cycle	2002–2007	11 (6)
2	RIPL-3	2003–2008	11 (5)
3	Nuclear data for the production of therapeutic radionuclides	2003–2007	8 (4)
4	Reference database for ion beam analysis	2005–2010	10 (4)
5	Reference database for neutron activation analysis	2005–2010	7 (4)
6	Updated decay data library for actinides	2005–2010	7 (4)



- Members
- Daniel Abriola
 - Balraj Singh
 - Daniel Cano
 - Iris Dillmann
 - Alejandro Sonzogni
 - Bernd Pfeiffer
 - José L. Tain

- Advisers
- Mark A. Kellett
 - Stanislav Simakov
 - Valentina Semkova

- Members and Advisers
- Mail to All

- Links
- IAEA Nuclear Data Services
 - IAEA Nuclear Data Section
 - DDEP Homepage
 - Meeting Homepage



IAEA Consultant's Meeting (CM) on Beta-Delayed Neutron emission evaluation

Scientific Secretary: [Daniel Abriola](#)

INFORMATION ON THIS WEB PAGE IS FOR EXCLUSIVE USE BY Beta-delayed neutron meeting PARTICIPANTS. THE DATA FROM THIS WEB PAGE SHOULD NOT BE QUOTED OR USED WITHOUT THE EXPLICIT CONSENT OF THE CONTRIBUTING AUTHOR.

Announcements

The IAEA Consultant's Meeting (CM) on Beta-Delayed Neutron emission evaluation was held at IAEA's Headquarters, Vienna, Austria, from 10-12 October 2011.

- [Preliminary Agenda](#)
- [Presentations](#)
- [Summary Report \(DRAFT\)](#)

Beta-Delayed Neutron emission evaluation

The main Goal of this meeting is to advise the IAEA-NDS whether to set up a CRP on Beta Delayed neutron emission. To achieve that Goal, the consultants reviewed the current state of affairs regarding the available compilations and new data from recent measurements. The consultants discussed possible ways to set up a dedicated database of evaluated data, and how to update the existing databases. It was recommended that the NDS starts preparations for this CRP.

ENSDF evaluations (D. Abriola)

- Collaboration with A. Sonzogni,
A=72 published.
- As part of ENSDF-2009 - evaluation of ^{84}Nb
A=84 published
- New Mass chain A=144 to be submitted 2011 in
collaboration with A. Sonzogni
(17 nuclei, 93 new experimental references,
21 XUNDL-files)



NSR compilations (1)

Compilation began **September 2005** when IAEA designated **Mark Kellett** as NSR keyword compiler

Three journals covered by the IAEA (~20-25% of NSR entries):

Nuclear Physics A

European Physical Journal A

Physics Letters B

IAEA/NNDC collaborative visits:

- **M.A. Kellett** one week visit to NNDC, July 2005
- **M.A. Kellett** one week visit to NNDC, Dec. 2005
- **D. Winchell** one week visit to IAEA, June 2006
- **M.A. Kellett** one week visit to NNDC, Oct. 2006
- **M. Bhattacharya** one week visit to IAEA, Oct. 2007
- **B. Pritychenko** one week visits to IAEA, Nov. 2009, 2010, 2011



NSR compilations (2)

IAEA has compiled [and keyworded] the following papers:

2005:	258	[134]	(from Sept to Dec)
2006:	479	[348]	
2007:	869	[495]	
2008:	529	[298]	
2009:	670	[217]	
2010:	596	[298]	
2011:	259	[108]	(partial effort to finalize work)

Total: 3660 [1898] (in ~5.5 years)

Since 2009, Mark has mentored Emil Betak (consultant compiler), initial training on files of selected NP/A papers (chosen from files previously keyworded) and later reviewing newly keyworded files.

Significant time has been spent explaining and commenting in order to help train Emil.

5+2 Contracts – 2010...2011

1. Joshi and Jain (India)
2. Wang and Audi (China) Atomic Mass Evaluation (Horizontal)
3. Zuber (Poland)
4. A. Negret (Romania)



5. J. Timar – Z. Elekes (Hungary)

6. N. Stone (USA)

Nuclear Moments (Horizontal):
Compilation and evaluation

7. Lalkovski (Bulgaria)



Coordination of the NSDD network

International Network of Nuclear Structure
and Decay Data at IAEA Headquarters,
Vienna 4-8 April 2011.

Thirty-five participants from twenty countries attended the meeting, representing the majority of data evaluation centres, new evaluation groups and data dissemination centres, and making this the largest meeting in the history of the NSDD International Network of Evaluators





Members

- [Daniel Abriola](#)
- [George Audi](#)
- [Jean Blachot](#)
- [Zoltan Elekes](#)
- [Ameenah R. Farhan](#)
- [Richard Firestone](#)
- [Ashok K. Jain](#)
- [Huo Junde](#)
- [Jun-ichi Katakura](#)
- [John H. Kelley](#)
- [Tibor T. Kibedi](#)
- [Filip G. Kondev](#)
- [Stephan Lalkovski](#)
- [Ivan A. Mitropolsky](#)
- [Alexandru Negret](#)
- [Balraj Singh](#)
- [Dmytro Simochko](#)
- [Michael S. Smith](#)
- [Jaquish K. Tuli](#)
- [Ge Zhigang](#)
- [Kazimierz Zuber](#)

Advisers

- [Kalifeh Abusaleem](#)
- [Coral M. Baglin](#)
- [Dimitar L. Balabanski](#)
- [Ted Barnes](#)
- [Swapan Kumar Basu](#)
- [Shamsuzzoha Basunia](#)
- [Marie-Martine Be](#)
- [Edgardo Browne-Moreno](#)



INTERNATIONAL NETWORK OF NUCLEAR STRUCTURE AND DECAY DATA EVALUATORS (NSDD)

Scientific Secretary: [Daniel Abriola](#)

INFORMATION ON THIS WEB PAGE IS FOR EXCLUSIVE USE BY NETWORK PARTICIPANTS. THE DATA FROM THIS WEB PAGE SHOULD NOT BE QUOTED OR USED WITHOUT THE EXPLICIT CONSENT OF THE CONTRIBUTING AUTHOR.

Announcements

The 19th Network meeting of the NSDD network was held in IAEA's Headquarters, Vienna, Austria, from 4-8 April 2011.

- [Adopted Agenda](#)
- [Dinner info](#)
- [Meeting's Presentations](#)
- [List of Actions](#)
- [Web Tools for ENSDF evaluators](#)
Viktor Zerkin of IAEA's Nuclear Data Section developed a set of web tools. There is a site where evaluators can upload their data sets and run
[mailto:kazimierz.zuber@itj.edu.pl?subject=NSDD meeting](mailto:kazimierz.zuber@itj.edu.pl?subject=NSDD%20meeting) online: [fitchk](#), [pandora](#), [gcl](#) and [logft](#). Please check and comment.



Table of Contents

Foreword	7
NSDD Meetings	9
1. WELCOME REMARKS	11
2. SUMMARY	12
3. ADMINISTRATIVE AND ORGANIZATIONAL ITEMS	13
3.1. Report on the US Nuclear Data Program (Herman)	13
3.2. Report on the IAEA Nuclear Data Program (Abriola)	14
3.3. New Evaluation Centres/New Evaluators/Training (Tuli)	14
3.4. European Effort (Balabanski)	15
3.5. Organisational Review	16
3.6. Status of ENSDF Evaluations and Estimated Manpower Figures	16
4. TECHNICAL REPORTS AND ISSUES	17
4.1. Reminders	17
4.2. ENSDF Analysis Codes and Web Access	18
4.3. Databases	18
4.3.1. XUNDL (Singh)	18
4.3.2. NSR (Herman)	19
4.3.3. NuDat (Sonzogni)	19
4.3.4. LiveChart (Abriola)	20



5.	<u>TECHNICAL DISCUSSIONS</u>	20
5.1.	<u>EGAF File (Firestone)</u>	20
5.2.	<u>Decay Data Evaluation Project (DDEP) and ICRM Decay Data Working Group – Status (Bé)</u>	21
5.3.	<u>New JAVA Code for NDS (Singh)</u>	22
5.4.	<u>BrIcc code – E0+M1+E2 Admixtures, and when no mixing ratio is given for M1(E2) or E1(+M2) Transitions (Kibedi, Singh)</u>	22
5.5.	<u>Atomic Radiations (Kibedi, Kondev)</u>	23
5.6.	<u>ENSDF Review (Mitropolsky)</u>	25
5.7.	<u>Systematics of Nuclear Gamma Transitions (Mitropolsky)</u>	25
5.8.	<u>$\pi(\pi^2; 0_1^+ \rightarrow 2_1^+)$ Evaluation for Even-even Nuclides of Z = 24 to30 (Singh)</u>	25
5.9.	<u>Issues in ENSDF (Sonzogni)</u>	26
5.10.	<u>ND2013 (Sonzogni)</u>	26
5.11.	<u>JPI and MULT Assignments in ENSDF (Singh)</u>	27
6.	<u>HORIZONTAL EVALUATIONS</u>	27
6.1.	<u>Present Status of AME and NUBASE Evaluation (Wang)</u>	27
6.2.	<u>Nuclear Moments Compilation (Stone)</u>	27
6.3.	<u>Atlas of Nuclear Isomers (Jain)</u>	27
6.4.	<u>Structure and Decay Properties of K-Isomers in Nuclei with A>100: Database and Publication (Kondev,Kibedi)</u>	28
6.5.	<u>+BrIcc – Recent Development in Theoretical Conversion Coefficients (Kibedi)</u> ...	28



7.	TECHNICAL PRESENTATIONS	28
7.1.	Internal Conversion Coefficients (ICC) (Nica).....	28
7.2.	How to Draw a Level Scheme? Or About the Nature of Gamma-ray Spectroscopy Data (Nica)	28
7.3.	Mammoths, Meteors, and Supernovae (Firestone)	29
8.	ROUND TABLE DISCUSSIONS	30
9.	CONCLUSIONS AND RECOMMENDATIONS.....	31

ANNEXES

<u>1:</u>	<u>List of Participants</u>	<u>35</u>
2:	Agenda	39
<u>3:</u>	<u>Evaluation responsibilities: ENSDF data evaluation centres</u>	<u>43</u>
<u>4:</u>	<u>List of Continuous, New and completed Actions</u>	<u>45</u>
<u>5:</u>	<u>Status Reports of Evaluation Centres</u>	<u>51</u>



Workshops

2010



- Nuclear Reaction Data for Advanced Reactor Technologies, ICTP, Trieste, 3 - 14 May 2010 (TALYS & EMPIRE)
- Experimental Nuclear Reaction Data Compilation of EXFOR Database, IAEA, Vienna, Austria, 30 Aug - 3 Sept 2010
- Nuclear Structure and Decay Data: Theory and Evaluation, ICTP, Trieste, 11 - 15 Oct 2010



- Nuclear Data for Science and Technology: Analytical Applications, ICTP, Trieste, 8 - 12 Nov 2010

Workshops

2011

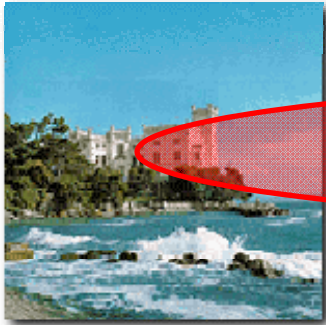


- **Workshop on Monte Carlo Radiation Transport and Associated Data needs for Medicap Applications, ICTP, Trieste, 17 - 28 Nov 2010 (HOSTED)**



Workshops

2012



- **Joint IAEA-ICTP Nuclear Structure and Decay Data: Theory and Evaluation, ICTP, Trieste, 6 - 17 August 2012**



- **ENSDF Evaluator's Workshop Calcutta ?**

Dissemination

How to find us?

The image shows a screenshot of the iGoogle homepage. At the top, there is a search bar with the text "nds iaea" entered. A red arrow points to the search bar. Below the search bar are two buttons: "Google Search" and "I'm Feeling Lucky". To the right of the search bar, there are links for "Advanced Search" and "Language Tools". Below the search bar, there is a checkbox that says "Show this page every time I start to browse the web. Make iGoogle my homepage". To the right of this checkbox, there is a link that says "Change theme from Sony | Vaio | Add stuff".

The main content area is divided into several sections:

- Home:** A sidebar on the left with a "Home" button and a list of links: YouTube, Date & Time, Weather, Gmail, CNN.com, Official Sony VAIO G..., NPR: News, Music, ..., NYTimes.com - Top ..., GoComics from Uni..., Comedy Central's J..., CNET News.com, Wired Top Stories, and Celebs by Access H.
- Official Sony VAIO Gadget:** A large advertisement for Sony Extended Service Plans. It features a clock face with "2 yrs" in the center and the text "Protect your investment: Sony Extended Service Plans". Below the clock, it says "Get your Peace of Mind" with a right-pointing arrow. At the bottom, there are two links: "GET SONY CUSTOMER SUPPORT" and "SONY WEEKLY DEALS", both with right-pointing arrows.
- Date & Time:** A widget showing a clock face, the date "Sat OCT 30", and a calendar grid for the month of October. The calendar grid shows the days of the week (S M T W T F S) and the dates (1-31).
- CNN.com:** A widget showing a link to "Dems make a mess of Florida U.S." with a small thumbnail image.
- YouTube:** A widget with a "Sign in to share with your friends. Close" link, a search bar with a "Search" button, and a dropdown menu for "Today's Spotlight Videos". Below the dropdown is a video player showing a close-up of a person's face.

[Videos](#) [Maps](#) [News](#) [Shopping](#) [Gmail](#) [more](#) ▼



nds iaea

About 672,000 results (0.19 seconds)



Adva

Everything

Images

Videos

More

New York, NY

Change location

Show search tools

▶ [IAEA Nuclear Data Services](#)

Provides access to databases, documents, programs and files. Maintained by the IAEA's Nuclear Data Centre.

www-nds.iaea.org/ - Cached - Similar

[RIPL-2 \(Index\)](#)

Handbook for calculations of nuclear reaction data, RIPL-2. IAEA-TECDOC-1506 (IAEA, Vienna, 2006). Available online at <http://www-nds.iaea.org/RIPL-2/> ...

www-nds.iaea.org/ripl2/ - Cached

[Cross-Section database for medical radioisotope production: IAEA-CRP](#)

A description of the formatting procedure is given in the report IAEA-NDS-210 (pdf, 68 KB). Complete documentation is available, including evaluation ...

www-nds.iaea.org/medical/ - Cached - Similar

[IBANDL](#)

Sep 27, 2010 ... This is the Ion Beam Analysis Nuclear Data Library produced according to the recommendations of the IAEA Technical Meeting held at the IAEA ...

www-nds.iaea.org/ibandl/ - Cached - Similar



NSDD activities in the IAEA

International Atomic Energy Agency
Nuclear Data Services
Provided by the Nuclear Data Section

IAEA.org | NDS Mission | About Us | Mirrors

Search

Hot Topics » ENDF/B-VII.0 • Safeguards data • WIMS-D Library • Fission Yields • ADS **News** » June 2009, POINT2009 Released

Request
CD/DVD with documentation, data, codes, etc.

Quick Links
ADS-Lib
Atomic Mass Data Centre
CINDA
Charged particles XS
DROSG-2000
EMPIRE-II
ENDF
ENDF Archive
ENDF Utility Codes
ENDVER
ENSDF
ENSDF ASCII Files
ENSDF programs
EXFOR
FENDL-2.1
Fission Yields
GANDR

NEW
RIPL-3 reference parameters for nuclear model calculations, 2010 [page]
JENDL-4.0 Japanese evaluated nuclear data library, 2010 [page] [list] [retrieve]
ROSFOND-2010 Russian Library of Evaluated Neutron Data [page] [list]

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

EXFOR Experimental nuclear reaction data
LiveChart of Nuclides Interactive Chart of Nuclides: Advanced and Basic
CINDA neutron reaction bibliography
ENDF Evaluated nuclear reaction libraries
ENSDF evaluated nuclear structure and decay data (+XUNDL) **
NSR Nuclear Science References *

NuDat 2.5 selected evaluated nuclear structure data	RIPL reference parameters for nuclear model calculations	IBANDL Ion Beam Analysis Nuclear Data Library	Charged particles XS Beam monitor & radionuclide production cross sections
PGAA Prompt gamma rays from neutron capture	FENDL-2.1 Fusion Evaluated Nuclear Data Library, Version 2.1	Photonuclear cross sections and spectra up to 140MeV	IRDF-2002 International Reactor Dosimetry File
NGATLAS atlas of neutron capture cross sections	Safeguards Data recommendations, August 2008	Medical Portal Data for Medical Applications	Standards - Neutron cross-sections, 2006 - Decay data, 2005

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

IAEA Nuclear Data Section

IAEA-NDS Mission, Staff and more
A+M Atomic and Molecular Data
Meetings Workshops
Newsletters
Coordinated Research Projects
Nuclear Reaction Data Center Network
Nuclear Structure & Decay Data Network
Technical Reports, TECDOCs
INDC(NDS) Reports
Computer Codes

Last Updated: 22-October-2010

© Copyright 2007-2010, International Atomic Energy Agency - Nuclear Data Section.
Vienna International Centre, P.O. Box 100, A-1400 Vienna, Austria
Telephone (+431) 2600-0. Facsimile (+431) 2600-7. E-mail: online@iaea.org. Read our [Disclaimer](#)

Web design: V.



Livechart display

Half life color code, value in seconds:

0 8.2E-4 1.4E-2 4.6E-2 1.E-1 2.3E-1 0.5 0.9 1.8 3.5 6.2 12 23.5 43 83.4 1.6E2 2.9E2 6E2 1.3E3 3E3 8.6E3 3.4E4 1.4E5 1.1E6 3E7 1E8



Show Filter

Visible Nuclides: 2934

Lock info panel

Nuclide

single selection

zooming and moving

nuclide data on mouse-over

¹⁵¹₆₆Dy Double click for more
 JP 7/2(-)
 Delta (MeV) -68.7586
 Half Life 17.9 3 min
 Decay 94.4 4 EC+ β+
 5.6 4 α
 Parent ¹⁵¹Ho ¹⁵⁵Er
 Daughter ¹⁴⁷Gd ¹⁵¹Tb

Radiations		
Type	keV	%
α	4069.4	5.6
β+	4069.4	5.6
β+	1363	0.58
γ	386.100	19.4
γ	49.460	18.0

parents – daughters chain (white - red)

Data sources: ENSDF + Radlist, NWC, Atlas of Neutron Resonance



Single nuclide details

Main data of the nuclide:

Nuclide	I^π	Mass excess (MeV)	Natural abundance or half life	S_n (keV)	S_p (keV)	Q_β (keV)	Q_α (keV)	Decay modes mode branch
¹⁷⁴ ₇₁ Lu	(1)-	-55.5753	3.31 y 5	6761.1 15	5307.9 16	273.3 22	1800 2	ec 100% β^+

more sources:
Angeli and
Stone

Major radiations E(keV) intensity	σ (barn)	Nuclear Charge Radius *(fm)	μ^{**} (μ_N)	Q^{**} (barn)
γ 76.47 5.9% 1241.85 5.14%		5.3634 303	+1.94 28 +1.988 5 1998Ge13 1.9 3 1975Kr11	+0.773 5 1998Ge13 Data for excited levels from 2011stZ

Chain of Parents and Daughters: ¹⁷⁴Lu ¹⁷⁴Yb

Level schema of the nuclide:

[Open level schema](#)

Level table of the nuclide:

Energy (keV)	I^π	Half Life
0.0	(1)-	3.31 y 5
44.6966 20	(2)-	
111.753 3	(3)-	
170.83 5	(6)-	142 d 2
200.297 5	(4-)	
240.818 4	(3+)	395 ns 15
259.534 10	(4+)	
281.168 18	(0+)	
302.45 8	(5+)	
311.205 9	(5-)	
320.111 8	(2+)	

Nuclear magnetic dipole and/or electric quadrupole moments

Magnetic dipole moments:

Nuclide	Energy (keV)	Half Life	I^π	μ (nm)	Ref. Std.	Method	Reference
¹⁷⁴ Lu	0	3.3 y	1-	+1.988 5	¹⁷⁵ Lu	CFBLS	1998Ge13
¹⁷⁴ Lu	0	3.3 y	1-	1.9 3	¹⁷³ Lu	NO/S	1975Kr11
¹⁷⁴ Lu	171	142 d	6-	+1.492 16	¹⁷⁵ Lu	CFBLS	1998Ge13
¹⁷⁴ Lu	171	142 d	6-	1.497 10		NMR/ON	1991Hi19

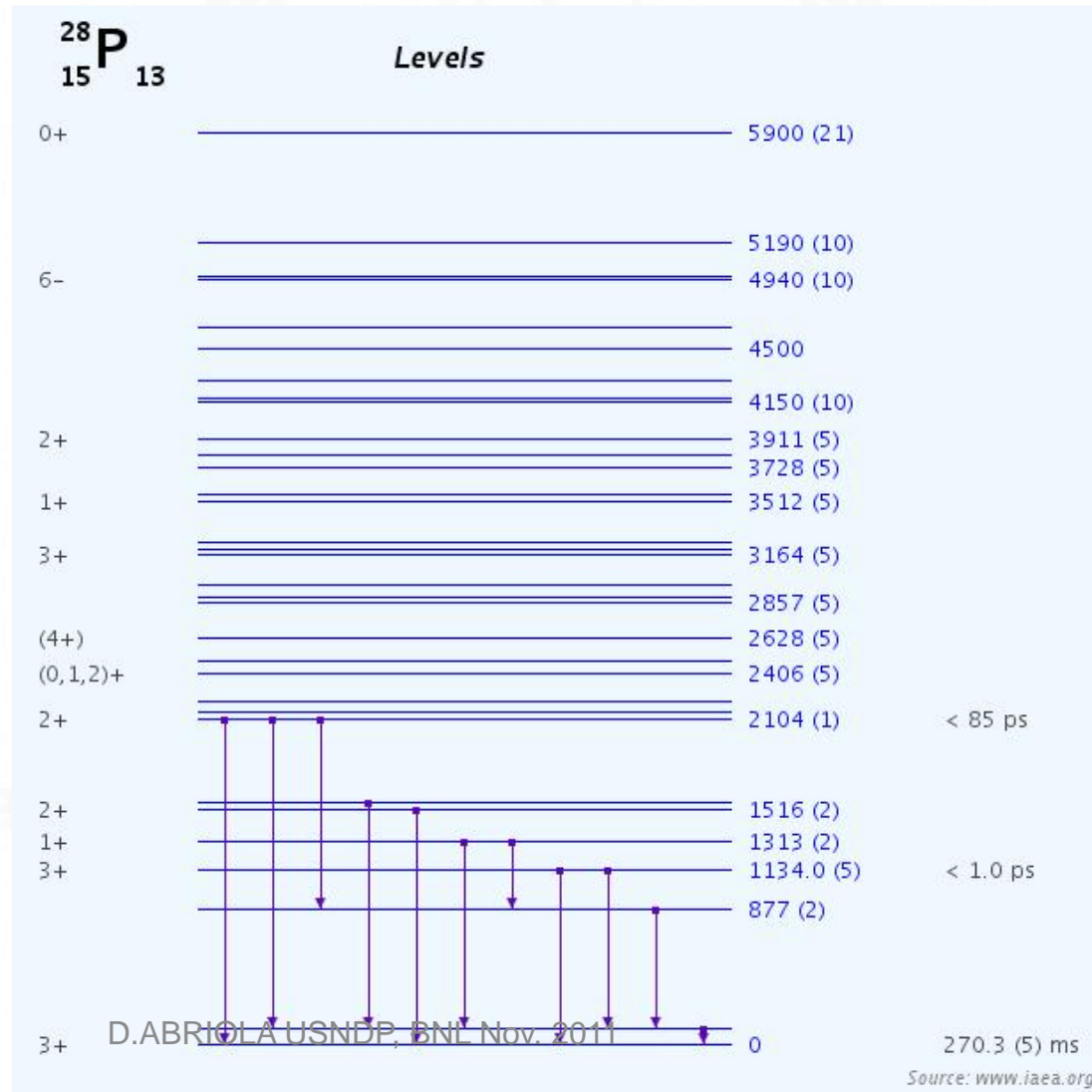
Electric quadrupole moments:

Nuclide	Energy (keV)	Half Life	I^π	Q (b)	Ref. Std.	Method	Reference
¹⁷⁴ Lu	0	3.3 y	1-	+0.773 5	¹⁷⁵ Lu	CFBLS	1998Ge13
¹⁷⁴ Lu	171	142 d	6-	+4.80 5	¹⁷⁵ Lu	CFBLS	1998Ge13



Levels and Bands plotting

<input type="text" value="0.0"/> < Energy < <input type="text" value="50000.0"/>	Image height: <input type="text" value="600"/>	Level width: <input type="text" value="300"/>	Band spacing: <input type="text" value="20"/>	Emphasise level: <input type="text" value="0.0"/> and/or gamma <input type="text" value="0.0"/>	<input type="button" value="Redraw"/>
<input checked="" type="checkbox"/> Show level energy	<input checked="" type="checkbox"/> Show spin-parity	<input checked="" type="checkbox"/> Show half life	<input type="checkbox"/> Show gamma	<input type="checkbox"/> Show all (possible overlapping) <input type="checkbox"/> Show legend	<input type="button" value="Reset"/>
<input checked="" type="checkbox"/> Non-band				<input type="checkbox"/> Download as EPS	



Filtering

Half life color code, value in seconds:
0 8.2E-4 1.4E-2 4.6E-2 1.E-1 2.3E-1 0.5 0.9 1.8 3.5 6.2 12 23.5 43 83.4 1.6E2 2.9E2 6E2 1.3E3 3E3 8.6E3 3.4E4 1.4E5

Show Filter Visible Nuclides: 1486 Lock info panel

Nuclide

Show Mendeleev table

Decay modes invert
 α β^- β^+ p n EC S

Spin and Parity invert + -
 0 1 2 3 4 5 6 7 8 9
 1/2 3/2 5/2 7/2 9/2 11/2 >11/2 (?)

Half life (s) Stable

Download data from NDS server

Dynamic filter on:

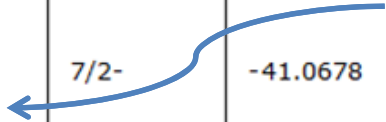
- Decay modes
- Spin and parity
- Half life

Download of selection details

Filtered nuclide details

Nuclide	I^π	Mass excess (MeV)	Natural abundance or half life	Decay modes		Major radiations		σ (barn)
				mode	branch	E(keV)	intensity	
21 Sc 38	(2-)	-4.9370 syst	< 300 ns	p	?%			
21 Sc 39	(7/2-)	-14.1680	< 300 ns	p	100%			
21 Sc 40	4-	-20.5232	182.3 ms 7	ec α	0.017 5%	β^+ 5641	49%	
				ec p	0.44 7%	γ 3735.6	99.54%	
				ec β^+	100%	755.6	41%	
21 Sc 41	7/2-	-28.6424	596.3 ms 17	ec β^+	100%	β^+ 5472.3	99.869%	
21 Sc 42	0+	-32.1212	681.3 ms 7	ec β^+	100%	β^+ 5402.95	99.8953%	
21 Sc 43	7/2-	-36.1879	3.891 h 12	ec β^+	100%	β^+ 1198.7	70.9%	
						γ 372.9	22.5%	
21 Sc 44	2+	-37.8161				β^+ 1474.1	94.27%	
						γ 1157.02	99.9%	
						1499.46	0.908%	
21 Sc 45	7/2-	-41.0678	100 %					σ_V 17.4 11 σ_V^m 9.8 11

Click on a symbol to show its levels



Energy (keV)	J^π	Half Life	Energy (keV)	J^π	Half Life	Energy (keV)	J^π	Half Life
0.0	7/2-	STABLE	3714.3 8	1/2,3/2,5/2	13 fs +14-10	7696.3 15		
12.40 5	3/2+	318 ms 7				7711.0 18		
376.50 12	3/2-	43.3 ps 23	3722.3 10			7712.5 17		
543.06 14	5/2+	5.5 ps 6	3776 13	(+)		7714.9 17		
720.12 14	5/2-	206 fs 16	3864.0 15			7725.0 17	3/2(-)	
939.24 15	1/2+	7.3 ps +6-3	3882 11	(1/2-)		7774.4 17	3/2(+)	
974.38 15	7/2+	2.54 ps 23	3890 30	+		7929.3 8	25/2+	<0.07 ps

21 Sc 46	4+	-41.7571	83.788 d 22	β^-	100%	β^- 356.8	99.9964%	σ_V 8.0 10
						γ 1120.54	99.9870%	
						889.28	99.9840%	

Query tool

NUCLIDES

Nuclide	Symbol	Z	N	A	Z range	N range	A range	Z	N	A	Z	N	A	
<input type="checkbox"/>		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/>	Q(β)	<input type="text"/> -26300 \leq keV \leq <input type="text"/> 29100			<input type="checkbox"/>	S(n)	<input type="text"/> -10662 \leq keV \leq <input type="text"/> 107000			<input type="checkbox"/>	S(p)	<input type="text"/> -5400 \leq keV \leq <input type="text"/> 233700		
<input type="checkbox"/>	Q(α)	<input type="text"/> -91000 \leq keV \leq <input type="text"/> 12300			<input type="checkbox"/>	R	<input type="text"/> -0.1149 \leq fm \leq <input type="text"/> 5.9045			<input type="checkbox"/>	ΔM	<input type="text"/> -91652.84 \leq keV \leq <input type="text"/> 200687		
<input type="checkbox"/>	B/A	<input type="text"/> -2267 \leq keV \leq <input type="text"/> 8794.5			<input type="checkbox"/>	AM	<input type="text"/> 1,007,825.032 \leq AMU \leq <input type="text"/> 295,215,447							

Angeli and Audi data

LEVELS - Bands - Decay Radiations

<input type="checkbox"/>	Energy	<input type="text"/> 0 \leq keV \leq <input type="text"/> 47,300				<input type="checkbox"/>	Isospin	<input type="text"/>	
<input type="checkbox"/>	Decays	<input type="text"/> \leq % \leq <input type="text"/>							
<input type="checkbox"/>	Half Life	<input type="text"/> 3.68E-8	fs	$\leq T_{1/2} \leq$	<input type="text"/> 7.7E24	y	<input type="checkbox"/>	Stable	
<input type="checkbox"/>	Magnetic Moment	<input type="text"/> -20 $\leq \mu \leq$ <input type="text"/> 38		<input type="checkbox"/>	Electric Moment	<input type="text"/> -219 $\leq Q \leq$ <input type="text"/> 64			
<input type="checkbox"/>	Decay radiation	<input type="text"/> 0 \leq keV \leq <input type="text"/> 19,636	<input type="text"/> 0 \leq % \leq <input type="text"/> 100	type	<input type="text"/> any	process	<input type="text"/> -	Shell	<input type="text"/> -
<input type="checkbox"/>	β mean energy	<input type="text"/> 0 \leq keV \leq <input type="text"/> 8,723							
<input type="checkbox"/>	Band: Head	<input type="text"/> 0 \leq keV \leq <input type="text"/> 42,007		J	<input type="text"/>	order	<input type="text"/>	π any	
				K	<input type="text"/>	π any	Alpha	<input type="text"/>	π any
<input type="checkbox"/> Ground state <input type="checkbox"/> yrast <input type="checkbox"/> Super Deformed <input type="checkbox"/> Octupole <input type="checkbox"/> Dipole <input type="checkbox"/> Vibrational									

decay radiation

bands

GAMMAS

<input type="checkbox"/>	Energy	<input type="text"/> 0.008 \leq keV \leq <input type="text"/> 18,128										
<input type="checkbox"/>	End Level	<input type="text"/> 0 \leq keV \leq <input type="text"/> 40,000		J	<input type="text"/>	order	<input type="text"/>	π any	<input type="checkbox"/>	Rel. Intensity	<input type="text"/> 0 \leq I \leq <input type="text"/> 7,456	
<input type="checkbox"/>	Conv. Coef.	<input type="text"/> 1.94E-09 $\leq \alpha \leq$ <input type="text"/> 5.6E10		Shell	<input type="text"/> any			<input type="checkbox"/>	Tot. Conv. Coef.	<input type="text"/> 0E00 $\leq \alpha \leq$ <input type="text"/> 1.3E12		
<input type="checkbox"/>	Multipolarity	<input type="text"/> E0	<input type="checkbox"/> weak	No mix	<input type="checkbox"/> Trans. Probab. W.u.	<input type="text"/> 0E00	B(E0)	<input type="text"/> 2.4E09	<input type="checkbox"/>	Mixing Ratio	<input type="text"/> -180 $\leq \delta \leq$ <input type="text"/> 4000	

end level details

Order by : Z , A

<input checked="" type="checkbox"/>	Z	<input checked="" type="checkbox"/>	A	<input type="checkbox"/>	N	<input type="checkbox"/>	Q β	<input type="checkbox"/>	S n	<input type="checkbox"/>	S p	<input type="checkbox"/>	Q α	<input type="checkbox"/>	R	<input type="checkbox"/>	ΔM	<input type="checkbox"/>	B/A	<input type="checkbox"/>	AM	<input type="checkbox"/>	E	<input type="checkbox"/>	B	<input type="checkbox"/>	T $_{1/2}$	<input type="checkbox"/>	μ	<input type="checkbox"/>	Q	<input type="checkbox"/>	Erad	<input type="checkbox"/>	Irad
<input type="checkbox"/>	E β	<input type="checkbox"/>	I β	<input type="checkbox"/>	E γ	<input type="checkbox"/>	I	<input type="checkbox"/>	α (...)	<input type="checkbox"/>	α	<input type="checkbox"/>	B(E)	<input type="checkbox"/>	B(M)	<input type="checkbox"/>	δ																		

Plot with ZVView

X axis: None Y axis: None

plotting

Output panels

You requested: ²³⁸U

Nuclides	Levels	Gammas	Bands	Decay Radiation
----------	--------	--------	-------	-----------------

Click on a nuclide symbol to show the schema

Nuclide	Q_{β^-}	S_n	S_p	Q_{α}	R	Mass Excess	Binding	Atomic Mass	J^{π}	$T_{1/2}$	Decays	Isospin	μ	Q	Additional data
²³⁸ U <small>92 146</small>	-147.1 17	6153.7 12	7.62 x 10 ³ 10	4269.8 29	5.8569 33	47308.948 1904	7570.120 8	50788.247 2044	0+	4.468 x 10 ⁹ y 3	α 100 SF 5.45 x 10 ⁻⁵ 7				comments

You requested: ²³⁸U

Nuclides	Levels	Gammas	Bands	Decay Radiation
----------	---------------	--------	-------	-----------------

Click on a nuclide symbol to show the schema

Nuclide	Energy (keV)	J^{π}_{order}	Band	$T_{1/2}$	$T_{1/2}$ [s]	Decays	Isospin	μ	Q	Additional Data
²³⁸ U <small>92 146</small>	0.0	0+	1	4.468 x 10 ⁹ y 3	1.41 x 10 ¹⁷	α 100 SF 5.45 x 10 ⁻⁵ 7				comments
²³⁸ U <small>92 146</small>	44.916 13	2+	1	206 ps 3	2.06 x 10 ⁻¹⁰			0.51 3		comments

You requested: ²³⁸U

Nuclides	Levels	Gammas	Bands	Decay Radiation
----------	--------	---------------	-------	-----------------

Click on a nuclide symbol to show the schema

Nuclide	Start Level			End Level		E_{γ} (keV)	I_{γ}	Multip.	δ	Theor. Conv. Coef.	α	Electric Trans. W.u.	Magnetic Trans. W.u.	Additional Data
	E(keV)	J^{π}_{order}	$T_{1/2}$	E(keV)	J^{π}_{order}									
²³⁸ U <small>92 146</small>	44.916 13	2+	206 ps 3			44.915 13		E2		L 444 M 123	609.0	281 4		comments
²³⁸ U <small>92 146</small>	148.38 3	4+				103.50 4		[E2]		L 8.405 M 2.332 N+ 0.878	11.6			comments

Output panels

You requested: ²³⁸U

Nuclides	Levels	Gammas	Bands	Decay Radiation
----------	--------	--------	--------------	-----------------

Click on a nuclide symbol to show the schema

Nuclide	Band	K π	α π	Yrast	S.D.	Vibr.	Coll.	Dip.	Oct.	Comments			
²³⁸ U <small>92 146</small>	1	0+								Kπ=0+ GROUND-STATE BAND. Coulomb excitation. Member of ground-state rotational band based on γ-deexcitation pattern and energy fit to rotational formula.			
Levels							Gammas						
E(keV)	Jπ _{order}	T _{1/2}	Decays	μ	Q	E(keV)	I	Multip.	δ	Conv.Coeff.	α	El. Trans. W.u.	Magn. Trans. W.u.
0.0	0+	4.468 x 10 ⁹ y <i>3</i>											
44.916 <i>13</i>	2+	206 ps <i>3</i>				44.915 <i>13</i>		E2			609.0		
148.38 <i>3</i>	4+					103.50 <i>4</i>		[E2]			11.6		

You requested: ²³⁸U

Nuclides	Levels	Gammas	Bands	Decay Radiation
----------	--------	--------	-------	------------------------

Click on a nuclide symbol to show the schema

Parent	T _{1/2}	Jp order	Decay	Daughter
²³⁸ U <small>92 146</small>	4.468 x 10 ⁹ y <i>3</i>	0+	α 100 %	²³⁴ Th <small>90 144</small>

Radiation	Energy [keV]	Intensity %	End point [keV]
A	4038 <i>5</i> .	0.078 <i>12</i>	
A	4151 <i>5</i> .	21 <i>3</i> .	
A	4198 <i>3</i> .	79 <i>3</i> .	
E CE K	3.85 <i>10</i>	0.002417	
E AU L	9.480	8.1 <i>11</i>	
E CE L	29.08 <i>6</i>	15.3 <i>20</i>	
E CE M	44.37 <i>6</i>	4.2 <i>6</i>	
E AU K	69.20	0 .	
E CE L	93.03 <i>10</i>	0.047 <i>8</i>	

D.ABRIOLA USNDP, BNL Nov. 2011

from Tom Burrows
Radlst

Plot mass number versus mixing of E2 mixed gamma transactions from a level J 2` to a level J 2 in even-even nuclides – use log on Y axis

NUCLIDES

even - even

LEVELS

starting level J 2'

GAMMAS

end level J 2

E2 mixed

plot

Order by : Z , A

Plot with ZVView
X axis: A Y axis: δ

Nuclide Symbol Z N A Z range N range A range Z N A Z N A

Q(β) -26300 \leq Q β \leq 28500 S(n) -14800 \leq S $_n$ \leq 233700 S(p) -10662 \leq S $_p$ \leq 118700

Q(α) -116192 \leq Q α \leq 12300 R -0.1149 \leq R \leq 5.045

Energy 0 \leq keV \leq 47,300 Decays \leq % \leq Isospin

Half Life 3.68E-8 fs \leq T $_{1/2}$ \leq 7.7E24 y Stable J π 2 weak order 2 π any

Magnetic Moment -20 \leq μ \leq 31 Electric Moment -219 \leq Q \leq 35.5

Band: Head 0 \leq keV \leq 42,007 J order π any K π any Alpha π any

Ground state yrast Super Deformed Octupole Dipole Vibrational

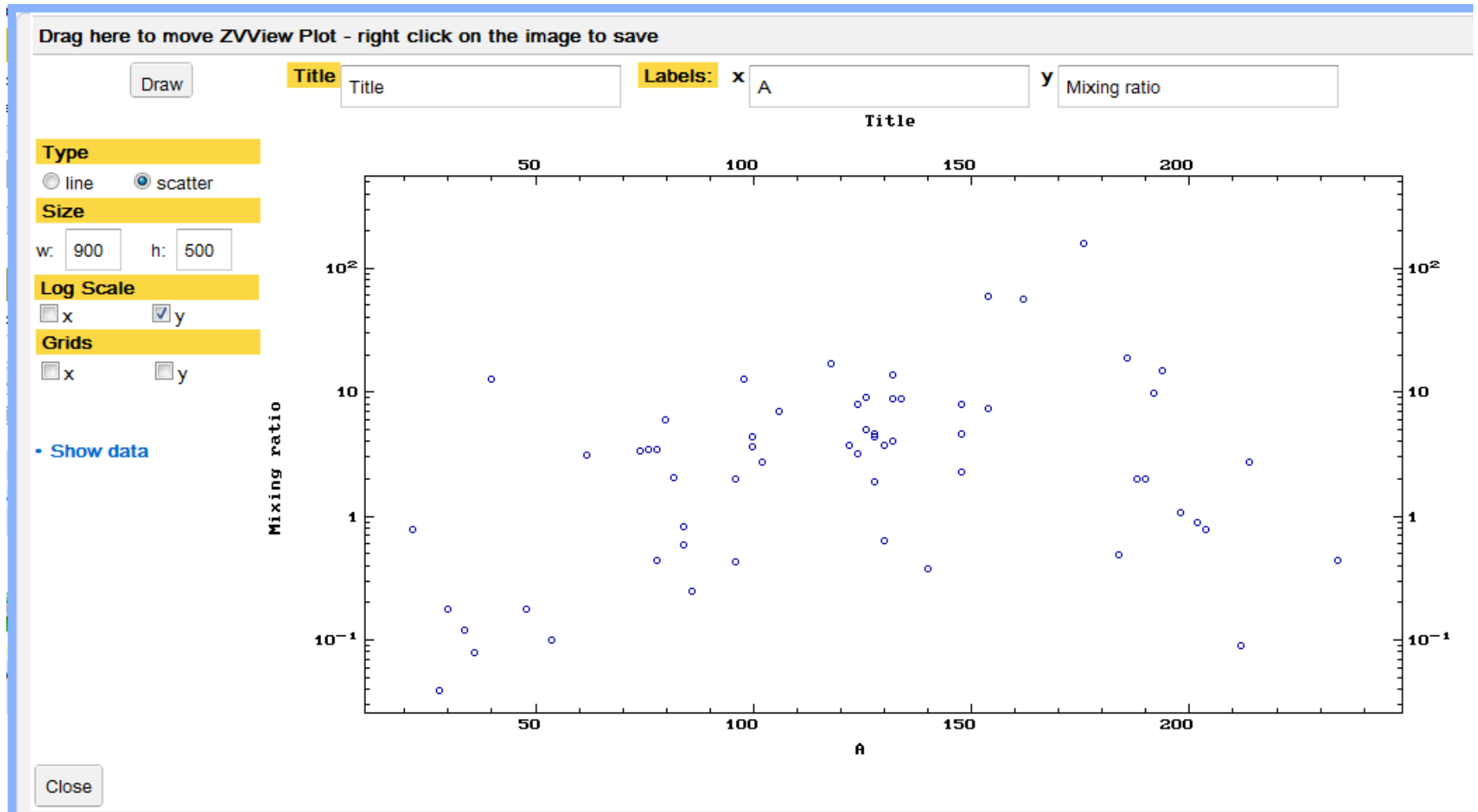
Energy 0 \leq keV \leq 18,128 End Level 0 \leq keV \leq 18,616 J 2 order 1 π any Rel. Intensity 0 \leq I \leq 7,456

Conv. Coef. 1.94E-09 \leq α \leq 1.23E10 Shell any Tot. Conv. Coef. 0E00 \leq α \leq 1.3E12

Multipolarity E2 weak Yes mix Trans. Probab. W.u. 0E00 B(E2) 2.5E09 Mixing Ratio -180 \leq δ \leq 4000

Z A N Q β S $_n$ S $_p$ Q α R E B T $_{1/2}$ μ Q E $_y$ I α (...) α B(E) B(M) δ

Plot mass number versus mixing of E2 mixed gamma transactions from a level $J 2^-$ to a level $J 2$ in even-even nuclides – use log on Y axis



Fields show upper and lower values present in the database

Z range N range A range

Z N A Z N A

even odd

$-10662 \leq S_n \leq 107000$ S(p) $-5400 \leq S_p \leq 233700$

$-0.1149 \leq R \leq 5.045$

Relational ENSDF
 October 2010 snapshot of the ENSDF database maintained by the **International Nuclear Structure and Decay Data Network**, under the auspices of the IAEA.

Isospin

24 y Stable J^π weak order π any

Electric Moment $-219 \leq Q \leq 64$

order π any K π any Alpha π any

st Super Deformed Octupole Dipole Vibrational

- Previous queries**
- 1 17:34:57
 - 2 8:45:32
 - 3 8:52:15
 - 4 8:52:52
 - 5 9:0:35

order π any Rel. Intensity $0 \leq I \leq 7,456$

Shell any Tot. Conv. Coef. $0E00 \leq \alpha \leq 1.3E12$

robab. W.u. $0E00$ B(E0) 2.4E09 Mixing Ratio $-180 \leq \delta \leq 4000$

Previous queries history for quick recalling

<http://nds121.iaea.org/exfor1/myensdf0.htm>

Web tools for ENSDF evaluators

by V.Zerkin, IAEA-NDS, April 2011

Upload your ENSDF data file, run remotely ENSDF analysis codes
FMTCHK, GTOL, LOGFT, PANDORA

Submit in new Window

Your name (optional):

Your ENSDF File:

Your ENSDF file. Examples: [text](#) web-links: [fmtchk.inp](#) [pandora.inp](#) [logft.inp](#) [gtol.inp](#) [235U](#)

Web and Database Programming: Viktor Zerkin, NDS, International Atomic Energy Agency (V.Zerkin@iaea.org)
Last updated: 04/19/2011 19:59:18



Run ENSDF Analysis Codes on Web

by V.Zerkin, IAEA-NDS, April 2011

<--- under development --->

Request #210

Username: Daniel

Uploading... File: **old.ens** size:132Kb (134310 bytes)

ENSDF file copy: ENS4up00210.txt size:132Kb (134310 bytes)

...Nuclide: **144SM**

...See: copy of your data file **old.ens**: [[text](#)], working ENSDF File: [[ENS4up00210.ensdf](#)]

[Run utilities](#)

Programs, parameters, run, results	Timeout: <input type="text" value="300"/> sec	Your Files [refresh]
<input type="checkbox"/> FMTCHK Checking ENSDF format /v-10.3a, 28-Sep-2007/ Analyzes the format of an ENSDF formatted file to verify that it conforms to "EVALUATED NUCLEAR STRUCTURE DATA FILE. A Manual for Preparation of Data Sets" by J.K. Tuli, Brookhaven National Laboratory	Input File: ENS4up00210.ensdf <input checked="" type="checkbox"/> Errors only (or full report) <input checked="" type="checkbox"/> Check continuation cards <input type="checkbox"/> Report only fatal errors <input type="checkbox"/> Suppress warning messages <input type="checkbox"/> Suppress XREF/DSID check Run	old.ens.ensdf 132669 17:36:54 old.ens.txt 134310 17:36:53
<input type="checkbox"/> GTOL Determines level energies from a least-squares fit to E_γ 's & feedings /v-7.2g, 30-Apr-2010/	Input File: ENS4up00210.ensdf <input type="checkbox"/> Create a new file with level energies replaced by GTOL results <input checked="" type="checkbox"/> Suppress gamma energy comparison <input checked="" type="checkbox"/> Suppress intensity comparison Assumed DCC theory (%): <input type="text" value="1.4"/> (Bricc-1.4%, Hsicc-3%, etc.) Run	
<input type="checkbox"/> LOGFT Calculates log ft for beta decay /v-7.2, 7-Feb-2001/ This program calculates log ft for beta decay. It also calculates the partial capture fractions for electron capture, the electron capture to positron ratio for positron decay, and the average beta energies. It will do special calculations for first and second forbidden unique. All other categories are treated as allowed.	Input File: ENS4up00210.ensdf Run	
<input type="checkbox"/> PANDORA Checks physics of ENSDF files /v-7.0b, 01-May-2007/ Provides the physics checks for an ENSDF file	Input File: ENS4up00210.ensdf <input checked="" type="checkbox"/> Level report and file sorted <input checked="" type="checkbox"/> Gamma report and files sorted <input checked="" type="checkbox"/> Radiation report and files sorted <input checked="" type="checkbox"/> Cross-reference output <input type="checkbox"/> Suppress warning messages Run	
<input type="checkbox"/> NDSPUB ENSDF publication program /v-12.26b, 15-Jul-2008/ Produces PostScript file for an ENSDF file. Note: Web interface is under development!	Input File: ENS4up00210.ensdf Type of input: <input type="text" value="0"/> (Cards-0, Working-1, Archive-2, Prepub-3) Run	



IAEA Commitment to NSDD Activities

CRPs, DDPs...

Individual contracts supporting 6 mass chains
and 2 horizontal evaluations

Continual running of ICTP and related
workshops

2 staff members dedicating time to ENSDF
evaluation, NSDD coordination and NSR
keywording + 1 staff (software development)



Thank you

