



International Atomic Energy Agency

**IAEA Nuclear Data Section
Nuclear Data Program**

**Paraskevi (Vivian) Dimitriou
Nuclear Data Section,
Division of Physical and Chemical Sciences,
International Atomic Energy Agency,
Vienna, Austria**

IAEA Nuclear Data Section

- provides **nuclear data services** to scientists worldwide (data libraries, bibliographies and related materials) through Internet, CD-ROM and other media
- produces **new databases** and assists developing countries through **technology transfer** activities with its nuclear data programme (Coordinated Research Projects, Data Development Projects, Training Workshops, Technical Meetings)

Nuclear Data Section

Nuclear Data Services Unit	Nuclear Data Development Unit	Atomic & Molecular Data Unit
<u>S. Simakov</u> Unit Head	<u>R. Capote Noy</u> Unit Head	<u>B.J. Braams</u> Unit Head
<u>V. Zerkov</u> Software Engineer	<u>A. Trkov</u> Nuclear Physicist	<u>H.-K. Chung</u> Atomic Physicist
<u>V. Semkova</u> Nuclear Physicist	<u>P. Dimitriou</u> Nuclear Physicist	<u>Marco Verpelli</u> Systems Analyst/Programmer
<u>N. Otsuka</u> Nuclear Data Physicist	<u>K. Nathani</u> Team Assistant	<u>K. Sheikh</u> Database Assistant
<u>L. Vrapcenjak</u> Nuclear Data Services Assistant		<u>A. Vasaros</u> IT Systems Engineer
<u>A. Oechs</u> Team Assistant		


Section Head: **R.A. Forrest**
Nuclear Data Physicist

Section Secretary: **R. Rangel Alvarez**



Nuclear Data Services Webpage

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



International Atomic Energy Agency


Nuclear Data Services

Provided by the Nuclear Data Section

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Hot Topics » ENDF/B-VII.1 • TENDL-2011 • JENDL-4 • IBANDL News » 2012/03/30 TENDL-2011 - TALYS Evaluated Nuclear Data Library


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


Quick Links
ADS-Lib
Atomic Mass Data Centre
CINDA
Charged particle reference cross section
DROSG-2000
EMPIRE-3.1
ENDF Archive
ENDF Retrieval
ENDF-6 Codes
ENDF-6 Format
ENDVER
ENSDF
ENSDF ASCII Files
ENSDF programs
EXFOR
FENDL-2.1
Fission Yields
GANDR
Geant4 Libraries
IBANDL
INDL/TSL


NEW
TENDL-2011 TALYS Evaluated Nuclear Data Library [page] [retrieve]
EMPIRE-3.1 (Rivoli) System of codes for nuclear reaction calculations, February-2012 [link]
ENDF-B/VII.1 U.S. Evaluated Nuclear Data Library, issued in 2011 [page] [retrieve]


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


 **EXFOR**
Experimental nuclear reaction data

 **LiveChart of Nuclides**
Interactive Chart of Nuclides

 **CINDA**
Nuclear reaction bibliography

 **ENDF**
Evaluated nuclear reaction libraries

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

 **NSR**
Nuclear Science References *

NuDat 2.6
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-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 Documents
INDC Reports Publications

 Computer
Codes


Mirrors

Partners

Events [3,4]

9th International Conference on Nuclear Option in Countries with Small and Medium Electricity Grids
June 3-6, 2012
Zadar, Croatia

13th International Conference on Nuclear Reaction Mechanisms
June 11-15, 2012
Villa Monasteron, Varenna, Italy



NDS Meetings



International Atomic Energy Agency
Nuclear Data Services
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Databases » EXFOR | ENDF | CINDA | IBANDL | Medical | PGAA | NGAtlas | RIPL | FENDL | IRDF-2002 | IRDFF

Request

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

Quick Links

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IAEA Nuclear Data Meetings

A comprehensive list of IAEA Nuclear Data Section meetings is available from [NA webpage](#).
Information on Atomic and Molecular Data Unit (AMDU) Meetings is available from [AMDU webpage](#).
Overview and history of the Nuclear Reaction Data Centres (NRDC) Network meetings are available from [NRDC meeting \(1969-\)](#).
Objectives and details of the International Network of Nuclear Structure and Decay Data (NSDD) Evaluators can be obtained from [NSDD](#).

Consultants' and Technical Meetings | Research Coordination Meetings | Training workshops

Consultants' and Technical Meetings

#	Meeting dates	Project Officer	Title	Link
1	4-6 November 2013	P. Dimitriou	CM on Compilation and Evaluation of Gamma-Ray Data	Webpage
2	8-10 October 2013	V. Semkova	CM on EXFOR Data in Resonance Region and Spectrometer Response Function	Webpage
3	8-12 July 2013	R. Capote Noy	TM on Toward a New Evaluation of Neutron Standards	Webpage
4	9-10 May 2013	R. Capote Noy	CM on Auger Electron Emission from Nuclear Decay Data Needs for Medical Applications	Webpage
5	11-13 March 2013	D.H. Abriola	CM on Accuracy of Experimental and Theoretical Nuclear Cross-Section Data for Ion Beam Analysis and Benchmarking	Webpage
6	12-14 November 2012	V. Semkova	CM on Benchmarking of Digitizing Software	Webpage
7	1-4 October 2012	S. Simakov	TM on Primary Radiation Damage: from nuclear reactions to point defects	Webpage
8	6-9 March 2012	S. Simakov	CM on Further Development of EXFOR	Webpage
9	2-4 November 2011	R. Forrest	TM on Long-term Needs for Nuclear Data Developments	Webpage
10	6-9 September 2011	R. Capote Noy	TM on Inelastic Scattering and Capture Cross-section Data of Major Actinides in the Fast Neutron Region	Webpage
11	22-26 August 2011	R. Capote Noy	TM on Intermediate-term Nuclear Data Needs for Medical Applications: Cross Sections and Decay Data	Webpage
12	21-24 June 2011	R. Capote Noy	CM on Improvements in Charged-particle Monitor Reactions and Nuclear Data for Medical Isotope Production	Webpage
13	13-15 April 2011	S. Simakov	CM on Neutron Source Spectra for EXFOR	Webpage
14	13-15 October 2010	R. Capote Noy	CM on International Cross Section Standards: Extending and Updating	Webpage
15	26-30 September 2010	R. Capote Noy	TM on Neutron Cross Section Covariances	Webpage
16	27-28 January 2009	Alan L. Nichols	CM on TAGS: Determination of Beta and Gamma Decay Components of Fission Products for Decay Heat Calculations	Webpage
17	24-27 November 2008	R. Capote Noy et al	CM on Prompt Fission Neutron Spectra of Major Actinides	Webpage

Web page: by L.Vrapcenjak

Mirrors

Partners

Events «3:4»


Nuclear Physics and Gamma-ray sources for Nuclear Security and Nonproliferation (NPNSNP)
January 28-30, 2014
Ricotti, Tokai-mura, Japan



International Workshop on Nuclear Data Covariances (CW2014)
April 28 - May 1, 2014
La Fonda on the Plaza, Santa Fe, New Mexico, USA

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Vienna International Centre, P.O. Box 100, A-1400 Vienna, Austria
Telephone (+431) 2600-0, Facsimile (+431) 2600-7, E-mail: nds.contact-point@iaea.org, Read our [Disclaimer](#)

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https://www.nds.iaea.org/index-meeting-cr... Nuclear Data meetings Compilation and Evaluation...

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Participants
 F. Becvar
 M. Krlicka
 S. Siem
 V. Varlamov
 M. Wiedeking
 R.B. Firestone

Scientific Secretary
 P. Dimitriou

Links
 NSDD
 Nuclear Data Services
 Nuclear Data Section
 NRDC Network
 IAEA
 EXFOR

Compilation and Evaluation of Gamma-Ray Data

(Consultants' Meeting, 4-6 November 2013, IAEA Headquarters, Vienna, Austria)

Objective

The purpose of this CM is to investigate the feasibility of updating the earlier work on the IAEA Photonuclear Data Library in 2000 (IAEA-TECDOC-1178), and extending the database to include continuum gamma ray data used to investigate the statistical properties of the nucleus. The past few years have seen a growing demand for a database of experimental and evaluated continuum gamma-ray data that would be of benefit to the user community working in various energy and non-energy applications and would furthermore provide a reliable source of information for future updates of the Reference Input Parameter Library. This meeting aims at addressing these growing data needs.

Presentations

#	Author	Title	Link
1	V. Varlamov	Photoneutron reaction cross sections: new approach for analysis and evaluation	PDF
2	M. Krlicka	Gamma-ray strength functions below the GDER maximum	PDF
3	S. Siem	Charged-Particle Reaction Data	PDF
4	R.B. Firestone	Neutron Capture Gamma-ray Data	PDF
5	F. Becvar		PDF
6	M. Wiedeking	Measuring the photon strength function below S_n	PDF

Web page updated: by L. Vrapoenjok

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 Vienna International Centre, P.O. Box 100, A-1400 Vienna, Austria
 Telephone (+431) 2600-0. Facsimile (+431) 2600-7. E-mail: nds.contact-point@iaea.org. Read our [Disclaimer](#)

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CRPs running at NDS

CRP Title	Period	Project Officer
Primary Radiation Damage Cross Sections	2013-2017	S. Simakov
Reference Database of beta-delayed neutron emission data	2013-2017	P. Dimitriou
International Reactor Dosimetry Library for Fission and Fusion (IRDFF) Testing and Validation	2013-2017	S. Simakov
Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production	2012-2016	R. Capote
Reference Database for Particle-Induced Gamma-ray Emission spectroscopy	2011-2015	P. Dimitriou
Prompt Fission Neutron Spectra of Major Actinides	2010-2014	R. Capote



CRP on International Reactor Dosimetry Library for Fission and Fusion (IRDFF) Testing and Validation

PO: S. Simakov, duration: 2013-2017

Background

The International Reactor Dosimetry and Fusion File (IRDFF) is an extension of the International Reactor Dosimetry File ([IRDF-2002](#)) to cover fission, fusion and accelerator driven applications.

This extension includes 4 new reactions ($^{67}\text{Zn}(n,p)^{67}\text{Cu}$, $^{113}\text{In}(n,n')^{113\text{m}}\text{In}$, $^{169}\text{Tm}(n,3n)^{167}\text{Tm}$, $^{209}\text{Bi}(n,3n)^{207}\text{Bi}$), 32 updated evaluations and increases the end-point energy of the library from 20 to 60 MeV.

Objectives

- to evaluate and eventually add to this library the high threshold reactions with cross-section peaks located between 20 and 100 MeV needed for applications in systems such as ADS, i.e. (n,3-6n) on isotopes ^{197}Au , ^{169}Tm , ^{209}Bi , ^{59}Co , ^{63}Cu , ^{89}Y , ^{93}Nb .
- to stimulate new energy integrated (integral) and point energy (differential) cross section measurements
- to collect all other experimental information suitable for validation which was not used before
- to test and validate the new library (critical assemblies, MACS, 14-MeV fusion D-T spectra etc)

Main Output

Improved, tested and validated International Reactor Dosimetry and Fusion File (IRDFF) with proper decay data and documentation.

RCM-1, 5-9 July 2013, Report INDC(NDS)-0639 <https://www-nds.iaea.org/publications/indc/indc-nds-0639.pdf>



CRP on Primary Radiation Damage Cross Sections

PO: S. Simakov, duration: 2013-2017

Scientific Background

dpa: displacement cross section used to characterize and compare the radiation damage induced by neutrons and charged particles in crystalline materials. Widely used since 1975 is the **NRT-pda** (the standard pda).

Limitations: it is not applicable to compound materials, does not account for the recombination of atoms during the cascade evolution, cannot be directly validated and has no uncertainties/covariancies.

Research Objectives

To improve the NRT standard by employing recent developments in primary radiation damage simulations.

Expected CRP Outputs

- Numerical database for NRT- and PRD-dpa as well as gas-production cross sections and their uncertainties;
- CRP final document describing the results of the work performed.

All information available at <http://www-nds.iaea.org/CRPdpa/>

RCM-1 Report INDC(NDS)-0648, in preparation



CRP on Reference Database for beta-delayed neutron emission data

PO: P. Dimitriou, duration 2013-2017

Scientific Background

Delayed neutrons are crucial for reactor kinetics and safety, calculations of the decay heat produced by γ -rays and β -particles, quantification of the antineutrino spectra produced from beta-decaying fission products with possible application in safeguards, nuclear structure and nuclear astrophysics.

Specific Research Objectives

- Compile the existing beta-delayed neutron data ($T_{1/2}$, P_n , neutron spectra for individual precursors);
- Priority list for evaluations and new measurements;
- Define and document the evaluation methodology and the "Standards" for delayed neutron emission;
- Improve theoretical models and systematics for extrapolating into unknown mass regions ;
- Create a reference database of evaluated data related to beta-delayed neutron emission;
- Re-evaluate the beta-delayed neutron reactor constants in appropriate group format

Expected Research Outputs

- Reference Database of beta-delayed neutron emission properties
- Re-evaluated reactor delayed-neutron constants for fissile actinides
- Technical document describing the evaluation methodology and the new database

RCM-1: 26-30 August 2013, Report INDC(NDS)-0647, in preparation
11 agreements + 3 contracts

More details from B. Singh



Decisions of 1st RCM on beta-delayed neutron emission

- Database separated into two sections:
 - A) Bdn data for individual precursors and related model predictions
 - B) Integral Bdn data (measured & produced from summation calculations), as well as decay constants in suitable group format
- Systematics and theoretical predictions of Bdn emission probabilities also available for comparison
- Option of online calculation of integral quantities starting from Bdn data of individual precursors (using summation code)

Work in progress at IAEA NDS:

Provide Gforge common work environment for CRP participants



Preliminary Example of Database



IAEA Nuclear Data Section

IAEA CRP on a Reference Database for Beta-Delayed Neutron Emission Data

≤ Z ≤
 ≤ N ≤
 Nucid
 ≤ Half-life [ms] ≤
 ≤ P(1n)% ≤
 ≤ P(2n)% ≤
 ≤ P(3n)% ≤

Search
 Nuclides found:167
 Clear
 Chart
 [Show/Hide Comments](#)
 [Show/Hide Q values](#)

Nucid	Reference	Half-life	%P(1n)	%P(2n)	%P(3n)	Avg n	Method	Spec	Half-life comments	P(n) Comments
Z 2 N 6 8HE	1963Ne07	30 ms (20)					β-	no	"A very rough estimate"	
	1965Po06	122 ms (2)	12 (1)			0.12	n, β-	no	Diffusion loss method to look at only Helium decay activity. From least-squares fits to all of the decay curves, our best value of the half-life...is 122(2) msec.	"Diffusion loss method", poor neutron counter efficiency assumed average E(n)=3 MeV (note neutron energy (15) MeV in 1976De31)
	1966Ne07	114 ms (25)					β-γ coin (decay of peak area)	no	"each [β-γ coin] spectrum...was decomposed...into a peak centered at 0.98 MeV and a smooth background. The area under the peak is proportional to the amount of 8He in each spectrum. The half-life of 8He was determined from the decay of the area of this peak, and the average of several runs yielded a value of 114(25) msec."	
	1973An11	120 ms	12 (8)			0.12	ion counting after 235U fission	no	No uncertainty given on half life	
	1981Bi03	117.5 ms (15)	16 (1)			0.16	n, β-, β-n coin	yes	"...measured with the 4PI neutron counter...If there were a diffusion loss of 8He from the aluminized mylar tape the measured half-life would become too short. Such a source of systematic error could, however, be excluded since a measurement with the beta-detector, which due to its small size is much more sensitive to a loss of activity, gave the same half-life within the error limits."	%P(n)=15(1) for β-n coin, %P(n)=18(2) for simultaneous singles as well as ratio of neutron to gamma count
	1991Lu22	124.6 ms (50)					β-	no	In Russian	
	2008Re22 1995Re22	116 ms (43)					delayed-coin (ion, β-/n)	no	Half-lives are determined by a delayed coincidence technique based on time-interval histograms using the arrival time of a specific ion as the start time and the arrival time of subsequent betas or neutrons as the stop time...Half-lives reported here are based on a weighted average of the half-lives obtained from beta, neutron, and beta-neutron-coincidence time-interval histograms	determined by two techniques?one involving the abundance of neutrons relative to the number of ions and the other the abundance of neutrons relative to the number of gamma rays. Results for Pn values are based on the weighted average of two techniques.
Z 3 N 6 9LI	2010Mi01							no		"The branching ratio for this decay channel is to be determined"
	1951Ga30	168 ms (4)					n-counting	no	Excluded as an outlier. "The half-life measurement was made by irradiating the target for several seconds, shutting the cyclotron off, and recording the decaying neutron activity by photographing the pulses displayed on an oscilloscope." Approximately 5 half lives measured	Identified as βn emitter
	1963Al18		75 (15)			0.75	β, β-n coin	no		P(n) from β spectra
	1965Do13	176 ms (1)					n-counting	no	Excluded for little detail of measurement. Least-squares fit to the accumulated neutron counts in the multiscaler	
	1965Sc17	172 ms (25)					n-counting	yes?	In German?	
	1970Ch07	177 ms (3)	35 (4)			0.35	(Li-9)α corr., n	yes	Excluded since half lives of 8Li and 16N have changed. Three	



Nuclear Data for Charged-particle Monitor Reactions and Medical Isotope Production

PO: R. Capote, duration: 2012-2016

Scientific Background

There is a renewed worldwide interest for improved nuclear-data for use in medical applications. The main data areas requiring improvements (measurements and re-evaluation of decay data) are:

- i) monitor reactions for charged-particle beams,
- ii) removal of data discrepancies in production of diagnostic gamma emitters,
- iii) production of novel positron emitters and of positron emitters via generator isotopes,
- iv) production of alpha emitters.

Output

- New measurements and evaluations of decay and cross section data for
 - i) reactions used to monitor charged-particle beams
 - ii) for production of novel positron and alpha emitters
- Accurate integral yields will also be derived for data validation.

RCM 1 Dec. 2012, Report INDC(NDS)-0630 available at <https://www-nds.iaea.org/publications/indc/indc-nds-0630.pdf>

More details from F. Kondev



Consultants Meeting on Auger Electron Emission from Nuclear Decay Data Needs for Medical Applications

9-10 May 2013

- New prospects in medical applications: target therapy
- High LET agents such as composite particles and Auger electrons most effective
- Need for reliable data on Auger electrons has emerged
- Exploratory meeting to assess needs and recommend ways of dealing with them

More from F. Kondev

Consultants Meeting on Compilation and Evaluation of Gamma-Ray Data

4-6 Nov. 2013

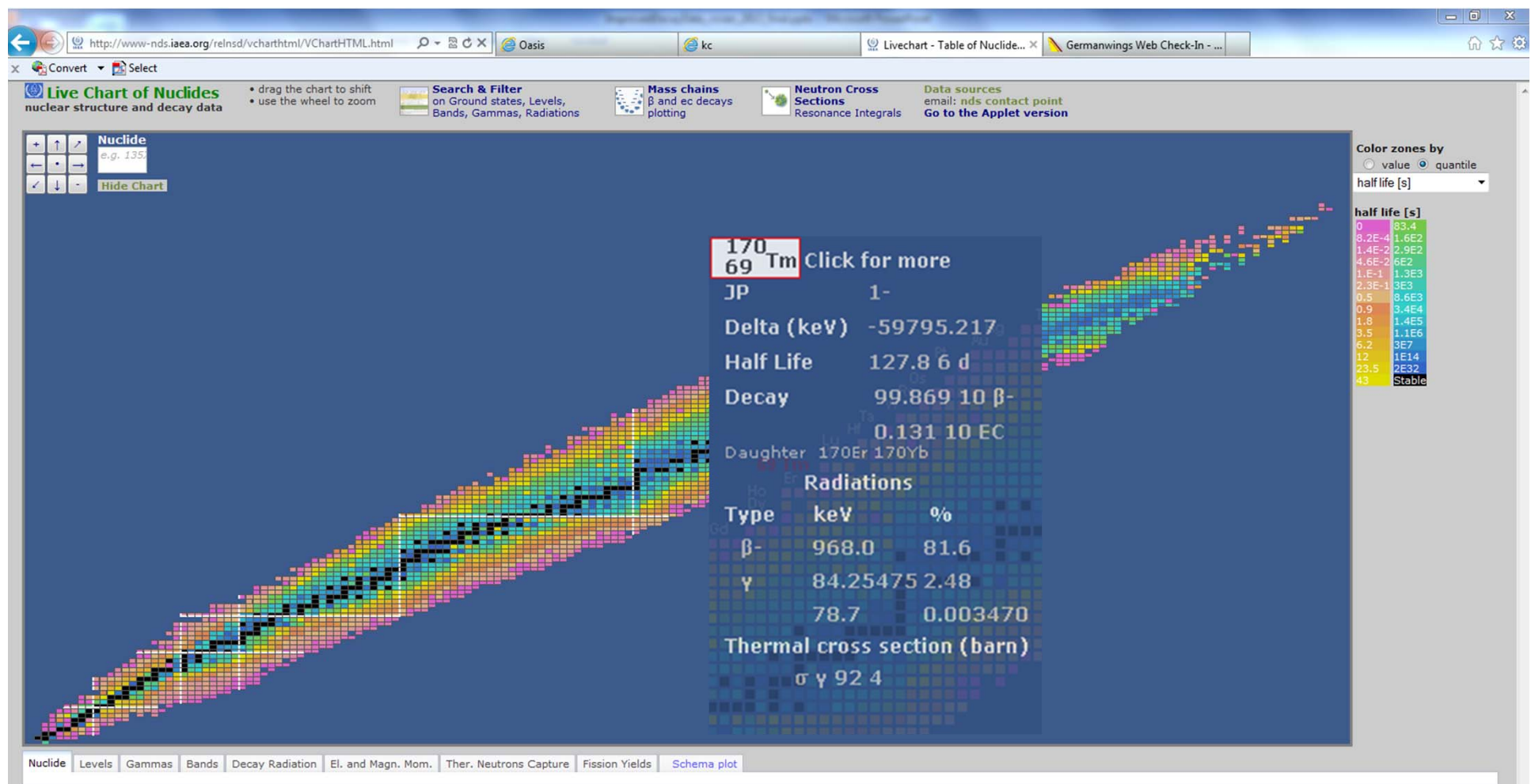
- Growth in new gamma-ray data
- Inconsistencies/problems in photonuclear data library (2000)
- Different techniques to extract photon strength function
- Consultant's meeting to assess the need for a database dedicated to gamma-ray data:
Recommended a new CRP

More from R. Firestone



LiveChart of Nuclides

(<http://www-nds.iaea.org/livechart/>)



Developed by M. Verpelli



Search and Filter on ground states, levels, bands, gammas, radiations

NUCLIDES ground state

Nuclide	Symbol	Z	N	A	Z range	N range	A range	Z	N	A	Z	N	A
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

☐ Q(β) $-26300 \leq \text{keV} \leq 29100$
☐ Q(EC) $-30079 \leq \text{keV} \leq 25461$
☐ Q(α) $-91000 \leq \text{keV} \leq 12300$

☐ Q(β^- n) $-39623 \leq \text{keV} \leq 30093$
☐ S(n) $-10662 \leq \text{keV} \leq 107000$
☐ S(p) $-5400 \leq \text{keV} \leq 233700$

☐ R $-0.1149 \leq \text{fm} \leq 5.9045$
☐ Atomic mass AM $-26300 \leq \mu \text{ AMU} \leq 29100$

LEVELS - Bands - Decay Radiations

☐ Energy $0 \leq \text{keV} \leq 47,300$
☒ Decays B.R. $0 \leq \% \leq 50$
☒ Only Ground State and Metastables
 ☐ Isospin

☐ β^- ☐ β^- n ☐ β^- 2n ☐ $2\beta^-$ ☐ β^- 3n ☐ β^- 4n ☐ β^- α ☐ β^- F ☐ β^- p

☐ β^+ ☐ $2\beta^+$ ☐ β^+ 2p ☐ β^+ α ☐ β^+ p ☐ β fission

☐ ec ☐ 2ec ☐ ec β^+ ☐ ec p ☐ ec 2p ☐ ec 3p ☐ ec α ☐ ec α p ☐ ec F ☐ ec SF

☒ α ☐ α ? ☐ IT ☐ IT? ☐ SF ☐ SF β^-

☐ ^3H ☐ ^3He ☐ ^8Be ☐ ^{12}C ☐ ^{20}O ☐ ^{20}Ne ☐ ^{22}Ne ☐ ^{24}Ne ☐ ^{28}Mg ☐ ^{34}Si

☐ p ☐ n ☐ D ☐ G ☐ 2p ☐ Mg ☐ Ne

☐ Half Life $3.68\text{E}-8$ fs $\leq T_{1/2} \leq 7.7\text{E}24$ y ☐ Stable ☐ J $^\pi$ ☐ weak order π any

☐ Magn. dipole μ $-20 \leq \mu_N \leq 38$ ☐ Electr. quadrupole Q $-219 \leq \text{barn} \leq 64$

☐ Decay radiation Energy $0 \leq \text{keV} \leq 36,210$ ☐ key 2 ☐ Intensity $0 \leq \% \leq 100$ type any process shell

☐ β End point $0 \leq \text{keV} \leq 8,723$ $1.2 \leq \log \text{FT} \leq 24.3$ α $0.077 \leq \text{Hindrance} \leq 6,077$

☐ Band: Head $0 \leq \text{keV} \leq 19,946$ J order π any K π any Alpha π any

☐ Ground state ☐ yrast ☐ Super Deformed ☐ Octupole ☐ Dipole ☐ Vibrational

GAMMAS

☐ Energy $0.008 \leq \text{keV} \leq 18,128$ ☐ End Level $0 \leq \text{keV} \leq 40,000$ J order π any

☐ Conv. Coef. $0\text{E}00 \leq \alpha \leq 1.3\text{E}12$ Total

☐ Multipolarity E0 ☐ weak No mix ☐ Trans. Probab. W.u. $0\text{E}00 \text{ B(E0)} 2.4\text{E}09$ ☐ Mixing Ratio $-180 \leq \delta \leq 4000$

Order by : Z, A

☒ Z ☒ A ☐ N ☐ Q(β) ☐ Q(α) ☐ Q(EC) ☐ Q(β^- n) ☐ Sn ☐ Sp ☐ R ☐ AM ☐ E ☐ T $_{1/2}$ ☐ BR ☐ μ ☐ Q ☐ Erad ☐ Irrad

☐ Ey ☐ α ☐ B(E) ☐ B(M) ☐ δ

Plot with ZVView

X axis: A Y axis: BR

email: nds.contact-point@iaea.org



Radiation spectra

Nuclide	Levels	Gammas	Bands	Decay Radiation	El. and Magn. Mom.	Ther. Neutrons Capture	Fission Yields	Scher	
Parent	T _{1/2}	E [keV]	Jp _{order}	Decay	Q _{gs → gs}	Daughter	Deposited Energy [keV]		
							Alpha	Beta	CE & Auger
¹³⁵ Xe ₅₄ ⁸¹	9.14 h 2	0.0	3/2+	β- 100 %	1164.218 4456	¹³⁵ Cs ₅₅ ⁸⁰	0.000 0.000	304.716 12.505	14.988 0.7

see the ENSDF source

Beta -

Fed level	Jp	End Point	Avg Energy	Intensity	LogFT	Unforb.
1062.420 14		(101.7980) 4	26.9 11	0.123 6	5.71 6	
981.315 22		(182.9030) 45000	50.0 12	0.075 5	6.71 5	
608.186 14	5/2+	(556.032) 4	173.3 15	3.11 14	6.67 3	
407.989 13		(756.229) 4	248.1 16	0.59 3	7.86 3	
249.793 12	5/2+	910 10	310.2 16	96 4	5.94 2	

Gamma

Start level	Jp	Final Level	Jp	Energy	Intensity	Mixing	Multipol.	Tot. Conv. Coeff.
407.989 13		249.793	5/2+	158.197 18	0.289 14			
608.186 14	5/2+	407.989		200.19 10	0.012 50			
249.793 12	5/2+	0.0	7/2+	249.794 15	90	1.0	M1(+E2)	0.0737 20
608.186 14	5/2+	249.793	5/2+	358.39 3	0.221 11		M1,E2	0.0265 17
981.315 22		608.186	5/2+	373.13 10	0.015 30			
407.989 13		0.0	7/2+	407.99 2	0.358 17			
1062.420 14		608.186	5/2+	454.2 2	0.0040 8			
981.315 22		407.989		573.32 9	0.0048 7			
608.186 14	5/2+	0.0	7/2+	608.185 15	2.90 13	0.5	M1(+E2)	0.0073 22
1062.420 14		407.989		654.432 16	0.05 0			
981.315 22		249.793	5/2+	731.52 2	0.055 30			
1062.420 14		249.793	5/2+	812.63 3	0.070 30			
1062.420 14		0.0	7/2+	1062.41 2	0.0041 8			

X-rays

Type	Energy	Intensity
X L	4.290	0.61 3
X KA2	30.6251 3	1.43 7
X KA1	30.9728 3	2.64 13
X KB3	34.92	0.25 1
X KB1	34.987	0.482 28
X KB	35.00	0.96 5
X KB2	35.818	0.149 9

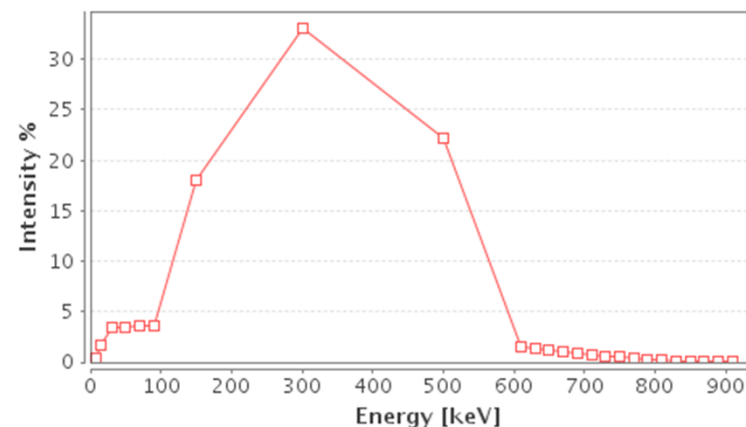
Electrons

Type	Energy	Intensity
AU L	3.550	5.25 24
AU K	25.50	0.59 3
CE K	213.809 15	5.6 4
CE L	244.080 15	0.82 11
CE M	248.577 15	0.169 23
CE N+	249.563 15	0.041 5
CE K	322.41 3	0.004939
CE L	352.68 3	0.000717
CE M	357.17 3	0.000148
CE N+	358.16 3	0
CE K	572.200 15	0.01823
CE L	602.471 15	0.002327
CE M	606.968 15	0.000475
CE N+	607.954 15	0.000115

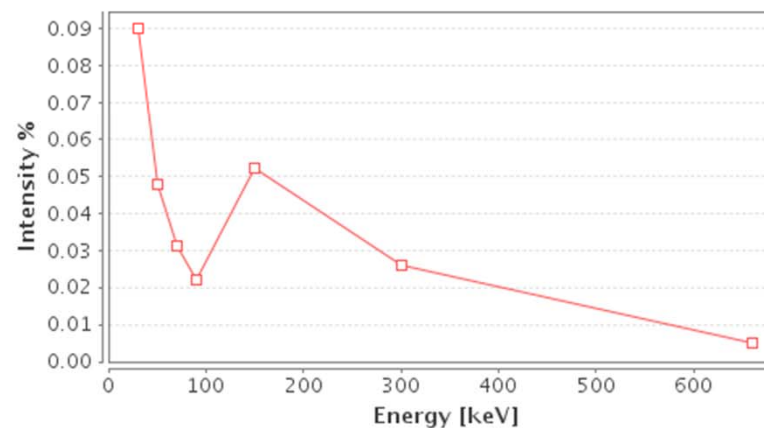
Highligh



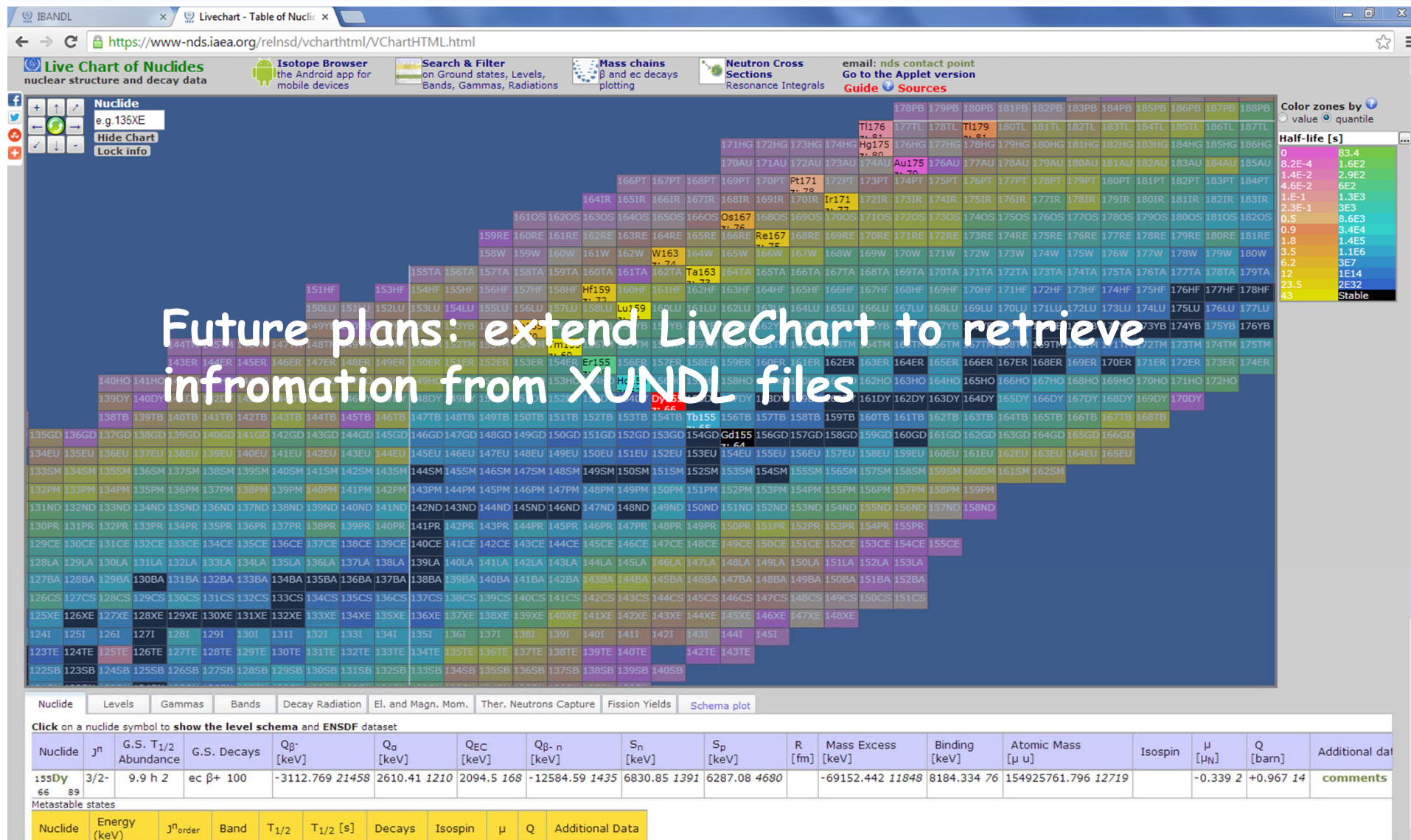
Show data table
Beta spectrum



Show data table
Bremstrahlung spectrum



LiveChart new feature: genetic relationships (20th NSDD Action)



IAEA NDS ANDROID app: Browse Structure and Decay Data on your mobile device

The screenshot displays the Google Play Store interface for the 'Isotope Browser' app. The app is developed by the IAEA Nuclear Data Section and was released on October 29, 2013. It is categorized under 'Books & Reference'. The app's icon is a circular pattern of green and yellow dots. The page includes an 'Install' button and an 'Add to Wishlist' button. Below the app card, three preview images are shown: a search interface, a Nuclides Chart, and a periodic table.

Isotope Browser
IAEA Nuclear Data Section - October 29, 2013
Books & Reference

Install Add to Wishlist

★★★★★ (20) g+1 +46 Recommend this on Google

Preview 1: Search Interface

Isotope Browser
NDS Nuclear Data Section

Chart Elements symbol or Z

Go Clear Advanced

GUIDE
Pick an Element (or enter Symbol, e.g. Xe , or Atomic Number Z, e.g. 54, or Nuclide, e.g. ^{135}Xe).
search starts automatically.
Tap an item in the result list to get detailed information
The Database includes ground states and isomers having half-life > 0.1 s

Chart
Shows the selected nuclides on the Nuclides Chart. All nuclides are shown if no search was already performed
The color code is according to the main decay mode.

Advanced Search
When the Advanced panel is visible, press Go to start searching,
when it is NOT visible, its parameters will NOT affect the query

Result list
Default sorting is by z, n. Use menu -> preferences to change it,
tap an item to go to the detail page

Preview 2: Nuclides Chart

Alpha
EC, Beta+
p
n
SF
Stable
?

Preview 3: Periodic Table

Sort by name

1 H	2 He				
3 Li	4 Be				
5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S
17 Cl	18 Ar	19 K	20 Ca	21 Sc	22 Ti
23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni
29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se
35 Br	36 Kr	37 Rb	38 Sr	39 Y	40 Zr
41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd
47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te
53 I	54 Xe	55 Cs	56 Ba	57 La	58 Ce
59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd
65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb
71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os
77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb
83 Bi	84 Po	85 At	86 Rn	87 Fr	88 Ra
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu
95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm
101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg
107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn



Nuclear Structure and Decay Data Network

<http://www-nds.iaea.org/nsdd/>

IAEA Role: Coordination

-Organizes NSDD Biennial Meetings

Last one: 20th Technical Meeting of the NSDD Network, Kuwait, 27-31 January 2013

36 participants from 17 countries

Summary Report **INDC(NDS)-0635** (available online)

Presentations, Photos, List of Actions etc: <http://www-nds.iaea.org/nsdd/>

Next: IAEA, Vienna, 2015

-Biennial IAEA/ICTP Workshops on "Nuclear Structure and Decay Data: Theory and Evaluation"

Last one: 6 -12 August 2012. **OUTCOME:** Evaluation of A=211 mass chain (NDS)

Next workshop: 24-28 March 2014:

effort to attract knowledgeable nuclear physicists and existing NSDD evaluators
for specialized training

NSDD evaluators are encouraged to apply-participation costs are reasonable

-Support of mass-chain evaluations (6 individual contracts lasting 3 years: some approaching end)

-Support of horizontal evaluations: 1 one-year contract on Magnetic moments update and recommendations

(N. Stone): tables available at <http://www-nds.iaea.org/nsdd/>, INDC(NDS) report in preparation



Nuclear Structure and Decay Data

- **Future funding:** coordinate and support regional efforts to secure funding from **other sources**

recent attempt to apply for **EU funds** (Action from 20th NSDD Meeting):

proposal for nuclear data network was submitted to ENSAR2 steering committee: rejected

(Institutes from Bulgaria, Romania, Norway, France, Germany, IAEA)

efforts to access IAEA Technical Cooperation funds: get Nuclear Data included as thematic area in regional TC projects- but local groups need to get organized and request for IAEA TC help

- **Future efforts (from 20th NSDD meeting):**
 - Technical Meeting to address the need for updating analysis codes
 - initiate Data Development project following conclusions and recommendations of TM
 - create online platform to test and validate improved codes
- **Future efforts on training (from 20th NSDD meeting)**
 - help organize specialized training workshops to improve evaluators skills

