



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



2141-32

**Joint ICTP-IAEA Workshop on Nuclear Reaction Data for Advanced
Reactor Technologies**

3 - 14 May 2010

Nuclear Data Service Provided by the IAEA

ZERKIN V.
*IAEA
Vienna
Austria*

Introduction to IAEA Nuclear Data Services.

Nuclear Reaction Databases and Retrieval Systems

Viktor Zerkin

IAEA Nuclear Data Section, Vienna, Austria

Joint ICTP-IAEA Workshop on Nuclear Reaction Data for
Advanced Reactor Technologies
Trieste - Italy, 3 - 14 May 2010



International Atomic Energy Agency

Nuclear Data Services

Provided by the Nuclear Data Section

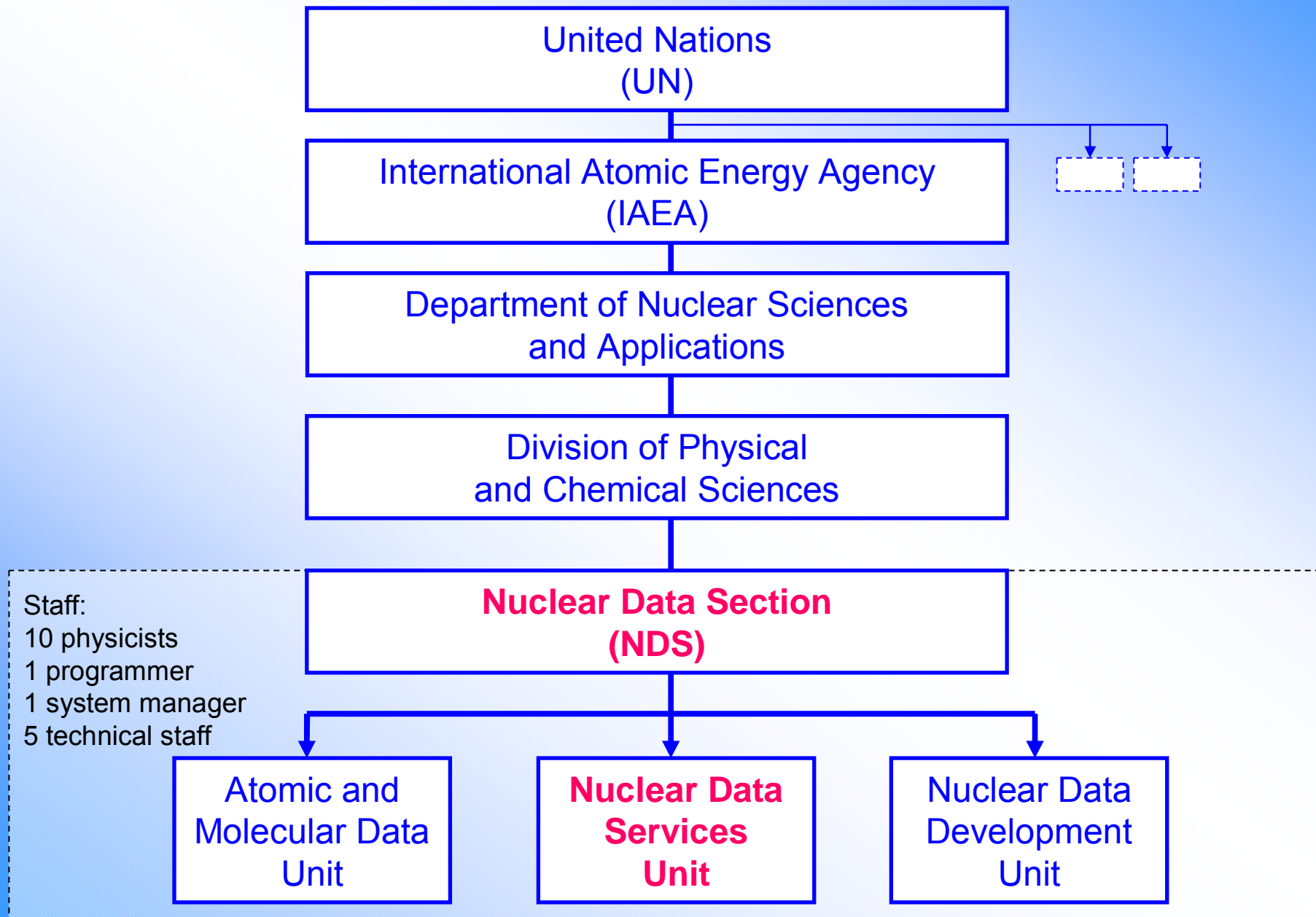
Our Internet Address

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

Our Postal Address:

Nuclear Data Section,
International Atomic Energy Agency
Vienna International Centre,
P.O. Box 100, A-1400 Vienna,
Austria

Our Place in the Organizational Structure



The Mission of NDS

The IAEA Nuclear Data Section (NDS)

- provides nuclear data services to scientists worldwide (data libraries, bibliographies and related materials) through Internet, CD-ROM and other media
- produces new databases through its data development programme
- assists developing countries through technology transfer activities

NDS Main Activity (nuclear part)

- **International cooperation**
 - Network of Nuclear Reaction Data Centres (NRDC)
 - Network Of Nuclear Structure And Decay Data Evaluators (NSDD)
 - software and database exchange with NNDC (USA)
- **Producing new data**
 - Coordinated Research Projects (CRP)
 - Data Development Projects
- **Getting data into databases**
 - compilation and data exchange: EXFOR, NSR, ENSDF
 - collect evaluated and specialized libraries
 - database and master files maintenance
- **Data dissemination**
 - Internet
 - CD-ROMs
 - requests from users' communities
- **Technology transfer**
 - "Mirror-sites" (India, Brazil)
 - Workshops

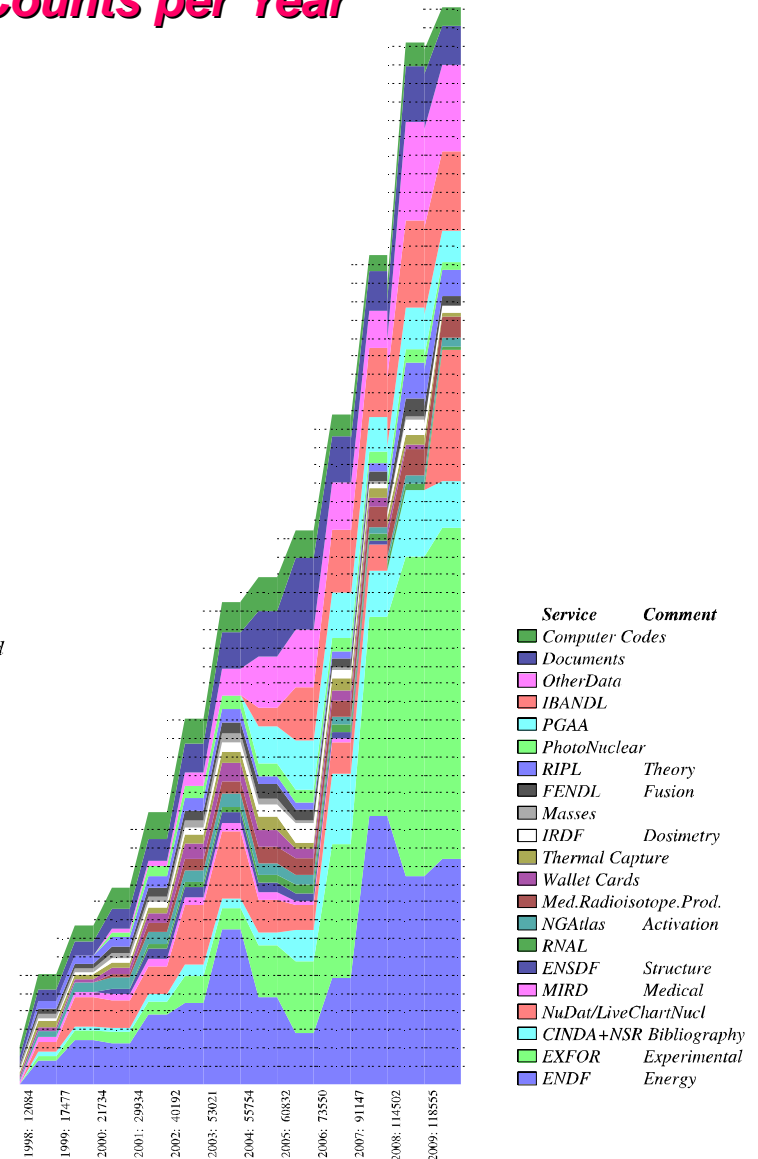
software development
system management

Nuclear Data Services: Web Statistics

Geographical Distribution (%)



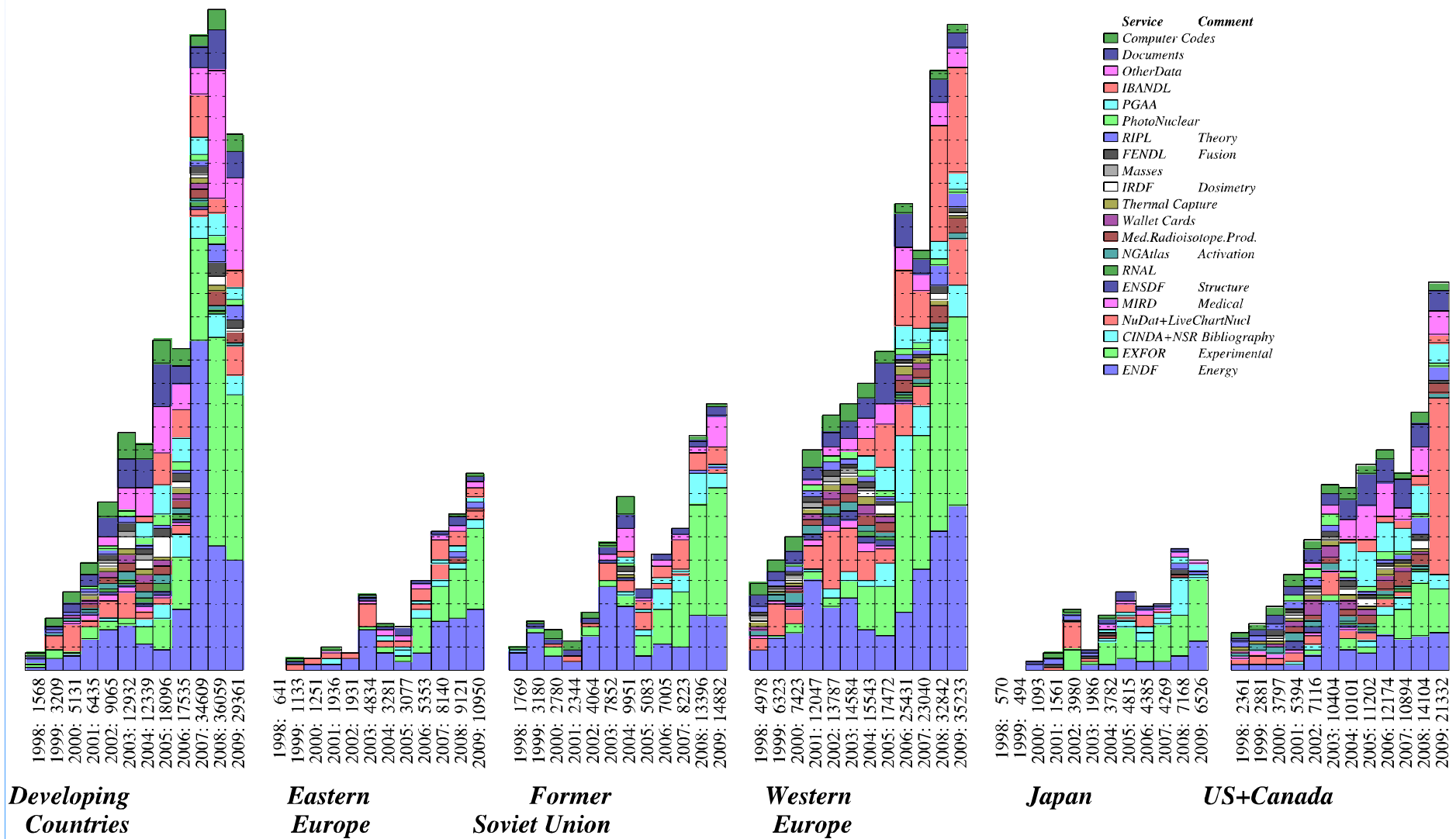
Counts per Year



- | Service | Comment |
|--------------------------|--------------|
| Computer Codes | |
| Documents | |
| OtherData | |
| IBANDL | |
| PGAA | |
| PhotoNuclear | |
| RIPL | Theory |
| FENDL | Fusion |
| Masses | |
| IRDF | Dosimetry |
| Thermal Capture | |
| Wallet Cards | |
| Med. Radioisotope. Prod. | |
| NGAtlas | Activation |
| RNAL | |
| ENSDF | Structure |
| MIRD | Medical |
| NuDat/LiveChartNucl | |
| CINDA+NSR Bibliography | |
| EXFOR | Experimental |
| ENDF | Energy |

Nuclear Data Services: Web Statistics

Geographically Distributed Counts



Types of Nuclear Data

- **Bibliographic data**
(e.g. CINDA, NSR)
- **Experimental data**
(e.g. EXFOR)
- **Evaluated data**
(e.g. ENDF)
- **Nuclear reaction data**
(e.g. EXFOR, ENDF)
- **Nuclear structure and decay data**
(e.g. ENSDF, NuDat)

Our Front Page

IAEA Nuclear Data Services - Microsoft Internet Explorer provided by IAEA

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

File Edit View Favorites Tools Help

IAEA Nuclear Data Services

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

IAEA.org | NDS Mission | About Us | Mirrors: India | Brazil

Search Go

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 programs
EXFOR
FENDL-2.1
Fission Yields
GANDR
IBANDL
INDL/TSL
IRDF-2002
LARELKIN
LiveChart of Nuclides
MIRD
Misc Actinides

NEW **ROSFOND-2010** Russian Library of Evaluated Neutron Data [list] [page]
CENDL-3.1 Chinese Evaluated Neutron Data Library [list] [retrieve]

Main | All | Reaction Data | Structure & Decay | by Applications | Doc & Codes | NDS-Internal | 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 *

Links to NNDC Developed in NNDC

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
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Mirrors

Partners

Events 12...next

ND2010
International Conference on Nuclear Data for Science and Technology
April 26 - 30, 2010
Jeju, Korea

Workshop
Workshop on Nuclear Reaction Data for Advanced Reactor Technologies
May 3 - 14, 2010
Miramare, Trieste, Italy

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Vienna International Centre, P.O. Box 100, A-1400 Vienna, Austria
Telephone: (+43) 2600 0, Facsimile: (+43) 2600 7, E-mail: nds@nds.iaea.org, Read our Disclaimers


Set-Tab from cookie: 0


Local intranet 100%


Tab: Structure and Decay Data

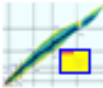
Main All Reaction Data **Structure & Decay** by Applications Doc & Codes NDS-Internal Index Events

Structure and Decay Data

 **NSR**
Nuclear Science References *

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

 **NuDat 2.5**
selected evaluated nuclear structure data **

 **LiveChart of Nuclides**
Interactive Chart of Nuclides:
Advanced and Basic

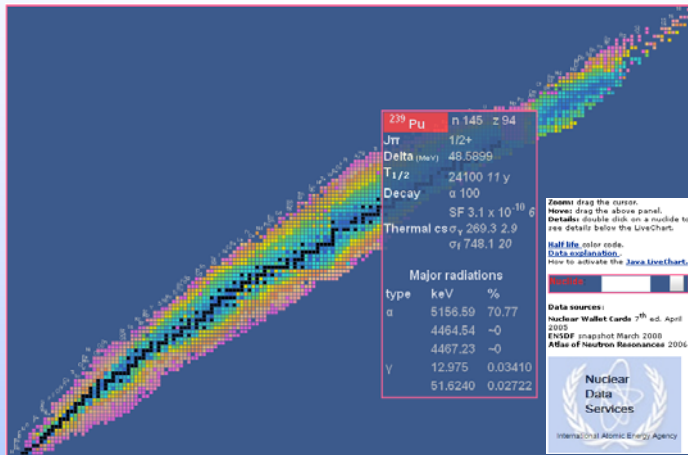
Miscellaneous

[ENSDF and NSR Manuals](#) - ENSDF Feb. 2001 version & NSR Aug. '96 version
[ENSDF programs](#) - ENSDF Analysis and Utility programs (ALPHAD, LOGFT, etc.)
[NSDD, ICTP Workshops](#) - workshop material, codes, programme, etc.
[International network of Nuclear Structure and Decay Data evaluators](#) - the NSDD network

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

Nuclear Structure and Decay: Databases and Web interfaces

LiveChart of Nuclides (Marco Verpelli, IAEA, 2006-2009)

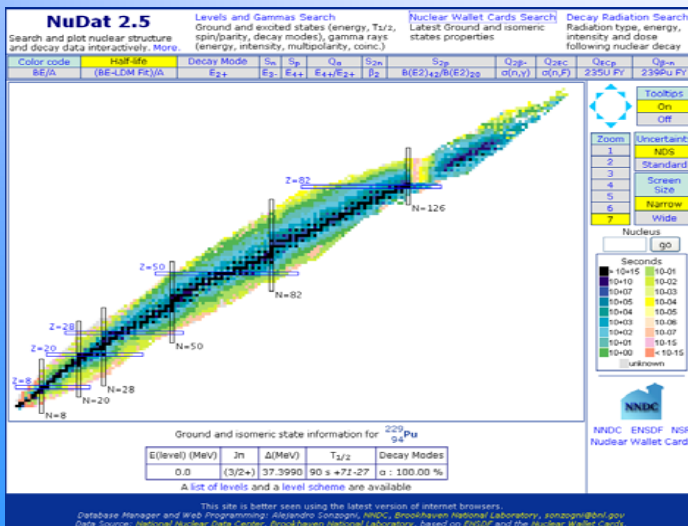


Source: ENSDF Master File

Bibliography, initially oriented to ENSDF evaluators

NSR (David Winchel, Boris Pritychenko, NNDC)

NuDat2 (Alejandro Sonzogni, NNDC)



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

National Nuclear Data Center
NNDC

IAEA NDS Main Databases: ENSDF | EXFOR | CINDA | LiveChart | NuDat | NSR | XUNDL | ENSDF | MIRD

Nuclear Science References (NSR)

Database version of April 30, 2010

The NSR database is a bibliography of nuclear physics articles, indexed according to content and spanning nearly 100 years of research. Over 80 journals are checked on a regular basis for articles to be included. For more information, see the [help page](#). The NSR database schema and web applications have undergone some recent changes. This is a revised version of the NSR Web Interface.

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

Author:

Nuclide:

Output format: HTML BibTex Text

Publication Year: from to

Database Manager: Boris Pritychenko, NNDC, Brookhaven National Laboratory
Web Programming: Boris Pritychenko, NNDC, Brookhaven National Laboratory
Data Source: NNDC, Brookhaven National Laboratory, NDS, International Atomic Energy Agency, NDG, McMaster University

Tab, Oriented to Application Fields

The image shows a screenshot of a web application interface. At the top, there is a horizontal navigation bar with several tabs: "Main", "All", "Reaction Data", "Structure & Decay", "by Applications" (which is highlighted in blue), "Doc & Codes", "NDS-Internal", "Index", and "Events". Below the navigation bar is a list of application fields, each preceded by a double chevron symbol (⟨⟨). The fields are: "Reactor Physics (particle transport, fuel cycle, transmutation, shielding)", "Atomic and molecular data for fusion research", "Ion Beam and Thin Layer Activation Analysis", "Dosimetry reactions", "Activation analysis", "Nuclear Medicine", and "Neutron Source Reactions". At the bottom of the interface, there are two footnotes: "*Database at the IAEA, Vienna" and "**Database at the US NNDC".

Main All Reaction Data Structure & Decay **by Applications** Doc & Codes NDS-Internal Index Events

- ⟨⟨ **Reactor Physics (particle transport, fuel cycle, transmutation, shielding)**
- ⟨⟨ **Atomic and molecular data for fusion research**
- ⟨⟨ **Ion Beam and Thin Layer Activation Analysis**
- ⟨⟨ **Dosimetry reactions**
- ⟨⟨ **Activation analysis**
- ⟨⟨ **Nuclear Medicine**
- ⟨⟨ **Neutron Source Reactions**

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

Databases, Tools, Documents relevant to Selected Application Field

Main All Reaction Data Structure & Decay **by Applications** Doc & Codes NDS-Internal Index Events

⤴ **Reactor Physics (particle transport, fuel cycle, transmutation, shielding)**

- [FENDL-2.1](#) - Fusion Evaluated Nuclear Data Library, Version 2.1
- [WIMSD-IAEA Library](#) - multigroup data library for the WIMS-D code
- [Minsk Actinides Library](#) - evaluated neutron reaction data (Maslov et al.)
- [NuDat 2.5](#) - selected evaluated nuclear structure data **
- [ENDF](#) - Evaluated nuclear reaction libraries
- [MENDL-2](#) - Russian cross-section data library for transmutation and activation of materials irradiated by neutrons with energies up to 100 MeV. Yu.N. Shubin et al.
- [Fission Yields](#) - Fission Product Yield Data for the Transmutation of Minor Actinide Nuclear Waste
- [Fission Yields Report](#) - Doc: Fission Product Yield Data for the Transmutation of Minor Actinide Nuclear Waste
- [ADS-Lib](#) - Application test library in ACE and MATXS format for ADS neutronics design
- [IRDF-2002](#) - International Reactor Dosimetry File

⤵ **Atomic and molecular data for fusion research**

⤵ **Ion Beam and Thin Layer Activation Analysis**

⤵ **Dosimetry reactions**

⤵ **Activation analysis**

⤵ **Nuclear Medicine**

⤵ **Neutron Source Reactions**

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

Nuclear Reaction Data

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

Quick Links
Photon and Electron Interaction Data
Photonuclear
Q-values, Thresholds
RIPL
RNAL
SIGACE
Safeguards Data
SigmaCalc
Spallation models
Specialized Evaluated Libraries Standards
Stopping Power Data for Light Ions
Th-U
Thermal neutron capture gamma rays
Thin Layer Activation
WIMSD-IAEA Library
Wallet cards
X and Gamma-rays standards
ZVVIEW

NEW ROSFOND-2010 Russian Library of Evaluated Neutron Data [list] [page]
CENDL-3.1 Chinese Evaluated Neutron Data Library [list] [retrieve]

Main All **Reaction Data** Structure & Decay by Applications Doc & Codes NDS-Internal Index Events

Database Retrieval Systems

- ENDF - Evaluated nuclear reaction libraries
- EXFOR - Experimental nuclear reaction data
- CINDA - neutron reaction bibliography

Data Libraries for download

- NGATLAS - atlas of neutron capture cross sections
- IBANDL - Ion Beam Analysis Nuclear Data Library
- FENDL-2.1 - Fusion Evaluated Nuclear Data Library, Version 2.1
- Minsk Actinides Library - evaluated neutron reaction data (Maslov et al.)
- IRDF-2002 - International Reactor Dosimetry File
- Charged particles XS - Beam monitor & radionuclide production cross sections
- PADF 2007 - Proton Activation Data File
- POINT2009 - Pointwise data of ENDF/B-VII.0 processed into temperature dependent format
- Standards - Neutron Cross-section Standards 2006
- RNAL - Reference Neutron Activation Library
- Various Specialized Evaluated Data Libraries in ENDF and other formats -
- ADS-Lib - Application test library in ACE and MATXS format for ADS neutronics design
- ENDF Archive - Download (FTP) evaluated data in original ENDF (4,5,6) format **new**
- Thin Layer Activation - Thin Layer Activation (TLA) Technique for Wear Measurements

Miscellaneous

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

IAEA Nuclear Data Section

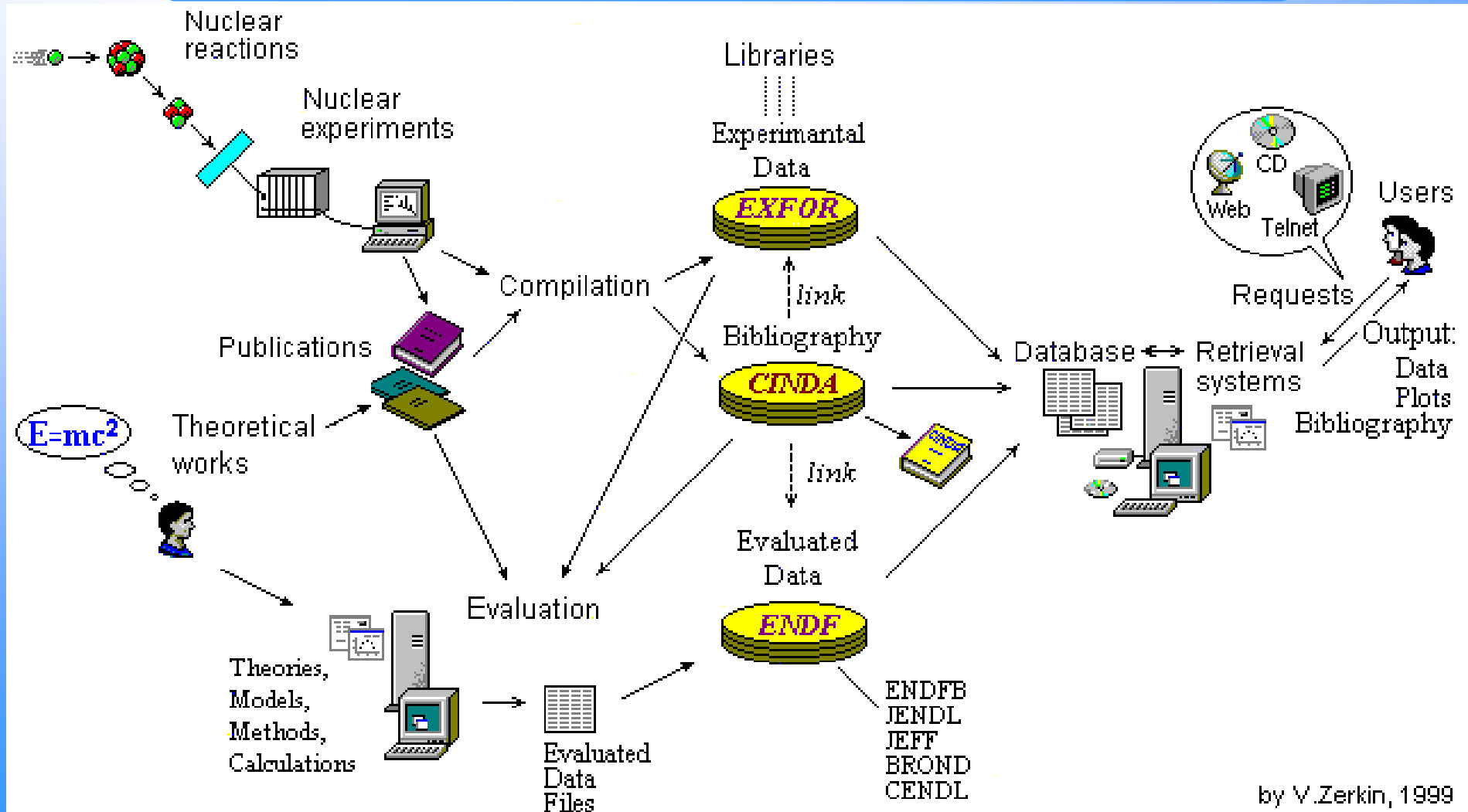
- IAEA-NDS Mission, Staff and more
- A+M Atomic and Molecular Data
- Meetings Workshops
- Newsletters
- Coordinated Research Projects
- Nuclear Reaction Data Center Network
- Nuclear Structure & Decay Data Network
- Technical Reports, TECDOCs
- INDC(NDS) Reports
- Computer Codes

Speaker's main activity is software development:

- Web Retrieval Systems EXFOR, ENDF, CINDA
- CD-ROMs: databases and retrieval systems
- Plotting package ZVView
- Database maintenance

Nuclear Reaction Databases

EXFOR - CINDA - ENDF



Basic principals of the system

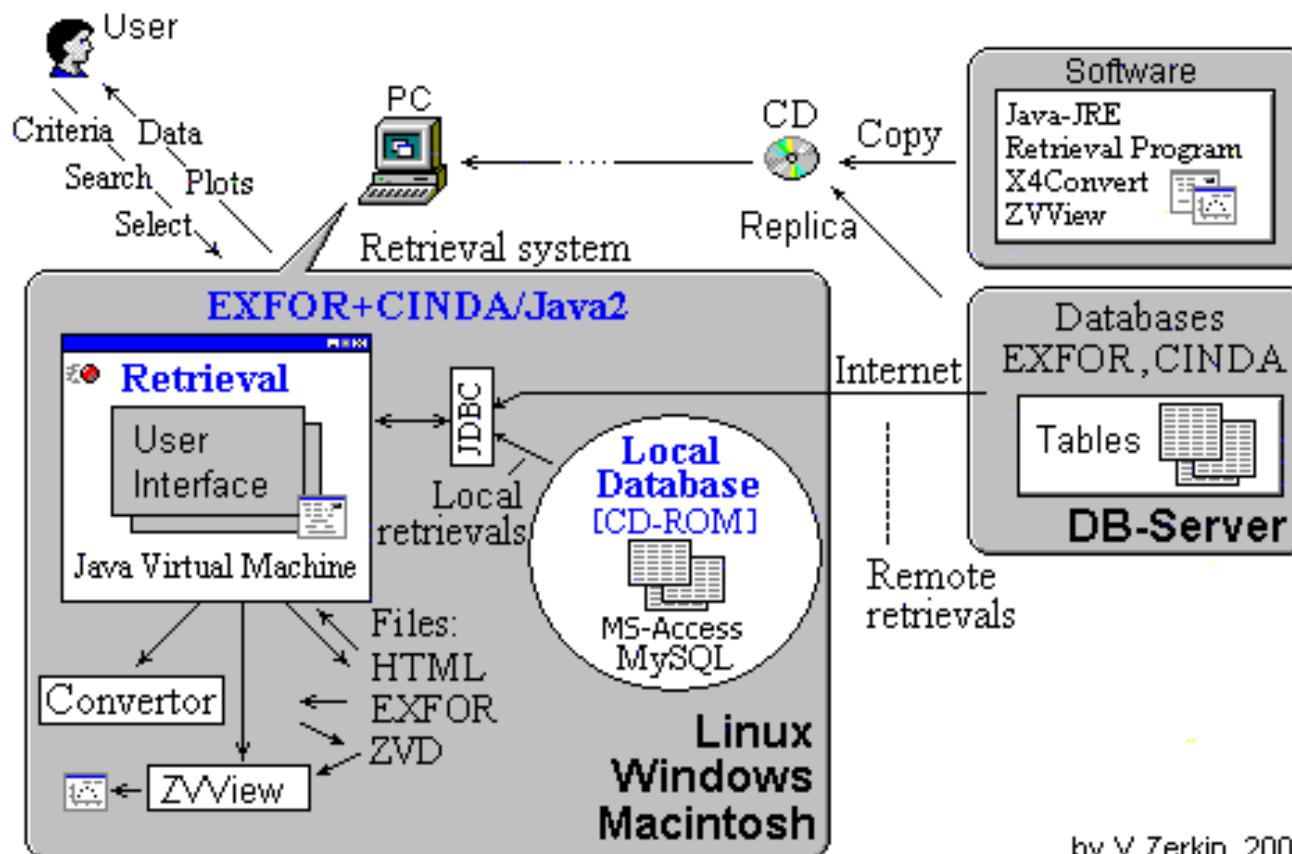
- **Maximum of platform independency**
 - operating systems: Linux, Windows, Mac
 - relational databases (MySQL, Access, SyBase)
 - programming languages:
C, Java, SQL, Javascript, Fortran
- **Free of charge components**
 - Apache, Tomcat, Linux
- **Full integration of components**
 - no need for installation of CD-ROMs
 - automatic configuration of Web-Servlets
 - encapsulated graphics

IAEA-NDS CD-ROMs

1. EXFOR-CINDA (MS-Access)
2. EXFOR-CINDA for Applications (MySQL)
3. EndVer/GUI + EXFOR (MySQL)
4. ENDF Libraries

Features

- ✓ For Windows, Linux, Mac
- ✓ Can run from CD-ROM (no installation)
- ✓ Can work with remote databases
- ✓ Integrated EXFOR and CINDA
- ✓ Help with Dictionaries
- ✓ Advanced search (+users' SQL)
- ✓ Interactive plotting
- ✓ Non-interactive EXFOR retrieval program
- ✓ Integrated PrePro, EndVer, X4TOC4, ZVView
- ✓ Used by Applications: Empire, EndVer/GUI, expandable...



by V.Zerkin, 2004

CD-ROM

EndVer/GUI + EXFOR for applications



Nuclear Data Section
International Atomic Energy Agency
Wagramer Strasse 5, P. O. Box 100, A-1400 Vienna, Austria
Tel: (+43 1) 2600-21714; Fax: (+43 1) 26007

7

2009-03-31



International Atomic Energy Agency
Nuclear Data Services
2004-2009



for Windows, Linux, Mac



EndVer/GUI

and EXFOR-CINDA for Applications

Tools for Evaluator: Databases, Retrieval Systems, Processing, Comparison
Experimental Data and Evaluations, Interactive Plotting.
All on Linux, Windows and Mac using MySQL

Using CD-ROM:

Run the Software Packages from CD-ROM (or from copy on Hard Disk)

To do:	on Linux:	on Windows:	on Mac (ppc, x86):
1 Run EndVer	<code>run_endver.sh</code>	<code>run_endver.bat</code>	<pre>- X11 - Applications - Terminal run_endver-mac ppc.sh run_endver-mac x86.sh run_endver-mac.sh</pre>
2 Run interactive retrieval system	<code>run_x4cd.sh</code>	<code>run_x4cd.bat</code>	<pre>- X11 - Applications - Terminal run_x4cd-mac.sh</pre>
3 Copy to Hard Drive	<code>install.sh</code> or <code>install.sh /x4app</code>	<code>install.bat</code> or <code>install.bat c:\x</code>	<code>install.sh</code>

General description: [readme.txt](#)
How to setup and use: [setup.txt](#)
IAEA Nuclear Data Services: <http://www-nds.iaea.org/>

EndVer/GUI

Integrated Tools for ENDF-Evaluators

Version 1.47, February 2009

- ✓ EndVer with Graphic User's Interface
- ✓ Integrated EndVer – PrePro-2007 – EXFOR
- ✓ PostScript graphics with PlotC4
- ✓ Plotting ENDF Files vs. EXFOR:
 - MF4 (DA), MF5 (DE), MF6 (DAE), MF3+33 (SIG)
- ✓ Interactive graphics with ZVView
- ✓ Includes full EXFOR and CINDA databases
- ✓ Test version for Macintosh



EXFOR-CINDA for Applications

Databases and Retrieval Systems
Version 1.99, March 2009

- ✓ Does not need installation, can run from CD-ROM
- ✓ Works with Local and Remote Databases
- ✓ Includes Non-Interactive EXFOR retrievals
- ✓ Integrated CINDA and EXFOR
- ✓ Advanced interactive search
- ✓ Help based on Dictionaries
- ✓ Interactive graphics with ZVView
- ✓ Test version for Macintosh

EndVer is an integrated software package for comparison of evaluated nuclear data files with experimental data from EXFOR database. Contains interactive plotting.

EXFOR is a comprehensive library of experimental nuclear reaction data induced by neutrons, charged particles and photons.

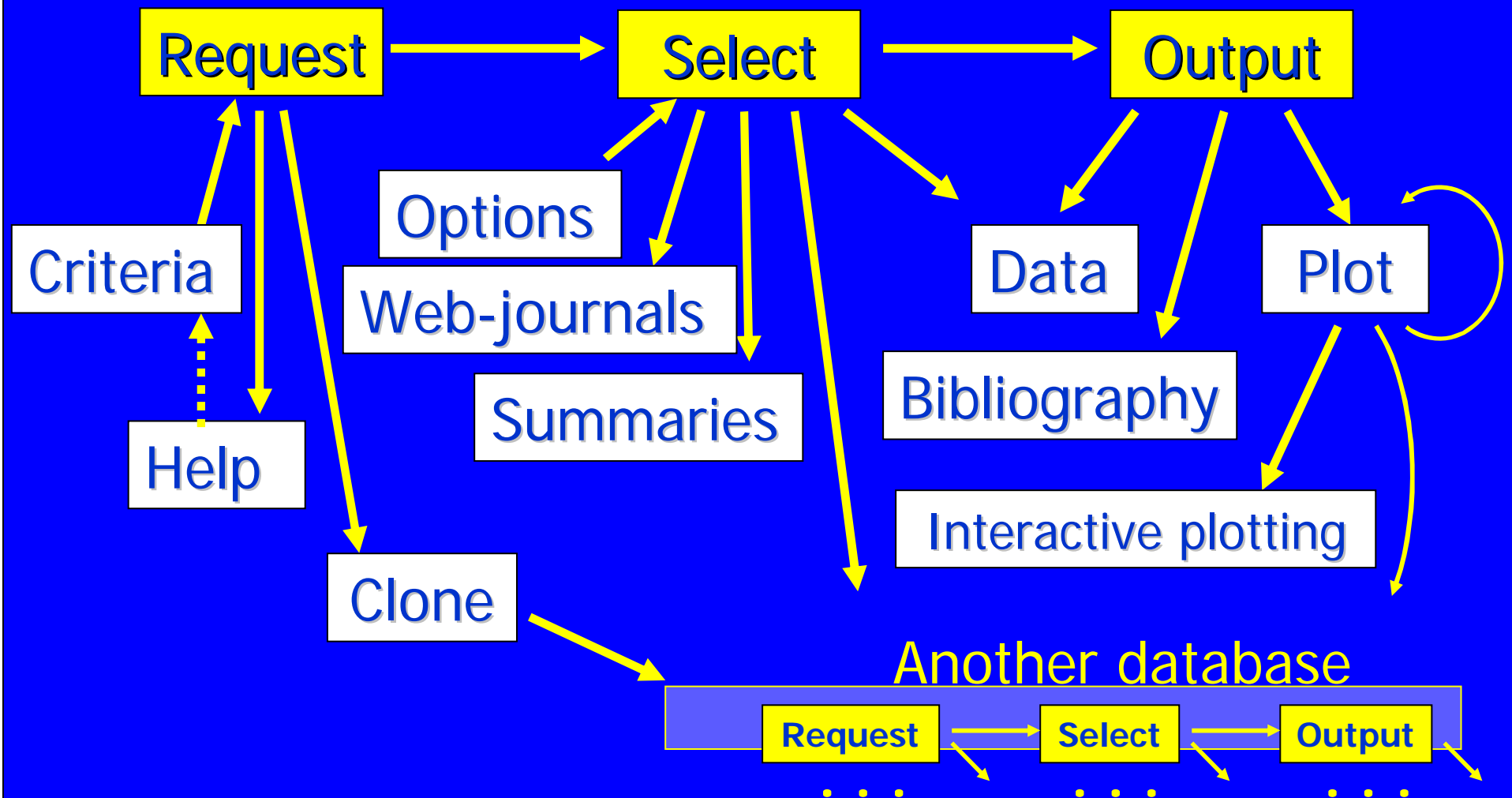
Contents (2009/03/23): 17,775 entries, 120,185 data tables.

CINDA library contains bibliographical references to experimental nuclear reaction data and to calculations, reviews, compilations and evaluations of neutron reaction and spontaneous fission data.
Contents (2009/03/27): 430,886 lines, 59,413 publications, 189,666 blocks

Retrieval Systems has been written on Java2: v1.98 (2008/05)

© The data on this CD-ROM are a product of the Network of Nuclear Reaction Data Centers.

Retrieval System: main stream of users' interactions



EXFOR Request Form

Help » EXFOR-Manual | Output | Plot+ | R33 | Databases » ENDF | CINDA | IBANDL | CD-ROM » EXFOR-CINDA | CD-Catalog



Experimental Nuclear Reaction Data (EXFOR)

Database Version of April 05, 2010
Software Version of 2010.03.05 Old interface is [\[here\]](#)



News

2010/02 Improvements and extensions:

- 1) Production of isotopes coded as ELEM/MASS: filtering and quick [plot] , sorting T4 [t4] [t4x]
- 2) Users' definition of ENDF:MF/MT for conversion EXFOR data to format C4 and advanced plotting
- 3) Search by compiling Center-ID (expert mode)
- 4) Search by outgoing particle coded in SF3,4,7 (expert mode)

[\[History\]](#)

The EXFOR library contains an extensive compilation of experimental nuclear reaction data. Neutron reactions have been compiled systematically since the discovery of the neutron, while charged particle and photon reactions have been covered less extensively. The library contains data from **18463** experiments (see [statistics](#) and [new compilation](#)).

Request Examples:

Target

Reaction

Quantity

Product

Energy from

Author(s)

Publication year

Accession #

- Extended
- Keywords
- Expert

Exclude superseded data

Search of Products

Listing only

Prompt-Help

(Entry#, Subent#)

Z,A)

Reaction Sub-Fields

Feedback and User's Input

Clone Request:

Use Help, Examples, Dynamic sections

Tip of the day: video-guide

- How-to video-guide
- Plot EXFOR-ENDF double differential cross-sections
- Advanced plotting
- Cross sections
 - Angular distribution
 - Emission spectra
 - Double differential
 - NUBAR
- Default
- Map

video

EXFOR Select Form

Request #5600
Results: Reactions: 9 Datasets: 144

Data Selection

Retrieve Selected Unselected All Reset

Output: EXFOR EXFOR+ Bibliography TAB C4 PlotC4

Plot: Quick-plot (cross-sections only) Advanced plot [how-to]

Narrow Energy (optional), eV: Min: Max:

Advanced

Select Datasets

Search by Reaction

Search by Author

Go to Web - journal

Go to NSR

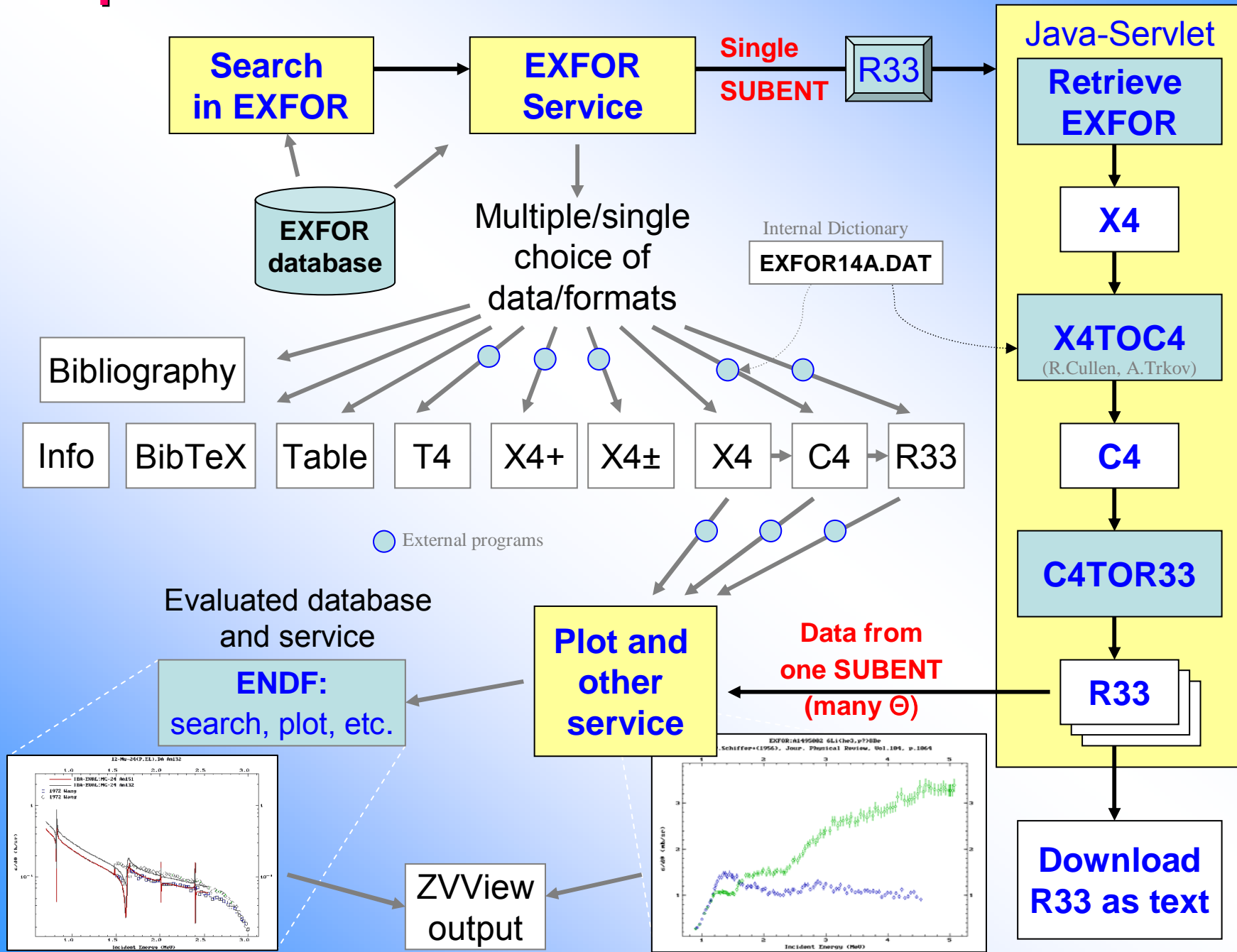
Output options

Get data in various formats

n	Display	Year	Author-1	Energy range, eV	Points	Reference	Accession#P	NSR-Key
1)	13-AL-27(N,TOT),,SIG					C4: MF3 MT1		
1	<input type="checkbox"/> Info X4 X4+ X4± T4	2009	F.Atchison+			J,NIM/A,300,312,1991		
2	<input checked="" type="checkbox"/> Info X4 X4+ X4± T4	2008	M.Mazari+	1.30e7	1.62e7			30037003
3	<input type="checkbox"/> Info X4 X4+ X4± T4	1994	G.Rohr+	2.50e5	2.00e7	49709 C,94GATLIN,,215,199405		22331004
4	<input checked="" type="checkbox"/> Info X4 X4+ X4± T4	1993	R.W.Finlay+	5.29e6	6.00e8	474 J,PR/C,47,237,9301		13569008 1993FI01
5	<input type="checkbox"/> Info X4 X4+ X4± T4	1991	J.R.Morales+	1.76e7	1.98e7	2 J,NIM/A,300,312,1991		30764004 1991M009
6	<input type="checkbox"/> Info X4 X4+ X4± T4	1990	L.Koester+	1.97e3		1 J,ZP/A,337,341,1990		22217010 1990KO34
7	<input checked="" type="checkbox"/> Info X4 X4+ X4± T4	1988	J.Franz+	1.60e8	5.75e8	22 J,NP/A,490,667,88		22117005 1988FR23
8	<input checked="" type="checkbox"/> Info X4 X4+ X4± T4	1984	M.Ohkubo	9.84e3	9.35e5	1010 W,OHKUBO,8412		21926003
9	<input checked="" type="checkbox"/> Info X4 X4+ X4± T4			7.12e2	7.88e4	927		004
10	<input type="checkbox"/> Info X4 X4+ X4± T4	1983	M.S.Gordon+	2.50e7	4.50e7	0 P,NPL-951,40,8304		12839004
11	<input type="checkbox"/> Info X4 X4+ X4± T4	1981	V.E.Zhitarev+			8 J,AE,50,(5),350,198105		41323002
12	<input type="checkbox"/> Info X4 X4+ X4± T4	1980	D.C.Larson+	2.00e6	8.06e7	685 C,80BNL,,277,8007		12882005
13	<input type="checkbox"/> Info X4 X4+ X4± T4	1979	L.Koester+	1.26e0	5.19e0	2 J,ZP/A,292,(1),95,1979		21660015 1979KO26
14	<input type="checkbox"/> Info X4 X4+ X4± T4	1977	R.B.Royer+	1.86e2		1 J,NIM,145,245,1977		12661004
15	<input type="checkbox"/> Info X4 X4+ X4± T4	1976	D.R.Waymire+	5.22e6	7.24e6	20 W,WAYMIRE,19761108		20671002
16	<input type="checkbox"/> Info X4 X4+ X4± T4	1975	P.V.R.Murthy+	3.40e10	2.73e11	7 J,NP/B,92,269,197506		10403005
17	<input type="checkbox"/> Info X4 X4+ X4± T4	1975	U.N.Singh+	4.06e3	4.19e5	432 J,PR/C,11,1117,197504		10515004 1975SI05

Output from EXFOR to other formats

How it works



X4+: EXFOR-interpreted, 2006

EXFOR data: <http://161.5.149.76/EXFOR/A1495.002>
Data retrieved from the EXFOR database version of March 06, 2009.

```
ENTRY          A1495    20031013    20040322    20050926    0000
SUBENT         A1495001  20031013    20040322    20050926    0000
BIB            10          15
TITLE          Study of the reaction mechanism for (He3,P) reactions
              with Li-6,B-10 and C-13
AUTHOR         (J.P.Schiffer,T.W.Bonner,R.H.Davis,F.W.Prosser,Jr.)
INSTITUTE      (IUSARIC)
              #(IUSARIC) Rice University, Houston, TX, USA
REFERENCE      (J,PR,104,1064,195611)
              # (J,PR,104,1064,195611) Journ.: Physical Review, Vol.104, p.1064 (1956) USA
              #+ #NSR=1956SC01 #DOI=10.1103/PhysRev.104.1064
FACILITY       (VDG)
              #(VDG) Van de Graaff
SAMPLE         Target materials were evaporated on 2-mil foil backing,
              thick enough to stop the He-3 beam yet thin compared
              to the range of the proton groups studied
METHOD         (PHD)
              #(PHD) Pulse-height discrimination
DETECTOR       (SCIN) Thallium-activated CsI crystals mounted on
              DuMont 6291 photomultiplier tubes.
              #(SCIN) Scintillation detector
ERR-ANALYSIS  (DATA-ERR2) The pulse-height resolution of the detectors
HISTORY        (19800811C) Compilation produced by Arzamas RFNC-VNIIEF
              (20031013U) Last checking has been done.
ENDBIB        15
COMMON        1          3
DATA-ERR2
PER-CENT      4.
ENDCOMMON     3
ENDSUBENT     22
SUBENT         A1495002  20031013    20040322    20050926    0000
BIB            5          11
REACTION       (3-LI-6(HE3,P)4-BE-8,PAR,DA)
              #(3-LI-6(HE3,P)4-BE-8,PAR,DA) Quantity: [DAP] Partial differential cross section d/dA
SAMPLE         Metallic Li-6 enriched to 96%. 10 microg/cm2 thick.
ERR-ANALYSIS  (EN-ERR) Digitizing error
              (DATA-ERR) Digitizing error
              (DATA-ERR1) Some uncertainty in the cross-section was
              introduced by not knowing precisely what fraction of
```


X4±: EXFOR-interactive Tree, 2008

ENTRY A1495 \wedge 1956, J.P.Schiffer+ last-updated: 2003-10-13

+ SUBENT A1495001 \wedge last-updated: 2003-10-13

- SUBENT A1495003 \wedge last-updated: 2003-10-13

- BIB #bibliographic and descriptive information

- REACTION

+ (3-LI-6(HE3,P)4-BE-8,PAR,DA)

+ SAMPLE

+ ERR-ANALYS

+ EN-SEC

+ STATUS

- COMMON 4x1 #Constant parameters

+ Legend

- Data

EN-ERR	E-LVL	DATA-ERR	DATA-ERR1
MEV	MEV	MB/SR	PER-CENT
0.0040	2.9	0.012	20.0

- DATA 3x191

- Legend

EN	Energy of Incident Projectile, Laboratory System	MEV	MeV
ANG	Angle, Laboratory System	ADEG	Angular Degrees
DATA	Partial differential cross section d/dA	MB/SR	millibarns per steradian

- Data

EN	ANG	DATA
MEV	ADEG	MB/SR
0.8989	150.0	0.7892
0.9053	0.0	0.9892
0.9216	150.0	0.8881
0.9354	0.0	1.139
0.9518	150.0	1.036
0.9554	150.0	1.135
0.9616	0.0	1.301
0.9804	0.0	1.413
0.9971	150.0	1.271
1.006	0.0	1.625

EXFOR Output Form

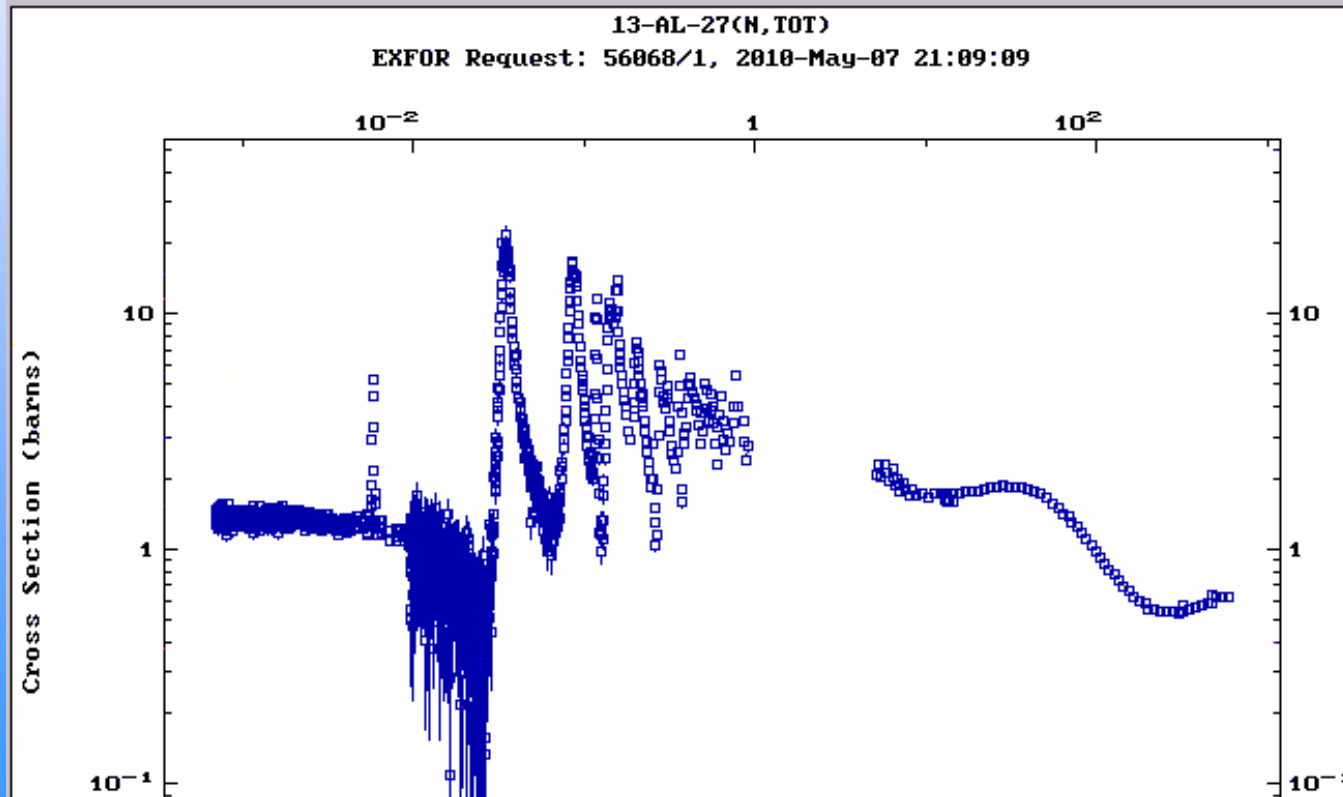
EXFOR Request #56068/1816

Output Data

Format	<u>Data</u> (Size)
EXFOR	Text (212Kb) ZIP (34Kb) Generate: X4±
Bibliography	html (15Kb) BibTeX (5Kb)
<i>Computational</i>	
C4	C4 (315Kb) C4.ZIP (23Kb) LST (99Kb)

Output data

Search similar evaluated data



ENDF Find and add to the plot evaluated data

- 1) 13-AL-27(N,TOT),,SIG
- 2) Use my data [\[example\]](#)

See: [plotted data](#) (194Kb)

Get plotted data

ENDF Select Form

Plot data

Request #2776

ENDF Data Selection (Plot for EXFOR Request #56068)

Retrieve **Plot** Selected Unselected All

Plotting options: Quick plot (cross-sections only: σ)

Sorted by: [Reactions] Reorder by: [Libraries] View: basic extended

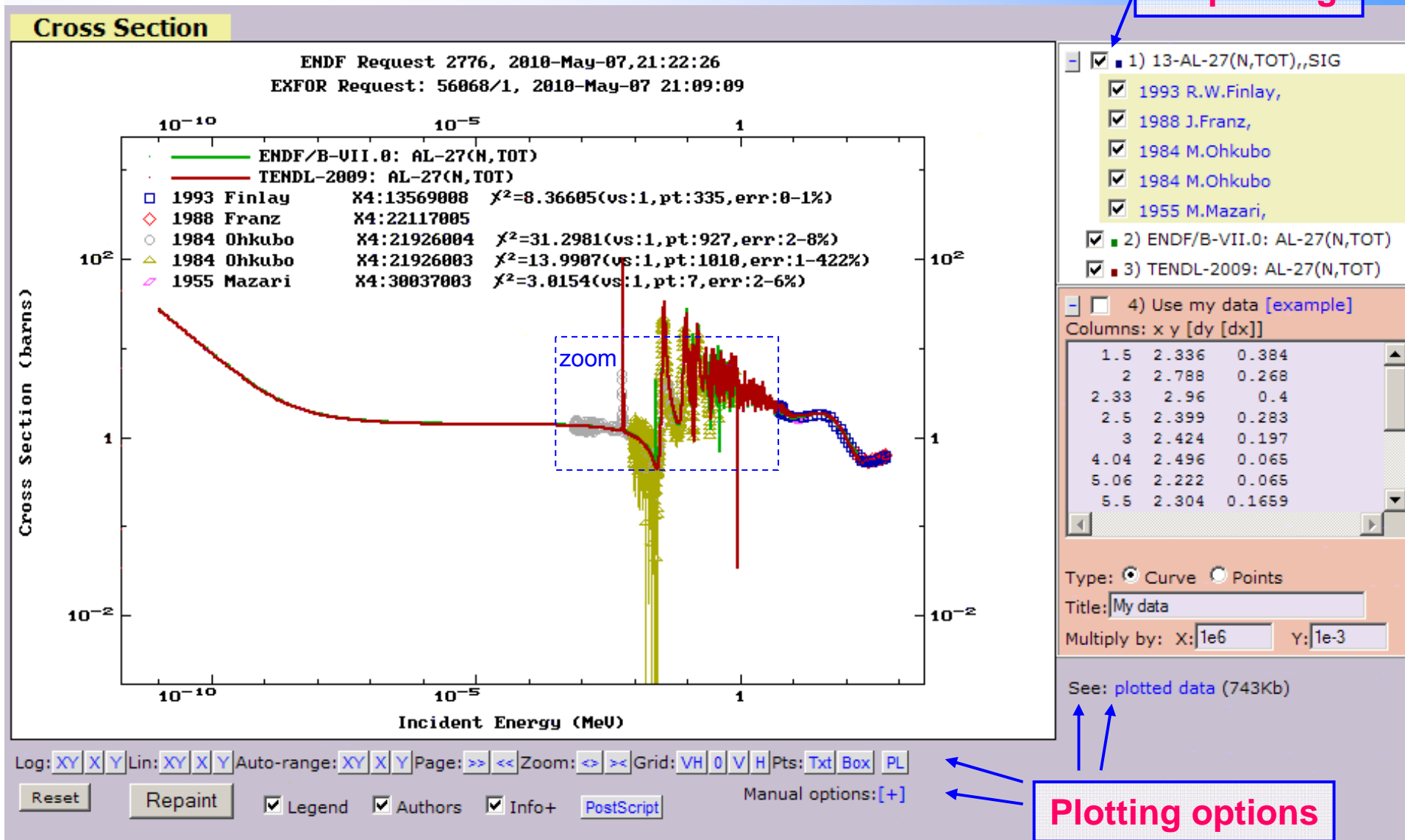
1) AL-27 (N, TOT), SIG MT=1 MF=3 NSUB=10

MF3: [SIG] Cross sections MT1: [N, TOT] Neutron total cross sections.

1	<input checked="" type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	ENDF/B-VII.0	E=150MeV Lab=LANL, ORNL Date=DIST-DEC06	M.B.Chadwick+, Derrient+
2	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JEFF-3.1	E=150MeV Lab=LANL Date=090105	M.B.CHADWICK & P.G.YOUNG
3	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JENDL-3.3	E=20MeV Lab=TIT, JAERI Date=20010713	Y.HARIMA, H.KITAZAWA, T.FUKAHORI
4	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JENDL-3.3	E=20MeV Lab=TIT, JAERI Date=20010713 T=300	Y.HARIMA, H.KITAZAWA, T.FUKAHORI
5	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	ENDF/B-VI	E=150MeV Lab=LANL Date=20011108	M.B.CHADWICK & P.G.YOUNG
6	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	ENDF/B-VI	E=150MeV Lab=LANL Date=20010926 T=300	M.B.CHADWICK & P.G.YOUNG
7	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	ROSFOND-2008	E=150MeV Lab=IPPE Date=DIST-DEC07	IGNATYUK A.V.
8	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	ROSFOND-2010	E=150MeV Lab=IPPE Date=DIST-DEC07	IGNATYUK A.V.
9	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	CENDL-3.1	E=20MeV Lab=CNDC, JNDC Date=DIST-DEC09	B.S.YU, S.CHIBA, Y.HARIMA
10	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JEF-2.2	Lab=ECN Date=920101	EC BLANKET TECHNOLOGY, TASK B2
11	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JEFF-3.0	E=150MeV Lab=LANL Date=DIST-APR02	M.B.CHADWICK & P.G.YOUNG
12	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JENDL/HE-2007	E=3000MeV Lab=SIT.SHIMZ Date=REV1-	K. Kosako
13	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	JENDL/HE-2004	E=3000MeV Lab=KAERI Date=REV1-	Y. Lee
14	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	FENDL/E-2.1	Lab=CDN-ENEA Date=EVAL-FEB97	FABBRI, MASETTI, ORSI, REFFO, TRKOV
15	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	TENDL-2008	E=20MeV Lab=NRG Date=REV1-	A.J. Koning and D. Rochman
16	<input checked="" type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	TENDL-2009	E=200MeV Lab=NRG Date=REV1-	A.J. Koning and D. Rochman
17	<input type="checkbox"/>	ENDF-6	Interpreted	σ	Plot	CENDL-2	Lab=CNDC/TIT Date=950817	B.YU, S.CHIBA, Y.HARIMA ET AL

ENDF Output Form with interactive Web ZVView plotting

Select data for plotting



Plotting options


Data for plotting: [ZVD \(724Kb\)](#), [send to ZVView](#); [download ZVView](#); [upload](#) and plot your ZVD file

ENDF Request Form

Help » ENDF Format Manual | Plot+ Databases » Medical | NGAtlas | RIPL | FENDL | IRDF-2002 | EXFOR | CINDA

Evaluated Nuclear Data File (ENDF)

Database Version of February 23, 2010
Software Version of 2010.02.22 Old interface is [\[here\]](#)



News & History

2010/02 Updated library:
1) [ROSFOND-2010](#): neutron library, 686 materials, Obninsk, Russia, issued in 2010 [\[page\]](#)
2) [IAEA-Med](#): data for medical radioisotope production. Proton sub-library corrected, 2010 [\[page\]](#)
2010/01 New library:
1) [CENDL-3.1](#) Chinese evaluated neutron data library, issued in 2009

Core nuclear reaction database contain recommended, evaluated cross sections, spectra, angular distributions, fission product yields, photo-atomic and thermal scattering law data, with emphasis on neutron induced reactions. The data were analyzed by experienced nuclear physicists to produce recommended libraries for one of the national nuclear data projects (USA, Europe, Japan, Russia and China). All data are stored in the internationally-adopted ENDF-6 format maintained by CSEWG.

Standard Request

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

Parameters:

Target »

Reaction »

Quantity »

[More Parameters...](#)


Libraries: All Selected

<input type="checkbox"/> Major Libraries	<input type="checkbox"/> Special Libraries
<input type="checkbox"/> 1) ENDF/B-VII.0 (USA,2006)	<input type="checkbox"/> Archival
<input type="checkbox"/> 2) JEFF-3.1.1 (Europe,2005-2009)	<input type="checkbox"/> Derived
<input type="checkbox"/> 3) JENDL-3.3 (Japan,2002)	
<input type="checkbox"/> 4) BROND-2.2 (Russia,1992)	
<input type="checkbox"/> 5) CENDL-3.1 (China,2009)	

Options:

Sort by: Reactions Evaluations

Clone Request:

Feedback: 

ENDF Flexible Database Explorer

The screenshot displays the ENDF Flexible Database Explorer application. The window title is "ENDF-Flexible Database Explorer, V.Zerkin, IAEA-NDS...". The interface is divided into several sections:

- Flexible Database Explorer (Sidebar):** Contains a menu with "Restart", "Close", "Config", "Selection", and "Help About". Below this is a tree view of data categories, including "Evaluated data [+Reaction]", "G Photo-Nuclear Data", "PHOTO Photo-Atomic Interac...", "DECAY Radioactive Decay Da...", "S/FPY Spontaneous Fission F...", "N Incident-Neutron Data", "N/FPY Neutron-Induced Fissi...", "TSL Thermal Neutron Scatter...", "Std Neutron Cross Section S...", "E Electro-Atomic Interactor...", "P Incident-Proton Data", "P/FPY Proton-Induced Fissio...", "D Incident-Deuteron Data", "D/FPY Deuteron-Induced Fis...", "T Incident-Triton Data", "T/FPY Triton-Induced Fission...", "HE3 Incident-He3 data", "HE3/FP He3-Induced Fission...", "HE4 Incident-Alpha data", and "HE4/FP Alpha-Induced Fissio...". At the bottom of the sidebar, there are controls for "Configuration: [Show]", "Video demo: [show]", "How-to slides: [hide]", "Slide-show: 1 3 23", and a "Switch" section with a legend for "open/close tree-node" (Closed/Opened) and "T:target R:reaction L:library Q:quantity".
- Target Materials:** Shows "Isotopes of 1-Hydrogen" with a list of "H-1", "H-2", and "H-3".
- Periodic Table:** A standard periodic table with element symbols and atomic numbers. It highlights the Lanthanides (Ce to Lu) and Actinides (Th to Lr).
- Summary:** A box containing the text: "Summary: Elements: 110 Nuclides: 2450 Selected: > 0) Evaluated data * 1) Incident-Particle: [N] Incident-Neutron Data".
- Nuclides:** A section with links for "[List]" and "[Chart-txt]".
- Nuclide Chart:** A plot of nuclides showing the relationship between atomic number (Z) on the x-axis and mass number (A) on the y-axis. The chart displays a grid of nuclides, with stable ones in yellow and others in blue.

ENDF Explorer: data found

The screenshot shows the ENDF Flexible Database Explorer software interface. The left pane displays a hierarchical tree view of nuclear data categories. The right pane shows a selection dialog box with the following content:

Select and retrieve data from database...

Clean Selection

Selected:

- 1) Incident-Particle: Incident-Neutron Data
- 2) Quantity: Covariances of neutron cross sections
- 3) Element: Iridium
- 4) Isotope: IR-193
- 5) Reaction: Production of two neutrons and a residual.
3 datasets (0%)

Retrieve Reset Retrieve in new Window
 Retrieve listing of evaluations only

FDBE - Flexible Database Explorer, v-1.0, 2006/01/20
Created by V.Zerkin, IAEA, 2005-2008

The tree view on the left includes the following categories:

- Evaluated data [+Reaction]
 - Photo-Nuclear Data
 - PHOTO Photo-Atomic Interaction Data
 - DECAY Radioactive Decay Data
 - S/FPY Spontaneous Fission Product Y
 - N Incident-Neutron Data [+Quantity]
 - COV/ACT Covariances for production
 - COV/DA Covariances for angular distr
 - COV/DE Covariances for energy distri
 - COV/NU Covariances of the average r
 - COV/RES Covariances of resonance p
 - COV/SIG Covariances of neutron cross
 - 77 Ir Iridium [+Target]
 - IR-193 Iridium [+Reaction]
 - N,2N Production of two neutrons and a
 - ENDF/B-VII.0 U.S. Evaluated Nuclear C
 - TENDL-2008 TALYS-based Evaluated N
 - TENDL-2009 TALYS-based Evaluated N
 - N,2N+A Production of two neutrons and
 - N,2N+P Production of 2 neutrons and
 - N,3N Production of three neutrons and
 - N,A Production of an alpha particle, p
 - N,D Production of a deuteron, plus a
 - N,EL Elastic scattering cross section fo
 - N,G Radiative capture.
 - N,HE3 Production of a 3He particle pl
 - N,INL Production of one neutron in the
 - N,N+A Production of a neutron and ar
 - N,N+D Production of a neutron and a

Standard ENDF Select Form

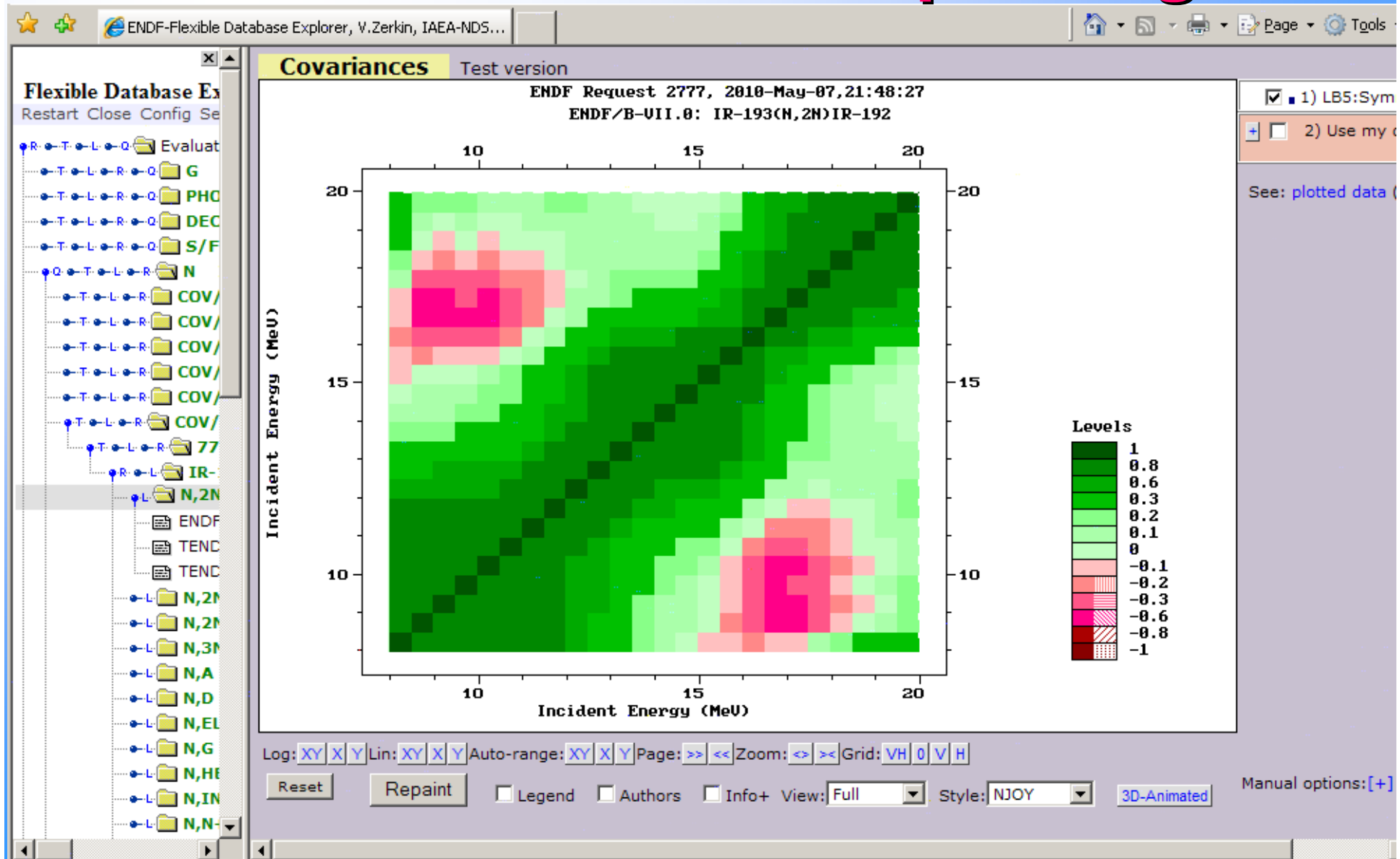
The screenshot displays the ENDF-Flexible Database Explorer application. The main window is titled "Request #2777" and "ENDF Data Selection". It features a "Retrieve" button and radio buttons for "Selected", "Unselected", and "All". A "Reset" button is also present. The interface shows a tree view on the left with categories like "Evaluated data", "Photo-Nuclear Data", "PHOTO", "DECAY", "S/FPY", "N", "COV/ACT", "COV/DA", "COV/DE", "COV/NU", "COV/RES", "COV/SIG", "77 Ir", "IR-193", "N,2N", "N,2N+A", "N,2N+P", "N,3N", "N,A", "N,D", "N,EL", "N,G", "N,HE3", "N,INL", "N,N+A", and "N,N+D". The main content area shows a list of data entries for IR-193 (N,2N) IR-192, COV/SIG. The entries are:

Item	Library	Format	Source	Energy	Lab	Date
1) IR-193 (N,2N) IR-192, COV/SIG	ENDF-6	Interpreted	MF33-Plot	E=20MeV	Lab=LANL, BNL	Date=DIST-DEC06
2) IR-193 (N,2N) IR-192, COV/SIG	ENDF-6	Interpreted	MF33-Plot	E=20MeV	Lab=NRG	Date=REV1-
3) IR-193 (N,2N) IR-192, COV/SIG	ENDF-6	Interpreted	MF33-Plot	E=200MeV	Lab=NRG	Date=REV1-

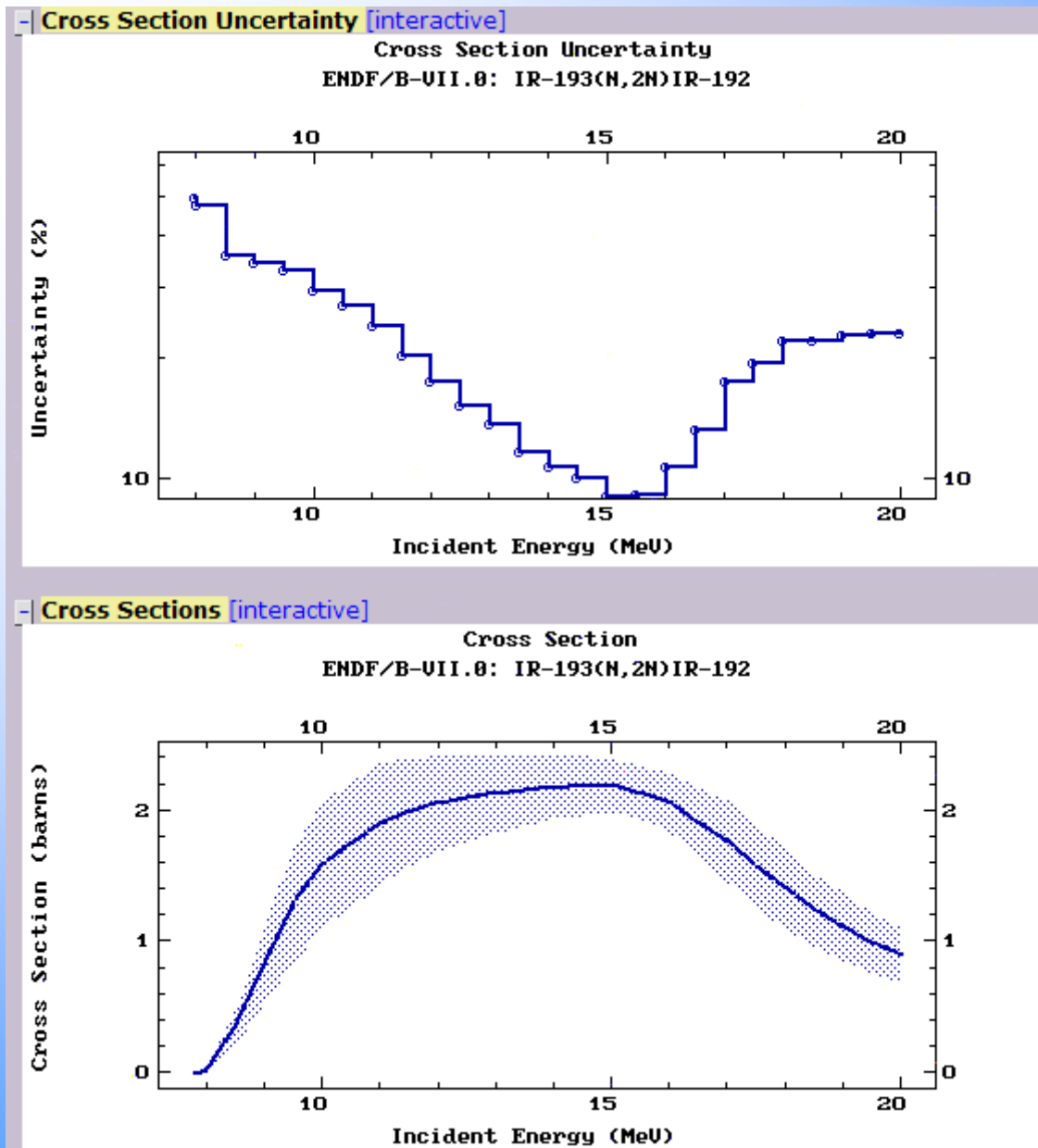
Below the table, there are "Plotting options" and "Other plots" sections. The "Plotting options" section includes a "Plot" option for cross sections with reconstructed resonances and applied Doppler broadening at 293K = 20°C. The "Other plots" section lists options for angular distributions ($d\sigma/d\Omega$), energy distributions ($d\sigma/dE$), double differential cross sections ($d^2\sigma/dE/d\Omega$), and cross sections with uncertainties ($\sigma \pm \Delta\sigma$). There are also links for "[Glossary]" and "[About]".

Page generated: 2010/05/07, 21:46:11 by E4-Servlet on www-nds.iaea.org
Project: "Multi-platform EXFOR-CINDA-ENDF", V.Zerkin, IAEA-NDS, 1999-2010
Request from: iaea.org (161.5.149.203)

Again ENDF Output Form with interactive ZVView plotting



Display Cross Section and Uncertainty



Correlation matrix

#ZVView-data-copy: 7-May-2010 22:13:17

#LB5:Symmetric Matrix

Z(26x26): $Z_{i,j} = \text{Cor}(\sigma_{x_i}, \sigma_{y_j}) * 1000$

	X (MeV)																					
Y (MeV)	7.992	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16	16.5	17	17.5	
7.992	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	1000	930.6	920.5	926.4	898.3	895.5	866.7	805.2	679.6	529.7	352.7	210.1	101.7	52	-17.93	-85.39	-125.4	-97.66	-12.27	102.2	-218.3
8.5	0	930.6	1000	999.4	998.7	992	980.3	943.8	866.1	730	583.1	404.7	257.4	156.3	107.4	27.05	-112	-269.4	-344.3	-309.5	-211.1	-7.856
9	0	920.5	999.4	1000	999.4	995.4	984.9	950.7	875.7	743.4	600.1	424.6	278.7	179	130.3	49.66	-93.97	-260.9	-346.6	-318.8	-231.9	-204.5
9.5	0	926.4	998.7	999.4	1000	996.5	989	959.1	889.9	763.2	623.2	450.2	305.7	205.7	156.7	76.36	-64.34	-228.8	-315.5	-289.6	-205.1	-237.7
10	0	898.3	992	995.4	996.5	1000	996	973.3	912.2	796.1	666	500.7	360	263.3	214.3	133.4	-17.89	-205.1	-318.8	-310.8	-231.8	-187.3
10.5	0	895.5	980.3	984.9	989	996	1000	989.8	944.9	846.1	727.6	571.9	436.3	340.7	291.4	211.4	64.16	-124.1	-248.4	-251.3	-187.3	-158.8
11	0	866.7	943.8	950.7	959.1	973.3	989.8	1000	981.8	912.9	816.6	679.8	555.3	464.3	415.4	338.2	196.2	2.736	-143.1	-167.2	-121.3	-91.32
11.5	0	805.2	866.1	875.7	889.9	912.2	944.9	981.8	1000	973.5	909.6	802.9	697.6	615.5	569.6	498.9	370.6	179.7	12.5	-37.4	-158.8	-115
12	0	679.6	730	743.4	763.2	796.1	846.1	912.9	973.5	1000	980	916.6	840.9	775.5	736.4	677	566.6	378.6	184.9	101.2	89.5	-89.67
12.5	0	529.7	583.1	600.1	623.2	666	727.6	816.6	909.6	980	1000	977.7	931.2	884.7	854	806.6	710	521.5	303.1	188.5	145.9	-132.7
13	0	352.7	404.7	424.6	450.2	500.7	571.9	679.8	802.9	916.6	977.7	1000	986.9	962.5	942.9	910.7	834.6	656.1	423	282.1	209.9	-91.32
13.5	0	210.1	257.4	278.7	305.7	360	436.3	555.3	697.6	840.9	931.2	986.9	1000	993.3	983.2	964.1	907.5	744	508.5	352.6	260.8	-43.15
14	0	101.7	156.3	179	205.7	263.3	340.7	464.3	615.5	775.5	884.7	962.5	993.3	1000	997.2	987.1	939.2	779.5	538.1	370.7	265	37.07
14.5	0	52	107.4	130.3	156.7	214.3	291.4	415.4	569.6	736.4	854	942.9	983.2	997.2	1000	995.7	955.3	801.6	561.7	391.1	280.8	107.8
15	0	-17.93	27.05	49.66	76.36	133.4	211.4	338.2	498.9	677	806.6	910.7	964.1	987.1	995.7	1000	974.7	838.5	608.2	436.4	280.8	136.6
15.5	0	-85.39	-112	-93.97	-64.34	-17.89	64.16	196.2	370.6	566.6	710	834.6	907.5	939.2	955.3	974.7	1000	938.2	766.4	616.6	504	134.9
16	0	-125.4	-269.4	-260.9	-228.8	-205.1	-124.1	2.736	179.7	378.6	521.5	656.1	744	779.5	801.6	838.5	938.2	1000	940.4	846	757	139.9
16.5	0	-97.66	-344.3	-346.6	-315.5	-318.8	-248.4	-143.1	12.5	184.9	303.1	423	508.5	538.1	561.7	608.2	766.4	940.4	1000	975.3	925	148.8
17	0	-12.27	-309.5	-318.8	-289.6	-310.8	-251.3	-167.2	-37.4	101.2	188.5	282.1	352.6	370.7	391.1	436.4	616.6	846	975.3	1000	985	148.8
17.5	0	102.2	-218.3	-231.9	-204.5	-237.7	-187.3	-121.3	-15.88	89.5	145.9	209.9	260.8	265	280.8	320.3	504	757	925.6	985	1000	139.9
18	0	232.8	-97.99	-115	-89.67	-132.7	-91.32	-43.15	37.07	107.8	132.1	163.8	192	180.9	191.1	221.6	399.2	660.3	855	943.2	985	130.9
18.5	0	340.4	11.1	-7.856	15.59	-33.54	0.5162	34.56	94.08	136.6	134.9	139.9	148.8	125.4	130.9	153.2	320.2	577.8	784.5	891.4	954	125.4
19	0	437.7	118.1	98.15	119.9	67.18	95.14	117.5	159.2	177.2	153.3	134.5	125.5	91.08	92.11	106.2	258.6	504.7	713.4	832.6	912	125.5
19.5	0	531.8	225.4	204.6	224.2	168.1	189.1	198.8	221.2	213.4	166.6	123.4	96.14	50.83	47.22	52.25	188	419.2	628.5	759.1	854	123.4
20	0	531.8	225.4	204.6	224.2	168.1	189.1	198.8	221.2	213.4	166.6	123.4	96.14	50.83	47.22	52.25	188	419.2	628.5	759.1	854	123.4
i	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	

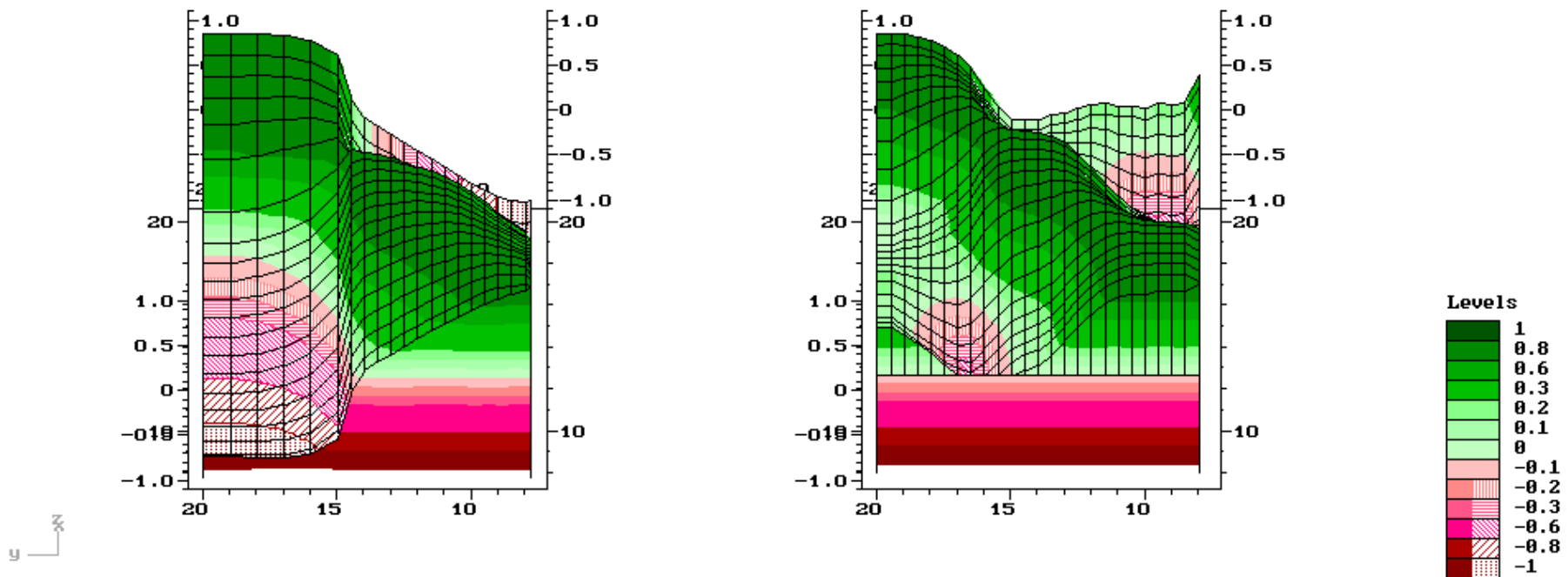
Animated 3-D display of correlation matrix

IR-193(N,2N)IR-192

TENDL-2008 vs. ENDF-B/VII.0

ENDF Request 2777, 2010-May-07, 21:48:27

ENDF/B-VII.0: IR-193(N,2N)IR-192



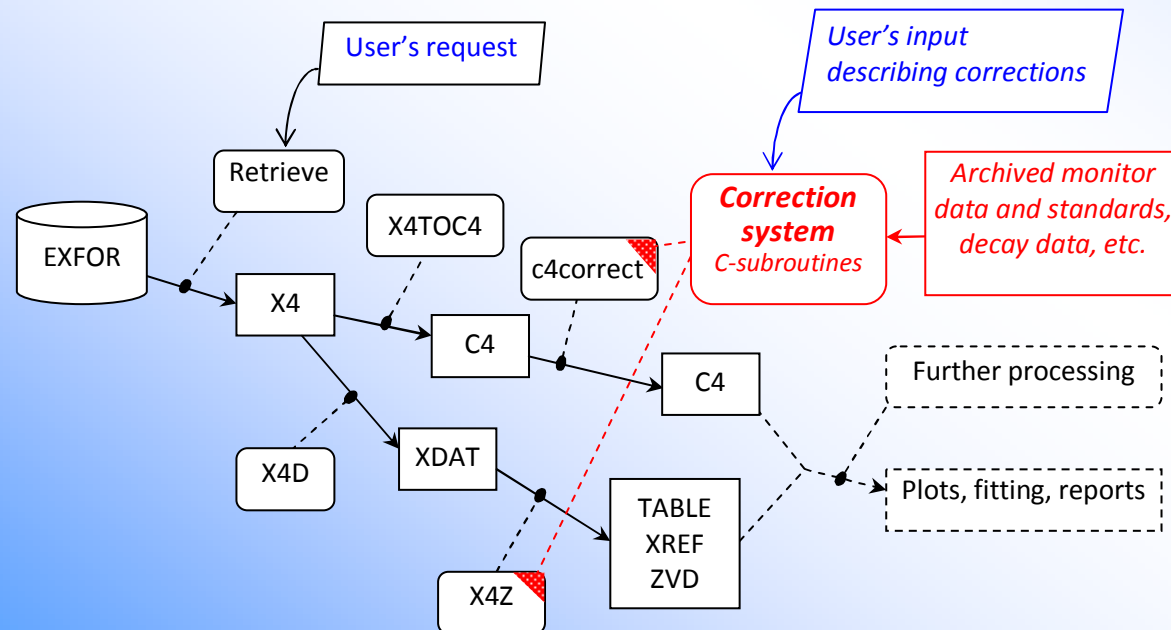
EXFOR Correction System

For the moment, the Correction System is able to perform:

- simple experimental data re-calculation using given factor;
- re-calculate any numbers (including data, energies, angles and their uncertainties) by inter-data expressions using several math operations;
- any manipulations can be limited by an energy range;
- re-normalize data using monitors from archive and recent standards;
- re-normalize data using monitor data coded in EXFOR and recent standards;
- re-normalize data using isotopes abundances and half-lives;
- set up uncertainties if they are not given;
- delete part of a data set;
- convert ratios to absolute numbers;
- calculate ratios to archival monitors and to monitors coded in EXFOR;
- change incident energies;
- correcting wrong units, etc.

Correction System: paradigm

- We DO NOT change EXFOR data:
we renormalize output from EXFOR system,
i.e. we correct of experimental data in computational formats
- Corrected output:
 - computational format C4
 - TABLE, XREF
 - XDAT (intermediate format used for plotting)
 - Quick plots
 - Advanced plots



Using Correction System

The screenshot shows the 'X4/Servlet: Select' web interface. The 'Data Selection' section includes options for 'Retrieve', 'Selected', 'Unselected', and 'All'. The 'Output' section has checkboxes for 'EXFOR', 'EXFOR+', 'Bibliography', 'TAB', 'C4', and 'PlotC4'. The 'Plot' section has checkboxes for 'Quick-plot (cross-sections only)' and 'Advanced plot [how-to]'. The 'Advanced data modifications' section includes a checkbox for 'Corrections' which is checked. The 'Corrections' field contains the following text:

```
11675026
a1=std05$u235nf[0.0253]/[MONIT1]; a2=std05$au197ng[0.0253]/[MONIT2];
m0:allen58 $ U235nf; #used monitor: 235U(n,f), Allen & Henkel, 1958
m1:std05 $ u235nf; #new monitor: 235U(n,f): IAEA-Standard 2005
y =y*a1*a2*m1/m0; dy=y*0.08; #re-normalization of data, set up data errors
```

A callout box labeled 'User's corrections' points to this field. Below the 'Corrections' field are links for '[example]', '[help]', and '[doc]'. The table below shows the results of the search:

n	Display	Year	Author-1	Energy range, eV	Points	Reference	Accession#P	NSR-Key
1	79-AU-197 (N,G)	1959	A.E.Johnsrud+	1.45e5 5.40e6	21	J, PR, 116, 927, 1959	11675026	1959J033

The table also shows 'Quantity: [CS] Cross section' and 'C4: MF3 MT102'. The 'Info' section at the bottom left provides details about the page generation and project.

- Two monitoring points (given in EXFOR COMMON blocks) were used together with energy dependent monitor. Re-normalize absolute cross section data.
- ```
11675026 #dataset=SUBENT
a1=std05$u235nf[0.0253]/[MONIT1];#correction factor for thermal cross section 235U(n,f)
a2=std05$au197ng[0.0253]/[MONIT2];#correction factor for thermal cross section 197Au(n,y)
m0:allen58 $ U235nf; #used monitor: 235U(n,f), Allen & Henkel, 1958
m1:std05 $ u235nf; #new monitor: 235U(n,f): IAEA-Standard 2005
y =y*a1*a2*m1/m0; #re-normalization of data
dy=y*0.08; #set up data errors
```

# Apply corrections

Microsoft Internet Explorer provided by IAEA

http://nds121.iaea.org/exfor2/servlet/X4sMakeX4

File Edit View Favorites Tools Help

Output Data

| Format       | Data      | Size |
|--------------|-----------|------|
| EXFOR        | Text      | 6Kb  |
|              | ZIP       | 2Kb  |
|              | Generate: | X4±  |
| Bibliography | html      | 3Kb  |
|              | BibTeX    | 1Kb  |

Requested corrections

```
11675026
a1=std05$u235nf[0.0253] / [MONIT1]; a2=std05$au197ng[0.0253] / [MONIT2];
m0:allen58 $ U235nf; #used monitor: 235U(n,f), Allen & Henkel, 1958
m1:std05 $ u235nf; #new monitor: 235U(n,f): IAEA-Standard 2005
y =y*a1*a2*m1/m0; dy=y*0.08; #re-normalization of data, set up data errors
```

Correction protocol

Applied corrections. Datasets: 1

```
1) EXFOR:#11675026 y Corrected_Points:21
11675026 a1=584.326/584; a2=98.6593/99; M0:allen58$u235nf; M1:std05$u235nf; Y=Y*a1*a2*M1/M0; dY=Y*0.08;
See used monitors: [plot]
```

79-AU-197(N,G)79-AU-198  
EXFOR Request: 6/1, 2010-May-07 22:35:21

1959 Johnsrud,\*

ENDF Find and add to the plot evaluated data

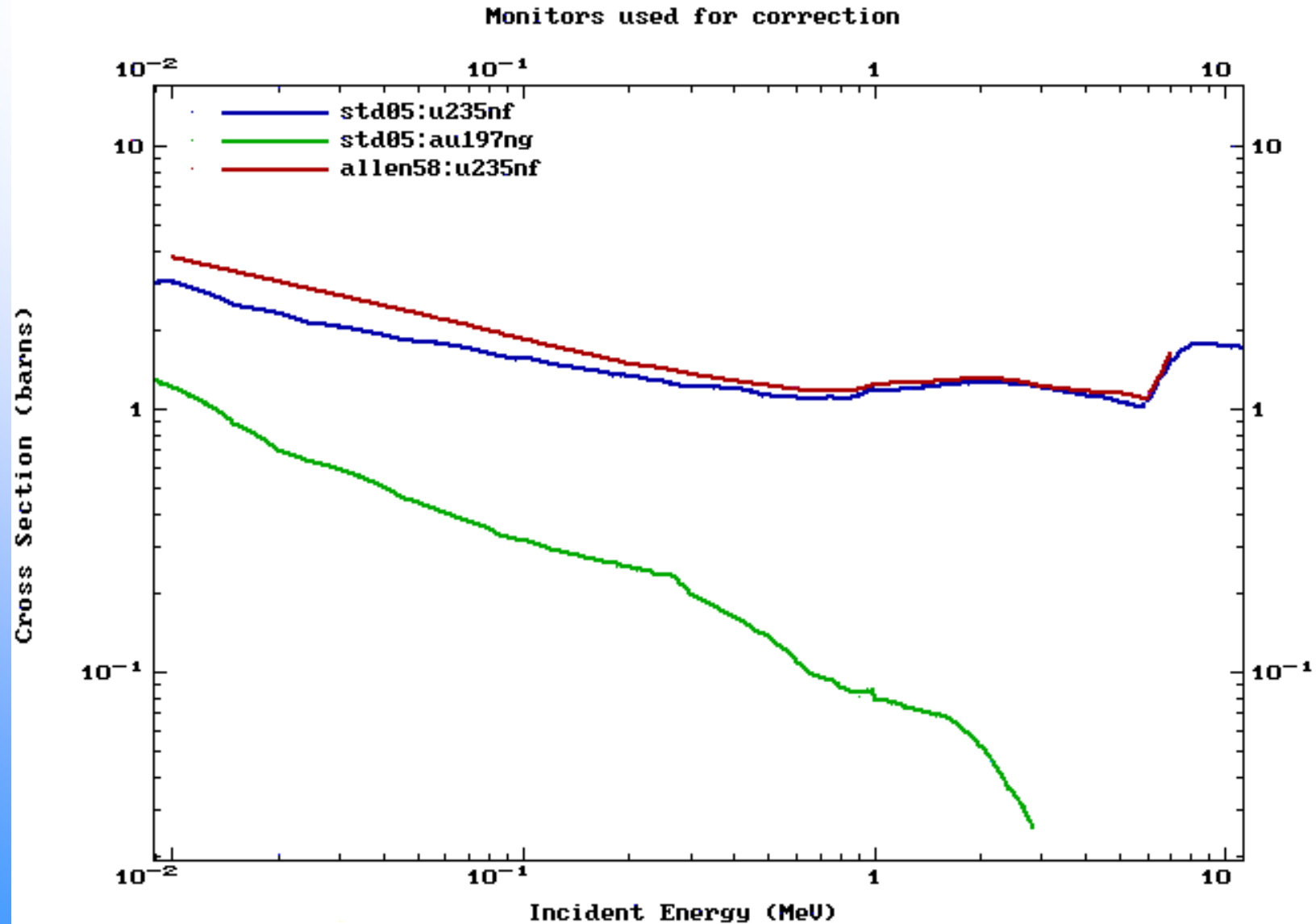
- 1) 79-AU-197(N,G)79-AU-198,,SIG
- 2) Use my data [example]

See: plotted data (3Kb)

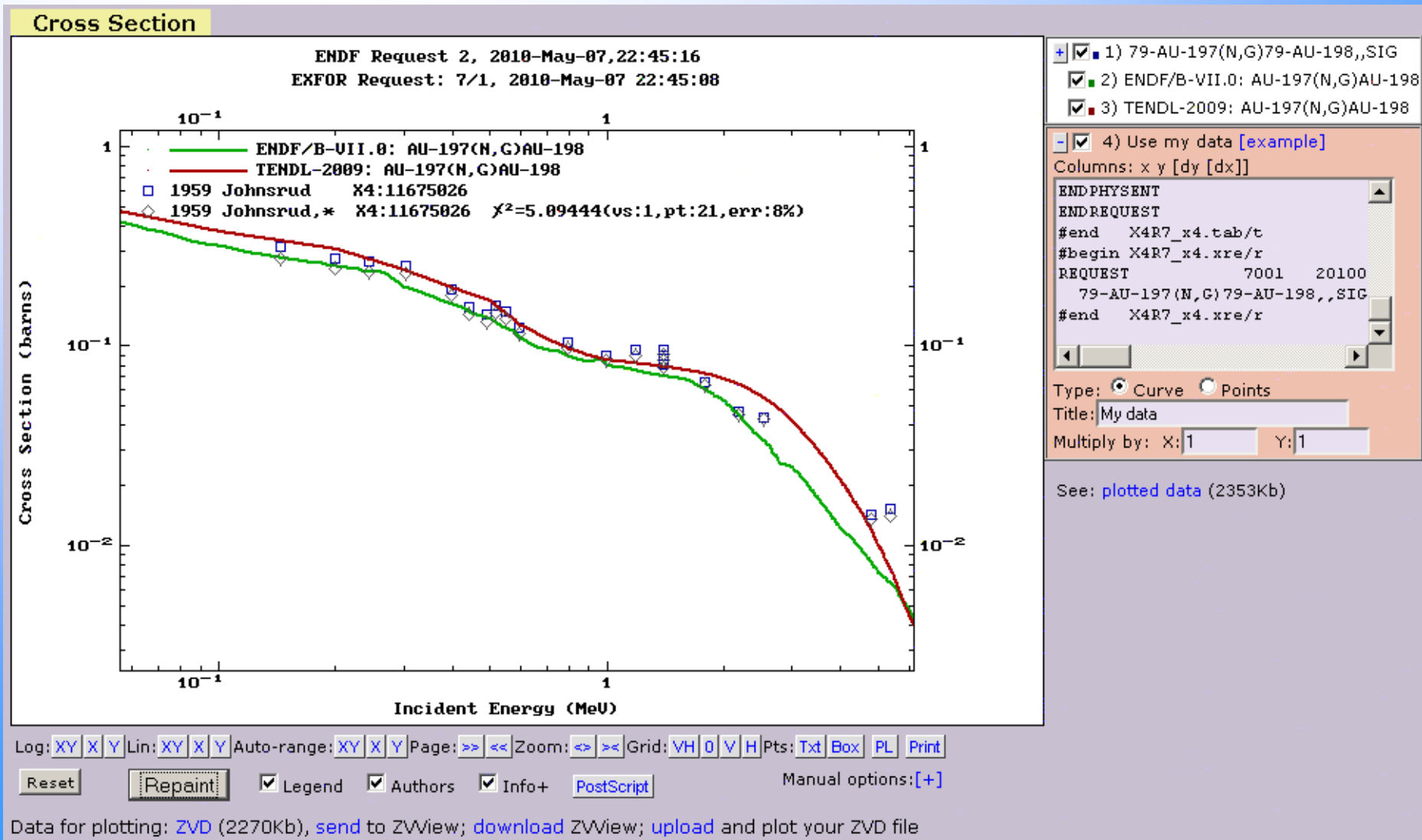
Local intranet 100%



# Checking used monitors



# Original EXFOR data, corrected data and evaluated data



# EXFOR 1142003 25-MN-55(N,G)25-MN-56,,SIG Menlove, 1967

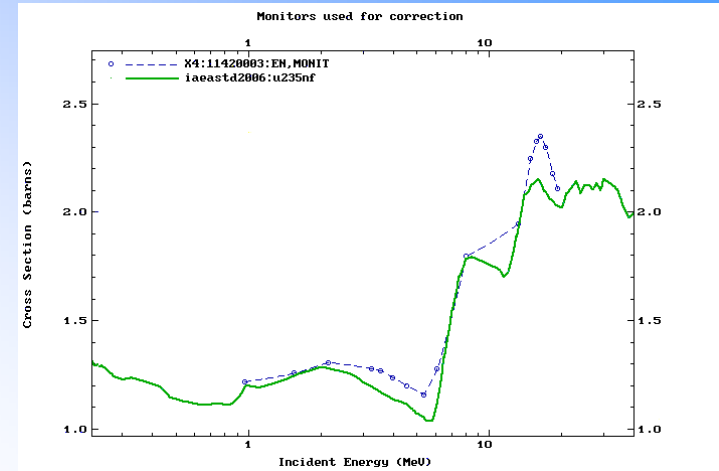
## Monitors used for re-normalization

```

SUBENT 11420001 860612
BIB 11 19
INSTITUTE (1USALOK)
REFERENCE (J,PR,163,1299,67)
 (C,66WASH,2,746,6603)
AUTHOR (H.O.MENLOVE,K.L.COOP,H.A.GRENCH,R.SHER)
TITLE NEUTRON RADIATIVE CAPTURE CROSS SECTIONS FOR NA23,
 MN55, IN115, AND HO165 IN THE ENERGY REGION 1.0 TO 19.4
 MEV.
FACILITY (VDG)
INC-SOURCE (P-T) 1.0-2.2 MEV.
 (D-D) 3.3-6.1 MEV.
 (A-BE) 13.3-19.4 MEV.
 (D-T) 13.3-19.4 MEV.
MONITOR (92-U-235(N,F),,SIG)
DETECTOR (NAICR)
METHOD (ACTIV)
STATUS (SCSRS)
HISTORY (760715T) TRANSLATED FROM SCISRS
 (820813A) CONVERTED TO REACTION FORMALISM
 (860612A) BIB UPDATE.

ENDBIB 19
NOCOMMON 0 0
ENDSUBENT 22
SUBENT 11420003 860612
BIB 2 2
REACTION (25-MN-55(N,G)25-MN-56,,SIG)
DECAY-DATA (25-MN-56,2.58HR,DG)
ENDBIB 2
NOCOMMON 0 0
DATA 5 17
EN EN-RSL DATA DATA-ERR MONIT
MEV MEV B B B
9.70 -01 1.00 -01 2.80 -03 2.2 -04 1.22
1.56 +00 1.2 -01 1.94 -03 1.5 -04 1.26
2.15 +00 1.3 -01 1.89 -03 1.4 -04 1.31
.....
1.735 +01 3.2 -01 7.05 -04 7.1 -05 2.30
1.844 +01 3.3 -01 5.80 -04 5.5 -05 2.18
1.939 +01 3.5 -01 4.72 -04 4.8 -05 2.11
ENDDATA 19
ENDSUBENT 26

```



IAEA Standards (2006)

```

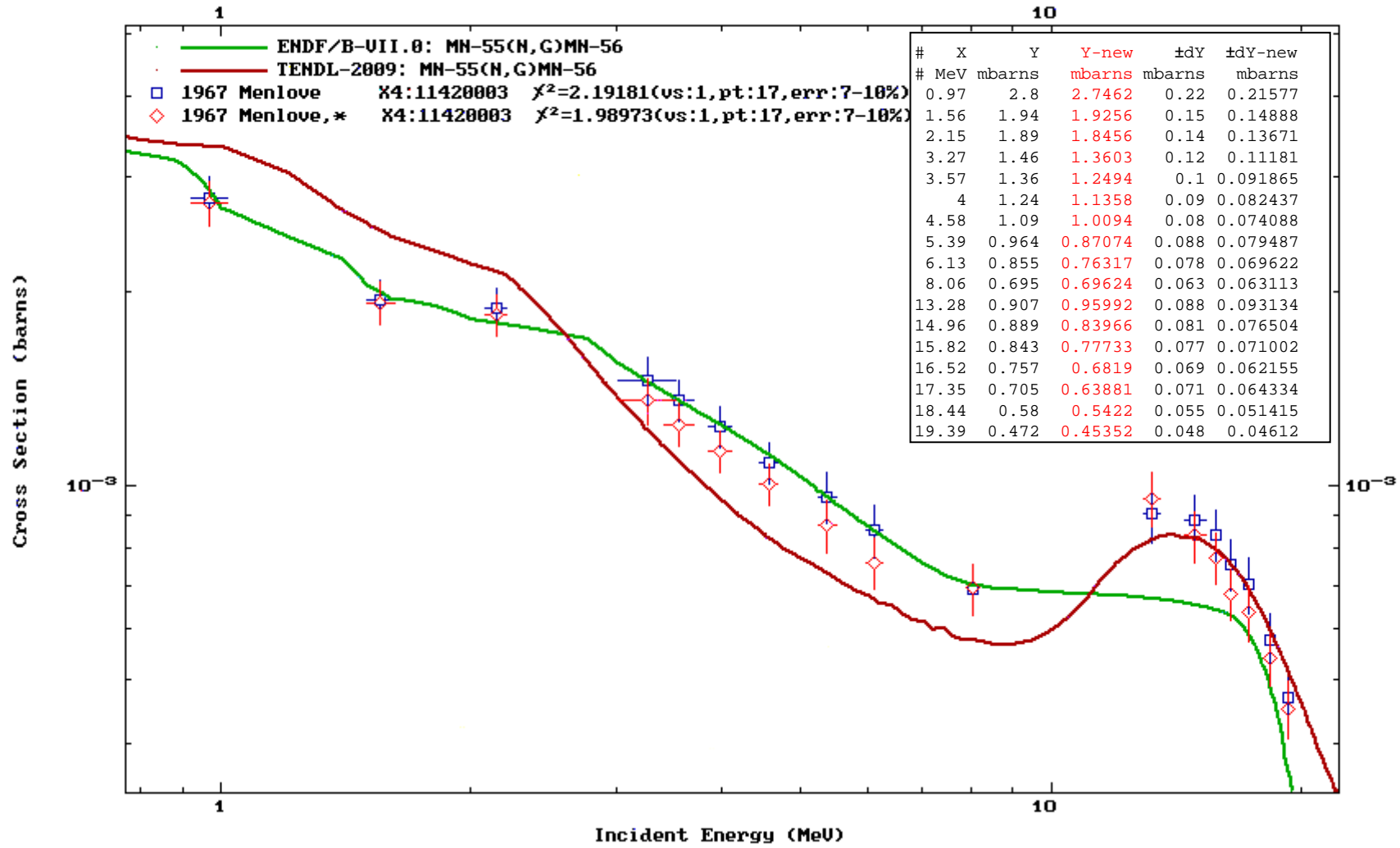
#Corrections:
11420003
 m0: [EN,MONIT];
 m1: iaeastd2006 $ u235nf;
 y =y*m1/m0;
 dy=dy*m1/m0;

```

# EXFOR 1142003 25-MN-55(N,G)25-MN-56,,SIG Menlove, 1967

Applied corrections. Datasets: 1  
 1) EXFOR:#11420003 Corrected\_Points:17  
 11420003 M0:[EN,MONIT]; M1:iaeastd2006\$u235nf; Y=Y\*M1/M0; dY=dY\*M1/M0;

ENDF Request 501, 2010-May-04,11:23:29  
 EXFOR Request: 802/1, 2010-May-04 11:28:16



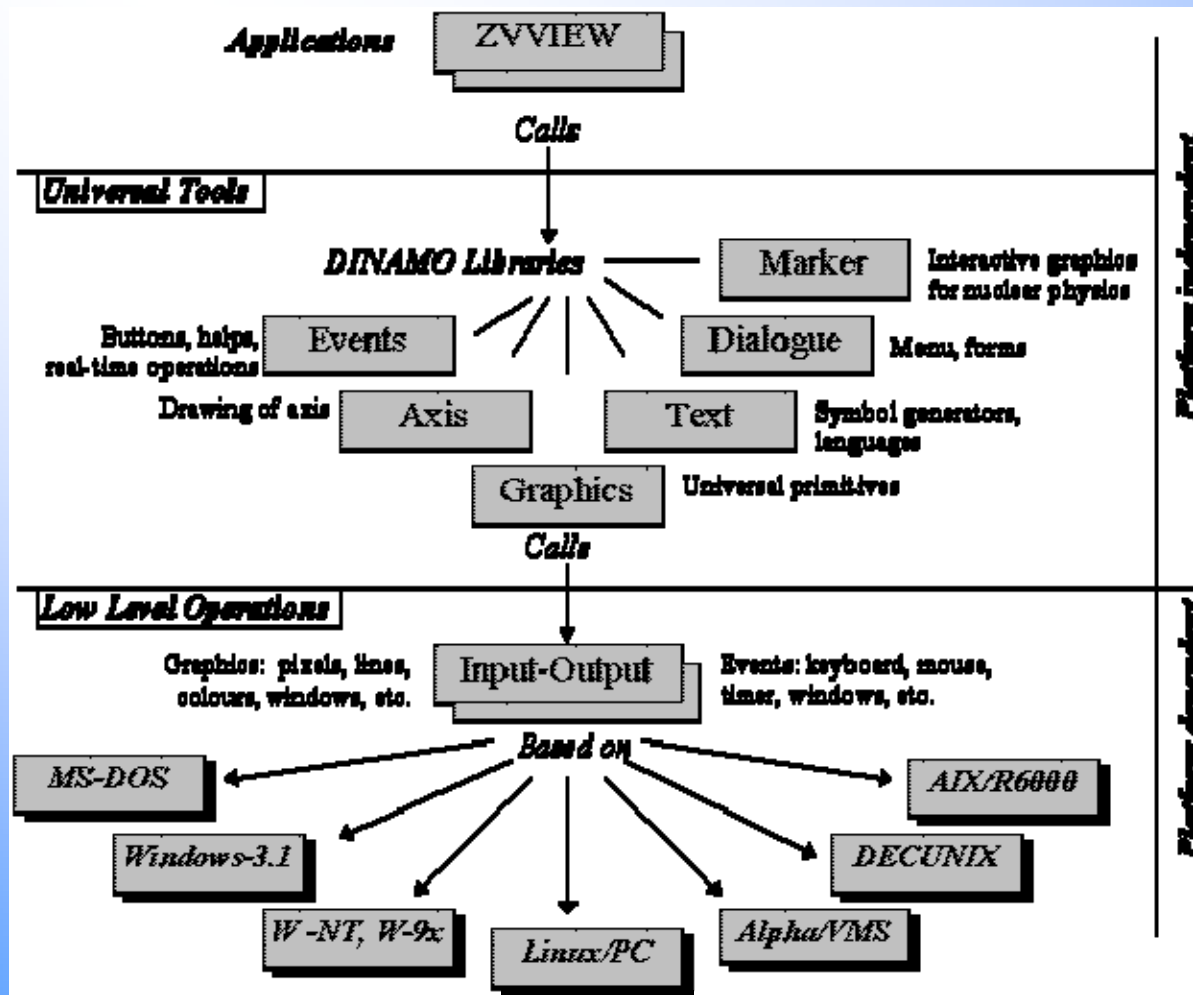
# Interactive plotting package ZVView

by V.Zerkin, Kiev-Vienna, 1993 -2010

ZVView: software package for efficient interactive visual analyses of the nuclear data.

DINAMO\*: basic graphics library for creating software applications for nuclear research.

## Software Structure



# ZVView / Dinamo: major features

- **Language** C, ~110.000 lines
- **User interface** Self-made, low level
- **Multi-platform** Windows, Linux/X11, Mac, VMS, MS-DOS, ...
- **Many data types** experimental, theoretical, spectra, ...
- **Many datasets** flexible array of functions
- **Many input formats** BNL-Table, Xref, MF3, MF33, etc.
- **Many output formats** ZVD, table, PCX, GIF, PS, EPS, EMF
- **Multi-language** English, Russian, French
- **Functions** Lin/Log, zoom by mouse, scaling, fitting, legend, changing units, 3D animation, scanning points, data comparison, selection of authors, etc.
- **Many regimes** stand-alone program, Web Browser-helper application, server-side plotting, non-interactive procedure to produce plots, ...
- **Part of packages** Exfor-Endf Web retrieval system, Empire, EndVer/GUI, EXFOR-CDROM, Web-ZVView, etc.



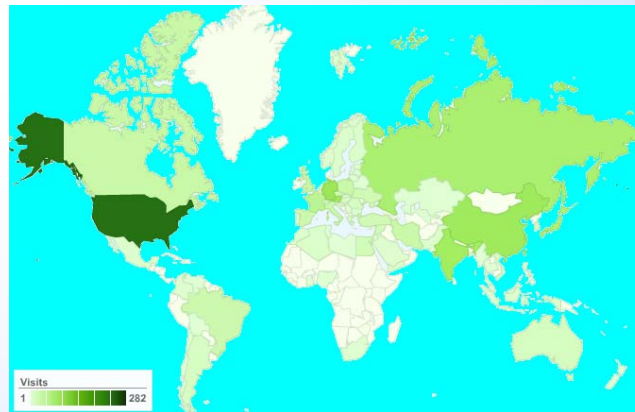
# ZVView: 1996-2010

Download: <http://www-nds.iaea.org/ndspub/zvview/>

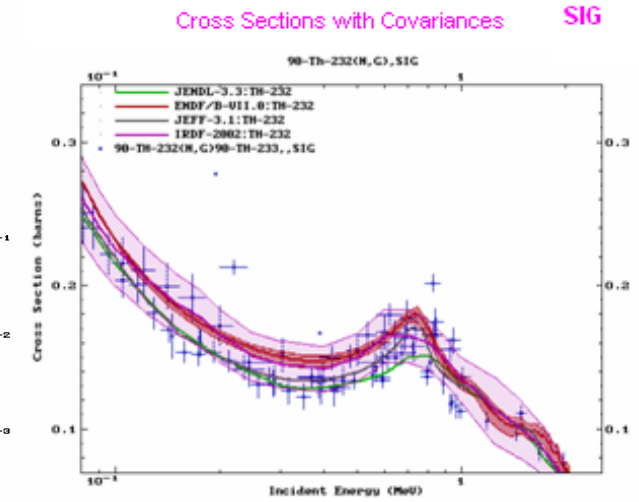
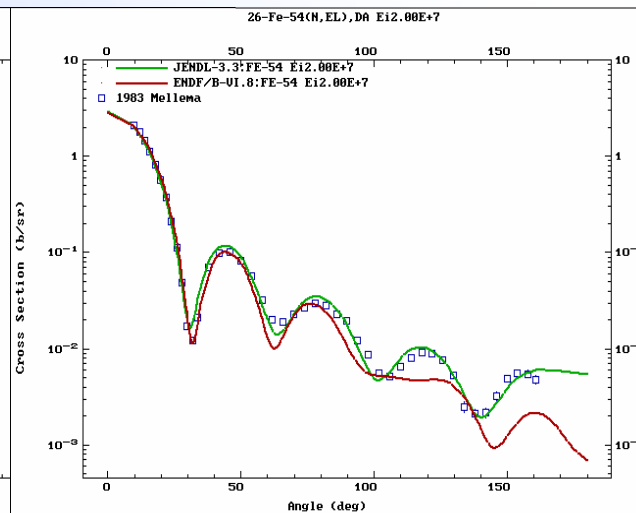
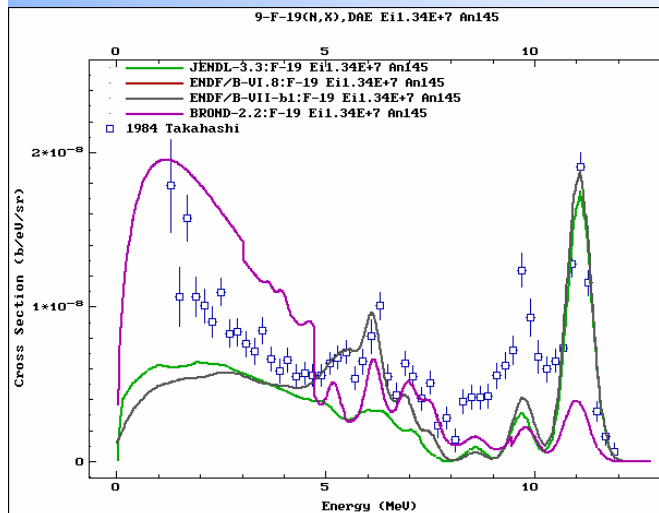
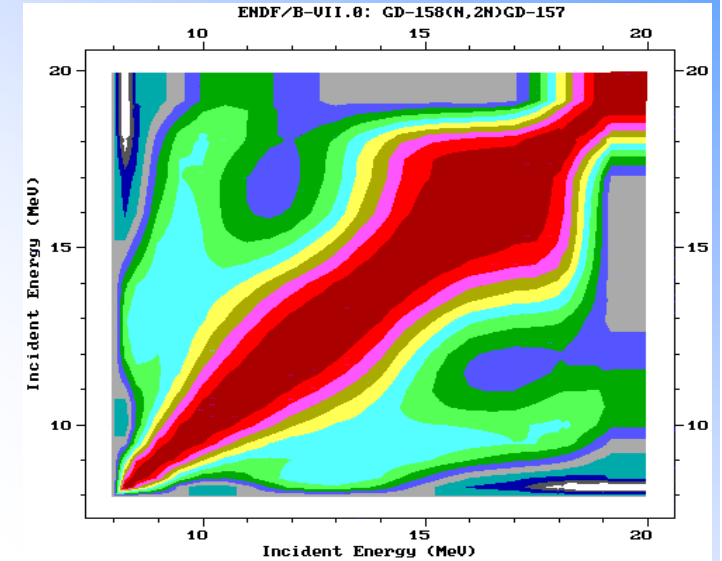
## Integrated into:

- EXFOR-ENDF Web Retrieval system
- Empire
- Endver/GUI
- EXFOR-CDROM
- PGAA
- NG-Atlas
- FENDL in Pictures
- IRDF-2002
- ENDF-covariance tools
- Web-ZVView

Last 15 Months: 1,528 visits came from 72 countries/territories 698 visitors (by Google Analytics)

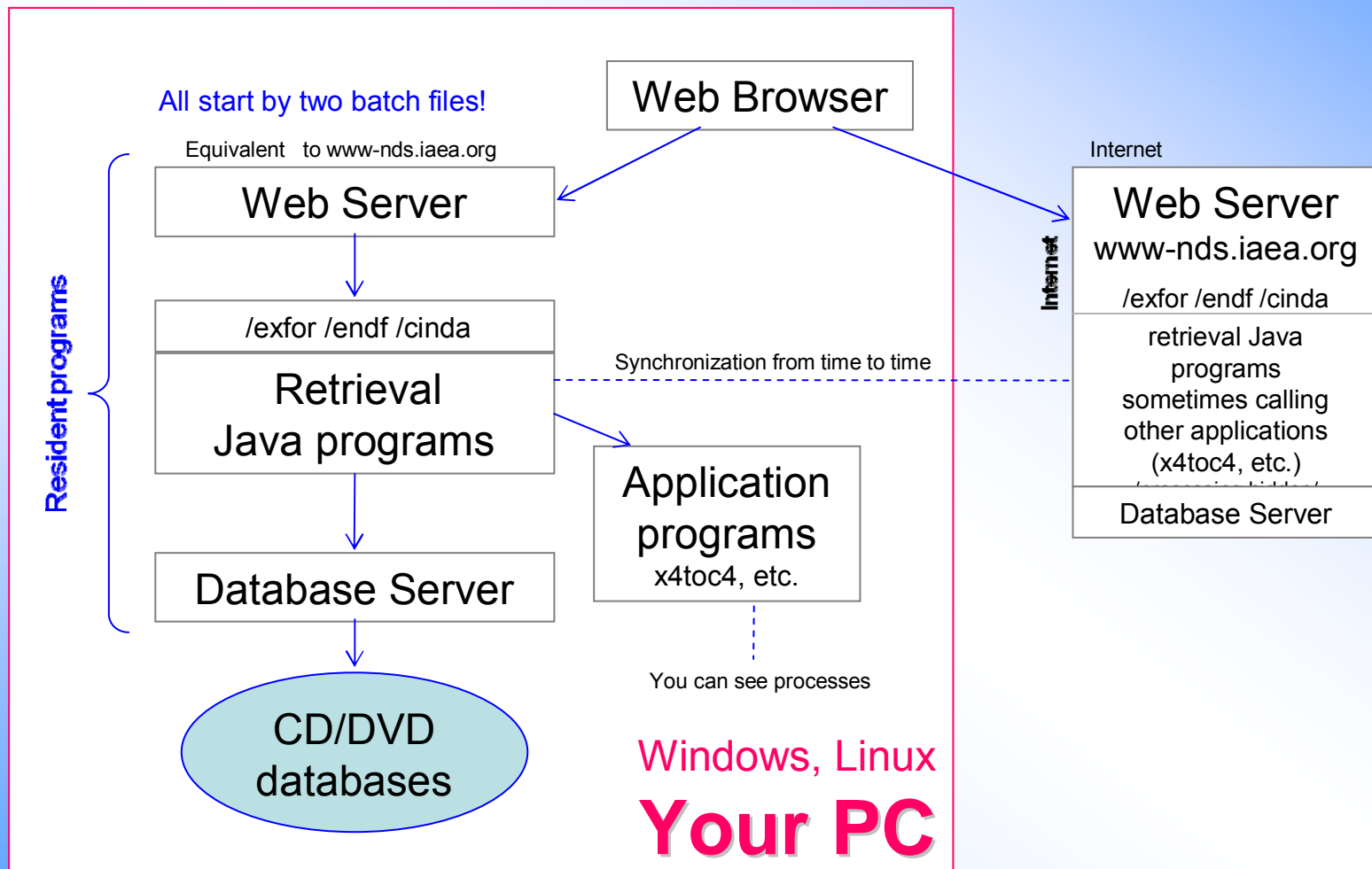


|                  |     |                   |    |
|------------------|-----|-------------------|----|
| 1. United States | 282 | 6. Russia         | 83 |
| 2. Germany       | 103 | 7. Japan          | 77 |
| 3. China         | 100 | 8. France         | 54 |
| 4. Austria       | 99  | 9. United Kingdom | 39 |
| 5. India         | 96  | 10. Canada        | 37 |



# Pilot project: “Web on your Table”

Complete Web retrieval system running locally





**Thank you.**