

Introduction to the IAEA Nuclear Data Services

Viktor Zerkin

International Atomic Energy Agency, Nuclear Data Section

Joint ICTP-IAEA Workshop on Nuclear Reaction Data for Nuclear Power Applications
Trieste, Italy, 22 - 26 September 2014



International Atomic Energy Agency

Nuclear Data Services

Provided by the Nuclear Data Section

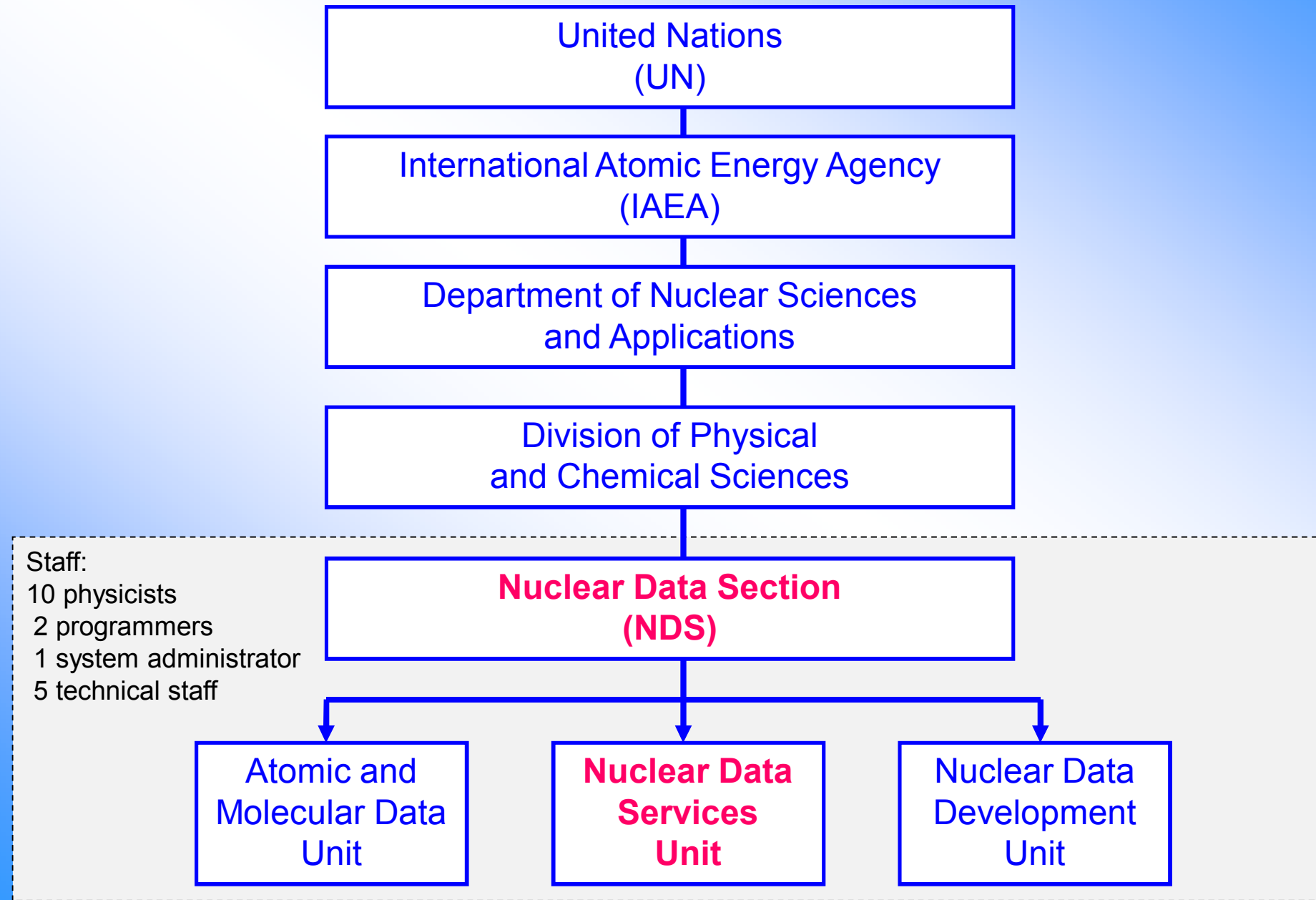
Our Internet Address

<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" (Brazil, India, China)
 - Workshops

software development
system management

Nuclear Data

- Traditional classification and major (general purpose) libraries

| | <i>Bibliographical</i> | <i>Experimental</i> | <i>Evaluated</i> |
|--------------------------|---|--|---|
| <i>Nuclear Reactions</i> | CINDA Computer Index of Nuclear Reaction Data | EXFOR* Experimental Nuclear Reaction Data | ENDF Evaluated Nuclear Data File |
| <i>Nuclear Structure</i> | NSR Nuclear Science References | XUNDL Experimental Unevaluated Nuclear Data List | ENSDF** Evaluated Nuclear Structure Data File |

Product of International Networks:

* NRDC Nuclear Reaction Data Center

** NSDD Nuclear Structure and Decay Data

- Specialized nuclear data libraries (examples)

| | <i>Experimental</i> | <i>Evaluated</i> |
|--------------------------|---|---|
| <i>Nuclear Reactions</i> | IBANDL Ion Beam Analysis Nuclear Data Library | - <i>ENDF formatted</i> - IRDF International Reactor Dosimetry and Fusion File - FENDL Fusion Evaluated Nuclear Data Library - many more |

- Nuclear data in various formats

- Software generating data

~50 years of regular activity and international co-operation in: data formats, exchange, storage, validation; partially in: software, Internet access, data processing, etc.

Our Front Page

IAEA Nuclear Data Services - Windows Internet Explorer provided by IAEA

https://www-nds.iaea.org/ IAEA Nuclear Data S...

International Atomic Energy Agency
Nuclear Data Services
Sección Datos Nucleares, OIEA

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

Search Go

Hot Topics » ENDF/B-VII.1 • TENDL-2012 • JENDL-4 • IBANDL **News** » 50 year anniversary of NDS, June 2014

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-3.2
ENDF Archive
ENDF Retrieval
ENDF-6 Codes
ENDF-6 Format
ENDVER
ENSDF
ENSDF ASCII Files
ENSDF programs
EXFOR
FENDL 3.0
Fission Yields
GANDR
Geant4 Libraries
IBANDL
INDL/TSL

NEW
JEFF-3.2 - Joint Evaluated Fission and Fusion File, coord. by NEA Data Bank, 2014 [page] [archive] [retrieve]
IRDF - International Reactor Dosimetry and Fusion File v1.03 [page] [archive] [retrieve]
CD/DVD-ROMs available for on-line downloading [page]
Portable Empire-3.2.2 for Windows - nuclear reaction model code system for data evaluation [page] [download]

Mirrors
Partners
Events <5:6>

5th Workshop of the Decay Data Evaluation Project (DDEP-2014)
October 6-8, 2014
Bucharest-Magurele, Romania

Workshop on elastic and Inelastic Neutron Scattering (WINS2014)
Dec. 3-5, 2014
Dresden, Germany

Main | All | Reaction Data | Structure & Decay | by Applications | Doc & Codes | Index | Events | Links | 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 |
| PGAA Prompt gamma rays from neutron capture | FENDL 3.0 Fusion Evaluated Nuclear Data Library, Version 3.0 | Photonuclear cross sections and spectra up to 140MeV |
| NAA Neutron Activation Analysis Portal | Safeguards Data recommendations, August 2008 | Medical Portal Data for Medical Applications |
| | | Charged particle reference cross section Beam monitor reactions |
| | | IRDF International Reactor Dosimetry and Fusion File |
| | | 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 |
|----------------------------------|-------------------------------|--------------------|-------------|-------------------------------|--------------------------------------|--|---|----------------|

© Copyright 2007-2014, 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: nds.contact-point@iaea.org. Read our [Disclaimer](#)

Last Updated: 19-September-2014

Web design: V.Zerkin, IAEA, 2008

Our Web Mirrors and Partners

International Atomic Energy Agency
Nuclear Data Services
قسم البيانات النووية مقدمة من

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

Search Go

Hot Topics » ENDF/B-VII.1 • TENDL-2012 • JENDL-4 • IBANDL News » 50 year anniversary of NDS, June 2014

<http://www-nds.iaea.org> →

<http://www-nds.indcentre.org.in> →

<http://www-nds.ciae.ac.cn> →

<http://www.nndc.bnl.gov> →

↑ Mirrors

Nuclear Data Services
International Atomic Energy Agency
Vienna, Austria

BARC, India
Nuclear Data Services
Bhabha Atomic Research Centre
Mumbai, India

CNDC, China
Nuclear Data Services
China Institute of Atomic Energy
Beijing

↑ Partners

NNDC
National Nuclear Data Center, Brookhaven, USA

Our CD-ROMs distribution

International Atomic Energy Agency
Nuclear Data Services
 قسم البيانات النووية مقدمة من

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

Search Go

Hot Topics » ENDF/B-VII.1 • TENDL-2012 • JENDL-4 • IBANDL News » 50 year anniversary of NDS, June 2014

Request

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

NDS-IAEA CD-ROM distribution - Windows Internet Explorer provided by IAEA

https://www-nds.iaea.org/cdroms/


International Atomic Energy Agency
Nuclear Data Services
 Section Données Nucléaires, AIEA

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

Search Go

Nuclear Data on CD/DVD-ROMs

Select products from the list below

| # | Product | Issued | Title [Link] Comment [Download] |
|--|---|-----------|--|
| 1 | <input type="checkbox"/> ADS v-2.0 | Dec-2008 | Application Library for Accelerator Driven Systems [page] |
| 2 | <input type="checkbox"/> EMPIRE-3.2.2 Portable for Windows | Jan-2014 | System of codes for nuclear reaction calculations and nuclear data evaluation [screen-shots] <input type="checkbox"/> Download (zip, 753Mb) |
| <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Required code:</p>  <p>Refresh</p> </div> <div style="text-align: center;"> <p>Enter code:</p> <input type="text"/> <input type="button" value="Go!"/> </div> </div> | | | |
| 3 | <input type="checkbox"/> ENDF libraries | Aug-2013 | 30 Evaluated Data Libraries including ENDF/B-VII.1, JEFF-3.2, JENDL-4.0u2, CENDL-3.1, ROSFOND-2010 |
| 4 | <input type="checkbox"/> EPDL97 | Mar-2002 | Photon and Electron interactions <input type="checkbox"/> Download (zip, 58Mb) |
| 5 | <input type="checkbox"/> EXFOR-CINDA for Windows | Apr-2013 | Database (MS-Access) and retrieval system (Java-2). Portable. [screen-shots] <input type="checkbox"/> Download (zip, 247Mb) |
| 9 | <input type="checkbox"/> INDL-TSL | May-2005 | Thermal Neutron Scattering Library [page] [archive] <input type="checkbox"/> Download (zip, 53Mb) |
| 22 | <input type="checkbox"/> RIPL-2 | Mar-2003 | Reference Input Parameter Library for theoretical calculations of nuclear reactions (does not supersede RIPL-1) [page] |
| 23 | <input type="checkbox"/> WIMSD | July-2008 | Software and Data to Plot and Compare Neutron Nuclear cross sections from WIMS-D Library files [page] <input type="checkbox"/> Download (zip, 167Mb) |
| 24 | <input type="checkbox"/> YAVSHITS | Feb-2002 | Theoretical evaluation of neutron and proton induced fission cross-sections for Pb-Pu targets in energy range 20-200 MeV [archive] <input type="checkbox"/> Download (zip, 175Kb) |

Send requests to:

| | | |
|--|---|--|
| Nuclear Data Section International Atomic Energy Agency Vienna International Centre, P.O.Box 100, A-1400 Vienna, Austria | Tel: (+43 1) 2600-21725 Fax: (+43 1) 26007 e-mail: nds.contact-point@iaea.org | Markup product(s) and <input type="button" value="Send e-mail"/> Please, remember to include your postal address: |
|--|---|--|

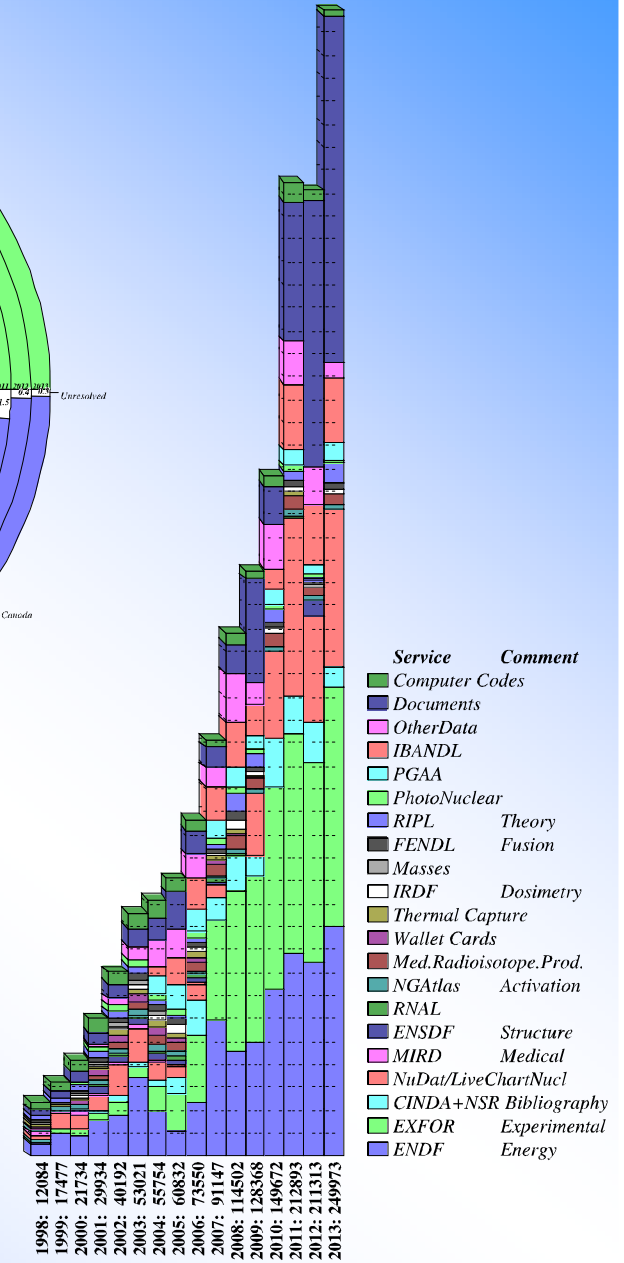
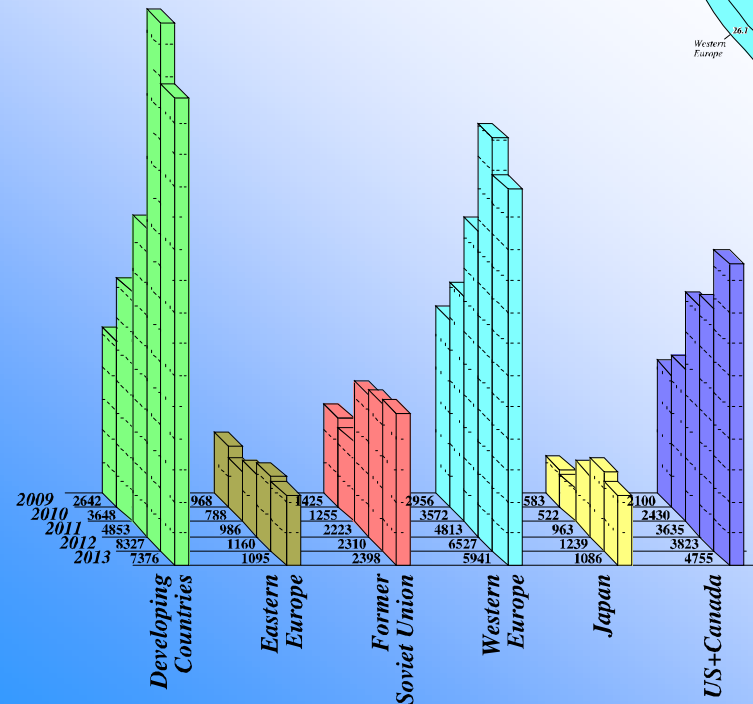
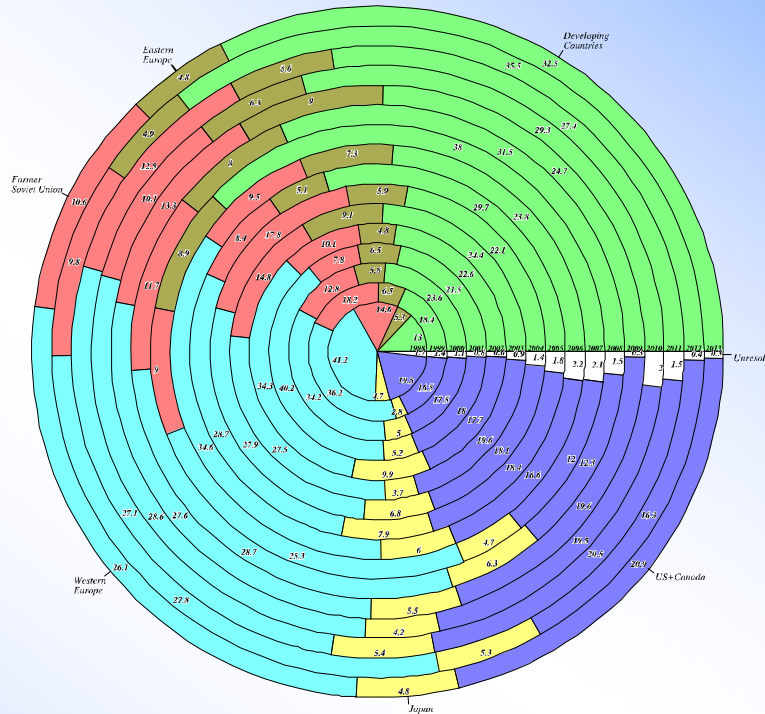
Hard copies of documents are available on request.

NDS Web Statistics

Total per Year

Geographical distribution (%)

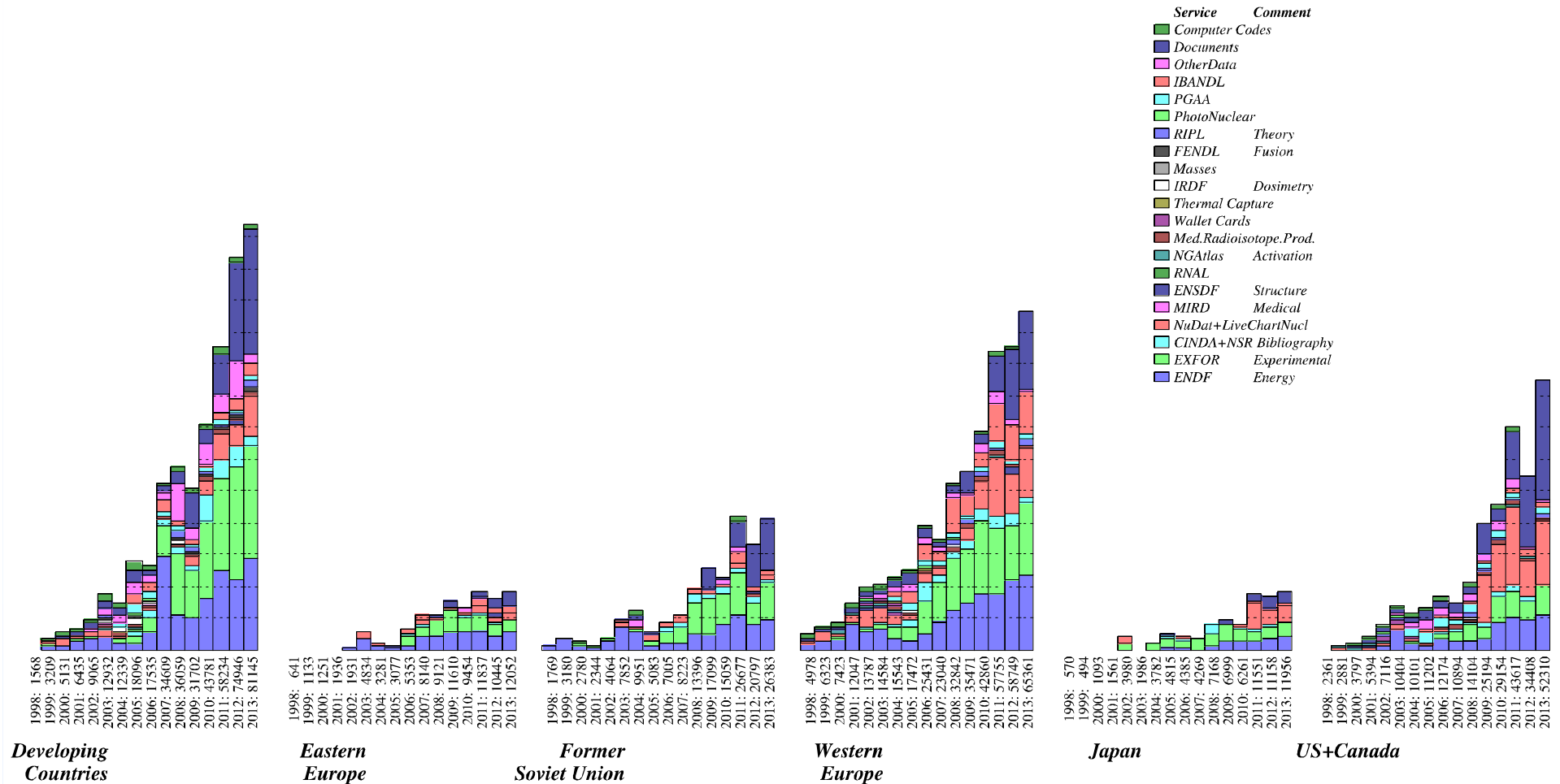
Average per Month*
*2012: 10 Months of service



- | Service | Comment |
|------------------------|--------------|
| Computer Codes | |
| Documents | |
| OtherData | |
| IBANDL | |
| PGAA | |
| PhotoNuclear | |
| R1PL | 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



Tabs by data types.

1) Structure and Decay Data

The screenshot shows a web interface with a navigation bar at the top containing tabs: Main, All, Reaction Data, Structure & Decay (selected), by Applications, Doc & Codes, NDS-Internal, Index, and Events. Below the navigation bar, the main content area is titled 'Structure and Decay Data' and contains four entries: NSR (Nuclear Science References), ENSDF (evaluated nuclear structure and decay data (+XUNDL)), NuDat 2.5 (selected evaluated nuclear structure data), and LiveChart of Nuclides (Interactive Chart of Nuclides: Advanced and Basic). Below this section is a 'Miscellaneous' section with links to ENSDF and NSR Manuals, ENSDF programs, NSDD ICTP Workshops, and the International network of Nuclear Structure and Decay Data evaluators. At the bottom, there are 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

Structure and Decay Data

 **NSR**
Nuclear Science References *

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

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

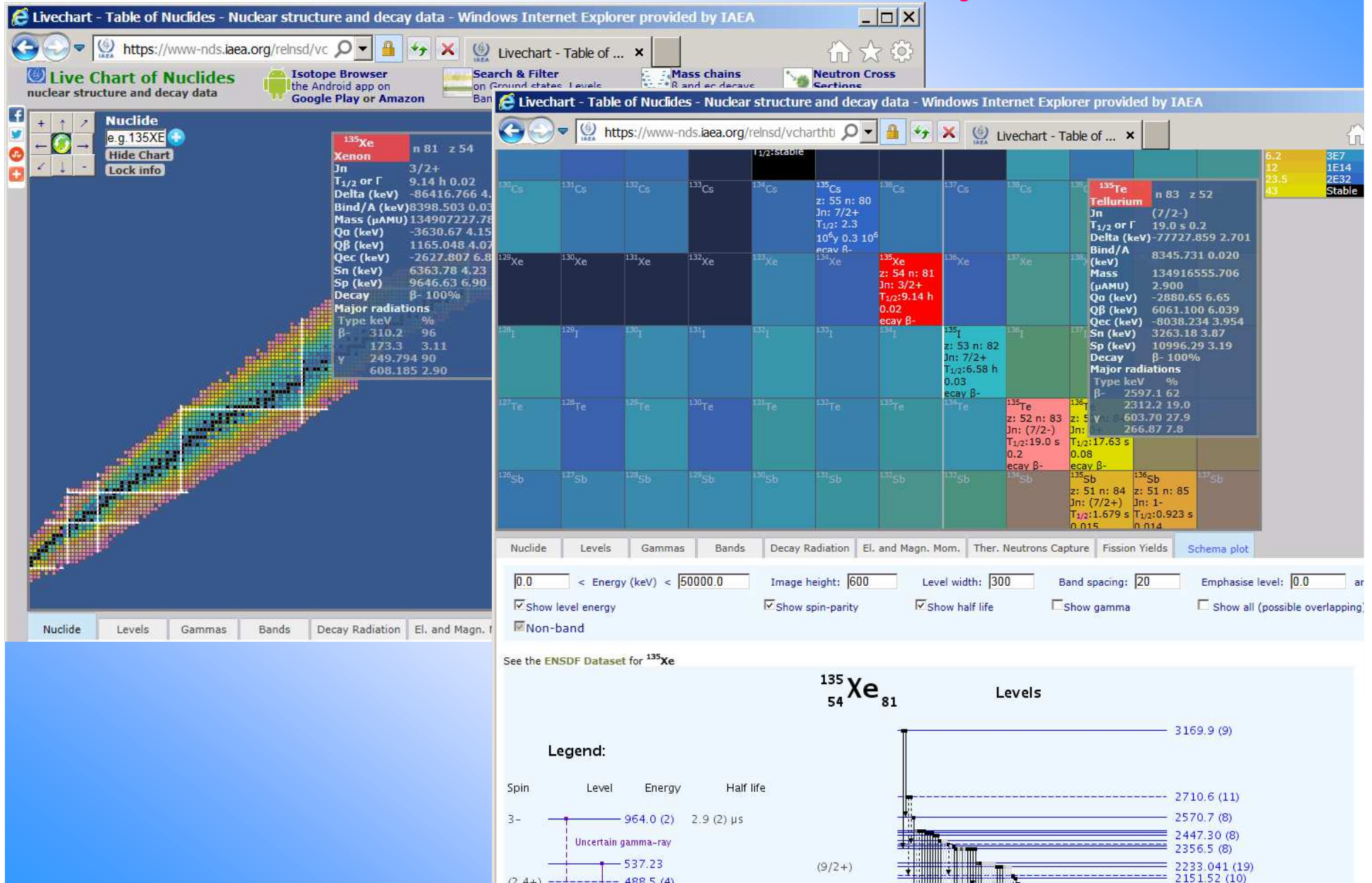
 **LiveChart of Nuclides**
Interactive Chart of Nuclides:
Advanced and Basic

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

Live Chart of Nuclides: nuclear structure and decay data



2) Nuclear Reaction Data

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

Quick Links
POINT2012
PREPRO
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
Mirror site: New NDS Web Mirror-site in China <http://www-nds.ciae.ac.cn/>
ANDROID app: Browse Structure and Decay Data on your mobile device [Google Play]
EXFOR Milestone: 20,000 experimental works are now in the database! [retrieve] [statistics] [updates]
IRDFFF - International Reactor Dosimetry and Fusion File v1.02 [page] [archive] [retrieve]

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

Database Retrieval Systems

- ENDF**
Evaluated nuclear reaction libraries
- EXFOR**
Experimental nuclear reaction data
- CINDA**
Nuclear reaction bibliography

Data Libraries for download

- [NGATLAS](#) - atlas of neutron capture cross sections
- [IBANDL](#) - Ion Beam Analysis Nuclear Data Library
- [FENDL 3.0](#) - Fusion Evaluated Nuclear Data Library, Version 3.0
- [Minsk Actinides Library](#) - evaluated neutron reaction data (Maslov et al.)
- [IRDF-2002](#) - International Reactor Dosimetry File
- [IRDFFF](#) - International Reactor Dosimetry and Fusion File
- [Charged particle reference cross section](#) - Beam monitor reactions
- [PADF 2007](#) - Proton Activation Data File
- [POINT2012](#) - Pointwise data of ENDF/B-VII.1, processed into temperature dependent form
- [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 evaluated data in original ENDF (4,5,6) format
- [Thin Layer Activation](#) - Thin Layer Activation (TLA) Technique for Wear Measurements
- [PIGE](#) - Reference Database for Particle Induced Gamma-ray Emission

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
- NRDC** Nuclear Reaction Data Center Network
- NSDD** Nuclear Structure & Decay Data Network
- Technical Documents INDC Reports Publications
- 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

Tab with data and tools sorted by Applications



The screenshot shows a web application interface with a navigation menu at the top and a list of application categories below. The navigation menu includes tabs for 'Main', 'All', 'Reaction Data', 'Structure & Decay', 'by Applications' (which is highlighted in blue), 'Doc & Codes', 'NDS-Internal', 'Index', and 'Events'. The list of application categories is as follows:

- 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

At the bottom of the interface, there are two footnotes: '*Database at the IAEA, Vienna' and '**Database at the US NNDC'.

by Applications.

Category: Reactor Physics

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 Databases

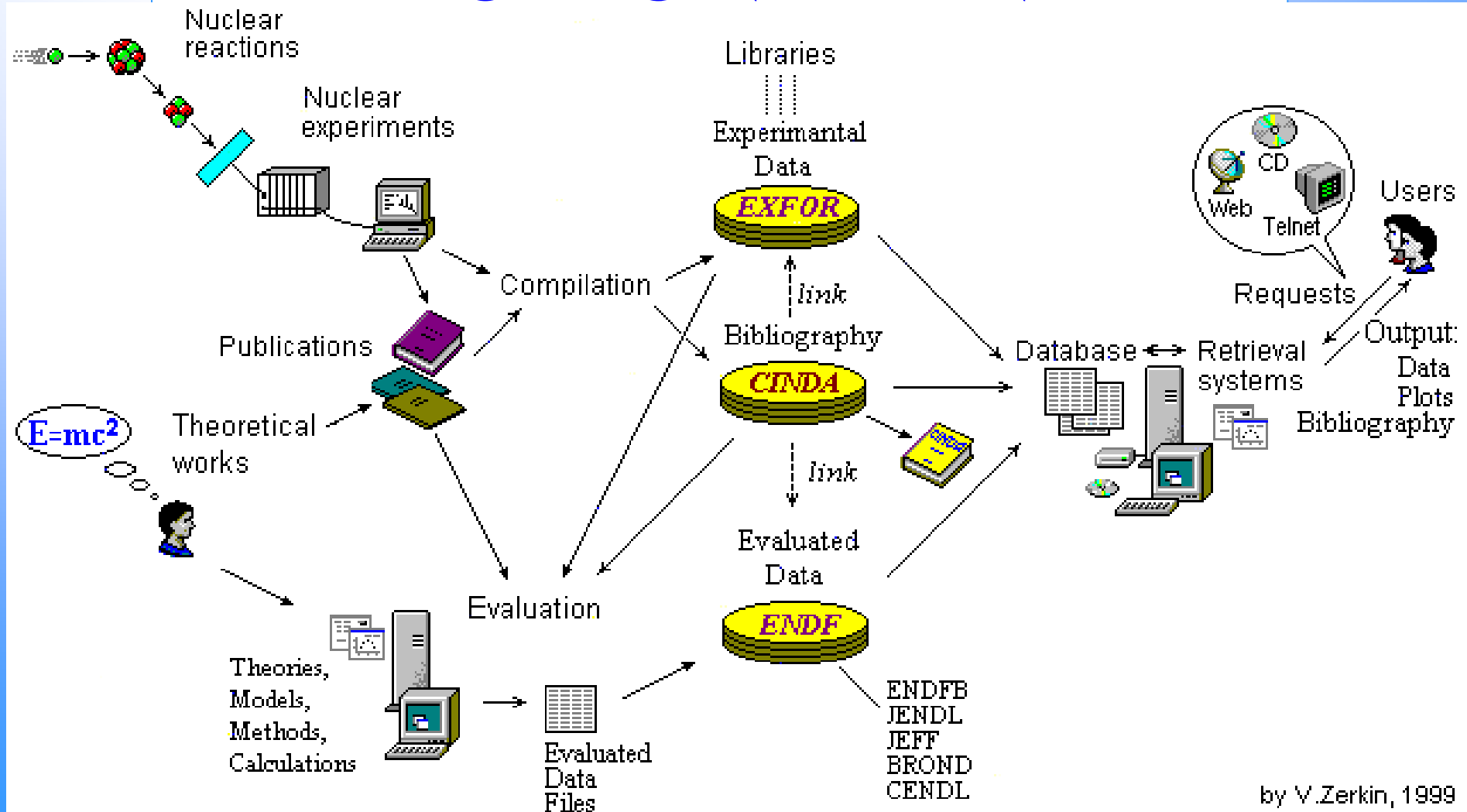
| Database | Contents | Size (January-2003) | Size (October-2014) |
|----------|---|---|---|
| EXFOR | contains experimental nuclear reaction data for incident neutrons, charged particles and photons | 13,500 Entries 97,000 Data sets 400 Mb ASCII-text | 20,465 Entries 157,502 Data sets 558 Mb ASCII-text |
| CINDA | contains bibliographical references to experimental nuclear reaction data and to calculations, reviews, compilations and evaluations of neutron reaction and spontaneous fission data | 266,000 Lines 40,500 Publications 32,500 Blocks 37 Mb ASCII-text | 556,026 Lines 91,082 Publications 289,111 Blocks 108 Mb ASCII-text |
| ENDF | is a collection of evaluated data libraries | ~300 Mb ASCII (5 basic libraries) | >30 Gb ASCII (46 libraries) |

EXFOR data library (EXFOR: EXchange FORmat)

- 1970 agreed format and established exchange between USA, NEA, IAEA, USSR
- ▶ - contains data from ~20,000 experiments (~\$20bn)
- NRDC: 13 nuclear data centres contribute ~500 new Entries every year
- since 2005: global data library with central maintenance in the IAEA (NDS)
- Master File (560Mb), 52 Dictionaries (2.6Mb), 2 Manuals (400 pages)
- Distribution (EXFOR, X4+, C4, XML, Html, plots): Web, CD/DVD ROM, FTP
- Databases: MySQL, MS-Access, SyBase
- Software: C, Java (GUI-Applications, Servlets), Fortran
- Connection (import-export) to other databases: ENDF, CINDA, NSR

Nuclear Reaction Databases

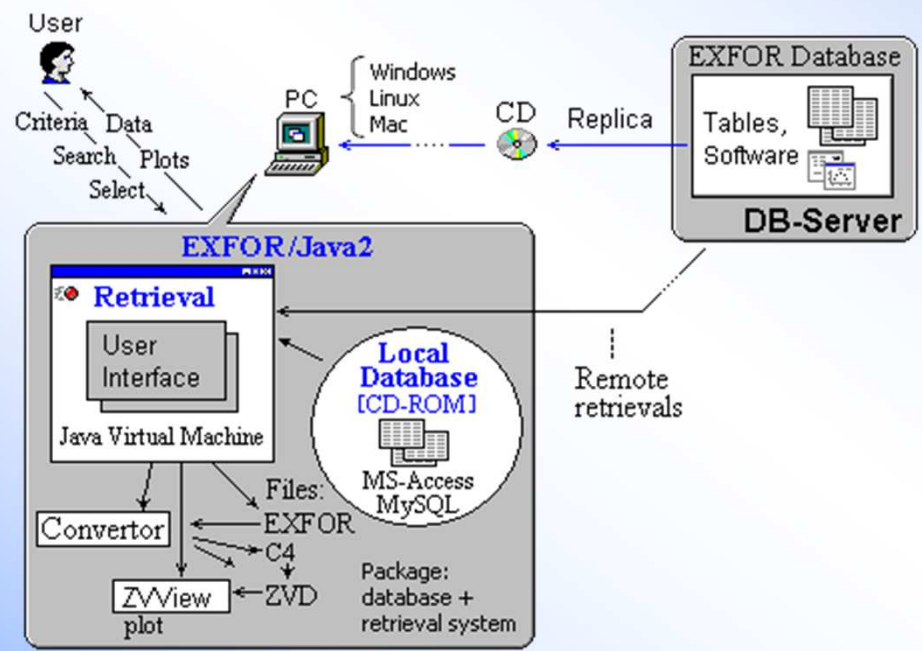
EXFOR - CINDA - ENDF



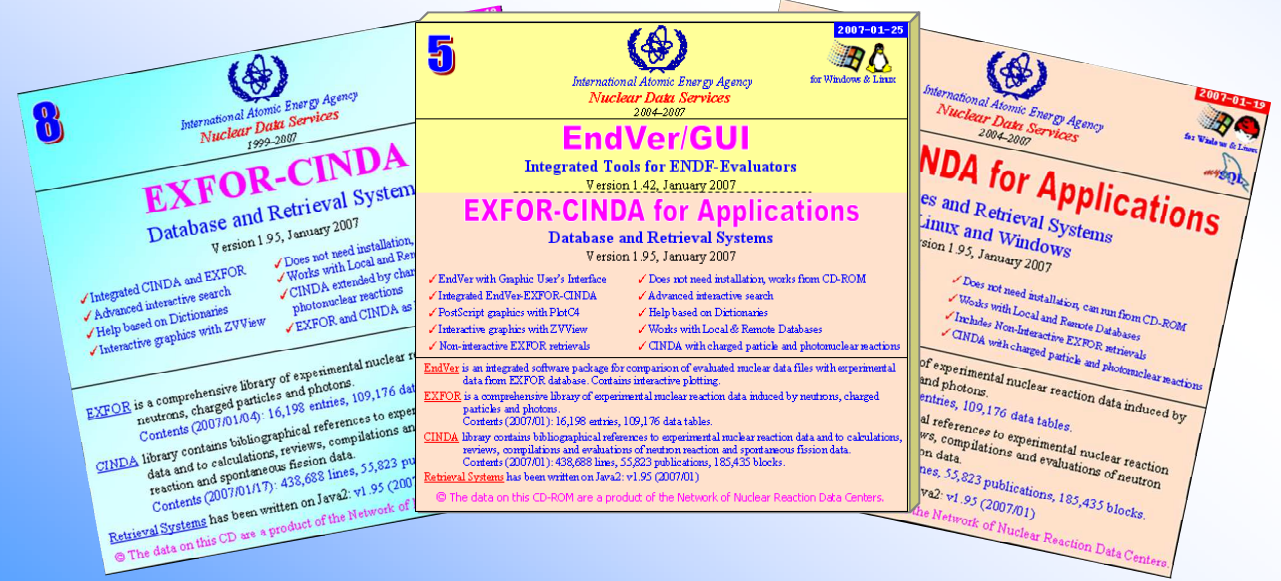
Basic principals of the IAEA-NDS nuclear data IT systems

- **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 (can work from CD-ROM)
 - automatic configuration of Web-Servlets
 - encapsulated graphics

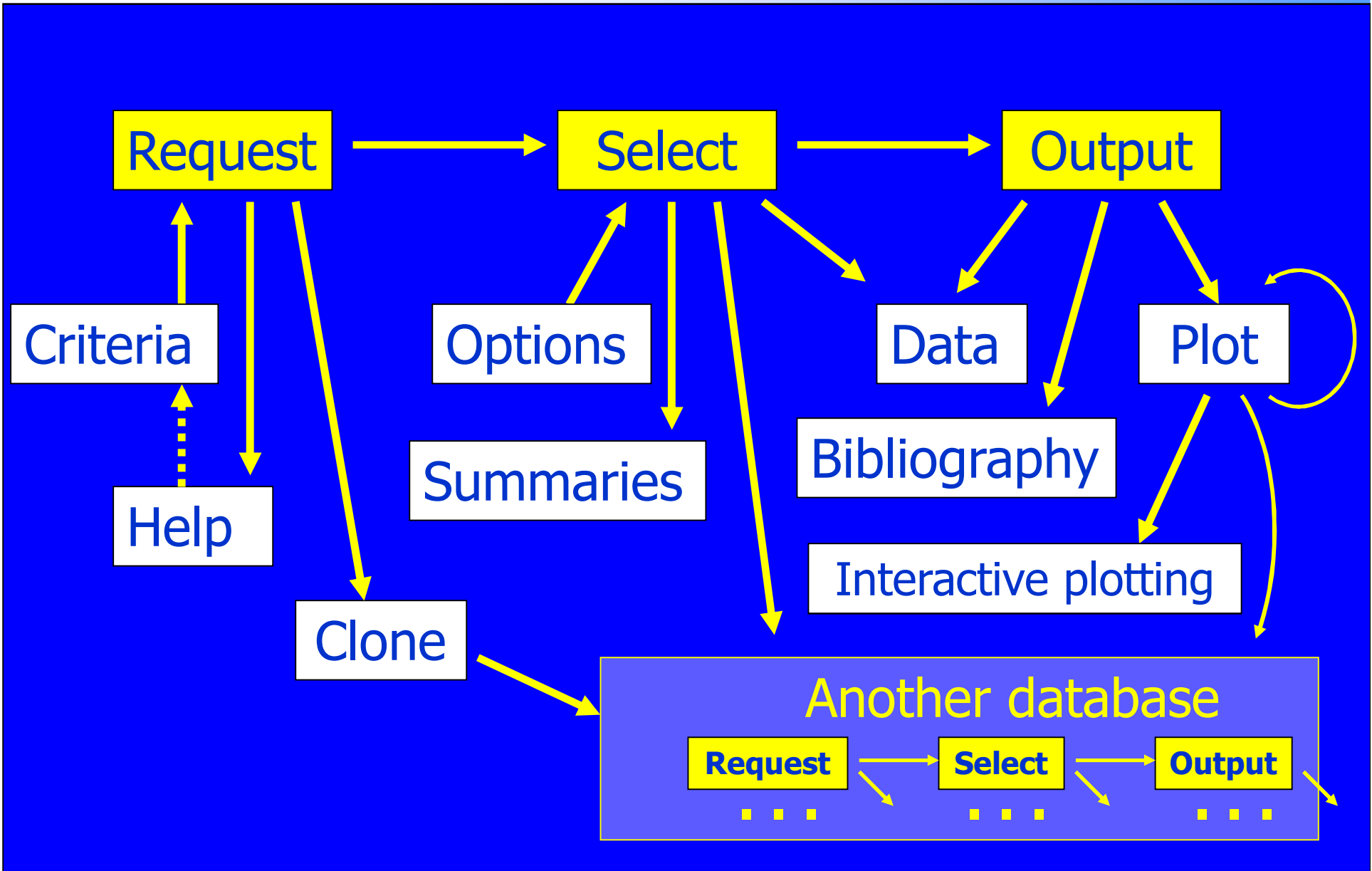
IAEA-NDS CD-ROM Database Retrieval Systems



- For Windows, Linux and Mac
- Does not need installation
- Can run from CD-ROM (DBMS on CD)
- Can work with remote databases
- Integrated EXFOR and CINDA
- Help with Dictionaries
- Advanced search (+users' SQL)
- Interactive plotting with ZVView
- EndVer/GUI with integrated PrePro and EXFOR
- Includes non-interactive retrievals to build new user's applications
- Used by Applications: Empire, EndVer, GANDR, expandable...





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 August 20, 2014
Software Version of 2014.07.09



News

2014/02 Universal X4Plot with arbitrary selection and grouping columns (use: "Sort by: reaction" and "View: extended") [how-to]

2014/02 New version (v2) of XML output format [about]

2013/05 **EXFOR Milestone: 20,000 experimental works are now in the database!**

2013/01 Collection of video-guides to EXFOR-ENDF database Web retrieval system: [page]

[+ [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 20465 experiments (see statistics and recent updates).

Request

Examples: 1 | 2 | 3 | 4 | 5 | 6 | 7 | ...

Submit | Reset | Help

Target AI-27

Reaction n,a 13-Aluminium [Del] Element → Isotope [Disable me]

Quantity CS

Product

Energy from

Author(s)

Publication year

Accession #

Extended

Keywords

Expert

Submit | Reset

Options

Exclude superseded data

Combinations (ratios,...)

Number of Products

Only

Help

publication

extended

Fields

User's Input

Clone Request:

CINDA | ENDF

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

Use Help, Examples, Dynamic sections

Note:

- all criteria are optional (selected by checking)
- selected criteria are combined for search with logical AND
- criteria separated in a field by ";" are combined with logical OR
- criteria starting with "^" will be used as logical NOT
- wildcards (*) and intervals (..) are available

Statistics of usage: visits: 365, data search: 1273, since 09-Jul-2014

EXFOR Select Form

Request #56
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

Retrieve: go to the next step

Output options

Select Datasets

Search by Reaction

Go to NSR

| n | Display | Year | Author-1 | Energy range, eV | Points | Reference | Accession#P | NSR-Key |
|------------------------------|--|------|---------------|------------------|--------|------------------------|-------------|-------------------|
| 1) | 13-AL-27 (N, TOT) ,, SIG | | | | | C4: MF3 MT1 | | |
| Quantity: [CS] Cross section | | | | | | | | |
| 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 | 7 | | | 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 1991MO09 |
| 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 | | | 432 | J,PR/C,11,1117,197504 | | 10515004 1975SI05 |

Search by Author

Go to Web - journal

Get data in various formats

Types of plotting on our Web

- Quick plot: EXFOR-ENDF, CS only; CS filtered by product ELEM/MASS
- Advanced plot (via C4 or C5): EXFOR-ENDF, MF1,3,4,5,6, using EndVer (A.Trkov); ratios, and ratios converted to cross sections
- Extended plot: EXFOR only, any quantities
- Special ENDF plotting: MF3*MF6:Low=0 by products, MF10, MF33, 35, 40, relative uncertainties, MF3+33
- R33 plot: EXFOR-IBANDL
- PlotC4 (D.E. Cullen): C4


```

ENTRY          41323    20050902
SUBENT         41323001  20050902
BIB            7        12
INSTITUTE      (4RUSMIF)
REFERENCE      (J,AE,50,(5),350,198105) M
              (J,SJA,50,325,1981) ENGLI
AUTHOR        (V.E.ZHITAREV,A.M.MOTORIN,
TITLE         .INTERACTION CROSS SECTION
              WITH COLD NEUTRONS
FACILITY      (REAC)
ERR-ANALYS    (EN-ERR)  WAVE-LENGTH RES
              TIMES 100 (IN P
HISTORY       (19981121C) + + COMPILED
              (20050902A) . . Correcte
              Data-heading
ENDBIB        12
COMMON        3        3
EN-ERR        TEMP      TEMP-ERR
PER-CENT      DEG-C     DEG-C
              3.        22.    3.
ENDCOMMON     3
ENDSUBENT     19
SUBENT        41323002  20050902
BIB           5        8
REACTION      (13-AL-27(N,TOT),,SIG)
SAMPLE        .ALUMINIUM MONOCRYSTAL, PU
              96 MM, DENSITY 2.70 GRAM/
              MACROCRISTALLINE ALUMINIUM
              THICKNESS 50 MM, DENSITY
ERR-ANALYS    (DATA-ERR) NO INFORMATION
STATUS        (TABLE) DATA ARE TAKEN FR
HISTORY       (19981121T) + + CONVERTED
ENDBIB        8
NOCOMMON      0        0
DATA          3        8
WVE-LN        DATA     DATA-ERR
ANGSTROM      B        B
  1.3000E+01  1.9300E+00  1.3000E-01
  1.4000E+01  2.1200E+00  9.0000E-02
  1.5000E+01  2.2500E+00  8.0000E-02
  1.6000E+01  2.3800E+00  7.0000E-02
  1.7000E+01  2.5400E+00  6.0000E-02
  1.8000E+01  2.6100E+00  6.0000E-02
  1.9000E+01  2.8200E+00  8.0000E-02
  2.0000E+01  3.1500E+00  6.0000E-02
ENDDATA       10
ENDSUBENT     23
ENDENTRY      2

```

```

ENTRY          41323    20050902
SUBENT         41323001  20050902
BIB            7        12
INSTITUTE      (4RUSMIF)
REFERENCE      (J,AE,50,(5),350,198105) MAIN REFERENCE, DATA ARE GIVEN
              (J,SJA,50,325,1981) ENGLISH TRANSLATION
AUTHOR        (V.E.ZHITAREV,A.M.MOTORIN,S.B.STEPANOV)
TITLE         .INTERACTION CROSS SECTIONS OF CERTAIN METALS
              WITH COLD NEUTRONS
FACILITY      (REAC)
ERR-ANALYS    (EN-ERR)  WAVE-LENGTH RESOLUTION DELTA-LAMBDA/LAMBDA
              TIMES 100 (IN PERCENT)
HISTORY       (19981121C) + + COMPILED AT THE CJD + +
              (20050902A) . . Corrected at the CJD + +
              Data-heading "EN" changed to "WVE-LN"
ENDBIB        12
COMMON        3        3
EN-ERR        TEMP      TEMP-ERR
PER-CENT      DEG-C     DEG-C
              3.        22.    3.
ENDCOMMON     3
ENDSUBENT     19
SUBENT        41323002  20050902
BIB           5        8
REACTION      (13-AL-27(N,TOT),,SIG)
SAMPLE        .ALUMINIUM MONOCRYSTAL, PURITY 99.99 PC, THICKNESS
              96 MM, DENSITY 2.70 GRAM/CM3 AND
              MACROCRISTALLINE ALUMINIUM, PURITY 99.99 PC,
              THICKNESS 50 MM, DENSITY 2.70 GRAM/CM3
ERR-ANALYS    (DATA-ERR) NO INFORMATION GIVEN
STATUS        (TABLE) DATA ARE TAKEN FROM TABLE 1 OF MAIN REF.
HISTORY       (19981121T) + + CONVERTED FROM SUBENT 88023002
ENDBIB        8
NOCOMMON      0        0
DATA          3        8
WVE-LN        DATA     DATA-ERR
ANGSTROM      B        B
  1.3000E+01  1.9300E+00  1.3000E-01
  1.4000E+01  2.1200E+00  9.0000E-02
  1.5000E+01  2.2500E+00  8.0000E-02
  1.6000E+01  2.3800E+00  7.0000E-02
  1.7000E+01  2.5400E+00  6.0000E-02
  1.8000E+01  2.6100E+00  6.0000E-02
  1.9000E+01  2.8200E+00  8.0000E-02
  2.0000E+01  3.1500E+00  6.0000E-02
ENDDATA       10
ENDSUBENT     23
ENDENTRY      2

```

EXFOR Interpreted: X4+, XML, X4±

EXFOR data: <http://www>
Data retrieved from the EX

```

ENTRY          41323
SUBENT         41323001
BIB            7
INSTITUTE      (4RUSMIF)
REFERENCE      #(4RUSMIF) M
(J,AE,50,(5),
(J,SJA,50,32)
#(J,AE,50,(5),
#(J,SJA,50,32)
AUTHOR         (V.E.ZHITAREV)
TITLE          .INTERACTION
WITH COLD NEU
FACILITY       (REAC)
#(REAC) React
ERR-ANALYS    (EN-ERR) W
T:
HISTORY        (19981121C)
(20050902A)

ENDBIB        12
COMMON        3
EN-ERR        TEMP    TI
PER-CENT      DEG-C   DI
3.            22.     3
ENDCOMMON     3
ENDSUBENT     19
SUBENT        41323002
BIB            5
REACTION       (13-AL-27(N,
#(13-AL-27(N,
# Proc:
SAMPLE         .ALUMINIUM MO
96 MM, DENS:
MACROCRISTA
THICKNESS 50
ERR-ANALYS    (DATA-ERR) N
STATUS        (TABLE) DAT
HISTORY        (19981121T)
ENDBIB        8
NOCOMMON      0
DATA          3
WVE-LN        DATA   DI
ANGSTROM      B       B
13.           1.93    0
14.           2.12    0
15.           2.25    0
16.           2.38    0
17.           2.54    0
18.           2.61    0
19.           2.82    0
20.           3.15    0
ENDDATA       10
ENDSUBENT     23
ENDENTRY      2
    
```

```

<?xml version="1.0" encoding="WINDOWS-1251"?>
<x4files>
  - <x4entry Author="V.E.Zhitarev" Ref1Year="1981" accnum="41323"
    - <x4subent N2="20050902" subacc="41323001">
      - <bib nKw="12">
        - <keyword subacc="41323001" nCodes="1" kw="INSTITUTE"
          - <kwCode iCode="0" pointer=" " >
            - <x4code type="INSTITUTE">
              <x4code1 expansion="Moscow Inst.of Engineer
                dictionary="INSTITUTE">4RUSMIF</x4code1>
            </x4code>
          </kwCode>
        </keyword>
      - <keyword subacc="41323001" nCodes="2" kw="REFERENCE"
        - <kwCode iCode="0" pointer=" " >
          - <x4code type="REFERENCE">
            <x4code1 expansion="Jour: Atomnaya Energi
              dictionary="REFERENCE" Year="1981" pag
                Type="J">J,AE,50,(5),350,198105</x4code1>
            </x4code>
          <Free type="1" ln="1"> MAIN REFERENCE, DATA
            </kwCode>
          - <kwCode iCode="1" pointer=" " >
            - <x4code type="REFERENCE">
              <x4code1 expansion="Jour: Soviet Atomic En
                dictionary="REFERENCE" Year="1981" pag
                  Type="J">J,SJA,50,325,1981</x4code1>
            </x4code>
          <Free type="1" ln="1"> ENGLISH TRANSLATION
            </kwCode>
          </keyword>
        - <keyword subacc="41323001" nCodes="1" kw="AUTHOR"
          - <kwCode iCode="0" pointer=" " >
            - <x4code type="AUTHOR">
              - <authors a1ni="V.E." a1="Zhitarev" nn="3">
                <author ii="1">V.E.ZHITAREV</author>
                <author ii="2">A.M.MOTORIN</author>
                <author ii="3">S.B.STEPANOV</author>
              </authors>
            </x4code>
          </kwCode>
        - <keyword subacc="41323001" nCodes="1" kw="TITLE">
          - <kwCode iCode="0" pointer=" " >
            <Free type="1" ln="2">.INTERACTION CROSS SE
              NEUTRONS</Free>
          </kwCode>
        </keyword>
      - <keyword subacc="41323001" nCodes="1" kw="FACILITY"
        - <kwCode iCode="0" pointer=" " >
          - <x4code type="FACILITY">
            <x4code1 expansion="Reactor" dictionary="FA
          </x4code>
        </kwCode>
      - <keyword subacc="41323001" nCodes="1" kw="ERR-ANA
        - <kwCode iCode="0" pointer=" " >
          <Code type="0">EN-ERR</Code>
          <Free type="1" ln="2"> WAVE-LENGTH RESOLUT
            (IN PERCENT)</Free>
        </kwCode>
    
```

EXFOR file

- ENTRY 41323 1981, V.E.Zhitarev last-updated: 2005-09-02
 - SUBENT 41323001 last-updated: 2005-09-02
 - BIB #bibliographic and descriptive information
 - INSTITUTE
 - (4RUSMIF) #Moscow Inst.of Engineering Physics, Moscow, Russia
 - REFERENCE
 - (J,AE,50,(5),350,198105) #Jour: Atomnaya Energiya, Vol.50, Issue.5, p.350 (1981), Russia
 - MAIN REFERENCE, DATA ARE GIVEN
 - (J,SJA,50,325,1981) #Jour: Soviet Atomic Energy, Vol.50, p.325 (1981), USA
 - ENGLISH TRANSLATION
 - AUTHOR
 - (V.E.ZHITAREV, A.M.MOTORIN, S.B.STEPANOV)
 - TITLE
 - .INTERACTION CROSS SECTIONS OF CERTAIN METALS WITH COLD NEUTRONS
 - FACILITY
 - ERR-ANALYS
 - HISTORY
 - COMMON 3x1 #Constant parameters
 - Legend

| | | | |
|----------|---|----------|-----------------------------|
| EN-ERR | Uncertainty in incident projectile energy | PER-CENT | per-cent |
| TEMP | Sample temperature | DEG-C | degrees Celsius, Centigrade |
| TEMP-ERR | Error in sample temperature | DEG-C | degrees Celsius, Centigrade |
 - Data

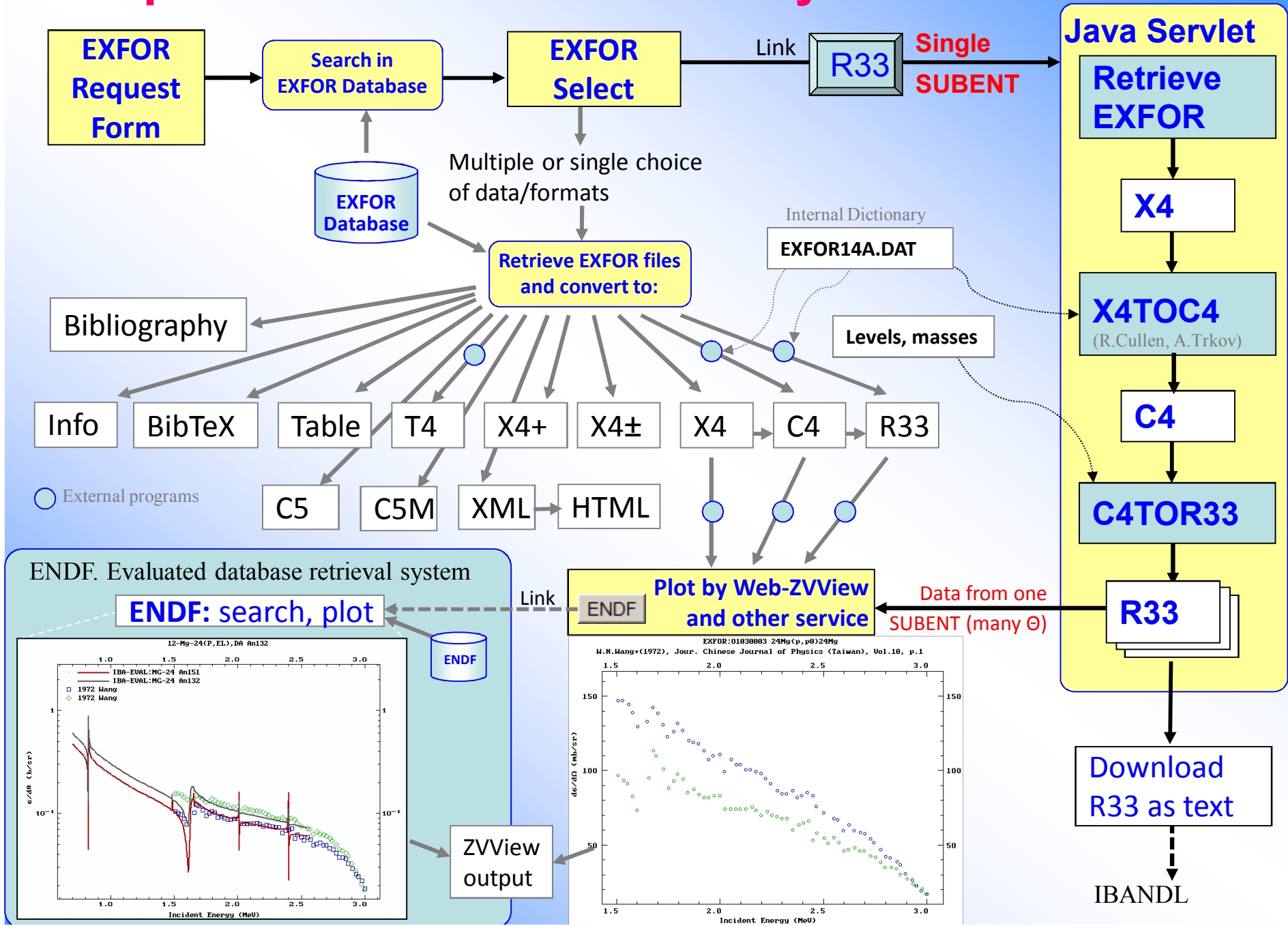
| | | |
|----------|-------|----------|
| EN-ERR | TEMP | TEMP-ERR |
| PER-CENT | DEG-C | DEG-C |
| 3.0 | 22.0 | 3.0 |
 - SUBENT 41323002 last-updated: 2005-09-02
 - BIB #bibliographic and descriptive information
 - REACTION
 - (13-AL-27(N,TOT),SIG)
 - #Target:AL-27 #Projectile:N #Reaction:N,TOT #Process:TOT:Total #Quantity:,SIG:CS:(
 - SAMPLE
 - .ALUMINIUM MONOCRYSTAL, PURITY 99.99 PC, THICKNESS 96 MM, DENSITY 2.70 GRAM/CM3 AND MACROCRISTALLINE ALUMINIUM, PURITY 99.99 PC, THICKNESS 50 MM, DENSITY 2.70 GRAM/CM3
 - ERR-ANALYS
 - STATUS
 - HISTORY
 - NOCOMMON
 - DATA 3x8
 - Legend

| | | | |
|----------|--|----------|-----------|
| WVE-LN | Wave length of incident particle | ANGSTROM | Angstroms |
| DATA | Cross section | B | barns |
| DATA-ERR | Error in value of quantity, defined under ERR-ANALYS | B | barns |
 - Data

| | | |
|----------|------|----------|
| WVE-LN | DATA | DATA-ERR |
| ANGSTROM | B | B |
| 13.0 | 1.93 | 0.13 |
| 14.0 | 2.12 | 0.09 |
| 15.0 | 2.25 | 0.08 |
| 16.0 | 2.38 | 0.07 |
| 17.0 | 2.54 | 0.06 |

Output from EXFOR retrieval system

How it works



EXFOR Output Form

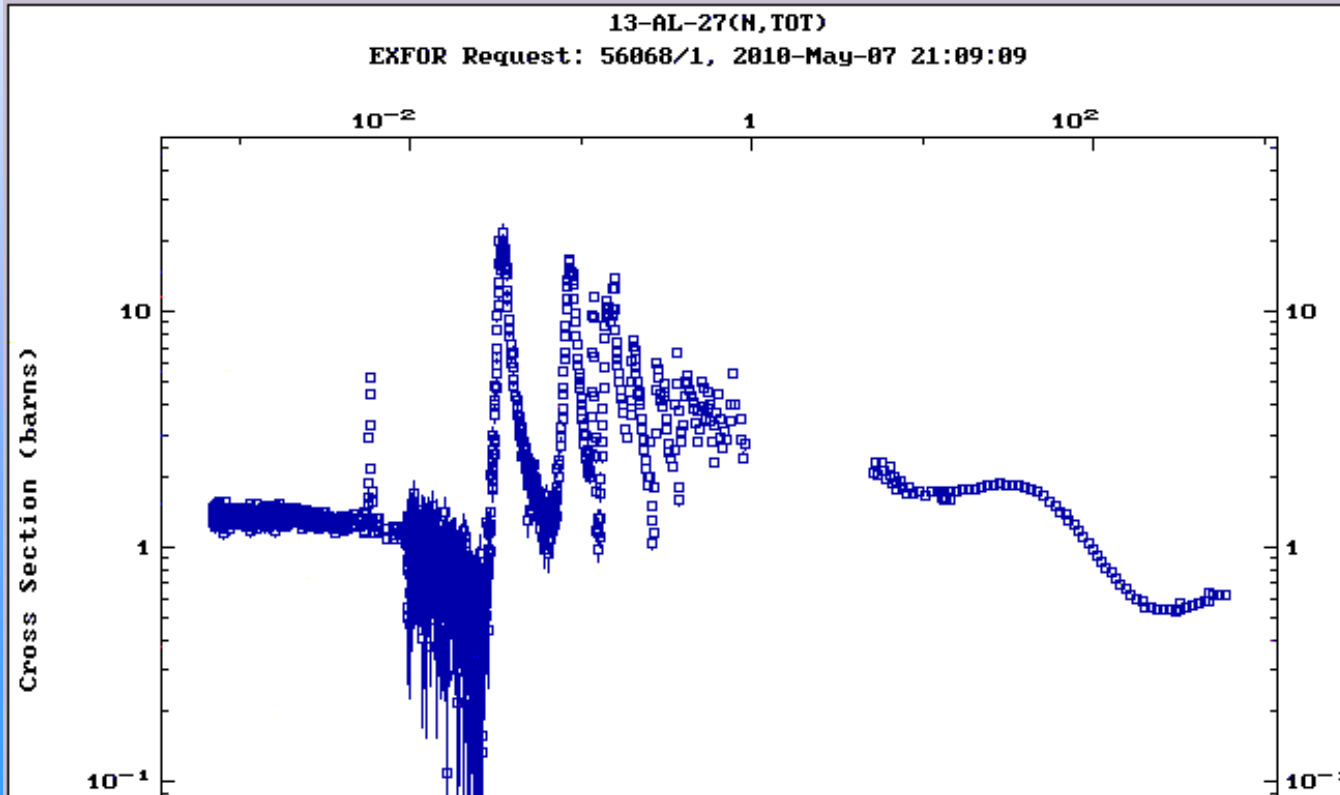
EXFOR Request #56068/1816

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+, Derrien+ |
| 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=TIIT, JAERI Date=20010713 | Y.HARIMA, H.KITAZAWA, T.FUKAHORI |
| 4 | <input type="checkbox"/> | ENDF-6 | Interpreted | σ | Plot | JENDL-3.3 | E=20MeV Lab=TIIT, 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/TIIT Date=950817 | B.YU, S.CHIBA, Y.HARIMA ET AL |

ENDF Output Form with interactive Web ZVView plotting

Select data for plotting

Cross Section

ENDF Request 2776, 2010-May-07, 21:22:26
EXFOR Request: 56068/1, 2010-May-07 21:09:09

Legend:

- ENDF/B-VII.0: AL-27(N,TOT)
- TENDL-2009: AL-27(N,TOT)
- 1993 Finlay X4:13569008 $\chi^2=8.36605$ (vs:1,pt:335,err:0-1%)
- ◇ 1988 Franz X4:22117005
- 1984 Ohkubo X4:21926004 $\chi^2=31.2981$ (vs:1,pt:927,err:2-8%)
- △ 1984 Ohkubo X4:21926003 $\chi^2=13.9907$ (vs:1,pt:1010,err:1-422%)
- ▽ 1955 Mazari X4:30037003 $\chi^2=3.0154$ (vs:1,pt:7,err:2-6%)

Plotting options

- 1) 13-AL-27(N,TOT),,SIG
 - 1993 R.W.Finlay,
 - 1988 J.Franz,
 - 1984 M.Ohkubo
 - 1984 M.Ohkubo
 - 1955 M.Mazari,
- 2) ENDF/B-VII.0: AL-27(N,TOT)
- 3) TENDL-2009: AL-27(N,TOT)
- 4) Use my data [example]

Columns: x y [dy [dx]]

| | | |
|------|-------|--------|
| 1.5 | 2.336 | 0.384 |
| 2 | 2.788 | 0.268 |
| 2.33 | 2.96 | 0.4 |
| 2.5 | 2.399 | 0.283 |
| 3 | 2.424 | 0.197 |
| 4.04 | 2.496 | 0.065 |
| 5.06 | 2.222 | 0.065 |
| 5.5 | 2.304 | 0.1659 |

Type: Curve Points
Title: My data
Multiply by: X: 1e6 Y: 1e-3

See: plotted data (743Kb)

Log: XY X Y Lin: XY X Y Auto-range: XY X Y Page: >> << Zoom: <> >> Grid: VH 0 V H Pts: Txt Box PL
Reset Reprint Legend Authors Info+ PostScript Manual 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 | IRDFF | EXFOR | CINDA

Evaluated Nuclear Data File (ENDF)

Database Version of March 14, 2014
Software Version of 2014.07.03 Old interface is [\[here\]](#)



News & History

2014/05 New feature of software:
1) [Plotting MF35 & MF5: energy distributions of secondary particles with uncertainties and covariances \[example\] \[img\]](#)

2014/03 Updated library:
1) [JEFF-3.2 Evaluated data library \(neutron data\), OECD Nuclear Energy Agency, 2014 \[page\]](#)
2) [IRDFF v-1.03 International Reactor Dosimetry and Fusion File \(update-2014\) \[page\]](#)

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. See database summary [\[here\]](#).

Standard Request

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

Libraries: All Selected Check Reset

Parameters:

Target IR-193 *
Reaction n,* *
Quantity COV/SIG *
[More Parameters...](#)

| | |
|--|---|
| <input type="radio"/> Major Libraries | <input type="radio"/> Special Libraries |
| <input type="checkbox"/> 1) ENDF/B-VII.1 (USA,2011) | <input type="radio"/> Archival |
| <input type="checkbox"/> 2) JEFF-3.2 (Europe,2014) | <input type="radio"/> Derived |
| <input type="checkbox"/> 3) JENDL-4.0u2 (Japan,2012) | |
| <input type="checkbox"/> 4) CENDL-3.1 (China,2009) | |
| <input type="checkbox"/> 5) ROSFOND-2010 (Russia,2010) | |
| <input type="checkbox"/> 6) BROND-2.2 (Russia,1992) | |

Options:
Sort by: Reactions Evaluations

Clone Request:

Feedback:

ENDF Flexible Database Explorer

Flexible Database Explorer
Restart Close Config Selection Help About

- Evaluated data [+Reaction]
- Photo-Nuclear Data
- PHOTO Photo-Atomic Interac
- DECAY Radioactive Decay Da
- S/FPY Spontaneous Fission F
- Incident-Neutron Data
- N/FPY Neutron-Induced Fissi
- TSL Thermal Neutron Scatter
- Std Neutron Cross Section S
- E Electro-Atomic Interactor
- Incident-Proton Data
- P/FPY Proton-Induced Fission
- Incident-Deuteron Data
- D/FPY Deuteron-Induced Fis
- Incident-Triton Data
- T/FPY Triton-Induced Fission
- HE3 Incident-He3 data
- HE3/FP He3-Induced Fission
- HE4 Incident-Alpha data
- HE4/FP Alpha-Induced Fissic

Configuration: [Show]
Video demo: [show]
How-to slides: [hide]

Slide-show: 1 3 23

Switch
Switches: open/close tree-node
Closed
Opened

T:target R:reaction L:library Q:quantity

Target Materials

Isotopes of 1-Hydrogen

- H-1
- H-2
- H-3

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

Summary:
Elements: 110
Nuclides: 2450

Selected:
> 0) Evaluated data
* 1) Incident-Particle: [N] Incident-Neutron Data

Nuclides: [List] [Chart-txt]

ENDF Explorer: data found

The screenshot displays the 'Flexible Database Explorer' application window. The left pane shows a hierarchical tree of data categories. The right pane, titled 'Select and retrieve data from database...', shows the selection process for a specific dataset.

Flexible Database Explorer
Restart Close Config Selection Help About

- 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 cros
- 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

Select and retrieve data from database... IAEA Flexible Database Explorer

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

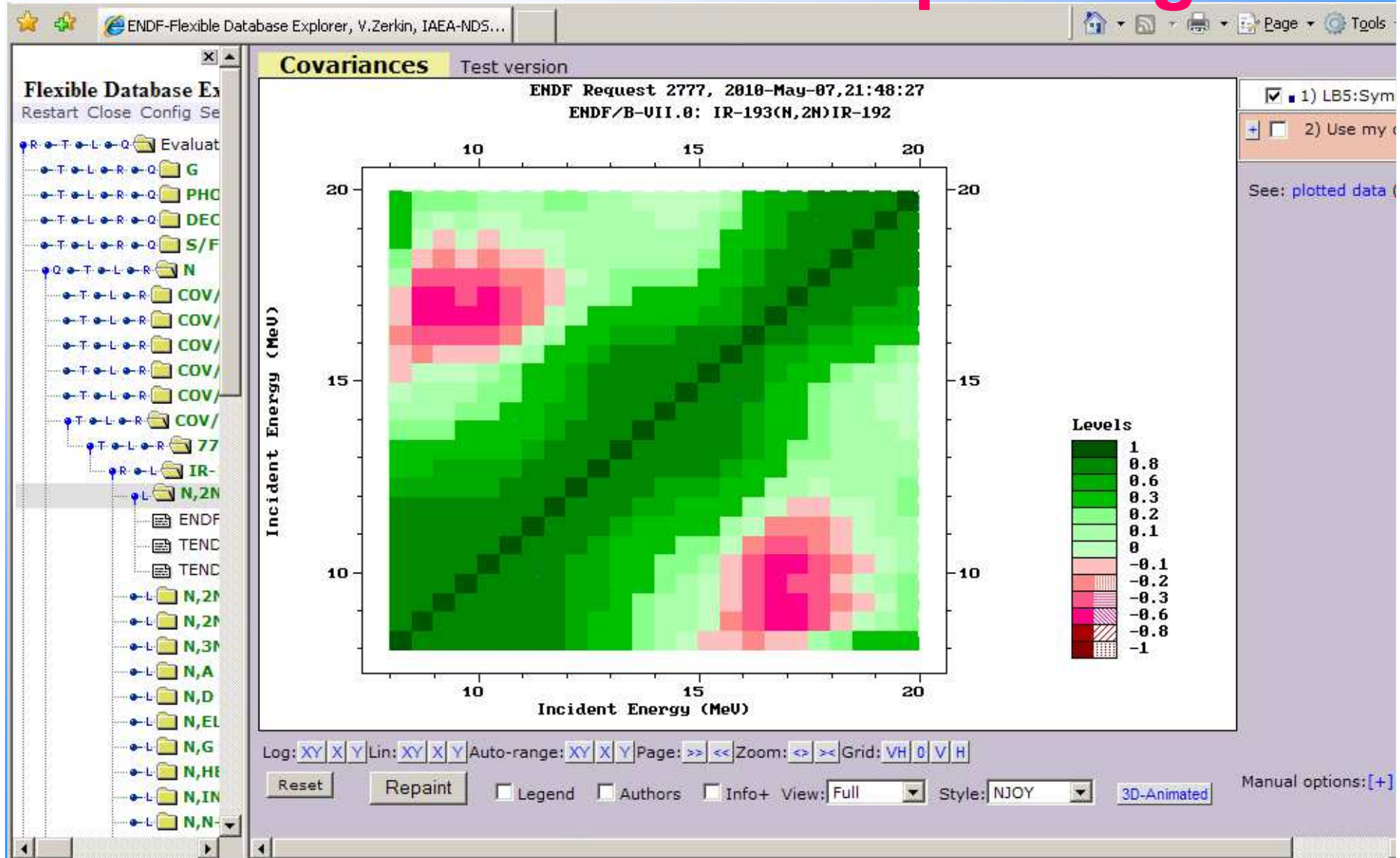
Standard ENDF Select Form

The screenshot displays the ENDF-Flexible Database Explorer application. The left sidebar shows a hierarchical tree of data categories, with '77 Ir Iridium' and 'N,2N Production of two' selected. The main window is titled 'Request #2777 ENDF Data Selection'. It features a 'Retrieve' button and radio buttons for 'Selected', 'Unselected', and 'All'. Below this, there are sorting and view options: 'Sorted by: [Reactions]', 'Reorder by: [Libraries]', and 'View: basic extended'. A table lists three data entries:

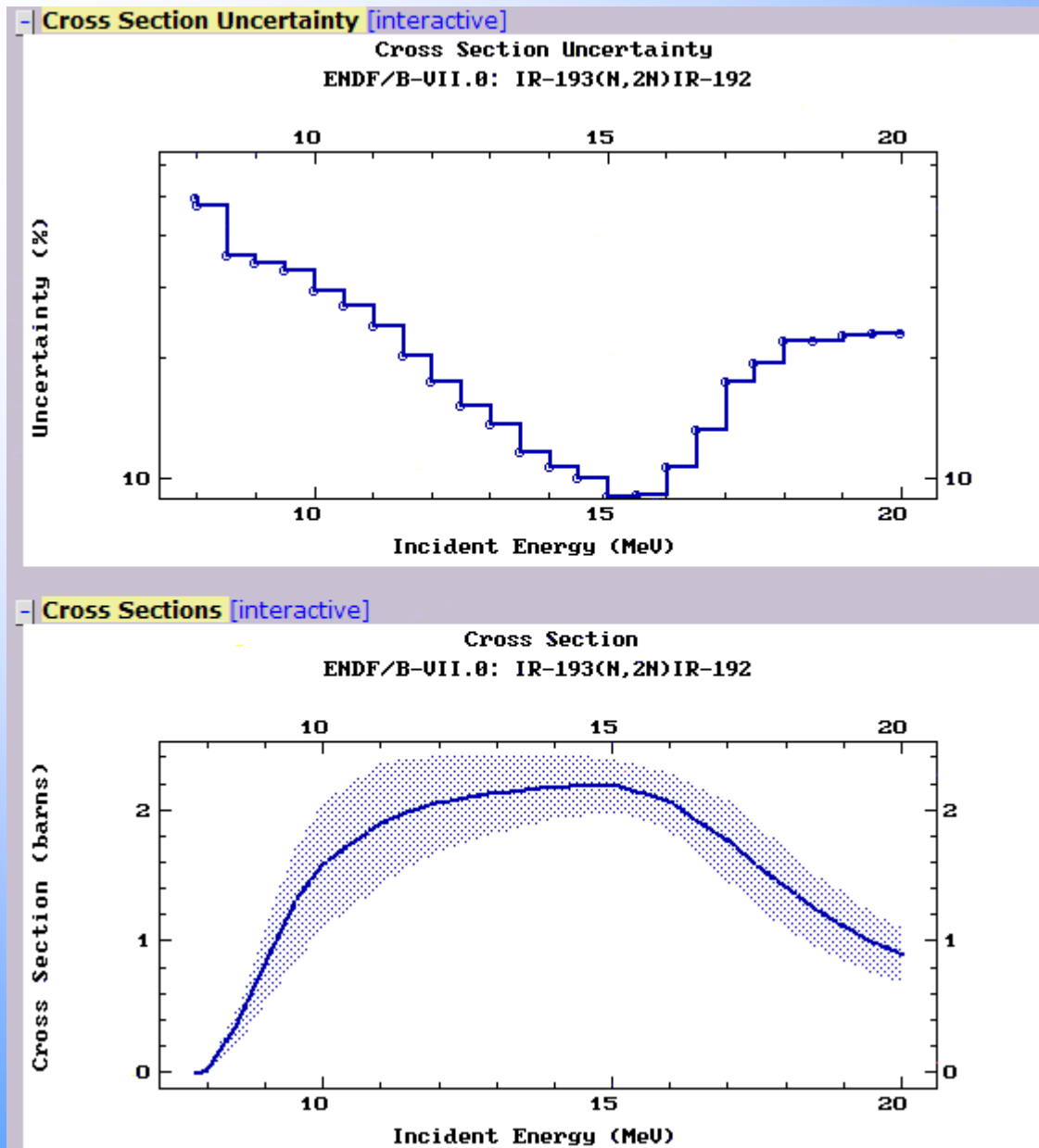
| | 1) | 2) | 3) |
|--|--|--------------|--------------------------------------|
| | IR-193 (N,2N) IR-192, COV/SIG | | |
| | MT=16 MF=33 NSUB=10 | | |
| | MF33: [COV/SIG] Covariances of neutron cross sections | | |
| | MT16: [N,2N] Production of two neutrons and a residual | | |
| | ENDF-6 Interpreted MF33-Plot | ENDF/B-VII.0 | E=20MeV Lab=LANL,BNL Date=DIST-DEC06 |
| | ENDF-6 Interpreted MF33-Plot | TENDL-2008 | E=20MeV Lab=NRG Date=REV1- |
| | ENDF-6 Interpreted MF33-Plot | TENDL-2009 | E=200MeV Lab=NRG Date=REV1- |

Below the table, there are plotting options: '*Plotting options: Plot cross sections with reconstructed resonances and applied Doppler broadening at the temperature 293°K =20°C'. Other plots include 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 ($\sigma \pm \Delta\sigma$). Links for '[Glossary]' and '[About]' are provided. At the bottom, the page generation details are shown: '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', and '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

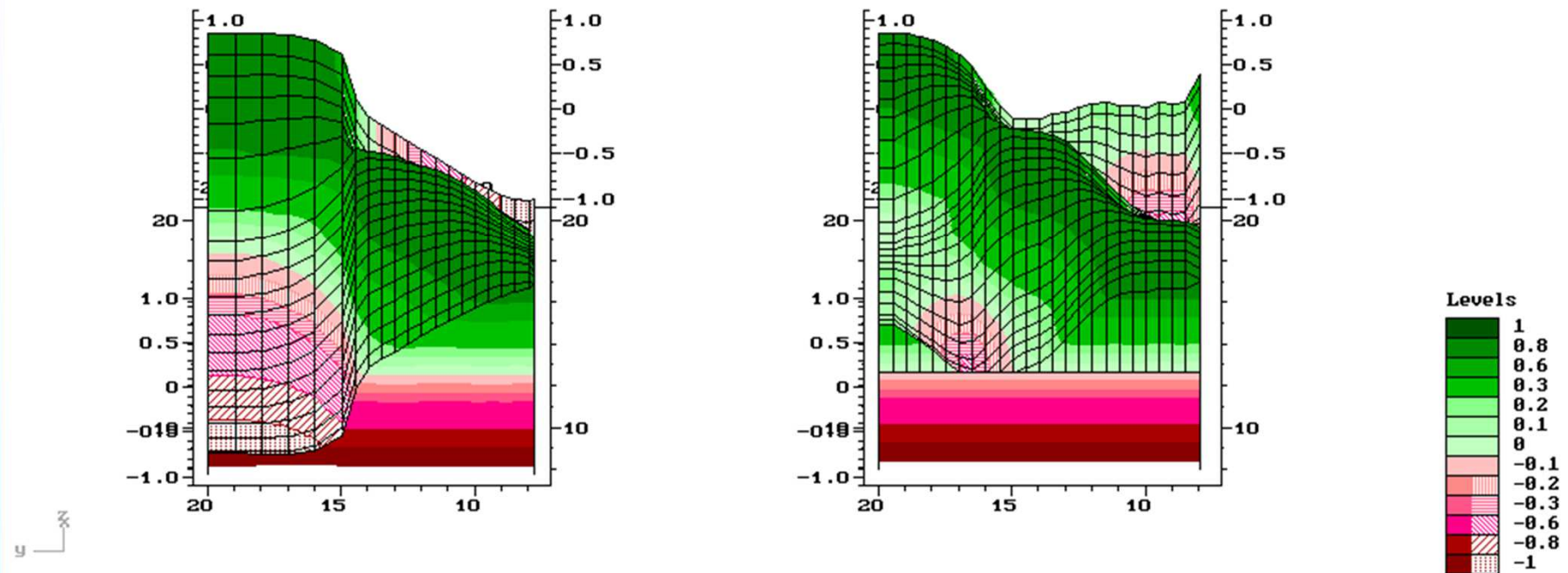
Z(26x26): $Z_{i,j} = \text{Cor}(\sigma_{x_i}, \sigma_{y_j}) * 1000$

| | 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 | -115 |
| 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 | -89.67 |
| 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 | 37.07 |
| 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 | 132.1 |
| 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 | 163.8 |
| 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 | 192 |
| 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 | 180.9 |
| 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 | 191.1 |
| 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 | 320.3 | 221.6 |
| 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 | 399.2 |
| 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 | 660.3 |
| 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 | 925.6 | 855 |
| 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 | 943.2 |
| 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 | 985 |
| 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 | 1000 |
| 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 | 1000 |
| 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 | 1000 |
| 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 | 1000 |
| 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 | 1000 |
| i | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

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 data correction system (re-normalization system)

Main ideas:

- 1) to re-normalize data using **old monitors** and **new standards**
- 2) to re-normalize data using decay data
- 3) to create a convenient tool for data modifications: multiply data to a factor, correct wrong units, set up uncertainties, delete part of a data set, recalculate data using isotope abundances, etc.

Final goals:

- 1) to re-normalize data from EXFOR **automatically** (using EXFOR information)
- 2) to collect experts' corrections to a database
- 3) to re-normalize data using **experts' corrections database**
- 4) to have Web system offering and implementing automatic, experts' and user's corrections in optional, semi-automatic and interactive modes
- 5) to generate and distribute renormalized data of whole EXFOR database

Nuclear Reaction Software Mosaic

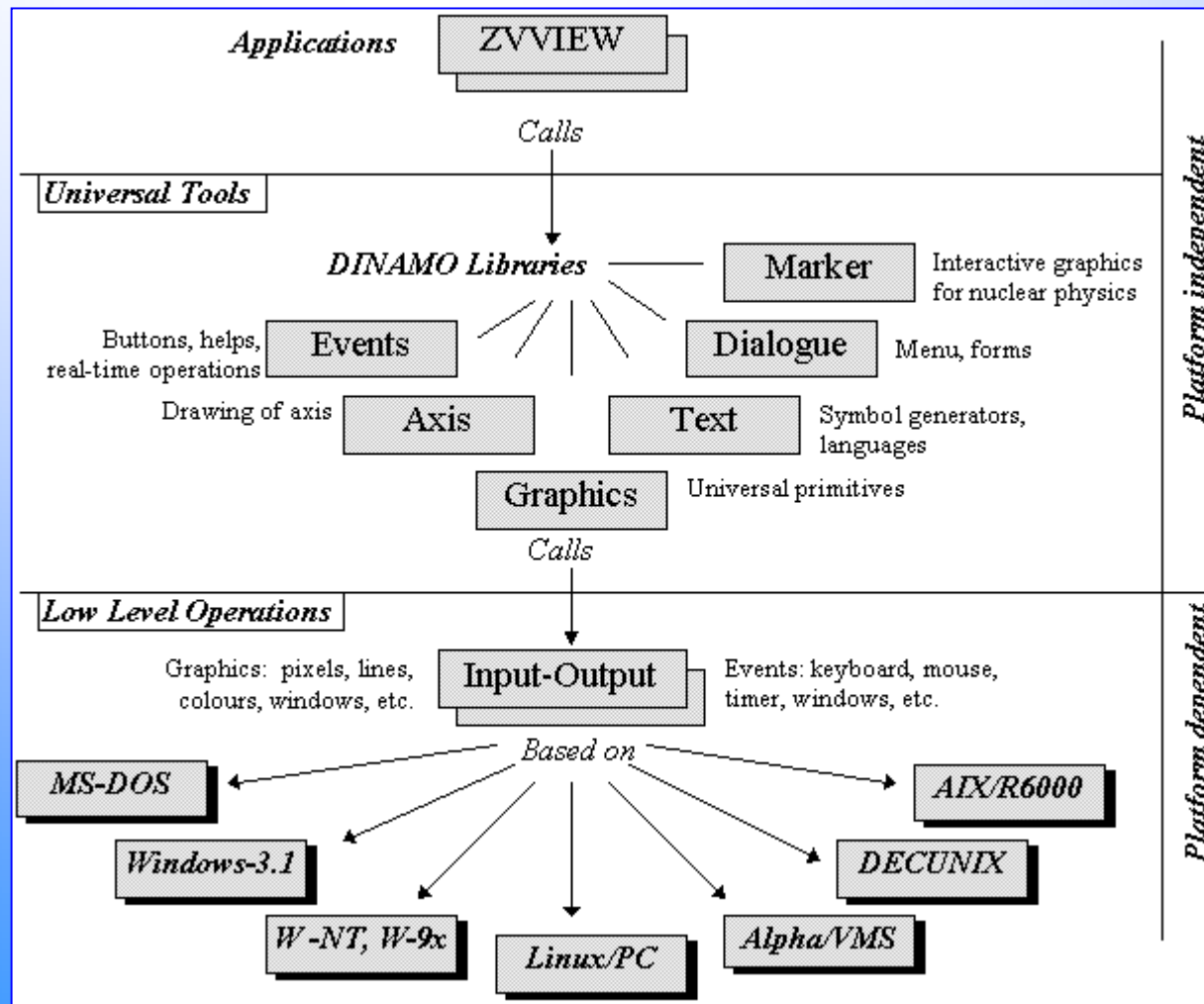
- Modularity and robustness
- Re-using modules
- Preserving knowledge



ZVView/DINAMO: interactive plotting

ZVView is a multi-platform software designed for nuclear reactions data evaluators to perform efficient interactive visual analysis of cross section data retrieved from EXFOR and ENDF libraries. Kiev-Vienna, 1993-2014

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



Platforms:

1. MS-Windows
2. Linux (X-Windows)
3. Mac OSX (X11)

Old platforms:

4. Alpha/VMS
5. DEC Unix
6. AIX/R6000
7. Windows-3.1
8. MS-DOS

Output:

1. Screen (Windows)
2. PostScript (PS, EPS)
3. Enhanced Metafile (EMF)
4. PCX
5. GIF, Animated-GIF

Basic ideas:

1. Language: C
2. Self-made GUI, PS, PCX, GIF
3. Low level API's (MS-Win, X11)
4. Max platform-independency
5. Minimalistic approach

Plotting system on the basis of DINAMO library

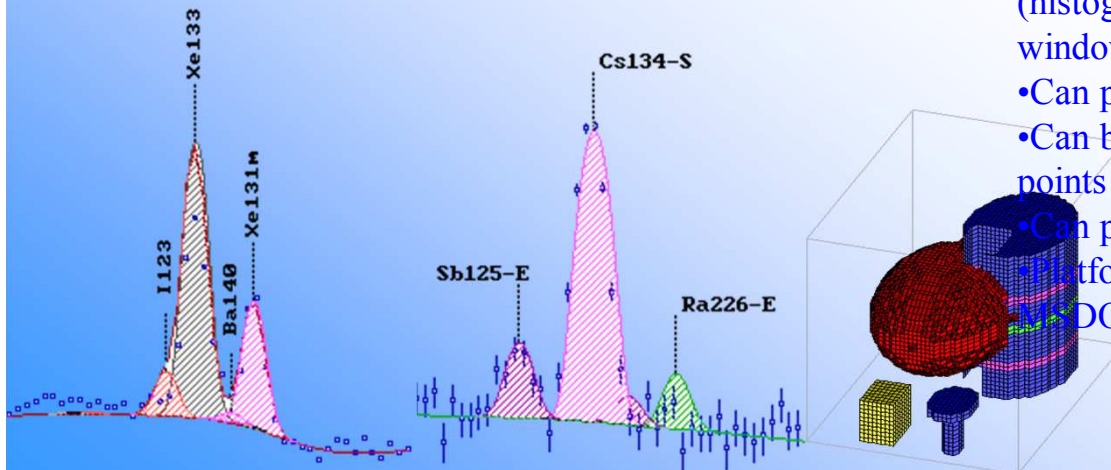
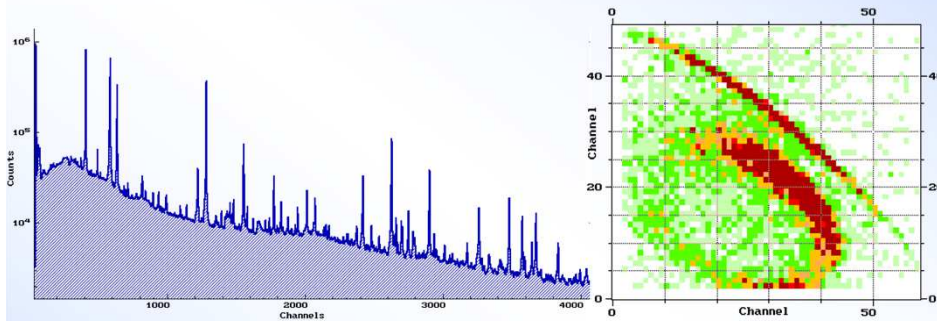
DINAMO: universal library of C subroutines for interactive plotting in nuclear research (1993-1999).

Graphics tools for nuclear research:

- Experiments (online, 1D, 2D histograms)
- Treatment experimental results
- Plotting analytical functions

Features:

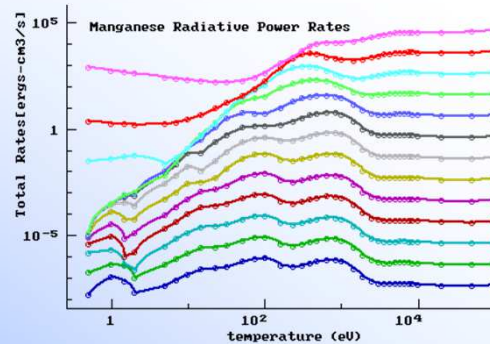
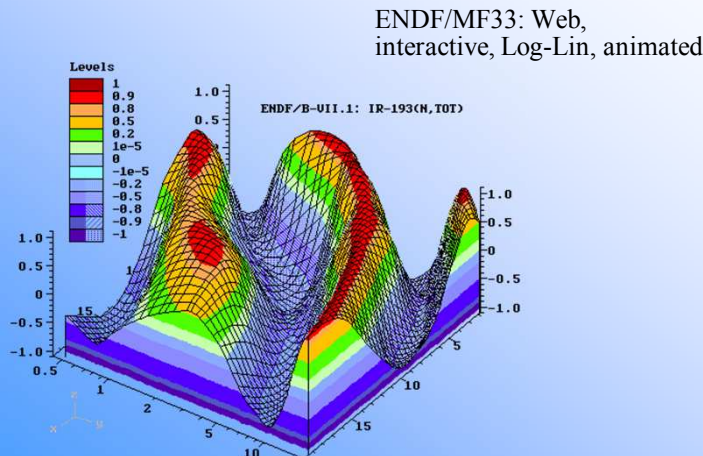
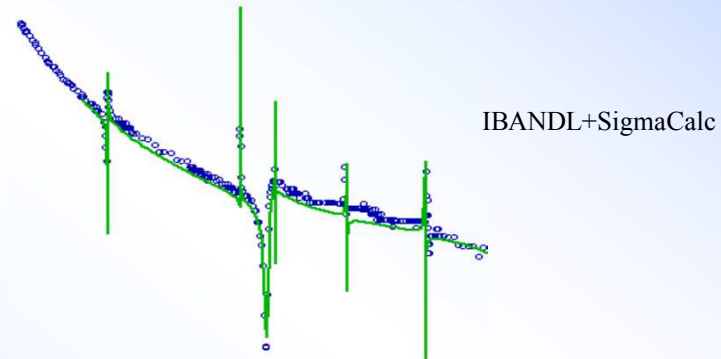
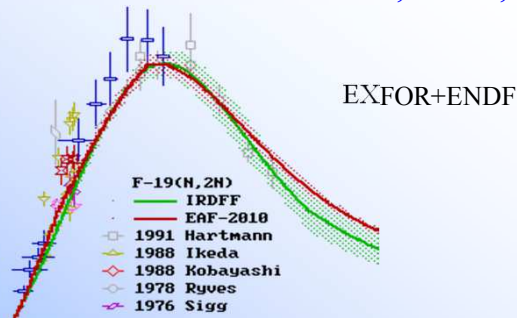
- Works with functions: y , $y(x)$, $z(x,y)$
- Plots many functions
- Data can be given in arrays (I2, I4, R4, R8) and can be calculated on the fly - calibration $getx(i)$, external functions (gamma-lines, Gaussians with background)
- Uncertainties can be given in arrays or calculated: per-cent, $\sqrt{\text{counts}}$, constant, etc.
- Display regimes: lin/log of x/y, interpolations (histograms/lin-lin), error bars/cloud/pipe, one-many windows, MOV/XOR, etc.
- Can plot maps, contours, 3D and animated 3D of $z(x,y)$
- Can be used for identify lines for different isotopes, data points of different authors and publications
- Can produce pex, gif, ps/eps, emf, animated-gif
- Platforms: MS-Windows, Linux, Mac-OSX; old versions: MS-DOS, VMS, DEC-UNIX, RS6000



ZVView: interactive plotting program for display and analysis of nuclear data

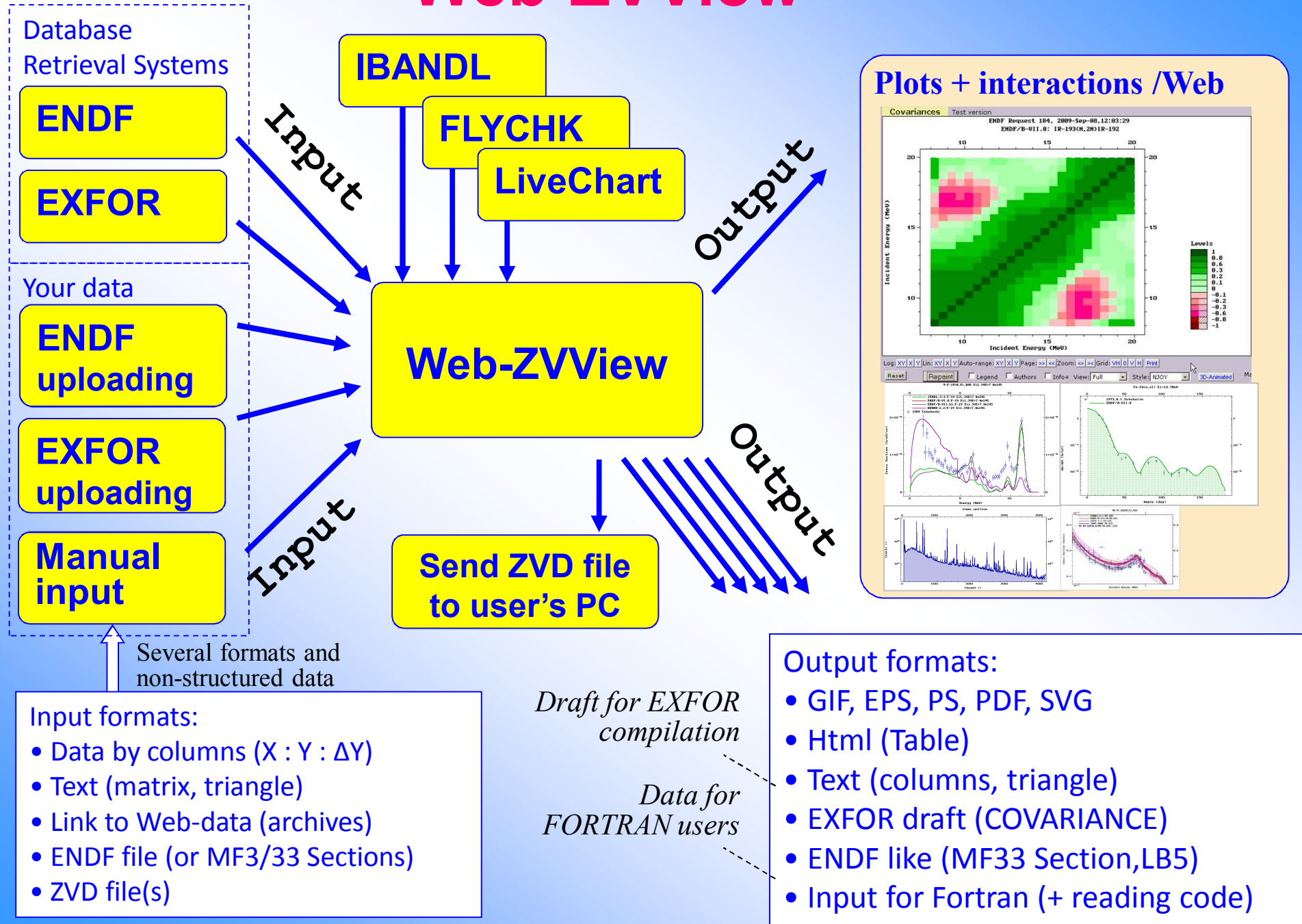
Features:

- All features inherited from DINAMO;
- Integrated with Empire, EndVer, EXFOR CD-ROMs.
- Works on Web: integrated with EXFOR-ENDF database retrieval systems, IBANDL, SigmaCals, LiveChart: can read data from remote archives, can be called as part of external Web service, etc.
- Reads nuclear data formats: TABLE/XREF, ENDF-MF3/MF40/MF33(Law5);
- Can read data from text files(columns): {y}; {x y}; {x y dy}; {x y dy dx}; {x y +dy -dy +dx -dx}; {x} {y} z{};
- Understands ENDF interpolation laws, can display ratios to selected curve
- Can do some least squared fitting, displays χ^2 (EXFOR-ENDF)
- Can work with authors: filter data, select, legend etc.



2009-2014

Web-ZVView



Several formats and non-structured data

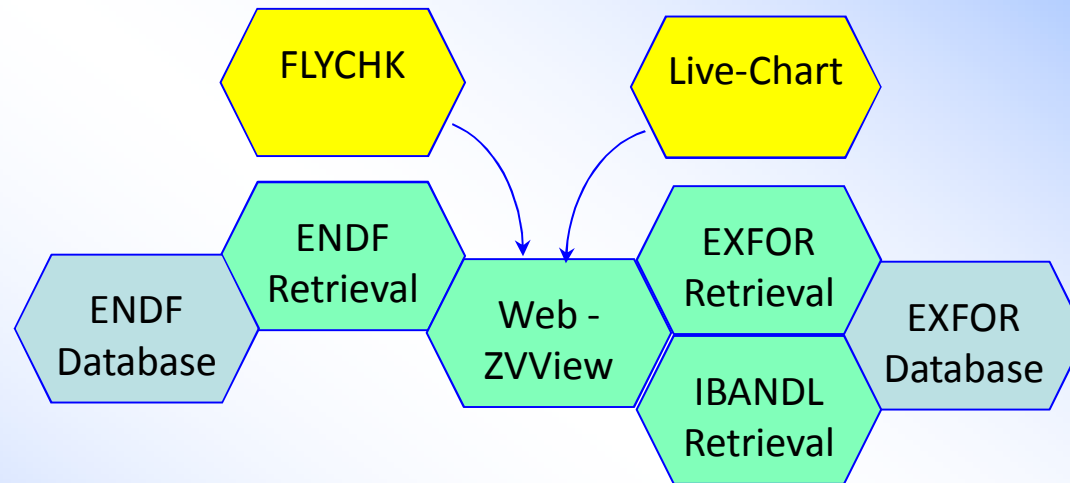
- Input formats:
- Data by columns (X : Y : ΔY)
 - Text (matrix, triangle)
 - Link to Web-data (archives)
 - ENDF file (or MF3/33 Sections)
 - ZVD file(s)

Draft for EXFOR compilation

Data for FORTRAN users

- Output formats:
- GIF, EPS, PS, PDF, SVG
 - Html (Table)
 - Text (columns, triangle)
 - EXFOR draft (COVARIANCE)
 - ENDF like (MF33 Section, LB5)
 - Input for Fortran (+ reading code)

Web mosaic: connection of applications



Useful features of Web-ZVView: copy/paste plots (inside Web session), insert text of ZVD file to the form as “my data”, output of plotted data in several formats, “manual” options, etc.

Web IBANDL calling Web-ZVView

IBANDL - Mozilla Firefox

File Edit View History Bookmarks Tools Help

nds121.iaea.org/exfor2/ibandl.htm

X4/Servlet: Select EXFOR: Experimental Nucl... X4/Servlet: Select IBANDL IBANDL

IBANDL
Ion Beam Analysis
Nuclear Data Library

Nucleus
C-13

Projectile
 p
 d
 ³He
 α
 ⁶Li
 ⁷Li

Type of data
 EBS
 NRA
 PIGE
 All

IBANDL
[Summary]

EXFOR

Home
CD version
Updates
Nuclear Data Services

¹³C + p

Type of data: ALL View: extended Convert units for plotting: C no rr->mb/sr mb/sr->rr Plots: [reset]

| No. | Reaction | Angle | Energy(keV) | Pts | Update | X4 | Reference | File | Plot |
|-----|---------------------------------------|--------|-------------|-----|------------|----|---|---|--|
| 1 | ¹³ C(p,p0) ¹³ C | 160 | 700-2500 | 451 | 2013-08-15 | | SigmaCalc 2.0. File created 21-6-2013 | View Save | <input checked="" type="checkbox"/> mb |
| 2 | ¹³ C(p,p0) ¹³ C | 163.8° | 2600-4990 | 169 | 2006-06-23 | | E. Kashy et al., Phys. Rev. 122(3) (1961) 884 » | View Save | <input type="checkbox"/> mb |
| 3 | ¹³ C(p,p0) ¹³ C | 160° | 780-2430 | 96 | 2013-05-27 | | N.P.Barradas et al., to be published » | View Save | <input checked="" type="checkbox"/> rr |
| 4 | ¹³ C(p,p0) ¹³ C | 158.4° | 450-1620 | 90 | 2011-11-22 | | E.Milne, Phys. Rev. 93 (1954) 762 » | View Save | <input checked="" type="checkbox"/> mb |
| 5 | ¹³ C(p,p0) ¹³ C | 146.5° | 1630-3310 | 80 | 2011-11-22 | | D.Zipoy et al., Phys. Rev. 106 (1957) 793 » | View Save | <input type="checkbox"/> mb |
| 6 | ¹³ C(p,p0) ¹³ C | 140° | 780-2430 | 97 | 2013-09-18 | | N.P.Barradas et al., Nucl. Instr. and Meth. B 316 (2013) 81 » | View Save | <input type="checkbox"/> rr |
| 7 | ¹³ C(p,p0) ¹³ C | 137° | 450-1600 | 93 | 2011-11-22 | | E.Milne, Phys. Rev. 93 (1954) 762 » | View Save | <input type="checkbox"/> mb |
| 8 | ¹³ C(p,p0) ¹³ C | 124.1° | 1620-3340 | 97 | 2011-11-22 | | D.Zipoy et al., Phys. Rev. 106 (1957) 793 » | View Save | <input type="checkbox"/> mb |
| 9 | ¹³ C(p,p0) ¹³ C | 121.5° | 1000-2580 | 279 | 2011-08-29 | X4 | V.A.Latorre+(1966), Jour. Physical Review, Vol.144, p.891 » | View Save | <input type="checkbox"/> mb |
| 10 | ¹³ C(p,p0) ¹³ C | 116° | 410-1600 | 88 | 2011-11-22 | | E.Milne, Phys. Rev. 93 (1954) 762 » | View Save | <input type="checkbox"/> mb |
| 11 | ¹³ C(p,p0) ¹³ C | 102.1° | 1600-3340 | 82 | 2011-11-22 | | D.Zipoy et al., Phys. Rev. 106 (1957) 793 » | View Save | <input type="checkbox"/> mb |
| 12 | ¹³ C(p,p0) ¹³ C | 85.6° | 1610-3340 | 85 | 2011-11-22 | | D.Zipoy et al., Phys. Rev. 106 (1957) 793 » | View Save | <input type="checkbox"/> mb |
| 13 | ¹³ C(p,p0) ¹³ C | 85.6° | 1580-4380 | 75 | 2011-11-22 | | H.J.Kim, W.T.Milner and F.K.McGowan Nuclear Data Tables v.A2 (1966) 353 » | View Save | <input type="checkbox"/> mb |
| 14 | ¹³ C(p,p0) ¹³ C | 85.6° | 430-1590 | 92 | 2011-11-22 | | E.Milne, Phys. Rev. 93 (1954) 762 » | View Save | <input type="checkbox"/> mb |

Datasets: 13 Reactions: 1 Points: 1423 References: 7
 + Add your dataset in R33 format for plotting
 + References.

Legend:
 X4 link to the dataset in EXFOR database retrieval system

Web IBANDL calling Web-ZVView

IBANDL - Mozilla Firefox

File Edit View History Bookmarks Tools Help

nds121.iaea.org/exfor2/ibandl.htm

X4/Servlet: Select EXFOR: Experimental Nucl... X4/Servlet: Select IBANDL IBANDL

IBANDL
Ion Beam Analysis
Nuclear Data Library

Nucleus
C-13

Projectile
 p
 d
 ³He
 α
 ⁶Li
 ⁷Li

Type of data
 EBS
 NRA
 PIGE
 All

IBANDL
[Summary]

EXFOR

Home
CD version
Updates
Nuclear Data Services

Welcome to Web-ZVView!
Interactive plotting of IBANDL and SigmaCalc data

1) $\theta=160^\circ$ N.P.Barradas et al., to be published
2) $\theta=158.4^\circ$ E.Milne, Phys. Rev. 93 (1954) 762
3) $\theta=160^\circ$ SigmaCalc 2.0. File created 22-6-2013

¹³C(p,p₀)¹³C 158.4deg.
SigmaCalc, 13C(p,p₀)13C 160.0deg.

$\chi^2=0.681109$ (vs:1,pt:96,err:12-27%)

2x10³
10³
5x10²
2x10²
10²
50

1.0 1.5 2.0 2.5

1.0 1.5 2.0 2.5

Incident Energy (MeV)

Log: XY X|Y|Lin: XY X|Y|Auto-range: XY X|Y|Page: >> << Zoom: <> <> Grid: V|H|0|V|H|Pts: Txt Box PL Print

Reset Repaint Legend Authors Info+ PostScript Manual options:[+] Clipboard: Copy

Shift legend:x=0 y=0 Split:0 1:xy;2:y Plot data or ratio:0 0:data; 1:ratio to dataset-1; 2:ratio to 2-nd, etc.

Data for plotting: ZVD (15Kb), send to ZVView; download ZVView; upload and plot your ZVD file

Select data for plotting [all] [none]
 1) 160deg c3pp0l.r33 13C(p,p0)13C
 2) 158.4deg c3pp0j.r33 13C(p,p0)13C
 3) 160deg C-13_pp0_160000.sc 13C(p,p0)13C
 4) Use my data [example]

See: plotted data (21Kb)

Web IBANDL calling Web-ZVView

IBANDL - Mozilla Firefox

File Edit View History Bookmarks Tools Help

nds121.iaea.org/exfor2/ibandl.htm

X4/Servlet: Select EXFOR: Experimental Nucl... X4/Servlet: Select IBANDL IBANDL

IBANDL
Ion Beam Analysis
Nuclear Data Library

Nucleus
C-13

Projectile
 p
 d
 ³He
 α
 ⁶Li
 ⁷Li

Type of data
 EBS
 NRA
 PIGE
 All

IBANDL
[Summary]

EXFOR

Home
CD version
Updates
Nuclear Data Services

Welcome to Web-ZVView!
Interactive plotting of IBANDL and SigmaCalc data

1) $\theta=160^\circ$ N.P.Barradas et al., to be published
2) $\theta=158.4^\circ$ E.Milne, Phys. Rev. 93 (1954) 762
3) $\theta=160^\circ$ SigmaCalc 2.0. File created 22-6-2013

¹³C(p,p₀)¹³C 158.4deg.
SigmaCalc, 13C(p,p₀)13C 160.0deg.

| Incident Energy (MeV) | Cross section (mb/sr) |
|-----------------------|-----------------------|
| 2.01 | 122.87 |
| 2.02 | 136.482 |
| 2.03 | 155.11 |
| 2.04 | 182.94 |
| 2.05 | 200.222 |
| 2.06 | 235.276 |
| 2.07 | 284.011 |
| 2.08 | 328.783 |
| 2.09 | 399.818 |
| 2.10 | 461.433 |
| 2.11 | 423.615 |
| 2.12 | 339.335 |
| 2.13 | 240.186 |
| 2.14 | 180.006 |
| 2.15 | 114. |

Select data for plotting [all] [none]
 1) 160deg c3pp0l.r33 13C(p,p₀)13C
 2) 158.4deg c3pp0j.r33 13C(p,p₀)13C
 3) 160deg C-13_pp0_160000.sc 13C(p,
 4) Use my data [example]

See: plotted data (21Kb)

Log: XY X Y Lin:XY X Y Auto-range:XY X Y Page: >> << Zoom: <> <> Grid: VH 0 V H Pts: Txt Box PL Print

Reset Repaint Legend Authors Info+ PostScript Manual options:[+] Clipboard: Copy

Shift legend:x=0 y=8 Split:0 1:xy;2:y Plot data or ratio:0 0:data; 1:ratio to dataset-1; 2:ratio to 2-nd, etc.

Data for plotting: ZVD (15Kb), send to ZVView; download ZVView; upload and plot your ZVD file

Thank you.