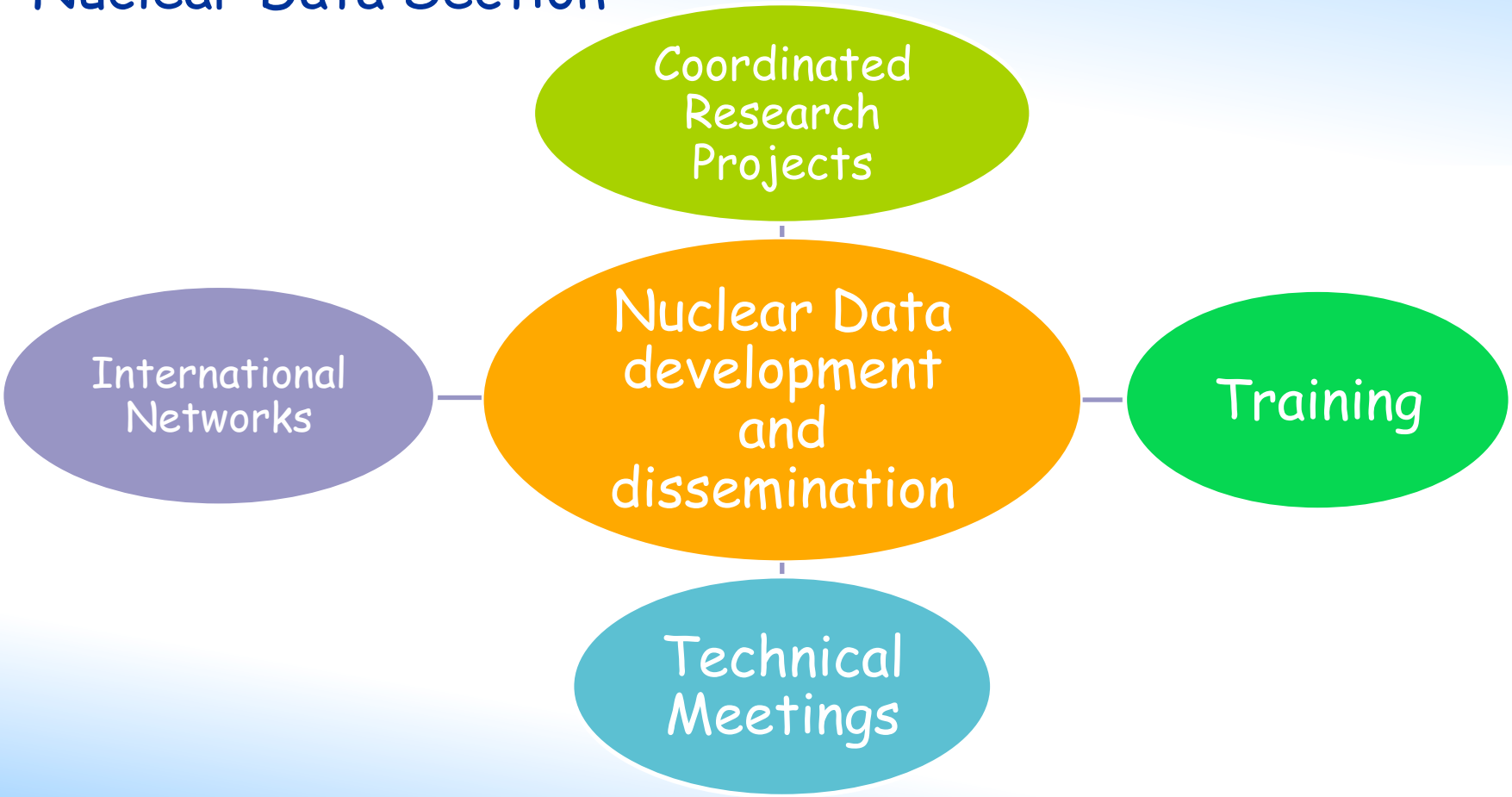
IAEA 60 Years
Atoms for Peace and Development

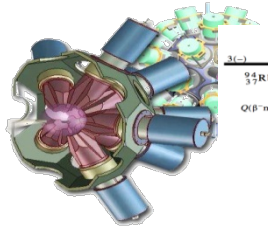
Nuclear Data for Basic Sciences and Applications

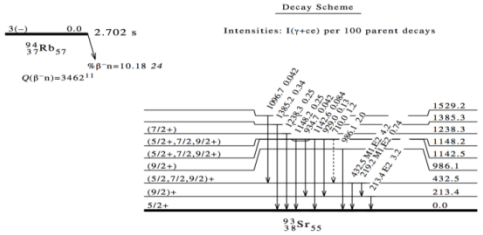
Paraskevi (Vivian) Dimitriou
Nuclear Data Section,
International Atomic Energy Agency,
Vienna, Austria

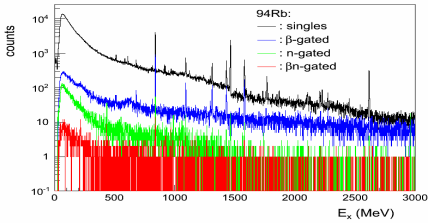
Division of Physical and Chemical Sciences: Nuclear Data Section



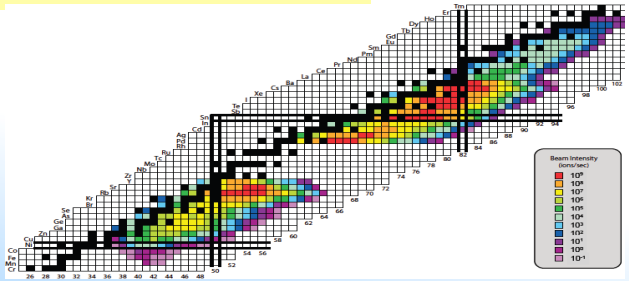
Basic Sciences: experiment + theory

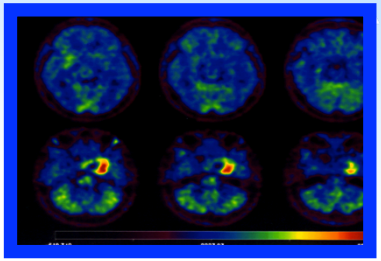






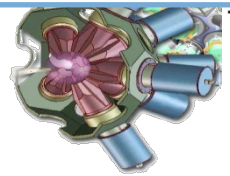
JYFLTRAP Penning trap

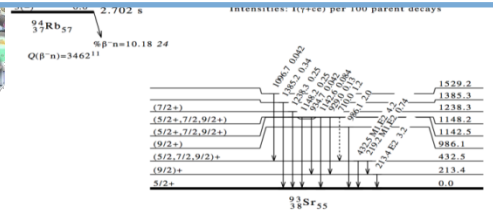


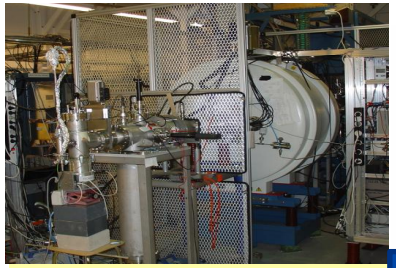


Applications:
Dosimetry, radiation protection, reactor operation+ safety, forensics, Homeland security, Cultural heritage, environmental Control

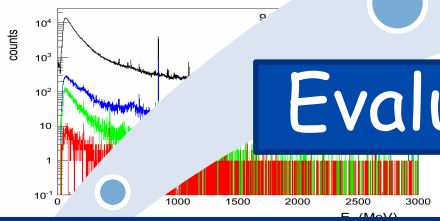
Nuclear Data

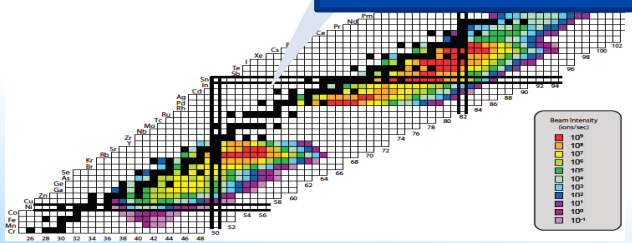


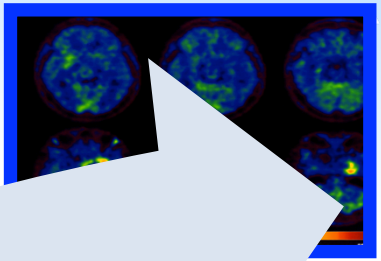




JYFLTRAP Penning trap







Dissemination

Evaluation

Compilation

Applications:
Dosimetry, radiation protection, reactor operation and safety, forensics, homeland security, Cultural heritage, environmental Control

Databases: Compiled data

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

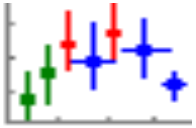
IAEA NDS Main Databases: END | EXFOR | CINDA | LiveChart | NuDat | NSR | XUND | ENSDF | MIRD

National Nuclear Data Center

Nuclear Science References (NSR)

NSR Reference Paper NIM **A 640**, 213 (2011)
Database version of August 29, 2016

The NSR database is a bibliography of nudear physics articles, indexed according to content and spanning more than 100 years of research. Over 80 journals are checked on a regular basis for artides to be induded. 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.



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

NNDC NRDC

Experimental Nuclear Reaction Data (EXFOR)

Database Version of 2016-09-05

Softw are Version of 2016-09-02

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 21401 experiments (see statistics and recent updates).

EXFOR Reference Paper: Nucl. Data Sheets 120(2014)272

National Nuclear Data Center

BROOKHAVEN NATIONAL LABORATORY
Home

NNDC Databases: NuDat | NSR | XUNDL | ENSDF | MIRD | ENDF | CSISRS | Sigma

Search the NNDC:

- ENSDF Format Manual
- Procedures Manual
- ENSDF Analysis and Utility Codes
- Q Values
- Log ft's

NSDD

XUNDL: Experimental Unevaluated Nuclear Data List Search and Retrieval

Last updated 2016-09-06

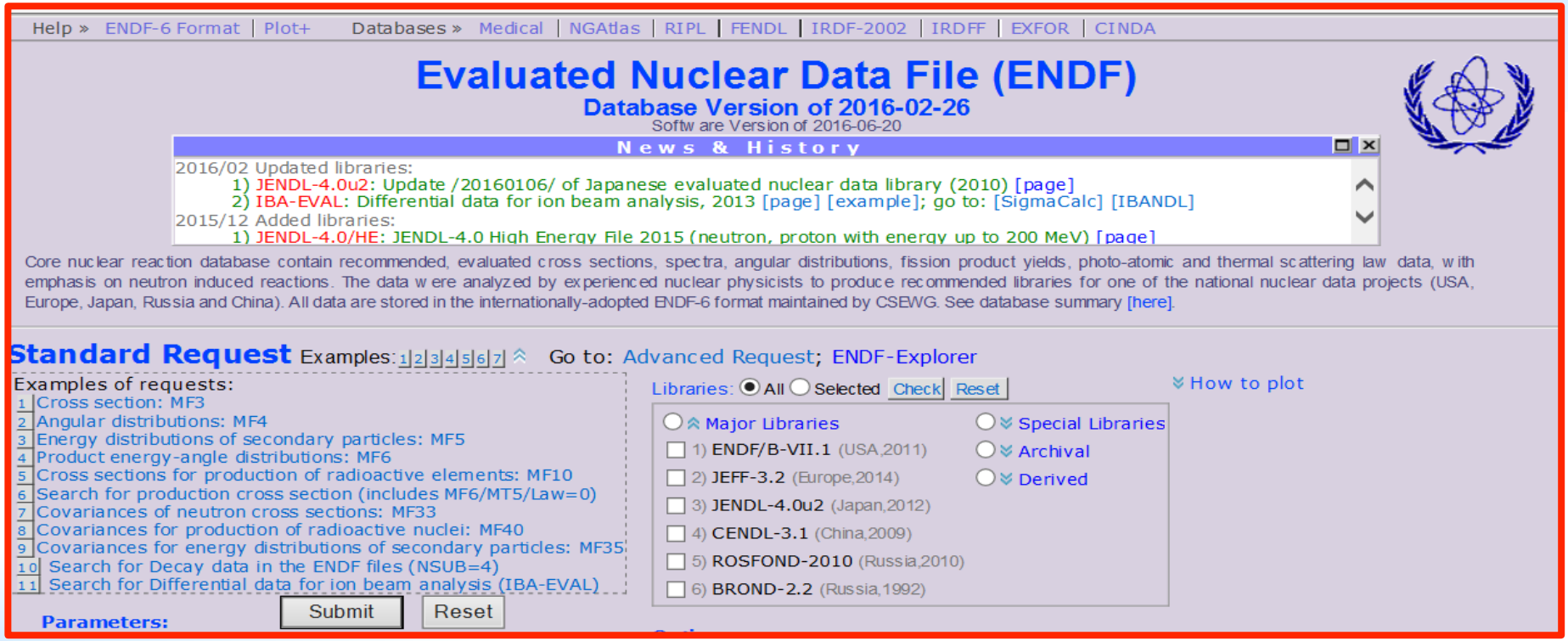
XUNDL contains compiled experimental nuclear structure data from more than 3500 recent papers. For evaluated nuclear data, see ENSDF.

Send Feedback

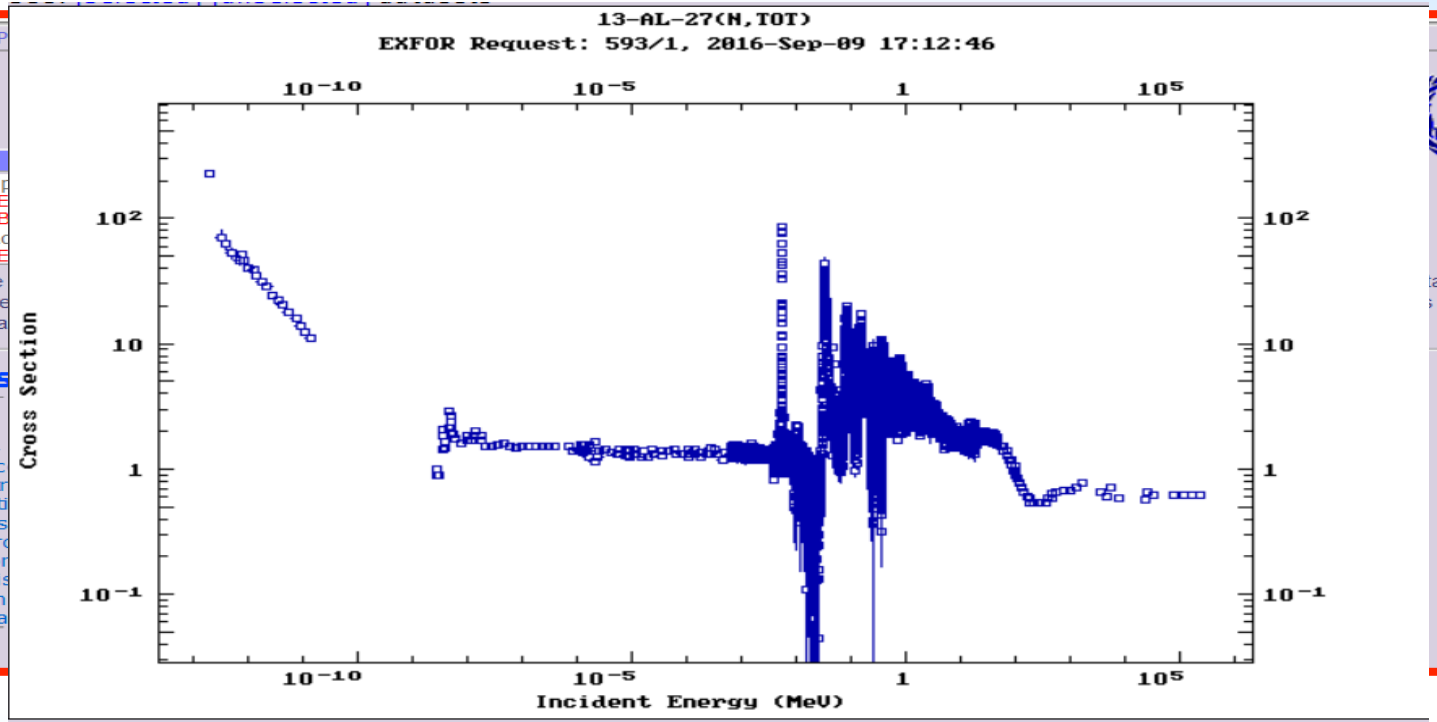
XUNDL Activity

59 new datasets added/modified in the last month!

Evaluated Nuclear Data File (ENDF)



Evaluated Nuclear Data File (ENDF)



Help » ENDF-6 Format | P

2016/02 Up
1) JE
2) IB
2015/12 Ac
1) JE

Core nuclear reaction database
emphasis on neutron induced re
Europe, Japan, Russia and China

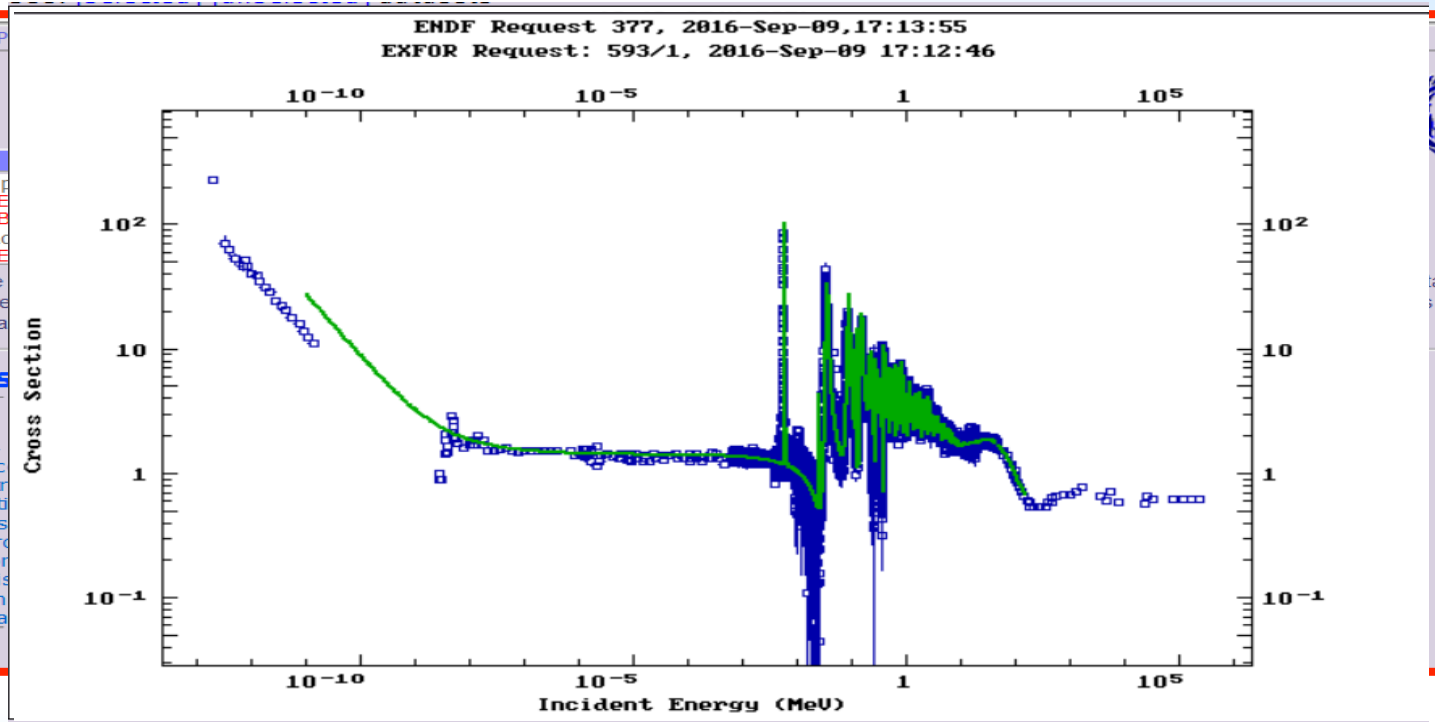
ta, with
(USA,

Standard Reques

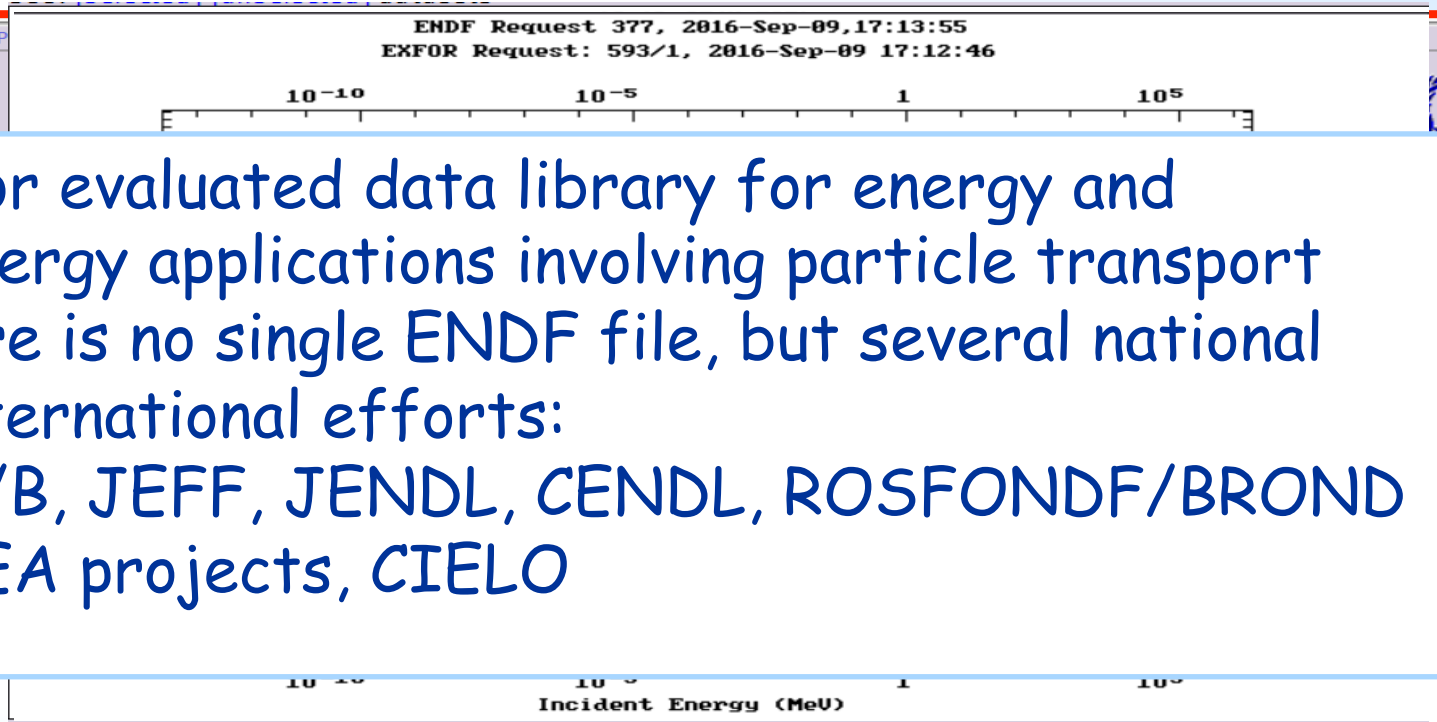
Examples of requests:
1 Cross section: MF3
2 Angular distributions: MF4
3 Energy distributions of sec
4 Product energy-angle distr
5 Cross sections for producti
6 Search for production cros
7 Covariances of neutron cr
8 Covariances for productio
9 Covariances for energy dis
10 Search for Decay data in
11 Search for Differential da

Parameters:

Evaluated Nuclear Data File (ENDF)

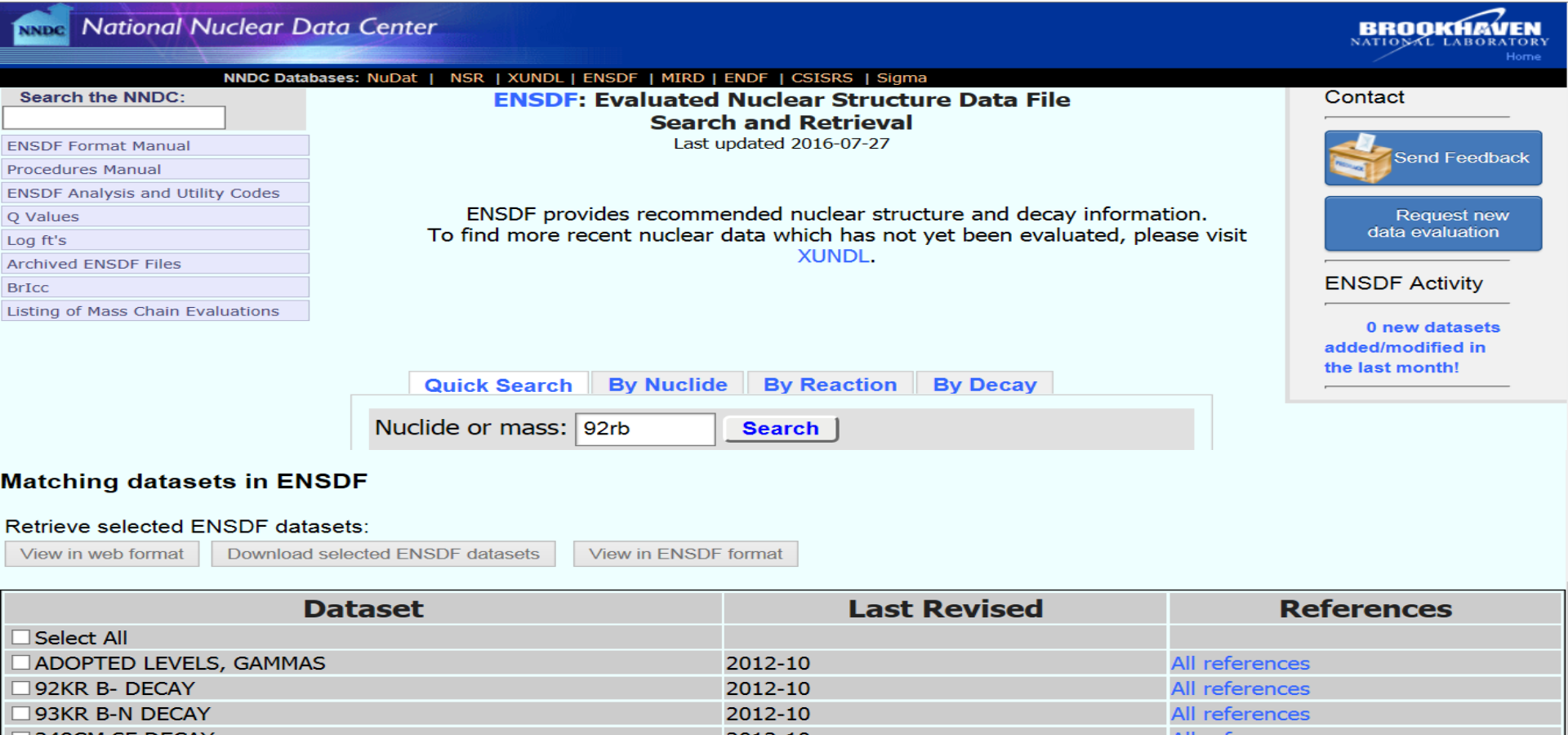


Evaluated Nuclear Data File (ENDF)

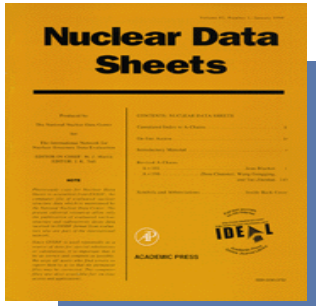


- Major evaluated data library for energy and non-energy applications involving particle transport
- There is no single ENDF file, but several national and international efforts:
  ENDF/B, JEFF, JENDL, CENDL, ROSFONDF/BROND
- IAEA projects, CIELO

Evaluated Nuclear Structure Data File (ENSDF)



ENSDF Evaluation



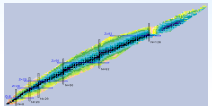
- Continuously updated
- Complete

- Levels, spins, parities
- Multipolarities, mxing ratios, conversion coefficients
- Half-lives, transitions strengths, emission probabilities…

ENSDF: Major Data Sources and Derivatives

MC Codes
- MCNPX
- GEANT

ENSDF



NuDat

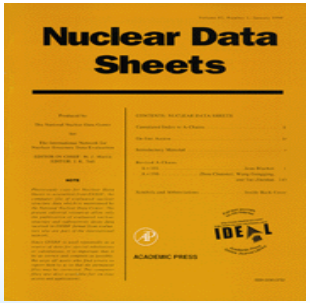
Live Chart

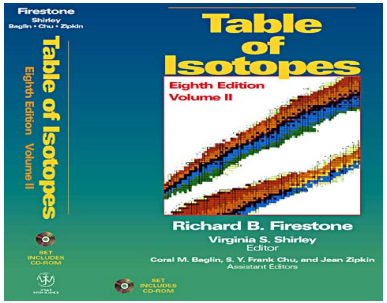
IE

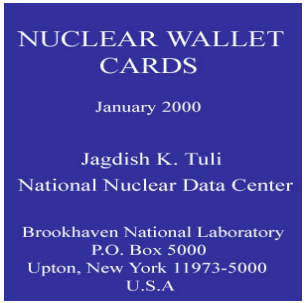
Derivative Databases:

NUBASE | **MIRD** | **RIPL** | **DDEP** | **JANIS** | **RADWARE** | **...**

Derivative Publications:







Widely used ENSDF retrieval systems

National Nuclear Data Center

NuDat 2.6

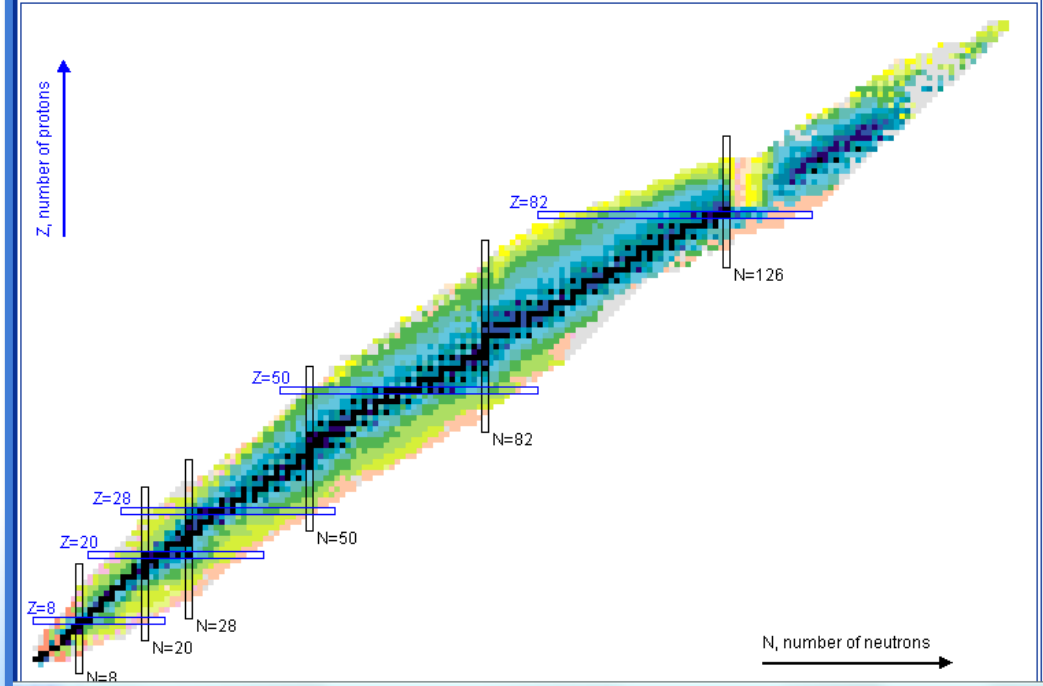
Search and plot nuclear structure and decay data interactively. More.

Levels and Gammas Search
Ground and excited states (energy, $T_{1/2}$, spin/parity, decay modes), gamma rays (energy, intensity, multipolarity, coinc.)

Nuclear Wallet Cards Search
Latest Ground and isomeric states properties

Decay Radiation Search
Radiation type, energy, intensity and dose following nuclear decay

Color code	Half-life	Decay Mode	Q_{β^-}	Q_{EC}	Q_{β^+}	S_n	S_p	Q_α	S_{2n}	S_{2p}	$Q_{2\beta^-}$	Q_{2EC}	Q_{ECp}	Q_{β^-n}
Q_{β^-2n}	BE/A	(BE-LDM Fit)/A	$E_{1st\ ex.\ st.}$	E_{2^+}	E_{3^-}	E_{4^+}	E_{4^+}/E_{2^+}	β_2	$B(E2)_{42}/B(E2)_{20}$	$\sigma(n,\gamma)$	$\sigma(n,F)$	235U FY	239Pu FY	252Cf FY



Tooltips: On / Off

Zoom: 1 2 3 4 5 6 7

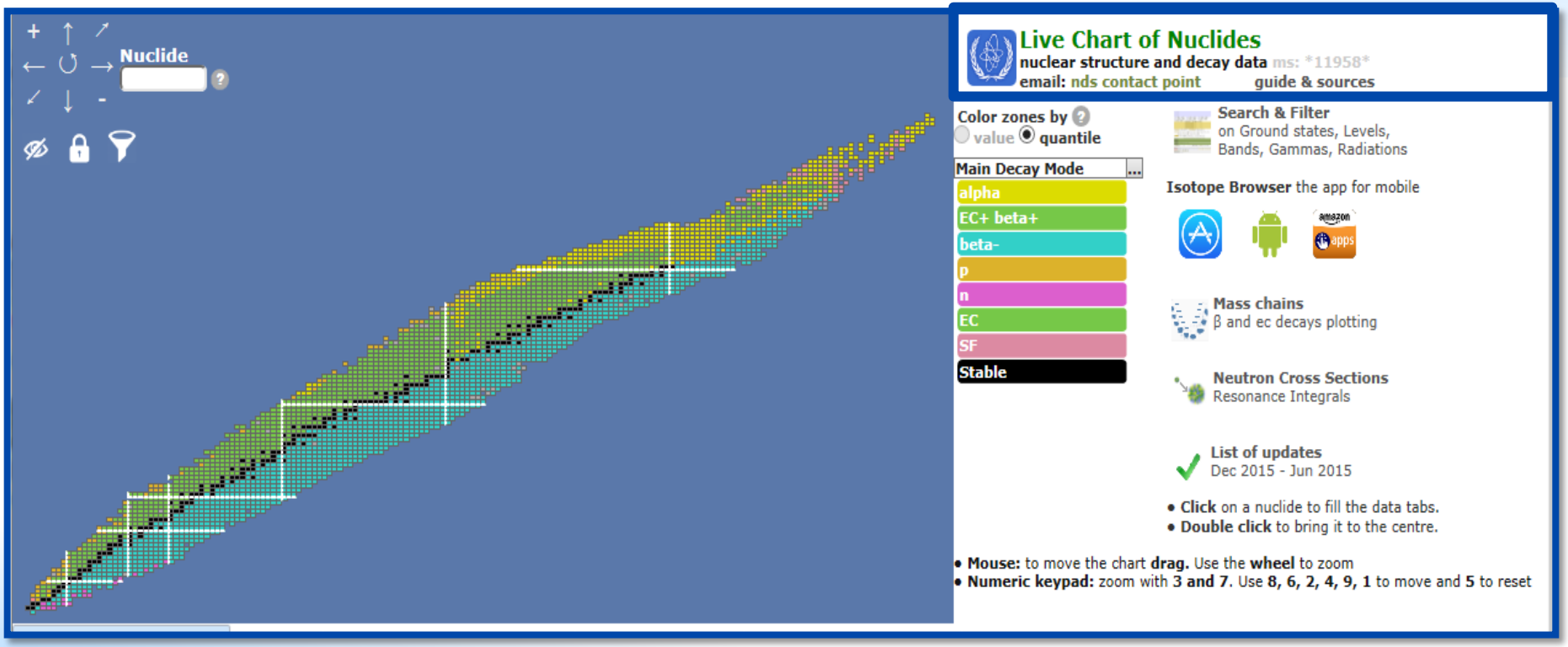
Uncertainty: NDS / Standard

Screen Size: Narrow / Wide

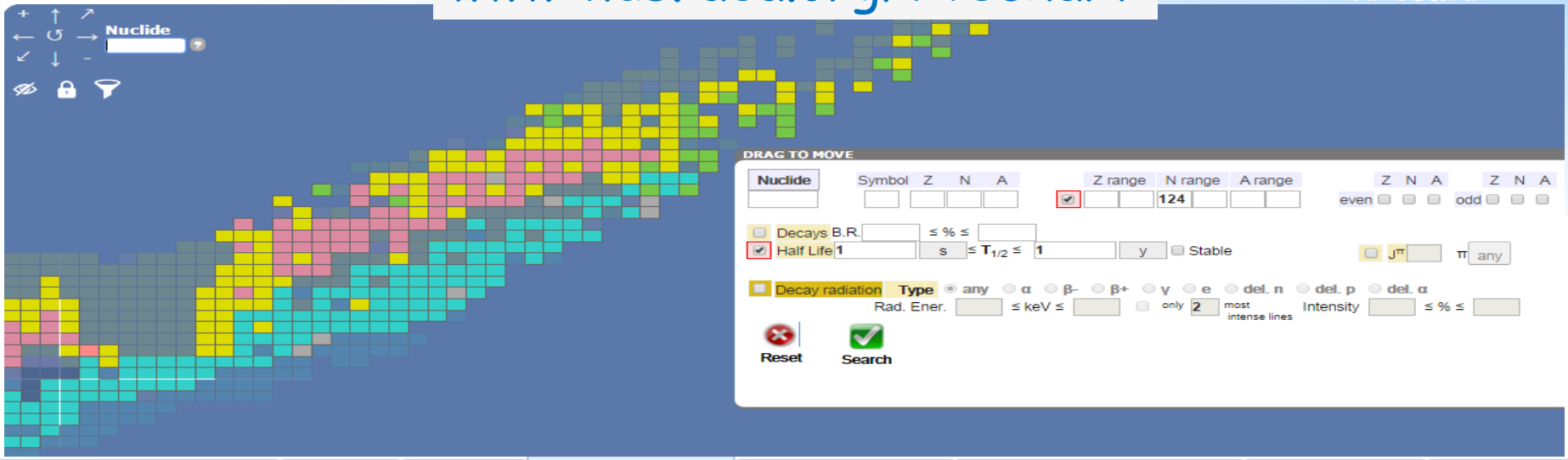
Nucleus: go

Seconds
> 10+15
10+10
10+07
10+05
10+04
10+03
10+02
10+01
10+00
10-01
10-02
10-03
10-04
10-05
10-06
10-07
10-15
< 10-15
unknown

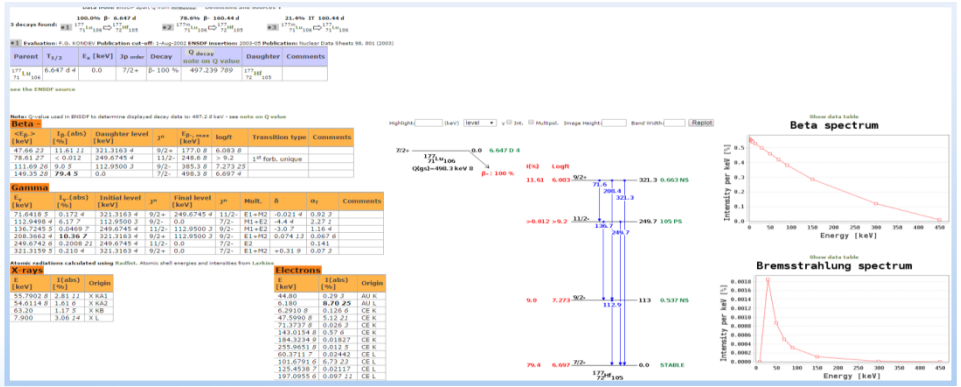
Widely used ENSDF retrieval systems



www-nds.iaea.org/livechart



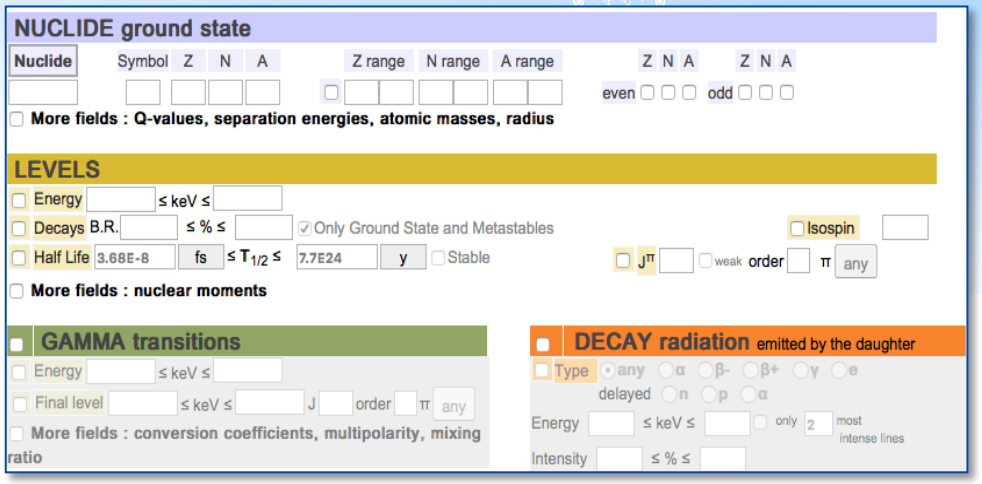
- Nuclides Chart with filter
- ENSDF + other NS properties
- Data tables with evaluators' comments
- Level and decay schemas, decay radiation, β and bremsstrahlung spectra
- CSV download

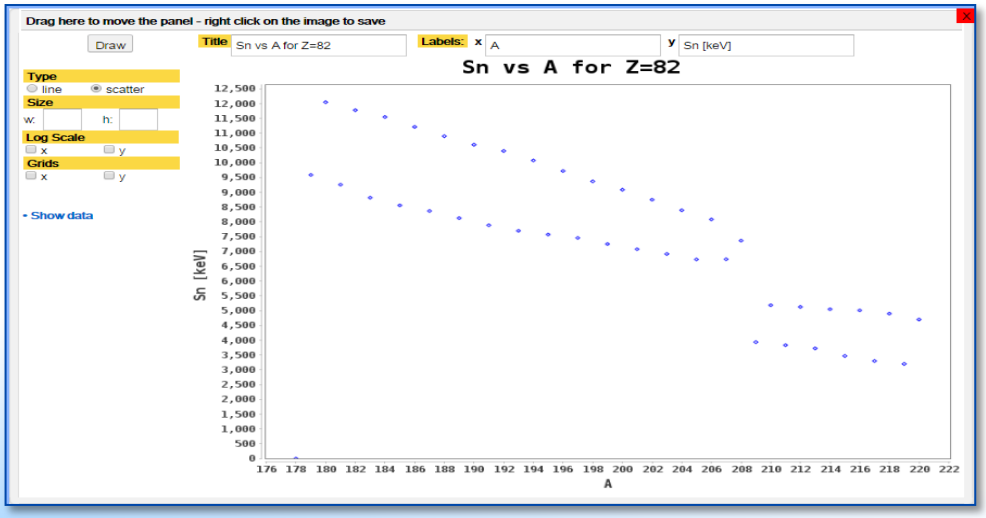


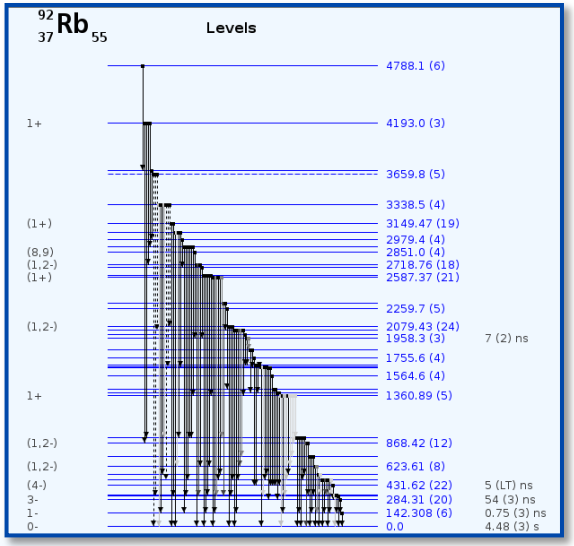
www-nds.iaea.org/queryensdf

Build your query on ENSDF

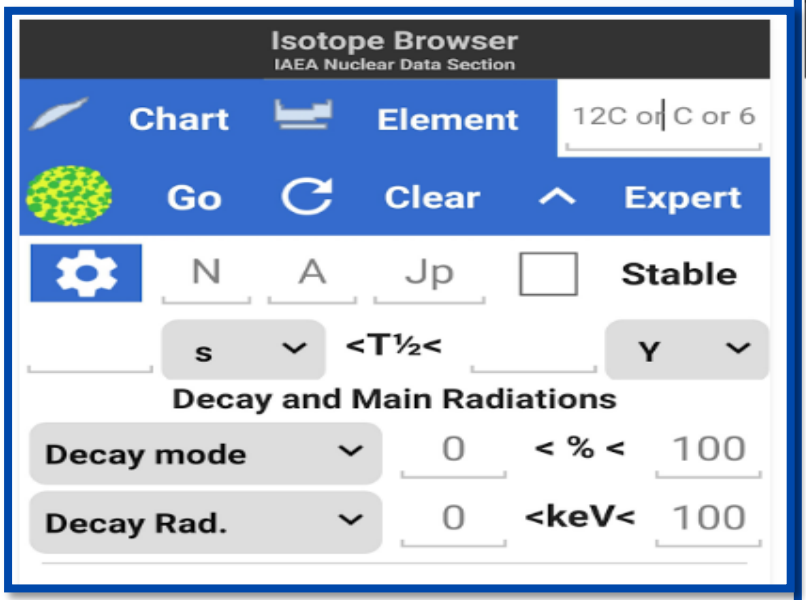
- Custom plotting
- Data tables, level and decay schemes
- CSV data downloading

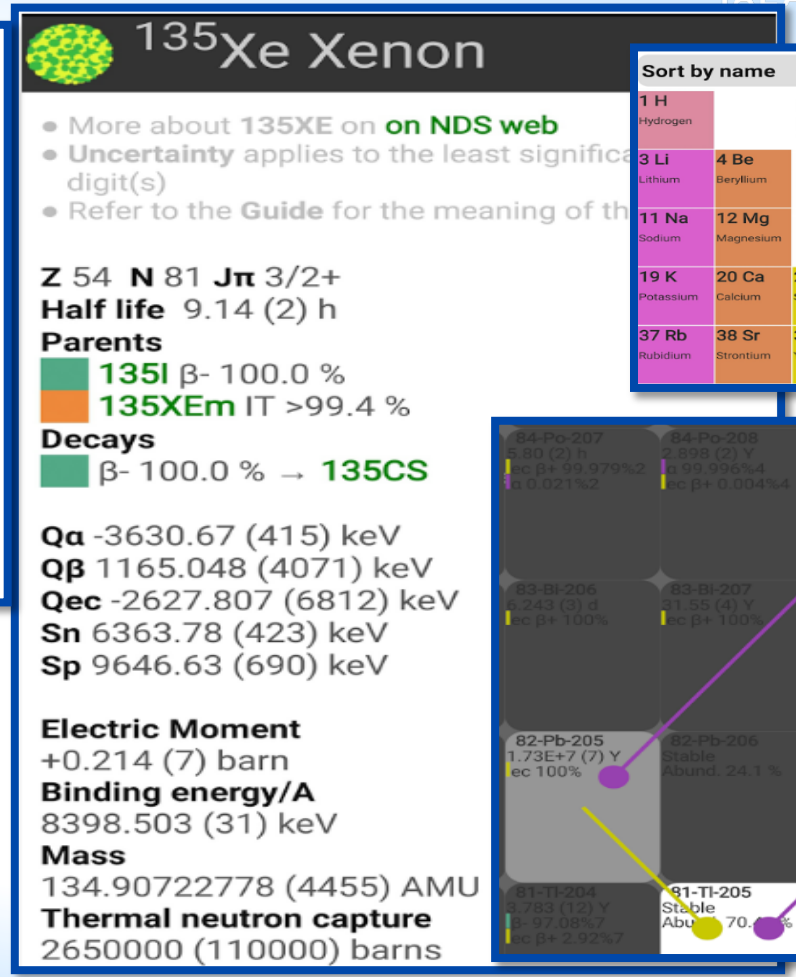


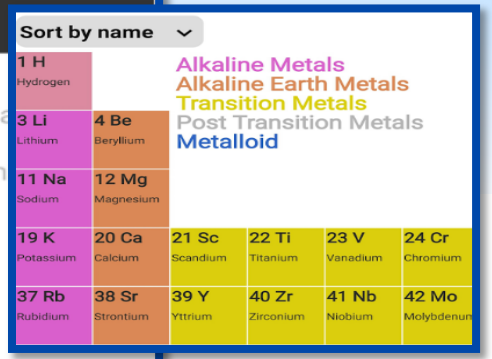


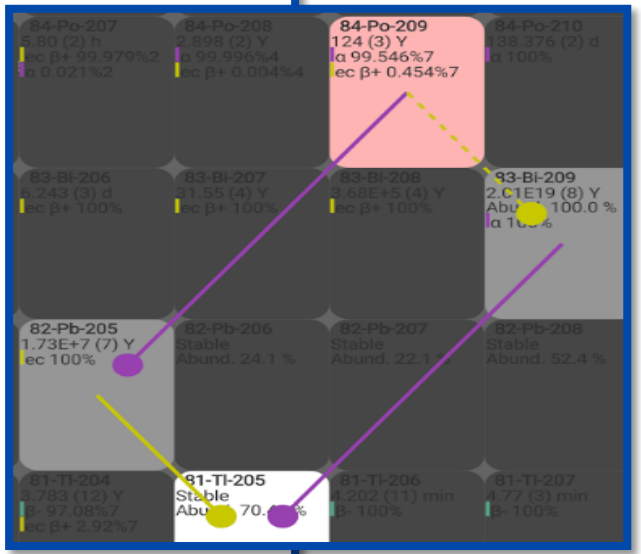


IAEA Isotope Browser – for mobile devices









- ENSDF + other NS data
- Query tool
- Chart with decay path

International Network of Nuclear Structure and Decay Data Evaluators

ITT Roorkee

Petersburgh Nuclear Physics Institute

McMaster University

International Network of Nuclear

Since 1974 under auspices of
Nuclear Data Section
International Atomic Energy Agency

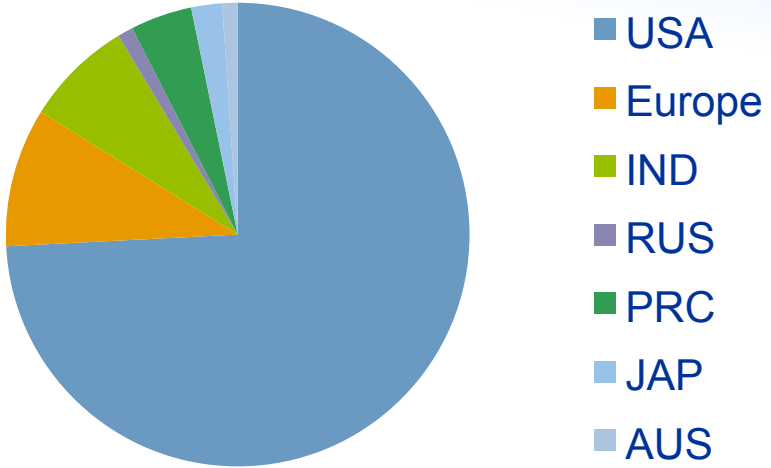
ITT Roorkee

Petersburgh Nuclear Physics Institute

McMaster University

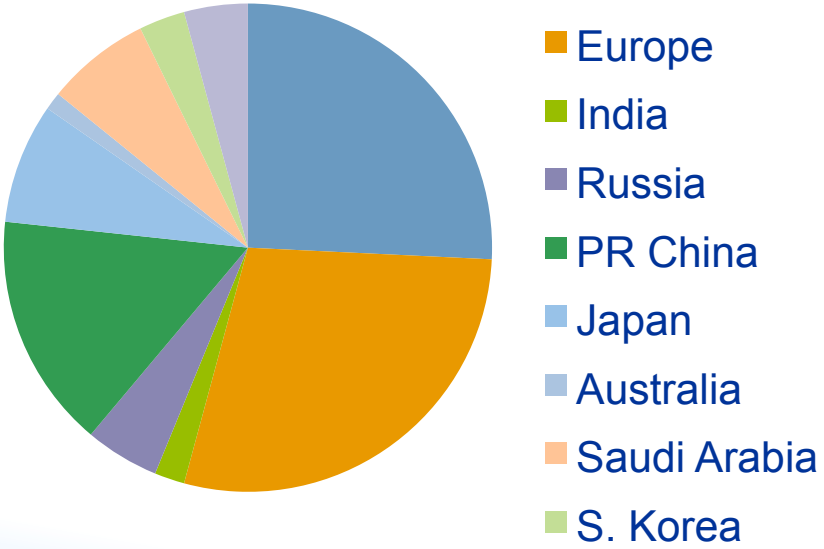
China Institute of Atomic Energy

NSDD evaluation vs Usage



FTE contribution to ENSDF

Downloads (%) from Nuclear Data Sheets



A bit of history

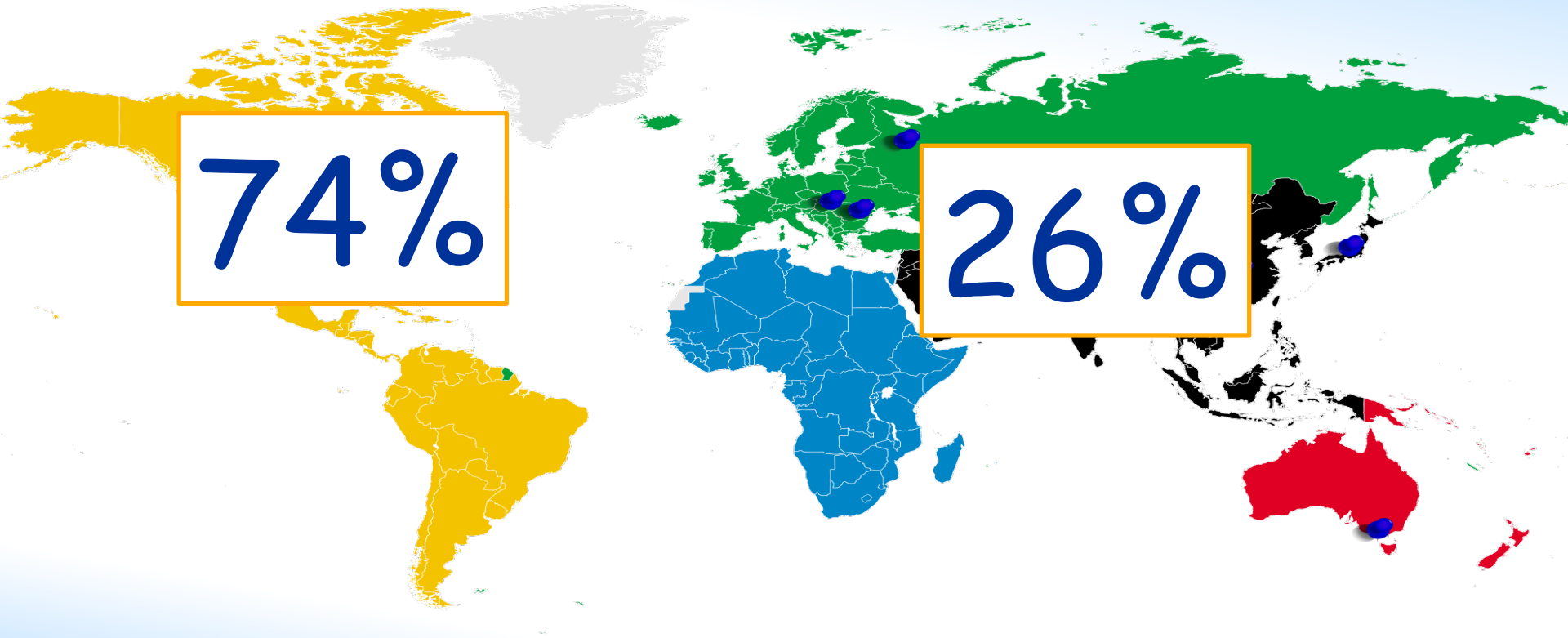
Table 2. Multinational mass chain evaluations for ENSDF – numbers of responsible laboratories/ institutes.

	Year			
	1981	1986	1996	2008
North America	6	6	6	6
Europe	6	5	4	1(→ 0)
Russia	2	2	2	1
Japan	1	1	1	1
China	-	-	1	2
Rest of the World	1	1	1	3
	16	15	15	14(→ 13)

10-11 November 2008
IAEA Technical Meeting on Reference Data Libraries for Nuclear Applications - ENSDF

c/o: A. Negret

Perspectives



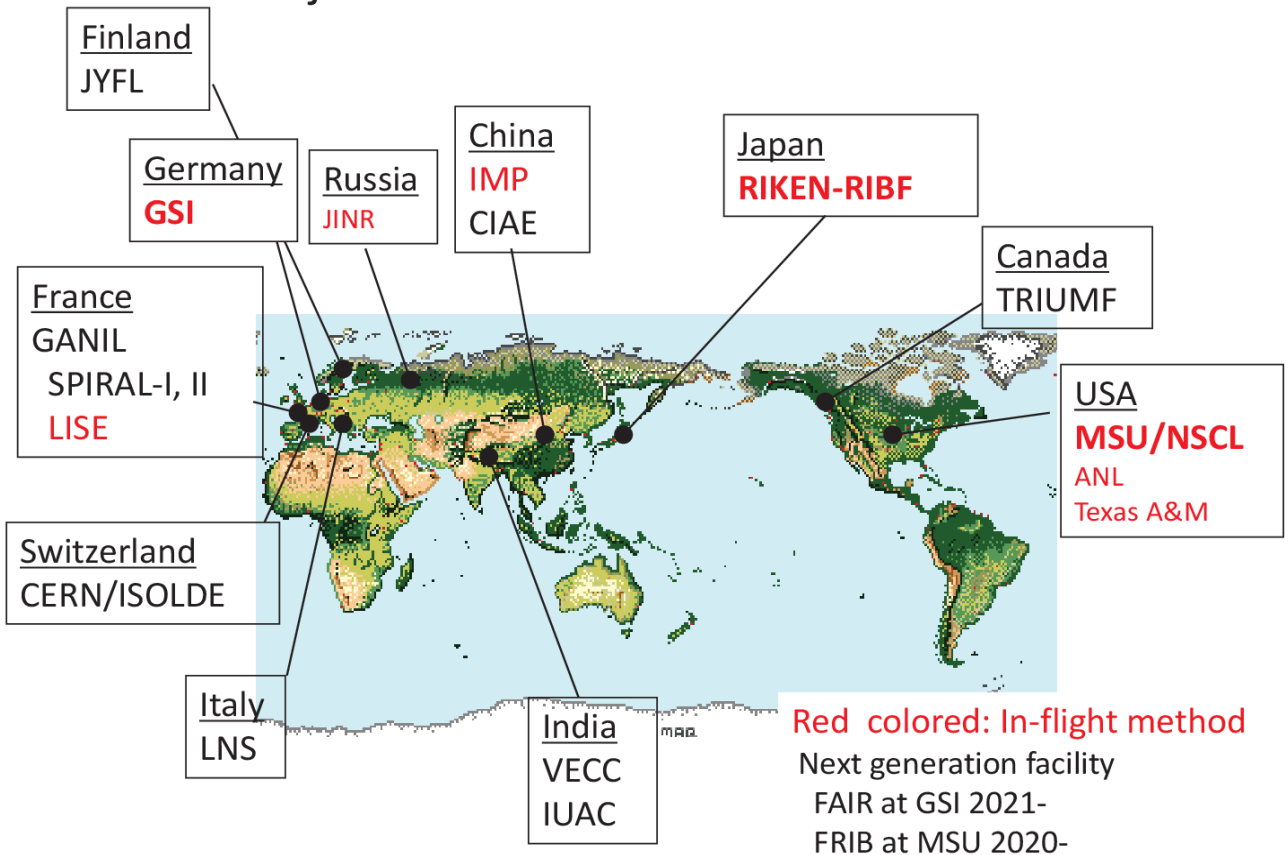
- 15 NSDD centres

Present and Future

- Require 12 full-time evaluators to keep ENSDF updated every 10 years – have only 9
- Limited funding
- Retirement of experienced evaluators
- Rapid growth in new data
- Increasing demands for reliable up-to-date nuclear data

- NSDD centres

Major RI Beam Facilities in the world



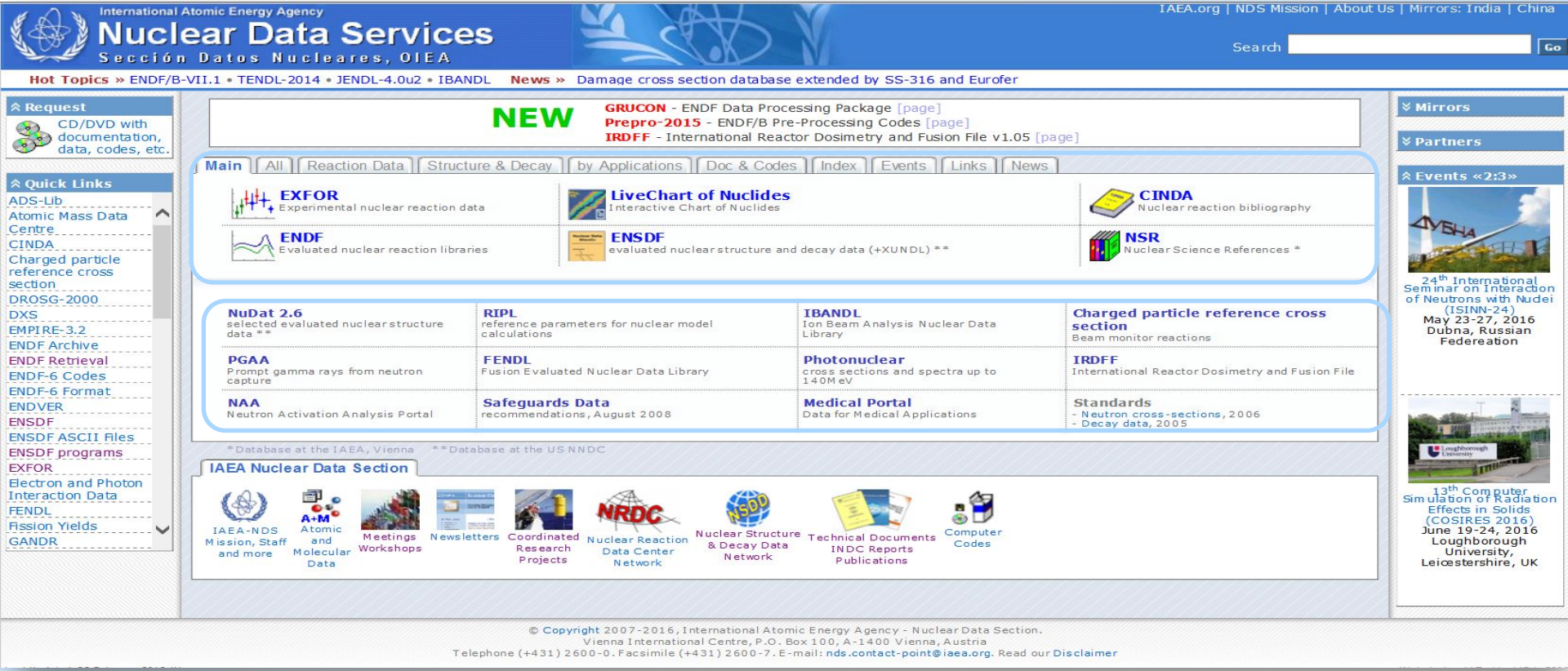
c/o: H. Sakurai, ICTP Workshop on NSDD, 22 Aug.-2 Sept. 2016, Trieste

Major RI Beam Facilities in the world

Contribution from the major facilities all around the world is CRUCIAL !

- Maintain expertise in nuclear data
- Keep ENSDF current
- Provide top quality data for applications and basic research

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



IAEA 60 Years
Atoms for Peace and Development

Thank you!