Progress in EXFOR/ENDF/IBANDL/PDF databases, retrieval systems, tools and software

Viktor Zerkin
International Atomic Energy Agency, Nuclear Data Section

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- Online news (technical part)
- ENDF Web: MF34, MF31
- Connecting to INIS
- EXFOR-NSR PDF database
- IBANDL news: Archive, License, API
- CSV output from EXFOR Web
- X4Pro - universal, fully relational EXFOR database
- EE-View - Experimental-Evaluated data Viewer
- Key point of X4Pro
- X5: comprehensive EXFOR in JSON

Concluding remarks

Main news. Summary

1. EXFOR

1) Link EXFOR to INIS (International Nuclear Information System)
2) CSV - Comma Separated Values output from EXFOR Web system
3) X4Pro - universal, fully relational EXFOR database (professional edition)
4) EE-View - fast experimental-evaluated data viewer
5) Web-API for search/downloading data from EXFOR/X4Pro and ENDF databases
6) X5 - comprehensive presentation of EXFOR in JSON. Available in X4Pro and on Web

2. ENDF

1) Plotting covariances of the average number of neutrons per fission MF31
2) Plotting covariances for angular distributions of secondary particles MF34
3) API for search and download data of MF4 with uncertainties from MF34
4) New evaluated libraries in the ENDF database:
   1. TENDL-2021 TALYS-based Evaluated Nuclear Data Library
   2. INDEN-Oct2022 evaluations produced by International Nuclear Data Evaluators Network (coord. by the IAEA)

3. EXFOR-NSR PDF database

1) Updates: 70, added 3,237 PDF files
   1. Total: +3, 237 => 226,127
   2. EXFOR-PDF: +988 => 27,845 (78% of 35,666)
   3. NSR-PDF: +2,249 => 190,886 (~79% of 241,534)

4. IBANDL

1) 3 database updates
2) IBANDL-Archive for downloading full library
3) API for search, downloading and converting (R33, CSV, JSON)

Online news (technical part)

EXFOR-CINDA-ENDF-IBANDL Web retrieval system

1) Functioning at NDS (IAEA), regularly updated
2) Functioning on Mirror-sites: BARC (India) and “Atomstandart” (Russia)
3) Stopped at NNDC (mid-2022), redirected to NDS

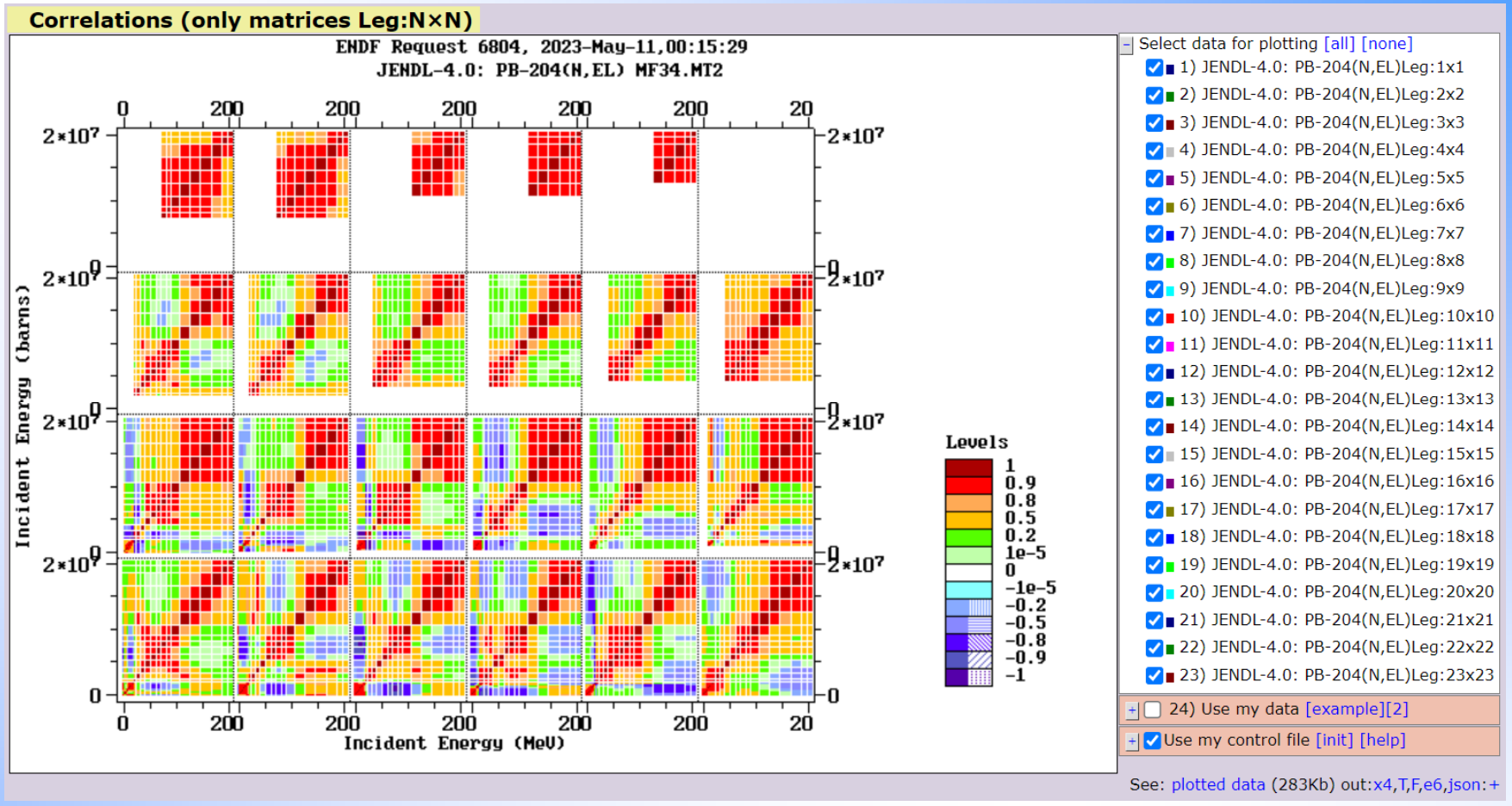
IT Security

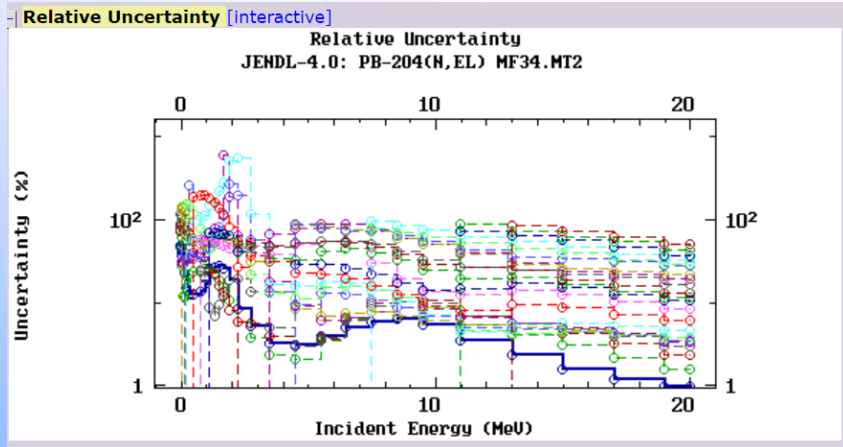
1) Web software system restructured for IT security reasons
2) Two new types of Web scanners were regularly implemented
3) Security assessment of source codes done centrally by IAEA-IT
4) Credentials for access databases from servlets

Users’ authorization system

1) New registration/authorization system for NRDC, NSDD, IAEA-CRP members (total: 35); applied for PDF’s, MyExfor, MyEndf, MyEnsdf

ENDF Web: MF34





ENDF MF34, MF31: request, consultations, testing by Roberto Capote.

Connecting to INIS

What for we need it?

We have links from EXFOR database and Web retrieval system:

1. To ENDF to search and plot evaluated data
2. To CINDA to search not yet compiled data
3. To NSR to get meta-data for non-1st References and NSR-PDF
4. Now: having link to INIS, every user can get PDF file – source of EXFOR data

Now it works for 5 Lab reports and covers ~1600 EXFOR-Entries

EXFOR links to INIS

EXFOR

Example #21

EXFOR

21 Display link to INIS for JINR Reports, to other reports

Request Submit Reset Help

Target
Reaction
Quantity
Product
Energy from to eV
Author(s)
Publication year
Last modified
Accession # 40940002;40940008;41477002;A0019

n	Acc#	1st Author	Year	Reference	
1)	40940 [7]	A.B.Popov+	1986	R,JINR-P3-86-599,198609	Rept: Joint Inst. for Nucl. Res., D

1) + Rept: Joint Inst. for Nucl. Res., Dubna Reports, No.86-599 (1986) INIS↗
The Neutron Integral and Differential Cross-Sections In the Energy Region Below 440 KeV at Nuclei Of Cu, Y, Nb, In, Sb and
A.B.Popov, G.S.Samosvat

Links to NSR and INIS

2) + Rept: Joint Inst. for Nucl. Res., Dubna Reports, No.82-914 (1982)

3) + Rept: Joint Inst. for Nucl. Res., Dubna Reports, No.82-770 (1982) NSR:1982VAZO INIS↗
Measurement of Differential Cross Sections of Neutron Scattering withNuclei on the IBR-30 Reactor
V.A.Vagov, V.A.Ermakov, G.N.Zimin, I.O.Zo, V.G.Nikolenko, A.B.Popov, G.S.Samosvat

Link to INIS

4) + Rept: Joint Inst. for Nucl. Res., Dubna Reports, No.84-668 (1984) INIS↗
Differential neutron scattering cross sections and average neutron resonance parameters of cadmium isotopes.

Purpose: get PDF via INIS

PDF in INIS

16036886.pdf

https://inis.iaea.org/collection/NCL...

Bing OASIS Search Retiring in... Home Other favorites

1 of 8

сообщения
объединенного
института
ядерных
исследований
дубна

Р3-84-668

Зо Ин Ок, А.И.Поплова, А.Б.Попов,
И.М.Саламатин, Г.С.Самосват

ДИФФЕРЕНЦИАЛЬНЫЕ
НЕЙТРОННЫЕ СЕЧЕНИЯ РАССЕЯНИЯ
И СРЕДНИЕ НЕЙТРОННЫЕ ПАРАМЕТРЫ
ИЗОТОПОВ КАДМИЯ

1984

INIS

IAEA NUCLEUS Sign In Help English

IAEA 50+ years of INIS International Nuclear Information System

Home INIS Home Thesaurus Browse

Search My Selection Search History

Clear All Insert Unicode

Search the INIS Repository

Everywhere RN:16036886 Search

Advanced Search

Limit to results with full text

Link to PDF in INIS

Primary Subject
NUCLEAR PHYSICS AND RADIATION PHYSICS (1)

Subject Area
Nuclear Physics (1)

Record Type
Report (1)

Literature Type
Numerical Data (1)

Conference Title

Journal Title

Results 1 ... search took: 0.016 seconds

PDF Differential neutron scattering cross sections and average neutron parameters of cadmium isotopes

Zo In Ok; Poplova, A.I.; Popov, A.B.; Salamatin, I.M.; Samosvat, G.S.

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics

1984

Citation Export

Abstract

[en] The averaged differential neutron scattering cross sections are measured for the 106, 108, 110, 112 and 116 even-even cadmium isotopes the booster mode on the IBR-30 reactor experimental values the s-and p-wave streng a functions and the parameters of potential scattering are obtained which correspond to two boundary conditions set on the wave functions. The obtained average parameters of cadmium isotopes for these boundary

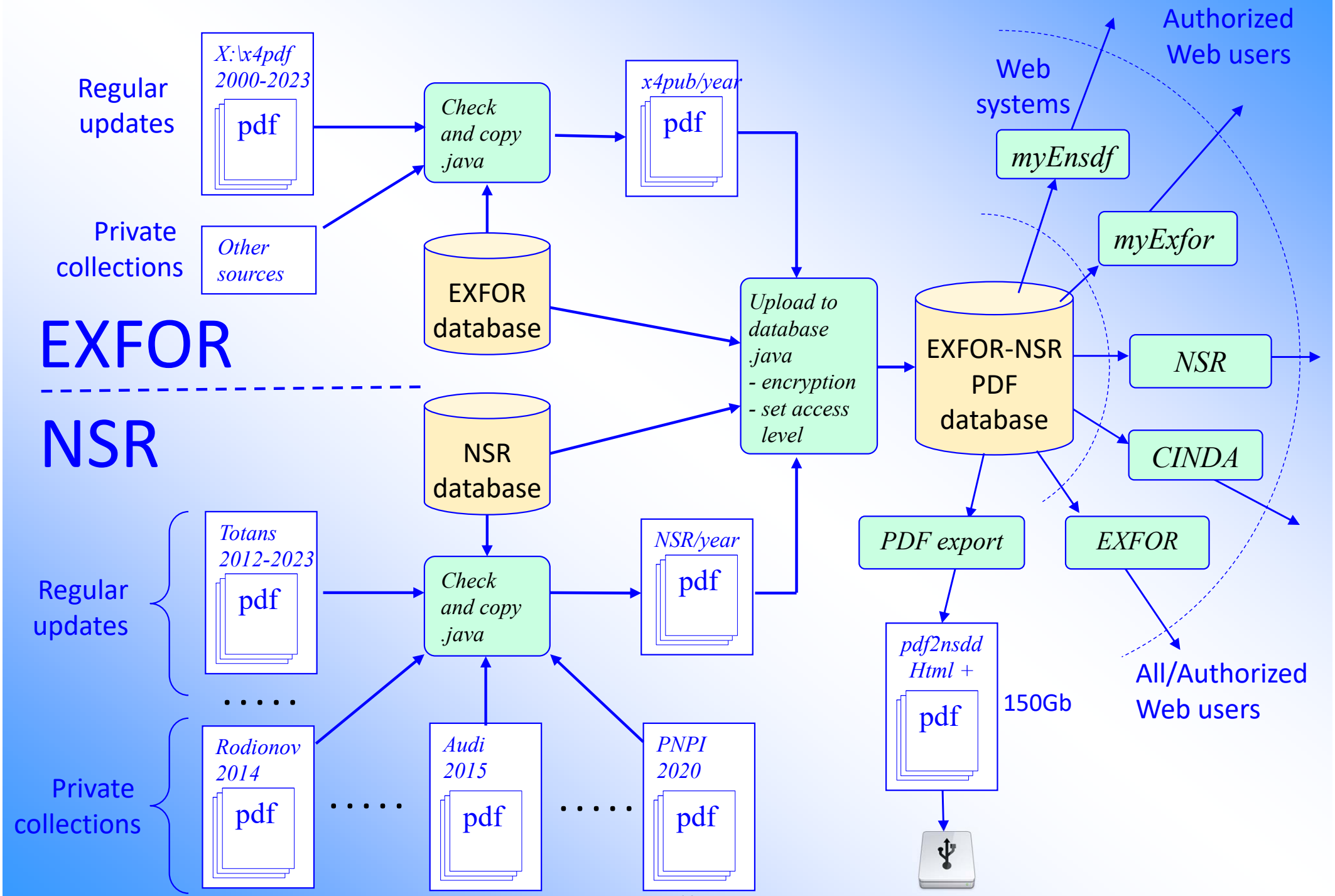
EXFOR-NSR PDF database

History of EXFOR-NSR PDF database

- Publications: from 1857 to 2023, 126 years
- Content: 226,129 PDF files from 2000 to 2023 (24 years)
- Coverage: EXFOR 27,846 files (78.1%); NSR 190,888 files (79%)
- Web access via: EXFOR, CINDA, myEnsdf on NDS site; via NSR on NNDC site (via VPN)

- 2005: EXFOR source papers are systematically stored in the IAEA-NDS PDF archive
- 2011: PDF files are included to EXFOR database (common between NNDC and NDS)
- 2011: EXFOR Web retrieval system provides PDF files to authorized users on NNDC and NDS Web sites
- 2012: PDF of original papers of NSR are exchanged between NNDC and NDS, and shared between NSR and EXFOR retrieval systems
- 2015: ENSDF evaluators donate their PDF collections to common database: A.Rodionov, G.Shulyak, B.Singh, G.Audi, F.Kondev
- 2015: NSR Web retrieval system provides access to PDF files for authorized users
- 2016: PNPI joins regular exchange of PDF files between NNDC and NDS
- 2016: CINDA Web retrieval system provides access to PDF files for authorized users
- 2016: IAEA-INDC reports are publically opened via Web EXFOR and NSR
- 2019: KINR opens lab reports and conference proceedings of Institute for Nuclear Research (Ukraine)
- 2022: 2,688 PDF files are public i.e., ~1.2% from total 226,129 publications
- 2022: paper describing EXFOR-NSR PDF database published in "Journal of Instrumentation"
  DOI: https://doi.org/10.1088/1748-0221/17/03/P03012, NSR: https://www.nndc.bnl.gov/nsr/nsrlink.jsp?2022ZE01
- 2022: discussion and checking with INIS: 1404 preprints JINR (Dubna)
- 2023: Link EXFOR – INIS for Lab reports of ANL, BARC, CEA, FEI, JINR: 1603 links to 1451 INIS articles

Functioning of EXFOR-NSR PDF database



EXFOR-NSR PDF database

Database updated: 2023-04-28. Files: 226129 from 2000-04-19 to 2023-04-28.

-	-	-	-	-	-	1857:1	1858:2	-	-	[1851-1858]:3
-	-	-	-	-	1896:3	-	1898:6	1899:2	1900:4	[1891-1900]:15
1901:1	1902:3	1903:6	1904:6	1905:7	1906:4	1907:6	1908:5	1909:3	1910:6	[1901-1910]:47
1911:6	1912:4	1913:6	-	-	-	1917:4	1918:4	1919:3	1920:7	[1911-1920]:34
1921:10	1922:9	1923:6	1924:10	1925:4	1926:2	1927:6	1928:16	1929:14	1930:17	[1921-1930]:94
1931:33	1932:29	1933:35	1934:60	1935:66	1936:78	1937:101	1938:94	1939:140	1940:113	[1931-1940]:749
1941:84	1942:35	1943:90	1944:168	1945:109	1946:183	1947:260	1948:228	1949:397	1950:546	[1941-1950]:2100
1951:589	1952:602	1953:621	1954:776	1955:831	1956:931	1957:979	1958:1338	1959:1226	1960:1654	[1951-1960]:9547
1961:1793	1962:1764	1963:2088	1964:1817	1965:2035	1966:2260	1967:2462	1968:2670	1969:2931	1970:3601	[1961-1970]:23421
1971:4081	1972:4880	1973:5639	1974:4570	1975:3934	1976:3896	1977:3696	1978:3635	1979:3497	1980:3552	[1971-1980]:41380
1981:3360	1982:3548	1983:3585	1984:3566	1985:3129	1986:3445	1987:3506	1988:3378	1989:3379	1990:3312	[1981-1990]:34208
1991:2826	1992:3088	1993:3307	1994:4247	1995:4010	1996:3978	1997:3863	1998:4178	1999:4324	2000:4305	[1991-2000]:38126
2001:4605	2002:4870	2003:4550	2004:4832	2005:5035	2006:4319	2007:5020	2008:4023	2009:3911	2010:3647	[2001-2010]:44812
2011:4032	2012:3718	2013:3489	2014:3666	2015:3102	2016:3584	2017:3614	2018:2712	2019:2529	2020:426	[2011-2020]:30872
2021:352	2022:325	2023:44								[2021-2023]:721

Total years:126, files:226129

Full volumes: [Conf.proc. & Books] [Theses] [Reports]

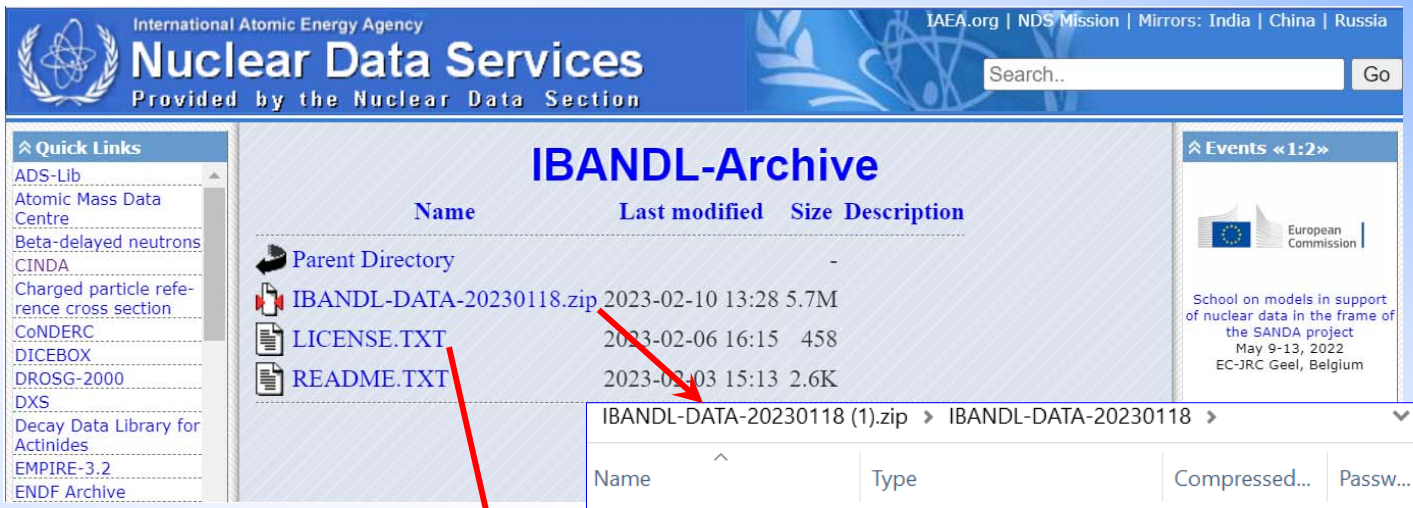
Checking mode //contributions to NSR-PDF

PDF coverage

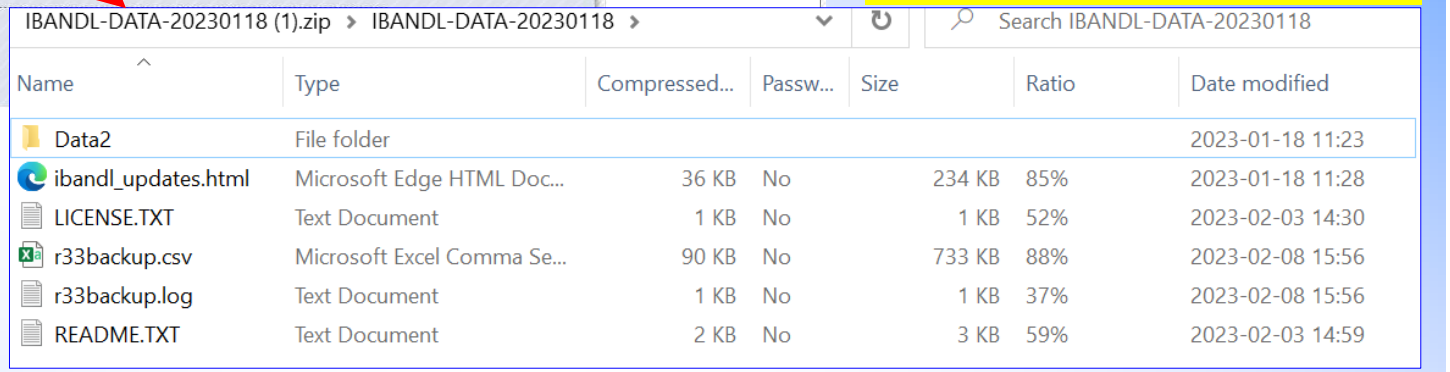
Database	#PDF/#References	#PDF+	Total #PDF+	Todo #PDF
NSR	190,888/241,534 ~79%	+1,804 ~0.7% from EXFOR	192,692 ~79.8%	48,842 ~20.2%
EXFOR	27,846/35,666 ~78.1%	+2,015 ~5.6% from NSR	29,861 ~83.7%	5,805 ~16.3%
CINDA	14,500/39,810 ~36.4%			
IBANDL	663/813 ~81.5%			

PDF files: 226,129 from 2000-04-19 to 2023-04-28

IBANDL news



IBANDL-DATA-20230118



README.TXT

```
"IBANDL - Ion Beam Analysis Nuclear Data Library"
 IAEA-NDS, 2005-2023, version 2023-01-18

_____________________________________________________________________

Copyright: (c) 2005-2023, International Atomic Energy Agency (IAEA)

License:   Creative Commons — Attribution 4.0 International (CC BY 4.0)
           https://creativecommons.org/licenses/by/4.0/

_____________________________________________________________________
```

Web API

1.1	Get full list	CSV	https://www-nds.iaea.org/exfor/ibandl?lst=1
1.2	Get full list	JSON	https://www-nds.iaea.org/exfor/ibandl?lst=2
2.1	Get one file	R33	https://www-nds.iaea.org/exfor/ibandl?ff=o6pp0m
2.2	Converted to RR	R33	https://www-nds.iaea.org/exfor/ibandl?ff=o6pp0m&convert=mb2rr
2.3	Converted to MB	R33	https://www-nds.iaea.org/exfor/ibandl?ff=c3pp0l&convert=rr2mb
2.4	Get file in JSON	JSON	https://www-nds.iaea.org/exfor/ibandl?ff=c3pp0l&convert=rr2mb&json
3.1	Get group of files	JSON	https://www-nds.iaea.org/exfor/ibandl?targ=13C&proj=a
3.2	and convert to MB	JSON	https://www-nds.iaea.org/exfor/ibandl?targ=13C&proj=a&convert=rr2mb
3.3	Get group by Target only	JSON	https://www-nds.iaea.org/exfor/ibandl?targ=13C

CSV output from EXFOR Web

What for we need it?

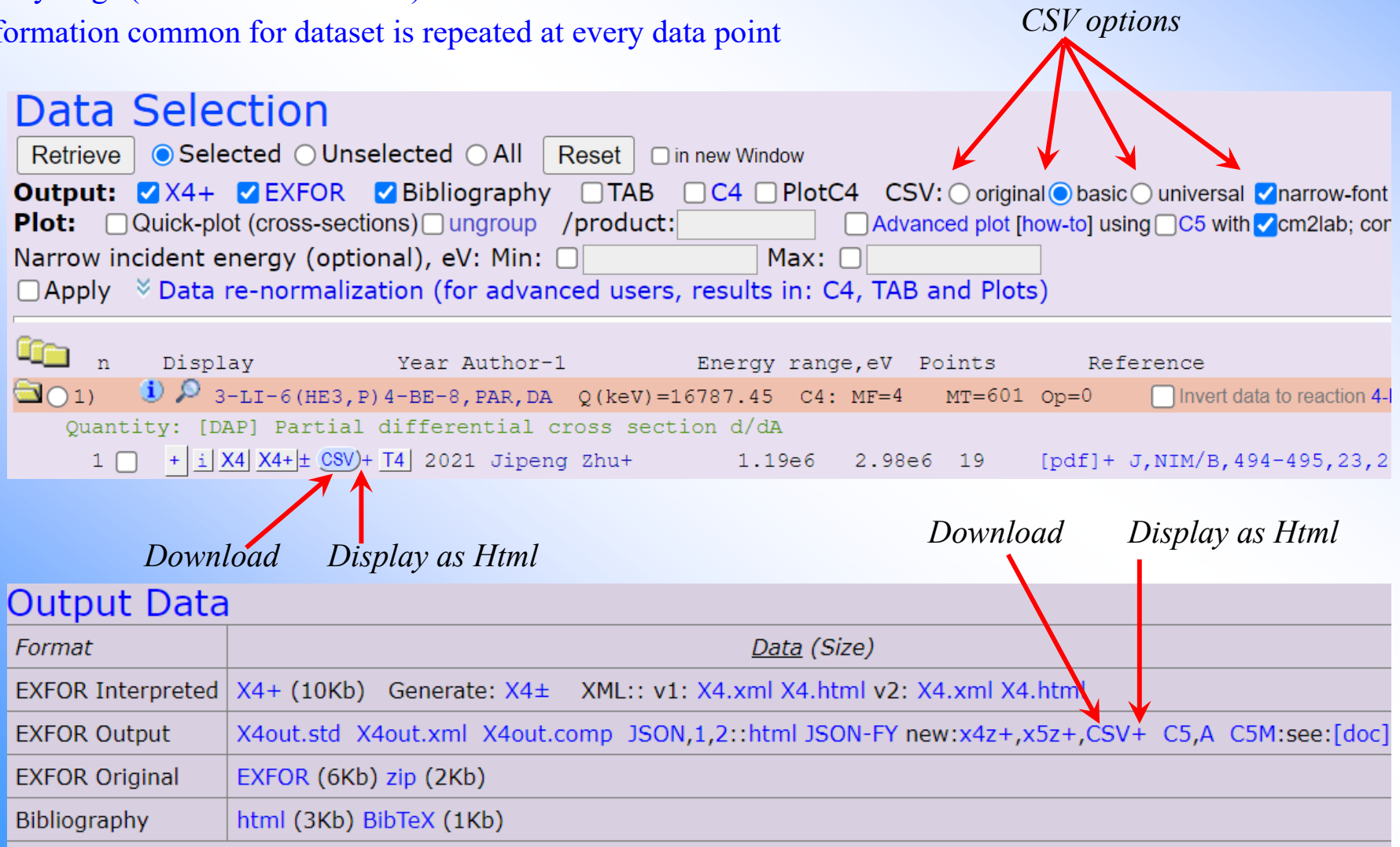
CSV is de-facto standard to download numerical data for further manipulations in Excel and other Apps.

Noticed a lot of downloading of [T4] and [plotted data] as plain text in column format.

Problems: how to present huge variety of EXFOR data in simple CSV format? Should it work for single Dataset only or for any EXFOR file? How it should present data of different quantities having different set of independent variables? All these problems made delay in implementation of CSV output from EXFOR Web retrieval system. Finally solution was worked out and implemented in 2023.

CSV output from EXFOR Web

1. Two types of CSV:
   a) for single Dataset: Subent<Pointer>
   b) for any EXFOR file having many Datasets
2. CSV for single Dataset includes all sorted data columns relevant for the Dataset: from COMMON from Subent-1 and from COMMON and DATA from current Subent. Data can be presented in original form and in Basic Units.
3. CSV for an EXFOR file includes Datasets with generalized computational form according to reaction type and family flags (Dict.213 and Dict.24)
4. Information common for dataset is repeated at every data point



CSV: how it looks. Dataset / original

```
ENTRY            S0268    20210415
AUTHOR       (Jipeng Zhu,Yuan Gao,
REFERENCE    (J,NIM/B,494-495,23,2021)
COMMON
ANG
ADEG
      146.
SUBENT         S0268004    20210415
REACTION     (3-LI-6(HE3,P)4-BE-8,PAR,DA)
COMMON
E-LVL        ERR-2       ERR-3
MEV          PER-CENT    PER-CENT
         0.        1.08        2.07
DATA
EN           DATA        ERR-T       ERR-S       ERR-1
KEV          MB/SR       PER-CENT    PER-CENT    PER-CENT
     1186.0        0.64         3.8         2.92         0.19
     1286.2        0.72         3.6         2.68         0.20
     1386.0        0.74         3.1         2.00         0.17
. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
     2875.1        1.28         3.0         1.58         0.55
     2983.2        1.34         3.0         1.57         0.59
ENDDATA
```

EXFOR

CSV: download text

```
DatasetID,year1,author1,DATA (MB/SR) 0.1,ERR-T (PER-CENT) 0.911,ERR-S (PER-CENT) 0.944,ERR-1 (PER-CENT) 0.955,ERR-2 (PER-CENT) 0.955,ERR-3 (PER-CENT) 0.955,EN (KEV) 1.1,E-LVL (MEV) 2.1,ANG (ADEG) 3.1,zaTarg1,Targ1,Proj,Emission,Prod,MF,MT,ReacType,Quant1,nx,indVars,Reacode
S0268004,2021,Jipeng Zhu+,0.64,3.8,2.92,0.19,1.08,2.07,1186.0,0.0,146.0,3006,3-LI-6,HE3,P,4-BE-8,4,601,DAP,DAP,3,234,"3-LI-6(HE3,P)4-BE-8,PAR,DA"
S0268004,2021,Jipeng Zhu+,0.72,3.6,2.68,0.2,1.08,2.07,1286.2,0.0,146.0,3006,3-LI-6,HE3,P,4-BE-8,4,601,DAP,DAP,3,234,"3-LI-6(HE3,P)4-BE-8,PAR,DA"
S0268004,2021,Jipeng Zhu+,0.74,3.1,2.0,0.17,1.08,2.07,1386.0,0.0,146.0,3006,3-LI-6,HE3,P,4-BE-8,4,601,DAP,DAP,3,234,"3-LI-6(HE3,P)4-BE-8,PAR,DA"
. . . . . .
S0268004,2021,Jipeng Zhu+,1.28,3.0,1.58,0.55,1.08,2.07,2875.1,0.0,146.0,3006,3-LI-6,HE3,P,4-BE-8,4,601,DAP,DAP,3,234,"3-LI-6(HE3,P)4-BE-8,PAR,DA"
S0268004,2021,Jipeng Zhu+,1.34,3.0,1.57,0.59,1.08,2.07,2983.2,0.0,146.0,3006,3-LI-6,HE3,P,4-BE-8,4,601,DAP,DAP,3,234,"3-LI-6(HE3,P)4-BE-8,PAR,DA"
```

CSV: display as Html table

#	DatasetID	year1	author1	DATA (MB/SR) 0.1 Y.Value	ERR-T (PER-CENT) 0.911 Y.Err+-	ERR-S (PER-CENT) 0.944 Y.sErr+-	ERR-1 (PER-CENT) 0.955 Y.pErr+-	ERR-2 (PER-CENT) 0.955 Y.pErr+-	ERR-3 (PER-CENT) 0.955 Y.pErr+-	EN (KEV) 1.1 X1.Value	E-LVL (MEV) 2.1 X2.Value	ANG (ADEG) 3.1 X3.Value	zaTarg1	Targ1	Proj	Emission	Prod	MF	MT	ReacType	Quant1	nx	indVars	Reacode
1	S0268004	2021	Jipeng Zhu+	0.64	3.8	2.92	0.19	1.08	2.07	1186.0	0.0	146.0	3006	3-LI-6	HE3	P	4-BE-8	4	601	DAP	DAP	3	234	3-LI-6(HE3,P)4-BE-8,PAR,DA
2	S0268004	2021	Jipeng Zhu+	0.72	3.6	2.68	0.2	1.08	2.07	1286.2	0.0	146.0	3006	3-LI-6	HE3	P	4-BE-8	4	601	DAP	DAP	3	234	3-LI-6(HE3,P)4-BE-8,PAR,DA
3	S0268004	2021	Jipeng Zhu+	0.74	3.1	2.0	0.17	1.08	2.07	1386.0	0.0	146.0	3006	3-LI-6	HE3	P	4-BE-8	4	601	DAP	DAP	3	234	3-LI-6(HE3,P)4-BE-8,PAR,DA

CSV: how it looks. Html, option: original

1. [+] produces Html page with two tables:
   a) CSV text presented in columns
   b) Legend presenting Headers and Units
2. Data columns include Header, Units, Rank (based on Plotting flag), variable meaning for example: Y.Value, Y.sErr+-, X1.Value
3. Option [original] presents all data from COMMON and DATA relevant to the Dataset as they are given in EXFOR

```
DATA                    4          28
EN          COS-CM      DATA-CM    ERR-S
MEV         NO-DIM      MB/SR      MB/SR
5.05        -0.881       112.0      10.1
5.05        -0.792       105.4       9.6
5.05        -0.679       100.5       9.8
5.05        -0.547       117.9      10.2
5.05        -0.397       112.9      10.6
. . . . . . . . . . . . . . . . . . . . .
6.25         0.739      1000.6      50.0
6.25         0.849      1608.5      80.1
6.25         0.932      3429.4     150.2
ENDDATA               30
```

Y (X1, X2)

Dataset.EXFOR.csv to html-table (by V.Zerkin, IAEA-NDS, ver.2023-04-23)

#	DatasetID	year1	author1	DATA-CM (MB/SR) 0.1 Y.Value	ERR-S (MB/SR) 0.944 Y.sErr+-	EN (MEV) 1.1 X1.Value	COS-CM (NO-DIM) 2.1 X2.Value	zaTarg1	Targ1	Proj	Emission	Prod	MF	MT	ReacType	Quant1	nx	indVars	Reacode
1	10437002	1975	D.L.Bernard+	112.0	10.1	5.05	-0.881	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
2	10437002	1975	D.L.Bernard+	105.4	9.6	5.05	-0.792	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
3	10437002	1975	D.L.Bernard+	100.5	9.8	5.05	-0.679	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
4	10437002	1975	D.L.Bernard+	117.9	10.2	5.05	-0.547	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
5	10437002	1975	D.L.Bernard+	112.9	10.6	5.05	-0.397	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
26	10437002	1975	D.L.Bernard+	1000.6	50.0	6.25	0.739	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
27	10437002	1975	D.L.Bernard+	1608.5	80.1	6.25	0.849	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
28	10437002	1975	D.L.Bernard+	3429.4	150.2	6.25	0.932	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA

Legend:

COS-CM	Cosine of angle, c.m.system
DATA-CM	Value of quantity specif. under REACTION, c.m. sys.
EN	Energy of incident projectile, laboratory system
ERR-S	Statistical uncertainty (1-Sigma)
(MB/SR)	millibarns per steradian
(MEV)	MeV
(NO-DIM)	no Dimensions
DA	Differential c/s with respect to angle

CSV: how it looks. Html, option: basic

Option [basic] presents all data from COMMON and DATA relevant to the Dataset in “Basic Units”
Sometimes Header is also modified, e.g. COS-CM to ANG-CM

Y *(X1,* *X2)*

Dataset.EXFOR.csv to html-table (by V.Zerkin, IAEA-NDS, ver.2023-04-23)

#	DatasetID	year1	author1	DATA-CM (B/SR) 0.1 Y.Value	ERR-S (B/SR) 0.944 Y.sErr+-	EN (EV) 1.1 X1.Value	ANG-CM (ADEG) 2.1 X2.Value	zaTarg1	Targ1	Proj	Emission	Prod	MF	MT	ReacType	Quant1	nx	indVars	Reacode
1	10437002	1975	D.L.Bernard+	0.112	0.0101	5.05e+6	151.763	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
2	10437002	1975	D.L.Bernard+	0.1054	0.0096	5.05e+6	142.373	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
3	10437002	1975	D.L.Bernard+	0.1005	0.0098	5.05e+6	132.766	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
4	10437002	1975	D.L.Bernard+	0.1179	0.0102	5.05e+6	123.161	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
5	10437002	1975	D.L.Bernard+	0.1129	0.0106	5.05e+6	113.391	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
26	10437002	1975	D.L.Bernard+	1.0006	0.05	6.25e+6	42.3537	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
27	10437002	1975	D.L.Bernard+	1.6085	0.0801	6.25e+6	31.8969	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
28	10437002	1975	D.L.Bernard+	3.4294	0.1502	6.25e+6	21.2512	8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA

Legend:

ANG-CM	Angle, c.m. system
DATA-CM	Value of quantity specif. under REACTION, c.m. sys.
EN	Energy of incident projectile, laboratory system
ERR-S	Statistical uncertainty (1-Sigma)
(ADEG)	angular Degrees
(B/SR)	barns/steradian
(EV)	electron-Volts
DA	Differential c/s with respect to angle

CSV: how it looks. Html, option: universal

Option [universal] presents generalized computational form according to reaction type and family flags (Dict.213 and Dict.24). All information including variables (measured and 7 independent) have fixed location (columns). Every variable is presented in 3 columns: meaning, value, absolute error. Meaning includes basic units. Universal CSV can present any many Dataset (from any EXFOR file). Data for angular distributions are converted from C.M. to Lab system.

y *x1* *x2* *x3* *x4* *x5* *x6* *x7* *Independent variables 24: y(x2,x4)*

#	DatasetID	year1	author1	y: Value	y	dy	x1: ResEn	x1 (eV)	dx1 (eV)	x2: IncEn	x2 (eV)	dx2 (eV)	x3: SecEn	x3 (eV)	dx3 (eV)	x4: Angle	x4 (deg)	dx4 (deg)	x5: Num	x5	dx5	x6: Other	x6	dx6	x7: Prod	ProdZA	ProdM	zaTarg1	Targ1	Proj	Emiss	Prod1	MF	MT	ReacType	Quant1	n	indVars	Reacode
1	10437002	1975	D.L.Bernard+	Data(B/SR)	0.10005	0.00902241	null			EN(EV)	5.05e+6		null			ANG(ADEG)	150.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
2	10437002	1975	D.L.Bernard+	Data(B/SR)	0.095369	0.00868636	null			EN(EV)	5.05e+6		null			ANG(ADEG)	140.1		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
3	10437002	1975	D.L.Bernard+	Data(B/SR)	0.092401	0.00901025	null			EN(EV)	5.05e+6		null			ANG(ADEG)	130.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
4	10437002	1975	D.L.Bernard+	Data(B/SR)	0.1104	0.00955112	null			EN(EV)	5.05e+6		null			ANG(ADEG)	120.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
5	10437002	1975	D.L.Bernard+	Data(B/SR)	0.107886	0.0101292	null			EN(EV)	5.05e+6		null			ANG(ADEG)	110.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
6	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0792692	0.00771215	null			EN(EV)	5.05e+6		null			ANG(ADEG)	100.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
7	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0364276	0.00359286	null			EN(EV)	5.05e+6		null			ANG(ADEG)	90.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
8	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0447812	0.0042843	null			EN(EV)	5.05e+6		null			ANG(ADEG)	80.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
9	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0839653	0.00822985	null			EN(EV)	5.05e+6		null			ANG(ADEG)	70.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
10	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0943562	0.00871307	null			EN(EV)	5.05e+6		null			ANG(ADEG)	60.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
11	10437002	1975	D.L.Bernard+	Data(B/SR)	0.106316	0.00995021	null			EN(EV)	5.05e+6		null			ANG(ADEG)	50.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
12	10437002	1975	D.L.Bernard+	Data(B/SR)	0.355889	0.0292091	null			EN(EV)	5.05e+6		null			ANG(ADEG)	40.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
13	10437002	1975	D.L.Bernard+	Data(B/SR)	0.645401	0.062806	null			EN(EV)	5.05e+6		null			ANG(ADEG)	30.1		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
14	10437002	1975	D.L.Bernard+	Data(B/SR)	0.805217	0.0790858	null			EN(EV)	5.05e+6		null			ANG(ADEG)	20.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
15	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0786111	0.00401988	null			EN(EV)	6.25e+6		null			ANG(ADEG)	150.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
16	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0132105	9.04829e-4	null			EN(EV)	6.25e+6		null			ANG(ADEG)	140.1		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
17	10437002	1975	D.L.Bernard+	Data(B/SR)	0.123293	0.00597618	null			EN(EV)	6.25e+6		null			ANG(ADEG)	130.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
18	10437002	1975	D.L.Bernard+	Data(B/SR)	0.140832	0.00702288	null			EN(EV)	6.25e+6		null			ANG(ADEG)	120.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
19	10437002	1975	D.L.Bernard+	Data(B/SR)	0.213	0.0100336	null			EN(EV)	6.25e+6		null			ANG(ADEG)	110.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
20	10437002	1975	D.L.Bernard+	Data(B/SR)	0.254696	0.0126909	null			EN(EV)	6.25e+6		null			ANG(ADEG)	100.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
21	10437002	1975	D.L.Bernard+	Data(B/SR)	0.176949	0.00848315	null			EN(EV)	6.25e+6		null			ANG(ADEG)	90.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
22	10437002	1975	D.L.Bernard+	Data(B/SR)	0.027746	0.00275419	null			EN(EV)	6.25e+6		null			ANG(ADEG)	80.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
23	10437002	1975	D.L.Bernard+	Data(B/SR)	0.010523	0.00104188	null			EN(EV)	6.25e+6		null			ANG(ADEG)	70.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
24	10437002	1975	D.L.Bernard+	Data(B/SR)	0.0149822	0.00106257	null			EN(EV)	6.25e+6		null			ANG(ADEG)	60.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
25	10437002	1975	D.L.Bernard+	Data(B/SR)	0.367941	0.018927	null			EN(EV)	6.25e+6		null			ANG(ADEG)	50.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
26	10437002	1975	D.L.Bernard+	Data(B/SR)	1.09874	0.0549043	null			EN(EV)	6.25e+6		null			ANG(ADEG)	40.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
27	10437002	1975	D.L.Bernard+	Data(B/SR)	1.78803	0.08904	null			EN(EV)	6.25e+6		null			ANG(ADEG)	30.1		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA
28	10437002	1975	D.L.Bernard+	Data(B/SR)	3.84705	0.168492	null			EN(EV)	6.25e+6		null			ANG(ADEG)	20.0		null			null			null			8016	8-O-16	N	EL	8-O-16	4	2	DA	DA	2	24	8-O-16(N,EL)8-O-16,,DA

Legend:

ANG	Angle, laboratory system
EN	Energy of incident projectile, laboratory system
(ADEG)	angular Degrees
(B/SR)	barns/steradian
(EV)	electron-Volts
DA	Differential c/s with respect to angle

X4Pro - universal, fully relational EXFOR database

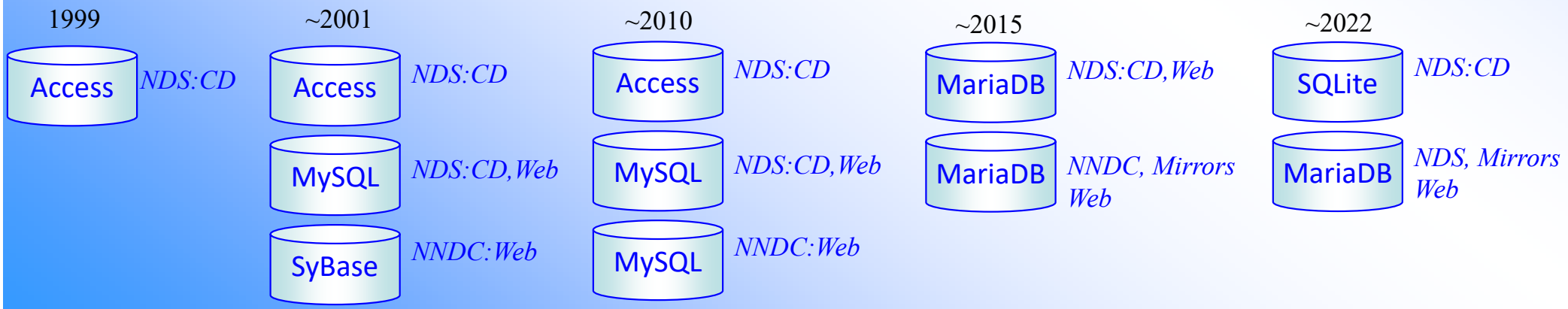
Introduction to X4Pro

Project "EXFOR Relational", 2000-2023

Initial plans in ~2000

1. *All information in EXFOR should be available for search in any order (direct access)*
2. *Execution time of typical request should be within 2-3 sec*
3. *The system should be really platform independent (simplest: no stored procedures, no foreign keys, etc.)*
4. *The system should guarantee integrity of original data*
   - *usage of BLOBs to store EXFOR-SUBENT (zipped)*
   - *data are stored in their original form (EXFOR format)*
   - *convincing other centers to switch to central database*
5. *etc.*

EXFOR-Relational: Platforms



X4Pro - extended EXFOR-Relational database

X4Pro offers

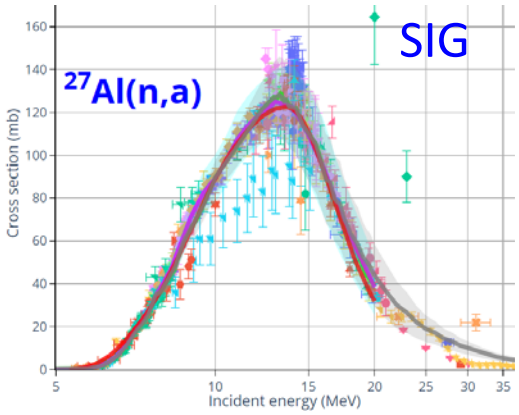
1. EXFOR data without EXFOR format.
   - *All data points, meta-data, data for corrections are stored in the database and accessible for SQL commands.*
   - *No need in original EXFOR for end-users.*
   - *No need in new EXFOR parsers/converters for new programming languages.*
   - *No need in intermediate files and formats with fixed structure (C5, XML, JSON).*
   - *Simple for programming on any language supporting SQL for data search, filtering, sorting, retrieval, renormalization.*

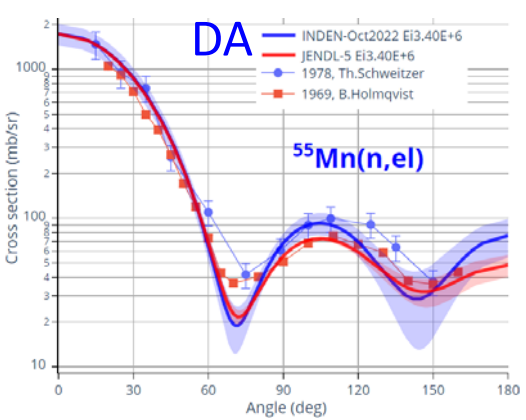
2. Local EXFOR database for programmatic access.

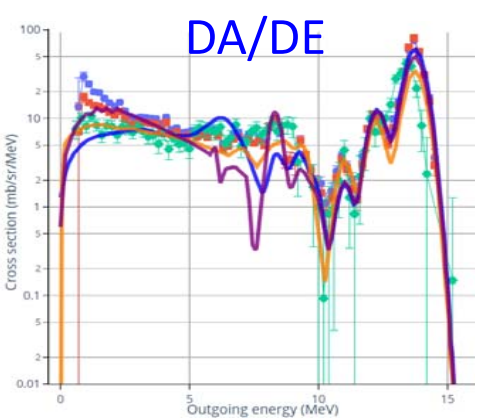
3. Examples.
   24 examples of Fortran and Python programs provided with source code (MIT licence) and "run-me" scripts retrieving and plotting data from local X4Pro and remote ENDF database via Web-API interface.

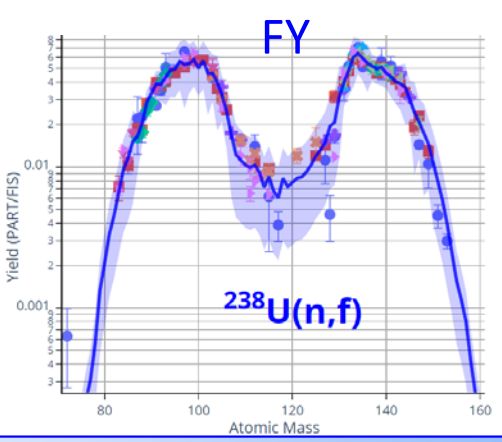
4. X5-JSON.
   - *Comprehensive EXFOR data presentation in JSON form.*
   - *Can be used for creating another systems built on JSON objects (e.g. NoSQL databases).*
   - *Example of building CouchDB is provided.*

X4Pro Python-examples: EXFOR + ENDF/Web

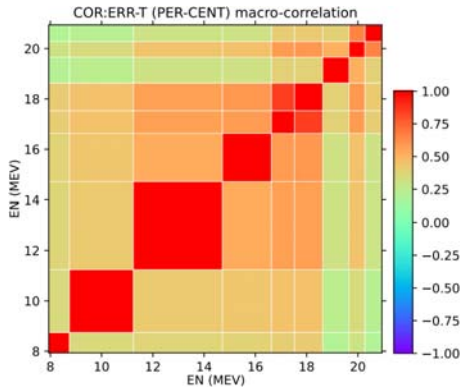


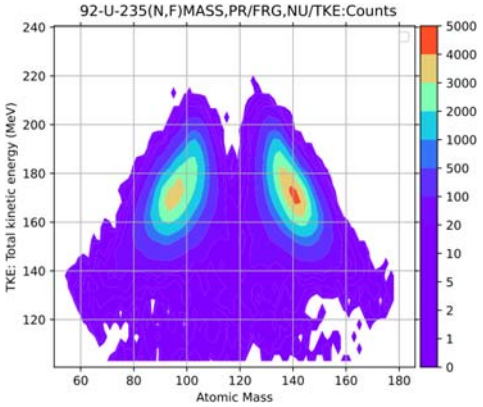


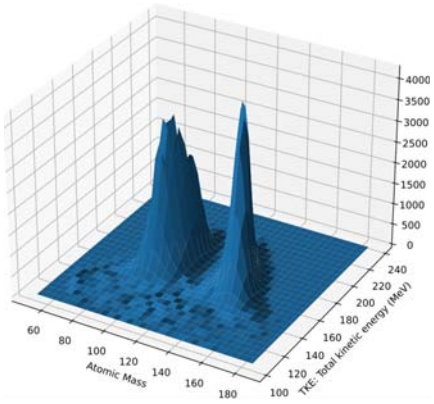




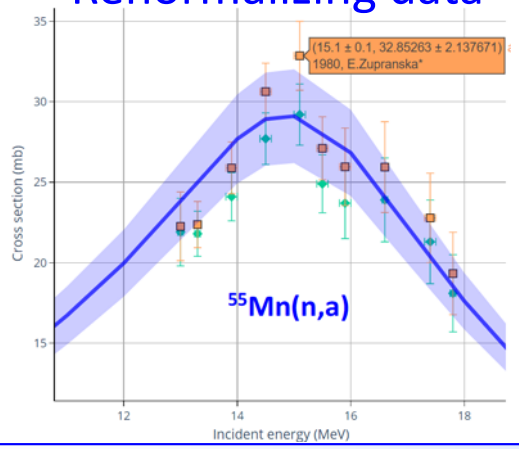
"Hidden" data



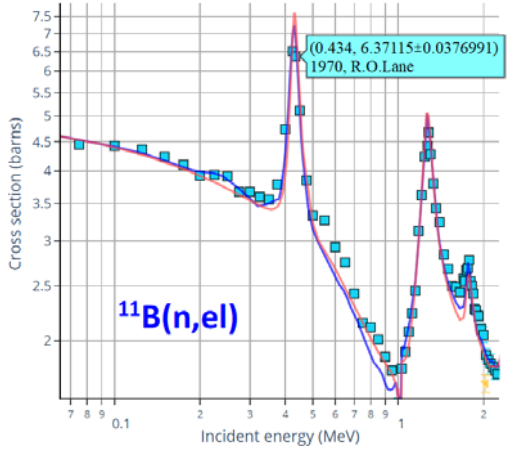


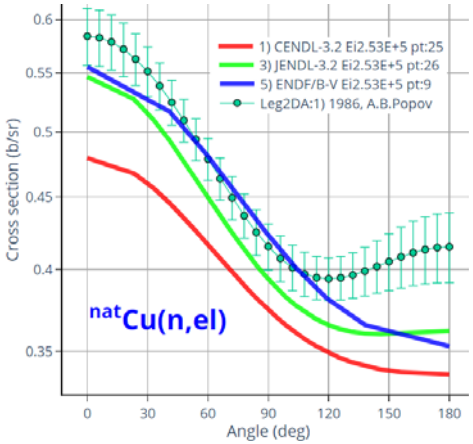


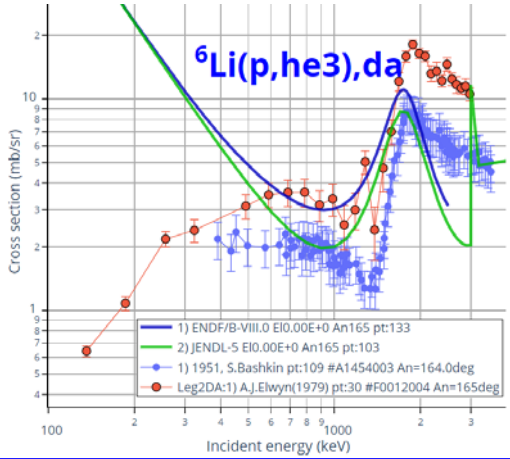
Renormalizing data



"Recalculating" data: LEG→SIG, LEG/RS+SIG→DA, LEG→DA:R33







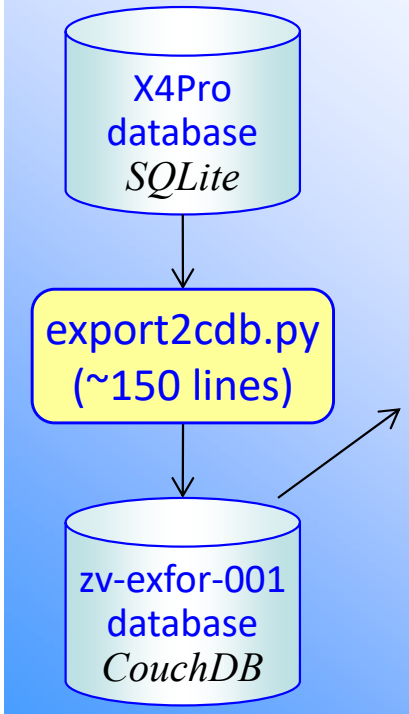
X4-JSON, CouchDB

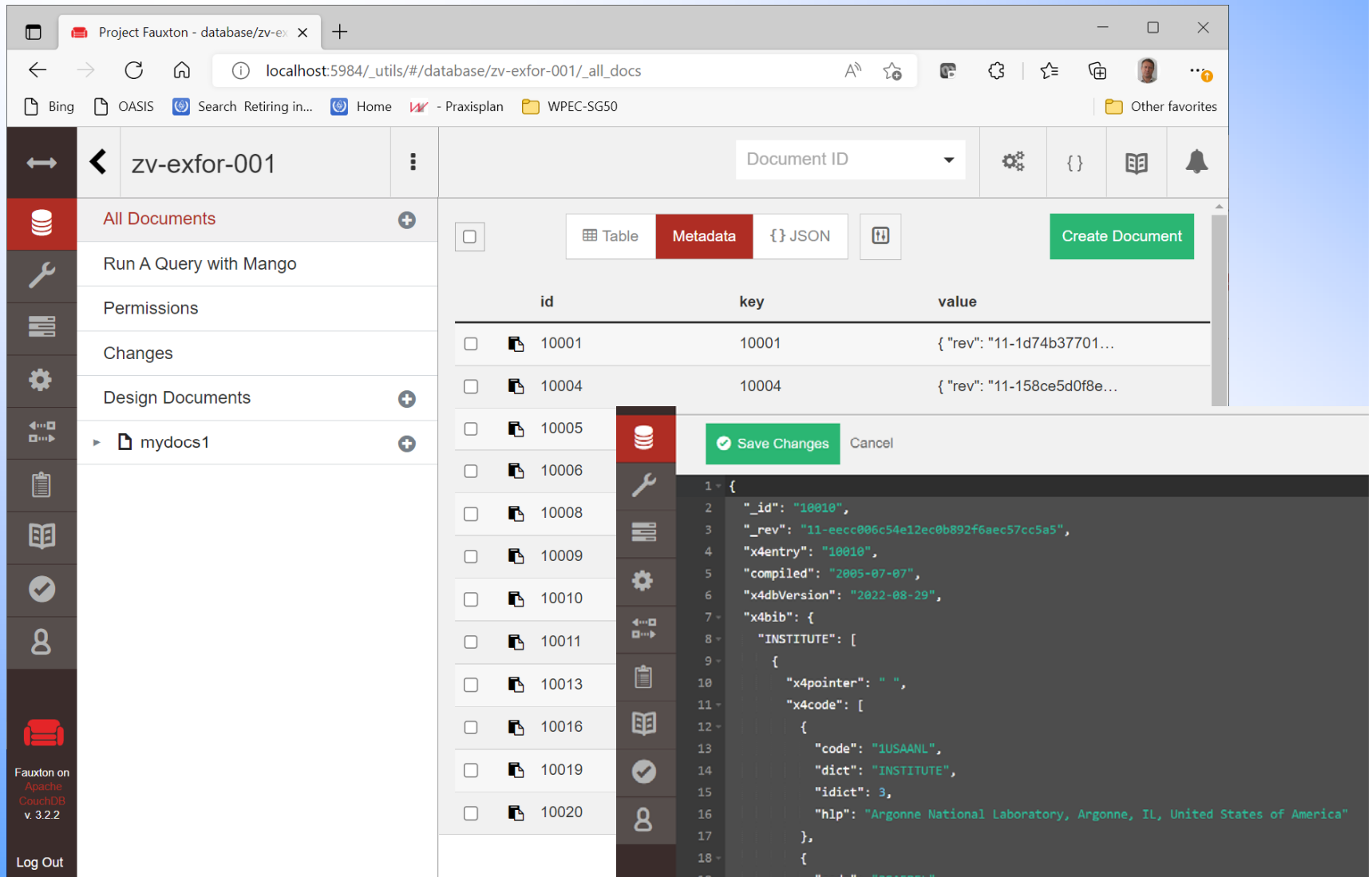
X5-JSON presents meta and numerical data:

1. *from EXFOR and Dictionaries structured as they are in EXFOR - to be useful by compilers*
2. *computational data by Datasets (~C5) including data for automatic correction by new monitor and decay data*

Available on Web-EXFOR as X4Z and X5Z

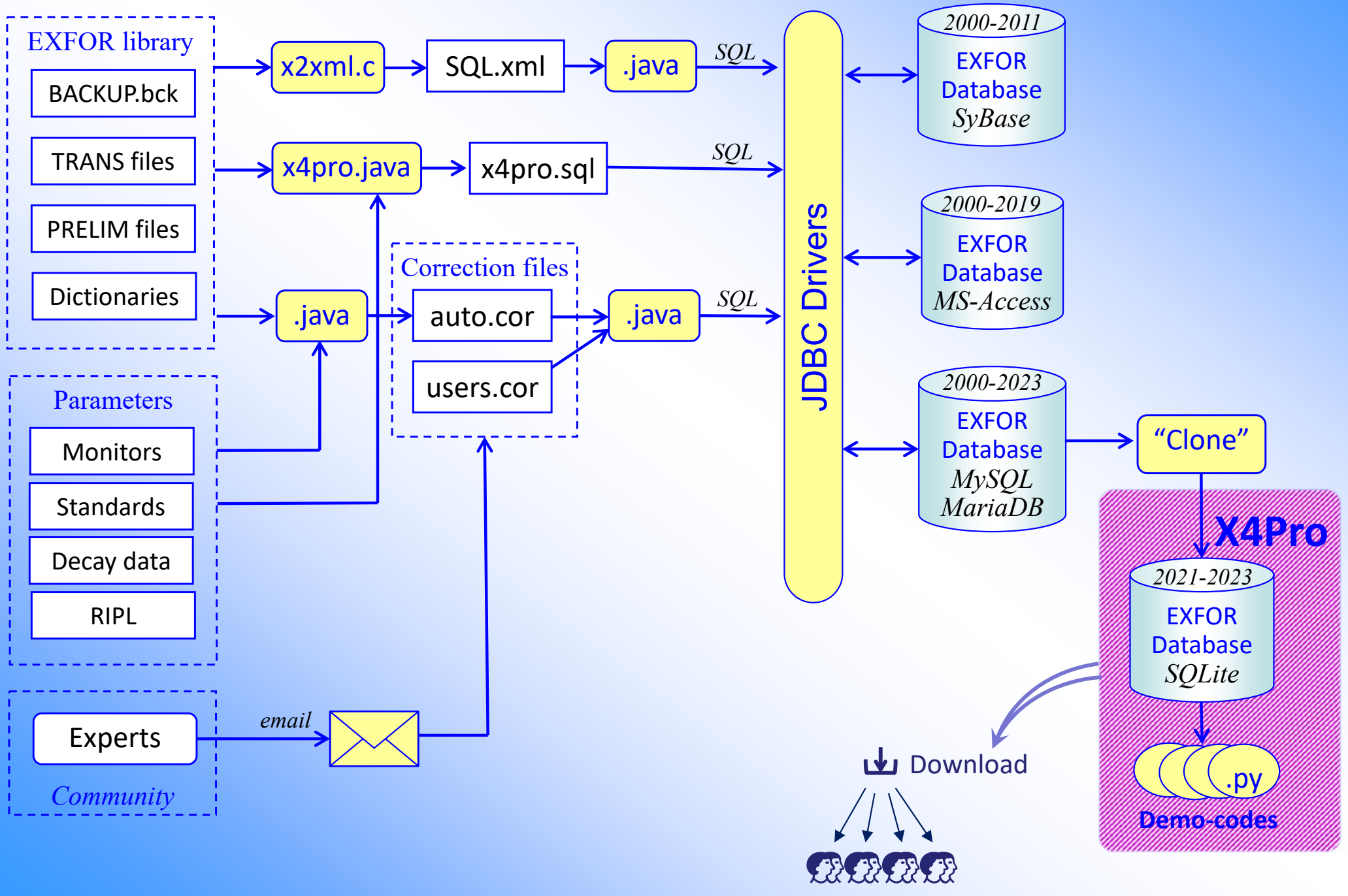
Example in X4Pro:





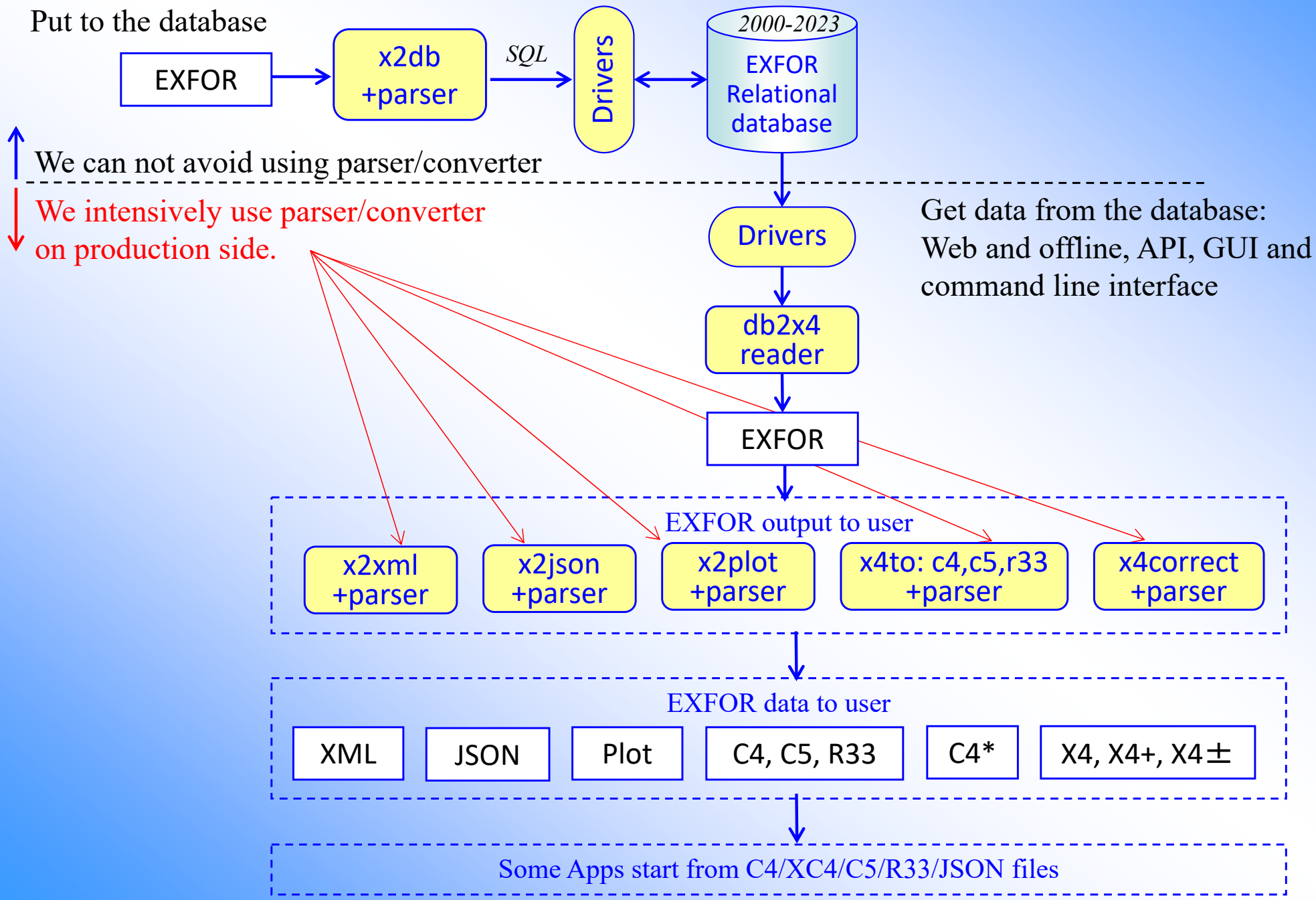
Maintenance of EXFOR relational. X4Pro production.

The system is functioning at the IAEA-NDS and NNDC since 2004 till now

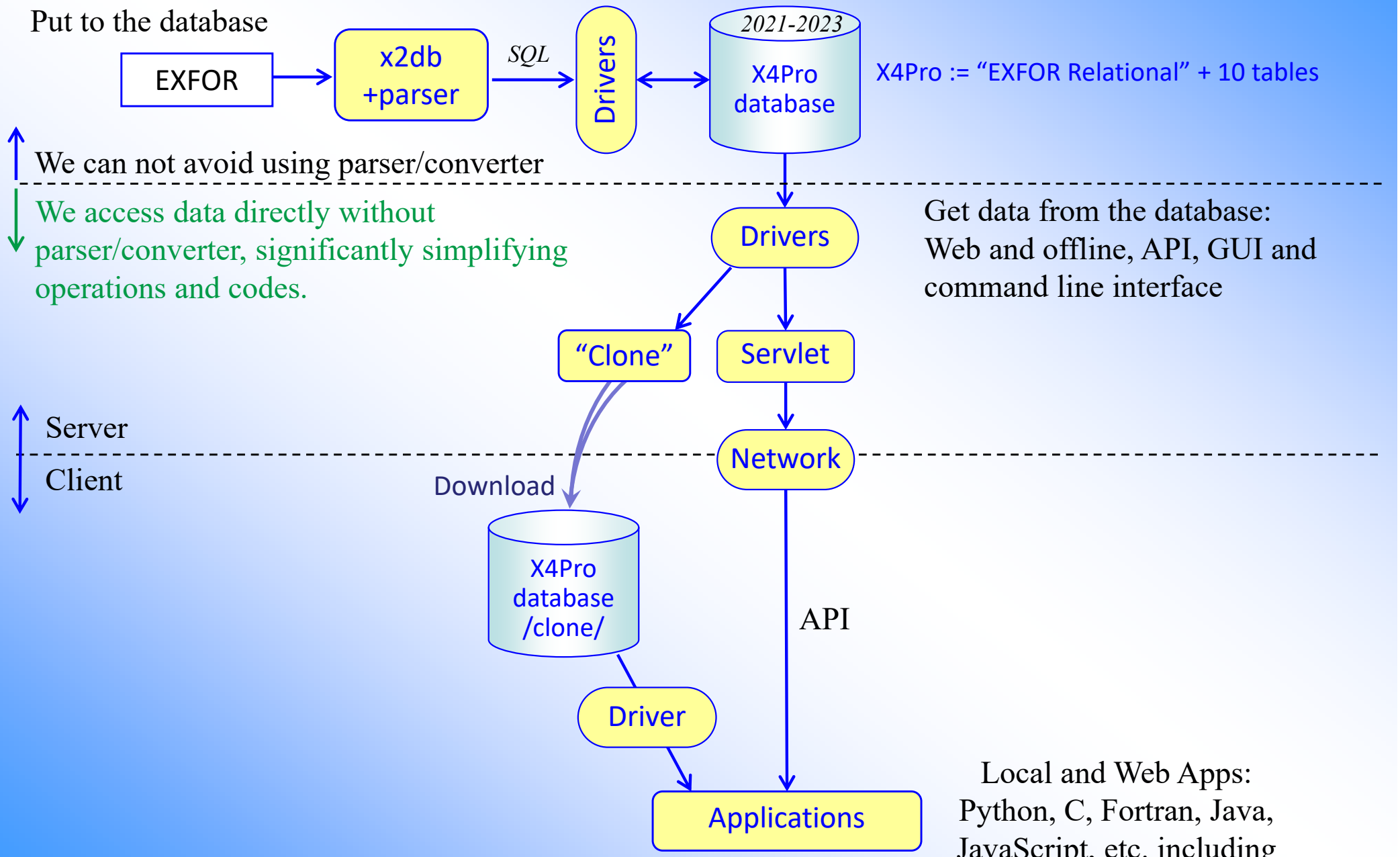


Functioning systems based on EXFOR-Relational

The system is functioning for public at the IAEA-NDS and NNDC since 2004



Systems based on X4Pro



EE-View

Experimental-Evaluated data Viewer

EE-View is an example using X4Pro database via EXFOR and ENDF Web-API

Motivation

1. What is wrong with present system? *+analyse existing systems*
2. What do we want to achieve? *clearly formulate goal, tasks, users/needs*
3. Technical solution. *observe existing technologies, create prototype, test performance*
4. Plan. *short and long term planning*
5. Implementation. *+ users feedback => iterations, improvement*

1. Present system: Web EXFOR, ENDF, CINDA/NSR, IBANDL

a) Oriented to professionals (evaluators, experimentalists, compilers, code developers, ...)

– difficult for newcomers

b) Universal, flexible (any search incl. wildcards, OR/AND/NOT: parameters with several values, ...)

– too many options, some users are lost

– too many parameters and details (e.g. ENDF: 40 MFs, EXFOR: 1500 Quantities)

c) Rich functionality: work with data on deep level, complex operations with data (inverse kinematics and reactions), cross-comparisons data, connections to other databases (EXFOR-ENDF, IBANDL-EXFOR, PDF, DOI, ...), various output formats (2 XML, 3 JSON, GIF/PS/EPS/PDF), etc.

– no simple search in all databases at once

– many operations to achieve simple plot (neutrons, cross-sections)

– too many output options and operations, some users are lost

– etc., etc.

d) Layout: [Request]→[Select]→[Retrieve]→[Download/Plot] changing web-pages

– modern tendency: stay on the same page, change its contents on events

Summary: universal system for professionals, complicated for general public

What is EE-View

EE-View: experimental-evaluated data previewer presenting an additional Web interface to existing EXFOR-ENDF database system. EE-View works in a Web-browser using Html5/JavaScript and plotting package Plotly.js.

EE-View retrieves data from EXFOR/X4Pro and ENDF databases via AJAX using Web-API.

EE-View provides following functionality:

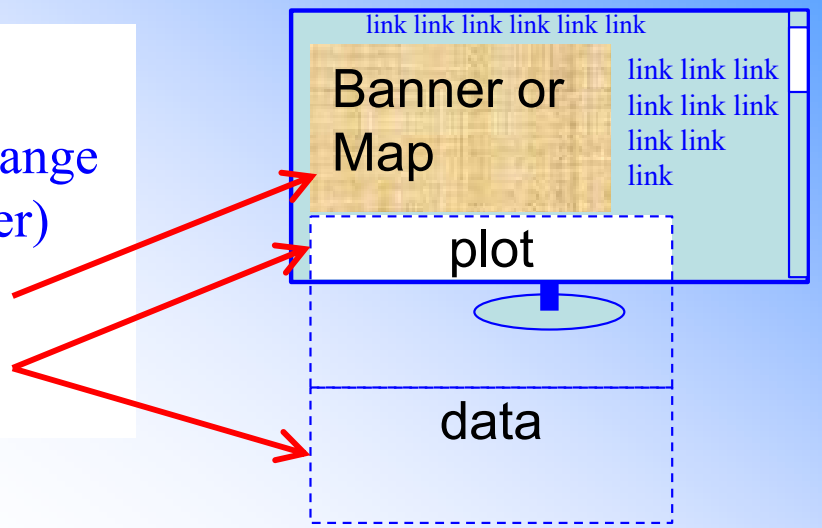
1. *Quick plot EXFOR and ENDF data by one click (few seconds)*
2. *Plot evaluated curves with error-band (MF33/MF34)*
3. *Coloured items in data selection menu indicate existing experimental and evaluated data*
4. *Selection datasets by reaction-codes and energy range*
5. *Copy/paste data to the plot*
6. *Export data to CSV format for uploading to Excel*
7. *Output plot to PNG and SVG using package Plotly.js*
8. *Implemented for cross sections and angular distributions*

EE-View Experimental-Evaluated data Viewer

1. Cross sections with drop-down choice of data: https://www-nds.iaea.org/exfor/eeview.htm
2. Cross sections with open choice of data: https://www-nds.iaea.org/exfor/eeview1.htm
3. Angular distributions: https://www-nds.iaea.org/exfor/eeview-da.htm

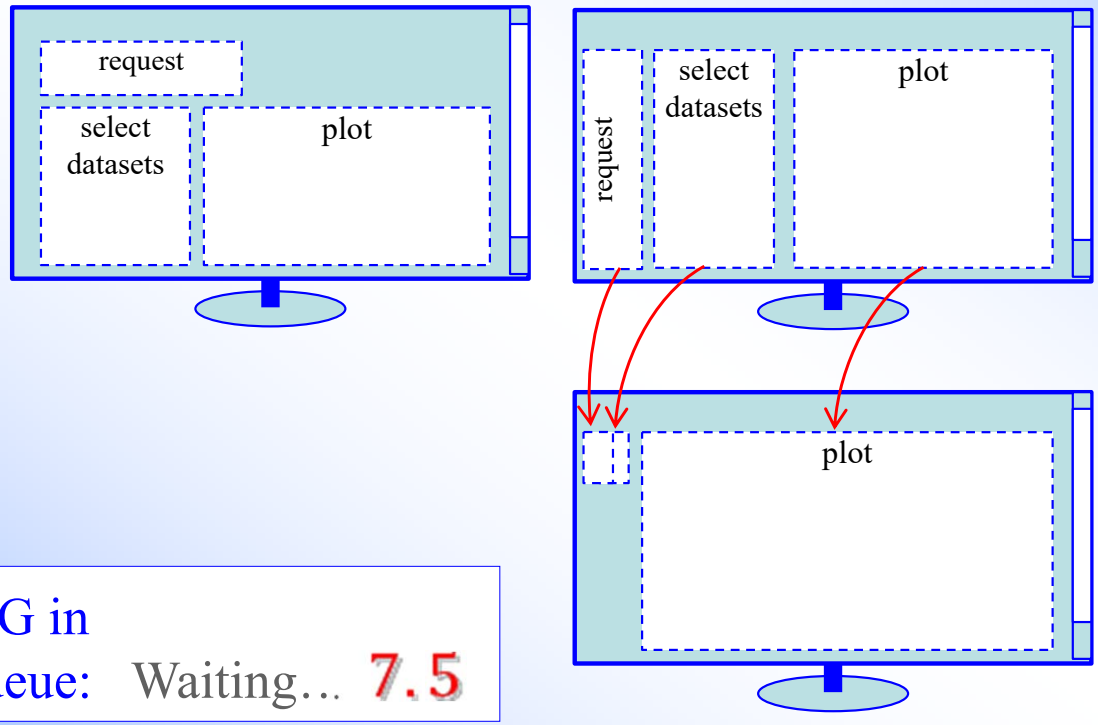
Layout

1) Typical screens: 4:3 → 16:9 (since ~2012)
2) Modern tendency: stay on the same page, change its contents on events (mouse/keyboard/ timer)
3) Today's layouts: huge banner (useless?) or select-map; click and scroll to see result



EE-View layout

1) Use modern tendency, but…
2) Try to avoid scrolling
3) Collapse/open sections maximizing plotting area (or other areas)
4) Resizable plotting area

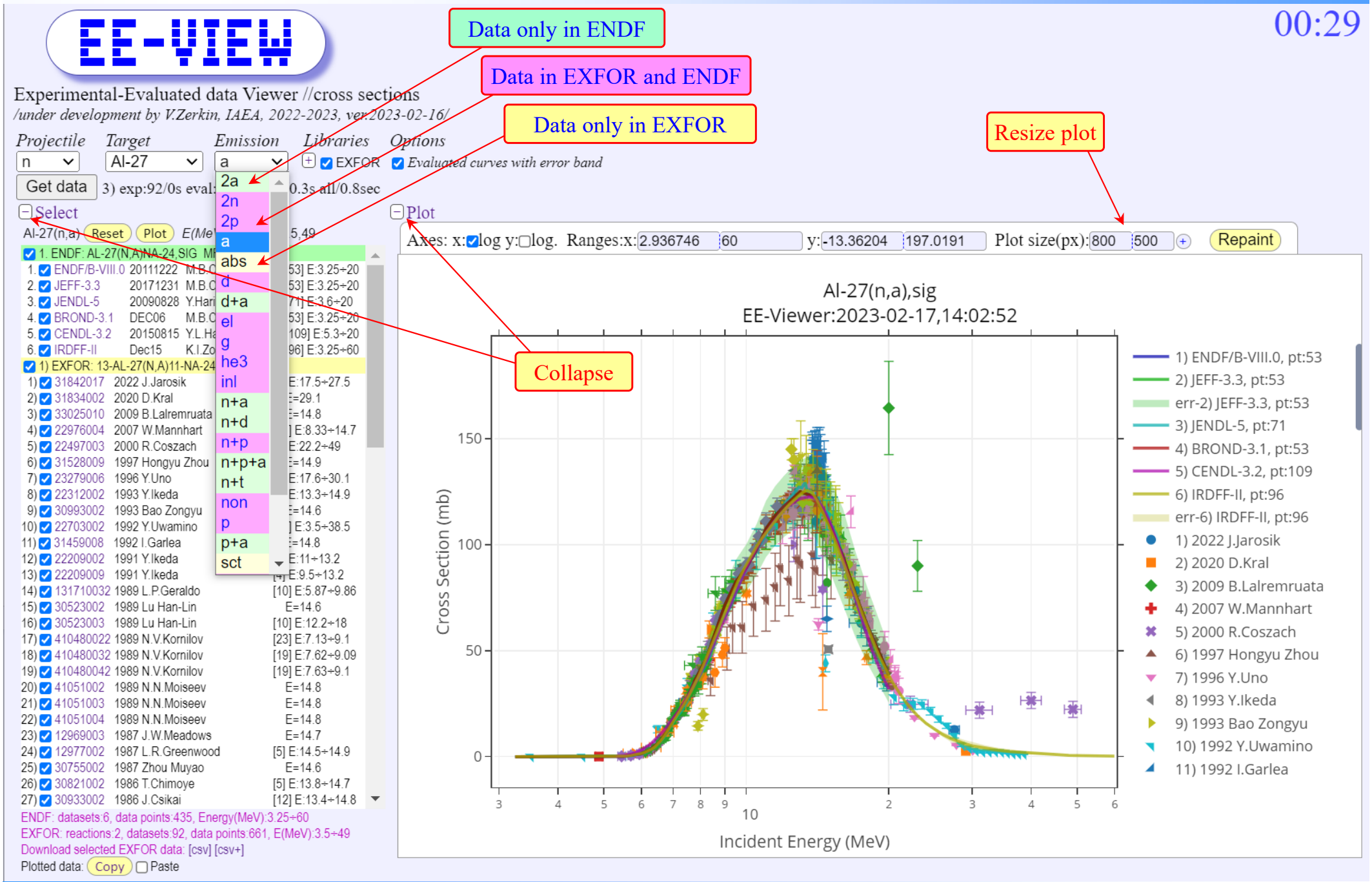


Time indication

Waiting time is indicated by animated PNG in parallel with the main JavaScript event queue: Waiting… 7.5

EE-View Experimental-Evaluated data Viewer

Cross sections



EE-View Experimental-Evaluated data Viewer

Cross sections

0.8sec

03:25

EE-VIEW

Experimental-Evaluated data Viewer //cross sections

/under development by V.Zerkin, IAEA, 2022-2023, ver.2023-02-16/

Get data | Al-27(n,a) 3) exp:92/0s eval:6/0.4s plot/0.4s all/0.8sec

Projectile:n

g ✓n p d t he3 a He-6 Li-6 Li-7

Target:Al-27

Ag-110M Ag-111 Ag-112 Ag-113 Ag-114 Ag-115 Ag-116 Ag-117 Ag-118M Al-26 Al-26M ✓Al-27 Al-CMP Al-OXI Am-240 Am-241 Am-242 Am-242M Am-243 Am-244 Am-244M Ar-0

Emission:a

2a 2n 2p ✓a abs d d+a el g he3 inl n+a n+d n+p n+p+a n+t non p p+a sct t

Select

Al-27(n,a) Reset Plot *E(MeV)min,max:* 8,18

1. ENDF: AL-27(N,A)NA-24,SIG MF:3 MT:107

1.	ENDF/B-VIII.0	20111222	M.B.Chadwick+	[53] E:3.25÷20
2.	JEFF-3.3	20171231	M.B.Chadwick+	[53] E:3.25÷20
3.	JENDL-5	20090828	Y.Harima+	[71] E:3.6÷20
4.	BROND-3.1	DEC06	M.B.Chadwick+	[53] E:3.25÷20
5.	CENDL-3.2	20150815	Y.L.Han	[109] E:5.3÷20
6.	IRDFF-II	Dec15	K.I.Zolotarev	[96] E:3.25÷60

1) EXFOR: 13-AL-27(N,A)11-NA-24,,SIG

1)	31842017	2022	J.Jarosik	[3] E:17.5÷27.5
2)	31834002	2020	D.Kral	E=29.1
3)	33025010	2009	B.Lalremruata	E=14.8
4)	22976004	2007	W.Mannhart	[28] E:8.33÷14.7
5)	22497003	2000	R.Coszach	[4] E:22.2÷49
6)	31528009	1997	Hongyu Zhou	E=14.9
7)	23279006	1996	Y.Uno	[6] E:17.6÷30.1
8)	22312002	1993	Y.Ikeda	[8] E:13.3÷14.9
9)	30993002	1993	Bao Zongyu	E=14.6
10)	22703002	1992	Y.Uwamino	[36] E:3.5÷38.5
11)	31459008	1992	I.Garlea	E=14.8
12)	22209002	1991	Y.Ikeda	[3] E:11÷13.2

Libraries

EXFOR

Options

Colors

ENDF data only

EXFOR data only

EXFOR ∪ ENDF

EXFOR ∩ ENDF

Statistics of usage: visits: 653, requests: 10

Created by V.Zerkin (v.zerkin@iaea.org), L

Database and Programming: EXFOR/X4P

Experimental Data Source: EXFOR, Netwo

Evaluated Data Source: CSEWG, WPEC, I

Libraries

EXFOR

ENDF/B-VIII.0 (USA,2018)

JEFF-3.3 (Europe,2017)

JENDL-5 (Japan,2021)

CENDL-3.2 (China,2020)

BROND-3.1 (Russia,2016)

IRDFF-II (IAEA,2019)

All other libraries

Options

Evaluated curves with error band

Colors

ENDF data only

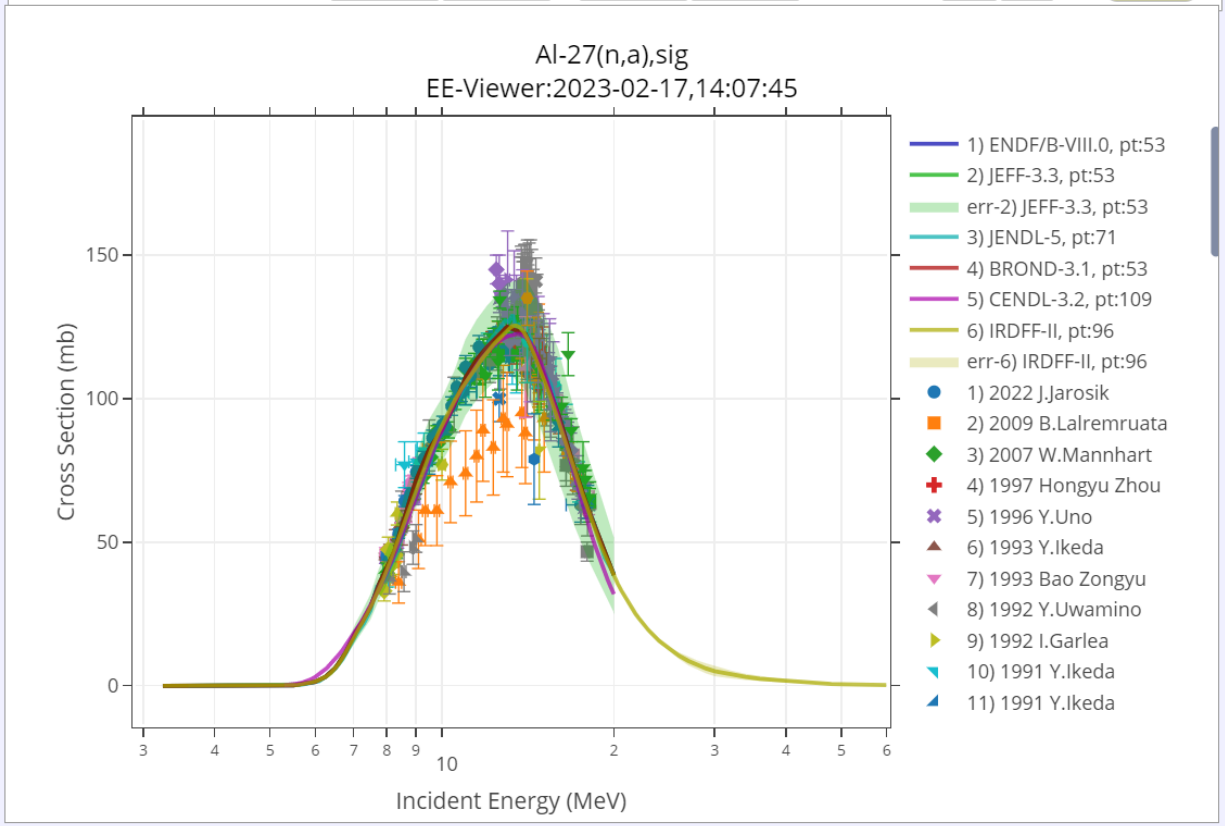
EXFOR data only

EXFOR ∪ ENDF

EXFOR ∩ ENDF

Plot

Axes: x:☑log y:☐log. Ranges:x:2.911482 60 y:-13.36204 197.0191 Plot size(px):750 500 Repaint



EE-View Experimental-Evaluated data Viewer

Angular distribution

2.7sec

04:18

EE-VIEW

Experimental-Evaluated data Viewer //angular distributions

/under development by V.Zerkin, IAEA, 2022-2023, ver.2023-02-16/

Projectile n | *Target* Mn-55 | *Emission* el | *Inc.Energy* 3.5 MeV | *Libraries* EXFOR | *Options* Evaluated curves with error band

Get data | 3) exp:80/0s eval:5/2.6s plot/0.1s all/2.7sec

Select

Mn-55(n,el) Reset Plot Ei=3.5MeV

1.	ENDF: MN-55(N,EL)MN-55-L0,DA MF:4 MT:2			
1.	ENDF/B-VIII.0	20111222	IAEA Evaluation ...	[137] Ei:3.5e6
2.	JEFF-3.3	20171231	IAEA Evaluation ...	[46] Ei:3.5e6
3.	JENDL-5	20210607	N.Iwamoto	[82] Ei:3.5e6
4.	BROND-3.1	20111222	IAEA Evaluation ...	[137] Ei:3.5e6
5.	CENDL-3.2	950817	B.S.Yu+	[74] Ei:3.5e6
	1) EXFOR: 25-MN-55(N,EL)25-MN-55,,DA			
1)	22155082	1992	A.Takahashi Ei:1.41e7	[16] An:15÷160
2)	21722038	1972	I.Fujita Ei:1.41e7	An=110
3)	20019082	1969	B.Holmqvist Ei:2.47e6	[19] An:19.9÷160
4)	20019082	1969	B.Holmqvist Ei:3.00e6	[20] An:19.9÷160
5)	20019082	1969	B.Holmqvist Ei:3.49e6	[20] An:19.9÷160
6)	20019082	1969	B.Holmqvist Ei:4.00e6	[20] An:19.9÷160
7)	20019082	1969	B.Holmqvist Ei:4.56e6	[20] An:19.9÷160
8)	20019082	1969	B.Holmqvist Ei:6.09e6	[19] An:19.9÷160
9)	20019082	1969	B.Holmqvist Ei:7.05e6	[19] An:19.9÷160
10)	20019082	1969	B.Holmqvist Ei:8.05e6	[19] An:19.9÷160
11)	11511008	1966	R.L.Becker Ei:3.20e6	[14] An:20÷150
12)	11519005	1966	S.A.Cox Ei:6.77e5	[8] An:20÷160
13)	11519005	1966	S.A.Cox Ei:6.86e5	[8] An:20÷160
14)	11519005	1966	S.A.Cox Ei:6.94e5	[8] An:20÷160
15)	11519005	1966	S.A.Cox Ei:7.03e5	[8] An:20÷160
16)	11519005	1966	S.A.Cox Ei:7.11e5	[8] An:20÷160
17)	11519005	1966	S.A.Cox Ei:7.19e5	[8] An:20÷160
18)	11519005	1966	S.A.Cox Ei:7.28e5	[8] An:20÷160
19)	11519005	1966	S.A.Cox Ei:7.36e5	[8] An:20÷160
20)	11519005	1966	S.A.Cox Ei:7.45e5	[8] An:20÷160
21)	11519005	1966	S.A.Cox Ei:7.53e5	[8] An:20÷160
22)	11519005	1966	S.A.Cox Ei:7.61e5	[8] An:20÷160
23)	11519005	1966	S.A.Cox Ei:7.70e5	[8] An:20÷160
24)	11519005	1966	S.A.Cox Ei:7.78e5	[8] An:20÷160
25)	11519005	1966	S.A.Cox Ei:7.87e5	[8] An:20÷160
26)	11519005	1966	S.A.Cox Ei:7.95e5	[8] An:20÷160
27)	11519005	1966	S.A.Cox Ei:8.03e5	[8] An:20÷160
28)	11519005	1966	S.A.Cox Ei:8.12e5	[8] An:20÷160

ENDF: datasets:5, data points:476, Energy(MeV):1.8e-4÷0.e0

EXFOR: reactions:2, datasets:80, data points:740, E(MeV):1.5e-5÷1.6e-4

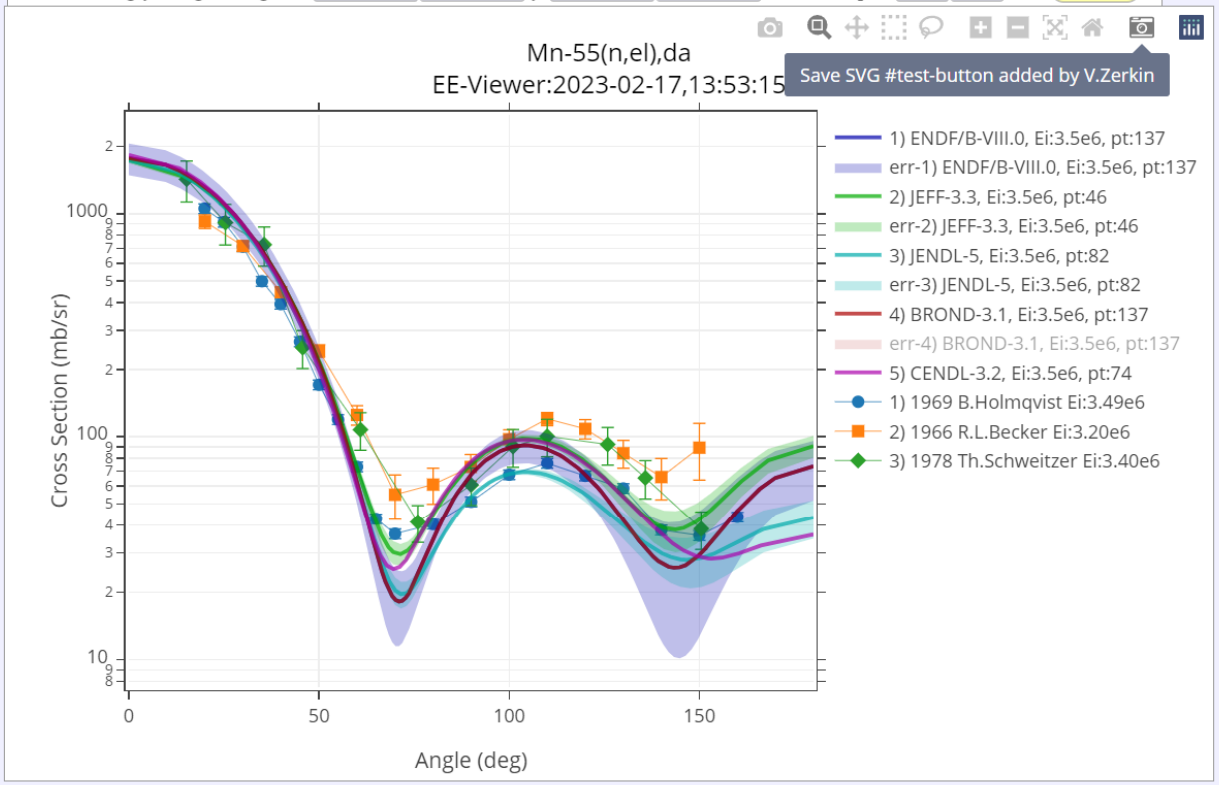
Download selected EXFOR data: [csv] [csv+]

Plotted data: Copy Paste

Plot

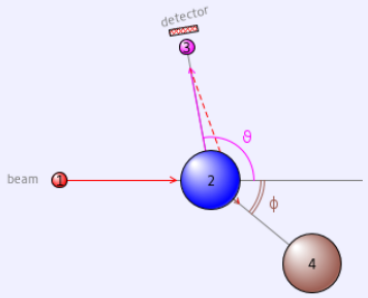
Axes: x:log y:log. Ranges:x: 0 180 y: 7.546586 2770.051 Plot size(px): 780 500 Repaint

Save SVG #test-button added by V.Zerkin



Point #9) x=100 y=97.4617 dy=9.93493 Dataset #2) 1966 R.L.Becker Ei:3.20e6

Point #9) Dataset #2) 1966 R.L.Becker Ei:3.20e6



25-MN-55(N,EL)25-MN-55,,DA Qvalue=0.0(keV)

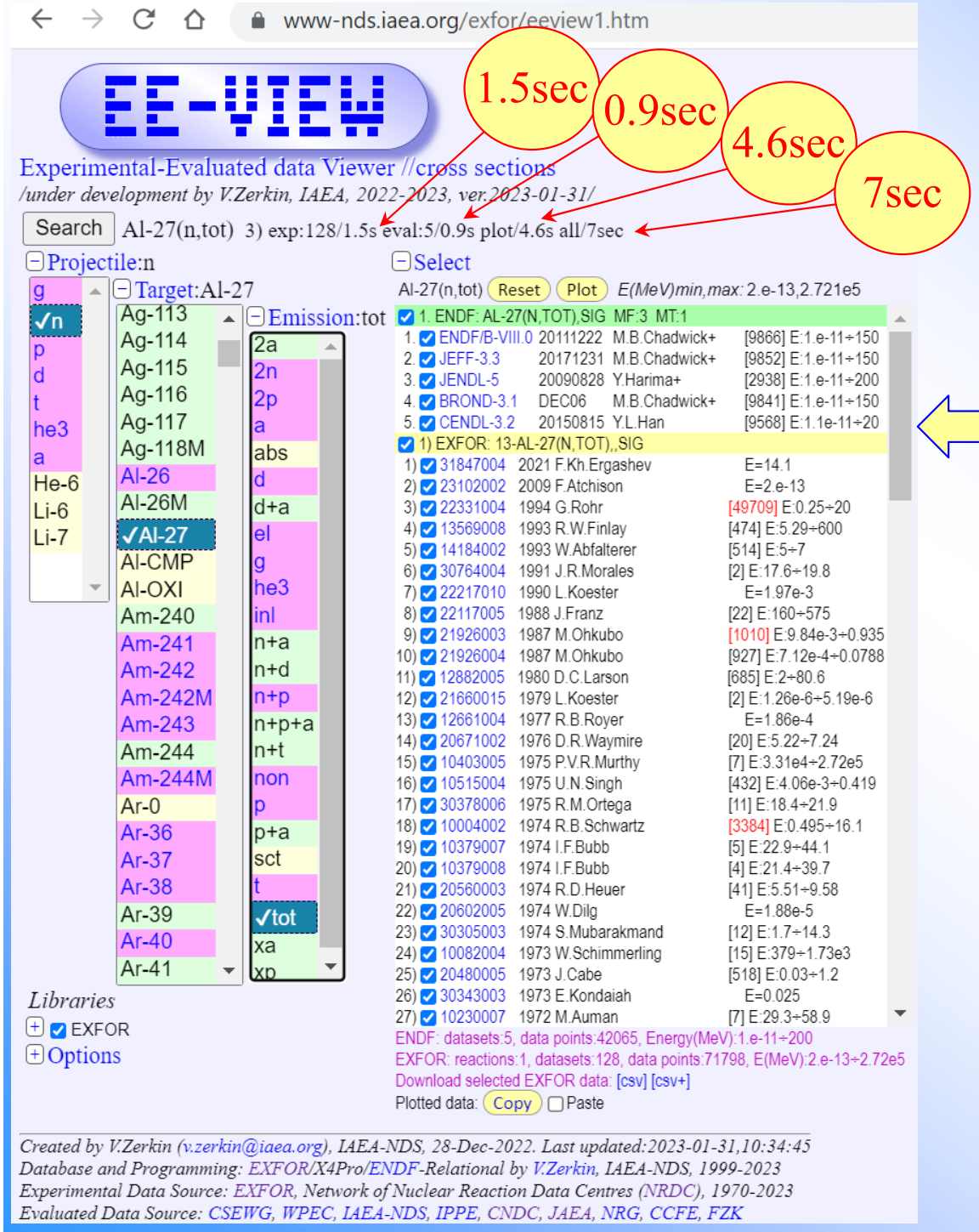
1 Projectile:	n	M_1=1.008665
2 Target:	Mn-55	M_2=54.938046
3 Scattered:	n	M_3=1.008665
4 Recoil:	Mn-55	M_4=54.938046
	Laboratory System	
E_1=3200.0	E_3=3065.0	θ=100.0° σ(θ)=97.4617 ±10.2%
E_2=0.0	E_4=134.995	φ=39.5° σ(φ)=302.871
	Center of Mass System	
E_{cm}=3142.31		
E_1'=3085.65	E_3'=3085.65	θ'=101.0° σ'(θ')=98.1023
E_2'=56.6528	E_4'=56.6528	φ'=79.0° σ'(φ')=98.1023

Units: M:(amu); E:(keV); σ:(mb/sr)

Statistics of usage: visits: 652, requests: 998, since 01-Feb-2023

Created by V.Zerkin (v.zerkin@iaea.org), IAEA-NDS, 28-Dec-2022. Last updated:2023-02-16,12:01:53
Database and Programming: EXFOR/X4Pro/ENDF-Relational by V.Zerkin, IAEA-NDS, 1999-2023
Experimental Data Source: EXFOR, Network of Nuclear Reaction Data Centres (NRDC), 1970-2023
Evaluated Data Source: CSEWG, WPEC, IAEA-NDS, IPPE, CNDC, JAEA, NRG, CCFE, FZK

EE-View performance



Stress-tests on cloud servers

Al-27(n,tot)

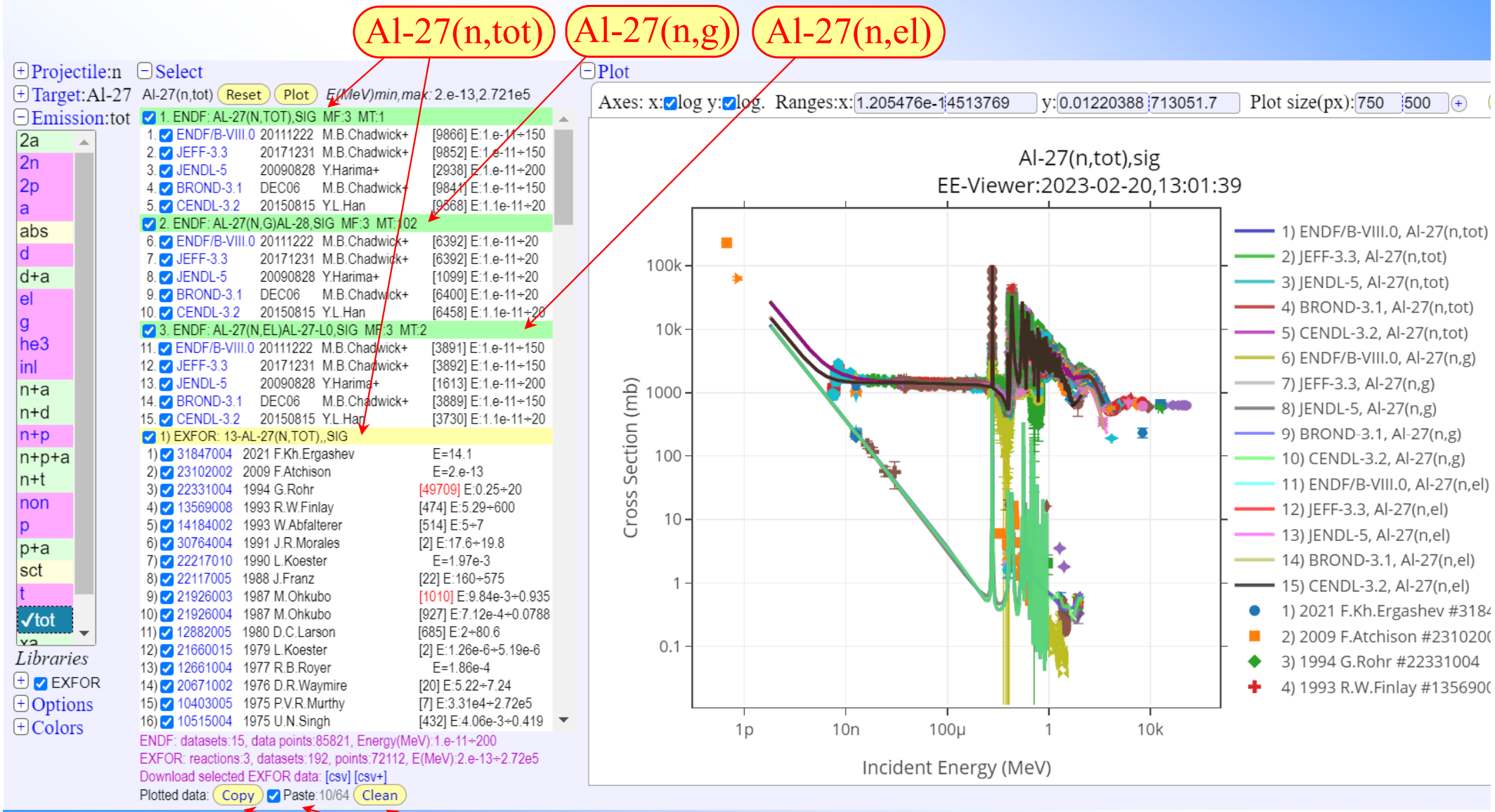
#	Operation	Time
1.	Retrieve EXFOR data datasets: 128, points: 71,798	1.5 sec
2.	Retrieve ENDF data datasets: 5, points: 42,065	0.9 sec
3.	Preparing data for plot (all)	4.6 sec
	All operations above:	7.0 sec
4.	Plot by Plotly.js	4.3 sec
	Total:	**10.3 sec**

U-235(n,f)

#	Operation	Time
1.	Retrieve EXFOR data datasets: 196, points: 133,591	3.1 sec
2.	Retrieve ENDF data datasets: 6, points: 273,311	2.8 sec
3.	Preparing data for plot (all)	7.6 sec
	All operations above:	13.4 sec
4.	Plot by Plotly.js	4.2 sec
	Total:	**17.6 sec**

Multiple Copy/Paste

Plotted data can be stored in the local “clipboard” by command [Copy] and later added to another plot by using Checkbox [Paste]. The content of local “clipboard” can be used several times storing data from current plot accumulating data from several reactions. Data selection Checkboxes can be used in usual way. Button [Clean] should be used to empty “clipboard”.

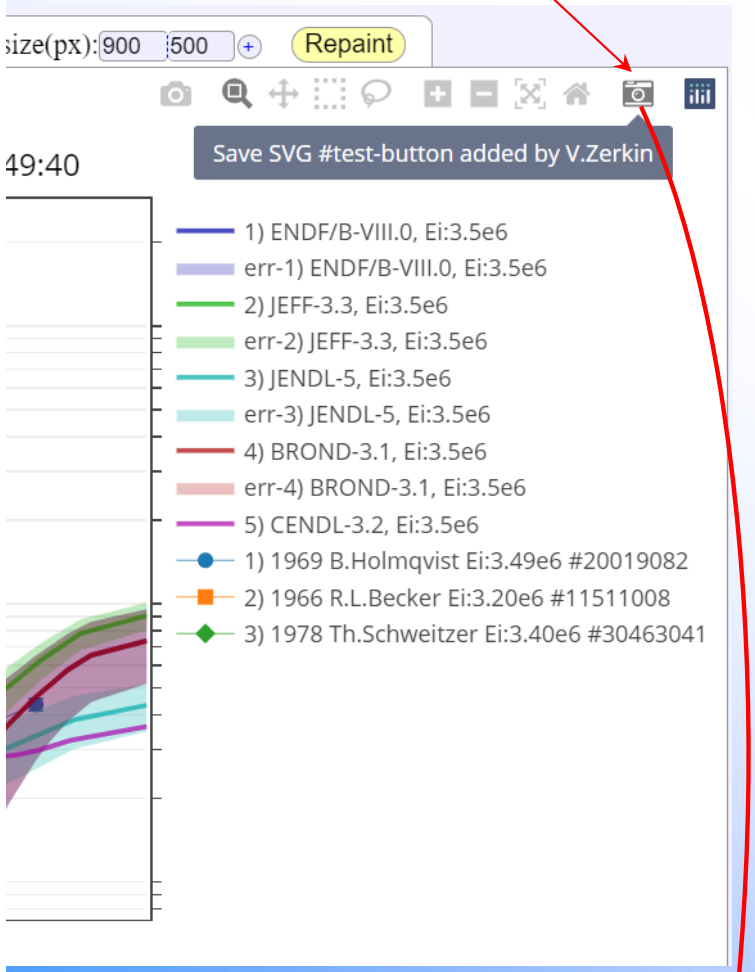


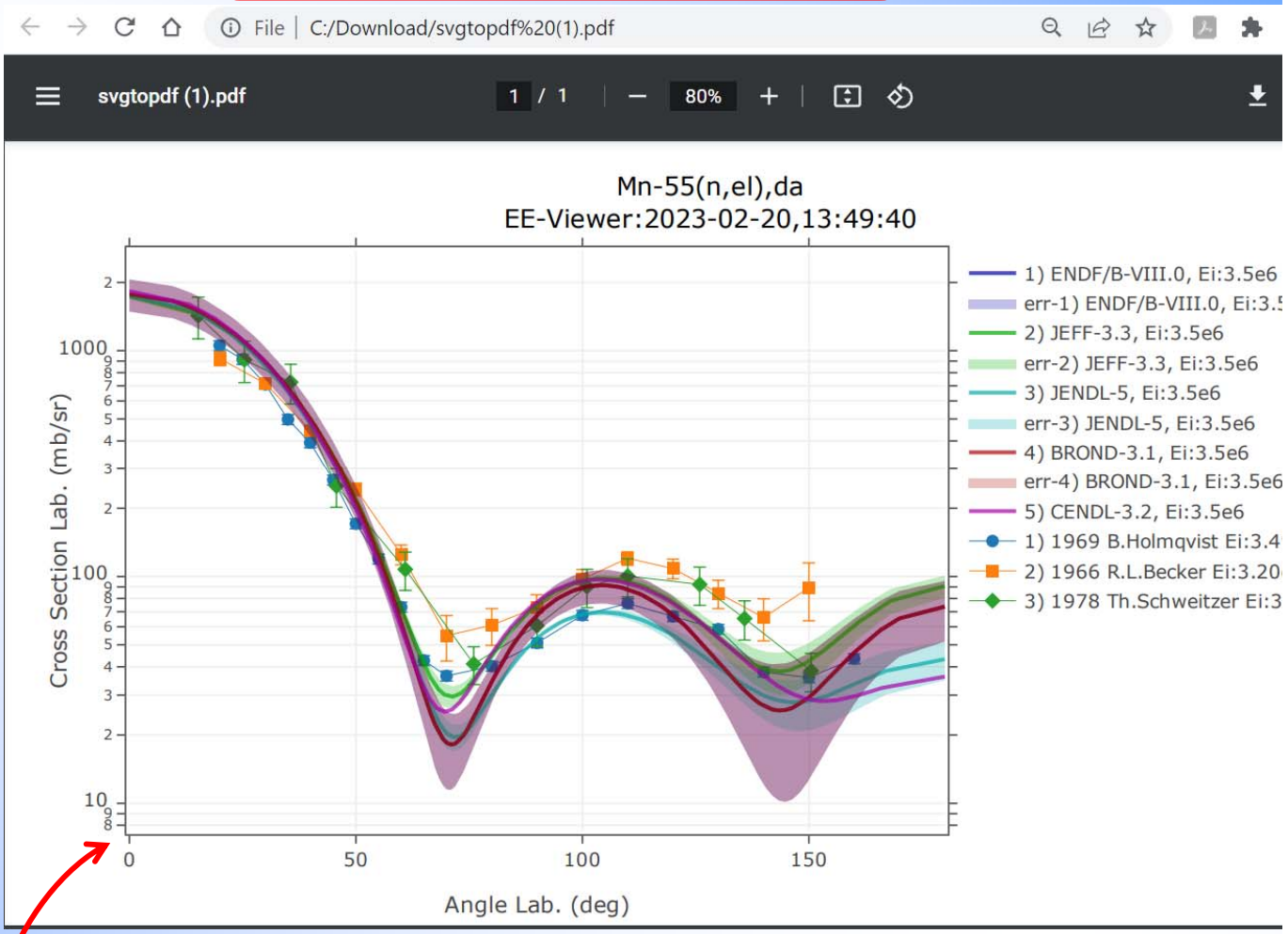
High quality graphics

A button [Save SVG], added to Plotly command panel, allows to store current plot in SVG (Scalable Vector Graphics) formatted file which can be converted to PDF or used by Web Browsers and other applications.

Save SVG

SVG converted to PDF online





EE-View summary

1. EE-View: experimental-evaluated data previewer.
   The main purpose: quickly find and plot nuclear reactions data

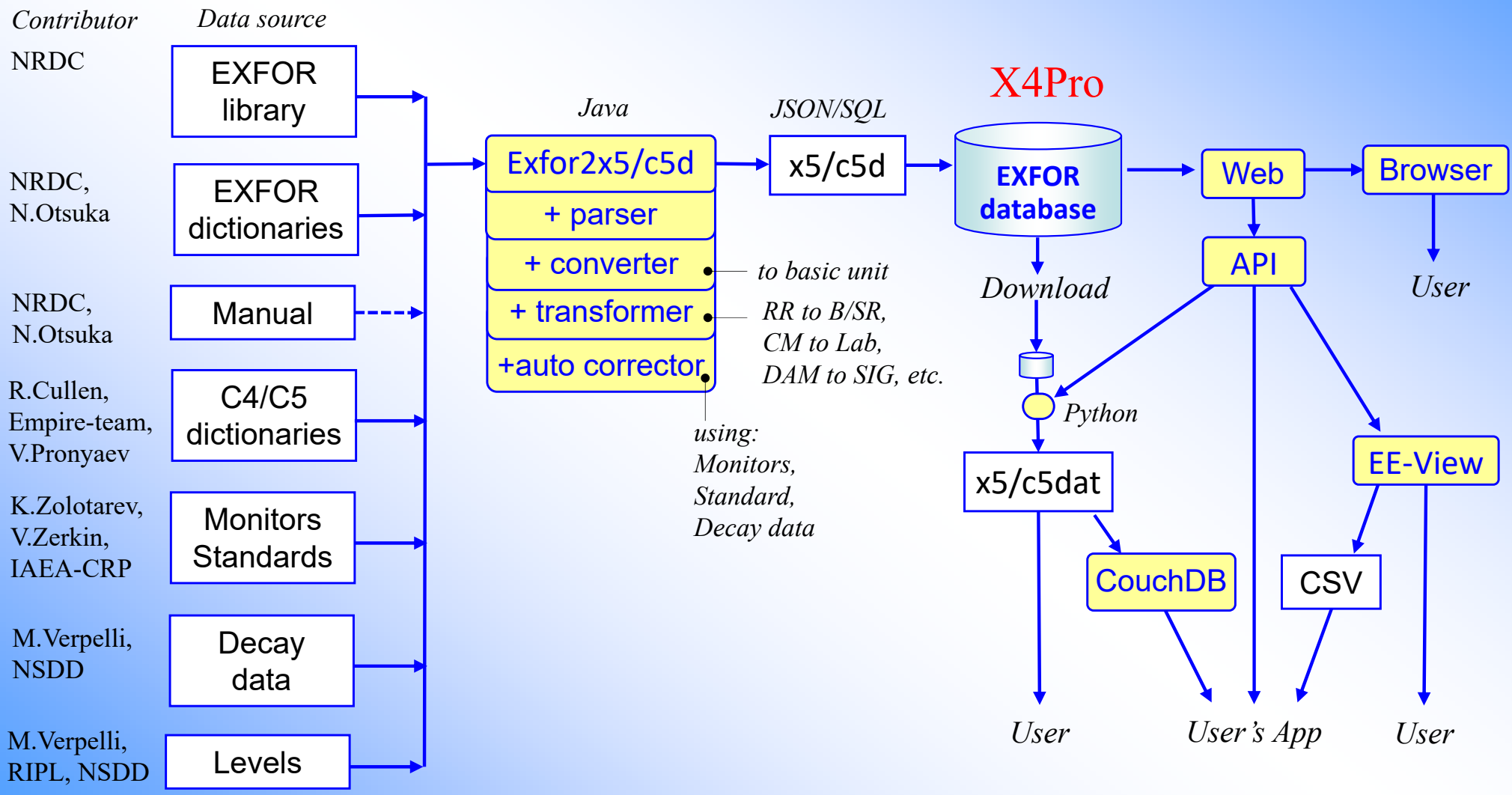
2. EE-View is implemented using Html-5/JavaScript and Plotly.js on client side and retrieving data from X4Pro and ENDF via AJAX using Web-API

3. EE-View provides following functionality:
   a) quick plot EXFOR and ENDF data with one click in a few seconds
   b) plot evaluated curves with error-band (MF33/MF34)
   c) coloured items in data selection menu indicate data presence in the databases
   d) selection datasets by reaction-codes and energy range
   e) multiple copy/paste data to the plot
   f) export data to CSV format for uploading to Excel
   g) output plot to PNG and SVG using package Plotly.js
   h) implemented for cross sections and angular distributions

4. Performance tests give good results

5. Example of Web Application using X4Pro

EXFOR – x5/c5dat – X4Pro – EE-View
Data flow

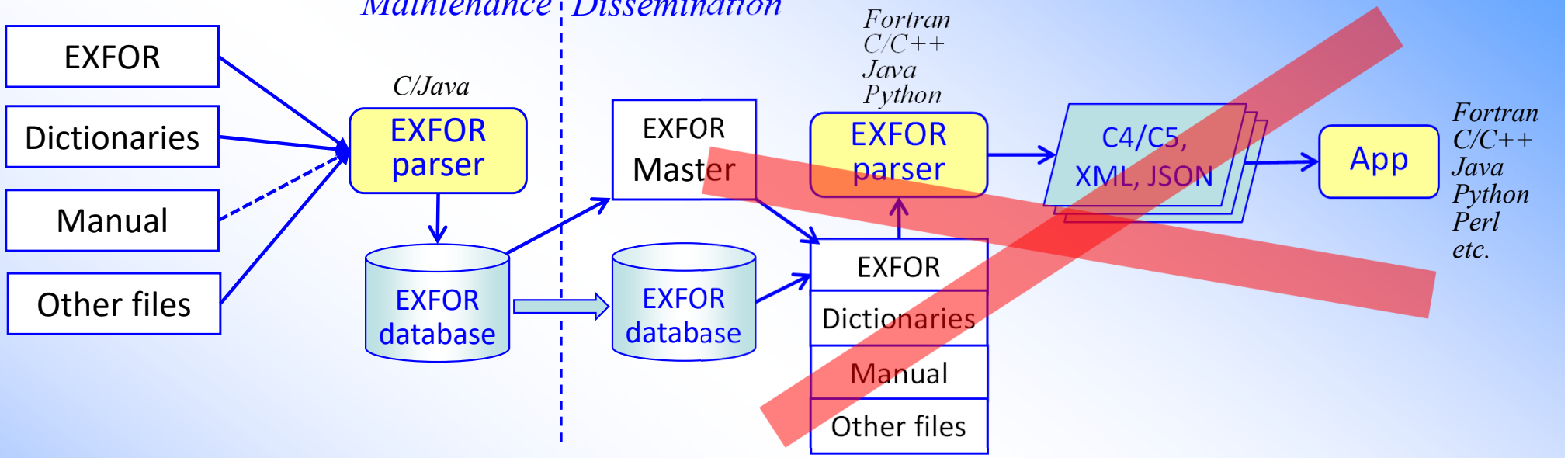


Key point of X4Pro

X4Pro makes every data point, dataset, entry, meta-data directly accessible via SQL commands

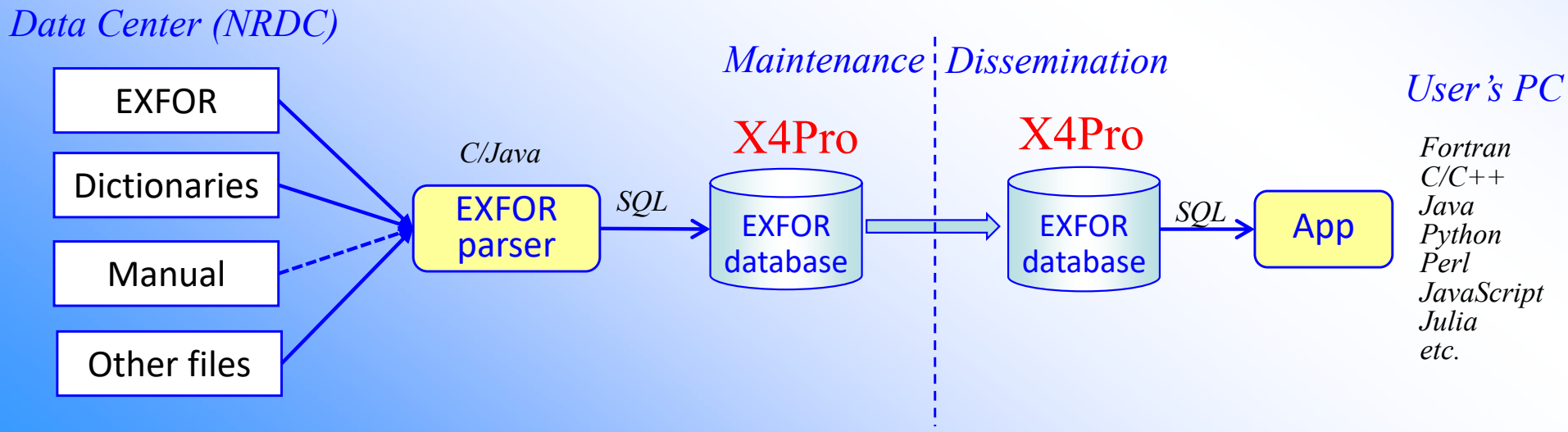
Today

We always need text files and Parsers.



Tomorrow

We can have relational database as source for users.



X5: comprehensive EXFOR in JSON

What for we need it?

We have interpreted output from EXFOR database and Web retrieval system: X4+, X4±, C4, C5, C5M, two JSON's, two XML's, StdOut, CompOut, etc.

1. X5 should cover all known users' needs in meta data and values incorporating all achievements of all previous outputs
2. Repeating data distributed in Tables of RDB, X5 presens information in consolidated form; to be used as isolated files and as input to NoSQL DB's
3. To be trivial to read in modern programming languages (JSON)
4. To simplify data usage and distribution (as part of DB, Web or Archive files)
5. Avoid complexity of distribution/maintenance of EXFOR-Parsers with current coding rules, dictionaries and additional files
6. Based of my experience dealing with SG50
7. Available on Web retrieval system, in X4Pro, in EXFOR-Archive

X5 - comprehensive presentation of EXFOR in JSON

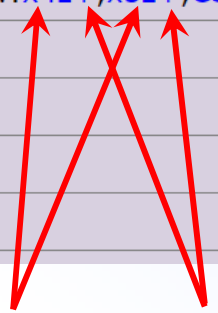
JSON file includes meta-data, dictionary-information, original and computational data, data for renormalization by monitor cross sections and decay data.
Distributed in X4Pro and generated online on ENFOR Web retrieval system.

Having X5, codes don't need neither original EXFOR, nor Parser, nor Dictionaries.

EXFOR Request #2437/4

Output Data

Format	*Data (Size)*
EXFOR Interpreted	X4+ (9Kb) Generate: X4± XML:: v1: X4.xml X4.html v2: X4.xml X4.html
EXFOR Output	X4out.std X4out.xml X4out.comp JSON,1,2::html JSON-FY new:x4z+,x5z+,CSV+ C5,A C5M:see:[doc]
EXFOR Original	EXFOR (8Kb) zip (2Kb)
Bibliography	html (3Kb) BibTeX (1Kb)
Computational	
C4	C4(C5) (8Kb) C4.ZIP (1Kb) C5(15Kb) LST(2Kb) X14A(1Kb)



JSON-text *JSON-to-Html*

Two options of output on Web, two tables in X4Pro:

- x4z: exactly reproducing EXFOR/Subentry structure and logic, oriented to "human" (compilers)
- x5z: based on Dataset concept, transforming data to comparable form, oriented to "machine" (end-users)

Two output types on Web:

- JSON-text
- Html interactive tree (generated on any JSON file)

X4Pro includes:

- two tables with x4z and x5z: x4pro_x4z 1.1Gb, x4pro_x5z 1.9Gb
- example showing how to reshuffle x4z to user's JSON and populate user's CouchDB database

X5. How it looks: x4z JSON //part-1

Database version

Input files, format, version

TRANS


```
{"format":"x5json.0.1.3"
,"now":"2023-05-05T16:11:22.530Z"
,"program":"exfor2x5z, by V.Zerkin, IAEA-NDS, 2019-2023, ver.2023-03-29"
,"input": {"files":[ {"exfor-file":"X4R2443_x4.txt", "format":"EXFOR", "created":"2023-05-05T16:11:18.000Z" }
                   ,{"exfor-dictionaries":"x4dict/", "format":"DICT_ARC_NEW", "modified":"2022-12-23T00:00:00.000Z" } ] }
,"output":{"files":[ {"x4c5.json":"X4R2443_x4.txt.x5z", "created":"2023-05-05T16:11:22.530Z" } ] }
,"x4dbVersion":"2023-04-29"
,"x4entries": [
 {"ENTRY":"S0268", "updated":20210415, "x4dbVersion":"2023-04-29", "TransID":"S030", "TransDate":20220323
  ,"y1":2021,"a1":"Jipeng Zhu+","r1":"J,NIM/B,494-495,23,2021"
  ,"ref":"Jour: Nucl. Instrum. Methods in Physics Res., Sect.B, Vol.494-495, p.23 (2021)"
  ,"title":"Differential cross sections for 7Li(3He,p0~4)9Be, 7Li(3He,d0)8Be and 6Li(3He,p0)8Be from 1.2 to 3 MeV"
  ,"x4subents":[
  {"SUBENT":"S0268001", "isub":1, "compiled":20210415, "TransID":"S030", "TransDate":20220323, "x4dbVersion":"2023-04-29"
   ,"BIB":{
     "TITLE":[
   {"x4pointer":" "
   ,"x4code":null
   ,"x4freetext":["Differential cross sections for 7Li(3He,p0~4)9Be,"
       ,"7Li(3He,d0)8Be and 6Li(3He,p0)8Be from 1.2 to 3 MeV"]
   }
     ]
    ,"AUTHOR":[
   {"x4pointer":" "
   ,"x4codes":[{"i":1,"ini":"","nam":"Jipeng Zhu"}
       ,{"i":2,"ini":"","nam":"Yuan Gao"}
       ,{"i":3,"ini":"","nam":"Liqing Qin"}
       ,{"i":4,"ini":"","nam":"Yan Sha"}
       ,{"i":5,"ini":"","nam":"Chris Jeynes"}
       ,{"i":6,"ini":"","nam":"Nianhua Peng"}
       ,{"i":7,"ini":"","nam":"Yugang Wang"}]
   }
     ]
```


Hierarchy reproduces structure of an EXFOR file with some extensions for ease processing, e.g.:

```
{format, …
  x4entries:[
    {ENTRY, …
      x4subents:[
        {SUBENT, …
          BIB: {
            "FACILITY":[
              {x4pointer,
                x4codes:[
                  {code,…}
                ]
              },…
            ]
          },
          COMMON: {
          },
          DATA: {
          }
        }
      ]
    }
  ]
}
```

X5. How it looks: x4z JSON


```
 ,"INSTITUTE":[
{"x4pointer":" "
,"x4codes":[{"code":"3CPRBJG", "dict":"INSTITUTE", "idict":3,"hlp":"Peking Univ., Beijing, China, People`s Rep."}
           ,{"code":"2UK SUR", "dict":"INSTITUTE", "idict":3,"hlp":"Univ. of Surrey, Guildford, United Kingdom"}]
}
  ]
 ,"REFERENCE":[
{"x4pointer":" "
,"x4codes":[{"code":"J,NIM/B,494-495,23,2021","stdFileName":"J,NIM_B,494-495,23,2021"
    ,"year":2021,"typ":"J","ref":"J,NIM/B","vol":"494-495","p":"23"
    ,"shortRef":"Jour: Nucl. Instrum. Methods in Physics Res., Sect.B, Vol.494-495, p.23 (2021)"}]
}
  ]
 ,"FACILITY":[
{"x4pointer":" "
,"x4codes":[{"code":"VDG", "dict":"FACILITY", "idict":18,"hlp":"Van de Graaff"}
           ,{"code":"3CPRBJG", "dict":"INSTITUTE", "idict":3,"hlp":"Peking Univ., Beijing, China, People`s Rep."}]
,"x4freetext":[" 4.5 MV Van de Graaff accelerator"]
}
  ]
 ,"SAMPLE":[
{"x4pointer":" "
,"x4code":null
,"x4freetext":["Two amorphous lithium fluoride (LiF) thin films with"
    ,"different Li isotopes composition were prepared:"
    ," 7LiF (natural abundance)"
    ," 6LiF (6Li-enriched up to 90%)"]
}
  ]
 ,"DETECTOR":[
{"x4pointer":" "
,"x4codes":[{"code":"SIBAR", "dict":"DETECTOR", "idict":22,"hlp":"Silicon surface barrier detector"}]
,"x4freetext":[" Two silicon surface barrier detectors were"
    ,"located at the backscattering angles of 150 deg (500"
    ,"um depletion depth) and 146 deg (2000 um depletion"
    ,"depth) in IBM geometry."]
}
  ]
```


Code

Dictionary

Expansion from Dictionary code

Unique ref-code

Sub-codes: year, type, ref-code, volume, page number

Free-text: array of strings

X5. How it looks: x4z JSON


```
,{"SUBENT":"22499003", "isub":3, "compiled":20160428, "TransID":"2249", "TransDate":20160818, "x4dbVersion":'
  ,"BIB":{
    "REACTION":[
  {"x4pointer":" "
  ,"x4code":{"code":"(70-YB-171(N,G)70-YB-172,,SIG,,AV)/\n(79-AU-197(N,G)79-AU-198,,SIG,,AV)"
      ,"c4reac":"((N,G),SIG,,AV)/((N,G),SIG,,AV)"
      ,"combi":"a/a","combiQuant":"Ratio of [Cross section]"
      ,"MF":203
      ,"MT":102
      ,"Units":"NO-DIM"
      ,"reacs": [
      {"code":"70-YB-171(N,G)70-YB-172,,SIG,,AV"
      ,"Reac":"N,G"
      ,"SF1":"70-YB-171","Targ":{"code":"70-YB-171","nam":"Yb-171","ZA":70171}
      ,"SF2":"N","Proj":{"code":"N","nam":"n","ZA":1}
      ,"SF3":"G"
      ,"SF4":"70-YB-172","Prod":{"code":"70-YB-172","nam":"Yb-172","ZAProd":70172}
      ,"SF6":"SIG"
      ,"SF8":"AV"
      ,"SF58":",SIG","Quant":"CS","BasicUnits":"B","QuantHlp":"Cross section"
      }
      ,{"code":"79-AU-197(N,G)79-AU-198,,SIG,,AV"
      ,"Reac":"N,G"
      ,"SF1":"79-AU-197","Targ":{"code":"79-AU-197","nam":"Au-197","ZA":79197}
      ,"SF2":"N","Proj":{"code":"N","nam":"n","ZA":1}
      ,"SF3":"G"
      ,"SF4":"79-AU-198","Prod":{"code":"79-AU-198","nam":"Au-198","ZAProd":79198}
      ,"SF6":"SIG"
      ,"SF8":"AV"
      ,"SF58":",SIG","Quant":"CS","BasicUnits":"B","QuantHlp":"Cross section"
      }]}
  ,"x4freetext":["   Averaged over"
      ," energy interval given in DATA section"]
  }
    ]
  ,"MONITOR":[
```


Reaction-combination:
MF, MT, Reaction-strings
SF1--SF9 Subfield codes,
info from Dictionaries

X5. How it looks: x4z JSON


```
   ,"DATA":{"ncols":5, "nrows":19
     ,"x4headers":[
      {"icol":0, "header":"EN", "units":"KEV", "pointer":" ","headerHelp":"Energy of incident projectile, l
     ,{"icol":1, "header":"DATA", "units":"MB/SR", "pointer":" ","headerHelp":"Value of quantity specified
     ,{"icol":2, "header":"ERR-T", "units":"PER-CENT", "pointer":" ","headerHelp":"Total uncertainty (1-Sig
     ,{"icol":3, "header":"ERR-S", "units":"PER-CENT", "pointer":" ","headerHelp":"Statistical uncertainty
     ,{"icol":4, "header":"ERR-1", "units":"PER-CENT", "pointer":" ","headerHelp":"1st partial uncertainty,
     ]
     ,"datacols":[
    ["EN"         ,"DATA"      ,"ERR-T"     ,"ERR-S"     ,"ERR-1"     ]
   ,["KEV"        ,"MB/SR"     ,"PER-CENT"  ,"PER-CENT"  ,"PER-CENT"  ]
   ,[" "          ," "         ," "         ," "         ," "         ]]
     ,"data":[
    [1186.0       ,0.64        ,3.8         ,2.92        ,0.19        ]
   ,[1286.2       ,0.72        ,3.6         ,2.68        ,0.2         ]
   ,[1386.0       ,0.74        ,3.1         ,2.0         ,0.17        ]
   ,[1484.8       ,0.77        ,3.1         ,1.94        ,0.18        ]
   ,[1585.8       ,0.92        ,3.0         ,1.77        ,0.19        ]
   ,[1683.8       ,1.01        ,3.1         ,2.02        ,0.26        ]
   ,[1783.5       ,0.94        ,3.0         ,1.87        ,0.26        ]
   ,[1884.7       ,0.98        ,3.0         ,1.82        ,0.28        ]
   ,[1982.0       ,1.03        ,2.9         ,1.62        ,0.29        ]
   ,[2081.6       ,1.0         ,3.0         ,1.78        ,0.36        ]
   ,[2180.9       ,1.04        ,3.0         ,1.75        ,0.38        ]
   ,[2284.0       ,1.06        ,3.0         ,1.75        ,0.41        ]
   ,[2384.9       ,1.21        ,3.0         ,1.69        ,0.44        ]
   ,[2480.5       ,1.15        ,3.0         ,1.7         ,0.46        ]
   ,[2578.0       ,1.15        ,3.0         ,1.6         ,0.46        ]
   ,[2678.9       ,1.2         ,3.1         ,1.67        ,0.52        ]
   ,[2778.5       ,1.22        ,3.1         ,1.65        ,0.53        ]
   ,[2875.1       ,1.28        ,3.0         ,1.58        ,0.55        ]
   ,[2983.2       ,1.34        ,3.0         ,1.57        ,0.59        ]]}
  }
 ]
}
```

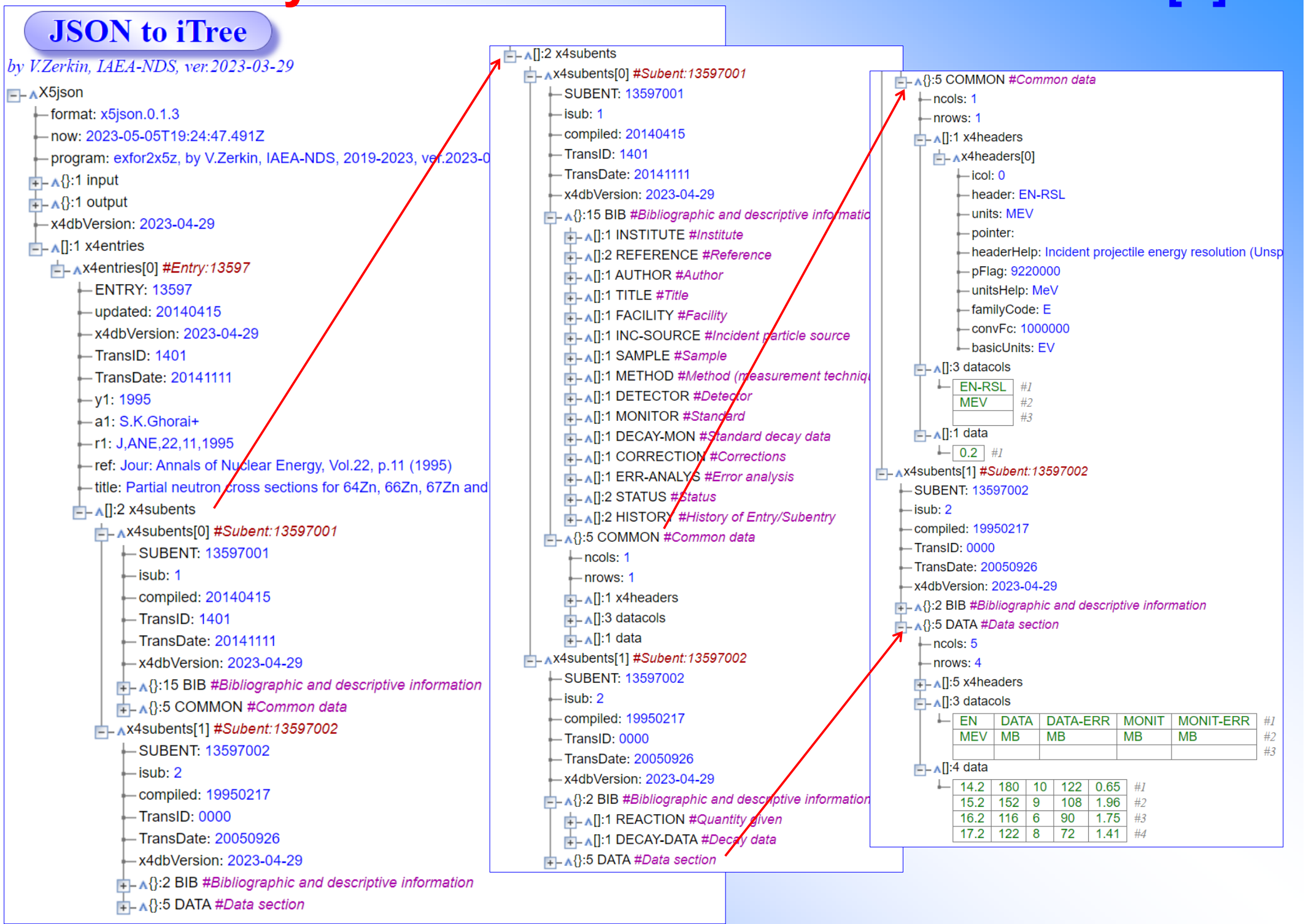

Looks exactly like EXFOR, but processable as it is.

X5. How it looks: x4z JSON


```
 ,"COVARIANCE":[
{"x4pointer":" "
,"x4code":null
,"x4freedata":[{"name": "23114002.COR:ERR-T (PER-CENT)"
 , "lx":9, "ly":9, "lz":81, "xm":1000000.0, "ym":1000000.0, "zm":0.01
 , "xunit":"MEV", "yunit":"MEV", "zunit":"PER-CENT"
 , "xname":"EN", "yname":"EN", "zname":"COR:ERR-T", "comment":"macro-correlation"
 , "xarr":[ 8.34, 9.15, 13.33, 16.1, 17.16, 17.9, 19.36, 19.95, 20.61]
 , "yarr":[ 8.34, 9.15, 13.33, 16.1, 17.16, 17.9, 19.36, 19.95, 20.61]
 , "zarr":[
    [100.0, 35.0, 37.0, 38.0, 40.0, 41.0, 21.0, 30.0, 20.0]
   ,[ 35.0,100.0, 42.0, 43.0, 45.0, 45.0, 24.0, 34.0, 22.0]
   ,[ 37.0, 42.0,100.0, 53.0, 57.0, 57.0, 30.0, 44.0, 29.0]
   ,[ 38.0, 43.0, 53.0,100.0, 58.0, 59.0, 31.0, 45.0, 30.0]
   ,[ 40.0, 45.0, 57.0, 58.0,100.0, 84.0, 39.0, 58.0, 40.0]
   ,[ 41.0, 45.0, 57.0, 59.0, 84.0,100.0, 39.0, 59.0, 42.0]
   ,[ 21.0, 24.0, 30.0, 31.0, 39.0, 39.0,100.0, 51.0, 39.0]
   ,[ 30.0, 34.0, 44.0, 45.0, 58.0, 59.0, 51.0,100.0, 65.0]
   ,[ 20.0, 22.0, 29.0, 30.0, 40.0, 42.0, 39.0, 65.0,100.0]]}
   ,{"name": "23114002.COR:MONIT-ERR (PER-CENT)"
 , "lx":9, "ly":9, "lz":81, "xm":1000000.0, "ym":1000000.0, "zm":0.01
 , "xunit":"MEV", "yunit":"MEV", "zunit":"PER-CENT"
 , "xname":"EN", "yname":"EN", "zname":"COR:MONIT-ERR", "comment":"micro-corr.(standard)"
 , "xarr":[ 8.34, 9.15, 13.33, 16.1, 17.16, 17.9, 19.36, 19.95, 20.61]
 , "yarr":[ 8.34, 9.15, 13.33, 16.1, 17.16, 17.9, 19.36, 19.95, 20.61]
 , "zarr":[
    [100.0, 43.0,  0.0,  0.0,  0.0,  0.0,  0.0,  0.0,  0.0]
   ,[ 43.0,100.0,  0.0,  0.0,  0.0,  0.0,  0.0,  0.0,  0.0]
   ,[  0.0,  0.0,100.0,  6.0,  9.0,  9.0, 11.0, 11.0, 11.0]
   ,[  0.0,  0.0,  6.0,100.0, 12.0, 12.0, 11.0, 11.0, 11.0]
   ,[  0.0,  0.0,  9.0, 12.0,100.0,100.0, 40.0, 40.0, 40.0]
   ,[  0.0,  0.0,  9.0, 12.0,100.0,100.0, 40.0, 40.0, 40.0]
   ,[  0.0,  0.0, 11.0, 11.0, 40.0, 40.0,100.0,100.0,100.0]
   ,[  0.0,  0.0, 11.0, 11.0, 40.0, 40.0,100.0,100.0,100.0]
   ,[  0.0,  0.0, 11.0, 11.0, 40.0, 40.0,100.0,100.0,100.0]]}
```


Covariance data given in free-text: presented as arrays prepared for processing

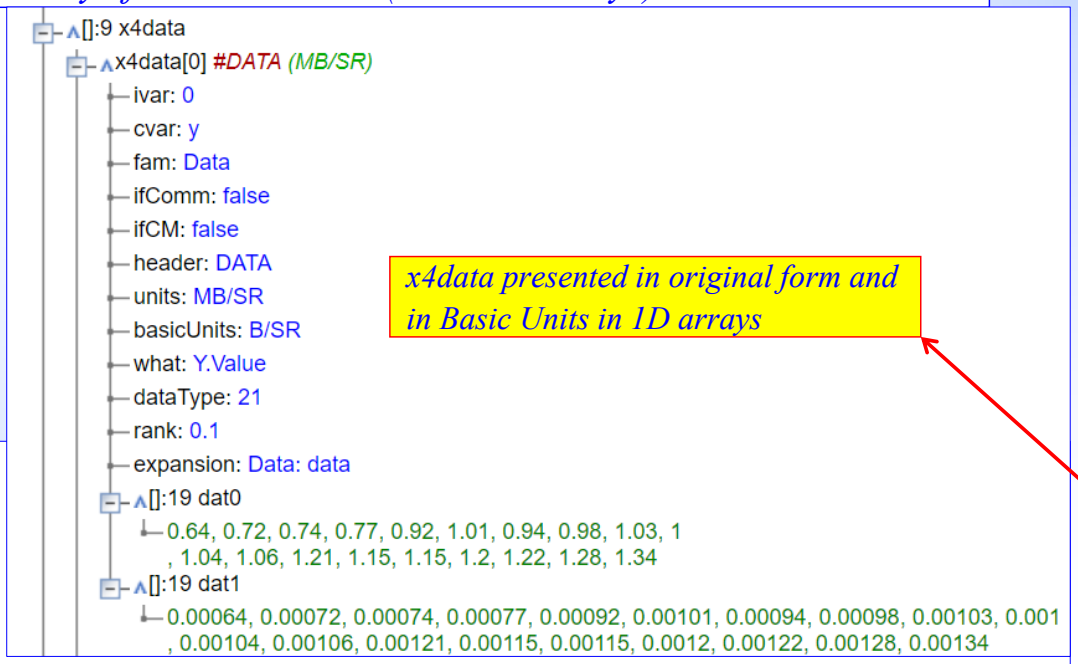
Hierarchy of x4z via Html interactive tree: x4z[+]



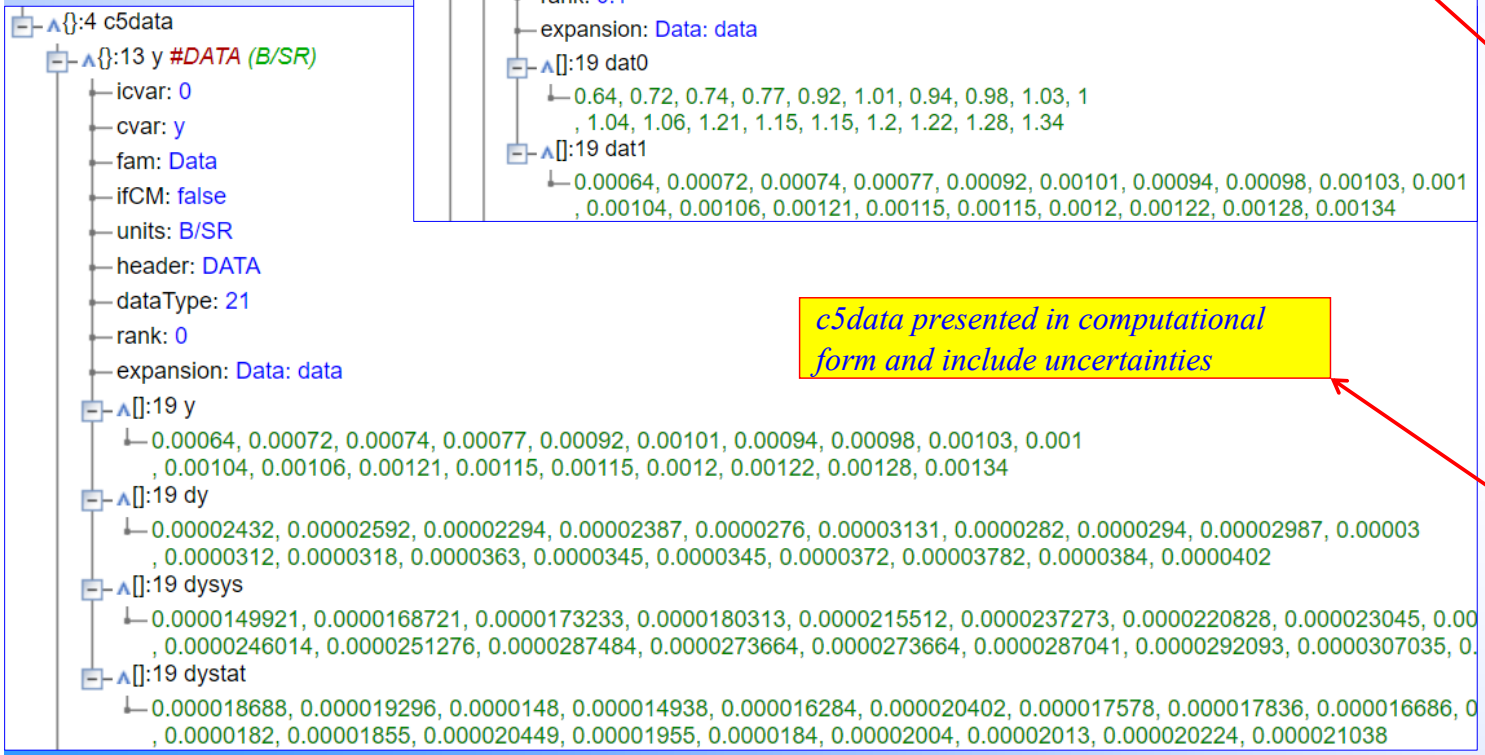
X5 Datasets. x5z JSON //part-2

X5z vs. X4z

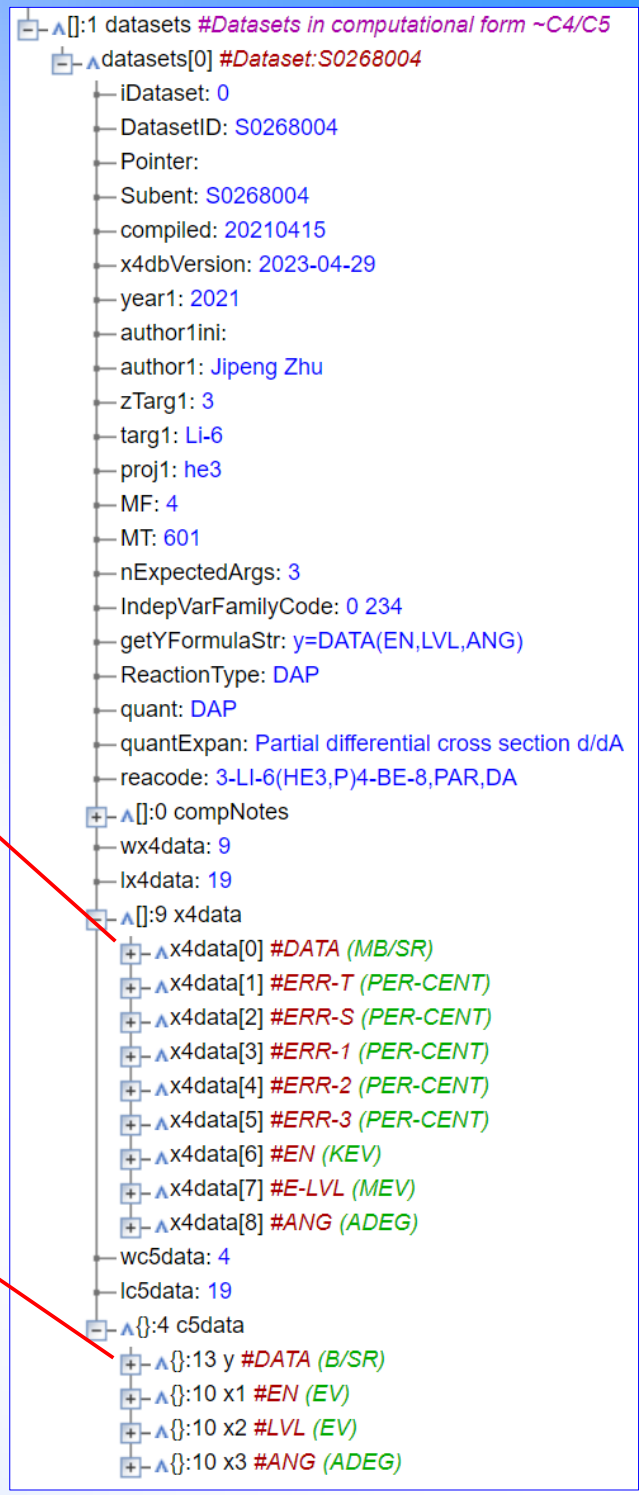
- *dropped data values from DATA*
- *added datasets[] into x4subnet*
- *added MF, MT, x4data[], c5data[], c5mon[], decay data[]*
- *added computationNotes, autoCorrectionNotes*
- *usus 1D arrays for data values (x4z: 2D arrays)*



x4data presented in original form and in Basic Units in 1D arrays



c5data presented in computational form and include uncertainties



X5 Datasets. x5z JSON

X5z. Preparing for automatic corrections

Additional input files, format, version:
- *Archive of Monitors*
- *Decay data imported from ENSDF*


```
{"format":"x5json.0.1.3"
,"now":"2023-05-08T11:07:49.807Z"
,"program":"exfor2x5z, by V.Zerkin, IAEA-NDS, 2019-2023, ver.2023-03-29"
,"input": {"files":[ {"exfor-file":"X4R2470_x4.txt", "format":"EXFOR", "created":"2023-05-08T11:06:34.000Z" }
                    ,{"exfor-dictionaries":"x4dict/", "format":"DICT_ARC_NEW", "modified":"2022-12-23T00:00:00.000Z" }
                    ,{"archive-monitors":"monitors/", "format":"zvv-out", "modified":"2022-08-31T00:00:00.000Z" }
                    ,{"decay-data":"monitors/decay/lara2/", "format":"LARA", "modified":"2022-01-18T00:00:00.000Z" } ] }
,"output":{"files":[ {"x4c5.json":"X4R2470_x4.txt.x5z", "created":"2023-05-08T11:07:49.807Z" } ] }
,"x4dbVersion":"2023-04-29"
,"x4entries": [
 {"ENTRY":"13597", "updated":20140415, "x4dbVersion":"2023-04-29", "TransID":"1401", "TransDate":20141111
  ,"y1":1995,"a1":"S.K.Ghorai+","r1":"J,ANE,22,11,1995"
  ,"ref":"Jour: Annals of Nuclear Energy, Vol.22, p.11 (1995)"
  ,"title":"Partial neutron cross sections for 64Zn, 66Zn, 67Zn and 68Zn between 14.2 and 18.2 MeV"
  ,"x4subents":[
```


- []:1 compNotes
  - RECALCULATED COLUMN:MONIT-ERR,B TO:PER-CENT:L=4

- {}:10 DECAY-DATA *#Decay data*
  - Nuclide: 29-CU-64
  - HalfLife: 12.7HR
  - HalfLife1:
  - RadiationType: AR
  - Ene: 511
  - Ene1: 511
  - Abu: 0.386
  - Abu1: 0.352
  - FcCorrDECAY_DATA: 1.0965909
  - reaction: 30-ZN-64(N,P)29-CU-64,,SIG

- {}:10 DECAY-MON *#Standard decay data*
  - Nuclide: 11-NA-24
  - HalfLife: 15.02HR
  - HalfLife1: 14.997HR
  - RadiationType: DG
  - Ene: 1369
  - Ene1: 1368.626
  - Abu: 1
  - Abu1: 0.999936
  - FcCorrDECAY_MON: 0.999936
  - monitorReaction: 13-AL-27(N,A)11-NA-24,,SIG

- datasets[0] *#Dataset:13597002*
  - iDataset: 0
  - DatasetID: 13597002
  - Pointer:
  - Subent: 13597002
  - compiled: 19950217
  - x4dbVersion: 2023-04-29
  - year1: 1995
  - author1ini: S.K.
  - author1: Ghorai
  - zTarg1: 30
  - targ1: Zn-64
  - proj1: n
  - MF: 3
  - MT: 103
  - nExpectedArgs: 1
  - IndepVarFamilyCode: 0 2
  - getYFormulaStr: y=DATA(EN)
  - ReactionType: CS
  - quant: CS
  - quantExpan: Cross section
  - reacode: 30-ZN-64(N,P)29-CU-64,,SIG
  - []:1 compNotes
  - {}:10 DECAY-DATA *#Decay data*
  - {}:10 DECAY-MON *#Standard decay data*
  - []:19 autoCorrNotes
  - wx4data: 6
  - lx4data: 4
  - []:6 x4data
    - x4data[0] *#DATA (MB)*
    - x4data[1] *#DATA-ERR (MB)*
    - x4data[2] *#MONIT-ERR (MB)*
    - x4data[3] *#EN (MEV)*
    - x4data[4] *#EN-RSL (MEV)*
    - x4data[5] *#MONIT (MB)*
  - wc5data: 2
  - lc5data: 4
  - {}:2 c5data
    - {}:12 y *#DATA (B)*
    - {}:11 x1 *#EN (EV)*
  - {}:8 c5mon
    - m0ref: [EN,MONIT,MONIT-ERR]/al27na
    - m1ref: recom/al27na
    - []:4 enNorm
    - []:4 m0
    - []:4 m1
    - []:4 dm0
    - []:4 dm1
    - []:4 Fc0

X5. How it looks: x5z JSON

X5z. Description details of automatic corrections

- []:19 autoCorrNotes
  - #[0]#---Monitor xs-data
  - #[0]#Reaction: 30-ZN-64(N,P)29-CU-64,,SIG
  - #[0]#Monitor: 13-AL-27(N,A)11-NA-24,,SIG
  - m0: [EN,MONIT,MONIT-ERR]; #[0]#old monitor(energy)
  - m1: recom$al27na; #[0]#new monitor(energy)
  - dy=dy/y; #to rel. uncertainties
  - y=y/m0*m1; #[0]#renormalizing CS
  - dy=(dy**2-dm0**2+dm1**2)**0.5; #[0]#replace monitor uncertainties (1)
  - #[1]#---Reaction decay-data
  - #[1]#REACTION (30-ZN-64(N,P)29-CU-64,,SIG)
  - #[1]#DECAY-DATA (29-CU-64,12.7HR,AR,511.,0.386) #Ix_old=0.386
  - a1=0.386/0.352; #[1]#DECAY-DATA: correction to new 511 keV gamma-yield per decay Cu-64 Ix_new=0.352
  - y=y*a1; #[1]#Renorm.factor: a1=1.0965909
  - #[2]#---Monitor decay-data (2)
  - #[2]#MONITOR (13-AL-27(N,A)11-NA-24,,SIG)
  - #[2]#DECAY-MON (11-NA-24,15.02HR,DG,1369.,1.00) #Im_old=1.0
  - a2=0.999936/1.0; #[2]#DECAY-MON: correction to new 1368.626 keV gamma-yield per decay Na-24 Im_new=0.999936
  - y=y*a2; #[2]#Renorm.factor: a2=0.999936 (3)
  - dy=dy*y; #to abs. uncertainties

- datasets[0] *#Dataset:13597002*
  - iDataset: 0
  - DatasetID: 13597002
  - Pointer:
  - Subent: 13597002
  - compiled: 19950217
  - x4dbVersion: 2023-04-29
  - year1: 1995
  - author1ini: S.K.
  - author1: Ghorai
  - zTarg1: 30
  - targ1: Zn-64
  - proj1: n
  - MF: 3
  - MT: 103
  - nExpectedArgs: 1
  - IndepVarFamilyCode: 0 2
  - getYFormulaStr: y=DATA(EN)
  - ReactionType: CS
  - quant: CS
  - quantExpan: Cross section
  - reacode: 30-ZN-64(N,P)29-CU-64,,SIG
  - []:1 compNotes
  - {}:10 DECAY-DATA *#Decay data*
  - {}:10 DECAY-MON *#Standard decay data*
  - []:19 autoCorrNotes
  - wx4data: 6
  - lx4data: 4
  - []:6 x4data
    - x4data[0] *#DATA (MB)*
    - x4data[1] *#DATA-ERR (MB)*
    - x4data[2] *#MONIT-ERR (MB)*
    - x4data[3] *#EN (MEV)*
    - x4data[4] *#EN-RSL (MEV)*
    - x4data[5] *#MONIT (MB)*
  - wc5data: 2
  - lc5data: 4
  - {}:2 c5data
    - {}:12 y *#DATA (B)*
    - {}:11 x1 *#EN (EV)*
  - {}:8 c5mon
    - m0ref: [EN,MONIT,MONIT-ERR]/al27na
    - m1ref: recom/al27na
    - []:4 enNorm
    - []:4 m0
    - []:4 m1
    - []:4 dm0
    - []:4 dm1
    - []:4 Fc0

1. *Energy dependent correction by Monitor cross sections to new Standard/recommended cross sections*
2. *Correction by Decay data: for new 511 keV gamma-yield per decay Cu-64*
   Factor: a1=1.0965909
3. *Correction by Monitor decay data: for new 1368.626 keV gamma-yield per decay Na-24*
   Factor: a2=0.999936

X5. How it looks: x5z JSON

X5z. Energy dependent correction by Monitor cross sections to new Standard/recommended cross sections

1

- {}:2 c5data
  - {}:12 y *#DATA (B)*
    - icvar: 0
    - cvar: y
    - fam: Data
    - ifCM: false
    - units: B
    - header: DATA
    - dataType: 21
    - rank: 0
    - expansion: Data: data
    - []:4 y
      - 0.18, 0.152, 0.116, 0.122
    - []:4 dy
      - 0.01, 0.009, 0.006, 0.008
    - []:4 dysys
      - 0.000954, 0.0027512, 0.0022504, 0.0023912
  - {}:11 x1 *#EN (EV)*
    - icvar: 1
    - cvar: x1
    - fam: EN
    - ifCM: false
    - units: EV
    - header: EN
    - dataType: 41
    - rank: 1
    - expansion: Incident energy: energy
    - []:4 x1
      - 14200000, 15200000, 16200000, 17200000
    - []:4 dx1
      - 100000, 100000, 100000, 100000

Note. We provide only data for corrections. Corrections are preformed by user's code.

- reacode: 30-ZN-64(N,P)29-CU-64,,SIG
- []:1 compNotes
- {}:10 DECAY-DATA *#Decay data*
- {}:10 DECAY-MON *#Standard decay data*
- []:19 autoCorrNotes
- wx4data: 6
- lx4data: 4
- []:6 x4data
  - x4data[0] *#DATA (MB)*
  - x4data[1] *#DATA-ERR (MB)*
  - x4data[2] *#MONIT-ERR (MB)*
  - x4data[3] *#EN (MEV)*
  - x4data[4] *#EN-RSL (MEV)*
  - x4data[5] *#MONIT (MB)*
- wc5data: 2
- lc5data: 4
- {}:2 c5data
  - {}:12 y *#DATA (B)*
  - {}:11 x1 *#EN (EV)*
- {}:8 c5mon
  - m0ref: [EN,MONIT,MONIT-ERR]/al27na
  - m1ref: recom/al27na
  - []:4 enNorm
  - []:4 m0
  - []:4 m1
  - []:4 dm0
  - []:4 dm1
  - []:4 Fc0

- {}:8 c5mon
  - m0ref: [EN,MONIT,MONIT-ERR]/al27na
  - m1ref: recom/al27na
  - []:4 enNorm
    - 14200000, 15200000, 16200000, 17200000 *#Normalization energy*
  - []:4 m0
    - 0.122, 0.108, 0.09, 0.072 *#Old monitor cross section*
  - []:4 m1
    - 0.11962, 0.105011, 0.089254, 0.0731812 *#New monitor cross section*
  - []:4 dm0
    - 0.00065, 0.00196, 0.00175, 0.00141 *#Old monitor cross section abs.error*
  - []:4 dm1
    - 0.000527832, 0.000531218, 0.0006517, 0.000614784 *#New monitor cross section abs.error*
  - []:4 Fc0
    - 0.980492, 0.972325, 0.991711, 1.01641 *#Energy dependent correction factor*

Concluding remarks

1. X4Pro database – way of full EXFOR database dissemination
2. X4Pro could be distributed on regular basis from NDS on behalf of NRDC
3. X5-json could be included to offline distribution (see next presentation) as product of NRDC
4. NRDC off-line EXFOR distribution policy – see next presentation
5. X5json – could be a “recommended” NRDC output to “large” users
6. EXFOR-NSR PDF database: should we continue on Web? (Transfer maintenance of PDF DB to Lidija Vrapcenjak, NDS)

1 – 5 would need NRDC decision/support
6 would need NRDC decision/support and consultation with NNDC

Thank you.