

From X4 to C4 to human-readable database



- General
- Newbase
- Examples

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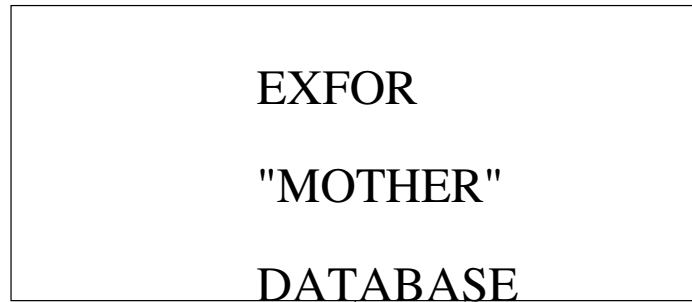
NRG Petten, the Netherlands

SG-30 meeting, IAEA, October 10-11, 2007

General

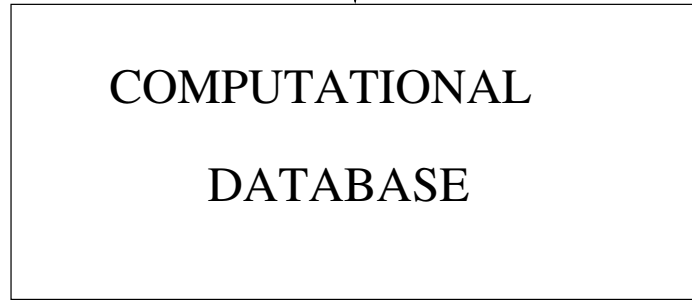
Forms of the EXFOR database:

- EXFOR database: tabulated data, in various different forms and dimensions, and extensive technical description of the measurement
- C4: numerical database with data given on a line-by-line basis
- Wanted (at least by AK): Directory-based database structure with all data categorized per nuclide and reaction channel. Each measurement should be represented by a simple x-y-dy file. Keep all important info in this file, however.



X4toC4 (IAEA,BNL)
NEA's code
JANIS (?)

LOSS

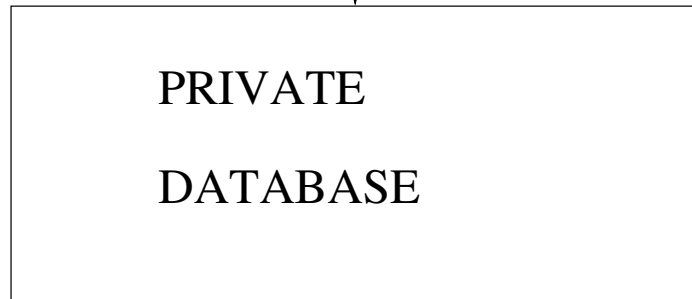


At least 2 versions:

- BNL-IAEA
- NEA

2-1

LOSS



Forrest-Kopecky (EASY)
Koning (directory structured)
FZK
Directly in code (EMPIRE)

Newbase

- newbase.f: Fortran code to translate C4 database into new database.
- Build in numerical checks: $x_s > 4$ barn for $E > 0.1$ MeV.
- Use RIPL-2 discrete level scheme to guess levels for (n,n') etc.
- Record exactly which entries were, and were not, translated.

Newbase

Current status:

Number of EXFOR	subentries:	130161	
Number of C4	subentries:	64431	
Number of Newbase files	:	41134	
C4 / EXFOR	:	49.50100	%
Newbase / EXFOR	:	31.60240	%
Newbase / C4	:	63.84194	%

Newbase

```
4096 Oct 8 12:33 a/  
4096 Oct 8 12:31 d/  
5470822 Oct 8 12:33 done.c4  
4096 Oct 8 12:31 g/  
4096 Oct 8 12:33 h/  
4096 Oct 8 12:27 n/  
590985 Oct 8 12:17 newbase*  
30554 Oct 8 11:52 newbase.f  
3098501 Oct 8 12:33 notdone.c4  
8591194 Oct 8 12:33 out  
4096 Oct 8 12:32 p/  
78793 Oct 8 12:33 suspicious.c4  
4096 Oct 8 12:33 t/  
26 Oct 8 11:53 x4all.c4 -> ../exfor/C4-2007-09-26.xc4  
29 Jun 28 17:08 x4all.x4 -> ../exfor/EXFOR-2007-05-21.BCK
```

Newbase

```
/home/finux01b/akoning/l4105/newbase> head suspicious.c4
#    1 Suspicious data set: xs > 4 barn for E > 1 MeV
#Subentry    10772004
#Author      R.L.White+
#Year        1972
#Reaction    46-PD-110(N,2N)46-PD-109-M,,SIG
           1 46110    3  16MA  1.5900+7           4.450000  0.330000
           1 46110    3  16MA  1.6300+7           4.900000  0.330000
#    2 Suspicious data set: xs > 4 barn for E > 1 MeV
#Subentry    14128002
#Author      J.B.Wilhelmy+
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/n> ll
```

```
4096 Oct  8 12:20 ac/
```

```
4096 Oct  8 12:27 ag/
```

```
4096 Oct  8 12:26 al/
```

```
4096 Oct  8 12:27 am/
```

```
.....
```

```
/home/finux01b/akoning/l4105/newbase/n/ca> ll
```

```
4096 Oct  8 12:26 000/
```

```
4096 Oct  8 12:25 040/
```

```
4096 Oct  8 12:26 041/
```

```
4096 Oct  8 12:23 042/
```

```
4096 Oct  8 12:26 043/
```

```
4096 Oct  8 12:26 044/
```

```
4096 Oct  8 12:21 046/
```

```
4096 Oct  8 12:23 048/
```


Newbase

```
/home/finux01b/akoning/l4105/newbase/n/ca/048> ll
```

```
4096 Oct  8 12:27 001/  
4096 Oct  8 12:27 016/  
4096 Oct  8 12:21 051/  
4096 Oct  8 12:21 051ang/  
4096 Oct  8 12:27 102/  
4096 Oct  8 12:26 107/  
4096 Oct  8 12:21 elang/  
4096 Oct  8 12:26 RI/  
4096 Oct  8 12:23 specav/
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/n/ca/048/016> ll  
 908 Oct  8 12:27 Betak1999.tot  
 760 Oct  8 12:23 Hille1961.tot  
 686 Oct  8 12:20 Hillman1962.tot  
 686 Oct  8 12:24 Holmberg1978.tot  
1279 Oct  8 12:25 Ikeda1988.tot  
 686 Oct  8 12:24 Minetti1966.tot  
 686 Oct  8 12:25 Pepelnik1985.tot  
 686 Oct  8 12:26 Tiwari1968.tot
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/n/ca/048/016> cat Ikeda1988.tot
```

```
# Target   : Z= 20 A= 48           Isomer=      Projectile=n
# Reaction: MT= 16 (n,2n   )   Isomer=
# Quantity: Cross section           Frame: L
# Author   : Y.Ikeda+              Year: 1988 EXFOR ID: 22089021
```

#	E (MeV)	xs (mb)	dxs (mb)	dE (MeV)
	1.49400E+01	8.06000E+02	7.80000E+01	0.00000E+00
	1.46700E+01	8.05000E+02	6.70000E+01	0.00000E+00
	1.44300E+01	7.64000E+02	4.80000E+01	0.00000E+00
	1.42200E+01	7.45000E+02	5.00000E+01	0.00000E+00
	1.39900E+01	7.59000E+02	5.00000E+01	0.00000E+00
	1.37500E+01	7.11000E+02	7.00000E+01	0.00000E+00
	1.35700E+01	6.79000E+02	5.60000E+01	0.00000E+00
	1.33300E+01	6.77000E+02	4.70000E+01	0.00000E+00

```
#Y.Ikeda, C.Konno, K.Oishi,
```

```
#T.Nakamura, H.Miyade, K.Kawade,
```

```
#H.Yamamoto, T.Katoh
```

```
#Rept. JAERI Reports
```

```
#No.1312, 1988
```

```
#-Activation cross section measurements for fusion reactor structural
```

```
#materials at neutron energy from 13.3 to 15.0 MeV using FNS facility.
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/p/zr/000> ll
total 12
drwxr-xr-x  2 akoning NRG_fys 4096 Oct  8 12:32 003/
drwxr-xr-x  2 akoning NRG_fys 4096 Oct  8 12:29 004/
drwxr-xr-x 17 akoning NRG_fys 4096 Oct  8 12:32 rp/
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/p/zr/000/rp> ll
```

```
4096 Oct 8 12:29 000001/  
4096 Oct 8 12:32 004007/  
4096 Oct 8 12:32 011022/  
4096 Oct 8 12:28 015032/  
4096 Oct 8 12:32 021044/  
4096 Oct 8 12:32 025054/  
4096 Oct 8 12:32 033074/  
4096 Oct 8 12:28 037082/  
4096 Oct 8 12:32 037083/  
4096 Oct 8 12:28 037084/  
4096 Oct 8 12:32 039088/  
4096 Oct 8 12:32 041091/  
4096 Oct 8 12:32 041092/  
4096 Oct 8 12:32 041095/  
4096 Oct 8 12:32 041096/
```

Newbase

```
/home/finux01b/akoning/l4105/newbase/p/zr/000/rp/033074> ll
```

```
909 Oct 8 12:28 Aleksandrov1993.tot
```

```
2254 Oct 8 12:32 Michel1997.tot
```

```
/home/finux01b/akoning/l4105/newbase/p/zr/000/rp/033074> cat Michel1997.tot
```

```
# Target : Z= 40 A= 0 Isomer= Projectile=p
```

```
# Reaction: Zres= 33 Ares= 74 Isomer=99
```

```
# Quantity: Cross section Frame: L
```

```
# Author : R.Michel+ Year: 1997 EXFOR ID: 00276238
```

#	E (MeV)	xs (mb)	dxs (mb)	dE (MeV)
	1.65000E+02	2.04000E-01	2.51000E-02	1.20000E+00
	2.26000E+02	1.01000E+00	1.51000E-01	1.42000E+00
	2.67000E+02	1.16000E+00	1.23000E-01	1.17000E+00
	2.77000E+02	1.49000E+00	1.41000E-01	1.42000E+00
	3.34000E+02	2.29000E+00	1.73000E-01	1.61000E+00
	3.55000E+02	2.42000E+00	1.89000E-01	1.38000E+00
	3.72000E+02	2.49000E+00	2.23000E-01	1.16000E+00
	5.69000E+02	5.55000E+00	4.26000E-01	1.28000E+00
	7.71000E+02	6.24000E+00	4.92000E-01	1.27000E+00
	8.00000E+02	6.45000E+00	4.76000E-01	0.00000E+00
	1.20000E+03	6.76000E+00	5.44000E-01	0.00000E+00
	1.20000E+03	6.54000E+00	4.98000E-01	1.10000E+00

Newbase

1.56000E+03	5.97000E+00	4.67000E-01	1.48000E+00
1.58000E+03	5.80000E+00	4.11000E-01	1.12000E+00
1.60000E+03	5.44000E+00	4.54000E-01	0.00000E+00
2.57000E+03	4.98000E+00	3.97000E-01	1.29000E+00
2.60000E+03	4.43000E+00	3.78000E-01	0.00000E+00

#R.Michel, R.Bodemann, H.Busemann,
R.Daunke, M.Gloris, H.-J.Lange,
B.Klug, A.Krins, I.Leya,
M.Luepke, S.Neumann, H.Reinhardt,
M.Schnatz-Buettgen, U.Herpers, Th.Schiekel,
F.Sudbrock, B.Holmqvist, H.Conde,
P.Malmborg, M.Suter, B.Dittrich-Hannen,
#P.-W.Kubik, H.-A.
#Jour. Nucl. Instrum. Methods in Physics Res., Sect.B
#Vol.129, p.153, 1997
#Cross Sections For the Production of Residual Nuclides
#By Low- And Medium-Energy Protons from the Target
#Elements C, N, O, Mg, Al, Si, Ca, Ti, V, Mn, Fe, Co,
#Ni, Cu, Sr, Y, Zr, Nb, Ba and Au.