Experience and observations with the use of EXFOR-Editor

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Contents

Status of entries in India

Since 2006, INDIA contributed in all more than 200 new Indian EXFOR entries

Identification for coding into EXFOR was done in consultation with IAEA

New Entries	EXFOR Workshop (Year)	
10	2006	(Dr. Otto Schwerer Manual entries) (B.A.R.C.)
31	2007	(Dr. Svetlana DUNAEVA, EXFOR editor) (B.A.R.C.)
55	2009	(Dr. Svetlana DUNAEVA, EXFOR editor software used) (B.A.R.C.)
80	2011	(Dr. Svetlana DUNAEVA Dr. Naohiko Otsuka) (Chandigarh)

Details of new Indian EXFOR entries are available in IAEA-NDS web site

Research Work carried out in Radiochemistry Division, B.A.R.C.

Purpose/Studies	Target	Projectile
Fission	Actinides	Neutrons and Charged particles
Fission	Pre-actinides	Charged particles
Fission	Actinides and Pre-actinides	Gamma rays
Nuclear reaction		Neutrons and Charged particles

Mass Distribution, % Fission yield, % Chain yield,
Charge Distribution, Fractional Cumulative Yield, Fractional Independent Yield,
Independent Yield Cross section, Chain Yield Cross section,
Nuclear Reaction Cross section, etc.

Successful data prepared in EXFOR and uploaded in I.A.E.A. web site

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

Target	Projectile	Purpose
Actinide, Pre-Actinides, Other Elements	Charged Particles, Neutrons, Gamma, Heavy ions	Nuclear fission and nuclear reactions

Papers uploaded

Charged Particles =	5+3	Neutrons =	4+4	Gamma =	2	Mixed =	6	Others =	4	Total =	28

Systems uploaded

Dr. Sarbjit Singh

^{209}Bi(α,f), ^{209}Bi(^{12}C,f), ^{209}Bi(^{16}O,f), ^{209}Bi(^{19}F,f), ^{209}Bi(γ,f), ^{238}U(α,f), ^{209}Bi (α,xn), ^{27}Al (α,xnyp), ^{209}Bi(γ,xn), ^{209}Bi(γ,f), ^{229}Th(n_{th},f), ^{233}U(n_{th},f), ^{235}U(n_{th},f), ^{239}Pu(n_{th},f), ^{241}Pu(n_{th},f), ^{244}Cm(s,f), ^{252}Cf(s,f), ^{59}Co(^{24}Mg,xnyp),

Paresh

^{232}Th(n,f), ^{233}Pa(n,f), ^{232}U(n,f), ^{238}U(n,f), ^{237}Np(n,f), ^{238}Pu(n,f), ^{240}Pu(n,f), ^{241}Am(n,f), ^{243}Am(n,f), ^{244}Cm(n,f), ^{245}Cm(n_{th},f), ^{249}Cf(n,f), ^{58}Ni(α,xn,yp), ^{232}Th(Li,f),

Accepted and uploaded in EXFOR

Charged Particles

Author : Sarbjit Singh, Compiler : Sarbjit Singh

Paper	Journal	Sent on	Entry No.
Alpha Particle Induced Fission of ^{209}Bi at 55.7 and 58.6 MeV	Radiochimica Acta 55, 169-172 (1991)	12.09. 2006	D6001
Alpha particle induced reaction on ^{27}Al at 55.2 and 58.2 MeV	Radiochimica Acta 51, 55-57 (1990)	04.12. 2006	D6005
Fission in the reaction of ^{12}C with ^{209}Bi at 73.4 and 84.2 MeV	J. of Radioanalytical and Nuclear Chemistry 242(2), 551-555, (1999)	16.03. 2007	D6006
Oxygen-16 induced fission of ^{209}Bi at 89.5 MeV	Radiochimica Acta 65(1), 9 (1994).	13.03. 2008	D6060
Fission studies in the reaction of ^{19}F with ^{209}Bi at 99.2 MeV	Journal of Radioanalytical and Nuclear Chemistry, Vol. 279, No.2 (2009) 547–552	14.08. 2009	D6077

Charged Particles

Author : Sarbjit Singh, Compiler : Others

Paper	Journal		Entry No.
Alpha Induced Fission of ^{209}Bi	Radiochimica Acta, 38, 69 (1985)		A0450
Alpha particle induced reactions of ^{209}Bi and ^{63}Cu and ^{65}Cu	Radiochimica Acta 39, 61 (1986)		A0353
Alpha particle induced reactions of ^{209}Bi at 55.7 and 58.6 MeV	Radiochimica Acta 57, 7-9 (1992)		O1300

Neutrons

Author : Sarbjit Singh, Compiler : Sarbjit Singh

Paper	Journal	Sent on	Entry No.
Mass distribution in the thermal neutron induced fission of ^{229}Th (Old version uploaded. To get uploaded the corrected version which was sent earlier)	Radiochimica Acta 31, 69-73 (1982)	15.01.2007	33002
Fission yields in the thermal neutron fission of ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu	(J,RCA,42,169,1987) (S.A.Chitambar)	22.08.2007	33003
Charge distribution in the thermal neutron induced fission of ^{229}Th	Radiochimica Acta 33,189,1983	03.10.2007	33007
Mass yields in ^{229}Th(n,f)	J. of Radioanalytical and Nuclear Chemistry, Vol. 275, No. 2, 445-451, (2008).	26.08.2008	33014
Charge distribution study in the neutron induced fission of ^{237}Np: Fractional cumulative yield of ^{134}Te, ^{135}I and ^{138}Xe	Radiochimica Acta 41, 9-10 (1987)		30765
Absolute fission yields in the fast neutron induced fission of ^{233}U by track etch combined with gamma-ray spectrometry	J. of Radioanalytical and Nuclear Chemistry 256(2), 353-355, (2003)		31573

Neutrons

Author : Sarbjit Singh, Compiler : Others

Paper	Journal	Sent on	Entry No.
Charge distribution in nuclear fission: Determination of fractional cumulative yields of ^{134}Te and ^{135}I in the spontaneous fission of ^{252}Cf. (Corrected FCY of ^{135}I added in 33007) (Symposium = Yes, Journal = Nil)	Phys. Rev. C17 (1), 188-194 (Jan. 1978)		30516, To re-submit
Post-neutron mass yield distribution and Photo-neutron cross-section measurements in 209-Bi with 65-MeV bremsstrahlung. (Haladhara Naik, ...)	(J,KPS,52,934,2008)		prelim. G017

Gamma

Author : Sarbjit Singh, Compiler : Sarbjit Singh

Paper	Journal	Sent on	Entry No.
Product yields for the photo-fission of ^{209}Bi with 2.5 GeV bremsstrahlung, Haladhara Naik, Sarbjit Singh, Annareddy Venkat Raman Reddy, Vijay Kumar Manchanda, Guinyun Kim, Kyung Sook Kim, Man-Woo Lee, Srinivasan Ganesan, Devesh Raj, Hee-Seock Lee, Young Do Oh, Moo-Hyun Cho, In Soo Ko and Won Namkung, Nuclear Instruments and Methods in Physics Research Section B: Volume B267, Issue 11, 1 June 2009, Pages 1891-1898.	J,NIM/B,267,1891,2009		G0015
Measurement of photo-fission yields and photo-neutron cross-sections in ^{209}Bi with 50 and 65MeV bremsstrahlung; H. Naik, S. Singh, A.V.R. Reddy, V.K. Manchanda, S. Ganesan, D. Raj, Md. Shakilur Rahman, K.S. Kim, M.W. Lee, G. Kim, Y.D. Oh, H.-S. Lee, M.-H. Cho, I.S. Ko, and W. Namkung, Eur. Phys. J. A 41, 323 (2009).	J,EPJ/A,41,323,2009		G0019

Miscellaneous

Author : Others, Compiler : Sarbjit Singh

Paper	Journal	Sent on	Entry No.
Effect of projectile structure in incomplete fusion in 24-Mg + 59-Co reaction, (R.Tripathi, K.Sudarshan, S.Sodaye, S.K.Sharma, A.V.R.Reddy, A.Goswami)	J,EPJ/A,42,25,2009		D6040
Fragment angular momenta in low and medium energy fission of 242-Pu (B.S.Tomar, A.Goswami, S.K.Das, T.Datta, B.K.Srivastava, A.G.C.Nair, Satya Prakash, M.V.Ramaniah)	(J,NP/A,327,225,1987)		D6044
	J,PR/C,54,(6),3099,1996		D6153
	J,PR/C,48,221,1993		D6162

Site for EXFOR editor software: http://www-nds.iaea.org/nrdc/nrdc_sft/

Experience and observations with the use of EXFOR-Editor

Addition of new code CHN,SIG in IAEA Dictionaries

Earlier code used for fission yields in the dictionary:

- **CUM,SIG ⇒ Cumulative cross section**
- **CHN,FY ⇒ Total chain yield (%)**

New code incorporated in the dictionary

- **CHN,SIG ⇒ Total chain yield cross section**

REACTION (83-BI-209(6-C-12,F)MASS,CHN,SIG)

```
REACTION    (83-BI-209(6-C-12,F)MASS,CHN,SIG)                  D6006 33   27
COMMON                 1           3                           D6006 33   32
EN                                                             D6006 33   33
MEV                                                            D6006 33   34
84.2                                                           D6006 33   35
ENDCOMMON              3           0                           D6006 33   36
DATA                   3          23                           D6006 33   37
MASS        DATA        ERR-T                                  D6006 33   38
NO-DIM      MB          MB                                     D6006 33   39
82.         5.26        0.77                                   D6006 33   40
87.         6.78        2.06                                   D6006 33   41
127.        6.53        1.00                                   D6006 33   62
ENDDATA               25           0                           D6006 33   63
```

LEXFOR "Fission Yields"

2. Relative yields.	**Fission yields are normalized to 200%**
(92-U-235(N,F)54-XE-124,IND,FY)	**Independent yield of the fission product ^{124}Xe**
(92-U-235(N,F)54-XE-133-G,CUM,SIG)	**Cumulative production cross section for the fission product ^{133g}Xe for coding product nuclei as variables in the DATA tables**
(92-U-235(N,F)ELEM/MASS,IND,FY)	**Independent yield of specified product nuclei which are given in the DATA table under the data headings ELEMENT, MASS, and ISOMER (if applicable)**
(92-U-235(N,F)MASS,CHN,FY)	**Chain yield of several mass numbers given in the DATA table under the data heading MASS**
92-U-235(N,F)MASS,CHN,SIG) (New added)	**Chain cross section of several mass numbers given in the DATA table under the data heading MASS**

Proposed addition/correction to LEXFOR "Fission Yields"

Memo CP-D/589

Absolute Cross sections (Fission fragment production cross section)

The absolute yield may be also expressed by the fission fragment production cross section. The relation between the cross section and fission yield is:

$$\sigma(Z,A) = FY(A,Z) \cdot \sigma_f$$

where

σ_f is the fission cross section of the reaction

REACTION coding: The quantity code SIG in SF6. The branch codes (SF5) for absolute yields may be also used in coding of fission fragment production cross sections

Units: a code from Dictionary 25 with the dimension B (*e.g.*, B).

REACTION (83-BI-209(6-C-12,F)MASS,CHN,SIG)

Reference:

[1] S. S. Rattan *et al.*, J. Radioanal. Nucl. Chem.. 242 (1999) 551 (EXFOR D6006) **^{209}Bi(^{12}C,f),**

[2] S. Singh *et al.*, J. Radioanal. Nucl. Chem.. 279 (2009) 547 (EXFOR D6077) **^{209}Bi(^{19}F,f),**

⇒ **This modification in the LEXFOR could not be found in the Software available in the IAEA web site**

Old and New REACTION code for the total chain yield

- Measured independent and cumulative cross sections of the given fission products was used to arrive at the total chain yield (YA).
- Independent yield and cumulative yield of a fission product in a given mass chain was assumed to be in the Gaussian form.
- In the absence of data on the width of the distribution (Sz) and most probable charge (Zp), the Zp was determined assuming unchanged charge distribution (UCD).

Old = REACTION (83-BI-209(6-C-12,F)MASS,CUM,SIG)

Newly added code:

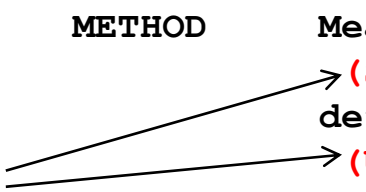
REACTION (83-BI-209(6-C-12,F)MASS,CHN,SIG,,,DERIV)

Finally used code:

REACTION (83-BI-209(6-C-12,F)MASS,CHN,SIG)

Avoid using "normal" parentheses in position 12, it's used only for EXFOR codes

Normal text parentheses should be moved to any other position (starting from 13)



```
METHOD      Measured independent and cumulative cross sections     D6006 32    3
            (Sz) and most probable charge (Zp), the Zp was         D6006 32    9
            determined assuming unchanged charge distribution      D6006 32   10
            (UCD). Since, neither the data on Sz nor on average    D6006 32   11
```

Email from Otto Schwerer Dated March 16, 2007

- **Error message which you received for symbols like Sz was because you had an opening parenthesis in position 12, which is reserved for EXFOR codes**
- **I corrected this by introducing a blank in position 12 and moving the text by one position**
- **This is a general rule: please avoid using "normal" parentheses in position 12, it's used only for EXFOR codes**

COMMENT should be used only if no other, more specific keyword exists

COMMENT ⇒ METHOD

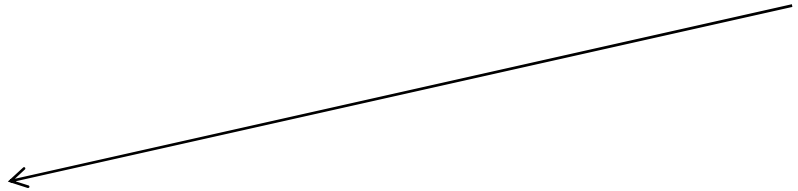
```
METHOD      Measured independent and cumulative cross sections      D6006 32     3
            of the given fission products was used to arrive        D6006 32     4
            at the total chain yield (YA). The independent yield    D6006 32     5
            and cumulative yield of a fission product in a given    D6006 32     6
            mass chain was assumed to be in the Gaussian form.      D6006 32     7
            In the absence of data on the width of the distributionD6006 32     8
             (Sz) and most probable charge (Zp), the Zp was         D6006 32     9
            determined assuming unchanged charge distribution       D6006 32    10
             (UCD). Since, neither the data on Sz nor on average    D6006 32    11
            number of neutrons emitted per fission (vT) was         D6006 32    12
            available for 209Bi(12C,f), hence these were determinedD6006 32    13
            by fitting the experimental yields to the equations in  D6006 32    14
            an iterative manner.                                    D6006 32    15
            An average value of vT was assumed and the YA for the   D6006 32    16
            fission products was determined. This calculated YA wasD6006 32    17
            used to arrive at the new vT value. The input and       D6006 32    18
            calculated vT were compared. The input vT value was     D6006 32    19
            varied between 5 to 10 to arrive at the appropriate     D6006 32    20
            value of vT. This whole process was repeated for        D6006 32    21
            various Sz values from 0.7 to 1.1. YA were compared forD6006 32    22
            all these Sz values to arrive at the best fit.          D6006 32    23
            The input value of vT = 5.5 for 73.4 MeV and 7.1 for    D6006 32    24
            84.2 MeV gave the best fit for the YA distribution at   D6006 32    25
            Sz = 0.90.                                              D6006 32    26
```

Email from Otto Schwerer
Dated March 16, 2007

I changed the keyword COMMENT in subentry 32 to METHOD which is more appropriate

RESULT is used in EXFOR only in very special circumstances

RESULT ⇒ ANALYSIS



```
ANALYSIS   Total chain yield cross section for a given mass chain D6006 32   28
           was determined by integrating the product yields for   D6006 32   29
           all the fission product in a given mass chain.         D6006 32   30
```

Email from Otto Schwerer Dated March 16, 2007

- **Furthermore, I changed the keyword RESULT to ANALYSIS in subentries 32, 33 and 34**
- **(RESULT is used in EXFOR only in very special circumstances which do not apply here)**

Examples of REACTION code and DATA

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

Alpha Particle Induced Fission of ^{209}Bi at 55.7 and 58.6 MeV

Cumulative yields (Cross section) determined for different fission products

D6001

```
SUBENT          W0401002   20060912                          W0401   2     1
BIB                    3          3                          W0401   2     2
REACTION    (83-BI-209(A,F)36-KR-85-M,CUM,SIG)                W0401   2     3
RAD-DET     (36-KR-85-M,DG)                                   W0401   2     4
DECAY-DATA  (36-KR-85-M,4.48HR,DG,151.2,0.75)                 W0401   2     5
ENDBIB                 3          0                          W0401   2     6
NOCOMMON               0          0                          W0401   2     7
DATA                   3          1                          W0401   2     8
EN          DATA        ERR-T                                 W0401   2     9
MEV         MB          MB                                    W0401   2    10
58.6        678.0       40.0                                  W0401   2    11
ENDDATA                3          0                          W0401   2    12
ENDSUBENT             11          0                          W0401   299999
```

Fractional cumulative yields (F.C.Y.) for different mass chains

```
SUBENT          W0401016   20060912                          W0401  16     1
BIB                    3          4                          W0401  16     2
REACTION    ((83-BI-209(A,F)40-ZR-97,CUM,FY)/                 W0401  16     3
            (83-BI-209(A,F)40-ZR-97,CHN,FY))                  W0401  16     4
DECAY-DATA  (40-ZR-97,16.8HR,DG,657.9,0.985)                  W0401  16     5
RESULT      (FRCUM)                                           W0401  16     6
ENDBIB                 4          0                          W0401  16     7
NOCOMMON               0          0                          W0401  16     8
DATA                   3          2                          W0401  16     9
EN          DATA        ERR-T                                 W0401  16    10
MEV         NO-DIM      NO-DIM                                W0401  16    11
55.7        0.667       0.039                                 W0401  16    12
58.6        0.589       0.111                                 W0401  16    13
ENDDATA                4          0                          W0401  16    14
ENDSUBENT             13          0                          W0401  1699999
```

All fission products in separate Sub Entries

Fission in the reaction of ^{12}C with ^{209}Bi at 73.4 and 84.2 MeV

Cumulative yield (Cross section) determined for different fission products

D6006

```
SUBENT          D6006008    20070315                                D6006   8     1
BIB                    2           4                                D6006   8     2
REACTION    (83-BI-209(6-C-12,F)38-SR-91,CUM,SIG)                   D6006   8     3
DECAY-DATA  (38-SR-91,9.63HR,DG,555.6,0.613,                        D6006   8     4
                             DG,652.9,0.0838,                       D6006   8     5
                             DG,1024.3,0.334)                       D6006   8     6
ENDBIB                 4           0                                D6006   8     7
NOCOMMON               0           0                                D6006   8     8
DATA                   3           2                                D6006   8     9
EN          DATA        ERR-T                                       D6006   8    10
MEV         MB          MB                                          D6006   8    11
→73.4       5.12        0.62                                        D6006   8    12
84.2        7.99        0.98                                        D6006   8    13
ENDDATA                4           0                                D6006   8    14
ENDSUBENT             13           0                                D6006   899999
```

Independent yield (Cross section) determined for different fission products

```
SUBENT          D6006002    20070315                                D6006   2     1
BIB                    2           3                                D6006   2     2
REACTION    (83-BI-209(6-C-12,F)35-BR-82,,SIG)                      D6006   2     3
DECAY-DATA  (35-BR-82,35.30HR,DG,554.348,0.708,                     D6006   2     4
                             DG,776.517,0.835)                      D6006   2     5
ENDBIB                 3           0                                D6006   2     6
NOCOMMON               0           0                                D6006   2     7
DATA                   3           2                                D6006   2     8
EN          DATA        ERR-T                                       D6006   2     9
MEV         MB          MB                                          D6006   2    10
→73.4       1.28        0.24                                        D6006   2    11
84.2        1.44        0.21                                        D6006   2    12
ENDDATA                4           0                                D6006   2    13
ENDSUBENT             12           0                                D6006   299999
```

All fission products in separate Sub Entries

Total chain yield cross section for the given sets of mass chains

```
SUBENT          D6006032   20070315                                  D6006 32     1
BIB                    3         28                                  D6006 32     2
METHOD      Measured independent and cumulative cross sections       D6006 32     3

REACTION    (83-BI-209(6-C-12,F)MASS,CHN,SIG)                        D6006 32    27
ANALYSIS    Total chain yield cross section for a given mass chain   D6006 32    28
            was determined by integrating the product yields for     D6006 32    29
            all the fission product in a given mass chain.           D6006 32    30
ENDBIB                28             0                               D6006 32    31
COMMON                 1             3                               D6006 32    32
EN                                                                   D6006 32    33
MEV                                                                  D6006 32    34
73.4                                                                 D6006 32    35
ENDCOMMON              3             0                               D6006 32    36
DATA                   3            23                               D6006 32    37
MASS        DATA        ERR-T                                        D6006 32    38
NO-DIM      MB          MB                                           D6006 32    39
82.         6.18        1.16                                         D6006 32    40
84.         1.06        0.12                                         D6006 32    41
87.         3.61        0.93                                         D6006 32    42
89.         3.54        0.37                                         D6006 32    43
90.         2.24        0.22                                         D6006 32    44

122.        5.99        0.65                                         D6006 32    59
124.        7.03        0.72                                         D6006 32    60
126.        3.67        0.73                                         D6006 32    61
127.        3.45        0.41                                         D6006 32    62
ENDDATA               25             0                               D6006 32    63
ENDSUBENT             62             0                               D6006 3299999
```

All Mass Chains are in same Sub Entry for a given Energy

Oxygen-16 induced fission of ^{209}Bi at 89.5 MeV

D6007

Cumulative yield (Cross section) determined for different fission products

```
SUBENT          D6007003    20080313                          D6007   3     1
BIB                    2           4                          D6007   3     2
REACTION    (83-BI-209(8-O-16,F)38-SR-91,CUM,SIG)             D6007   3     3
DECAY-DATA  (38-SR-91,9.63HR,DG,555.6,0.613,                  D6007   3     4
                             DG,652.9,0.0838,                 D6007   3     5
                             DG,1024.3,0.334)                 D6007   3     6
ENDBIB                 4           0                          D6007   3     7
NOCOMMON               0           0                          D6007   3     8
DATA                   3           1                          D6007   3     9
EN          DATA        ERR-T                                 D6007   3    10
MEV         MB          MB                                    D6007   3    11
89.5        2.671       0.914                                 D6007   3    12
ENDDATA                3           0                          D6007   3    13
ENDSUBENT             12           0                          D6007   399999
```

Independent yield (Cross section) determined for different fission products

```
SUBENT          D6007011    20080313                          D6007  11     1
BIB                    2           2                          D6007  11     2
REACTION    (83-BI-209(8-O-16,F)43-TC-99-M,,SIG)              D6007  11     3
DECAY-DATA  (43-TC-99-M,6.01HR,DG,140.51,0.877)               D6007  11     4
ENDBIB                 2           0                          D6007  11     5
NOCOMMON               0           0                          D6007  11     6
DATA                   3           1                          D6007  11     7
EN          DATA        ERR-T                                 D6007  11     8
MEV         MB          MB                                    D6007  11     9
89.5        0.125       0.171                                 D6007  11    10
ENDDATA                3           0                          D6007  11    11
ENDSUBENT             10           0                          D6007  1199999
```

All fission products in separate Sub Entries

16-O ion induced reaction of ^{27}Al at 76.1 MeV

D6007

Reaction cross sections

```
SUBENT         D6007035   20080313                                  D6007 35     1
BIB                 5          6                                    D6007 35     2
SAMPLE      Super pure aluminium foil 25.4 mumeter                   D6007 35     3
COMMENT     Total cross section in mb in the 16-O ion induced        D6007 35     4
            reaction of 27-Al at 16-O particle energy of 76.1 MeV.   D6007 35     5
REACTION    (13-AL-27(8-O-16,X)11-NA-22,,SIG)                        D6007 35     6
DECAY-DATA  (11-NA-22,2.602YR,DG,1274.5,0.999)                       D6007 35     7
STATUS      (TABLE) Data taken from page 11 of main reference.       D6007 35     8
ENDBIB              6          0                                     D6007 35     9
NOCOMMON            0          0                                     D6007 35    10
DATA                3          1                                     D6007 35    11
EN          DATA      ERR-T                                          D6007 35    12
MEV         MB        MB                                             D6007 35    13
76.1        6.60      0.93                                           D6007 35    14
ENDDATA             3          0                                     D6007 35    15
ENDSUBENT          14          0                                     D6007 3599999
```

Reaction cross sections

```
REACTION    (13-AL-27(8-O-16,X)4-BE-7,,SIG)                          D6007 34     6
DECAY-DATA  (4-BE-7,53.3D,DG,477.7,0.104)                            D6007 34     7

REACTION    (13-AL-27(8-O-16,X)11-NA-22,,SIG)                        D6007 35     6
DECAY-DATA  (11-NA-22,2.602YR,DG,1274.5,0.999)                       D6007 35     7

REACTION    (13-AL-27(8-O-16,X)11-NA-24,,SIG)                        D6007 36     6
DECAY-DATA  (11-NA-24,14.96HR,DG,1368.5,1.00)                        D6007 36     7

REACTION    (13-AL-27(8-O-16,X)13-AL-29,,SIG)                        D6007 37     6
DECAY-DATA  (13-AL-29,6.56MIN,DG,1273.0,0.906)                       D6007 37     7
```

All Reaction products in separate Sub Entries

Alpha particle induced reaction on ^{27}Al at 55.2 and 58.2 MeV

Reaction cross sections

D6005

```
SUBENT          D6005002    20061124                                  D6005  2     1
BIB                    3           3                                  D6005  2     2
REACTION     (13-AL-27(A,X)11-NA-22,,SIG)                             D6005  2     3
DECAY-DATA   (11-NA-22,2.602YR,DG,1274.5,0.999)                       D6005  2     4
STATUS       (TABLE) Data taken from  p.56 of main reference.         D6005  2     5
ENDBIB                 3           0                                  D6005  2     6
NOCOMMON               0           0                                  D6005  2     7
DATA                   3           2                                  D6005  2     8
EN           DATA       ERR-T                                        D6005  2     9
MEV          MB         MB                                           D6005  2    10
55.2         49.77       0.82                                        D6005  2    11
58.2         43.98       1.63                                        D6005  2    12
ENDDATA                4           0                                  D6005  2    13
ENDSUBENT             12           0                                  D6005  299999
```

Reaction cross sections

```
SUBENT          D6005008    20061124                                  D6005  8     1
BIB                    3           3                                  D6005  8     2
REACTION     (13-AL-27(A,X)4-BE-7,,SIG)                               D6005  8     3
DECAY-DATA   (4-BE-7,53.3D,DG,477.7,0.104)                            D6005  8     4
STATUS       (TABLE) Data taken from  p.56 of main reference.         D6005  8     5
ENDBIB                 3           0                                  D6005  8     6
NOCOMMON               0           0                                  D6005  8     7
DATA                   3           2                                  D6005  8     8
EN           DATA       ERR-T                                        D6005  8     9
MEV          MB         MB                                           D6005  8    10
55.2         1.025       0.054                                       D6005  8    11
58.2         1.136       0.054                                       D6005  8    12
ENDDATA                4           0                                  D6005  8    13
ENDSUBENT             12           0                                  D6005  899999
```

All Reaction products in separate Sub Entries

Fission studies in the reaction of ^{19}F with ^{209}Bi at 99.2 MeV

Cumulative yield (Cross section) for different fission products

D6077

```
COMMON                1          3                                  D6077  1    60
EN                                                                  D6077  1    61
MEV                                                                 D6077  1    62
99.2                                                                D6077  1    63
ENDCOMMON             3          0                                  D6077  1    64

SUBENT         D6077002   20090814                                  D6077  2     1
BIB                   3          3                                  D6077  2     2
REACTION    (83-BI-209(9-F-19,F)36-KR-85-M,CUM,SIG)                 D6077  2     3
DECAY-DATA  (36-KR-85-M,4.48HR,DG,151.195,0.75)                     D6077  2     4
STATUS      (TABLE) Table 1 of J,JRN,279,547,2009                   D6077  2     5
ENDBIB                3          0                                  D6077  2     6
NOCOMMON              0          0                                  D6077  2     7
DATA                  2          1                                  D6077  2     8
DATA        DATA-ERR                                                D6077  2     9
MB          MB                                                      D6077  2    10
6.7         0.8                                                     D6077  2    11
ENDDATA               3          0                                  D6077  2    12
ENDSUBENT            11          0                                  D6077  299999
```

Independent yield (Cross section) for different fission products

```
SUBENT         D6077007   20090814                                  D6077  7     1
BIB                   3          4                                  D6077  7     2
REACTION    (83-BI-209(9-F-19,F)41-NB-96,,SIG)                      D6077  7     3
DECAY-DATA  (41-NB-96,23.35HR,DG,568.871,0.58,                      D6077  7     4
                              DG,778.224,0.9645)                    D6077  7     5
STATUS      (TABLE) Table 1 of J,JRN,279,547,2009                   D6077  7     6
ENDBIB                4          0                                  D6077  7     7
NOCOMMON              0          0                                  D6077  7     8
DATA                  2          1                                  D6077  7     9
DATA        DATA-ERR                                                D6077  7    10
MB          MB                                                      D6077  7    11
8.0         1.8                                                     D6077  7    12
ENDDATA               3          0                                  D6077  7    13
ENDSUBENT            12          0                                  D6077  799999
```

All fission products in separate Sub Entries

Relative Fractional cumulative yields (RFCY) for different mass chains

```
SUBENT          D6077023   20090814                                  D6077 23     1
BIB                    6         19                                  D6077 23     2
COMMENT     In order to determine the fractional cumulative yield    D6077 23     3
             (FCY)of parent and fractional independent yield of theD6077 23     4
            daughter (FIY), the latter was assumed to be the last    D6077 23     5
            member of the mass chain involved.                       D6077 23     6
            Since there can be some yield of the grand daughter      D6077 23     7
            product, the above mentioned FCY in the true sense is aD6077 23     8
            relative fractional cumulative yield (RCY).              D6077 23     9
            Data mentioned in this paper on page 550                 D6077 23    10
REACTION    ((83-BI-209(9-F-19,F)40-ZR-97,CUM,FY)/                   D6077 23    11
            (83-BI-209(9-F-19,F)41-NB-97,CUM,FY))                    D6077 23    12
DECAY-DATA  (40-ZR-97,16.744HR)                                      D6077 23    13
            (41-NB-97,72.1MIN,DG,657.94,0.9823)                      D6077 23    14
RAD-DET     (41-NB-97,DG)                                            D6077 23    15
ANALYSIS    (DECAY)                                                  D6077 23    16
            Fractional cumulative yield (FCY). In fact this          D6077 23    17
            is relative fractional cumulative yield (RFCY).          D6077 23    18
            The count rate for the gamma rays of the daughter        D6077 23    19
            product was used for the determination of RFCY.          D6077 23    20
STATUS      (TABLE) Table 2 of J,JRN,279,547,2009                    D6077 23    21
ENDBIB                19          0                                  D6077 23    22
NOCOMMON               0          0                                  D6077 23    23
DATA                   3          1                                  D6077 23    24
MASS        DATA        DATA-ERR                                     D6077 23    25
NO-DIM      NO-DIM      NO-DIM                                       D6077 23    26
97.         0.53        0.05                                         D6077 23    27
ENDDATA                3          0                                  D6077 23    28
ENDSUBENT             27          0                                  D6077 2399999
```

All fission products in separate Sub Entries

Total chain yield cross section for the given set of mass chains

```
SUBENT         D6077027   20090814                                  D6077 27     1
BIB                 5         39                                   D6077 27     2
METHOD      Measured independent and cumulative cross sections     D6077 27     3
            of the given fission products was used to arrive       D6077 27     4
            at the total chain yield (YA). The independent yield   D6077 27     5
COMMENT     * Comment by compiler (S.Singh, 2009-08-13):           D6077 27    26
            In the EXFOR library there is no suitable reaction   D6077 27   27
            code for this type of reactions. I have used as      D6077 27   28
            (83-BI-209(9-F-19,F)MASS,CUM,SIG,,,DERIV)            D6077 27   29
            but in fact it should be CHN instead of CUM, as this D6077 27   30
            is a chain yield cross section                       D6077 27   31
           * Comment by NDS (N.Otsuka, 2009-08-14)               D6077 27   32
            REACTION code is changed to                          D6077 27   33
              (83-BI-209(9-F-19,F)MASS,,SIG)                     D6077 27   34
            for the moment.                                      D6077 27   35
REACTION    (83-BI-209(9-F-19,F)MASS,,SIG)                         D6077 27    36
ANALYSIS    (GAUSS) Total chain yield cross section for a given    D6077 27    37
            mass chain was determined by integrating the product D6077 27   38
            yields for all the fission product in a given        D6077 27   39
            mass chain.                                          D6077 27   40
STATUS      (TABLE) Table 1 of J,JRN,279,547,2009                  D6077 27    41
ENDBIB             39          0                                   D6077 27    42
NOCOMMON            0          0                                   D6077 27    43
DATA                3         16                                   D6077 27    44
MASS        DATA       DATA-ERR                                    D6077 27    45
NO-DIM      MB         MB                                          D6077 27    46
90.         26.0       5.8                                         D6077 27    47
91.         16.0       2.3                                         D6077 27    48
92.         22.6       9.8                                         D6077 27    49

124.        70.5       17.2                                        D6077 27    61
126.        13.0       2.6                                         D6077 27    62
ENDDATA           18          0                                    D6077 27    63
ENDSUBENT         62          0                                    D6077 2799999
```

All Mass Chains are in same Sub Entry for a given Energy

Total fission product yield cross section

```
SUBENT         D6077028   20090814                                  D6077 28     1
BIB                   3          7                                  D6077 28     2
REACTION    (83-BI-209(9-F-19,F),,SIG)                            D6077 28     3
ANALYSIS    Integration of chain cross section                    D6077 28     4
            Total fission product yield was found to              D6077 28     5
            be 2256 +/- 160 mb. Hence fission cross section which D6077 28     6
            is half of that was around 1128 +/- 80 mb.            D6077 28     7
STATUS      (TABLE) Table 1 of J,JRN,279,547,2009                 D6077 28     8
            (DEP,D6077027) Chain cross section                    D6077 28     9
ENDBIB                7          0                                 D6077 28    10
NOCOMMON              0          0                                 D6077 28    11
DATA                  2          1                                 D6077 28    12
DATA        DATA-ERR                                              D6077 28    13
MB          MB                                                    D6077 28    14
1128.0      80.0                                                  D6077 28    15
ENDDATA               3          0                                 D6077 28    16
ENDSUBENT            15          0                                 D6077 2899999
```

Mass distribution in the thermal neutron induced fission of ^{229}Th

33014

Fission product chain yield (%) per fission for the given sets of mass chains

```
SUBENT         33014002   20080408                                  33014  2     1
BIB                 3          5                                    33014  2     2
REACTION    (90-TH-229(N,F)MASS,CHN,FY)                             33014  2     3
STATUS      (TABLE) Data is taken from table 3 of the paper         33014  2     6
           Mass yields (in %)                                       33014  2     7
ENDBIB              5          0                                    33014  2     8
COMMON              1          3                                    33014  2     9
EN                                                                  33014  2    10
EV                                                                  33014  2    11
0.5                                                                 33014  2    12
ENDCOMMON           3          0                                    33014  2    13
DATA                3         27                                    33014  2    14
MASS        DATA      ERR-S                                         33014  2    15
NO-DIM      PC/FIS    PC/FIS                                        33014  2    16
 83.        5.62      0.18                                          33014  2    17
 84.        10.19     0.25                                          33014  2    18
 85.        10.43     0.09                                          33014  2    19
 87.        7.78      0.25                                          33014  2    20
 88.        9.27      0.58                                          33014  2    21
 89.        9.35      0.27                                          33014  2    22

 138.       7.05      0.28                                          33014  2    36
 139.       10.98     0.32                                          33014  2    37
 140.       8.24      0.20                                          33014  2    38
 141.       7.6       0.23                                          33014  2    39
 143.       8.72      0.08                                          33014  2    40
 144.       10.64     0.31                                          33014  2    41
 146.       2.99      0.46                                          33014  2    42
 147.       2.68      0.27                                          33014  2    43
ENDDATA            29         0                                    33014  2    44
ENDSUBENT          43         0                                    33014  299999
```

All Mass Chains are in same Sub Entry for a given Energy

Charge distribution in the thermal neutron induced fission of ^{229}Th

33007

Fractional cumulative yields (FCY) for different mass chains

```
SUBENT          33004002    20071003                                33004   2     1
BIB                    3           5                                33004   2     2
REACTION    ((90-TH-229(N,F)53-I-135,CUM,FY)/                       33004   2     3
            (90-TH-229(N,F)54-XE-135,CHN,FY))                       33004   2     4
DECAY-DATA  (53-I-135,6.61HR,DG,1260.409,0.289)                     33004   2     5
            (54-XE-135,9.10HR,DG,249.794,0.902)                     33004   2     6
RESULT      (FRCUM) Fractional cumulative yield (FCY)               33004   2     7
ENDBIB                 5           0                                33004   2     8
NOCOMMON               0           0                                33004   2     9
DATA                   3           1                                33004   2    10
MASS        DATA        ERR-T                                       33004   2    11
NO-DIM      NO-DIM      NO-DIM                                      33004   2    12
135.        0.950       0.015                                       33004   2    13
ENDDATA                3           0                                33004   2    14
ENDSUBENT             13           0                                33004   299999
SUBENT          33004003    20071003                                33004   3     1
BIB                    3           5                                33004   3     2
REACTION    ((90-TH-229(N,F)56-BA-140,CUM,FY)/                      33004   3     3
            (90-TH-229(N,F)57-LA-140,CHN,FY))                       33004   3     4
DECAY-DATA  (56-BA-140,12.75D,DG,537.311,0.2439)                    33004   3     5
            (57-LA-140,40.272HR,DG,487.021,0.443)                   33004   3     6
RESULT      (FRCUM) Fractional cumulative yield (FCY)               33004   3     7
ENDBIB                 5           0                                33004   3     8
NOCOMMON               0           0                                33004   3     9
DATA                   3           1                                33004   3    10
MASS        DATA        ERR-T                                       33004   3    11
NO-DIM      NO-DIM      NO-DIM                                      33004   3    12
140.        0.926       0.019                                       33004   3    13
ENDDATA                3           0                                33004   3    14
ENDSUBENT             13           0                                33004   399999
```

All fission products in separate Sub Entries

Fission Yields in the Thermal Neutron Fission of ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu

Fission product Cumulative yields for the given sets of mass chains

33007

```
SUBENT         33007002    20070807                                  33007  2     1
BIB                   2           4                                  33007  2     2
REACTION    (92-U-233(N,F)ELEM/MASS,CUM,FY)                          33007  2     3
FLAG        (1.) Radiochemical Separation                            33007  2     4
            (2.) Gamma Spectrometry                                  33007  2     5
            (3.) Mass spectrometry                                   33007  2     6
ENDBIB                4           0                                  33007  2     7
COMMON                1           3                                  33007  2     8
EN                                                                   33007  2     9
MEV                                                                  33007  2    10
0.0253                                                               33007  2    11
ENDCOMMON             3           0                                  33007  2    12
DATA                  5          48                                  33007  2    13
ELEMENT     MASS        DATA        ERR-S       FLAG                 33007  2    14
NO-DIM      NO-DIM      PC/FIS      PC/FIS      NO-DIM               33007  2    15
38.         88.         5.46        0.07        3.                   33007  2    16
38.         89.         6.39        0.16        3.                   33007  2    17

38.         91.         6.68        0.18        1.                   33007  2    20
40.         91.         6.31        0.09        3.                   33007  2    21
40.         92.         6.47        0.08        3.                   33007  2    22

53.         131.        3.62        0.09        2.                   33007  2    47
53.         133.        6.14        0.14        2.                   33007  2    48
54.         135.        5.85        0.14        2.                   33007  2    49
55.         133.        6.05        0.06        3.                   33007  2    50
55.         137.        6.84        0.12        3.                   33007  2    51

60.         148.        1.293       0.013       3.                   33007  2    62
60.         150.        0.495       0.005       3.                   33007  2    63
ENDDATA              50          0                                   33007  2    64
ENDSUBENT            63          0                                   33007  299999
```

All Mass Chains are in same Sub Entry for a given Energy

Measurement of photo-fission yields and photo-neutron cross-sections in ^{209}Bi with 50 and 65MeV bremsstrahlung

Fission product Cumulative yields for the given sets of mass chains

G0014

```
SUBENT         G0014002   20080421                                  G0014  2     1
BIB                 2          3                                   G0014  2     2
REACTION    (83-BI-209(G,F)MASS,CUM,FY)                            G0014  2     3
STATUS      Data is taken from table 1. Cumulative yields          G0014  2     4
            determined in the present work                         G0014  2     5
ENDBIB              3          0                                   G0014  2     6
COMMON              1          3                                   G0014  2     7
EN                                                                 G0014  2     8
MEV                                                                G0014  2     9
65.0                                                               G0014  2    10
ENDCOMMON           3          0                                   G0014  2    11
DATA                3         14                                   G0014  2    12
MASS        DATA      +ERR-T                                       G0014  2    13
NO-DIM      PC/FIS    PC/FIS                                       G0014  2    14
89.0        0.314     0.058                                        G0014  2    15
91.0        0.443     0.082                                        G0014  2    16
95.0        0.723     0.069                                        G0014  2    17
95.0        0.693     0.087                                        G0014  2    18
97.0        0.857     0.091                                        G0014  2    19
99.0        0.934     0.129                                        G0014  2    20
103.0       1.0       0.0                                          G0014  2    21
105.0       0.959     0.013                                        G0014  2    22
112.0       0.675     0.056                                        G0014  2    23
112.0       0.627     0.172                                        G0014  2    24
113.0       0.579     0.189                                        G0014  2    25
115.0       0.471     0.021                                        G0014  2    26
117.0       0.090     0.017                                        G0014  2    27
117.0       0.144     0.015                                        G0014  2    28
ENDDATA            16         0                                   G0014  2    29
ENDSUBENT          28         0                                   G0014  299999
```

All Mass Chains are in same Sub Entry for a given Energy

Effect of projectile structure in incomplete fusion in $^{24}Mg+^{59}Co$ reaction

D6040

Angular distributions of PLFs in the $^{24}Mg+^{59}Co$ reaction at E_{lab}= *93, 100, 108 MeV.* Lab angular distributions of PLFs were transformed into a centre-of-mass (CM) frame using the CM kinetic energies of PLFs.

$$\frac{d\sigma}{d\omega}\left(\frac{mb}{sr}\right)$$

```
SUBENT          D6040002    20091104
BIB                    1           1
REACTION    (27-CO-59(12-MG-24,X)ELEM,,DA)
ENDBIB                 1           0
COMMON                 1           3
ELEMENT
NO-DIM
  10.
ENDCOMMON              3           0
DATA                   3          12
EN          ANG-CM      DATA-CM
MEV         ADEG        MB/SR
93.         17.31048    9.158
93.         23.04801    16.1723
93.         28.75743    10.86821
93.         34.43153     5.3063
100.        17.19765    19.80141
100.        22.89794    32.24164
100.        28.57047    18.83845
100.        34.20811    9.04341
108.        14.34676    54.4901
108.        20.06128    44.42564
108.        25.75151    21.62097
108.        31.4104     12.72109
ENDDATA               14           0
```

DA - Differential with angle of outgoing particle

Neon Z = 10

```
D6040  2     1
D6040  2     2
D6040  2     4
D6040  2     5
D6040  2     6
D6040  2     7
D6040  2     8
D6040  2     9
D6040  2    10
D6040  2    11
D6040  2    12
D6040  2    13
D6040  2    14
D6040  2    15
D6040  2    16
D6040  2    17
D6040  2    18
D6040  2    19
D6040  2    20
D6040  2    21
D6040  2    22
D6040  2    23
D6040  2    24
D6040  2    25
```

CM kinetic energy spectra of Ne emitted at θ_{lab} = 18° in the ^{24}Mg + ^{59}Co reaction at E_{lab} = 93, 100 and 108 MeV.

$$\frac{\partial^2\sigma}{\partial\omega\ \partial E}\left(\frac{mb}{sr-MeV}\right)$$

DA - Differential with angle of outgoing particle

DE - Differential with energy of outgoing particle

```
SUBENT          D6040010    20091104                          D6040 10     1
BIB                    2           2                          D6040 10     2
REACTION    (27-CO-59(12-MG-24,X)ELEM,,DA/DE)                 D6040 10     3
COMMENT     Ne emitted at lab angle = 18 degree.              D6040 10     4
ENDBIB                 2           0                          D6040 10     5
COMMON                 2           3                          D6040 10     6
ELEMENT     ANG                                               D6040 10     7
NO-DIM      ADEG                                              D6040 10     8
  10.       18.                                               D6040 10     9
ENDCOMMON              3           0                          D6040 10    10
DATA                   3         479                          D6040 10    11
EN          E-CM        DATA-CM                               D6040 10    12
MEV         MEV         MB/SR/MEV                             D6040 10    13
93.         21.58796    0.0084                                D6040 10    14
93.         21.75357    0.02522                               D6040 10    15

93.         44.91898    0.00928                               D6040 10   146
93.         45.10441    0.00928                               D6040 10   147
100.        21.62372    0.02732                               D6040 10   148

100.        34.8082     0.83834                               D6040 10   226
100.        34.98347    1.07444                               D6040 10   227

108.        21.41987    0.01644                               D6040 10   313
108.        21.57917    0.                                    D6040 10   314

108.        52.27753    0.10331                               D6040 10   491
108.        52.4613     0.                                    D6040 10   492
ENDDATA              481           0                          D6040 10   493
ENDSUBENT            492           0                          D6040 1099999
```

Cross-sections of PLFs emitted in the ^{24}Mg + ^{59}Co reaction at E_{lab} = = *93, 100 and 108 MeV.*

Elements, Z

```
SUBENT         D6040011   20091104                                  D6040 11     1
BIB                 2          4                                    D6040 11     2
REACTION    (27-CO-59(12-MG-24,X)ELEM,,SIG)                         D6040 11     3
ERR-ANALYS (DATA-ERR) Uncertainties on the cross-section are due     D6040 11     4
           to the extrapolation of the measured angular             D6040 11     5
           distribution.                                            D6040 11     6
ENDBIB              4          0                                    D6040 11     7
NOCOMMON            0          0                                    D6040 11     8
DATA                4         24                                    D6040 11     9
EN          ELEMENT    DATA       DATA-ERR                          D6040 11    10
MEV         NO-DIM     MB         MB                                D6040 11    11
93.         3.         5.7        2.8                               D6040 11    12
93.         4.         2.2        1.                                D6040 11    13

93.         10.        11.        1.                                D6040 11    19
100.        3.         17.        3.                                D6040 11    20
100.        4.         6.         2.                                D6040 11    21

100.        10.        20.1       2.                                D6040 11    27
108.        3.         18.        3.62                              D6040 11    28
108.        4.         7.         1.3                               D6040 11    29

108.        10.        41.        8.86                              D6040 11    35
ENDDATA            26          0                                    D6040 11    36
ENDSUBENT          35          0                                    D6040 1199999
ENDENTRY           11          0                                    D604099999999
```

Fission fragment anisotropies for the ^{13}C + ^{235}U system at near-Coulomb barrier energies

D6032

REACTION → Branch (SF5) → CN - Compound-nucleus part

```
SUBENT         D6032002   20080403                                  D6032  2     1
BIB                 2          3                                    D6032  2     2
REACTION    (92-U-235(6-C-13,F)98-CF-248,CN,SIG)                    D6032  2     3
STATUS      Data given in table is cross-section (fig.2) from the   D6032  2     4
            paper.                                                  D6032  2     5
ENDBIB              3          0                                    D6032  2     6
NOCOMMON            0          0                                    D6032  2     7
DATA                3          6                                    D6032  2     8
EN-CM       DATA        ERR-S                                       D6032  2     9
MEV         MB          MB                                          D6032  2    10
59.7        10.         1.5                                         D6032  2    11
61.5        30.         2.2                                         D6032  2    12
66.3        221.        12.                                         D6032  2    13
71.1        494.        28.                                         D6032  2    14
75.8        790.        30.                                         D6032  2    15
79.6        968.        37.                                         D6032  2    16
ENDDATA             8          0                                    D6032  2    17
ENDSUBENT          16          0                                    D6032  299999
```

All fission products in separate Sub Entries

Angular momentum of fission fragments in low energy fission of actinides

G/T = Ground State / Total = g / (m+g)
SF5, SF6 = IND,FY/RAT - Independent fission-product yield ratio
FIS = Fission at fixed energy

33011

Naik, Paresh

```
SUBENT          33011002    20071031                                  33011   2     1
BIB                    3           9                                  33011   2     2
REACTION    (90-TH-232(N,F)51-SB-130-G/T,IND,FY/RAT,,FIS)             33011   2     3
DECAY-DATA  (51-SB-130-G,38.4MIN,DG,182.46,0.65,                      33011   2     4
                                 DG,331.08,0.78,                      33011   2     5
                                 DG,793.62,1.0,                       33011   2     6
                                 DG,839.58,1.0)                       33011   2     7
            (51-SB-130-M,6.3MIN,DG,182.46,0.41,                       33011   2     8
                                DG,793.62,0.86,                       33011   2     9
                                DG,839.58,1.0)                        33011   2    10
STATUS      (TABLE)Data taken from the table No.1                     33011   2    11
ENDBIB                 9           0                                  33011   2    12
COMMON                 1           3                                  33011   2    13
EN-DUMMY                                                              33011   2    14
MEV                                                                   33011   2    15
  1.9                                                                 33011   2    16
ENDCOMMON              3           0                                  33011   2    17
DATA                   4           1                                  33011   2    18
DATA        DATA-ERR    MISC        MISC-ERR                          33011   2    19
NO-DIM      NO-DIM      NO-DIM      NO-DIM                            33011   2    20
0.490       0.150        9.8         2.0                              33011   2    21
ENDDATA                3           0                                  33011   2    22
ENDSUBENT             21           0                                  33011   299999
```

All fission products in separate Sub Entries

33011

G/T = Ground State / Total = g / (m+g)
SF5, SF6 = IND,FY/RAT - Independent fission-product yield ratio
SPA = Spectrum average

```
SUBENT         33011008   20071031                                33011   8     1
BIB                   3          9                                33011   8     2
REACTION    (92-U-232(N,F)51-SB-130-G/T,IND,FY/RAT,,SPA)          33011   8     3
DECAY-DATA  (51-SB-130-G,38.4MIN,DG,182.46,0.65,                  33011   8     4
                                 DG,331.08,0.78,                  33011   8     5
                                 DG,793.62,1.0,                   33011   8     6
                                 DG,839.58,1.0)                   33011   8     7
            (51-SB-130-M,6.3MIN,DG,182.46,0.41,                   33011   8     8
                                DG,793.62,0.86,                   33011   8     9
                                DG,839.58,0.01)                   33011   8    10
STATUS      (TABLE)Data taken from the table No.1                 33011   8    11
ENDBIB                9          0                                33011   8    12
COMMON                1          3                                33011   8    13
EN-DUMMY                                                          33011   8    14
EV                                                                33011   8    15
  0.0253                                                          33011   8    16
ENDCOMMON             3          0                                33011   8    17
DATA                  4          1                                33011   8    18
DATA        DATA-ERR   MISC       MISC-ERR                        33011   8    19
NO-DIM      NO-DIM     NO-DIM     NO-DIM                          33011   8    20
0.427       0.055       8.8        0.9                            33011   8    21
ENDDATA               3          0                                33011   8    22
```

All fission products in separate Sub Entries

33011

M/T = Meta Stable State / Total = m / (m+g)
SF5, SF6 = IND,FY/RAT - Independent fission-product yield ratio
SPA = Spectrum average

```
SUBENT         33011012   20071031                                33011 12     1
BIB                 3          7                                 33011 12     2
REACTION   (92-U-232(N,F)53-I-132-M/T,IND,FY/RAT,,SPA)           33011 12     3
DECAY-DATA (53-I-132-M,83.6MIN,DG,600.0,0.132,                   33011 12     4
                               DG,667.73,0.132,                  33011 12     5
                               DG,772.68,0.131)                  33011 12     6
           (53-I-132-G,2.7HR,DG,667.73,0.987,                    33011 12     7
                             DG,772.68,0.762)                    33011 12     8
STATUS     (TABLE)Data taken from the table No.1                 33011 12     9
ENDBIB              7          0                                 33011 12    10
COMMON              1          3                                 33011 12    11
EN-DUMMY                                                         33011 12    12
EV                                                               33011 12    13
  0.0253                                                         33011 12    14
ENDCOMMON           3          0                                 33011 12    15
DATA                4          1                                 33011 12    16
DATA       DATA-ERR   MISC       MISC-ERR                       33011 12    17
NO-DIM     NO-DIM     NO-DIM     NO-DIM                         33011 12    18
0.456      0.076       8.6        1.0                           33011 12    19
ENDDATA             3          0                                 33011 12    20
ENDSUBENT          19          0                                 33011 1299999
```

All fission products in separate Sub Entries

Fragment angular momenta in low and medium energy fission of ^{242}Pu

G/T = Ground State / Total = g / (m+g)
SF5, SF6 = IND,FY/RAT - Independent fission-product yield ratio
SPA = Spectrum average

33020

```
SUBENT         33020002   20081127                                33020  2     1
BIB                   3          6                                33020  2     2
REACTION    (94-PU-241(N,F)51-SB-128-G/T,IND,FY/RAT,,SPA)         33020  2     3
DECAY-DATA  (51-SB-128-G,9.01HR,DG,743.41,1.0,                    33020  2     4
                                DG,754.06,1.0)                    33020  2     5
            (51-SB-128-M,10.4MIN,DG,743.41,0.96,                  33020  2     6
                                 DG,754.06,0.964)                 33020  2     7
STATUS      (TABLE)Data taken from the table No.1                 33020  2     8
ENDBIB                6          0                                33020  2     9
NOCOMMON              0          0                                33020  2    10
DATA                  4          1                                33020  2    11
DATA        DATA-ERR   MISC       MISC-ERR                       33020  2    12
NO-DIM      NO-DIM     NO-DIM     NO-DIM                         33020  2    13
0.53        0.08        8.1        1.2                           33020  2    14
ENDDATA               3          0                                33020  2    15
ENDSUBENT            14          0                                33020  299999
```

All fission products in separate Sub Entries

Examples of

FACILITY, INC-SOURCE, DETECTOR, METHOD, ANALYSIS, ERR-ANALYS, STATUS

FACILITY used for the experiment

→	ACCEL -	Accelerator
	CYCLO -	Cyclotron
	ISOCY -	Isochronous cyclotron
→	LINAC -	Linear accelerator
	MICRT -	Microtron
→	REAC -	Reactor (NEUT)
	SPECM -	Mass spectrometer
	VDG -	Van de Graff
→	VDGT -	Tandem van de Graaff

INC-SOURCE - Incident projectile source

	BRST -	Bremsstrahlung
→	CF252 -	Spont.fission of Californium-252 (NEUT)
	D-BE -	Deuteron-Beryllium (NEUT)
	D-LI -	Deuteron-Lithium (NEUT)
	D-T -	Deuteron-Tritium (NEUT)
	EXPLO -	Nuclear explosive device (NEUT)
→	REAC -	Reactor (NEUT)
	SPALL -	Spallation
	THCOL -	Thermal column (NEUT)

DETECTOR – Detector description

	BF3 -	Boron Trifluoride neutron detector (NEU)
→	BGO -	Bismuth-Germanate crystal detector
	COIN -	Coincidence counter arrangement
	GEMUC -	Geiger-Mueller counter (GAM)
	HE3SP -	He-3 spectrometer (NEU)
→	HPGE -	Hyperpure Germanium detector (GAM)
	IMPSI -	Passivated implanted planar Si detector
	LEGE -	Low energy Germanium Detector (GAM)
→	NAICR -	Sodium-Iodide crystal
	PROPC -	Proportional counter
	SILI -	Silicon-Lithium detector (GAM)

METHOD – Experimental Technique Description

→	ABSFY -	Absolute fission yield measurement (FY)
	ACTIV -	Activation
	ASPEC -	Alpha spectrometry
→	BCINT -	Beam current integrated
	BGCT -	Beta-gamma coincidence technique
	BSPEC -	Beta ray spectrometry
	BURN -	Burn-up (NEUT)
→	CHSEP -	Chemical separation
	COINC -	Coincidence
	EDE -	Particle identification by `E/Delta E` measurement
	EDEG -	Energy degradation by foils
→	EXTB -	Irradiation with external beam
	FISCT -	Absolute fission counting (FY)
	FLUX -	Neutron flux monitoring (FY)

	FPGAM -	Direct gamma-ray spectrometry (FY)
→	**GSPEC -**	**Gamma ray spectrometry**
	HEJET -	Collection by He jet
	INTB -	Irradiation with internal beam
	MASSP -	Mass spectrometry of a product
	OLMS -	On-line mass separation
	PHD -	Pulse-height discrimination
	PSD -	Pulse-shape discrimination
→	**RCHEM -**	**Radiochemical separation (FY)**
	REAC -	Reactivity measurement (NEUT)
	REC -	Collection of recoils
→	**RELFY -**	**Relative fission yield measurement (FY)**
	RVAL -	R-value measurement (FY)
	STTA -	Stacked target irradiation
	TOF -	Time-of-flight
	TRN -	Transmission method
	TTM -	Thick-target method
	XSPEC -	X-ray spectrometry

ANALYSIS – Experimental result analysis

	AREA -	**Area analysis (RP)**
→	**CHGDS -**	**Corrected for charge distribution**
→	**CORAB -**	**Correction on isotopic abundance**
	INTAD -	**Integration of angular distribution**
	INTED -	**Integration of energy distribution**
	INTPD -	**Integration of momentum distribution**
	SURGT -	**Surrogate reaction method**
	UNFLD -	**Unfolding procedure**
	WSP -	**Woods-Saxon potential**

ERR-ANALYS – Error Source Description

DATA-ERR -	Error in Value of Quantity, defined under `ERR-ANALYS`
DCNST-ERR -	Error in decay constant
E-EXC-ERR -	Excitation Energy Error
EN-ERR -	Uncertainty in Incident Projectile Energy
EN-RES-ERR -	Error in Resonance Energy
ERR-EDD -	Error of energy value given under DECAY-DATA
ERR-HL -	Error of half-life value given under DECAY-DATA
ERR-IDD -	Error of intensity value given under DECAY-DATA
ERR-S -	Statistical Uncertainty (1-Sigma)
ERR-SYS -	Total Systematic Uncertainty
ERR-T -	Total Uncertainty (1-Sigma)
HL-ERR -	Error in Half-Life
Q-VAL-ERR -	Q-Value Uncertainty
RATIO-ERR -	Ratio Error
SUM-ERR -	Error in Sum

STATUS- Input of data and actual value source

APRVD -	Approved by author
CURVE -	Data read from a curve
PRELM -	Preliminary data
TABLE -	Data received by center in tabular form

Suggestions / Clarifications

Editing of Date of ENTRY

- Date of ENTRY normally is entered when one starts inputting the data. It is better if the date is put around the date of completion
- One has to come out of the editor and change using Note Pad
- It will be better if this facility is provided within the EXFOR Editor

Editing of Entry number

- Similarly, some times one may start with some Entry number which may get changed
- One has to come out of the editor and change using Note Pad
- It will be better if this facility is provided within the EXFOR Editor

CHEX program

- **Though the entry is correct but still the CHEX program (Check) does not give clear signal**

```
ZCHEX (Version 2010-04-05) run on 27-Apr-2011
 ---------------------------------------
 Input file: E:\Exfor2011\D6040.EXF
 ENTRY D6040
 ** Label invalid or missing
   ENTRY         D6040   20091104                    D6040000    1
  **  End-of-file found while looking for:    ENTRY
   First pass completed with no fatal errors
1
 - Second pass checking –
 ENTRY D6040
```

For same Entry Checker program gives no error.

- **Errors: 0 Warnings: 0 It's OK!**

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