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RESPAR3 and RESPAR3ED LIBRARIES

Resonance Parameters from BNL-325 (3rd Ed. 1973)

Content and Format Description

Abstract

RESPAR3 and RESPAR3ED contain the resonance parameters from BNL-325 in standard and edited formats respectively. The libraries can be obtained on magnetic tape, free of charge, from the IAEA Nuclear Data Section.

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RESPAR3 and RESPAR3ED Libraries

Resonance Parameters from BNL-325

RESPAR3 Library

RESPAR3 Library contains the resonance parameter from BNL-325 report (3rd edition) in a standard format and so, difficult to read.

The format of the library could, roughly, be described as follows:

For each nuclide there are two types of records:

1st type Record Contains

	Description	Columns	
	Charge number	1-3	(right adjusted)
	Author	4-12	
	Year	13-14	
*	Descriptor of heads	15-72	
	Counter	80	

2nd type Record Contains

	Description	Columns	
	Mass number	1-3	(right adjusted)
**	Data	4-80	

Since the data fields have no defined positions because the columns used for one data field depend on which data we are considering, we will not describe here the columns for each data.

For each nuclide, there is one record of the 1st type and as many records as necessary in the 2nd type. Subsequent to all the 2nd type records for one nuclide there is a blank record.

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* To understand better the meaning of this descriptor, see the Table used by program TABIT described in the following pages.

** The data included here depend on the description on the 1st type record (e.g. they may be E_o, J, L, Γ_p, Γ_n, and so on).

An important remark: it should be noted that data contained in the 2nd type record are in a mixed format. Sometimes special characters preceed the data themselves, with special meaning such as:

G	stands for "greater than"
X	stands for "approximately"
C	stands for "no error in data"
L	stands for "lower than"

Therefore, in order to handle this format, special input routines should be developed (e.g. reading in A-format in a FORTRAN program and converting the numeric part of a field to number).

The following example better explains the format of the library:

for each nuclide

Charge number	Author	Year	Descriptor	Count	→ 1st type record
data 1					
data 2					2nd type record
: :					
data last					
blank record					
Charge number	Author	Year	Descriptor	Count	

```
 BRECMD-SM   73J,A,AE,B,AE,D,E,
17176.     4.     1.0      0.8     2 0
17250.     4.     8.       1.      3 1

 BRECMD-SM   73J,A,AE,B,AE,DD,E,HA,
18663.     5.     55.      3.      1.5   1   260.
181200.    8.     50.      5.      0.5   1   83.
181256.    10.    3.6      1.0     1.5
181450.    10.    350.             1.5   2
181565.    10.    300.     30.     2.5   2
181840.    10.    8.2      1.5     1.5   1   17.
182300.    10.    200.     40.     1.5   2
182375.    10.    130.     20.     0.5   1   106.
182445.    10.    20.3     2.5     3.5   3
183050.           100.             1.5   2
183200.           250.             0.5   1   166.
183500.           100.             0.5   1   63.
184000.           65.              0.5   1   38.
```

TABIT program

Since the format of RESPAR3 library is not easy to read, a program to convert all data contained in RESPAR into a "pretty" listing should be useful.

Such program exists and it is called TABIT. A listing of the source code is available from NDS. TABIT program was developed at Brookhaven National Laboratory, and was written in FORTRAN IV for a CDC computer. Therefore, some changes (not many) are necessary to run it into an IBM or Burroughs computer (most changes involving I/O or branch statements).

This program uses a Table to convert some codes used in descriptor of heads (as mentioned in the 1st type RESPAR3 record) into readable heads in the pretty listings. Part of this table is shown in the figure below.

The output of TABIT is another library equivalent to RESPAR3 but read to be printed. This library is called RESPAR3ED and its format is similar to the format used in BNL-325 report.

```
**** TSO FOREGROUND HARDCOPY ****
DSNAME=XNLR.TABIT.DATA

43  DD   4J                                  8                    4
44  IN   8A 5IG 0      GAMMA                 16                   9
45  IO   8G GAM N        GAM GAM             16                   9
46  IP   8G GAMNSQ                           16                   9
47  IQ   8SIG 0        GAM F                 16                   9
48  IR   8GAM F/       GAM                   16                   9
49  IS   8SIG 0        (GMF+GMG)             16                   9
50  IT   8G GAM N/     GAM                   16                   9
51  IU   8SIG 0        GAMF/GAM              16                   9
52  IV   8PI/2SIGO     GAMMAGAM              16                   9
53  IW   8PI/2SIGO     GAMMA F               16                   9
54  IX   8GAMMA NO     GAMF/GAM              16                   9
55  IY   8GAMMA F/     (GMF+GMG)             16                   9
56  IZ   8SIG 0        GAMMA N               16                   9
57  I1   8GAMMA F+     GAM GAM               16                   9
58  I2   8GAM GAM/     GAMMA F               16                   9
59  I3   8G GAM NO     GAMMA                 16                   9
```

RESPAR3ED Library

RESPAR3ED Library contains the resonance parameters (output from TABIT program) from BNL-325 report in an edited listing.

This library is formed by more than 100 files, each file containing all isotopes of a determined element. The record size is 80-bytes and one file is at least 7280 bytes long (block factor = 91).

If not all the file is used to describe the resonance parameters for one element, the rest remains blank.

The format used for this library is presented in the following lines. Basically there are 3 types of records:

1st type Record Contains

Description	Columns	
"Z=" ("charge number equal to")	5-6	
Charge number	8-10	(right adjusted)
Author	12-20	
Year	23-26	
Comments	30-38	

There is one 1st type record for each nuclide and between this 1st type record and the first 2nd type record there are two blank records.

2nd type Record Contains

Description	Columns
1st head	2-8
2nd head	9-16
:	
10th head	74-80

This record contains heads for data that will be listed below, (e.g. E_o, J, L, GAMMA N, GAMMA P and so on). For heads bigger than 7 columns, two 2nd type records will be needed, (e.g. TARGET ISOTOPE).

After the 2nd type records and before the first 3rd type records one blank record is included.

3rd type Record Contains

Description	Columns	
1st datum-field	2-8	(left adjusted)
2nd " "	9-16	(" ")
3rd " "	17-24	(" ")
: :	:	
10th datum field	74-80	(" ")

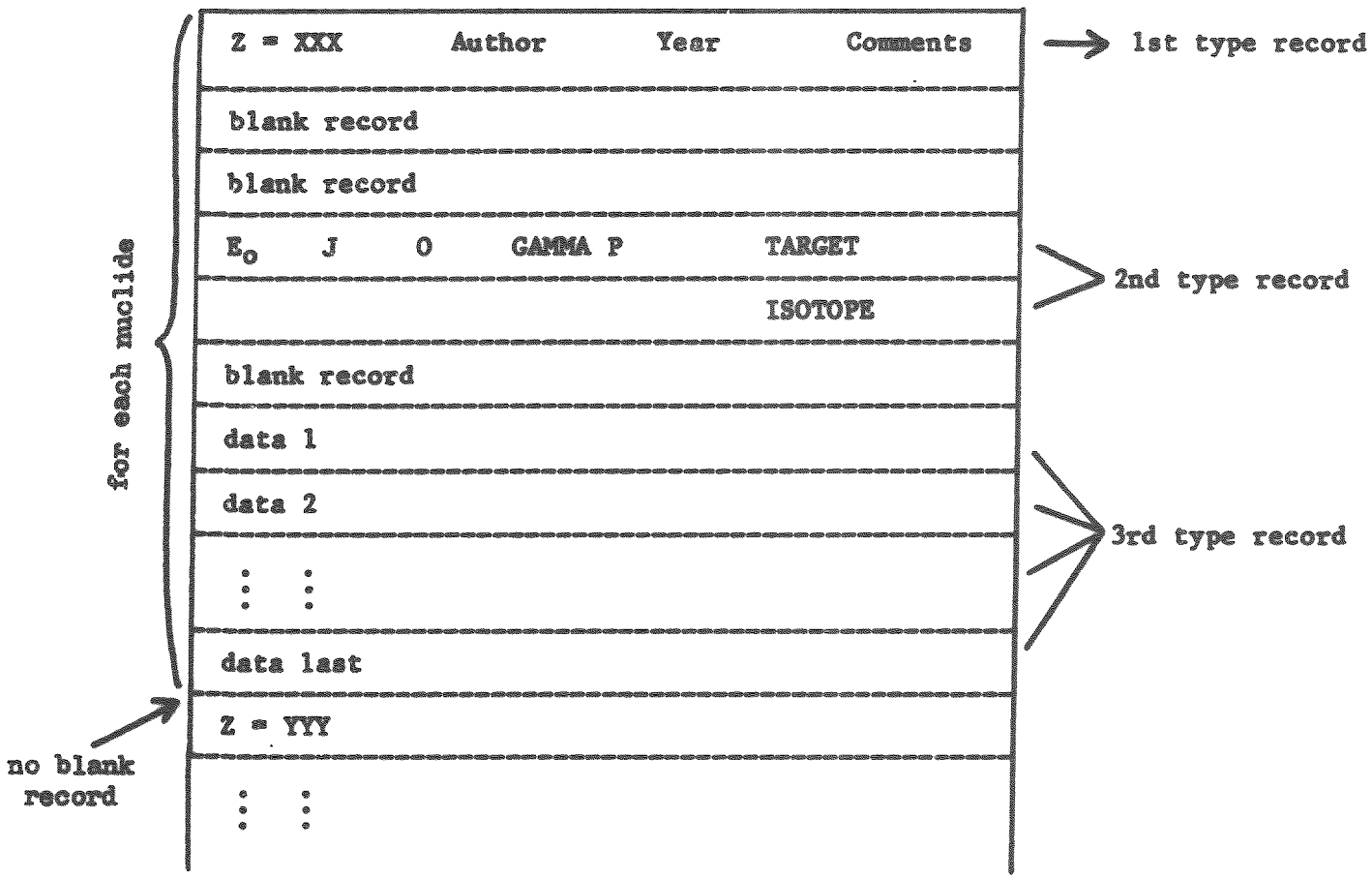
These records contain data themselves, as specified in head contained in the 2nd type records.

The data are left justified on each field and sometimes some alphanumerical characters appear in each field. These characters have special meaning such as:

X stands for "approximately"
G stands for "greater than"
L stands for "lower than"

As many 3rd type records are necessary to be included in each nuclide.

The following figure better describes the format:



1 Z= 8 RECMD-SM 1973 TABULATED 14-SEP-76

EO	ERROR	GAMMA	ERROR	J	L	TARGET ISOTOPE
176.	4.	1.0	0.8	2	0	17
250.	4.	8.	1.	3	1	17

1 Z= 8 RECMD-SM 1973 TABULATED 14-SEP-76

EO	ERROR	GAMMA	ERROR	J	L	G GAMMA NI	TARGET ISOTOPE
663.	5.	55.	3.	1.5	1	260.	18
1200.	8.	50.	5.	0.5	1	83.	18
1256.	10.	3.6	1.0	1.5			18
1450.	10.	350.		1.5	2		18
1565.	10.	300.	30.	2.5	2		18
1840.	10.	8.2	1.5	1.5	1	17.	18
2300.	10.	200.	40.	1.5	2		18
2375.	10.	130.	20.	0.51			
2445.	10.	20.3	2.5	3.5	3		18
3050.		100.		1.5	2		18
3200.		250.		0.5	1	166.	18
3500.		100.		0.5	1	63.	18
4000.		65.		0.5	1	38.	18

The record size for this library is 80-bytes. If the description of resonance parameters for one nuclide requires more than 80-bytes (10 data fields) some data fields are not included in the library.

For example, for Z = 7 ($^{14}_{7}$N), the RESPAR3 library contains the following data fields:

E_o, ERROR, GAMMA, ERROR, GAMMA N, ERROR,
J, L , GAMMA P, ERROR, GAMMA ALPHY,
ERROR, TARGET ISOTOPE.

Therefore, in the RESPAR3ED the data fields GAMMA P, ERROR, TARGET ISOTOPE are omitted.

The mass number for each isotope is given in this library under the head TARGET ISOTOPE and there is no special position for this field.

A selective retrieval program for data in this library may consider two possibilities:

FIRST - One would only specify charge number and every isotope for this element would be listed clearly, this is the easier method, since it would involve only listing a file.

SECOND - One would specify charge number and number of mass. In this case after looking for a matching charge number in every 1st type record, a sequential scanning in the corresponding 2nd type record would be necessary to find the appropriate mass number. Therefore this should not always be done, since the mass number is sometimes not included for an isotope.