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NNDC ON-LINE SERVICES DOCUMENTATION

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March 31, 1987

NATIONAL NUCLEAR DATA CENTER

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Introduction

This document describes the on-line services available from the National Nuclear Data Center (NNDC) located at Brookhaven National Laboratory. The services are available free of cost to US Dept. of Energy, its contractors and others who support the NNDC or supply data to the NNDC. Four of the center's data bases are now accessable to non-NNDC scientists via remote connection to the center's VAX 11/780. To use this service, you must have a terminal with access by either a telephone line or the PHYSNET network. A VT100 terminal or a terminal with VT-100 emulation is recommended but not required.

Access

For access to this service or information about the service, please contact:

C.L. Dunford or J.K. Tuli
National Nuclear Data Center
Brookhaven National Laboratory
Upton, N.Y. 11973

Telephone:
(516) 282-2902
FTS 666-2902

For new accounts, be prepared to give a code of 6 or fewer characters which will be your personal authorization code. This code must be given during the login sequence for your access to the services.

The NNDC VAX 11/780 can be accessed via telephone using the number (516) 282-5390. Use the following communications parameters:

Protocol:	ASCII only. Full duplex.
Speed:	300 or 1200 bps.
Word:	7-bit, space parity, 1 stop bit or 8-bit, parity off, 1 stop bit or 7-bit, parity off, 2 stop bits.

After getting the on-line signal, type a carriage return; wait and type a second carriage return. The VAX login prompt should then appear on your terminal.

Access via PHYSNET, a DECNET network, is accomplished by logging-in on your local node and then executing a SET HOST command. The NNDC VAX's name is BNLNDC (address 43.405). The VAX login prompt will appear as soon as the connection is made.

Login and Logout

The login sequence is described in more detail later. However you will need to enter the account name, NNDC, in response to the VAX login prompt, Username: and your authorization code when asked. When terminating a retrieval session, enter LOGOUT. If you wish to suppress some of the retrieval program dialog, you may add a switch /EXPERT to your authorization code. A permanent EXPERT assignment can be made by contacting one of the above NNDC staff.

```
Username: NNDC
Authorization code: yourcode/EXPERT
                    .
                    .
$ LOGOUT
```

Disk File Storage

Disk storage for on-line system users has been allocated on the logical device, SCR. All file manipulation commands described below automatically refer to files located on this disk storage area. File names are constructed according to standard VAX/VMS conventions, that is, name.type;version. Name and type can be alphanumeric containing up to 39 characters. Version must be numeric. Output files from user retrievals will be stored on SCR by default. Other files of interest to users, such as this document, will also be stored there.

A "wild-card" character, *, may be substituted for any part of the file specification. However, the file manipulation commands as implemented for the on-line users may not accept a wild-card in one or more parts of the file specification. A warning message is given when a wild-card is not properly used. A blank file specification implies that ALL files are requested.

Users of the on-line system may request that a special directory be set aside for the exclusive use of their account. In this case, all retrieval files will be stored in this directory. The file manipulation commands will refer to the files stored in this directory and to files in the general user storage area also.

File Transfer

Users who have a terminal which can capture data on a disk, can transfer a file to his local facility using the TYPE command. Users accessing the NNDC on-line system via a PC or a mainframe running KERMIT, may transfer a file to their local machine using the SEND command described below.

For the user accessing via a DECNET protocol network, we allow direct computer to computer file transfers. The network file transfer command is

```
$ COPY
    From: BNLNDC"BNLNDC"::SCR:your_file
    To: []    .
```

Network users may transfer files to NNDC via the same technique, simply by reversing the file input order. For a user who has requested a unique file storage area, the command is:

```
$ COPY BNLNDC"BNLNDC"::SAO:[SCR.your_last_name]your_file []    .
```

Data Bases

This document describes the four data bases which are available, and how to execute a retrieval from each of them. Sample retrievals are included. The four data bases are:

Nuclear Structure References - updated monthly
An indexed bibliography to the literature covering low and intermediate nuclear physics research. Indexing of the publications is complete from 1969 but citations exist from 1910. Exerpts from this data base are published three times a year as RECENT REFERENCES in the journal NUCLEAR DATA SHEETS.

Evaluated Nuclear Structure Data File - updated semi-annually
A file of evaluated experimental nuclear structure and radioactive decay data organized by mass chains. The contents corresponds to the mass chain evaluations published in the NUCLEAR DATA SHEETS.

Nuclear Data File - updated semi-annually
A file of recommended nuclear properties derived from ENSDF and other sources. The contents are described in detail in the next section.

CINDA - updated monthly
A bibliography of low energy neutron physics investigations. The information is organized by target nucleus and reaction. References are grouped according to the experiment. The contents of this data base is published by the IAEA, Vienna with semi-annual supplements.

Contents of the Nuclear Data File

The contents of the on-line nuclear data file (NUDAT) is derived from serveral sources . The data base contains level information and decay gamma data derived from the ENSDF "adopted" data sets for each nuclide, nuclear ground and metastable state properties from the "Nuclear Wallet Cards" and radiations seen in radioactive decay. The data can be retrieved on the basis of logical selection criteria for each data field which is supplied interactively by the user.

The data included in the present data base are of two types, searchable and auxiliary. The searchable data include:

1. nuclear mass number
2. nuclear proton number
3. nuclear neutron number
4. odd/even-ness of neutron/proton numbers
5. level energy
6. spin-parity
7. half-life
8. gamma energy
9. gamma multipolarity
10. decay mode
11. radiation type
12. radiation energy
13. radiation intensity

Auxilliary, nonsearchable data include:

1. level energy uncertainty
2. half-life uncertainty
3. gamma energy uncertainty
4. gamma intensity (relative) with uncertainty
5. mixing ratio with uncertainty
6. conversion coefficient with uncertainty
7. natural abundance
8. mass excess
9. decay mode branching
10. decay mode Q-value
11. radiation dose

Retrievals can be made on combination of the 10 searchable data fields listed above, but the retrieval will be efficient only if at least one of the"key" parameters, namely mass number, charge number, and level energy is specified.

General Conventions

In the following documentation, we use the convention that the text is identical to text transmitted to your terminal except for underlined text and text preceded by ***. Underlined text is text entered by the user in response to a terminal prompt and *** preceding text indicates an explanatory comment which does not appear during a retrieval session. User input may be in upper or lower case or a mixture of the two. HELP type information can be obtained at most points where a user response is required by entering a question mark, ?.

NNDC On-line Service Login Sequence

*** Account name entry by on-line user

Username: NNDC

*** System messages from the NNDC VAX 11/780

Welcome to VAX/VMS version V4.2 on node BNLNDC
Last interactive login on Friday, 25-JUL-1986 16:18
Last noninteractive login on Thursday, 24-JUL-1986 14:59
27-JUL-1986 20:03:40

*** General on-line service messages from the service manager

WELCOME TO THE ON-LINE DATA SERVICE FACILITY LOCATED ON THE VAX 11/780 AT THE

NATIONAL NUCLEAR DATA CENTER
BROOKHAVEN NATIONAL LABORATORY
UPTON, NEW YORK, USA

6/20/86	A PASSWORD IS NO LONGER REQUIRED FOR LOGIN. YOUR AUTHORIZATION CODE IS YOUR PASSWORD. THE CODE NO LONGER ECHOS. IF YOU DO NOT HAVE AN AUTHORIZATION CODE, PLEASE CONTACT C.L.DUNFORD AT NNDC, PHONE 516-282-2804 OR FTS 666-2804. ACCESS IS POSSIBLE OVER "PHYSNET". PLEASE CALL FOR INFORMATION.
7/8/86	THE NSR DATA BASE HAS BEEN RELOADED. RETRIEVAL BY KEYNUMBER OR ANY AUTHOR NOW SUPPORTED. THE CINDA RETRIEVAL INPUT DIALOG HAS BEEN COMPLETELY REVISED. PLEASE ADVISE IF YOU HAVE ANY PROBLEMS.
7/23/86	THE ENSDF DATA BASE IS NOW AVAILABLE. OUTPUT CAN BE OBTAINED IN EITHER ENSDF OR EXPANDED TABULAR FORMAT.

*** Authorization code (6 or fewer characters) entered by user does not echo

Authorization code: _____

*** Messages from on-line manager to this user

YOUR REQUEST TO MAIL YOUR 242PU RETRIEVAL HAS BEEN PROCESSED.

*** The HELP command list all available commands.

```
$ help

  The following commands are available to you
     $ NUDAT              (access to nuclear structure data)
     $ ENSDF              (access to the ENSDF data base)
     $ NSR                (access to Nuclear Structure References)
     $ CINDA              (access to neutron physics bibliography)
     $ HELP               (list available commands)
     $ DIR    file-spec    (list files on the scratch area)
     $ TYPE   file-spec    (type a file from the scratch area)
     $ DELETE file-spec    (delete a file from the scratch area)
     $ PRINT  file-spec    (print a file from the scratch area)
     $ MESS               (types any messages from the system manager)
     $ LOGOUT             (terminate access to NNDC VAX)
```

See previous discussion on disk file storage for details on file naming conventions.

*** The DIR command lists files in the disk area for on-line users.

```
$ dir al27.*

Directory SAO:[SCR]

AL27.CIN              25/30    28-Jul-1986  14:21  (REWD,REWD,REWD,REWD)
AL27.NSR             120/150   28-Jul-1986  10:44  (REWD,REWD,REWD,REWD)
```

*** The TYPE command will list a file on the user's terminal.

```
$ type al27.nsr

                    NATIONAL NUCLEAR DATA CENTER

                ** NUCLEAR STRUCTURE REFERENCES RETRIEVAL **
                              28-JUL-86

 Number   Contents                          References   Retrieved

    1     T 27AL                              1994         NO
    2     R (N,A)                              620         NO
    3     C 1.AND.2                             44         DISK
```

*** The PRINT command will output a file to the NNDC line printer. The
*** output will be labeled with the user's name and phone number and
*** can be mailed on request.

$ print al27.cin

*** The DELETE command will allow the user to delete a file from his disk
*** area.

$ delete al27.nsr

*** The SEND command activates the KERMIT SEND function. The user must be
*** connected to the NNDC On-line Data Base System while running KERMIT on
*** his PC.

$ send al27.nsr
(escape sequence to return to local KERMIT)
KERMIT-MS>RECEIVE file-spec
*** Note that file-spec is usually optional and required only if the local file
*** name is to be different from the file transferred from the NNDC computer.
*** File specifications may contain wild card constructions as described on
*** page 88 of the KERMIT User's Guide.
KERMIT-MS>CONNECT
*** The requested file will be transferred to the user's PC. On completion
*** or failure, the user remains logged-in on the NNDC computer and so should
*** issue a local KERMIT connect command to continue.

*** The MESS command displays any messages from the on-line manager to the
*** user. This message may be the same as appears in the login sequence,
*** but may contain new information added since login.

$ mess

YOUR REQUEST TO MAIL YOUR 242PU RETRIEVAL HAS BEEN PROCESSED.
PLEASE SEND ME YOUR NEW TELEPHONE NUMBER.

*** The LOGOUT command terminates your connection to the NNDC VAX.

$ logout

NNDC logged out at 28-JUL-1986 16:38:21.37

HELP Information For NSR

*** Command to activate NUCLEAR STRUCTURE REFERENCES retrieval program.

$ nsr

*** Program identification message

NUCLEAR STRUCTURE REFERENCES RETRIEVAL PROGRAM
VERSION OF JUNE 26, 1986

29-JUL-86

This program gives you access to the NUCLEAR STRUCTURE REFERENCES data base which contains an indexed bibliography to the nuclear physics literature. The interactive dialog will guide you to the specification of your retrieval. Further details on the accepted response to each input request can be displayed on your terminal by entering a ?.

*** Master menu

Select next step from the following options:
Initialize Browse Retrieve Exit Message or ?
* ?

There are four major options or job termination which can be executed at this point. They are

1. INITIALIZE - Allows user to set criteria common to all retrievals. Any active key list from previous BROWSE activities will be deleted.
2. BROWSE - User specifies quantities and the system responds with the number of references which satisfy the retrieval criteria. These lists may be saved for use in creating other lists which are logical combinations of any two existing lists.
3. RETRIEVE - Any active reference list may be retrieved. The retrieved references may be output to the NNDC line printer or displayed on the user's terminal.
4. EXIT - Terminate the job
5. MESSAGE - Allows user to enter a message for the data base manager.

*** INITIALIZE option

*** Publication year selection

Enter range of publication years desired, ALL(blank) or ?
* ?

A year or range of years is required. Enter one of the following
1. ALL all years in the file
2. YY a single year YY (e.g. 75)
3. YY-ZZ a range of years (e.g. 75-78)
4. YY a year and all later years (e.g. 75-)
5. -ZZ all years up to and including ZZ (e.g. -78)

*** Publication type selection

Enter desired publication type, ALL(blank) or PRIMARY, or ?
* ?

One may enter either of the following
1. ALL all references
2. PRIMARY primary references only

*** Entry date selection

Enter entry date cutoff in the form YYMMDD or ?
* ?

Enter a six digit number in the form YYMMDD. Only entries made after that date will be retrieved. To get entries made after September 21, 1981, enter 810921.

*** BROWSE option

You are now in the BROWSE option. Please select your next step from
Look Extract Combine Summarize Done or ?
* ?

There are four possible BROWSE operations and a termination instruction. They are
1. LOOK - A list of retrieval parameters logically adjacent to the input parameter for which at least one reference exists is generated.

2. EXTRACT - A scan of the library is done and a list of references which satisfy the retrieval quantity and the general criteria given in the INITIALIZE option is generated.
3. COMBINE - A new reference list is created from a logical combination of two existing lists.
4. SUMMARIZE - Presents a list of active reference lists and the status of each on the user's terminal
5. DONE - Terminate the BROWSE option

*** LOOK and EXTRACT operation

Enter Extract retrieval variable type and value or ?. Blank to exit.
* ?

A retrieval parameter must be specified in the form
PARAMETER TYPE (blank) PARAMETER VALUE e.g. R (P,N)

The allowed parameter types are
1. N - nuclide for which nuclear structure information is given
2. T - target nuclide in a nuclear reaction
3. I - an incident particle in a nuclear reaction
4. O - an outgoing particle in a nuclear reaction
5. S - a special subject code
6. M - a measured quantity
7. D - a deduced quantity
8. C - a calculated quantity
9. X - a compiled, analyzed or evaluated quantity
10. R - a nuclear reaction code
11. A - an author's name
12. K - user will input a list of keynumbers (not in LOOK operation)

Enter a blank to exit from the Extract operation.

For more detail on valid parameter values enter
PARAMETER TYPE (blank) ? e.g. R ?

*** Nuclide or Target specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* n ?

Nuclides and targets have the same format. They may be either an isotope or an element. Elements are specified by their chemical symbol; an isotope by the mass number followed by the chemical symbol. The chemical symbol for element 104 and above is taken as the charge number less 100.

Valid examples	47TI	titanium 47
	NI	nickel
	25904	Element-104, mass 259

*** Incident or Outgoing particle specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* i ?

Incident or outgoing particles are generally entered as the corresponding isotope symbol, e.g. 7LI for lithium 7. The special symbols are

gamma rays	G or X-RAY
neutrinos	NU or NUBAR
electrons	E or E+
muons	MU or MU+ or MU-
kaons	K- or KO or K+
pions	PI or PI- or PIO or PI+
neutron	N
proton	P
deuteron	D
triton	T
alpha	A

*** Subject specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* s ?

The available subject categories are listed below. They are the same for the parameter types S, C, D, M, AND X.

14C-DECAY	24NE-DECAY	A-DECAY
A-SPECTRA	ANALOGS	B(LAMBDA)
B+-DECAY	B--DECAY	B-DECAY
B-SPECTRA	BREMSSTRAHLUNG	CE
COULEX	DEFORMATION	DOPPLER
DSIGMA	EC-DECAY	FISSION
G-MULTIPOLARITY	G-SPECTRA	HI
I-SHIFT	ICPND	IT-DECAY
LEVEL-PROP	MESIC-ATOMS	MU
N-DECAY	N-SPECTRA	P-DECAY
P-SPECTRA	PARAMETERS	POLARIZATION
Q	QUADRUPOLE	RADIUS
RESONANCE	ROT-BANDS	SF-DECAY
SIGMA	SPALLATION	T1/2
TTY	TWO-B--DECAY	TWO-EC-DECAY
X-RAYS	YIELDS	YRAST

*** Reaction specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* r ?

Nuclear reactions should be entered in standard physics notation that is (incident particle,outgoing particles). The particle codes to be used are those described under incident and outgoing particles. The order of outgoing particles is generally left to right first by particle mass, then by particle charge. Do not give up if you have been unsuccessful in specifying a reaction on your first try when there is more than one outgoing particle. Try again permuting the outgoing particle order. Never include gammas as outgoing particles unless gammas are the only outgoing particles. Use F for fission as in (N,F).

Example: you will find entries for (n,np) and (n,pn) under the code
R (N,NP)

*** Author specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* a ?

The name of any author of a publication can be entered. The format is last name, a comma and then initials. The comma and initials are optional. If not included, then any paper with an author with the requested last name will be retrieved.

Example: A BAKER,A.B. or A BAKER

*** Keynumber specification

Enter Extract retrieval variable type and value or ?. Blank to exit.
* k ?

When selecting the option to enter a list of keynumbers, the parameter value is used as identifier of the keynumber list. A keynumber is a six character identifier assigned to each reference in the data base. This identifier corresponds to the keynumber in the RECENT REFERENCES publication. The list you enter will be treated like the reference list for any other retrievable parameter. You will be prompted for the input keynumbers one at a time. When you have completed specifying the list, enter a blank keynumber.

Example: K MY LIST
* 86M002
* 81PAZY
*

*** COMBINE operation

Enter Combine operation instruction or ?
* ?

The COMBINE operation will logically combine two existing lists of references. The instruction takes the form
LIST NUMBER . OPERATION . LIST NUMBER

The valid operations are
1. AND - gives the logical "and" of the two lists
2. NOT - gives the logical "and not" of the two lists
3. OR - gives the logical "or" of the two lists

The list numbers must be integers and correspond to the identifying number for the list as shown in the SUMMARIZE display list

Valid examples are 3.OR.4 1.NOT.4 4.AND.2

*** Selection of a reference list

You are now in the BROWSE option. Please select your next step from
Look Extract Combine Summarize Done or ?
* e

Enter Extract retrieval variable type and value or ?. Blank to exit.
* n 136eu

1 ENTRIES FOUND FOR 136EU

If you wish to save this reference list enter YES
* y

Enter Extract retrieval variable type and value or ?. Blank to exit.
*

You are now in the BROWSE option. Please select your next step from
Look Extract Combine Summarize Done or ?
* d

*** RETRIEVE option

You are now in the RETRIEVAL option. Please select lists to be retrieved from

Number	Contents	References	Retrieved
1	N 136EU	1	NO

```
    Enter Output, New file, Summarize, Done or ?
  * ?

     There are three possible RETRIEVE operations and a termination instruction.
They are
        1. OUTPUT    - Execute a retrieval of one of the lists produced
                       in the BROWSE option
        2. NEW FILE  - Select a new output file
        3. SUMMARIZE - Presents a list of active reference lists and the
                       status of each on the user's terminal
        4. DONE      - Terminate the RETRIEVE option


***       Execute a retrieval

    Enter Output, New file, Summarize, Done or ?
  * o

    Enter number of list to be retrieved -1


***      Specify a new output file.

    Enter Output, New file, Summarize, Done or ?
  * n

      Enter output file specs - ?

    Give the full file specification for the file which will contain the output of
your retrievals.  If output is to go to your terminal enter a carriage return.


*** EXIT from the program.

  Select next step from the following options:
      Initialize  Browse  Retrieve  Exit  Message  or ?
* e
```

```
$ nsr

                NUCLEAR STRUCTURE REFERENCES RETRIEVAL PROGRAM
                        VERSION OF JUNE 26, 1986

                              28-JUL-86

                NSR     Data Base last updated on    21-Jul-86

  Select next step from the following options:
     Initialize  Browse  Retrieve  Exit  Message  or ?
* i

 Enter range of publication years desired, ALL(blank) or ?
* 80

 Enter desired publication type, ALL(blank) or PRIMARY, or ?
* p

 Enter entry date cutoff in the form YYMMDD or ?
* ____

 Select next step from the following options:
     Initialize  Browse  Retrieve  Exit  Message  or ?
* b

 You are now in the BROWSE option. Please select your next step from
     Look  Extract  Combine  Summarize  Done  or ?
* e

 Enter Extract retrieval variable type and value or ?. Blank to exit.
* n 49v

          26 ENTRIES FOUND FOR 49V

 If you wish to save this reference list enter YES
* y

 Enter Extract retrieval variable type and value or ?. Blank to exit.
* ____

 You are now in the BROWSE option. Please select your next step from
     Look  Extract  Combine  Summarize  Done  or ?
* d

 Select next step from the following options:
     Initialize  Browse  Retrieve  Exit  Message  or ?
* r
```

You are now in the RETRIEVAL option. Please select lists to be retrieved from

Number	Contents	References	Retrieved
1	N 49V	26	NO

Enter Output, New file, Summarize, Done or ?
* o

Enter number of list to be retrieved - 1

NATIONAL NUCLEAR DATA CENTER

** NUCLEAR STRUCTURE REFERENCES RETRIEVAL **
20-JUL-86

RETRIEVAL CRITERIA

RETRIEVAL SPECIFICATION: N 49V
ENTERED SINCE: THE BEGINNING
YEAR(S): 1980 TO 1986
PRIMARY REFERENCES ONLY

80Ch16
Phys.Rev.Lett. 45, 1235 (1980)
B.H.Chou, G.E.Mitchell, E.G.Bilpuch, C.R.Westerfeldt
Correlations for Reduced-Width Amplitudes in 49V

<KEYWORDS>NUCLEAR REACTIONS 48Ti(p,p'),E=2.2-3.1 MeV; analyzed reduced width data; 49V resonances deduced channel amplitude correlations. Channel spin representation,Kreiger-Porter distribution.

There are more references. Do you want the next one?
<CR> for yes, STOP for no or ALL for all stop

LIST RETRIEVAL TERMINATED

Enter Output, New file, Summarize, Done or ?
* d

Select next step from the following options:
Initialize Browse Retrieve Exit Message or ?
* e

HELP Information for ENSDF

*** Command to activate EVALUATED NUCLEAR STRUCTURE DATA FILE retrieval
*** program

$ ensdf

*** Program identification message

EVALUATED NUCLEAR STRUCTURE DATA RETRIEVAL PROGRAM
VERSION OF JULY 16, 1986

27-JUL-86

This program gives you access to the ENSDF data base which contains evaluated experimental nuclear structure and radioactive decay data. The data base is organized by nuclide. For each nuclide, there is one or more data sets which give evaluated data for the nucleus based upon all experiments or a reaction or decay which produces this nucleus. The data sets also contain textual information about the evaluation. The output is given in tabular form by default or optionally in ENSDF format. The format of an ENSDF data set is described in BNL-NCS-51655. A retrieval is specified interactively. If more information about a response is needed, enter a question mark(?).

*** Master menu

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- ?

The options are defined as follows:

A	- display a list of nuclides with mass, A
Z	- display a list of nuclides with charge, Z
Isotope	- display a list of data sets for a nuclide retrievals by data set can be made here
Retrieve	- retrieve by nuclide or mass chain
New file	- specify a new output file
Format	- specify a new output format
Message	- write a message for the data base manager
Exit	- terminate the program

*** Display a list of nuclides for a selected mass number

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- a

Enter mass number or ?- ?

Enter the mass number in integer format. If you have specified a valid nuclear mass number, all nuclides with that mass number will be listed. A carriage return will return to the master menu.

*** Display a list of nuclides for a selected element

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- z

Enter charge number, chemical symbol or ?- ?

Enter the charge number in integer format or the chemical symbol in character format. If you have specified a valid element, all nuclides for that element will be listed. A carriage return will return to the master menu.

*** Display a list of data sets for a selected nuclide

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- i

Enter a nuclide symbol or ?- ?

Enter the nuclide symbol in character format. The nuclide symbol consists of a one to three digit mass number followed by the chemical symbol. If you have specified a valid nuclide, all the data sets for that nuclide will be listed. A carriage return will return to the master menu.

*** Mass chain or nuclide retrieval option

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- r

Enter mass number, nuclide symbol or ?- ?

Enter the mass number or nuclide symbol in character format. A mass number consists of one to three digits. A nuclide symbol is a mass number followed by the chemical symbol. If you have specified valid input, all the data sets for that input will be retrieved. A carriage return will return to the master menu.

*** New output file selection

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- n

Enter output file specs - ?

Give the full file specification for the file which will contain the output of your retrievals. If output is to go to your terminal, enter a carriage return.

*** New output format specification

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- f

Enter desired output format, Table, Ensdf, or ?- ?

Three output formats are available
Narrow table - output is in an interpreted table form, 80 characters wide
Wide table - output is in an interpreted table form, 132 characters wide
ENSDF - output is in ENSDF format

*** Send a message to on-line manager

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- m

Enter your message a line at a time with a maximum of 78 characters on a line. A blank line will end the message.

*

*** EXIT from the program

Please select one of the following:
A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- e

```
$ ensdf

        EVALUATED NUCLEAR STRUCTURE DATA RETRIEVAL PROGRAM
                VERSION OF MAR 11, 1987

                        11-MAR-87

            ENSDF   Data Base last updated on   3-Mar-87

  Please select one of the following:
     A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ? - i

  Enter desired output format, Narrow table, Wide table, Ensdf or ?- w

  Enter output file specs -

  Please select one of the following:
     A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ? - i

  Enter a nuclide symbol or ? - 47v

  Data sets for nuclide 47V

        Number   Data set ID                          Records
           1     ADOPTED LEVELS, GAMMAS                1358
           2     47CR B+ DECAY                           28
           3     45SC(3HE,N) E=10.5, 15 MEV               5
           4     46TI(P,G) E=0.4-1.8 MEV RES           1382
           5     46TI(P,G) E=0.72-4 MEV                   8
           6     46TI(P,G),(P,P),(P,P'),(P,P'G)          25
           7     46TI(D,N),(3HE,D)                      131
           8     46TI(16O,15N) E=48 MEV                  21
           9     47TI(P,N),(P,NG) E=3.6-6.0 MEV         109
          10     47TI(3HE,T) E=24.6 MEV IAS              21
          11     50CR(P,A) E=12 MEV                      23
          12     (HI,XNG)                                96

  Enter set number of data set to be retrieved - 2
```

PRODUCED BY THE 9BE(40CA,2N) REACTION. ALSO PRODUCED VIA 46TI(3HE,2N) (77HO25,77EDO1,76EDZX) AND Ti(3HE,XN) (85HOZS). MEASURED DECAY CURVE OF 47V 87.5G; HEJET SYSTEM, LOWENERGY PHOTON SYSTEM, GELI.
ALL DATA FROM ADOPTED LEVELS

E(level)	Jpi
0.0	3/2
87.525 9	5/2

[RETURN=NEXT SCREEN 1=PREVIOUS SCREEN 2=TOP OF FILE 3=QUIT]

PRODUCED BY THE 9BE(40CA,2N) REACTION. ALSO PRODUCED VIA 46TI(3HE,2N) (77HO25,77EDO1,76EDZX) AND Ti(3HE,XN) (85HOZS). MEASURED DECAY CURVE OF 47V 87.5G; HE-JET SYSTEM, LOW-ENERGY PHOTON SYSTEM, GELI.

Eec	Level	Ib+[*#]	Iec[#]	Log ft[@]	I(ec+b+)[#]	Comments
(7363. 14)	87.525 9	3.9 13		5.1 2		EAV=2971 7
(7451. 14)	0.0	96.1 13		3.71 1		EAV=3014 7

[*] ABSOLUTE INTENSITY PER 100 DECAYS OF PARENT FROM
RI(87.5G)/RI(G+-) AND CC(87.5G) AND ASSUMPTION THAT FEEDING OF HIGHER STATES IS NEGLIGIBLE (<0.5%). IE AP 0.1% (EVALUATOR)

[#] For absolute intensity per 100 decays, multiply by 1.000

[@] CALCULATED BY EVALUATOR

[RETURN=NEXT SCREEN 1=PREVIOUS SCREEN 2=TOP OF FILE 3=QUIT]

PRODUCED BY THE 9BE(40CA,2N) REACTION. ALSO PRODUCED VIA 46TI(3HE,2N) (77HO25,77EDO1,76EDZX) AND Ti(3HE,XN) (85HOZS). MEASURED DECAY CURVE OF 47V 87.5G; HE-JET SYSTEM, LOW-ENERGY PHOTON SYSTEM, GELI.
RI(87.5G)/RI(G+-)=1.35% 60. UNCERTAINTY INCLUDES ESTIMATE FOR THE FACT THAT THE ANNIHILATION SITE IS NOT RESTRICTED TO THE PRODUCTION SITE.

Eg[*]	Level	Ig[#@]	Mult.[*]	Mix. ratio[*]	Conv. coef.[*]	Comments
87.5 1	87.525 9	3.7 12	M1+E2	+0.125 21	0.042 4	KC= 0.037 3$LC= 0.0036 3

[*] FROM ADOPTED GAMMAS

[#] ABSOLUTE INTENSITY PER 100 DECAYS OF PARENT FROM

RI(87.5G)/RI(G+-)

[@] For absolute intensity per 100 decays, multiply by 1.000

[EOF ENCOUNTERED 1=PREVIOUS SCREEN 2=TOP OF FILE 3=QUIT] 3

```
Enter set number of data set to be retrieved -

Please select one of the following:
   A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- f

Enter desired output format, Narrow table, Wide table, Ensdf, or ?- e

Enter output file specs

Please select one of the following:
   A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- r

Enter mass number, nuclide symbol or ?- 47v

              Data sets retrieved
                47V    ADOPTED LEVELS, GAMMAS
                47V    47CR B+ DECAY
                47V    45SC(3HE,N) E=10.5, 15 MEV
                47V    46TI(P,G) E=0.4-1.8 MEV RES
                47V    46TI(P,G) E=0.72-4 MEV
                47V    46TI(P,G),(P,P),(P,P'),(P,P'G)
                47V    46TI(D,N),(3HE,D)
                47V    46TI(16O,15N) E=48 MEV
                47V    47TI(P,N),(P,NG) E=3.6-6.0 MEV
                47V    47TI(3HE,T) E=24.6 MEV IAS
                47V    50CR(P,A) E=12 MEV
                47V    (HI,XNG)

  Enter set number of data set to be retrieved - 1

47V     ADOPTED LEVELS, GAMMAS                          86NDS     860527
47V   XA47CR B+ DECAY
47V   XB(HI,XNG)
47V   XC46TI(P,G) E=0.4-1.8 MEV RES
47V   XD46TI(D,N),(3HE,D)
47V   XE46TI(16O,15N) E=48 MEV
47V   XF47TI(P,N),(P,NG) E=3.6-6.0 MEV
47V   XG47TI(3HE,T) E=24.6 MEV IAS
47V   XH50CR(P,A) E=12 MEV
47V   Q-7451      14 13000.8 6 5167.57 6-8241.0    2485WA02,85DEZU
47V  CQ SP         FROM 85DEZU.  OTHER: 5168.07 18 (85WA02) BASED ON
47V 2CQ PRELIMINARY VALUE REPORTED BY AUTHORS OF 85DEZU (85WA04)
47V  C  OTHER REACTIONS:
47V  C  45SC(14N,12B) E AP 130 MEV:  83MI28 MEASURED SIGMA(E(12B)),
47V 2C  POLARIZATION OF 12B GS VERSUS Q.  STUDIED REACTION MECHANISMS.
47V  C  32S(18O,T) E=28-45 MEV:  84RO29 MEASURED YIELD CURVE (G+-; NAI,GG)
                                  .
                                  .
                                  .

  Enter set number of data set to be retrieved -

  Please select one of the following:
     A, Z, Isotope, Retrieve, New file, Format, Message, Exit or ?- e
```

HELP Information for NUDAT

*** Command to activate Nuclear Data retrieval program

$ nudat

*** Program identification message

NUCLEAR STRUCTURE DATA RETRIEVAL PROGRAM
VERSION OF NOV. 6, 1985

28-JUN-86

This program gives you access to nuclear data extracted from several data bases. The data consists of four types

a) nuclear level information,
b) decay gamma information.
c) nuclear ground/metastable state properties,
d) nuclear radiations,

The data base is accessed via the DATATRIEVE query language. Most users will want the program to allow them to enter information interactively in order to construct a retrieval command. This information is supplied by the user by answering a series of questions. When the question requires selecting from an option list, you need enter only the first character of the option name.

If you are familiar with DATATRIEVE and the structure of this data base you can use the full power of DATATRIEVE to to query the data base by directly entering DATATRIEVE commands.

At any point, you may answer a prompt with a "?" to get additional information about the response required. At any time you may enter a control-C (↑C) to terminate a DATATRIEVE operation. If no operation is in progress, it will be ignored.

*** Master menu

Build, Display, Command, Message or Exit : ?

Build - the program will allow you to construct your DATATRIEVE retrieval command interactively. A response to any prompt with a "$" during this operation will abort the operation.

```
Display  - you may print an existing data collection
Command  - you may directly specify a valid DATATRIEVE
           instruction
Message  - you may write a message for the data base
           manager
Exit     - use this option when you wish to finish your
           retrieval session
```

*** Construction of a retrieval specification

```
Build, Display, Command, Message or Exit : b

YOU HAVE CHOSEN TO BUILD A COMMAND FROM ITS COMPONENTS
```

*** Selecting the data type to be retrieved

```
SELECT DATA TYPE (default is L)
     Levels, Gammas, Both(L&G), Nuclei or Radiations: ?

  Select the types of data you wish to retrieve.  You can
choose from the following:
        Levels      - nuclear level information,
        Gammas      - level gamma decay information,
        Both        - level and gamma information,
        Nuclides    - properties of ground/metastable states,
        Radiations  - radiations seen in decay of nuclei,
        <CR>        - default value (current value).
If the selected data type is changed, all data collections
will be deleted.
```

*** Select output mode

```
SELECT OPERATION (default is P)
     Print or Save : ?

  Select the type of operation to be done.  You can choose
from the following:
      Print  - display data retrieved from a source,
      Save   - make a collection of data which will be saved
               and can be the source for further retrievals,
      <CR>   - default value, Print.
```

*** Select output collection name if retrieval to be Saved

```
ENTER NAME FOR NEW COLLECTION (default is CURRENT)
     Collection name : ?
```

You may give the collection you are about to create a name. If you do not give a name, the default name is "CURRENT". A unique name you supply will permit you to save the collection until you end this session or release it with a DATATRIEVE instruction, RELEASE "name". You may see the names of the active collections with the instruction SHOW COLLECTIONS. The name of a collection must be alphanumeric and not be a DATATRIEVE keyword.

*** Select input data source

```
RETRIEVAL SOURCE (default is M)
     Master, Current or Other : ?
```

The source of data for retrieval and display may be one of the following:

Master	-	the complete data base,
Current	-	the current collection,
Other	-	some other collection,
<CR>	-	default value, Master.

*** Choose whether or not to select a subset of input data

```
RETRIEVAL SCOPE (default is P)
     Whole or Part : ?
```

You may choose to retrieve or display data records from the data source which have desired values in one or more data fields. You may enter one of the following:

Whole	-	use the entire source data set,
Part	-	data selection desired,
<CR>	-	default value, Whole.

*** Selection of a subset of input data

If Part is selected, you will be asked to enter the data limits for one field at a time for those data fields which can be specified for the data selected. A blank response for the selection criteria for a field means that all values are acceptable. If you wish to give an additional specification for a field, end your expression with a colon ":". If you are finished with specifying criteria before all field prompts have been given, enter a "#".

*** Data entry for numeric data fields

A blank indicates that no selection is to be done on this data field.
A "#" means that no further selection on data is required.

For numeric data you can specify

equality	= num(,num,...)
greater than	> num
less than	< num
less than or =	LE num
greater than or =	GE num
a range of values	BT num AND num

where num is an integer or floating point number with NO trailing decimal point.

All expressions can be negated if preceded by NOT. For example NOT = 73 eliminates records where the field has the value 73.

All expressions numeric or character can be the string MISSING or NOT MISSING with the meaning that the field value is not known or known respectively.

*** Data entry for character data fields

A blank indicates that no selection is to be done on this data field.
A "#" means that no further selection on data is required.

For character data you can specify

exact match	= "string",("string",...)
no match	NE "string",("string",...)
substring match	CONT "string",("string",...)

All expressions can be negated if preceded by NOT. For example NOT CONT "E1" eliminates records where the field contains the string, E1.

All expressions numeric or character can be the string MISSING or NOT MISSING with the meaning that the field value is not known or known respectively.

*** Selection of mass number, proton number or neutron number

```
MASS NO.    : ?
PROTON NO.  : ?
NEUTRON NO. : ?
```

Enter a numeric expression to select data based on nucleus mass number, proton number or neutron number values. This is a numeric data field.

*** Selection of nucleus oddness or evenness

```
ODD/EVEN    : ?
```

Enter one of the following to select evenness/oddness of the nuclide:

O-O - odd Z and odd A,
E-E - even Z and even A,
O-E - odd Z, even A or even Z, odd A.

A blank indicates that no selection is to be done on this data field.
A "#" means that no further selection on data is required.

*** Selection of nuclear level energy, decay gamma ray energy or
*** radiation energy

```
E-LEVEL     : ?
E-GAMMA     : ?
R-ENERGY    : ?
```

Enter a numeric expression to select data based on nuclear level energy or decay gamma ray energy (keV). This is a numeric data field.

*** Selection of spin and parity

```
J-PI        : ?
```

Enter a character expression to select data based on level spin and parity. The ENSDF notation is used; that is spin followed by parity. For example, one would enter:

"3+" for integral spin and positive parity or
"3/2-" for half-integral spin and negative parity.

*** Selection of half-life

T 1/2 : ?

Enter a character expression to select data based on level half-life. The ENSDF notation is used; that is a number followed by a time unit. For example, one would enter:

"1.0 H" for one hour,
"3.1E+2 Y" for 3100 years,
"1.37 KEV" for 1.37 keV.

Some other units are minutes(M), days(D), seconds(S), milliseconds(MS), microseconds(US) and nanoseconds(NS).

NOTE that this character expression is converted to a numeric value for retrieval purposes so can be used in numeric expressions. You must enclose the selected half-life value(s) in quotes as shown above.

*** Selection of decay gamma ray multipolarity

MULTIPOL. : ?

Enter a character expression to select data based on gamma multipolarity. The ENSDF notation is used. For example, one would enter:

"E2" for electric quadrupole and
"M1" for magnetic dipole radiation.

*** Selection of the decay mode

DECAY MODE : ?

Enter a character expression to select data based on decay mode. The decay modes recognized are:

B- for beta- emission, EC for electron capture/beta+,
P for proton emission, N for neutron emission,
T for triton emission, A for alpha emission,
F for spontaneous fission

*** Selection of radiation

RADIATION : ?

Enter a character expression to select data based on type of radiation. The decay modes recognized are:

B- for beta-, B+ for positrons,
E for electrons, G for gamma rays,
A for alpha particles.

*** Selection of radiation intensity

```
          R-INTENSITY : ?
```

Enter a numeric expression to select data based on nuclear radiation intensity(percent). The value entered should be between .01 and 100.0.

*** Sample retrieval sequence

```
   LEVELS COLLECTION
     FIND LEVELS IN NUCLEAR_LEVELS WITH MASS =1

   GAMMAS COLLECTION
     FIND GAMMAS IN LEVEL_GAMMAS WITH MASS =1

     FIND LEVELS CROSS GAMMAS OVER LEVID

       IS EXPRESSION CORRECT? (default is Y)
            Yes, No or Revise : ?
```

Listed above are the DATATRIEVE command(s) constructed by the program from your input. If you have made errors in your input, then by answering "No", you can respecify your retrieval. If you wish to revise the parameter selection only, then respond with "Revise"

```
       IS EXPRESSION CORRECT? (default is Y)
            Yes, No or Revise : y


  LEVELS COLLECTION
  [12 records found]

  GAMMAS COLLECTION
  [15 records found]

  COMBINED COLLECTION
  [6 records found]


  TO CONTINUE AFTER OUTPUT IS COMPLETE, PRESS <CR>
  TO END PRINT OUT AT ANY TIME, PRESS <↑ C>

                (retrieval appears here)

  *****COMPLETE*****   <CR> TO CONTINUE
```

*** Displaying an existing collection

Build, Display, Command, Message or Exit : d

YOU HAVE CHOSEN TO DISPLAY AN EXISTING COLLECTION

ENTER OUTPUT FILE (default is your terminal)
Output file specs : ?

Your retrieval will be displayed on your terminal unless you specify some other file. The file specification should conform to standard VAX file naming conventions which are:

name.extension .

Your output will go to the line printer if you enter LPT: .

*** Select fields for display (only for a collection of both levels
*** and gammas

SELECT FIELDS FOR DISPLAY (default is A)
Level, Gamma or All : ?

Each output record will contain the fields mass(A), chemical symbol(El), level energy(E-level). The other data fields displayed depend on the option selected.

Level	-	the level energy uncertainty, the level spinparity(JPI) and the half-life(T1/2) with uncertainty.
Gamma	-	the gamma energy(EG), intensity(IG), multipolarity, mixing ratio and conversion coefficient with their uncertainties.
All	-	the level spinparity(JPI) and half-life (T1/2), and the gamma ray energy(EG), intensity(IG) and conversion coefficient.

*** Select source collection

ENTER SOURCE COLLECTION NAME (default is CURRENT)
Collection name : ?

If you have requested the data source be some collection other than the current collection, you must give its name here.

Collections:
CURRENT
239PU

*** Specify sort order of output file

```
SELECT OUTPUT SORT ORDER (default none)
     by Nuclide, Level energy or Gamma energy : ?
```

The data retrieved will be sorted according to the keys that you select. For each option the sort order is

Nuclide	-	mass number, proton number, level energy, (gamma energy)
Level	-	level energy, mass number, proton number, (gamma energy)
Gamma	-	gamma energy, mass number, proton number,
<CR>	-	default value, order as in data source.

*** Direct entry of a DATATRIEVE command

```
Build, Display, Command, Message or Exit : c

DTR> ?
```

You may specify any valid DATATRIEVE command involving the domains "NUCLIDES", "NUCLEAR_LEVELS", "LEVEL_GAMMAS" or "RADIATIONS".

*** EXIT from retrieval program

```
Build, Display, Command, Message or Exit : e
```

Sample NUDAT Retrieval

```
$ nudat

          NUCLEAR STRUCTURE DATA RETRIEVAL PROGRAM
              VERSION OF NOV. 6, 1985

                      28-JUL-86

          NUDAT  Data Base last updated on  01-May-86

    Build, Display, Command, Message or Exit : b

YOU HAVE CHOSEN TO BUILD A COMMAND FROM ITS COMPONENTS


    SELECT DATA TYPE (default is L)
         Levels, Gammas, Both(L&G), Nuclei or Radiations: r

    SELECT OPERATION (default is P)
         Print or Save : s

    ENTER NAME FOR NEW COLLECTION (default is CURRENT)
         Collection name : BDEC

    RETRIEVAL SOURCE (default is M)
         Master, Current or Other : ____

    RETRIEVAL SCOPE (default is P)
         Whole or Part : ____

         MASS NO.    : ____

         PROTON NO.  : ____

         T 1/2       : bt "12 h" and "3 d"

         DECAY MODE  : ="ec"

         RADIATION   : ="b+"

         RENERGY     : #


  FIND RADIATIONS WITH T12LOG BT    4.6355  AND    5.4136 AND  DMODE ="E
  C" AND  RAD ="B+"

    IS EXPRESSION CORRECT? (default is Y)
         Yes, No or Revise : y

[123 records found]
```

```
   FIND RADIATIONS WITH T12LOG BT     4.6355  AND    5.4136  AND   DMODE ="E
   C"  AND   RAD ="B+"

      IS EXPRESSION CORRECT? (default is Y)
           Yes, No or Revise  :  y

[123 records found]

      Build, Display, Command, Message or Exit : d

  YOU HAVE CHOSEN TO DISPLAY AN EXISTING COLLECTION


      ENTER OUTPUT FILE (default is your terminal)
           Output file specs : ____

      ENTER SOURCE COLLECTION NAME (default is CURRENT)
           Collection name : BDEC

      SELECT OUTPUT SORT ORDER (default none)
           by Nuclide, Energy or Intensity : n


    PRINT MASS,P_NUM VIA ELEMENTS,DMODE,HL,RAD,RADDEF,RAD_DATA OF CURRENT
    SORTED BY NUCLEUS,T12LOG,RAD,RAD_E

      IS EXPRESSION CORRECT? (default is Y)
           Yes, No or Revise : y


 TO CONTINUE AFTER OUTPUT IS COMPLETE, PRESS <CR>
 TO END PRINT OUT AT ANY TIME, PRESS < C>
```

(sample of retrieval on the next page)

```
 *****COMPLETE*****   <CR> TO CONTINUE

      Build, Display, Command, Message or Exit : e
```

MASS NUMBER	ELEMENT	DECAY MODE	HALF LIFE	RADIATION		RADIATION ENERGY (KEV)		END POINT ENERGY (KEV)		RADIATION INTENSITY (%)		DOSE (G-RAD/UCI-H)
48	CR	EC	21.56 H	B+		91.	4	212.	8	1.47	24	0.0028
55	CO	EC	17.53 H	B+		435.68	20	1021.0	5	25.6	15	0.238
55	CO	EC	17.53 H	B+		476.22	20	1112.9	5	4.26	20	0.0432
55	CO	EC	17.53 H	B+	TOT	567.07	21			76.	4	0.917
55	CO	EC	17.53 H	B+		648.98	20	1498.2	5	46.	3	0.636
57	NI	EC	36.08 H	B+		130.	3	302.	7	0.41	5	0.0011
57	NI	EC	36.08 H	B+		197.	3	464.	7	0.86	10	0.0036
57	NI	EC	36.08 H	B+		304.	3	716.	7	5.0	4	0.0324
57	NI	EC	36.08 H	B+	TOT	346.	3			40.4	10	0.298
57	NI	EC	36.08 H	B+		359.	3	843.	7	34.1	9	0.261
64	CU	EC	12.701 H	B+		278.1	4	652.9	8	17.90	18	0.106
69	GE	EC	39.05 H	B+		145.0	11	332.	3	0.26	4	0.0008
69	GE	EC	39.05 H	B+		270.8	11	629.	3	2.3	4	0.0133
69	GE	EC	39.05 H	B+	TOT	492.8	13			24.	6	0.247
69	GE	EC	39.05 H	B+		521.4	12	1203.5	25	21.	6	0.233
71	AS	EC	62.0 H	B+		202.2	17	466.	4	0.1620		0.0007
71	AS	EC	62.0 H	B+		212.8	17	491.	4	0.1080		0.0005
71	AS	EC	62.0 H	B+		341.8	18	793.	4	0.2800		0.0020
71	AS	EC	62.0 H	B+	TOT	350.5	18			29.55		0.221
71	AS	EC	62.0 H	B+		352.0	18	816.	4	29.00		0.217
72	AS	EC	26.0 H	B+		351.	3	814.	7	0.459	20	0.0034
72	AS	EC	26.0 H	B+		400.	3	927.	7	0.164	9	0.0014
72	AS	EC	26.0 H	B+		822.	4	1865.	7	5.81	18	0.102
72	AS	EC	26.0 H	B+		1115.	4	2495.	7	64.1	15	1.52
72	AS	EC	26.0 H	B+	TOT	1166.	5			87.7	23	2.18
72	AS	EC	26.0 H	B+		1203.	4	2638.	7	0.7	4	0.0179
72	AS	EC	26.0 H	B+		1526.	4	3329.	7	16.3	17	0.530
76	BR	EC	16.2 H	B+		207.	7	471.	11	0.13	3	0.0006
76	BR	EC	16.2 H	B+		253.	7	578.	11	0.92	11	0.0050
76	BR	EC	16.2 H	B+		336.	7	770.	11	1.44	13	0.0103
76	BR	EC	16.2 H	B+		375.	7	860.	11	6.3	6	0.0503
76	BR	EC	16.2 H	B+		427.	7	979.	11	5.2	4	0.0473
76	BR	EC	16.2 H	B+		551.	7	1260.	11	1.24	13	0.0146
76	BR	EC	16.2 H	B+		558.	7	1274.	11	0.20	9	0.0024

(etc.)

HELP Information for CINDA

*** Command to activate the CINDA retrieval program

$ cinda

*** Program identification message

NEUTRON REACTION BIBLIOGRAPHIC RETRIEVAL PROGRAM
VERSION OF JUNE 11, 1986

30-JUL-86

This program gives you access to the CINDA data base which contains a nuclide and reaction index to the neutron physics literature. Retrieval specifications are built interactively by answering queries from the program. If further detail about the required response is needed, enter a question mark(?).

*** Master menu

Please select one of the following:
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ? ?

The options are defined as follows:

Parameters	-	specify a complete set of retrieval parameters
Selective	-	selectively modify retrieval parameters
Current	-	display current retrieval parameters
Retrieve	-	execute a retrieval with current parameters
New file	-	specify a new output file
Message	-	write a message for the data base manager
Exit	-	terminate the program

*** Retrieval parameter specification

The parameters listed below may be specified serially in the PARAMETER option or singlely by parameter in the SELECTIVE option.

*** Parameter specification singlely

Please select one of the following:

```
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ?- s

Enter parameter number or ?- ?

Enter a number between 1 and 9.  The numbers have the following meaning:
     1   Element                    2   Mass
     3   Quantity                   4   Laboratory
     5   Block Number               6   Publication Date
     7   Energy Range               8   Publication Type
     9   Work Type
A blank terminates parameter modification.

Enter parameter number or ?- 7

Energy Range      : ____

*** Element, parameter 1

Element           : ?

 Enter either a chemical symbol or a charge number (eg. ZR or 40). Ranges
may also be given with either notation (eg. ZR-42). Missing upper or lower
limits imply lowest or highest possible value respectively. Two special codes
can be used for fission products (FPROD) or many nuclides (MANY). A blank
implies ALL.

*** Nuclide mass, parameter 2

Mass              : ?

 Enter a mass number (eg. 238). Ranges may also be given (eg. 7-9). Missing
upper or lower limits imply lowest or highest possible value respectively.
Three special codes can be used for natural element (ELEM), isotopes (ISOT)
or compounds (COMP). A blank implies
ALL.

*** Nuclear quantity, parameter 3

Quantity          : ?

 Enter a nuclear reaction or quantity code (eg. TOT). A range of values can
be given (eg. NP-ND). The valid quantity codes are:
          EVL   TOT   SEL   DEL   POL   POT   SIN   DIN   TSL
          SCT   SNE   ABS   RIA   NG    RIG   SNG   DNG   NEG
          N2N   NXN   NEM   NP    NNP   PEM   ND    NND   DEM
          NT    NNT   TEM   NHE   NA    NNA   AEM   NF    RIF
          ALF   ETA   NU    NUD   NUF   SFN   SFG   FPG   FPB
          NFY   FRS   CHG   RES   STF   LDL   GN    GF
A blank implies ALL.
```

*** Laboratory where work performed, parameter 4

Laboratory : ?

A three character laboratory code (eg. BNL) or range of codes (eg. GAHAR) can be given. A blank implies ALL.

*** Block number, parameter 5

Block Number : ?

Enter a number or a range between 1 and 999. (eg. 700-750) The block number along with Z, A, Q, and LAB uniquely identify a CINDA "experiment". A blank implies ALL.

*** Main reference publication date, parameter 6

Publication Date : ?

A publication date or range of dates can be selected (eg 7506-8112). The date must be in the format yearmonth (YYMM). A blank implies ALL.

*** Incident neutron energy range, parameter 7

Energy Range : ?

Incident energy selection should be entered as a floating point number or range (eg. 3.0+6-2.0+7). The number must be given in this five character format. The energy is in electron volts. A blank implies ALL.

*** Type of publication desired, parameter 8

Publication Type : ?

The publication type can be given as ALL (or blank), BOOK meaning only entries which would appear in the CINDA book, and PRIMARY meaning only journal references.

*** Work type, parameter 9

Work Type : ?

The work type can be given as ALL (or blank), E for experimental, T for theoretical, or R for review and evaluation.

*** Display current values for the retrieval parameters

Please select one of the following:
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ?- c

The current values of the retrieval parameters are:

1	Element	: CR
2	Mass	: 52
3	Quantity	: TOT
4	Laboratory	:
5	Block Number	:
6	Publication Date	: 7501-
7	Energy Range	: 1.0+6-2.0+7
8	Publication Type	:
9	Work Type	: EXPERIMENTAL

*** Select a new output file

Please select one of the following:
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ? - new file

Enter output file specs - ?

Give the full file specification for the file which will contain the output of your retrievals. If output is to go to your terminal, enter a carriage return.

*** Execute retrieval with current retrieval parameters

Please select one of the following:
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ? - r

*** EXIT from retrieval program

Please select one of the following:
Parameters, Selective, Current, Retrieve, New file,
Message, Exit or ? - e

Sample CINDA Retrieval

```
$ cinda

        NEUTRON REACTION BIBLIOGRAPHIC RETRIEVAL PROGRAM
              VERSION OF JUNE 11, 1986

                    29-JUL-86

          CINDA  Data Base last updated on  25-Jul-86

  Please select one of the following:
     Parameters, Selective, Current, Retrieve, New file,
     Message, Exit or ? - p


  Enter retrieval parameter specifications:

  Element          : v

  Mass             : 51

  Quantity         : tot

  Laboratory       :

  Block Number     :

  Publication Date :

  Energy Range     :

  Publication Type : p

  Work Type        : e

The current values of the retrieval parameters are:

      1  Element             : V
      2  Mass                : 51
      3  Quantity            : TOT
      4  Laboratory          :
      5  Block Number        :
      6  Publication Date    :
      7  Energy Range        :
      8  Publication Type    : PRIMARY
      9  Work Type           : EXPERIMENTAL

  Please select one of the following:
     Parameters, Selective, Current, Retrieve, New file,
     Message, Exit or ? - r
```

CINDA RETRIEVAL SPECIFICATION

Element	:	V
Mass	:	51
Quantity	:	TOT
Laboratory	:	
Block Number	:	
Publication Date	:	
Energy Range	:	
Publication Type	:	PRIMARY
Work Type	:	EXPERIMENTAL

NUCLIDE V 51

Total	Maxw		COL	Expt	Jour	PR	48	265	3508	Dunning+ IONCH,TRANS,RABE/PARAFIN N
	Maxw			Expt	Data	EXFOR12634		.021	8403	.1 PT. SIGMA.
Total	1.3+4	1.0+6	ANL	Expt	Jour	PR	79	28	5007	Blair+ TRANS +6KEV RESOL CURVE
	1.3+4	1.0+6		Expt	Data	EXFOR11666		.002	7606	. 137 PTS. SIGMA.
Total	1.4+7		CAR	Expt	Jour	PR	81	139	5101	Lasday. MEAN E GOOD GEOM RADII GIVEN
	1.4+7			Expt	Data	EXFOR11041		.006	7606	.1 PT. SIGMA.
Total	2.0+3	2.5+4	ANL	Expt	Jour	PR	85	595	5202	Hibdon+ TRNSM RES AT 7 13 17 23KEV.
	2.0+3	2.5+4		Expt	Data	EXFOR11386		.005	7606	.19 PTS. SIGMA.
Total	1.4+7		ANL	Expt	Jour	PR	88	686	5211	Goodman+ TD NEUTS 2.4+0.1B
	1.4+7			Expt	Data	EXFOR11057		.010	7606	. 1PT. SIG.
Total	2.1-2	4.5+0	CRC	Expt	Jour	CJP	31	432	5303	Brockhouse. CRYST SPEC.
	2.1-2	4.5+0		Expt	Data	EXFOR11653		.002	7606	. 14 PTS. SIGMA.
Total	1.0+3	3.0+4	SAH	Expt	Jour	IJP	30	99	5603	Patro+ TOF.TRANSMISSN CURVES ONLY
Total	1.4+3	1.0+5	DKE	Expt	Jour	PR	106	110	5704	Marshak+ ABSOLUTE CURVE.
	1.4+3	1.0+5		Expt	Data	EXFOR11640		.005	7606	. 136 PTS. SIGMA.
Total	1.0+2	3.0+4	ANL	Expt	Jour	PR	111	288	5807	Cote+ TRNS OKS NEWSON 6200B,167EVRES
	6.4+1	8.9+4		Expt	Data	EXFOR11641			7606	.145 PTS. SIGMA.
Total	2.0-3	2.9-1	MTR	Expt	Jour	NSE	7	193	6002	Schmunk+ SCINT TRANS CURVE
	2.0-3	2.9-1		Expt	Data	EXFOR11634		.003	7606	.93 PTS. SIGMA.
Total	1.8+7	2.8+7	LRL	Expt	Jour	PR	120	521	6010	Peterson+ TRANS 4ES CURV CFD OPTMDL
	1.8+7	2.8+7		Expt	Conf	58GENEVA14		109	5809	.SUPERSEDED
	1.8+7	2.8+7		Expt	Data	EXFOR11108		.016	7606	. 4 PTS. SIGMA.
Total	Maxw		GRE	Expt	Jour	NSA	15	3471	6110	Denis+ CS 9.96+.33BARN AT 22 DC
Total	3.7+6		BAR	Expt	Jour	PR	125	331	6201	Kent+400KEV SPREAD CONT. PR114 1563.
	3.7+6			Expt	Data	EXFOR11617		.011	7606	.1 PT. SIGMA.

(etc)

*** TYPE CARRIAGE RETURN TO CONTINUE ***