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Vers.1

INDC INTERNATIONAL NUCLEAR DATA COMMITTEE

The AEP[1] Barnbook
D A T L I B

Nuclear Reaction Cross Sections and Reactivity Parameter Library and Files [2]

Rainer Feldbacher [1]

October 1987

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2) Work partially supported by:
IAEA (Contract No. 4082/RB)
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CONTENT

ABSTRACT
Nuclear reaction data for light isotope charged particle reactions (Z<6) have been compiled. This hardcopy contains file headers, plots and an extended bibliography.
Numerical data files and processing routines are available on tape at IAEA-NDS.

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1. INTRODUCTION

THE AEP-BARNBOOK DATLIB

- is a compilation of cross section data and pertaining quantities taken from the literature for selected reactions out of the comprehensive reaction list for nuclear reactions between charged nuclei (Chapter 2).
- includes one data set for each reaction which represents the "recommended cross section". This recommended data are the result of an evaluation (e.g. putting together different energy ranges, etc.) and is recommended for use to the user of this barnbook.
  In the following, this recommended data are indicated by an asterisk (*) in the file headers and plots.

The comprehensive reaction list (Chapter 2) contains a large list of nuclear reactions for charged nuclei (Target: Z<6; Projectile: Z<2 with few exceptions). Only selected reactions out of this are taken into account for the data compilation. This selection is based on

- Importance of the reaction for the advanced fuel fusion research within the Alternate Enegry Physics Program;
- Availability of the data.

Note that DATLIB is subject to continued development. This version represents the present state of this development.

DATA TYPES:

DATLIB containes:

- integral reaction cross sections vs. projectile energy
  sigma(E) abbr.: SIG(E)

- Maxwell averaged reactivity parameters vs. temperature
  <sigma.v>(T) SVM(T)

- differential cross sections vs. projectile energy and scattering angle
  sigma(E;theta) DSE(E;theta)
  sigma(Theta;E) DST(Theta;E)

There is a difference in the representation of the various data types: SIG(E) and SVM(T) are functions of only one quantity, the projectile energy E or the plasma temperature T, resp.. Thus they are tabulated and plotted as functions f(x).

The quantities DSE and DST depend on two variables, the beam energy E and the scattering angle Theta. These data are presented as a FUNCTION OF THE FIRST VARIABLE inside the paranthesis, while the second one acts as PARAMETER. In

other words, these quantities f(x1,x2) are tabulated and plotted as f(x1) with x2 being a parameter. In particular, DSE is the excitation function with scattering angle being parameter, while DST is the angular distribution with E acting as parameter.

This scheme may be applicated to other functions of two variables (e.g. differential cross sections) and may be generalized to more parameters.

UNITS:

particle or beam energy ..... keV
temperature ..... keV
integral cross section ..... barn
angular dependent cross section ..... barn/sr
reactivity parameter ..... barn.cm/s

If not explicitely noted otherwise, all data are given in the laboratory system of reference (target system). In general, the heavier reaction partner is considered as target. The corresponding energy scale for target-projectile interchange is gained by multiplying the energy scale with

$$m\ (\text{target})\ /\ m\ (\text{projectile}).$$

The center of mass energy scale is gained by:

$$E(\text{cm}) = E(\text{projectile})\ .\ \frac{m\ (\text{target})}{m\ (\text{target}) + m\ (\text{projectile})}$$

DISPOSITION:

The hardcopy form of DATLIB consists of:

- Table of File Headers
- Plot Section
- References

In the table of contents the entries to the data sets are listed in a sequence which will be explained below. Each entry consists of 4 or 5 lines:

1st line: Asterisk (if recommended data); reaction symbol; informations about reaction energy.
2nd line: Data type (SIG, SVM, DST,..); range of variables.
3rd line: References (/AEP/ indicates a data set resulting from our own evaluation).
4th line: additional informations in free text (may be skipped).
5th line: name of the file where the data are stored

Example:

```
B-11(p,aa)A +8681.
SIG (E(p)=100.-10000.)
/MOREAU 1977/
lower bound of resonance parameter set
B1PAALOMO.SIG
```

Explanation:

This is a data set of the reaction B-11(p,aa)A,
reaction energy = 8681 keV;
it is an integral reaction cross section
for proton energies between 100 and 4000 keV;
it is taken from ref /MOREAU 1977/;
it is stored in the file [104,3]B1PAALOMO.SIG on the
PDP-11/23.

This entries are identical to the pertinent file headers and are also quoted in a short version on the pertinent plot.

The plot section contains the data. The data sets are arranged in the same sequence as they are indicated by their entries in the table of headers.

References are given, not only to each reaction contained in DATLIB, but also to a lot of additional reactions from the comprehensive reaction list (chapter 2).

Those references which are available at AEP are written in capital letters in the form e.g. /FOWLER 1975/ with full reference given at the last section of this report in alphabetical order.

References from the EXFOR library are quoted together with their EXFOR- entry numbers. Additional references are in general from three sources: /JARMIE 1956/, /ARNUSH 1980/ together with /SHUY 1979/ and /HOLDEN 1980-1986/ (see chapter 'reference list', section 'major compilations and bibliographies'), indicated by J,A,H, respectively. They are basically written in the form in which they are given there.

PRINCIPLE OF ORDER:

I.) with respect to the reaction:

1. increasing Z of target
2. increasing A of target
3. increasing Z of projectile
4. increasing A of projectile
5. increasing Z of 1st outgoing particle
6. increasing A of 1st outgoing particle
(7. increasing Z of 2nd outgoing particle)
(8. increasing A of 2nd outgoing particle)
(.....)

II.) with respect to the outgoing particles:

Sequence of outgoing particles: 1. increasing Z
2. increasing A
exception: gammas always at the end !

FILES:

For computer application the data are stored on disk files on the institute's PDP-11/23. The files are specified by

FILENAME.EXT

The filename (Max. 9 characters) is build up by an abbreviation of the reaction symbol, using a mnemonic code:

1. target: 1 or 2 characters
2. projectile: 1 or 2 characters
3. channel: depending on free characters available
4. reference: last 2 characters (followed by the dot).

The following abbreviations are used:

not specified	X	He-4	A
gamma	G	Li-6	L6
neutron	N	Li-7	L7
proton	P	Be-7	47
deuteron	D	Be-9	49
triton	T	B-10	B0
He-3	H3	B-11	B1

The extension (max. 3 characters following the dot) indicates the data type (.SIG, .SVM,..)

Example: B1PGGAP.SIG is the name of the file where following data are stored: target: B-11, projectile: proton, GG indicates 2 gammas, AP indicates /AEP/, .SIG indicates integral cross section. Note that this code is a mnemonic one and does not allow for computer processing of the file name.

DATA HANDLING AND PROCESSING ROUTINES

System TRANSLATE with routines RDDL1, RDDLHD, GETALT, WRDL1: reading and writing the DATLIB format (/AEPCC-86.003/)

DIG - a code for digitizing of curves and functions (AEP-84.021)

AEPCC-GRAPHICS: Plotroutines (AEPCC-86.004)

MAMA - a code to compute Maxwell averaged reactivity parameters. (AEP-84.019)

SVBM1 - a code to compute beam-Maxwell averaged reactivity parameters and Doppler broadened cross sections. (AEPCC-86.001)

2. COMPREHENSIVE REACTION LIST

P	(p , p)	P		
D	(p , g)	3He	+	5494 keV
D	(p , np)	P	-	2225 keV
D	(p , p)	D		
D	(d , g)	A	+	23847 keV
D	(d , n)	3He	+	3269 keV
D	(d , np)	D	-	2225 keV
D	(d , nnp)	P	-	4449 keV
D	(d , p)	T	+	4033 keV
D	(d , d)	D		
T	(p , g)	A	+	19814 keV
T	(p , n)	3He	-	764 keV
T	(p , np)	D	-	6257 keV
T	(p , nnp)	P	-	8482 keV
T	(p , p)	T		
T	(d , n)	A	+	17589 keV
T	(d , np)	T	-	2225 keV
T	(d , d)	T		
T	(t , nn)	A	+	11332 keV
T	(t , t)	T		
3He	(p , p)	3He		
3He	(d , np)	3He	-	2225 keV
3He	(d , p)	A	+	18353 keV
3He	(d , pp)	T	-	1461 keV
3He	(d , d)	3He		
3He	(t , np)	A	+	12096 keV
3He	(t , d)	A	+	14320 keV
3He	(t , x)	A		
3He	(t , t)	3He		
3He	(3He, g)	6Be	+	11489 keV
3He	(3He, pp)	A	+	12860 keV
3He	(3He,3He)	3He		
A	(p , p)	A		
A	(d , g)	6Li	+	1475 keV
A	(d , np)	A	-	2225 keV
A	(d , d)	A		
A	(t , g)	7Li	+	2468 keV
A	(t , n)	6Li	-	4782 keV
A	(t , t)	A		
A	(3He, g)	7Be	+	1588 keV
A	(3He,3He)	A		
A	(a , n)	7Be	-	18990 keV
A	(a , np)	6Li	-	24596 keV
A	(a , p)	7Li	-	17346 keV
A	(a , pp)	6He	-	27320 keV
A	(a , d)	6Li	-	22371 keV
A	(a , a)	A		
6Li	(p , g)	7Be	+	5606 keV
6Li	(p , p)	6Li		
6Li	(p ,3He)	A	+	4018 keV
6Li	(d , n)	7Be	+	3381 keV
6Li	(d ,n3He)	A	+	1794 keV

6Li	(d , p)	7Li	+	5025 keV
6Li	(d , pt)	A	+	2557 keV
6Li	(d , d)	6Li		
6Li	(d , a)	A	+	22371 keV
6Li	(t , nn)	7Be	-	2876 keV
6Li	(t , na)	A	+	16114 keV
6Li	(t , p)	8Li	+	801 keV
6Li	(t , d)	7Li	+	993 keV
6Li	(t , t)	6Li		
6Li	(3He, n)	8B	-	1975 keV
6Li	(3He, np)	7Be	-	2112 keV
6Li	(3He, pa)	A	+	16878 keV
6Li	(3He, d)	7Be	+	112 keV
6Li	(3He,3He)	6Li		
6Li	(a , g)	10B	+	4460 keV
6Li	(a , p)	9Be	-	2126 keV
6Li	(a , da)	A	-	1475 keV
6Li	(a , a)	6Li		
6Li	(6Li, n)	11C	+	9450 keV
6Li	(6Li,n3Hea)	A	+	318 keV
6Li	(6Li, na)	7Be	+	1906 keV
6Li	(6Li, p)	11B	+	12215 keV
6Li	(6Li, pp)	10Be	+	986 keV
6Li	(6Li, pta)	A	+	1082 keV
6Li	(6Li, pa)	7Li	+	3550 keV
6Li	(6Li, d)	10B	+	2985 keV
6Li	(6Li,3He)	9Be	+	1892 keV
6Li	(6Li, aa)	A	+	20896 keV
7Li	(p , n)	7Be	-	1644 keV
7Li	(p , p)	7Li		
7Li	(p , a)	A	+	17346 keV
7Li	(d , nn)	7Be	-	3869 keV
7Li	(d , ndd)	A	-	8725 keV
7Li	(d , na)	A	+	15121 keV
7Li	(d , p)	8Li	-	192 keV
7Li	(d , d)	7Li		
7Li	(d , t)	6Li	-	993 keV
7Li	(d ,3He)	6He	-	4481 keV
7Li	(t , n)	9Be	+	10438 keV
7Li	(t , nnn)	7Be	-	10126 keV
7Li	(t , nna)	A	+	8864 keV
7Li	(t , p)	9Li	-	2386 keV
7Li	(t , d)	8Li	-	4225 keV
7Li	(t , t)	7Li		
7Li	(t , a)	6He	+	9839 keV
7Li	(3He, g)	10B	+	17788 keV
7Li	(3He, npa)	A	+	9628 keV
7Li	(3He, nd)	7Be	-	7138 keV
7Li	(3He, p)	9Be	+	11201 keV
7Li	(3He, da)	A	+	11852 keV
7Li	(3He, t)	7Be	-	881 keV
7Li	(3He,3He)	7Li		
7Li	(3He, a)	6Li	+	13328 keV
7Li	(a , g)	11B	+	8665 keV
7Li	(a , n)	10B	-	2790 keV
7Li	(a , a)	7Li		

7Be	(p , g)	8B	+	138 keV
7Be	(d , pa)	A	+	16766 keV
7Be	(t , npa)	A	+	10508 keV
7Be	(3He, ppa)	A	+	11272 keV
7Be	(a , g)	11C	+	7544 keV
9Be	(p , g)	10B	+	6587 keV
9Be	(p , npa)	A	-	1574 keV
9Be	(p , p)	9Be		
9Be	(p , da)	A	+	651 keV
9Be	(p , t)	7Be	-	12082 keV
9Be	(p , a)	6Li	+	2126 keV
9Be	(d , g)	11B	+	15816 keV
9Be	(d , n)	10B	+	4362 keV
9Be	(d ,nnpa)	A	-	3798 keV
9Be	(d , p)	10Be	+	4587 keV
9Be	(d , d)	9Be		
9Be	(d , ta)	A	+	4684 keV
9Be	(d , a)	7Li	+	7152 keV
9Be	(t , n)	11B	+	9559 keV
9Be	(t , t)	9Be		
9Be	(3He, n)	11C	+	7558 keV
9Be	(3He, nn)	10C	-	5564 keV
9Be	(3He, na)	7Be	+	14 keV
9Be	(3He, p)	11B	+	10323 keV
9Be	(3He,3He)	9Be		
9Be	(3He, aa)	A	+	19004 keV
9Be	(a , n)	12C	+	5701 keV
9Be	(a , n)	X		
9Be	(a , nn)	11C	-	13020 keV
9Be	(a , naa)	A	-	1574 keV
9Be	(a , a)	9Be		
10B	(p , g)	11C	+	8690 keV
10B	(p , n)	10C	-	4433 keV
10B	(p , p)	10B		
10B	(p , pda)	A	-	5936 keV
10B	(p ,3Hea)	A	-	442 keV
10B	(p , a)	7Be	+	1146 keV
10B	(d , g)	12C	+	25186 keV
10B	(d , n)	11C	+	6465 keV
10B	(d , p)	11B	+	9230 keV
10B	(d , pta)	A	-	1903 keV
10B	(d , d)	10B		
10B	(d ,3He)	9Be	-	1093 keV
10B	(d , aa)	A	+	17911 keV
10B	(t , p)	12B	+	6342 keV
10B	(t , pa)	8Li	-	3659 keV
10B	(t , d)	11B	+	5197 keV
10B	(t , t)	10B		
10B	(t , a)	9Be	+	13227 keV
10B	(t ,6He)	7Be	-	6361 keV
10B	(3He, g)	13N	+	21636 keV
10B	(3He, n)	12N	+	1572 keV
10B	(3He, np)	11C	+	972 keV
10B	(3He, p)	12C	+	19692 keV
10B	(3He, paa)	A	+	12418 keV
10B	(3He, d)	11C	+	3196 keV
10B	(3He, t)	10C	-	3669 keV

10B	(3He,3He)	10B		
10B	(3He,6Li)	7Be	-	2873 keV
10B	(a , g)	14N	+	11611 keV
10B	(a , n)	13N	+	1058 keV
10B	(a , p)	13C	+	4061 keV
10B	(a , d)	12C	+	1339 keV
10B	(a , a)	10B		
11B	(p , g)	12C	+	15956 keV
11B	(p , n)	11C	-	2764 keV
11B	(p , p)	11B		
11B	(p , aa)	A	+	8681 keV
11B	(d , g)	13C	+	18678 keV
11B	(d , n)	12C	+	13732 keV
11B	(d , nn)	11C	-	4989 keV
11B	(d , p)	12B	+	1145 keV
11B	(d , d)	11B		
11B	(d , t)	10B	-	5197 keV
11B	(d , a)	9Be	+	8031 keV
11B	(t , p)	13B	-	233 keV
11B	(t , t)	11B		
11B	(t , a)	10Be	+	8585 keV
11B	(t , aa)	6He	+	1175 keV
11B	(3He, g)	14N	+	20735 keV
11B	(3He, n)	13N	+	10182 keV
11B	(3He, p)	13C	+	13184 keV
11B	(3He, d)	12C	+	10463 keV
11B	(3He, t)	11C	-	2001 keV
11B	(3He,3He)	11B		
11B	(3He, a)	10B	+	9123 keV
11B	(a , g)	15N	+	10991 keV
11B	(a , n)	14N	+	157 keV
11B	(a , p)	14C	+	783 keV
11B	(a , d)	13C	-	5169 keV
11B	(a , t)	12C	-	3858 keV
11B	(a , a)	11B		
11B	(11B, x)	X		
11B	(11B,11B)	11B		

3. FILE HEADERS

```
  D (p,g) 3He  + 5494.
  SIG (E(p)=500.-1500)
  /FOWLER 1949/; data taken from /JARMIE 1956/
  DPGFO.SIG

  D (p,g) 3He  + 5494.
  SIG (E(p)=162.-1835)
  /GRIFFITHS 1955/; data taken from /JARMIE 1956/
  DPGGR.SIG

* D (p,g) 3He  + 5494.
  SIG (E(p)=162.-1500)
  /AEP/; from /FOWLER 1949/,/GRIFFITHS 1955/
  DPGAP.SIG

  D (p,g) 3He  + 5494.
  SVM (T=1.-1000.)
  /FOWLER 1975/, computed from formula
  DPGFO.SVM

* D (p,g) 3He  + 5494.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG/AEP/
  DPGAP.SVM


  D (p,np) P  - 2225.
  SIG (E(p)= 3500.-5500.)
  /GIBBONS 1959/; data taken from a curve
  DPNPGI.SIG

  D (p,np) P  - 2225.
  SIG (E(p)=10000.-100000.)
  /LYKASOV 1978/; data taken from /EXFOR/
  DPNPLY.SIG

* D (p,np) P  - 2225.
  SIG (E(p)= 3500.-100000.)
  /AEP/; from /GIBBONS 1959/,/LYKASOV 1978/
  DPNPAP.SIG

  D (p,np) P  - 2225.
  SVM (T=27.-1000.)
  /FOWLER 1975/; computed from formula
  DPNPFO.SVM

* D (p,np) P  - 2225.
  SVM (T=50.-1000.)
  /AEP/; computed from SIG/AEP/
  DPNPAP.SVM


* D (d,n) 3He  + 3269.
  SIG (E(d)=1.- 20000.)
  /ECPL-82/
  DDNEC.SIG
```

```
  D (d,n) 3He  + 3269.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  DDNFO.SVM

* D (d,n) 3He  + 3269.
  SVM (T=0.1-1000.)
  /ECPL-82/
  DDNEC.SVM


* D (d,p) T  + 4033.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  DDPEC.SIG

  D (d,p) T  + 4033.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  DDPFO.SVM

  D (d,p) T  + 4033.
  SVM (T=1-1000.)
  /MCNALLY 1980/
  DDPNA.SVM

* D (d,p) T  + 4033.
  SVM (T=0.1-1000)
  /ECPL-82/
  DDPEC.SVM


  T (p,g) A  + 19814.
  SIG (E(p)=100.-6300.)
  /PERRY 1955/; data taken from /JARMIE 1956/
  4pi*sigma(theta=90)
  TPGPE.SIG

* T (p,g) A  + 19814.
  SIG (E(p)=0.1-20000.)
  /ECPL-82/
  TPGEC.SIG

  T (p,g) A  + 19814.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  TPGFO.SVM

* T (p,g) A  + 19814.
  SVM (T=0.1-1000.)
  /ECPL-82/
  TPGEC.SVM
```

```
  T (p,n) 3He  - 764.
  SIG (E(p)=1000.-4100.)
  /JARVIS 1950/; data taken from /JARMIE 1956/
  TPNJS.SIG

* T (p,n) 3He  - 764.
  SIG (E(p)=1025.-20000.)
  /ECPL-82/
  TPNEC.SIG

  T (p,n) 3He  - 764.
  SVM (T=8.8-1000.)
  /FOWLER 1975/; computed from formula
  TPNFO.SVM

  T (p,n) 3He  - 764.
  SVM (T=24.-1000.)
  /MCNALLY 1980/
  TPNNA.SVM

* T (p,n) 3He  - 764.
  SVM (T=16.02-1000.)
  /ECPL-82/
  TPNEC.SVM


* T (d,n) A  + 17589.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  TDNEC.SIG

  T (d,n) A  + 17589.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  TDNFO.SVM

  T (d,n) A  + 17589.
  SVM (T=1.,1000.)
  /MCNALLY 1980/
  TDNNA.SVM

* T (d,n) A  + 17589.
  SVM (T=0.1-1000.)
  /ECPL-82/
  TDNEC.SVM

* T (d,ng) A  + 17589.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  TDNGEC.SIG

* T (d,ng) A  + 17589.
  SVM (T=0.1-1000.)
  /ECPL-82/
  TDNGEC.SVM
```

```
  T (t,nn) A  + 11332.
  SIG (E(t)=1.-95000.)
  /MILEY 1974/; data taken from a table
  TTNNMI.SIG

  T (t,nn) A  + 11332.
  SIG (E(t)=0.1-5000.)
  /HALE 1978/; data taken from EXFOR D0019.002
  R-Matrix fit
  TTNNHA.SIG

  T (t,nn) A  + 11332.
  SIG (E(t)=31.-155.)
  /SEROV 1977/; data taken from EXFOR A0007.002
  TTNNSE.SIG

  T (t,nn) A  + 11332.
  SIG (E(t)=60.-1140.)
  /GOVOROV 1962/; data taken from EXFOR A0027.002
  TTNNGO.SIG

* T (t,nn) A  + 11332.
  SIG (E(t)=0.1-20000.)
  /ECPL-82/
  TTNNEC.SIG

  T (t,nn) A  + 11332.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  TTNNFO.SVM

  T (t,nn) A  + 11332.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  TTNNNA.SVM

* T (t,nn) A  + 11332.
  SVM (T=0.1-1000.)
  /ECPL-82/
  TTNNEC.SVM


* 3He (d,p) A  + 18353.
  SIG (E(d)=5.-20000.)
  /ECPL-82/
  H3DPEC.SIG

  3He (d,p) A  + 18353.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  H3DPFO.SVM

  3He (d,p) A  + 18353.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  H3DPNA.SVM
```

```
* 3He (d,p) A  + 18353.
  SVM (T=0.12-1000.)
  /ECPL- 82/
  H3DPEC.SVM

* 3He (d,pg) A  + 18353.
  SIG (E(d)=185.-1000.)
  partial cross section via 5Li
  /BUSS 1968/; data taken from EXFOR C0027.
  H3DPGBU.SIG

* 3He (d,pg) A  + 18353.
  SVM (T=1.5-1000.)
  /AEP/; computed from SIG /BUSS 1968/
  H3DPGAP.SVM


  3He (t,x) A
  SIG (E(t)=100.-800.)
  /MOAK 1953/; data read from a curve
  summed cross section for (t,np)+(t,d)+(t,p)5He
  H3TXMO.SIG

  3He (t,x) A
  SIG (E(T)=1.-95000.)
  /MILEY 1974/; data taken from a table
  summed cross section for (t,np)+(t,p)5He+(t,d)
  H3TXMI.SIG

  3He (t,x) A
  SIG (E(t)=150.-1000.)
  /YOUN 1961/; data read from a curve
  summed cross section for (t,np)+(t,p)5He+(t,d)
  H3TXYO.SIG

  3He (t,x) A
  SIG (E(t)=460.-1087.)
  /KUEHN 1963/; data taken from a table
  summed cross section for (t,np)+(t,p)5He+(t,d)
  H3TXKU.SIG

  3He (t,x) A
  SVM (T=10.-1000.)
  /MCNALLY 1980/
  sum of (t,np)+(t,p)5He+(t,d)
  H3TXNA.SVM


  3He (t,np) A  + 12096.
  SIG (E(t)=100.-800.)
  /MOAK 1953/; data computed from /MOAK 1953/: 51% of (t,x) A
  (t,np) direct three-body breakup
  H3TNPMO.SIG
```

```
  3He (t,np) A  + 12096.
  SIG (E(t)=1.-95000.)
  /MILEY 1974/; computed from /MILEY 1974/: 51% of (t,x)A
  cross section for (t,np) direct three body breakup
  H3TNPMI.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=150.-1000.)
  /YOUN 1961/; data read from a curve
  summed cross section for (t,np)+(t,p)5He
  H3TNPYO.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=1900.)
  /SMITH 1963/; data taken from text
  summed cross section for (t,np)+(t,p)5He
  H3TNPSM.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=1460.-1087.)
  /KUEHN 1963/; data taken from a table
  cross section for (t,np) direct three-body breakup
  H3TNPKU.SIG

* 3He (t,np) A  + 12096.
  SIG (E(t)=1.-1100.)
  /AEP/; from /MILEY 1974/,/KUEHN 1963/
  cross section for (t,np) direct three body breakup
  H3TNPAP.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=100.-800.)
  /MOAK 1953/; data computed from /MOAK 1953/: 6% of (t,x) A
  cross section for (t,p) 5He -> n+A
  H3TPMO.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=1.-95000.)
  /MILEY 1974/; computed from /MILEY 1974/: 6% of (t,x)A
  cross section for reaction via (t,p)5He -> n+a
  H3TPMI.SIG

  3He (t,np) A  + 12096.
  SIG (E(t)=1460.-1087.)
  /KUEHN 1963/; data taken from a table
  cross section for reaction via (t,p) 5He -> n+A
  H3TPKU.SIG

* 3He (t,np) A  + 12096.
  SIG (E(t)=1.-1100.)
  /AEP/; from /MILEY 1974/,/KUEHN 1963/
  cross section for reaction via (t,p)5He -> n+a
  H3TPAP.SIG

  3He (t,np) A  + 12096.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  H3TNPFO.SVM
```

```
  3He (t,np) A  + 12096.
  SVM (T=10.-1000.)
  /MCNALLY 1980/; 55% of SVM (t,x)
  H3TNPNA.SVM

  3He (t,np) A  + 12096.
  SVM (T=10.-1000.)
  /MCNALLY 1980/; 4% of SVM (t,x)
  H3TPNA.SVM

* 3He (t,np) A  + 12096.
  SVM (T=1.-1000.)
  /AEP/; computed from SIG/AEP/
  (t,np) 3-body breakup
  H3TNPAP.SVM

* 3He (t,np) A  + 12096.
  SVM (T=1.-1000.)
  /AEP/, computed from SIG/AEP/
  (t,p)5He-channel
  H3TPAP.SVM


  3He (t,d) A  + 14320.
  SIG (E(t)=100.-800.)
  /MOAK 1953/; data computed from /MOAK 1953/: 43% of (t,x) A
  H3TDMO.SIG

  3He (t,d) A  + 14320.
  SIG (E(t)=1.-95000.)
  /MILEY 1974/; computed from /MILEY 1974/: 43% of (t,x)A
  H3TDMI.SIG

  3He (t,d) A   + 14320.
  SIG (E(t)=1460.-1087.)
  /KUEHN 1963/; data taken from a table
  H3TDKU.SIG

* 3He (t,d) A  + 14320.
  SIG (E(t)=1.-1080.)
  /AEP/; from /MILEY 1974/,/KUEHN 1963/
  H3TDAP.SIG

  3He (t,d) A  + 14320.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  H3TDFO.SVM

  3He (t,d) A  + 14320.
  SVM (T=10.-1000.)
  /MCNALLY 1980/; 41% of SVM (t,x)
  H3TDNA.SVM

* 3He (t,d) A  + 14320.
  SVM (T=1.-1000.)
  /AEP/, computed from SIG/AEP/
  H3TDAP.SVM
```

```
  3He (3He,pp) A  + 12860.
  SIG (E(3He)=100.-735.)
  /GOOD 1954/; data read from a curve
  H3H3PPGO.SIG

  3He (3He,pp) A  + 12860.
  SIG (E(3He)=160.-2200.)
  /DWARAKANATH 1971/; data read from a curve
  H3H3PPDW.SIG

  3He (3He,pp) A  + 12860.
  SIG (E(3He)=6.-10000.)
  /DWARAKANATH 1971/; data computed: S-function fit
  H3H3PP1DW.SIG

  3He (3He,pp) A  + 12860.
  SIG (E(3He)=3030.-30000.)
  /PRITZKER 1976/; data taken from a table
  H3H3PPPR.SIG

  3He (3He,pp) A  + 12860.
  SIG (E(3He)=6.-10000.)
  /KRAUSS 1987/; data computed: S-function fit
  H3H3PP1KR.SIG

* 3He (3He,pp) A  + 12860.
  SIG (E(3He)=6.-30000.)
  /AEP/; from /DWARAKANATH 1971/,/PRITZKER 1976/
  H3H3PPAP.SIG

  3He (3He,pp) A  + 12860.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  H3H3PPFO.SVM

  3He (3He,pp) A  + 12860.
  SVM (T=1.1=1000.)
  /MCNALLY 1979/
  H3H3PPNA.SVM

* 3He (3He,pp) A  + 12860.
  SVM (T=1.-1000.)
  /AEP/; computed from SIG /AEP/
  H3H3PPAP.SVM
```

```
* A (t,g) 7Li  + 2468.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  ATGFO.SVM

* A (t,n) 6Li  - 4782.
  SVM (T=54.-1000.)
  /FOWLER 1975/; computed from formula
  ATNFO.SVM

* A (3He,g) 7Be  + 1588.
  SIG (E(3He)=290.-2200.)
  /OSBORNE 1982/; data taken from EXFOR A0155
  AH3GOS.SIG

* A (3He,g) 7Be  + 1588.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  AH3GFO.SVM


* 6Li (p,g) 7Be  + 5606.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L6PGFO.SVM


* 6Li (p,3He) A  + 4018.
  SIG (E(p)=1.-20000.)
  /ECPL-82/
  L6PH3EC.SIG

  6Li (p,3He) A  + 4018.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L6PH3FO.SVM

  6Li (p,3He) A  + 4018.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6PH3NA.SVM

* 6Li (p,3He) A  + 4018.
  SVM (T=0.2-1000.)
  /ECPL-82/
  L6PH3EC.SVM


* 6Li (d,n) 7Be  + 3381.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  L6DNEC.SIG

  6Li (d,n) 7Be  + 3381.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6DNNA.SVM
```

```
* 6Li (d,n) 7Be  + 3381.
  SVM (T=0.3-1000.)
  /ECPL-82/
  L6DNEC.SVM


* 6Li (d,n3He) A  + 1794.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6DNH3NA.SVM


* 6Li (d,p) 7Li  + 5025.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  L6DPEC.SIG

  6Li (d,p) 7Li  + 5025.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6DPNA.SVM

* 6Li (d,p) 7Li  + 5025.
  SVM (T=0.3-1000.)
  /ECPL-82/
  L6DPEC.SVM


* 6Li (d,pt) A  + 2557.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  L6DPTEC.SIG

  6Li (d,pt) A  + 2557.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6DPTNA.SVM

* 6Li (d,pt) A  + 2557.
  SVM (T=0.32-1000.)
  /ECPL-82/
  L6DPTEC.SVM


* 6Li (d,a) A  + 22371.
  SIG (E(d)=1.-20000.)
  /ECPL-82/
  L6DAEC.SIG

  6Li (d,a) A  + 22371.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L6DANA.SVM
```

```
* 6Li (d,a) A  + 22371.
  SVM (T=0.32-1000.)
  /ECPL-82/
  L6DAEC.SVM


* 6Li (t,nn) 7Be  - 2876.
  SIG (E(t)=4310.-20000.)
  /ECPL-82/
  L6TNNEC.SIG

* 6Li (t,nn) 7Be  - 2876.
  SVM (T=54.-1000.)
  /ECPL-82/
  L6TNNEC.SVM


  6Li (3He,pa) A  + 16878.
  SVM (T=10.-1000.)
  via 8Be ground state
  /MCNALLY 1980/
  L6H3P0NA.SVM

  6Li (3He,pa) A  + 16878.
  SVM (T=10.-1000.)
  via 8Be 2.94MeV excited state
  /MCNALLY 1980/
  L6H3P1NA.SVM

  6Li (3He,pa) A  + 16878.
  SVM (T=10.-1000.)
  via 8Be 16.63MeV excited state
  /MCNALLY 1980/
  L6H3P2NA.SVM

  6Li (3He,pa) A  + 16878.
  SVM (T=10.-1000.)
  via 8Be 16.92MeV excited state
  /MCNALLY 1980/
  L6H3P3NA.SVM

  6Li (3He,pa) A  + 16878.
  SVM (T=10.-1000.)
  3-particle break up
  /MCNALLY 1980/
  L6H3PANA.SVM


* 6Li (3He,d) 7Be  + 112.
  SIG (E(3He)=170.-20000.)
  /ECPL-82/
  L6H3DEC.SIG

  6Li (3He,d) 7Be  + 112.
  SVM (T=100.-1000.)
  /MCNALLY 1980/
  L6H3DNA.SVM
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```
* 6Li (3He,d) 7Be  + 112.
  SVM (T=3.62-1000.)
  /ECPL-82/
  L6H3DEC.SVM


* 6Li (a,g) 10B  + 4460.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L6AGFO.SVM


* 6Li (6Li,n) 11C  + 9450.
  SVM (T=40.-1000.)
  /MCNALLY 1980/
  L6L6NNA.SVM

* 6Li (6Li,na) 7Be  + 1906.
  SIG (E(6Li)=1600.-5000.)
  /RUBY 1977/; data taken from EXFOR B0134.002
  L6L6NARU.SIG

* 6Li (6Li,na) 7Be  + 1906.
  SVM (T=40.-1000.)
  /MCNALLY 1980/
  L6L6NANA.SVM

* 6Li (6Li,p) 11B  + 12215.
  SVM (T=40.-1000.)
  /MCNALLY 1980/
  L6L6PNA.SVM

* 6Li (6Li,d) 10B  + 2985.
  SVM (T=40.-1000.)
  /MCNALLY 1980/
  L6L6DNA.SVM

* 6Li (6Li,pta) A  + 1082.
  SVM (T=40.-1000.)
  /MCNALLY 1980/
  via 9B
  L6L6PTANA.SVM

* 6Li (6Li,aa) A  + 20896.
  SVM (T=10.-1000.)
  /MCNALLY 1980/
  L6L6AANA.SVM
```

```
* 7Li (p,n) 7Be  - 1644.
  SIG (E(p)=1880.-20000.)
  /ECPL-82/
  L7PNEC.SIG

  7Li (p,n) 7Be  - 1644.
  SVM (T=19.-1000.)
  /FOWLER 1975/; computed from formula
  L7PNFO.SVM

* 7Li (p,n) 7Be  - 1644.
  SVM (T=30.-1000.)
  /ECPL-82/
  L7PNEC.SVM


* 7Li (p,a) A  + 17346.
  SIG (E(p)=10.-20000.)
  /ECPL-82/
  L7PAEC.SIG

  7Li (p,a) A  + 17346.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L7PAFO.SVM

  7Li (p,a) A  + 17346.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L7PANA.SVM

* 7Li (p,a) A  + 17346.
  SVM (T=0.12-1000.)
  /ECPL-82/
  L7PAEC.SVM


* 7Li (d,nn) 7Be  - 3869.
  SIG (E(d)=4970.-20000.)
  /ECPL-82/
  L7DNNEC.SIG

* 7Li (d,nn) 7Be  - 3869.
  SVM (T=72.-1000.)
  /ECPL-82/
  L7DNNEC.SVM


  7Li (d,na) A  + 15121.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L7DNAFO.SVM

* 7Li (d,na) A  + 15121.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L7DNANA.SVM
```

```
  7Li (d,p) 8Li  - 192.
  SIG (E(d)=700.-3400.)
  /MINGAY 1979/; data taken from EXFOR D0021.002
  L7DPMI.SIG

  7Li (d,p) 8Li  - 192.
  SIG (E(d)=579.4-1181.6)
  /FILLIPONE 1982/; data taken from EXFOR A0157.002
  L7DPFI.SIG

  7Li (d,p) 8Li  - 192.
  SIG (E(d)=602.-1510.)
  /KAVANAGH 1960/; data taken from EXFOR P0080.002
  L7DPKA.SIG

* 7Li (d,p) 8Li  - 192.
  SIG (E(d)=602.-3400.)
  /AEP/ from /KAVANAGH 1960/,/MINGAY 1978/
  L7DPAP.SIG

* 7Li (d,p) 8Li  - 192.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG/AEP/
  L7DPAP.SVM


* 7Li (d,t) 6Li  - 993.
  SIG (E(d)=1280.-4140.)
  /MACKLIN 1955/; data taken from EXFOR P0131.002
  L7DTMA.SIG

* 7Li (d,t) 6Li  - 993.
  SVM (T=13.-1000.)
  /AEP/; computed from SIG/MACKLIN 1956/
  L7DTAP.SVM


* 7Li (t,nnn) 7Be  - 10126.
  SIG (E(t)=14470.-20000.)
  /ECPL-82/
  L7TNNNEC.SIG

* 7Li (t,nnn) 7Be  - 10126.
  SVM (T=260.-1000.)
  /ECPL-82/
  L7TNNNEC.SVM


  7Li (t,nna) A  + 8864.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L7TNNAFO.SVM

* 7Li (t,nna) A  + 8864.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L7TNNANA.SVM
```

```
  7Li (3He,npa) A  + 9628.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L7H3NPAFO.SVM

* 7Li (3He,npa) A  + 9628.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  L7H3NPANA.SVM


* 7Li (3He,t) 7Be  - 881.
  SIG (E(3He)=1250.-20000.)
  /ECPL-82/
  L7H3TEC.SIG

* 7Li (3He,t) 7Be  - 881.
  SVM (T=20.-1000.)
  /ECPL-82/
  L7H3TEC.SVM


* 7Li (a,g) 11B  + 8665.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  L7AGFO.SVM


  7Li (a,n) 10B  - 2790.
  SIG (E(a)=4420.-5120.)
  /MACKLIN 1968/; data taken from EXFOR P0117.002
  L7ANMA.SIG

* 7Li (a,n) 10B  - 2790.
  SIG (E(a)=4380.-8200.)
  /GIBBONS 1959/; data taken from EXFOR P0001.001
  L7ANGI.SIG

* 7Li (a,n) 10B  - 2790.
  SVM (T=32.-1000.)
  /FOWLER 1975/; computed from formula
  L7ANFO.SVM


  7Be (p,g) 8B  + 138.
  SIG (E(p)=360.-360.)
  /WIEZOREK 1977/; data taken from EXFOR B0091.002
  47PGWI.SIG

  7Be (p,g) 8B  + 138.
  SIG (E(p)=480.-1900.)
  /PARKER 1966/; data taken from EXFOR P0020.002
  47PGPA.SIG
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```
* 7Be (p,g) 8B  + 138.
  SIG (E(p)=360.-1900.)
  /AEP/; from /WIEZOREK 1977/,/PARKER 1966/
  47PGAP.SIG

* 7Be (p,g) 8B  + 138.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  47PGFO.SVM


  7Be (d,pa) A  + 16766.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  47DPAFO.SVM

* 7Be (d,pa) A  + 16766.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  47DPANA.SVM


  7Be (t,npa) A  + 10508.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  47TNPAFO.SVM

* 7Be (t,npa) A  + 10508.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  47TNPANA.SVM


  7Be (3He,ppa) A  + 11272.
  SVM (T=1.3-1000.)
  /FOWLER 1975/; computed from formula
  47H3PPAFO.SVM

* 7Be (3He,ppa) A  + 11272.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  47H3PPANA.SVM


* 7Be (a,g) 11C  + 7544.
  SVM (T=1.6-1000.)
  /FOWLER 1975/; computed from formula
  47AGFO.SVM
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```
* 9Be (p,g) 10B  + 6587.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  49PGFO.SVM

* 9Be (p,npa) A  - 1574.
  SVM (T=21.-1000.)
  /FOWLER 1975/; computed from formula
  via 9B
  49PNPAFO.SVM

* 9Be (p,da) A  +  651.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  49PDAFO.SVM

* 9Be (p,a) 6Li  + 2126.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  49PAFO.SVM

* 9Be (a,n) 12C  + 5701.
  SVM (T=1.2-1000.)
  /FOWLER 1975/; computed from formula
  49ANFO.SVM

* 9Be (a,naa) A  - 1574.
  SIG (E(a)=4200.-20000.)
  /ECPL-82/
  49ANAAEC.SIG


  10B (p,g) 11C  + 8690.
  SIG (E(p)=450.-2500.)
  /DAY 1954/; data from /JARMIE 1956/
  B0PGDA.SIG

* 10B (p,g) 11C  + 8690.  E(g)=8690.
  SIG (E(p)=200.-2200.)
  /WIESCHER 1983/; data read from a curve
  capture via C-11 ground state
  B0PGWI.SIG

* 10B (p,gg) 11C  + 8690.  E(g1)=4371. E(g2)=4319.
  SIG (E(p)=200.-2200.)
  /WIESCHER 1983/; data read from a curve
  capture to C-11 4319.keV state
  B0PGG1WI.SIG

* 10B (p,gg) 11C  + 8690.  E(g1)=2212.  E(g2)=6478.
  SIG (E(p)=200.-2200.)
  /WIESCHER 1983/; data read from a curve
  capture to C-11 6478.keV state
  B0PGG2WI.SIG

* 10B (p,g) 11C  + 8690.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  B0PGFO.SVM
```

```
  10B (p,n) 10C  - 4433.
  SIG (E(p)=6850.-11700.)
  /MUMINOV 1980/; data taken from EXFOR A0085.024
  BOPNMU.SIG

* 10B (p,n) 10C  - 4433.
  SIG (E(p)=4940.-10500.)
  /EARWAKER 1963/; data taken from EXFOR P0002.002
  BOPNEA.SIG


  10B (p,p) 10B
  SIG (E(p)=850.-1600.)
  /BROWN 1951/; data from /JARMIE 1956/
  BOPPBR.SIG

* 10B (p,p) 10B
  SIG (E(p)=3000.-10000.)
  /BORELI 1970/; data read from a curve
  BOPPBO.SIG

* 10B (p,pg) 10B   E(g)=718.
  SIG (E(p)= 1500.-2550.)
  /DAY 1954/; data from /JARMIE 1956/
  inelastic scattering via B-10 718keV state
  BOPPGDA.SIG


* 10B (p,3Hea) A  - 442.
  SIG (E(p)=484.-20000.)
  /ECPL-82/
  BOPH3AEC.SIG

* 10B (p,3Hea) A  - 442.
  SVM (T=12.-1000.)
  /ECPL-82/
  BOPH3AEC.SVM


  10B (p,a) 7Be  + 1146.
  SIG (E(p)=60.-180.)
  /SZABO 1972/; data taken from a table
  BOPASZ.SIG

  10B (p,a) 7Be  + 1146.
  SIG (E(p)=100.-1500.)
  /JARMIE 1956/; from /BACH 1955/,/BROWN 1951/,/BURCHAM 1950/
  BOPAJA.SIG

  10B (p,a) 7Be  + 1146.
  SIG (E(p)=3000.-7000.)
  /JENKIN 1964/; data taken from a curve
  via Be-7 ground state
  BOPAJE.SIG
```

```
* 10B (p,a) 7Be  + 1146.
  SIG (E(p)=100.-20000.)
  /ECPL-82/
  B0PAEC.SIG

  10B (p,a) 7Be  + 1146.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  B0PAFO.SVM

* 10B (p,a) 7Be  + 1146.
  SVM (T=2.02-1000.)
  /ECPL-82/
  B0PAEC.SVM


* 10B (p,ag) 7Be  + 1146.
  SIG (E(p)=3600.-6000.)
  /JENKIN 1964/; data read from a curve
  reaction via Be-7 429.keV state
  B0PAGJE.SIG


  10B (d,n) 11C  + 6465.
  SIG (E(d)=7000.-16010.)
  /ANDERS 1981/; data taken from a table
  B0DNAN.SIG

  10B (d,n) 11C  + 6465.
  SIG (E(d)=600.-3200.)
  /WOHLLEBEN 1969/; data taken from a table
  B0DNWO.SIG

  10B (d,n) 11C  + 6465.
  SIG (E(d)=3000.-9000.)
  /DIN 1967/; data read from a curve
  B0DNDI.SIG

* 10B (d,n) 11C  + 6465.
  SIG (E(d)=100.-20000.)
  /ECPL-82/
  B0DNEC.SIG

* 10B (d,n) 11C  + 6465.
  SVM (T=1.82-1000.)
  /ECPL-82/
  B0DNEC.SVM


* 10B (d,ng) 11C  + 6465.   E(g)=4320.
  SIG (E(d)=111.-159.)
  /CECIL 1982/; data taken from a table
  via C-11 4320.keV level
  B0DNGCE.SIG
```

```
  10B (d,p) 11B  + 9230.
  SIG (E(d)=150.-700.)
  /PARIS 1954/; data read from a curve
  BODPPA.SIG

  10B (d,p) 11B  + 9230.
  SIG (E(d)=150.-300.)
  /HARRISON 1960/; data read from a curve
  via 11B ground state
  BODPHA.SIG

  10B (d,p) 11B  + 9230.
  SIG (E(d)=1000.-3500.)
  /BREUER 1964/; data read from a curve
  via 11B ground state
  BODPBR.SIG

* 10B (d,p) 11B  + 9230.
  SIG (E(d)=100.-20000.)
  /ECPL-82/
  BODPEC.SIG

  10B (d,pg) 11B  + 9230.
  SIG (E(d)=150.-300.)
  /HARRISON 1960/; data read from a curve
  via 11B 1st state
  BODPG1HA.SIG

  10B (d,pg) 11B  + 9230.
  SIG (E(d)=150.-300.)
  /HARRISON 1960/; data read from a curve
  via 11B 2nd state
  BODPG2HA.SIG

  10B (d,pg) 11B  + 9230.
  SIG (E(d)=150.-300.)
  /HARRISON 1960/; data read from a curve
  via 11B 3rd state
  BODPG3HA.SIG

  10B (d,pg) 11B  + 9230.
  SIG (E(d)=1000.-3500.)
  /BREUER 1964/; data read from a curve
  via 11B 1st state
  BODPG1BR.SIG

  10B (d,pg) 11B  + 9230.
  SIG (E(d)=1000.-3500.)
  /BREUER 1964/; data read from a curve
  via 11B 2nd state
  BODPG2BR.SIG

* 10B (d,p) 11B  + 9230.
  SVM (T=2.42-1000.)
  /ECPL-82/
  BODPEC.SVM
```

```
* 10B (d,dg) 10B  E(g)=2150.
  SIG (E(d)=6500.-12000.)
  /STOCKER 1974/; data taken from a table
  via 10B 2150.keV state
  B0DDGST.SIG


  10B (d,aa) A  + 17911.
  SIG (E(d)=1000.-1750.)
  /PURSER 1963/; data taken from a table
  B0DAAPU.SIG

  10B (d,aa) A +  17911.
  SIG (E(d)=600.-2600.)
  /COMSAN 1968/; data read from a curve
  via 8Be ground state
  B0DAA0CO.SIG

  10B (d,aa) A +  17911.
  SIG (E(d)=600.-2600.)
  /COMSAN 1968/; data read from a curve
  via 8Be 1st state
  B0DAA1CO.SIG

* 10B (d,aa) A  + 17911.
  SIG (E(d)=100.-20000.)
  /ECPL-82/
  B0DAAEC.SIG

* 10B (d,aa) A  + 17911.
  SVM (T=1.82-1000.)
  /ECPL-82/
  B0DAAEC.SVM


* 10B (a,n) 13N  + 1058.
  SIG (E(a)=2550.-4830.)
  /GIBBONS 1959/; data taken from EXFOR P0001.005
  B0ANGI.SIG


* 10B (a,a) 10B
  SIG (E(a)=5000.-30000.)
  /DAVID 1972/; data read from a curve
  B0AADA.SIG


  11B (p,g) 12C  + 15956.
  SIG (E(p)=360.-2000.)
  /HUUS 1953/; from /TAUSSIG 1977/ from /JARMIE 1957/
  B1PGHU.SIG

  11B (p,g) 12C  + 15956.
  SIG (E(p)=500.-4000.)
  /SEGEL 1965; data read from a curve
  B1PGSE.SIG
```

```
* 11B (p,g) 12C  + 15956.
  SIG (E(p)=360.-4000.)
  /AEP/; from /SEGEL 1965/,/HUUS 1953/
  B1PGAP.SIG

  11B (p,g) 12C  + 15956.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  B1PGFO.SVM

* 11B (p,g) 12C  + 15956.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /AEP/
  B1PGAP.SVM


  11B (p,gg) 12C  + 15956.;  g(4000.) g(12000.)
  SIG (E(p)=100.-2000.)
  /HUUS/; from /TAUSSIG 1977/ from /JARMIE 1957/
  B1PGGHU.SIG

  11B (p,gg) 12C  + 15956.;  g(4000.) g(12000.)
  SIG (E(p)=540.-4000.)
  /SEGEL 1965/; data taken from a curve
  B1PGGSE.SIG

* 11B (p,gg) 12C  + 15956.;  g(4000.) g(12000.)
  SIG (E(p)=100.-4000.)
  /AEP/; from /SEGEL 1965/,/HUUS 1953/
  B1PGGAP.SIG

* 11B (p,gg) 12C  + 15956.;  g(4000.) g(12000.)
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /AEP/
  B1PGGAP.SVM


  11B (p,n) 11C  - 2764.
  SIG (E(p)=2890.-5510.)
  /GIBBONS 1959/; data taken from EXFOR P0001.003
  B1PNGI.SIG

  11B (p,n) 11C  - 2764.
  SIG (E(p)=4720.-15000.)
  /FURUKAWA 1960/; data taken from EXFOR P0045.002
  B1PNFU.SIG

  11B (p,n) 11C  - 2764.
  SIG (E(p)=3000.-3700.)
  /SEGEL 1965/; data taken from a curve
  B1PNSE.SIG

  11B (p,n) 11C  - 2764.
  SIG (E(p)=10870.-27500.)
  /ANDERS 1981/; data taken from a table
  B1PNAS.SIG
```

```
  11B (p,n) 11C  - 2764.
  SIG (E(p)=4700.-8500.)
  /ANDERSON 1964/; data taken from /HOEHN 1981/
  B1PNAN.SIG

* 11B (p,n) 11C  - 2764.
  SIG (E(p)=3020.-20000.)
  /ECPL-82/
  B1PNEC.SIG

  11B (p,n) 11C  - 2764.
  SVM (T=32.-1000.)
  /FOWLER 1975/; computed from formula
  B1PNFO.SVM

  11B (p,n) 11C  - 2764.
  SVM (T=50.-1000.)
  /ECPL-82/
  B1PNEC.SVM

* 11B (p,n) 11C  - 2764.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /ECPL-82/
  B1PNAP.SVM


* 11B (p,pg) 11B
  SIG (E(p)=2500.-4000.)
  /SEGEL 1965/; data read from a curve
  inelastic scattering via 11B 2130.keV state
  B1PPGSE.SIG


  11B (p,aa) A  + 8681.
  SIG (E(p)=300.-1800.)
  /BECKMAN 1953/; data read from a curve
  via 8Be ground level
  B1PA0BE.SIG

  11B (p,aa) A  + 8681.
  SIG (E(p)=780.-6010.)
  /SYMONS 1963/; data taken from a table
  via 8Be ground level
  B1PA0SY.SIG

  11B (p,aa) A  + 8681.
  SIG (E(p)=540.-3800.)
  /SEGEL 1965/; data read from a curve
  via 8Be ground level
  B1PA0SE.SIG

  11B (p,aa) A  + 8681.
  SIG (E(p)=3400.-7800.)
  /BOERCHERS 1983/; data read from a curve
  via 8Be ground level
  B1PA0BO.SIG
```

```
11B (p,aa) A  + 8681.
SIG (E(p)=5000.-45000.)
/BUCK 1983/; data read from a curve
via 8Be ground level
B1PA0BU.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=300.-1800.)
/BECKMAN 1953/; data read from a curve
via 8Be 1st excited level
B1PA1BE.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=780.-3660.)
/SYMONS 1963/; data taken from a table
via 8Be 1st excited level
B1PA1SY.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=540.-3800.)
/SEGEL 1965/; data read from a curve
via 8Be 1st excited level
B1PA1SE.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=5000.-45000.)
/BUCK 1983/; data read from a curve
via 8Be 1st level
B1PA1BU.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=30.-1500.)
/DAVIDSON 1979/; data read from a curve
sum of all alpha channels
B1PAADA.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=100.-10000.)
/MOREAU 1977/; computed: upper bound of resonance parameter set
sum of all alpha channels
B1PAAUPMO.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=100.-10000.)
/MOREAU 1977/; computed: lower bound of resonance parameter set
sum of all alpha channels
B1PAALOMO.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=100.-10000.)
/GORDON 1981/; computed: resonance parameters from unknown source
sum of alpha channels
B1PAAGO.SIG

11B (p,aa) A  + 8681.
SIG (E(p)=35.-2000.)
/MILEY 1974/; analytical fit
sum of alpha channels,
B1PAAMI.SIG
```

```
  11B (p,aa) A  + 8681.
  SIG (E(p)=30.-3000.)
  /EXFOR/; from /DAVIDSON 1979/,/SEGEL 1965/
  sum of all alpha channels
  B1PAAEX.SIG

  11B (p,aa) A  + 8681.
  SIG (E(p)=68.-20000.)
  /ECPL-82/
  sum of all alpha channels
  B1PAAEC.SIG

* 11B (p,aa) A  + 8681.
  SIG (E(p)=30.-20000.)
  /AEP/; from /EXFOR/,/SEGEL 1965/,/MOREAU 1977/,/ECPL-82/
  sum of all alpha channels
  B1PAAAP.SIG

  11B (p,aa) A  + 8681.
  SVM (T=1.-1000.)
  /FOWLER 1975/; computed from formula
  B1PAAFO.SVM

  11B (p,aa) A  + 8681.
  SVM (T=1.-1000.)
  /MCNALLY 1980/
  B1PAANA.SVM

  11B (p,aa) A  + 8681.
  SVM (T=1.42-1000.)
  /ECPL-82/
  B1PAAEC.SVM

* 11B (p,aa) A  + 8681.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /AEP/
  B1PAAAP.SVM


* 11B (d,n) 12C  + 13732.
  SIG (E(d)=100.-20000.)
  /ECPL-82/
  B1DNEC.SIG

* 11B (d,n) 12C  + 13732.
  SVM (T=1.82-1000.)
  /ECPL-82/
  B1DNEC.SVM


* 11B (d,nn) 11C  - 4989.
  SIG (E(d)=7000.-16000.)
  /ANDERS 1981/; data taken from a table
  B1DNNAN.SIG
```

```
  11B (d,p) 12B  + 1145.
  SIG (E(d)=500.-3000.)
  /KAVANAGH 1958/; data read from a curve
  B1DPKA.SIG

* 11B (d,p) 12B  + 1145.
  SIG (E(d)=100.-20000.)
  /ECPL-82/
  B1DPEC.SIG

* 11B (d,p) 12B  + 1145.
  SVM (T=1.82-1000.)
  /ECPL-82/
  B1DPEC.SVM


  11B (a,n) 14N  + 157.
  SIG (E(a)=400.-5000.)
  /WALKER 1949/
  B1ANWA.SIG

  11B (a,n) 14N  + 157.
  SIG (E(a)=3700.-7850.)
  /VAN DER ZWAN 1975/
  B1ANVA.SIG

* 11B (a,n) 14N  + 157.
  SIG (E(a)=360.-7850.)
  /AEP/; from /WALKER 1977/,/VAN DER ZWAN 1975/
  B1ANAP.SIG

* 11B (a,n) 14N  + 157.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /AEP/
  B1ANAP.SVM


  11B (a,p) 14C  + 783.
  SIG (E(a)=2500.-3600.)
  /LEE 1959/
  B1APLE.SIG

  11B (a,p) 14C  + 783.
  SIG (E(a)=1450.-2900.)
  /DAYRAS 1976/
  B1APDA.SIG

  11B (a,p) 14C  + 783.
  SIG (E(a)=4400.-6700.)
  /HOU 1977/
  B1APHO.SIG

* 11B (a,p) 14C  + 783.
  SIG (E(a)=1450.-6700.)
  /AEP/; from /LEE 1959/,/DAYRAS 1976/,/HOU 1977/
  B1APAP.SIG
```

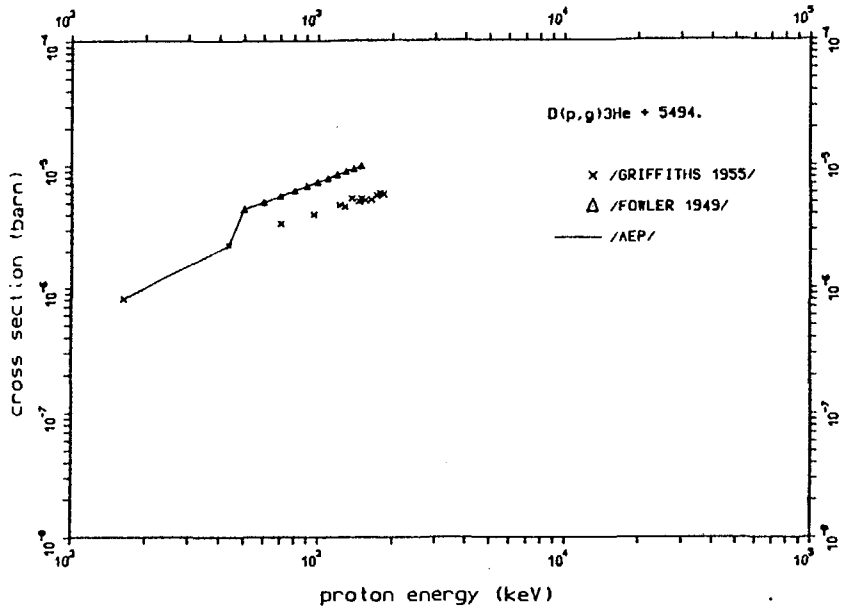
```
* 11B (a,p) 14C  + 783.
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /AEP/
  B1APAP.SVM

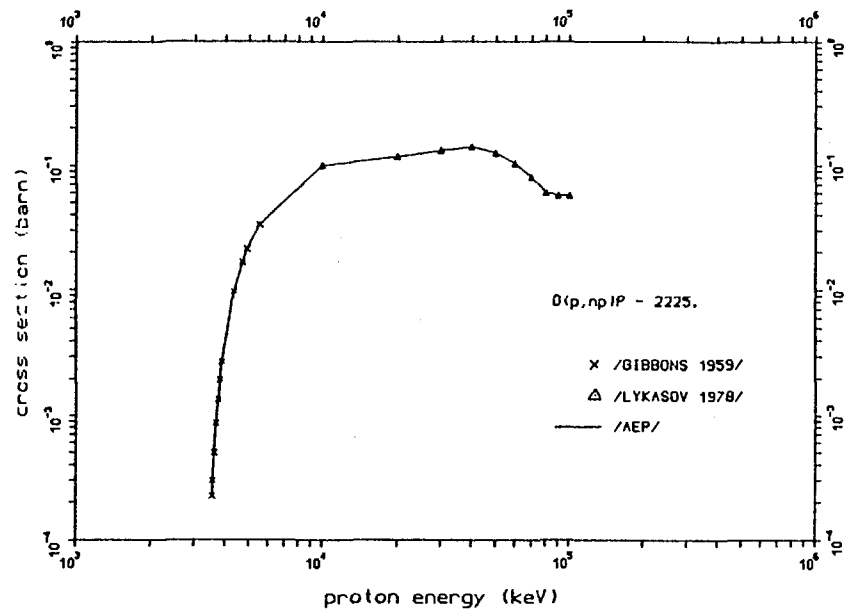

  11B (11B,x) X
  SIG (E(11B)=3100.-7200.)
  /HIGH 1976/
  sum of outgoing channels
  B1B1SHI.SIG

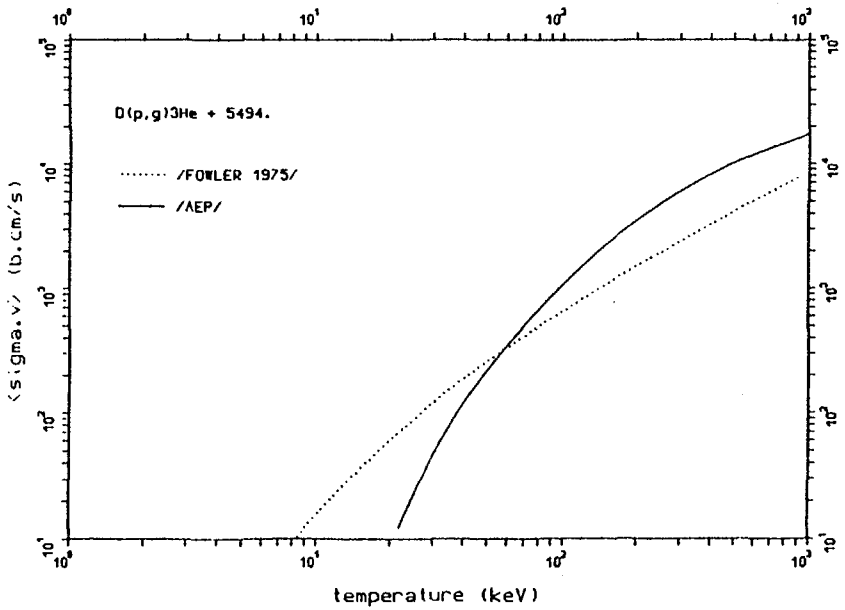
* 11B (11B,x) X
  SIG (E(B-11)=2000.-20000.)
  /NORBECK 1980/
  sum of outgoing channels, optical model fit
  B1B1SNO.SIG

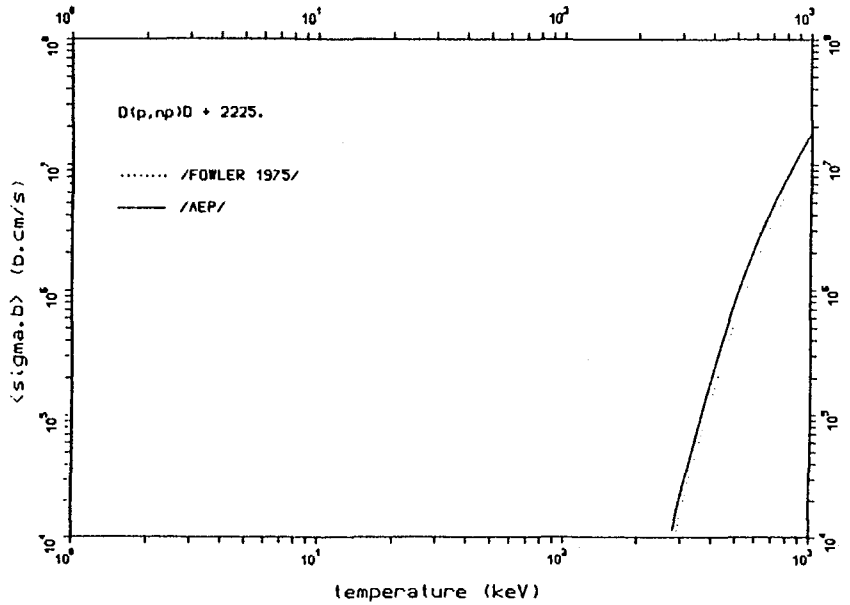
* 11B (11B,x) X
  SVM (T=10.-1000.)
  /AEP/; computed from SIG /NORBECK 1980/
  B1B1SAP.SVM
```

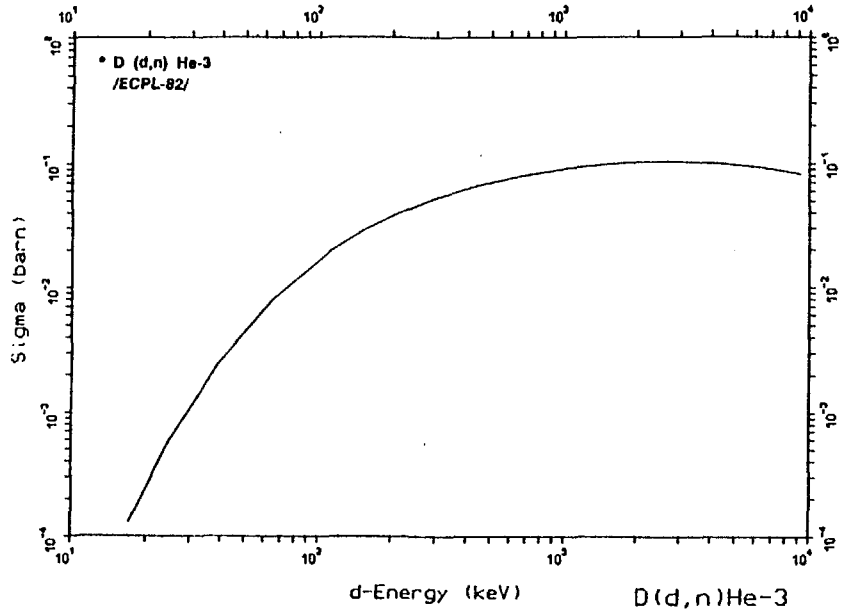
4. PLOTS

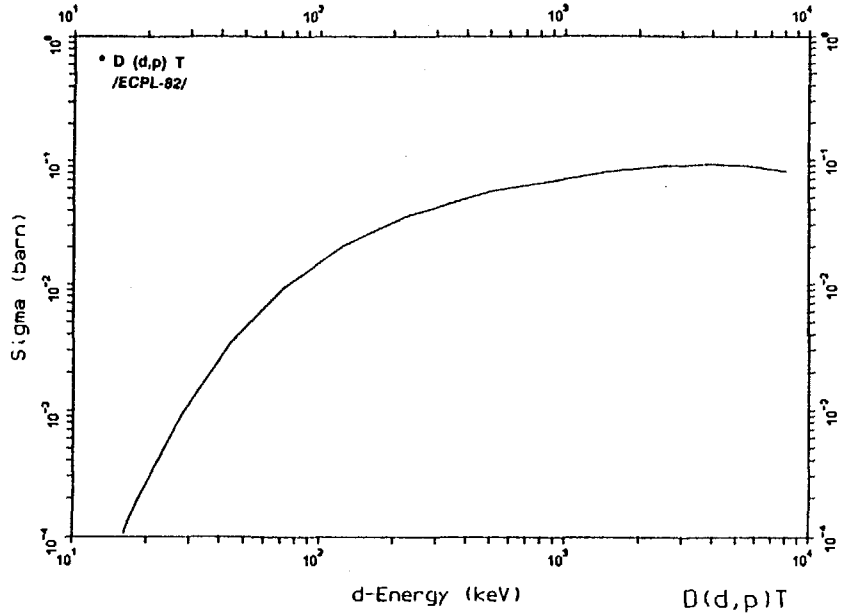

D(p,g)3He + 5494.
× /GRIFFITHS 1955/
Δ /FOWLER 1949/
—— /AEP/
cross section (barn)
proton energy (keV)

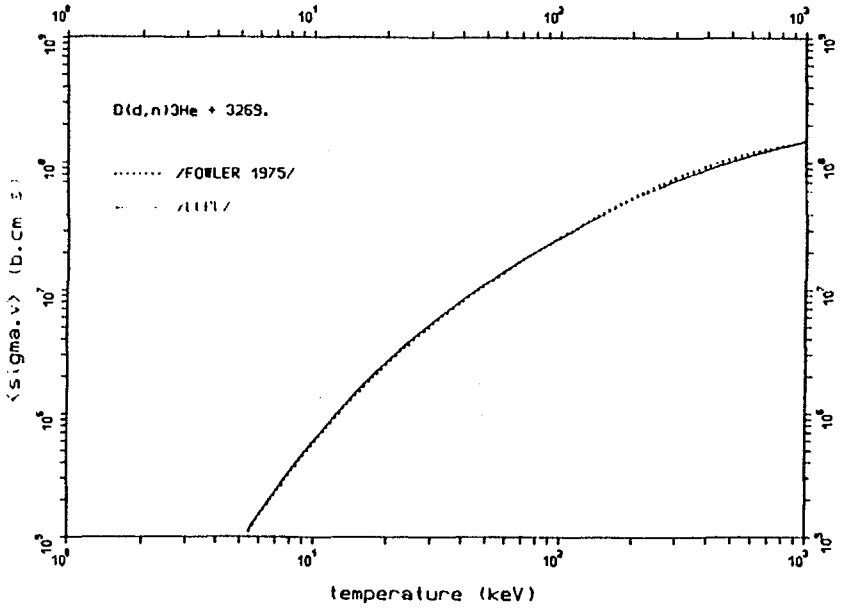

D(p,np)P - 2225.
× /GIBBONS 1959/
Δ /LYKASOV 1978/
—— /AEP/
cross section (barn)
proton energy (keV)

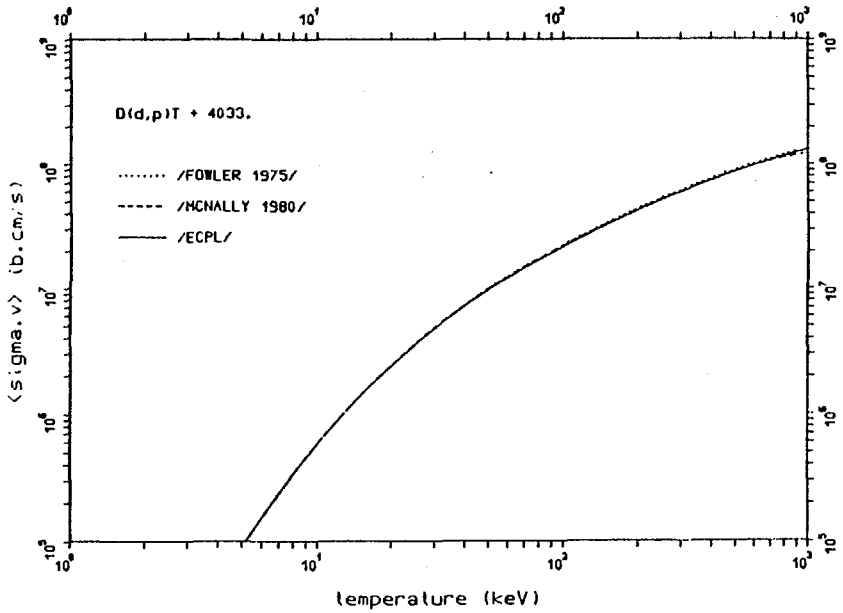

D(p,g)3He + 5494.
····· /FOWLER 1975/
—— /AEP/
<sigma.v> (b.cm/s)
temperature (keV)

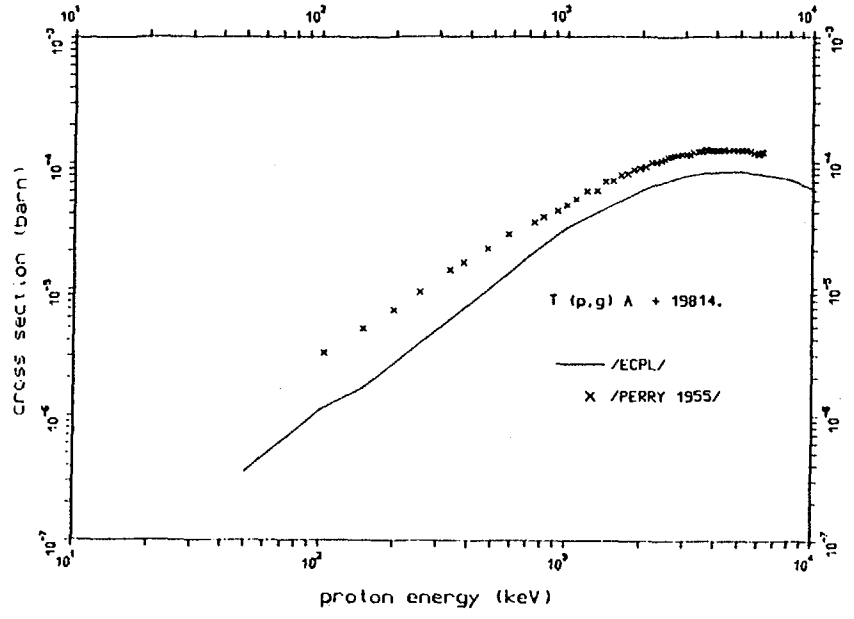

D(p,np)D + 2225.
····· /FOWLER 1975/
—— /AEP/
<sigma.b> (b.cm/s)
temperature (keV)

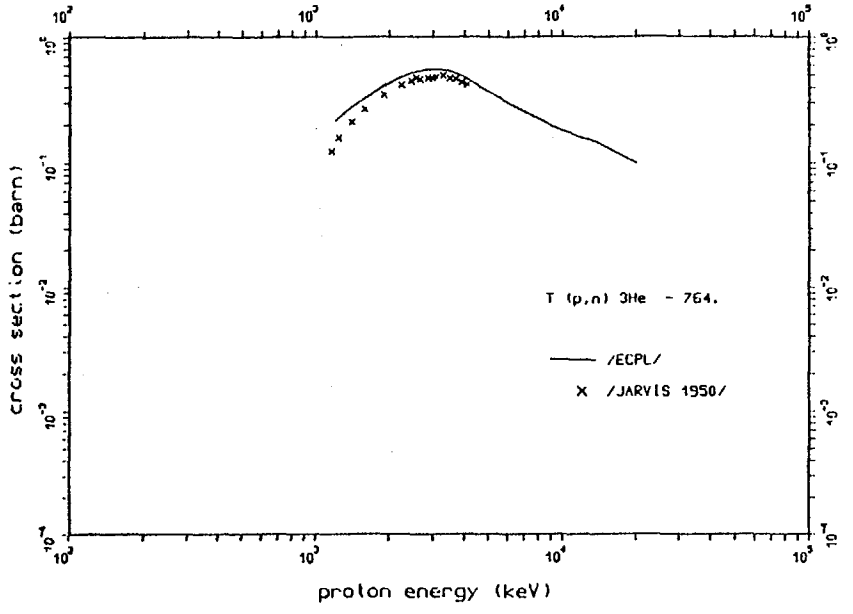

• D (d,n) He-3
/ECPL-82/
Sigma (barn)
d-Energy (keV)
D(d,n)He-3

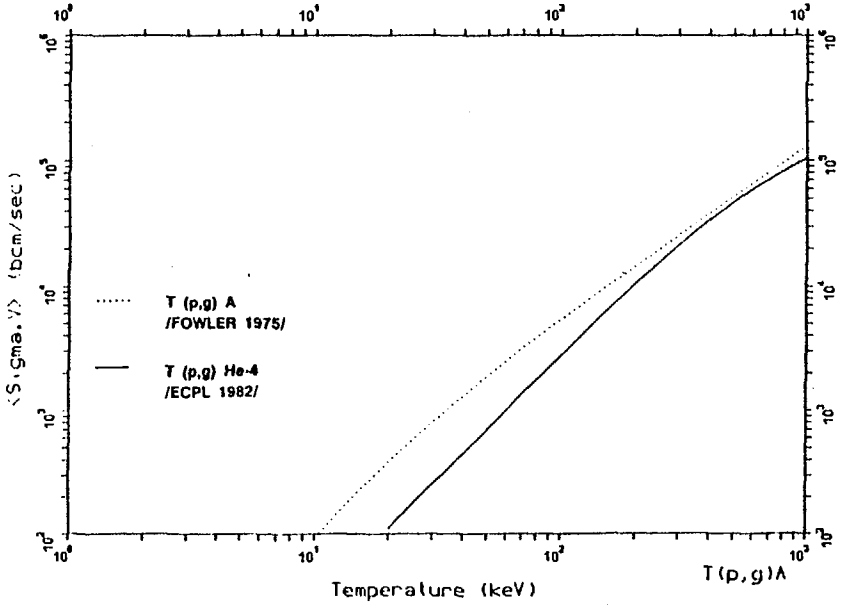

• D (d,p) T
/ECPL-82/
Sigma (barn)
d-Energy (keV)
D(d,p)T

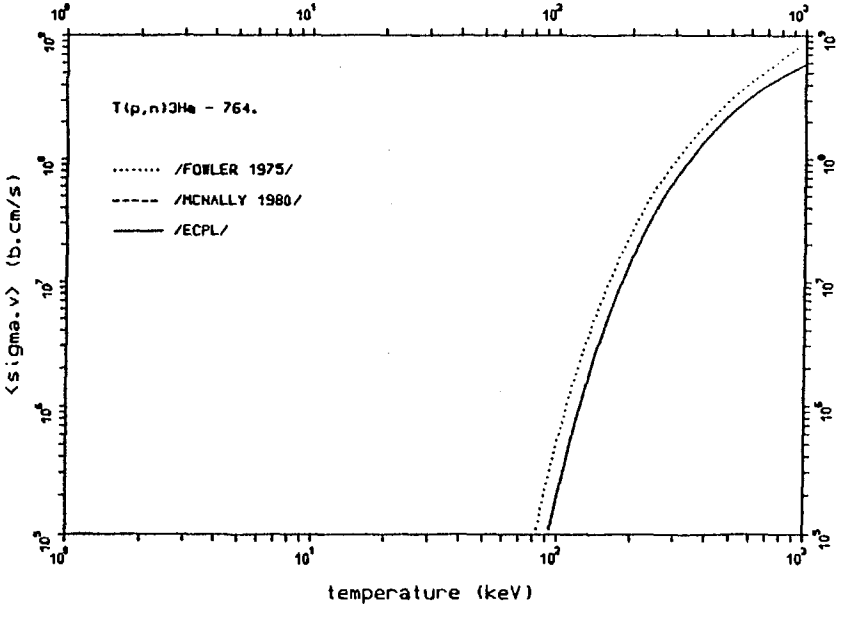

D(d,n)3He + 3269.
/FOWLER 1975/
temperature (keV)

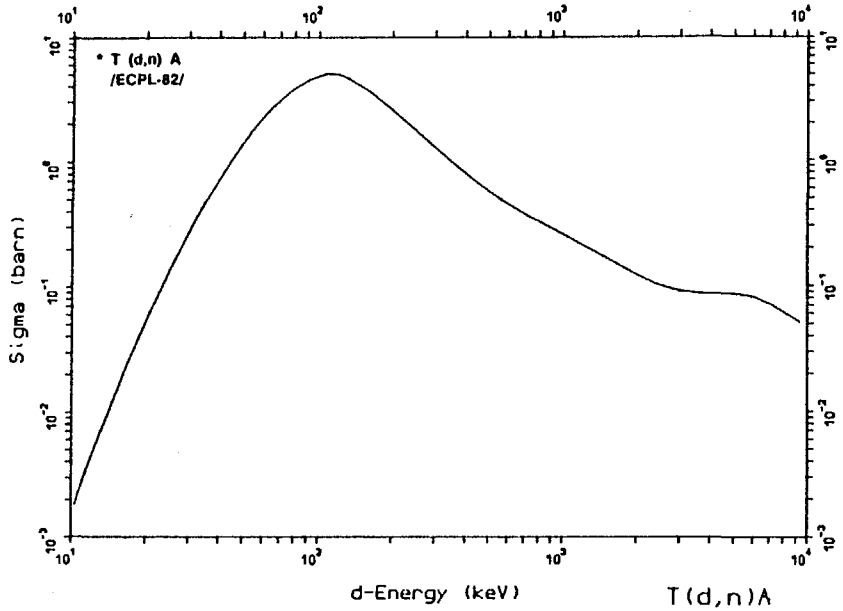

D(d,p)T + 4033.
/FOWLER 1975/
/MCNALLY 1980/
/ECPL/
temperature (keV)

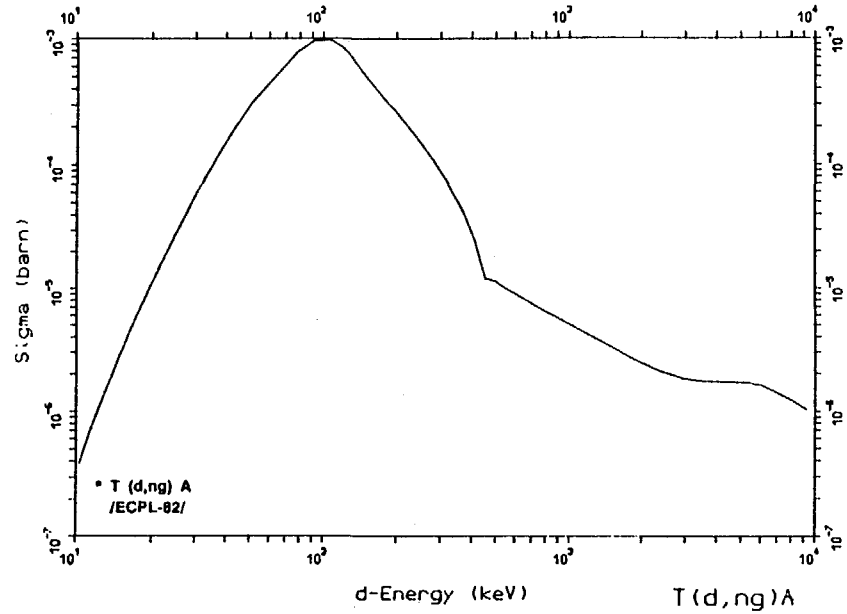

T (p,g) A + 19814.
/ECPL/
X /PERRY 1955/
cross section (barn)
proton energy (keV)

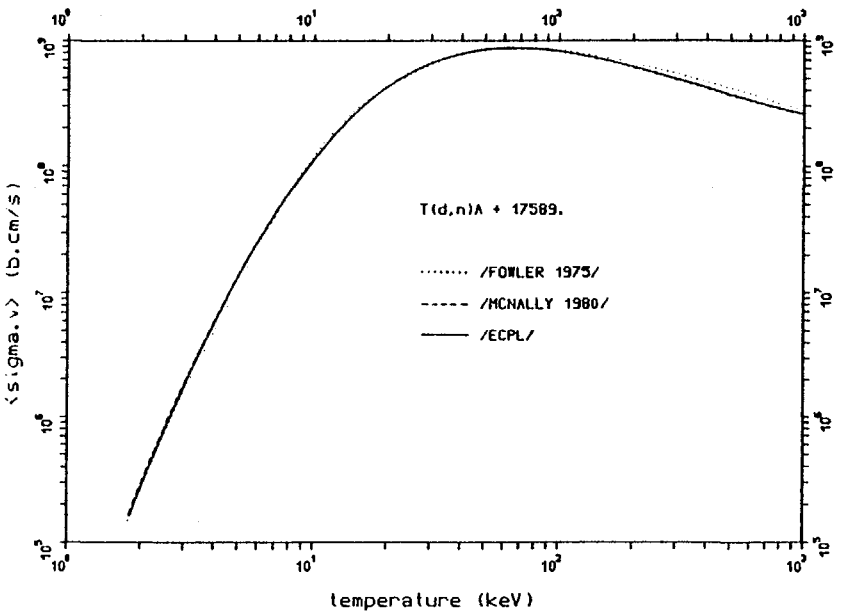

T (p,n) 3He - 764.
/ECPL/
X /JARVIS 1950/
cross section (barn)
proton energy (keV)

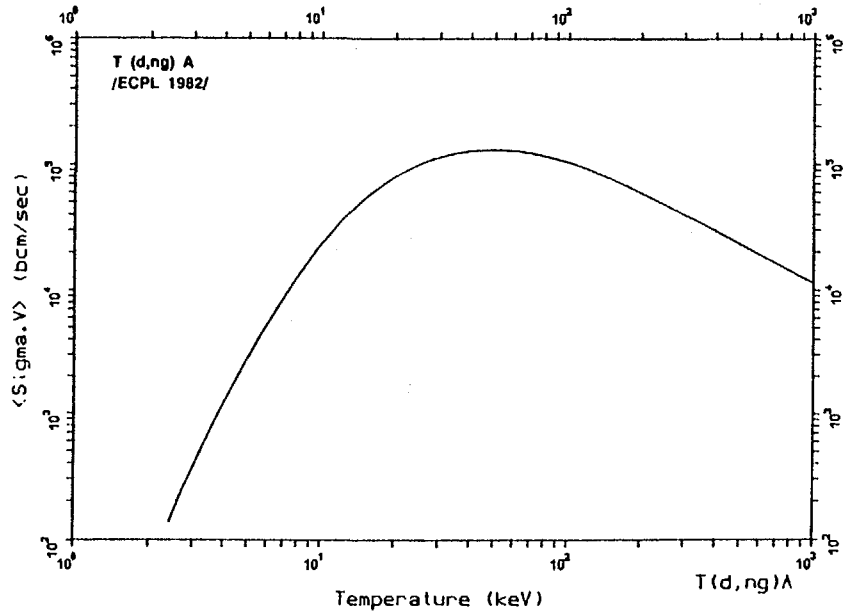

T (p,g) A
/FOWLER 1975/
T (p,g) He-4
/ECPL 1982/
<sigma.v> (bcm/sec)
Temperature (keV)
T(p,g)A

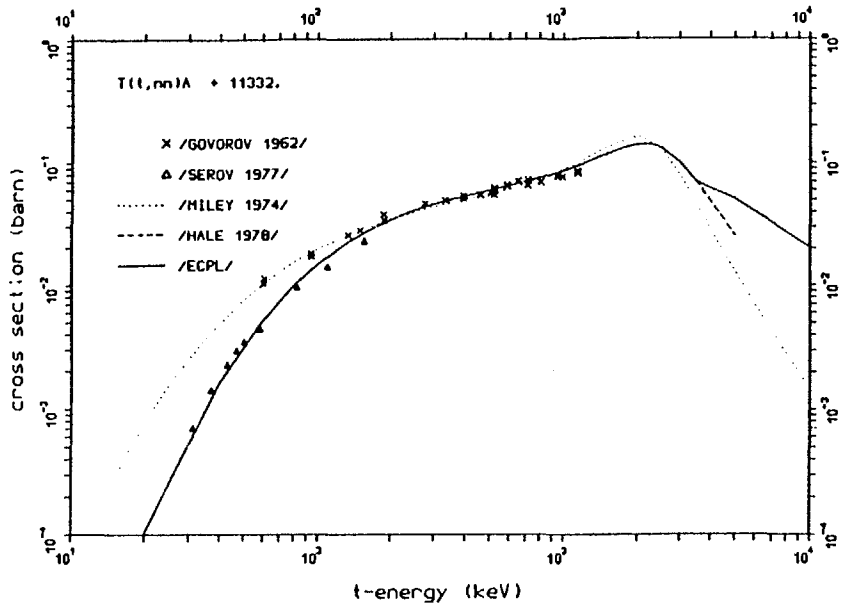

T(p,n)3He - 764.
/FOWLER 1975/
/MCNALLY 1980/
/ECPL/
<sigma.v> (b.cm/s)
temperature (keV)

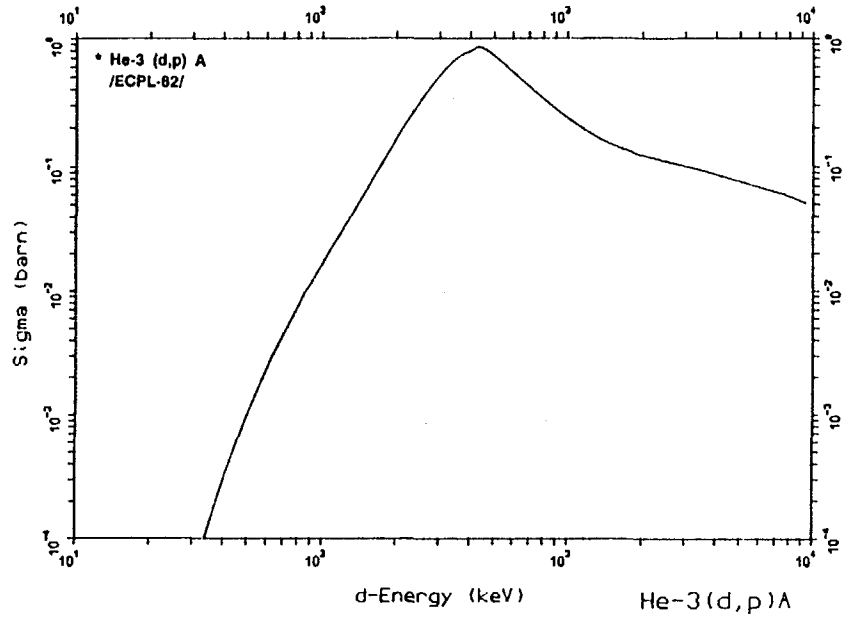

* T (d,n) A
/ECPL-82/
Sigma (barn)
d-Energy (keV)
T(d,n)A

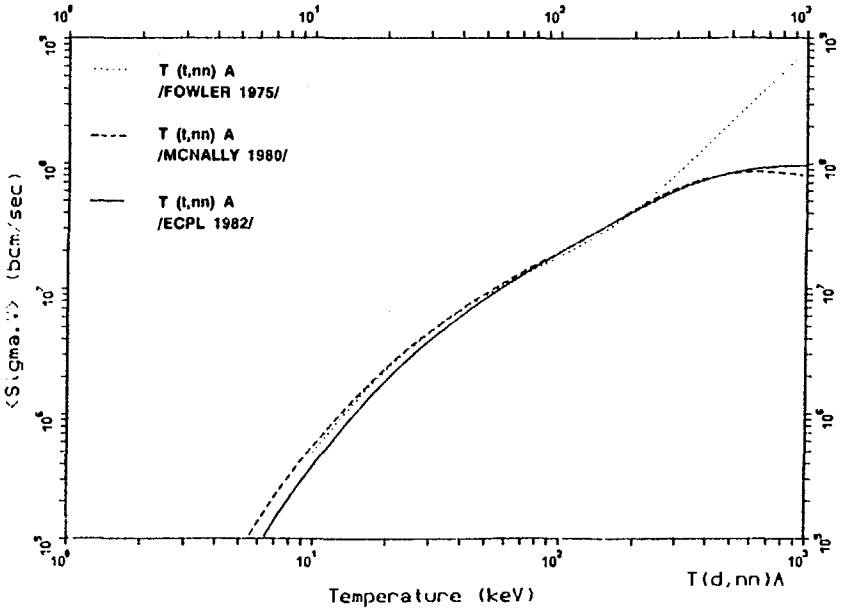

* T (d,ng) A
/ECPL-82/
Sigma (barn)
d-Energy (keV)
T(d,ng)A

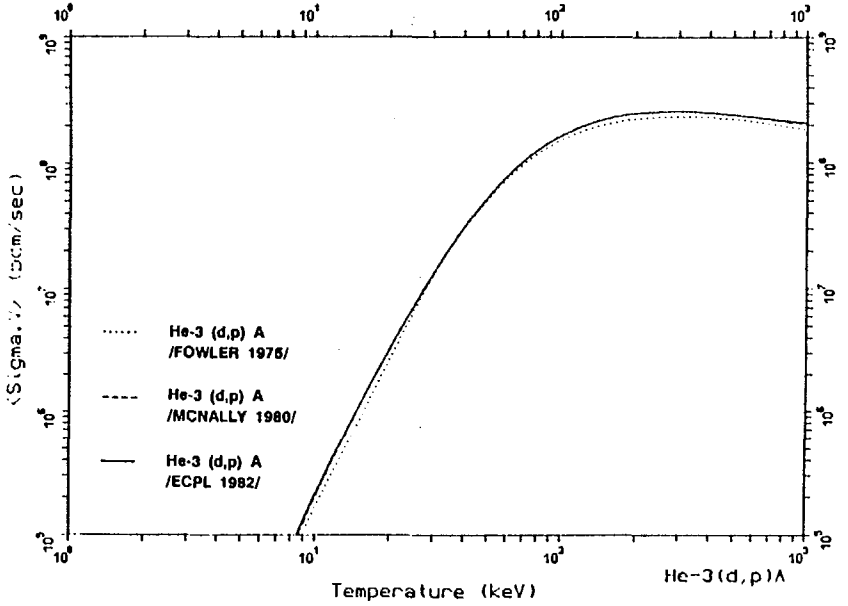

T(d,n)A + 17589.
/FOWLER 1975/
/MCNALLY 1980/
/ECPL/
<sigma.v> (b.cm/s)
temperature (keV)

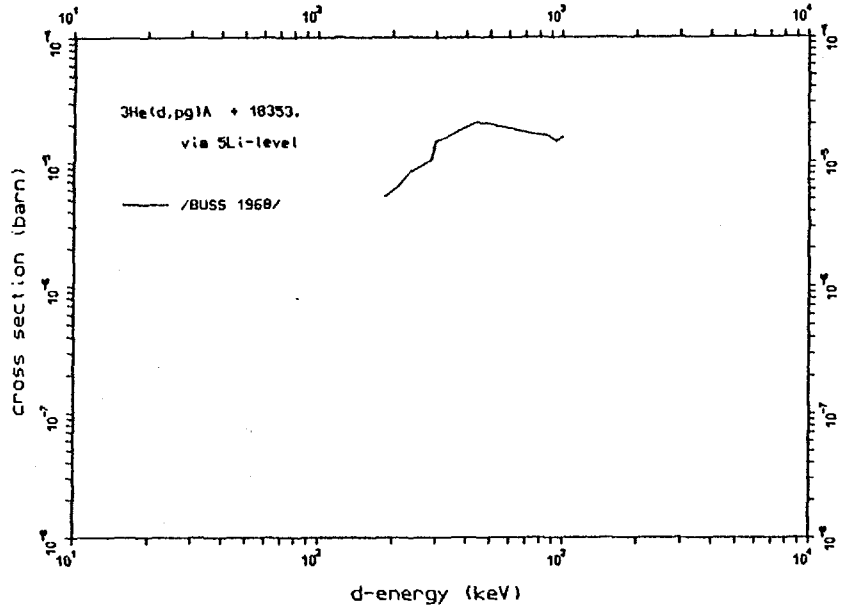

T (d,ng) A
/ECPL 1982/
<Sigma.V> (bcm/sec)
Temperature (keV)
T(d,ng)A

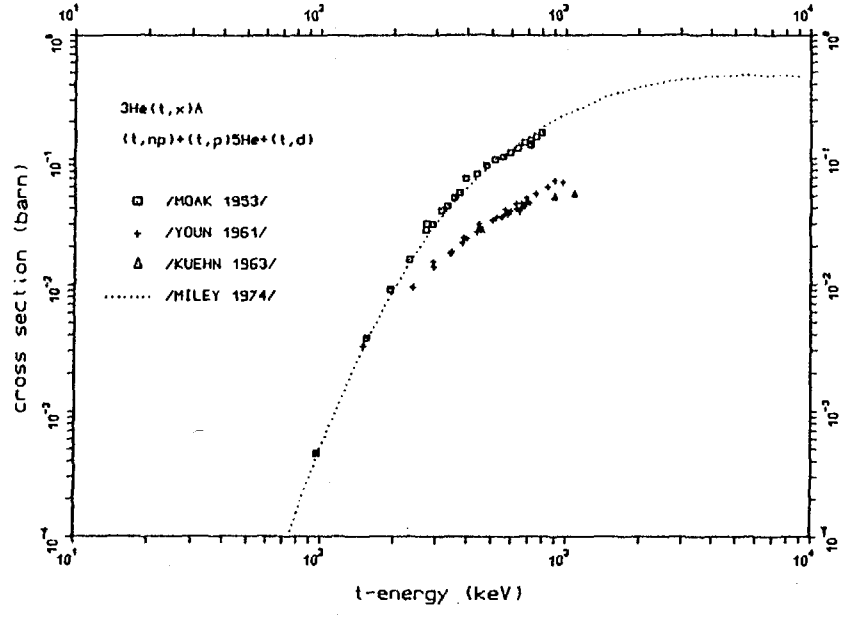

T(t,nn)A + 11332.
× /GOVOROV 1962/
Δ /SEROV 1977/
/MILEY 1974/
/HALE 1978/
/ECPL/
cross section (barn)
t-energy (keV)

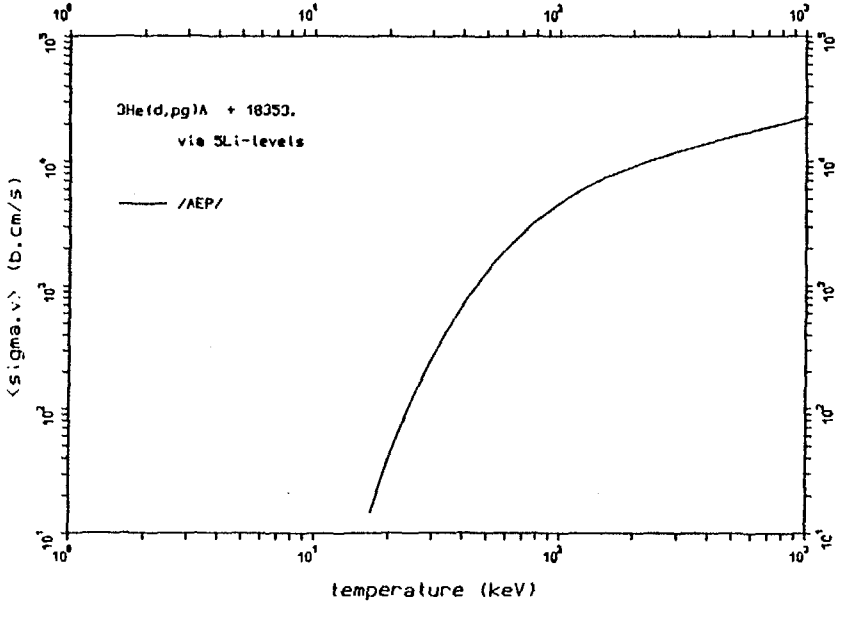

* He-3 (d,p) A
/ECPL-82/
Sigma (barn)
d-Energy (keV)
He-3(d,p)A

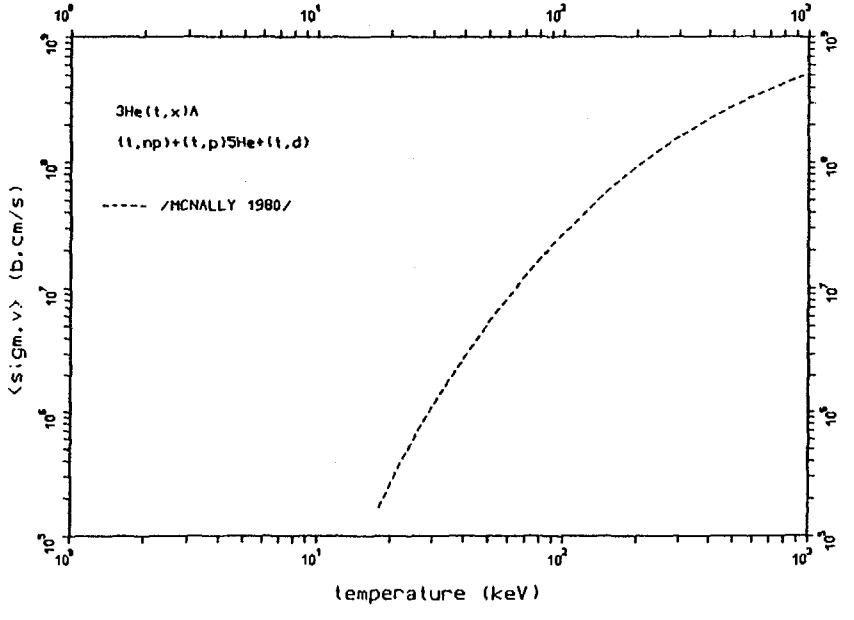

T (t,nn) A
/FOWLER 1975/
T (t,nn) A
/MCNALLY 1980/
T (t,nn) A
/ECPL 1982/
Temperature (keV)
T(d,nn)A

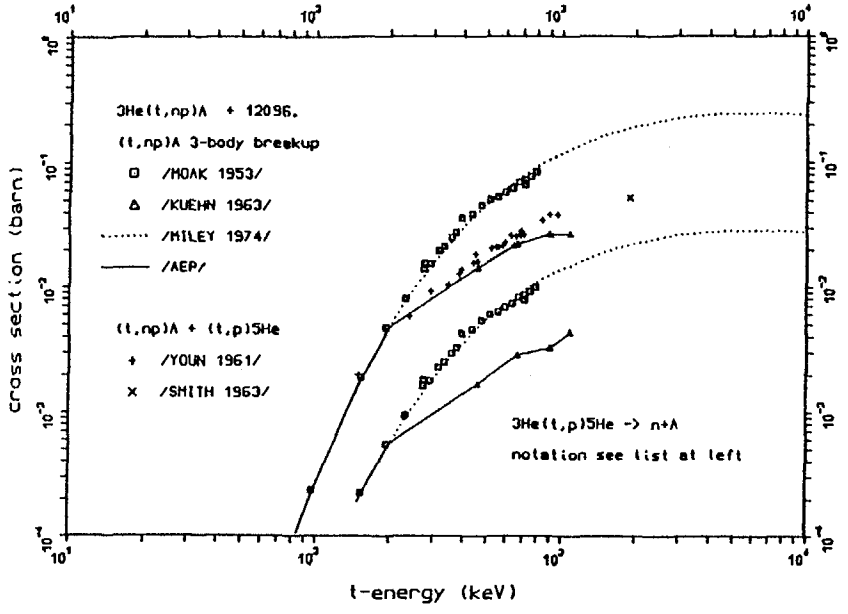

He-3 (d,p) A
/FOWLER 1975/
He-3 (d,p) A
/MCNALLY 1980/
He-3 (d,p) A
/ECPL 1982/
Temperature (keV)
He-3(d,p)A

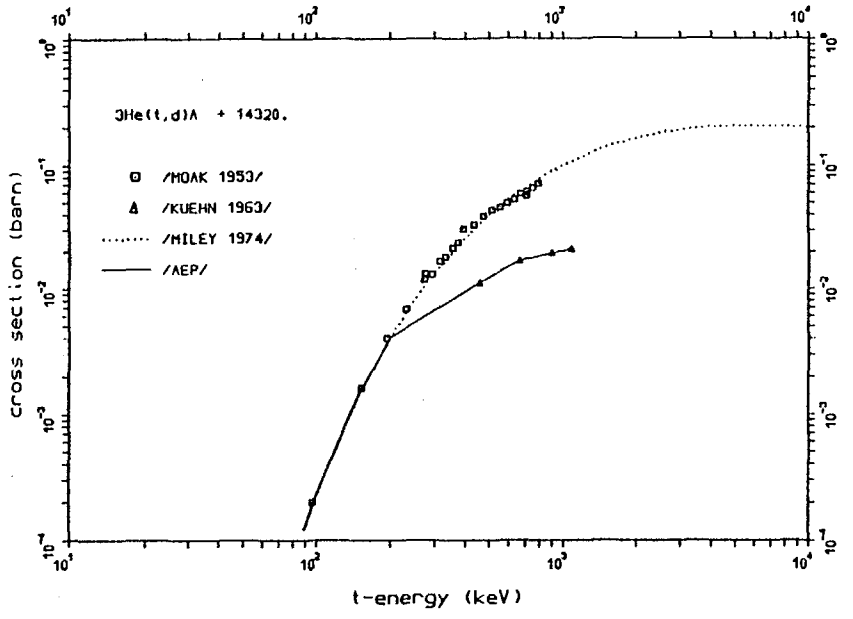

3He(d,pg)A + 18353.
via 5Li-level
/BUSS 1968/
cross section (barn)
d-energy (keV)

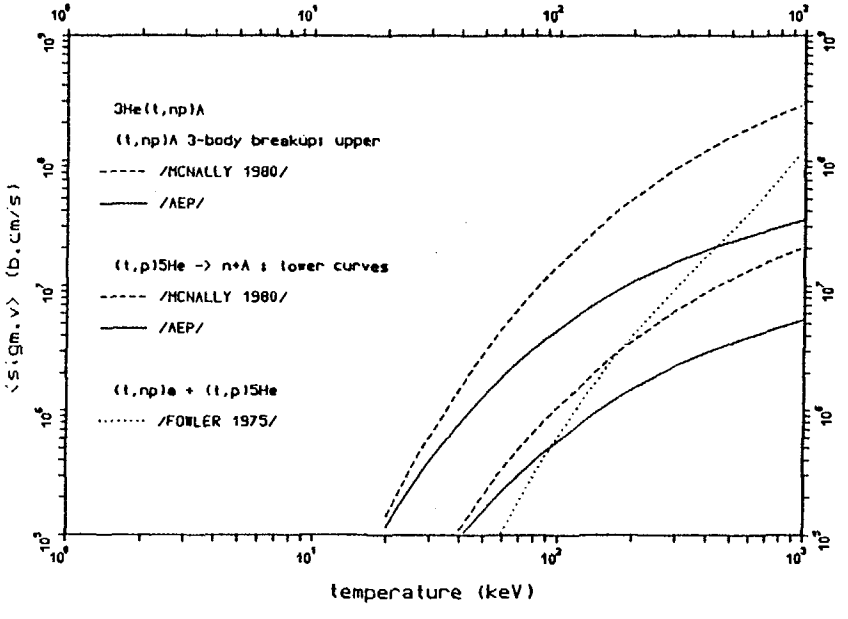

3He(t,x)A
(t,np)+(t,p)5He+(t,d)
/MOAK 1953/
/YOUN 1961/
/KUEHN 1963/
/MILEY 1974/
cross section (barn)
t-energy (keV)

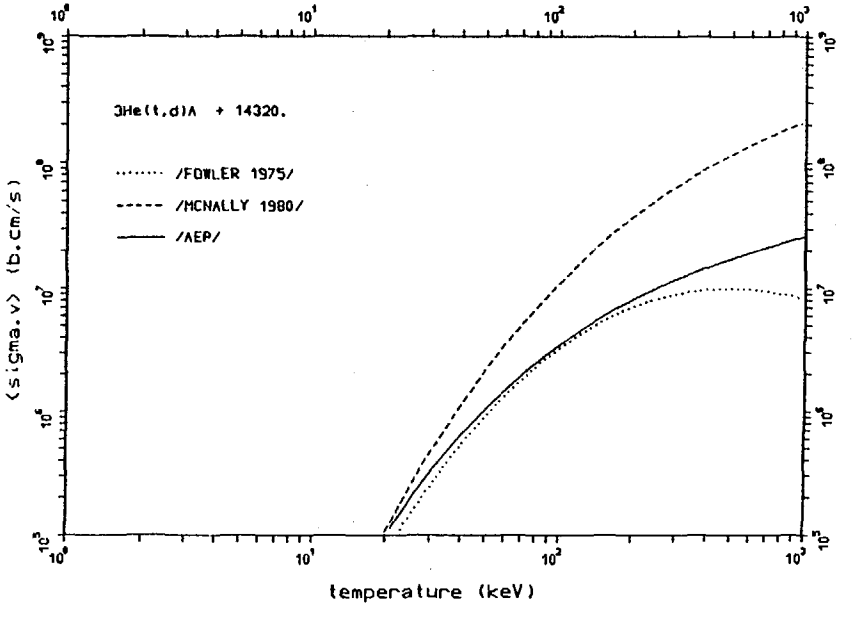

3He(d,pg)A + 18353.
via 5Li-levels
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)

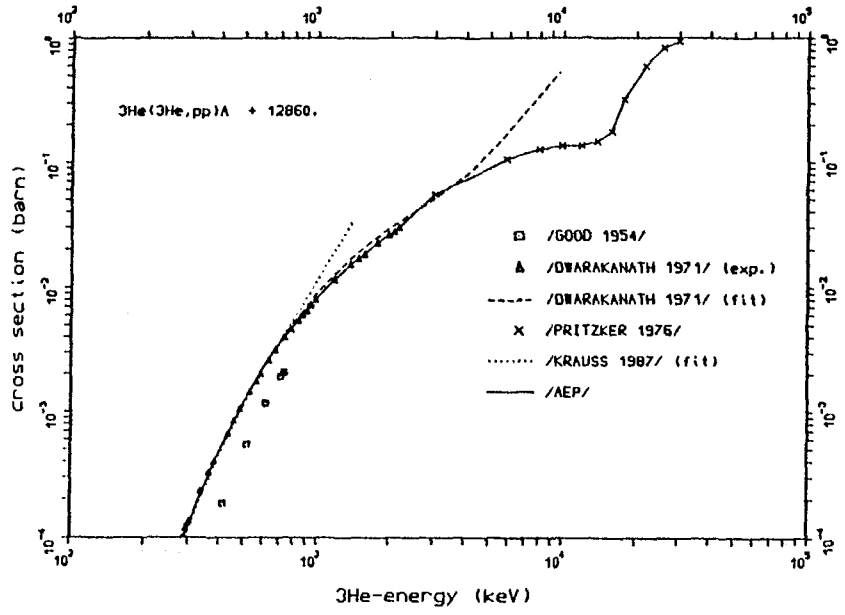

3He(t,x)A
(t,np)+(t,p)5He+(t,d)
/MCNALLY 1980/
<sigm.v> (b.cm/s)
temperature (keV)

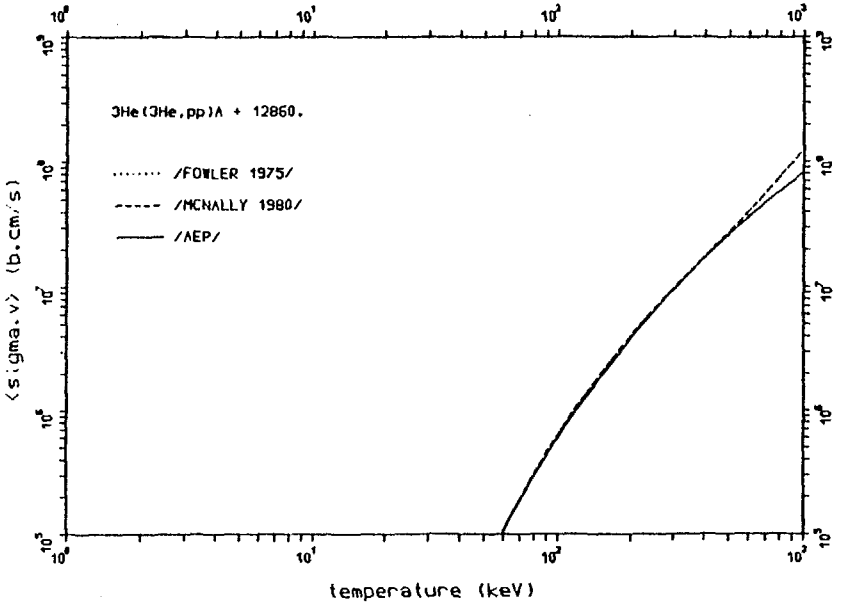

3He(t,np)A + 12096.
(t,np)A 3-body breakup
/MOAK 1953/
/KUEHN 1963/
/MILEY 1974/
/AEP/
(t,np)A + (t,p)5He
/YOUN 1961/
/SMITH 1963/
3He(t,p)5He -> n+A
notation see list at left
cross section (barn)
t-energy (keV)

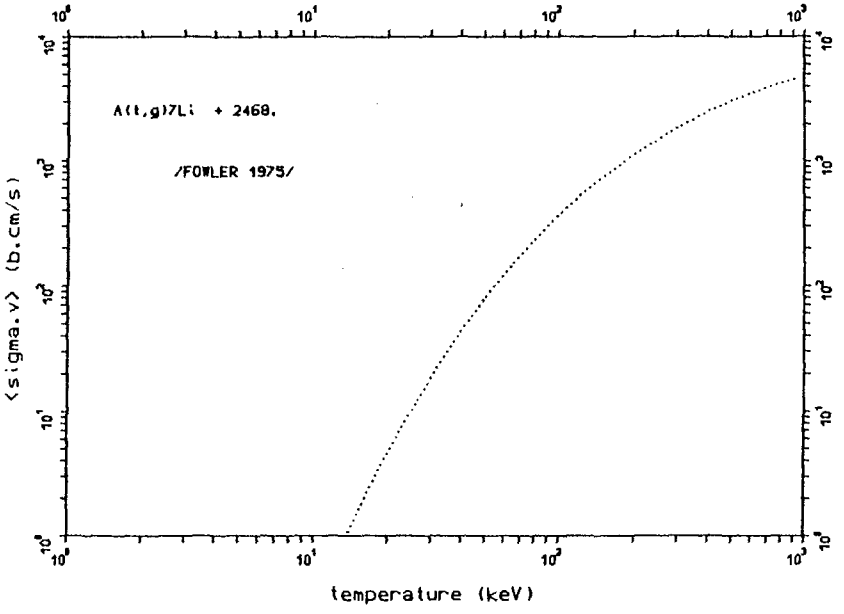

3He(t,d)A + 14320.
/MOAK 1953/
/KUEHN 1963/
/MILEY 1974/
/AEP/
cross section (barn)
t-energy (keV)

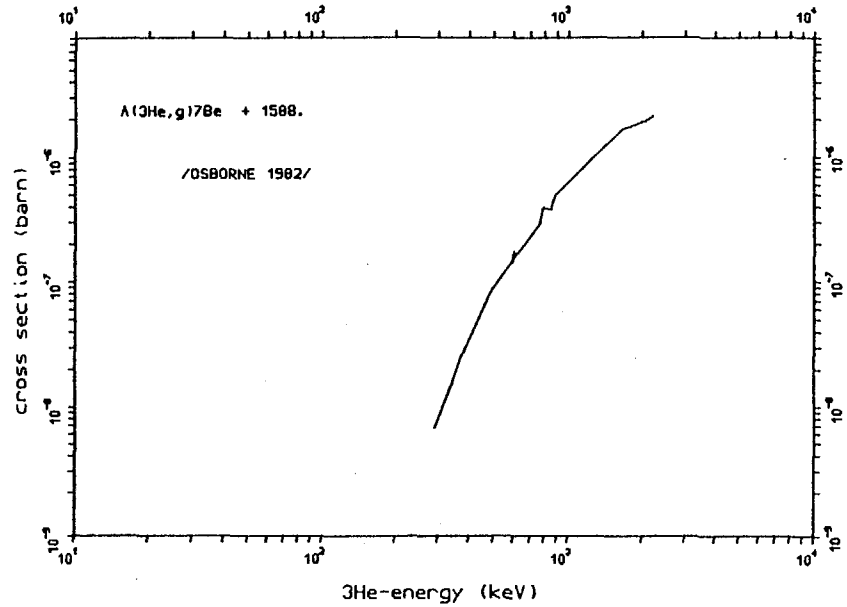

3He(t,np)A
(t,np)A 3-body breakup: upper
/MCNALLY 1980/
/AEP/
(t,p)5He -> n+A : lower curves
/MCNALLY 1980/
/AEP/
(t,np)a + (t,p)5He
/FOWLER 1975/
<sigm.v> (b.cm/s)
temperature (keV)

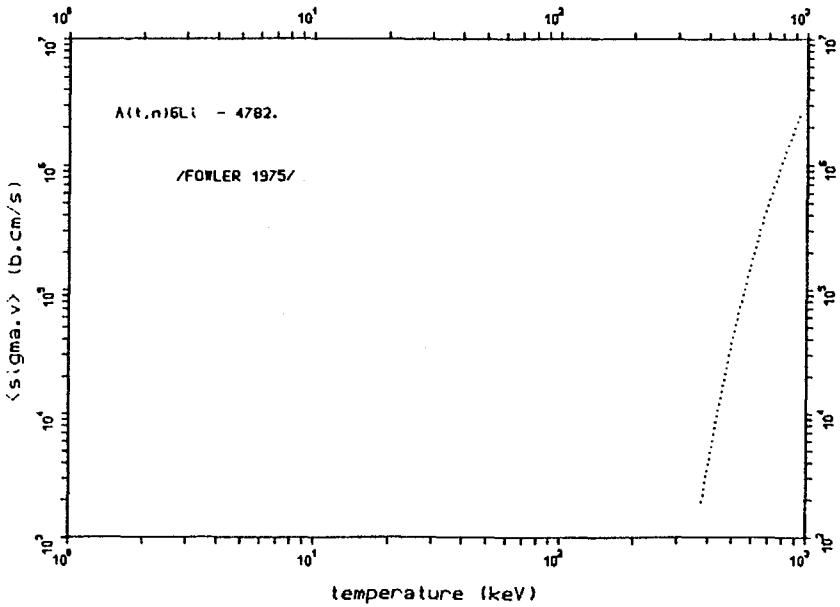

3He(t,d)A + 14320.
/FOWLER 1975/
/MCNALLY 1980/
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)

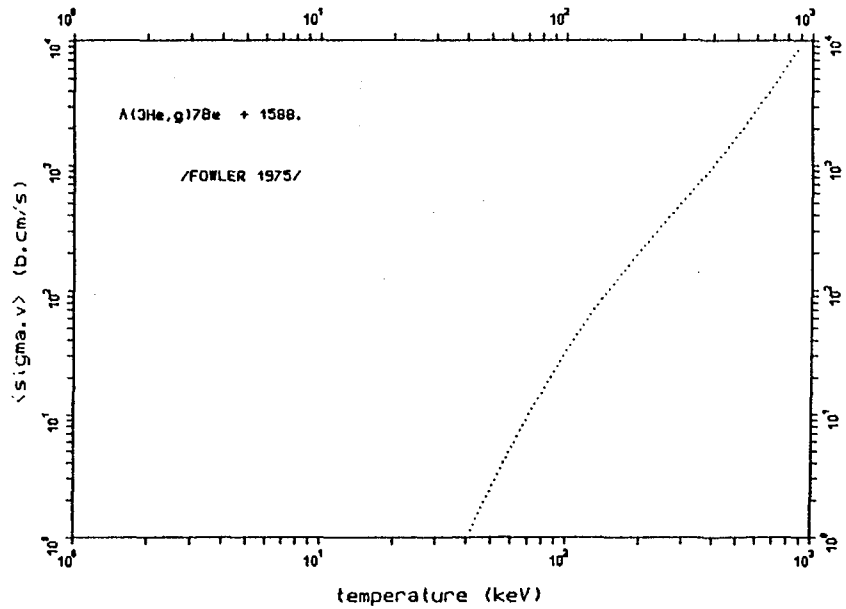

3He(3He,pp)A + 12860.
/GOOD 1954/
/DWARAKANATH 1971/ (exp.)
/DWARAKANATH 1971/ (fit)
/PRITZKER 1976/
/KRAUSS 1987/ (fit)
/AEP/
cross section (barn)
3He-energy (keV)

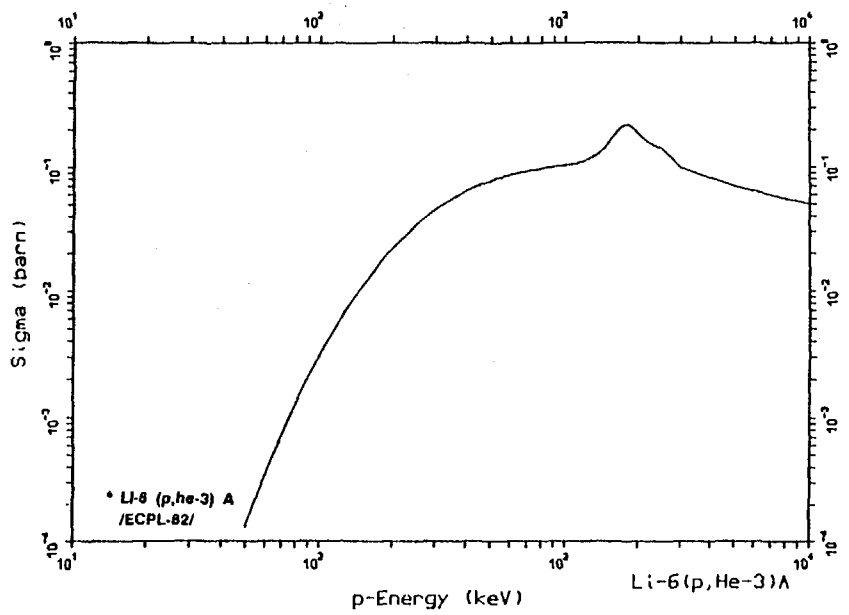

3He(3He,pp)A + 12860.
/FOWLER 1975/
/MCNALLY 1980/
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)

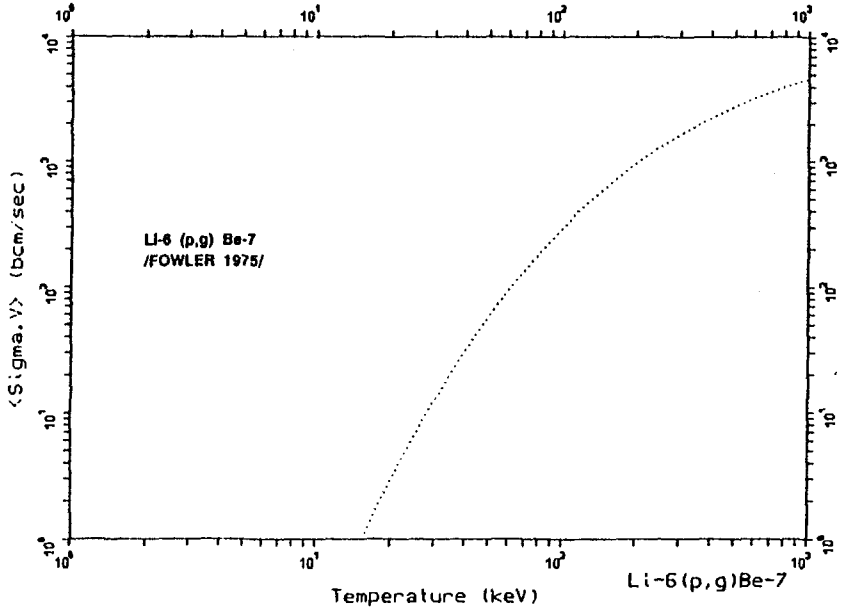

A(t,g)7Li + 2468.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

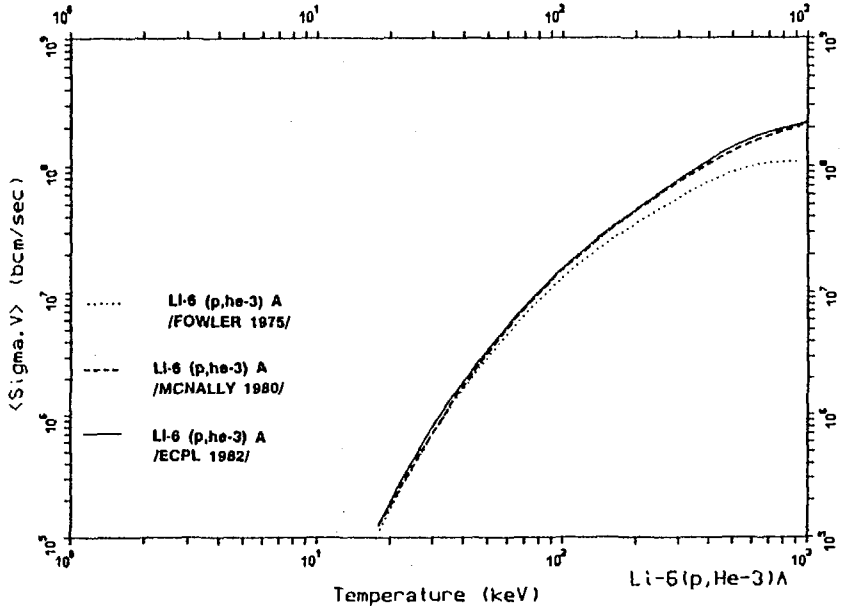

A(3He,g)7Be + 1588.
/OSBORNE 1982/
cross section (barn)
3He-energy (keV)

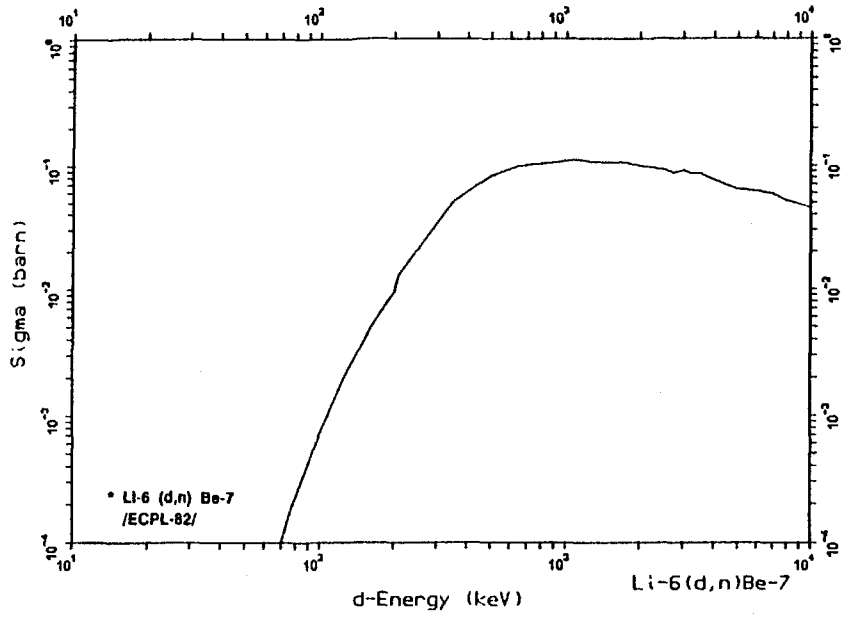

A(t,n)6Li - 4782.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

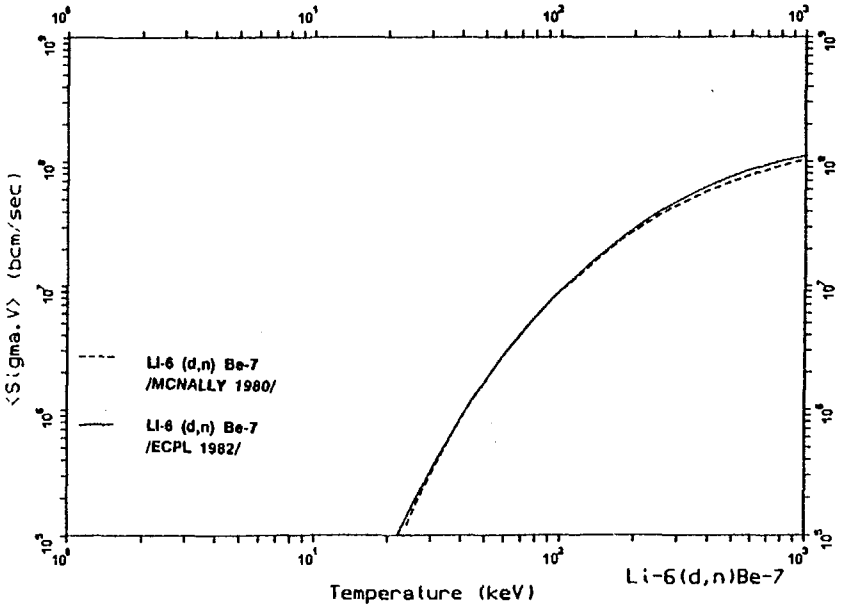

A(3He,g)7Be + 1588.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

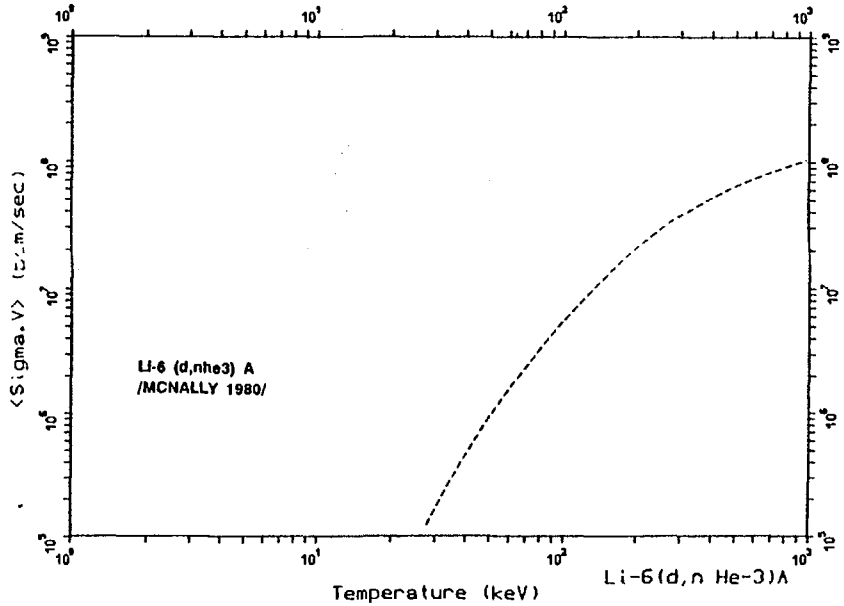

Sigma (barn)
p-Energy (keV)
Li-6(p,He-3)A
* Li-6 (p,he-3) A
/ECPL-82/

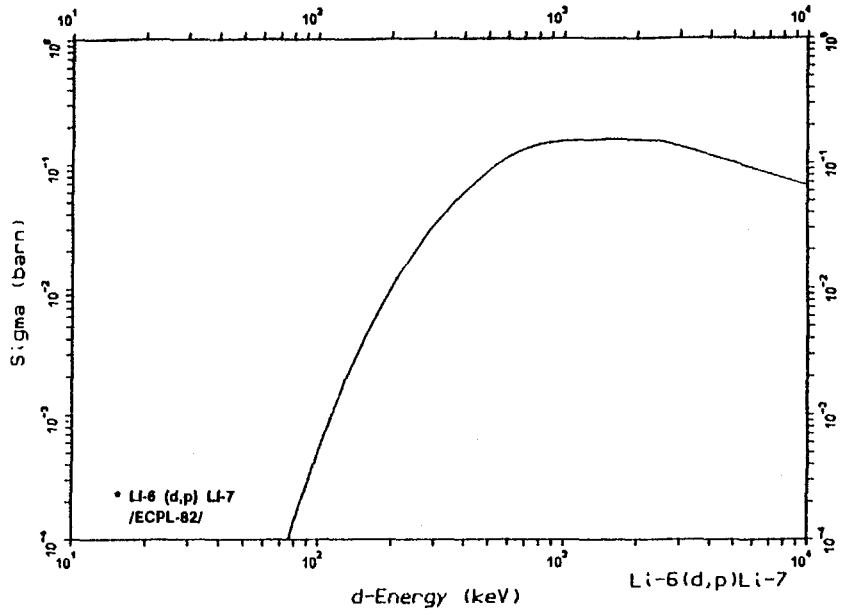

<Sigma.V> (bcm/sec)
Temperature (keV)
Li-6(p,g)Be-7
Li-6 (p,g) Be-7
/FOWLER 1975/

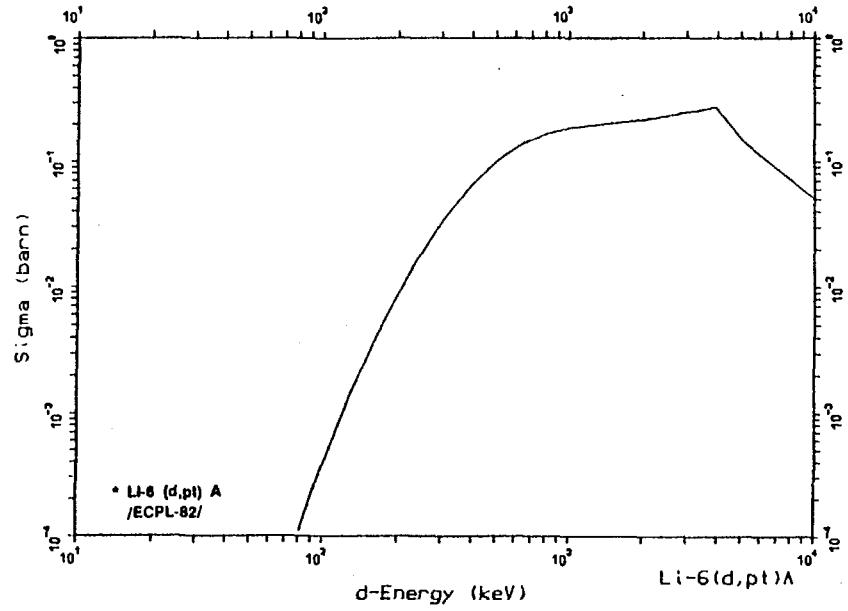

<Sigma.V> (bcm/sec)
Temperature (keV)
Li-6(p,He-3)A
Li-6 (p,he-3) A
/FOWLER 1975/
Li-6 (p,he-3) A
/MCNALLY 1980/
Li-6 (p,he-3) A
/ECPL 1982/

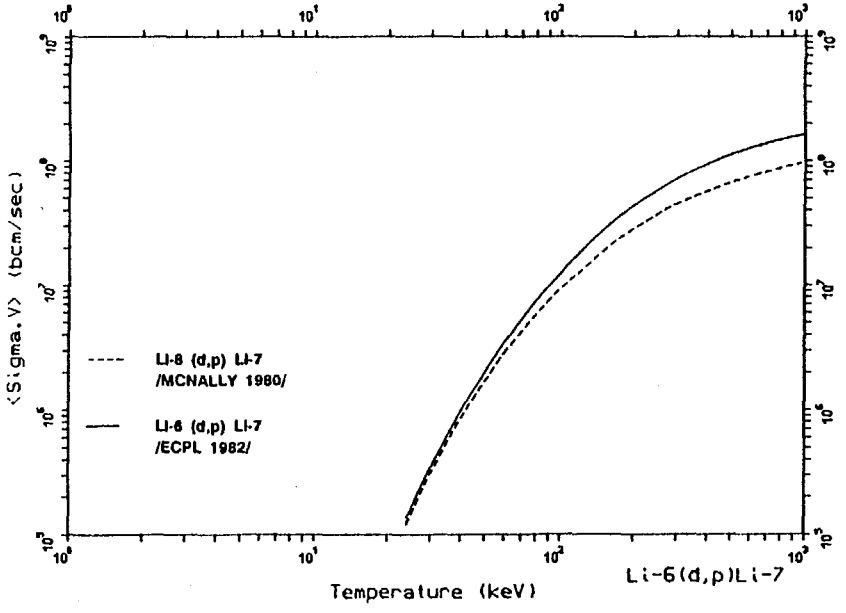

Sigma (barn)
* Li-6 (d,n) Be-7
/ECPL-82/
d-Energy (keV)
Li-6(d,n)Be-7

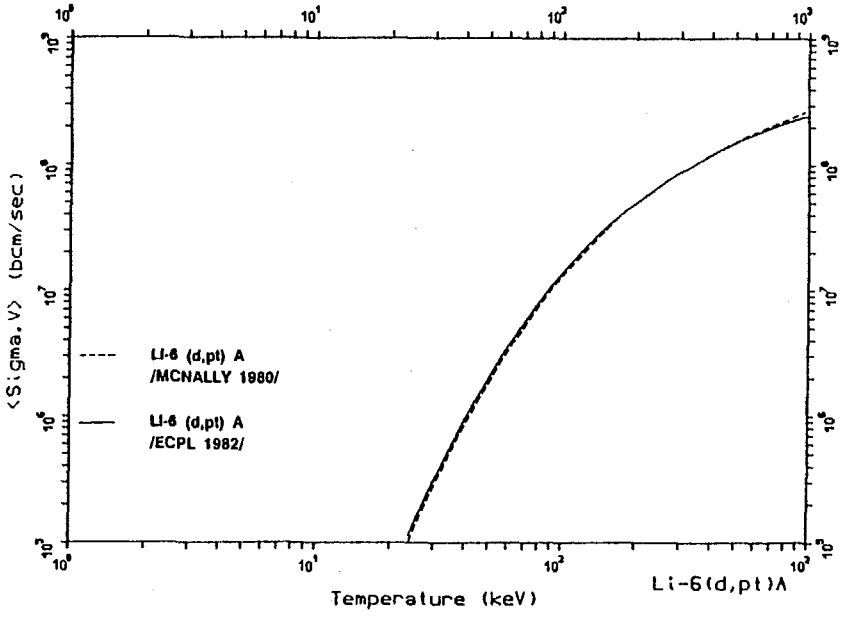

<Sigma.V> (bcm/sec)
Li-6 (d,n) Be-7
/MCNALLY 1980/
Li-6 (d,n) Be-7
/ECPL 1982/
Temperature (keV)
Li-6(d,n)Be-7

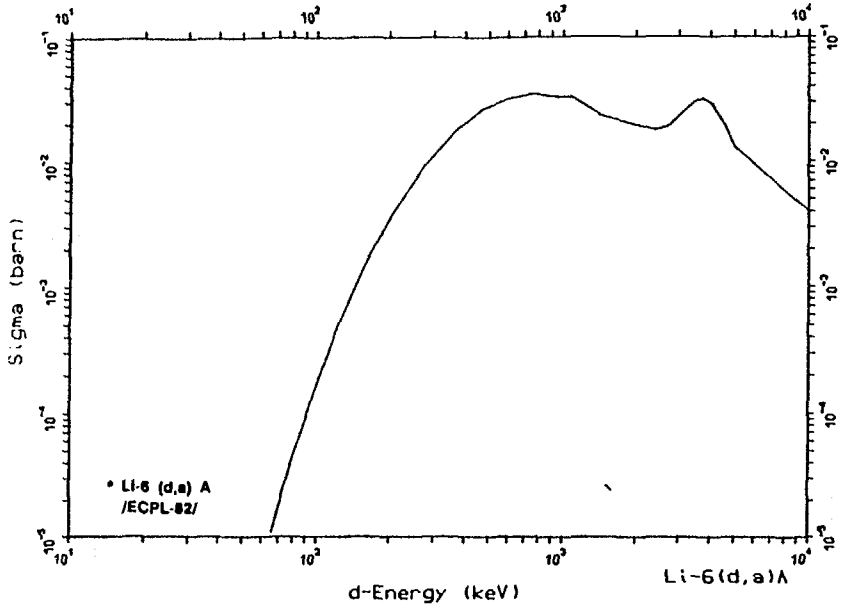

<Sigma.V> (bcm/sec)
Li-6 (d,nhe3) A
/MCNALLY 1980/
Temperature (keV)
Li-6(d,n He-3)A

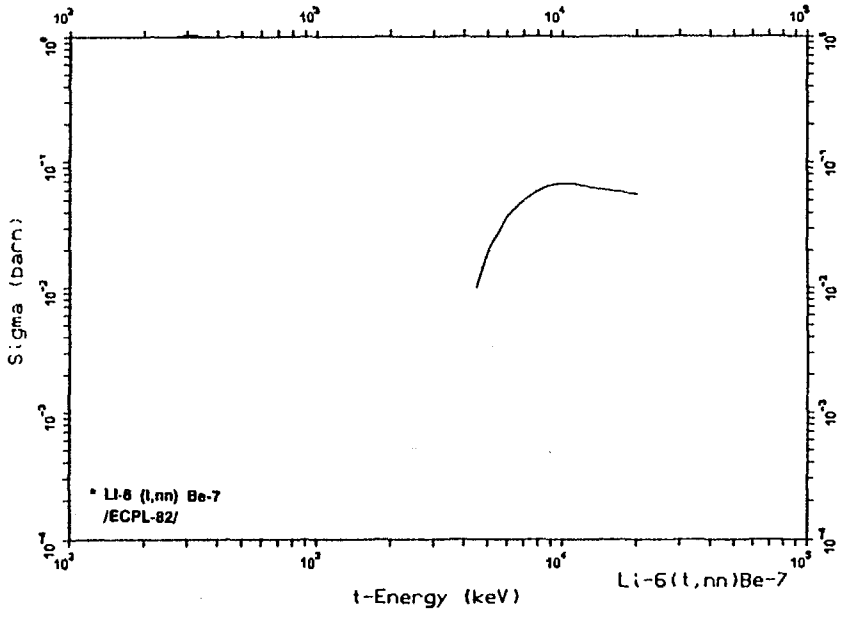

Sigma (barn)
d-Energy (keV)
Li-6(d,p)Li-7
* Li-6 (d,p) Li-7
/ECPL-82/

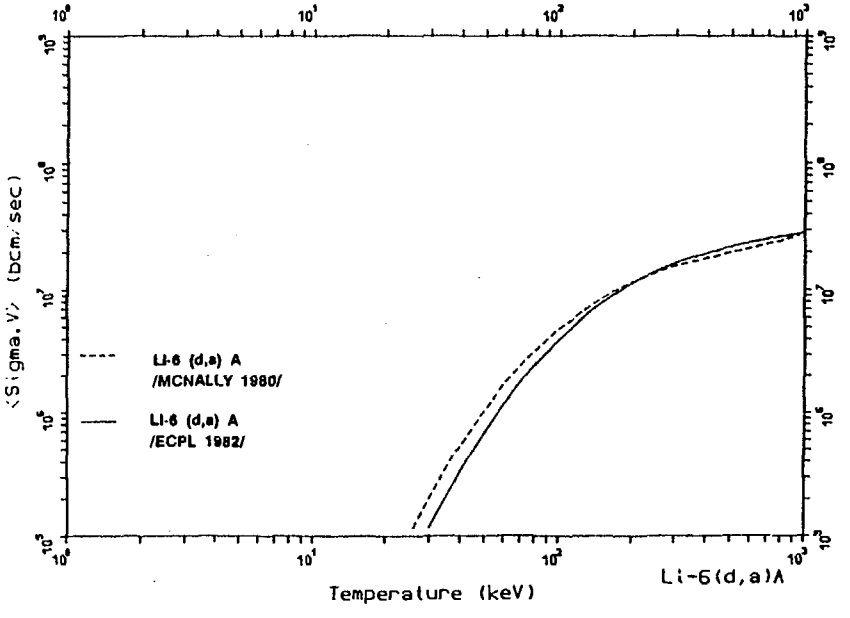

Sigma (barn)
d-Energy (keV)
Li-6(d,pt)A
* Li-6 (d,pt) A
/ECPL-82/

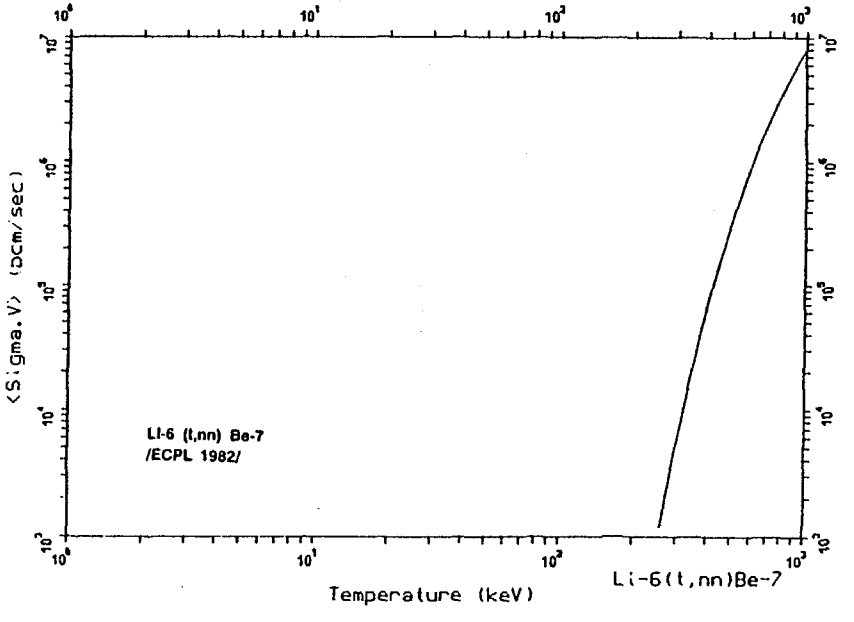

<Sigma.V> (bcm/sec)
Temperature (keV)
Li-6(d,p)Li-7
Li-6 (d,p) Li-7
/MCNALLY 1980/
Li-6 (d,p) Li-7
/ECPL 1982/

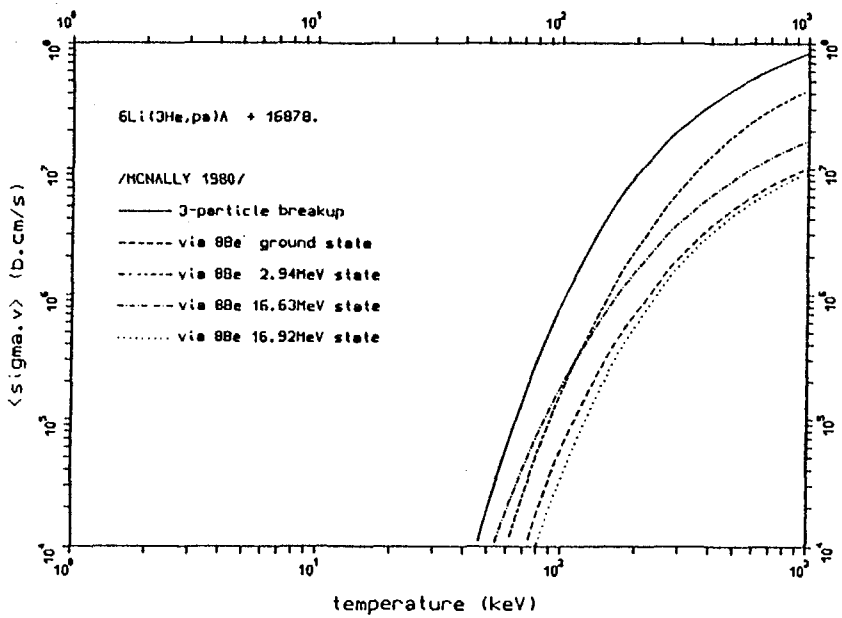

<Sigma.V> (bcm/sec)
Temperature (keV)
Li-6(d,pt)A
Li-6 (d,pt) A
/MCNALLY 1980/
Li-6 (d,pt) A
/ECPL 1982/

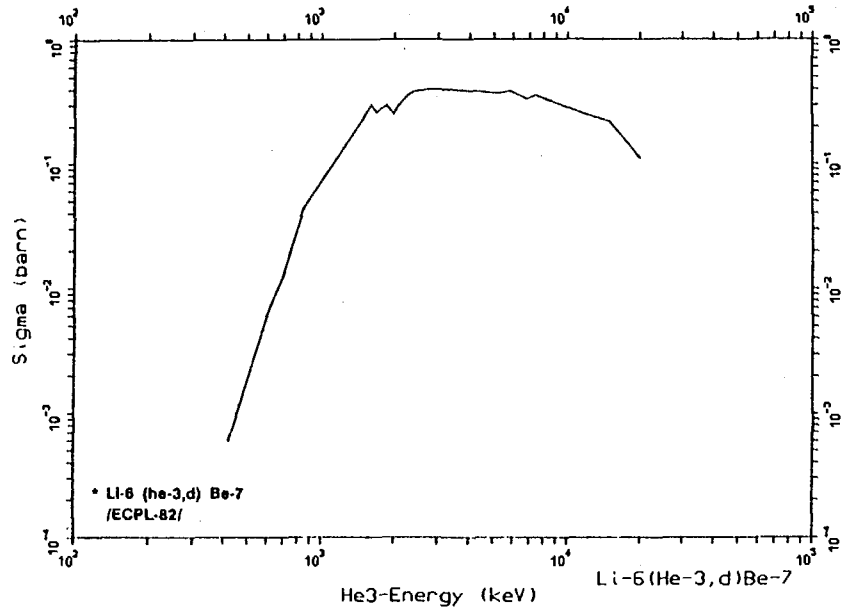

Sigma (barn)
d-Energy (keV)
Li-6(d,a)A
* Li-6 (d,a) A
/ECPL-82/

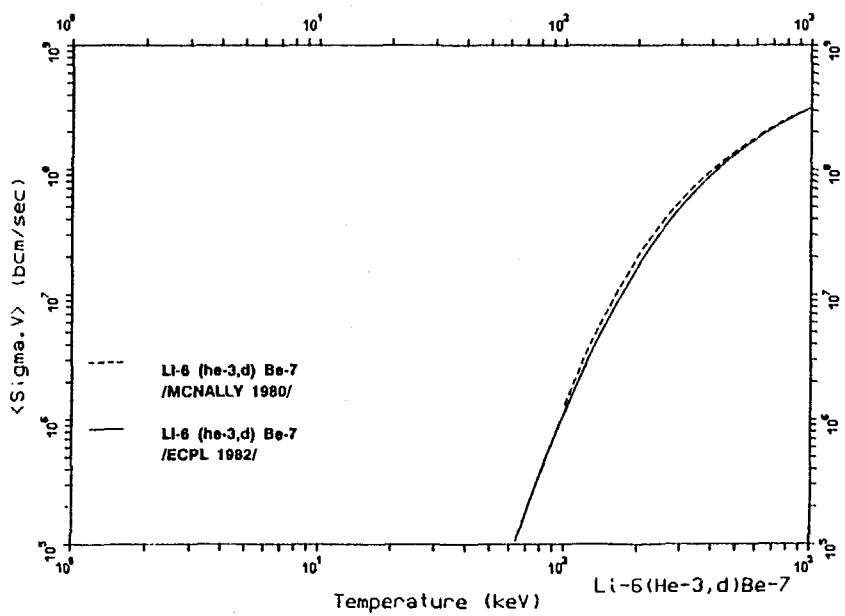

Sigma (barn)
t-Energy (keV)
Li-6(t,nn)Be-7
* Li-6 (t,nn) Be-7
/ECPL-82/

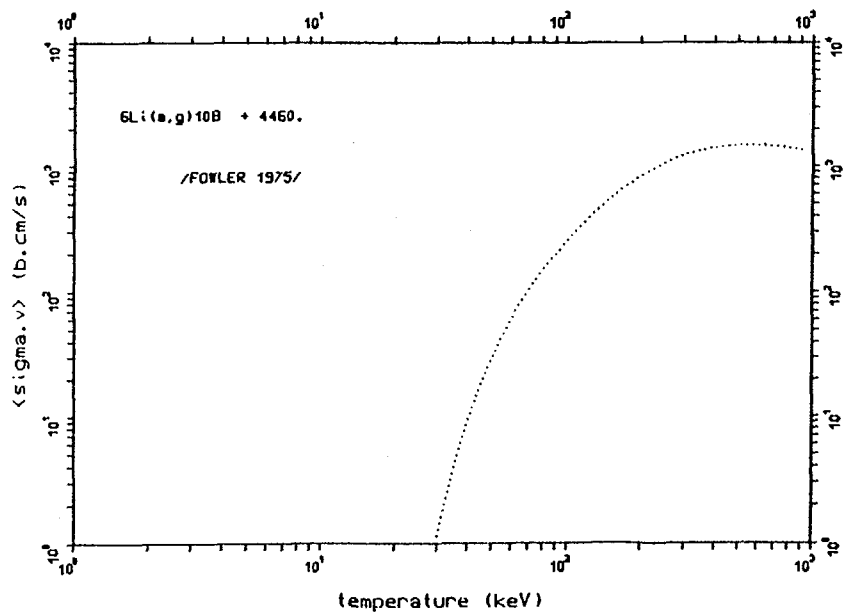

<Sigma.V> (bCm/sec)
Temperature (keV)
Li-6(d,a)A
Li-6 (d,a) A
/MCNALLY 1980/
Li-6 (d,a) A
/ECPL 1982/

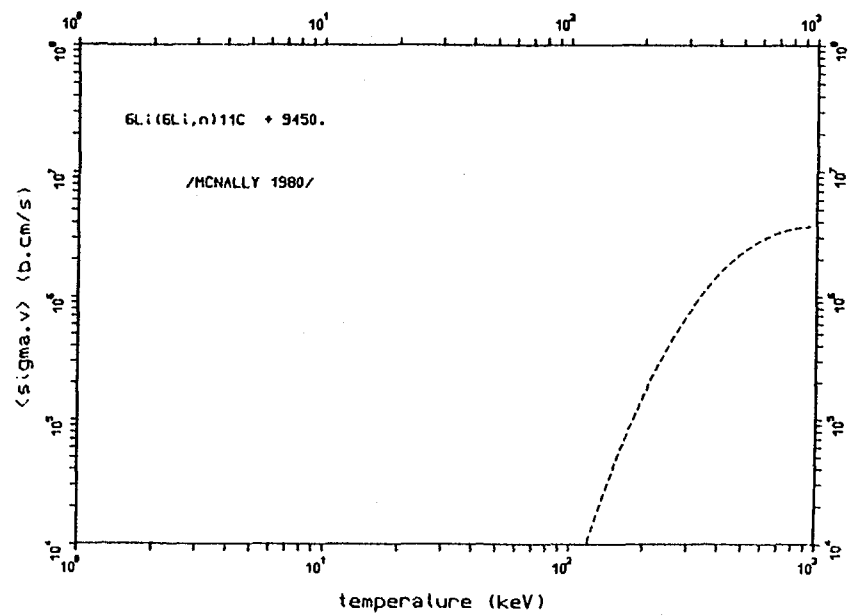

<Sigma.V> (bCm/sec)
Temperature (keV)
Li-6(t,nn)Be-7
Li-6 (t,nn) Be-7
/ECPL 1982/

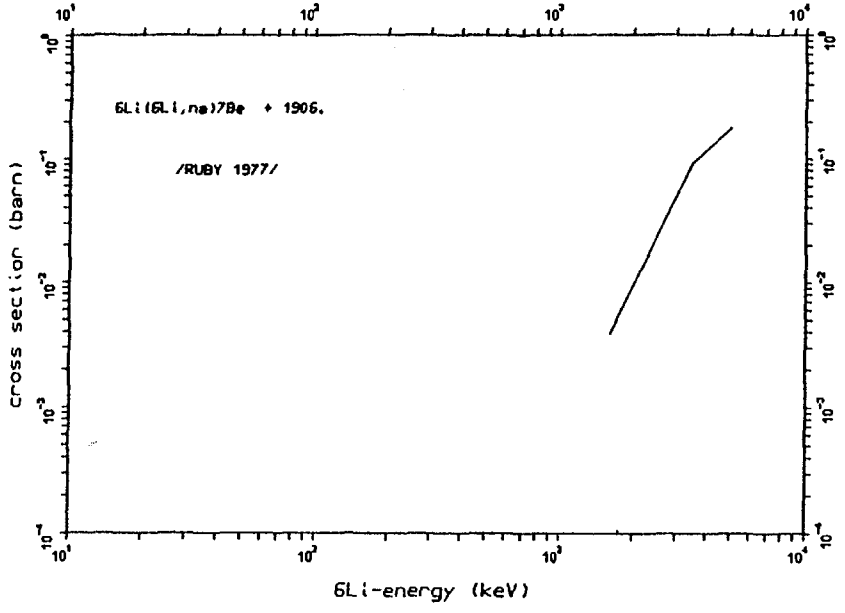

6Li(3He,pa)A + 16878.
/MCNALLY 1980/
3-particle breakup
via 8Be ground state
via 8Be 2.94MeV state
via 8Be 16.63MeV state
via 8Be 16.92MeV state
<sigma.v> (b.cm/s)
temperature (keV)

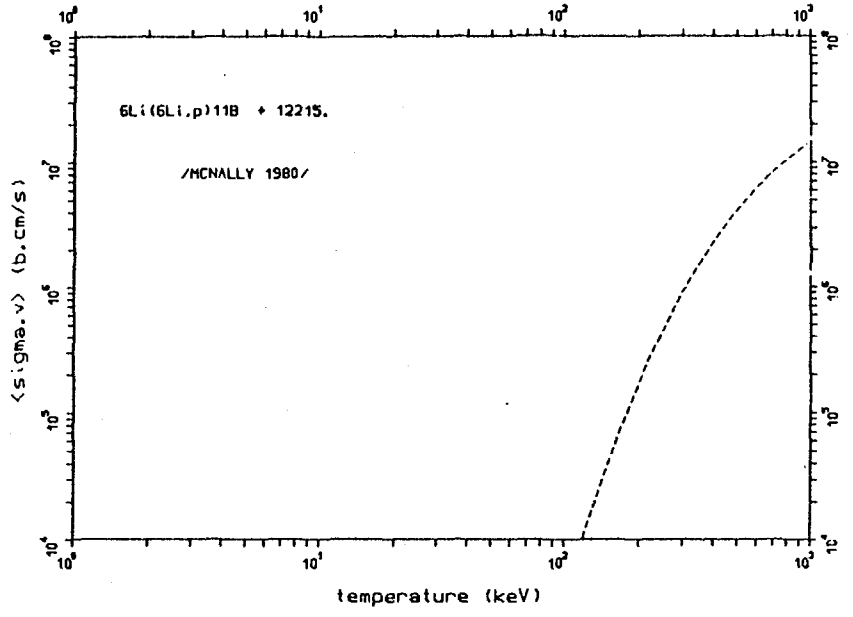

* Li-6 (he-3,d) Be-7
/ECPL-82/
Sigma (barn)
He3-Energy (keV)
Li-6(He-3,d)Be-7

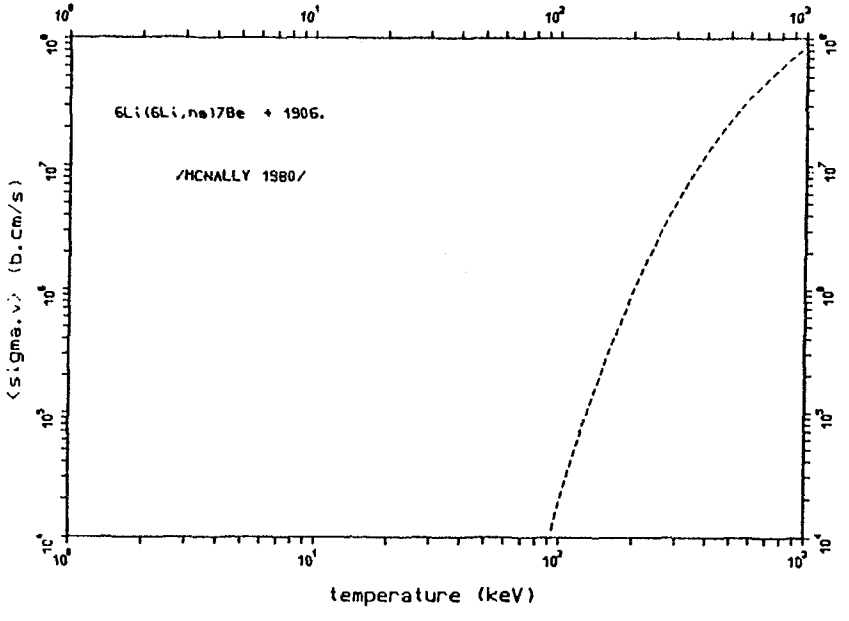

Li-6 (he-3,d) Be-7
/MCNALLY 1980/
Li-6 (he-3,d) Be-7
/ECPL 1982/
<Sigma.V> (bcm/sec)
Temperature (keV)
Li-6(He-3,d)Be-7

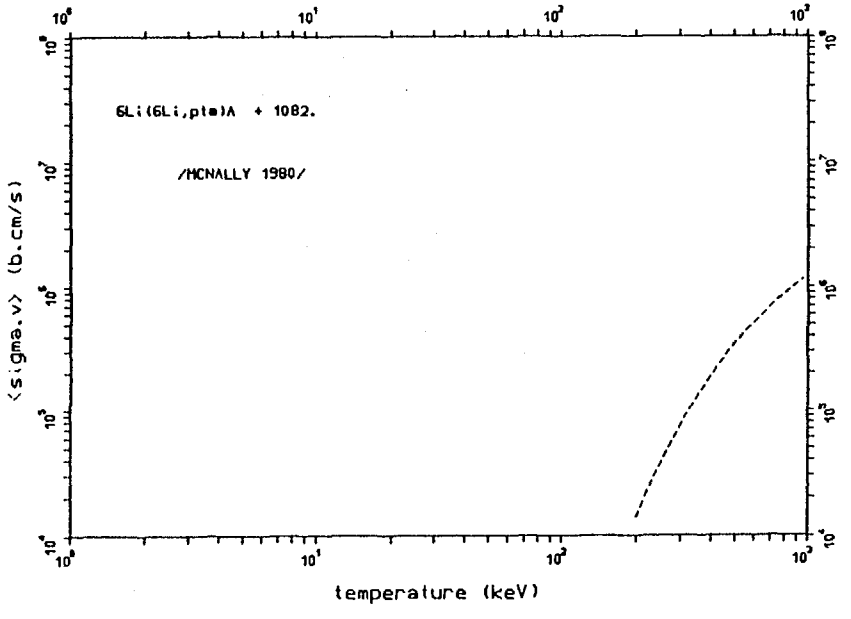

6Li(a,g)10B + 4460.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

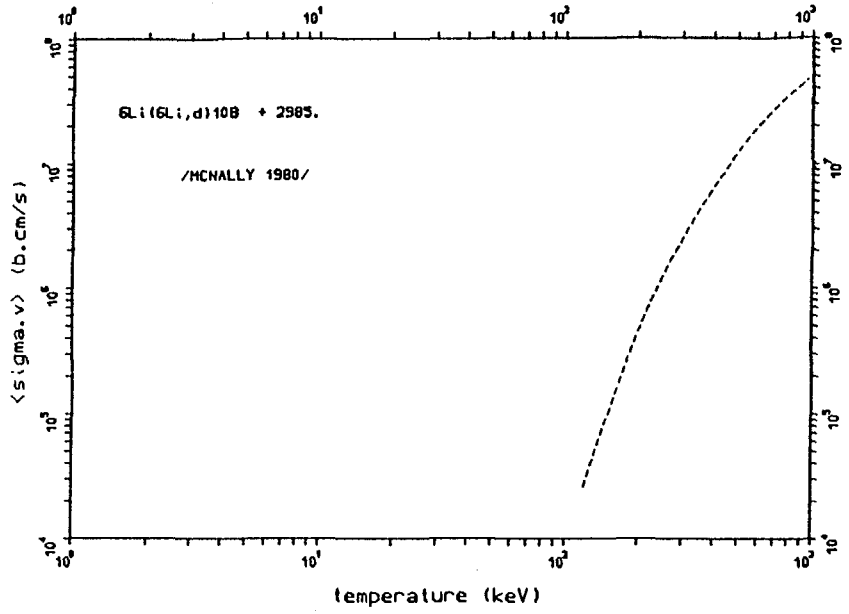

6Li(6Li,n)11C + 9450.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

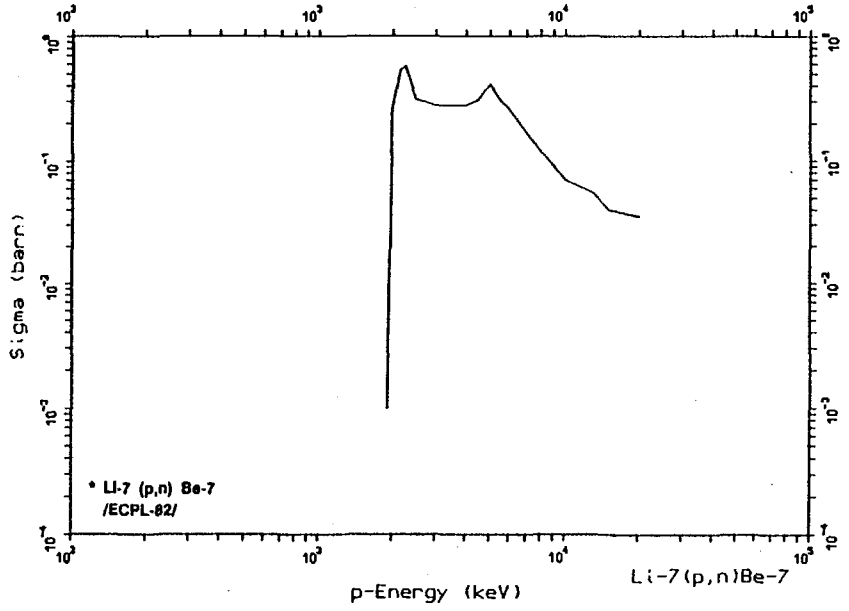

6Li(6Li,na)7Be + 1906.
/RUBY 1977/
cross section (barn)
6Li-energy (keV)

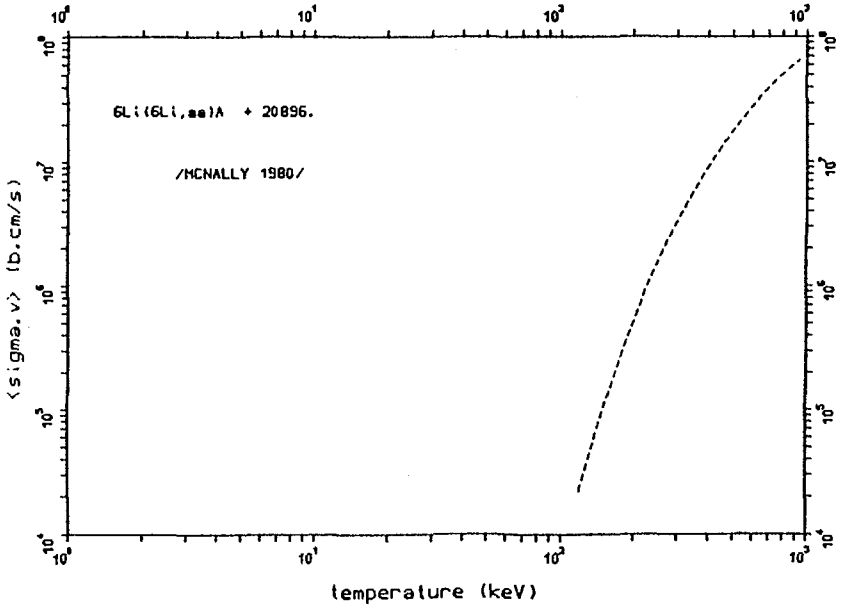

6Li(6Li,p)11B + 12215.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

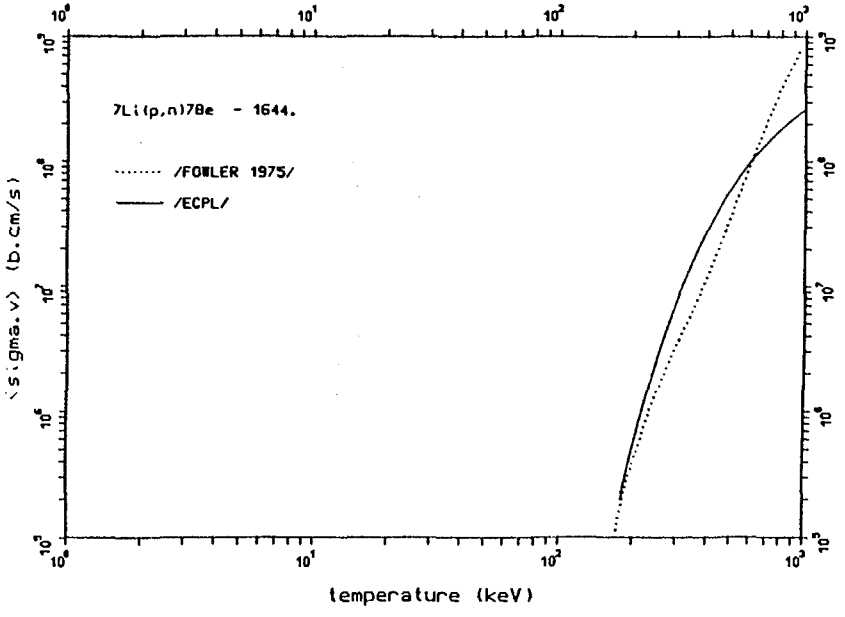

6Li(6Li,na)7Be + 1906.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

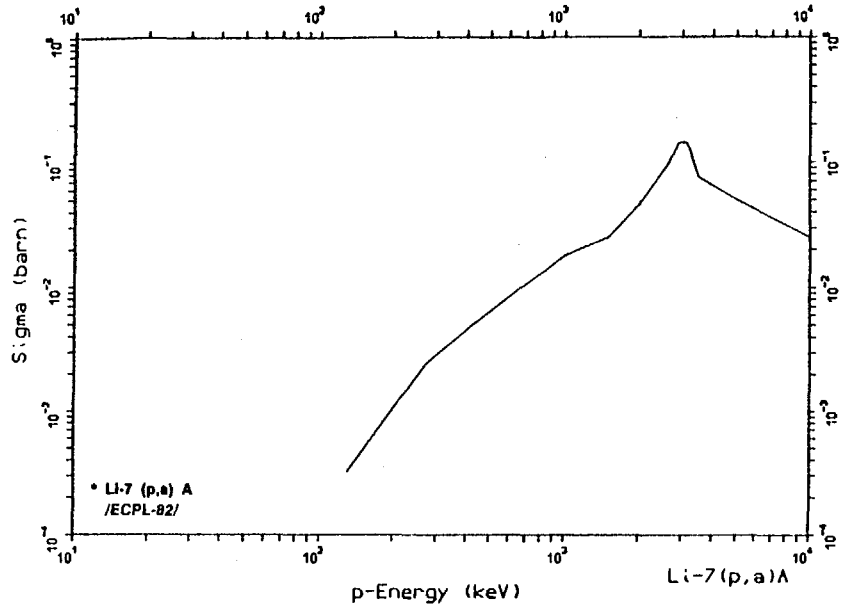

6Li(6Li,pta)A + 1082.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

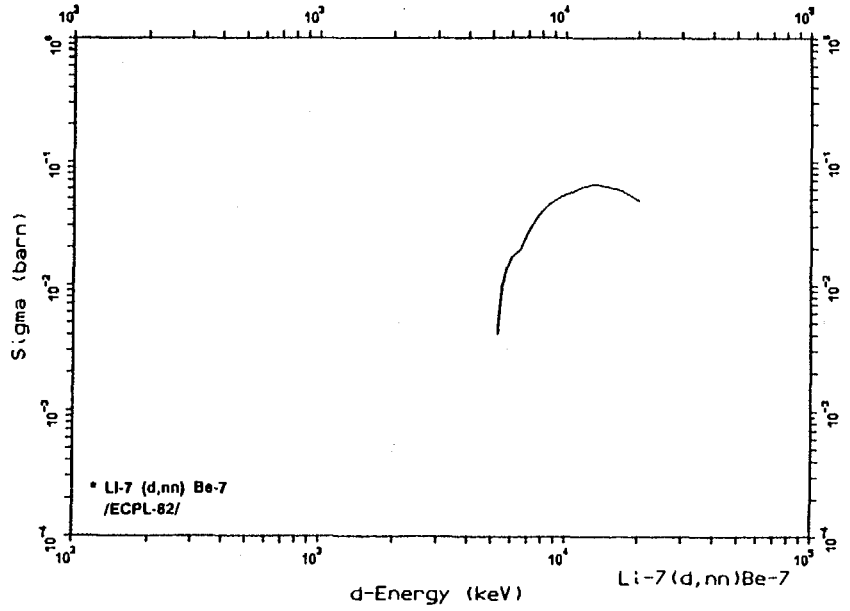

6Li(6Li,d)10B + 2985.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

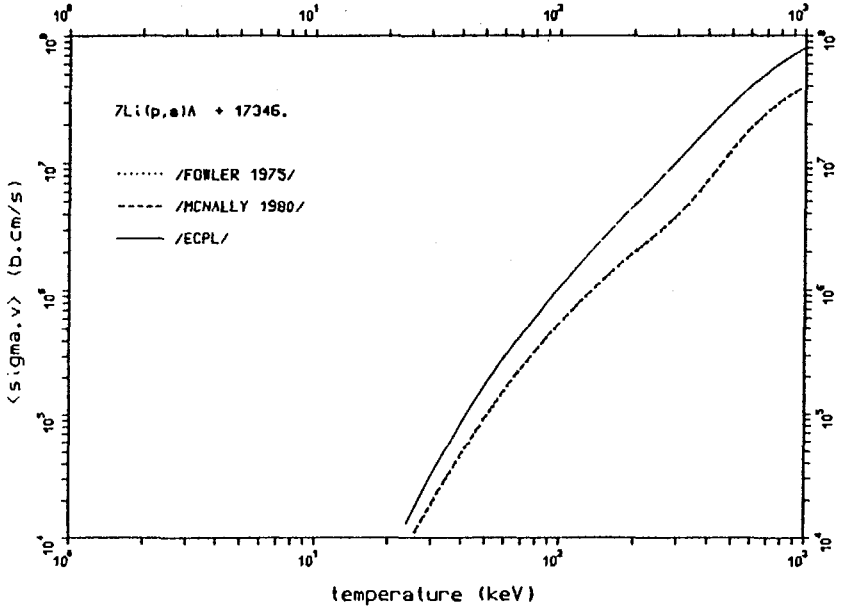

* Li-7 (p,n) Be-7
/ECPL-82/
Sigma (barn)
p-Energy (keV)
Li-7(p,n)Be-7

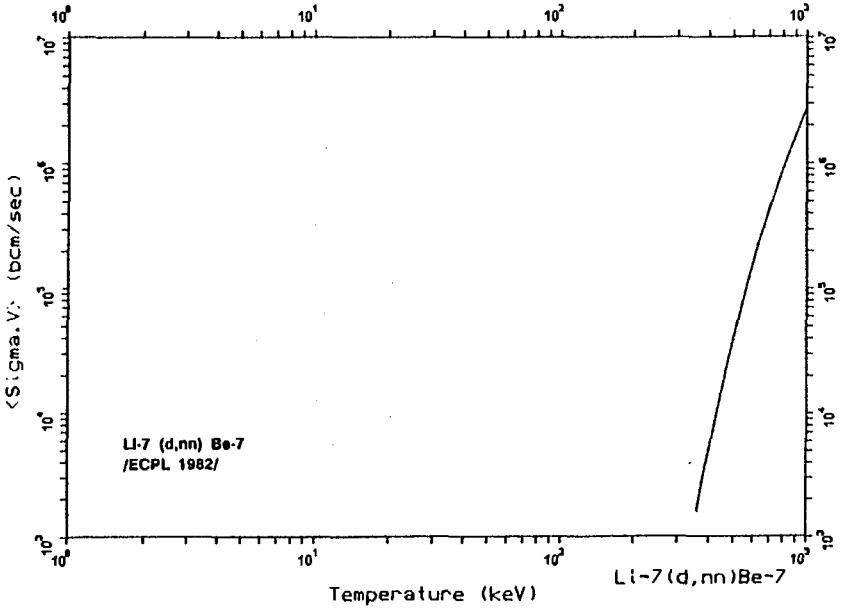

6Li(6Li,aa)A + 20896.
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

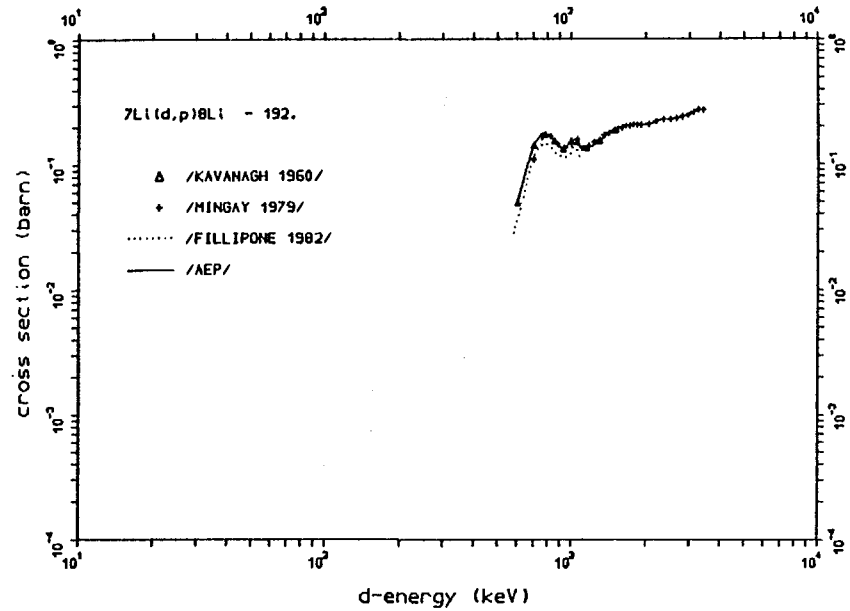

7Li(p,n)7Be - 1644.
/FOWLER 1975/
/ECPL/
<sigma.v> (b.cm/s)
temperature (keV)

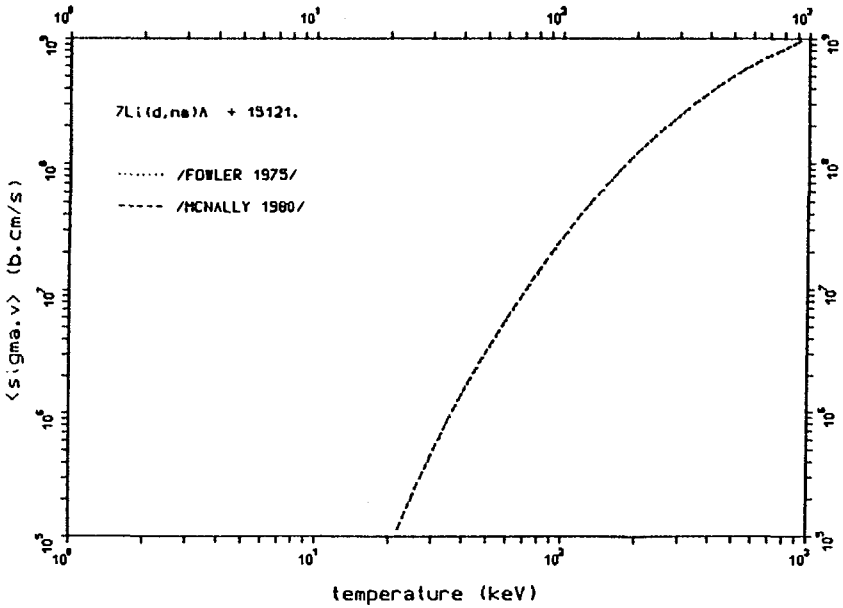

Sigma (barn)
p-Energy (keV)
Li-7(p,a)A
* Li-7 (p,a) A
/ECPL-82/

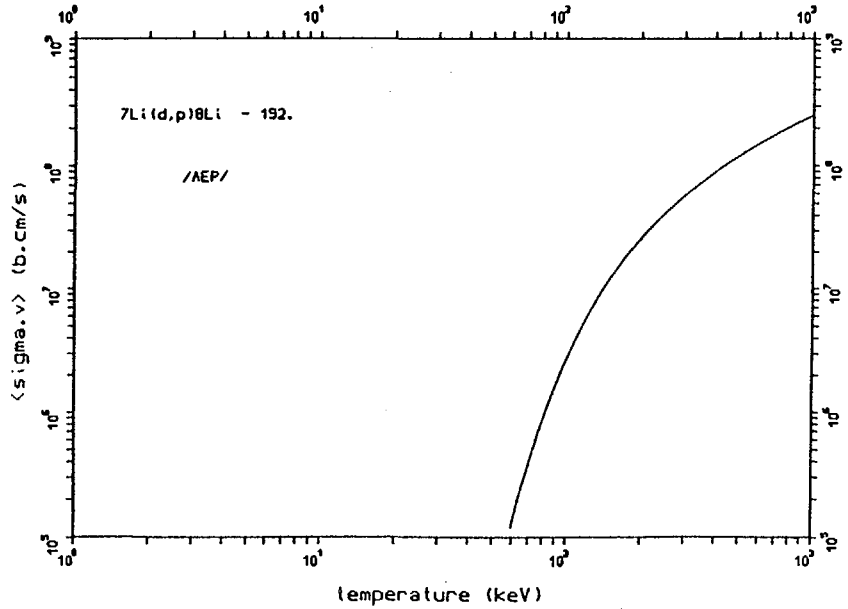

Sigma (barn)
d-Energy (keV)
Li-7(d,nn)Be-7
* Li-7 (d,nn) Be-7
/ECPL-82/

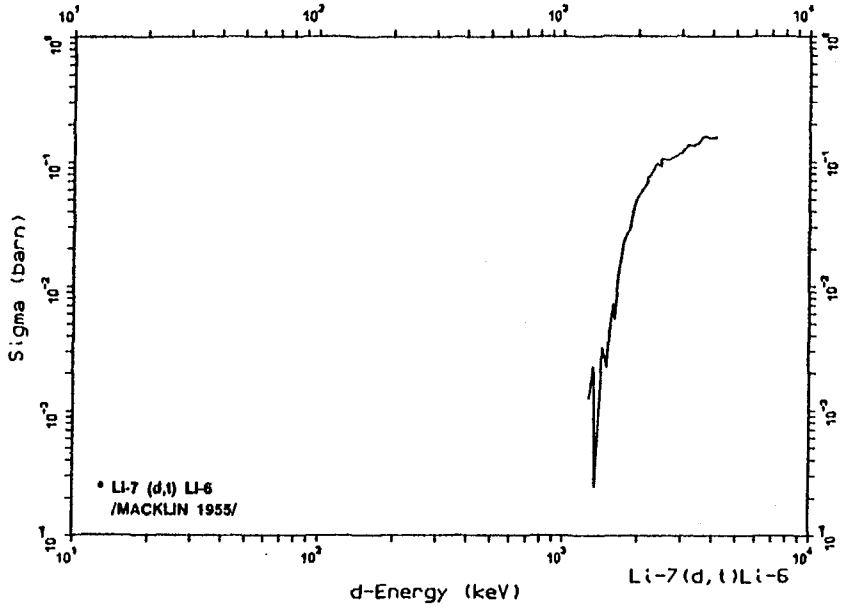

<sigma.v> (b.cm/s)
temperature (keV)
7Li(p,a)A + 17346.
/FOWLER 1975/
/MCNALLY 1980/
/ECPL/

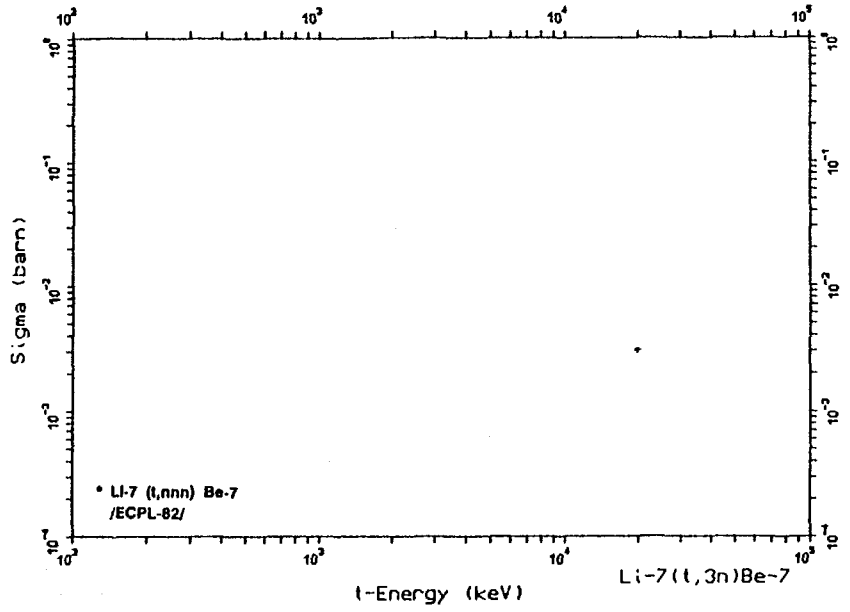

<Sigma.V> (bcm/sec)
Temperature (keV)
Li-7(d,nn)Be-7
Li-7 (d,nn) Be-7
/ECPL 1982/

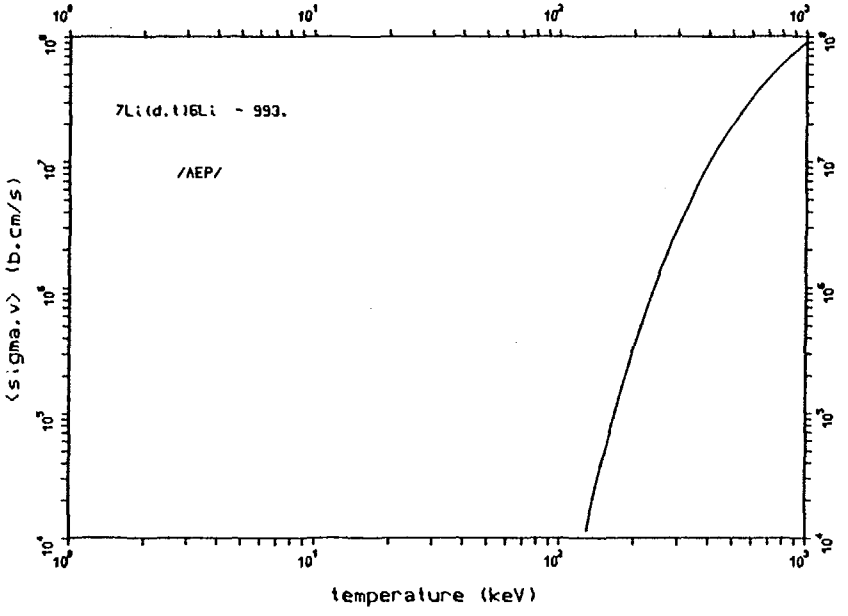

7Li(d,p)8Li - 192.
/KAVANAGH 1960/
/MINGAY 1979/
/FILLIPONE 1982/
/AEP/
cross section (barn)
d-energy (keV)

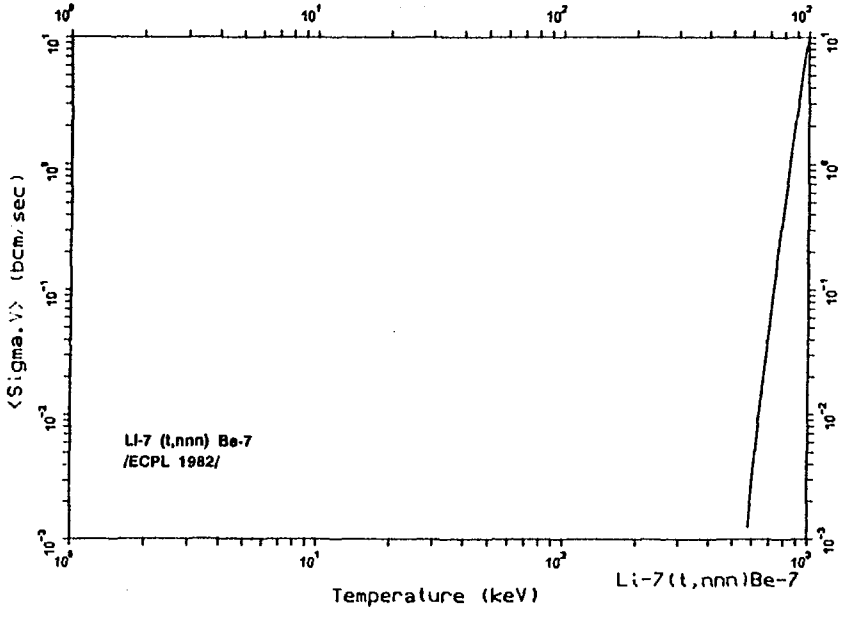

7Li(d,na)A + 15121.
/FOWLER 1975/
/MCNALLY 1980/
<sigma.v> (b.cm/s)
temperature (keV)

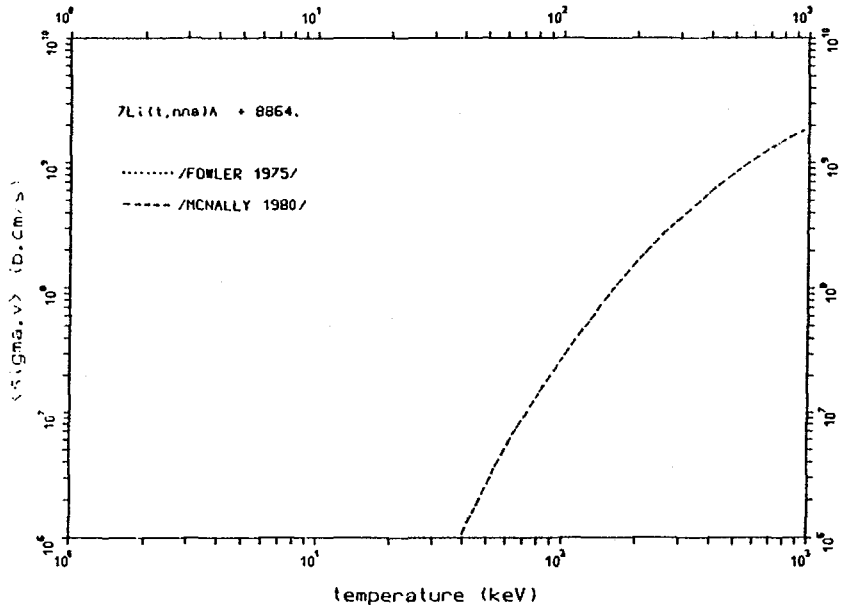

7Li(d,p)8Li - 192.
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)

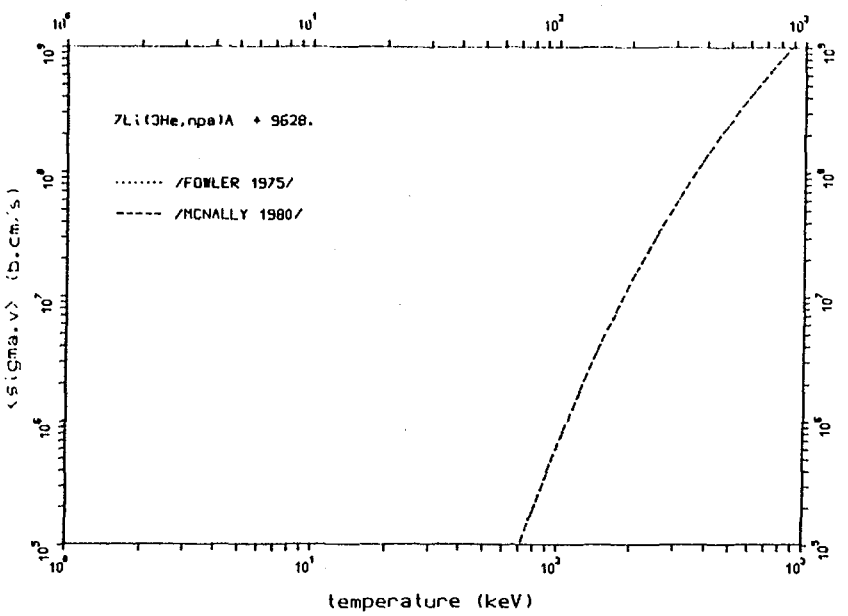

Sigma (barn)
d-Energy (keV)
Li-7(d,t)Li-6
* Li-7 (d,t) Li-6
/MACKLIN 1955/

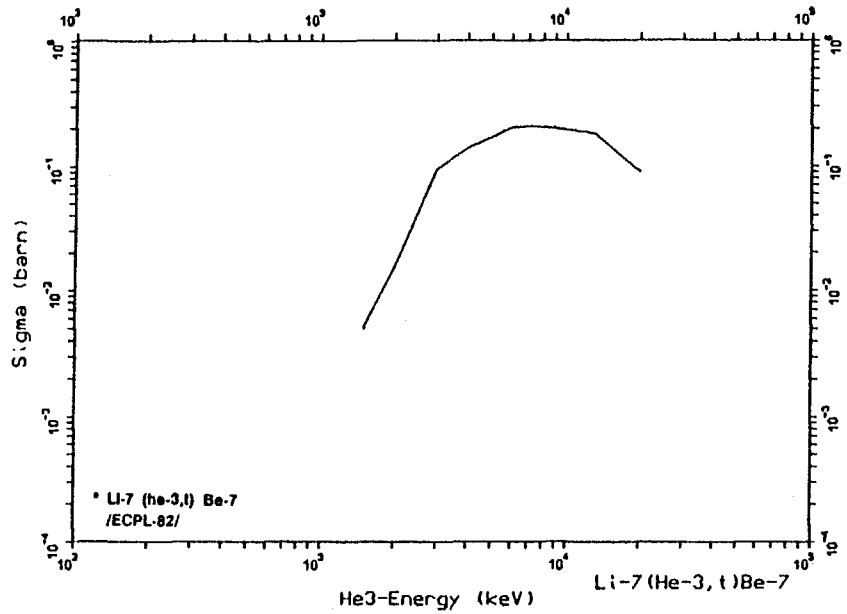

Sigma (barn)
t-Energy (keV)
Li-7(t,3n)Be-7
* Li-7 (t,nnn) Be-7
/ECPL-82/

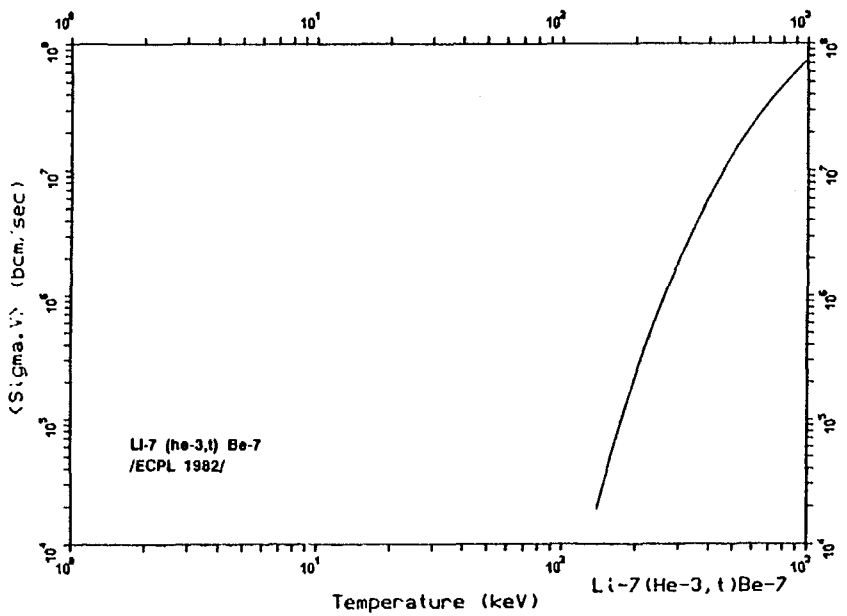

<sigma.v> (b.cm/s)
temperature (keV)
7Li(d,t)6Li - 993.
/AEP/

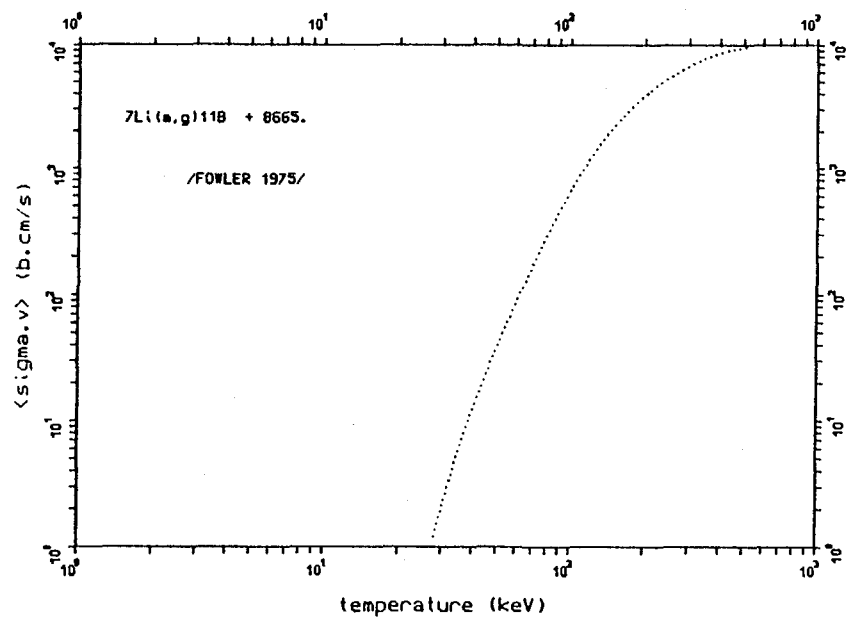

<Sigma.V> (bCm/sec)
Temperature (keV)
Li-7(t,nnn)Be-7
Li-7 (t,nnn) Be-7
/ECPL 1982/

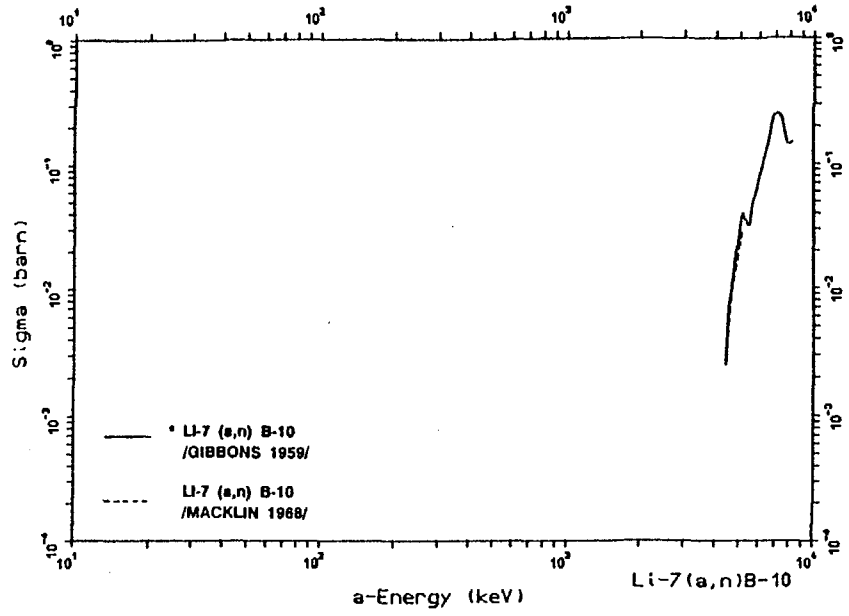

7Li(t,nna)A + 8864.
/FOWLER 1975/
/MCNALLY 1980/
temperature (keV)

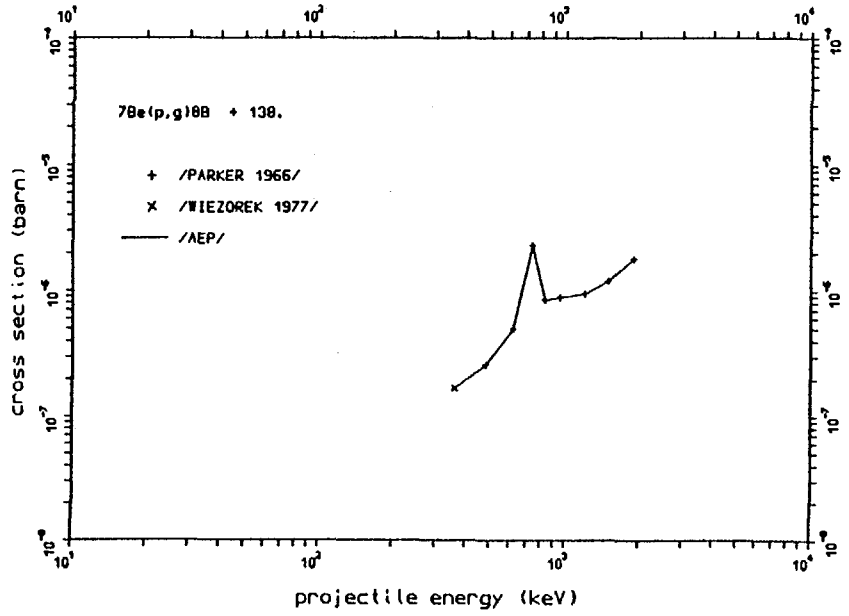

7Li(3He,npa)A + 9628.
/FOWLER 1975/
/MCNALLY 1980/
temperature (keV)

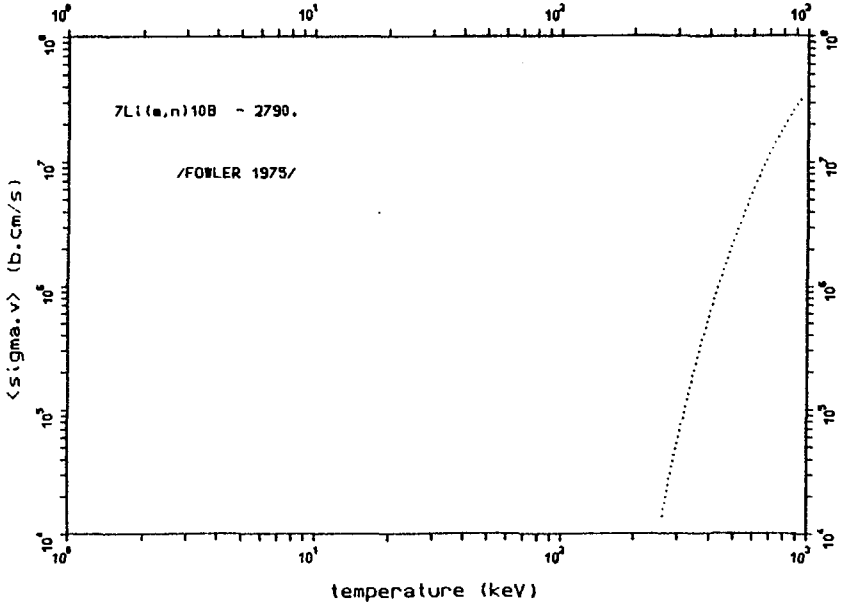

Sigma (barn)
He3-Energy (keV)
Li-7(He-3,t)Be-7
* Li-7 (he-3,t) Be-7
/ECPL-82/

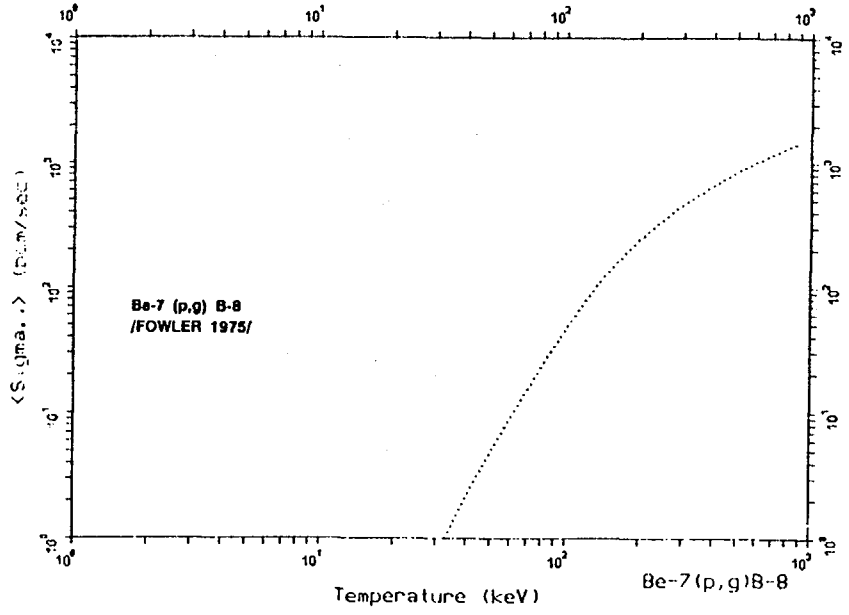

Temperature (keV)
Li-7(He-3,t)Be-7
Li-7 (he-3,t) Be-7
/ECPL 1982/

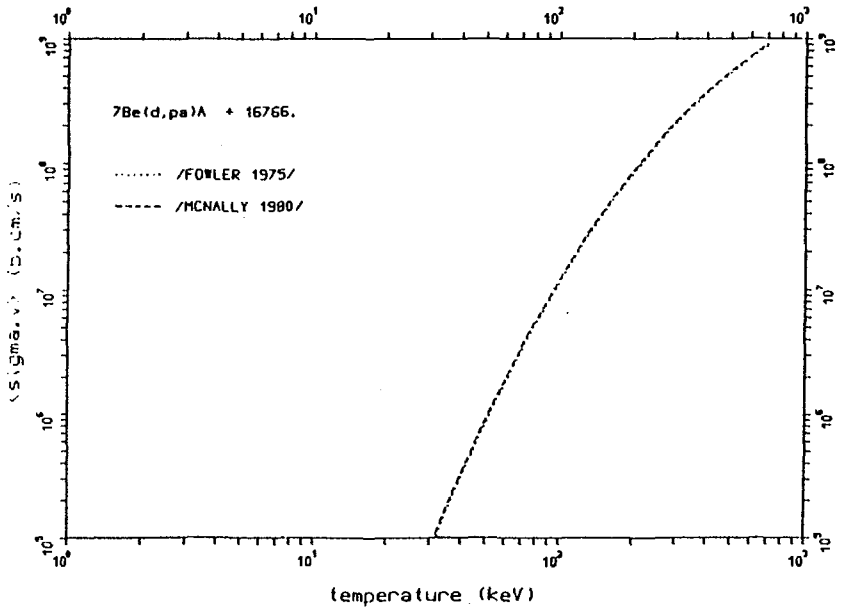

7Li(m,g)11B + 8665.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

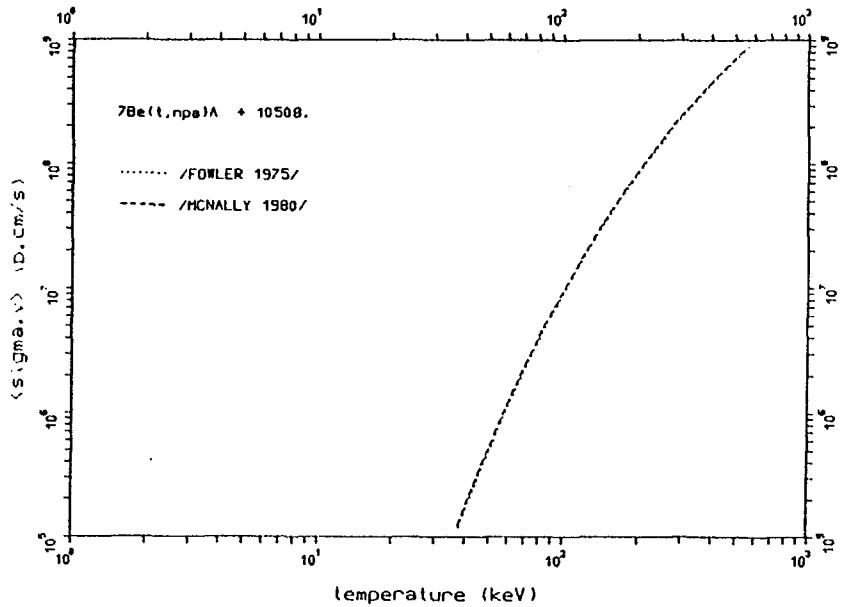

Sigma (barn)
a-Energy (keV)
Li-7(a,n)B-10
* Li-7 (a,n) B-10
/GIBBONS 1959/
Li-7 (a,n) B-10
/MACKLIN 1968/

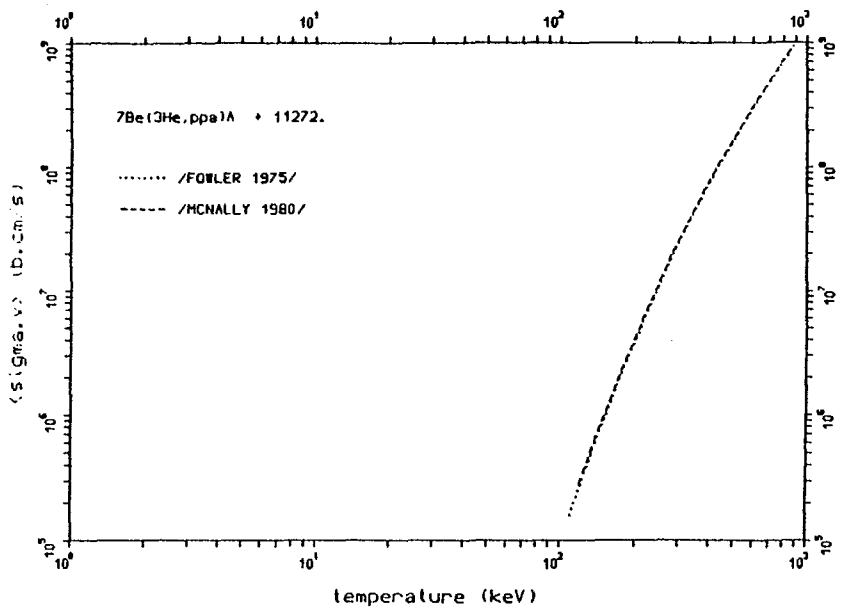

7Be(p,g)8B + 138.
+ /PARKER 1966/
× /WIEZOREK 1977/
/AEP/
cross section (barn)
projectile energy (keV)

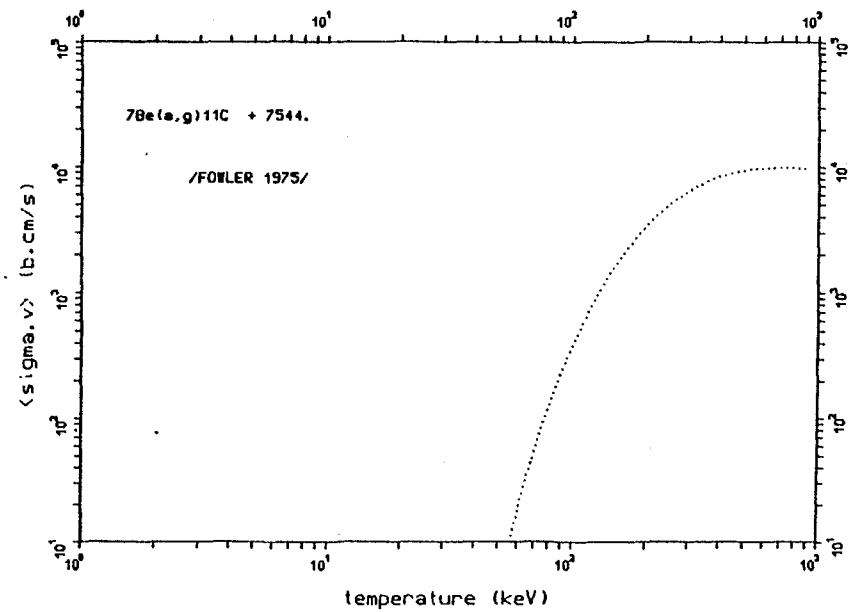

7Li(a,n)10B ~ 2790.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

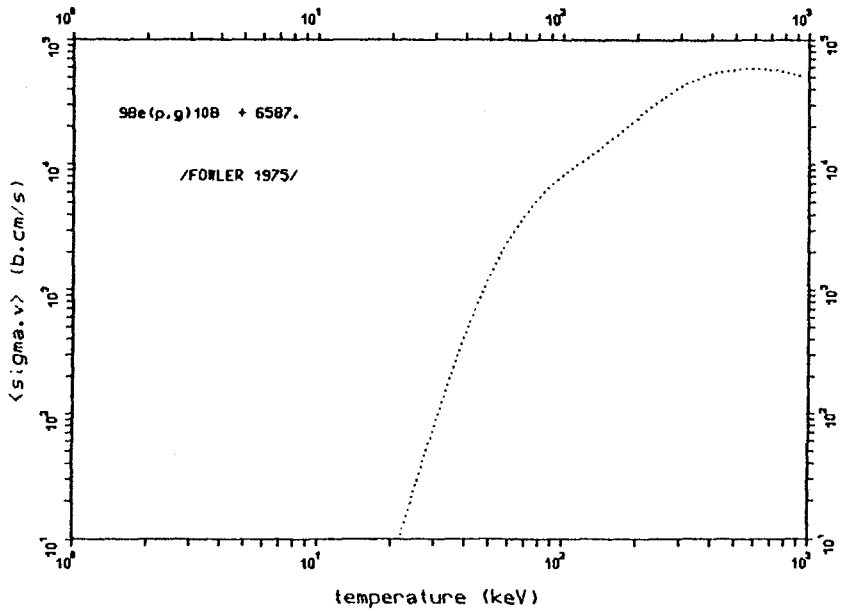

Be-7 (p,g) B-8
/FOWLER 1975/
Temperature (keV)
Be-7(p,g)8-8

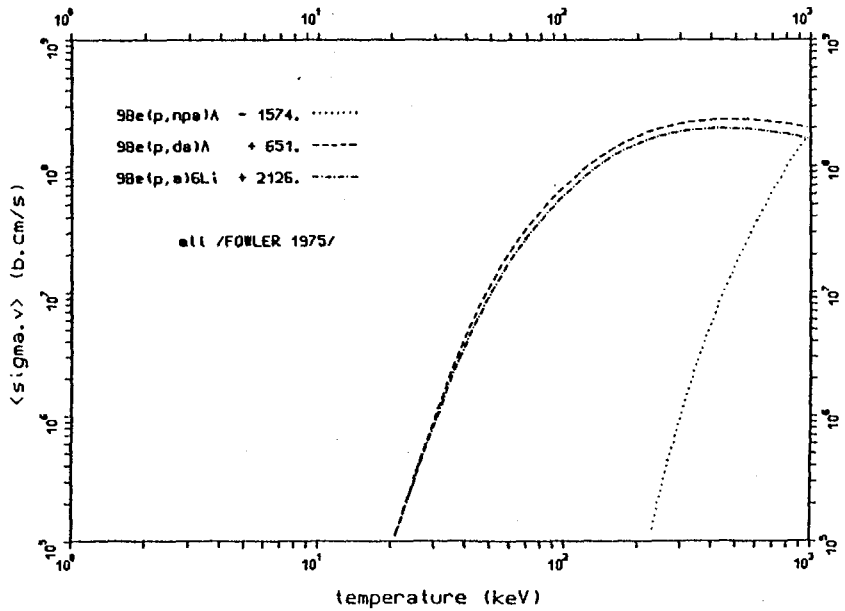

7Be(d,pa)A + 16766.
/FOWLER 1975/
/MCNALLY 1980/
temperature (keV)

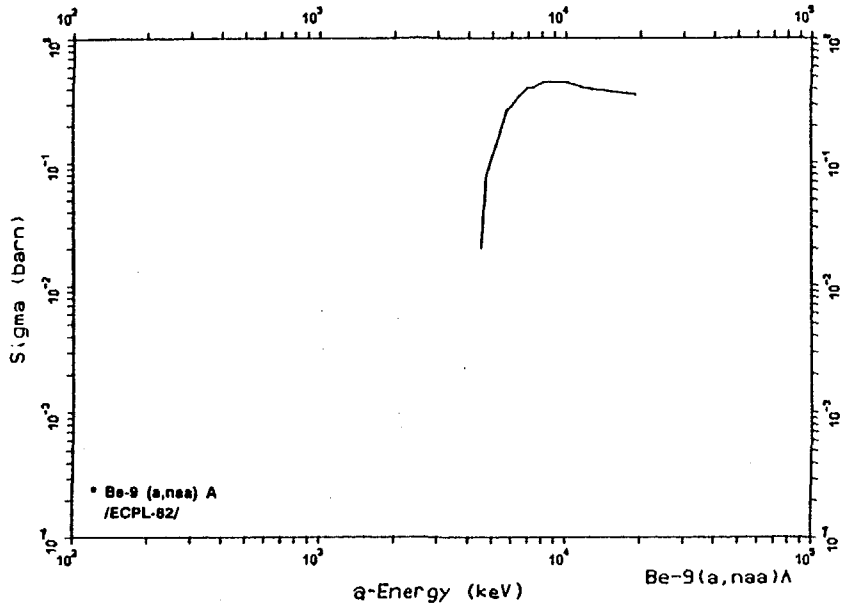

7Be(t,npa)A + 10508.
/FOWLER 1975/
/MCNALLY 1980/
temperature (keV)

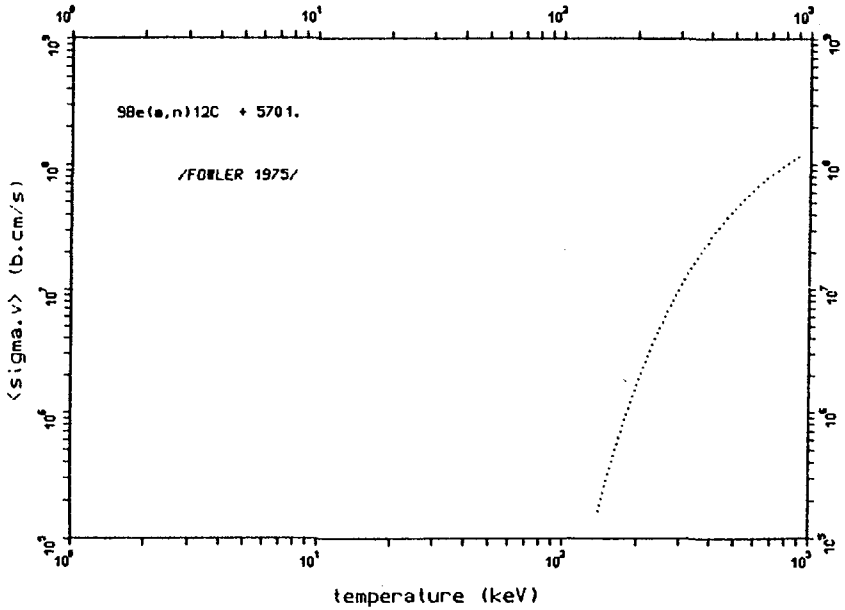

7Be(3He,ppa)A + 11272.
/FOWLER 1975/
/MCNALLY 1980/
temperature (keV)

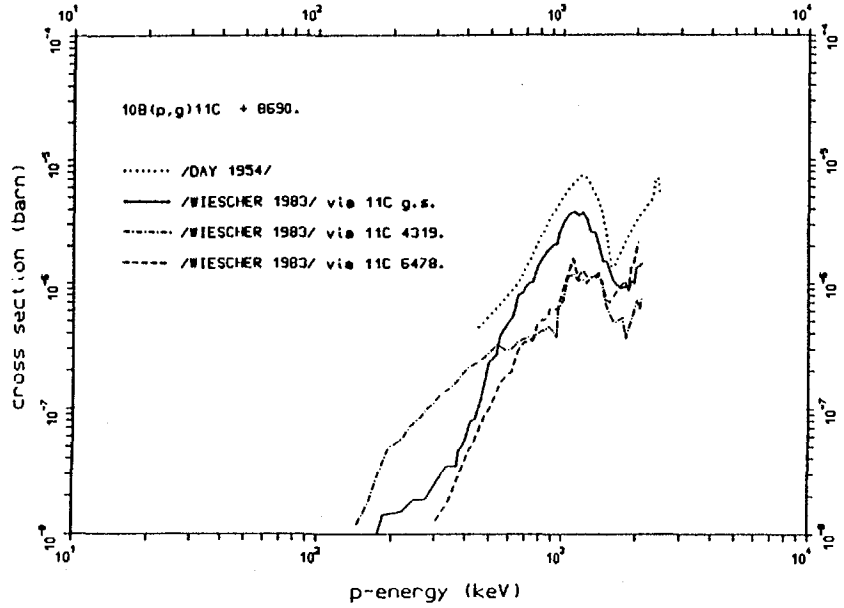

7Be(a,g)11C + 7544.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

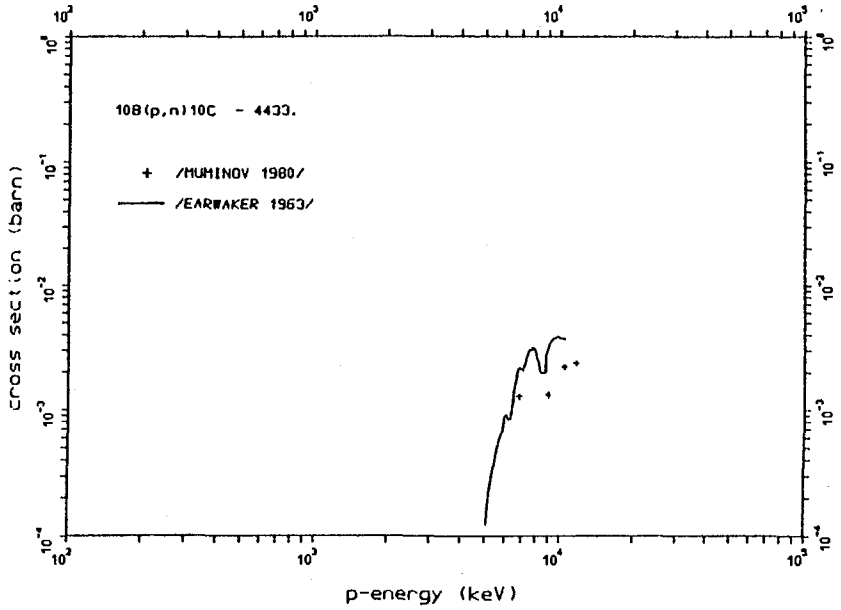

9Be(p,g)10B + 6587.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

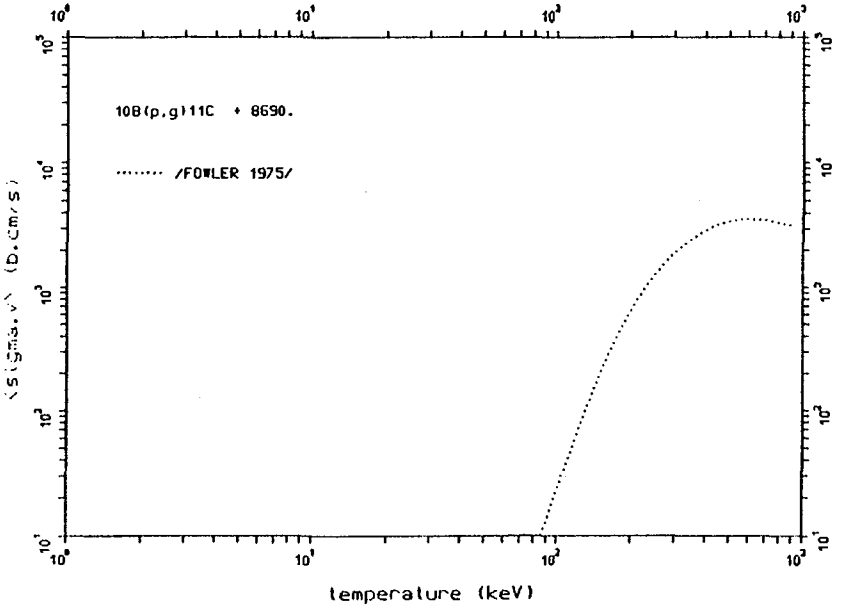

9Be(p,npa)A - 1574.
9Be(p,da)A + 651.
9Be(p,a)6Li + 2126.
all /FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

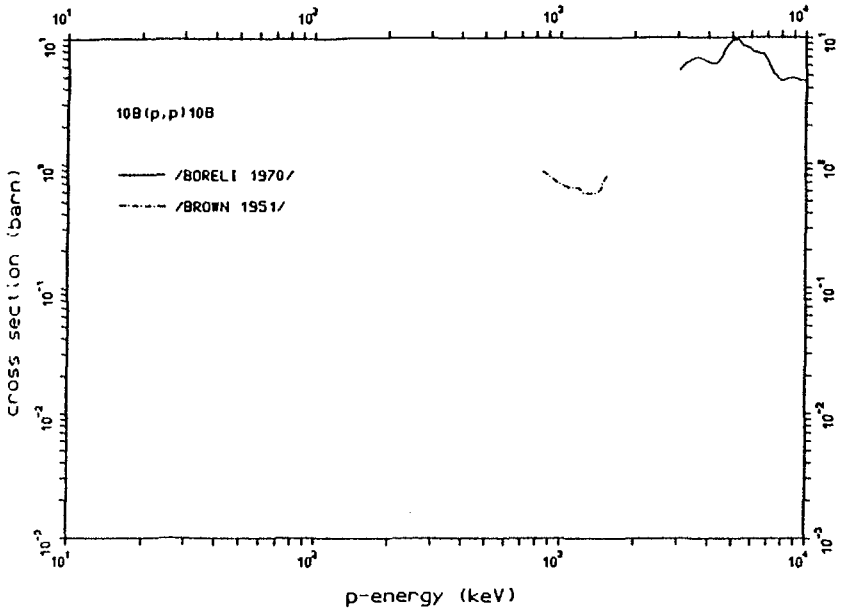

Sigma (barn)
* Be-9 (a,naa) A
/ECPL-82/
a-Energy (keV)
Be-9(a,naa)A

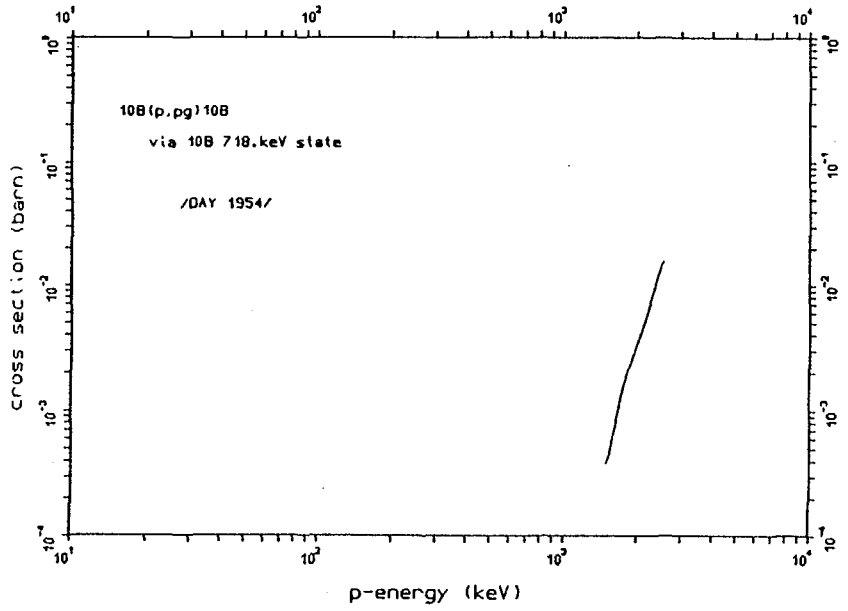

9Be(a,n)12C + 5701.
/FOWLER 1975/
<sigma.v> (b.cm/s)
temperature (keV)

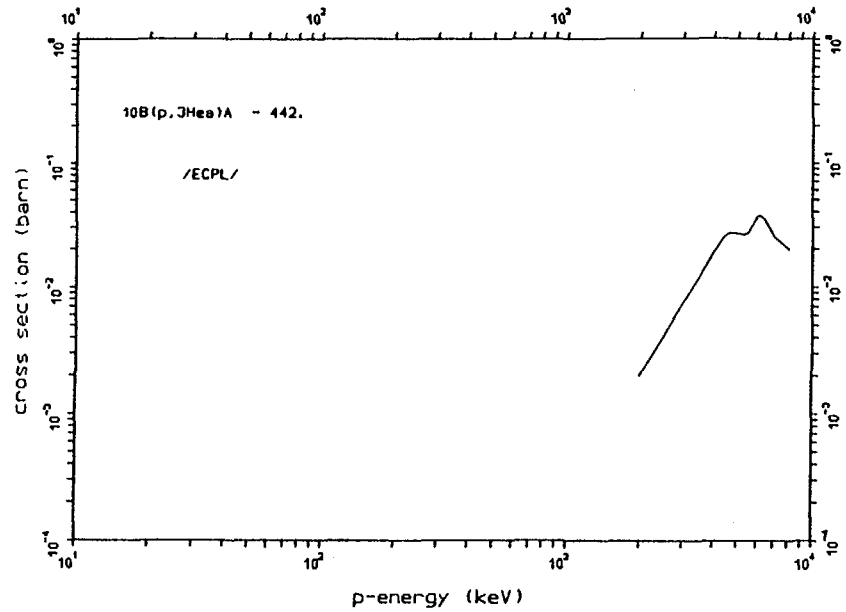

10B(p,g)11C + 8690.
/DAY 1954/
/WIESCHER 1983/ via 11C g.s.
/WIESCHER 1983/ via 11C 4319.
/WIESCHER 1983/ via 11C 6478.
cross section (barn)
p-energy (keV)

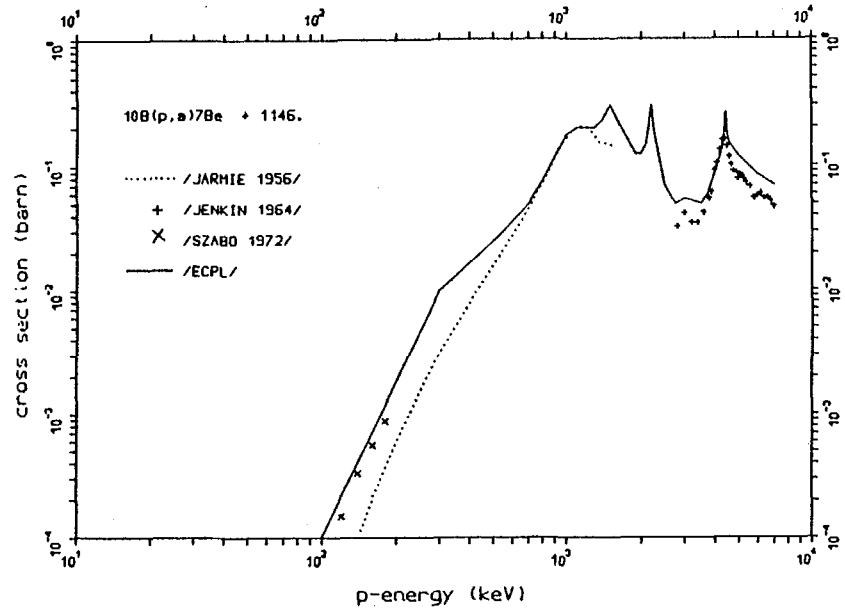

10B(p,n)10C - 4433.
/MUHINOV 1980/
/EARWAKER 1963/
cross section (barn)
p-energy (keV)

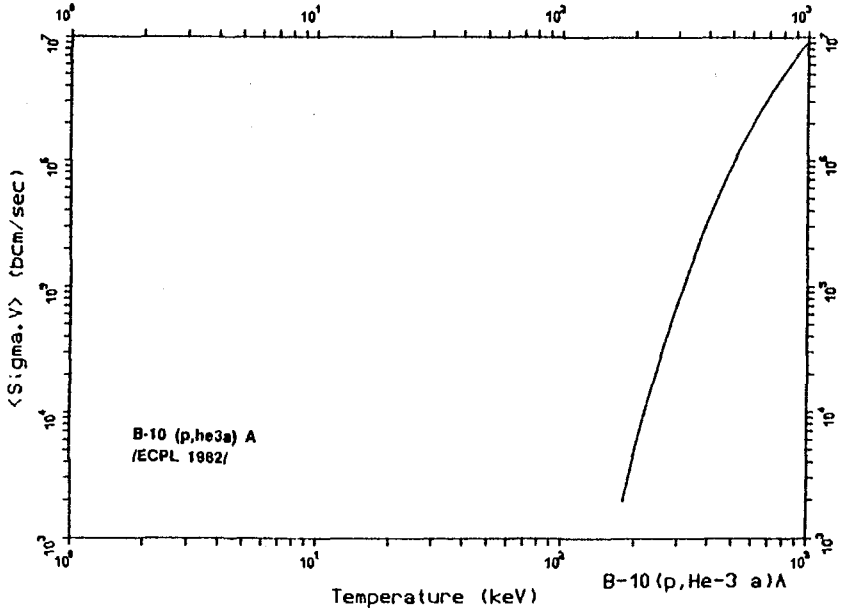

10B(p,g)11C + 8690.
/FOWLER 1975/
temperature (keV)

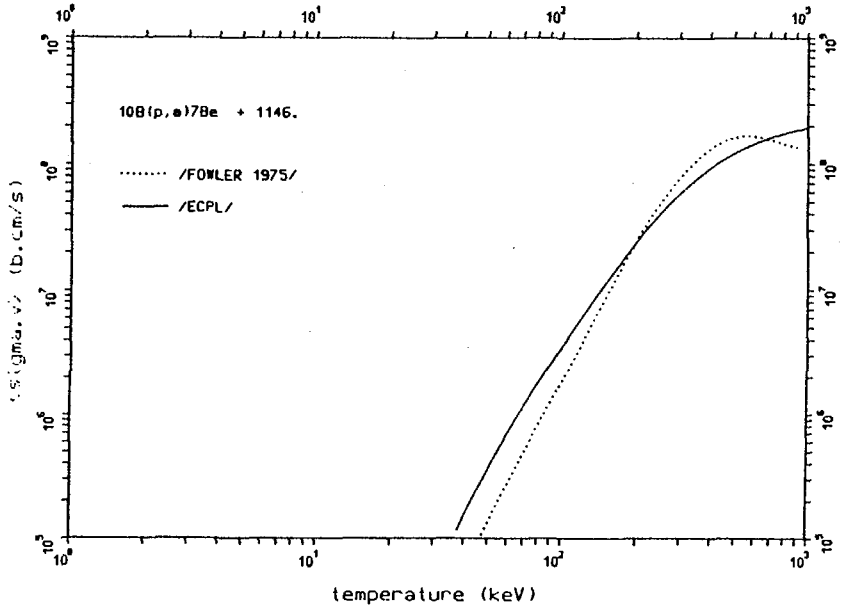

10B(p,p)10B
/BORELI 1970/
/BROWN 1951/
cross section (barn)
p-energy (keV)

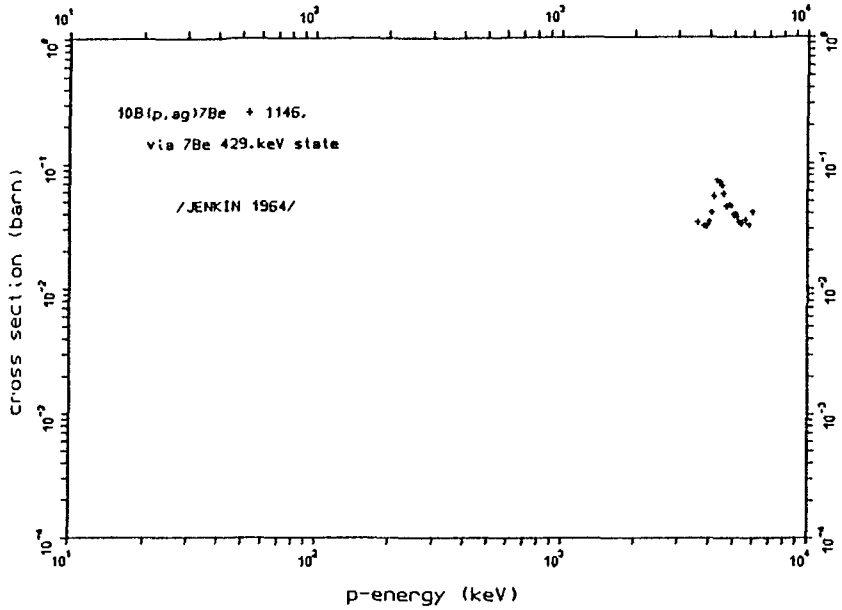

10B(p,pg)10B
via 10B 718.keV state
/DAY 1954/
cross section (barn)
p-energy (keV)

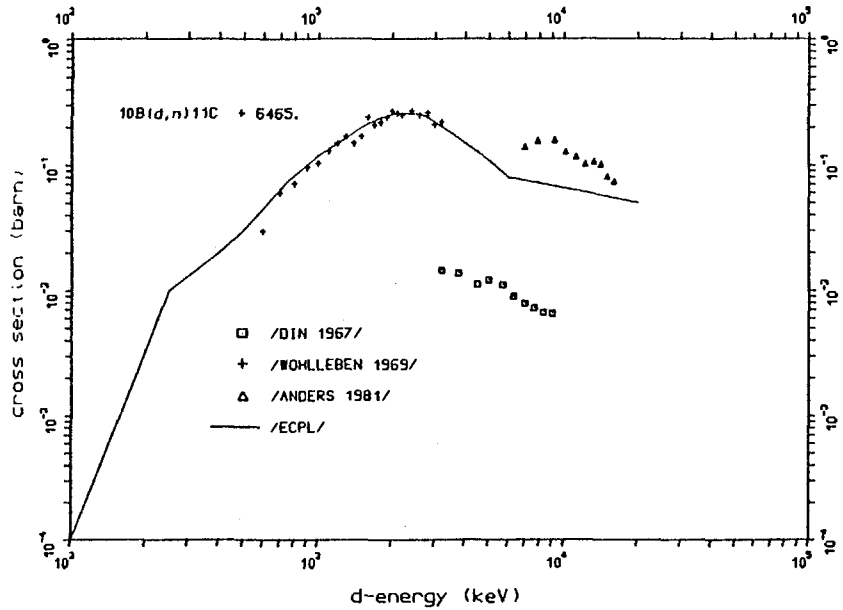

10B(p,3Hea)A - 442.
/ECPL/
cross section (barn)
p-energy (keV)

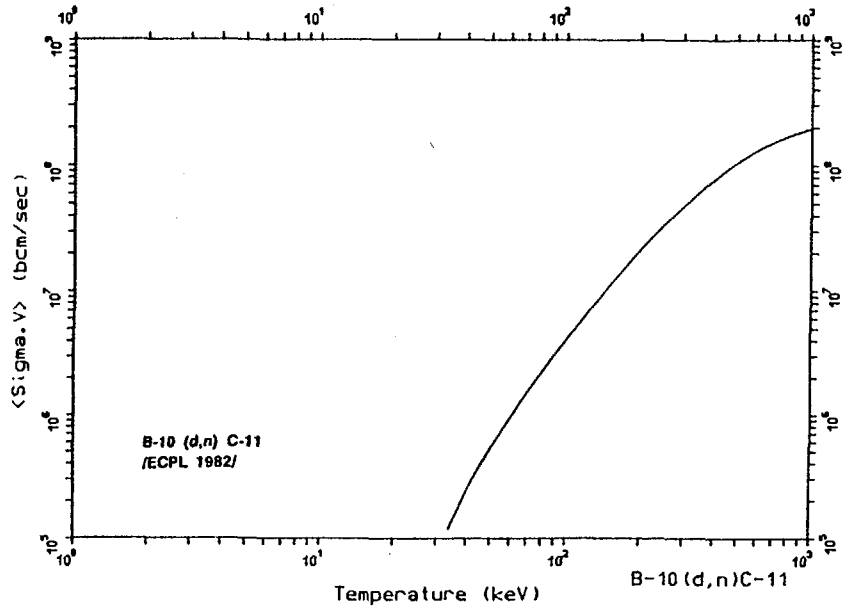

10B(p,a)7Be + 1146.
/JARMIE 1956/
/JENKIN 1964/
/SZABO 1972/
/ECPL/
cross section (barn)
p-energy (keV)

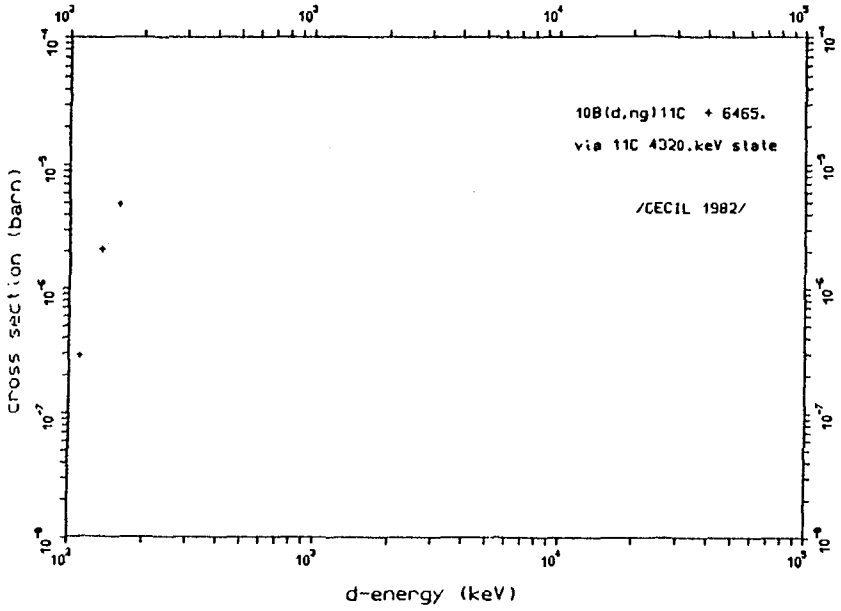

B-10 (p,he3a) A
/ECPL 1982/
<Sigma.V> (bCm/sec)
Temperature (keV)
B-10(p,He-3 a)A

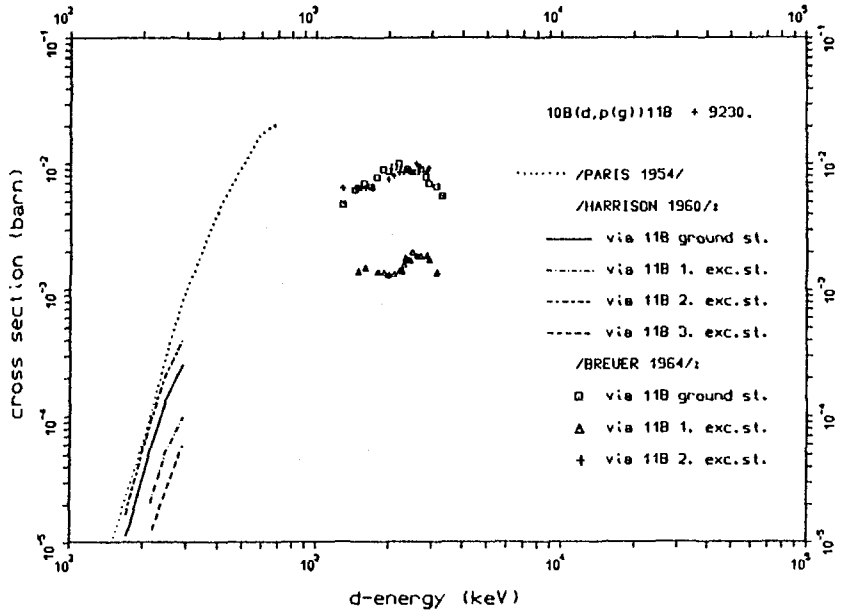

10B(p,a)7Be + 1146.
/FOWLER 1975/
/ECPL/
temperature (keV)

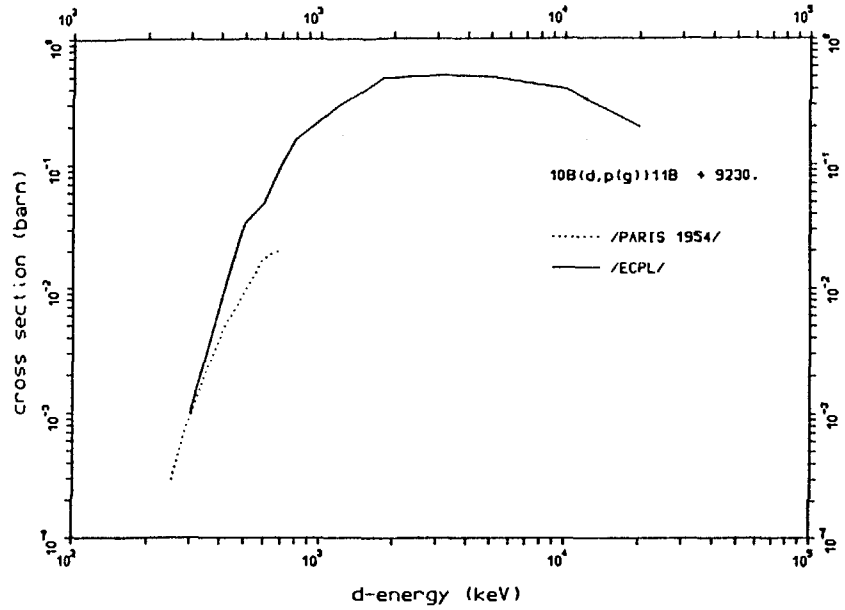

10B(p,ag)7Be + 1146.
via 7Be 429.keV state
/JENKIN 1964/
cross section (barn)
p-energy (keV)

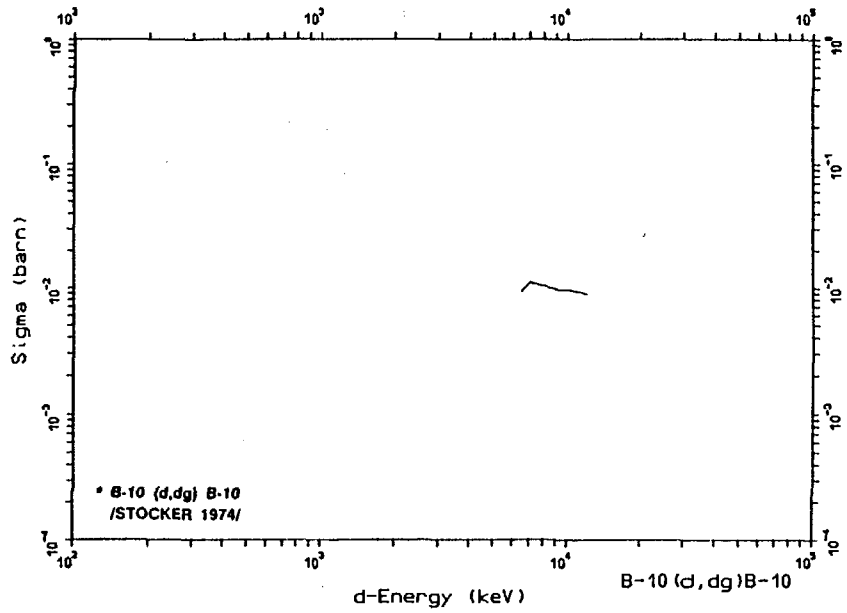

10B(d,n)11C + 6465.
/DIN 1967/
/WOHLLEBEN 1969/
/ANDERS 1981/
/ECPL/
cross section (barn)
d-energy (keV)

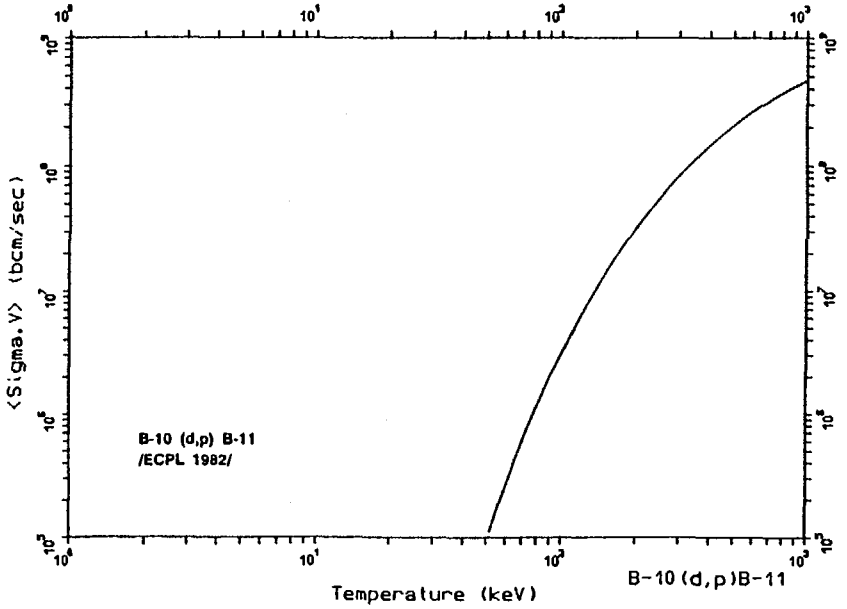

B-10 (d,n) C-11
/ECPL 1982/
<Sigma.V> (bcm/sec)
Temperature (keV)
B-10(d,n)C-11


10B(d,ng)11C + 6465.
via 11C 4320.keV state
/CECIL 1982/
cross section (barn)
d-energy (keV)


10B(d,p(g))11B + 9230.
/PARIS 1954/
/HARRISON 1960/:
via 11B ground st.
via 11B 1. exc.st.
via 11B 2. exc.st.
via 11B 3. exc.st.
/BREUER 1964/:
via 11B ground st.
via 11B 1. exc.st.
via 11B 2. exc.st.
cross section (barn)
d-energy (keV)


10B(d,p(g))11B + 9230.
/PARIS 1954/
/ECPL/
cross section (barn)
d-energy (keV)


* B-10 (d,dg) B-10
/STOCKER 1974/
Sigma (barn)
d-Energy (keV)
B-10 (d,dg)B-10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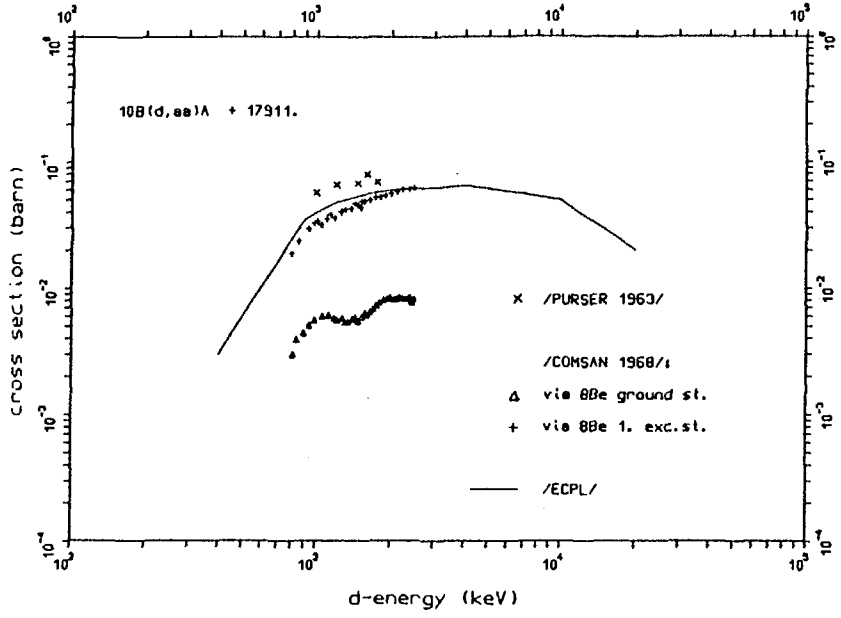
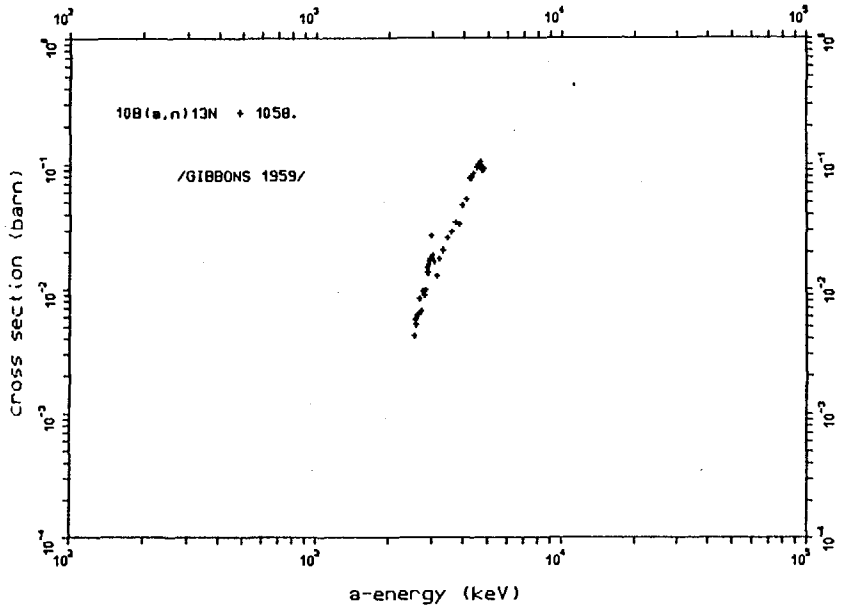
<Sigma.V> (bcm/sec)
Temperature (keV)
B-10 (d,p)B-11


10B(d,aa)A + 17911.
× /PURSER 1963/
/COMSAN 1968/:
Δ via 8Be ground st.
+ via 8Be 1. exc.st.
/ECPL/
cross section (barn)
d-energy (keV)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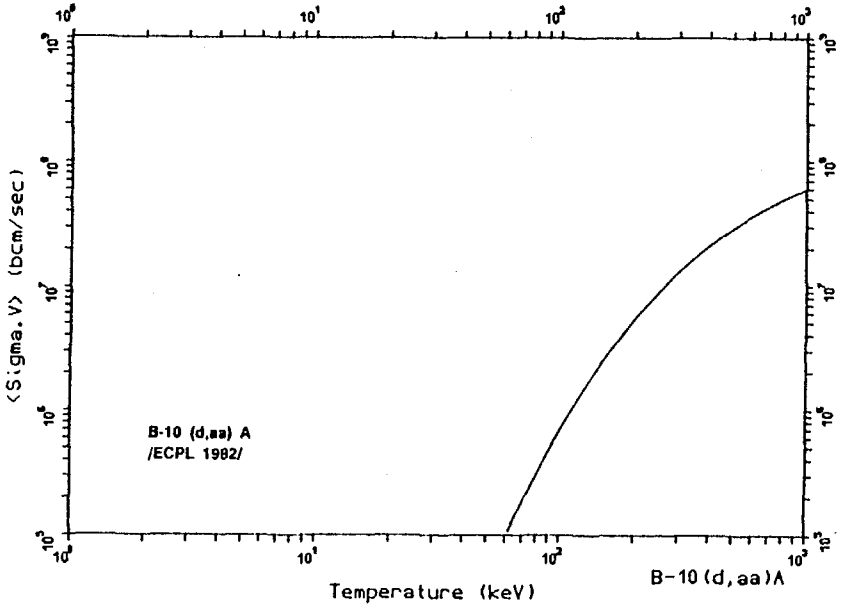
/GIBBONS 1959/
cross section (barn)
a-energy (keV)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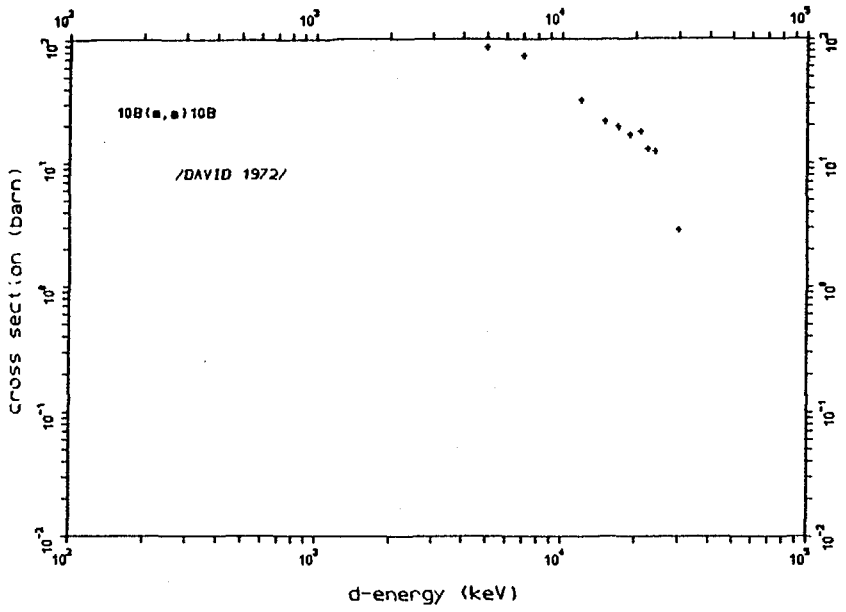
/ECPL 1982/
<Sigma.V> (bcm/sec)
Temperature (keV)
B-10(d,aa)A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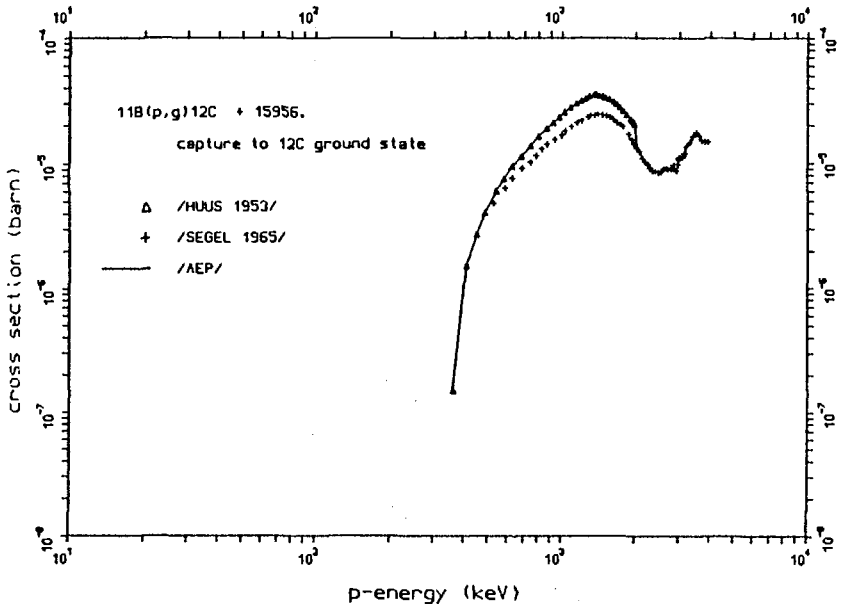
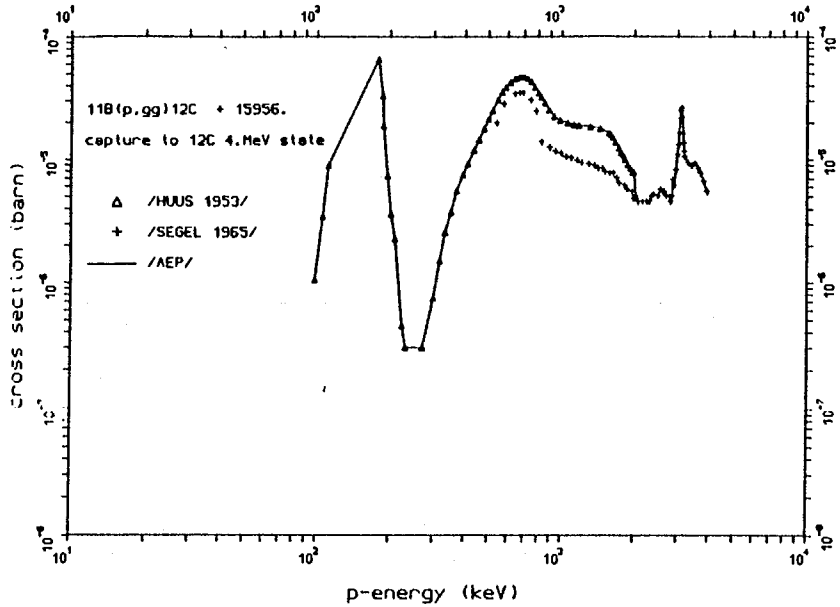
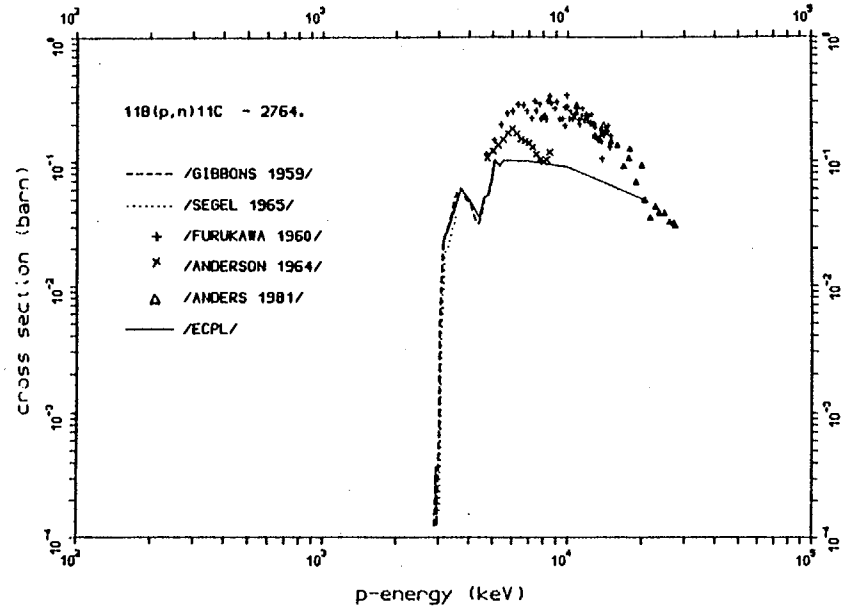
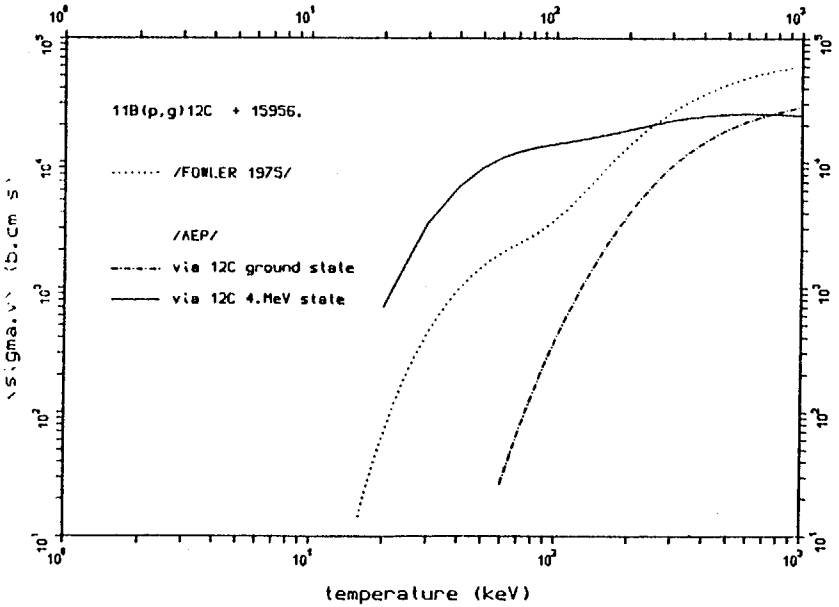
/DAVID 1972/
cross section (barn)
d-energy (keV)


11B(p,g)12C + 15956.
capture to 12C ground state
Δ /HUUS 1953/
+ /SEGEL 1965/
/AEP/
cross section (barn)
p-energy (keV)


11B(p,gg)12C + 15956.
capture to 12C 4.MeV state
Δ /HUUS 1953/
+ /SEGEL 1965/
/AEP/
cross section (barn)
p-energy (keV)


11B(p,n)11C - 2764.
/GIBBONS 1959/
/SEGEL 1965/
+ /FURUKAWA 1960/
× /ANDERSON 1964/
Δ /ANDERS 1981/
/ECPL/
cross section (barn)
p-energy (keV)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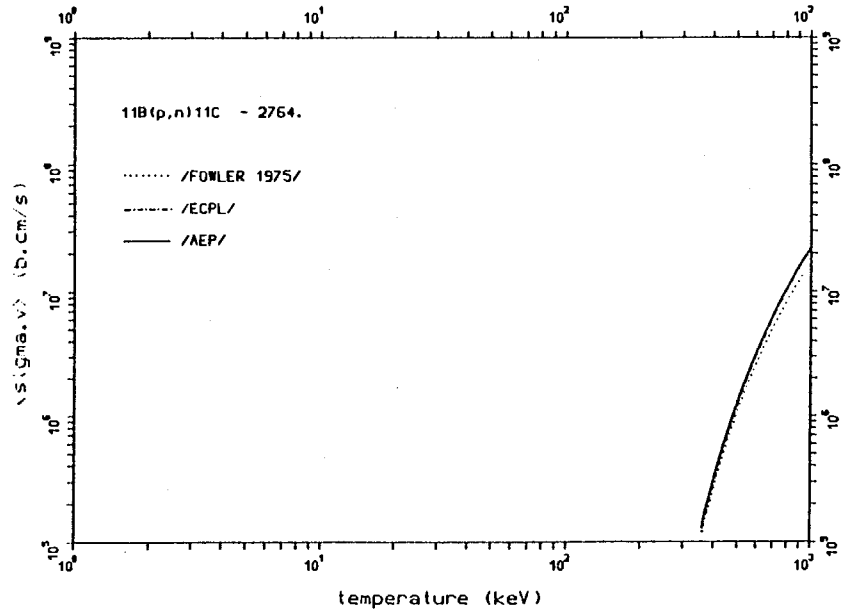
/FOWLER 1975/
/AEP/
via 12C ground state
via 12C 4.MeV state
temperature (keV)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/ECPL/
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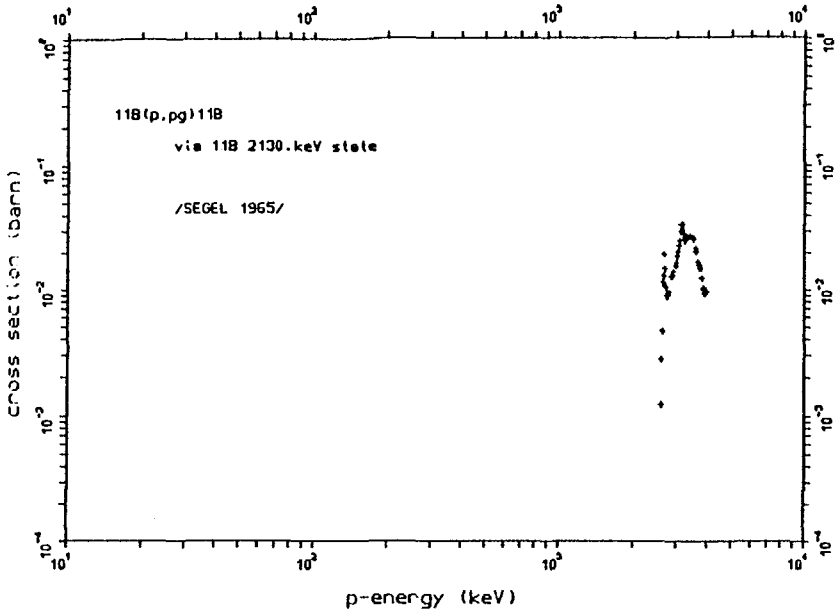
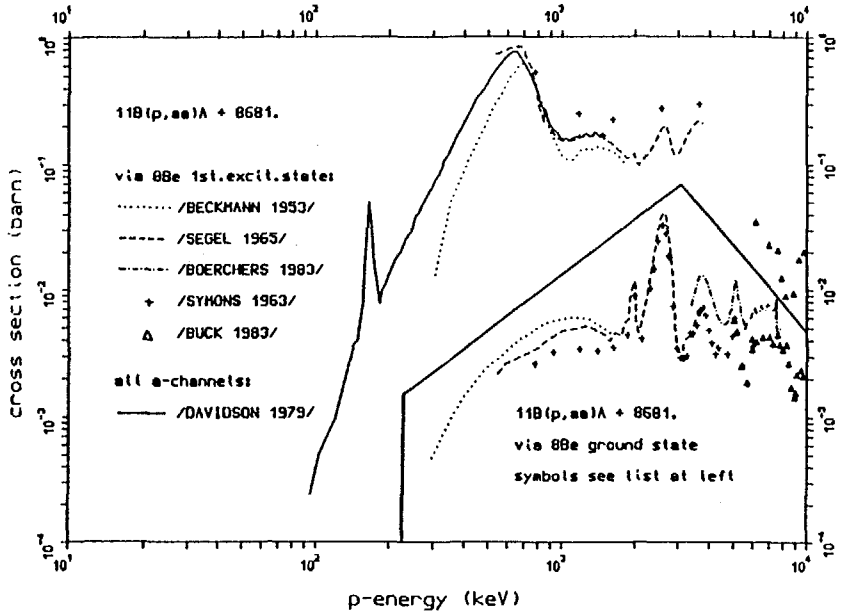
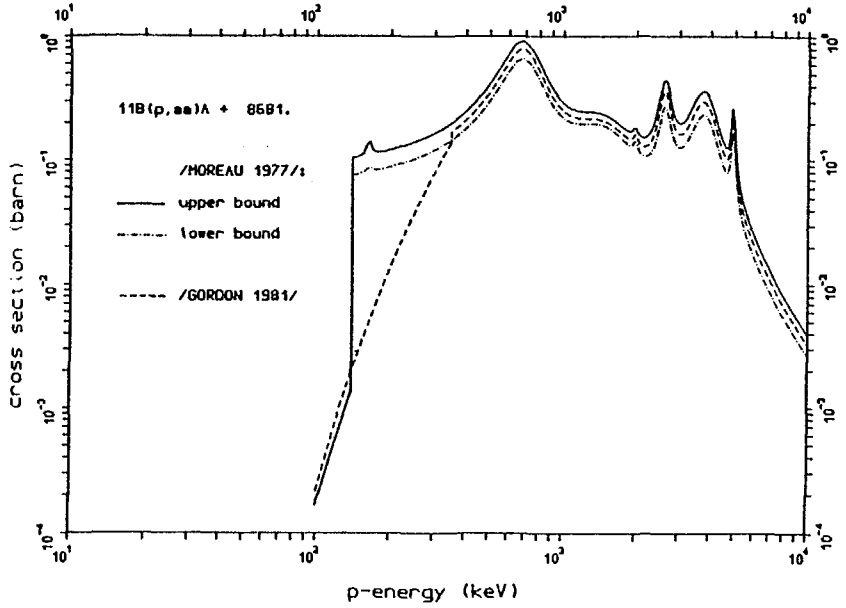
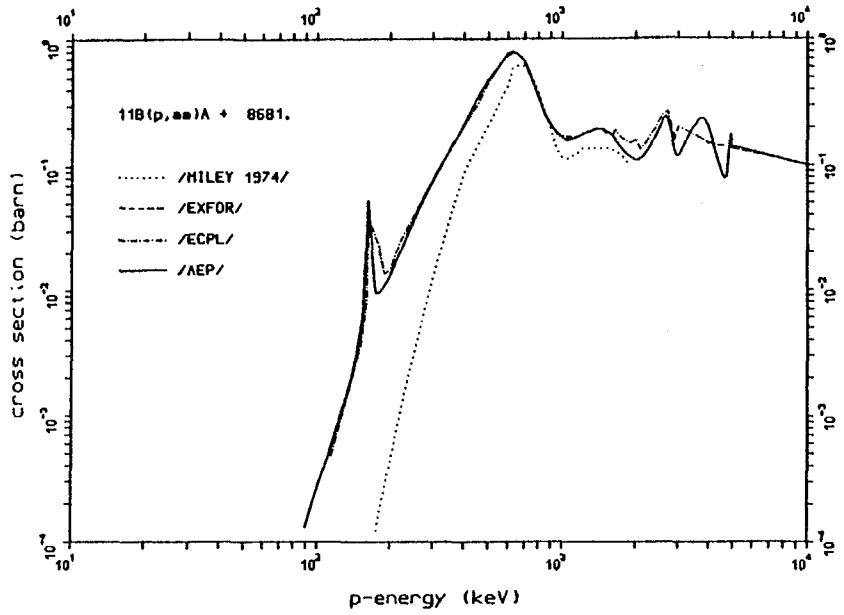
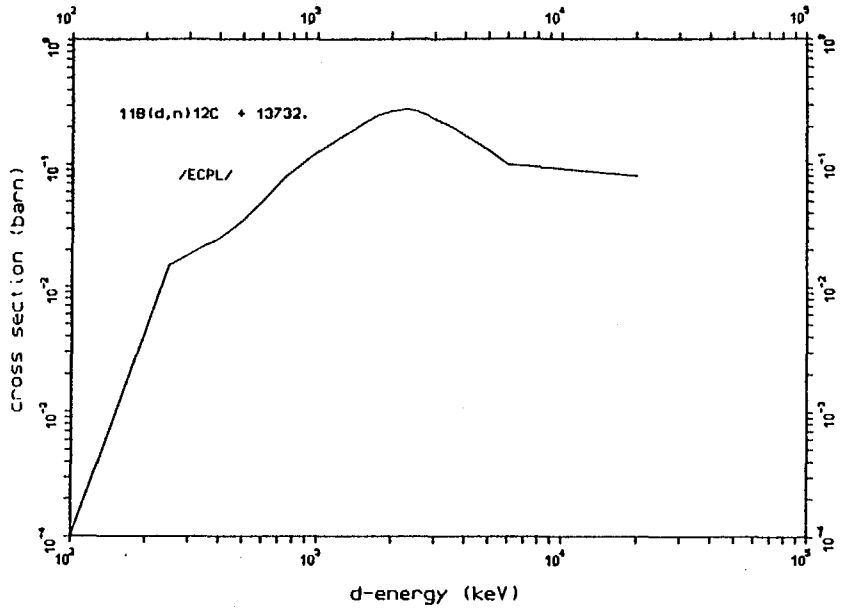
temperature (keV)

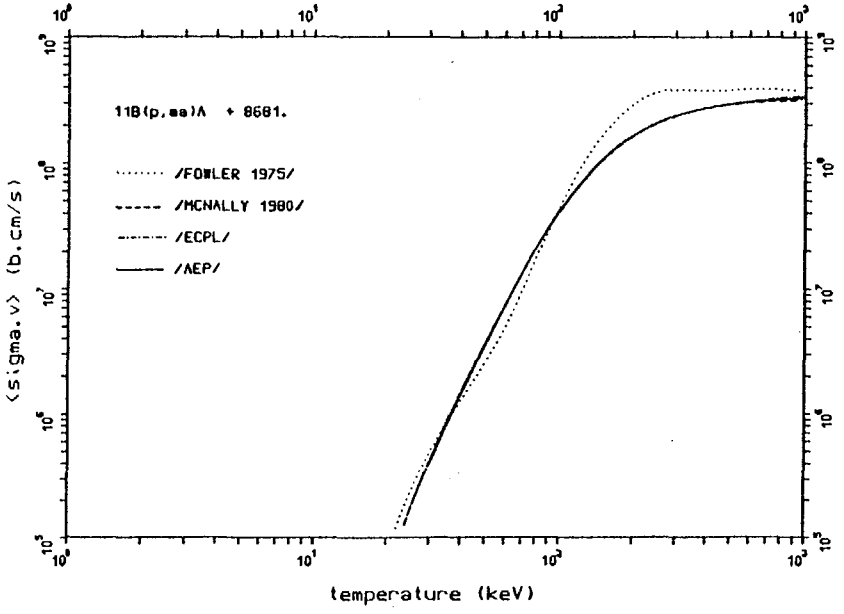

11B(p,pg)11B
via 11B 2130.keV state
/SEGEL 1965/
cross section (barn)
p-energy (keV)

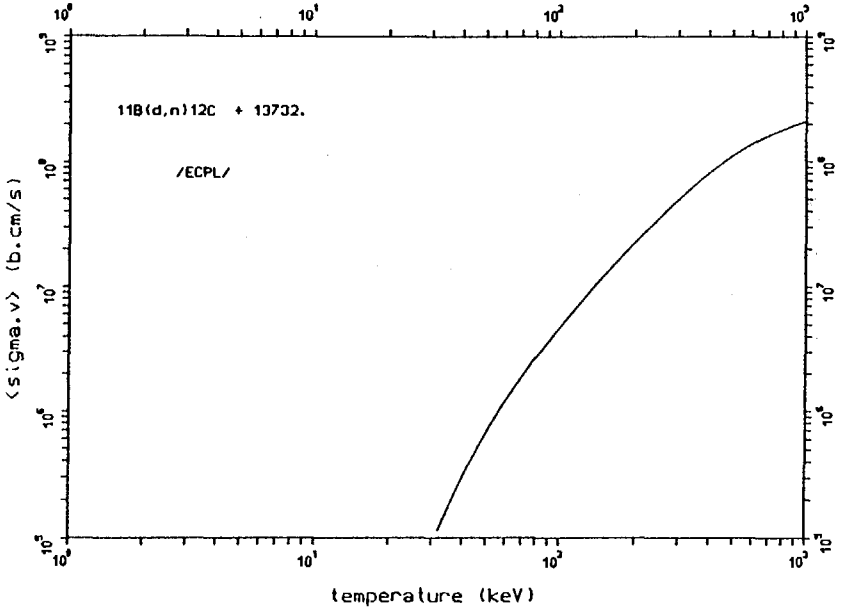

11B(p,aa)A + 8681.
via 8Be 1st.excit.state:
/BECKMANN 1953/
/SEGEL 1965/
/BOERCHERS 1983/
/SYMONS 1963/
/BUCK 1983/
all a-channels:
/DAVIDSON 1979/
11B(p,aa)A + 8681.
via 8Be ground state
symbols see list at left
cross section (barn)
p-energy (keV)


11B(p,aa)A + 8681.
/MOREAU 1977/:
upper bound
lower bound
/GORDON 1981/
cross section (barn)
p-energy (keV)


11B(p,aa)A + 8681.
/HILEY 1974/
/EXFOR/
/ECPL/
/AEP/
cross section (barn)
p-energy (keV)


11B(d,n)12C + 13732.
/ECPL/
cross section (barn)
d-energy (keV)


11B(p,aa)A + 8681.
/FOWLER 1975/
/MCNALLY 1980/
/ECPL/
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)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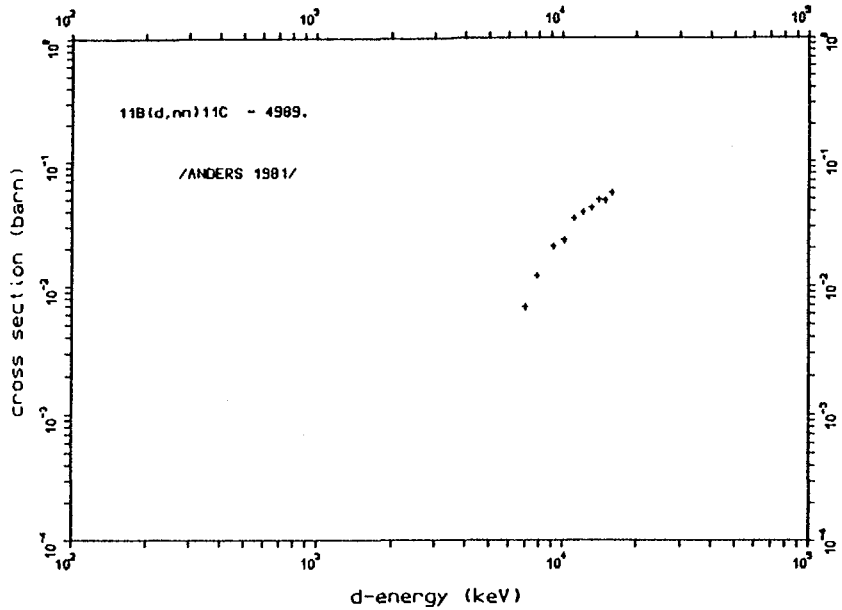
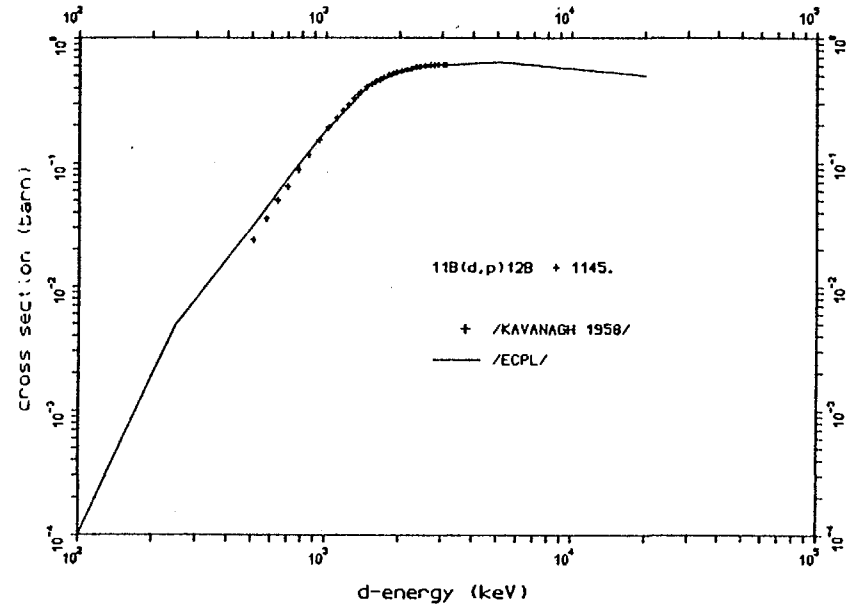
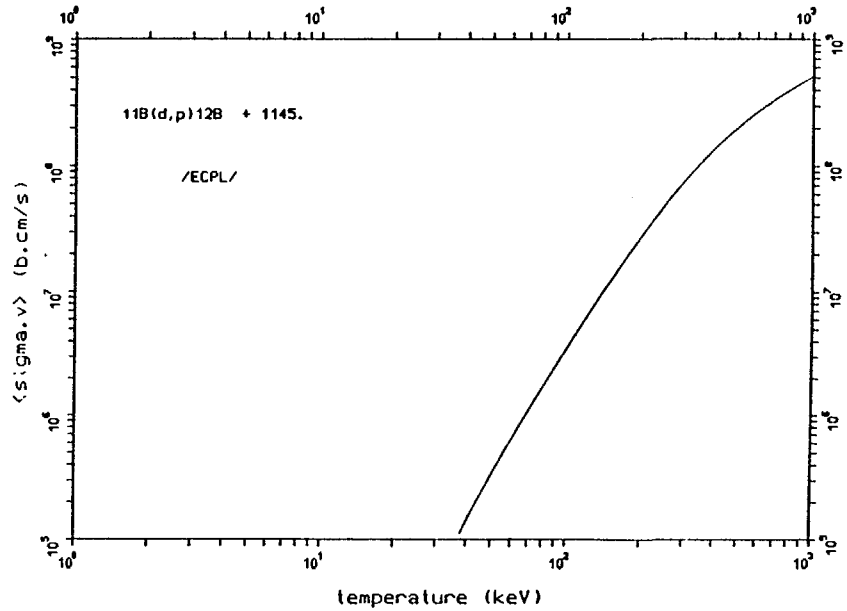
temperature (keV)


11B(d,nn)11C - 4989.
/ANDERS 1981/
cross section (barn)
d-energy (keV)


11B(d,p)12B + 1145.
+ /KAVANAGH 1958/
/ECPL/
cross section (barn)
d-energy (keV)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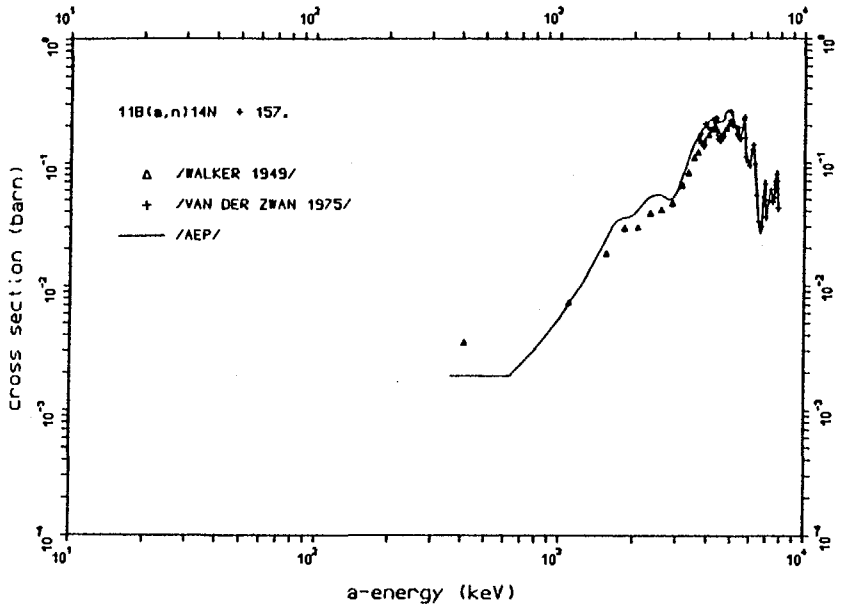
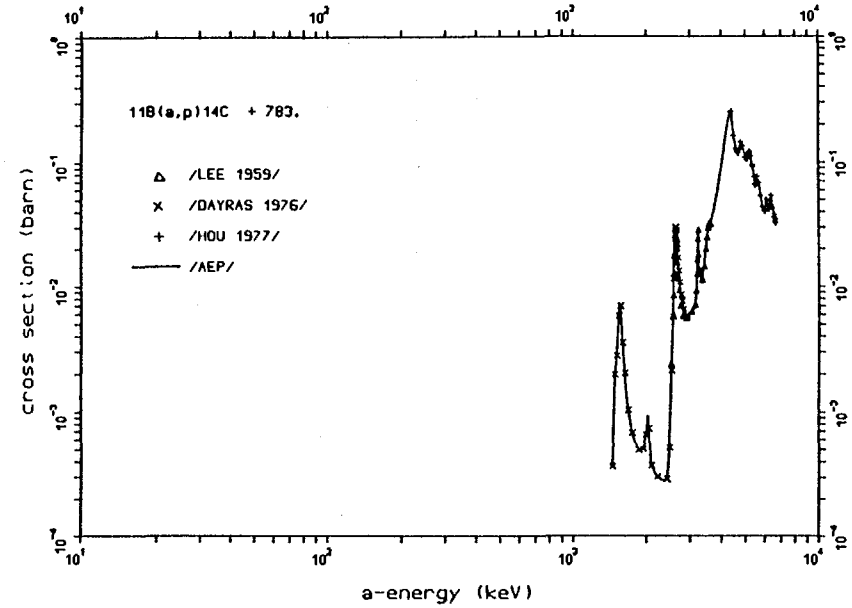
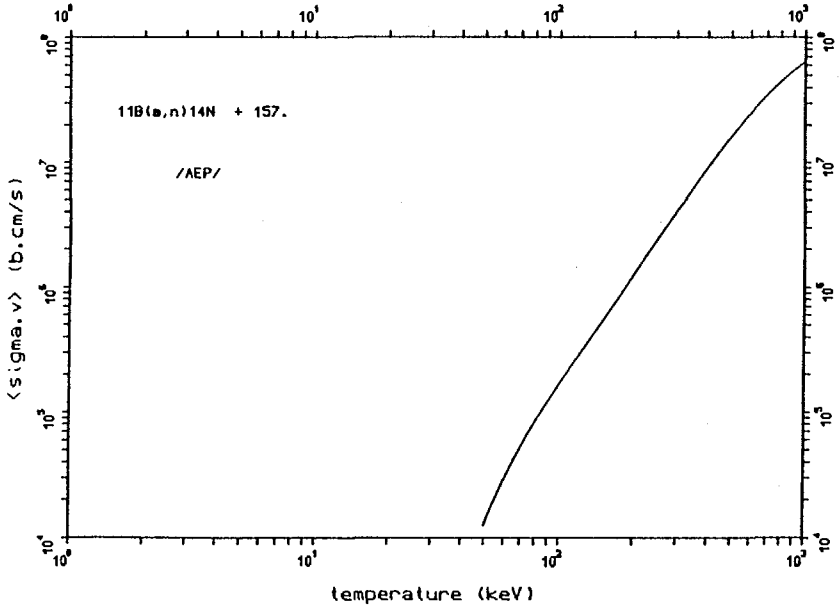
/ECPL/
<sigma.v> (b.cm/s)
temperature (keV)


11B(a,n)14N + 157.
/WALKER 1949/
/VAN DER ZWAN 1975/
/AEP/
cross section (barn)
a-energy (keV)


11B(a,p)14C + 783.
/LEE 1959/
/DAYRAS 1976/
/HOU 1977/
/AEP/
cross section (barn)
a-energy (keV)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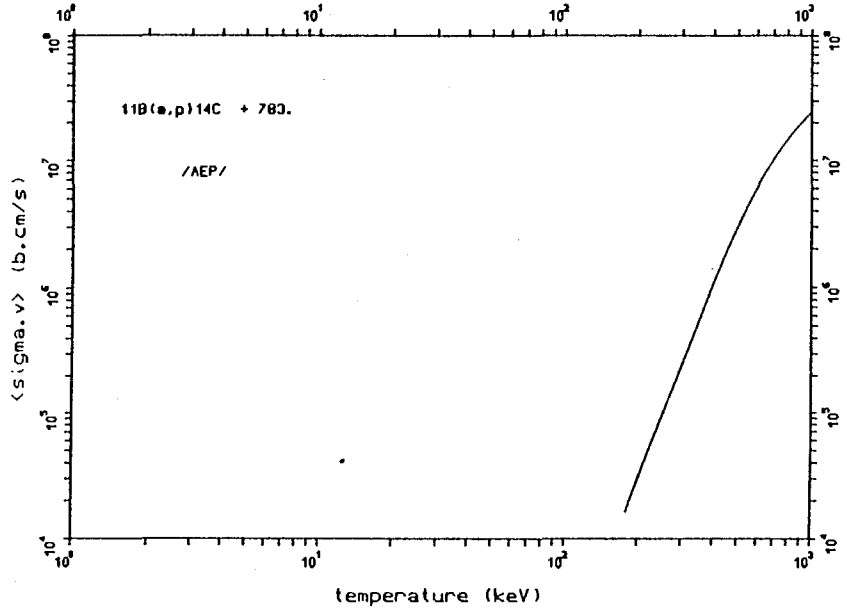
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)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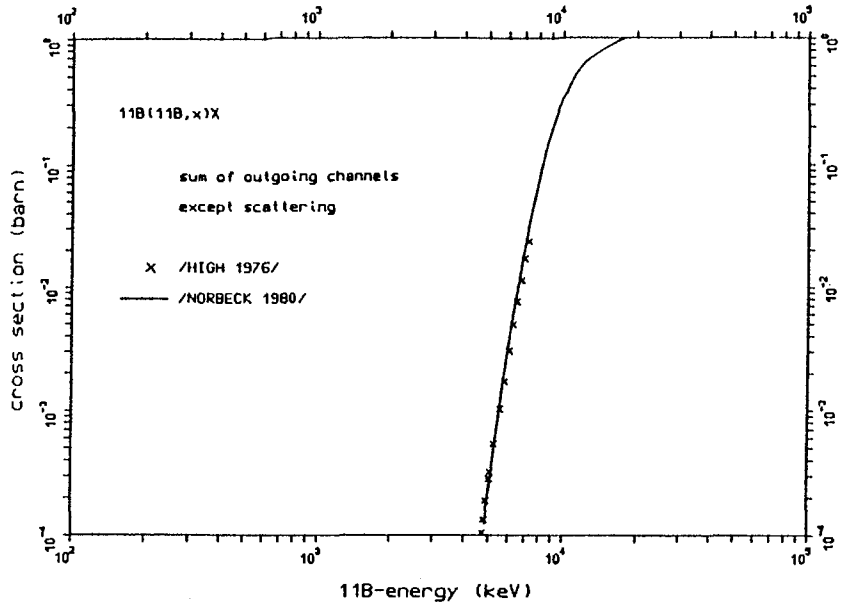
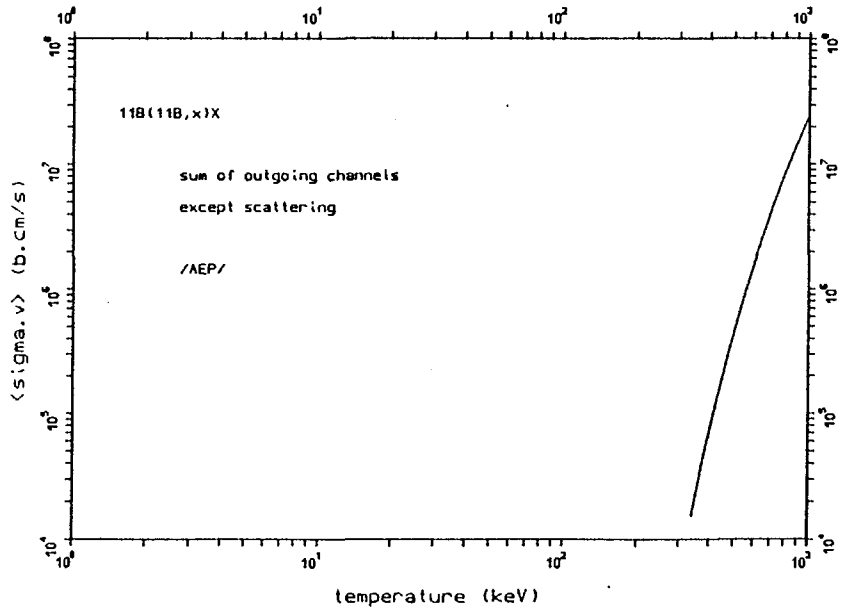
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)


11B(11B,x)X
sum of outgoing channels
except scattering
X /HIGH 1976/
/NORBECK 1980/
cross section (barn)
11B-energy (keV)


11B(11B,x)X
sum of outgoing channels
except scattering
/AEP/
<sigma.v> (b.cm/s)
temperature (keV)

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D (p , g) 3He

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D (p , np) P

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D (d , n) 3He

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D (d , p) T

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