

NRDF/A

**NUCLEAR REACTION DATA FILE
FOR ASTROPHYSICS
IN JCPRG**

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NRDF/A

Nuclear Reaction Data File For Astrophysics

I. Theoretical evaluations for astrophysical reactions of light nuclei

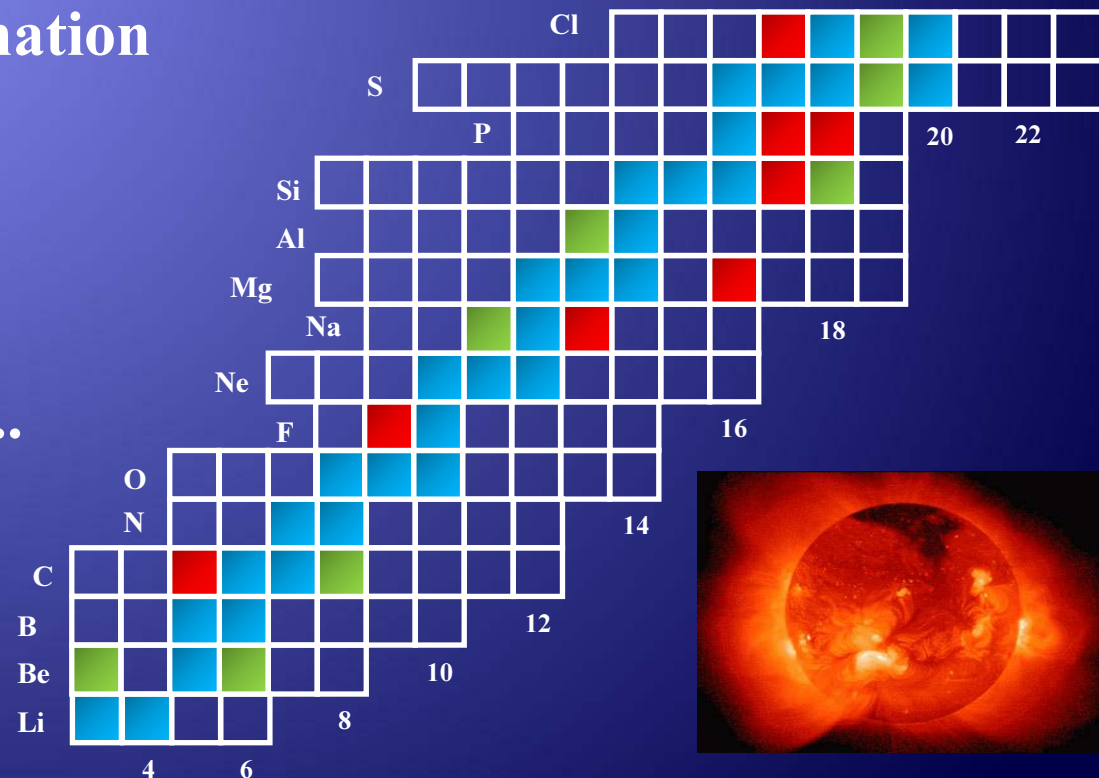
II. Bibliographic information

- NSR based info.

III. Data compilation

- s-factor,
- reaction rate etc..
- experimental
- theoretical

Nucleosynthesis of light element



II. NRDF/A bibliographic information

ICPRG 北海道大学理学部核物理実験室
原子核反応データ研究開発センター
Hokkaido University Nuclear Reaction Data Centre

Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)
NRDF/A : Nuclear Reaction Data File for Astrophysics

Survey of Bibliographic Information (Compiled in 2009)

Survey of Bibliographic Information (Compiled in 2008)

Target	EXCEL File Download
$^1\text{H}, ^2\text{H}, ^3\text{H}$	01H-03H.xls
$^3\text{He}, ^4\text{He}$	03He-04He.xls
$^6\text{Li}, ^7\text{Li}$	06Li-07Li.xls
$^7\text{Be}, ^8\text{Be}, ^9\text{Be}$	07Be-09Be.xls
$^{10}\text{B}, ^{11}\text{B}$	10B-11B.xls
$^{11}\text{C}, ^{12}\text{C}, ^{13}\text{C}, ^{14}\text{C}$	11C-14C.xls
$^{13}\text{N}, ^{14}\text{N}, ^{15}\text{N}$	13N-15N.xls, 13N-15N_fin.xls
$^{14}\text{O}, ^{15}\text{O}, ^{16}\text{O}, ^{17}\text{O}, ^{18}\text{O}$	14O-18O.xls, 14O-18O_fin.xls
^{19}F	19F.xls
$^{19}\text{Ne}, ^{20}\text{Ne}, ^{21}\text{Ne}, ^{22}\text{Ne}$	19Ne-22Ne.xls
$^{23}\text{Na}, ^{24}\text{Na}, ^{25}\text{Na}$	23Na-25Na.xls
$^{24}\text{Mg}, ^{25}\text{Mg}, ^{26}\text{Mg}$	24Mg-26Mg.xls, 26Mg.xls
$^{26}\text{Al}, ^{27}\text{Al}$	26Al-27Al.xls
$^{27}\text{Si}, ^{28}\text{Si}, ^{29}\text{Si}, ^{30}\text{Si}$	27Si-30Si.xls

Cross Sections of Selected Key Reactions (Compiled in 2006)

Data ID	Reaction	# of points	Data file
A0001	$^{12}\text{C}(n,\gamma)^{13}\text{C}$	7	data_graph
A0002	$^{12}\text{C}(n,\alpha)^{10}\text{C}$	0	(no data available)

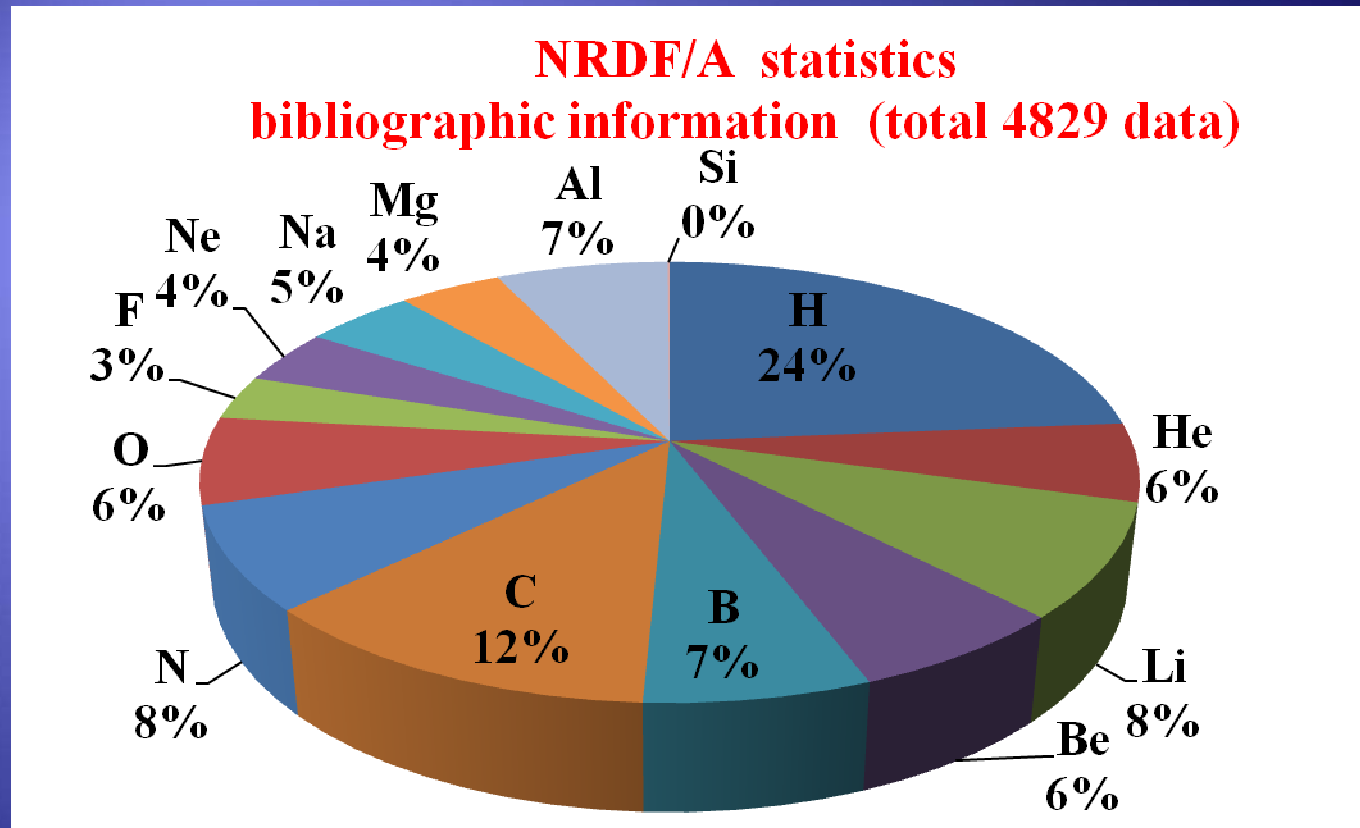
03He-04He.xls (印刷用印刷) [印刷E-1] - Microsoft Excel

反応	Keynumber	著者情報-雑誌	著者情報-巻号	著者情報-ページ	著者情報-年次	著者情報-First Author
3He(n,p)3He	1996M03	NP/A	598	367	1996	S.L.Mints
3He(n,p)3He	1994O180	JF/G	20	117	1994	S.Ohkyohzaki
3He(n,p)3He	2002PA19	PR/C	67	05206	2002	T.-S.Park
3He(n,p)3He	2002O11	Physica A	326	472	2002	M.Corradi
3He(n,p)3He	2001M058	NP/A	689	280	2001	L.E.Mercurio
3He(n,p)3He	2001M002	PR/C	63	015801	2001	L.E.Mercurio
3He(n,p)3He	2000M038	PL	84	5958	2000	L.E.Mercurio
3He(n,p)3He	1999HO20	PR/C	60	023801	1999	C.J.Horowitz
3He(n,p)3He	1998BA94	PL/B	436	243	1998	J.N.Bischoff
3He(n,p)3He	1991CA16	PR/C	44	619	1991	J.Carlsen
3He(n,p)3He	1983TE05	AJ	272	311	1983	P.E.Tegner
3He(d,p)3He	2007O02U	Proc.17th International Spin Physics Symposium			2007	S.Goski
3He(d,p)3He	2007BA10	PR/C	75	027601	2007	F.C.Beber
3He(d,p)3He	2006B010	Eur.Phys.J.D	38	455	2006	V.M.Gotrinsky
3He(d,p)3He	2005DE46	NP/A	76	783	2005	P.Desauwensent
3He(d,p)3He	2004O005	Prog.Theor.Phys	154	285	2004	S.Oruy
3He(d,p)3He	2004DE48	At.Data.Nucl.Dat	86	203	2004	P.Desauwensent
3He(d,p)3He	2004BB08	PR/C	69	044608	2004	S.Brazinha
3He(d,p)3He	2003HA35	PR/C	68	048801	2003	K.Haefliger
3He(d,p)3He	2003G043	NPL/A	18	302	2003	S.Goski
3He(d,p)3He	2002UE02	PL/B	533	1	2002	T.Uesaka
3He(d,p)3He	2002HA01	PR/C	66	067801	2002	K.Haefliger
3He(d,p)3He	2002FL03	PR/C	66	057601	2002	K.A.Fletcher
3He(d,p)3He	2002BA77	NP/A	707	277	2002	F.C.Beber
3He(d,p)3He	2001UE01	NP/A	684	606c	2001	T.Uesaka
3He(d,p)3He	2001BA21	EP/J/A	10	487	2001	F.Rozsa
3He(d,p)3He	1998A016	JF	130	026	1998	P.F.Emery

<http://www.jcprg.org/nrdfa/>

Bibliographic information based on the NSR data base.

II. NRDF/A bibliographic information



- **139 Nuclear Reaction**
- **Incident particle (e, p, d, t, 3He a, n)**

III. NRDF/A Data compilation

Nuclear Reaction Data Centre (ICPRG)
NRDF/A : Nuclear Reaction Data File for Astrophysics

1H α -n α 1n	1H α -n α 2H	2He α p3He	2He α n2p	2He α d4He	2He α n3He	2He α p3H	2He α d6Li
3He α p4He	3He α n3He	3He α n4He	3He α t2n4He	3He α d7Li	3He α e-n α 4He	3He α p α n α 4He	3He α d α 4He
3He α t α 4He	3He α t α p4He	3He α 3He α 2p4He	3He α d α 7Be	4He α t α 6Li	6Li α p7Be	6Li α p3He	6Li α d10B
7Li α n7Be	7Li α p8Be	7Li α p4He	7Li α d α 2 α 4He	7Li α t α 2 α 4He	7Li α d11B	7Li α n10B	7Be α p8B
7Be α d α 2 α 4He	7Be α t α p2 α 4He	7Be α d α 11C	8Be α d α 12C	9Be α p10B	9Be α n8B	9Be α p10Be	10B α p11C
10B α p7Be	10B α n13N	11B α p12C	11B α n11C	11B α p8Be	11B α n14N	11B α p14C	11C α p12N
12C α p13C	12C α p13N	12C α d18O	12C α n15O	13C α n14C	13C α p14N	13C α n13N	13C α n16O
14C α p15N	14C α n14N	14C α d18O	14N α p14C	14N α p15O	14N α n14O	14N α p11C	14N α d18F
15N α p18O	15N α p15O	15N α p12C	15N α d19F	15N α n18F	14O α d18Ne	14O α p17F	15O α d19Ne
16O α p17O	16O α p17F	16O α p13N	16O α d20Ne	17O α n19O	17O α d18F	17O α p14N	17O α n20Ne
18O α p19O	18O α p19F	18O α p15N	18O α d22Ne	18O α n21Ne			

Code	Data file	Bib	Author	No
Ai2001	exp, all	NP/A890(2001)790	MAlotta	a0043
Cos2000	exp, all	PL/B482(2000)43	H.Costantini	a0044
Prs1994	exp, all	ZP/A250(1994)171	P.Pratl	a0045

Code	Data file	Bib	Author	No
Ai2001	exp, all	NP/A890(2001)790	MAlotta	a0043

Code	Data file	Bib	Author	No
Con2007	exp, all	PR/C75(2007)065803	F.Confortola	a0009

experimental & theoretical

- s-factor
- reaction rate
- β -decay rate
- resonance parameter
- etc...

NRDF/A DATA COMPILATION
WEB-SITE WILL BE OPENED
NEAR THE FUTURE



Previous version
NRDF/A CD-ROM
(2006)

III. NRDF/A Data compilation example

```
#NO      A0008-1
#TITLE   Thermonuclear reaction rates of 9Be(p,g)10B
#AUTHOR  D.Zahnow, C.Angulo, M.Junker, C.Rolfs, S.Schmidt, W.H.Schulte, E.Somorjai
#INSTITUTE
#REFERENCE NP/A589(1995)95
#REACTION 9Be(p,g)10B
#PHQ     S-factor
#STATUS  Table.1, Fig.4
#        Experiment
```

**Bibliographic
information**

```
#Compiled A.Wano in 2009/12/28
#Checked  A.Makinaga in 2010/1/29
#COMENT
```

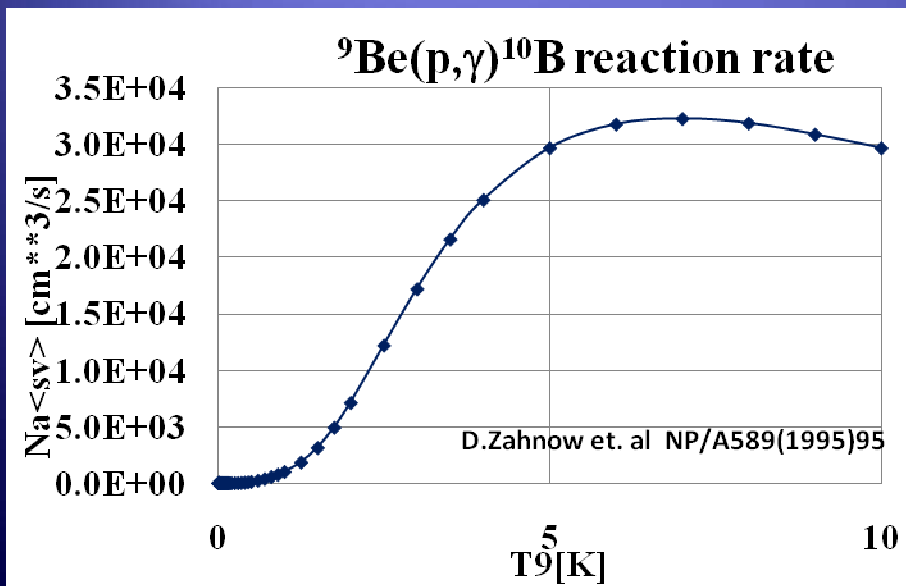
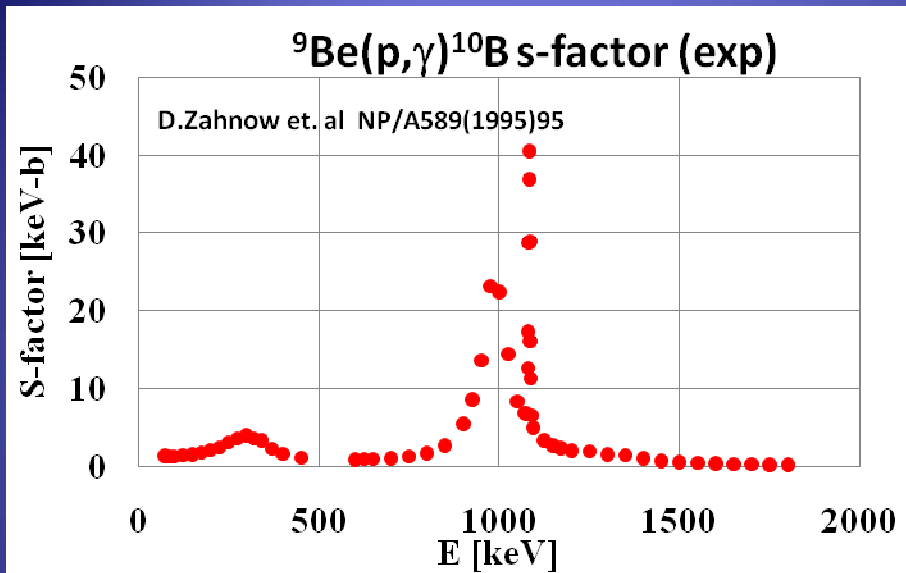
```
# (a)Effective beam energy within the target.
# (b)Statistical error only.
# (c)Standard Value (see text).
# (d)Reaction yield (not the S(E) factor due to narrow width of the Er=1083 keV resonance.
```

Comment

```
# DATA
#=====
#Eeff(a) Error S-factor(b) Error Comment
#(keV) (keV) (keV-b) (keV-b)
73.3 0.5 1.31 0.07
85.8 0.5 1.24 0.05
98.4 0.5 1.26 0.05
123.5 0.5 1.45 0.06
```

data

III. NRDF/A Data compilation example



ELSEVIER

Nuclear Physics A 589 (1995) 95–105

NUCLEAR
PHYSICS A

Thermonuclear reaction rates of ${}^9\text{Be}(p,\gamma){}^{10}\text{B}$ \star

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Received 23 January 1995; revised 1 March 1995

Abstract

An excitation function of the ${}^9\text{Be}(p,\gamma){}^{10}\text{B}$ capture reaction has been measured over the proton energy range $E_p = 75$ to 1800 keV using a 4π summing crystal. The data are dominated by three broad resonances including interference effects with the direct-capture process. Near temperatures of $T_9 = 0.8$ the reaction rates are lower by a factor 4 compared to values given in a compilation, while at other temperatures the rates are similar.

Keywords: NUCLEAR REACTIONS ${}^9\text{Be}(p,\gamma)$, $E = 75$ –1800 keV; measured E_γ , I_γ ; deduced $\sigma(E)$, thermonuclear reaction rates, astrophysical S -factor.

III. NRDF/A Data compilation example

Lists of new theoretical and experimental data
compiled in NRDF/A.

Reaction	Exp.	Theor.
$d(^3\text{He},p)^4\text{He}$	3	0
$^3\text{He}(d,p)^4\text{He}$	1	0
$^3\text{He}(\alpha, \gamma)^7\text{Be}$	2	0
$^9\text{Be}(p, \gamma)^{10}\text{B}$	1	1
$^9\text{Be}(p, \alpha)^6\text{Li} +$ $^9\text{Be}(p,d)^8\text{Be}$	1	0
$^9\text{Be}(p, \alpha)^6\text{Li}$	2	
$^9\text{Be}(p,d)^8\text{Be}$	1	0
Total	11	2

Phys. Quant.	Exp.	Theor.
s-factor	11	1
cross section	2	0
reaction rate	0	1
Total	13	2

Compiled in 2009