
ADF26: bundle-n and bundle-nl populations of excited states in beams

Provides complete bundle-n populations for neutral hydrogen beams and bundle-nl populations for helium beams.

Utilising subroutines :

ADAS312 ADAS313

Formatted files to ADF26 specification :

<u>Database Status</u>	<u>Date = March 17, 2003</u>	<u>Data type =bundle-n populations.</u>	<u>Data root =/.../adas/adas/adf26/</u>			
<i>Beam element</i>	<i>Plasma species</i>	<i>Library</i>	<i>Sub-library</i>	<i>Prefix</i>	<i>Comments</i>	<i>Quality</i>
h	h1,he2,li3,be4,b5,c6	bdn97#h			Generated by ADAS310	high
	n7,o8,f9,ne10					
	ar18, fe26c	bdn99#h			Generated by ADAS310	high
he	h1,he2,li3,be4,b5,c6,	bnl99#he_fast			Generated by ADAS311	high
	n7,o8,f9,ne10					
	h1,he2,li3,be4,b5,c6,	bnl99#he_slow			Generated by ADAS311	high
	n7,o8,f9,ne10					

Notes:

4. A special data collection for hydrogen-beams from H⁺ sources based on a beam reference energy of 140 keV can be made available.

Data lines :

ZT, SVREF, SPEC, DATE, CODE

NEB, NDT, TREF

(EB(IEB), IEB=1,NEB)

(DT(IDT), IDT=1,NDT)

for IDT = 1 to NDT

Format:

(SV(IEB,IDT), IEB=1,NEB)

repeat

TT, EREF, DREF

TT(ITT), ITT=1,NTT)

SVT(ITT), ITT=1,NTT)

variable identification :

<i>name</i>	<i>meaning</i>
ZT	charge of target ion
SVREF	beam emission coefft. at reference beam energy, target density and temperature
SPEC	specification of target (text) (eg. BE)
DATE	date of calculation
CODE	name of source computer code for calculation
NEB	number of beam energies
NDT	number of target densities
TREF	reference target temperature (eV)
EB()	beam energies (eV/amu)
DT()	target densities (cm-3)
SV(,)	beam emission coefficient (cm ³ s-1) at reference temp. 1st parameter - beam energy 2nd parameter - target density
NTT	number of target temperatures
EREF	reference beam energy (eV/amu)
DREF	reference target density (cm-3)
TT()	target temperatures (eV)

SVT()

beam emission coefficient (cm³ s⁻¹) at reference beam energy and target density

Table B26c - example.

EFFECTIVE CONTRIBUTION TABLE FOR ION PRINCIPAL QUANTUM SHELL POPULATIONS IN THERMAL PLASMA

Z0 = 1.00E+00 Z1 = 1.00E+00

TRAD = 1.00E+08 K TE = 2.32E+07 K TP = 2.32E+07 K
W = 0.00E+00 NE = 1.00E+12 CM-3 NP = 1.00E+00 CM-3

EH = 5.00E+03 EV/AMU NH = 1.00E+07 CM-3 NH/NE = 1.00E-05 FLUX = 9.78E+14 CM-2 SEC-1

CHARGE EXCHANGE OFF : N1/N+ = 1.55774E-09 RECOMB COEFF = 1.41805E-16 CM+3 SEC-1 IONIZ COEFF = 9.10325E-08 CM+3 SEC-1

CHARGE EXCHANGE ON : N1/N+ = 6.31532E-05 RECOMB COEFF = 5.74899E-12 CM+3 SEC-1 IONIZ COEFF = 9.10325E-08 CM+3 SEC-1

I	N	F1	F2	F3	B(CHECK)	B(ACTUAL)	NN/(BN*N+)
1	1	0.00000E+00	4.17478E+05	1.69248E+15	1.69257E+10	1.69257E+10	3.73131E-15
2	2	2.94207E+09	3.46209E+00	7.07864E+10	8.93669E+05	8.93669E+05	1.48493E-14
3	3	9.81965E+08	2.26208E+00	4.13167E+10	4.75183E+05	4.75183E+05	3.33793E-14
4	4	3.28624E+08	1.47509E+00	4.53230E+09	6.60782E+04	6.60782E+04	5.93213E-14
5	5	9.40789E+07	1.14219E+00	5.92840E+08	1.18709E+04	1.18709E+04	9.26753E-14
6	6	3.01391E+07	1.04455E+00	9.83733E+07	2.88816E+03	2.88816E+03	1.33441E-13
7	7	1.08565E+07	1.01606E+00	2.19777E+07	9.06417E+02	9.06417E+02	1.81619E-13
8	8	4.47092E+06	1.00660E+00	6.12533E+06	3.44613E+02	3.44613E+02	2.37209E-13
9	9	2.12537E+06	1.00313E+00	2.08631E+06	1.56090E+02	1.56090E+02	3.00211E-13
10	10	1.21828E+06	1.00178E+00	8.89081E+05	8.68312E+01	8.68312E+01	3.70626E-13
11	11	9.70780E+05	1.00141E+00	5.59173E+05	6.79010E+01	6.79010E+01	4.48452E-13
12	12	6.55705E+05	1.00095E+00	3.14509E+05	4.55559E+01	4.55559E+01	5.33690E-13
13	15	1.79864E+05	1.00026E+00	5.36477E+04	1.28957E+01	1.28957E+01	8.33876E-13
14	20	2.46854E+04	1.00003E+00	5.24022E+03	2.61140E+00	2.61140E+00	1.48243E-12
15	30	2.69940E+03	1.00000E+00	5.24974E+02	1.17573E+00	1.17573E+00	3.33543E-12
16	40	5.45893E+02	1.00000E+00	1.03540E+02	1.03551E+00	1.03551E+00	5.92963E-12
17	50	1.54325E+02	1.00000E+00	2.89295E+01	1.01004E+00	1.01004E+00	9.26503E-12
18	60	5.30496E+01	1.00000E+00	9.87713E+00	1.00345E+00	1.00345E+00	1.33416E-11
19	70	2.00581E+01	1.00000E+00	3.71571E+00	1.00130E+00	1.00130E+00	1.81594E-11
20	80	7.40139E+00	1.00000E+00	1.36282E+00	1.00048E+00	1.00048E+00	2.37184E-11
21	90	1.91434E+00	1.00000E+00	3.45916E-01	1.00012E+00	1.00012E+00	3.00186E-11
22	100	-7.02001E-01	1.00000E+00	-1.37908E-01	9.99954E-01	9.99954E-01	3.70601E-11

BN = F1*(N1/N+) + F2 + F3*(NH/NE)
N1 = POPULATION OF GROUND STATE OF ION
N+ = POPULATION OF GROUND STATE OF NEXT IONISATION STAGE
NN = POPULATION OF PRINCIPAL QUANTUM SHELL N OF ION
BN = SAHA-BOLTZMANN FACTOR FOR PRINCIPAL QUANTUM SHELL N
EH = NEUTRAL HYDROGEN BEAM ENERGY
W = RADIATION DILUTION FACTOR
Z0 = NUCLEAR CHARGE

Z1 = ION CHARGE+1