ADF20: G(Te) functions

Provides G(Te) functions. Formatting conventions and variable storage are given below.

Utilising subroutines :

> ADAS506

Formatted files to ADF20 specification :

Database Status | Date = March 17, 2003 | Data type = g(Te) functions | Data root = /.../adas/adas/adf20/

Sequence	Members	Library	Comments	Elec. Press (Kcm-3)	Resolution	Quality
H-like	C	gft95#h	Summers&Horton	1.0^{10}-3.0^{15}	j	high
He-like	C	gft95#he	Summers & Horton	1.0^{10}-3.0^{15}	j	high
Li-like	Be,C,N,O,Ne,Na,Mg,Al,Si,S, Ar,Ca,Ti,Cr,Fe,Ni	gft95#li	McWhirter (n=2,3,4,5)	1.0^{10}-3.0^{15}	j	high
Be-like	C,N,O,Ne,Na,Mg,Al,Si,S,Ar, Ca,Ti,Fe,Ni	gft95#be	Lang (n=2,3)	1.0^{10}-3.0^{15}	j	high
B-like	C,N,O,Ne,Mg,Si,Fe	gft95#b	Sampson/Zhang(n=2,3)	1.0^{10}-3.0^{15}	j	medium
C-like	C,O,Ne,Mg,Si,S,Ca,Fe	gft95#c	Monsignori-Fossi (n=2)	1.0^{10}-3.0^{15}	j	high
N-like	Ne,Mg,Si,S,Ar,Ca	gft95#n	Landini (n=2)	1.0^{10}-3.0^{15}	j	high
O-like	Mg,Si,	gft95#n	Landini (n=2)	1.0^{10}-3.0^{15}	j	high
Na-like	Fe,Ni	gft95#na	Sampson/Zhang(n=3,4,5)	1.0^{10}-3.0^{15}	j	medium
Al-like	Fe		Mason & Young(n=2,3)		j	high
Si-like	Fe		Mason &Young(n=2,3)		j	high

Notes:
1. adf20 file generation is automatic once the relevant specific ion file of type adf04 is available. Amount and choice of data placed in the adf20 category is in reponse to usage and user request.

2. Member name structure is */.../adas/adf20/<library>/<library>_<source>#<ion>_p<pressure>.dat*. where <source> is the producer's name ('al' = Lanzafame:).

3. The more advanced (generalised) type of G(Te) function (adf16) became available with the release of ADAS version 1.4 (see code ADAS405).

Data lines :   *Format:*

     EL, IZ, NLEVELS, NKNOTS, NLINES

     SHFILE

     SBFILE

     SSFILE

     PROG, DATE, UID

     for i = 1 , NLEVELS

          IND, CODE, IS, IL, IJ

     repeat

     for it = 1, NKNOTS

          TE, DENS, P, RHE TM, TEL, DENSL, PL

     repeat

     SPSYMB

     for itr0 = 1 , NLINES , 10

          (WVLAP(itr), itr=itr0, itr0+9)

          (WVLEX(itr), itr=itr0, itr0+9)

          (LL(itr), LU(itr), itr=itr0, itr0+9)

          for it = 1, NKNOTS

               TELV, (GFT(itr,it),itr=itr0,itr0+9)

          repeat

     repeat

     DESCRIPTIVE TEXT

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variable identification :

name	*meaning*
EL	two character element symbol
IZ	ion charge
NLEVELS	number of energy levels for ion
NKNOTS	number of data values for a transition
NLINES	number of transitions
SHFILE	source file for hydrogen to electron number density ratio
SBFILE	source files for ionisation balance calculation
SSFILE	source specific ion file
PROG	computer code used fro the data production
DATE	date of production
UID	user identifier of data producer
IND()	index numbers of energy levels
CODE()	arbitrary identifier string for energy levels
IS()	multiplicity of level
IL()	total orbital quantum number of level
IJ()	(statistical weight-1)/2 for level
TE()	electron temperatures (K)
DENS()	electron densities (cm-3)
P()	pressure (K cm-3)
RHE()	hydrogen/electron number density ratio
TM()	time (or unspecified counter)

TEL()	log10(electron temperature(K))
DENSL()	log10(electron density (cm-3))
PL()	log10(pressure (Kcm-3))
SPSYMB	spectroscopic notation for emitting ion
WVLAP()	appproximate wavelength for line (Angstrom)
WVLEX()	exact wavelength for line (Angstrom)
LL()	lower level index for line
LU()	upper level index for line
TELV	log10(electron temperature (K))
GFT(,)	$G(T_e)$ function (cm3 s-1)

	1st parameter	- transition
	2nd parameter	- temperature

Table B20c - example.

```
O + 5  /NLEVELS=  24/NKNOTS=   9/NLINES=  29/

  SOURCE FILES:
  -------------
  NH/NE DATA              - JETXCL.NHNECOEF.DATA
  IONISATION BALANCE DATA - JETSHP.<>CD85#O.DATA
  SPECIFIC ION FILE DATA  - JETXCL.COPDT#LI.DATA(SM#05)

  PROCESSING CODE                     DATE         USER IDENTIFIER
  ----------------------------        --------     ---------------
  JETSHP.GOFT.FORT                    12/01/92     JETXCL

  ENERGY LEVEL INDEXING
  ---------------------
  INDX     CODE               S L  WJ
  ----     --------------     - -  --
    1       2s    2S(J=0.5)   2(0) 0.5
    2       2p*   2P(J=0.5)   2(1) 0.5
    3       2p    2P(J=1.5)   2(1) 1.5
    4       3s    3S(J=0.5)   2(0) 0.5
    5       3p*   3P(J=0.5)   2(1) 0.5
    6       3p    3P(J=1.5)   2(1) 1.5
    7       3d*   3D(J=1.5)   2(2) 1.5
    8       3d    3D(J=2.5)   2(2) 2.5
    9       4s    4S(J=0.5)   2(0) 0.5
   10       4p*   4P(J=0.5)   2(1) 0.5
   11       4p    4P(J=1.5)   2(1) 1.5
```

12	4d*	4D(J=1.5)	2(2)	1.5
13	4d	4D(J=2.5)	2(2)	2.5
14	4f*	4F(J=2.5)	2(3)	2.5
15	4f	4F(J=3.5)	2(3)	3.5
16	5s	5S(J=0.5)	2(0)	0.5
17	5p*	5P(J=0.5)	2(1)	0.5
18	5p	5P(J=1.5)	2(1)	1.5
19	5d*	5D(J=1.5)	2(2)	1.5
20	5d	5D(J=2.5)	2(2)	2.5
21	5f*	5F(J=2.5)	2(3)	2.5
22	5f	5F(J=3.5)	2(3)	3.5
23	5g*	5G(J=3.5)	2(4)	3.5
24	5g	5G(J=4.5)	2(4)	4.5

PLASMA MODEL

TE(K)	NE(CM-3)	P(KCM-3)	NH/NE	TIME(S)	LOG(TE)	LOG(NE)	log(P)
3.55D+04	8.51D+09	3.00D+14	9.20D-01		4.55	9.93	14.48
3.98D+04	7.79D+09	3.00D+14	9.13D-01		4.60	9.88	14.48
4.47D+04	6.76D+09	3.00D+14	9.10D-01		4.65	9.83	14.48
5.01D+04	6.03D+09	3.00D+14	9.09D-01		4.70	9.78	14.48
5.62D+04	5.37D+09	3.00D+14	9.05D-01		4.75	9.73	14.48
6.31D+04	4.79D+09	3.00D+14	9.01D-01		4.80	9.68	14.48
7.08D+04	4.27D+09	3.00D+14	8.85D-01		4.85	9.63	14.48
7.94D+04	3.80D+09	3.00D+14	8.65D-01		4.90	9.58	14.48
8.91D+04	3.39D+09	3.00D+14	8.55D-01		4.95	9.53	14.48

TABLE OF G(T) VALUES (CM3 S-1) FOR O VI

APPROX WLENGTH	1037.6	1031.9	183.9	184.1	150.1	150.1	172.8	173.0	173.0	132.2
SPECTR WLENGTH	1037.614	1031.924	183.937	184.117	150.124	150.089	172.935	0.000	173.082	132.219
TRANSITION	1- 2	1- 3	2- 4	3- 4	1- 5	1- 6	2- 7	3- 7	3- 8	2- 9
LOG(TE(K))										
4.55	2.843D-41	5.448D-41	2.684D-52	5.368D-52	3.314D-53	6.539D-53	1.032D-52	2.058D-53	1.878D-52	5.791D-57
4.60	6.259D-37	1.204D-36	6.462D-47	1.292D-46	9.122D-48	1.801D-47	2.905D-47	5.794D-48	5.283D-47	3.554D-51
4.65	3.996D-33	7.711D-33	3.476D-42	6.951D-42	5.541D-43	1.095D-42	1.797D-42	3.584D-43	3.266D-42	4.402D-46
4.70	1.015D-29	1.965D-29	5.898D-38	1.180D-37	1.050D-38	2.077D-38	3.456D-38	6.892D-39	6.275D-38	1.571D-41
4.75	1.301D-26	2.526D-26	4.104D-34	8.208D-34	8.088D-35	1.600D-34	2.689D-34	5.362D-35	4.878D-34	2.119D-37
4.80	7.007D-24	1.364D-23	9.981D-31	1.996D-30	2.159D-31	4.273D-31	7.228D-31	1.441D-31	1.310D-30	9.300D-34
4.85	1.326D-21	2.590D-21	7.237D-28	1.447D-27	1.707D-28	3.379D-28	5.732D-28	1.143D-28	1.038D-27	1.141D-30
4.90	1.146D-19	2.242D-19	2.068D-25	4.136D-25	5.285D-26	1.047D-25	1.775D-25	3.539D-26	3.211D-25	5.209D-28
4.95	6.106D-18	1.198D-17	3.200D-23	6.400D-23	8.818D-24	1.747D-23	2.952D-23	5.886D-24	5.337D-23	1.224D-25

APPROX WLENGTH	132.3	536.7	537.2	115.8	448.1	531.3	115.8	447.9	531.1	531.3
SPECTR WLENGTH	132.312	0.000	0.000	115.830	447.840	0.000	115.822	447.712	0.000	0.000
TRANSITION	3- 9	5- 9	6- 9	1-10	4-10	7-10	1-11	4-11	7-11	8-11
LOG(TE(K))										
4.55	1.158D-56	4.149D-57	8.325D-57	2.809D-57	6.955D-58	1.344D-58	5.635D-57	1.395D-57	2.683D-59	2.419D-58
4.60	7.109D-51	2.546D-51	5.110D-51	1.836D-51	4.546D-52	8.786D-53	3.682D-51	9.116D-52	1.753D-53	1.581D-52
4.65	8.804D-46	3.153D-46	6.328D-46	2.411D-46	5.969D-47	1.154D-47	4.832D-46	1.197D-46	2.301D-48	2.075D-47
4.70	3.141D-41	1.125D-41	2.258D-41	9.086D-42	2.250D-42	4.348D-43	1.821D-41	4.508D-42	8.669D-44	7.817D-43
4.75	4.239D-37	1.518D-37	3.046D-37	1.291D-37	3.196D-38	6.177D-39	2.585D-37	6.401D-38	1.231D-39	1.110D-38
4.80	1.860D-33	6.662D-34	1.337D-33	5.946D-34	1.472D-34	2.845D-35	1.190D-33	2.947D-34	5.668D-36	5.110D-35
4.85	2.282D-30	8.173D-31	1.640D-30	7.637D-31	1.891D-31	3.655D-32	1.528D-30	3.784D-31	7.276D-33	6.561D-32
4.90	1.042D-27	3.731D-28	7.487D-28	3.641D-28	9.015D-29	1.742D-29	7.281D-28	1.803D-28	3.467D-30	3.126D-29
4.95	2.447D-25	8.766D-26	1.759D-25	8.911D-26	2.207D-26	4.265D-27	1.781D-25	4.410D-26	8.482D-28	7.647D-27

APPROX WLENGTH	129.8	129.8	497.9	498.4	129.8	498.3	518.1	518.2	518.2	0.0
SPECTR WLENGTH	129.785	0.000	498.090	0.000	129.871	498.431	519.610	0.000	519.723	0.000
TRANSITION	2-12	3-12	5-12	6-12	3-13	6-13	7-14	8-14	8-15	0-0
LOG(TE(K))										
4.55	7.581D-57	1.513D-57	2.296D-57	4.592D-58	1.363D-56	4.130D-57	4.171D-57	2.972D-58	6.081D-57	0.000D+00
4.60	4.959D-51	9.897D-52	1.502D-51	3.004D-52	8.916D-51	2.702D-51	2.721D-51	1.939D-52	3.962D-51	0.000D+00
4.65	6.501D-46	1.298D-46	1.969D-46	3.937D-47	1.169D-45	3.542D-46	3.557D-46	2.534D-47	5.171D-46	0.000D+00
4.70	2.441D-41	4.872D-42	7.392D-42	1.478D-42	4.389D-41	1.330D-41	1.331D-41	9.481D-43	1.932D-41	0.000D+00
4.75	3.447D-37	6.880D-38	1.044D-37	2.088D-38	6.199D-37	1.879D-37	1.871D-37	1.334D-38	2.714D-37	0.000D+00
4.80	1.576D-33	3.145D-34	4.772D-34	9.544D-35	2.834D-33	8.588D-34	8.517D-34	6.069D-35	1.233D-33	0.000D+00
4.85	2.006D-30	4.003D-31	6.074D-31	1.215D-31	3.607D-30	1.093D-30	1.079D-30	7.687D-32	1.560D-30	0.000D+00
4.90	9.462D-28	1.889D-28	2.866D-28	5.731D-29	1.702D-27	5.157D-28	5.063D-28	3.607D-29	7.311D-28	0.000D+00
4.95	2.290D-25	4.570D-26	6.934D-26	1.387D-26	4.118D-25	1.248D-25	1.218D-25	8.681D-27	1.757D-25	0.000D+00

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C
C   TRANSITION WAVELENGTHS ADJUSTED TO SPECTROSCOPIC VALUES IN KELLY
C
C   R. W. P. MCWHIRTER   15/01/92
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