ADF12: charge exchange effective emission coefficients

Provides effective emission coefficients for charge exchange recombinations lines. These are stored as 1-dimensional scans from a reference value at reference plasma conditions. Formatting conventions and variable storage are given below.

Utilising subroutines :

ADAS303

Formatted files to ADF12 specification :

Database Status Date = March 17, 2003 Data type = CX effective emission coeffts. Data root = /.../adas/adas/adf12/

Library	*Donors*	*Receivers*	*Datatsets*	*Comments*	*Quality*
ionatom	H0, He0	b5,be4,c6,h1,he2,n7 ne10,o8,si1	ionatom_qeff#h0.dat, ionatom_qeff#he0.dat	Original JET data for for a range of ions	medium
qef93#h	H0	b5,be4,c6,h1,he2,n7, ne10,o8,si14	qef93#h_<source>#<recvr>.dat		medium
qef97#h	H0*	he2,li3,be4,b5,c6,ne10	qef97#h_e2n_kvi#<recvr>.dat	Based on KVI/Missouri data prepared by Hoekstra, Bliek, Olson H(n=2) donor	medium
qef99#h	H0	ar18	qef99#h_ctmc#ar18.dat	Restricted n-shell capture/incomplete	low
qef93#he	He0	be4,c6,h1,he2,o8,	qef93#he_<source>#<recvr>.dat	Incomplete set	medium
qef97#he	He0	c6,he2	qef97#he_<donor state>kvi#<recvr>.dat	Metastable donors	medium
qef93#na	Na0	he2	qef93#na_kvi#he2.dat	Based on KVI data prepared by Hoekstra, Bliek Na(3s) donor	medium
qef97#li	Li0	he2,li3,be4,b5,c6, n7,o8,ne10	qef93#li_kvi#<recvr>.dat	Based on KVI/Missouri data prepared by Hoekstra, Bliek, Olson Li(2s) donor	medium

Notes: 1. <source> denotes the origin of the fundamental state selective charge exchange cross-section data; blank for JET 'old' data, 'gyt' for Gayet data.
<recvr> denotes the receiving bare nucleus.

2. <donor state> for helium donors are metastable donors indicated in the form '2s-s' for $2\,^1S$

Data lines : *Format:*

NSEL

for ISEL= 1 to NSEL

NFO , DATA , IBLOCK, CODE , ISEL

QREF

EBREF, TIREF , NIREF , ZEREF , BREF

NBEAM, NTI , NDI , NZE , NB

(ENER(IE), IE=1,24)

(QEFF(IE), IE=1,24)

(TI(IT), IT=1,12)

(QEFF(IT), IT=1,12)

(DENSI(IN), IN=1,24)

(QEFF(IN), IN=1,24)

(ZEFF(IZ), IZ=1,12)

(QEFF(IZ), IZ=1,12)

(BMAG(IB), IB=1,12)

(QEFF(IB), IB=1,12)

repeat

variable identification :

name	*meaning*
NSEL	number of spectrum lines available

INFO	information text on transition
DATA	charge exchange data source
IBLOCK	source block selected
CODE	processing code
ISEL	index of spectrum line
QREF	effective emission coefficient at reference conditions
EBREF	reference beam energy (eV/amu)
TIREF	reference ion temperature (eV)
NIREF	reference ion density (cm-3)
ZEREF	reference Zeff
BREF	reference magnetic field (Tesla)
NBEAM	number of beam energies
NTI	number of ion temperatures
NDI	number of ion densities
NZE	number of Zeff's
NB	number of magnetic field strengths
ENER()	collision energies (eV/amu)
QEFF()	effective emission coefficient (cm**3 sec-1)
TI()	plasma ion temperatures (eV)
QEFF()	effective emission coefficient (cm**3 sec-1)
NI()	plasma ion density (cm-3)
QEFF()	effective emission coefficient (cm**3 sec-1)
ZEFF()	plasma Zeff
QEFF()	effective emission coefficient (cm**3 sec-1)
BMAG()	total plasma magnetic field (Tesla)

QEFF() effective emission coefficient (cm**3 sec-1)

Table B12c - example.

```
   33
SPSCLMS ON HE+2 6-4  H(1S) DONOR 10/7/90     HE2NEW1(4)  LMS   ISEL=8
  6.52D-10                                                     QEFREF
  4.00D+04  5.00D+03  2.50D+13  2.00D+00  3.00D+00              PARMREF
        19         12         17          6          1        NPARMSC
  1.00D+03  1.50D+03  2.00D+03  3.00D+03  5.50D+03  7.00D+03   ENER
  1.00D+04  1.50D+04  2.00D+04  3.00D+04  4.00D+04  5.00D+04
  6.00D+04  7.00D+04  8.00D+04  1.00D+05  1.50D+05  2.00D+05
  3.00D+05  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  1.67D-13  1.07D-12  2.51D-12  5.02D-12  1.07D-11  1.62D-11   QENER
  3.20D-11  7.65D-11  1.65D-10  5.06D-10  6.52D-10  5.82D-10
  4.65D-10  3.54D-10  2.58D-10  1.40D-10  3.78D-11  1.25D-11
  2.23D-12  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  1.00D+03  2.00D+03  3.00D+03  5.00D+03  7.00D+03  1.00D+04   TIEV
  1.30D+04  1.60D+04  1.90D+04  2.20D+04  2.50D+04  3.00D+04
  6.53D-10  6.53D-10  6.52D-10  6.52D-10  6.52D-10  6.52D-10   QTIEV
  6.51D-10  6.51D-10  6.51D-10  6.51D-10  6.51D-10  6.51D-10
  1.00D+11  2.00D+11  3.00D+11  5.00D+11  7.00D+11  1.00D+12   DENSI
  2.00D+12  3.00D+12  5.00D+12  7.00D+12  1.00D+13  2.00D+13
  2.50D+13  3.00D+13  5.00D+13  7.00D+13  1.00D+14  0.00D+00
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  6.05D-10  6.11D-10  6.15D-10  6.22D-10  6.27D-10  6.32D-10   QDENSI
  6.40D-10  6.44D-10  6.47D-10  6.49D-10  6.50D-10  6.52D-10
  6.52D-10  6.52D-10  6.53D-10  6.53D-10  6.53D-10  0.00D+00
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  1.00D+00  2.00D+00  3.00D+00  4.00D+00  5.00D+00  6.00D+00   ZEFF
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  6.49D-10  6.52D-10  6.53D-10  6.53D-10  6.53D-10  6.53D-10   QZEFF
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  3.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00   BMAG
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
  6.52D-10  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00   QBMAG
  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00  0.00D+00
C-------------------------------------------------------------------------
C  EFFECTIVE COEFFICIENT LIST:
C
C     ISEL    TYPE      ION       INFORMATION
C     ----    ----      ---       -----------
C       8.   CX.EMIS.  HE+ 1      N = 6 -  4   6559.4    10/7/90  J2460
C-------------------------------------------------------------------------
```