

ADAS Subroutine d6sgcf

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SUBROUTINE D6SGCF ( IZ0      , IZL      , IZH      ,
&                  ISDIMD   , IZDIMD   , ITDIMD   , IPDIMD   , IMDIMD   ,
&                  NMSUM    , IZIP     , IMIP     , IPIZM    ,
&                  NDLINE   , NDCOMP   ,
&                  NLINE    , NCOMP    , SPECL    , IPLINE   ,
&                  IZION    , IMET     , CIMET    , INDPH    , CINDPH   ,
&                  IFILE    ,
&                  NTDIM    , ITMAX    ,
&                  DENS     , DENSH    ,
&                  PECA     , LPEC     ,
&                  FPABUN   ,
&                  GCFPEQ   , GCFEQ    ,
&                  NDRAT    , NRAT     ,
&                  ILINE    , JLINE    ,
&                  RATA
&
)

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C

C ***** FORTRAN77 SUBROUTINE: D6SGCF *****

C

C PURPOSE : TO ASSEMBLE GCF FUNCTIONS AND THEIR COMPONENTS USING
 C FRACTIONAL METASTABLE ABUNDANCES.

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C INPUT : (I*4) IZ0 = NUCLEAR CHARGE
 C INPUT : (I*4) IZL = MINIMUM ION CHARGE+1 IN MASTER DATA FILES
 C INPUT : (I*4) IZH = MAXIMUM ION CHARGE+1 IN MASTER DATA FILES
 C INPUT : (I*4) ISDIMD = MAXIMUM NUMBER OF (CHARGE, PARENT, GROUND)
 C BLOCKS IN ISONUCLEAR MASTER FILES
 C INPUT : (I*4) IZDIMD = MAXIMUM NUMBER OF CHARGE STATES
 C IN ISONUCLEAR MASTER FILES
 C INPUT : (I*4) ITDIMD = MAXIMUM NUMBER OF TEMP OR DENS VALUES IN
 C ISOELECTRONIC MASTER FILES
 C INPUT : (I*4) IPDIMD = MAXIMUM NUMBER OF METASTABLES FOR EACH
 C IONISATION STAGE
 C INPUT : (I*4) IMDIMD = MAXIMUM NUMBER OF METASTABLES
 C
 C INPUT : (I*4) NMSUM = TOTAL NUMBER OF POPULATIONS
 C
 C INPUT : IZIP() = ION CHARGE +1 (IZ1) OF METASTABLE IN LIST
 C INPUT : IMIP() = METASTABLE INDEX WITHIN CHARGE STATE IZ1
 C OF METASTABLE INDEX FROM COMPLETE LIST
 C INPUT : IPIZM(,) = METASTABLE INDEX IN COMPLETE LIST
 C 1ST DIM: INDEX IZ1-IZL+1
 C 2ND DIM: METASTABLE COUNT FOR STAGE (IGRD)
 C INPUT : (I*4) NDLINE = MAXIMUM NUMBER OF LINES ALLOWED
 C INPUT : (I*4) NDCOMP = MAXIMUM NUMBER OF COMPONENT FOR EACH LINE
 C INPUT : (I*4) NLINE = NUMBER OF LINES IDENTIFIED IN SCRIPT
 C INPUT : (I*4) NCOMP() = NUMBER OF COMPONENTS OF SCRIPT LINE
 C INPUT : (I*4) IZION(,) = CHARGE STATE OF COMPONENT

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C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (I*4)  IMET(,)  = METASTABLE INDEX OF COMPONENT OF
C          SCRIPT LINE WITHIN CHARGE STATE
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (C*1)  CIMET(,) = SIGN (+, BLANK OR -) OF METASTABLE
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (I*4)  INDPH(,) = PEC FILE INDEX OF LINE COMPONENT
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (C*1)  CINDPH(,) = DRIVER (E OR BLANK => ELECTRONS)
C          (H          => HYDROGEN )
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (I*4)  IFILE(,) = INDEX OF PEC FILE IN FILE LIST
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C INPUT  : (I*4)  NTDIM    = MAXIMUM NUMBER OF DTEV/DDENS PAIRS
C INPUT  : (I*4)  ITMAX    = NUMBER OF ( DTEV() , DDENS() ) PAIRS
C INPUT  : (R*8)  DENS()   = ELECTRON DENSITIES (CM-3)
C INPUT  : (R*8)  DENSH()  = HYDROGEN DENSITIES (CM-3)
C INPUT  : (R*8)  PECA(,,) = PHOTON EMISSIVITY COEFFICIENTS (CM3 S-1)
C          1ST DIM: TEMPERATURE INDEX
C          2ND DIM: LINE INDEX
C          3RD DIM: COMPONENT INDEX
C INPUT  : (L*4)  LPEC(,)  = .TRUE. => PHOTON EMISSIVITY OBTAINED
C          .FALSE. => PHOTON EMISSIVITY NOT OBTAINED
C          2ND DIM: LINE INDEX
C          3RD DIM: COMPONENT INDEX
C INPUT  : (R*8)  FPABUN(,) = RESOLVED METASTABLE EQUILIBRIUM
C          FRACTIONAL ABUNDANCES
C          1ST DIM: - TEMPERATURE/DENSITY PAIR
C          2ND DIM: - METASTABLE INDEX
C INPUT  : (I*4)  NDRAT    = MAXIMUM NUMBER OF LINE RATIOS ALLOWED
C INPUT  : (I*4)  NRAT     = NUMBER OF RATIOS IDENTIFIED IN SCRIPT
C INPUT  : (I*4)  ILINE()  = INDEX OF NUMERATOR LINE FOR LINE RATIO
C INPUT  : (I*4)  JLINE()  = INDEX OF DENOMINATOR LINE FOR LINE RATIO
C
C OUTPUT : (C*16) SPECL(,) = SPEC. OF POINTERS OF LINE COMPONENT
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C OUTPUT : (I*4)  IPLINE(,) = METASTABLE POINTER OF LINE COMPONENT
C          1ST DIM: LINE INDEX
C          2ND DIM: COMPONENT INDEX
C OUTPUT : (R*8)  GCFPEQ(,,) = GCF FUNC. COMPONENT (CM3 S-1)
C          1ST DIM: TEMPERATURE INDEX
C          2ND DIM: LINE INDEX
C          3RD DIM: LINE COMPONENT INDEX
C OUTPUT : (R*8)  GCFEQ(,) = GCF FUNCTION (CM3 S-1)
C          1ST DIM: TEMPERATURE INDEX
C          2ND DIM: LINE INDEX

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C OUTPUT : (R*8)  RATA(,)  = LINE GCF RATIOS
C                                     1ST IND: TEMPERATURE INDEX
C                                     2ND IND: RATIO INDEX
C
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C PROGRAM: (I*4)  IT          = GENERAL INDEX FOR TEMPERATURE
C           (I*4)  IP          = GENERAL INDEX FOR CHARGE
C           (I*4)  IZ1        = GENERAL INDEX FOR CHARGE+1
C           (I*4)  IL          = GENERAL INDEX FOR LINE
C           (I*4)  IR          = GENERAL INDEX FOR RATIO
C           (I*4)  ICPT       = GENERAL INDEX FOR LINE COMPONENT
C
C
C ROUTINES:
C      ROUTINE      SOURCE      BRIEF DESCRIPTION
C      -----
C
C AUTHOR : H. P. SUMMERS, JET
C          K1/1/57
C          JET EXT. 4941
C
C DATE   : 03/05/94
C
C UNIX-IDL PORT:
C
C AUTHOR: WILLIAM OSBORN (TESSELLA SUPPORT SERVICES PLC)
C
C DATE:   07/06/96
C
C VERSION: 1.1      DATE:07/06/96
C MODIFIED: WILLIAM OSBORN
C          - FIRST VERSION
C VERSION: 1.2      DATE:27/06/96
C MODIFIED: WILLIAM OSBORN
C          - REMOVED UNUSED VARIABLES
C
C-----
C      CHARACTER      CIMET (NDLINE, NDCOMP)
C      CHARACTER      CINDPH (NDLINE, NDCOMP)
C      CHARACTER*16    SPECL (NDLINE, NDCOMP)
C      INTEGER        IFILE (NDLINE, NDCOMP) ,      ILINE (NDRAT)
C      INTEGER        IMDIMD,      IMET (NDLINE, NDCOMP)
C      INTEGER        IMIP (IMDIMD) ,      INDPH (NDLINE, NDCOMP)
C      INTEGER        IPDIMD,      IPIZM (IZDIMD, IPDIMD)
C      INTEGER        IPLINE (NDLINE, NDCOMP) ,      ISDIMD,      ITDIMD
C      INTEGER        ITMAX,      IZ0,      IZDIMD,      IZH
C      INTEGER        IZION (NDLINE, NDCOMP) ,      IZIP (IMDIMD)
C      INTEGER        IZL,      JLINE (NDRAT)
C      INTEGER        NCOMP (NDLINE) ,      NDCOMP,      NDLINE
C      INTEGER        NDRAT,      NLINE,      NMSUM,      NRAT
C      INTEGER        NTDIM
C      LOGICAL        LPEC (NDLINE, NDCOMP)

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REAL*8          DENS (NTDIM) ,  DENS (NTDIM)
REAL*8          FPABUN (NTDIM, IMDIM) ,      GCFEQ (NTDIM, NDLINE)
REAL*8          GCFPEQ (NTDIM, NDLINE, NDCOMP)
REAL*8          PECA (NTDIM, NDLINE, NDCOMP)
REAL*8          RATA (NTDIM, NDRAT)
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