ADAS Subroutine b1data

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       SUBROUTINE B1DATA( IUNIT  , NDLEV  , NDTRN ,
     &                    TITLED , IZ     , IZ0   , IZ1   , BWNO  ,
     &                    IL     ,
     &                    IA     , CSTRGA , ISA   , ILA   , XJA   , WA ,
     &                    NV     , SCEF   ,
     &                    ITRAN  ,
     &                    I1A    , I2A    , AVAL  , SCOM
     &                  )
C-----------------------------------------------------------------------
C
C  ****************** FORTRAN77 SUBROUTINE: B1DATA *********************
C
C  PURPOSE:  TO FETCH DATA FROM INPUT SPECIFIC Z EXCITATION FILE.
C            (ELECTRON IMPACT TRANSITIONS ONLY).
C
C  CALLING PROGRAM: ADAS201
C
C  DATA:
C           THE 'REAL' DATA IN THE FILE IS REPRESENTED IN AN ABBREVIATED
C           FORM WHICH OMITS THE "D" OR "E" EXPONENT SPECIFIER.
C           e.g. 1.23D-06 or 1.23E-06 IS REPRESENTED AS 1.23-06
C                6.75D+07 or 6.75E+07 IS REPRESENTED AS 6.75+07
C
C           THEREFORE THE FORM OF EACH 'REAL' NUMBER IN THE DATA SET IS:
C                          N.NN+NN or N.NN-NN
C
C           THE UNITS USED IN THE DATA FILE ARE TAKEN AS FOLLOWS:
C
C           IONISATION POTENTIAL: WAVE NUMBER (CM-1)
C           INDEX LEVEL ENERGIES: WAVE NUMBER (CM-1)
C           TEMPERATURES        : KELVIN
C           A-VALUES            : SEC-1
C           GAMMA-VALUES        :
C           RATE COEFFT.        : CM3 SEC-1
C
C
C  SUBROUTINE:
C
C  INPUT : (I*4)  IUNIT   = UNIT TO WHICH INPUT FILE IS ALLOCATED
C  INPUT : (I*4)  NDLEV   = MAXIMUM NUMBER OF LEVELS THAT CAN BE READ
C  INPUT : (I*4)  NDTRN   = MAX. NUMBER OF TRANSITIONS THAT CAN BE READ
C
C  OUTPUT: (C*3)  TITLED  = ELEMENT SYMBOL.
C  OUTPUT: (I*4)  IZ      =  RECOMBINED ION CHARGE READ
C  OUTPUT: (I*4)  IZ0     =         NUCLEAR CHARGE READ
C  OUTPUT: (I*4)  IZ1     = RECOMBINING ION CHARGE READ
C                           (NOTE: IZ1 SHOULD EQUAL IZ+1)
C  OUTPUT: (R*8)  BWNO    = IONISATION POTENTIAL (CM-1)
C
C  OUTPUT: (I*4)  IL      = INPUT DATA FILE: NUMBER OF ENERGY LEVELS
C
C  OUTPUT: (I*4)  IA()    = ENERGY LEVEL INDEX NUMBER
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C  OUTPUT: (C*12) CSTRGA()= NOMENCLATURE/CONFIGURATION FOR LEVEL 'IA()'
C  OUTPUT: (I*4)  ISA()   = MULTIPLICITY FOR LEVEL 'IA()'
C                           NOTE: (ISA-1)/2 = QUANTUM NUMBER (S)
C  OUTPUT: (I*4)  ILA()   = QUANTUM NUMBER (L) FOR LEVEL 'IA()'
C  OUTPUT: (R*8)  XJA()   = QUANTUM NUMBER (J-VALUE) FOR LEVEL 'IA()'
C                           NOTE: (2*XJA)+1 = STATISTICAL WEIGHT
C  OUTPUT: (R*8)  WA()    = ENERGY RELATIVE TO LEVEL 1 (CM-1) FOR LEVEL
C                           'IA()'
C
C  OUTPUT: (I*4)  NV      = INPUT DATA FILE: NUMBER OF GAMMA/TEMPERATURE
C                           PAIRS FOR A GIVEN TRANSITION.
C  OUTPUT: (R*8)  SCEF()  = INPUT DATA FILE: ELECTRON TEMPERATURES (K)
C                           (INITIALLY JUST THE MANTISSA. SEE 'ITPOW()')
C                           (NOTE: TE=TP=TH IS ASSUMED)
C
C  OUTPUT: (I*4)  ITRAN   = INPUT DATA FILE: NUMBER OF ELECTRON IMPACT
C                                            TRANSITIONS.
C
C  OUTPUT: (I*4)  I1A()   = ELECTRON IMPACT TRANSITION:
C                            LOWER ENERGY LEVEL INDEX
C  OUTPUT: (I*4)  I2A()   = ELECTRON IMPACT TRANSITION:
C                            UPPER ENERGY LEVEL INDEX
C  OUTPUT: (R*8)  AVAL()  = ELECTRON IMPACT TRANSITION:
C                            A-VALUE (SEC-1)
C  OUTPUT: (R*8)  SCOM(,) = ELECTRON IMPACT TRANSITION:
C                            GAMMA VALUES
C                           1ST DIMENSION - TEMPERATURE 'SCEF()'
C                           2ND DIMENSION - TRANSITION NUMBER
C
C          (I*4)  NDTEM   = PARAMETER = MAX NUMBER OF INPUT FILE TEMPS.
C
C          (I*4)  I4UNIT  = FUNCTION (SEE ROUTINE SECTION BELOW)
C          (I*4)  IQS     = X-SECT DATA FORMAT SELECTOR
C                           NOTE: IQS=3 ONLY ALLOWED IN THIS PROGRAM
C          (I*4)  I       = GENERAL USE.
C          (I*4)  J       = GENERAL USE.
C          (I*4)  J1      = INPUT DATA FILE - SELECTED TRANSITION:
C                            LOWER ENERGY LEVEL INDEX (CASE ' ' & 'P')
C          (I*4)  J2      = INPUT DATA FILE - SELECTED TRANSITION:
C                            UPPER ENERGY LEVEL INDEX (CASE ' ' & 'P')
C                            CAPTURING    LEVEL INDEX (CASE 'H' & 'R')
C          (I*4)  ILINE   = ENERGY LEVEL INDEX FOR CURRENT LINE
C          (I*4)  IAPOW   = EXPONENT OF 'AVALM'
C          (I*4)  IGPOW() = EXPONENT OF 'GAMMA()'
C          (I*4)  ITPOW() = TEMPERATURES - EXPONENT
C                           NOTE: MANTISSA INITIALLY KEPT IN 'SCEF()'
C
C          (R*4)  ZF      = SHOULD BE EQUIVALENT TO 'IZ1'
C
C          (R*8)  AVALM   = INPUT DATA FILE - SELECTED TRANSITION:
C                           MANTISSA OF:   ('IAPOW' => EXPONENT)
C                            A-VALUE (SEC-1)          (CASE ' ')
C                            NEUTRAL BEAM ENERGY      (CASE 'H')
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C                              NOT USED                  (CASE 'P' & 'R')
C          (R*8)  GAMMA() = INPUT DATA FILE - SELECTED TRANSITION:
C                           MANTISSA OF: ('IGPOW()' => EXPONENT)
C                            GAMMA VALUES             (CASE ' ' & 'P')
C                            RATE COEFFT. (CM3 SEC-1) (CASE 'H' & 'R')
C                           DIMENSION => TEMPERATURE 'SCEF()'
C
C          (C*1)  TCODE   = TRANSITION: DATA TYPE POINTER:
C                           ' ' => Electron Impact   Transition
C                           'P' => Proton   Impact   Transition
C                           'H' => Charge   Exchange Recombination
C                           'R' => Free     Electron Recombination
C          (C*80) CLINE   = CURRENT ENERGY LEVEL INDEX PARAMETER LINE
C
C          (L*4)  LDATA   = IDENTIFIES  WHETHER  THE END OF AN  INPUT
C                           SECTION IN THE DATA SET HAS BEEN LOCATED.
C                           (.TRUE. => END OF SECTION REACHED)
C
C
C ROUTINES:
C          ROUTINE    SOURCE    BRIEF DESCRIPTION
C          ------------------------------------------------------------
C          I4UNIT     ADAS      FETCH UNIT NUMBER FOR OUTPUT OF MESSAGES
C
C AUTHOR:  PAUL E. BRIDEN (TESSELLA SUPPORT SERVICES PLC)
C          K1/0/81
C          JET EXT. 4569
C
C DATE:    09/10/90
C
C UPDATE:  16/11/90 - LEVEL LINE READ AS A CHARACTER*80 STRING FIRST
C                     (PE BRIDEN)
C
C UPDATE:  23/04/93 - PE BRIDEN - ADAS91: ADDED I4UNIT FUNCTION TO WRITE
C                                         STATEMENTS FOR SCREEN MESSAGES
C
C UPDATE:  24/05/93 - PE BRIDEN - ADAS91: CHANGED I4UNIT(0)-> I4UNIT(-1)
C
C-----------------------------------------------------------------------
      CHARACTER*12        CSTRGA(NDLEV)
      CHARACTER*3         TITLED
      INTEGER             I1A(NDTRN),  I2A(NDTRN),  IA(NDLEV),   IL
      INTEGER             ILA(NDLEV),  ISA(NDLEV),  ITRAN,       IUNIT
      INTEGER             IZ,          IZ0,         IZ1,         NDLEV
      INTEGER             NDTRN,       NV
      REAL*8              AVAL(NDTRN), BWNO,        SCEF(NDTEM)
      REAL*8              SCOM(NDTEM,NDTRN),        WA(NDLEV)
      REAL*8              XJA(NDLEV)
```