ADAS Subroutine d5spc2

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      SUBROUTINE D5SPC2( DSNAME, IBSEL  , IZIN   , IZ0IN  ,
     &                   ITVAL  , TVAL   , DVAL   ,
     &                   WLNGTH ,
     &                   PECA   , LTRNG  , LDRNG  ,
     &                   TITLX  , IRCODE
     &                 )
C-----------------------------------------------------------------------
C
C  ******************* FORTRAN77 SUBROUTINE: D5PSC2 *******************
C
C  PURPOSE: TO EXTRACT AND INTERPOLATE  PHOTON EMISSIVITIES FOR
C           EMITTING IONS.
C
C     THIS IS A NEW ROUTINE, WRITTEN BECAUSE OF THE VERY
C           NAMING CONVENTIONS ON THE IBM AND UNIX MACHINES.
C           IT REPLACES THE OLD SPEC FORTRAN ROUTINE AND A LOT
C           OF THE OBSOLETE FUNCTIONALITY THEREIN. THIS ROUTINE
C           TAKES AS INPUT THE NAMES OF THE PHOTON EMISSIVITY FILES
C           AND CHECKS THEY ARE THERE BEFORE OPENING THEM AND
C           EXTRACTING ALL REQUIRED INFORMATION.
C
C  CALLING PROGRAM: D5SPEC
C
C  SUBROUTINE:
C
C  INPUT : (I*4)   IBSEL   = INDEX OF DATA-BLOCK SELECTED FOR ANALYSIS
C  INPUT : (I*4)   IZIN    = ION CHARGE OF EMITTING ION
C  INPUT : (I*4)   IZ0IN   = NUCLEAR CHARGE OF EMITTING ION
C
C  INPUT : (I*4)   ITVAL   = NO. OF ELECTRON TEMPERATURE/DENSITY PAIRS
C  INPUT : (R*8)   TVAL()  = ELECTRON TEMPERATURES (UNITS: EV)
C                            DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C  INPUT : (R*8)   DVAL()  = ELECTRON DENSITIES (UNITS: CM-3)
C                            DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C
C  OUTPUT: (R*8)   WLNGTH  = SELECTED BLOCK WAVELENGTH (ANGSTROMS)
C
C  OUTPUT: (R*8)   PECA()  = PHOTON EMISSIVITIES.
C                            DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C  OUTPUT: (L*4)   LTRNG() =.TRUE.  => OUTPUT 'PECA()'  VALUE WAS INTER-
C                                      POLATED  FOR  THE  USER  ENTERED
C                                      ELECTRON TEMPERATURE 'TVAL()'.
C                           .FALSE. => OUTPUT 'PECA()'  VALUE WAS EXTRA-
C                                      POLATED  FOR  THE  USER  ENTERED
C                                      ELECTRON TEMPERATURE 'TVAL()'.
C                            DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C  OUTPUT: (L*4)   LDRNG() =.TRUE.  => OUTPUT 'PECA()'  VALUE WAS INTER-
C                                      POLATED  FOR  THE  USER  ENTERED
C                                      ELECTRON DENSITY 'DVAL()'.
C                           .FALSE. => OUTPUT 'PECA()'  VALUE WAS EXTRA-
C                                      POLATED  FOR  THE  USER  ENTERED
C                                      ELECTRON DENSITY 'DVAL()'.
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C                              DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C
C  OUTPUT: (C*120) TITLX   = INFORMATION STRING (DSN ETC.)
C  OUTPUT: (I*4)   IRCODE  = RETURN CODE FROM SUBROUTINE:
C                              0 => NORMAL COMPLETION - NO ERROR DETECTED
C                              1 => DATA SET MEMBER FOR EMITTING ION WITH
C                                   CHARGE 'IZIN' & ION CHARGE 'IZ0IN' CAN
C                                   NOT BE FOUND/DOES NOT EXIST.
C                              2 => DISCREPANCY BETWEEN REQUESTED CHARGES
C                                   AND THOSE IN INPUT FILE.
C                              3 => THE SELECTED DATA-BLOCK 'IBSEL' IS OUT
C                                   OF RANGE OR DOES NOT EXIST.
C                              4 => INVALID VALUE FOR 'IZ0IN' ENTERED.
C                                   ('IZ0MIN' <= 'IZ0IN' <= 'IZ0MAX')
C                              5 => INVALID VALUE FOR 'IZIN' ENTERED.
C                                   ( 0  <= 'IZIN' <= 99 )
C                              9 => ERROR ENCOUNTERED WHEN TRYING TO OPEN
C                                   INPUT DATA-SET.
C
C          (I*4)   NSTORE  = PARAMETER= MAXIMUM NUMBER  OF  DATA-BLOCKS
C                                       WHICH CAN BE READ FROM THE INPUT
C                                       DATA-SET.
C          (I*4)   NTDIM   = PARAMETER= MAXIMUM NUMBER OF ELECTRON TEMP-
C                                       ERATURES THAT CAN BE READ  FROM
C                                       AN INPUT DATA-SET DATA-BLOCK.
C          (I*4)   NDDIM   = PARAMETER= MAXIMUM NUMBER OF ELECTRON DENS-
C                                       ITIES  THAT  CAN  BE  READ  FROM
C                                       AN INPUT DATA-SET DATA-BLOCK.
C          (I*4)   IZ0MIN  = PARAMETER: MIN. ALLOWED VALUE FOR 'IZ0IN'
C          (I*4)   IZ0MAX  = PARAMETER: MAX. ALLOWED VALUE FOR 'IZ0IN'
C
C          (I*4)   IUNIT   = UNIT TO WHICH INPUT DATA SET IS ALLOCATED
C          (I*4)   NBSEL   = TOTAL NUMBER OF DATA-BLOCKS READ FROM INPUT
C                            DATA SET.
C          (I*4)   IZ0     = INPUT FILE - EMITTING ION - NUCLEAR CHARGE
C          (I*4)   IZ      = INPUT FILE - EMITTING ION - CHARGE
C          (I*4)   IZ1     = INPUT FILE - EMITTING ION - CHARGE + 1
C
C          (L*4)   LOPEN   = .TRUE.  => INPUT DATA SET OPEN.
C                            .FALSE. => INPUT DATA SET CLOSED.
C
C          (C*2)   ESYM    = INPUT FILE - EMITTING ION - ELEMENT SYMBOL
CA         (C*120)  DSNAME  = NAME OF DATA SET INTERROGATED
C
C          (I*4)   ISELA() = INPUT DATA FILE: DATA-BLOCK ENTRY INDICES.
C                            DIMENSION: DATA-BLOCK INDEX
C          (I*4)   ITA()   = INPUT DATA SET-NUMBER OF ELECTRON TEMPERA-
C                            TURES.
C                            DIMENSION: DATA-BLOCK INDEX
C          (I*4)   IDA()   = INPUT DATA SET-NUMBER OF ELECTRON DENSITIES
C                            DIMENSION: DATA-BLOCK INDEX
C
C          (R*8)   TETA(,) = INPUT DATA SET -
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C                             ELECTRON TEMPERATURES (UNITS: eV)
C                             1st DIMENSION: ELECTRON TEMPERATURE INDEX
C                             2nd DIMENSION: DATA-BLOCK INDEX
C          (R*8)   TEDA(,) = INPUT DATA SET -
C                             ELECTRON DENSITIES    (UNITS: cm-3)
C                             1st DIMENSION: ELECTRON DENSITY     INDEX
C                             2nd DIMENSION: DATA-BLOCK INDEX
C          (R*8)   PEC(,,)   =INPUT DATA SET -
C                              FULL SET OF IONIZATIONS PER PHOTON
C                              1st DIMENSION: ELECTRON TEMPERATURE INDEX
C                              2nd DIMENSION: ELECTRON DENSITY     INDEX
C                              3rd DIMENSION: DATA-BLOCK INDEX
C
C          (C*10)  CWAVEL() = INPUT FILE - WAVELENGTH (ANGSTROMS)
C                             DIMENSION: DATA-BLOCK INDEX
C          (C*8)   CFILE()  = INPUT FILE - SPECIFIC ION FILE SOURCE
C                             DIMENSION: DATA-BLOCK INDEX
C          (C*8)   CTYPE()  = INPUT FILE - TYPE OF DATA (IE EXCIT., ETC)
C                             DIMENSION: DATA-BLOCK INDEX
C          (C*2)   CINDM()  = INPUT FILE - METASTABLE INDEX
C                             DIMENSION: DATA-BLOCK INDEX
C
C ROUTINES:
C          ROUTINE    SOURCE    BRIEF DESCRIPTION
C          ------------------------------------------------------------
C          E3DATA     ADAS      FETCH INPUT DATA FROM SELECTED DATA SET
C          E3CHKB     ADAS      CHECK VALIDITY OF ION AND 'IBSEL'
C          E3SPLN     ADAS      INTERPOLATE DATA WITH TWO WAY SPLINES
C          E3TITL     ADAS      CREATE DESCRIPTIVE TITLE FOR OUTPUT
C
C AUTHOR:  TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C DATE:    08/11/95
C
C VERSION: 1.1 DATE: 08-11-95
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C               - FIRST RELEASE
C
C VERSION: 1.2 DATE: 10-11-95
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C               - INCREASED LENGTH OF TITLX FROM 80 TO 120
C
C VERSION: 1.3 DATE: 08-06-98
C MODIFIED: RICHARD MARTIN
C     - INCREASED NTDIM AND NDDIM TO 30.
C
C-----------------------------------------------------------------------
C-----------------------------------------------------------------------
C
C-----------------------------------------------------------------------
      CHARACTER*120       DSNAME,      TITLX
      INTEGER             IBSEL,       IRCODE,      ITVAL,       IZ0IN
      INTEGER             IZIN
      LOGICAL             LDRNG(ITVAL),            LTRNG(ITVAL)
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      REAL*8              DVAL(ITVAL), PECA(ITVAL), TVAL(ITVAL), WLNGTH
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