ADAS Subroutine d6spow

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       SUBROUTINE D6SPOW( LSELA  , LEXSA  , LDEFA  , LPART  , LEXSS  ,
     &                    IZ0    , IZL    , IZH    , NPART  ,
     &                    ISDIMD , IZDIMD , ITDIMD , IPDIMD , IMDIMD ,
     &                    ACDA   , SCDA   , CCDA   , PRBA   ,
     &                    PRCA   , QCDA   , XCDA   , PLTA   ,
     &                    NMSUM  , IZIP   , IMIP   , IPIZM  ,
     &                    NTDIM  , ITMAX  ,
     &                    DENS   , DENSH  ,
     &                    FPABUN , FSABUN , FPINTG , FSINTG ,
     &                    ELTPEQ ,
     &                    ACDSEQ , SCDSEQ , CCDSEQ , ERBSEQ ,
     &                    ERCSEQ , ELTSEQ ,
     &                    ERBEQ  , ERCEQ  , ELTEQ  , ERADA
     &                  )
C
C-----------------------------------------------------------------------
C
C  ****************** FORTRAN77 SUBROUTINE: D6SPOW *********************
C
C PURPOSE : TO ASSEMBLE RADIATED ENERGY EXCESS FUNCTIONS USING
C           FRACTIONAL METASTABLE ABUNDANCES INTEGRAL EXCESSES
C
C NOTE    : THE SOURCE ISONUCLEAR MASTER FILE DATA ARE OBTAINED BY A
C           PRIOR CALL TO SUBROUTINE D6DATA FROM SEQUENTIAL FILES
C           WITH THE FOLLOWING NAMING CONVENTIONS:
C
C                   (1) JETSHP.ACD<YR>#<EL).<CODE>DATA
C                   (2) JETSHP.SCD<YR>#<EL>.<CODE>DATA
C                   (3) JETSHP.CCD<YR>#<EL>.<CODE>DATA
C                   (4) JETSHP.PRB<YR>#<EL>.<FILT>.<CODE>DATA
C                   (5) JETSHP.PRC<YR>#<EL>.<FILT>.<CODE>DATA
C                   (6) JETSHP.QCD<YR>#<EL>.<CODE>DATA
C                   (7) JETSHP.XCD<YR>#<EL>.<CODE>DATA
C                   (8) JETSHP.PLT<YR>#<EL>.<CODE>DATA
C
C       WHERE, <YR>   = TWO DIGIT YEAR NUMBER
C              <EL>   = ONE OR TWO CHARACTER ELEMENT SYMBOL
C              <CODE> = R       => PARTIAL DATA
C                       U       => PARTIAL DATA
C                       OMITTED => STANDARD DATA
C              <FILT> = SIX CHARACTER POWER FILTER CODE
C
C       AND DATA OF CLASSES 6 AND 7 DO NOT EXIST FOR THE PARTIAL CASE.
C
C
C INPUT  : (L*4)  LSELA()   = .TRUE.  => INPUT DATA SET TYPE FOR THIS
C                                        INDEX SELECTED
C                           = .FALSE. => INPUT DATA SET FOR THIS INDEX
C                                        NOT SELECTED
C INPUT  : (L*4)  LEXSA()   = .TRUE.  => INPUT DATA SET TYPE FOR THIS
C                                        SELECTED INDEX EXISTS
C                           = .FALSE. => INPUT DATA SET DOES NOT EXIST
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C                                          FOR THIS SELECTED INDEX
C INPUT  : (L*4)  LDEFA()   = .TRUE.  => INPUT DATA SET TYPE FOR THIS
C                                          DEFAULT YEAR INDEX EXISTS
C                           = .FALSE. => INPUT DATA SET DOES NOT EXIST
C                                          FOR THIS DEFAULT YEAR INDEX
C INPUT  : (L*4)  LPART     = .TRUE.  => PARTIAL DATA SELECTED
C                           = .FALSE. => STANDARD DATA SELECTED
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)  NPART()   = METASTABLE PARTITION.  I.E. NUMBER OF
C                             METASTABLES FROM CHARGE STATE IZL-1 TO
C                             IZH ON INPUT
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  : (R*8)  ACDA(,,,) = INTERPOLATION OF ACD COEFFICIENT (CM3 S-1)
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: RECOMBINING METASTABLE INDEX
C                             4TH DIM: RECOMBINED METASTABLE INDEX
C INPUT  : (R*8)  SCDA(,,,) = INTERPOLATION OF SCD COEFFICIENT (CM3 S-1)
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: RECOMBINING METASTABLE INDEX
C                             4TH DIM: RECOMBINED METASTABLE INDEX
C INPUT  : (R*8)  CCDA(,,,) = INTERPOLATION OF CCD COEFFICIENT (CM3 S-1)
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: RECOMBINING METASTABLE INDEX
C                             4TH DIM: RECOMBINED METASTABLE INDEX
C INPUT  : (R*8)  PRBA(,,)  = INTERPOLATION OF PRB COEFFICIENT (W CM3 )
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: RECOMBINING METASTABLE INDEX
C INPUT  : (R*8)  PRCA(,,)  = INTERPOLATION OF PRC COEFFICIENT (W CM3 )
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: RECOMBINING METASTABLE INDEX
C INPUTT : (R*8)  QCDA(,,,) = INTERPOLATION OF QCD COEFFICIENT (CM3 S-1)
C                             1ST DIM: TEMPERATURE INDEX
C                             2ND DIM: CHARGE STATE INDEX
C                             3RD DIM: FIRST METASTABLE INDEX
C                             4TH DIM: SECOND METASTABLE INDEX
C INPUT  : (R*8)  XCDA(,,,) = INTERPOLATION OF XCD COEFFICIENT (CM3 S-1)
C                             1ST DIM: TEMPERATURE INDEX
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C                                2ND DIM: CHARGE STATE INDEX
C                                3RD DIM: FIRST PARENT METASTABLE INDEX
C                                4TH DIM: SECOND PARENT METASTABLE INDEX
C INPUT  : (R*8)  PLTA(,,)   = INTERPOLATION OF PLT COEFFICIENT (W CM3 )
C                                1ST DIM: TEMPERATURE INDEX
C                                2ND DIM: CHARGE STATE INDEX
C                                3RD DIM: METASTABLE INDEX
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)  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)  FPABUN(,)  = RESOLVED METASTABLE EQUILIBRIUM
C                                FRACTIONAL ABUNDANCES
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR
C                                2ND DIM: - METASTABLE INDEX
C INPUT  : (R*8)  FPINTG(,)  = RESOLVED TRANSIENT METASTABLE POPULATION
C                                EXCESS INTEGRALS
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR
C                                2ND DIM: - METASTABLE INDEX
C OUTPUT : (L*4)  LEXSS()    = .TRUE.  => OUTPUT STANDARD MASTER DATA FOR
C                                         THIS INDEX GENERATED
C                              = .FALSE. => OUTPUT STANDARD MASTER DATA FOR
C                                         THIS INDEX NOT GENERATED
C OUTPUT : (R*8)  FSABUN(,)  = STAGE EQUILIBRIUM FRACTIONAL ABUNDANCES
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                                2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  FSINTG(,)  = STAGE TRANSIENT FRACTIONAL ABUNDANCES
C                                EXCESSES
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                                2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  ELTPEQ(,)  = METASTABLE PARTIAL TRANSIENT RADIATED
C                                LINE ENERGY EXCESS FUNCTIONS
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR
C                                2ND DIM: - METASTABLE INDEX
C OUTPUT : (R*8)  ACDSEQ(,)  = STANDARD (UNRESOLVED) ACD COEFFICIENT
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                                2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  SCDSEQ(,)  = STANDARD (UNRESOLVED) SCD COEFFICIENT
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                                2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  CCDSEQ(,)  = STANDARD (UNRESOLVED) CCD COEFFICIENT
C                                1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                                2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  ERBSEQ(,)  = STANDARD (UNRESOLVED) RB ENERGY EXCESS
C                                COEFFICIENT
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C                              1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                              2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  ERCSEQ(,) = STANDARD (UNRESOLVED) RC ENERGY EXCESS
C                             COEFFICIENT
C                              1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                              2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  ELTSEQ(,) = STANDARD (UNRESOLVED) LT ENERGY EXCESS
C                             COEFFICIENT
C                              1ST DIM: - TEMPERATURE/DENSITY PAIR INDEX
C                              2ND DIM: - CHARGE STATE INDEX (IZ1-IZL+1)
C OUTPUT : (R*8)  ERBEQ()   = TOTAL TRANSIENT RADIATED RECOM-BREMS
C                                    ENERGY EXCESS FUNCTION
C OUTPUT : (R*8)  ERCEQ()   = TOTAL TRANSIENT CX RADIATED RECOM ENERGY
C                                    EXCESS FUNCTION NORMALISED TO
C                                    ELECTRON DENSITY
C OUTPUT : (R*8)  ELTEQ()   = TOTAL TRANSIENT RADIATED LINE ENERGY
C                                    EXCESS FUNCTION
C OUTPUT : (R*8)  ERADA()   = TOTAL TRANSIENT RADIATED ENERGY EXCESS
C                                    FUNCTION
C
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)  ICL       = GENERAL INDEX FOR CLASS
C          (I*4)  IPP       = GENERAL PARENT INDEX
C          (I*4)  IPG       = GENERAL GROUND INDEX
C          (I*4)  IZREF     = GENERAL CHARGE STAE POINTER INDEX
C          (I*4)  IPRT      = GENERAL INDEX FOR PARENT METASTABLE
C          (I*4)  IGRD      = GENERAL INDEX FOR METASTABLE
C
C
C ROUTINES:
C          ROUTINE    SOURCE    BRIEF DESCRIPTION
C          ------------------------------------------------------------
C
C
C AUTHOR : H. P. SUMMERS, JET
C          K1/1/57
C          JET  EXT. 4941
C
C DATE   : 28/04/94
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
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C     - REMOVED UNUSED VARIABLES
C
C-----------------------------------------------------------------------
      INTEGER             IMDIMD,      IMIP(IMDIMD),             IPDIMD
      INTEGER             IPIZM(IZDIMD,IPDIMD),     ISDIMD,      ITDIMD
      INTEGER             ITMAX,       IZ0,         IZDIMD,      IZH
      INTEGER             IZIP(IMDIMD),             IZL,         NMSUM
      INTEGER             NPART(IZDIMD),            NTDIM
      LOGICAL             LDEFA(8),    LEXSA(8),    LEXSS(8),    LPART
      LOGICAL             LSELA(8)
      REAL*8              ACDA(NTDIM,IZDIMD,IPDIMD,IPDIMD)
      REAL*8              ACDSEQ(NTDIM,IZDIMD)
      REAL*8              CCDA(NTDIM,IZDIMD,IPDIMD,IPDIMD)
      REAL*8              CCDSEQ(NTDIM,IZDIMD),     DENS(NTDIM)
      REAL*8              DENSH(NTDIM),             ELTEQ(NTDIM)
      REAL*8              ELTPEQ(NTDIM,IMDIMD),     ELTSEQ(NTDIM,IZDIMD)
      REAL*8              ERADA(NTDIM),             ERBEQ(NTDIM)
      REAL*8              ERBSEQ(NTDIM,IZDIMD),     ERCEQ(NTDIM)
      REAL*8              ERCSEQ(NTDIM,IZDIMD),     FPABUN(NTDIM,IMDIMD)
      REAL*8              FPINTG(NTDIM,IZDIMD),     FSABUN(NTDIM,IZDIMD)
      REAL*8              FSINTG(NTDIM,IZDIMD)
      REAL*8              PLTA(NTDIM,IZDIMD,IPDIMD)
      REAL*8              PRBA(NTDIM,IZDIMD,IPDIMD)
      REAL*8              PRCA(NTDIM,IZDIMD,IPDIMD)
      REAL*8              QCDA(NTDIM,IZDIMD,IPDIMD,IPDIMD)
      REAL*8              SCDA(NTDIM,IZDIMD,IPDIMD,IPDIMD)
      REAL*8              SCDSEQ(NTDIM,IZDIMD)
      REAL*8              XCDA(NTDIM,IZDIMD,IPDIMD,IPDIMD)
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