

## ADAS Subroutine spfman5e

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      SUBROUTINE SPFMAN5E( Z0      , Z      , ZEFF  , TITLE , IETYP ,
&                          IXTYP , IND1   , IND2   , WI, WJ, EI, EJ,
&                          IATYP , ACOEFF, IFTYP  , IOTYP , IFOUT ,
&                          IXMAX , ITMAX  , EDAT   , XDAT  , TDAT  ,
&                          IORD  , IIBTS  , IIFPT  , IIXOP , IIDIF ,
&                          XTIT1 , IGRD1  , XL1    , XU1   ,
&                          YL1   , YU1   , XTIT2  , IGRD2 ,
&                          XL2   , XU2   , YL2    , YU2   , IWRITE,
&                          FXC2  , FXC3  , XA     , YA     , APOMA ,
&                          DIFOMA, TOA   , GOA    , APGOA , EXCRA ,
&                          DEXCRA, GBARFA,
&                          ICT   , ITOUT , S      , FIJ   , EIJ
&                          )
      IMPLICIT REAL*8 (A-H, O-Z)
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C-----
C  PURPOSE: ANALYSE ELECTRON IMPACT RATE DATA AND CONVERT TO
C  RATE COEFFICIENTS
C
C  VARIOUS FORMS OF DATA ENTRY ARE ALLOWED
C
C  EXTENDED ARRAY DIMENSION VERSION OF SPFMAIN5
C
C  DATA IS FITTED WITH APPROXIMATE FORMS TO AID INTERPOLATION DEPENDING
C  ON THE TRANSITION TYPE. THESE ARE
C      1. DIPOLE
C      2. NON-DIPOLE
C      3. SPIN CHANGE
C      4. OTHER
C
C  DATA ENTRY IS VIA CALL TO PANEL SUBROUTINE SPFMA4E AS FOLLOWS:
C
C  INPUT
C      IPAN = INITIAL PANEL NUMBER AT START
C
C  OUTPUT
C      IPAN = FINAL PANEL NUMBER
C      ANS  = YES  - FINISH UP CALCULATION SINCE NO MORE CASES
C          = NO   - DATA FOR NEW CASE RETURNED
C      Z0   = NUCLEAR CHARGE OF ION
C      Z    = ION CHARGE
C      ZEFF = ION CHARGE + 1
C      TITLE = TITLE FOR CASE
C      IETYP = 1  LEVEL ENERGIES IN CM-1
C            = 2  LEVEL ENERGIES IN RYD
C      IXTYP = 1  DIPOLE TRANSITION
C            = 2  NON-DIPOLE TRANSITION
C            = 3  SPIN CHANGE TRANSITION
C            = 4  OTHER
C      IND1 = LOWER LEVEL INDEX (USER CHOICE)
C      IND2 = UPPER LEVEL INDEX (USER CHOICE)
C      WI   = LOWER LEVEL STATISTICAL WEIGHT
C      WJ   = UPPER LEVEL STATISTICAL WEIGHT
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C EI = LOWER LEVEL ENERGY (IN SELECTED UNITS)  
C EJ = UPPER LEVEL ENERGY  
C IATYP = 1 A-COEFFICIENT RETURNED  
C = 2 OSCILLATOR STRENGTH RETURNED  
C = 3 LINE STRENGTH RETURNED  
C ACOEFF = TRANSITION PROBABILITY (IN ABOVE FORM, DIPOLE CASE ONLY)  
C IFTYP = 1 KELVIN FOR SOURCE TEMP. UNITS  
C = 2 EV FOR SOURCE TEMP. UNITS  
C = 3 SCALED UNITS (TE(K)/Z1\*\*2) FOR SOURCE TEMP. UNITS  
C = 4 REDUCED UNITS (KTE/EIJ) FOR SOURCE TEMP. UNITS  
C IOTYP = 1 EXCITATION RATE COEFFICIENT (CM3 S-1) RETURNED  
C = 2 DE-EXCITATION RATE COEFFICIENT (CM3 S-1) RETURNED  
C = 3 UPSILON RETURNED  
C IFOUT = 1 KELVIN FOR OUTPUT TEMPERATURE UNIT  
C = 2 EV FOR OUTPUT TEMPERATURE UNIT  
C = 3 SCALED UNITS (TE(K)/Z1\*\*2)  
C = 4 REDUCED UNITS RETURNED (KTE/EIJ)  
C IXMAX = NUMBER OF TEMP/RATE PAIRS ENTERED  
C ITMAX = NUMBER OF OUTPUT TEMPERATURES ENTERED  
C EDAT(I) = INPUT TEMPS. (SELECTED UNITS)  
C XDAT(I) = INPUT RATE COEFFTS. (SELECTED UNITS)  
C TDAT(I) = OUTPUT TEMPS. (SELECTED UNITS)  
C IIRD = \*\*\* UNUSED \*\*\*  
C IIGPH = 0 NO COMPARATIVE GRAPH TO BE PRODUCED  
C = 1 COMPARATIVE GRAPH TO BE PRODUCED  
C IIGPG = 0 NO GAMMA GRAPH TO BE PRODUCED  
C = 1 GAMMA GRAPH TO BE PRODUCED  
C IIBTS = 0 BAD POINT OPTION OFF  
C = 1 BAD POINT OPTION ON  
C IIFPT = 1 SELECT ONE POINT OPTIMISING  
C = 2 SELECT TWO POINT OPTIMISING  
C IIXOP = 0 OPTIMISING OFF  
C = 1 OPTIMISING ON (IF ALLOWED)  
C IIDIF = \*\*\* UNUSED \*\*\*  
C XTIT1 = SPECIFIC TITLE FOR COMPARATIVE GRAPH  
C IGRD1 = 10 DO NOT PUT GRAPH IN A GRIDFILE  
C = 11 PUT GRAPH IN A GRIDFILE  
C IDEF1 = 11 USE DEFAULT SCALING FOR GRAPH  
C = 10 SCALING FOR GRAPH RETURNED  
C XL1 = LOWER X FOR COMPARATIVE GRAPH  
C XU1 = UPPER X FOR COMPARATIVE GRAPH  
C YL1 = LOWER Y FOR COMPARATIVE GRAPH  
C YU1 = UPPER Y FOR COMPARATIVE GRAPH  
C XTIT2 = SPECIFIC TITLE FOR GAMMA GRAPH  
C IGRD2 = 10 DO NOT PUT GRAPH IN A GRIDFILE  
C = 11 PUT GRAPH IN A GRIDFILE  
C IDEF2 = 11 USE DEFAULT SCALING FOR GRAPH  
C = 10 SCALING FOR GRAPH RETURNED  
C XL2 = LOWER X FOR GAMMA GRAPH  
C XU2 = UPPER X FOR GAMMA GRAPH  
C YL2 = LOWER Y FOR GAMMA GRAPH  
C YU2 = UPPER Y FOR GAMMA GRAPH  
C

C  
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 C - Updated comments as part of subroutine  
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 INCLUDE 'PARAMS'

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 CHARACTER\*40            TITLE,            XTIT1,            XTIT2  
 INTEGER                IATYP,            ICT,                IETYP,            IFOUT  
 INTEGER                IFTYP,            IGRD1,            IGRD2,            IIBTS  
 INTEGER                IIDIF,            IIFPT,            IIORD,            IIXOP  
 INTEGER                IND1,            IND2,            IOTYP,            ITMAX  
 INTEGER                ITOUT,            IWRITE,            IXMAX,            IXTYP  
 REAL\*8                 ACOEFF,            APGOA (ISTDIM)  
 REAL\*8                 APOMA (ISTDIM) ,                DEXCRA (ISTDIM)  
 REAL\*8                 DIFOMA (ISTDIM) ,                EDAT (ISTDIM)  
 REAL\*8                 EI,                EIJ,                EJ  
 REAL\*8                 EXCRA (ISTDIM) ,                FIJ,                FXC2  
 REAL\*8                 FXC3,                GBARFA (ISTDIM)  
 REAL\*8                 GOA (ISTDIM) , S,                TDAT (ISTDIM)  
 REAL\*8                 TOA (ISTDIM) , WI,                WJ  
 REAL\*8                 XA (ISTDIM) ,    XDAT (ISTDIM) ,                XL1  
 REAL\*8                 XL2,                XU1,                XU2  
 REAL\*8                 YA (ISTDIM) ,    YL1,                YL2,                YU1  
 REAL\*8                 YU2,                Z,                 Z0,                ZEFF