

ADAS Subroutine spec

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      SUBROUTINE SPEC( IBSEL , IZIN , IZ0IN ,  
&                    ITVAL , TVAL , DVAL ,  
&                    WLNTH ,  
&                    PECA , LTRNG , LDRNG ,  
&                    TITLX , IRCODE  
&                    )
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C-----  
C  
C ***** FORTRAN77 SUBROUTINE: SPEC *****  
C  
C PURPOSE: TO EXTRACT AND INTERPOLATE PHOTON EMISSIVITIES FOR  
C EMITTING IONS.  
C USES THE SAME ROUTINES USED BY ADAS503, EXCEPT FOR:  
C  
C 'E3FILE' - WHICH OPENS THE REQUESTED FILE.  
C 'E3CHKB' - WHICH CHECKS INPUT VALUES ARE CONSISTENT WITH  
C THE SELECTED DATA-BLOCK 'IBSEL' AND 'IBSEL' IS  
C IN RANGE.  
C  
C THE FIRST OF THESE FUNCTIONS IS CARRIED OUT IN 'ADAS503'  
C VIA ISPF PANELS USING THE ROUTINE 'E3SPF0' - ADAS503 DOES  
C NOT REQUIRE THE ROUTINE 'E3CHKB' AS THE USER CANNOT SELECT  
C AN INVALID VALUE FOR 'IBSEL' OR 'IBSEL'/EMITTER COMBINATION  
C  
C CALLING PROGRAM: GENERAL USE  
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) WLNTH = 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
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C                                     ELECTRON DENSITY 'DVAL()' .
C                                     .FALSE. => OUTPUT 'PECA()' VALUE WAS EXTRA-
C                                     POLATED FOR THE USER ENTERED
C                                     ELECTRON DENSITY 'DVAL()' .
C                                     DIMENSION: TEMPERATURE/DENSITY PAIR INDEX
C
C OUTPUT: (C*80)  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 'IZOIN' 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 'IZOIN' ENTERED.
C                                     ('IZOMIN' <= 'IZOIN' <= 'IZOMAX')
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)  IZOMIN  = PARAMETER: MIN. ALLOWED VALUE FOR 'IZOIN'
C (I*4)  IZOMAX  = PARAMETER: MAX. ALLOWED VALUE FOR 'IZOIN'
C
C (I*4)  IZOLST  = LAST VALUE OF 'IZOIN' FOR WHICH INPUT
C                                     DATA WAS READ.
C (I*4)  IZLAST  = LAST VALUE OF 'IZIN' FOR WHICH INPUT
C                                     DATA WAS READ.
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 (I*4)  IPOS    = USED IN CONVERTING CWAVEL -> WLNTH
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
C (C*3)  EXTIN   = CURRENT ADAS SOURCE DATA FILE EXTENSION
C (C*3)  EXTLST  = ADAS SOURCE DATA FILE EXT. USED LAST TIME

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C          DATA WAS READ.
CA      (C*80)  UIDIN   = CURRENT ADAS SOURCE DATA USER ID.
CA      (C*80)  UIDLST  = ADAS SOURCE DATA USER ID USED LAST TIME
C          DATA WAS READ.
C      (C*8)   GRPIN   = CURRENT ADAS SOURCE DATA GROUPNAME
C      (C*8)   GRPLST  = ADAS SOURCE DATA GROUPNAME USED LAST TIME
C          DATA WAS READ.
CA      (C*80)  TYPIN   = ADAS DATA FILE SUBDIRECTORY (OPTIONAL)
CA      (C*80)  TYPLST  = ADAS DATA FILE SUBDIRECTORY USED LAST TIME
C          DATA WAS READ.
C      (C*11)  C11     = USED IN CONVERTING CWAVEL -> WLNTH
CA      (C*80)  DSNREQ  = NAME OF DATA SET REQUESTED
C          (MAY OR MAY NOT EXIST)
CA      (C*80)  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 -
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

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C ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
E3FILE	ADAS	OPEN DATA SET FOR SELECTED EMITTER
E3DATA	ADAS	FETCH INPUT DATA FROM SELECTED DATA SET
E3CHKB	ADAS	CHECK VALIDITY OF ION AND 'IBSEL'
E3SPLN	ADAS	INTERPOLATE DATA WITH TWO WAY SPLINES

C E3TITL ADAS CREATE DESCRIPTIVE TITLE FOR OUTPUT
C XXUID ADAS FETCHES/SETS ADAS SOURCE DATA USER ID
C XXSPEC ADAS FETCHES/SETS ADAS SOURCE DATA FILE NAME+
C
C AUTHOR: H. P. SUMMERS
C K1/1/57
C JET EXT. 4941
C
C DATE: 11/10/91
C
C UPDATE: 05/12/91 - PE BRIDEN: 'NSTORE' INCREASED FROM 10 TO 100
C
C UPDATE: 28/02/92 - PE BRIDEN: 'NSTORE' INCREASED FROM 100 TO 150
C
C UPDATE: 10/03/93 - PE BRIDEN: INTRODUCED CALL TO XXUID TO ESTABLISH
C IF USERID OF INPUT DATASET CHANGES
C BETWEEN CALLS.
C SAVE NAME OF LAST READ DATASET.
C (ADDED VARIABLES UIDIN,UIDLST,DSNREQ)
C
C UPDATE: 2/09/93 - HPS : INTRODUCED CALL TO XXSPEC TO ESTABLISH
C IF USRGRP, USRTYP AND USREXT OF INPUT
C DATASET CHANGES BETWEEN CALLS.
C SAVE NAME OF LAST READ DATASET.
C (ADDED VARIABLES GRPIN,GRPLST,TYPIN,
C TYPLST, EXTIN, EXTLST)
C
C UPDATE: 6/05/94 - PEB : INCREASED PARAMETER NSTORE 150 -> 350
C
C UPDATE: 3/11/94 - L.JALOTA : CHANGED DSNAME, UIDIN SIZE TO 80 CHARS.
C UPDATE: 23/11/94 - L.JALOTA : TIDIED UP STRING LENGTH DEFINITIONS
C
C VERSION: 1.1 DATE: 25-05-95
C MODIFIED: TIM HAMMOND
C - PUT UNDER S.C.C.S. CONTROL
C
C VERSION: 1.2 DATE: 22-04-96
C MODIFIED: TIM HAMMOND/PAUL BRIDEN
C - INCREASED PARAMETERS: NSTORE: 350 -> 500
C NDDIM: 20 -> 26
C NTDIM: 20 -> 35
C - MODIFIED CONVERSION OF CWAVEL->WLNTH
C (ADDED VARIABLES C11 AND IPOS)
C
C VERSION: 1.3 DATE: 20-09-99
C MODIFIED: RICHARD MARTIN
C INCREASED TITLX TO CHAR*120
C
C-----
C-----
C
C-----
C

CHARACTER*120 TITLX

INTEGER	IBSEL,	IRCODE,	ITVAL,	IZ0IN
INTEGER	IZIN			
LOGICAL	LDRNG(ITVAL),		LTRNG(ITVAL)	
REAL*8	DVAL(ITVAL),	PECA(ITVAL),	TVAL(ITVAL),	WLNTH