

ADAS Subroutine h9ttyp

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SUBROUTINE H9TTYP ( NDLEV , NDMET , NDTRN , NPLR , NPLI ,
&                  ITRAN , TCODE , I1A , I2A , AVAL ,
& IADFTYP,
&                  ICNTE , ICNTP , ICNTR , ICNTH , ICNTI ,
&                  ICNTL , ICNTS ,
&                  IETRN , IPTRN , IRTRN , IHTRN , IITRN ,
&                  ILTRN , ISTRN ,
&
&                  IE1A , IE2A , AA ,
&                  IP1A , IP2A ,
&                  IA1A , IA2A , AUGA ,
&                  IL1A , IL2A , WVLA ,
&                  IS1A , IS2A , LSS04A
&                  )

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C
C *****
C ***** FORTRAN77 SUBROUTINE: BXTTYP *****
C *****
C PURPOSE: TO SORT TRANSITION ARRAYS INTO SEVEN TRANSITION/RECOMB TYPES
C
C CALLING PROGRAM: General
C
C SUBROUTINE:
C
C INPUT : (I*4) NDLEV = MAXIMUM NUMBER OF LEVELS THAT CAN BE READ
C INPUT : (I*4) NDMET = MAXIMUM NUMBER OF METASTABLES
C INPUT : (I*4) NDTRN = MAXIMUM NUMBER OF TRANS. THAT CAN BE READ
C
C OUTPUT: (I*4) NPLR = NO. OF ACTIVE METASTABLES OF (Z+1) ION
C OUTPUT: (I*4) NPLI = NO. OF ACTIVE METASTABLES OF (Z-1) ION
C
C INPUT : (I*4) ITRAN = INPUT DATA FILE: NUMBER OF TRANSITIONS
C INPUT : (C*1) TCODE() = TRANSITION: DATA TYPE POINTER:
C ' ','1','2','3' => Electron Impact Transition
C 'P','p' => Proton Impact Transition
C 'H','h' => Charge Exchange Recombination
C 'R','r' => Free Electron Recombination
C 'I','i' => Electron Impact Ionisation to z
C 'L','l' => Satellites from DR Recombination
C 'S','s' => Electron Impact Ionisation to z+1
C INPUT : (I*4) I1A() = TRANSITION:
C LOWER ENERGY LEVEL INDEX (CASE ' ' & 'P')
C PARENT ENERGY LEVEL INDEX(CASE 'H' & 'R')
C ( & 'L')
C FINAL PARENT LEVEL INDEX (CASE 'S')
C INPUT : (I*4) I2A() = TRANSITION:
C UPPER ENERGY LEVEL INDEX (CASE ' ' & 'P')
C CAPTURING LEVEL INDEX (CASE 'H' & 'R')
C ( & 'L')
C IONISING LEVEL INDEX (CASE 'S')
C INPUT : (R*8) AVAL() = TRANSITION:
C A-VALUE (SEC-1) (CASE ' ')
C NEUTRAL BEAM ENERGY (CASE 'H')

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C AUGER VALUE (SEC-1) (CASE 'R')
C PARENT WAVLENGTH (A) (CASE 'L')
C NOT USED (CASE 'P' & 'S')
C
C OUTPUT: (I*4) ICNTE = NUMBER OF ELECTRON IMPACT TRANSITIONS INPUT
C OUTPUT: (I*4) ICNTP = NUMBER OF PROTON IMPACT TRANSITIONS INPUT
C OUTPUT: (I*4) ICNTR = NUMBER OF FREE ELECTRON RECOMBINATIONS INPUT
C OUTPUT: (I*4) ICNTH = NO. OF CHARGE EXCHANGE RECOMBINATIONS INPUT
C OUTPUT: (I*4) ICNTI = NO. OF IONISATIONS TO Z INPUT
C OUTPUT: (I*4) ICNTL = NO. OF SATELLITE DR RECOMBINATIONS INPUT
C OUTPUT: (I*4) ICNTS = NO. OF IONISATIONS TO Z+1 INPUT
C
C OUTPUT: (I*4) IETRN() = ELECTRON IMPACT TRANSITION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT ELECTRON IMPACT TRANSITIONS.
C OUTPUT: (I*4) IPTRN() = PROTON IMPACT TRANSITION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT PROTON IMPACT TRANSITIONS.
C OUTPUT: (I*4) IRTRN() = FREE ELECTRON RECOMBINATION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT FREE ELECTRON RECOMBINATIONS.
C OUTPUT: (I*4) IHTRN() = CHARGE EXCHANGE RECOMBINATION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT CHARGE EXCHANGE RECOMBINATIONS.
C OUTPUT: (I*4) IITRN() = ELECTRON IMPACT IONISATION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT IONISATIONS FROM LOWER STAGE ION.
C OUTPUT: (I*4) ILTRN() = SATELLITE DR RECOMBINATION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT SATELLITE DR RECOMBINATIONS.
C OUTPUT: (I*4) ISTRN() = ELECTRON IMPACT IONISATION:
C INDEX VALUES IN MAIN TRANSITION ARRAYS WHICH
C REPRESENT IONISATIONS TO UPPER STAGE ION.
C
C OUTPUT: (I*4) IE1A() = ELECTRON IMPACT TRANSITION:
C LOWER ENERGY LEVEL INDEX
C OUTPUT: (I*4) IE2A() = ELECTRON IMPACT TRANSITION:
C UPPER ENERGY LEVEL INDEX
C OUTPUT: (R*8) AA() = ELECTRON IMPACT TRANSITION: A-VALUE (SEC-1)
C
C
C OUTPUT: (I*4) IP1A() = PROTON IMPACT TRANSITION:
C LOWER ENERGY LEVEL INDEX
C OUTPUT: (I*4) IP2A() = PROTON IMPACT TRANSITION:
C UPPER ENERGY LEVEL INDEX
C
C OUTPUT: (I*4) IA1A() = AUGER TRANSITION:
C PARENT ENERGY LEVEL INDEX
C OUTPUT: (I*4) IA2A() = AUGER TRANSITION:
C RECOMBINED ION ENERGY LEVEL INDEX
C OUTPUT: (R*8) AUGA() = AUGER TRANSITION: AUG-VALUE (SEC-1)
C RECOMBINED ION ENERGY LEVEL INDEX
C OUTPUT: (I*4) IL1A() = SATELLITE DR TRANSITION:

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C                                     RECOMBINING ION INDEX
C OUTPUT: (I*4)  IL2A()  = SATELLITE DR TRANSITION:
C                                     RECOMBINED ION INDEX
C OUTPUT: (R*8)  WVLA()  = SATELLITE DR TRANSITION: PARENT WVLGTH.(A)
C                                     DR SATELLITE LINE INDEX
C OUTPUT: (I*4)  IS1A()  = IONISING TRANSITION:
C                                     IONISED ION INDEX
C OUTPUT: (I*4)  IS2A()  = IONISING TRANSITION:
C                                     IONISING ION INDEX
C OUTPUT: (L*4)  LSS04A(,)= .TRUE. => IONIS. RATE SET IN ADF04 FILE:
C                                     .FALSE.=> NOT SET IN ADF04 FILE
C                                     1ST DIM: LEVEL INDEX
C                                     2ND DIM: PARENT METASTABLE INDEX
C
C          (I*4)  I          = GENERAL USE.
C
C
C ROUTINES: NONE
C
C AUTHOR:  HP SUMMERS (REVISION OF BXTTYP BY PE BRIDEN)
C          K1/1/57
C          JET EXT. 4941
C
C DATE   : 11/06/92
C
C-----
C PUT UNDER SCCS CONTROL:
C
C VERSION: 1.1 DATE: 10/05/96
C MODIFIED: WILLIAM OSBORN (TESSELLA SUPPORT SERVICES PLC)
C          - FIRST PUT UNDER SCCS
C
C VERSION: 1.2 DATE: 13/09/99
C MODIFIED: HUGH SUMMERS, UNIVERSITY OF STRATHCLYDE
C          - ADDED DETECTION OF L-LINES AND S-LINES
C
C-----
C
C VERSION: 1.2 DATE: 01/05/2003
C MODIFIED: Martin O'Mullane
C          - Replaced original bxttyp with b8ttyp version 1.2.
C Hence the 1.2 version no.
C
C-----
C
C VERSION: 1.3 DATE: 27/11/03
C MODIFIED: Paul Bryans, University of Strathclyde
C          - allow lower case values of tcode and different types of
C            electron impact excitation (i.e. ' ', '1', '2', '3')
C          - fix number of electron impact transitions for adf04 iv
C
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C VERSION: 1.4 DATE: 26/11/04

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C MODIFIED: Allan Whiteford, University of Strathclyde

C - Renamed to h9ttyp.

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CHARACTER	TCODE (NDTRN)			
INTEGER	I1A (NDTRN) ,	I2A (NDTRN) ,	IA1A (NDTRN)	
INTEGER	IA2A (NDTRN) ,	IADFTYP ,	ICNTE ,	ICNTH
INTEGER	ICNTI ,	ICNTL ,	ICNTP ,	ICNTR
INTEGER	ICNTS ,	IE1A (NDTRN) ,	IE2A (NDTRN)	
INTEGER	IETR (NDTRN) ,		IHTR (NDTRN)	
INTEGER	IITR (NDTRN) ,		IL1A (NDLEV)	
INTEGER	IL2A (NDLEV) ,	ILTR (NDTRN)		
INTEGER	IP1A (NDTRN) ,	IP2A (NDTRN) ,	IPTR (NDTRN)	
INTEGER	IRTR (NDTRN) ,		IS1A (NDLEV)	
INTEGER	IS2A (NDLEV) ,	ISTR (NDTRN) ,		ITRAN
INTEGER	NDLEV ,	NDMET ,	NDTRN ,	NPLI
INTEGER	NPLR			
LOGICAL	LSS04A (NDLEV ,	NDMET)		
REAL*8	AA (NDTRN) ,	AUGA (NDTRN) ,	AVAL (NDTRN)	
REAL*8	WVLA (NDLEV)			