

ADAS Subroutine nsuph1

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      SUBROUTINE NSUPH1 (TEV, EBEAM, TIEV, NIMP , ZIMPA , FRIMPA, AMIMPA,
&                      ITYP1 , ITYP2 , ITYP3 , ITYP4 , ITYP5 , ITYP6 ,
&                      XTBE , XTBP , XTBZ , STBE , STBP , STBZ ,
&                      LXTBE , LXTBP , LXTBZ , LSTBE , LSTBP , LSTBZ ,
&                      PXTBE , PXTBP , PXTBZ , PSTBE , PSTBP , PSTBZ ,
&                      LPXTBE, LPXTBP, LPXTBZ, LPSTBE, LPSTBP, LPSTBZ,
&                      DSLPATH)
C
C      IMPLICIT REAL*8 (A-H, O-Z)
C
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C
C ***** FORTRAN77 SUBROUTINE: NSUPH1 *****
C-----
C  PURPOSE: ACCESS SPECIFIC HIGHER QUALITY DATA FOR HYDROGEN
C
C  POPULATION STRUCTURE CALCULATION IN THE BUNDLE-N APPROXIMATION.
C
C  DATA TYPES ARE:
C
C      (1) ELECTRON IMPACT EXCITATION - SPECIFIC ION FILE IS OPENED.
C      (2) ELECTRON IMPACT IONISATION - SPECIFIC FIT IS USED.
C      (3) H+ IMPACT EXCITATION - QHIEXDAT FILE IS OPENED.
C      (4) H+ IMPACT IONIS + CX - QHIEXDAT FILE IS OPENED.
C      (5) ZIMP ION IMPACT EXCITATION - QHIEXDAT FILE IS OPENED.
C      (6) ZIMP ION IMPACT IONIS + CX - QHIEXDAT FILE IS OPENED.
C
C  INPUT
C      TEV      = ELECTRON TEMPERATURE (EV)
C      EBEAM    = BEAM ENERGY (EV/AMU) USED AS A UNIFORM VELOCITY SHIFT
C                FOR ION COLLISIONS
C      TIEV     = ION TEMPERATURE (EV)
C      NIMP     = NUMBER OF IMPURITY IONS (EXCLUDING H+)
C      ZIMPA()  = Z OF EFFECTIVE IMPURITY FOR ION COLLISIONS (EXCEPT H+)
C      FRIMPA() = FRACTION OF TOTAL IMPURITY NUMBER DENSITY (EXCL H+)
C      AMIMPA() = ATOMIC MASS NUMBER OF IMPURITY
C      ITYP1    = 0 DO NOT OBTAIN TYPE 1 DATA
C                = 1 OBTAIN TYPE 1 DATA
C      ITYP2    = 0 DO NOT OBTAIN TYPE 2 DATA
C                = 1 OBTAIN TYPE 2 DATA
C      ITYP3    = 0 DO NOT OBTAIN TYPE 3 DATA
C                = 1 OBTAIN TYPE 3 DATA
C      ITYP4    = 0 DO NOT OBTAIN TYPE 4 DATA
C                = 1 OBTAIN TYPE 1 DATA
C      ITYP5    = 0 DO NOT OBTAIN TYPE 5 DATA
C                = 1 OBTAIN TYPE 2 DATA
C      ITYP6    = 0 DO NOT OBTAIN TYPE 6 DATA
C                = 1 OBTAIN TYPE 3 DATA
C      DSLPATH  = STRING CONTAINING PATH FOR INPUT FILE FOR UNIT 15
C
C  OUTPUT
C      XTBE(N, N'') = TYPE 1 RATE COEFFICIENT
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C XTBP (N,N'') = TYPE 3 RATE COEFFICIENT
 C XTBZ (N,N'') = TYPE 5 RATE COEFFICIENT
 C STBE (N) = TYPE 2 RATE COEFFICIENT
 C STBP (N) = TYPE 4 RATE COEFFICIENT
 C STBZ (N) = TYPE 6 RATE COEFFICIENT
 C LXTBE (N,N'') = TYPE 1 MARKER (0 =NO VALUE, 1=VALUE)
 C LXTBP (N,N'') = TYPE 3 MARKER
 C LXTBZ (N,N'') = TYPE 5 MARKER
 C LSTBE (N) = TYPE 2 MARKER
 C LSTBP (N) = TYPE 4 MARKER
 C LSTBZ (N) = TYPE 6 MARKER
 C PXTBE (N) = TYPE 1 PROJECTION MULTIPLIER
 C PXTBP (N) = TYPE 3 PROJECTION MULTIPLIER
 C PXTBZ (N) = TYPE 5 PROJECTION MULTIPLIER
 C PSTBE = TYPE 2 PROJECTION MULTIPLIER
 C PSTBP = TYPE 4 PROJECTION MULTIPLIER
 C PSTBZ = TYPE 6 PROJECTION MULTIPLIER
 C LPXTBE (N) = TYPE 1 PROJECTION MULTIPLIER USED ABOVE THIS N'
 C LPXTBP (N) = TYPE 3 PROJECTION MULTIPLIER USED ABOVE THIS N'
 C LPXTBZ (N) = TYPE 5 PROJECTION MULTIPLIER USED ABOVE THIS N'
 C LPSTBE = TYPE 2 PROJECTION MULTIPLIER USED ABOVE THIS N
 C LPSTBP = TYPE 4 PROJECTION MULTIPLIER USED ABOVE THIS N
 C LPSTBZ = TYPE 6 PROJECTION MULTIPLIER USED ABOVE THIS N

C ***** H.P. SUMMERS, JET 9 MAY 1990 *****
 C ***** 20 JUL 1990 *****
 C ***** 13 AUG 1990 *****
 C ***** NEW ELECTRON EXCIT. DATA 22 JAN 1991 *****
 C ***** NEW ION IMPACT EXCIT. DATA 3 JUL 1991 *****
 C ***** NEW ELEC. IMPACT ION. DATA 3 JUL 1991 *****
 C ***** DATA EXTENSION BY ADDING 1 MAR 1992 *****
 C SOME INTERMEDIATE VALUES +
 C ADDITION OF B, N, NE ION. +
 C CHARGE EXCHANGE.
 C ***** MULTIPLE, SIMULTANEOUS 11 JAN 1994 *****
 C IMPURITY EXTENSION
 C ERROR CORRECTED IN IMPURITY
 C REDUCED MASSES

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 C
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 C
 C UPDATE: 19/01/94 - JONATHAN NASH - TESSELLA SUPPORT SERVICES PLC

C THE FOLLOWING MODIFICATIONS HAVE BEEN MADE TO THE SUBROUTINE:

- 1) A PARAMETER FLAG HAS BEEN ADDED TO SWITCH ON/OFF
 C DIAGNOSTIC PRINTING (UNIT 6).

C NOTES: NO ATTEMPT HAS BEEN MADE TO RESTRUCTURE THE ROUTINE. RATHER
 C THE MINIMUM AMOUNT OF WORK TO INTEGRATE THE ROUTINE INTO
 C ADAS310 HAS BEEN COMPLETED.
 C

C UNIX-IDL PORT:
C
C VERSION: 1.1 DATE: 16-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - FIRST VERSION
C
C VERSION: 1.2 DATE: 18-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - ADDED VARIABLE DSLPATH AND CHANGED NAME OF INPUT FILE
C
C VERSION: 1.3 DATE: 18-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - CORRECTED STRING HANDLING SYNTAX IN CONSTRUCTION OF
C DSNAME, COMMENTED OUT REFERENCES TO DEBUG LOGICAL
C VARIABLE AND INSERTED 'CALL' BEFORE XXSLEN.
C
C VERSION: 1.4 DATE: 18-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - MODIFIED CONSTRUCTION OF DSNAME
C
C VERSION: 1.5 DATE: 18-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - ADDED DSLPATH IN CALL TO QH.FOR
C
C VERSION: 1.6 DATE: 22-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - REPLACED CALLS TO NAG ROUTINE E02BBF WITH ADAS ROUTINE
C DXNBBF
C
C VERSION: 1.7 DATE: 23-1-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - REPLACED CALLS TO NAG ROUTINE E01BAF WITH ADAS ROUTINE
C DXNBAF
C
C VERSION: 1.8 DATE: 08-02-96
C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
C - REMOVED SUPERFLUOUS VARIABLES
C
C VERSION: 1.9 DATE: 03-04-97
C MODIFIED: H.ANDERSON
C - ALTERED TO USE RESTRUCTURED ADF02 DATASET sia#h_rfm.dat
C
C VERSION: 1.10 DATE: 03/04/97
C MODIFIED: HARVEY ANDERSON.
C ALTERED TO USE NEW PREFERRED ADF02 DATASET sia#h_j97.dat
C
C VERSION: 1.11 DATE: 08-04-97
C MODIFIED: RICHARD MARTIN
C CHANGED NAME OF ADF02 FILE FROM sia#h_j97.dat TO
C sia#h_j97#h.dat
C
C VERSION: 1.12 DATE: 23-02-99
C MODIFIED: HARVEY ANDERSON

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C      ADDED ADDITIONAL CODE TO ACCESS THE FUNDAMENTAL DATA
C      FOR ARGON WHICH IS CONTAINED IN THE ADF02 TYPE FILE.
C
C
C      VERSION : 1.13                      DATE: 20-10-2003
C      MODIFIED: Martin O'Mullane
C              - Extend TITLX to 120 to match e2titl routine.
C
C      VERSION: 1.14 DATE: 07-07-2004
C      MODIFIED: Allan Whiteford
C              - Changed calls from DXNB{A,B}F TO XXNB{A,B}F
C
C      VERSION: 1.15 DATE: 07-07-2004
C      MODIFIED: Allan Whiteford
C              - Updated comments as part of subroutine documentation
C                procedure.

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C
C      PARAM : (L*4)  DEBUG      = FLAGS DIAGNOSTIC PRINTING.
C                          .TRUE. => PRINT DIAGNOSTICS.
C                          .FALSE. => DO NOT PRINT DIAGNOSTICS.
C
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C
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LOGICAL	DEBUG				
CHARACTER*80		DSLPATH			
INTEGER		ITYP1,	ITYP2,	ITYP3,	ITYP4
INTEGER		ITYP5,	ITYP6,	LPSTBE,	LPSTBP
INTEGER		LPSTBZ,	LPXTBE (NDLOW)		
INTEGER		LPXTBP (NDLOW) ,		LPXTBZ (NDLOW)	
INTEGER		LSTBE (NDLOW) ,		LSTBP (NDLOW)	
INTEGER		LSTBZ (NDLOW) ,		LXTBE (NDLOW, NDLOW)	
INTEGER		LXTBP (NDLOW, NDLOW) ,		LXTBZ (NDLOW, NDLOW)	
INTEGER		NIMP			
REAL*8		AMIMPA (10) ,	EBEAM,	FRIMPA (10) ,	PSTBE
REAL*8		PSTBP,	PSTBZ,	PXTBE (NDLOW)	
REAL*8		PXTBP (NDLOW) ,		PXTBZ (NDLOW)	
REAL*8		STBE (NDLOW) ,	STBP (NDLOW) ,	STBZ (NDLOW) ,	TEV
REAL*8		TIEV,	XTBE (NDLOW, NDLOW)		
REAL*8		XTBP (NDLOW, NDLOW) ,		XTBZ (NDLOW, NDLOW)	
REAL*8		ZIMPA (10)			