

# ADAS Subroutine supphe1

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SUBROUTINE SUPPHE1 (TEV,EBEAM,TIEV,NIMP,ZIMPA,FRIMPA, AMIMPA,  
& DSLPATH )  
IMPLICIT REAL*8 (A-H,O-Z)
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C  
C ***** FORTRAN 77 ROUTINE : SUPPHE1.F *****  
C  
C PURPOSE : ACCESS FUNDAMENTAL CROSS SECTION DATA FOR THE  
C           BUNDLED NL CALCULATION.  
C  
C INPUT  :  
C  
C (R*8)  TEV           : ELECTRON TEMPERATURE (eV)  
C (R*8)  EBEAM        : NEUTRAL BEAM ENERGY (eV/AMU)  
C (R*8)  TIEV         : ION TEMPERATURE (eV)  
C (R*8)  ZIMP         : Z OF EFFECTIVE IMPURITY FOR ION  
C                   COLLISIONS ( EXC H+ ).  
C (I*4)  ITYP1        : 1 OBTAIN ELECTRON IMPACT EXCITATION  
C                   DATA FROM SPECIFIC ION FILE.  
C                   0 DO NOT OBTAIN ELECTRON IMPACT  
C                   EXCITATION DATA FROM SPECIFIC ION.  
C (I*4)  ITYP2        : 1 OBTAIN ELECTRON IMPACT IONISATION  
C                   DATA FROM SZD TYPE FILE.  
C                   0 DO NOT OBTAIN ELECTRON IMPACT  
C                   IONISATION DATA FROM SZD FILE.  
C (I*4)  ITYP3        : 1 OBTAIN H+ IMPACT EXCITATION  
C                   DATA FROM ADF02 TYPE FILE.  
C                   0 DO NOT OBTAIN H+ IMPACT EXCITATION  
C                   DATA FROM ADF02 TYPE FILE.  
C (I*4)  ITYP4        : 1 OBTAIN H+ IMPACT IONISATION AND  
C                   CHARGE EXCHANGE FROM ADF02 TYPE FILE.  
C                   0 DO NOT OBTAIN H+ IMPACT IONISATION  
C                   AND CHARGE EXCHANGE FROM ADF02 TYPE FILE.  
C (I*4)  ITYP5        : 1 OBTAIN ZIMP ION IMPACT EXCITATION FROM  
C                   ADF02 TYPE FILE.  
C                   0 DO NOT OBTAIN ZIMP ION IMPACT EXCITATION  
C                   FROM ADF02 TYPE FILE.  
C (I*4)  ITYP6        : 1 OBTAIN ZIMP ION IMPACT IONISATION AND  
C                   CHARGE EXCHANGE FROM ADF02 TYPE FILE.  
C                   0 DO NOT OBTAIN ZIMP ION IMPACT IONISATION  
C                   AND CHARGE EXCHANGE FROM ADF02 TYPE FILE.  
C (CHR)  DSLPATH      : CHARACTER STRING CONTAINING THE USER NAME.  
C                   INFORMATION REQUIRED TO OPEN UP LOW LEVEL  
C                   DATA FILES (OBTAINED FROM IDL).  
C (C*120) TITLX       : CHARACTER STRING SPECIFYING THE SOURCE  
C                   OF IONISATION DATA  
C  
C OUTPUT  :  
C  
C (I*4)  NSYS         : NUMBER OF SPIN SYSTEMS (=2)  
C (I*4)  ISYSA(IS)    : MULTIPLICITY OF SPIN SYSTEM  
C (I*4)  NNA(IR)      : N-SHELL FOR COPDAT FILE LEVEL INDEX IR
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C (I\*4) ISA (IR) : MULTIPLICITY  
 C (I\*4) ILA (IR) : TOTAL ORBITAL ANGULAR MOMENTUM  
 C (R\*8) WTA (IR) : STATISTICAL WEIGHT  
 C (R\*8) ATBE (IR, IR'' ) : EINSTEIN A-COEFFICIENT  
 C (R\*8) XTBE (IR, IR'' ) : ELECTRON IMPACT EXCITATION RATE COEFFICIENT.  
 C (I\*4) LXTBE (IR, IR'' ) : ELECTRON IMPACT EXCITATION TYPE MARKER  
 C (0 =NO VALUE, 1=VALUE)  
 C (R\*8) XTBP (I, I'' , IS) : H+ IMPACT EXCITATION RATE COEFFICIENT.  
 C (R\*8) XTBPZ (I, I'' , IS) : ZIMP ION IMPACT EXCITATION RATE COEFFICIENT  
 C (R\*8) STBE (I, IS) : ELECTRON IMPACT IONISATION RATE COEFFICIENT  
 C (R\*8) STBP (I, IS) : H+ ION IMPACT IONISATION AND CHARGE  
 C EXCHANGE RATE COEFFICIENT.  
 C (R\*8) STBPZ (I, IS) : ZIMP ION IMPACT IONISATION AND CHARGE  
 C EXCHANGE RATE COEFFICIENT  
 C (I\*4) LXTBP (I, I'' , IS) : H+ IMPACT EXCITATION TYPE MARKER  
 C (0 =NO VALUE, 1=VALUE)  
 C (I\*4) LXTBPZ (I, I'' , IS) : ZIMP ION IMPACT EXCITATION TYPE MARKER  
 C (I\*4) LSTBE (I, IS) : ELECTRON IMPACT IONISATION TYPE MARKER  
 C (I\*4) LSTBP (I, IS) : H+ IMPACT IONISATION & CHARGE EXCHANGE  
 C TYPE MARKER  
 C (I\*4) LSTBPZ (I, IS) : ZIMP ION IMPACT IONISATION AND CHARGE EXCHANGE  
 C TYPE MARKER  
 C (R\*8) PXTBP (I, IS) : H+ IMPACT EXCITATION TYPE PROJECTION MULTIPLIER  
 C (R\*8) PXTBPZ (I, IS) : ZIMP ION IMPACT EXCITATION TYPE PROJECTION  
 C MULTIPLIER  
 C (R\*8) PSTBE (IS) : ELECTRON IMPACT IONISATION TYPE PROJECTION  
 C MULTIPLIER  
 C (R\*8) PSTBP (IS) : H+ IONISATION & CHARGE EXCHANGE TYPE  
 C PROJECTION MULTIPLIER  
 C (R\*8) PSTBPZ (IS) : ZIMP ION IMPACT IONISATION AND CHARGE EXCHANGE  
 C TYPE PROJECTION MULTIPLIER  
 C (I\*4) LPXTBP (I, IS) : H+ IMPACT EXCITATION TYPE PROJECTION MULTIPLIER  
 C USED ABOVE THIS N'  
 C (I\*4) LPXTBPZ (I, IS) : ZIMP ION IMPACT EXCITATION TYPE 5 PROJECTION  
 C MULTIPLIER USED ABOVE THIS N'  
 C (I\*4) LPSTBP (IS) : H+ IMPACT IONISATION & CHARGE EXCHANGE TYPE  
 C PROJECTION MULTIPLIER USED ABOVE THIS N  
 C (I\*4) LPSTBPZ (IS) : ZIMP ION IMPACT IONISATION AND CHARGE EXCHANGE  
 C TYPE PROJECTION MULTIPLIER USED ABOVE THIS N

ROUTINES:

| ROUTINE | SOURCE | DESCRIPTION   |
|---------|--------|---|
| XXSLEN  | ADAS   | IDENTIFY THE FIRST & LAST NON-BLANK CHARACTER IN A STRING.                        |
| XXWORD  | ADAS   | MANIPULATES STRINGS.  |
| SZD     | ADAS   | RETURNS ELECTRON IMPACT IONISATION RATES WHICH ARE OBTAINED FROM ADF07 TYPE FILE. |
| QHE     | ADAS   | RETURNS BEAM/THERMAL MAXWELL  |

AVERAGED RATE COEFFICIENTS.

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DATE : 26/11/97

MODIFICATIONS : REPLACED NAG ROUTINES WITH THE NEAR  
ADAS EQUIVALENT ROUTINES.  
HARVEY ANDERSON  
DATE : 10/3/99

VERSION: 1.2 DATE: 15-10-99  
MODIFIED: RICHARD MARTIN  
REMOVED 'ACTION' FROM OPEN STATEMENT.

VERSION: 1.3 DATE: 07-07-2004  
MODIFIED: ALLAN WHITEFORD  
-CHANGED CALLS FROM DXNB{A,B}F TO XXNB{A,B}F

VERSION: 1.4 DATE: 04-11-2004  
MODIFIED: ALLAN WHITEFORD  
-ADDED DECLARATION OF TITLX VARIABLE

VERSION : 1.5  
DATE : 22-02-2005  
MODIFIED: Martin O'Mullane  
- Declare ltrng as a logical.  
- Replace TITLF with DSLPATH in calls to qhe for  
itypes 4 and 5.

VERSION : 1.6  
DATE : 16-05-07  
MODIFIED: Allan Whiteford  
- Moved parameter statement to below comment block  
as part of subroutine documentation procedure.

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CHARACTER\*80 DSLPATH  
INTEGER NIMP  
REAL\*8 AMIMPA(10), EBEAM, FRIMPA(10), TEV  
REAL\*8 TIEV, ZIMPA(10)