

ADAS Subroutine dhdata

```
      SUBROUTINE DHDATA( YEAR      , YEARDF , TITLE  , IFAIL
&          , IZ0      , IZ1      , ICLASS , ITMAX  , IEVCUT
&          , ITDIMD  , ITMAXD  , IDMAXD  , IZMAXD
&          , DTEV    , DDENS
&          , DTEVD   , DDENSD  , DRCOFD  , ZDATA
&          , DRCOFI
&          )
C
C-----
C ***** FORTRAN77 SUBROUTINE: DHDATA *****
C
C PURPOSE : TO EXTRACT 'SANCO' COLLISIONAL DIELECTRONIC DATA
C
C CALLING PROGRAM: IONBAL (ADAS412)
C
C NOTE    : THE SOURCE DATA IS CONTAINED AS SEQUENTIAL DATASETS
C           AS FOLLOWS:
C
C           (1) JETSHP.ACD<YR>#<IEL>.DATA
C           (2) JETSHP.SCD<YR>#<IEL>.DATA
C           (3) JETSHP.CCD<YR>#<IEL>.DATA
C           (4) JETSHP.PR<YR>#<IEL>.EV<CUT>.DATA
C           (5) JETSHP.PLT<YR>#<IEL>.EV<CUT>.DATA
C           (6) JETSHP.PRC<YR>#<IEL>.EV<CUT>.DATA
C           (7) JETSHP.PLS<YR>#<IEL>.DATA
C
C           WHERE, <YR> = TWO INTEGERS FOR THE YEAR SELECTED
C                   <IEL> = ELEMENT NAME
C                   <CUT> = ENERGY CUT-OFF (EV)
C
C                   IF <CUT> = 0 THEN .EV<CUT> IS DELETED FROM ABOVE FILES.
C#
C# mar20-95 Alessandro Lanzafame
C#           conversion to Unix
C#
C#           (1) /ADAS/adas/adf11/acd<YR>/acd<YR>_<IEL>.dat
C#           (2) /ADAS/adas/adf11/scd<YR>/scd<YR>_<IEL>.dat
C#           (3) /ADAS/adas/adf11/ccd<YR>/ccd<YR>_<IEL>.dat
C#           (4) /ADAS/adas/adf11/prb<YR>/prb<YR>_<IEL>.dat
C#           (5) /ADAS/adas/adf11/plt<YR>/plt<YR>_<IEL>.dat
C#           (6) /ADAS/adas/adf11/prc<YR>/prc<YR>_<IEL>.dat
C#           (7) /ADAS/adas/adf11/pls<YR>/pls<YR>_<IEL>.dat
C#
C INPUT  : (C*2) YEAR      = YEAR OF DATA
C          (C*2) YEARDF   = DEFAULT YEAR OF DATA IF REQUESTED YEAR
C                   DOES NOT EXIST
C          (I*4) IZ0      = NUCLEAR CHARGE
C          (I*4) IZ1      = MINIMUM ION CHARGE + 1
C          (I*4) ICLASS   = CLASS OF DATA (1 - 6)
C          (I*4) ITMAX    = NUMBER OF ( DTEV() , DDENS() ) PAIRS
C          (I*4) IEVCUT   = ENERGY CUT-OFF (EV)
```

```

C          (R*8)  DTEV()    = DLOG10(ELECTRON TEMPERATURES (EV))
C          (R*8)  DDENS()  = DLOG10(ELECTRON DENSITIES (CM-3))
C
C OUTPUT : (C*80)  TITLF    = INFORMATION STRING
C          (I*4)  ITDIMD   = MAXIMUM NUMBER OF DATA TEMP & DENS
C          (I*4)  ITMAXD   = NUMBER OF DATA DTEVD()
C          (I*4)  IDMAXD   = NUMBER OF DATA DDENS()
C          (I*4)  IZMAXD   = NUMBER OF DATA ZDATA()
C          (I*4)  ITDIMD   = MAXIMUM NUMBER OF DATA TEMP & DENS
C          (I*4)  ZDATA()  = Z1 CHARGES IN DATASET
C          (I*4)  IFAIL    = 0      IF ROUTINE SUCCESSFUL
C                          = 1      IF ROUTINE OPEN STATEMENT FAILED
C          (R*8)  DTEVD()  = DLOG10(DATA ELECTRON TEMPERATURES (EV))
C          (R*8)  DDENSD() = DLOG10(DATA ELECTRON DENSITIES (CM-3))
C          (R*8)  DRCOFD() = DLOG10(DATA RATE COEFFICIENTS (CM-3/S))
C          (R*8)  DRCOFI() = INTERPOLATION OF DRCOFD(,,) FOR
C                          DTEV() & DDENS()
C
C PROGRAM: (C*2)  SEQUA()  = ION NAMES FOR A PARTICULAR IZ0
C          (C*36) DSNAME   = FILE NAME ( SEE ABOVE TYPES )
C          (C*80) STRING   = GENERAL VARIABLE
C          (C*80) BLANK    = BLANK STRING
C          (C*2)  YEARSV   = LAST YEAR USED IN THIS ROUTINE
C          (I*4)  IREAD    = INPUT STREAM FOR OPEN STATEMENT
C          (I*4)  IZOSV    = LAST IZ0 USED IN THIS ROUTINE
C          (I*4)  ICLSV    = LAST ICLASS USED IN THIS ROUTINE
C          (I*4)  INDXZ1   = LOCATION OF IZ1 IN ZDATA()
C          (I*4)  LCK      = MUST BE GREATER THAN 'ITMAXD' & 'IDMAXD'
C                          & 'ITMAX' - ARRAY SIZE FOR SPLINE CALCS.
C          (R*8)  A()      = GENERAL ARRAY
C          (R*8)  DRCOF0(,) = INTERPOLATION OF DRCOFD(,,) W.R.T DTEV()
C          (L*8)  LEXIST   = TRUE --- FILE TO OPEN EXISTS ELSE NOT
C
C PE BRIDEN = ADDED VARIABLES (14/01/91)
C
C          (I*4)  L1       = PARAMETER = 1
C          (I*4)  IOPT     = DEFINES THE BOUNDARY DERIVATIVES FOR THE
C                          SPLINE ROUTINE 'XXSPLN', SEE 'XXSPLN'.
C
C          (L*4)  LSETX    = .TRUE. => SET UP SPLINE PARAMETERS RELATING
C                          TO X-AXIS.
C                          .FALSE. => DO NOT SET UP SPLINE PARAMETERS
C                          RELATING TO X-AXIS.
C                          (I.E. THEY WERE SET IN A PREVIOUS
C                          CALL )
C                          (VALUE SET TO .FALSE. BY 'XXSPLN')
C
C          (R*8)  DY()     = SPLINE INTERPOLATED DERIVATIVES
C
C          (R*8) ADAS FUNCTION - 'R8FUN1' ( X -> X )
C
C AUTHOR : JAMES SPENCE (TESSELLA SUPPORT SERVICES PLC)

```

```

C          K1/0/80
C          JET  EXT. 4866
C
C DATE    : 22/02/90
C
C DATE    : 21/08/90 PE BRIDEN - REVISION: SEQUA(43) CHANGED ('TE'->'TC')
C
C DATE    : 08/10/90 PE BRIDEN - REVISION: RENAMED SUBROUTINE
C
C DATE    : 12/11/90 PE BRIDEN - CORRECTION: MOVE THE SETTING OF 'INDXZ1'
C                                          TO AFTER THE '20 CONTINUE'
C                                          STATEMENT.  ALSO SAVE THE
C                                          VALUE OF 'IZ1MIN'.
C
C DATE    : 14/01/91 PE BRIDEN - ADAS91:   CALLS TO NAG SPLINE ROUTINES
C                                          'E01BAF' & 'E02BBF' REPLACED
C                                          BY CALLS TO ADAS SPLINE
C                                          ROUTINE 'XXSPLN'.
C
C DATE    : 25/06/91 PE BRIDEN - CORRECTION: CHANGED FOLLOWING DIMENSION:
C                                          'DIMENSION DRCOFI(ITDIMD)'
C                                          TO
C                                          'DIMENSION DRCOFI(ITMAX)'.
C
C DATE    : 25/06/91 HP SUMMERS - REVISION: RENAMED FROM D2DATA TO DHDATA
C                                          SET IOPT=4 FOR IONBAL
C DATE    : 27/04/92 PE BRIDEN - ADDED DEFAULT YEAR FOR DATA IF
C                                          REQUESTED YEAR DOES NOT EXIST.
C                                          (ADDED 'YEARDF'), INTRODUCED IFAIL=-1
C                                          IF DEFAULT YEAR WAS USED AND NOT THE
C                                          REQUESTED YEAR.
C
C DATE    : 20/03/95 AC LANZAFAME - CONVERSION TO UNIX
C                                          CHANGED OPEN STATEMENT AND FILE
C                                          NAMES
C                                          ADIR ADIR1 ADDED
C                                          DSNAME FROM C*30 TO C*40
C
C ROUTINES:
C          ROUTINE      SOURCE      BRIEF DESCRIPTION
C          -----
C          XXSPLN      ADAS          CUBIC SPLINE INTERPOLATION/EXTRAPOLATION
C          R8FUN1      ADAS          REAL*8 FUNCTION: ( X -> X )
C
C VERSION 1.1 DATE: 29-10-97
C RICHARD MARTIN
C ADAS412 - PUT UNDER SCCS CONTROL.
C
C VERSION: 1.2 DATE: 01-12-97
C RICAHRD MARTIN
C REMOVED DUPLICATE VARIABLE DECLARATION.

```

C
C VERSION: 1.3 DATE: 23-11-98
C RICHARD MARTIN & DAVID BROOKS
C REMOVED 'DSNAME(12:13) = YEARDF' STATEMENT (FOR IBM).

C
C-----
C

CHARACTER*80	TITLE			
CHARACTER*2	YEAR,	YEARDF		
INTEGER	ICLASS,	IDMAXD,	IEVCUT,	IFAIL
INTEGER	ITDIMD,	ITMAX,	ITMAXD,	IZ0
INTEGER	IZ1,	IZMAXD,	ZDATA(ITDIMD)	
REAL*8	DDENS(ITMAX),		DDENS(ITDIMD)	
REAL*8	DRCOFD(ITDIMD, ITDIMD, ITDIMD)			
REAL*8	DRCOFI(ITMAX),		DTEV(ITMAX)	
REAL*8	DTEVD(ITDIMD)			