## ADAS Subroutine xxdata\_11

	subroutine	e xxdata_11( iunit , iclass ,
	æ	isdimd , iddimd , itdimd ,
	æ	ndptnl , ndptn , ndptnc , ndcnct ,
	æ	iz0 , is1min , is1max ,
	æ	nptnl , nptn , nptnc ,
	æ	iptnla , iptna , iptnca ,
	æ	ncnct , icnctv ,
	æ	iblmx , ismax , dnr_ele, dnr_ams,
	æ	isppr , ispbr , isstgr ,
	æ	idmax , itmax ,
	æ	ddens , dtev , drcof ,
	æ	lres , lstan , lptn
	æ	)
c-		·
С		
C	* * * * * * * * * * * * * *	***** fortran77 subroutine: xxdata 11 ******************
C		
C	purpose: to i	read a complete adfl1 file. check its class and
C	dete	ermine its standard, resolved and partition organisation
C	acet	similie ieb seanaara, ieboivea ana pareieron organibacion.
C	calling prog	ram: various
c	carring progr	
c	notos (1)	A standard adf11 file contains ger data between one
c	1100003. (1)	whole ionisation stage and another whole ionisation
C		atage
C a		Stage.
C		A resolved (or partial) additi file contains ger data
С		between a set of metastables of one ionisation stage
С		and a set of metastables of another ionisation stage.
С		A resolved file is distinguished from a standard file
С		by the presence of a 'connection vector' in the adili
С		data file header lines.
С		The connection vector specifies the number of meta-
С		stables in each ionisation stage which are coupled
С		together by gcr data.
С	(2)	A `partitioned' adf11 file contains gcr data between
С		clumps of ionisation stages or metastables or comb-
С		inations of the two called `partitions'.
С		A 'partition level' is a specification of the
С		partitions which span all the ionisation stages (and
С		metastables) of an element. Successive partition
С		levels give a heirarchy corresponding to larger
С		partitions and greater clumping.
С		A 'superstage' is a set of partitions which are close-
С		coupled.
С		There are thus equivalences :
С		ionisation stage – superstage
С		metastable - partition
С		ion charge - superstage index
С		A partitioned adf11 file may be standard (with each
С		superstage comprising only one partition) or resolved.
С		A partitioned file is distinguished by the presence of
С		'partition specification block' in the adf11 data

С	file head	er lines.						
С	(3) When a partition specification block is present, it							
С	should be ordered from the highest partition level							
С	index to lowest partition level index. Thus the first							
С	partition	in the par	tition blo	ock has the l	least numbe	er		
С	of partit:	ions and th	e last has	s the greates	st number.			
С	(4) Twelev cla	asses of ad	f11 data :	file mav be r	read by the	1		
C	subroutine	as follow	:					
C	Babioacin		•					
C	class index	type GCR	data cont	tent				
C								
C	1 acd	recombin	ation coe	ffts				
C	2 scd	ionisati	on coefft	9				
	2 SCU	CV rocom	bination (	o oooffta				
	J ccu	CA TECOM						
C	4 pro		rems powe.	COEIILS				
С	5 prc	CX power	COEIILS					
С	6 qca	base met	a. coupl.	COEIILS				
С	/ xca	parent m	eta. coup.	L. COEIITS				
С	8 plt	low leve	l line por	wer coeffts				
С	9 pls	represen	t. line po	ower coefft				
С	10 zcd	effectiv	e charge					
С	11 ycd	effectiv	e squared	charge				
С	12 ecd	effectiv	e ionisat:	ion potential	_			
С								
С	(5) A resolved	d adfll fil	e, with a	connection v	vector, has	a set		
С	of names a	and pointer	s at prec	ise positions	s in the da	ta file.		
С	which are	recognised	•					
С	The names	are differ	ent for pa	artitioned ar	nd unpartit	ioned		
С	data file:	s as follow	:					
С								
С	fi	Le unp	artitioned	d par	rtitioned			
С	cla	ass	names	-	names			
С								
С	(a)	Ll)	z1		s1			
С	Х -	,			-			
C		(indices 1	and 2)	(indices 1	and 2)			
C								
C	acd	inrt	iard	isnn	isnh			
C	scd	inrt	igrd	ispp	ispb			
C	sed	iprt	igrd	ispp	ispb			
	ccu	iprt	IGIO	ispp	тэрр			
	ard	ipit		Ispp				
C	prc	Tbrc	. ,	Tabb				
С	qca	igra	jgra	ispo	gada C			
С	xcd	iprt	jprt	lspp	Jspp			
С	plt	igrd		ispb				
С	pls	igrd		ispb				
С	zcd	igrd		ispb				
С	ycd	igrd		ispb				
С	ecd	igrd		ispb				
С								
С	(6) In partit	cioned nome	nclature:	s=superstage	e; p=partit	ion;		
С	b=base (	current sup	erstage),	p=parent (ne	ext up supe	r-		
С	stage), d	c=child (ne	xt down si	uperstage). ]	Thus arrays	i		

'iprtr' and 'igrd' in old notation are now substituted С by 'isppr' and 'ispbr' respectively internally and in С external naming. С С С С subroutine: С = unit to which input file is allocated input : (i\*4) iunit С input : (i\*4) iclass = class of data (1 - 12): С 1-acd, 2-scd, 3-ccd, 4-prb, 5-prc С 6-qcd, 7-xcd, 8-plt, 9-pls,10-zcd С 11-ycd, 12-ecd С С isdimd = maximum number of (sstage, parent, base) С input : (i\*4) blocks in isonuclear master files С = maximum number of dens values in input : (i\*4) iddimd С isonuclear master files С input : (i\*4) itdimd = maximum number of temp values in С isonuclear master files С input : (i\*4) ndptnl = maximum level of partitions С = maximum no. of partitions in one level input : (i\*4) ndptn С input : (i\*4) ndptnc = maximum no. of components in a partition С = maximum number of elements in connection input : (i\*4) ndcnct С vector С С output: (i\*4) iz0 = nuclear charge С = minimum ion charge + 1 output: (i\*4) is1min С С (generalised to connection vector index) = maximum ion charge + 1 output: (i\*4) is1max С (note excludes the bare nucleus) С (generalised to connection vector index С and excludes last one which always remains С the bare nucleus) С = number of partition levels in block output: (i\*4) nptnl С nptn() = number of partitions in partition level output: (i\*4) С С 1st dim: partition level = number of components in partition output: (i\*4) nptnc(,) С 1st dim: partition level С 2nd dim: member partition in partition level С iptnla() output: (i\*4) = partition level label (0=resolved root,1= С unresolved root) С 1st dim: partition level index С = partition member label (labelling starts at 0) output: (i\*4) iptna(,) С С 1st dim: partition level index 2nd dim: member partition index in partition С level С output:  $(i \star 4)$  iptnca(,,) = component label (labelling starts at 0) С 1st dim: partition level index С 2nd dim: member partition index in partition С level С 3rd dim: component index of member partition С c output:  $(i \star 4)$  ncnct = number of elements in connection vector output:  $(i \times 4)$  icnctv() = connection vector of number of partitions С

```
of each superstage in resolved case
С
                             including the bare nucleus
С
                             1st dim: connection vector index
С
С
  output: (i*4) iblmx
                           = number of (sstage, parent, base)
С
                             blocks in isonuclear master file
С
С
  output: (i*4) ismax
                           = number of charge states
                             in isonuclear master file
С
                             (generalises to number of elements in
С
                              connection vector)
С
                           = CX donor element name for iclass = 3 or 5
  output: (c*12) dnr_ele
С
                             (blank if unset)
С
                           = CX donor element mass for iclass = 3 or 5
  output: (r*8) dnr ams
С
                              (0.0d0 if unset)
С
 output: (i*4) isppr()
                           = 1st (parent) index for each partition block
С
                             1st dim: index of (sstage, parent, base)
С
                                      block in isonuclear master file
С
  output: (i*4) ispbr()
                           = 2nd (base) index for each partition block
С
                             1st dim: index of (sstage, parent, base)
С
                                      block in isonuclear master file
С
                           = s1 for each resolved data block
  output: (i*4) isstgr()
С
                              (generalises to connection vector index)
С
С
                             1st dim: index of (sstage, parent, base)
                                      block in isonuclear master file
С
С
                           = number of dens values in
  output: (i*4) idmax
С
                             isonuclear master files
С
С
 output: (i*4)
                 itmax
                           = number of temp values in
                             isonuclear master files
С
 output: (r*8) ddens()
                           = log10(electron density(cm-3)) from adf11
С
                           = log10(electron temperature (eV) from adf11
С
  output: (r*8) dtev()
                 drcof(,,) = if(iclass <=9):</pre>
  output: (r*8)
С
                                log10(coll.-rad. coefft.) from
С
                                isonuclear master file
С
                             if(iclass >=10):
С
                                coll.-rad. coefft. from
С
                                isonuclear master file
С
                             1st dim: index of (sstage, parent, base)
С
                                      block in isonuclear master file
С
                             2nd dim: electron temperature index
С
                             3rd dim: electron density index
С
С
  output: (1*4) lres
                           = .true. => partial file
С
С
                           = .false. => not partial file
 output: (l*4)
                           = .true. => standard file
С
                 lstan
                           = .false. => not standard file
С
                           = .true. => partition block present
С
 output: (l*4)
                 lptn
                           = .false. => partition block not present
С
С
c routines:
          routine source
                              brief description
С
          _____
С
                     adas
С
          i4unit
                              fetch unit number for output of messages
```

```
i4fctn
                   adas
                           convert string to integer form
С
                            return element name given nuclear charge
                   adas
          xfelem
С
         xxword adas
xxslen adas
xxcase adas
                            extract position of number in buffer
С
                            find string less front and tail blanks
С
                            convert a string to upper or lower case
С
                            analyse an adf11 file partition block
С
          xxrptn
                   adas
С
c author: h. p. summers, university of strathclyde
          ja7.08
С
         tel. 0141-548-4196
С
C
c date: 04/10/06
C
c version: 1.1 date: 04/10/2006
c modified: hugh summers
c - first edition.
С
c version: 1.2 date: 21/01/2007
c modified: Allan Whiteford
c - Commented out warning about lack of iclass,
                all of the present ADAS files do not contain
С
                this information
С
С
                 (first commit to CVS)
С
c version: 1.3 date: 08/03/2007
c modified: Hugh Summers
c - adjustments for revised ecd formats.
С
                charge exchange donor/donor mass checks and
                dnr_ele, dnr_ams added to parameter return.
С
С
C-----
     CHARACTER*12
                       DNR_ELE
                               ICLASS, ICNCTV(NDCNCT)
IDMAX, IPTNA(NDPTNL,N
     INTEGER
                       IBLMX,
     INTEGER
                        IDDIMD,
                                                IPTNA (NDPTNL, NDPTN)
                       IPTNCA (NDPTNL, NDPTN, NDPTNC)
     INTEGER
     INTEGER
                       IPTNLA(NDPTNL),
                                               IS1MAX,
                                                            IS1MIN
     INTEGER
                       ISDIMD, ISMAX, ISPBR(ISDIMD)
                                                ISSTGR(ISDIMD)
     INTEGER
                       ISPPR(ISDIMD),
                        ITDIMD, ITMAX,
     INTEGER
                                               IUNIT,
                                                            ΙZΟ
     INTEGER
                       NCNCT,
                                   NDCNCT,
                                               NDPTN,
                                                           NDPTNC
                                   NPTN (NDPTNL)
     INTEGER
                       NDPTNL,
     INTEGER
                       NPTNC (NDPTNL, NDPTN),
                                               NPTNL
                                    LRES,
                        LPTN,
     LOGICAL
                                                LSTAN
     REAL*8
                       DDENS(IDDIMD),
                                                DNR_AMS
     REAL*8
                       DRCOF(ISDIMD, ITDIMD, IDDIMD)
     REAL*8
                       DTEV(ITDIMD)
```