

ADAS Subroutine c8prsl

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      SUBROUTINE C8PRSL( MXNSHL , MXPRSL , IZ0      , IZ1      ,
&                      NPLINE , NPU      , NPL      , NUMAX    ,
&                      WHIGH  , WLOW   , EM       , QEX      ,
&                      TOTPOP , TOTEMI , AVRGWL , QEFF      ,
&                      TBLPOP , TBLEMI , TBLWLN
&                      )
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C ***** FORTRAN77 SUBROUTINE: C8PRSL *****

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C PURPOSE: FILLS TABLES FOR REQUESTED PREDICTIONS OF SPECTRUM LINES.

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C CALLING PROGRAM: C8EMIS

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C INPUT : (I*4) MXNSHL = MAXIMUM VALUE OF PRINCIPAL QUANTUM NUMBER.

C INPUT : (I*4) MXPRSL = MAXIMUM NUMBER OF SPECTRUM LINES TO
C PREDICT.

C INPUT : (R*8) IZ0 = NUCLEAR CHARGE.

C INPUT : (R*8) IZ1 = ION CHARGE.

C INPUT : (I*4) NPLINE = NUMBER OF SPECTRUM LINES TO PREDICT.

C INPUT : (I*4) NPU() = LIST OF UPPER PRINCIPAL QUANTUM NUMBERS OF
C SPECTRUM LINES TO PREDICT.

C DIMENSION: PREDICTED LINE INDEX.

C INPUT : (I*4) NPL() = LIST OF LOWER PRINCIPAL QUANTUM NUMBERS OF
C SPECTRUM LINES TO PREDICT.

C DIMENSION: PREDICTED LINE INDEX.

C INPUT : (I*4) NUMAX = MAXIMUM UPPER PRINCIPAL QUANTUM NUMBER FOR
C OBSERVED SPECTRUM LINES.

C INPUT : (R*8) WHIGH() =

C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L).

C INPUT : (R*8) WLOW(,) =

C 1ST DIMENSION: REFERENCED BY I4IDFL(N,L).

C 2ND DIMENSION: REFERENCED BY L+1.

C INPUT : (R*8) EM = EMISSION MEASURE.

C INPUT : (R*8) QEX() =

C DIMENSION: MXNSHL.

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C OUTPUT: (R*8) TOTPOP() = TOTAL COLLISION POP. FOR PREDICTED SPECTRUM
C LINE.

C UNITS: CM-2

C DIMENSION: PREDICTED LINE INDEX.

C OUTPUT: (R*8) TOTEMI() = TOTAL COLLISION EMISSIVITIES FOR PREDICTED
C SPECTRUM LINE.

C UNITS: PH CM-2 SEC-1

C DIMENSION: PREDICTED LINE INDEX.

C OUTPUT: (R*8) AVRGWL() = AVERAGE AIR WAVELENGTH FOR PREDICTED
C SPECTRUM LINE.

C UNITS: A

C DIMENSION: PREDICTED LINE INDEX.

C OUTPUT: (R*8) QEFF() = EFF. RATE COEFFICIENT FOR PREDICTED

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C          SPECTRUM LINE.
C          UNITS:
C          DIMENSION: PREDICTED LINE INDEX.
C OUTPUT: (R*8)  TBLPOP(,) = TABLE OF COLLISION POP. FOR PREDICTED
C          SPECTRUM LINE.
C          UNITS: CM-2
C          1ST DIMENSION: PREDICTED LINE INDEX.
C          2ND DIMENSION: REFERENCED BY FUNC I4IDLI().
C OUTPUT: (R*8)  TBLEMI(,) = TABLE OF COLLISION EMISSIVITIES FOR
C          PREDICTED SPECTRUM LINE.
C          UNITS: PH CM-2 SEC-1
C          1ST DIMENSION: PREDICTED LINE INDEX.
C          2ND DIMENSION: REFERENCED BY FUNC I4IDLI().
C OUTPUT: (R*8)  TBLWLN(,) = TABLE OF WAVELENGTHS FOR PREDICTED SPECTRUM
C          LINE.
C          UNITS: A
C          1ST DIMENSION: PREDICTED LINE INDEX.
C          2ND DIMENSION: REFERENCED BY FUNC I4IDLI().
C
C PARAM : (I*4)  C1      = PRECISION AIR WAVELENGTH PARAM.
C PARAM : (I*4)  C2      = PRECISION AIR WAVELENGTH PARAM.
C PARAM : (I*4)  C3      = PRECISION AIR WAVELENGTH PARAM.
C PARAM : (I*4)  C4      = PRECISION AIR WAVELENGTH PARAM.
C PARAM : (I*4)  C5      = PRECISION AIR WAVELENGTH PARAM.
C PARAM : (I*4)  RZ      = PRECISION AIR WAVELENGTH PARAM.
C
C          (I*4)  IN      = LOOP INDEX FOR SPECTRUM LINES.
C          (I*4)  N       = PRINCIPAL QUANTUM NUMBER OF INITIAL STATE.
C          (I*4)  L       = LOOP INDEX FOR ORBITAL QUANTUM NUMBER OF
C          INITIAL STATE.
C          (I*4)  N1      = PRINCIPAL QUANTUM NUMBER OF FINAL STATE.
C          (I*4)  L1      = LOOP INDEX FOR ORBITAL QUANTUM NUMBER OF
C          FINAL STATE.
C          (I*4)  NP      = LOOP INDEX FOR PRINCIPAL QUANTUM NUMBER.
C          (I*4)  IDL     = ARRAY INDEX.
C          (I*4)  ID      = ARRAY INDEX.
C
C          (R*8)  Z1      = REAL VALUE = IZ1.
C          (R*8)  T1      = COL. POP. FOR PREDICTED SPECTRUM LINE.
C          UNITS: CM-2
C          (R*8)  T2      = COL. EMIS. FOR PREDICTED SPECTRUM LINE.
C          UNITS: PH CM-2 SEC-1
C          (R*8)  E0      = BINDING ENERGY
C          UNITS: RYD
C          (R*8)  E10     = BINDING ENERGY
C          UNITS: RYD
C          (R*8)  DELTA   =
C          (R*8)  SIG2    =
C          (R*8)  RF      =
C          (R*8)  WAVAIR  = WAVELENGTH FOR PREDICTED SPECTRUM LINE.
C          UNITS: A
C          (R*8)  SUM1    = SUM OF COL. POP. FOR PREDICTED LINE.
C          UNITS: CM-2

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C (R*8) SUM2 = SUM OF COL. EMIS. FOR PREDICTED LINE.
 C UNITS: PH CM-2 SEC-1
 C (R*8) SUM3 = SUM OF WAVELENGTHS FOR PREDICTED LINE.
 C UNITS: A
 C
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C ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
I4UNIT	ADAS	RETURNS UNIT NO. FOR OUTPUT OF MESSAGES.
I4IDFL	ADAS	RETURNS UNIQUE INDEX GIVEN QUANTUM NUMBERS N AND L.
I4IDLI	ADAS	RETURNS INDEX FOR PREDICTED SPECTRUM LINE TABLES.
R8ATAB	ADAS	RETURNS HYDRONIC L-RESOLVED A-VALUES. IF INPUT QUANTUM NUMBERS ARE INVALID THEN RETURNS ZERO.
R8CONST	ADAS	RETURNS FUNDAMENTAL ATOMIC CONSTANTS.

C AUTHOR: JONATHAN NASH (TESSELLA SUPPORT SERVICES PLC)
 C K1/0/81
 C JET EXT. 5183
 C

C DATE: 14/10/93
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C MODIFIED: TIM HAMMOND (TESSELLA SUPPORT SERVICES PLC)
 C ADDED ERROR MESSAGE FOR NUMERICAL ERRORS INTRODUCED
 C BY BAD VALUES FOR THE OBSERVED SPECTRUM LINES
 C ALSO GENERAL UNIX PORT.
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C DATE: 20/6/95
 C

C VERSION: 1.2

C MODIFIED: Martin O'Mullane

C - Corrected the vacuum to air conversion. Parameter C4 of the
 C expression for the refractive index of air should be 146.0
 C and not 176.0. (see Astrophysical Quantities section 54)
 C - Introduced R8CONST to return fundamental atomic constants.
 C The mass dependent rydberg constant is returned if set
 C by XXRAMS in the main program. As a consequence RZ has
 C been removed from the parameter statement.
 C

C DATE: 08/04/99
 C

INTEGER	IZ0,	IZ1,	MXNSHL,	MXPRSL
INTEGER	NPL (MXPRSL),	NPLINE,	NPU (MXPRSL),	NUMAX
REAL*8	AVRGWL (MXPRSL),		EM	
REAL*8	QEFF (MXPRSL),		QEX (MXNSHL)	
REAL*8	TBLEMI (MXPRSL,	2*MXNSHL-3)		

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REAL*8          TBLPOP (MXPRSL, 2*MXNSHL-3)
REAL*8          TBLWLN (MXPRSL, 2*MXNSHL-3)
REAL*8          TOTEMI (MXPRSL) ,          TOTPOP (MXPRSL)
REAL*8          WHIGH ( (MXNSHL* (MXNSHL+1) ) /2)
REAL*8          WLOW ( (MXNSHL* (MXNSHL+1) ) /2, MXNSHL)
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