

ADAS Subroutine c8emis

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      SUBROUTINE C8EMIS ( MXNSHL , MXOBSL , MXPRSL , IZ0      ,  
&                       IZ1      , NGRND  , NTOT    , NBOT    ,  
&                       DENSZ    , DENS    , NOLINE  , NU      ,  
&                       NL      , EMISA   , NPLINE  , NPU     ,  
&                       NPL     , QTHEOR  , FTHEOR  , TBQMEP  ,  
&                       TBQMEM  , TBQMIP  , TBQMIM  , NUMIN   ,  
&                       NUMAX   , EM      , QEX     , TOTPOP  ,  
&                       TOTEMI  , AVRGWL  , QEFF    , TBLPOP  ,  
&                       TBLEMI  , TBLWLN  
&                       )
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C ***** FORTRAN77 SUBROUTINE: C8EMIS *****

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C PURPOSE: PREDICTS THE L-RESOLVED EMISSIVITY FOR REQUESTED
C TRANSITIONS.

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C CALLING PROGRAM: ADAS308

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

C INPUT : (I*4) MXOBSL = MAXIMUM NUMBER OF OBSERVED SPECTRUM LINES.

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

C INPUT : (I*4) IZ0 = NUCLEAR CHARGE.

C INPUT : (I*4) IZ1 = ION CHARGE.

C INPUT : (I*4) NGRND = PRINCIPAL QUANTUM NUMBER OF GROUND STATE.

C INPUT : (I*4) NTOT = PRINCIPAL QUANTUM NUMBER OF HIGHEST BOUND
C STATE.

C INPUT : (I*4) NBOT = MINIMUM PRINCIPAL QUANTUM NUMBER.

C INPUT : (R*8) DENSZ = PLASMA ION DENSITY.

C UNITS: CM-3

C INPUT : (R*8) DENS = ELECTRON DENSITY.

C UNITS: CM-3

C INPUT : (I*4) NOLINE = NUMBER OF OBSERVED SPECTRUM LINES.

C INPUT : (I*4) NU () = LIST OF UPPER PRINCIPAL QUANTUM NUMBERS OF
C OBSERVED SPECTRUM LINES.

C DIMENSION: SPECTRUM LINE INDEX.

C INPUT : (I*4) NL () = LIST OF LOWER PRINCIPAL QUANTUM NUMBERS OF
C OBSERVED SPECTRUM LINES.

C DIMENSION: SPECTRUM LINE INDEX.

C INPUT : (R*8) EMISA () = LIST OF EMISSIVITIES OF OBSERVED SPECTRUM
C LINES.

C DIMENSION: SPECTRUM LINE INDEX.

C INPUT : (I*4) NPLINES = 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.

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C INPUT : (R*8) QTHEOR() = MEAN CHARGE EXCHANGE OR EXCITATION RATE
C COEFFICIENTS FOR N-LEVELS AVERAGED OVER
C BEAM FRACTIONS.
C UNITS: CM3 SEC-1
C DIMENSION: REFERENCED BY N QUANTUM NUMBER.
C INPUT : (R*8) FTHEOR() = MEAN CHARGE EXCHANGE OR EXCITATION RATE
C FOR NL-LEVELS AS A FRACTION OF
C CORRESPONDING N-LEVEL.
C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L) .
C INPUT : (R*8) TBQMEP() = ELECTRON RATE COEFFT. FOR NL->NL+1.
C INDEX FOR NL->NL+1 TRANSITION GIVEN BY
C I4IDFL(N,L) .
C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L) .
C INPUT : (R*8) TBQMEM() = ELECTRON RATE COEFFT. FOR NL+1->NL.
C INDEX FOR NL+1->NL TRANSITION GIVEN BY
C I4IDFL(N,L+1) .
C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L) .
C INPUT : (R*8) TBQMIP() = POSITIVE ION RATE COEFFT. FOR NL->NL+1.
C INDEX FOR NL->NL+1 TRANSITION GIVEN BY
C I4IDFL(N,L) .
C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L) .
C INPUT : (R*8) TBQMIM() = POSITIVE ION RATE COEFFT. FOR NL+1->NL.
C INDEX FOR NL+1->NL TRANSITION GIVEN BY
C I4IDFL(N,L+1) .
C DIMENSION: REFERENCED BY FUNC I4IDFL(N,L) .
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C OUTPUT: (I*4) NUMIN = MINIMUM UPPER PRINCIPAL QUANTUM NUMBER FOR
C OBSERVED SPECTRUM LINES.
C OUTPUT: (I*4) NUMAX = MAXIMUM UPPER PRINCIPAL QUANTUM NUMBER FOR
C OBSERVED SPECTRUM LINES.
C OUTPUT: (R*8) EM = EMISSION MEASURE.
C OUTPUT: (R*8) QEX() =
C DIMENSION: MXNSHL.
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
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.

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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 PARAM : (I*4) MXN = MXNSHL.
 C PARAM : (I*4) MXOB = MXOBSL.
 C (I*4) NREP =
 C (I*4) IC = LOOP INDEX.
 C (I*4) ICREP() =
 C DIMENSION: MXOB.
 C (R*8) WHIGH() =
 C DIMENSION: REFERENCED BY L+1.
 C (R*8) WLOW(,) =
 C 1ST DIMENSION: REFERENCED BY I4IDFL(N,L).
 C 2ND DIMENSION: REFERENCED BY L+1.

C ROUTINES:

ROUTINE	SOURCE	BRIEF DESCRIPTION
I4UNIT	ADAS	RETURNS UNIT NO. FOR OUTPUT OF MESSAGES.
CXWFIL	ADAS	
CXEMQX		
CXPRSL	ADAS	PREDICTS REQUESTED SPECTRUM LINES.

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 C K1/0/81
 C JET EXT. 5183

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INTEGER IZ0, IZ1, MXNSHL, MXOBSL
 INTEGER MXPRSL, NBOT, NGRND
 INTEGER NL(MXOBSL), NOLINE, NPL(MXPRSL), NPLINE
 INTEGER NPU(MXPRSL), NTOT, NU(MXOBSL), NUMAX
 INTEGER NUMIN
 REAL*8 AVRGWL(MXPRSL), DENS, DENSZ
 REAL*8 EM, EMISA(MXOBSL)
 REAL*8 FTHEOR((MXNSHL*(MXNSHL+1))/2)

REAL*8	QEFF (MXPRSL) ,	QEX (MXNSHL)
REAL*8	QTHEOR (MXNSHL)	
REAL*8	TBLEMI (MXPRSL, 2*MXNSHL-3)	
REAL*8	TBLPOP (MXPRSL, 2*MXNSHL-3)	
REAL*8	TBLWLN (MXPRSL, 2*MXNSHL-3)	
REAL*8	TBQMEM ((MXNSHL* (MXNSHL+1)) /2)	
REAL*8	TBQMEP ((MXNSHL* (MXNSHL+1)) /2)	
REAL*8	TBQMIM ((MXNSHL* (MXNSHL+1)) /2)	
REAL*8	TBQMIP ((MXNSHL* (MXNSHL+1)) /2)	
REAL*8	TOTEMI (MXPRSL) ,	TOTPOP (MXPRSL)