

ADAS Subroutine b8popm

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      SUBROUTINE B8POPM( NDTEM , NDDEN , NDMET , NDLEV ,
&                      NPL   , NPLR  , NPLI  ,
&                      MAXT   , MAXD  , NMET  ,
&                      DENSA  , IMETR ,
&                      LRSEL  , LISEL , LHSEL ,
&                      RATPIA , RATMIA , RATHA ,
&                      STCKM  , STVRM  , STVIM , STVHM ,
&                      POPAR
&                      )
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C ***** FORTRAN77 SUBROUTINE: B8POPM *****

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C PURPOSE: TO CONSTRUCT METASTABLE LEVEL POPULATIONS.

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C CALLING PROGRAM: ADAS205/ADAS206

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C SUBROUTINE:

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C INPUT : (I*4) NDTEM = MAXIMUM NUMBER OF TEMPERATURES ALLOWED

C INPUT : (I*4) NDDEN = MAXIMUM NUMBER OF DENSITIES ALLOWED

C INPUT : (I*4) NDMET = MAXIMUM NUMBER OF METASTABLE LEVELS ALLOWED

C INPUT : (I*4) NDLEV = MAXIMUM NUMBER OF ENERGY LEVELS ALLOWED

C INPUT : (I*4) NPL = NO. OF METASTABLES OF (Z+1) ION ACCESSED

C BY EXCITED STATE IONISATION IN COPASE

C FILE WITH IONISATION POTENTIALS GIVEN

C ON THE FIRST DATA LINE

C INPUT : (I*4) NPLR = NO. OF ACTIVE METASTABLES OF (Z+1) ION

C INPUT : (I*4) NPLI = NO. OF ACTIVE METASTABLES OF (Z-1) ION

C

C INPUT : (I*4) MAXT = NUMBER OF INPUT TEMPERATURES (1 ->'NDTEM')

C INPUT : (I*4) MAXD = NUMBER OF INPUT DENSITIES (1 ->'NDDEN')

C INPUT : (I*4) NMET = NUMBER OF METASTABLES LEVELS (1 ->'NDMET')

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C INPUT : (R*8) DENSA() = ELECTRON DENSITIES (UNITS: CM⁻³)

C INPUT : (I*4) IMETR() = INDEX OF METASTABLE IN COMPLETE LEVEL LIST

C (ARRAY SIZE = 'NDMET')

C

C INPUT : (L*4) LRSEL = .TRUE. => FREE ELECTRON RECOMBINATION

C REQUESTED.

C = .FALSE. => FREE ELECTRON RECOMBINATION

C NOT REQUESTED.

C INPUT : (L*4) LHSEL = .TRUE. => CHARGE TRANSFER FROM NEUTRAL

C HYDROGEN REQUESTED.

C = .FALSE. => CHARGE TRANSFER FROM NEUTRAL

C HYDROGEN NOT REQUESTED.

C INPUT : (L*4) LISEL = .TRUE. => IONISATION FROM LOWER IONIS.

C STAGE REQUESTED.

C = .FALSE. => IONISATION FROM LOWER IONIS.

C STAGE NOT REQUESTED.

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C INPUT : (R*8) RATPIA(,,) = RATIO ( N(Z+1)/N(Z) STAGE ABUNDANCIES )
C
C 1ST DIMENSION: TEMP/DENS INDEX
C 2ND DIMENSION: PARENT INDEX
C INPUT : (R*8) RATMIA(,,) = RATIO ( N(Z-1)/N(Z) STAGE ABUNDANCIES )
C
C 1ST DIMENSION: TEMP/DENS INDEX
C 2ND DIMENSION: PARENT INDEX
C INPUT : (R*8) RATHA() = RATIO (NEUTRAL H DENSITY/ELECTRON DENSITY)
C
C INPUT : (R*8) STCKM(,,) = METASTABLE POPULATIONS STACK:
C 1st DIMENSION: METASTABLE INDEX
C 2nd DIMENSION: TEMPERATURE INDEX
C 3rd DIMENSION: DENSITY INDEX
C INPUT : (R*8) STVRM(,,,) = METASTABLE LEVEL:
C FREE-ELECTRON RECOMBINATION COEFFICIENTS
C (UNITS* CM**3/SEC-1)
C 1ST DIMENSION: METASTABLE INDEX
C 2ND DIMENSION: TEMPERATURE INDEX
C 3RD DIMENSION: DENSITY INDEX
C 4TH DIMENSION: PARENT INDEX
C INPUT : (R*8) STVIM(,,,) = METASTABLE LEVEL:
C ELECTRON IMPACT IONISATION COEFFICIENTS
C (UNITS* CM**3/SEC-1)
C 1ST DIMENSION: METASTABLE INDEX
C 2ND DIMENSION: TEMPERATURE INDEX
C 3RD DIMENSION: DENSITY INDEX
C 4TH DIMENSION: PARENT INDEX
C INPUT : (R*8) STVHM(,,,) = METASTABLE LEVEL:
C CHARGE-EXCHANGE RECOMBINATION COEFFICIENTS
C (UNITS* CM**3/SEC-1)
C 1st DIMENSION: METASTABLE INDEX
C 2nd DIMENSION: TEMPERATURE INDEX
C 3rd DIMENSION: DENSITY INDEX
C 4TH DIMENSION: PARENT INDEX
C
C OUTPUT: (R*8) POPAR(,,) = LEVEL POPULATIONS
C 1ST DIMENSION: LEVEL INDEX
C 2ND DIMENSION: TEMPERATURE INDEX
C 3RD DIMENSION: DENSITY INDEX
C (ON OUTPUT CONTAINS POPULATIONS FOR
C METASTABLE LEVELS ONLY.)
C
C (R*8) DCOEF = DENSITY MULTIPLIED BY RELEVANT RATIOS FOR
C CALCULATING RECOMBINATION CONTRIBUTIONS.
C
C (I*4) IT = TEMPERATURE ARRAY INDEX
C (I*4) IP = PARENT INDEX
C (I*4) IN = DENSITY ARRAY INDEX
C (I*4) IM = METASTABLE LEVEL ARRAY INDEX
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C ROUTINES: NONE
C
C AUTHOR: HP SUMMERS (UPGRADE OF BXPOPM BY PE BRIDEN)

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C          K1/1/57
C          JET EXT. 4941
C
C DATE:    11/06/92
C
C*****
C UNIX-IDL PORT:
C
C AUTHOR:  DAVID H BROOKS, UNIVERSITY OF STRATHCLYDE
C
C DATE:    UNKNOWN
C
C*****
C PUT UNDER SCCS CONTROL:
C
C VERSION: 1.1 DATE: 10/05/96
C MODIFIED: WILLIAM OSBORN (TESSELLA SUPPORT SERVICES PLC)
C   - FIRST PUT UNDER SCCS
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C
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C          INTEGER          IMETR (NDMET) ,          MAXD,          MAXT
C          INTEGER          NDDEN,          NDLEV,          NDMET,          NDTEM
C          INTEGER          NMET,          NPL,          NPLI,          NPLR
C          LOGICAL          LHSEL,          LISEL,          LRSEL
C          REAL*8           DENSA (NDDEN)
C          REAL*8           POPAR (NDLEV, NDTEM, NDDEN) , RATHA (NDDEN)
C          REAL*8           RATMIA (NDDEN, NDMET) ,          RATPIA (NDDEN, NDMET)
C          REAL*8           STCKM (NDMET, NDTEM, NDDEN)
C          REAL*8           STVHM (NDMET, NDTEM, NDDEN, NDMET)
C          REAL*8           STVIM (NDMET, NDTEM, NDDEN, NDMET)
C          REAL*8           STVRM (NDMET, NDTEM, NDDEN, NDMET)

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