

## ADAS Subroutine bxpopo

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      SUBROUTINE BXPOPO( NDTEM , NDDEN , NDMET , NDLEV ,
&                      MAXT   , MAXD   , NMET  , NORD  ,
&                      DENSA  , IMETR  , IORDR  ,
&                      LRSEL  , LHSEL  ,
&                      RATIA  , RATHA  ,
&                      STACK  , STVR   , STVH   ,
&                      POPAR
&                      )
```

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C-----
C
C ***** FORTRAN77 SUBROUTINE: BXPOPO *****
C
C PURPOSE: TO CONSTRUCT ORDINARY/NON-METASTABLE LEVEL POPULATIONS.
C
C CALLING PROGRAM: ADAS205/ADAS206
C
C SUBROUTINE:
C
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
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' )
C INPUT : (I*4) NORD = NUMBER OF ORDINARY LEVELS ( 1 ->'NDLEV' )
C
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 INPUT : (I*4) IORDR() =INDEX OF ORDINARY EXCITED LEVELS IN COMPLETE
C                      LEVEL LIST.
C                      (ARRAY SIZE = 'NDLEV' )
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
C INPUT : (R*8) RATIA() = RATIO ( N(Z+1)/N(Z) STAGE ABUNDANCIES )
C INPUT : (R*8) RATHA() = RATIO (NEUTRAL H DENSITY/ELECTRON DENSITY)
C
C INPUT : (R*4) STACK(,,,) = ORDINARY EXCITED LEVEL POPULAT'N DEPENDENCE
C                      ON METASTABLE LEVEL.
C                      1st DIMENSION: ORDINARY LEVEL INDEX
C                      2nd DIMENSION: METASTABLE INDEX
C                      3rd DIMENSION: TEMPERATURE INDEX
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C
C          4th DIMENSION: DENSITY INDEX
C INPUT : (R*8) STVR(,,) = ORDINARY EXCITED LEVEL:
C          FREE-ELECTRON RECOMBINATION COEFFICIENTS
C          (UNITS* CM**3/SEC-1)
C          1st DIMENSION: ORDINARY LEVEL INDEX
C          2nd DIMENSION: TEMPERATURE INDEX
C          3rd DIMENSION: DENSITY INDEX
C INPUT : (R*8) STVH(,,) = ORDINARY EXCITED LEVEL:
C          CHARGE-EXCHANGE RECOMBINATION COEFFICIENTS
C          (UNITS* CM**3/SEC-1)
C          1st DIMENSION: ORDINARY LEVEL INDEX
C          2nd DIMENSION: TEMPERATURE INDEX
C          3rd DIMENSION: DENSITY INDEX
C
C I/O      : (R*8)  POPAR(,,) = LEVEL POPULATIONS
C          1st DIMENSION: LEVEL INDEX
C          2nd DIMENSION: TEMPERATURE INDEX
C          3rd DIMENSION: DENSITY INDEX
C          ON INPUT : CONTAINS POPULATIONS FOR
C                   METASTABLE LEVELS ONLY.
C          ON OUTPUT: CONTAINS POPULATIONS FOR
C                   ALL LEVELS.
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) IN        = DENSITY ARRAY INDEX
C          (I*4) IO        = ORDINARY LEVEL ARRAY INDEX
C          (I*4) IM        = METASTABLE LEVEL ARRAY INDEX
C
C
C ROUTINES: NONE
C
C AUTHOR:  PAUL E. BRIDEN (TESSELLA SUPPORT SERVICES PLC)
C          K1/0/81
C          JET EXT. 4569
C
C DATE:    09/10/90
C
C UPDATE:  20/05/93- P BRIDEN: STACK ARRAY CHANGED FROM REAL*8 -> REAL*4
C
C-----
C
C-----
C
C          INTEGER          IMETR (NDMET) ,          IORDR (NDLEV)
C          INTEGER          MAXD,          MAXT,          NDDEN,          NDLEV
C          INTEGER          NDMET,          NDTEM,          NMET,          NORD
C          LOGICAL          LHSEL,          LRSEL
C          REAL*8           DENSA (NDDEN)
C          REAL*8           POPAR (NDLEV, NDTEM, NDDEN) , RATHA (NDDEN)
C          REAL*8           RATIA (NDDEN)
C          REAL             STACK (NDLEV, NDMET, NDTEM, NDDEN)

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REAL\*8  
REAL\*8

STVH (NDLEV, NDTEM, NDDEN)  
STVR (NDLEV, NDTEM, NDDEN)