ADAS Subroutine b1rate

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      SUBROUTINE B1RATE( NARR  , TEMP   , GAMMA  ,
     &                           EUPPER , ELOWER ,
     &                           WUPPER , WLOWER ,
     &                           RATE   , DRATE
     &                 )
C-----------------------------------------------------------------------
C
C  ****************** FORTRAN77 SUBROUTINE: B1RATE *********************
C
C  PURPOSE: TO CALCULATE THE EXCITATION AND DE-EXCIATATION RATE COEFFI-
C           CIENTS FOR A SET OF INPUT TEMPERATURE(kelvin)/ GAMMA PAIRS.
C
C  CALLING PROGRAM:  ADAS201
C
C  SUBROUTINE:
C
C  INPUT :  (I*4)  NARR    = NUMBER OF INPUT TEMPERATURE/GAMMA PAIRS
C  INPUT :  (R*8)  TEMP()  = TEMPERATURE VALUES (kelvin)
C  INPUT :  (R*8)  GAMMA() = GAMMA VALUES
C
C  INPUT :  (R*8)  EUPPER  = SELECTED TRANSITION - UPPER ENERGY LEVEL
C                            RELATIVE TO INDEX LEVEL 1 (CM-1).
C  INPUT :  (R*8)  ELOWER  = SELECTED TRANSITION - LOWER ENERGY LEVEL
C                            RELATIVE TO INDEX LEVEL 1 (CM-1).
C
C  INPUT :  (R*8)  WUPPER  = SELECTED TRANSITION - UPPER ENERGY LEVEL
C                            STATISTICAL WEIGHT.
C  INPUT :  (R*8)  WLOWER  = SELECTED TRANSITION - LOWER ENERGY LEVEL
C                            STATISTICAL WEIGHT.
C
C  OUTPUT:  (R*8)  RATE    = EXCITATION RATE COEFFS (cm**3/s)
C  OUTPUT:  (R*8)  DRATE   = DEEXCITATION RATE COEFS (cm**3/s)
C
C           (R*8)  TK2ATE  = PARAMETER = EQUATION CONSTANT = 1.5789D+05
C           (R*8)  R2GAM   = PARAMETER = EQUATION CONSTANT = 2.17161D-08
C           (R*8)  WN2RYD  = PARAMETER =
C                            WAVE NUMBER (CM-1) TO RYDBERG CONVERSION
C
C           (I*4)  I       = GENERAL ARRAY INDEX
C
C           (R*8)  SUPPER  = 1/(UPPER LEVEL STATISTICAL WEIGHT)
C           (R*8)  SLOWER  = 1/(LOWER LEVEL STATISTICAL WEIGHT)
C           (R*8)  RYDDIF  = NEGATIVE TRANSITION ENERGY IN RYDBERGS
C                            ( NOTE: 1 Rydberg = 1.09737E5 cm-1)
C           (R*8)  ATE     = EQUATION PARAMETER
C           (R*8)  GVAL    = EQUATION PARAMETER
C
C ROUTINES:  NONE
C
C NOTES:
C            EQUATIONS USED -
C
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C                      2.17161E-8 x GAMMA x SQRT(157890 / TEMP)
C            RATE = ------------------------------------------
C                   WLOWER x EXP(1.4388 x (EUPPER-ELOWER) / TEMP)
C
C                      2.17161E-8 x GAMMA x SQRT(157890 / TEMP)
C            DRATE = ------------------------------------------
C                                    WUPPER
C
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C          K1/0/81
C          JET EXT. 4569
C
C DATE:    09/10/90
C
C--------------------------------------------------------------------------
C
C--------------------------------------------------------------------------
      INTEGER             NARR
      REAL*8              DRATE(NARR), ELOWER,      EUPPER
      REAL*8              GAMMA(NARR), RATE(NARR),  TEMP(NARR),  WLOWER
      REAL*8              WUPPER
```