ADAS Subroutine gximpr

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C
       SUBROUTINE GXIMPR(IZ,WI,EI,WJ,EJ,M,AJI,EPS,OMEG,N,T,RAT,QI,QJ,
     &GA)
       IMPLICIT REAL*8(A-H,O-Z)
C-----------------------------------------------------------------------
C  PURPOSE: CALCULATES ELECTRON COLLISIONAL EXCITATION AND DEEXCITATION
C           RATE COEFFICIENTS FOR DIPOLE TRANSITIONS IN THE IMPACT
C           PARAMETER APPROXIMATION
C
C   (BURGESS AND SUMMERS,1976,MON.NOT.R.AST.SOC.,174,345)
C
C   OPTIONALLY A SET OF INCIDENT ELECTRON ENERGIES AND COLLISION STRENGT
C   MAY BE PROVIDED, IN WHICH CASE THE IMPACT PARAMETER THEORY IS USED T
C   CALCULATE THE COLLISION STRENGTHS AT HIGH ENERGY WITH VALUES SCALED
C   THE HIGHEST ENERGY INPUT COLLISION STRENGTH.
C   EITHER THE ABSORPTION OSCILLATOR STRENGTH OR THE EINSTEIN COEFFICIEN
C   MUST BE PROVIDED, THE OTHER BEING COMPUTED.
C  ARGUMENTS
C   IZ,WI,EI,WJ,EJ,M,AJI,EPS(20),OMEG(20),N,T(40),RAT,QI(40),QJ(40),
C   GA(40)
C  SUBROUTINES
C   EIQIP,XIP,YIP,ZERO1
C  INPUT
C       IZ=ION CHARGE
C       TRANSITION NAME TAKES THE FORM
C          ELECTRON TRANS.(COLS 11-15), ANGULAR TRANS.(COLS 21-40)
C       WI=STATISTICAL WEIGHT OF STATE I
C       EI=BINDING ENERGY OF STATE I (RYDBERGS)
C       WJ=STATISTICAL WEIGHT OF STATE J
C       EJ=BINDING ENERGY OF STATE J (RYDBERGS)
C       M=NUMBER OF TABULAR VALUES OF COLLISION STRENGTH
C       FIJ=ABSORPTION OSCILLATOR STRENGTH FOR TRANSITION
C       AJI=EINSTEIN COEFFICIENT FOR TRANSITION
C       EPS(K)=INCIDENT ELECTRON ENERGIES (RYDBERGS)
C       OMEG(K)=COLLISION STRENGTHS
C       N=NUMBER OF ELECTRON TEMPERATURES
C       T(I)=ELECTRON TEMPERATURES (DEGS. K)
C  OUTPUT
C   RAT=RATIO OF OMEG(M) TO I.P. OMEGA.
C   QI(I)=COLLISIONAL EXCITATION RATE COEFFICIENTS
C   QJ(I)=COLLISIONAL DEEXCITATION RATE COEFFICIENTS.
C   GA(I)=GAMMA PARAMETER
C  AUTHOR
C   HUGH SUMMERS     1977/5/20
C  UPDATES
C       1983/9/1 1985/6/13  ***** LATTER IS IMPORTANT CORRECTION
C                                 IDENTIFIED IN CODE
C  COMMENTS
C   I IS THE LOWER LEVEL OF THE TRANSITION.
C   M MAY BE ZERO, IN WHICH CASE NO EPS AND OMEG VALUES ARE REQUIRED.
C   UNDERFLOW IS NOT TRAPPED. THIS MAY BE ACHEIVED IN IBM FORTRAN WITH T
C
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C  VERSION: 1.1 DATE: 18-06-98
C  MODIFIED: MARTIN OMULLANE
C  - INCLUDED IN ADAS.
C
C  VERSION: 1.2 DATE: 18-06-98
C  MODIFIED: ALLAN WHITEFORD
C  - UPDATED COMMENTS AS PART OF SUBROUTINE DOCUMENTATION
C                 PROCEDURE
C
C-----------------------------------------------------------------------
      INTEGER            IZ,          M,           N
      REAL*8             AJI,         EI,          EJ,          EPS(20)
      REAL*8             GA(40),      OMEG(20),    QI(40),      QJ(40)
      REAL*8             RAT,         T(40),       WI,          WJ
      REAL*8             EI,          EIJ,         EIQ,         EM
      REAL*8             FLAG,        PHI,         R,           SC
      REAL*8             WI,          WJ,          Z
      REAL*8             DELTA,       XI
      REAL*8             DELTA,       XI
      REAL*8             A,           B,           D1,          E
      REAL*8             T2,          TIF,         VA,          VB
      REAL*8             X,           XI,          Z
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