ADAS Subroutine cxcrps

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      SUBROUTINE CXCRPS( IZT  , IZC  , N    , LI   , LJ   ,
     &                   WI   , EI   , WJ   , EJ   , EM   ,
     &                   PHI  , TV   , TEV  , DENS , TAU  ,
     &                   QI   , QJ   , GA
     &                 )
C
C
C-----------------------------------------------------------------------
C
C  ****************** FORTRAN77 SUBROUTINE: CXCRIP *********************
C
C  PURPOSE:  CALCULATES PENGELLY & SEATON (1964) COLLISION RATES BETWEEN
C            NEARLY DEGENERATE LEVELS. A VARIATION OF IMPACT PARAMETER
C            THEORY FOR DIPOLE TRANSITIONS IS USED.
C
C  CALLING PROGRAM:  CXCRDG
C
C  INPUT : (I*4)  IZT     = TARGET ION CHARGE.
C  INPUT : (I*4)  IZC     = CHARGE OF COLLIDING PARTICLE.
C  INPUT : (I*4)  N       = PRINCIPAL QUANTUM NUMBER.
C  INPUT : (I*4)  LI      = ORBITAL QUANTUM NUMBER.
C  INPUT : (I*4)  LJ      = ORBITAL QUANTUM NUMBER.
C  INPUT : (R*8)  WI      = STATISTICAL WEIGHT OF STATE I.
C  INPUT : (R*8)  EI      = BINDING ENERGY OF STATE I.
C                           UNITS: RYD
C  INPUT : (R*8)  WJ      = STATISTICAL WEIGHT OF STATE J.
C  INPUT : (R*8)  EJ      = BINDING ENERGY OF STATE J.
C                           UNITS: RYD
C  INPUT : (R*8)  EM      = REDUCED MASS FOR COLLIDING PARTICLE.
C                           UNITS: ELECTRON MASSES
C  INPUT : (R*8)  PHI     = FIJ/EIJ WHERE:
C                           FIJ = ABSORPTION OSCILLATOR STRENGTH;
C                           EIJ = EI-EJ = THE TRANSITION ENERGY (RYD).
C  INPUT : (R*8)  TV      = TEMPERATURE (COLLIDING PARTICLE
C                           DISTRIBUTION).
C                           UNITS: EV
C  INPUT : (R*8)  TEV     = TEMPERATURE (ELECTRON DISTRIBUTION).
C                           UNITS: EV
C  INPUT : (R*8)  DENS    = ELECTRON DENSITY.
C                           UNITS: CM-3
C  INPUT : (R*8)  TAU     = MEAN RADIATIVE LIFETIME OF INTIAL AND FINAL
C                           LEVELS.
C                           UNITS: SEC
C
C  OUTPUT: (R*8)  QI      = EXCITATION RATE COEFFICIENT.
C                           UNITS: CM3 SEC-1
C  OUTPUT: (R*8)  QJ      = DEEXCITATION RATE COEFFICIENTS.
C                           UNITS: CM3 SEC-1
C  OUTPUT: (R*8)  GA      = GAMMA RATE PARAMETER.
C                           UNITS:
C
C  PARAM : (R*8)  P1      =
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C  PARAM : (R*8)  P2      =
C
C          (I*4)  IND1    =
C                           : 0 = FINITE RADIATIVE LIFETIME CUT-OFF.
C                           : 1 = BETHE CUT-OFF.
C          (I*4)  IND2    =
C                           : 0 = LIFETIME OR BETHE CUT-OFF.
C                           : 1 = DEBYE CUT-OFF.
C
C          (R*8)  T       = TEMPERATURE (COLLIDING PARTICLE
C                           DISTRIBUTION).
C                           UNITS:
C          (R*8)  TE      = TEMPERATURE (ELECTRON DISTRIBUTION).
C                           UNITS:
C          (R*8)  ATP     =
C          (R*8)  Z1      = ZT+1.
C          (R*8)  XN      = REAL VALUE = N.
C          (R*8)  XLI     = REAL VALUE = LI.
C          (R*8)  XLJ     = REAL VALUE = LJ.
C          (R*8)  XL      =
C          (R*8)  DNL     =
C          (R*8)  EIJ     =
C          (R*8)  TAU1    =
C          (R*8)  F1      =
C          (R*8)  F       =
C          (R*8)  B       =
C
C ROUTINES: NONE
C
C AUTHOR:  JONATHAN NASH (TESSELLA SUPPORT SERVICES PLC)
C          K1/0/81
C          JET EXT. 5183
C
C DATE:    11/10/93
C
C-----------------------------------------------------------------------
C
C-----------------------------------------------------------------------
      INTEGER             IZC,         IZT,         LI,          LJ
      INTEGER             N
      REAL*8              DENS,        EI,          EJ,          EM
      REAL*8              GA,          PHI,         QI,          QJ
      REAL*8              TAU,         TEV,         TV,          WI
      REAL*8              WJ
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