

## ADAS Subroutine r8fdip

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C
      REAL*8 FUNCTION R8FDIP (E1,L1,E2,L2)
      IMPLICIT REAL*8 (A-H,O-Z)
C-----
C
C ***** FORTRAN77 FUNCTION: R8FDIP *****
C
C PURPOSE: CALCULATES THE DIPOLE INTEGRAL I (KAPPA1,L1,KAPPA2,L2,1)
C
C NOTE: CREATED BY ALAN BURGESS AS DEFINED IN PHIL. TRANS. ROY. SOC.
C       A226,255,1970, WHERE E1=KAPPA1**2 AND E2=KAPPA2**2. APPLIES TO
C       POSITIVE ELECTRON ENERGIES, THAT IS THE FREE-FREE CASE.
C       IT IS SUITABLE FOR USE IN EQUATIONS (8), (9), (10) OR (11) OF
C       J. PHYS. B. 7,L364,1974.
C
C CALLING PROGRAMS: GENERAL
C
C INPUT:  (R*8)  E1      = KAPPA1**2 WHERE KAPPA1 IS SCALED INITIAL
C          ELECTRON WAVE NUMBER
C INPUT:  (I*4)  L1      = ORBITAL ANGULAR OMENTUM OF INITIAL ELECTRON
C INPUT:  (R*8)  E2      = KAPPA2**2 WHERE KAPPA2 IS SCALED INITIAL
C          ELECTRON WAVE NUMBER
C INPUT:  (I*4)  L2      = ORBITAL ANGULAR OMENTUM OF FINAL ELECTRON
C
C OUTPUT: (R*8)  R8FDIP = I (KAPPA1,L1,KAPPA2,L2,1)
C
C ROUTINES:
C
C      ROUTINE      SOURCE      BRIEF DESCRIPTION
C-----
C      R8FDIP1      ADAS        SMALL ENRGY CHGE.APPROX. TO DIPOLE INTEG.
C      R8FDIP2      ADAS        SMALL ENRGY CHGE.APPROX. TO DIPOLE INTEG.
C      R8FMON1      ADAS        EVALUATES MONOPOLE INTEGRAL
C      ARGAM        ADAS        CALCULATES ARG GAMMA (L+1+I*A)
C
C UNIX-IDL PORT:
C
C VERSION: 1.1                      DATE: 17-04-07
C MODIFIED: HUGH SUMMERS
C          - FIRST FULLY COMMENTED RELEASE
C-----
      IF (E1+E2-1.0D-40) 11,11,12
11 R8FDIP=0.0D0
      RETURN
12 IF (E1-E2) 1,1,2
   1 EMIN=E1
     EMAX=E2
     GO TO 3
   2 EMIN=E2
     EMAX=E1
   3 T=EMIN/EMAX
     IF (T-0.02944D0) 4,4,5
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4 R8FDIP=R8FDIP1 (E1, L1, E2, L2)
  GO TO 9
5 IF (T-0.16667D0) 7, 6, 6
6 R8FDIP=R8FDIP2 (E1, L1, E2, L2)
  GO TO 9
7 R8FDIP=R8FDIP1 (E1, L1, E2, L2)
  IF (R8FDIP*R8FDIP-1.0D-40) 6, 6, 8
8 RETURN
9 IF (R8FDIP*R8FDIP-1.0D-40) 10, 10, 8
10 WRITE (6, 100)
  RETURN
100 FORMAT (17H      R8FDIP FAILURE)
  END
  INTEGER          L1,          L2
  REAL*8           E1,          E2
```