

## ADAS Subroutine cxqxn

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      SUBROUTINE CXQXN ( MXNENG , MXNSHL , MXBEAM , NBEAM ,
&                      BMENA   , BMFRA   , NBOT   , NTOP   ,
&                      NMINF   , NMAXF   , NENRGY , ENRGYA ,
&                      ALPHA   , XSECNA , QTHEOR , RATE
&                      )
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C
C ***** FORTRAN77 SUBROUTINE: CXQXN *****
C
C PURPOSE:  USES THE INPUT DATASET TO CALCULATE THE CHARGE EXCHANGE
C           RATE COEFFICIENTS FOR N-LEVELS AVERAGED OVER THE BEAM
C           FRACTIONS.
C
C CALLING PROGRAM:  ADAS308
C
C INPUT : (I*4)  MXNENG    = MAXIMUM NO. OF ENERGIEL.
C INPUT : (I*4)  MXNSHL    = MAXIMUM NO. OF N SHELLS.
C INPUT : (I*4)  MXBEAM    = MAXIMUM NO. OF BEAM ENERGIES.
C INPUT : (I*4)  NBEAM     = NUMBER OF BEAM ENERGIES.
C INPUT : (R*8)  BMENA ( ) = BEAM ENERGY COMPONENTS.
C                               UNITS:  EV/AMU
C                               DIMENSION: COMPONENT INDEX.
C INPUT : (R*8)  BMFRA ( ) = BEAM COMPONENT FRACTIONS.
C                               DIMENSION: COMPONENT INDEX.
C INPUT : (I*4)  NBOT      = MINIMUM PRINCIPAL QUANTUM NUMBER.
C INPUT : (I*4)  NTOP      = MAXIMUM PRINCIPAL QUANTUM NUMBER.
C INPUT : (I*4)  NMINF     = MINIMUM PRINCIPAL QUANTUM NUMBER OF INPUT
C                               DATASET.
C INPUT : (I*4)  NMAXF     = MAXIMUM PRINCIPAL QUANTUM NUMBER OF INPUT
C                               DATASET.
C INPUT : (I*4)  NENRGY    = NUMBER OF ENERGIES IN DATASET.
C INPUT : (R*8)  ENRGYA ( ) = COLLISION ENERGIES.
C                               UNITS:  EV/AMU
C                               DIMENSION: ENERGY INDEX
C INPUT : (R*8)  ALPHA ( ) = EXTRAPOLATION PARAMETER ALPHA.
C                               DIMENSION: ENERGY INDEX
C INPUT : (R*8)  XSECNA ( , ) = N-RESOLVED CHARGE EXCHANGE CROSS-SECTIONS.
C                               UNITS:  CM2
C                               1ST DIMENSION: ENERGY INDEX
C                               2ND DIMENSION: N-SHELL
C
C OUTPUT: (R*8)  QTHEOR ( ) = MEAN RATE COEFFICIENTS FOR N-LEVELS
C                               AVERAGED OVER BEAM FRACTIONS.
C                               UNITS:  CM3 SEC-1
C                               DIMENSION: REFERENCED BY N QUANTUM NUMBER.
C OUTPUT: (R*8)  RATE ( , ) = RATE COEFFICIENTS FOR EACH COMPONENT OF
C                               THE BEAM AS A FUNCTION OF N-LEVEL.
C                               UNITS:  CM3 SEC-1
C                               1ST DIMENSION: BEAM INDEX
C                               2ND DIMENSION: N-SHELL
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C
C PARAM : (R*8)  ALPMIN    = MINIMUM VALUE OF EXTRAPOLATION EXPONENT
C                   'ALPHA' .
C PARAM : (R*8)  C1        =
C
C           (I*4)  IB        = BEAM INDEX.
C           (I*4)  N         = PRINCIPAL QUANTUM NUMBER.
C           (I*4)  IE        = ENERGY INDEX.
C           (I*4)  IEU       = ENERGY INDEX ABOVE BEAM ENERGY.
C           (I*4)  IEL       = ENERGY INDEX BELOW BEAM ENERGY.
C
C           (R*8)  XNMAXF    = REAL VALUE = NMAXF.
C           (R*8)  ALPHA     = EXTRAPOLATION EXPONENT.
C           (R*8)  VEL       = VELOCITY OF INCIDENT ATOM.
C                               UNITS: CM SEC-1
C           (R*8)  GRAD      = GRADIENT OF STRAIGHT LINE INTERPOLATION.
C           (R*8)  XSEC      = CROSS-SECTION AT INTERMEDIATE ENERGY.
C
C           (L*4)  LMATCH    = FLAG IF BEAM ENERGY MATCHES EXACTLY A DATA
C                               SET ENERGY.
C                               = .TRUE.  => BEAM ENERGY MATCHES.
C                               = .FALSE. => BEAM ENERGY DOES NOT MATCH.

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C ROUTINES:  NONE

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C          K1/0/81
C          JET EXT. 5183

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C DATE:    18/10/93

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INTEGER	MXBEAM,	MXNENG,	MXNSHL,	NBEAM
INTEGER	NBOT,	NENRGY,	NMAXF,	NMINF
INTEGER	NTOP			
REAL*8	ALPHAA (MXNENG) ,		BMENA (MXBEAM)	
REAL*8	BMFRA (MXBEAM) ,		ENRGYA (MXNENG)	
REAL*8	QTHEOR (MXNSHL) ,		RATE (MXBEAM, MXNSHL)	
REAL*8	XSECNA (MXNENG, MXNSHL)			