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WORKSHOP ON NUCLEAR MODEL COMPUTER CODES

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HAUSER'S, A COMPUTER CODE TO CALCULATE NUCLEAR CROSS SECTIONS

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DESCRIPTION OF INPUT

1. READ(5,501) (COMNTS(I),I=1,30)
FORMAT (10A8)

READ IN 3 CARDS CONTAINING COMENTS
FIRST EIGHT COLUMS OF CARD 3 WILL BE PRINTED ON
ANY CARDS PUNCHED CONTAINING TRANSMISSION FUNCTIONS

2. READ (5,502) MCHAN,NIN,MWLS,TCUT,PUN,PUNN,NDIR
FORMAT (3I5,5X,3F10.0,3I10)

MCHAN = NUMBER OF REACTION PAIRS IN CALCULATION
LIMIT\ MCHAN .LE. NCHM (=6)
NOTE GAMMA RAY CHANNEL FOLLOWS REACTION PAIR
CHANNELS, FISSION CHANNEL FOLLOWS GAMMA RAY CHANNEL

NIN = WHICH REACTION PAIR IS THE INCOMING CHANNEL
LIMIT\ NIN .LE. MCHAN, CANNOT BE GAMMA RAY CHANNEL
OR FISSION CHANNEL

MWLD = 0 IF NO WIDTH FLUCTUATION CORRECTIONS ARE TO BE
APPLIED. = 1 IF CORRECTIONS ARE TO BE APPLIED
TO PARTICLE CHANNELS ONLY. =2 IF TO BE APPLIED
TO PARTICLE AND FISSION CHANNELS. NOTE THAT THE
GAMMA CHANNELS ARE ASSUMED NOT TO BE DIRECTLY
EFFECTED.
CORRECTIONS ARE CALCULATED BY TEPEL, HOFMANN, AND
WEIDENMULLER APPROXIMATIONS
REF\ PHYS. LETT. 49B (1974) 1

TCUT = LOG (BASE 10) OF SMALLEST VALUE OF T(L)/T(L=0)
FOR WHICH TL;S WILL BE CALCULATED

PUN = FLAG DETERMINING WHETHER CROSS SECTIONS WILL
BE PUNCHED
= 0 NO PUNCH, =1 PUNCH

PUNN = FLAG FOR PUNCHING HOW COMPOUND NUCLEUS DECAYS
AS FUNCTION OF REACTION PAIR, ENERGY, AND J-PI
= 0 NO PUNCH, =1 FRACTION WILL BE PUNCHED

NDIR = NUMBER OF DIRECT REACTIONS TO BE CONSIDERED
DIRECT REACTION ARE ASSUMED TO ONLY OCCUR IN THE

INCOMING REACTION PAIR CHANNELS
IF NDIR .GT. 0, NDIR = NUMBER OF CHANNELS FOR WHICH
DIRECT REACTION CROSS SECTIONS GIVEN. LIMIT = 7.
IF NDIR .EQ. 0, NO DIRECT REACTION COMPETITION
IF NDIR .LT. 0, ABS(NDIR) = NUMBER OF ENERGIES FOR
WHICH DIRECT REACTION CROSS SECTIONS. ONLY TOTAL
DIRECT REACTION CROSS SECTIONS GIVEN. LIMIT = 33.

3. DO 3 I =1,MCHAN (SEE CARD 2)
READ (5,503) Z1(I),A1(I),I1(I),ME1(I),A2(I),I2(I),
ME2(I),(COM(I,LL),LL=1,3)
FORMAT (3F5.0,F10.0,3F5.0,F10.0,3A8)

Z1(I) = CHARGE OF PROJECTILE (LIGHT REACTANT)

A1(I) = MASS(OF PROJECTILE (LIGHT REACTANT)

I1(I) = PI*J OF PROJECTILE (LIGHT REACTANT)

ME1(I) = MASS EXCESS OF PROJECTILE (LIGHT REACTANT)

Z2(I) ,A2(I),I2(I), AND ME2(I) HAVE SIMILAR MEANING
AS DO CORRESPONDING X1(I) QUANTITIES EXCEPT REFER
TO TARGET (HEAVY REACTANT)

A;S NORMALLY HAVE INTEGER VALUES (BUT IN F FORMAT)
IF J = 0, THEN USE 0.1 FOR I1 AND I2 WITH PROPER
SIGN
ME EXPRESSED IN MEV

COM(I,LL) = SPACE TO IDENTIFY REACTION PAIR

IF (Z1 .LE. 9 .AND. ME1 .EQ. 0.0) THEN I1 AND ME1
WILL BE ASSIGNED ON BASIS OF Z1*A1
Q VALUE FOR REACTION WILL BE OBTAINED FROM ME;S

4. DO 10 I=1,NCHAN (WHERE NCHAN IS NUMBER OF
REACTION PAIRS IN WHICH BOTH MEMBERS ARE PARTICLES)
READ (5,504) NEL,NL,IPRINT,IPUNCH,NCARDS,IPUN(I)
,COMR
FORMAT (6I5,F10.7)

NEL = NUMBER OF ENERGIES FOR WHICH TL;S WILL BE
CALCULATED (NEL .GT. 0) OR READ IN (NEL .LT. 0.0)
LIMIT\ NEL .LT. NMA (=32)

NL = MAXIMUM NUMBER OF L VALUES FOR TL WANTED
IF NL = 0, THEN SET TO MIN(3*NCARDS,LMA) WHERE LMA
IS MAXIMUM NUMBER OF L VALUES SET BY PROGRAM

LIMIT\ NL .LT. LMA (=32)

IPRINT = FLAG WHICH DETERMINES WHETHER TL;S PRINTED
= 0 TL;S PRINTED, =1 NOT PRINTED

IPUNCH = FLAG WHICH DETERMINES IF TL;S PUNCHED
=0 TL;S PUNCHED, = 1 NOT PUNCHED

NCARDS = NUMBER OF CARDS PER ENERGY READ IN
8 TL;S PER CARD
IF NCARDS = 0, THEN SET TO 4
LIMIT\ NCARDS .LE. 4 (LMA/8)

IPUN(I) = FLAG WHICH DETERMINES IF THE FRACTION OF
COMPOUND NUCLEUS DECAYS INTO THIS CHANNEL WILL BE
PRINTED AND PUNCHED
= 0 NO PRINTING OR PUNCH
= K, K VALUES ARE PRINTED AND (IF PUN =1) PUNCHED
ONE FOR EACH ANGULAR MOMENTUM. BOTH
PARITIES ARE INCLUDED

CORR = FACTOR BY WHICH TL IS TO BE MULTIPLIED
IF (CORR .LE. 0.0) CORR = 1.0

5. IF (NEL .LT. 0) (SEE CARD 4)
READ (5,501) COMNTS
FORMAT (10A8)

COMNTS = FOUR (4) CARDS OF COMNTS
NORMALLY WILL BE FOUR CARDS PUNCHED WHEN TL;S
GENERATED

6. IF (NEL .LT. 0) (SEE CARD 4)
DO 7 J = 1,ABS(NEL) READ (5,505) ET(J),OTTY
FORMAT (F10.0,7E10.3)

ET(J) = ENERGY AT WHICH TL WAS CALCULATED
ET IS IN MEV AND IS ASSUMED TO BE IN C.M. SYSTEM
OTTY (OPTIONAL) = RADIUS IN FERMIS WHERE MATCHING
TO EXTERNAL WAVE FUNCTIONS WAS PERFORMED

7. IF (NEL .LT. 0) (SEE CARD 4)
READ (5,506) (TL(L),L=LL1,LL2,NMA) NL VALUES OF TL
FORMAT (8F10.0)

TRANSMISSION FUNCTIONS FOR L=0,NL-1
EIGHT TL;S PER CARD
TL;S READ IN AS LOG (BASE 10) TL

8. IF (NEL .GT. 0) (SEE CARD 4)
DO 8 J=1,NEL READ (5,506) ET(J) ONE PER CARD
FORMAT (8F10.0)

ET = ENERGY AT WHICH TL;S WILL BE CALCULATED

9. IF (NEL .GT. 0) (SEE CARD 4)
READ (5,507) V0,DV0,DDV0,W0,DW0,WS,DWS,WGAU
FORMAT (8F10.0)

V0 = DEPTH OF REAL NUCLEAR POTENTIAL, ASSUMED TO
BE OF WOODS-SAXON FORM (IN MEV)

DV0 = CHANGE OF DEPTH OF REAL CENTRAL POTENTIAL PER
MEV (MEV/MEV)

DDV0 = SECOND DERIVATIVE WITH RESPECT TO ENERGY OF
THE REAL NUCLEAR POTENTIAL (MEV/MEV**2)

W0 = DEPTH OF IMAGINARY NUCLEAR POTENTIAL, ASSUMED
TO BE OF WOODS-SAXON FORM (IN MEV)

DW0 = CHANGE IN DEPTH OF IMAGINARY CENTRAL POTENTIAL
PER MEV

WS = DEPTH OF IMAGINARY NUCLEAR POTENTIAL,ASSUMED
TO BE OF DERIVATIVE WOODS-SAXON FORM (MEV)

DWS = CHANGE IN DEPTH OF IMAGINARY SURFACE POTENTIAL
PER MEV

WGAU = DEPTH OF IMAGINARY NUCLEAR POTENTIAL,
ASSUMED TO BE IN FORM OF GAUSSIAN
NOTE, BOTH WGAU AND WS SHOULD NOT BE USED IN SAME
CALCULATION

IF V0 = 0.0, THEN DEFAULT VALUES USED FOR V0,DV0,
DDV0,DW0,WS,DWS,WGAU
FOR PROTONS BECCHETTI AND GREENLEES
REF\ PHYS. REV. 182 (1969) 1190
NEUTRONS- WILMORE AND HODGSON (AS CORRECTED BY
HODGSON)
REF NUCL. PHYS. 55(1964) 673
DEUTERONS, PEREY AND PEREY
REF\ PHYS. REV. 132 (1963) 755
MASS = 3, BECCHETTI AND GREENLEES
REF\ ANN. REPT, U. OF MINN 1969
ALPHA, MCFADDEN AND SATCHLER

REF\ NUCL. PHYS. 64 (1966) 177

10. IF (NEL .GT. 0) (SEE CARD 4)
READ (5,508. RO,RR,RI,AP.AI,RC,NDIF,DELR
FORMAT (8F10.3)

RO = COULOMB RADIUS (FERMIS*A**(-1/3))

RR = REAL RADIUS (FERMIS*A**(-1/3))

RI=IMAGINARY RADIUS (FERMIS*A**(-1/3))

AR = REAL DIFUSENESS (FERMIS)

AI = IMAGINARY DIFUSENESS (FERMIS)

RC = SHIFT FROM SURFACE AT WHICH GAUSIAN POTENTIAL IS PEAKED (FERMIS)

ACTUAL RADIUS = R*A2(1)**(1/3)
IF (RO .EQ. 0.0) THEN DEFAULT VALUES ARE USED FOR RO,RR,RI,AR,AI

NDIF = NUMBER OF DIFUSENESS LENGTHS PASSED NUCLEAR RADIUS (AS DETERMINED BY RO) AT WHICH MATCHING WILL BE DONE TO EXTERNAL WAVEFUNCTIONS
IF (NDIF .EQ. 0) NDIF = 15.0

DELR = INTEGRATION STEP SIZE (FERMIS)
IF (DELR .EQ. 0.0) DELR = 0.05 * AR
LIMIT\ MATCHING RADIUS (= RO*A2(NIN)**(1/3) + NDIF*AR) MUST BE LESS THAN NPIST (=2000)*DELR

11. IF HAVE GAMMA RAYS
READ (5,504) NEL,NL,IPRINT,IPUNCH,NCARDS,
IPUN(NCHAN+1),CORR
FORMAT (6I5,F10.0)

SYMBOLS HAVE SAME MEANING AS CARD 4

12. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS NEGATIVE
READ (5,501) (COMNTS(II),II=1,40)
FORMAT (8A10)

SAME AS FOR CARD 5

13. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS NEGATIVE, DO 15 J=1,ABS(NEL)
READ (5,505) TGE(J)
FORMAT (F10.0,7E10.3)

TGE IS ENERGY AT WHICH TL WAS CALCULATED
ONE PER CARD

14. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS NEGATIVE
READ (5,506) (TGP(L),L=J,LL2,NMA) NL VALUES
FORMAT (8F10.0)

TGP=GAMMA TRANSMISSION FUNCTIONS FOR ENERGY TGE HAVING POSITIVE PARITY FOR J = 0,NL-1
8 TL;S PER CARD

15. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS NEGATIVE
READ (5,506) (TGN(L),L=J,LL2,NMA) NL VALUES
FORMAT (8F10.0)

TGN = GAMMA TRANSMISSION FUNCTIONS FOR ENERGY TGE HAVING NEGATIVE PARITY FOR J = 0,NL-1
8 TL;S PER CARD

16. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS POSITIVE, DO 16 J=1,NEL
READ (5,508) TGE(J)
FORMAT (8F10.0)

TGE= ENERGY AT WHICH TL WILL BE CALCULATED
ONE PER CARD

17. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS POSITIVE
READ (5,506) SMRE,GRE,ERE,DUM
FORMAT (8F10.0)

SMRE = FRACTION OF E1 SUM RULE TO BE USED

GRE = WIDTH (IN MEV) OF E1 GIANT RESONANCE

SMRE = ENERGY (IN MEV) OF GIANT E1 RESONANCE DIVIDED BY A**(-1/3)

DUM = FRACTION OF WEISKOPF;S M1 TO BE USED

IF SMRE .EQ. 0.0, THEN VALUES FROM HOLMES AND WOOLSEY
WILL BE USED FOR SMRE,ERE,GRE, AND DOM
REF\ REV. MOD. PHYS. TO BE PUBLISHED

18. IF HAVE GAMMA RAYS AND NEL OF CARD 11 IS POSITIVE
READ (5,506) ECC,AG,DELG
FORMAT (8F10.0)

ECC = NOT USED

AG = A PARAMETER OF BACK-SHIFTED FERMI GAS LEVEL DENSITY (NOTE B = 0 FOR THIS CASE)

DELG = PAIRING ENERGY OF LEVEL DENSITY

NOTE AG AND DELG OVERRIDE PARAMETERS ON CARD 21 FOR COMPOUND NUCLEUS
IF (AG .EQ. 0.0) THEN AG AND DELG SET TO VALUES DETERMINED BY HOLMES AND WOOLSEY
REF\ REV. MOD. PHYS. TO BE PUBLISHED

19. IF HAVE FISSION
READ (5,504) NFE,NFL,NPRINT,NPUNCH,NCARDS, IPUN(NCHAN+2),CORR
FORMAT (6I5,F10.0)

SYMBOLS HAVE SAME MEANING AS SYMBOLS IN CORRESPONDING POSITIONS OF CARD 4

20. IF HAVE FISSION AND NFE OF CARD 19 IS NEGATIVE
DO 22 J = 1,ABS(NFE)
FORMAT (F10.0,7E10.3)

TFE IS THE ENERGY AT WHICH TL WAS CALCULATED
ONE PER CARD

21. IF HAVE FISSION AND NFE OF CARD 19 IS NEGATIVE
READ (5,506) (TFP(L),L=J,LL2,NMA) NL VALUES

TFP = FISSION TRANSMISSION FUNCTIONS FOR ENERGY TFE HAVING POSITIVE PARITY FOR J=0,NL-1
8 TL'S PER CARD

22. IF HAVE FISSION AND NFE OF CARD 19 IS NEGATIVE

READ (5,506) (TFN(L),L=4,LL2,NMA) NL VALUES
FORMAT (8F10.0)

TFN = FISSION TRANSMISSION FUNCTIONS FOR ENERGY TFE HAVING NEGATIVE PARITY FOR J=0,NL-1
8 TL'S PER CARD

23. IF HAVE FISSION AND NFE OF CARD 19 IS POSITIVE
DO 23 J=1,NFE
READ (5,508) TFE(J)
FORMAT (8F10.0)

TFE = ENERGY AT WHICH TL WILL BE CALCULATED
ONE PER CARD

24. IF HAVE FISSION AND NFE OF CARD 19 IS POSITIVE
READ (5,506) HOM1,HOM2,EBAR1,EBAR2
FORMAT (8F10.0)

HOM1 = H-BAR OMEGA FOR BARRIER 1 (MEV)

HOM2 = H-BAR OMEGA FOR BARRIER 2 (MEV)

EBAR1 = ENERGY OF BARRIER 1 (MEV)

EBAR2 = ENERGY OF BARRIER 2 (MEV)

IF (EBAR1 .LT. 0.5) USE DEFAULT VALUES FOR HOM1, HOM2,EBAR1, EBAR2. VALUES OBTAINED FROM LEAST SQUARES TO DATA OF BRITT ET AL (D,PF)

25. IF HAVE FISSION AND NFE IS POSITIVE
READ (5,509) FDE,FDEL,FA,FB,FC,FEO,FTT,FK
FORMAT (7F10.0,2F5.0)

SYMBOLS (EXCEPT FDE) HAVE SAME MEANING AS SYMBOLS IN CORRESPONDING POSITIONS OF CARD 27
FDE IS NOT USED

51. IF (NDIR .GT. 0)
READ (5,501) NED,(DIREX(I),I=1,NDIR)
FORMAT (I10,7F10.0)

NED = NUMBER OF ENERGIES AT WHICH DIRECT REACTION CROSS SECTIONS WILL BE GIVEN LIMIT = 35

DIREX(I) = ENERGY OF LEVEL (I) TO WHICH DIRECT

REACTION PROCEEDS. THE ENERGY MUST BE SAME AS FOR
ONE OF THE LEVELS IN THE INCOMING REACTION PAIR
GIVEN ON CARD 27.

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52.       IF (NDIR .GT. 0)
READ (5,502) (DIRE(I),I=1,NED)
FORMAT (8F10.0)
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DIRE(I) = ENERGY (I) AT WHICH DIRECT REACTION CROSS
SECTION IS GIVEN

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53.       IF (NDIR .GT. 0)  DO 53 I=1,NED
READ (5,502) (DIRI(I,J),J=1,NDIR
FORMAT (8F10.0)
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DIRI(I,J) = DIRECT REACTION CROSS SECTION GIVEN FOR
ENERGY DIRE(J) FOR LEVEL DIREX(I)

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54.       IF (NDIR .LT. 0)
READ (5,502) (DIRE(I),I=1,NED)
FORMAT (8F10.0)
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DIRE(I) = ENERGY (I) AT WHICH DIRECT REACTION CROSS
SECTION IS GIVEN

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55.       IF (NDIR .LT. 0)
READ (5,502) (DIRI(I),I=1,NED)
FORMAT (8F10.0)
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DIRI(I) = TOTAL DIRECT REACTION CROSS SECTION AT
ENERGY DIRE(I)

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26.00 32 MI = 1,MCHAN
READ (5,500) N,NLEV,NER,START,CCUT,CORR
 FORMAT (7F10.0,2F5.0)
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N = REACTION PAIR NUMBER FOR WHICH LEVEL INFORMATION
WILL FOLLOW.
IF N .EQ. 0 THEN N SET TO MI

NLEV = NUMBER OF DISCRETE LEVELS TO BE READ IN
LIMIT\ TOTAL NUMBER OF DISCRETE STATES MUST BE
LESS THAN NLISM (=100)

NER = NUMBER OF COMPETING REACTION PAIRS COMPETING
IN THIS RESIDUAL NUCLEUS
LIMIT\ TOTAL NUMBER OF COMPETING REACTION PAIRS FOR

ALL RESIDUAL NUCLEI MUST BE LESS THAN NUC (=7)

START = ENERGY (IN MEV) ABOVE LAST DISCRETE STATE
READ IN THE LEVEL CONTINUM WILL START

CCUT = MIN. SPIN CUTOFF FACTOR
IF (CCUT .LE. 0.0) CCUT = 3.0+0.025*A2(N)

CORR = ENERGY WHICH IS SUBTRACTED FROM EXCIT(K)

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27.  DO 27 J = 1,LEV
READ (5,101) EXCIT(K),JP(K),NSIG,(COMNTS(I),I=1,6)
FORMAT (2F10.0,I10,6A6)
FORMAT (2F10.0,I10,6A6)
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EXCIT(K) = EXCITATION ENERGY (IN MEV) OF DISCRETE
LEVEL.

JP(K) = PI*J OF DISCRETE LEVEL
IF J = 0, THEN USE J= 0.1 WITH PROPER SIGN

NSIG = FLAG WHICH DETERMINES WHETHER CROSS SECTION
WILL BE PRINTED OR PUNCHED.
NSIG = 0 NO OUTPUT
NSIG = 1 CROSS SECTION PRINTED AND (IF PUNH .EQ. 1)
PUNCHED
NSIG .LT. 0 ANGULAR DISTRIBUTIONS WILL BE GIVEN
FOR ABS(NSIG) POINTS EQUALLY SPACED IN ANGLE
BETWEEN 0 AND 90 DEGREES. NOTE CROSS SECTIONS ARE
SYMETRIC ABOUT 90
SYMMETRIC ABOUT 90 DEGREES. A LIMIT OF NANG (=12)
ANGLES CAN BE CALCULATED.
DECAY TO THIS LEVEL WILL BE OUTPUTTED IF REACTION
PAIR FRACTION ALSO DESIRED
LIMIT\ NO MORE THAN NUIP (=20) CAN BE PRINTED
FOR ALL REACTION CHANNELS
NO OUTPUT FOR DISCRETE STATES IS ALLOWED FOR GAMMA RAYS
OR FISSION

COMNTS(II) = COMENTS CONCERNING DISCRETE STATE

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28. READ (5,501) DE(N),XDEL(N),XA(N),XB(N),
XC(N),XEX(N),XEQ(N),XIT(N),XK(N)
FORMAT (7F10.0,2F5.0)
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DE(N) = INTEGRATION STEP SIZE IN CALCULATING
CONTRIBUTION FROM CONTINUM
IF DE .EQ. 0.0 THEN DE SET TO 0.5
IF DE .LT. 0., CROSS SECTIONS WILL BE GIVEN FOR

CONTINUUM STATES IN ENERGY STEPS OF AES(DL)

XDEL(N) = PAIRING ENERGY IN FERMI GAS FORMULA

XA(N) = A PARAMETER IN FERMI GAS FORMULA
IF (XA .EQ. 0.0)THEN XA,XB,XC,XDEL SET TO VALUES
OF HOLMES AND WOOLSEY
REF\ REV. MOD. PHYS. TO BE PUBLISHED

XB(N) = B PARAMETER IN RELATIONSHIP BETWEEN
EXCITATION ENERGY AND NUCLEAR TEMPERATURE.
E -XDEL = A*T*T + B*T

XC(N) = SPIN CUTOFF FACTOR (USUALLY DENOTED SIGMA
IN THE LITERATURE) SQUARED DIVIDED BY THE NUCLEAR
TEMPERATURE

XEX(N) = ENERGY BELOW WHICH USE CONSTANT
TEMPERATURE FORMULA

XEC(N) = PAIRING ENERGY IN CONSTANT TEMPERATURE
FORMULA

XTT(N) = TEMPERATURE (IN MEV) OF CONSTANT
TEMPERATURE FORMULA

XK(N) = MULTIPLACATIVE FACTOR BY WHICH LEVEL
DENSITY IS ALTERED.
IF XK .EQ. 0.0 THEN XK SET TO 1.0

29. IF (NBR .NE. 0) DO 32 I=1,NBR
READ (5,502) NE,NCARDS,JPU,(COSEP(I,MM),MM=1,3)
FORMAT (3I5,15X,3A8)

NE = NUMBER OF ENERGIES READ IN TO GIVE FRACTION
OF DECAYS OF RESIDUAL NUCLEUS INTO THIS REACTION PAIR
LIMIT\ NE .LE. NMA (=32)

NCARDS = NUMBER OF CARDS READ IN PER ENERGY PER
PARITY, WITH 6 FRACTIONS PER CARD
IF NCARDS .EQ. 0 THEN NCARDS SET TO 4
LIMIT\ NCARDS .LE. 4 (LMA/8)

JPU = NOT USED

COSEP( ) = SPACE FOR COMENTS

30. DO 32 J=1,NE
READ (5,503) HFE(J)

FORMAT (F10.3)

HFE(J) = ENERGY AT WHICH FRACTION OF RESIDUAL
(THEN COMPOUND) NUCLEUS DECAY WAS CALCULATED
ONE PER CARD

31. READ (5,501) (HFTP(L),L=LL1,LL2,NMA)
READ IN (8*NCARDS-1) VALUES, 8 PER CARD
FORMAT (8F10.1)

HFTP(L) = FRACTION OF COMPOUND DECAYS GOING INTO
PARTICULAR REACTION PAIR FOR POSITIVE PARITY AS
FUNCTION OF J

32. READ (5,501) (HFTN(L),L=LL1,LL2,NMA)
READ IN (8*NCARDS-1) VALUES, 8 PER CARD
FORMAT (8F10.1)

HFTN(L) = FRACTION OF COMPOUND DECAYS GOING INTO
PARTICULAR REACTION PAIR FOR NEGATIVE PARITY AS
FUNCTION OF J

33. READ (5,551) NJOB,IPRE
FORMAT (I5,2F10.0)

NJOB = NUMBER OF ENERGIES AT WHICH HAUSER-FESHBACH
CALCULATIONS WILL BE PERFORMED
IF (NJOB .EQ. 0) THEN NJOB SET TO 100

IPRE=FLAG FOR PRE-EQUILIBRIUM
IPRE=0, NO PRE-EQUILIBRIUM CALCULATION
IPRE .GT. 0, PRE-EQUILIBRIUM CALCULATION
AND (IF NIN .EQ. 1) DIRECT (N,A) CALCULATION

34. IF (IPRE .GT. 0)
READ (5,501) NPART,NHOLE,EBMAX,F2
FORMAT (2I5,2F10.3)

NPART=NUMBER OF PARTICLES IN FIRST STAGE OF
CALCULATION (DEFAULT=A-PROJECTILE+1)

NHOLE=NUMBER OF HOLES IN FIRST STAGE OF CALCULATION
(DEFAULT=1)

EBMAX=MAXIMUM INCIDENT ENERGY (DEFAULT=20.)

F2=REDUCED MATRIX ELEMENT (DEFAULT=1.35)

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35.  DO 35 NNJOB=1,NJOB
READ (5,530) ECM,JMAX
FORMAT (8F10.0)

ECM = ENERGY (IN MEV AND IN CENTER OF MASS) AT
WHICH CALCULATIONS WILL BE PERFORMED
IF (ECM .LT. 0.0) THEN ECM READ IN IS TREATED AS ELAB

JMAX = MAXIMUM ANGULAR MOMENTUM COMPOUND NUCLEUS
CAN SUPPORT WHEN BOMBARDED BY REACTION PAIR NIN
AT ENERGY ECM
IF (JMAX .EQ. 0.0) THEN JMAX SET TO MAXIMUM VALUE
ALLOWED BY PROGRAM
LIMIT\ JMAX .LE. LMA (=32)


36.   READ (5,502) IXP
FORMAT (315,5X,6F10.0)

IXP = CONTROL OF START OF NEW CALCULATIONS
IXP .LT 0   CONTROL STARTS WITH CARD 1
IXP .EQ. 0  PROGRAM STOPS
IXP .GT. 0    CONTROL STARTS AT CARD 27
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