Principal cross sections

Energy (MeV)

Cross section (barns)

- total
- absorption
- elastic
- gamma production

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance total cross section

Energy (MeV)

Cross section (barns)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance total cross section

Energy (MeV)

Cross section (barns)

10^-2

10^-1

10^0

10^1
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance total cross section
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance total cross section

Energy (MeV)

Cross section (barns)

total
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance absorption cross sections

![Graph showing resonance absorption cross sections.](image-url)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance absorption cross sections

Energy (MeV)

Cross section (barns)

capture
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance absorption cross sections

Cross section (barns)

Energy (MeV)

capture
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
resonance absorption cross sections

Cross section (barns)

Energy (MeV)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Non-threshold reactions

Cross section (barns)

Energy (MeV)

$10^{-3}$

(n,gma)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Inelastic levels

Cross section (barns) vs. Energy (MeV)

- (n,n*1)
- (n,n*2)
- (n,n*3)
- (n,n*4)
- (n,n*5)
Inelastic levels

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99

Energy (MeV)

Cross section (barns)

- (n,n*6)
- (n,n*7)
- (n,n*8)
- (n,n*9)
- (n,n*10)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Inelastic levels

![Graph showing inelastic levels with cross sections in barns vs energy in MeV. The curves represent different inelastic reactions: (n,n*21), (n,n*22), (n,n*23), (n,n*24), (n,n*25).]
Threshold reactions

Cross section (barns) vs. Energy (MeV)

- (n,x)
- (n,2n)
- (n,n*)a
- (n,n*)p
- (n,n*)d
Threshold reactions

Energy (MeV)

Cross section (barns)

- (n,t)
- (n,a)
- (n,2a)
- (n,2p)
- (n,pa)
Threshold reactions

Cross section (barns) vs. Energy (MeV) for the reactions (n,p*11), (n,p*12), (n,p*13), (n,p*14), and (n,p*15).
The graph illustrates the threshold reactions for the reaction $N + 13$AL$-27$ in ENDF/B-VI.6 with APT LA150 and NJOY 99. The x-axis represents the energy (MeV) ranging from 6 to 20, while the y-axis represents the cross section in barns ($\times 10^{-3}$) ranging from 0 to 6. The reactions are labeled as (n,d$^*$0), (n,d$^*$1), (n,d$^*$2), (n,d$^*$3), and (n,d$^*$4). The curves show different behaviors at various energies, indicating the threshold effects for different reactions.
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Threshold reactions

Energy (MeV) vs Cross section (barns)

- (n,d*10)
- (n,d*11)
- (n,d*12)
- (n,d*13)
- (n,d*14)
Threshold reactions

Cross section (barns)

Energy (MeV)

(n,d*15)
(n,d*16)
(n,d*17)
(n,d*18)
(n,d*19)
Threshold reactions

Cross section (barns) vs. Energy (MeV)

- (n,t*9)
- (n,t*10)
- (n,t*c)
- (n,a*0)
- (n,a*1)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Threshold reactions

![Graph showing cross section for different reactions vs energy](image-url)
Threshold reactions

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99

Energy (MeV)

Cross section (barns)

- (n,a*12)
- (n,a*13)
- (n,a*14)
- (n,a*15)
- (n,a*16)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for elastic
angular distribution for elastic
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*1)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*2)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*3)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for \((n,n^*4)\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*5)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n*6)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*7)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*8)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*9)

\[ P = \cos^{-1} \cdot 10^0 \]

\[ \text{Energy (MeV)} \]

\[ \text{Cosine} \]

\[ \text{Prob/Cos} \]
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n*10)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*11)
angular distribution for (n, n*12)
angular distribution for \((n,n*13)\)
angular distribution for (n,n*14)

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n*15)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*16)
angular distribution for (n,n*17)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n^{*}18)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*19)
angular distribution for (n,n*20)
angular distribution for (n, n*21)
angular distribution for \((n,n^*22)\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*23)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n^*24)
angular distribution for (n, n*25)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*26)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n^*27)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n*29)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99 angular distribution for (n,n*30)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,n*31)
angular distribution for \((n,n^*32)\)
angular distribution for (n,n*33)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99 angular distribution for (n,n*34)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,n*36)
angular distribution for (n,n*37)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99

angular distribution for (n,n*38)
angular distribution for \((n,n^*39)\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Neutron emission for (n,x)
Neutron emission for (n,2n)
Neutron emission for \((n,n^*)a\)
Neutron emission for \((n,n^*)p\)
Neutron emission for (n,n*)d

Energy (MeV) vs. Sec. Energy

Probability vs. Energy (MeV)
Neutron emission for (n,n*)t

Energy (MeV)

Sec. Energy 0.0 400 600 8.8 18.8 19.0 19.2 19.4 19.6 19.8 20.0

Prob./MeV 10^-3 10^-1 10^0
Neutron emission for \((n,n^*c)\)
Photon emission for (n,\gamma)
Photon emission for (n,x)
Photon emission for (n,2n)
Photon emission for \((n,n^*)a\)

\[E_\gamma (\text{MeV}) \quad E_n (\text{MeV}) \quad \text{Prob}/\text{MeV}\]
Photon emission for \((n,n^*)p\)
Photon emission for (n,n*)d
Photon emission for (n,n*)t
Photon emission for \((n,n^*1)\)
Photon emission for (n,n*2)
Photon emission for \((n,n^{*}3)\)
Photon emission for (n,n*4)
Photon emission for (n,n*5)
Photon emission for (n,n*6)
Photon emission for \((n,n^*7)\)
Photon emission for (n,n*8)
Photon emission for $(n,n^*9)$
Photon emission for (n,n*10)

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Photon emission for 

\( (n,n*11) \)
Photon emission for (n,n*12)
Photon emission for (n,n*13)
Photon emission for (n,n*14)
Photon emission for (n,n*15)
Photon emission for (n,n*16)
Photon emission for (n,n\textsuperscript{*}17)
Photon emission for (n,n*18)
Photon emission for (n,n*19)
Photon emission for (n,n*20)

\[ P_{\gamma}(E_{\gamma}, E_n) \]

\( E_n \text{ (MeV)} \)

\( E_{\gamma} \text{ (MeV)} \)

Prob/MeV

10^0

10^{-2}

10^{-4}

10^{-6}

10^{-8}

10^{-10}

10^{-12}

10^{-14}

10^{-16}

0

5

10

20

40

60

80

100

120

140

160
Photon emission for (n,n*21)
Photon emission for \((n,n^*23)\)
Photon emission for $(n,n^*24)$
Photon emission for (n,n*25)
Photon emission for (n,n*26)
Photon emission for (n,n*27)
Photon emission for (n,n*28)
Photon emission for (n,n^*29)
Photon emission for (n,n*30)
Photon emission for (n,n^*31)
Photon emission for (n,n*32)
Photon emission for (n,n*33)
Photon emission for (n,n*34)
Photon emission for (n,n*35)
Photon emission for (n,n*36)
Photon emission for (n,n*37)
Photon emission for \((n,n^*38)\)
Photon emission for (n,n*39)
Photon emission for (n,n*c)
Photon emission for (n,2a)
Photon emission for (n,2p)
Photon emission for (n,pa)
Photon emission for (n,da)

Eγ (MeV)

Prob./MeV

E_n (MeV)
Photon emission for (n,p*1)
Photon emission for (n,p*2)
Photon emission for (n,p*3)
Photon emission for (n,p*4)
Photon emission for (n,p*5)
Photon emission for (n,p*6)
Photon emission for (n,p*7)
Photon emission for (n,p*8)
Photon emission for (n,p*9)
Photon emission for (n,p*10)
Photon emission for (n,p*11)
Photon emission for (n,p*12)
Photon emission for (n,p*13)
Photon emission for (n,p^14)
Photon emission for (n,p\*15)
Photon emission for (n,p*16)
Photon emission for (n,p*17)
Photon emission for (n,p*18)
Photon emission for (n,p*19)
Photon emission for \((n, p^*c)\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Photon emission for (n,d*1)
Photon emission for \((n,d^*2)\)
Photon emission for (n,d*3)

\[ E_{\gamma}(\text{MeV}) \times 10^0 \]

\[ E_n(\text{MeV}) \times 10^{1.6} \]

\[ \text{Prob/MeV} \times 10^{1.2} \]
Photon emission for (n,d*4)
Photon emission for (n,d*5)
Photon emission for (n,d*6)
Photon emission for (n,d*7)
Photon emission for (n,d*8)
Photon emission for (n,d*9)
Photon emission for (n,d*10)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Photon emission for (n,d*11)
Photon emission for (n,d*12)
Photon emission for (n,d*13)
Photon emission for (n,d*14)
Photon emission for (n,d*15)
Photon emission for (n,d*16)
Photon emission for (n,d*17)
Photon emission for (n,d*18)
Photon emission for (n,d*19)
Photon emission for (n,d*c)
 Photon emission for $(n,t^*1)$
Photon emission for (n,\textit{t}^*2)
Photon emission for (n,t*3)
Photon emission for (n,t*4)
Photon emission for (n,t*5)
Photon emission for (n,\(t^*6\))
Photon emission for (n,t*7)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Photon emission for (n,t*8)
Photon emission for $(n, t^*9)$
Photon emission for (n,t*10)
Photon emission for (n,t*c)
Photon emission for (n,a*1)
Photon emission for (n,a*2)
Photon emission for (n,a*3)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
Photon emission for (n,a*4)
Photon emission for (n,a*5)
Photon emission for (n,a*6)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 ND2Y 99
Photon emission for (n,a*7)
Photon emission for \((n,a^8)\)
Photon emission for (n,a*9)
Photon emission for (n,a*10)
Photon emission for (n,a*11)
Photon emission for \((n,a^{*12})\)
Photon emission for (n,a*13)
Photon emission for (n,a*14)

\[
\text{Prob/MeV} \quad 10^{-2} \quad 0 \quad 10^0 \quad 10^{-1}
\]

\[
E_n (\text{MeV}) \quad 0 \quad 20 \quad 40 \quad 60 \quad 80 \quad 100 \quad 120 \quad 140 \quad 160
\]

\[
E_\gamma (\text{MeV}) \quad 0 \quad 2 \quad 4
\]
Photon emission for (n,a*15)
Photon emission for (n,a*16)
Photon emission for (n,a*17)
Photon emission for (n,a*18)
Photon emission for (n,a*19)
Photon emission for (n,a*c)
thermal capture photon spectrum
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
14 MeV photon spectrum
Particle production cross sections

Energy (MeV)

Cross section (barns)

- Protons
- Deuterons
- Tritons
- Alphas
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from \( (n,x) \)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from (n,n*)p
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from (n,x)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from (n,2p)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from (n,pa)
angular distribution for (n,p*0) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,p*1) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,p*2) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,p*3) proton
angular distribution for (n,p*4) proton
angular distribution for (n,p*5) proton

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99

Probl/Cos

1.0 0.5 0.0 -0.5 -1.0 0

Energy (MeV)

120 140 160

1.0 1.5 2.0 2.5

Cosine
angular distribution for (n,p^*6) proton
angular distribution for \((n,p^*7)\) proton
angular distribution for (n,p*8) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,p*9) proton
angular distribution for (n,p*10) proton
angular distribution for (n,p*11) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,p*12) proton

Energy (MeV)

1.0 0.5 0.0 -0.5 -1.0 0 20 40 60 80 100 120 140 160

Cosine

Probl/Cos

10^0
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,p*13) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,p*14) proton
angular distribution for (n,p*15) proton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,p*16) proton
angular distribution for (n,p*17) proton

Prob/Cos

Cosine

Energy (MeV)

-1.0 -0.5 0.0 0.5 1.0

10^0

1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0
angular distribution for (n,p*18) proton
angular distribution for (n,p*19) proton

Energy (MeV)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
protons from (n,p* c)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
deuterons from \( (n,x) \)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
deuterons from \((n,n^*)d\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
deuterons from (n,da)
angular distribution for (n,d*0) deuteron
angular distribution for (n,d*) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,d*2) deuteron
angular distribution for (n,d*3) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,d*4) deuteron

Prob/Cos

10^0

Cosine

1.0 0.5 0.0 -0.5 -1.0 0

Energy (MeV)

20 40 60 80 100 120 140 160
angular distribution for (n,d*5) deuteron

Energy (MeV)

Cosine

Prob/Cos

10^0

1.0  0.5  0.0  -0.5  -1.0  0

120 140 160
angular distribution for (n,d*6) deuteron
angular distribution for (n,d*7) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,d*8) deuteron
angular distribution for (n,d*9) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,d*10) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,d*11) deuteron
angular distribution for (n,d*12) deuteron
angular distribution for (n,d*13) deuteron
angular distribution for (n,d*14) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,d*15) deuteron
angular distribution for \((n,d^{*16})\) deuteron
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,d*17) deuteron
angular distribution for (n,d*18) deuteron
angular distribution for (n,d*19) deuteron
deuterons from (n,d\(^*\)c)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
tritons from (n,x)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*0) triton

Energy (MeV)

Cosine

Prob/Cos

10^0

1.0 0.5 0.0 -0.5 -1.0 0 20 40 60 80 100 120 140 160
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*1) triton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*2) triton

Prob/Cos

1.0 0.5 0.0 -0.5 -1.0 0

Energy (MeV)

10^0

1.0 0.5 0.0 -0.5 -1.0 0

Cosine
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n, t*3) triton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*4) triton
angular distribution for (n,t*5) triton
angular distribution for (n,t*6) triton
angular distribution for \((n, t^*7)\) triton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*8) triton
angular distribution for \( (n,t^*9) \) triton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,t*10) triton
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
tritons from (n,t*c)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from (n,x)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from (n,n*)a
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from (n,x)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NDY 99
alphas from (n,2a)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from (n,pa)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from \((n,da)\)
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for \((n,a^*0)\) alpha

\[
\text{Energy (MeV)}
\]

\[
\text{Cosine}
\]

\[
\text{Prob.Cos}
\]

\[10^0\]
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*1) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,a*2) alpha

Prob/Cos

1.0 0.5 0.0 -0.5 -1.0 0

Energy (MeV)

10^0

N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,a*2) alpha

Prob/Cos

1.0 0.5 0.0 -0.5 -1.0 0

Energy (MeV)

10^0
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,a*3) alpha
angular distribution for (n,a*4) alpha
angular distribution for (n,a^5) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*6) alpha

Energy (MeV)

Cosine

1.0 0.5 0.0 -0.5 -1.0

Prob/Cos

10^0

10^1
angular distribution for (n,a*7) alpha
angular distribution for (n,a*8) alpha
angular distribution for (n,a*9) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*10) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
angular distribution for (n,a*11) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*12) alpha
angular distribution for (n,α*13) alpha
angular distribution for (n, a*14) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99

angular distribution for (n,a*15) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99

angular distribution for (n,a*16) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*17) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJQY 99
angular distribution for (n,a*18) alpha
angular distribution for (n,a*19) alpha
N + 13-AL-27 ENDF/B-VI.6 APT LA150 NJOY 99
alphas from (n,a*c)