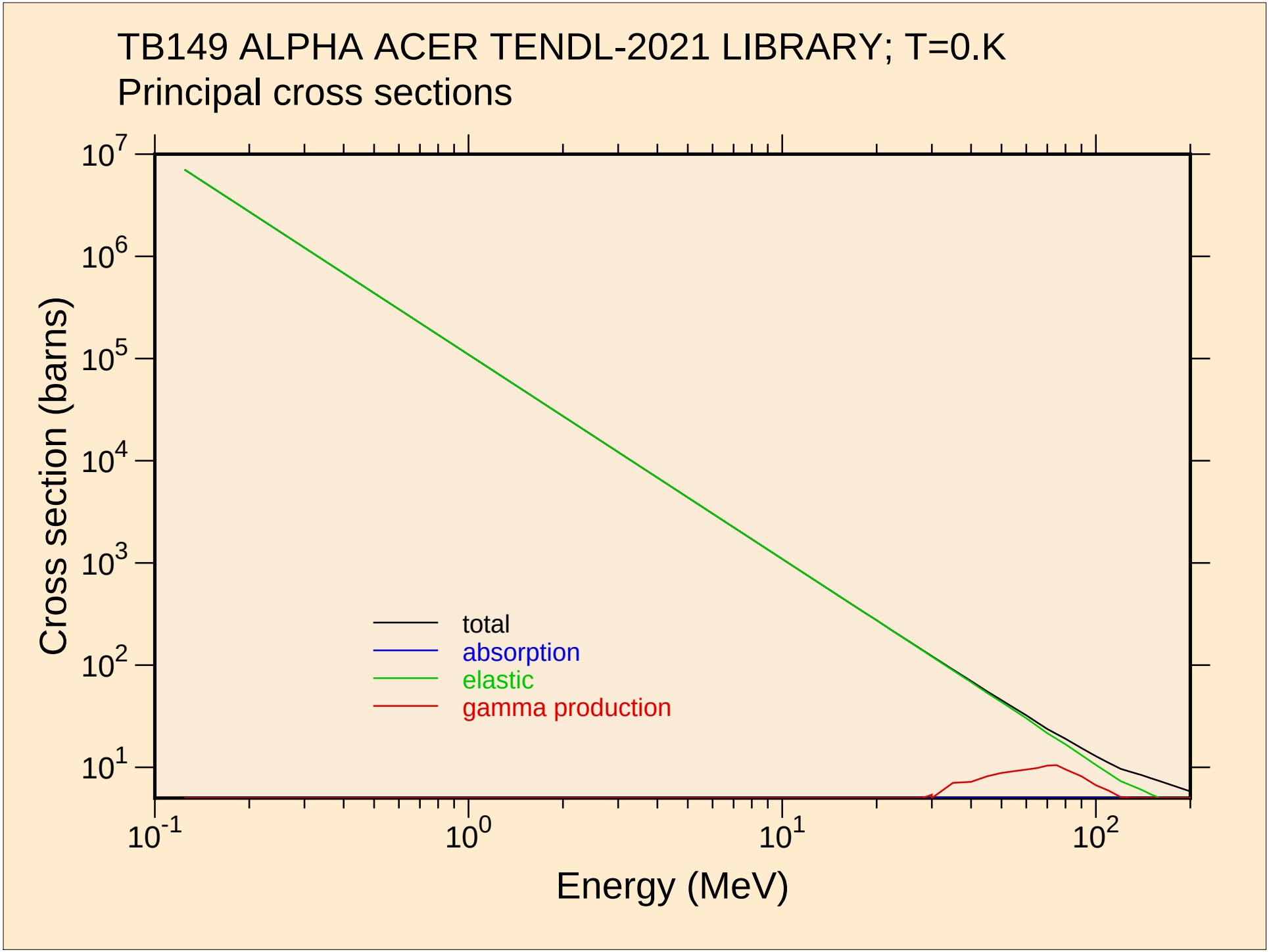
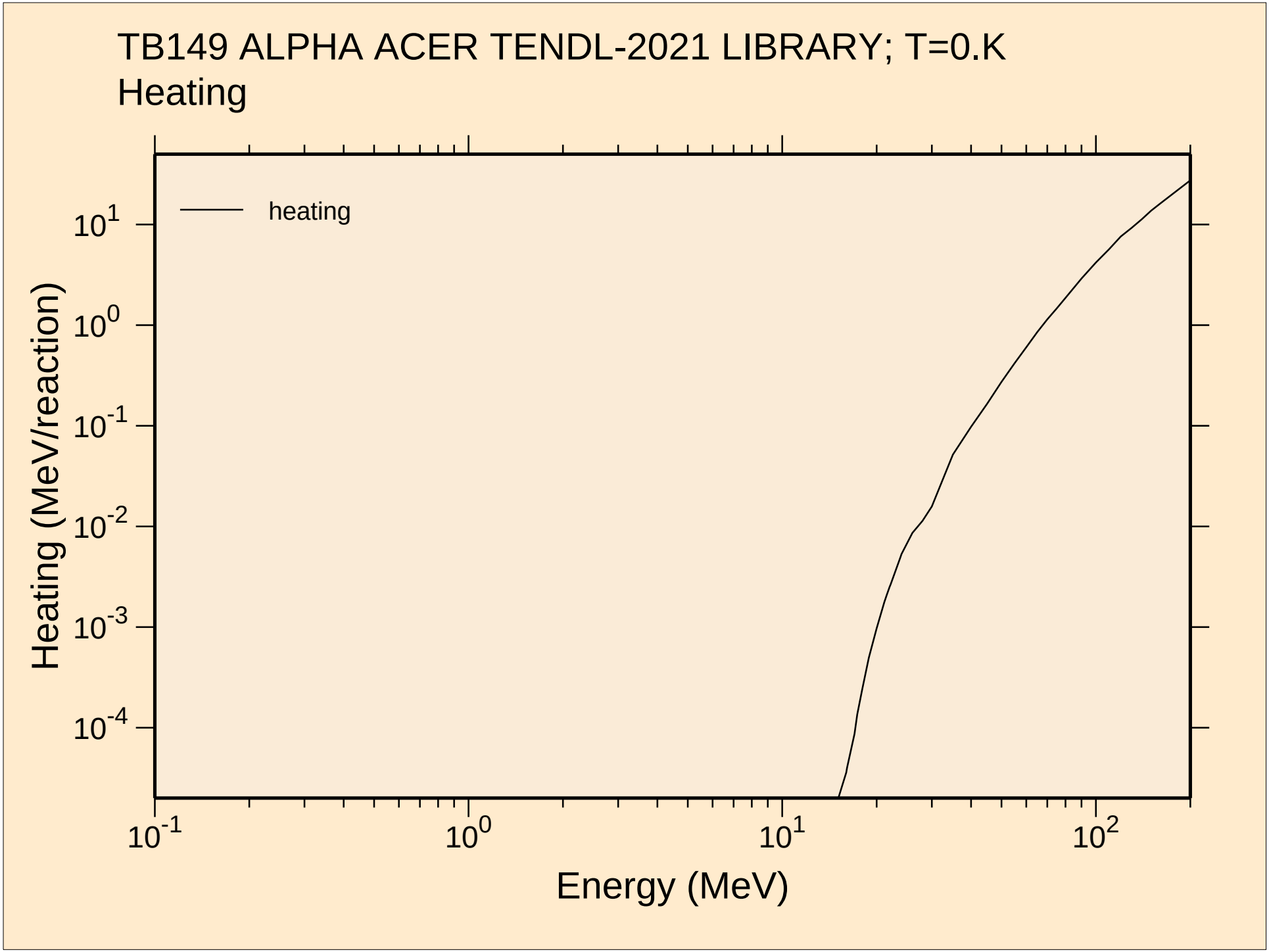
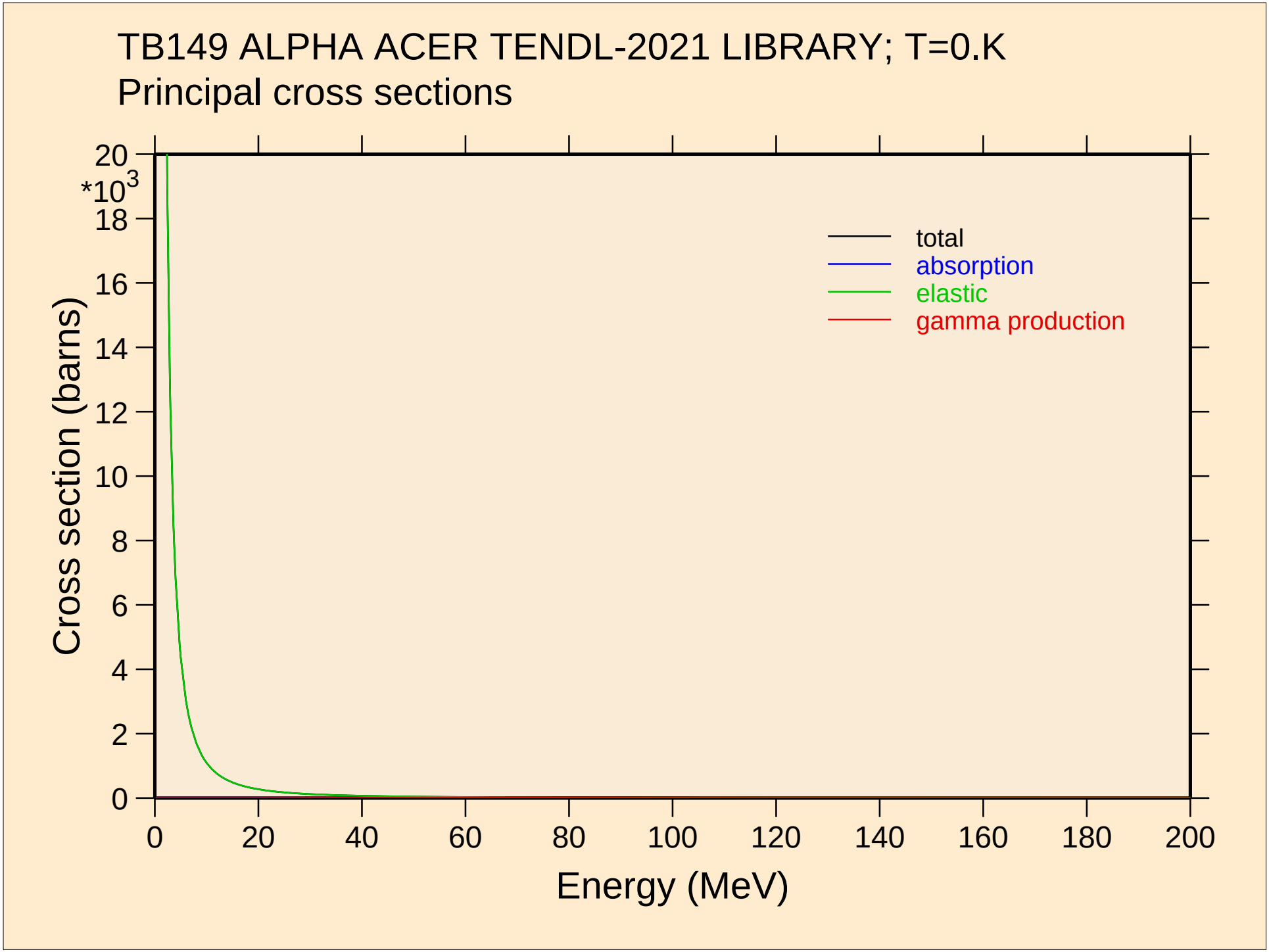
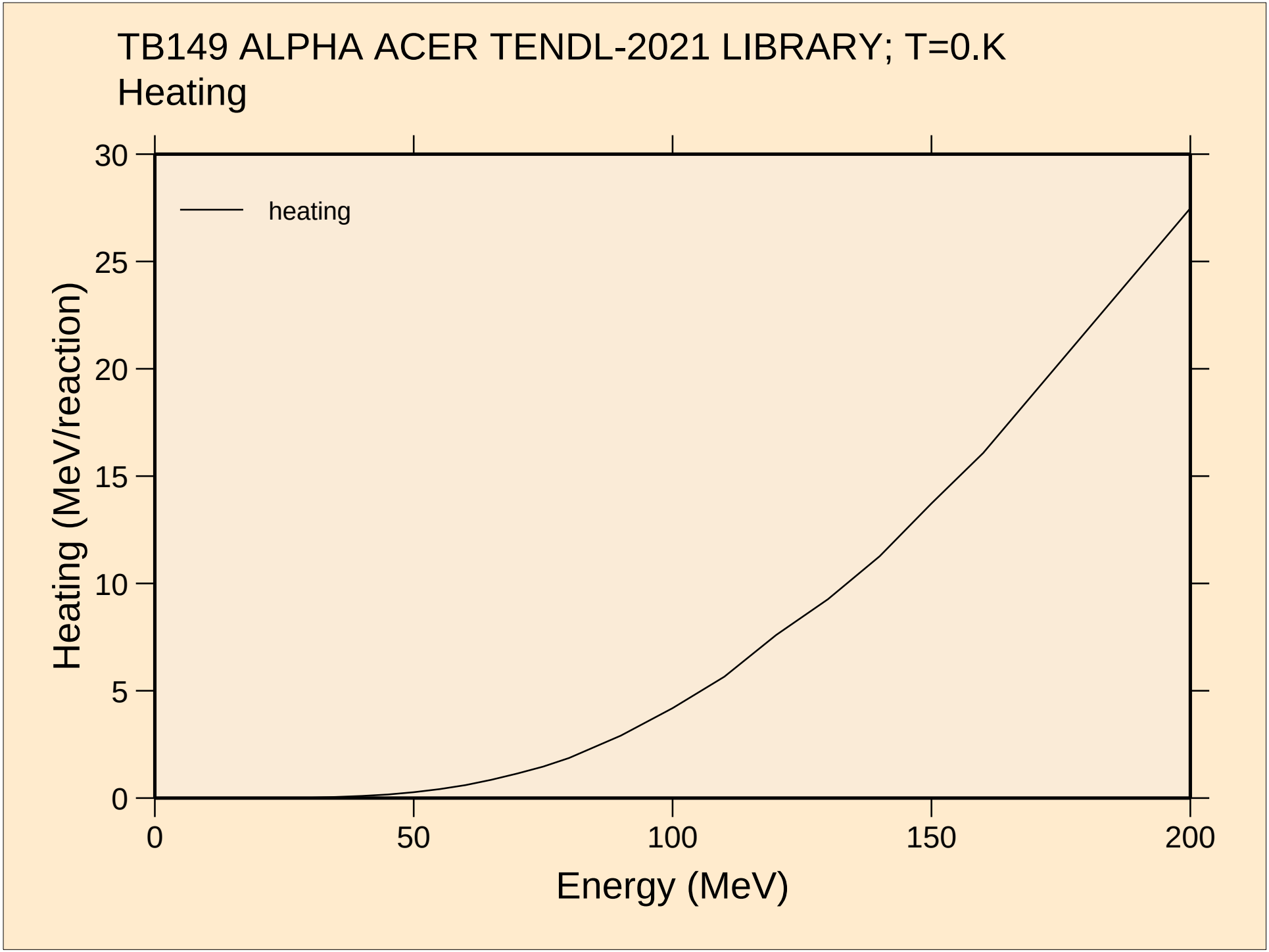
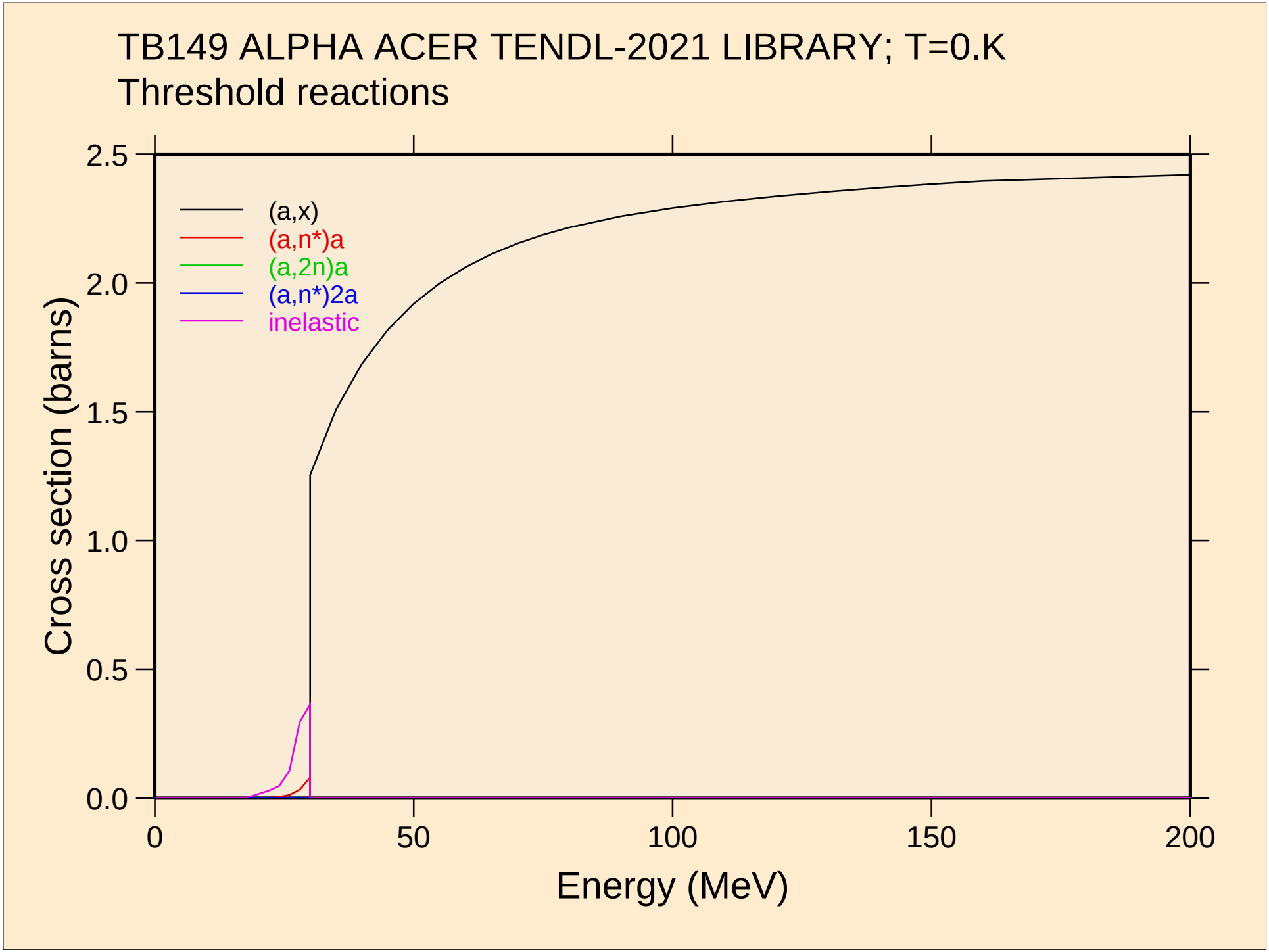
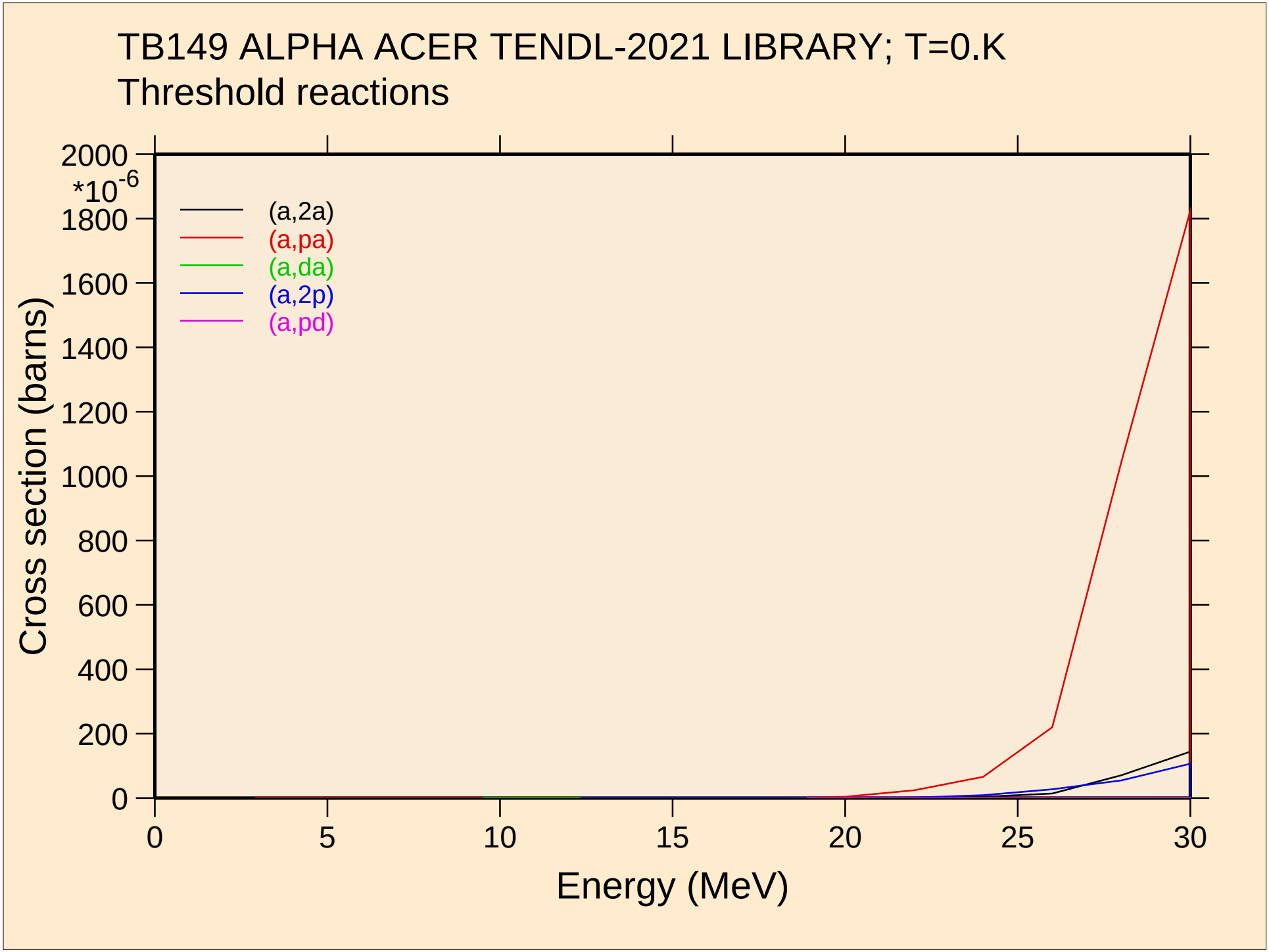

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production

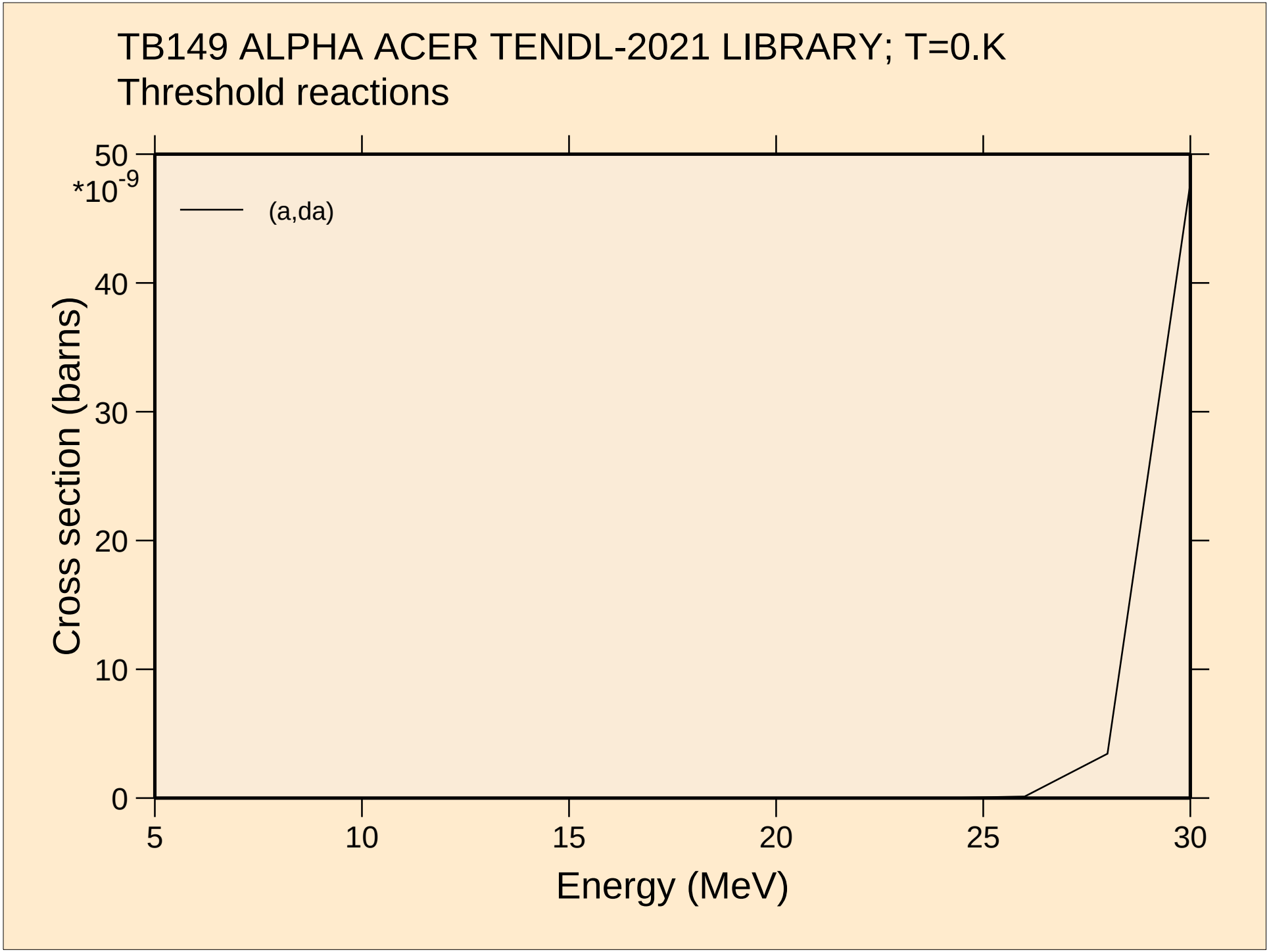

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-1
10^0
10^1
10^2

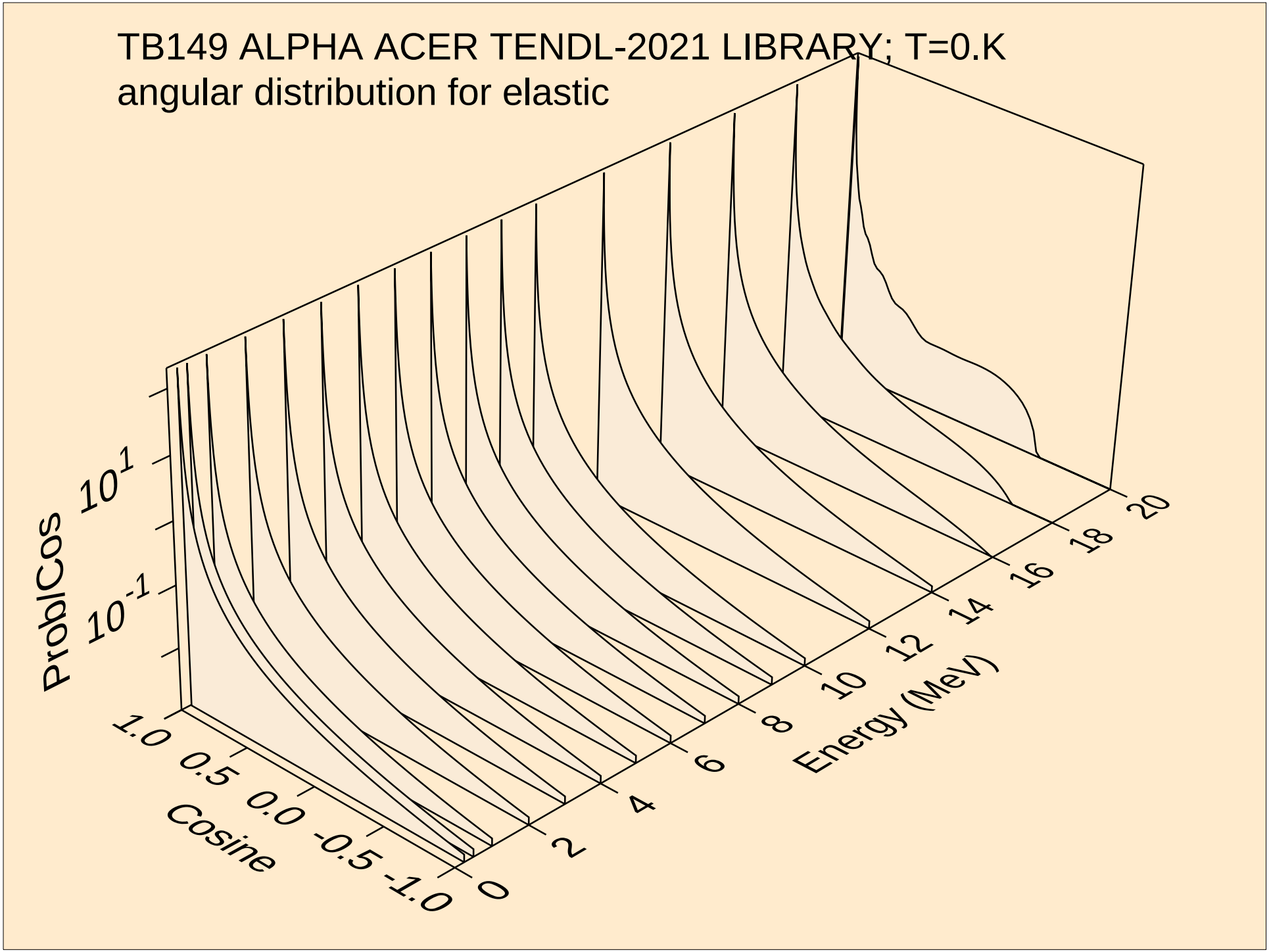

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Principal cross sections
Cross section (barns)
*10^3
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)
total
absorption
elastic
gamma production

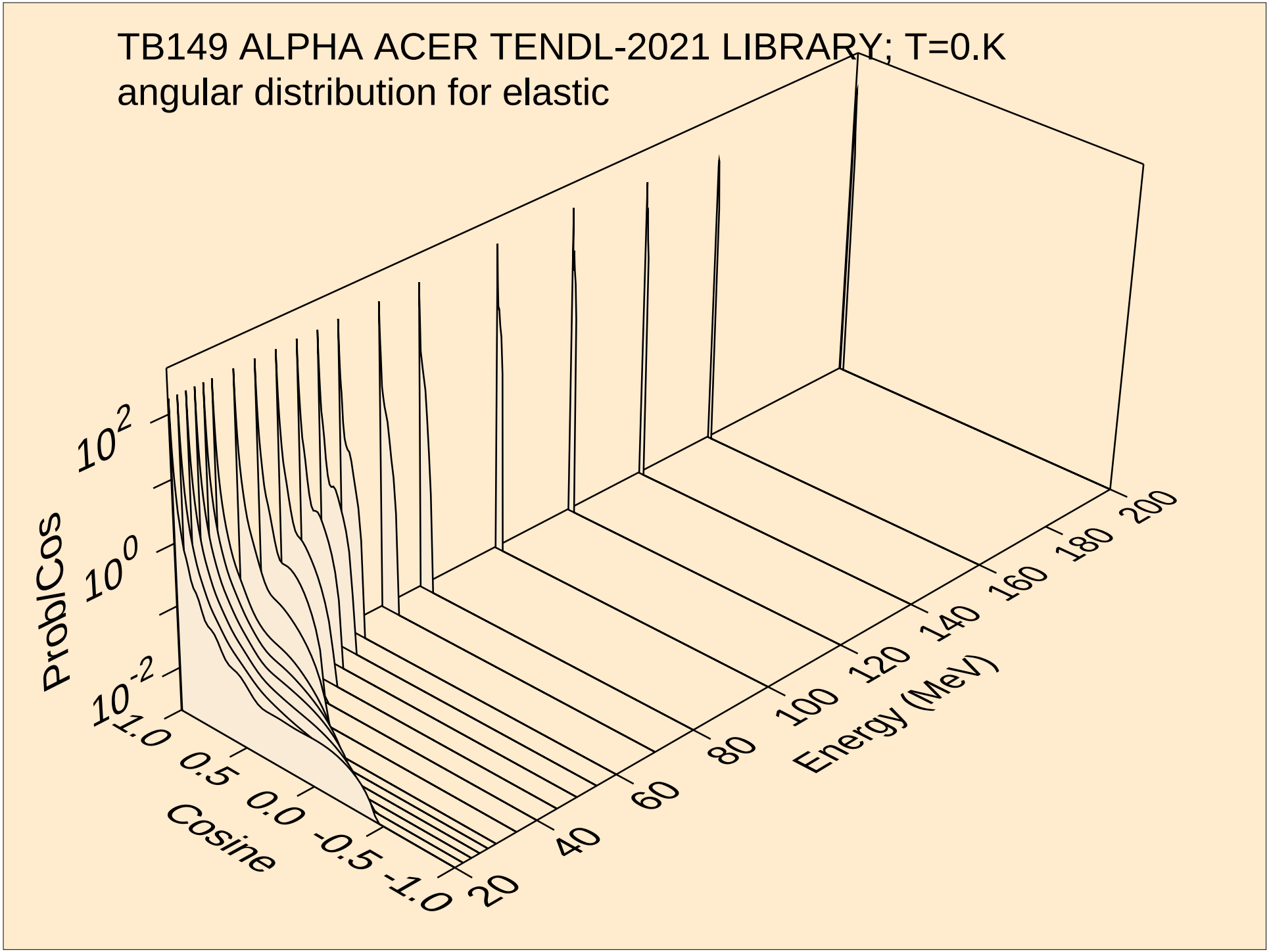

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
5
10
15
20
25
30
0
50
100
150
200


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Threshold reactions
(a,x)
(a,n*)a
(a,2n)a
(a,n*)2a
inelastic
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
0
50
100
150
200

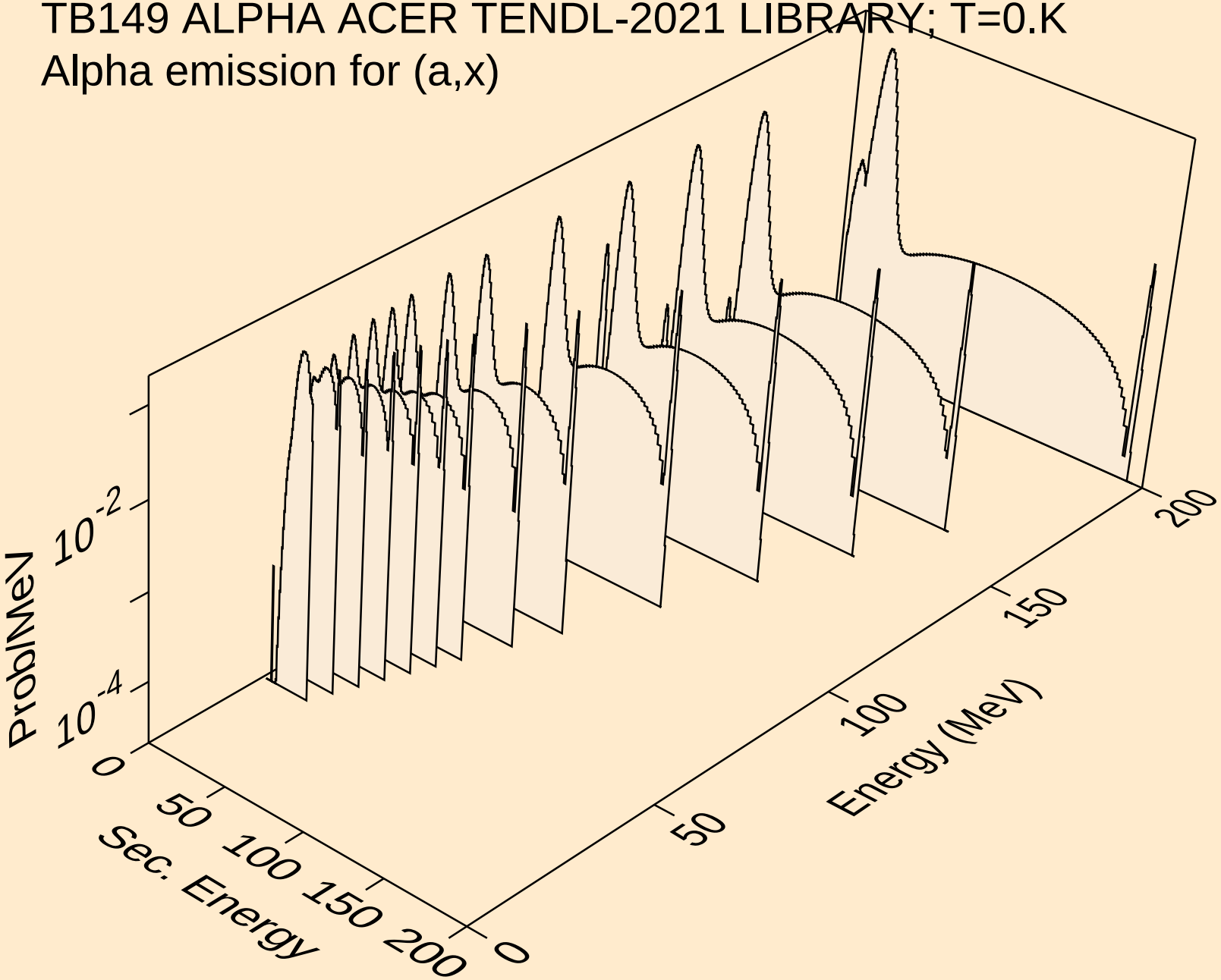

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Threshold reactions
Cross section (barns)
*10^-6
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
5
10
15
20
25
30
Energy (MeV)
(a,2a)
(a,pa)
(a,da)
(a,2p)
(a,pd)

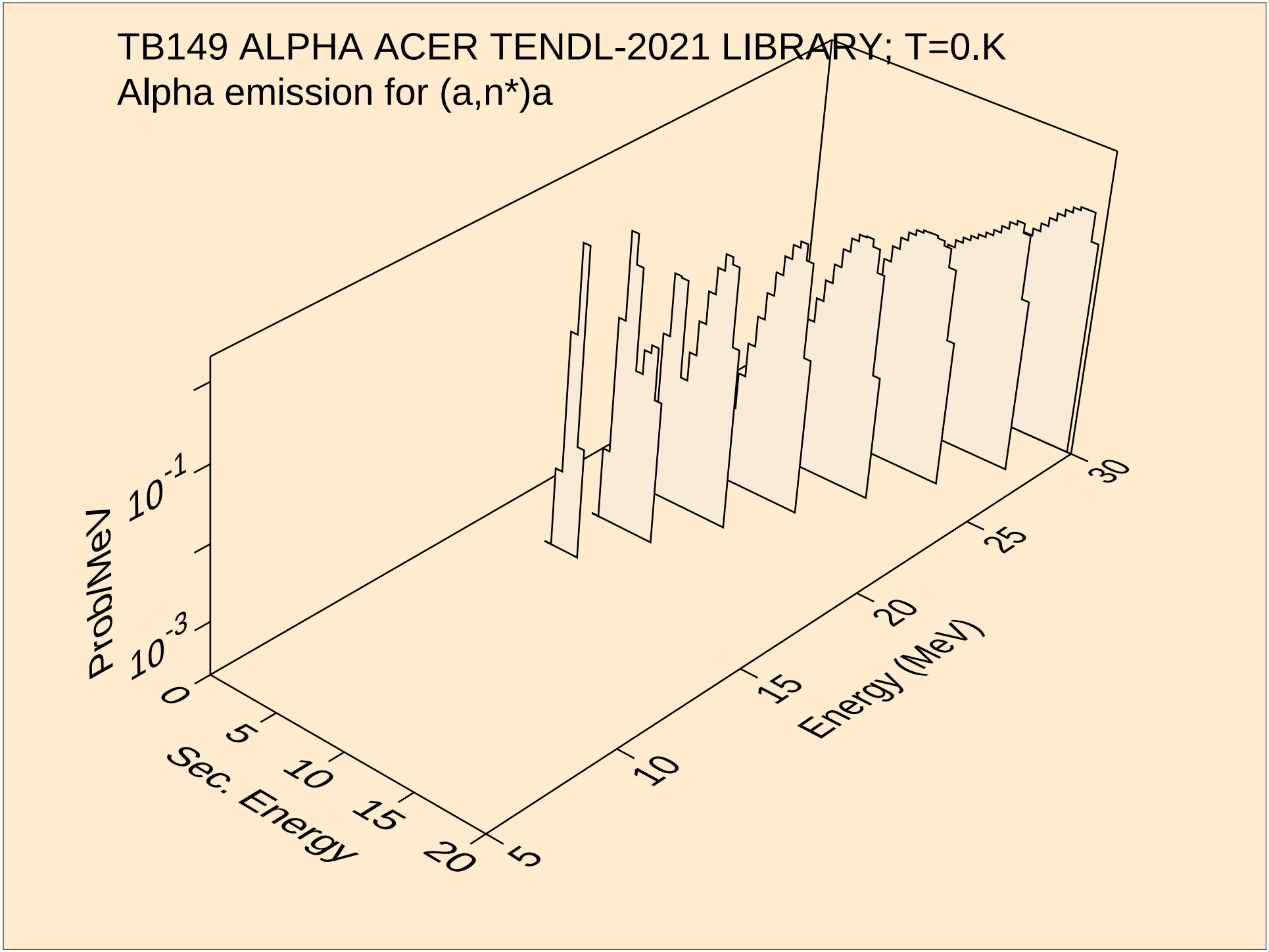

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Threshold reactions
(a,da)
Cross section (barns)
*10^-9
50
40
30
20
10
0
5
10
15
20
25
30
Energy (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
angular distribution for elastic
Prob/Cos
10^{1}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

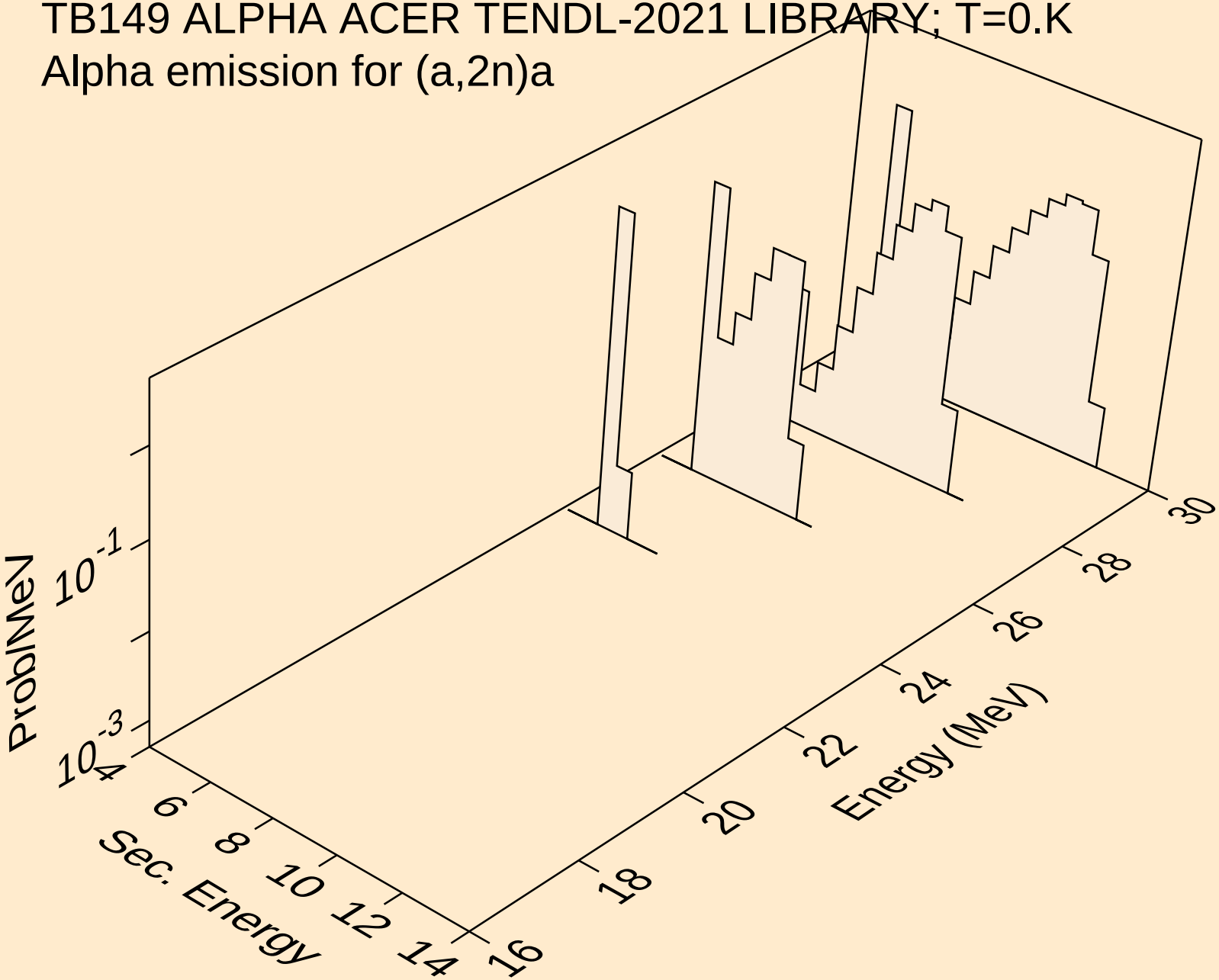

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
angular distribution for elastic
ProbCos
10^{2}
10^{0}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
20
40
60
80
100
120
140
160
180
200

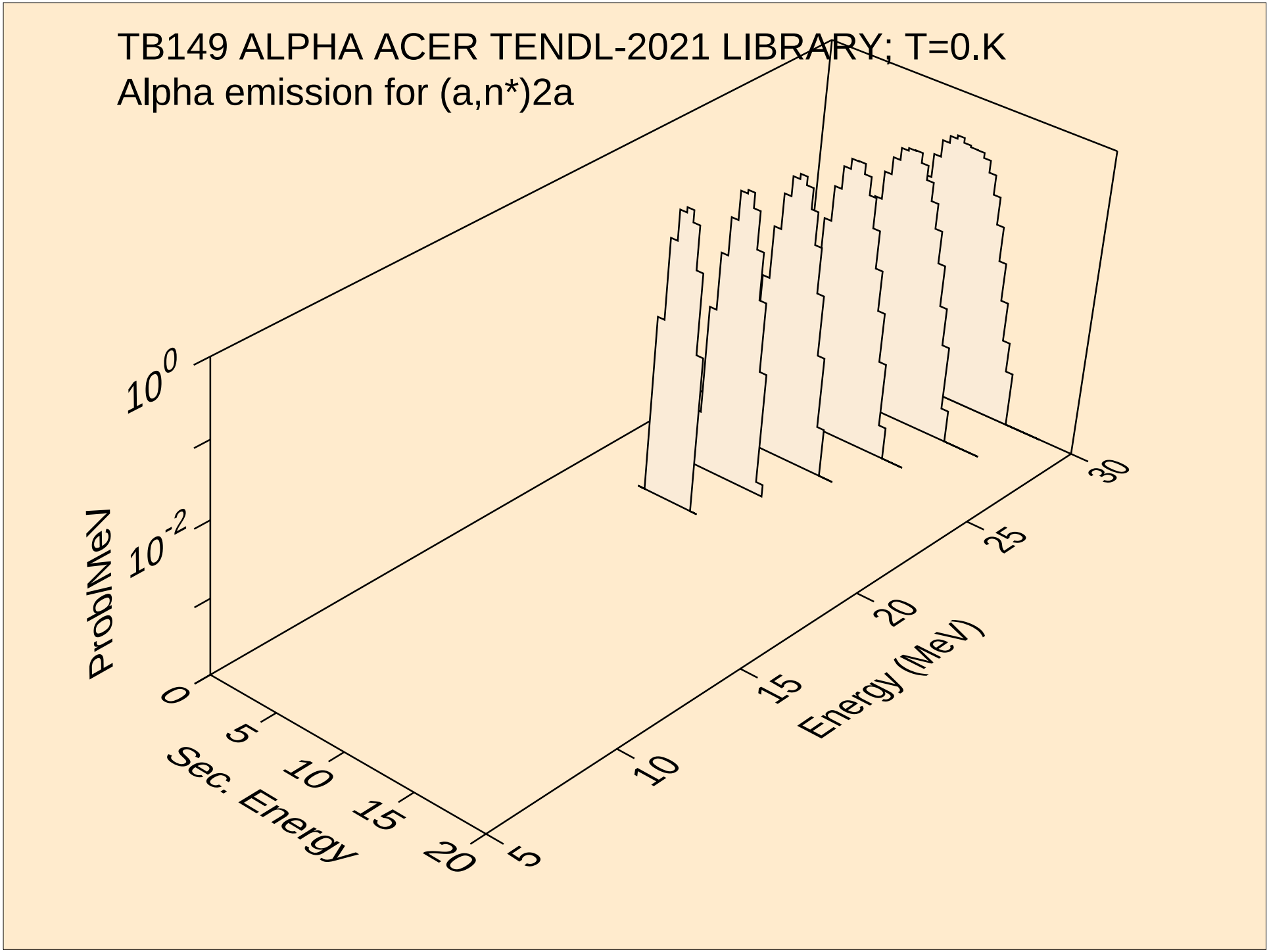
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,x)

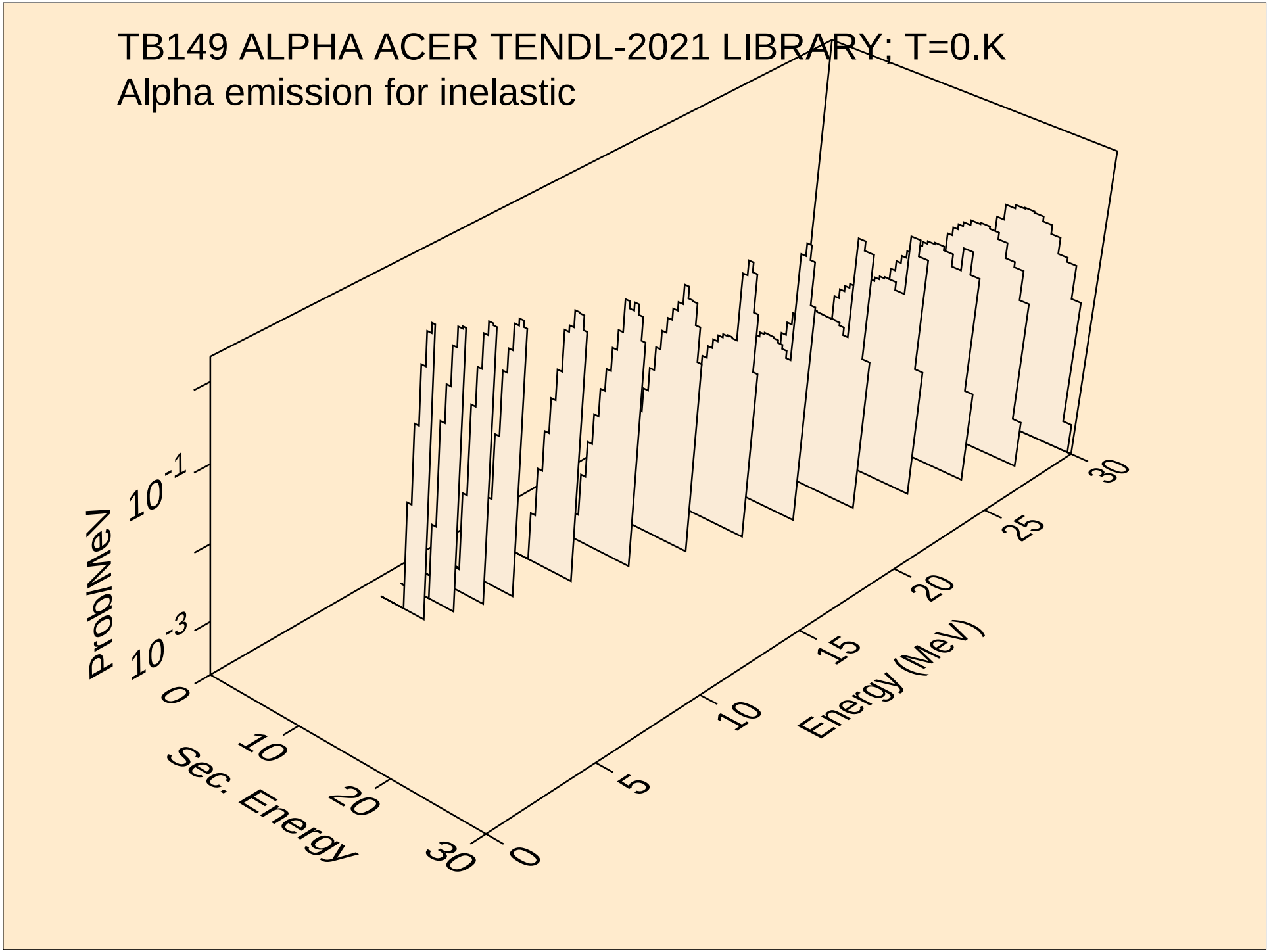


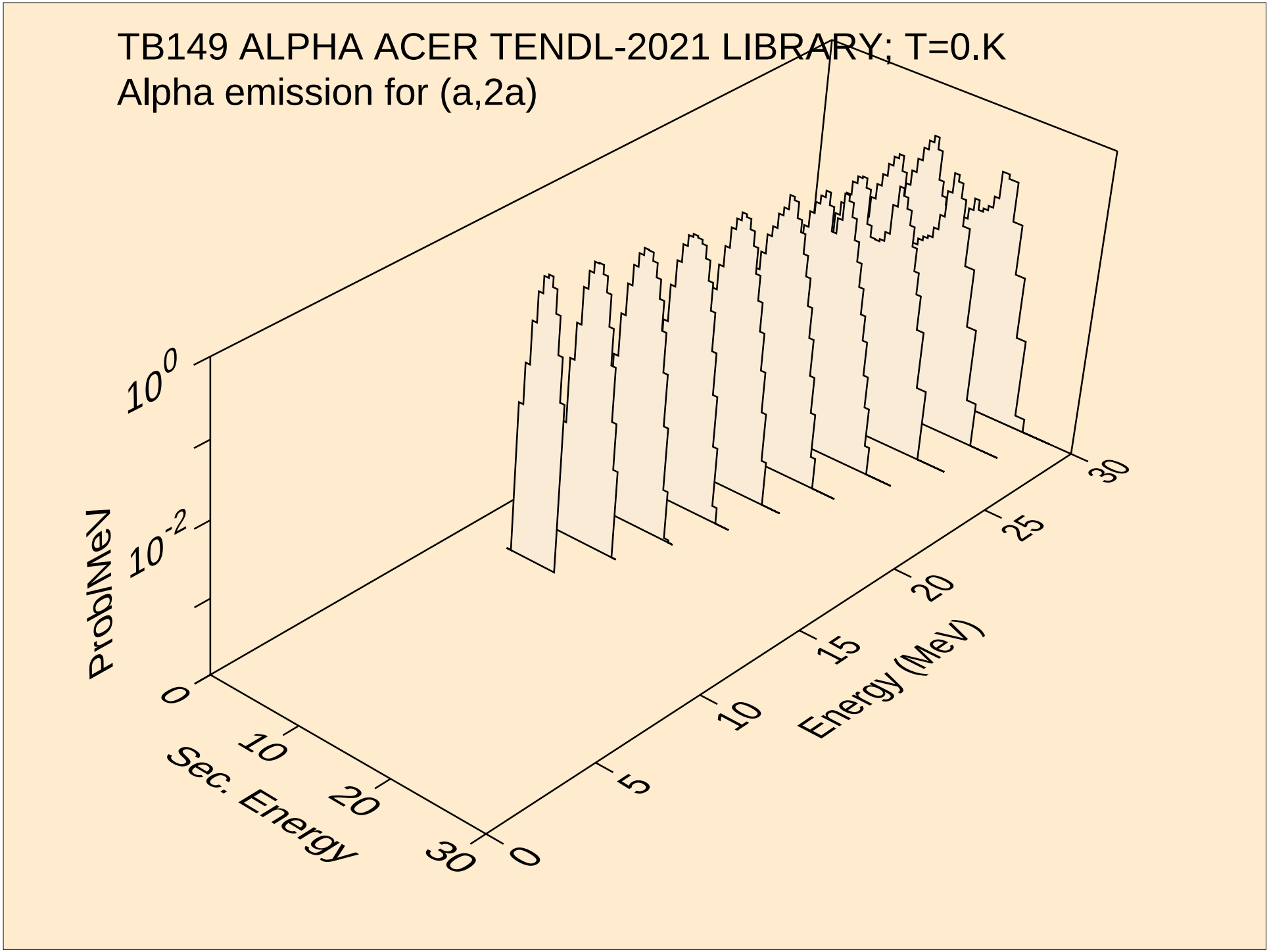

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,n*)a
Prob/MeV
10-1
10-3
0
5
10
15
20
Sec. Energy
5
10
15
20
25
30
Energy (MeV)

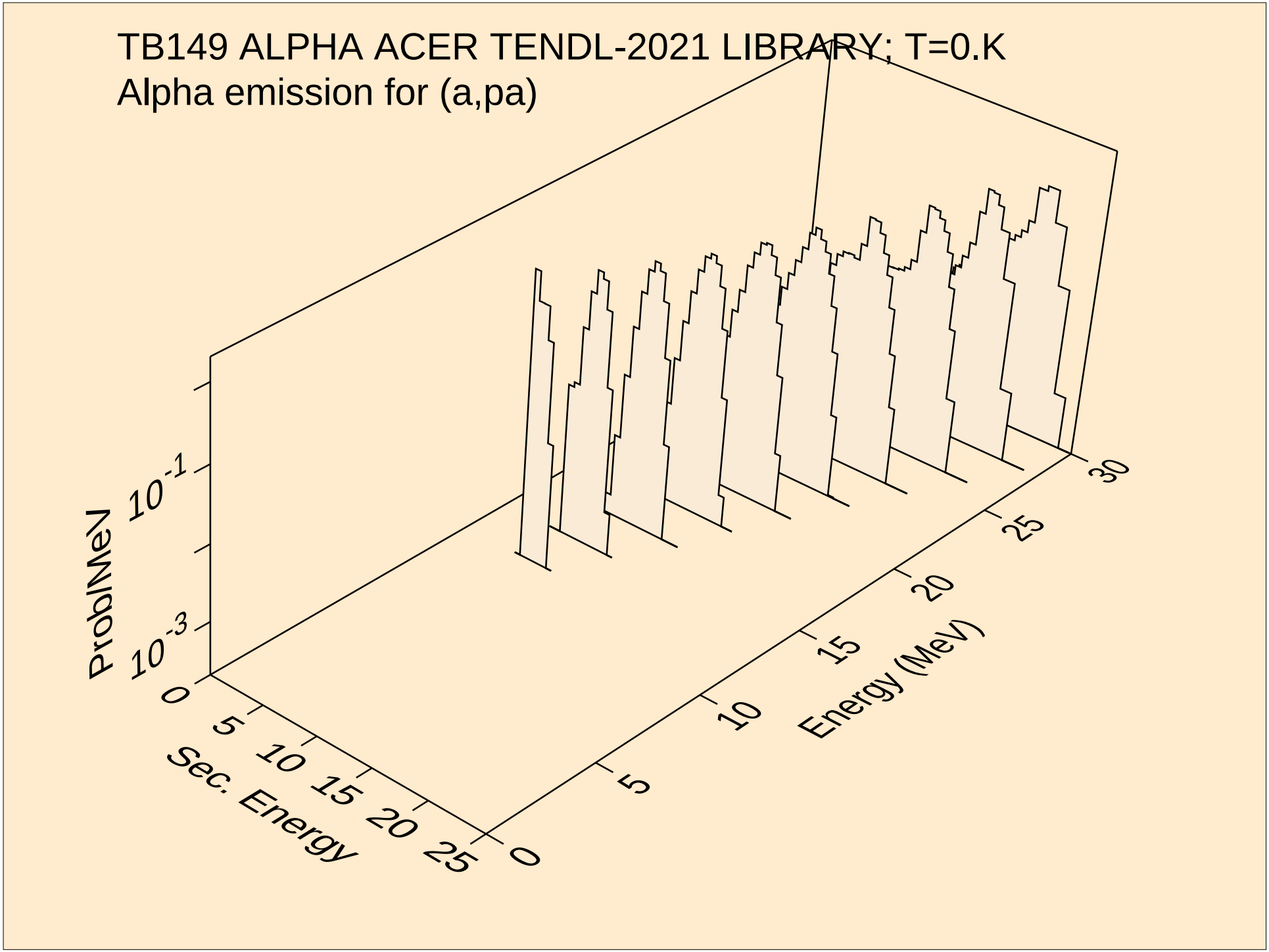
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,2n)a

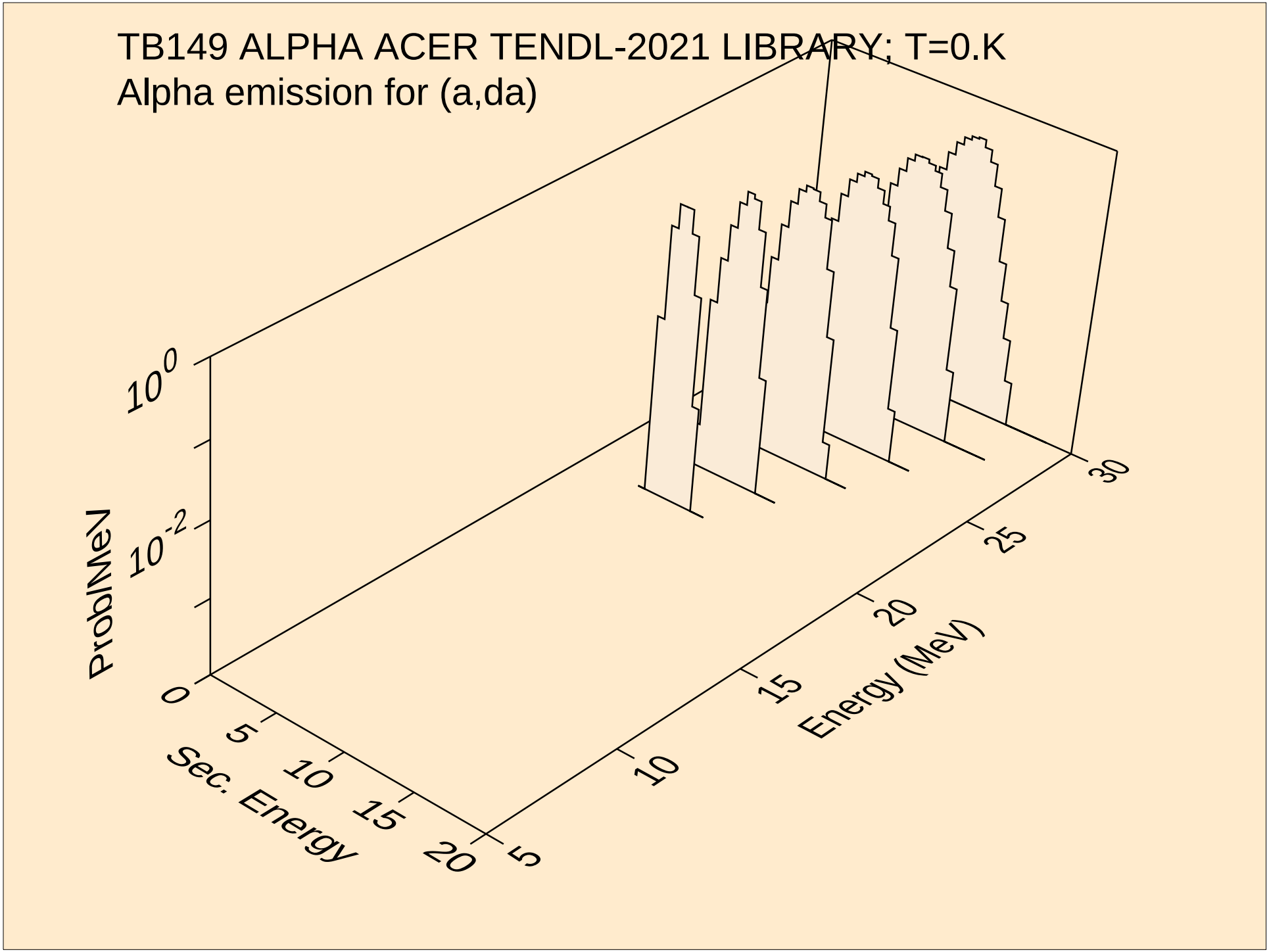


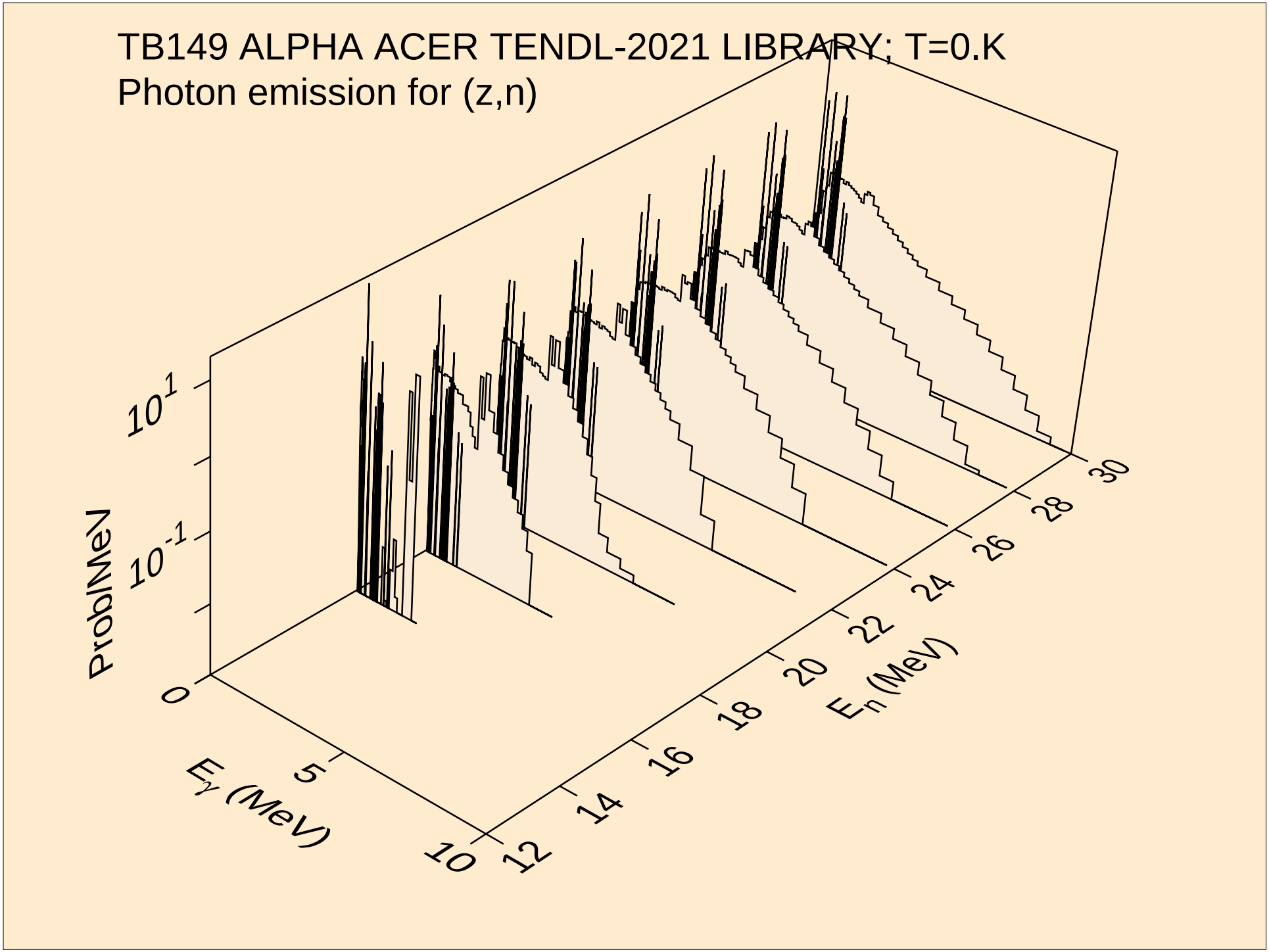

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,n*)2a
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
15
20
Energy (MeV)
5
10
15
20
25
30


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for inelastic
Prob/MeV
10-1
10-3
0
10
20
30
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)

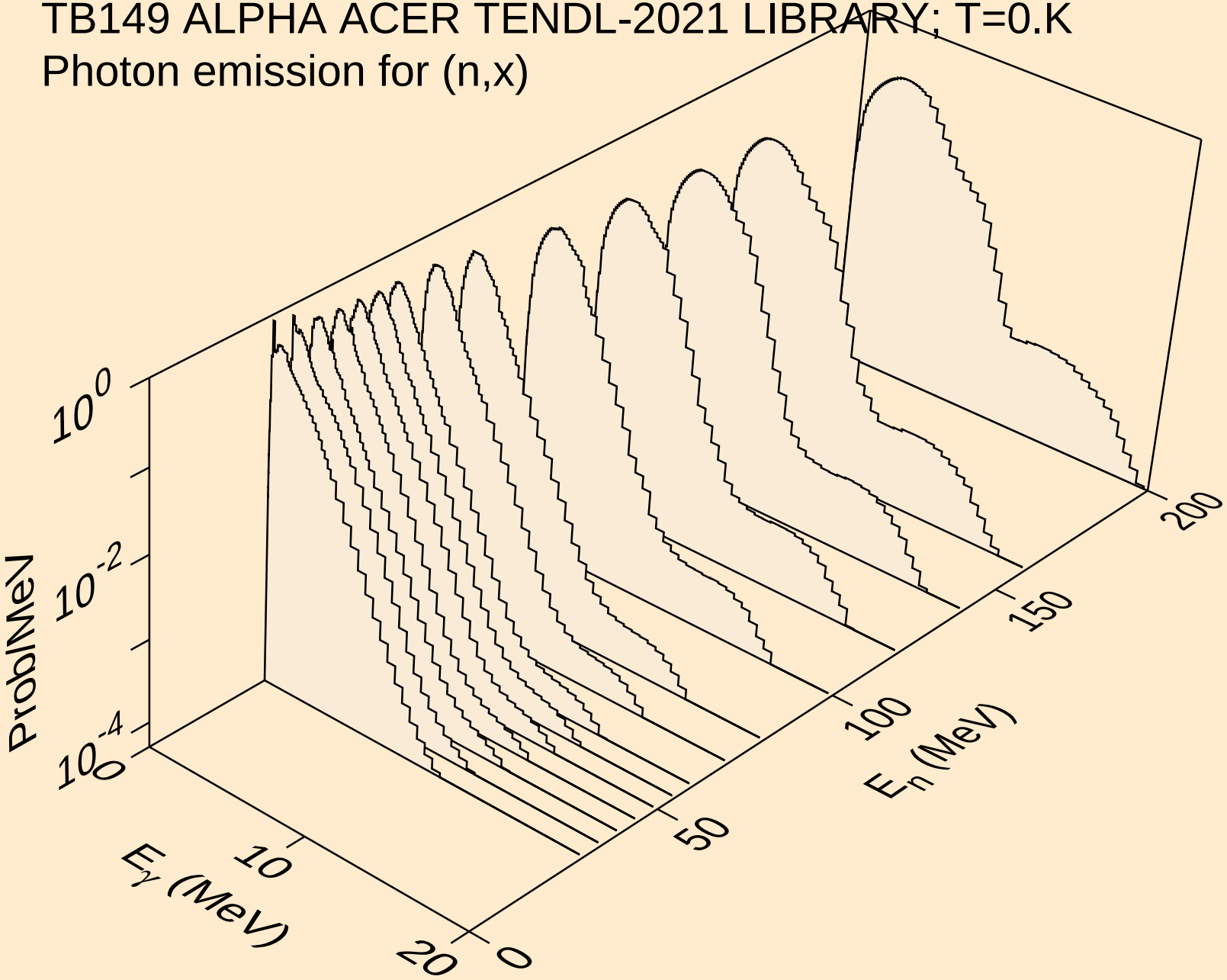

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,2a)
Prob/MeV
10^0
10^{-2}
0
10
20
30
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)

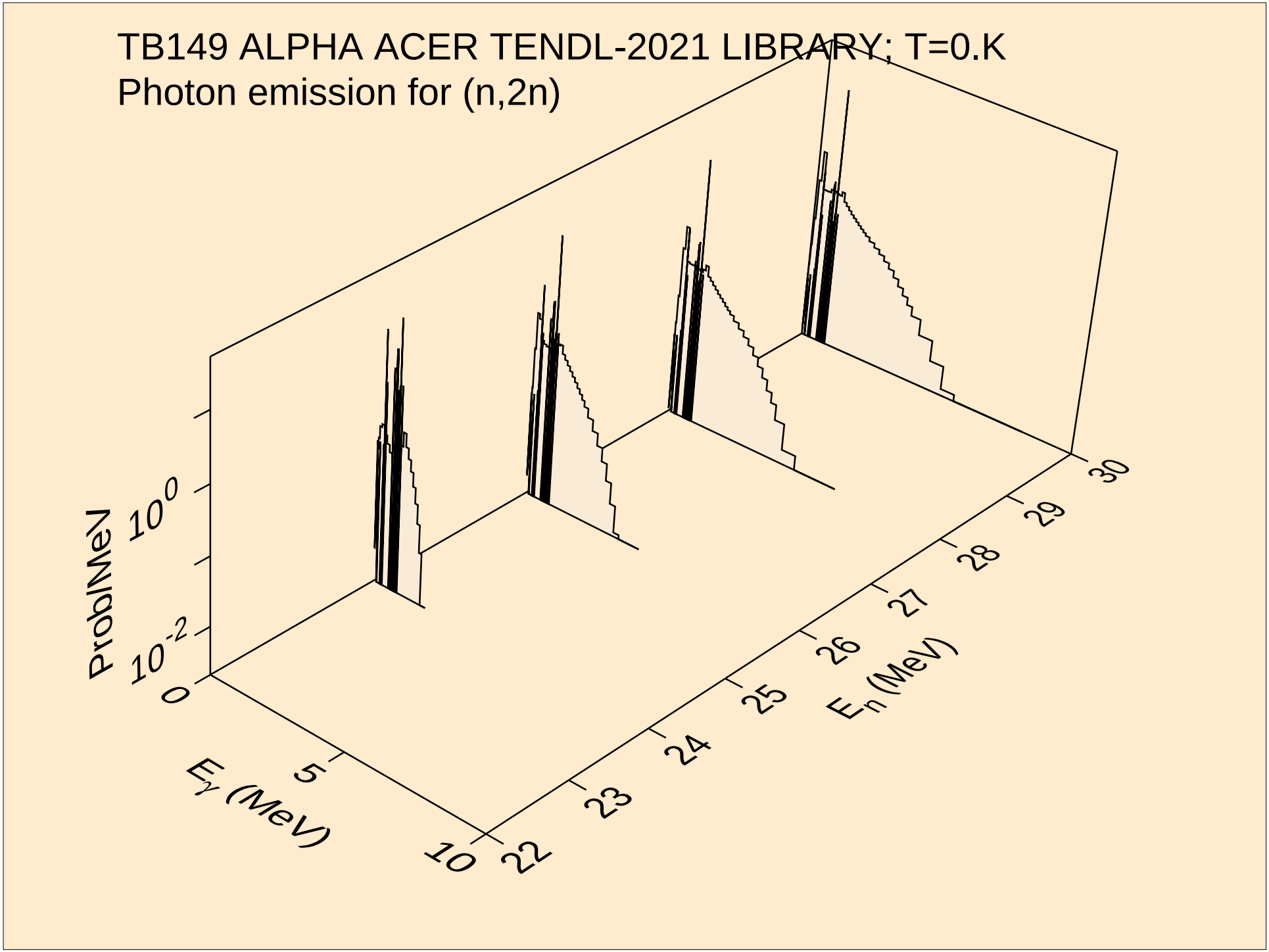

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,pa)
Prob/MeV
10-1
10-3
0
5
10
15
20
25
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Alpha emission for (a,da)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
15
20
Energy (MeV)
5
10
15
20
25
30

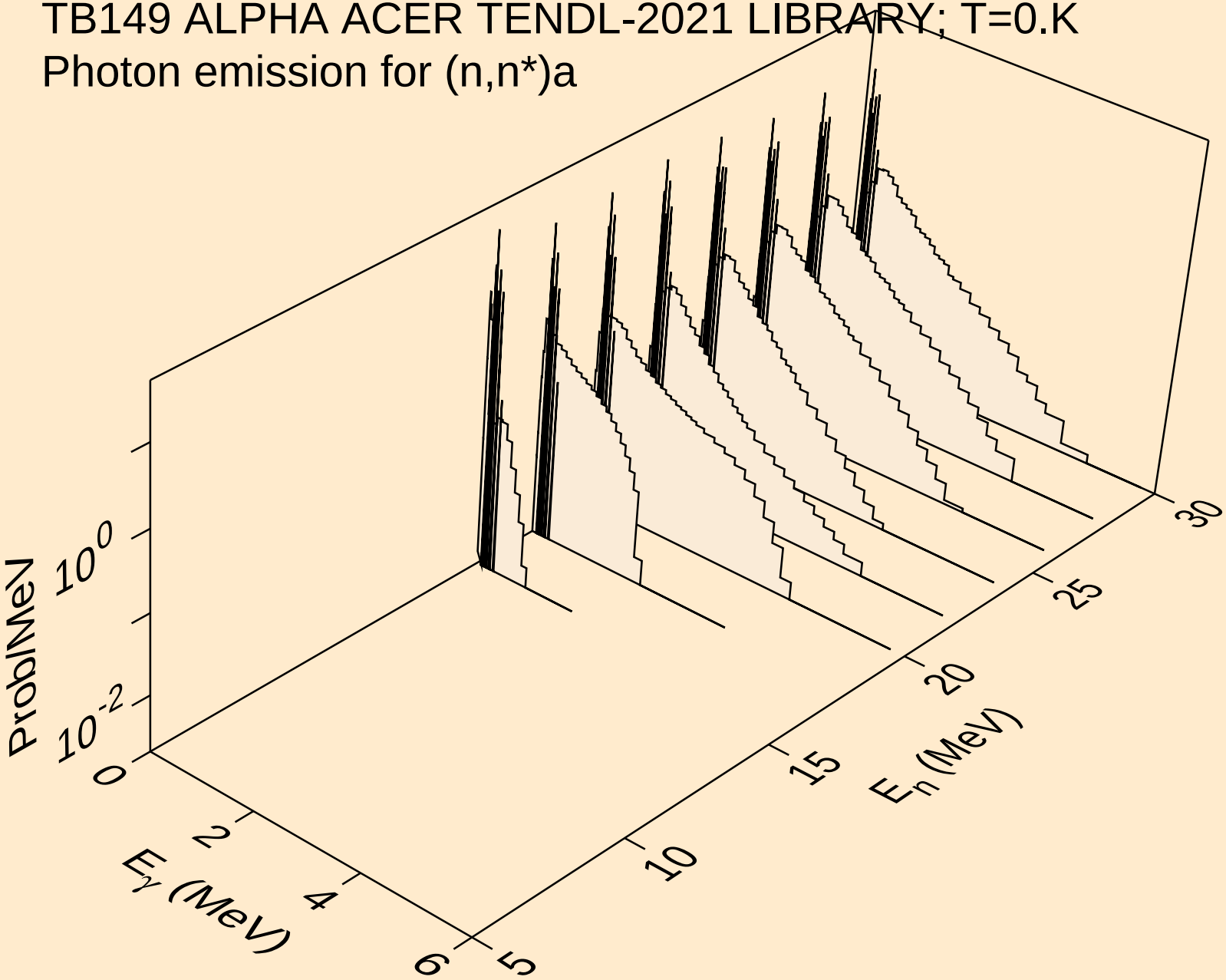

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (z,n)
Prob/MeV
10^1
10^-1
0
5
10
E_γ (MeV)
12
14
16
18
20
22
24
26
28
30
E_n (MeV)

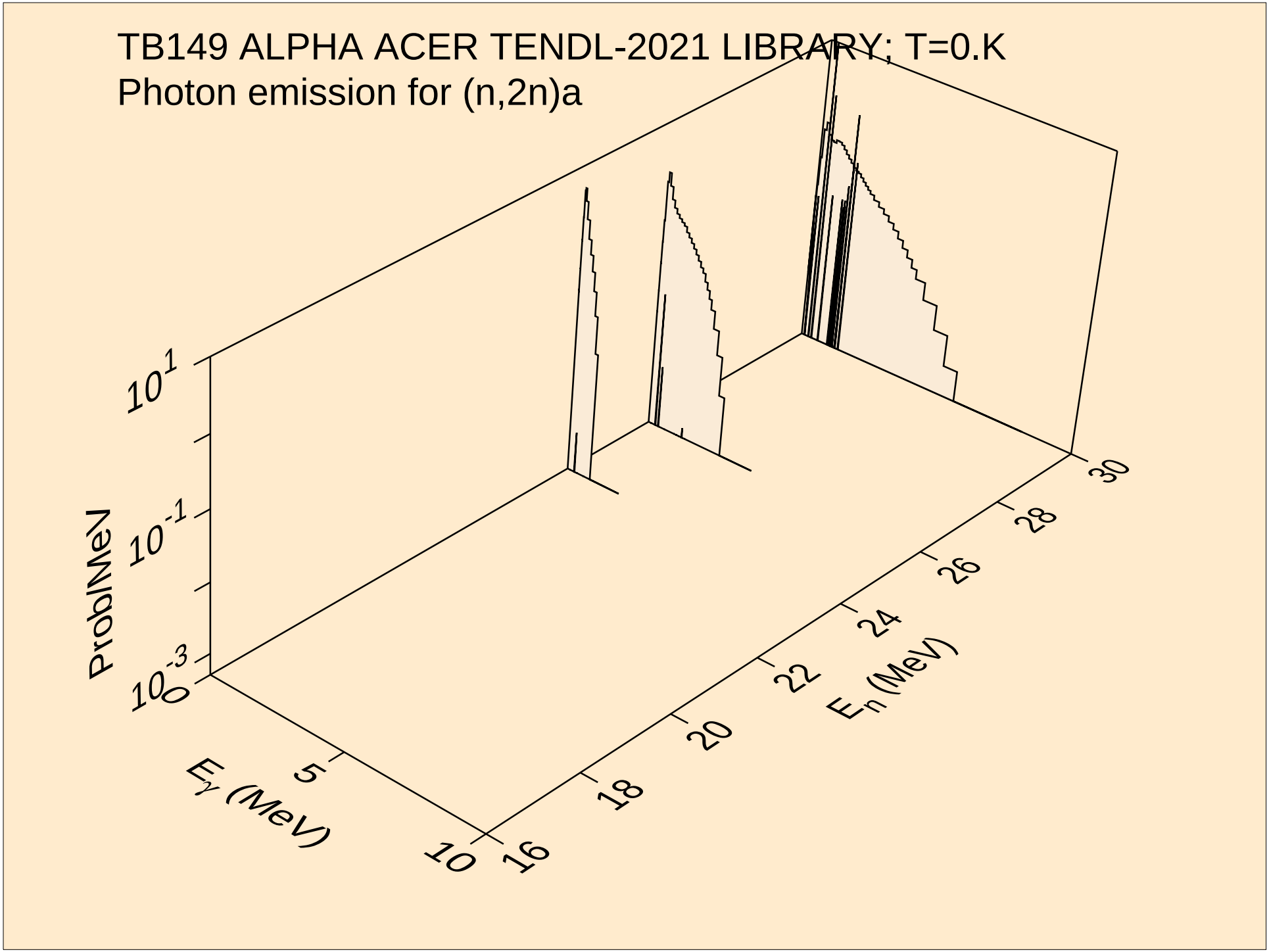
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,x)

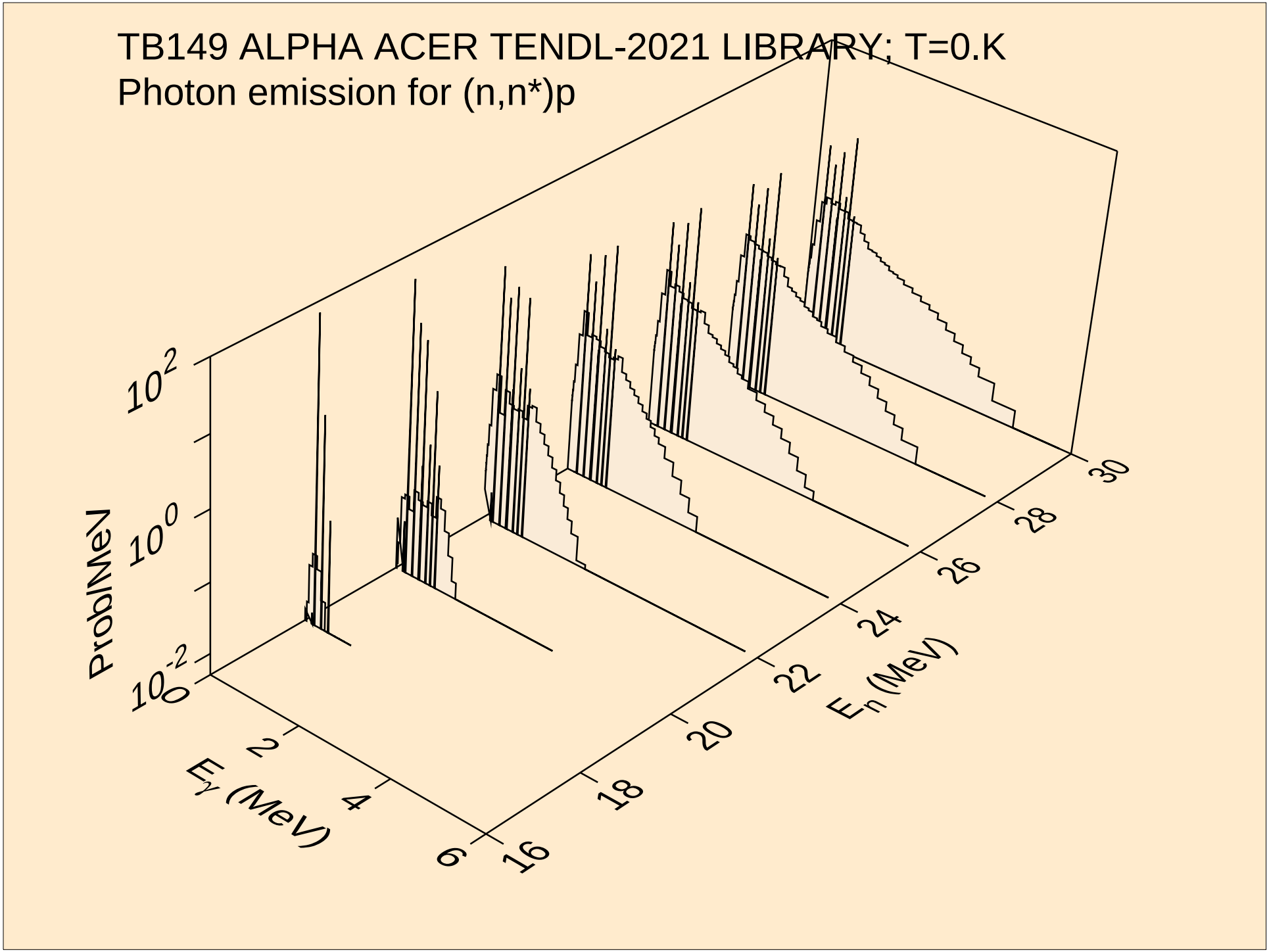


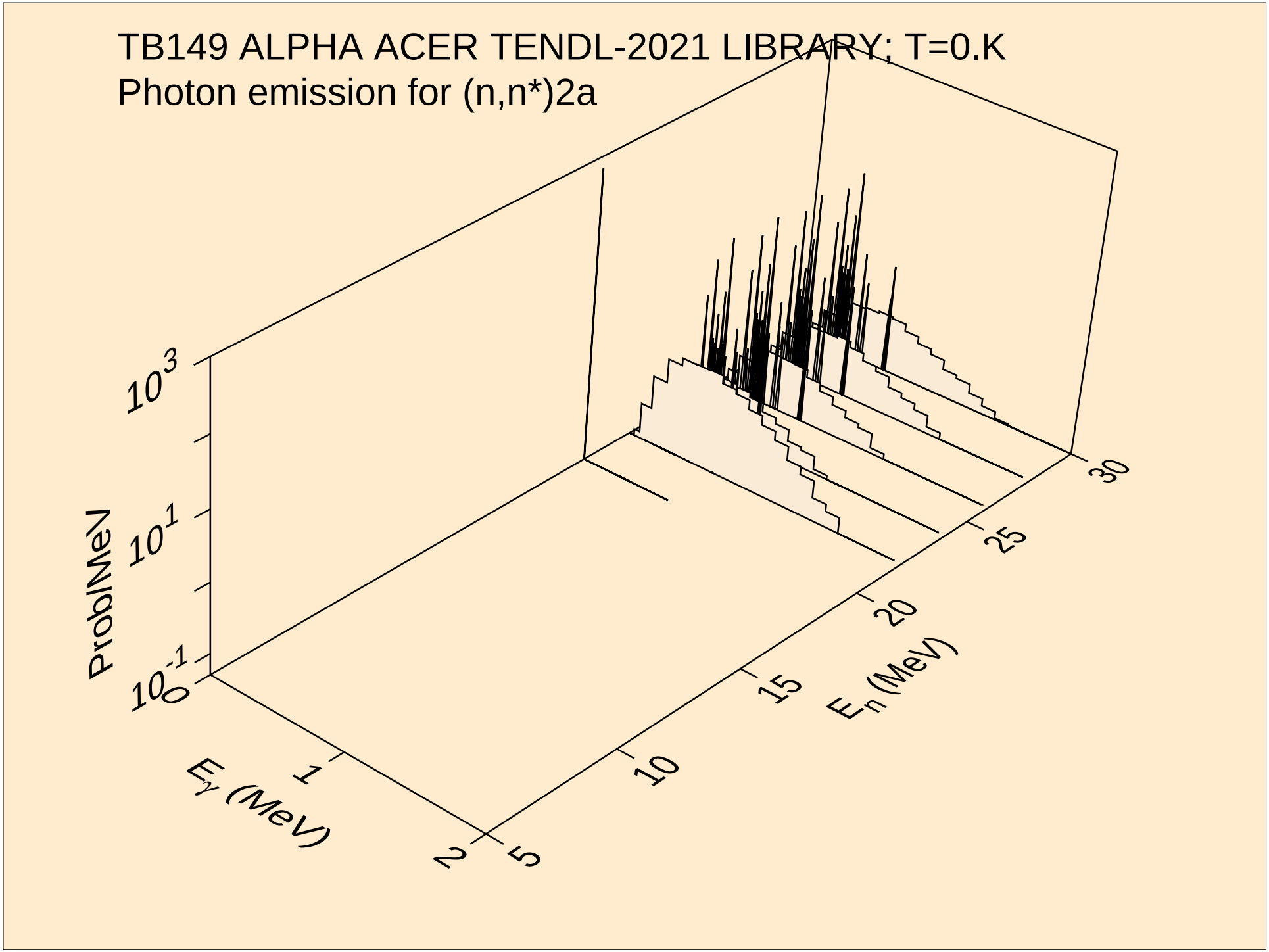

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2n)
Prob/MeV
10^0
10^{-2}
0
5
10
E_γ (MeV)
22
23
24
25
26
27
28
29
30
E_n (MeV)

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,n*)a

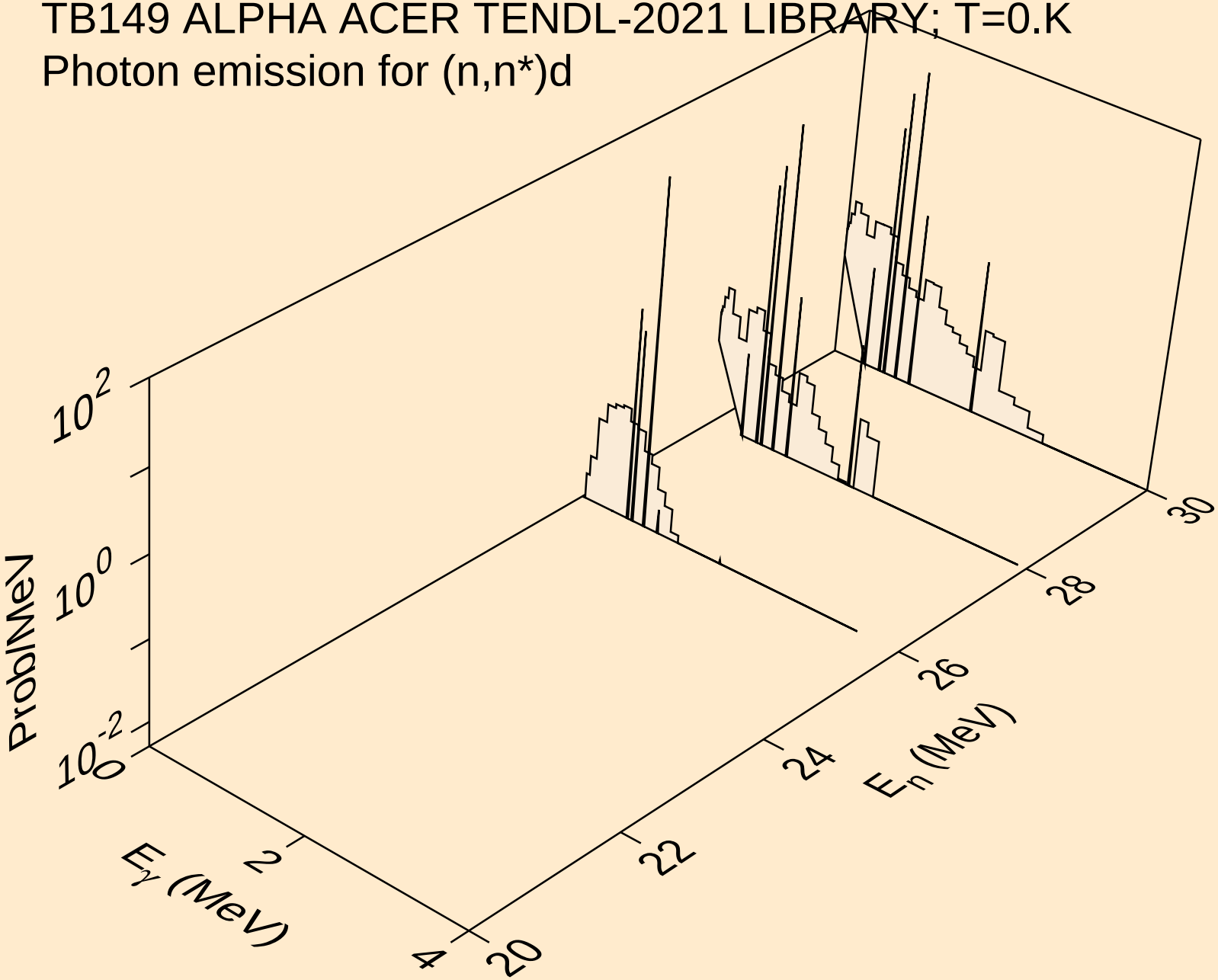


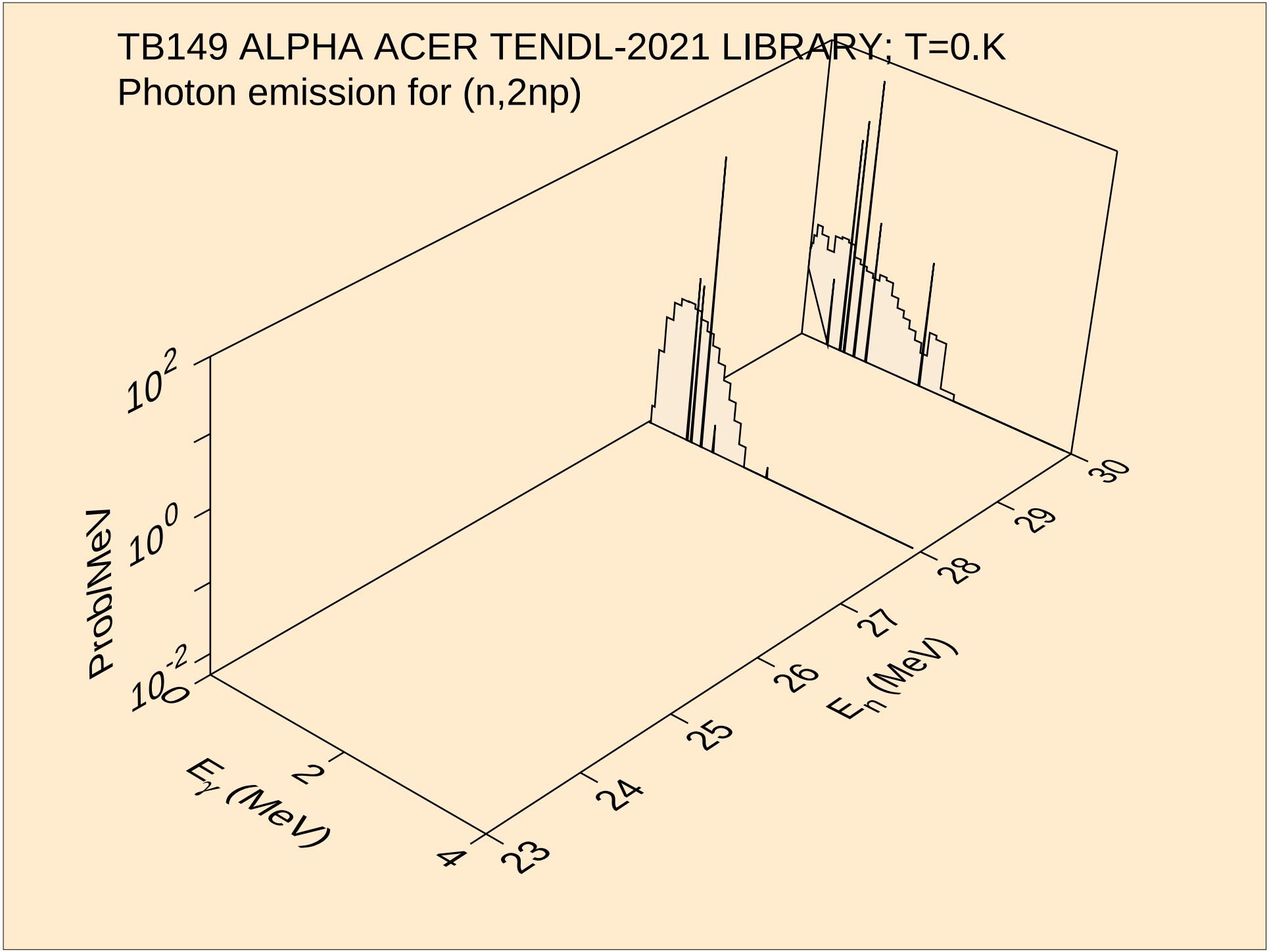

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2n)a
Prob/MeV
10^{1}
10^{-1}
10^{-3}
E_γ (MeV)
0
5
10
E_n (MeV)
16
18
20
22
24
26
28
30


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,n*)p
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
6
E_n (MeV)
16
18
20
22
24
26
28
30

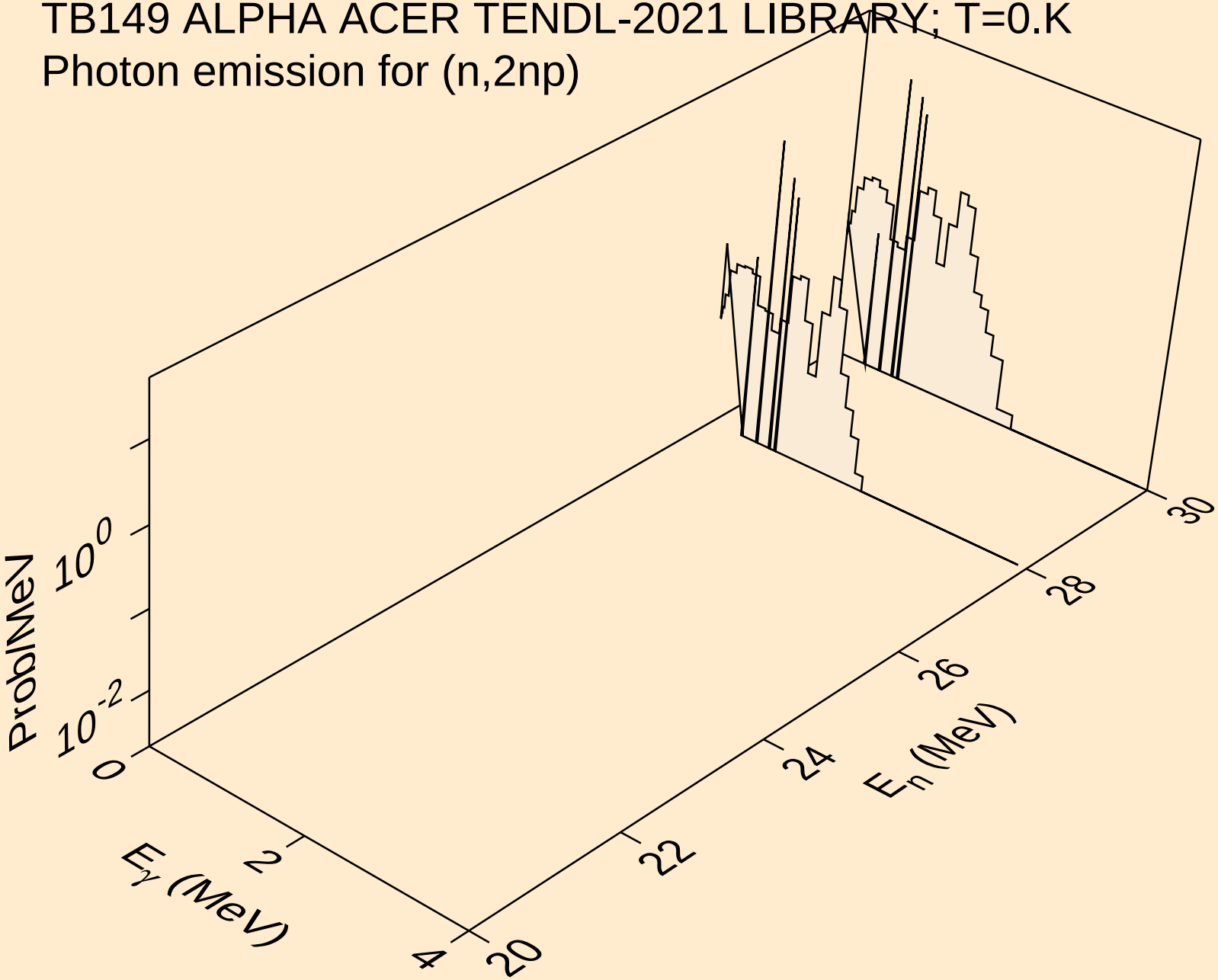

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,n*)2a
Prob/MeV
10^{3}
10^{1}
10^{-1}
E_γ (MeV)
0
1
2
E_n (MeV)
5
10
15
20
25
30

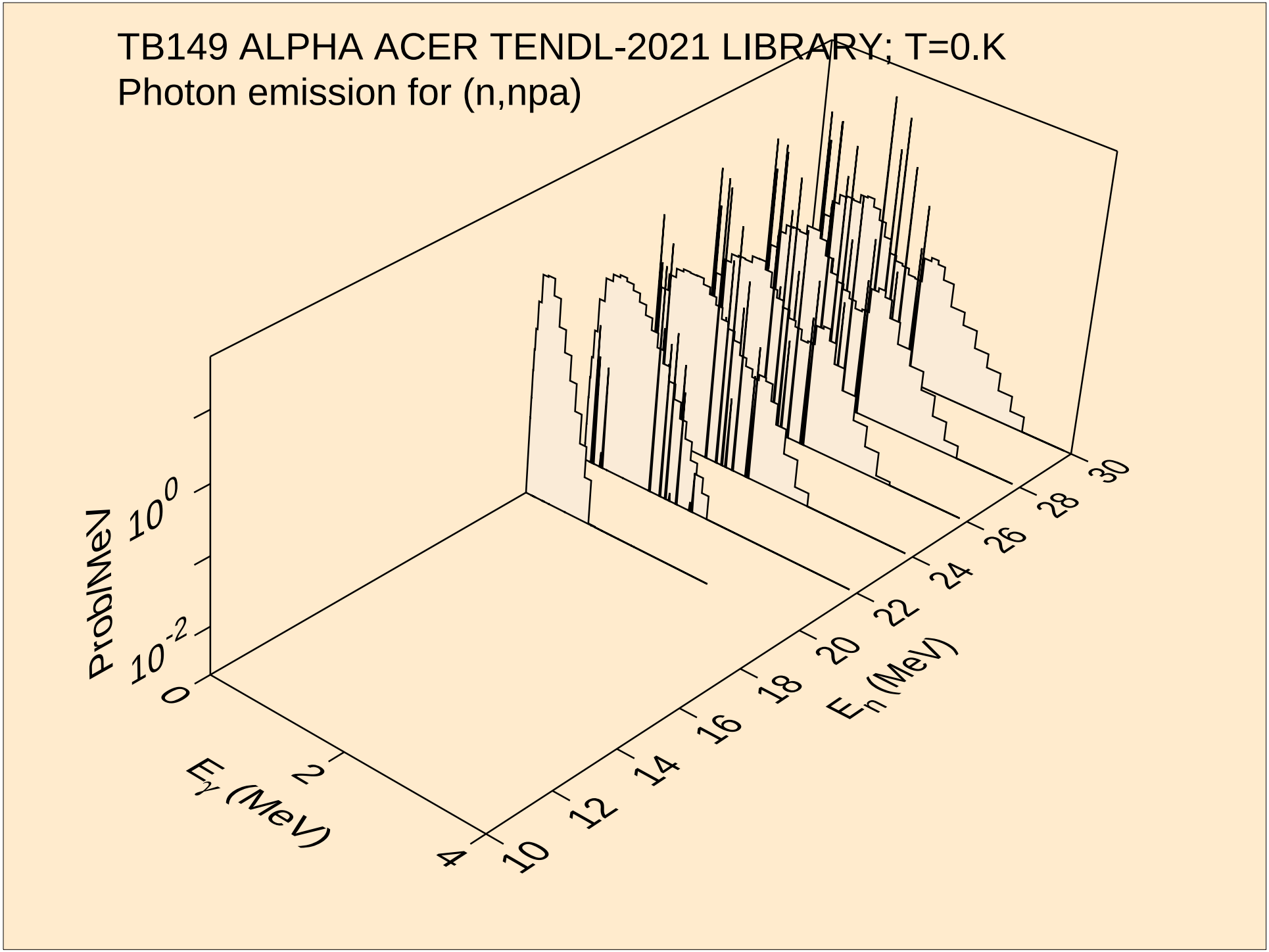
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,n*)d

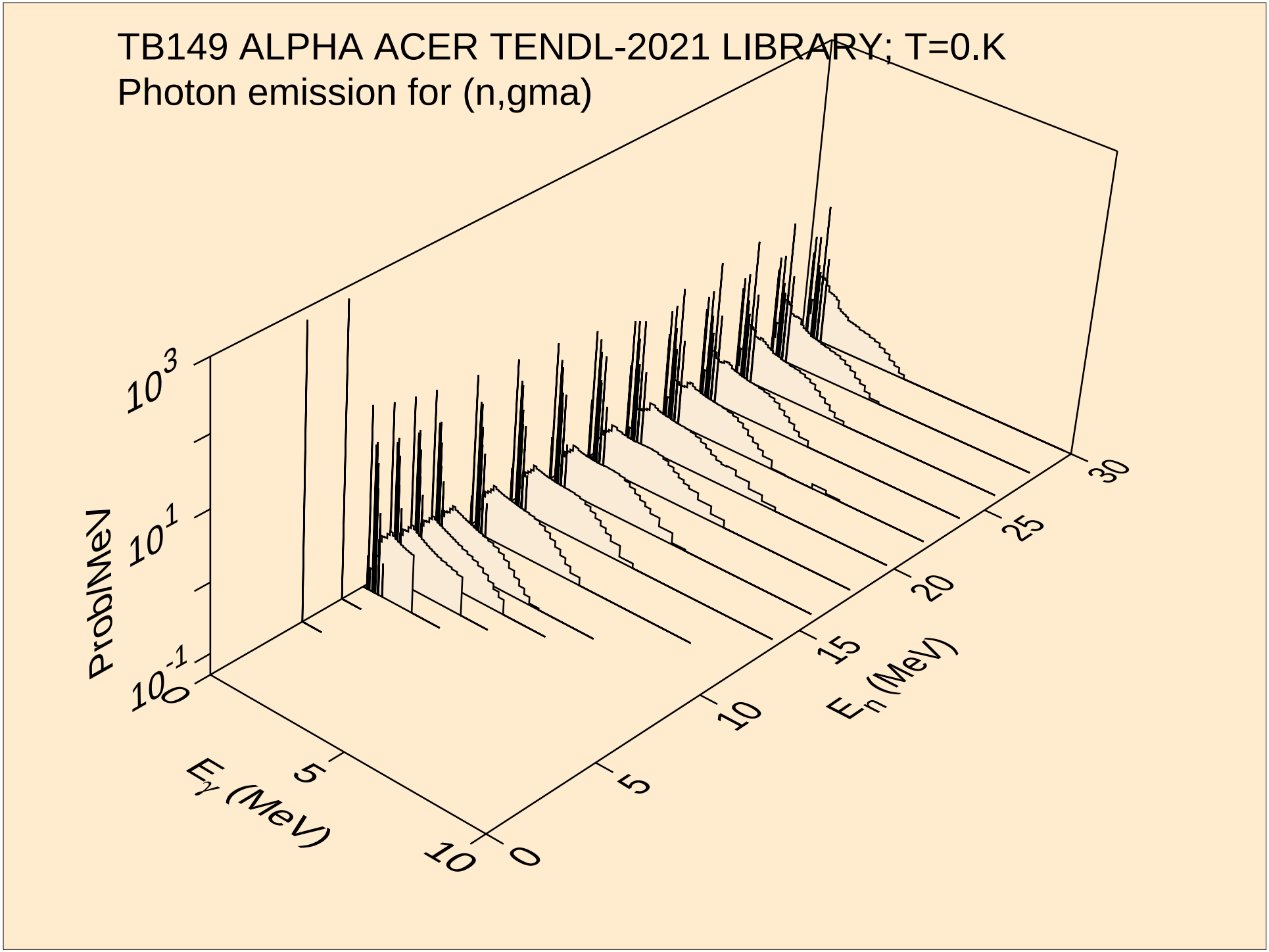


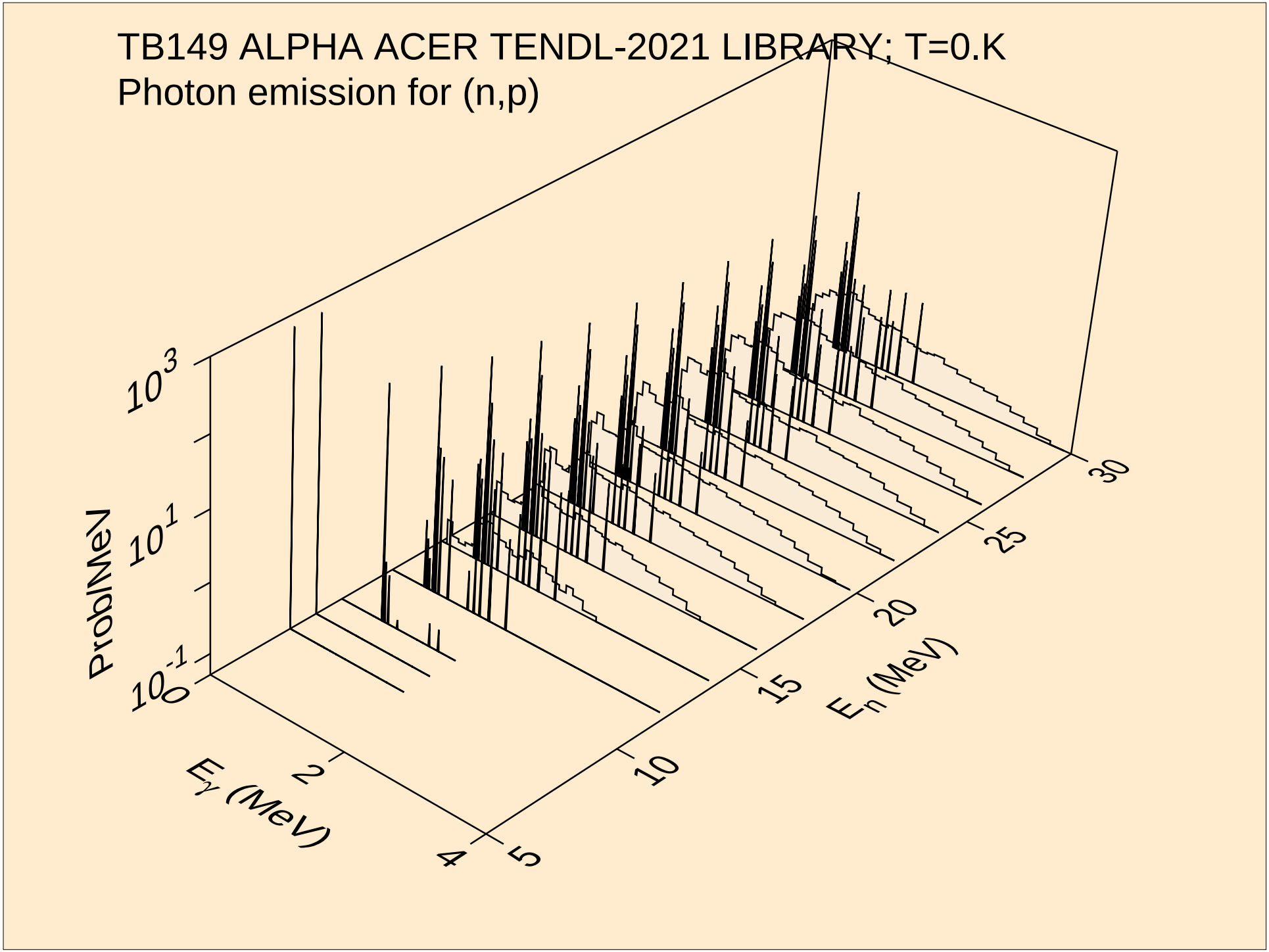

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2np)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
23
24
25
26
27
28
29
30
E_n (MeV)

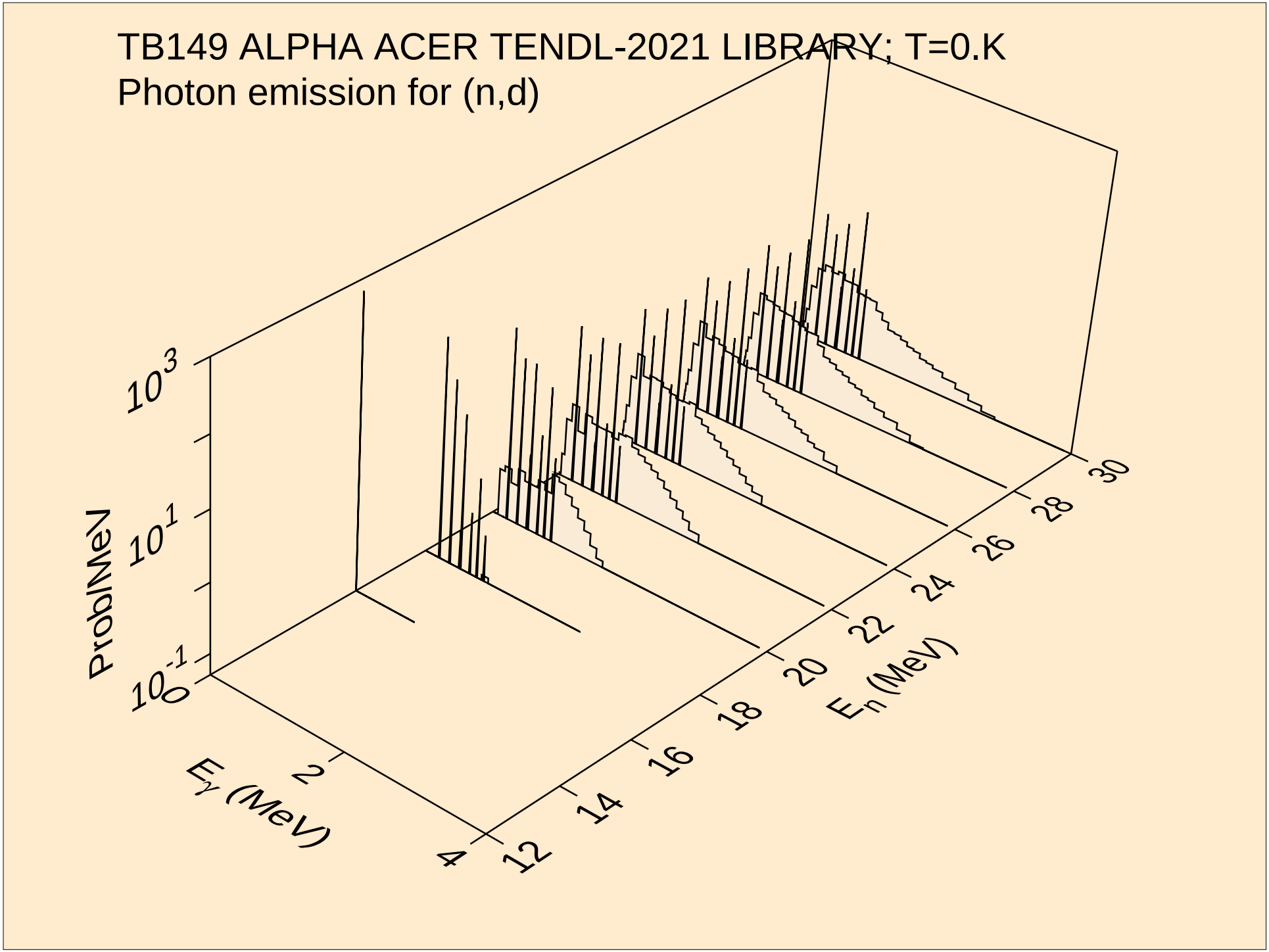
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2np)

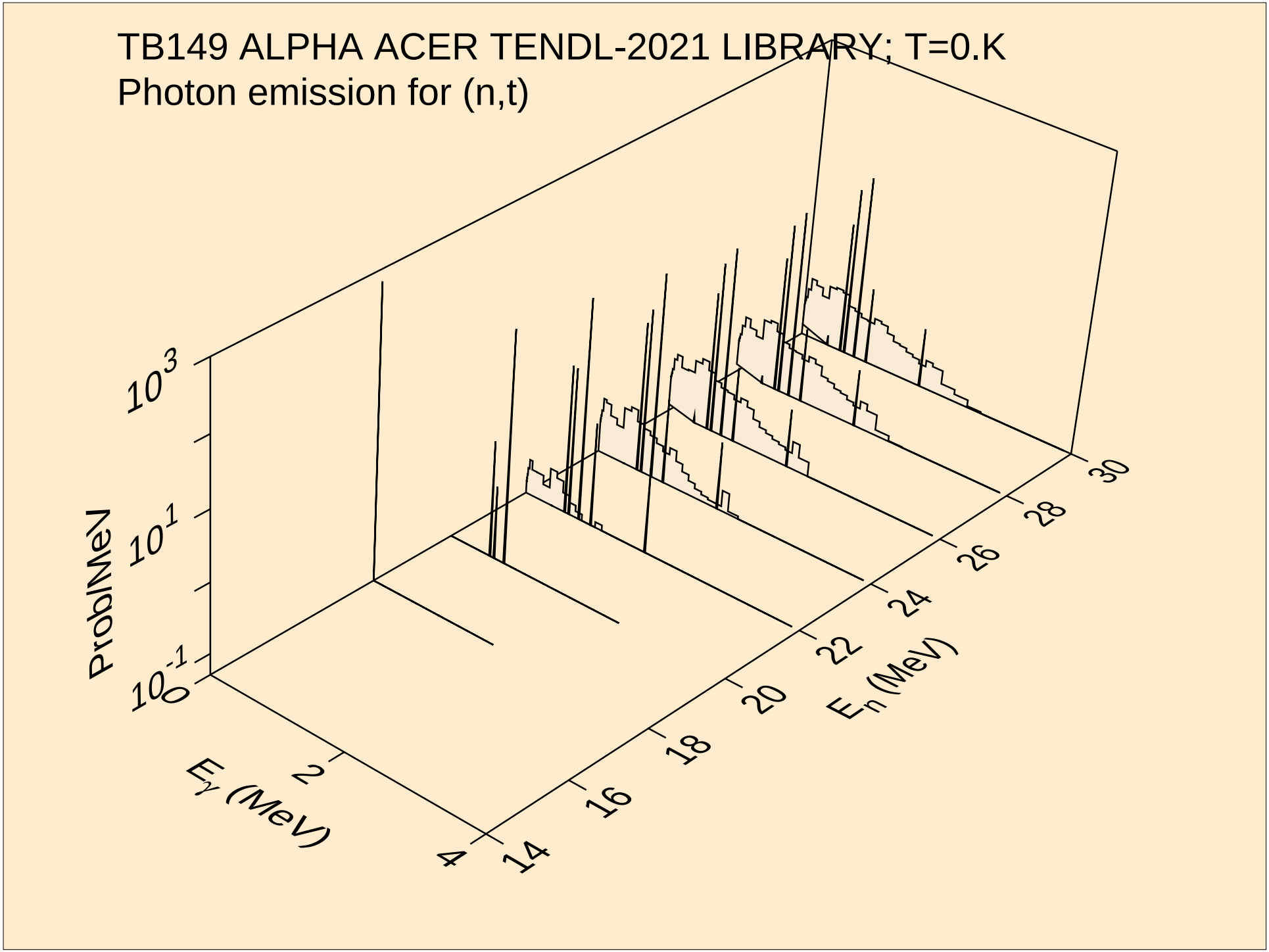


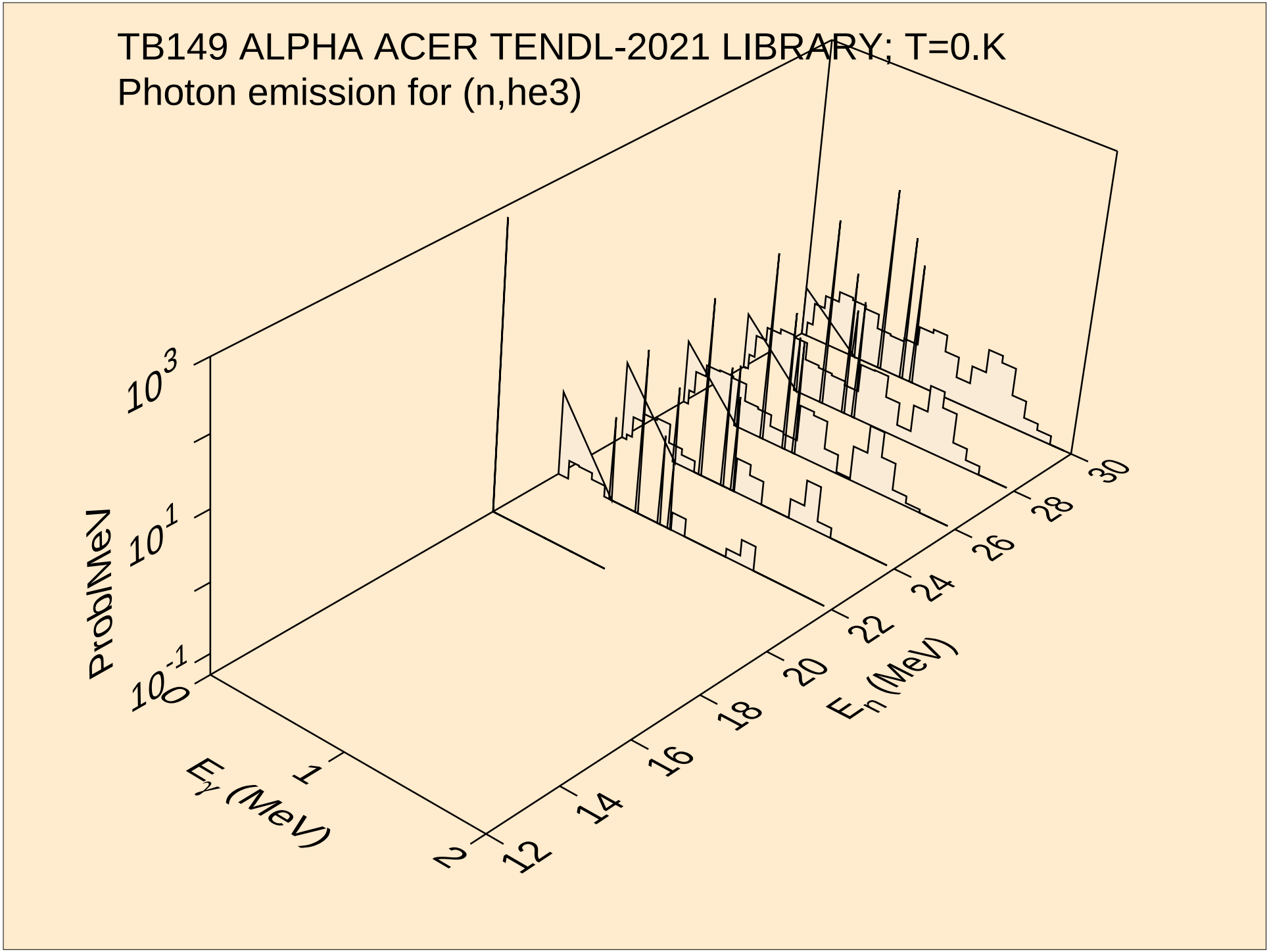

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,npa)
Prob/MeV
10^0
10^{-2}
0
2
4
E_γ (MeV)
10
12
14
16
18
20
22
24
26
28
30
E_n (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,gma)
Prob/MeV
10^{3}
10^{1}
10^{-1}
E_γ (MeV)
0
5
10
E_n (MeV)
0
5
10
15
20
25
30

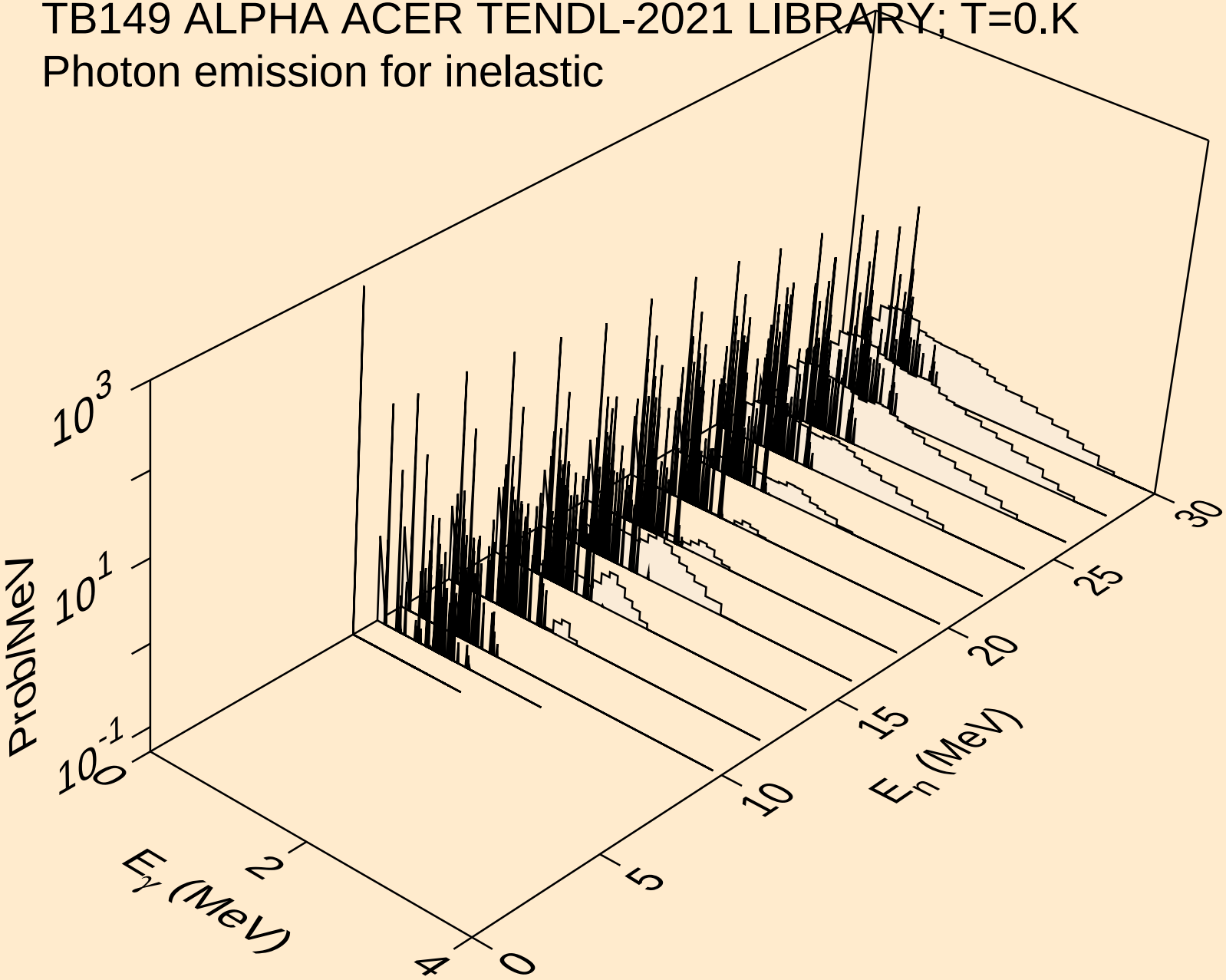

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,p)
Prob/MeV
10^{3}
10^{1}
10^{-1}
0
2
4
E_γ (MeV)
5
10
15
20
25
30
E_n (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,d)
Prob/MeV
10^{3}
10^{1}
10^{-1}
0
2
4
E_γ (MeV)
12
14
16
18
20
22
24
26
28
30
E_n (MeV)

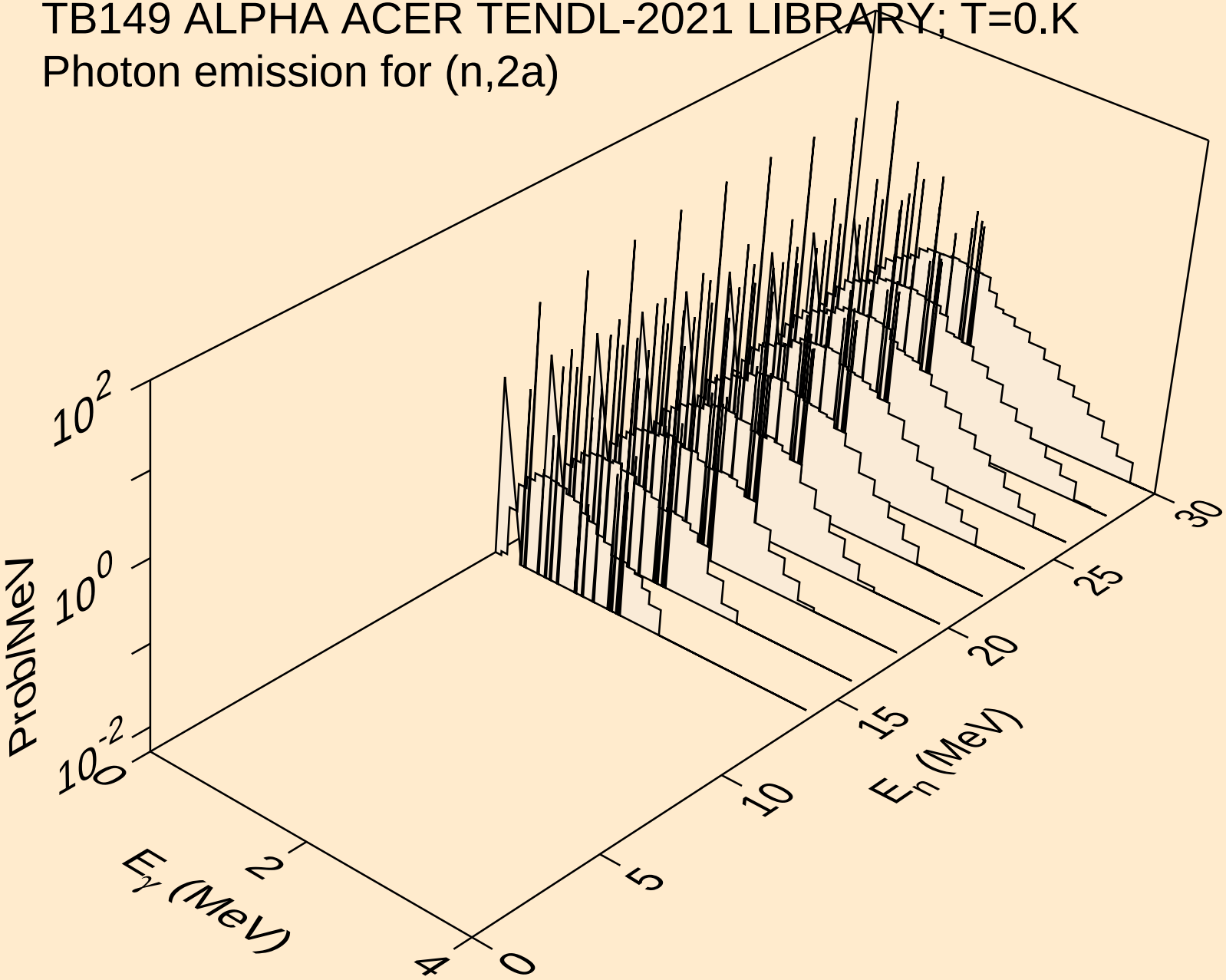

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,t)
Prob/MeV
10^{3}
10^{1}
10^{-1}
0
2
4
E_γ (MeV)
14
16
18
20
22
24
26
28
30
E_n (MeV)

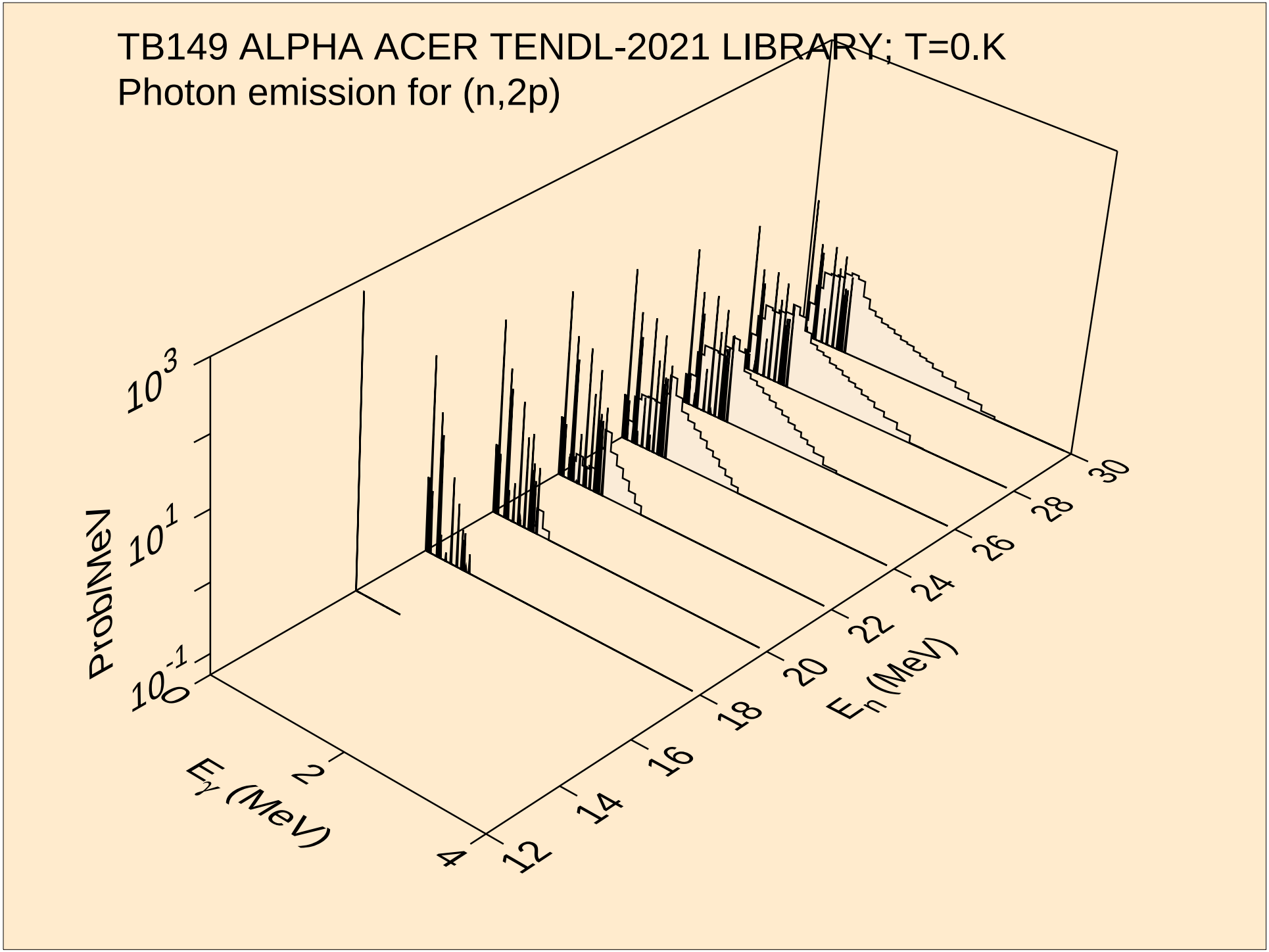

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,he3)
Prob/MeV
10^3
10^1
10^{-1}
0
1
2
E_γ (MeV)
12
14
16
18
20
22
24
26
28
30
E_n (MeV)

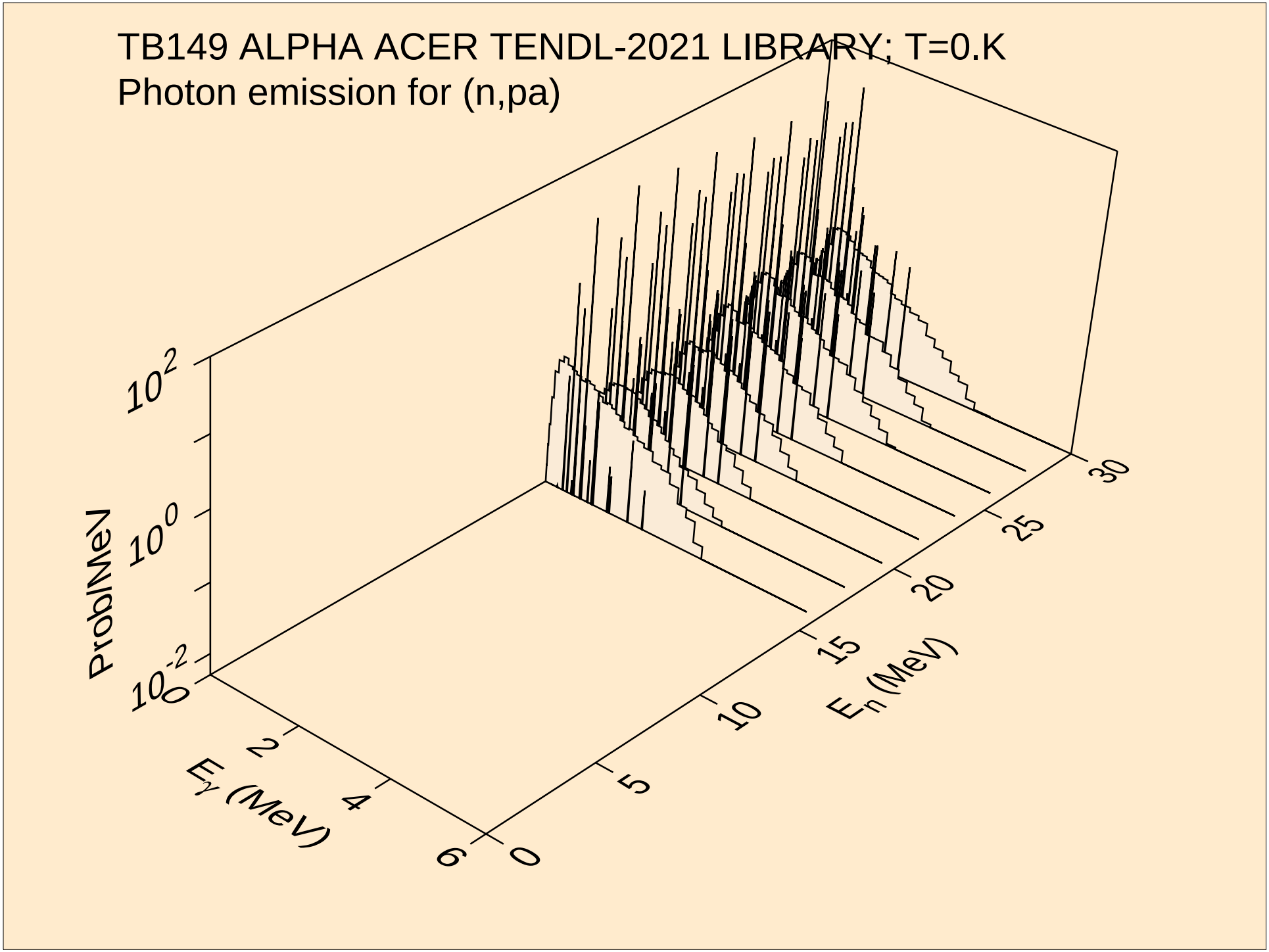
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for inelastic

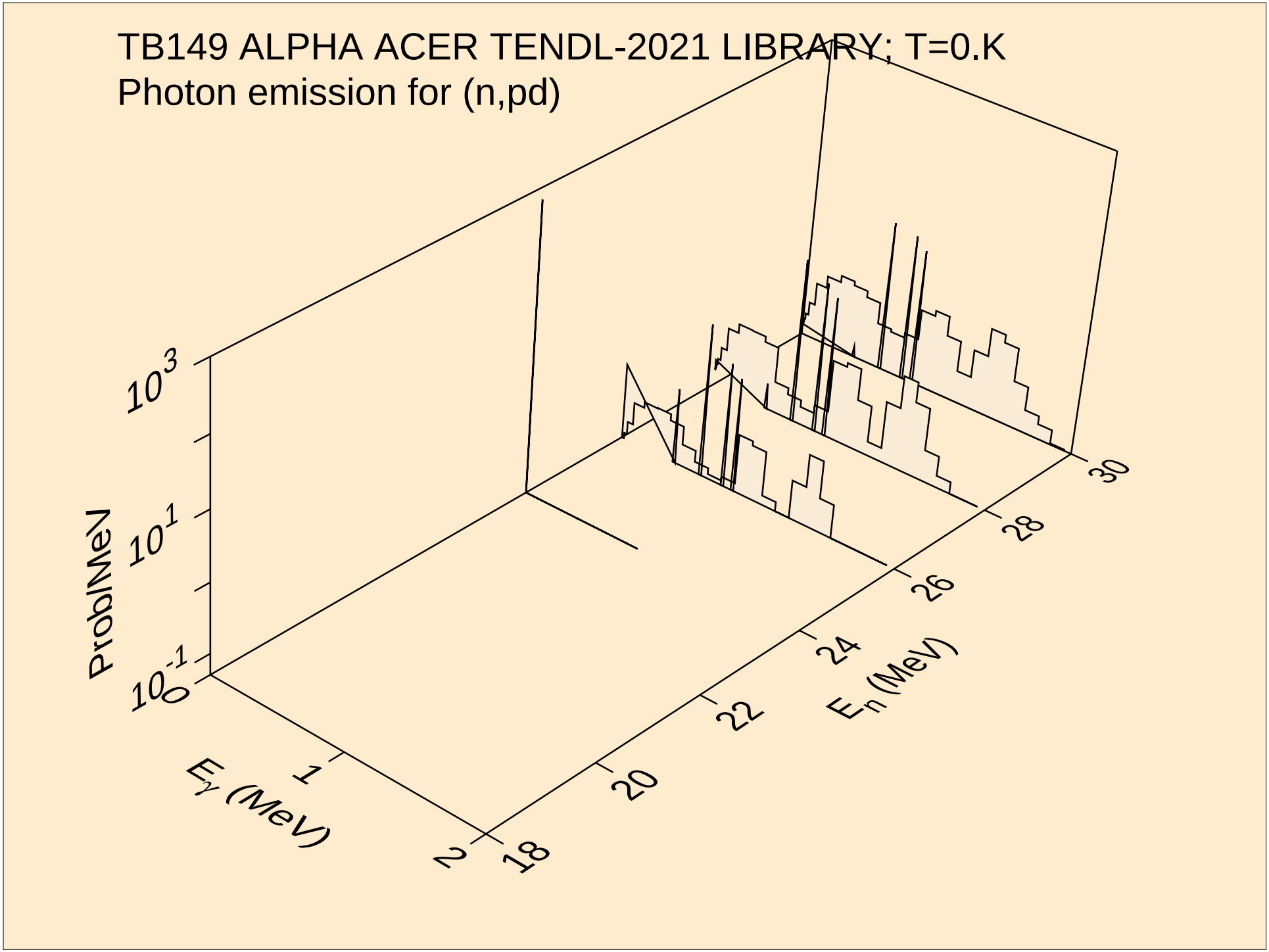


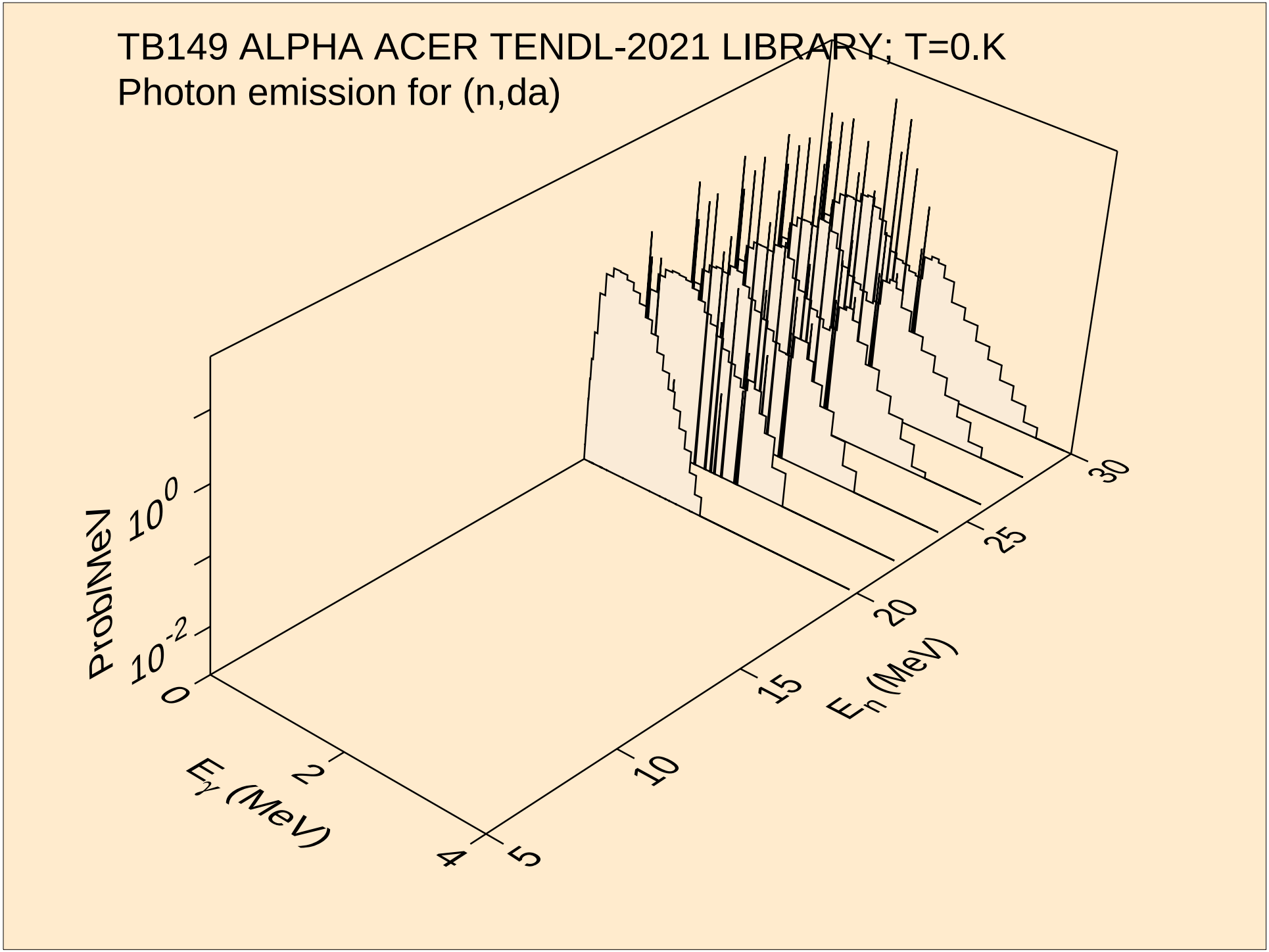
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2a)

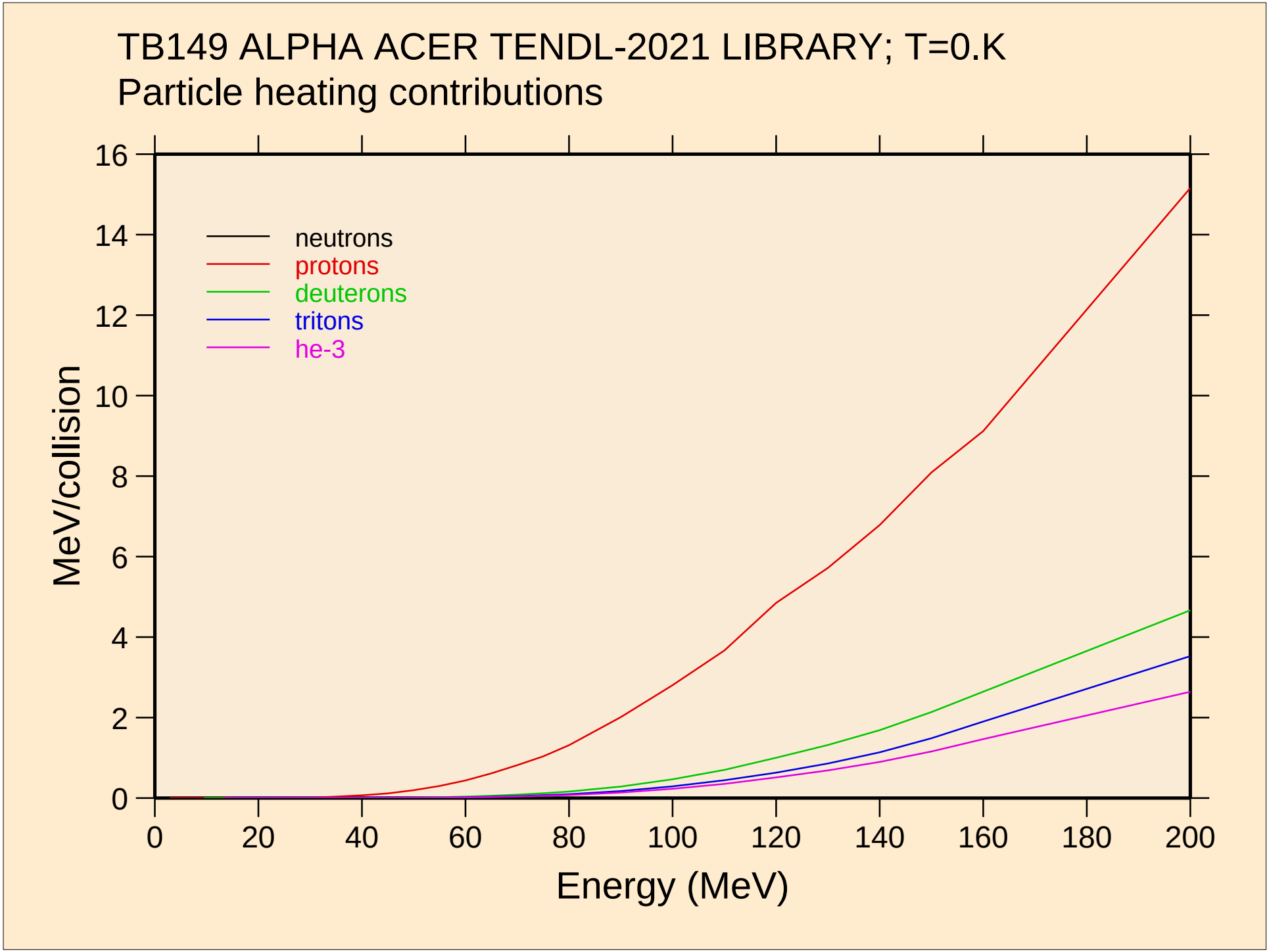


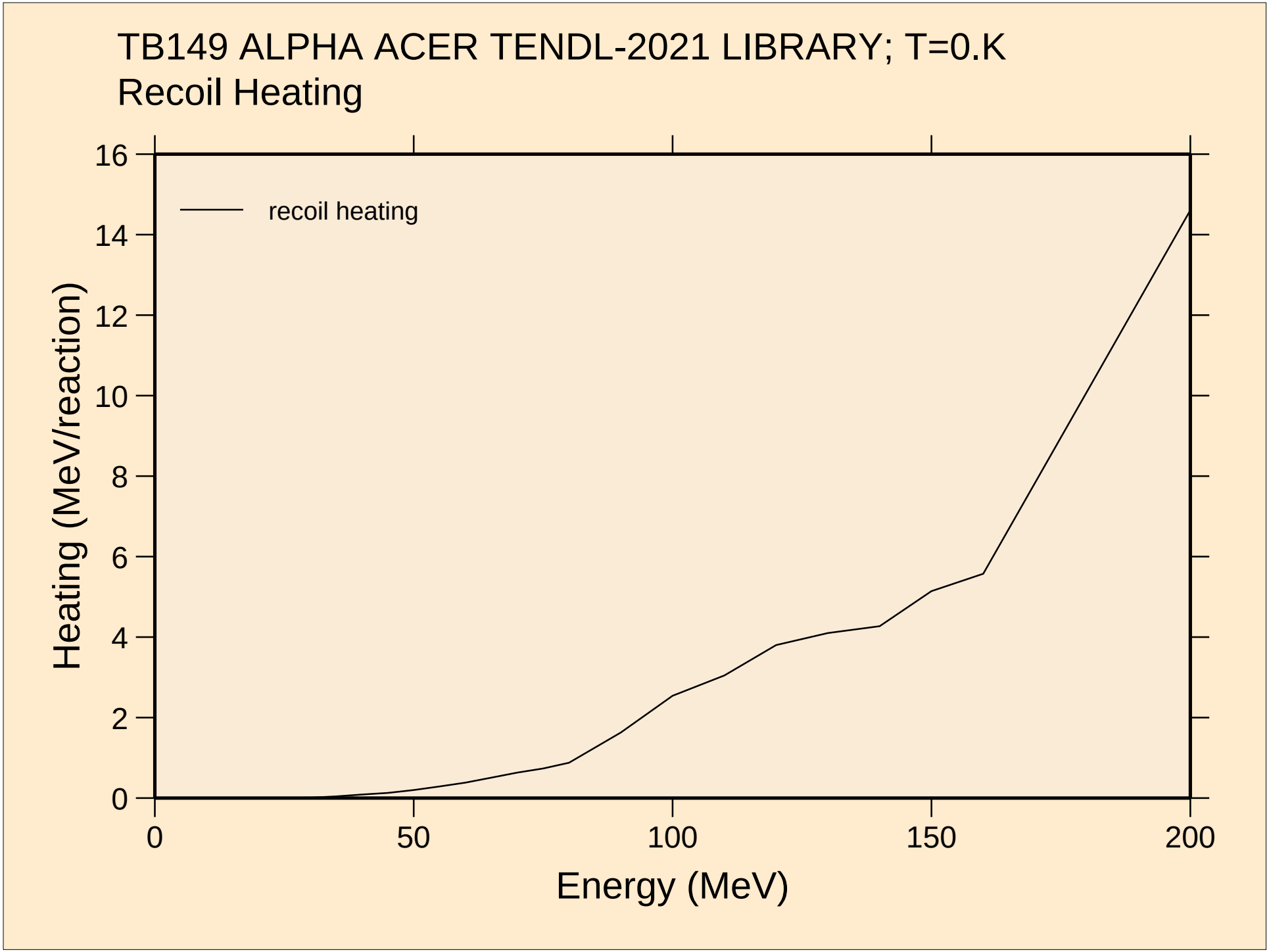

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,2p)
Prob/MeV
10^{3}
10^{1}
10^{-1}
0
2
4
E_γ (MeV)
12
14
16
18
20
22
24
26
28
30
E_n (MeV)

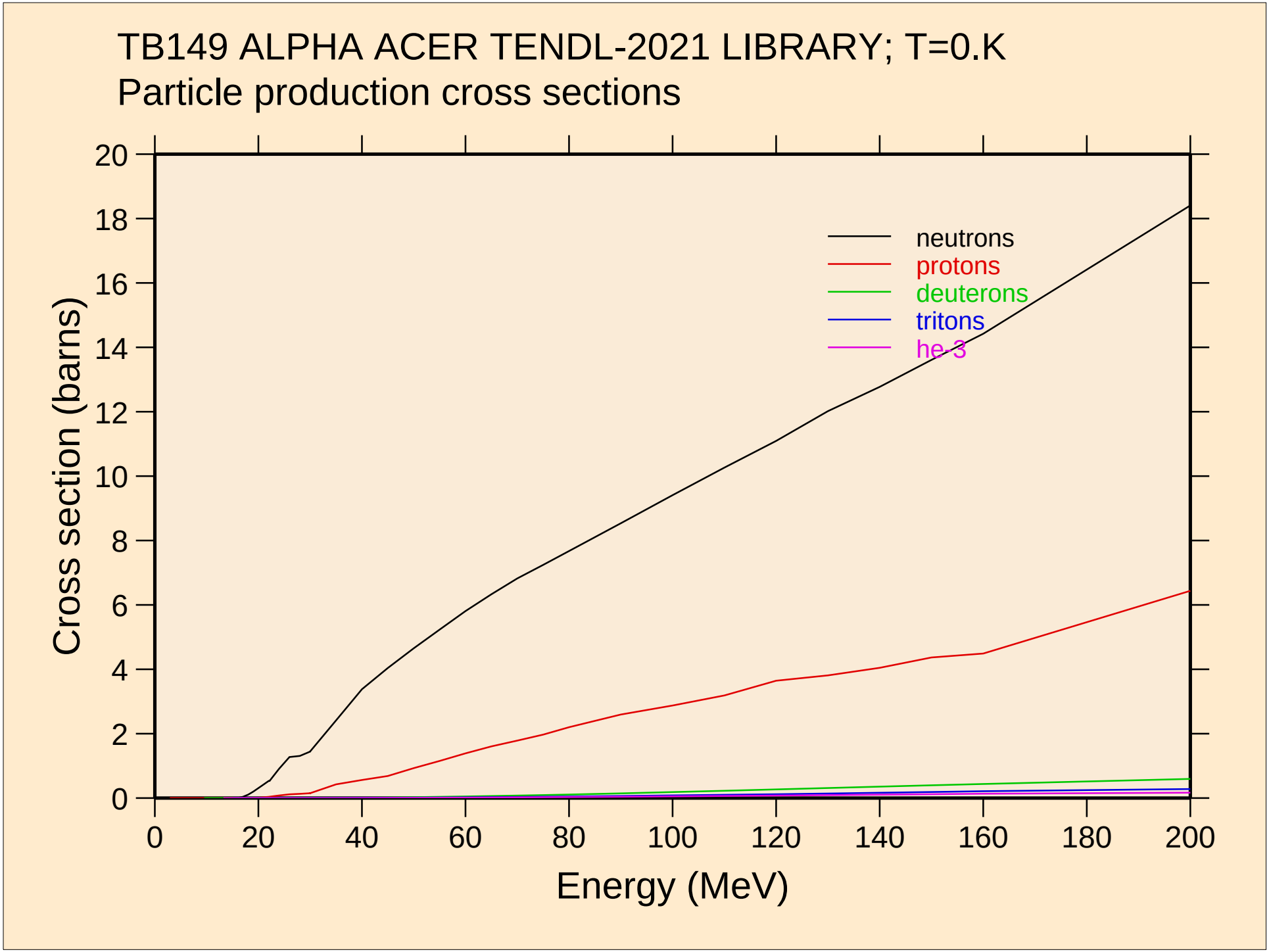

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,pa)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
6
E_n (MeV)
0
5
10
15
20
25
30

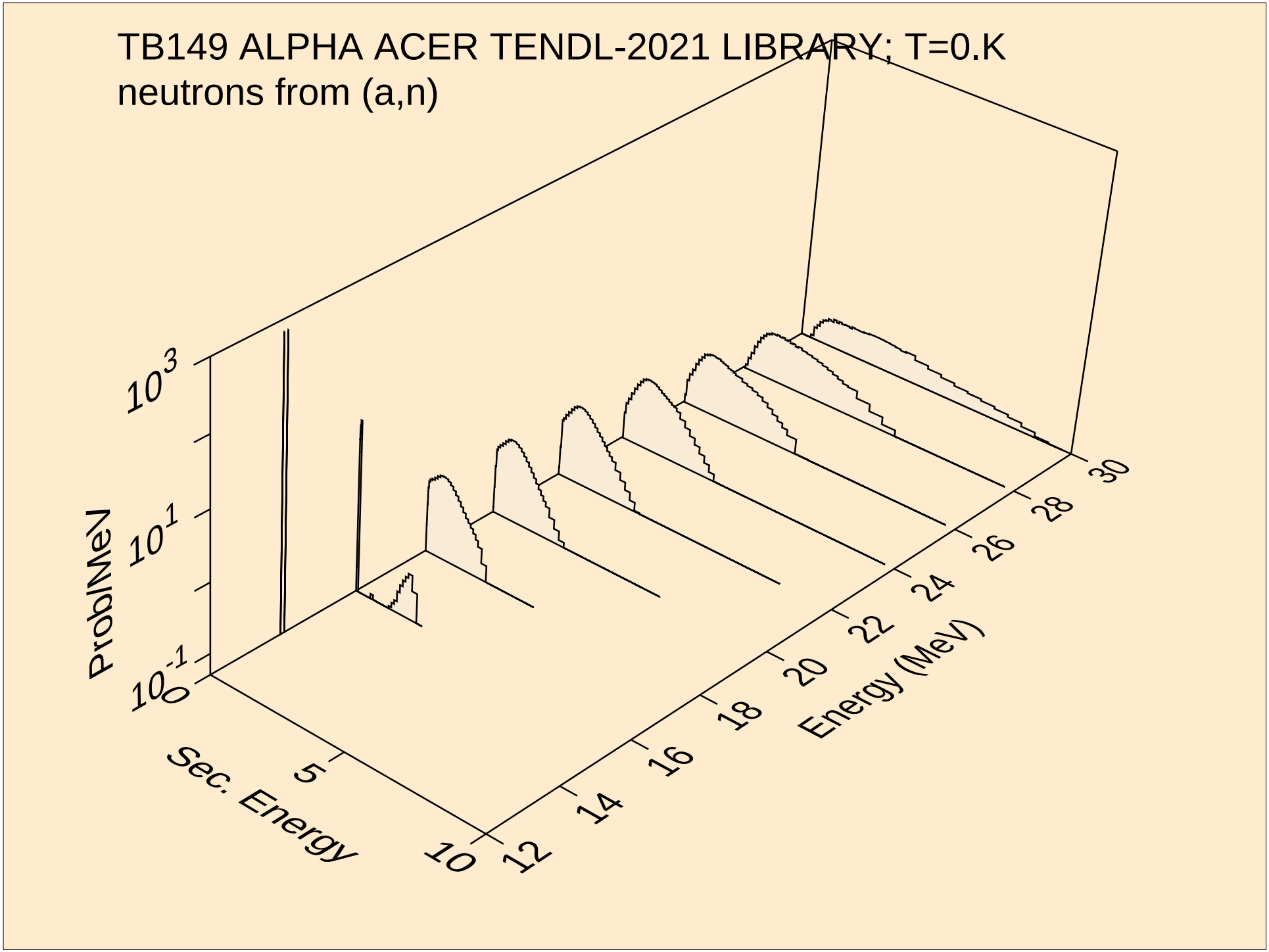

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,pd)
Prob/MeV
10^{3}
10^{1}
10^{-1}
0
1
2
E_γ (MeV)
18
20
22
24
26
28
30
E_n (MeV)

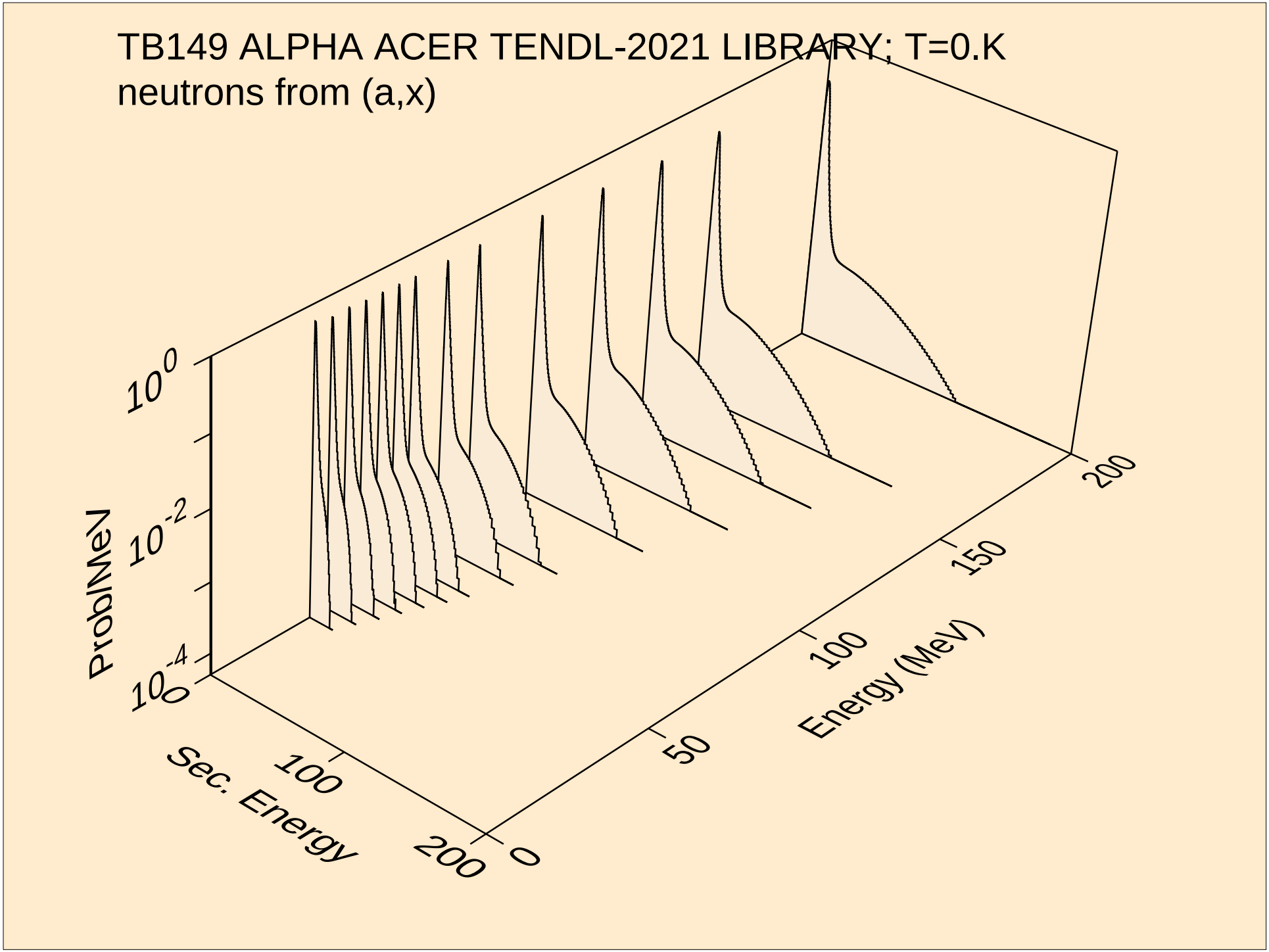

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Photon emission for (n,da)
Prob/MeV
10^0
10^{-2}
0
2
4
E_γ (MeV)
5
10
15
20
25
30
E_n (MeV)

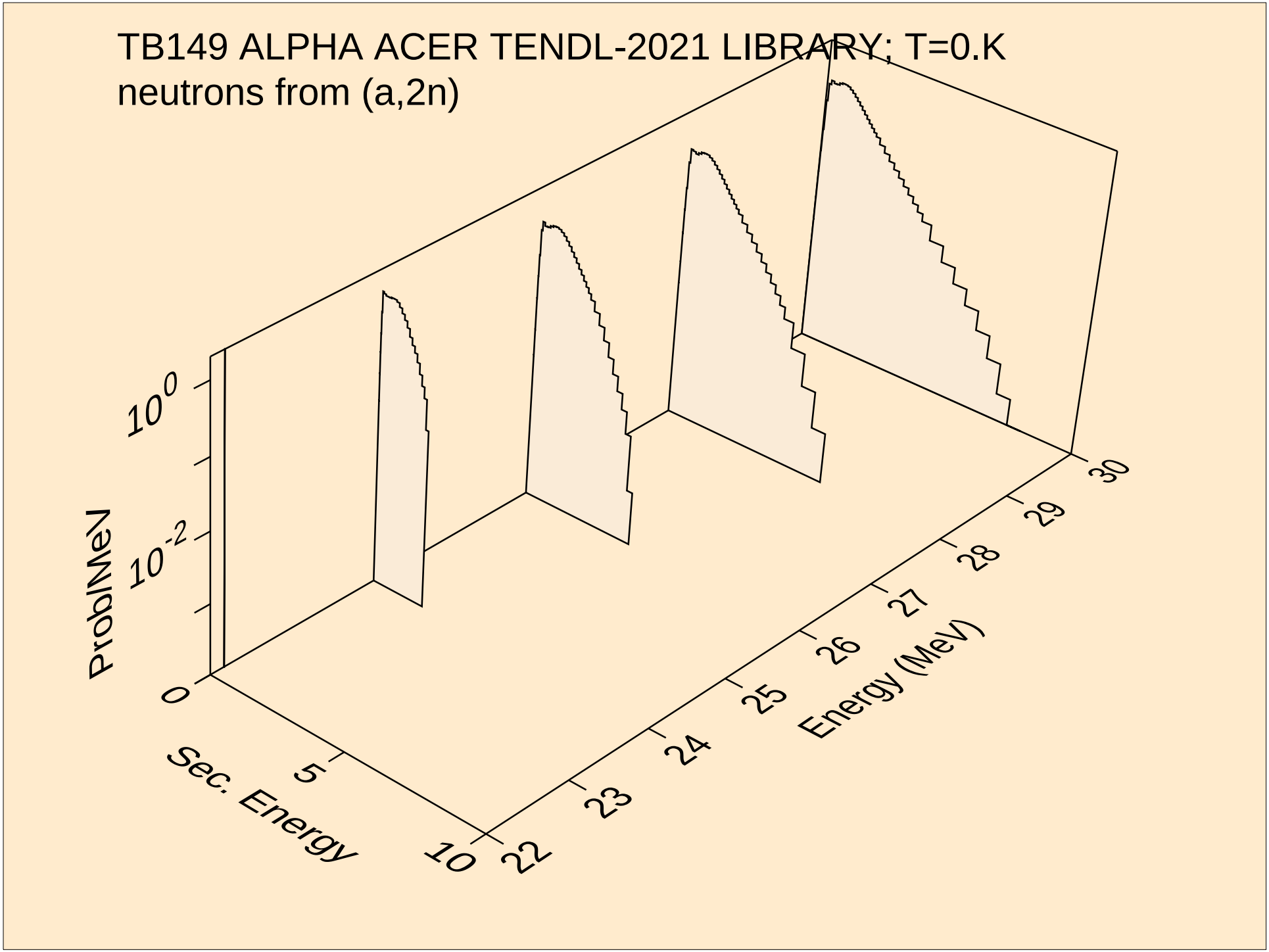

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Particle heating contributions
neutrons
protons
deuterons
tritons
he-3
MeV/collision
Energy (MeV)
0
2
4
6
8
10
12
14
16
0
20
40
60
80
100
120
140
160
180
200

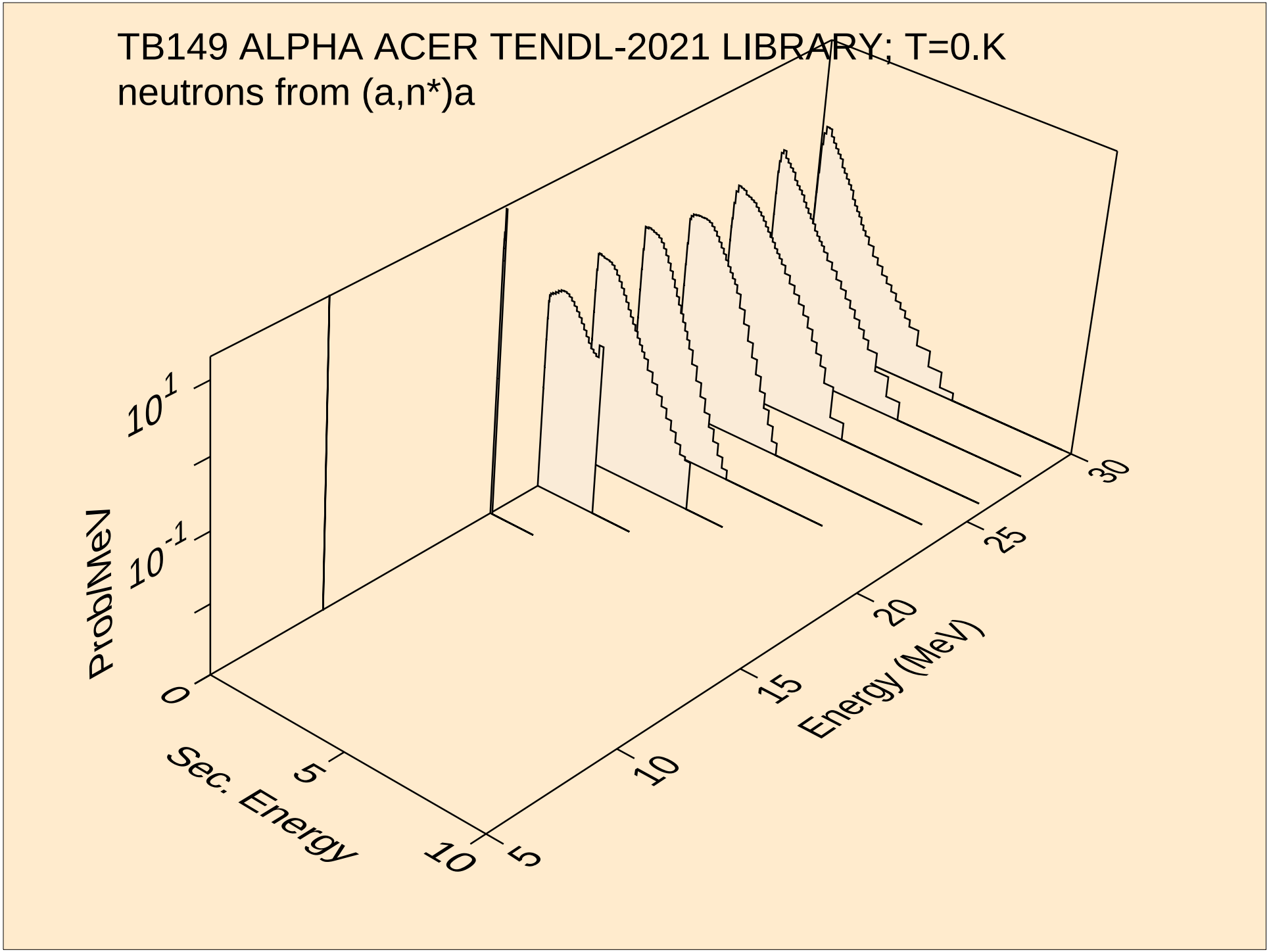

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
0
2
4
6
8
10
12
14
16
0
50
100
150
200

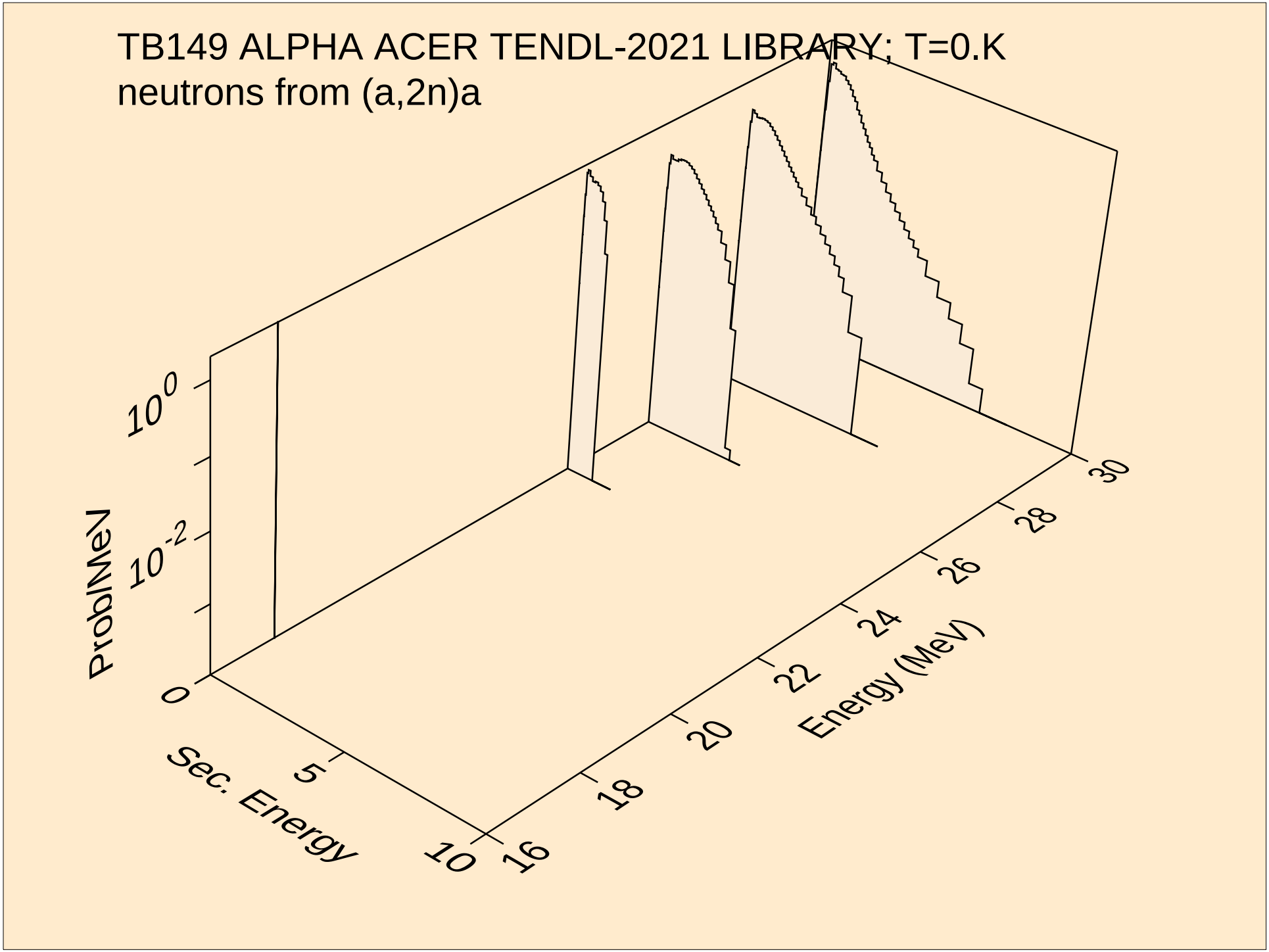

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
Particle production cross sections
Cross section (barns)
Energy (MeV)
neutrons
protons
deuterons
tritons
he-3
0
2
4
6
8
10
12
14
16
18
20
0
20
40
60
80
100
120
140
160
180
200

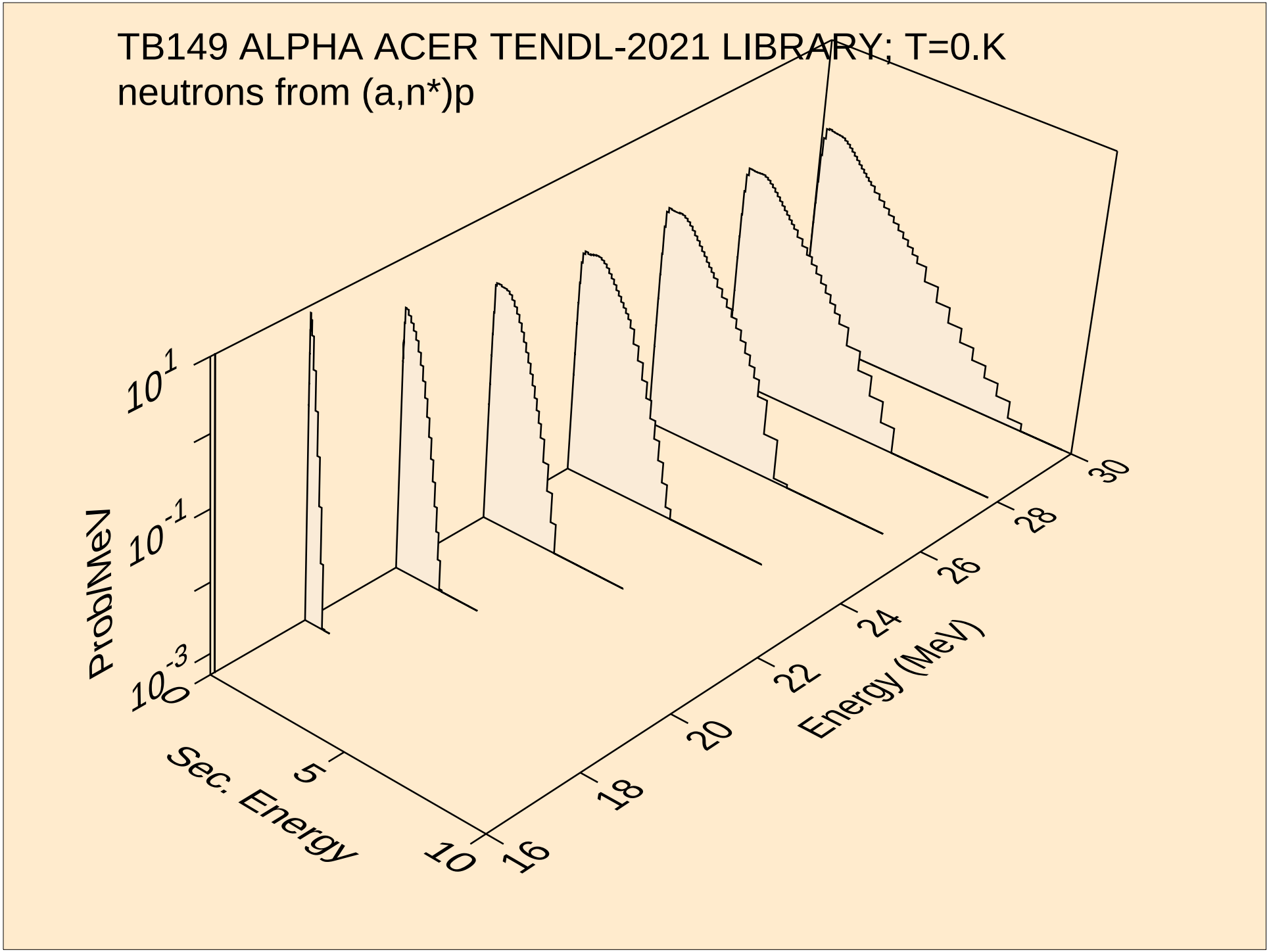

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,n)
Prob/MeV
10^{3}
10^{1}
10^{-1}
Sec. Energy
0
5
10
Energy (MeV)
12
14
16
18
20
22
24
26
28
30

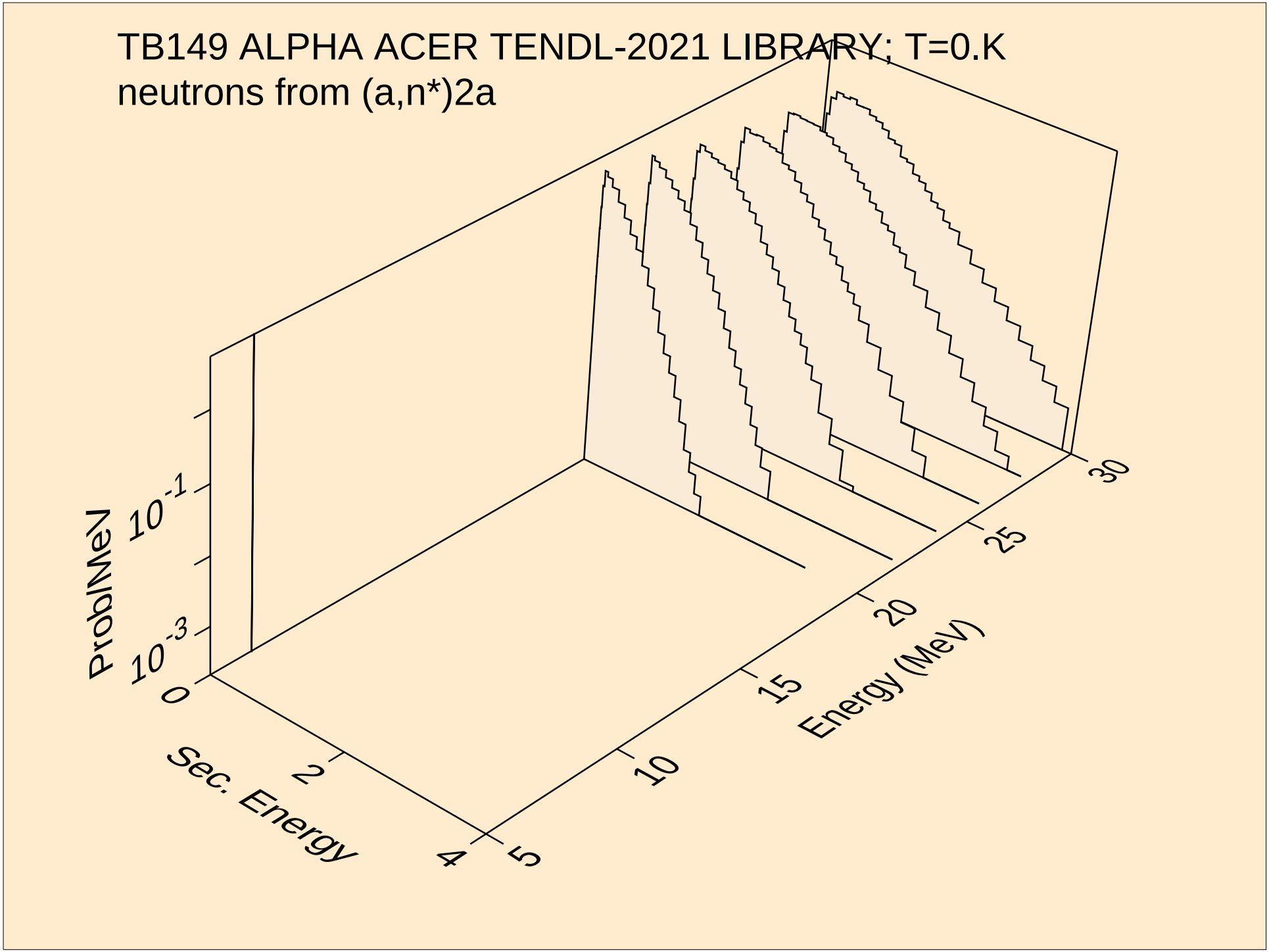

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,x)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
Sec. Energy
0
100
200
Energy (MeV)
0
50
100
150
200

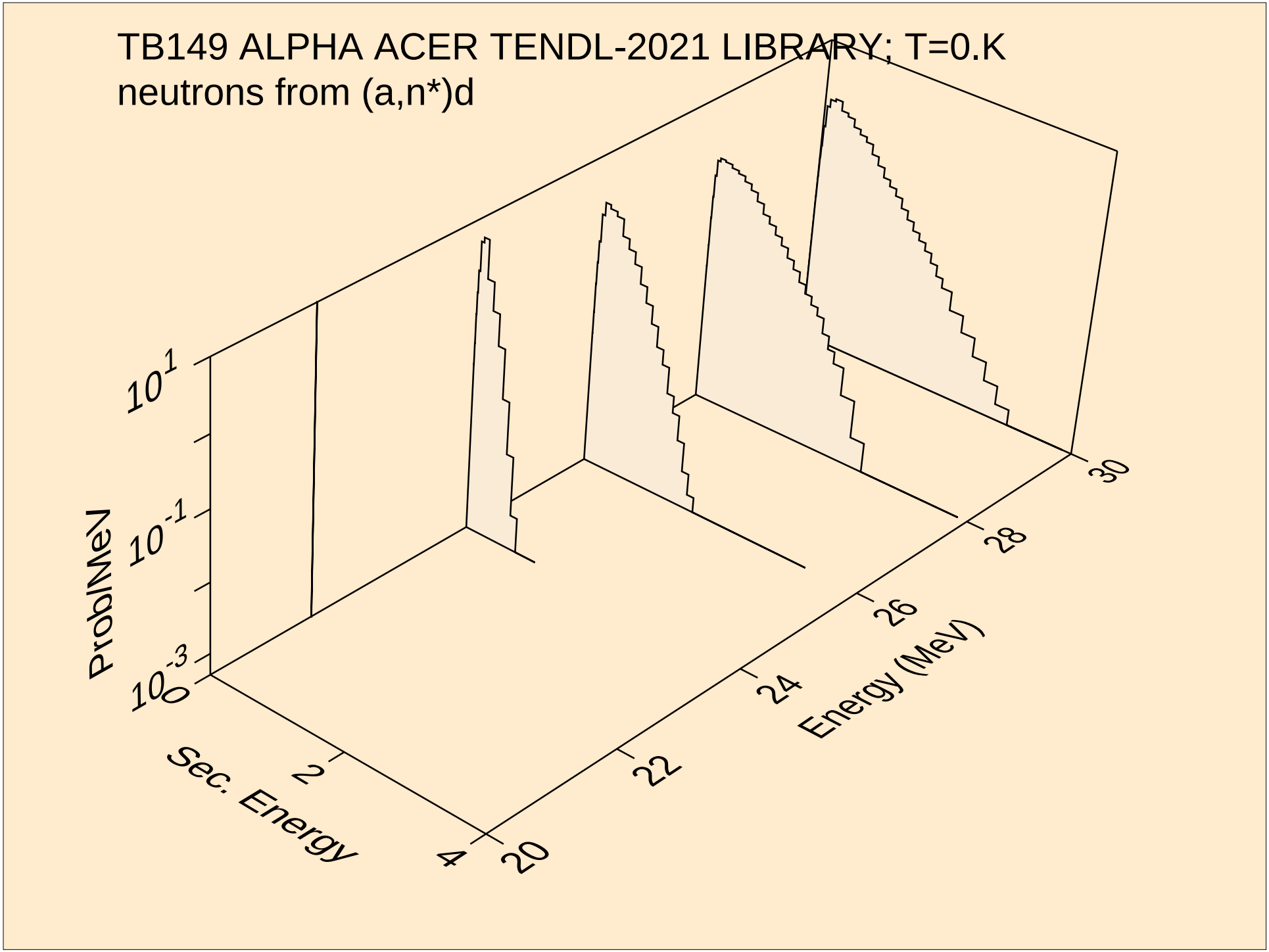

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,2n)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
22
23
24
25
26
27
28
29
30
Energy (MeV)

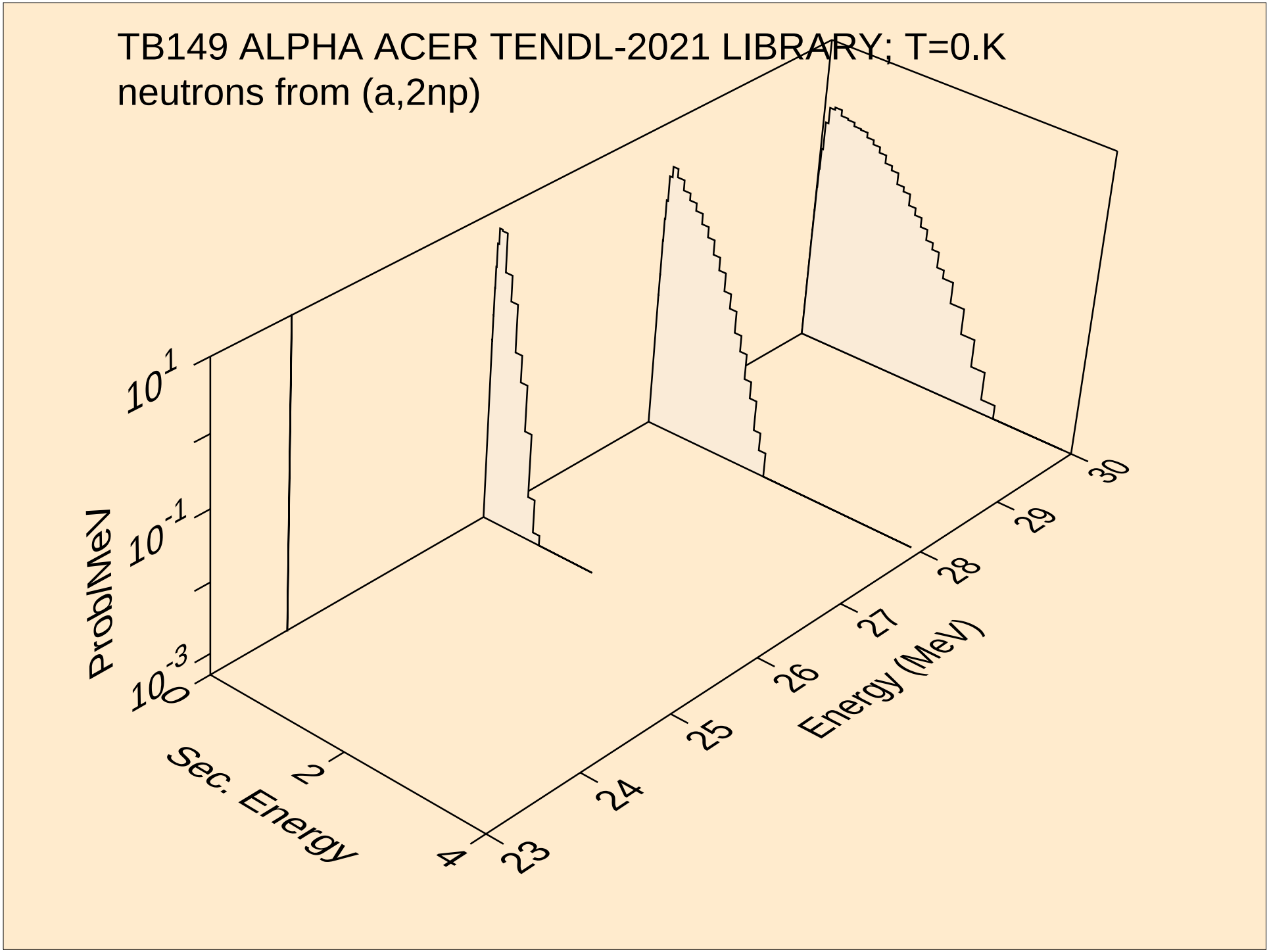

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,n*)a
Prob/MeV
10^1
10^-1
0
Sec. Energy
5
10
5
10
15
20
25
30
Energy (MeV)

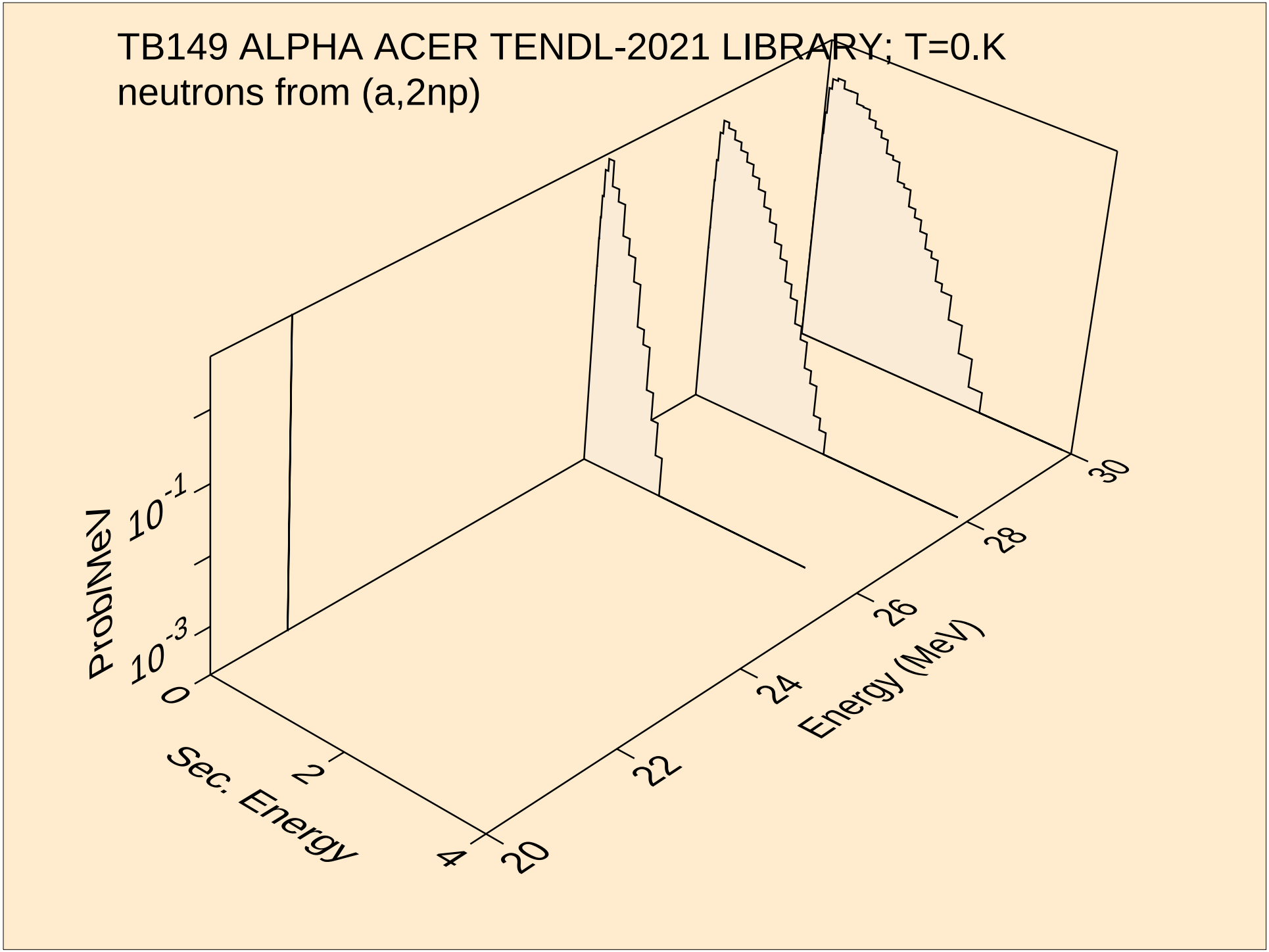

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,2n)a
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
16
18
20
22
24
26
28
30
Energy (MeV)

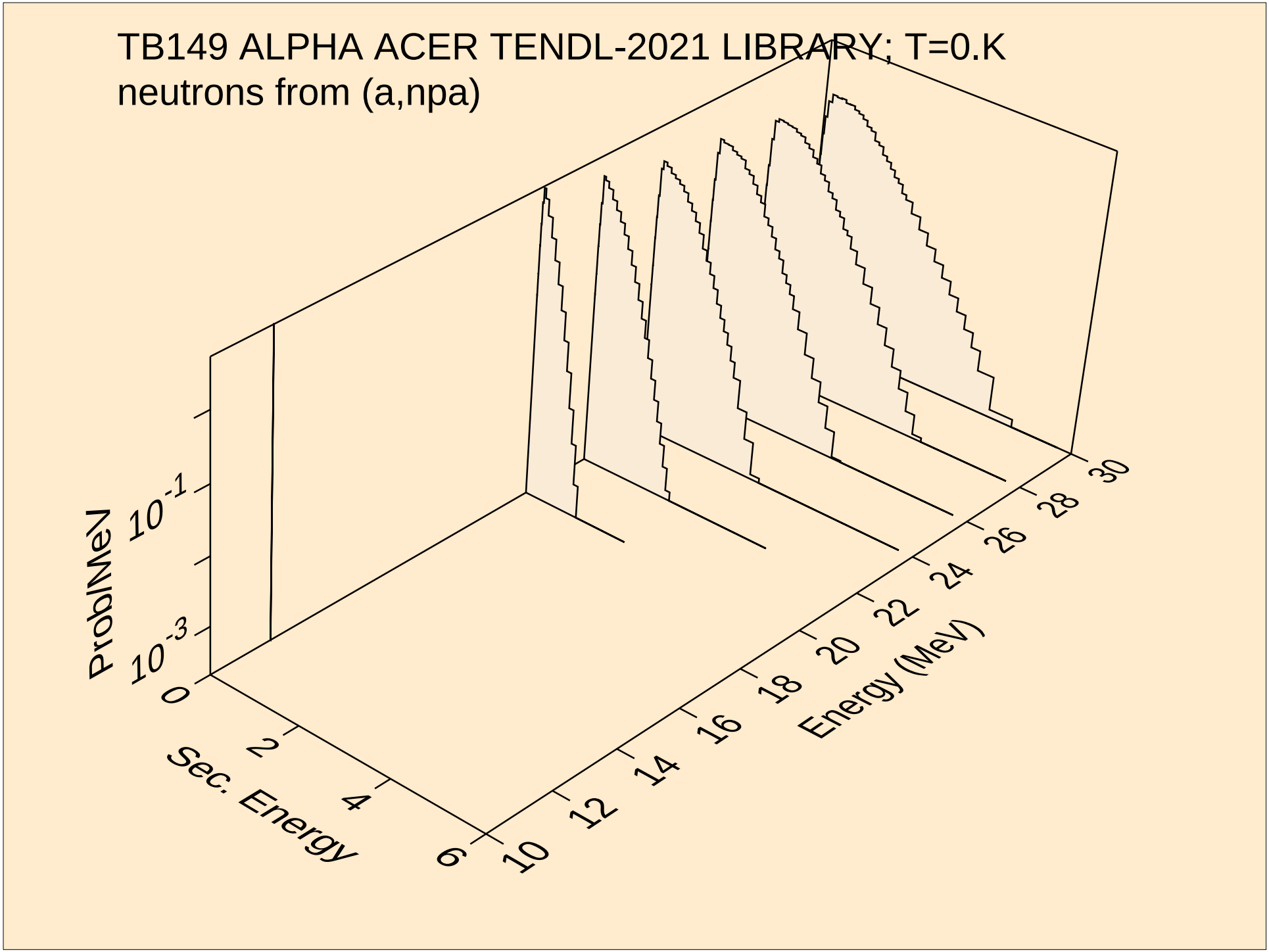

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,n*)p
Prob/MeV
10^1
10^-1
10^-3
Sec. Energy
0
5
10
Energy (MeV)
16
18
20
22
24
26
28
30

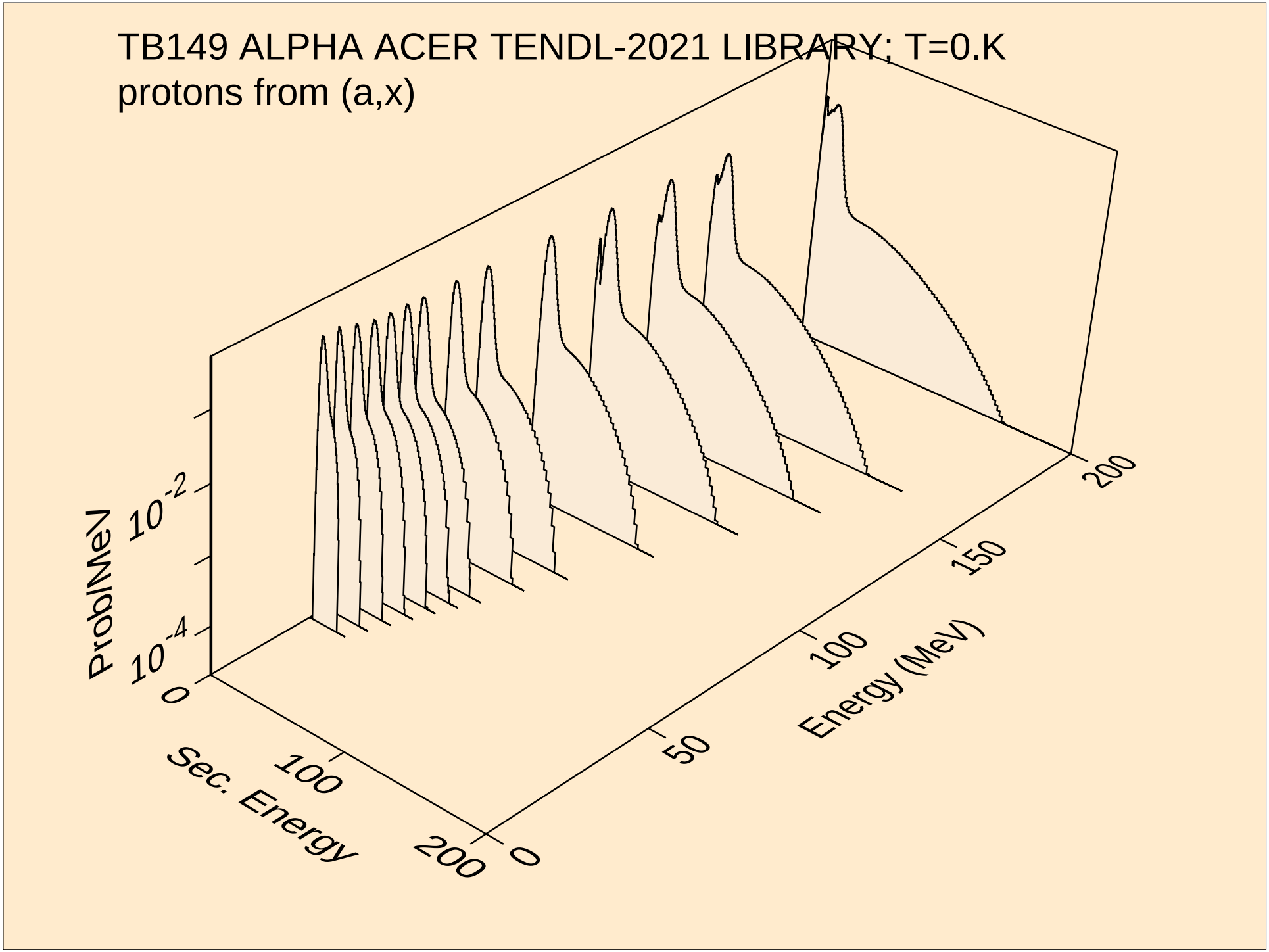

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,n*)2a
Prob/MeV
10-1
10-3
0
Sec. Energy
2
4
5
10
15
20
25
30
Energy (MeV)

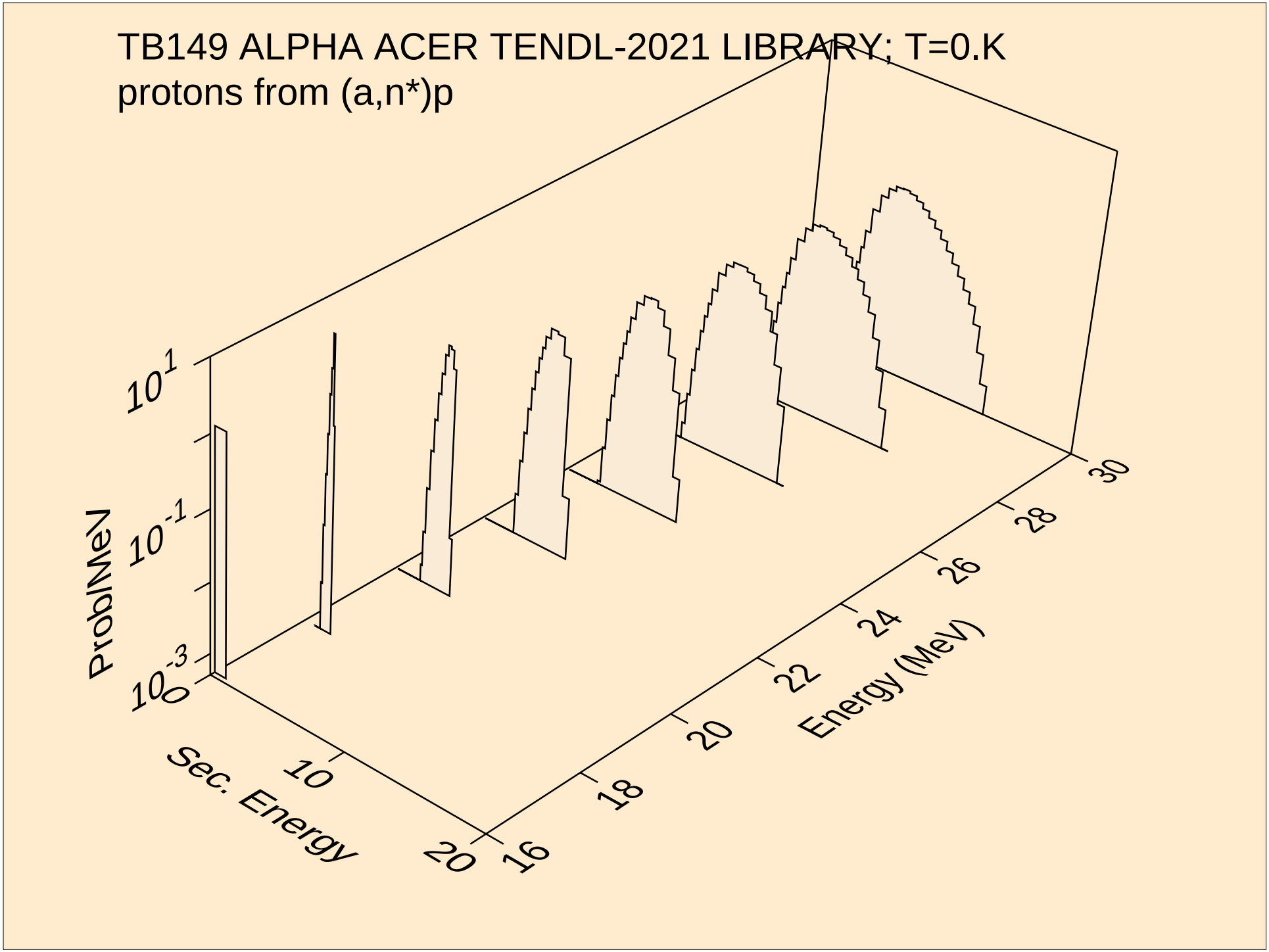

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,n*)d
Prob/MeV
10^1
10^-1
10^-3
0
2
4
Sec. Energy
20
22
24
26
28
30
Energy (MeV)

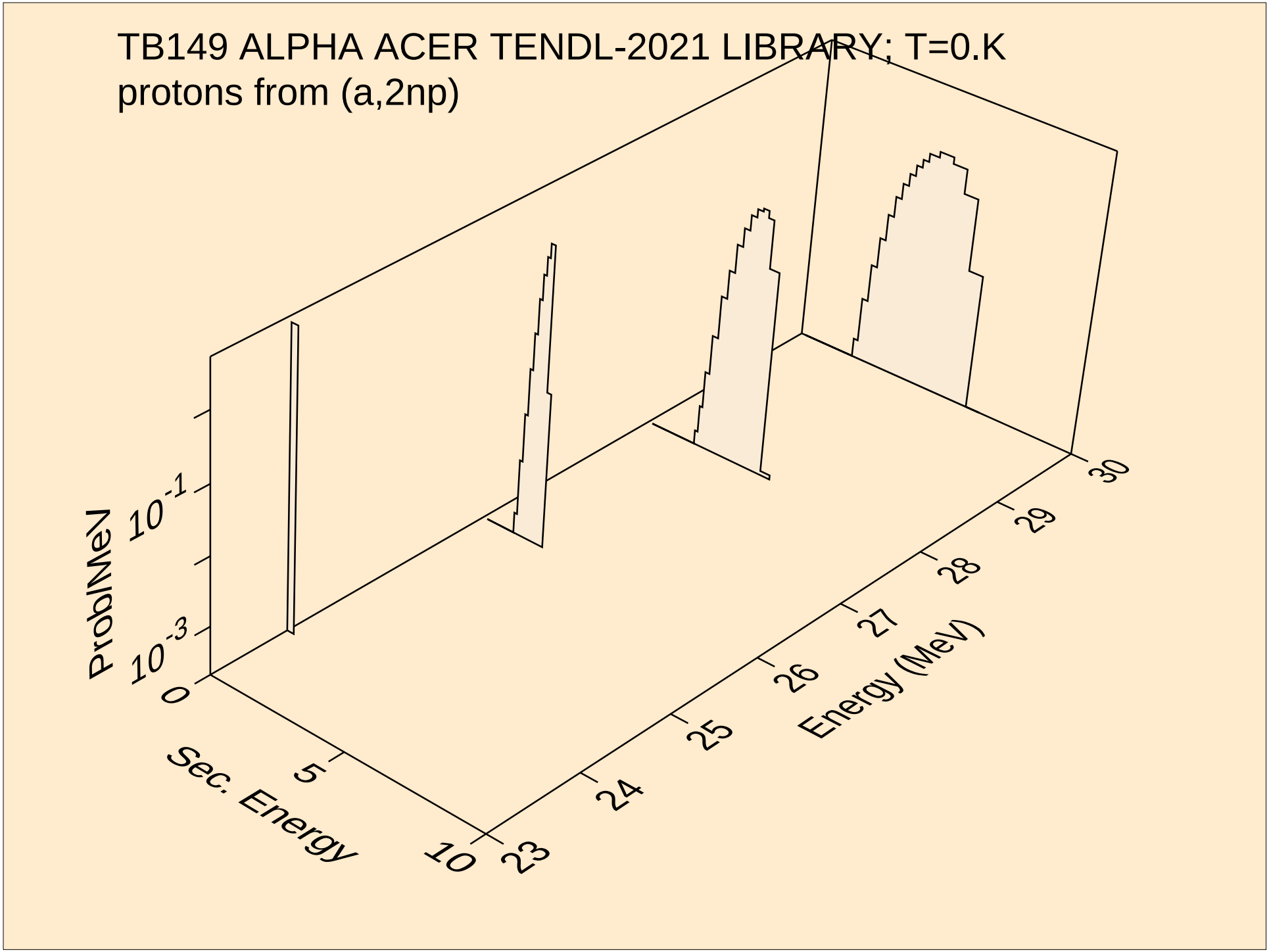

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,2np)
Prob/MeV
10^1
10^-1
10^-3
0
2
4
Sec. Energy
23
24
25
26
27
28
29
30
Energy (MeV)

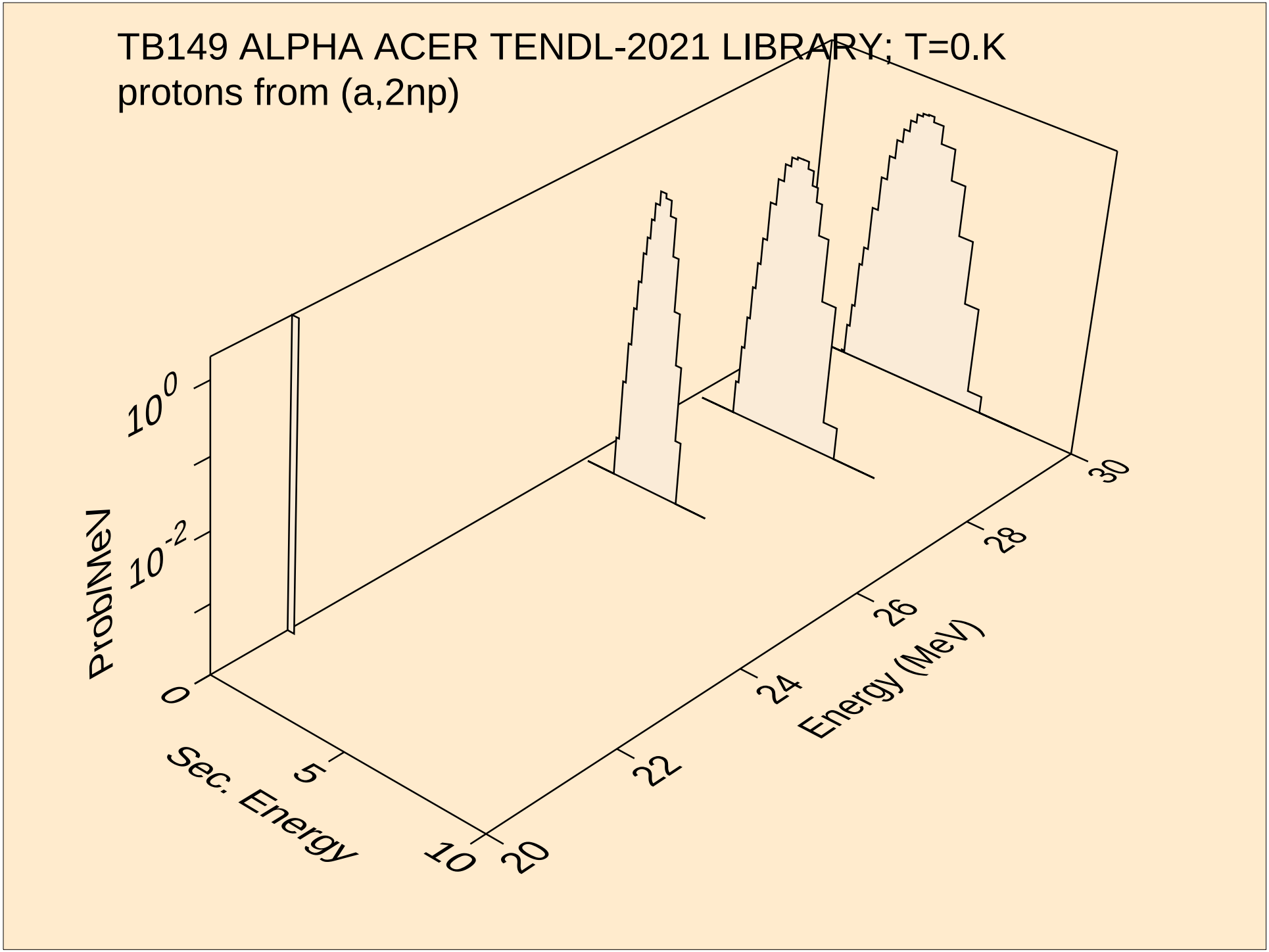

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,2np)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
2
4
20
22
24
26
28
30
Energy (MeV)

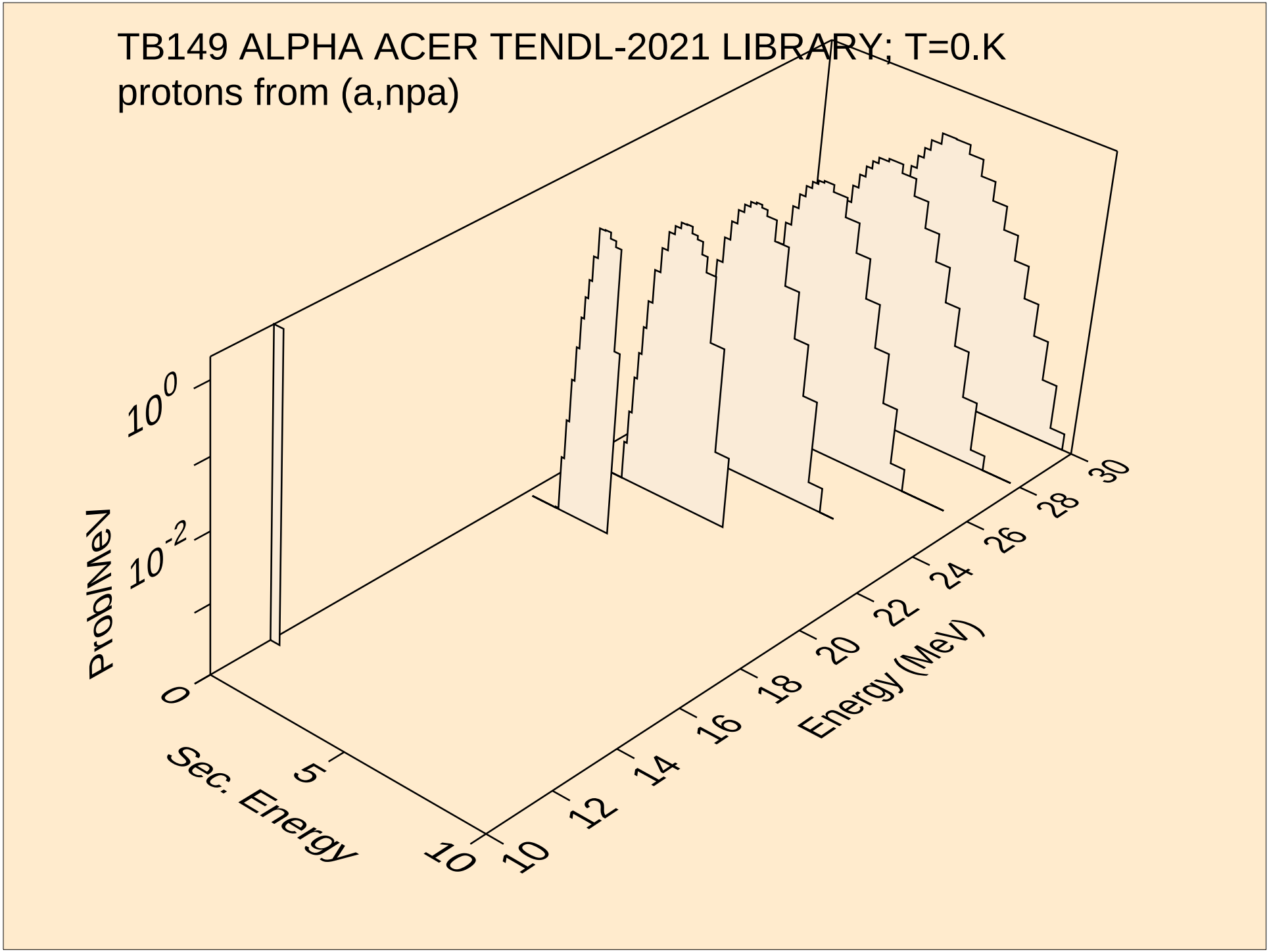

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
neutrons from (a,npa)
Prob/MeV
10-1
10-3
0
2
4
6
Sec. Energy
10
12
14
16
18
20
22
24
26
28
30
Energy (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

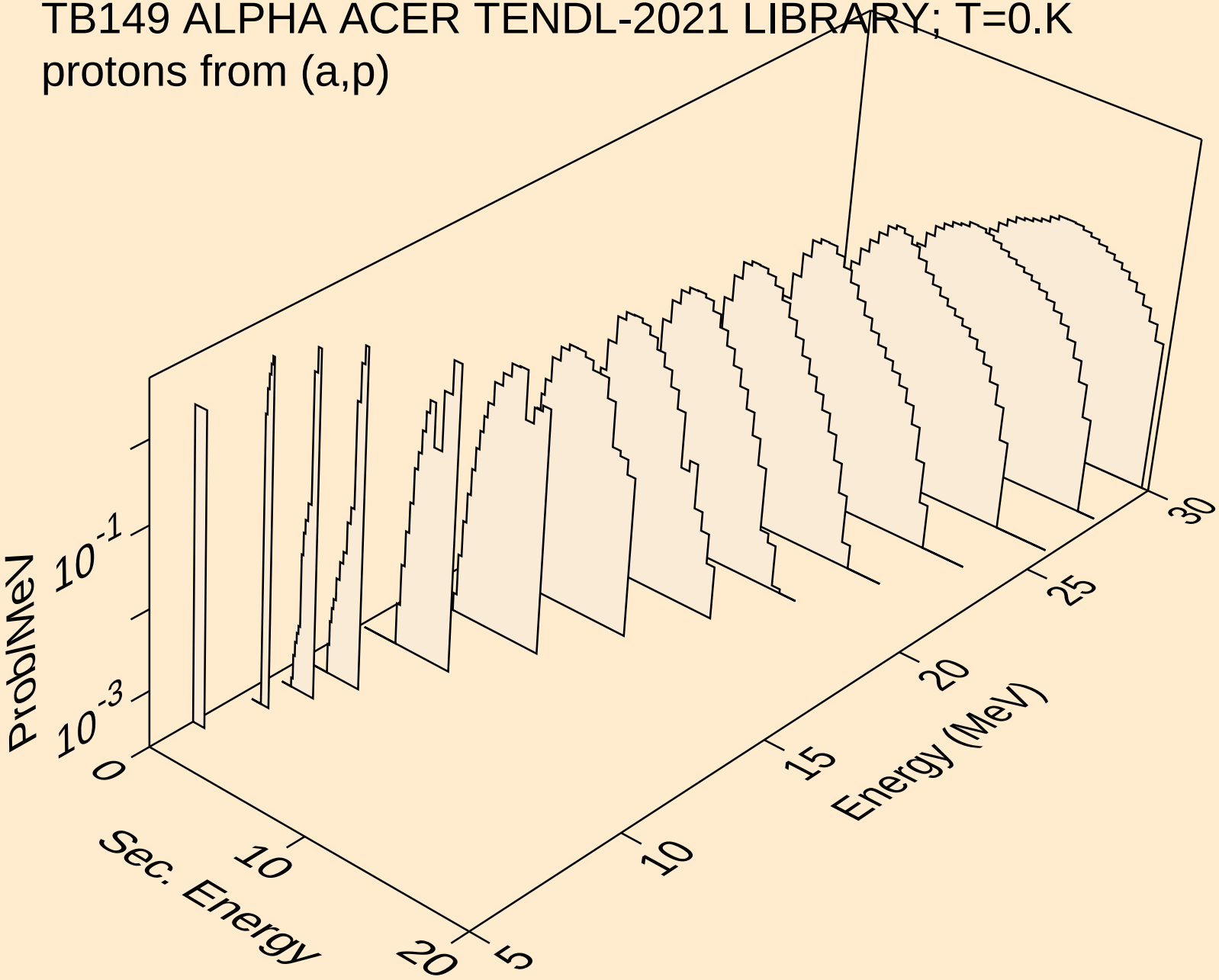

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,n*)p
Prob/MeV
10^1
10^-1
10^-3
0
10
20
Sec. Energy
16
18
20
22
24
26
28
30
Energy (MeV)

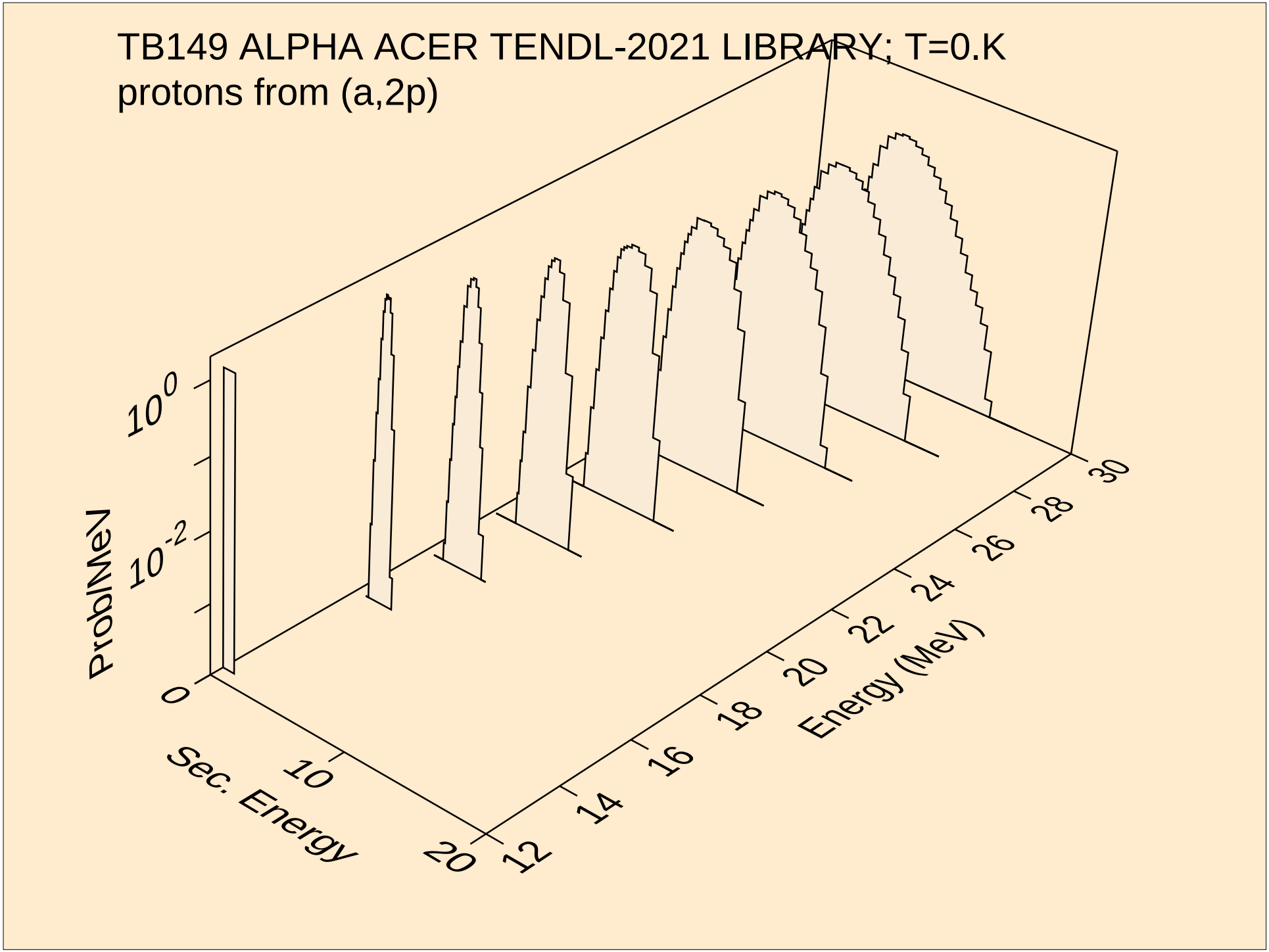

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,2np)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
23
24
25
26
27
28
29
30
Energy (MeV)

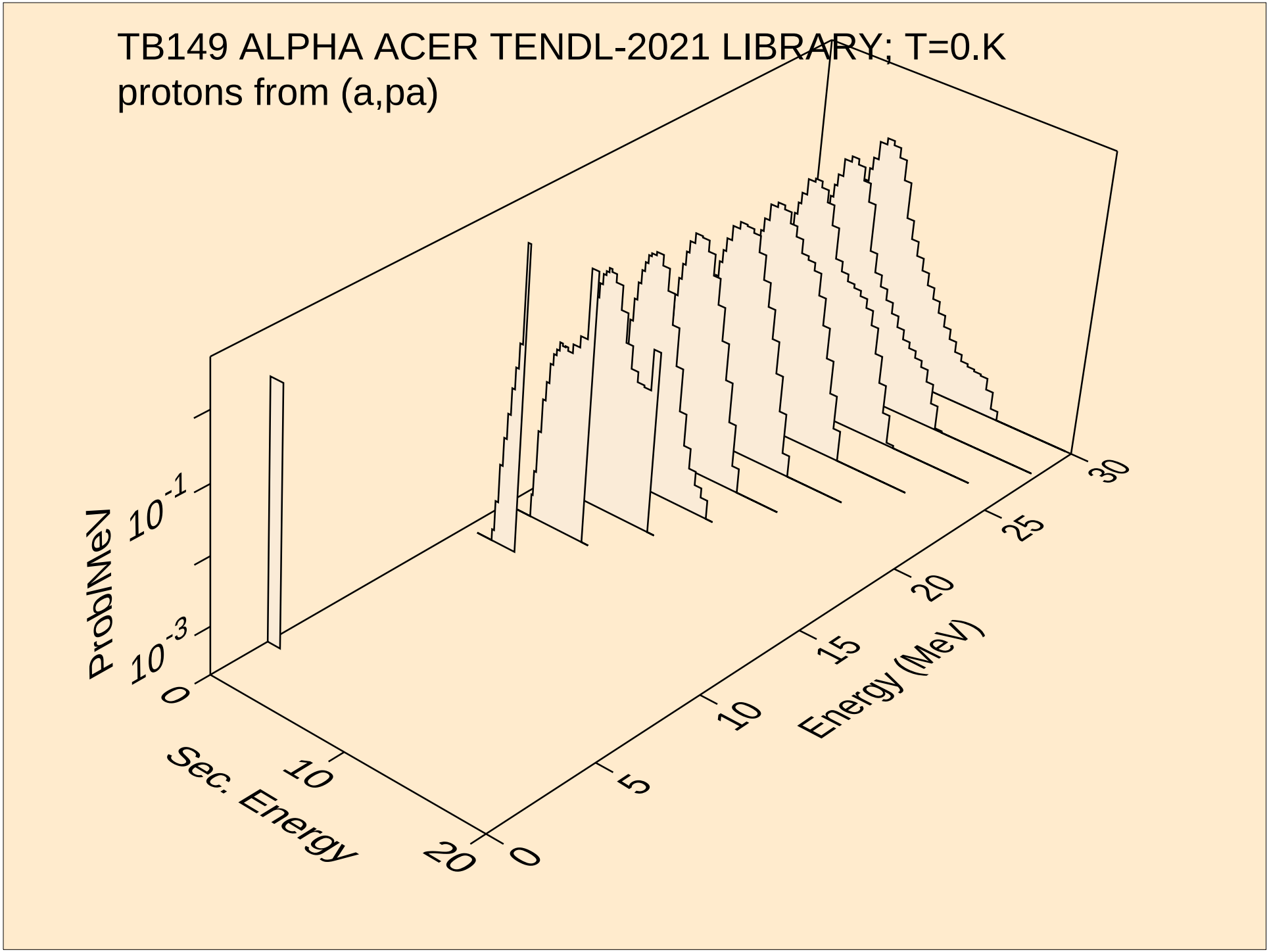

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,2np)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
20
22
24
26
28
30
Energy (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,npa)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
Energy (MeV)
10
12
14
16
18
20
22
24
26
28
30

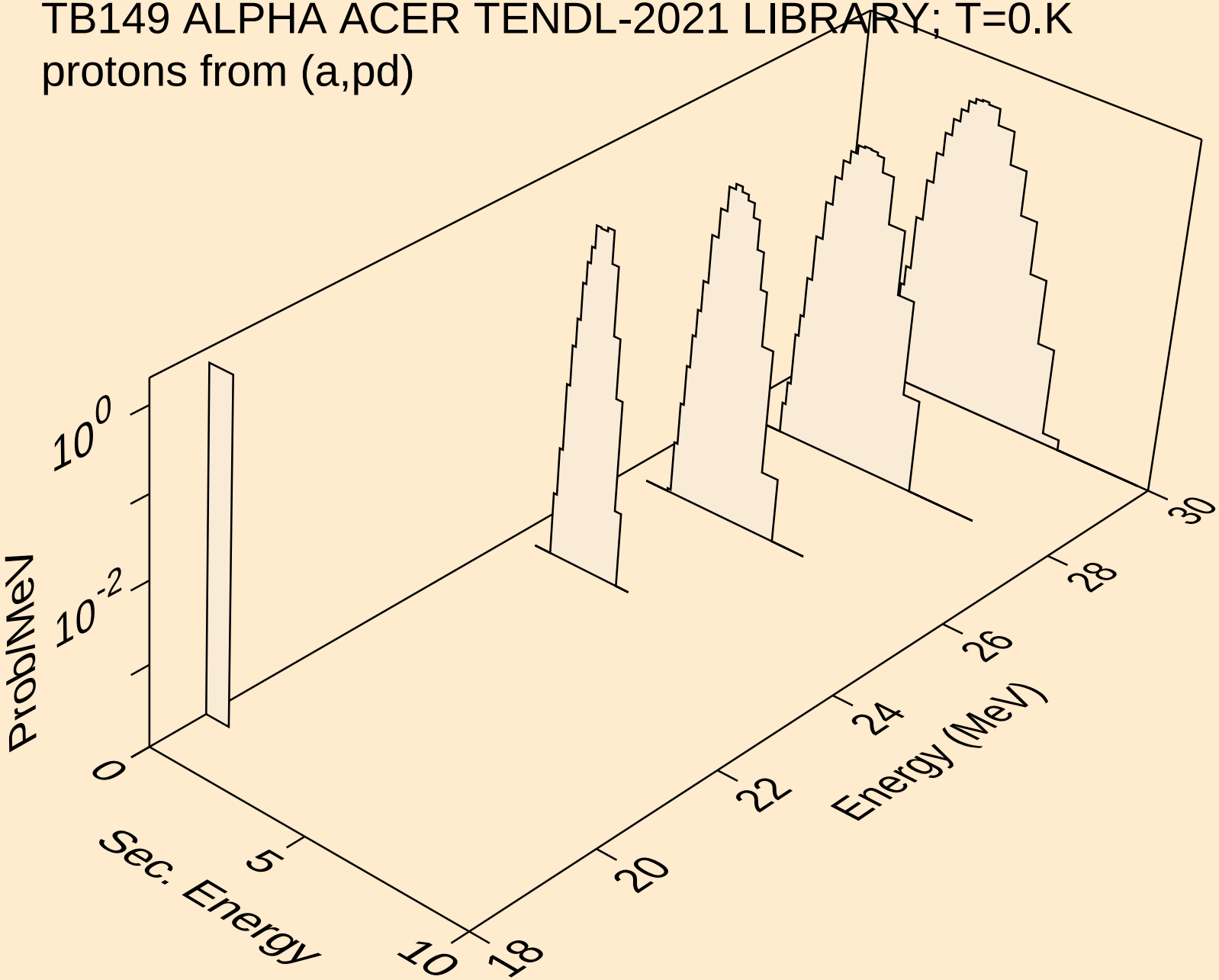
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,p)

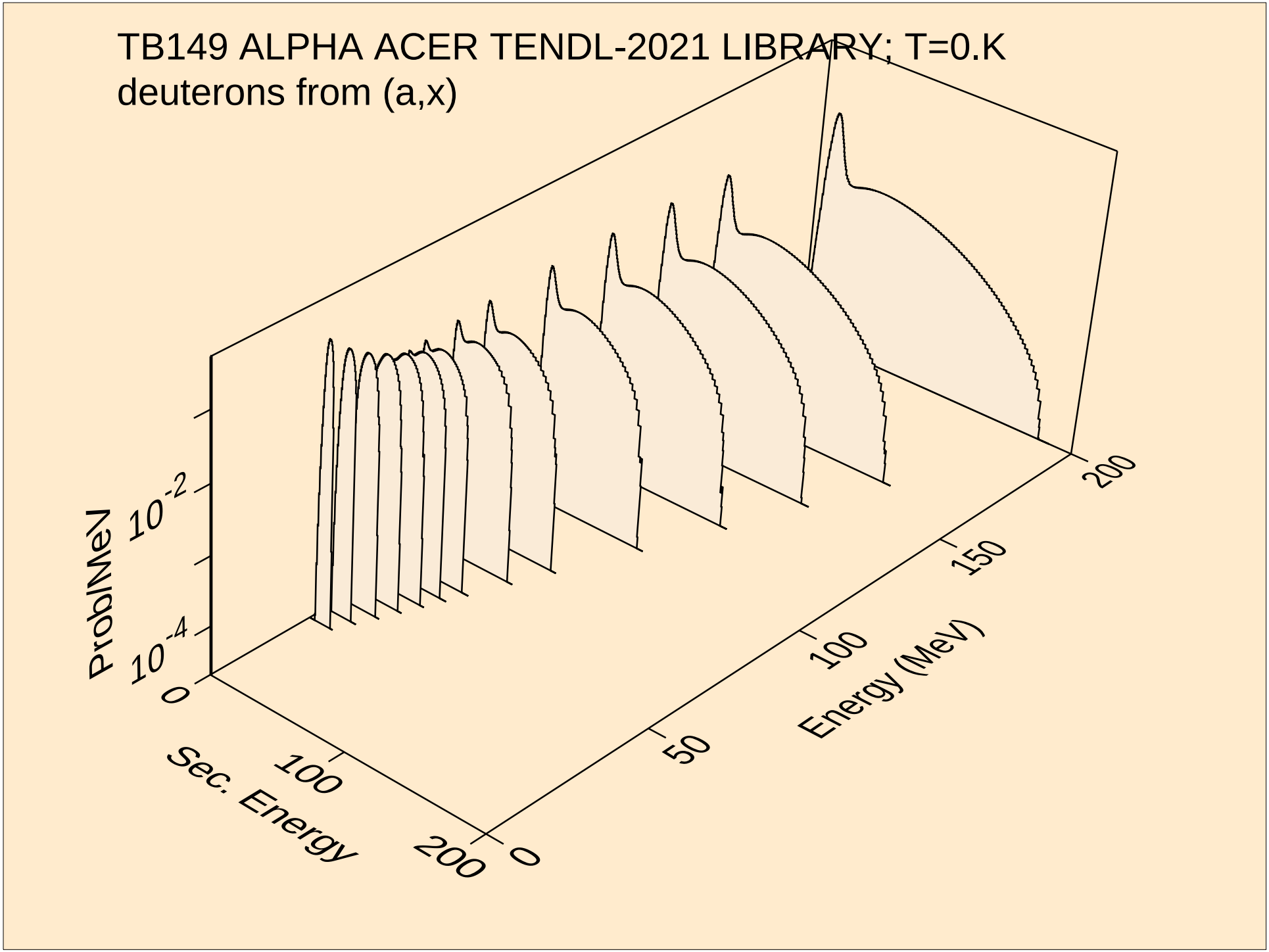


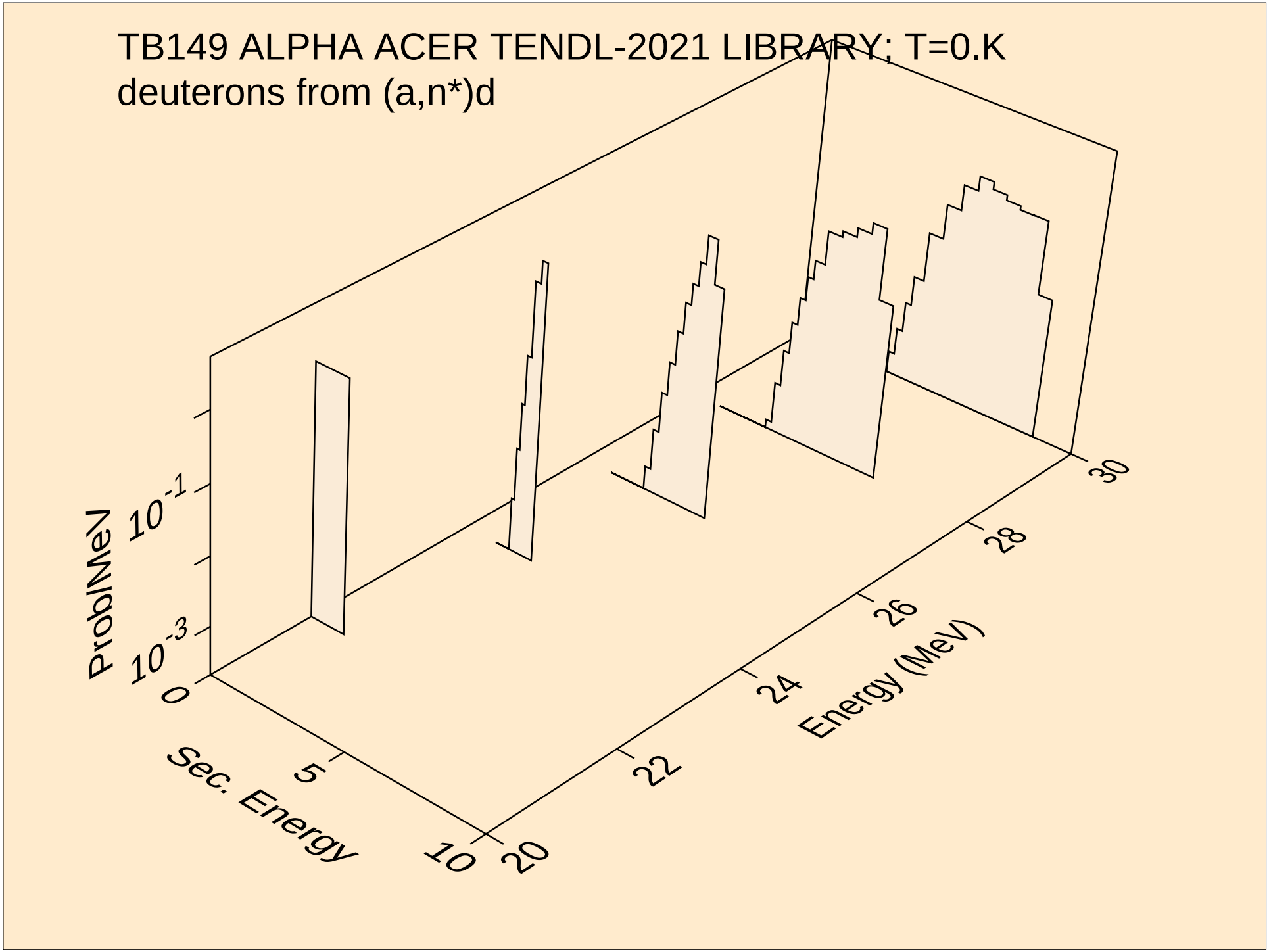

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,2p)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
10
20
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

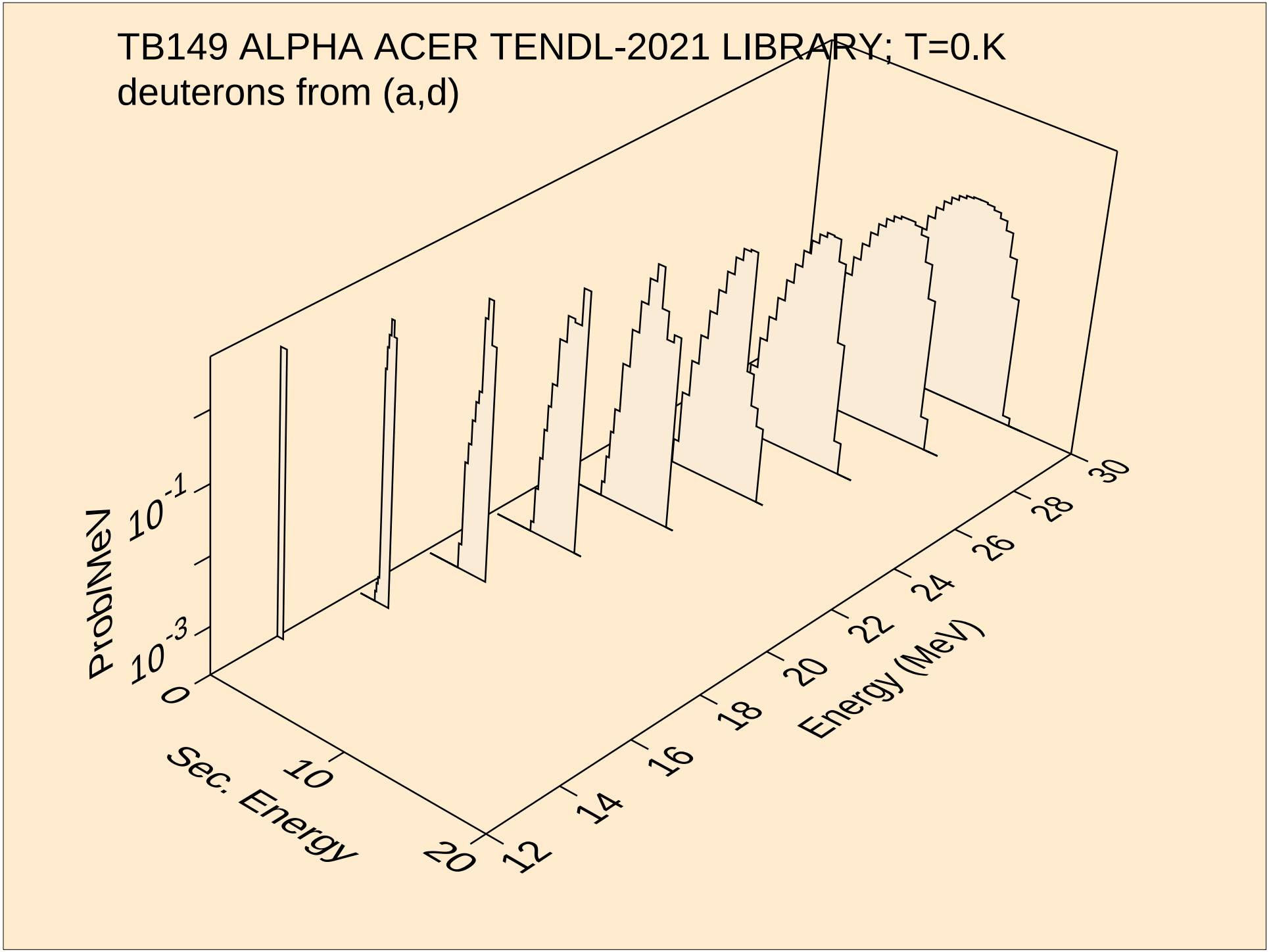

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,pa)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
0
5
10
15
20
25
30
Energy (MeV)

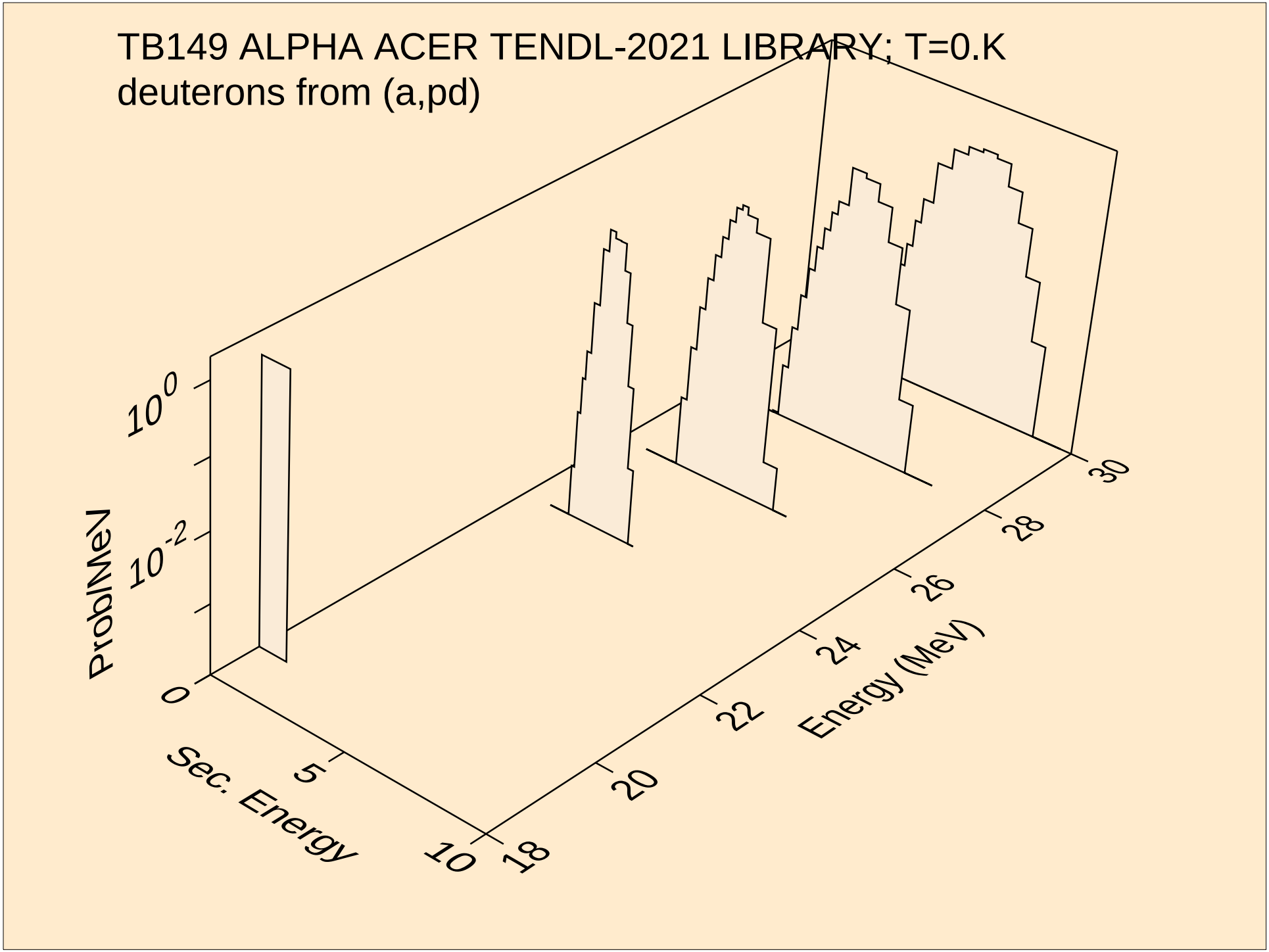
TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
protons from (a,pd)

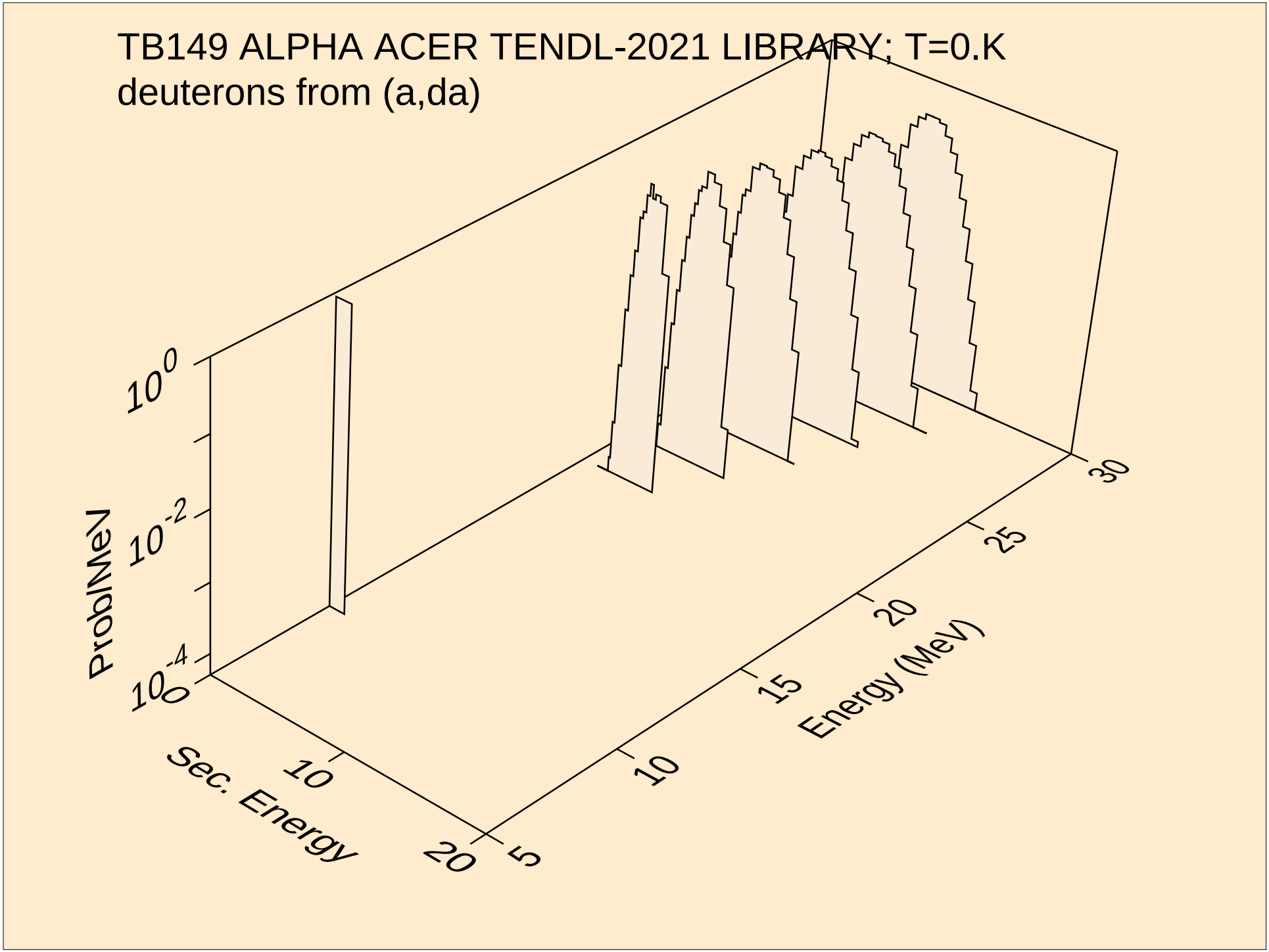



TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
deuterons from (a,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

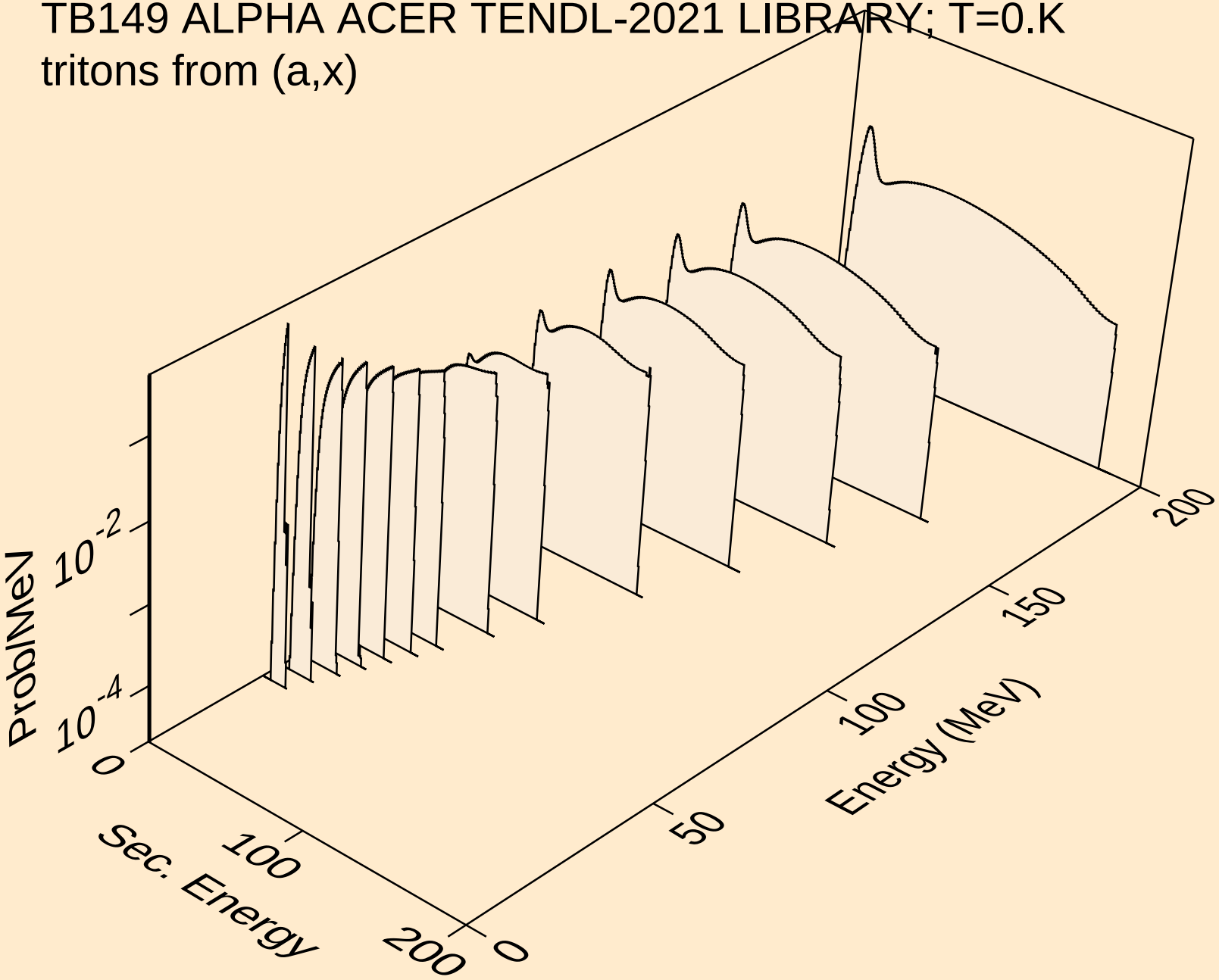

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
deuterons from (a,n*)d
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
20
22
24
26
28
30
Energy (MeV)

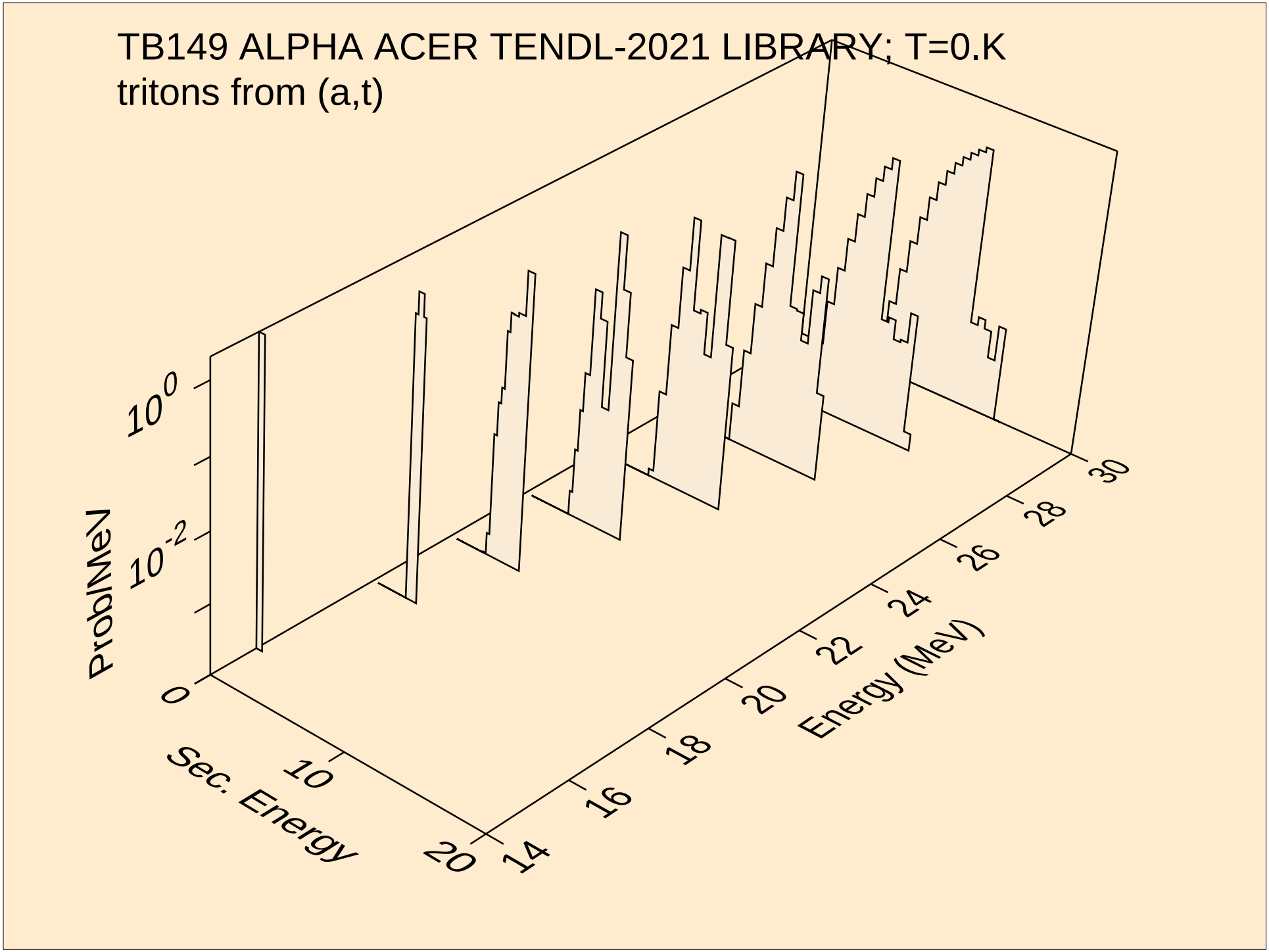

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
deuterons from (a,d)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

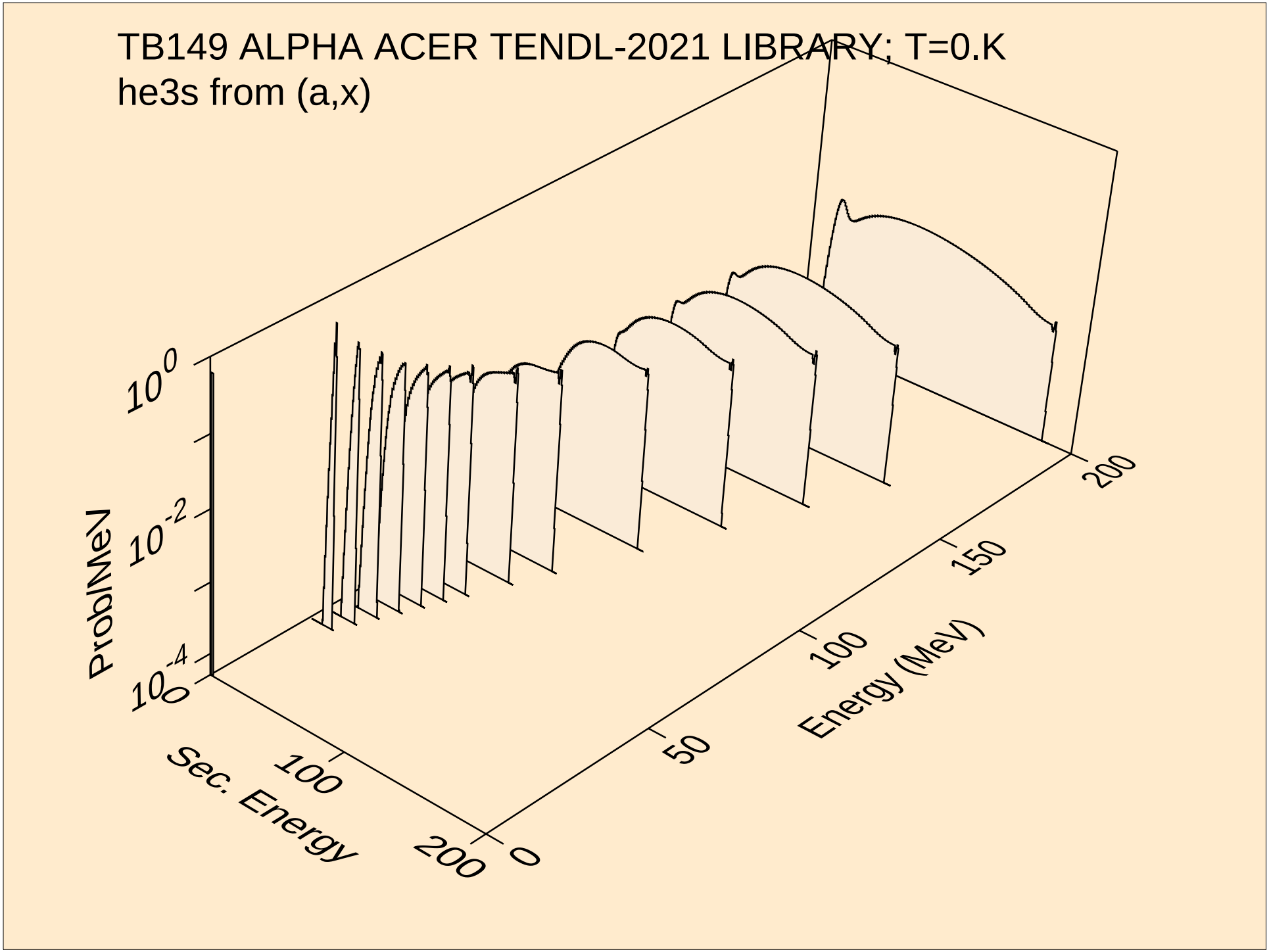

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
deuterons from (a,pd)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
5
10
18
20
22
24
26
28
30
Energy (MeV)

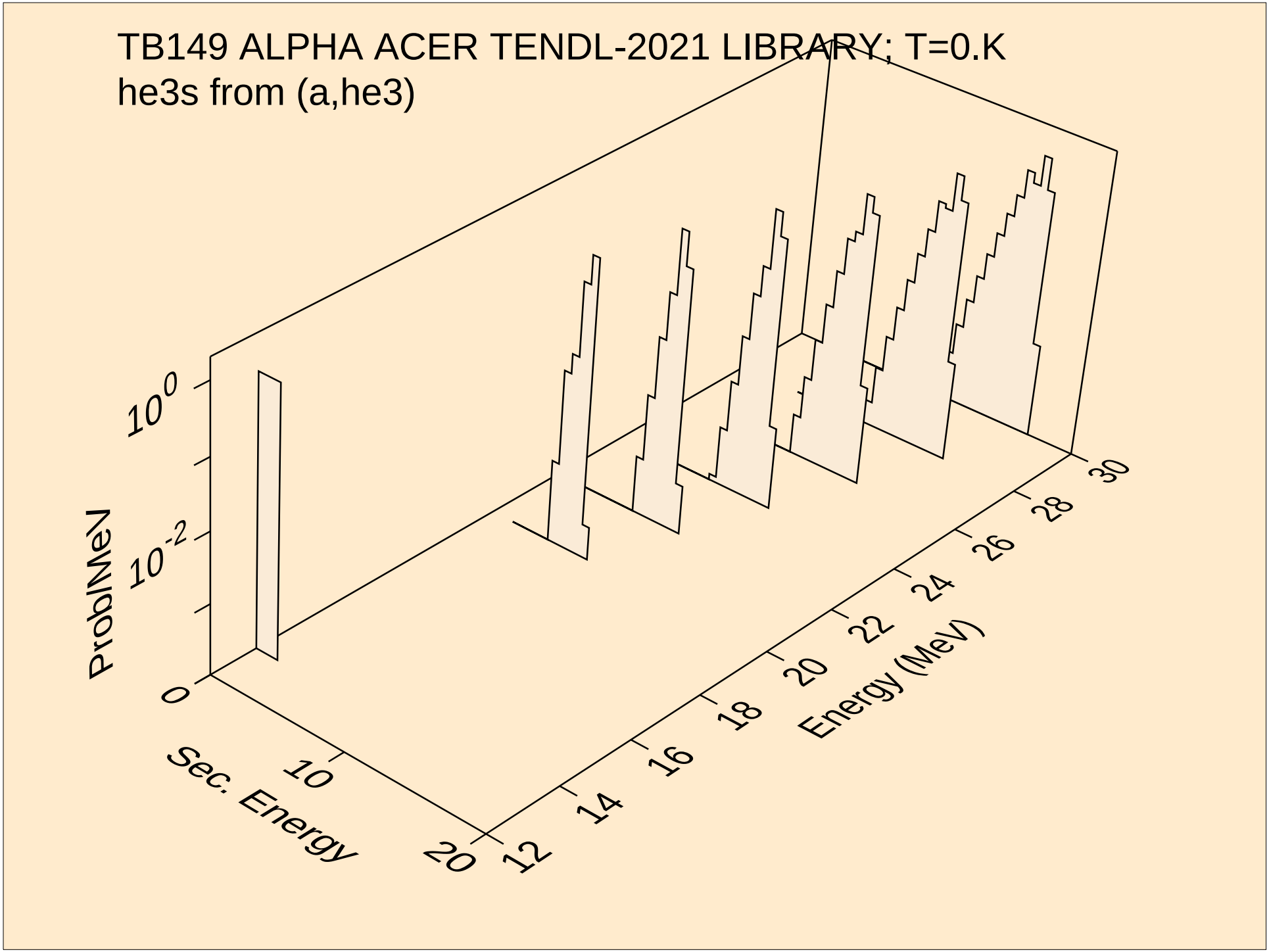

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
deuterons from (a,da)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
0
10
20
Sec. Energy
5
10
15
20
25
30
Energy (MeV)

TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
tritons from (a,x)




TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
tritons from (a,t)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
10
20
14
16
18
20
22
24
26
28
30
Energy (MeV)


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
he3s from (a,x)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
Sec. Energy
0
100
200
Energy (MeV)
0
50
100
150
200


TB149 ALPHA ACER TENDL-2021 LIBRARY; T=0.K
he3s from (a,he3)
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
10
20
12
14
16
18
20
22
24
26
28
30
Energy (MeV)