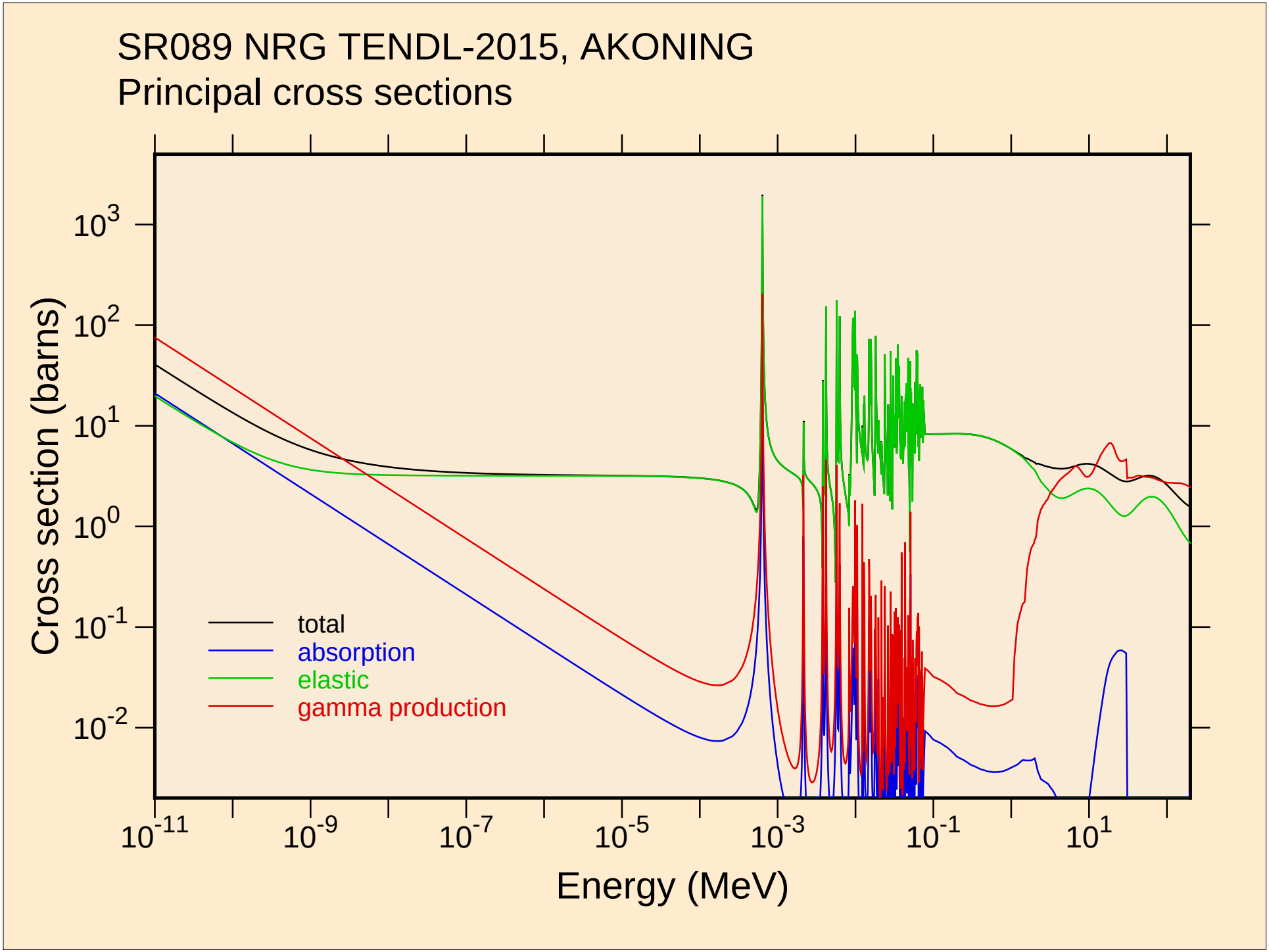
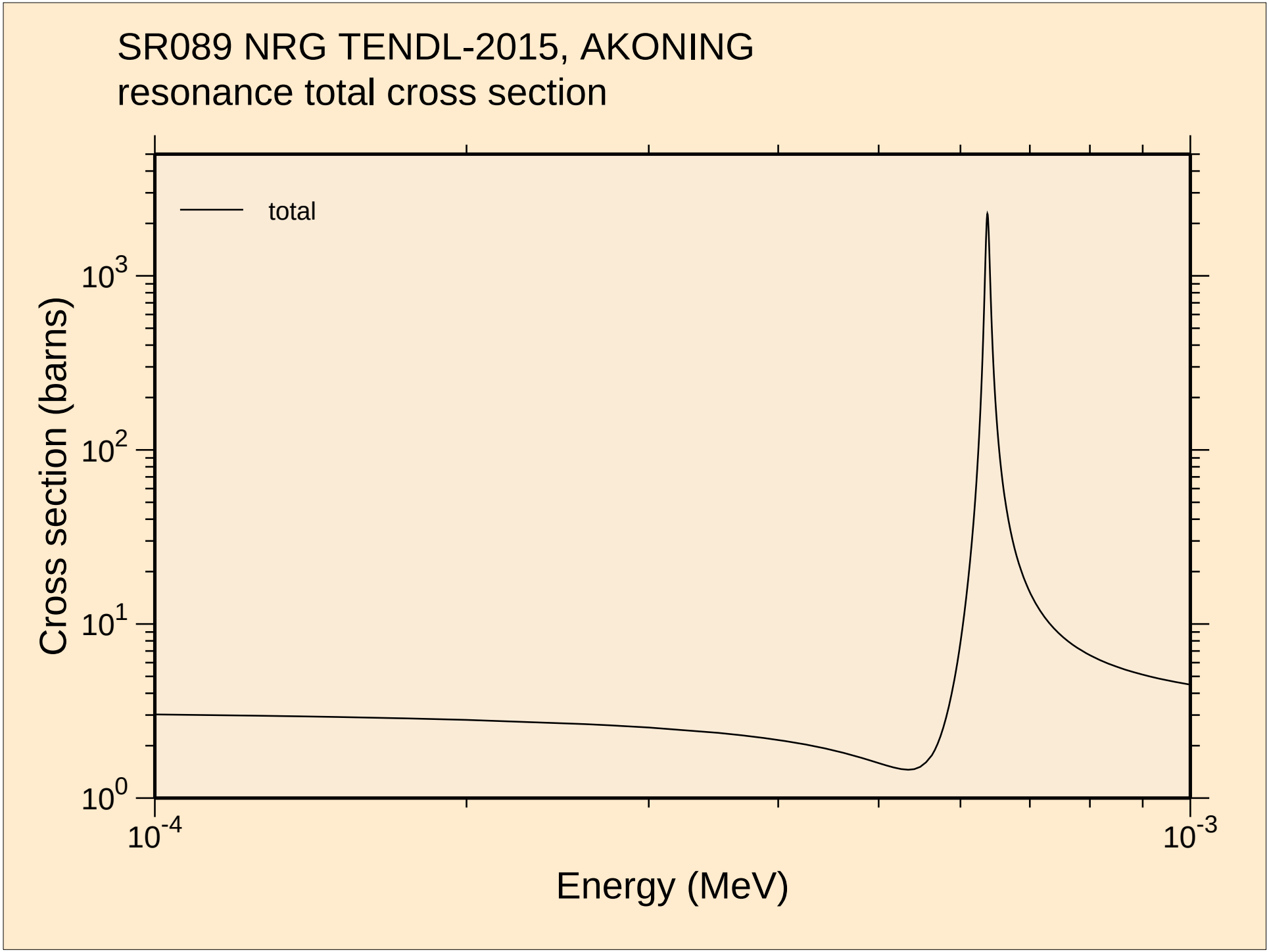
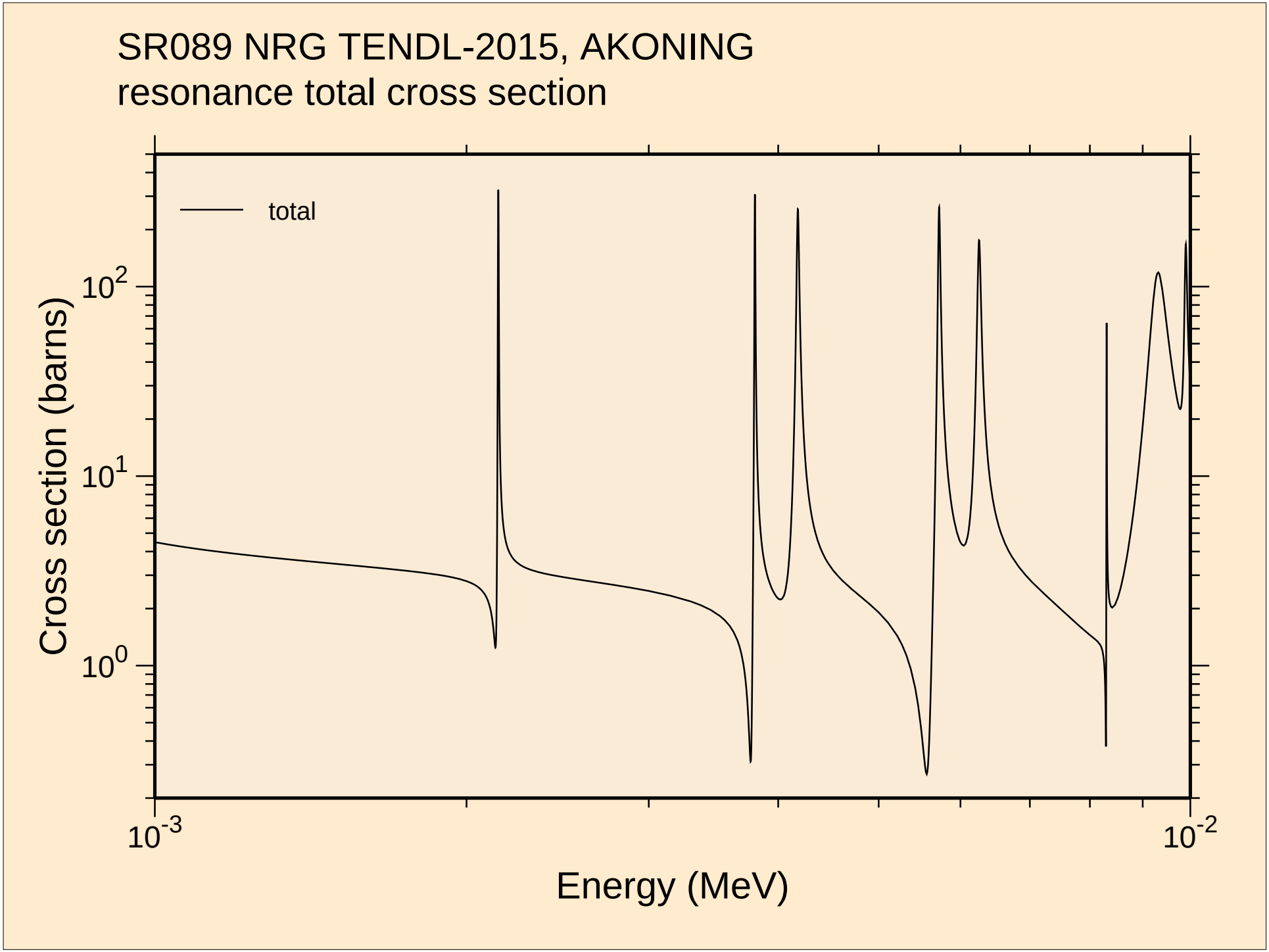
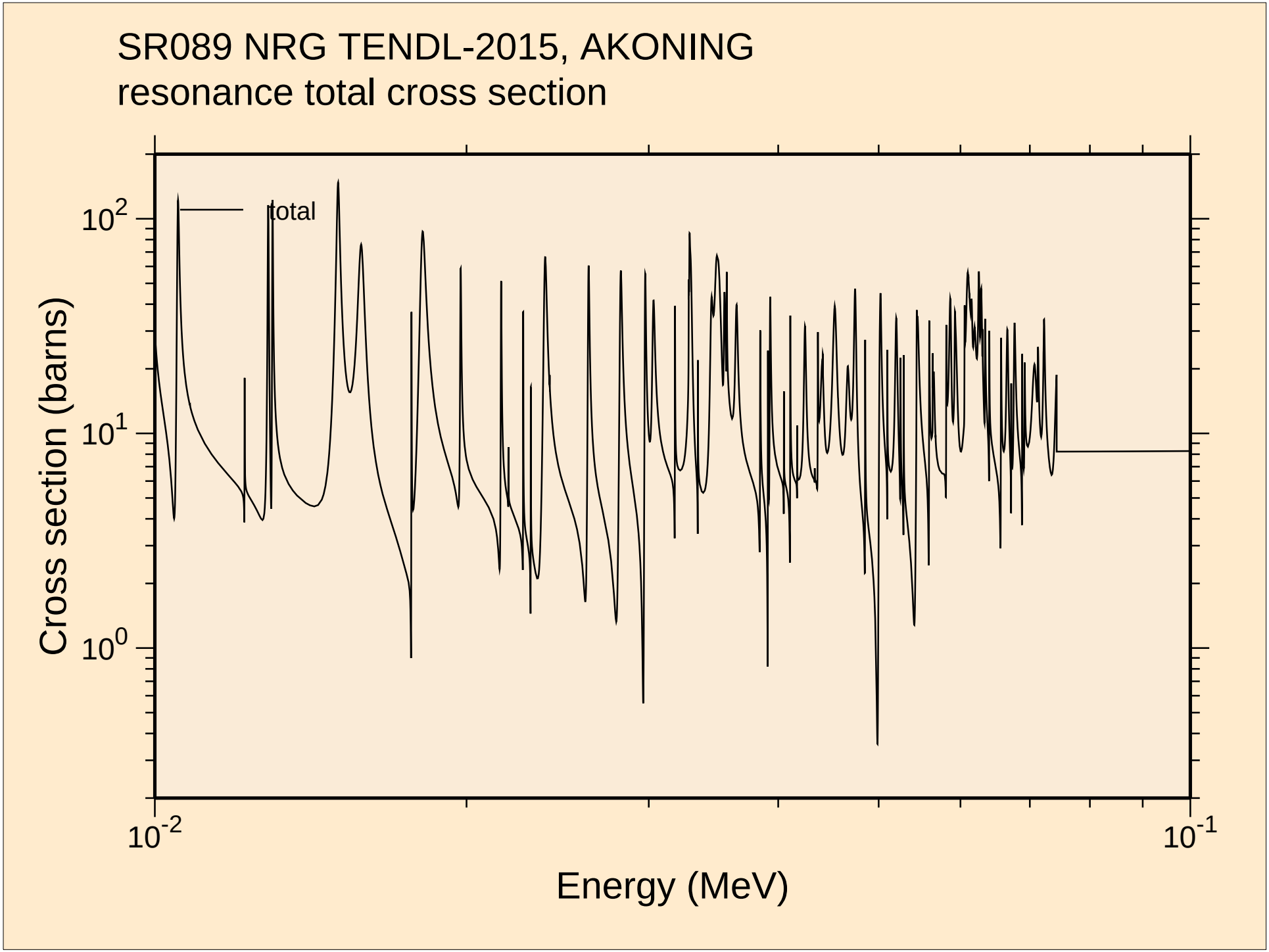
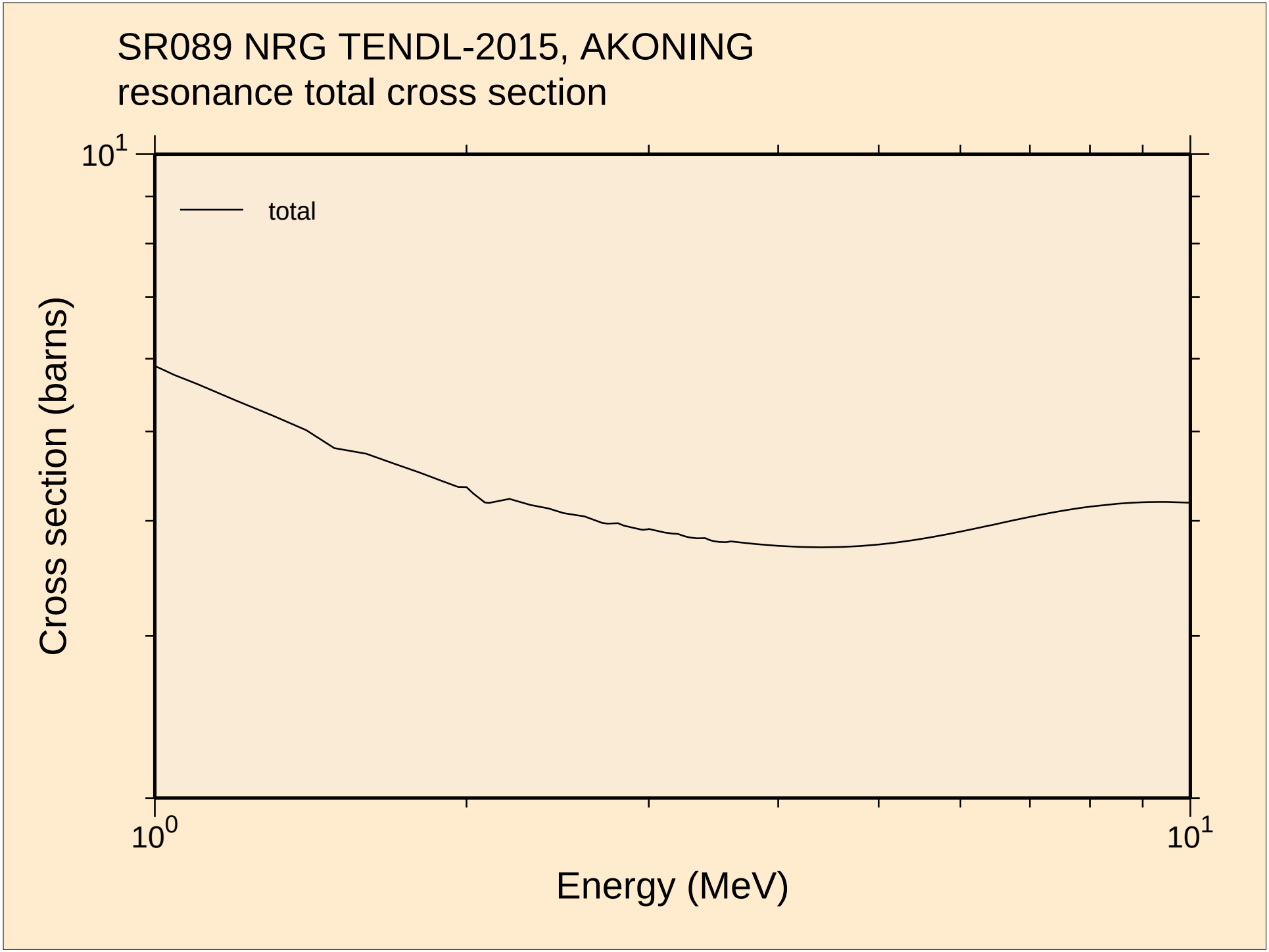
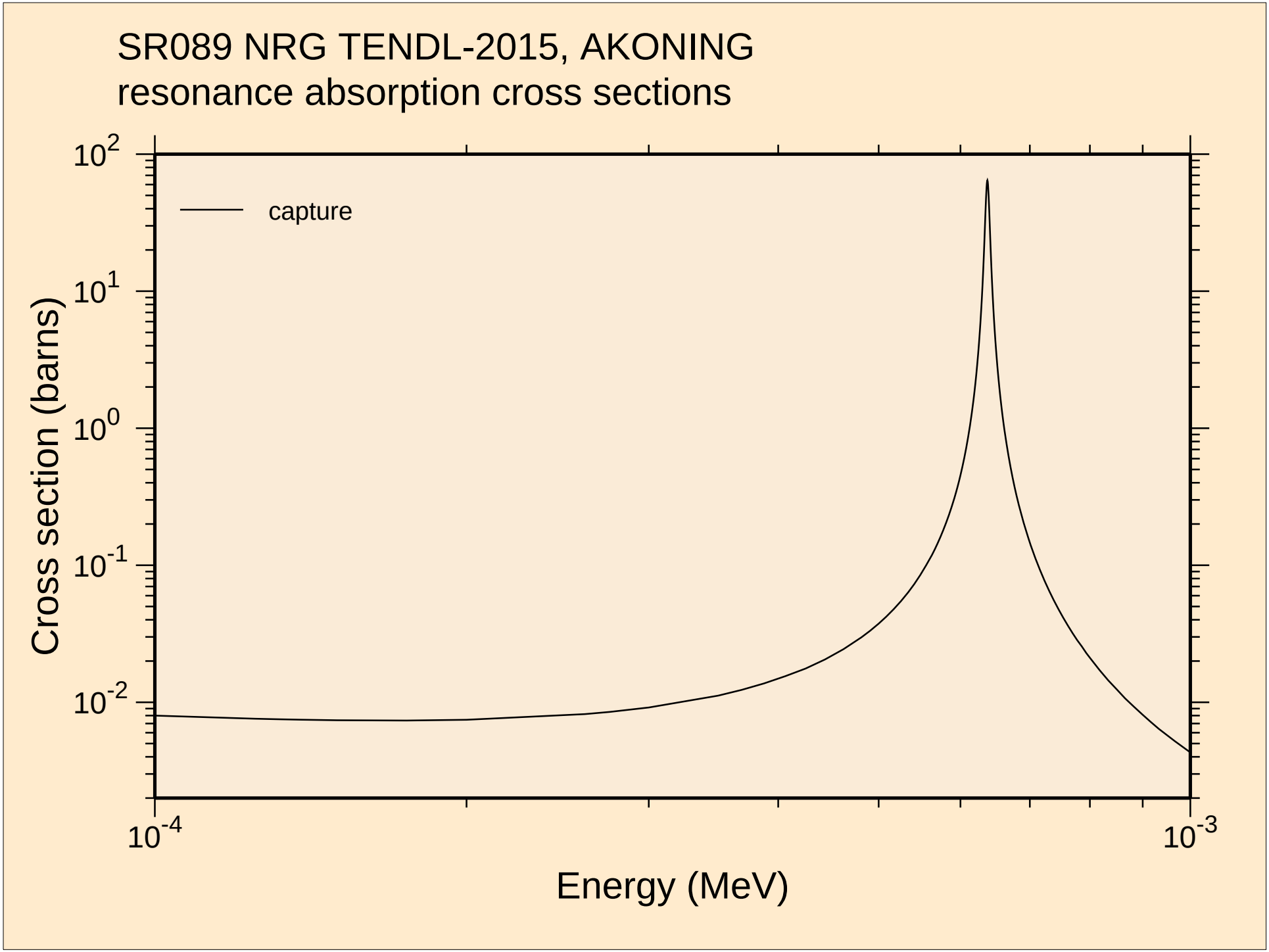

SR089 NRG TENDL-2015, AKONING
Principal cross sections
Cross section (barns)
$10^{3}$
$10^{2}$
$10^{1}$
$10^{0}$
$10^{-1}$
$10^{-2}$
total
absorption
elastic
gamma production
$10^{-11}$
$10^{-9}$
$10^{-7}$
$10^{-5}$
$10^{-3}$
$10^{-1}$
$10^{1}$
Energy (MeV)

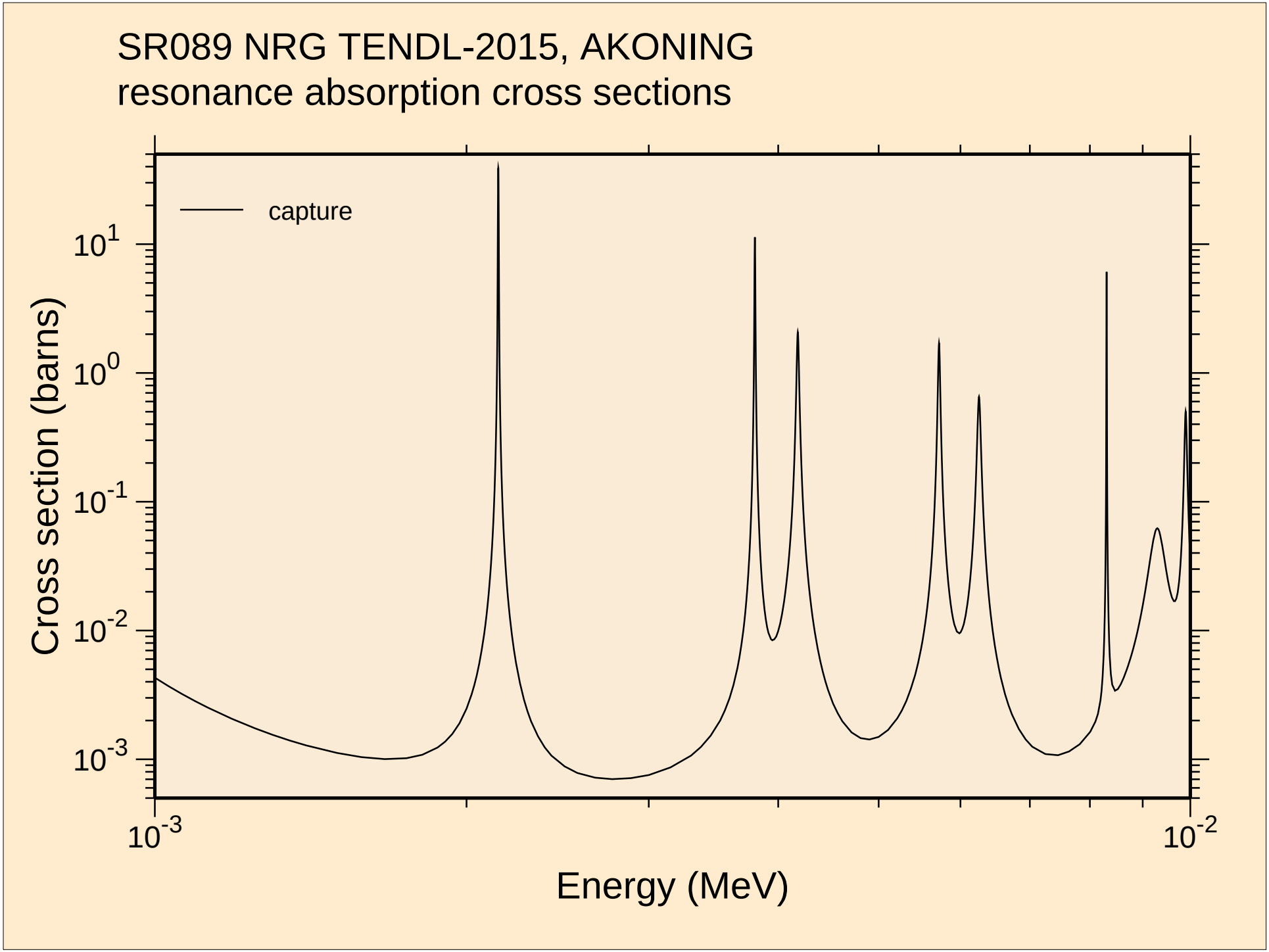

SR089 NRG TENDL-2015, AKONING
resonance total cross section
total
Cross section (barns)
10^3
10^2
10^1
10^0
10^-4
10^-3
Energy (MeV)

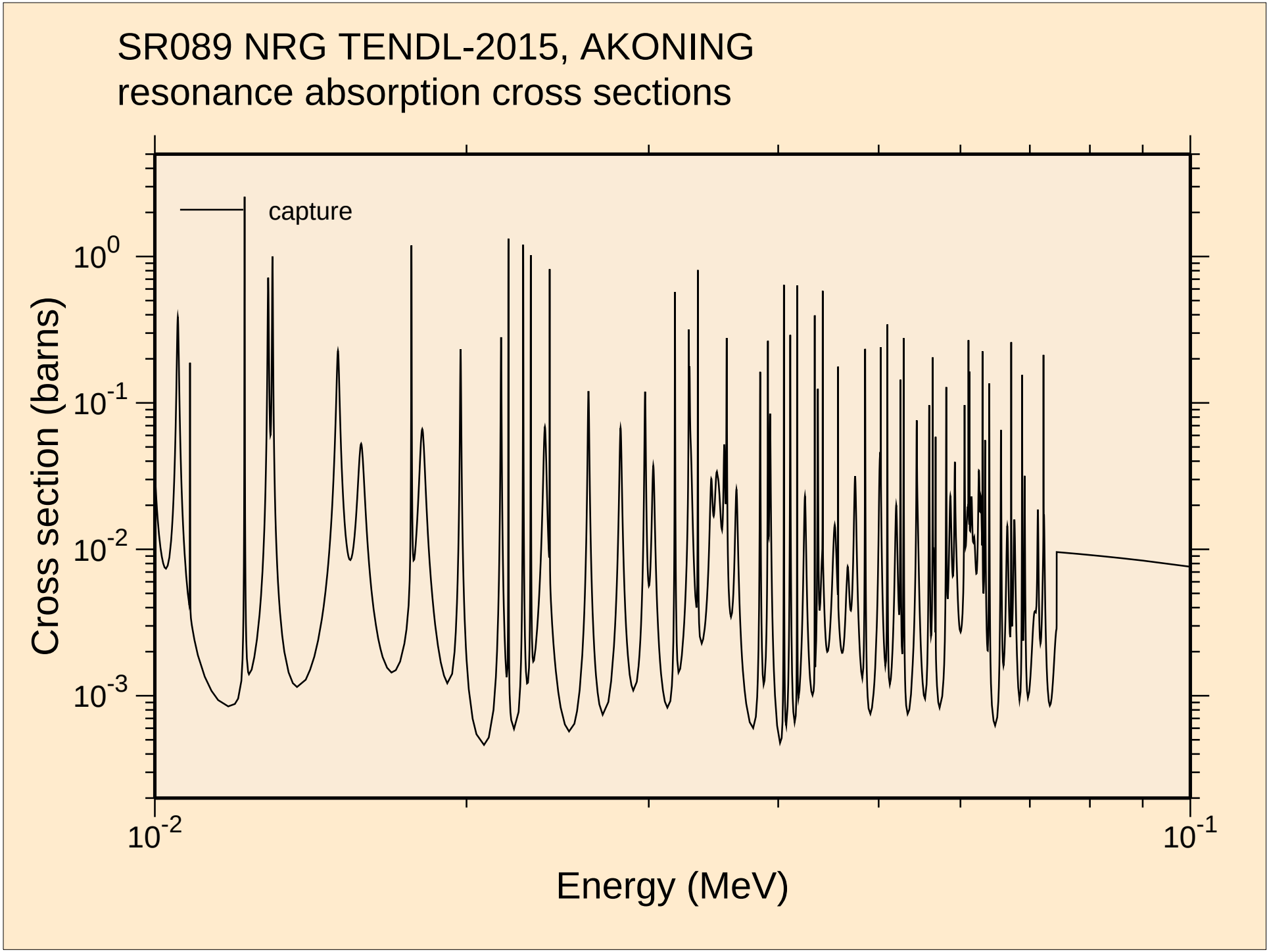

SR089 NRG TENDL-2015, AKONING
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^-3
10^-2
Energy (MeV)

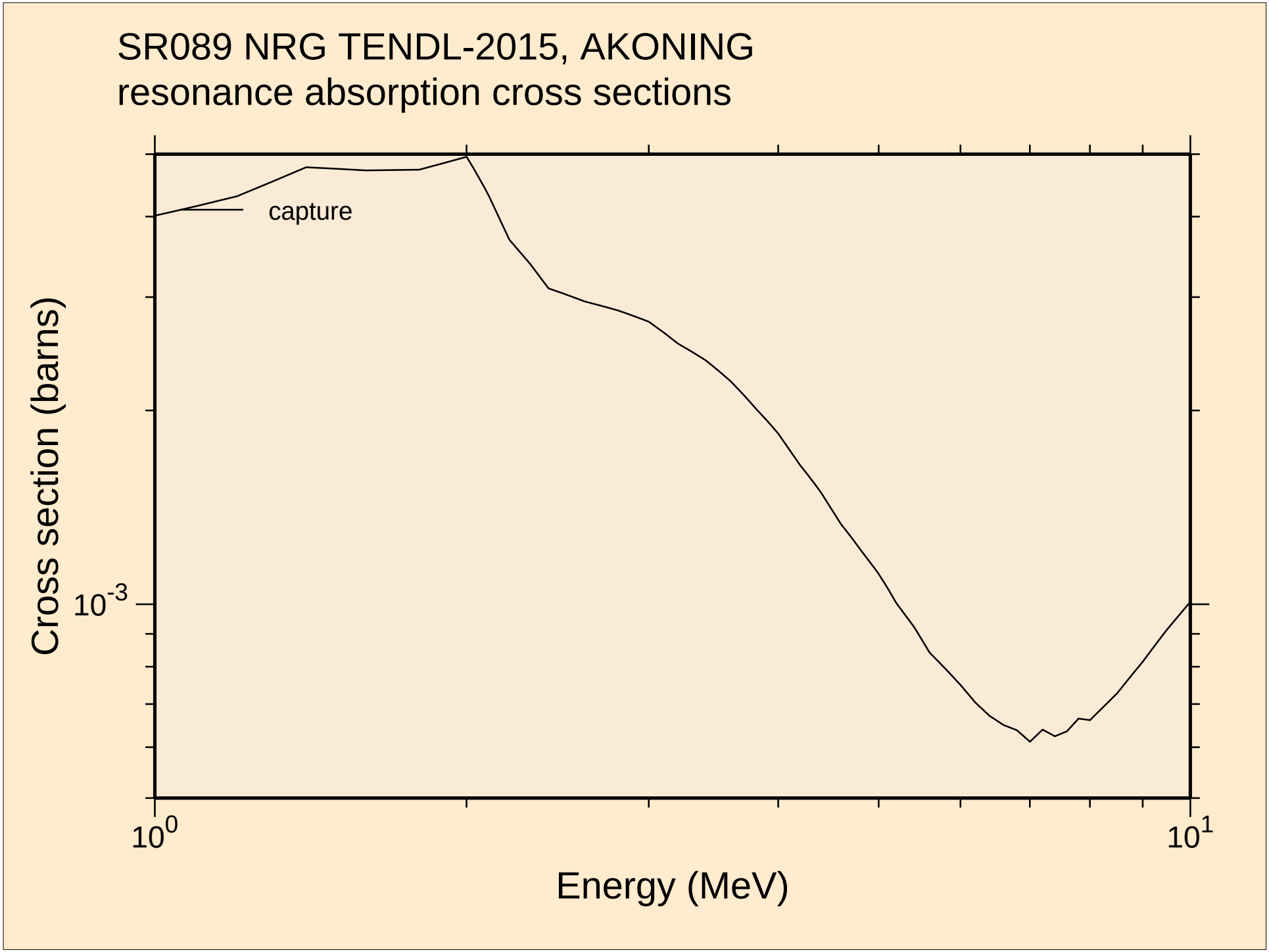

SR089 NRG TENDL-2015, AKONING
resonance total cross section
total
$10^2$
$10^1$
$10^0$
Cross section (barns)
$10^{-2}$
$10^{-1}$
Energy (MeV)

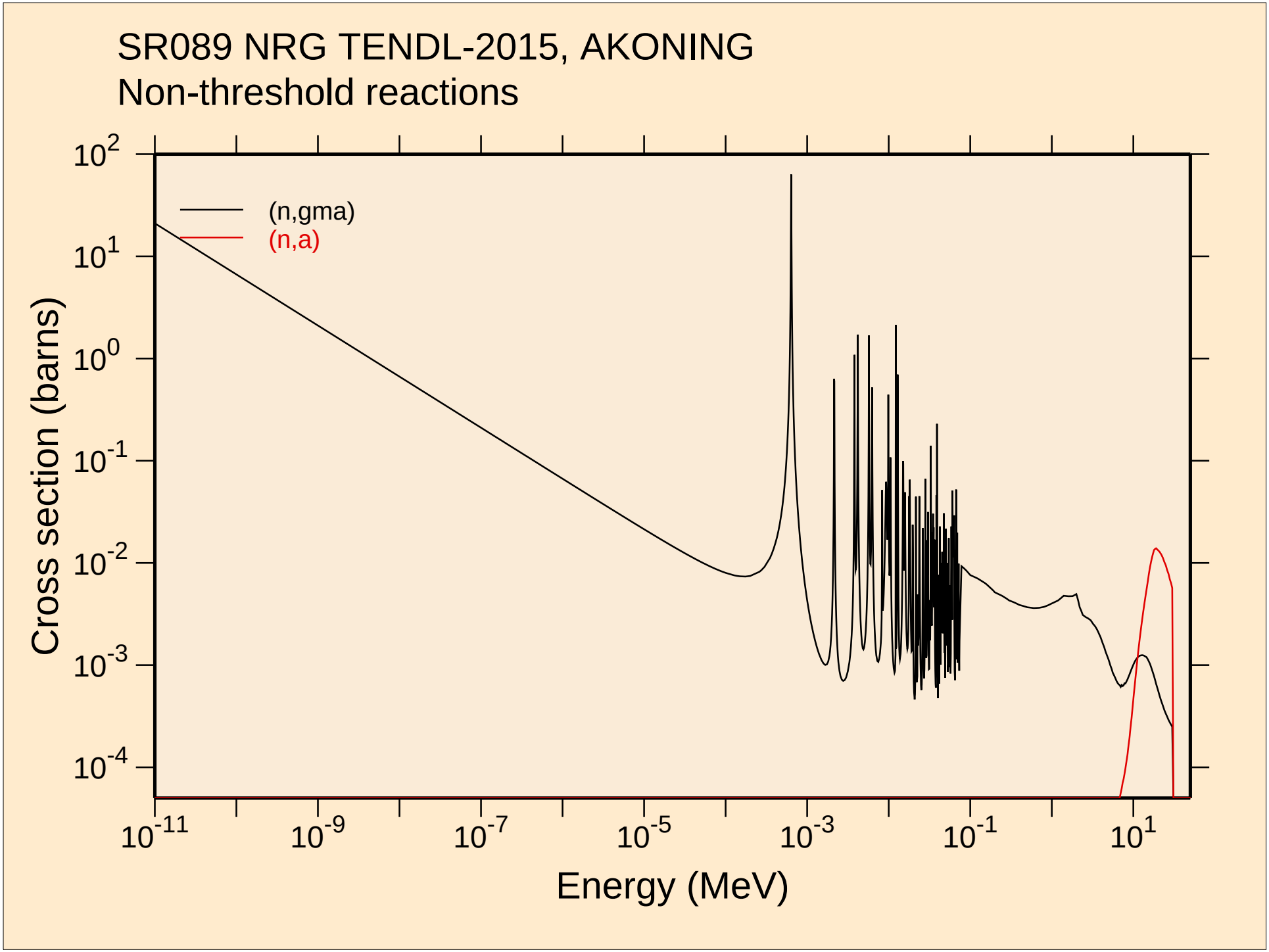

SR089 NRG TENDL-2015, AKONING
resonance total cross section
$10^1$
total
Cross section (barns)
$10^0$
$10^1$
Energy (MeV)

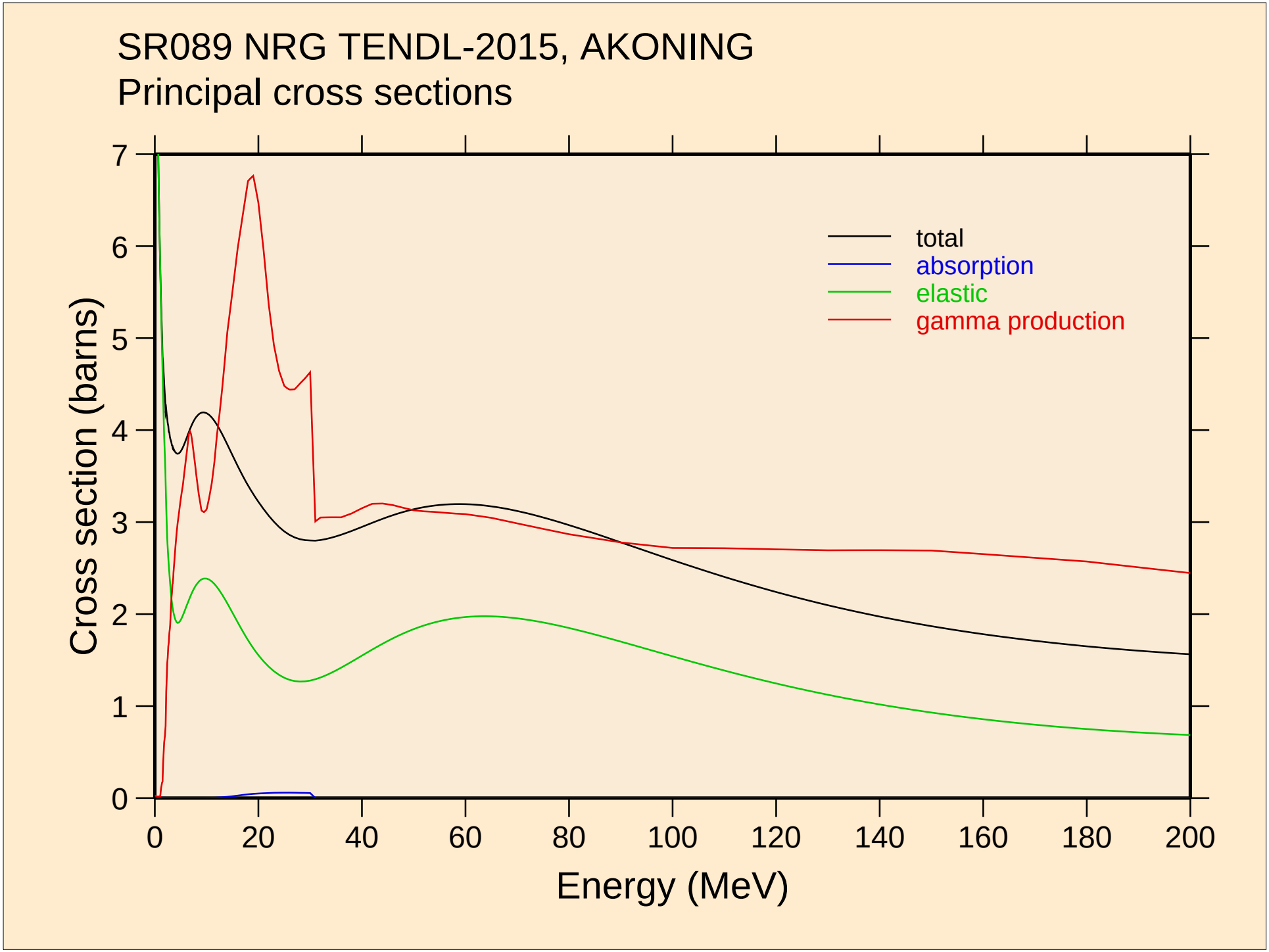

SR089 NRG TENDL-2015, AKONING
resonance absorption cross sections
capture
Cross section (barns)
$10^{2}$
$10^{1}$
$10^{0}$
$10^{-1}$
$10^{-2}$
$10^{-4}$
$10^{-3}$
Energy (MeV)

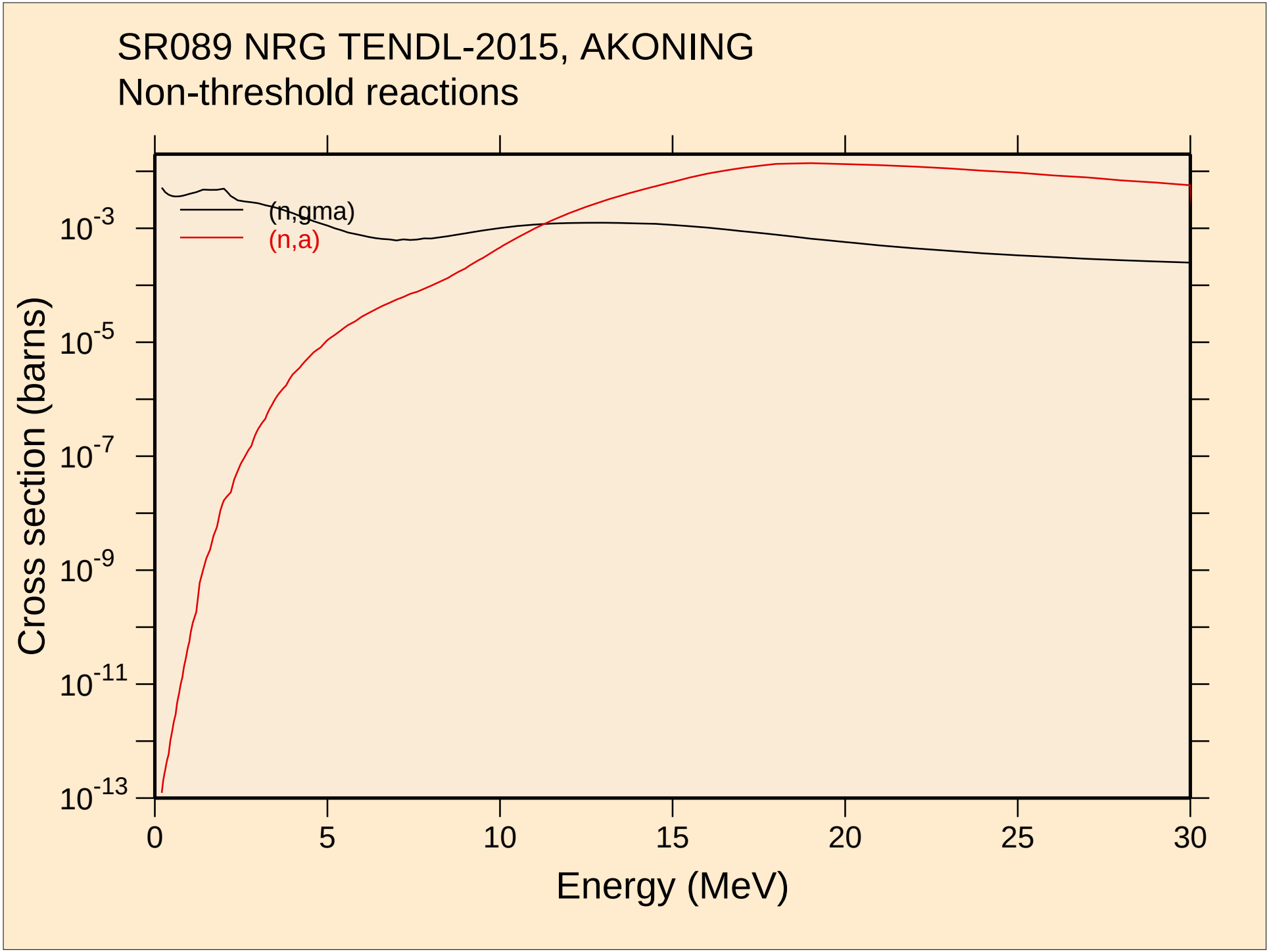

SR089 NRG TENDL-2015, AKONING
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-3
10^-2
Energy (MeV)

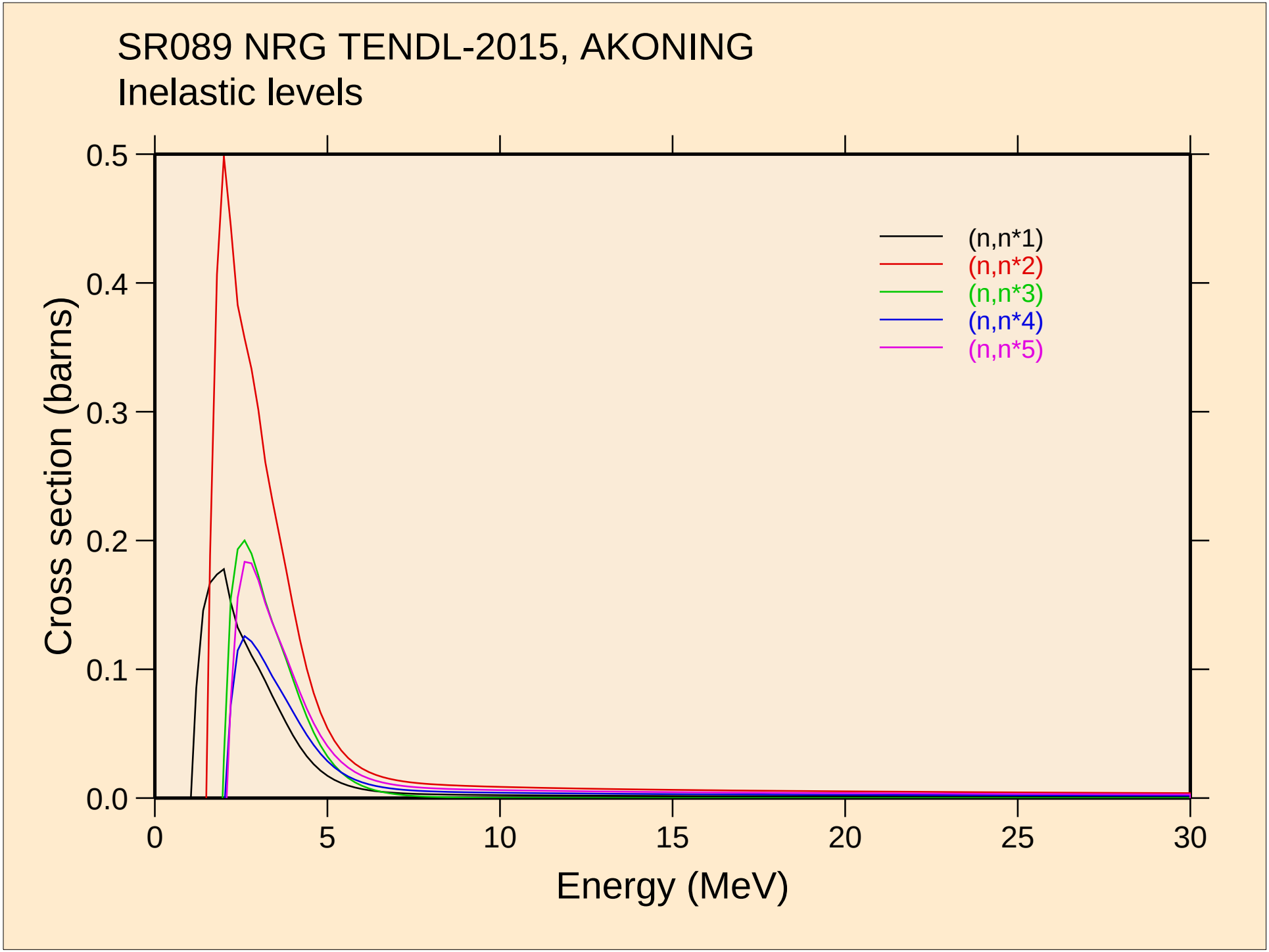

SR089 NRG TENDL-2015, AKONING
resonance absorption cross sections
capture
Cross section (barns)
$10^{0}$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^{-2}$
$10^{-1}$
Energy (MeV)

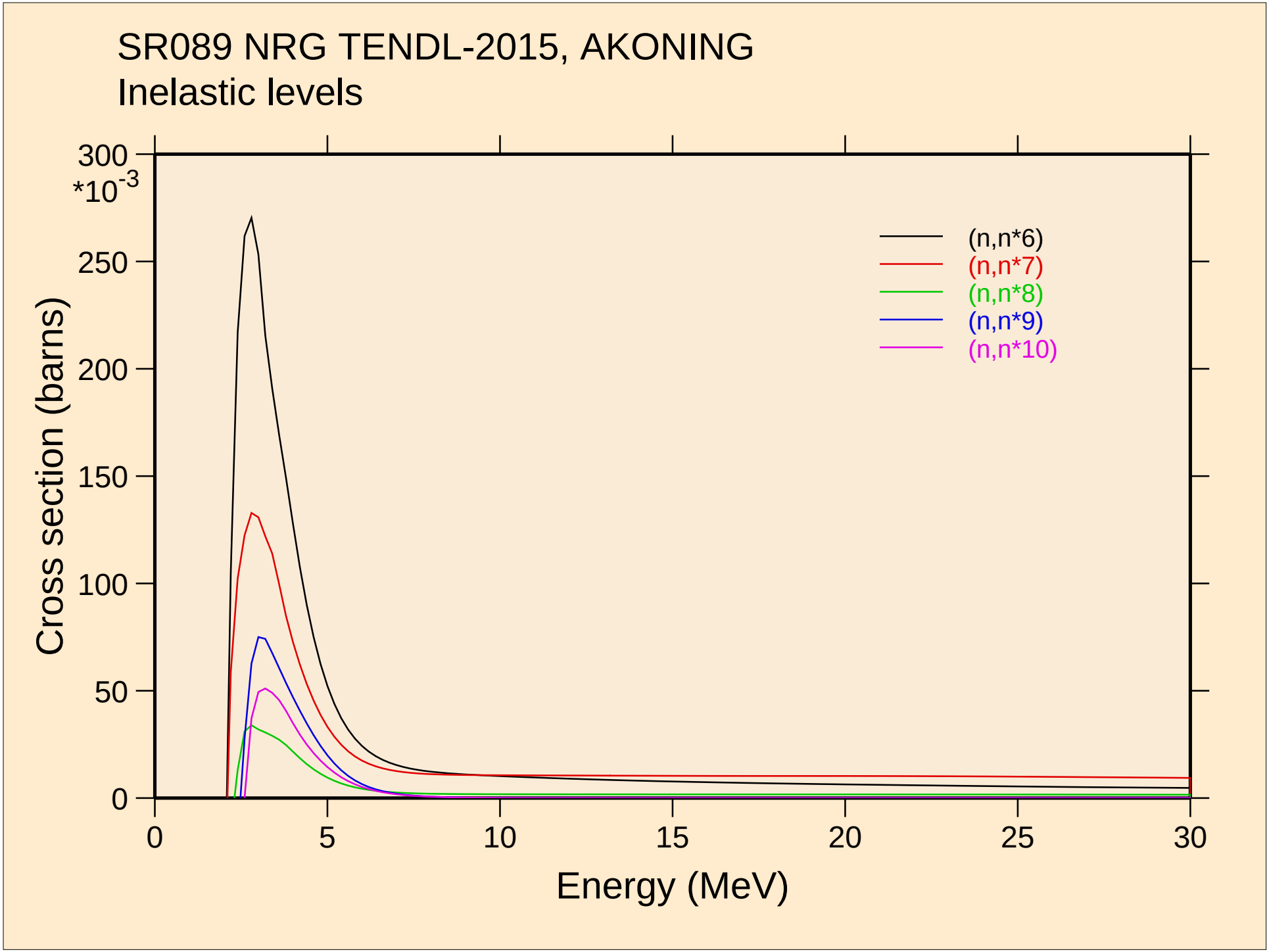

SR089 NRG TENDL-2015, AKONING
resonance absorption cross sections
capture
Cross section (barns)
10-3
100
101
Energy (MeV)

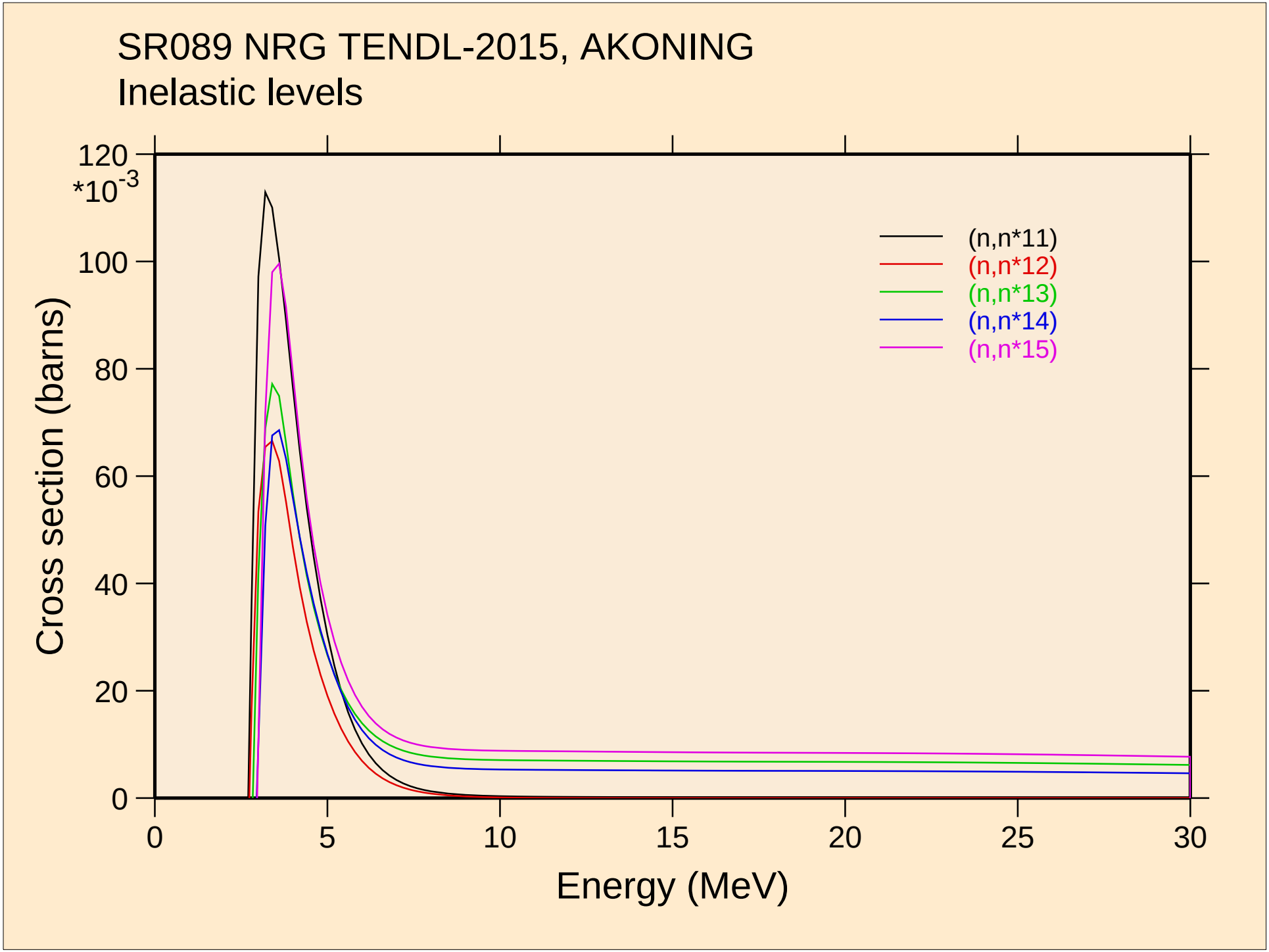

SR089 NRG TENDL-2015, AKONING
Non-threshold reactions
(n,gma)
(n,a)
Cross section (barns)
Energy (MeV)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1

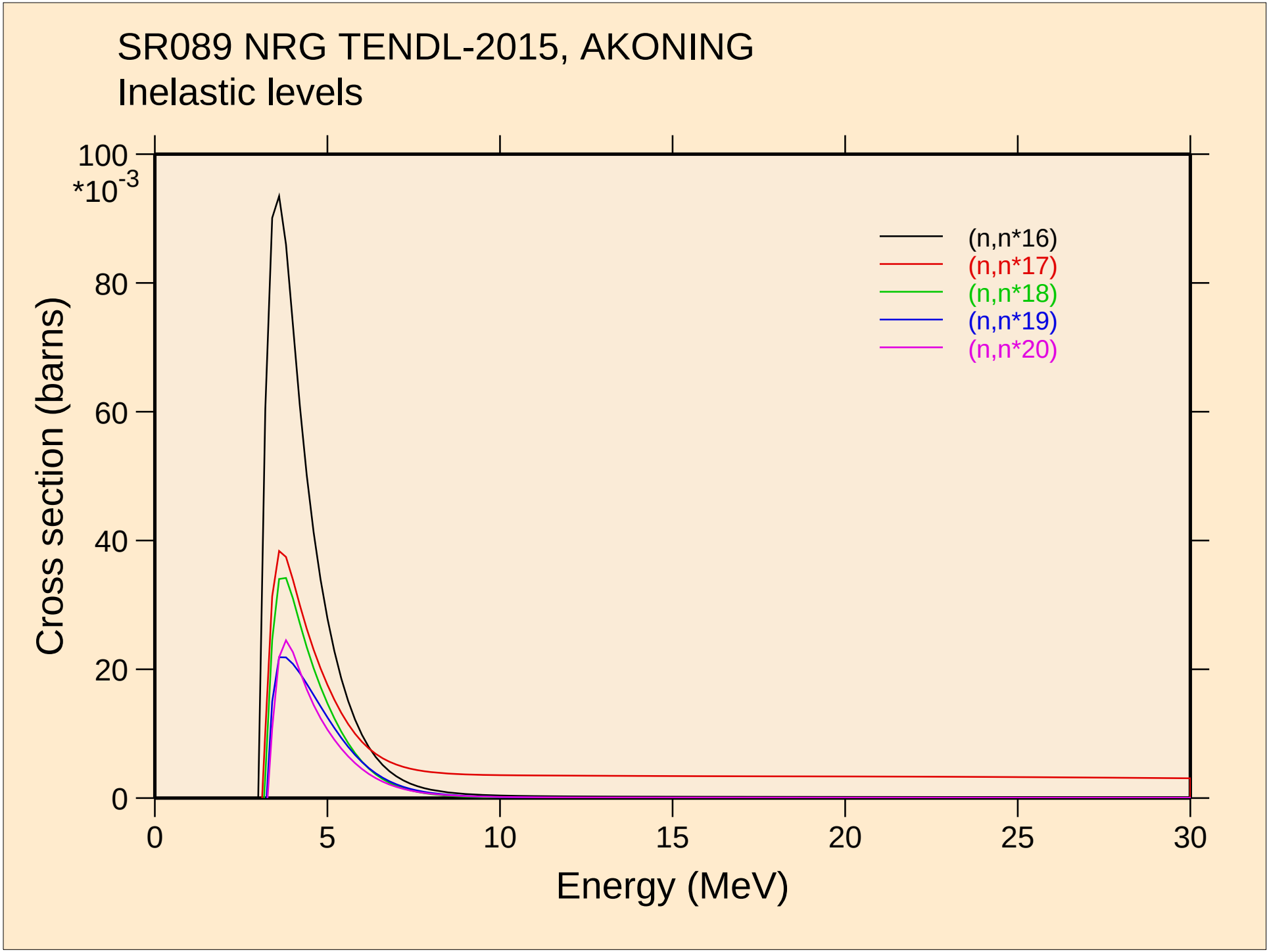

SR089 NRG TENDL-2015, AKONING
Principal cross sections
Cross section (barns)
Energy (MeV)
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160
180
200
total
absorption
elastic
gamma production

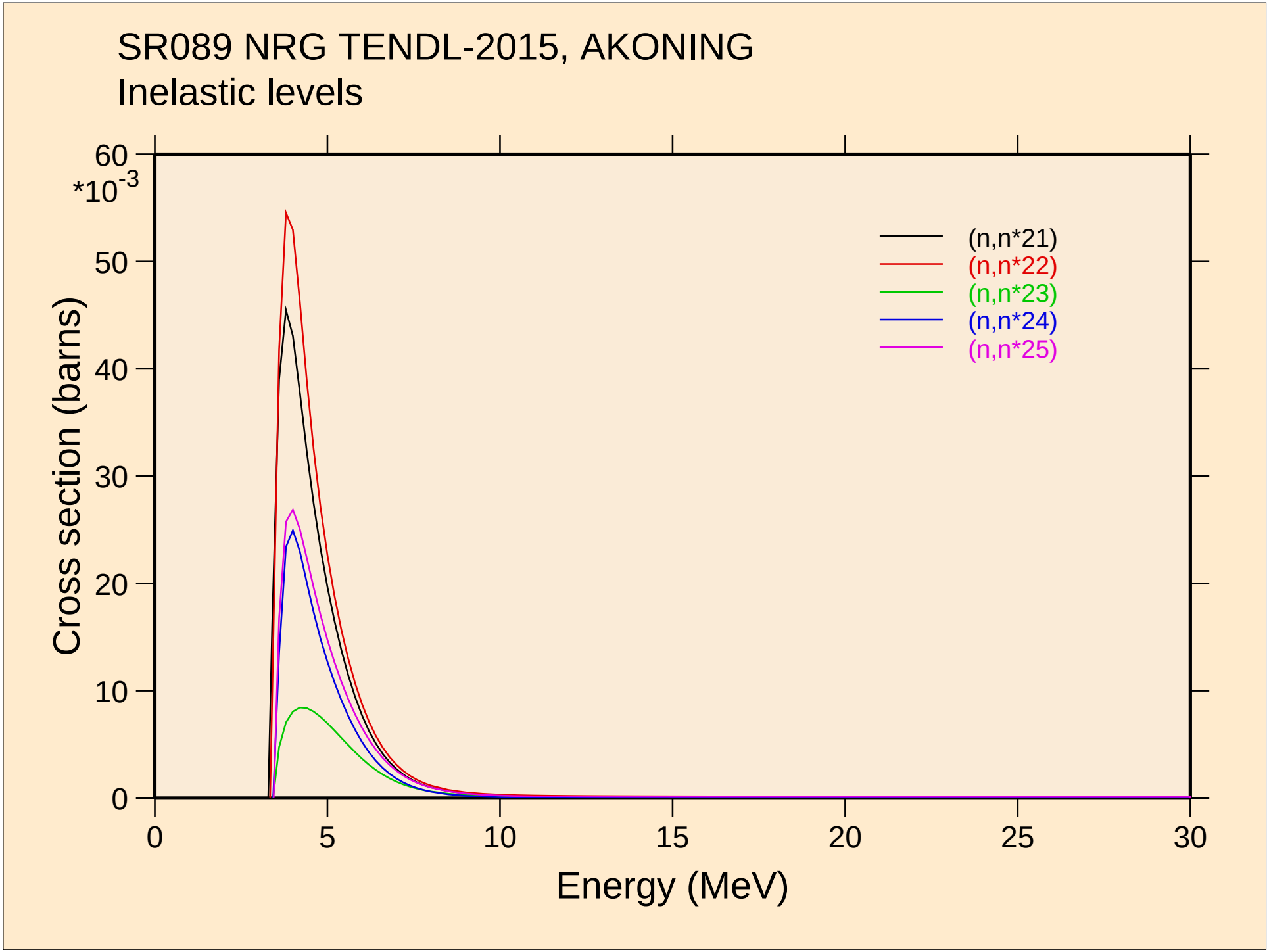

SR089 NRG TENDL-2015, AKONING
Non-threshold reactions
(n,gma)
(n,a)
Cross section (barns)
10-3
10-5
10-7
10-9
10-11
10-13
0
5
10
15
20
25
30
Energy (MeV)

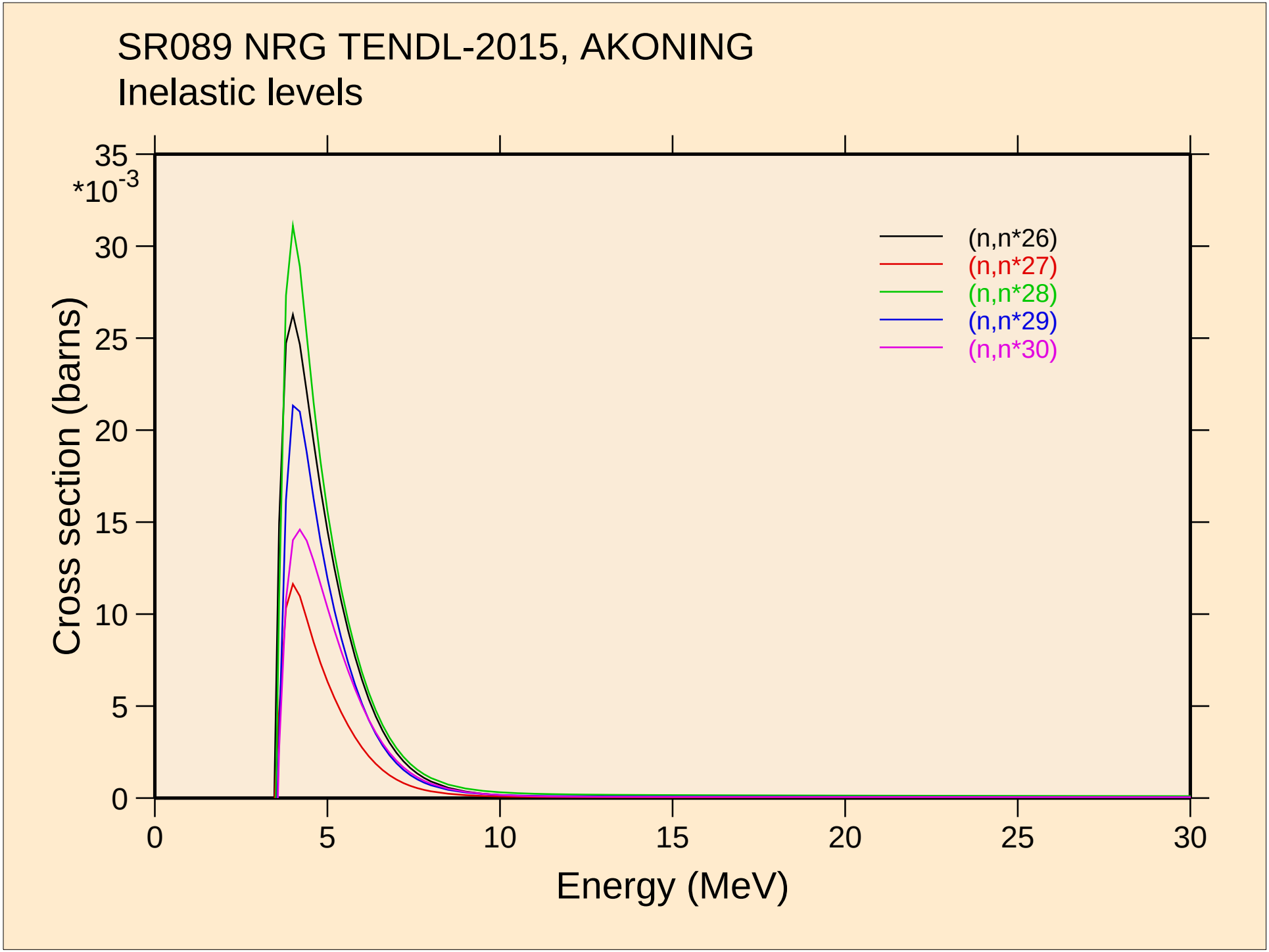

SR089 NRG TENDL-2015, AKONING
Inelastic levels
Cross section (barns)
0.0
0.1
0.2
0.3
0.4
0.5
0
5
10
15
20
25
30
Energy (MeV)
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

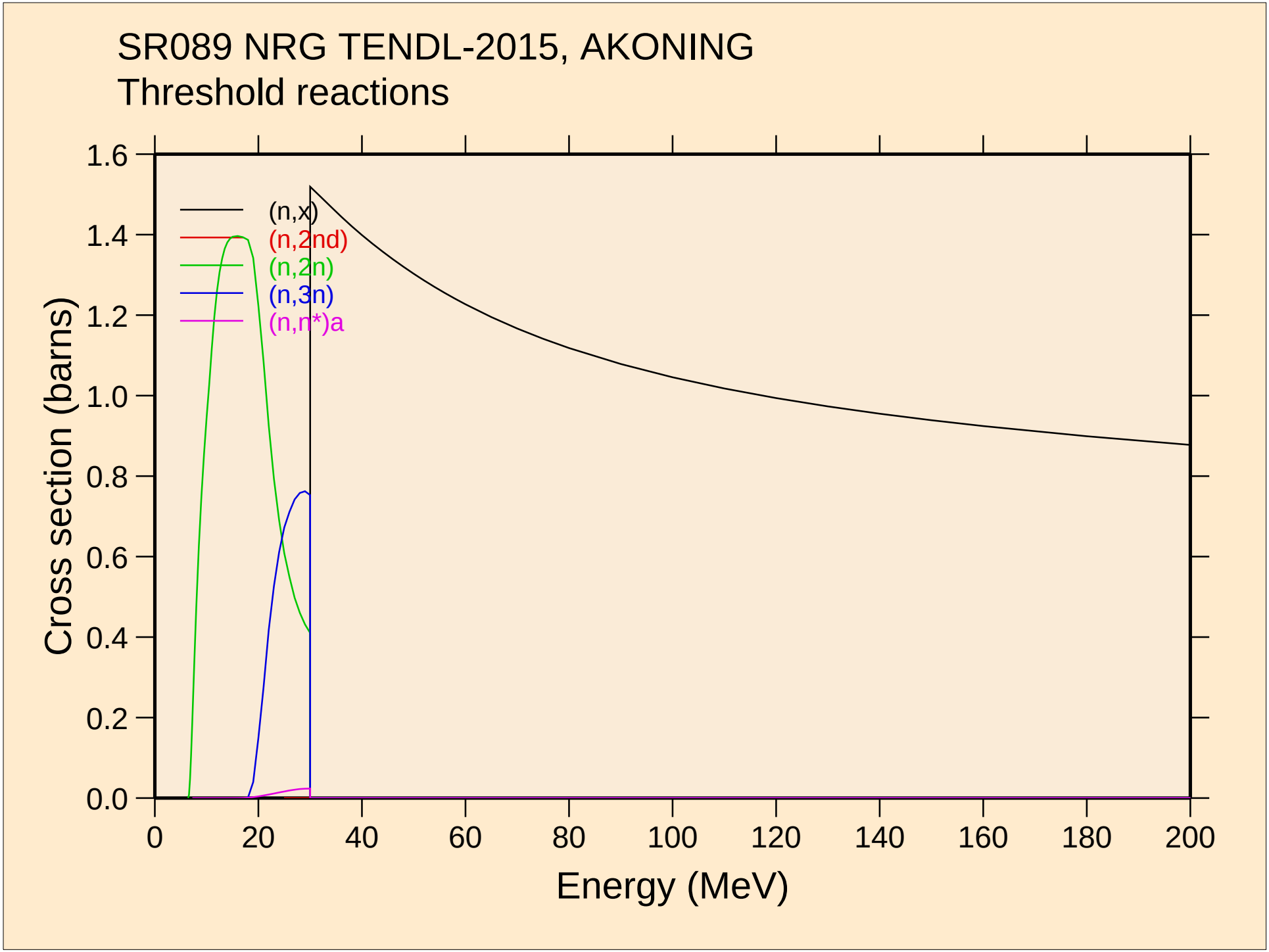

SR089 NRG TENDL-2015, AKONING
Inelastic levels
300
*10-3
250
200
150
100
50
0
Cross section (barns)
0
5
10
15
20
25
30
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

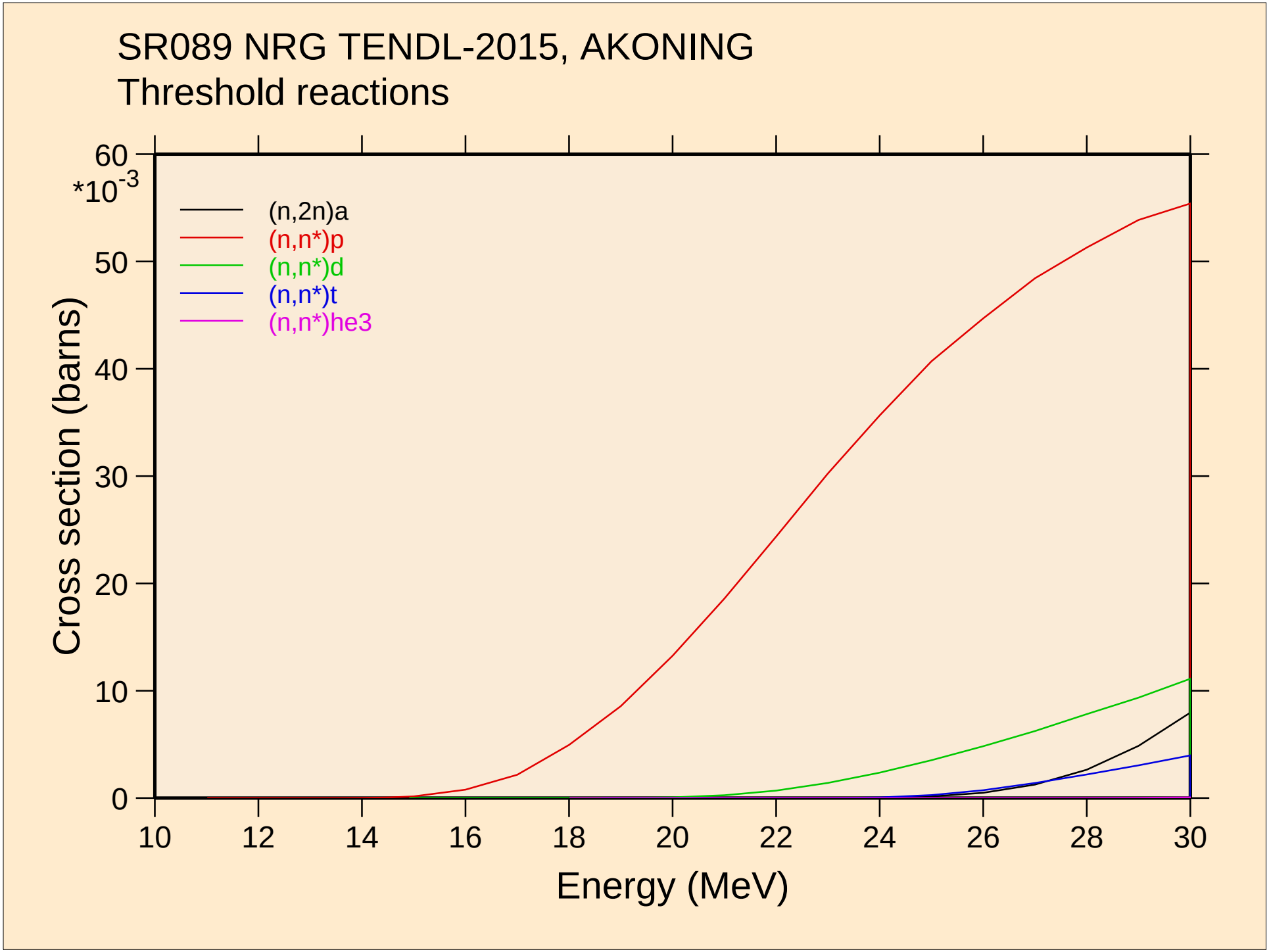

SR089 NRG TENDL-2015, AKONING
Inelastic levels
120
*10-3
100
80
60
40
20
0
Cross section (barns)
0
5
10
15
20
25
30
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

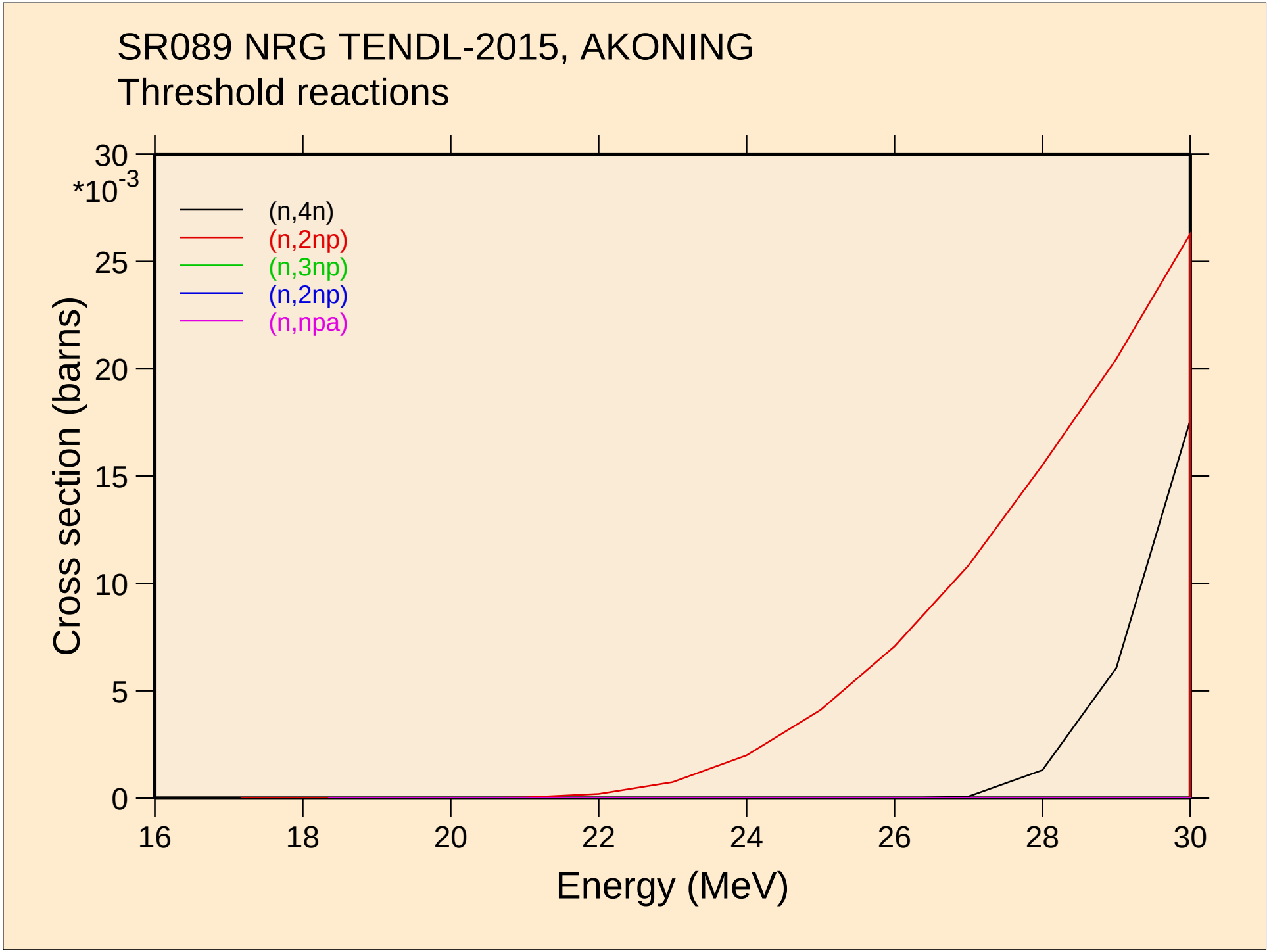

SR089 NRG TENDL-2015, AKONING
Inelastic levels
100
*10-3
80
60
40
20
0
Cross section (barns)
0
5
10
15
20
25
30
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

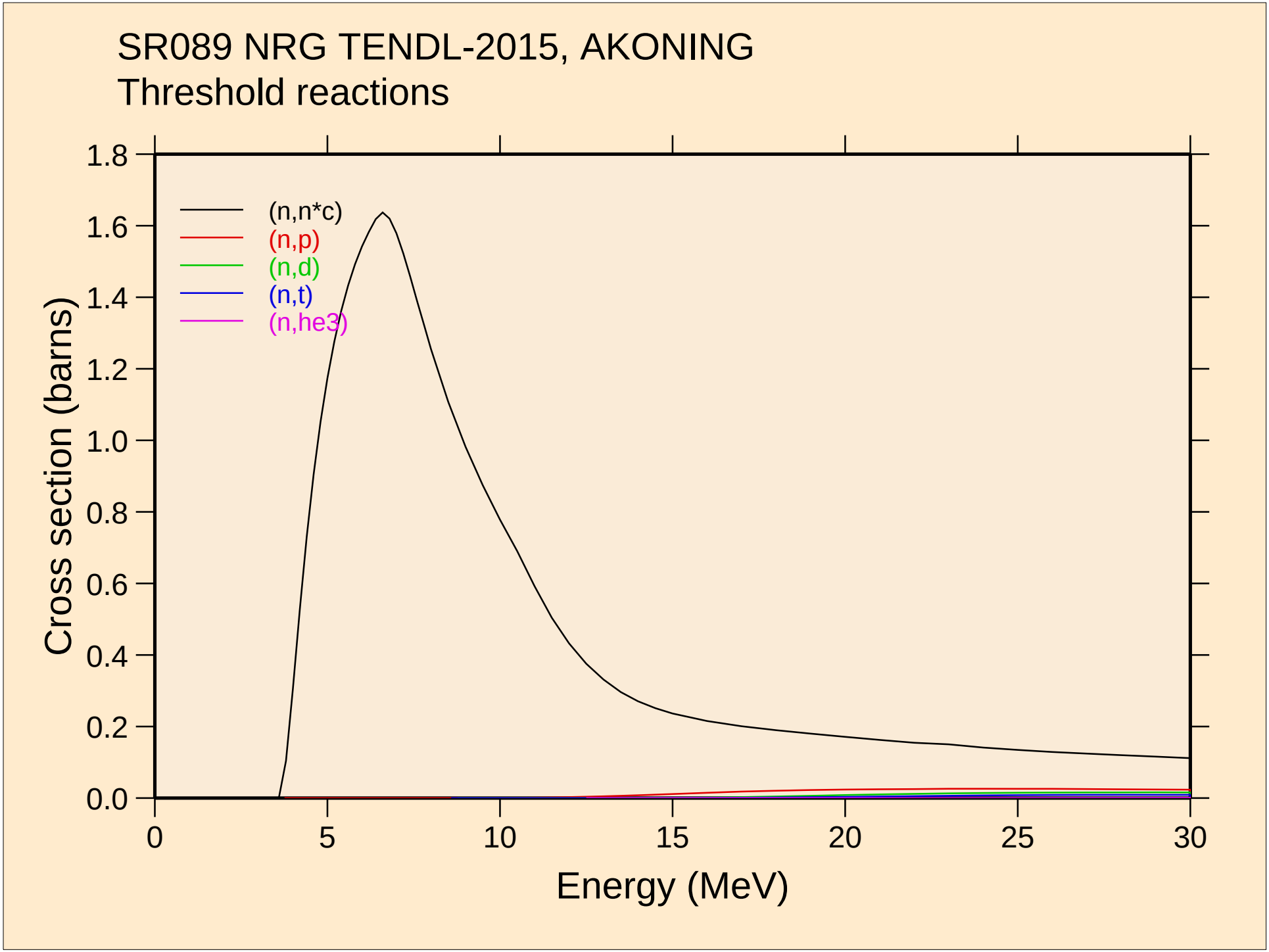

SR089 NRG TENDL-2015, AKONING
Inelastic levels
Cross section (barns)
*10-3
60
50
40
30
20
10
0
0
5
10
15
20
25
30
Energy (MeV)
(n,n*21)
(n,n*22)
(n,n*23)
(n,n*24)
(n,n*25)

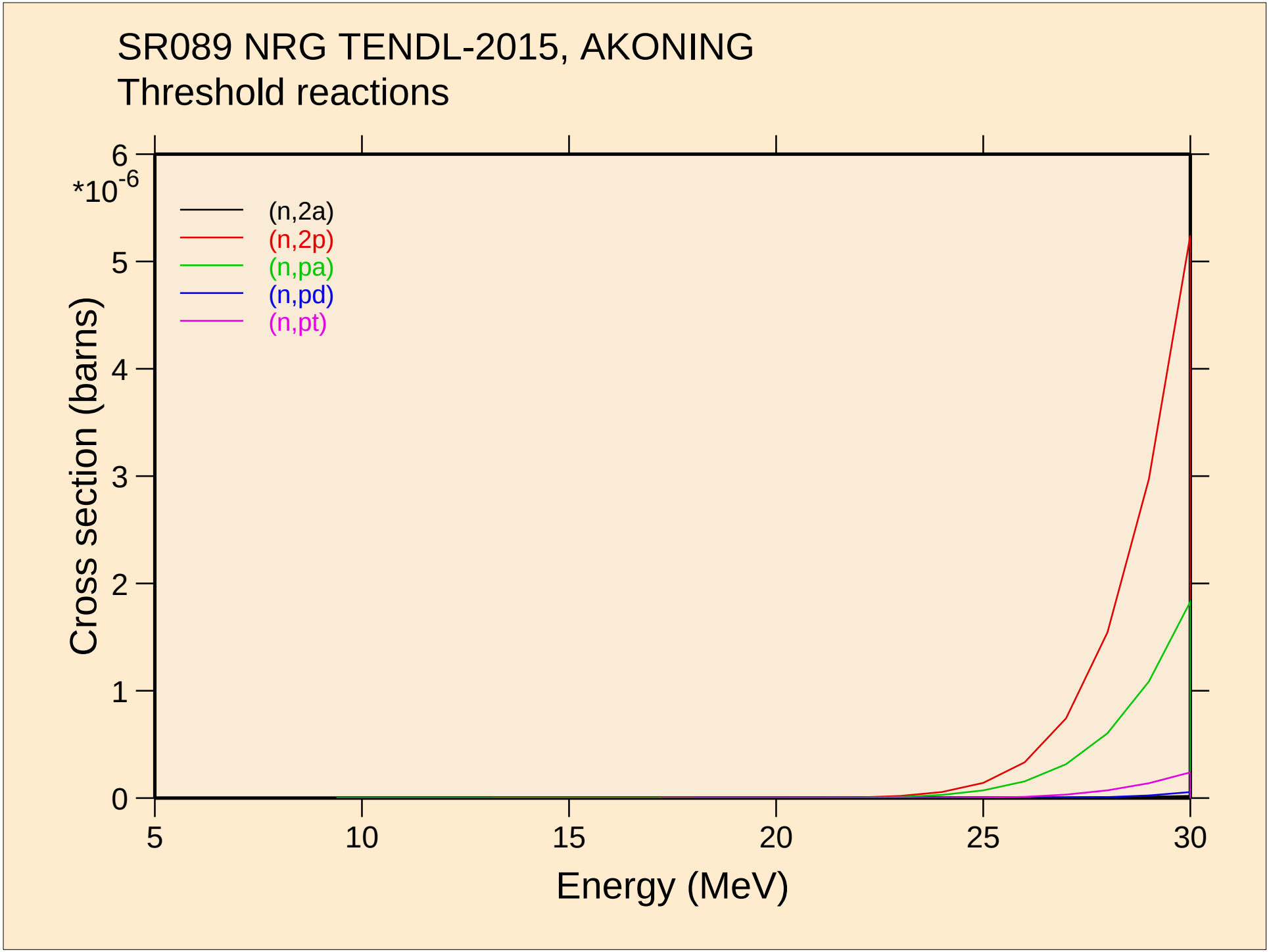

SR089 NRG TENDL-2015, AKONING
Inelastic levels
*10-3
35
30
25
20
15
10
5
0
Cross section (barns)
0
5
10
15
20
25
30
Energy (MeV)
(n,n*26)
(n,n*27)
(n,n*28)
(n,n*29)
(n,n*30)

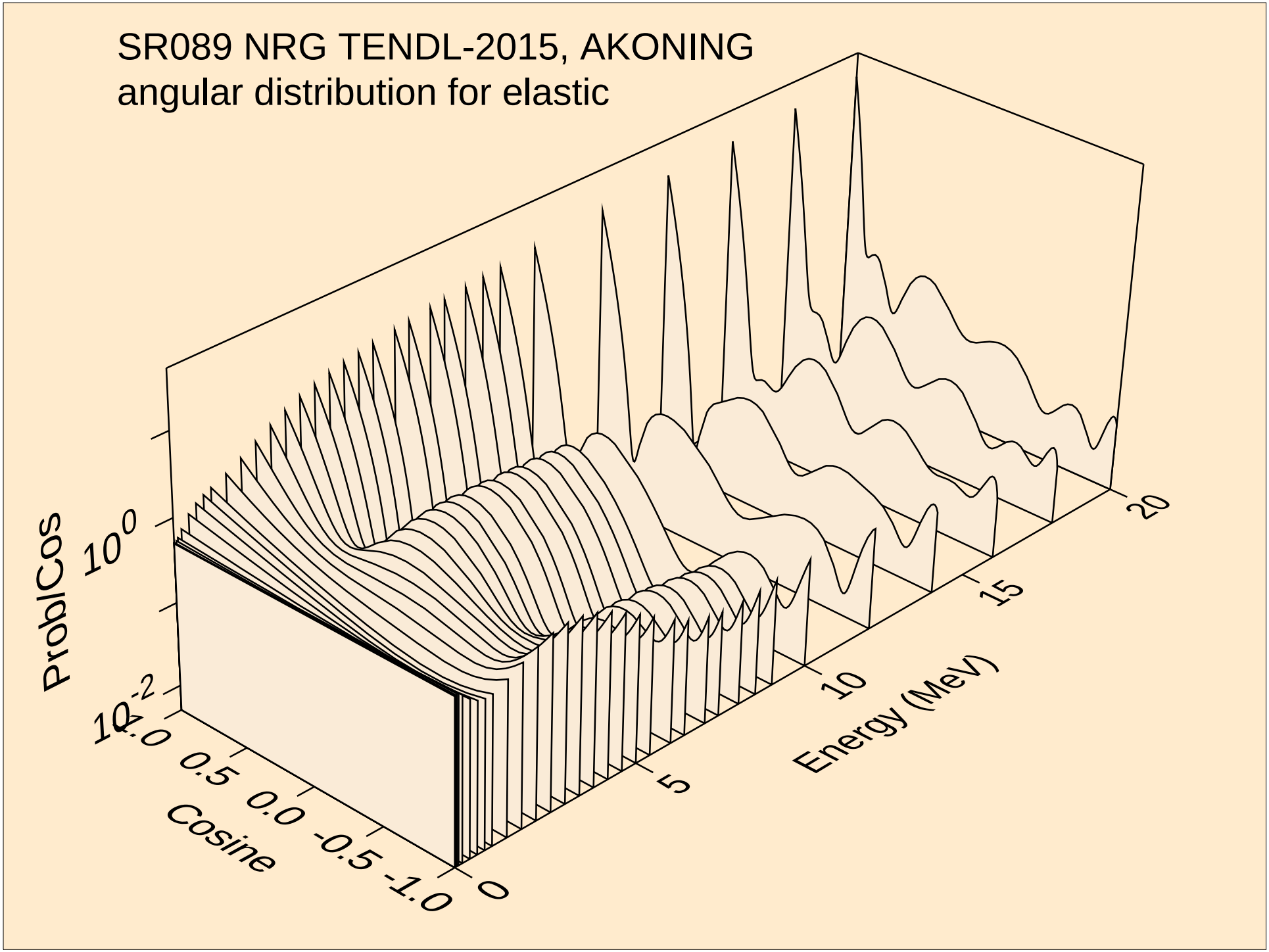

SR089 NRG TENDL-2015, AKONING
Threshold reactions
(n,x)
(n,2nd)
(n,2n)
(n,3n)
(n,n*)a
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
0
20
40
60
80
100
120
140
160
180
200

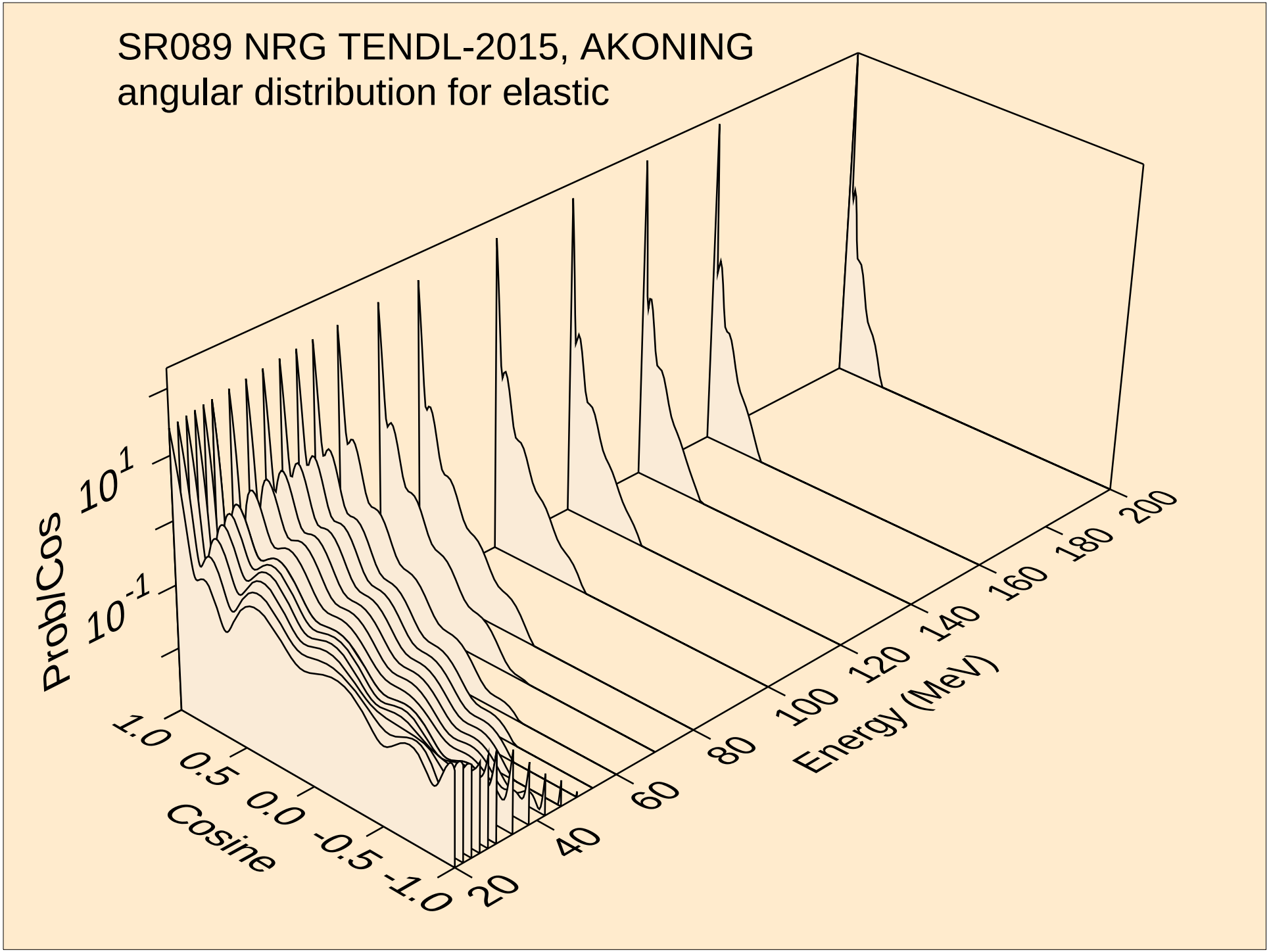

SR089 NRG TENDL-2015, AKONING
Threshold reactions
*10-3
60
50
40
30
20
10
0
Cross section (barns)
(n,2n)a
(n,n*)p
(n,n*)d
(n,n*)t
(n,n*)he3
10
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

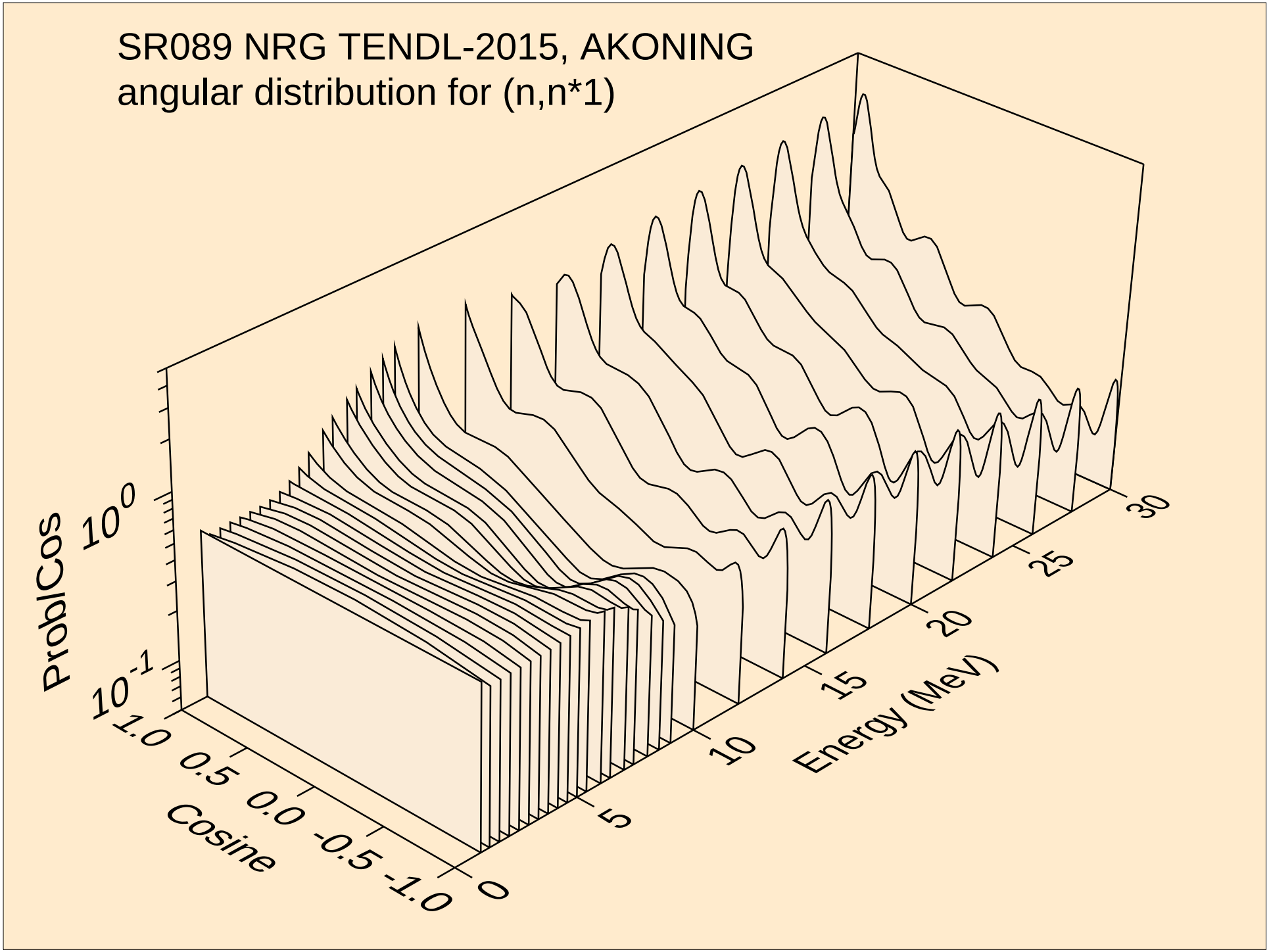

SR089 NRG TENDL-2015, AKONING
Threshold reactions
*10-3
30
25
20
15
10
5
0
Cross section (barns)
(n,4n)
(n,2np)
(n,3np)
(n,2np)
(n,npa)
16
18
20
22
24
26
28
30
Energy (MeV)

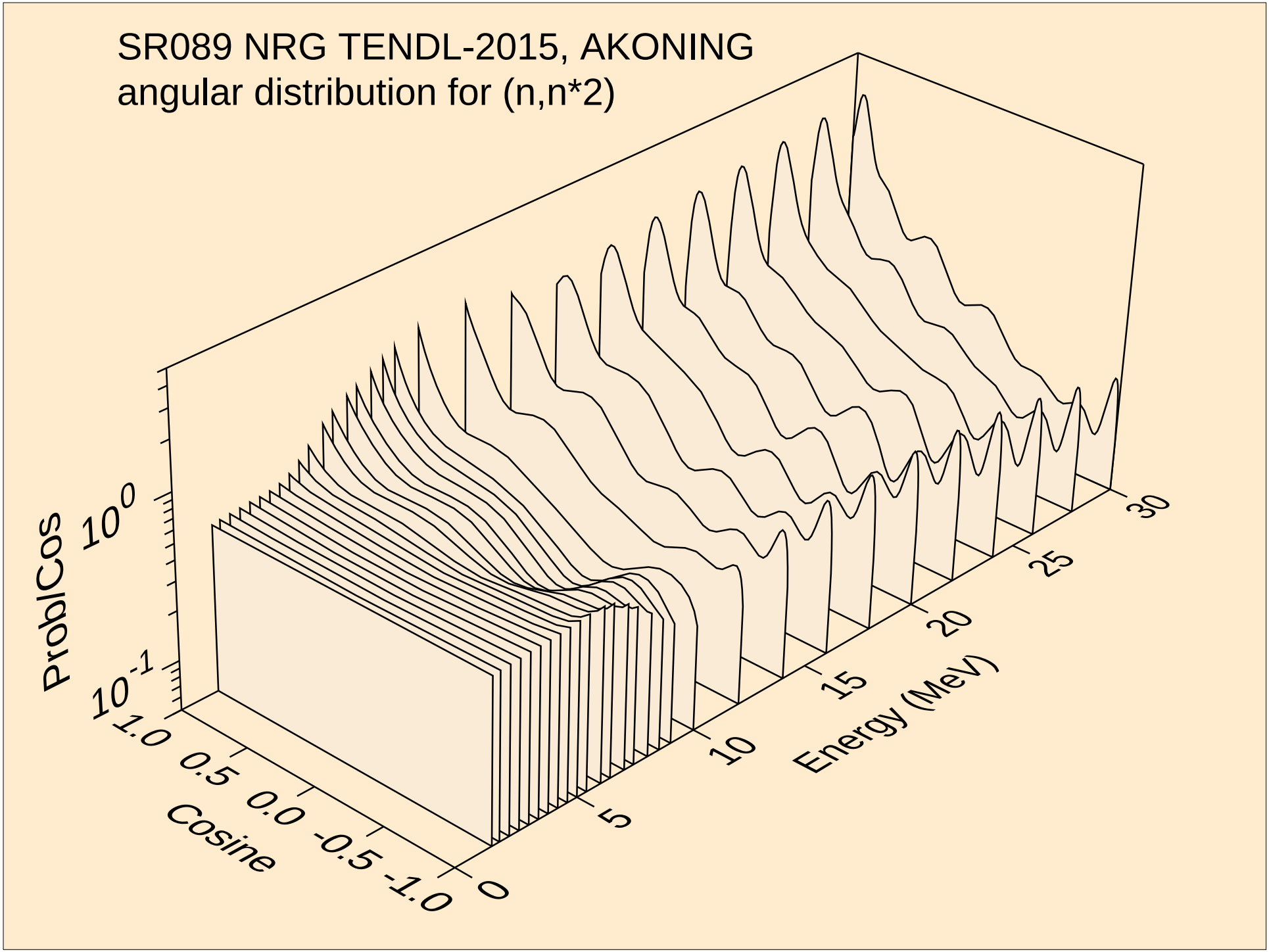

SR089 NRG TENDL-2015, AKONING
Threshold reactions
(n,n*c)
(n,p)
(n,d)
(n,t)
(n,he3)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
0
5
10
15
20
25
30

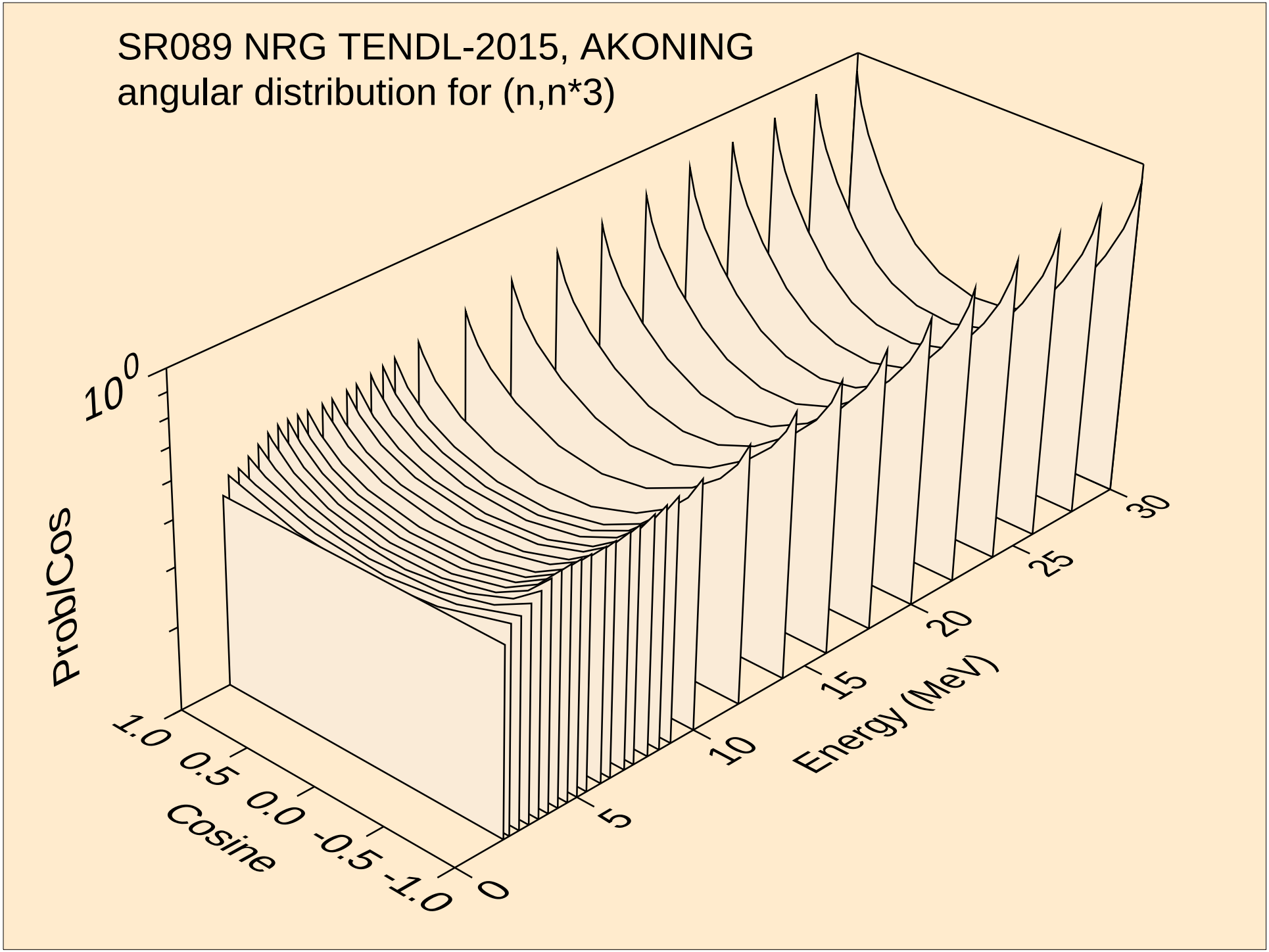

SR089 NRG TENDL-2015, AKONING
Threshold reactions
*10-6
Cross section (barns)
Energy (MeV)
(n,2a)
(n,2p)
(n,pa)
(n,pd)
(n,pt)
0
1
2
3
4
5
6
5
10
15
20
25
30

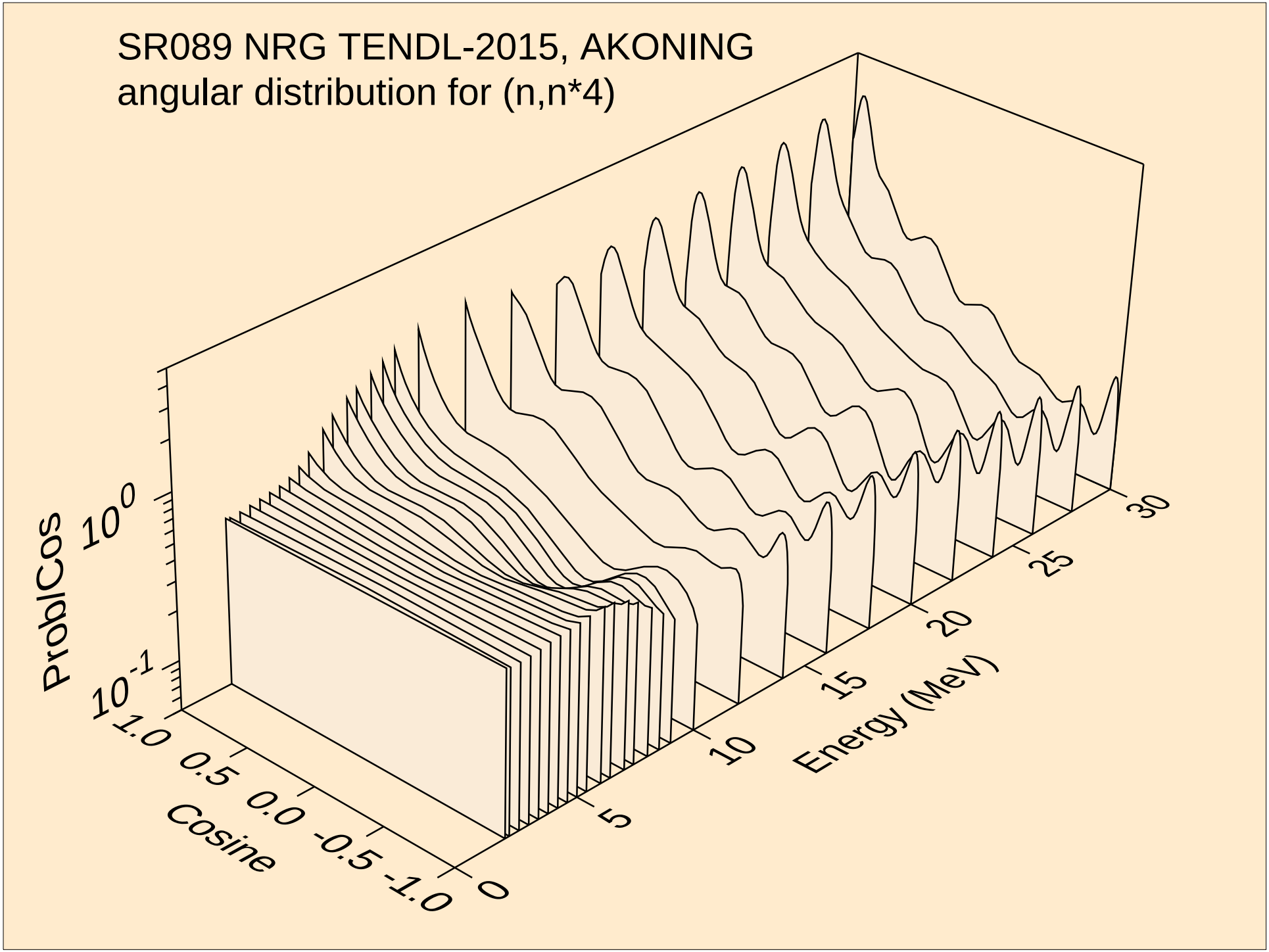

SR089 NRG TENDL-2015, AKONING
angular distribution for elastic
ProbCos
$10^{0}$
$10^{-2}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

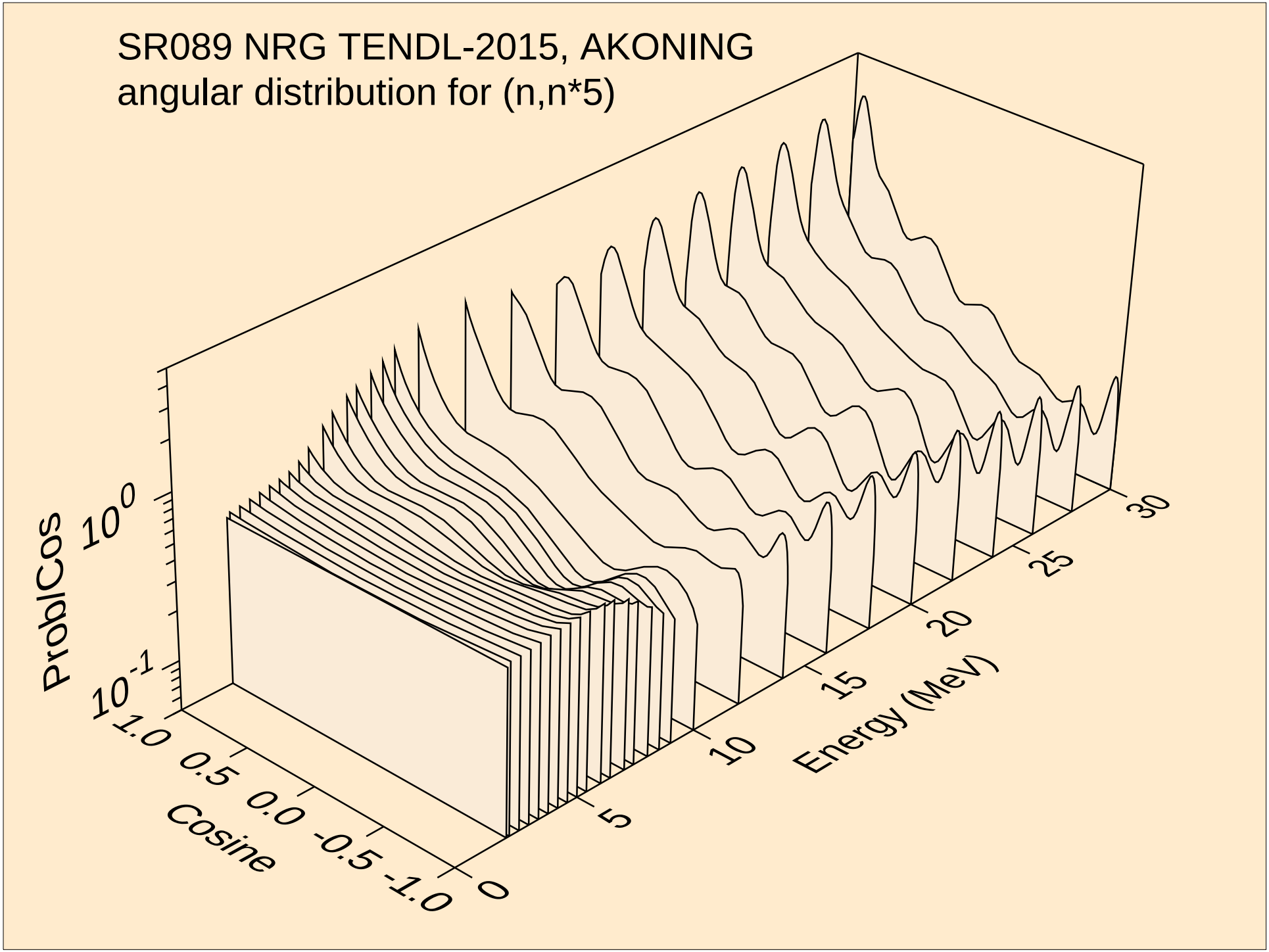

SR089 NRG TENDL-2015, AKONING
angular distribution for elastic
ProbCos
$10^{1}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

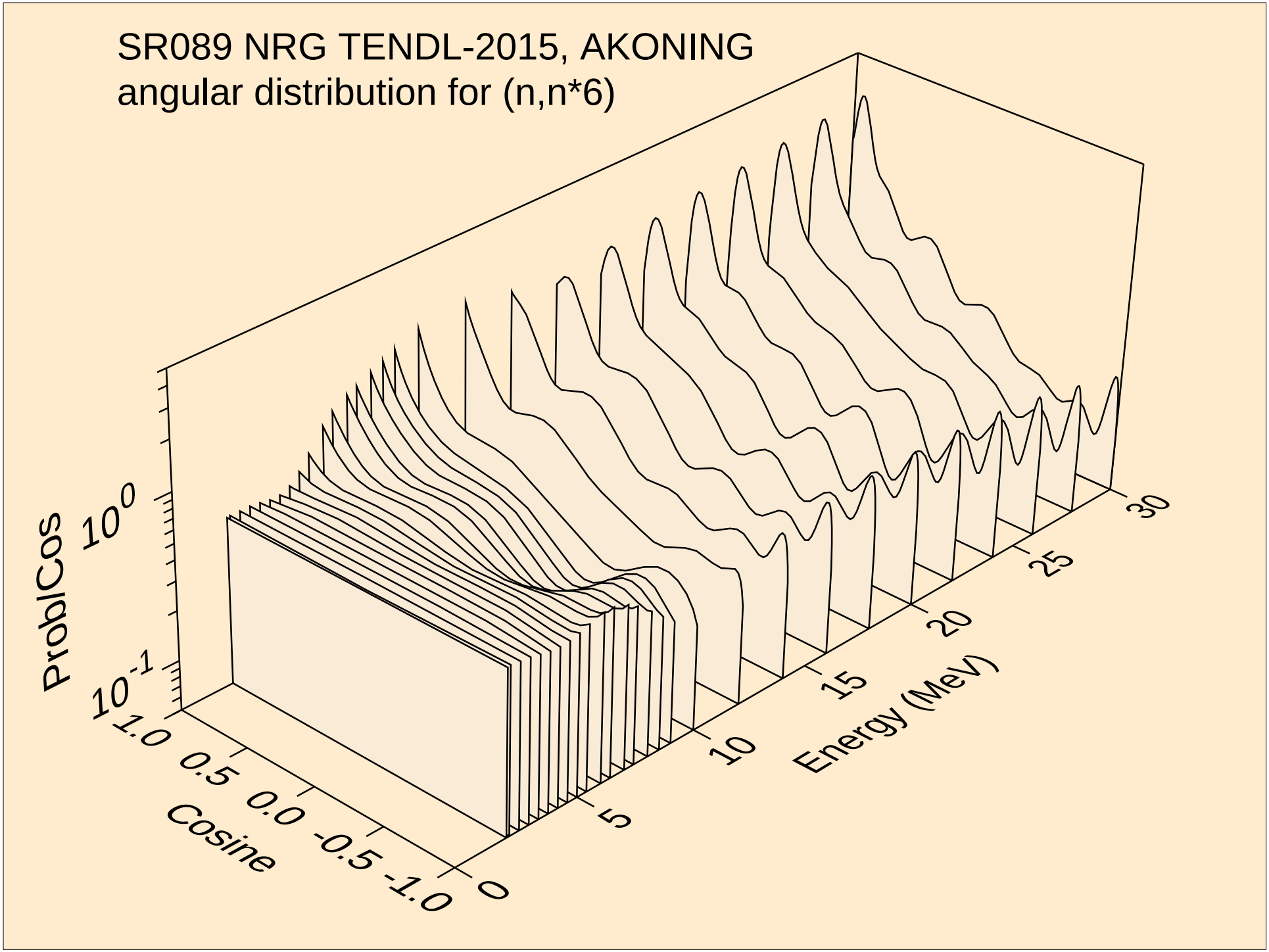

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*1)
Prob\Cos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

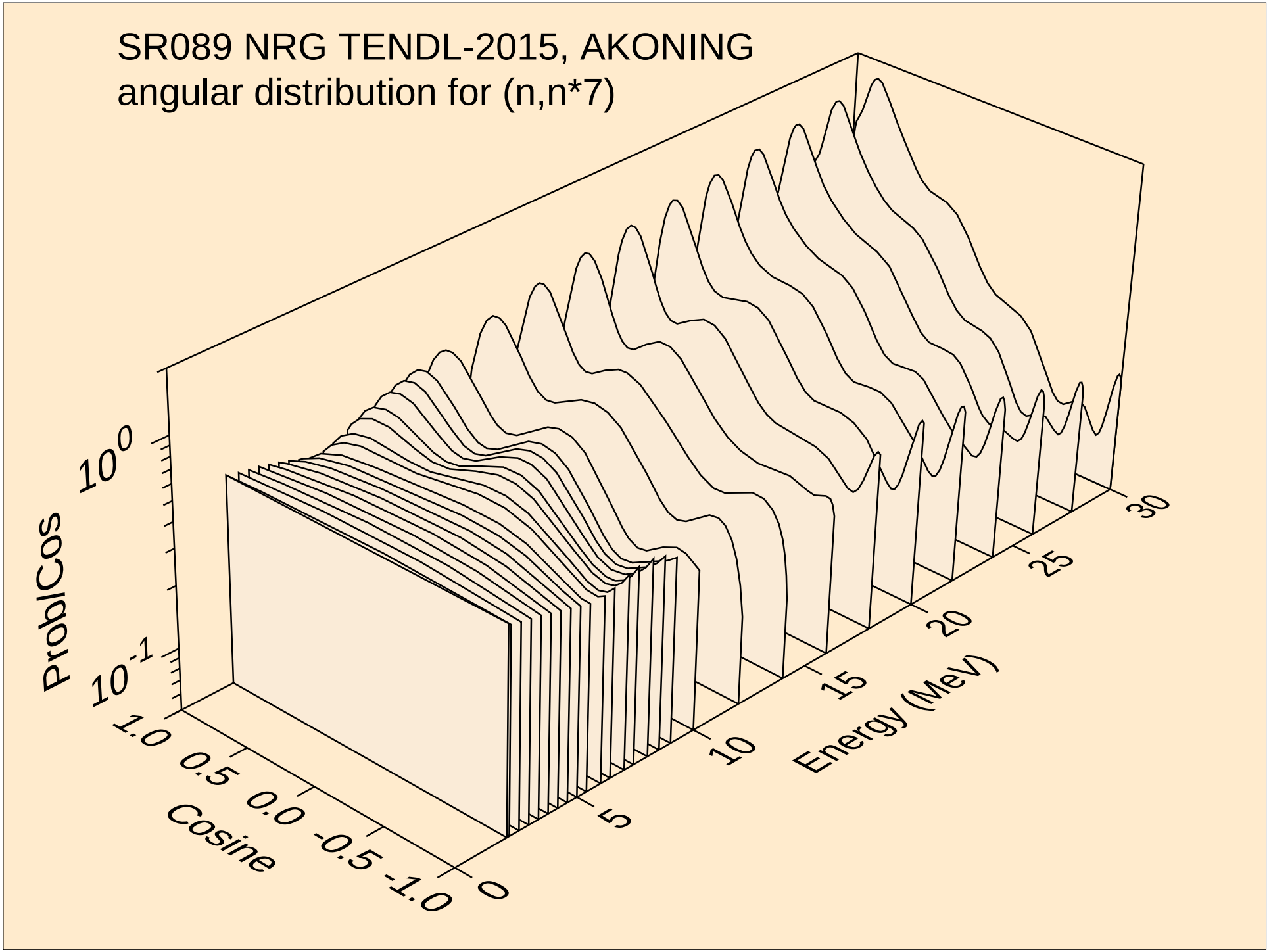

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*2)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

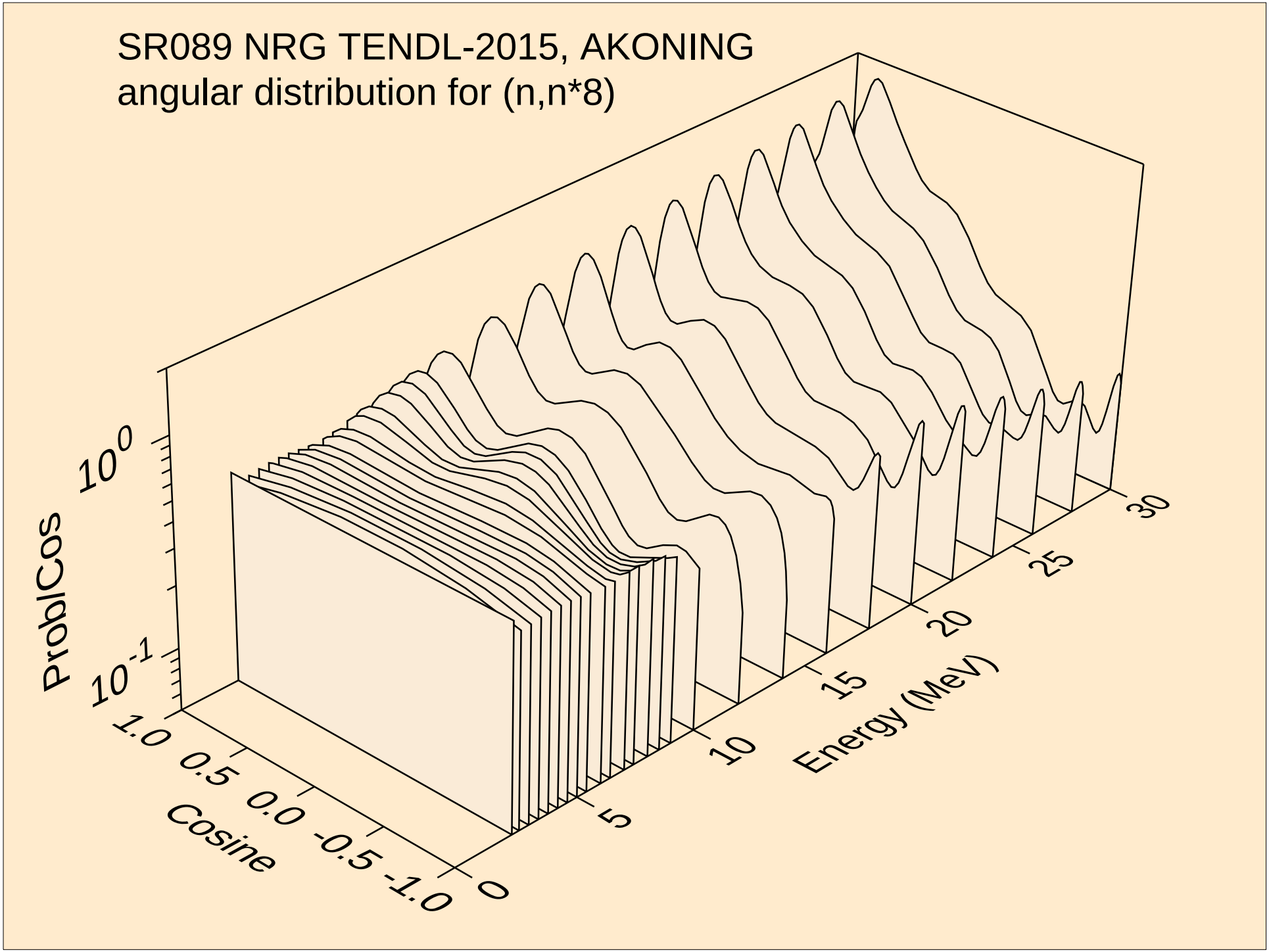

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*3)
$10^0$
Prob\Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

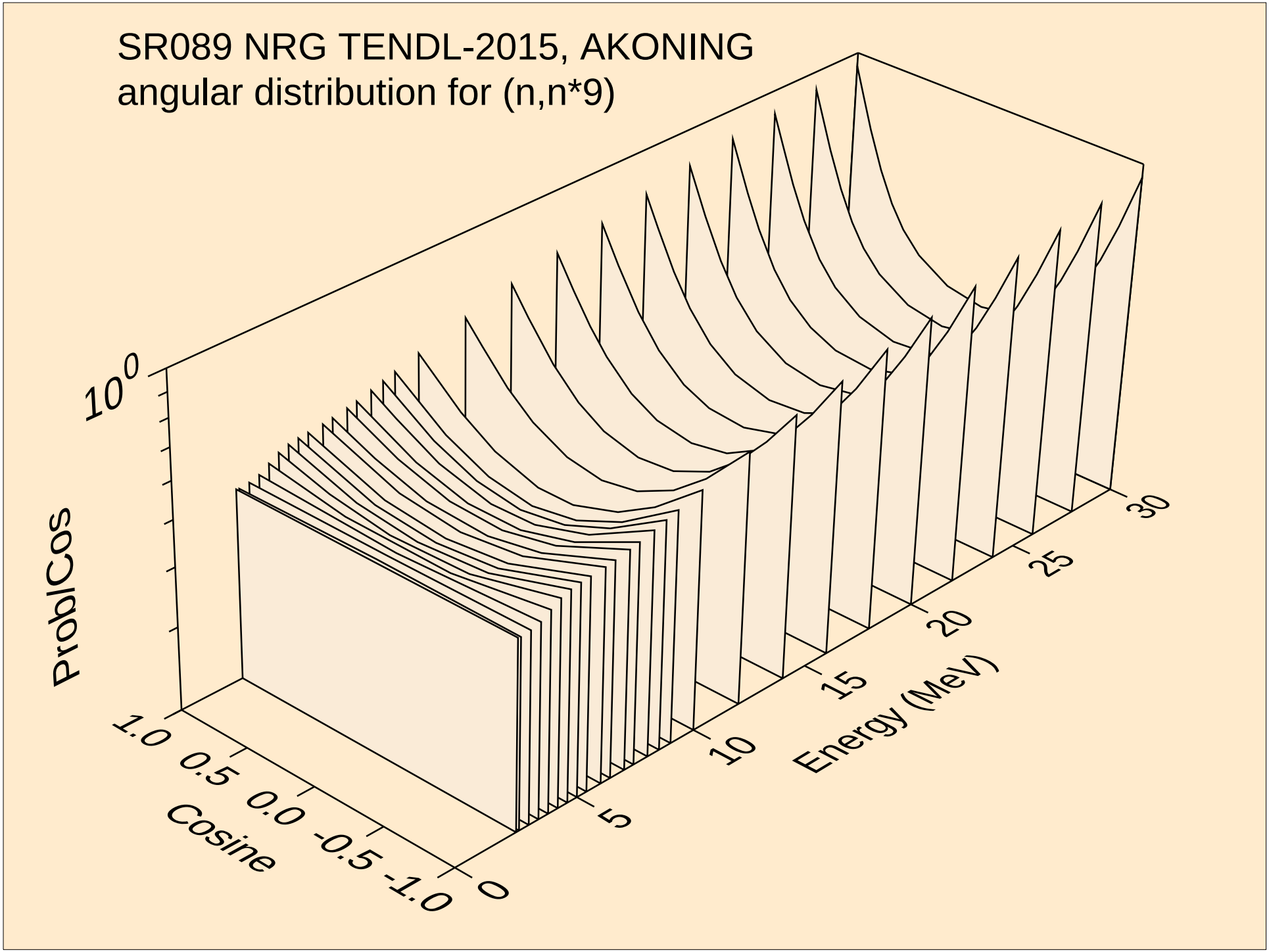

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*4)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

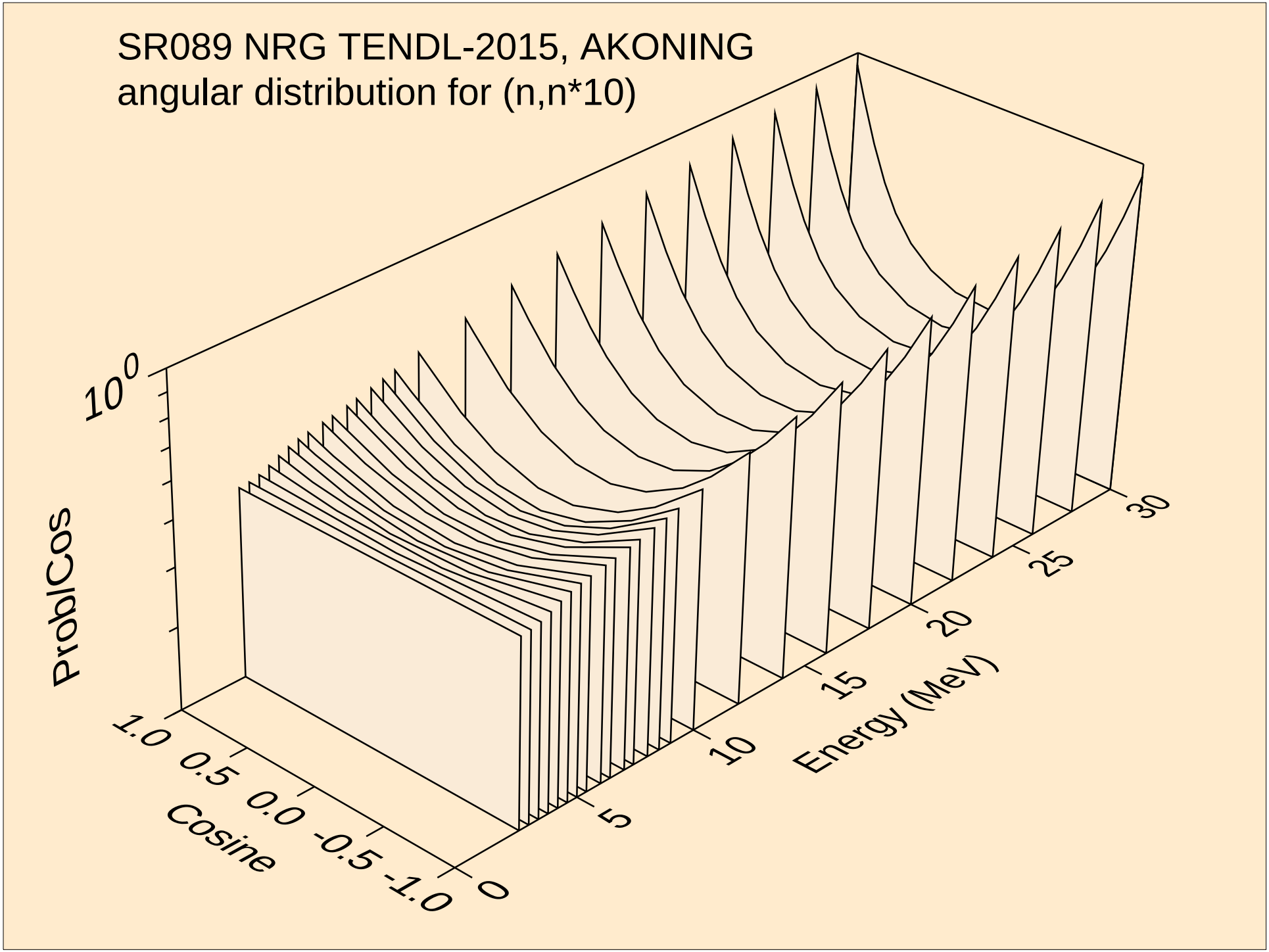

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*5)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

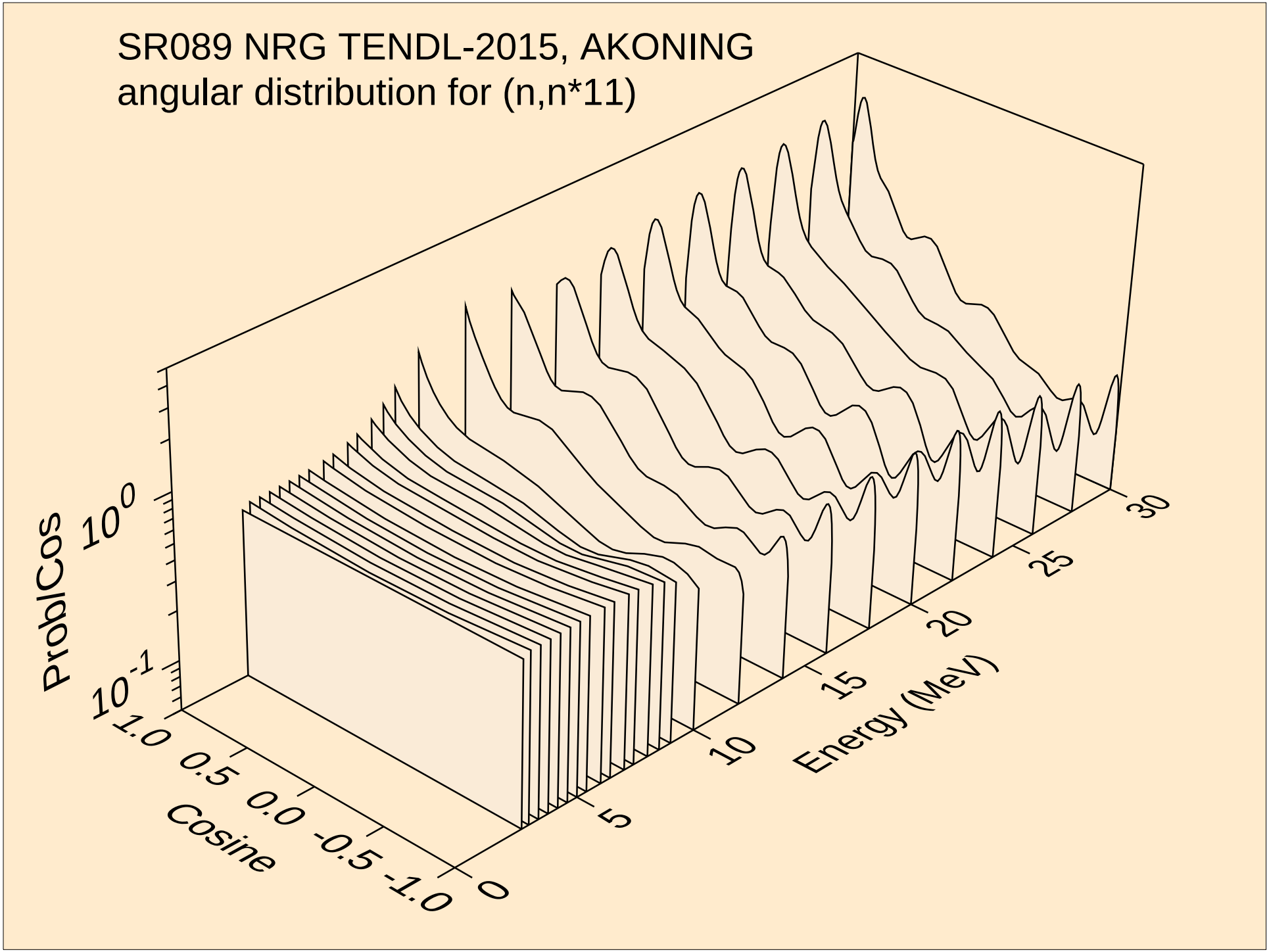

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*6)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

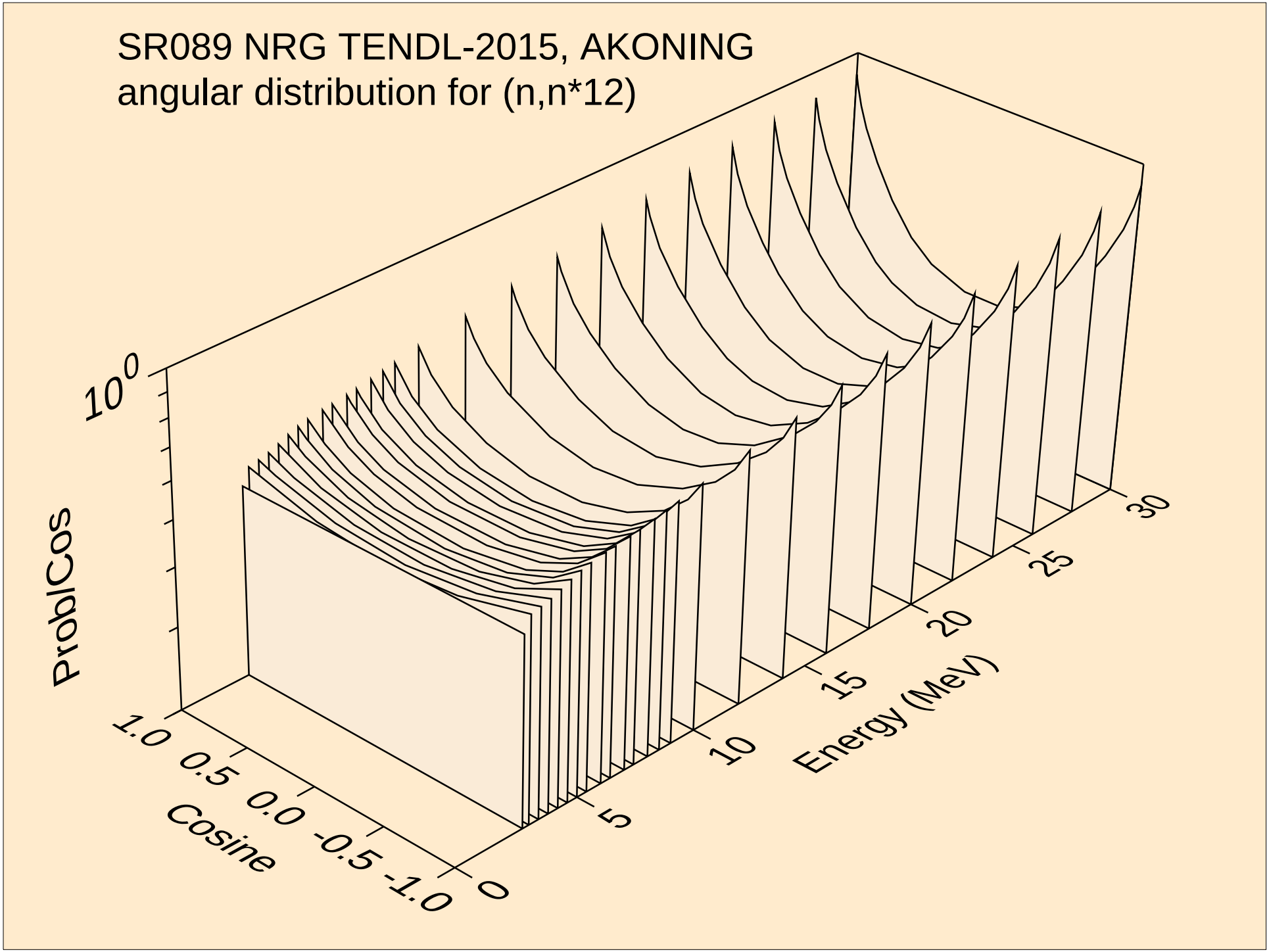

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*7)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

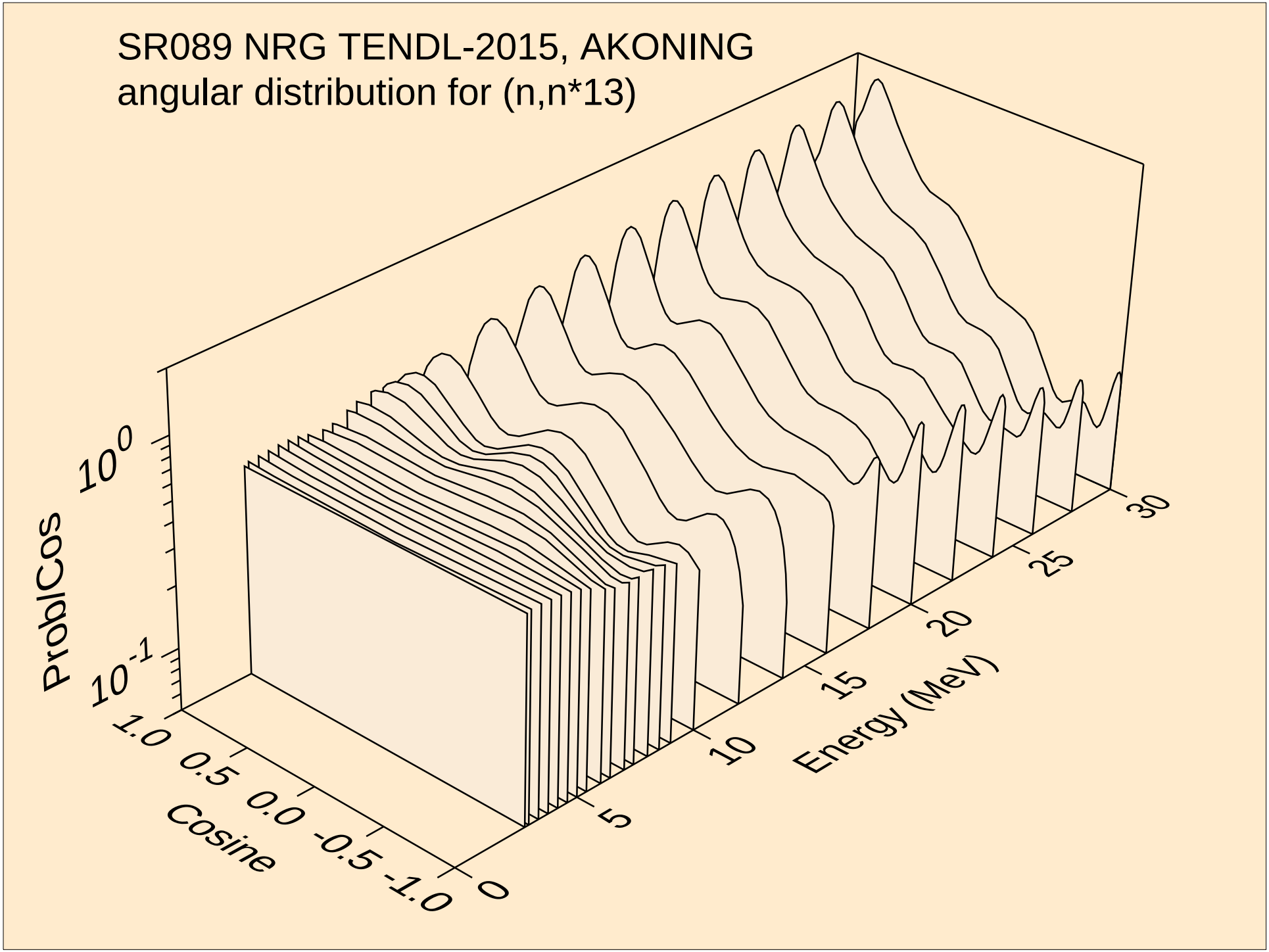

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*8)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

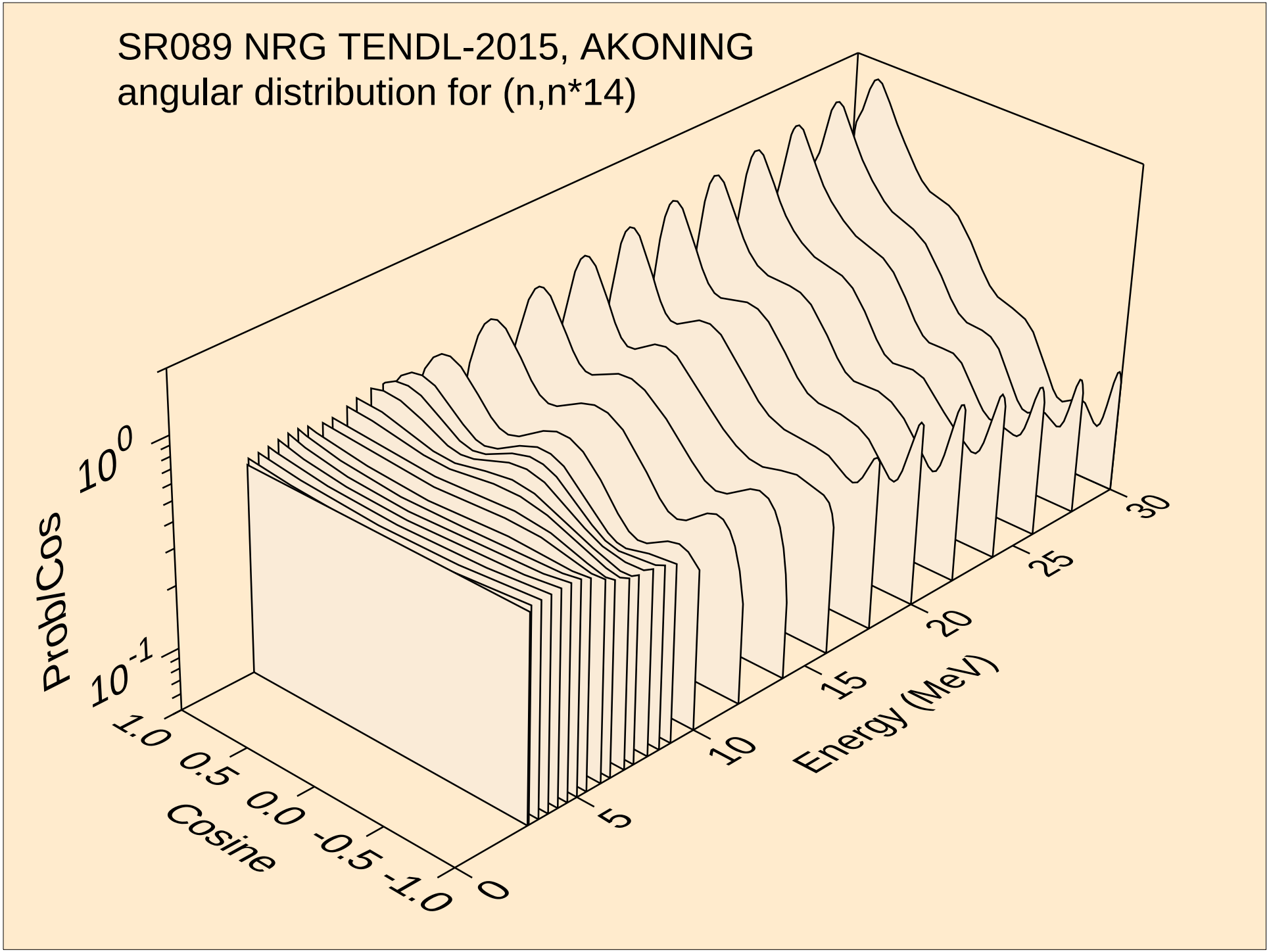

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*9)
$10^0$
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

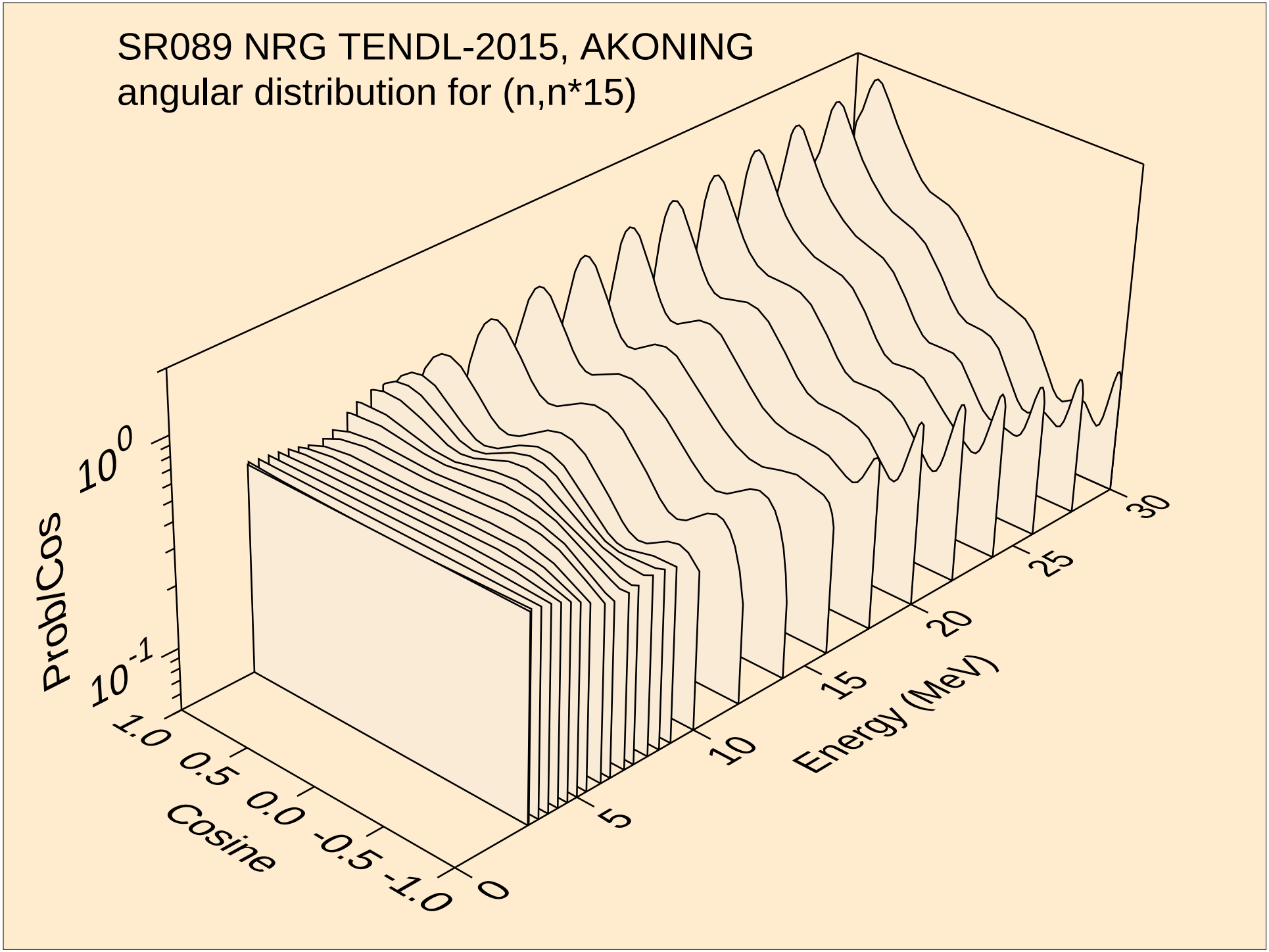

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*10)
$10^0$
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

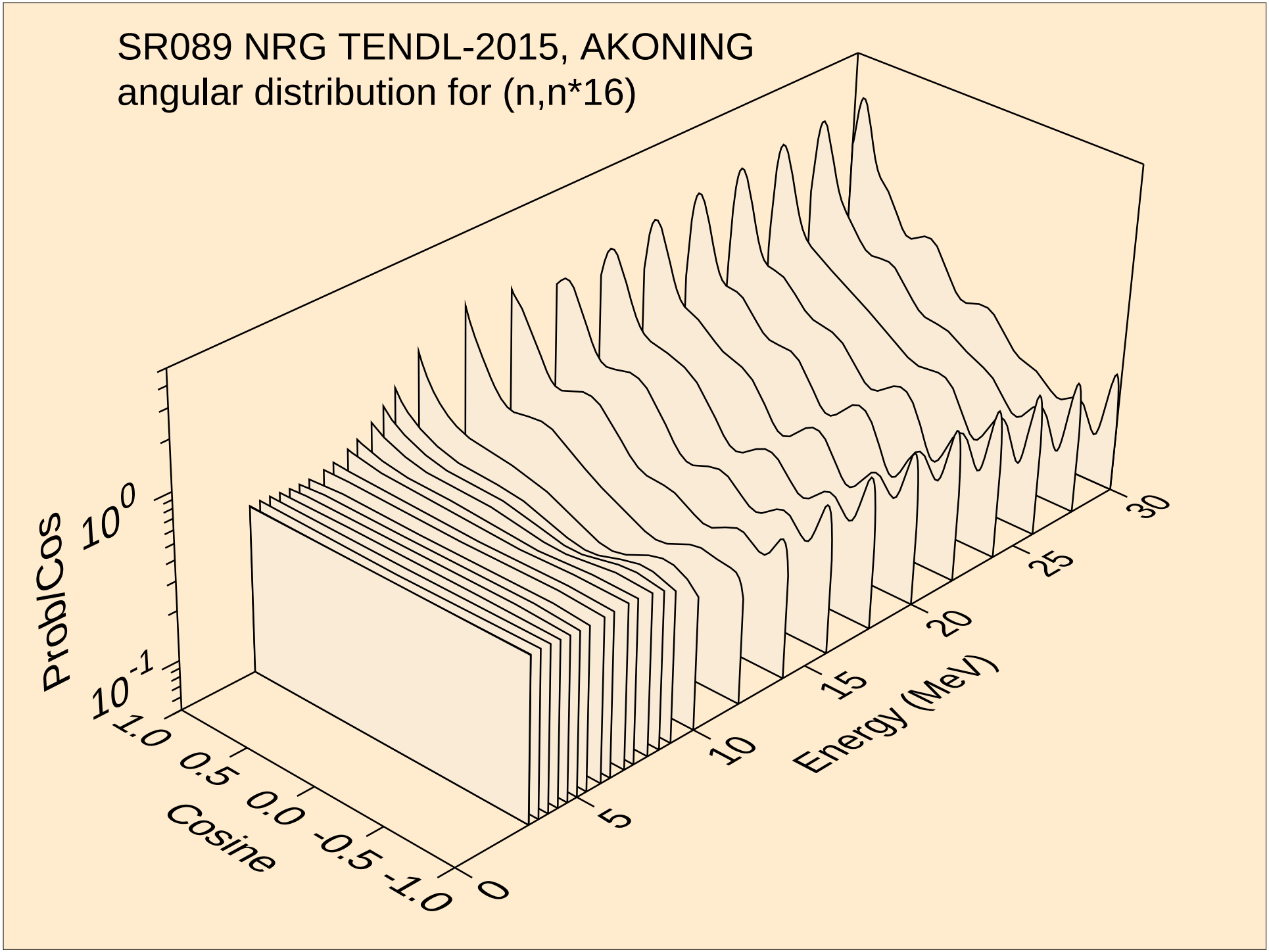

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*11)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

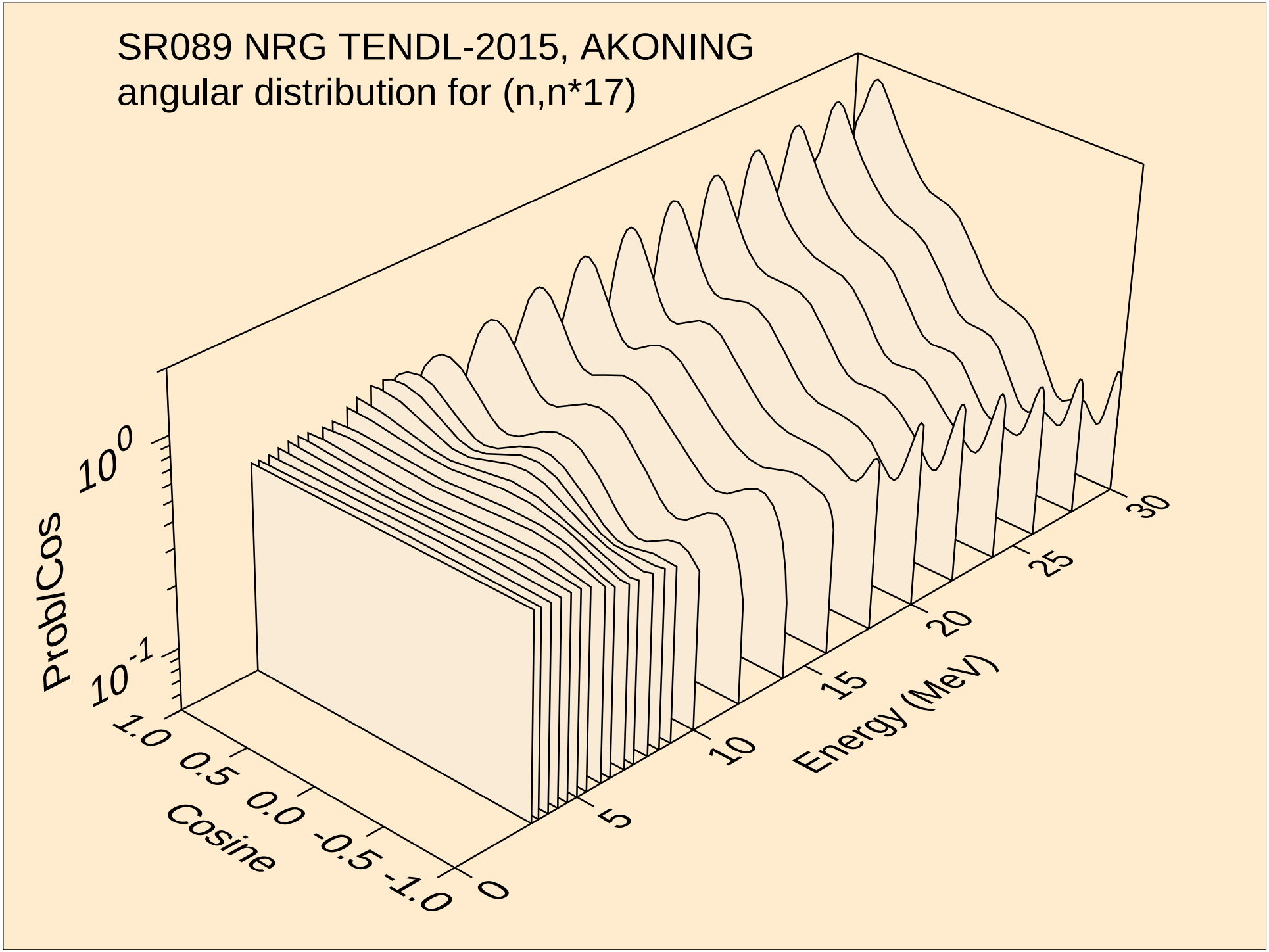

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*12)
$10^0$
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

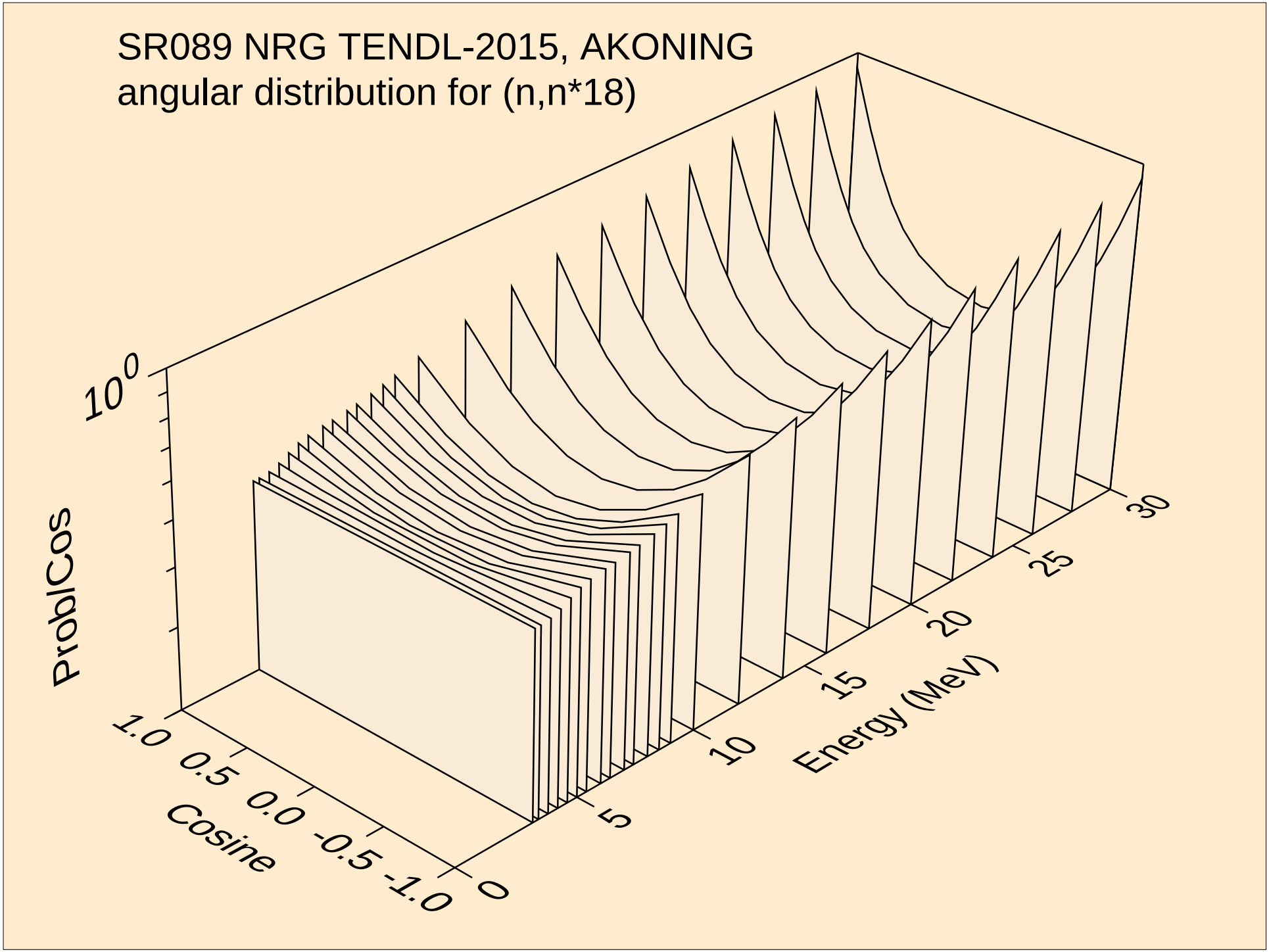

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*13)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

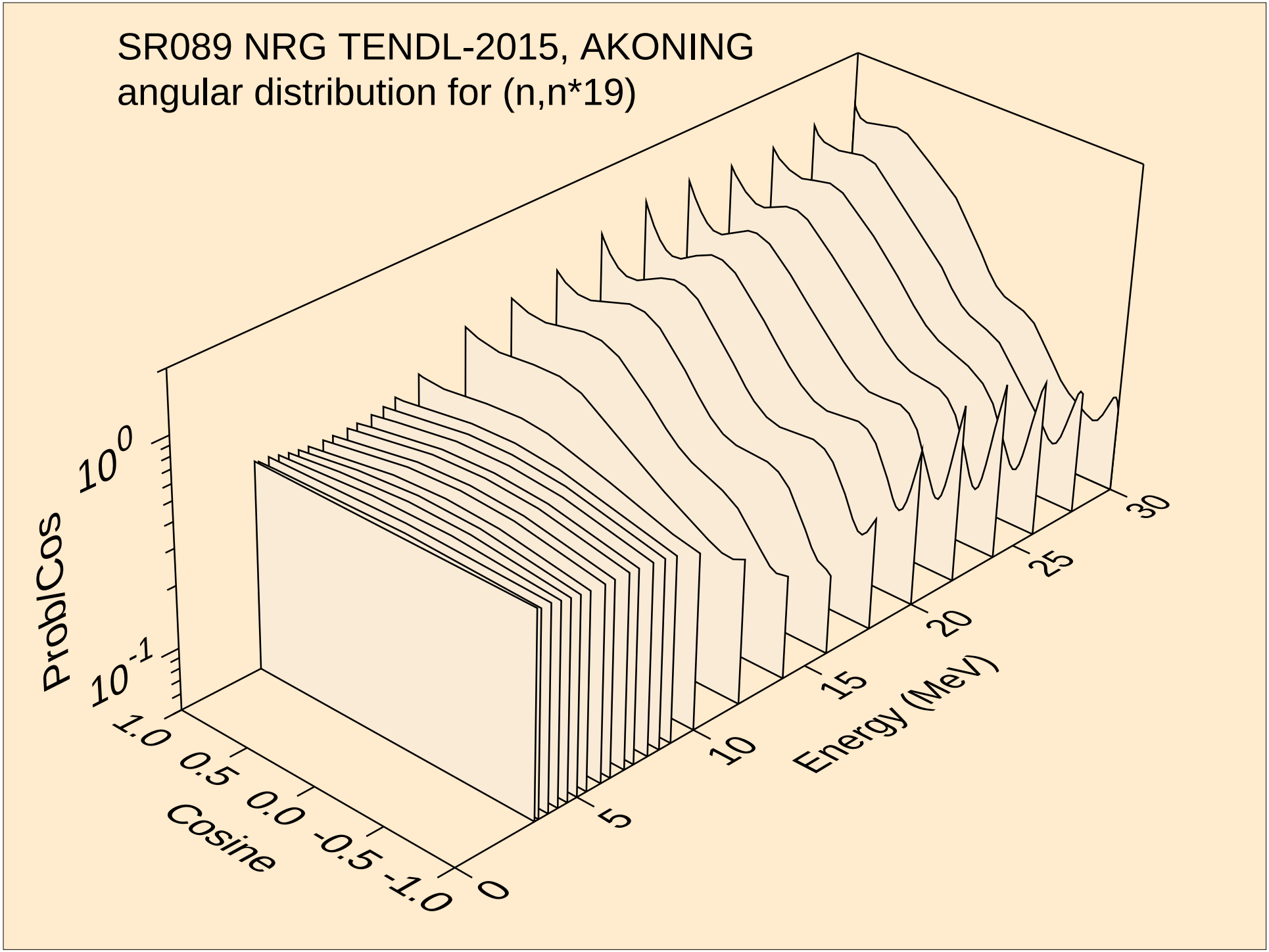

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*14)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

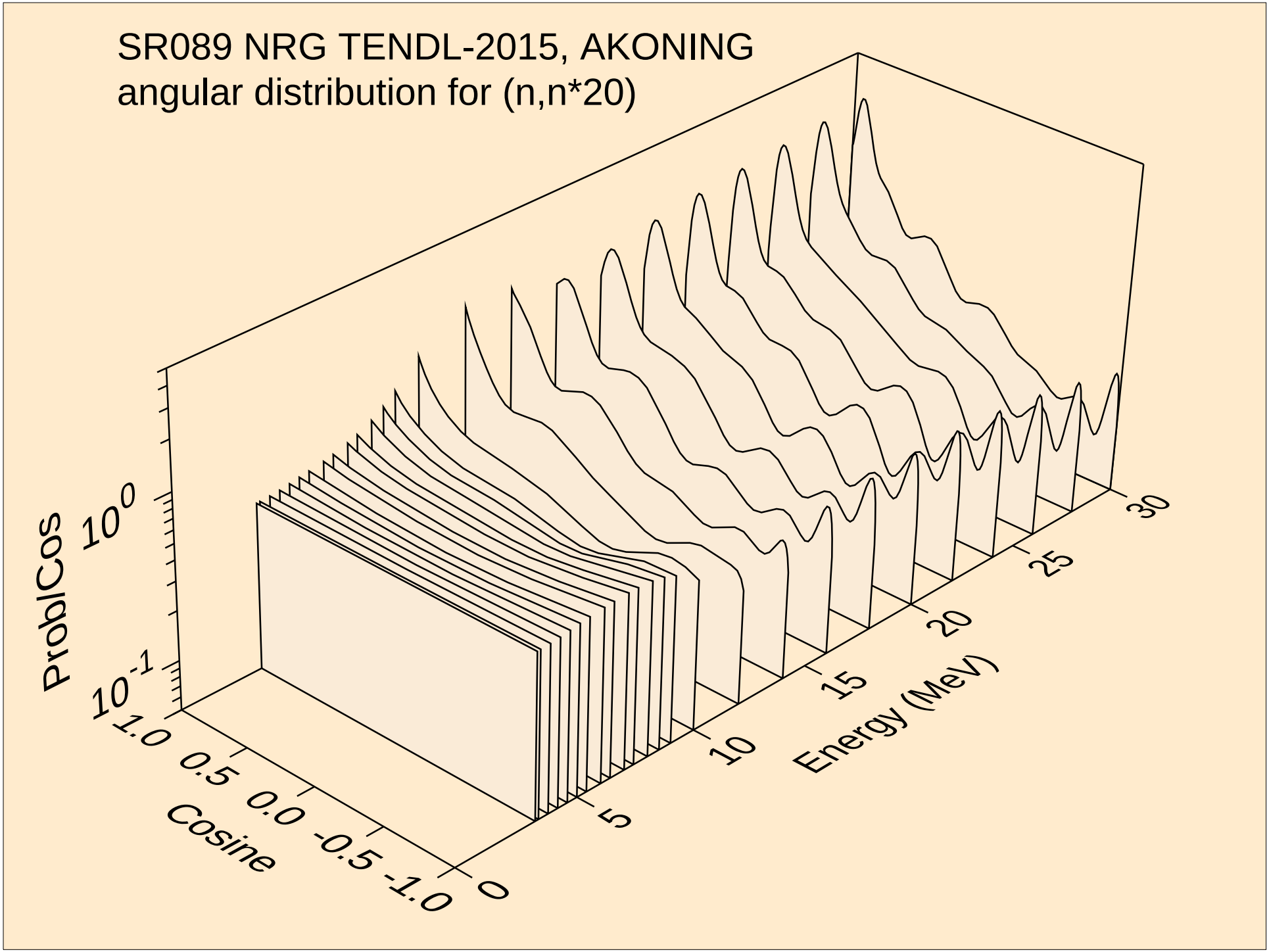

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*15)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

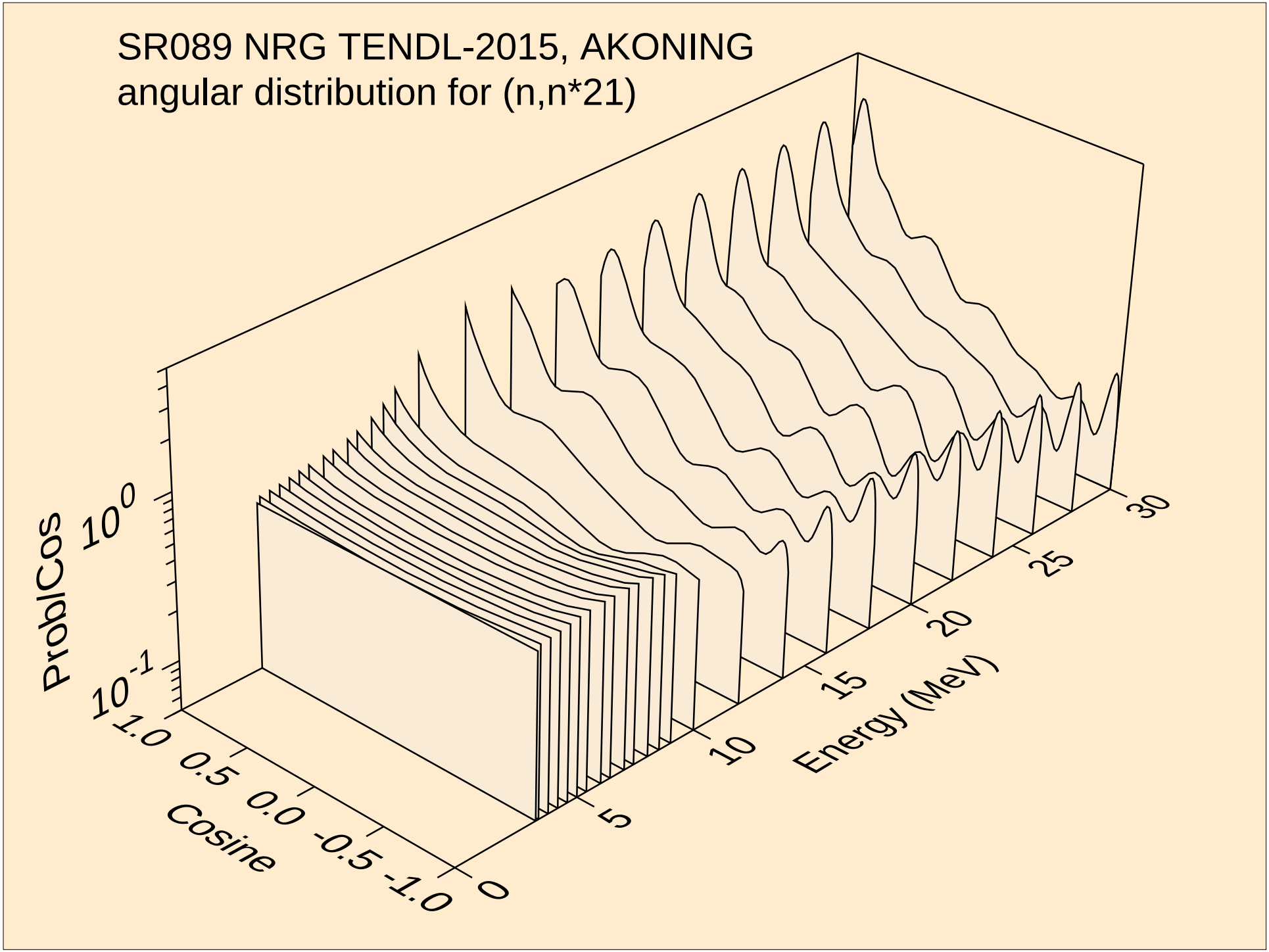

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*16)
Prob\Cos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

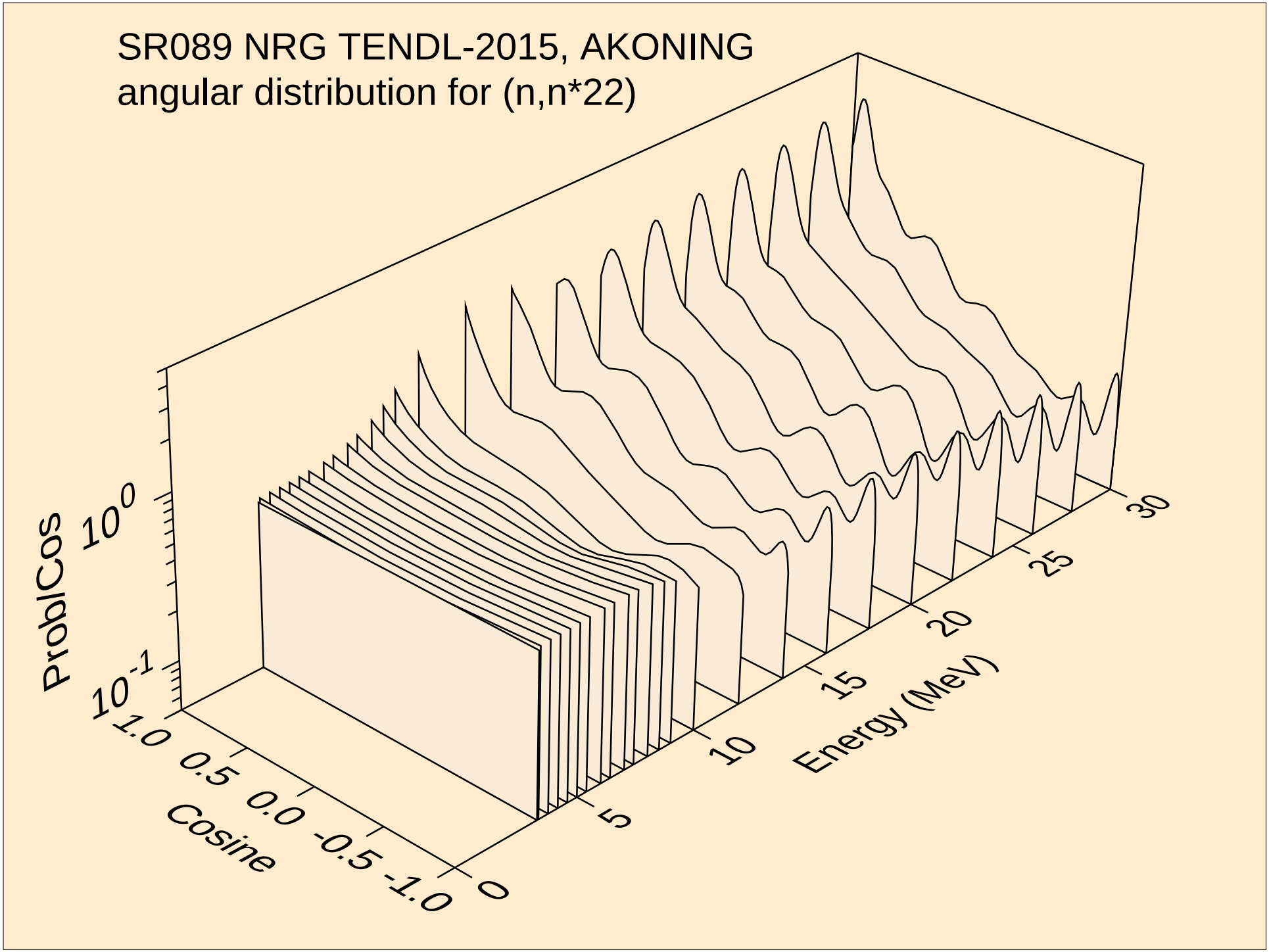

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*17)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

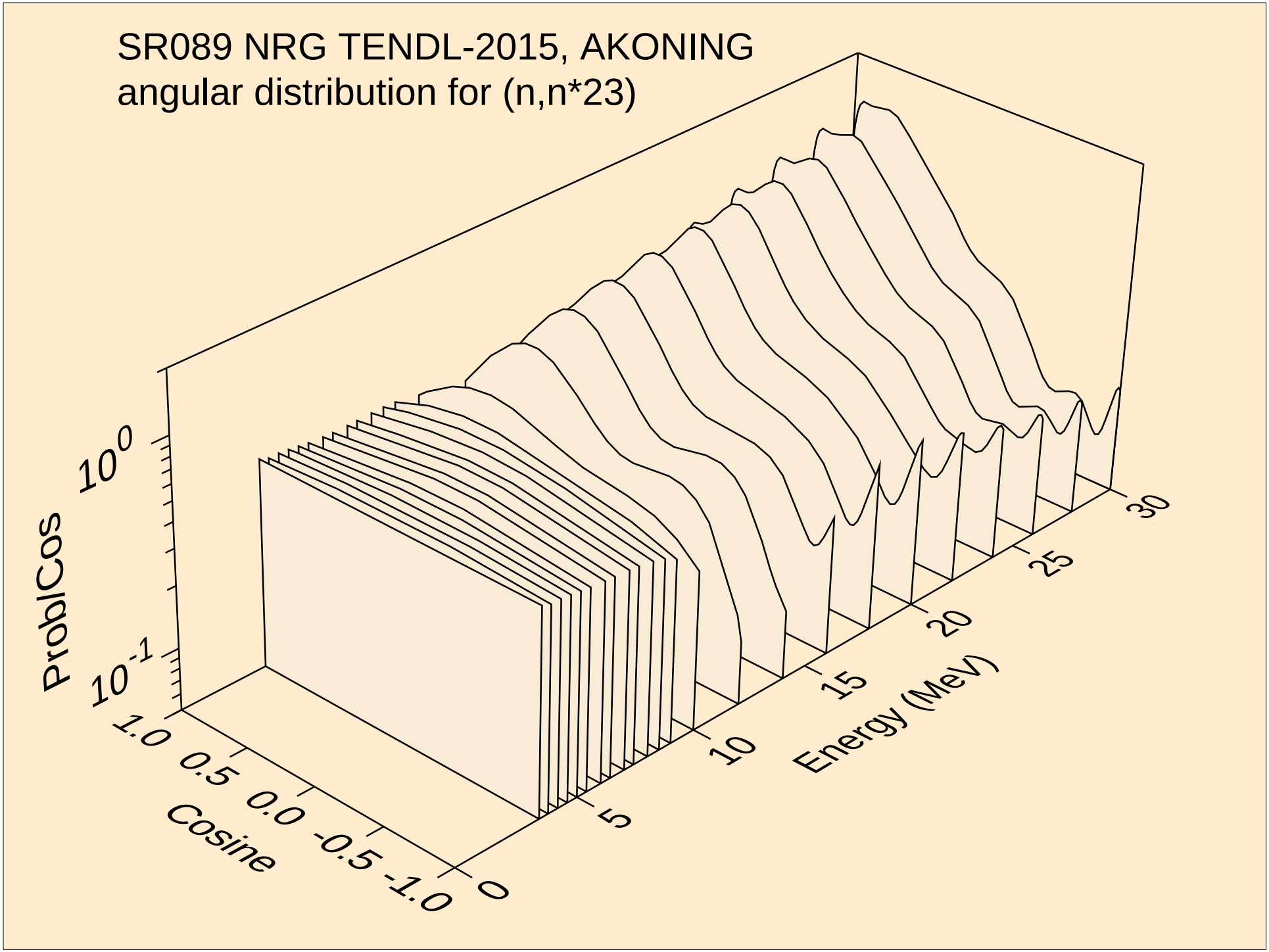

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*18)
$10^0$
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

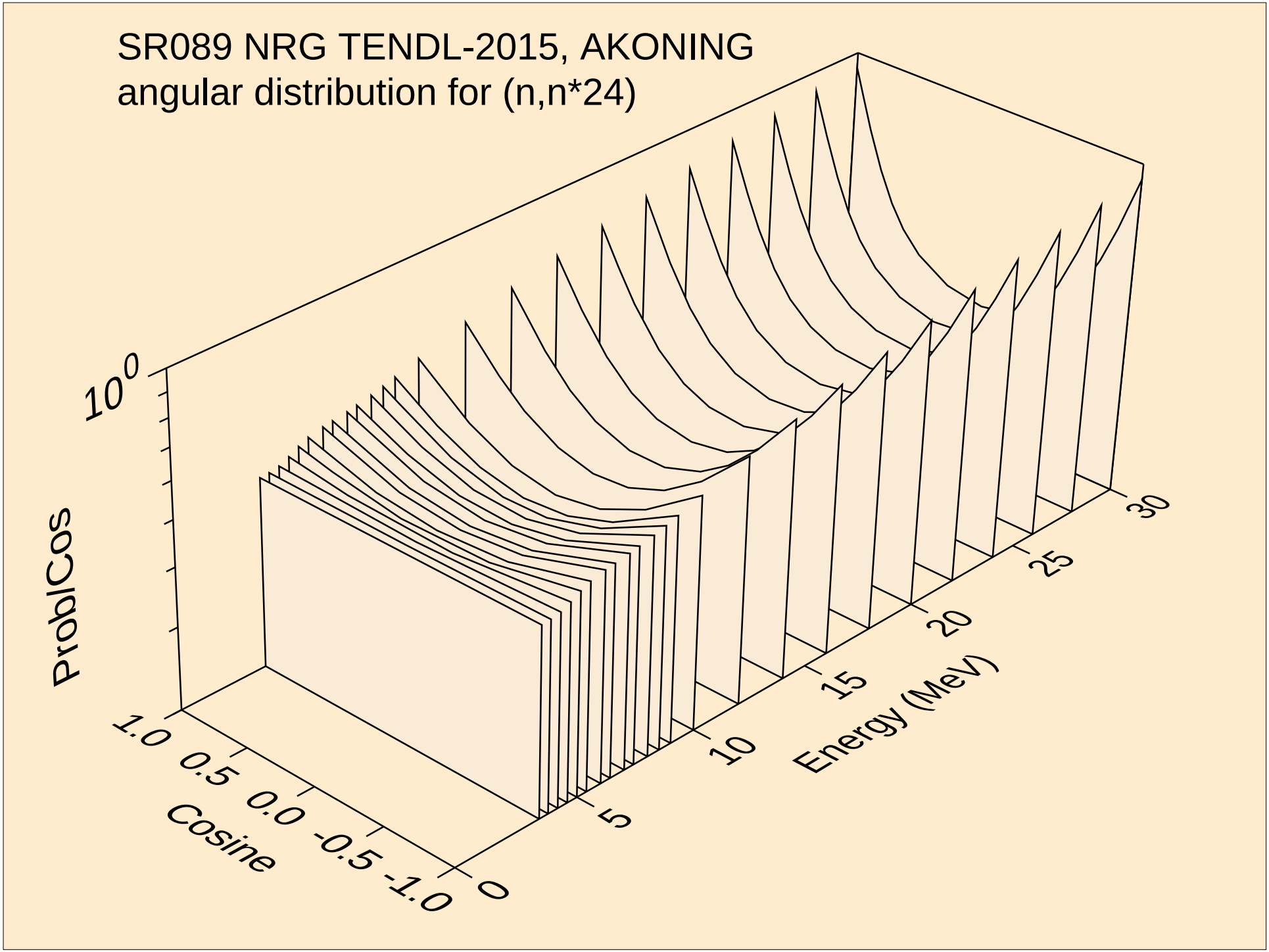

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*19)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

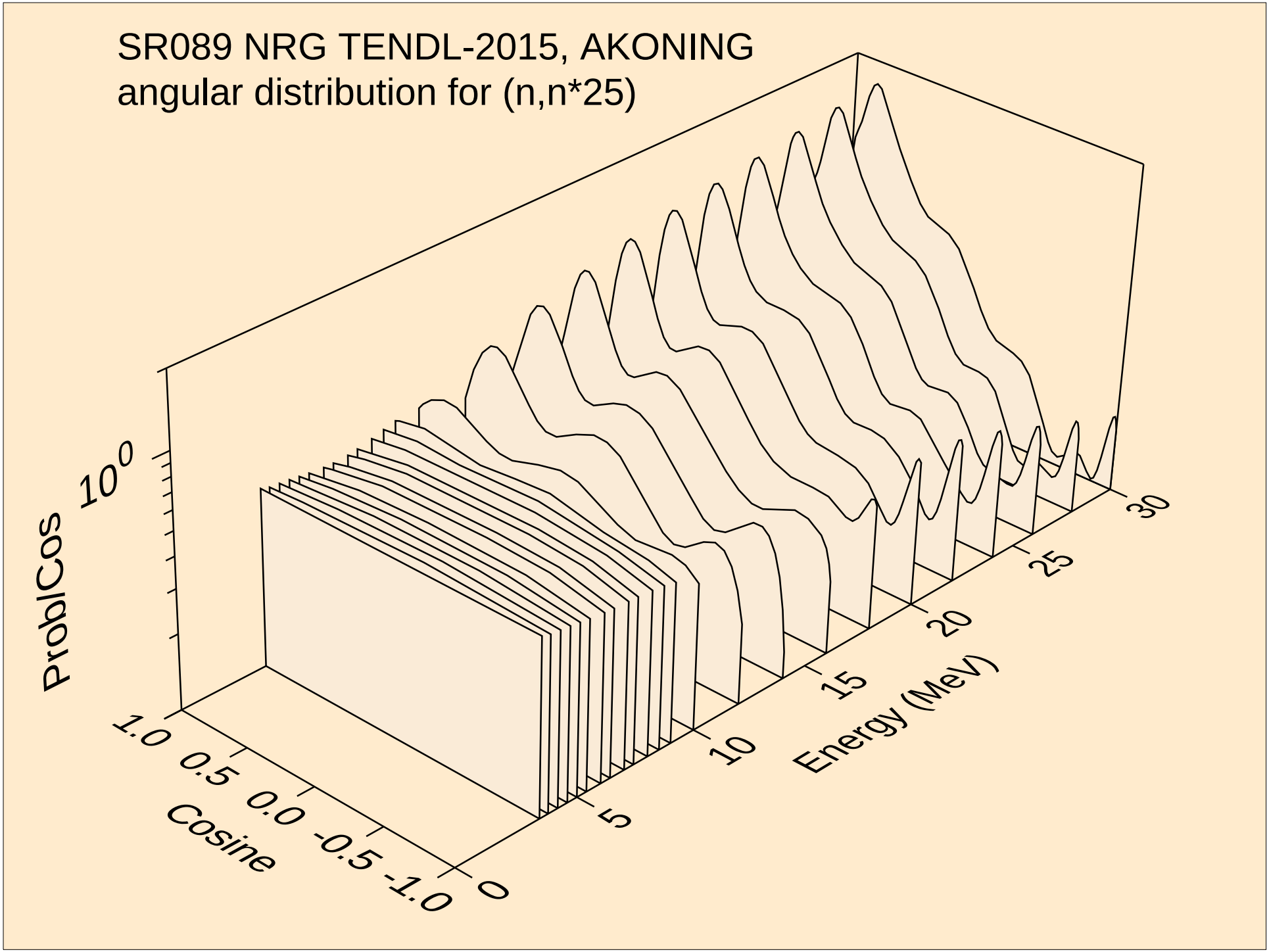

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*20)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

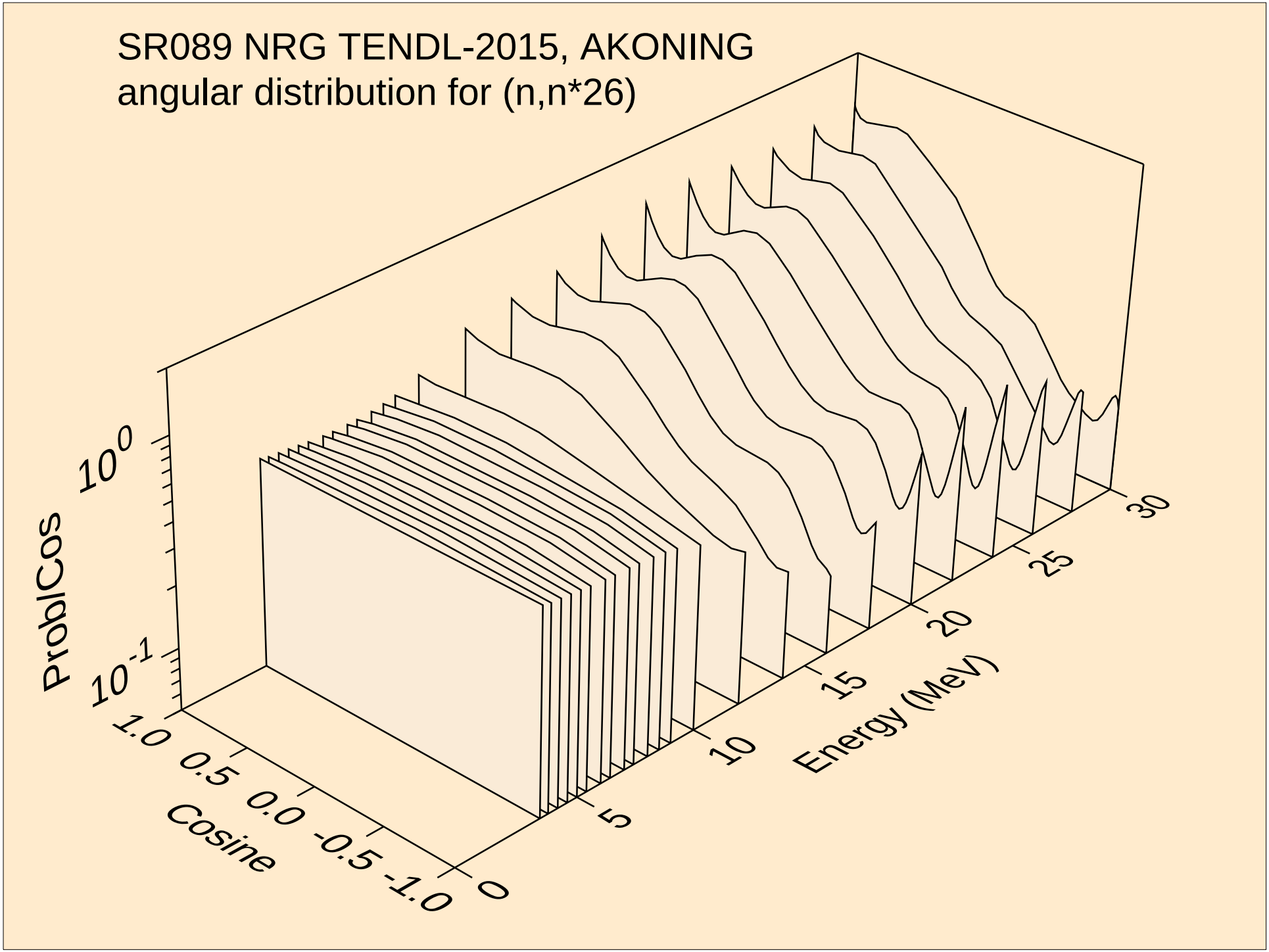

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*21)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

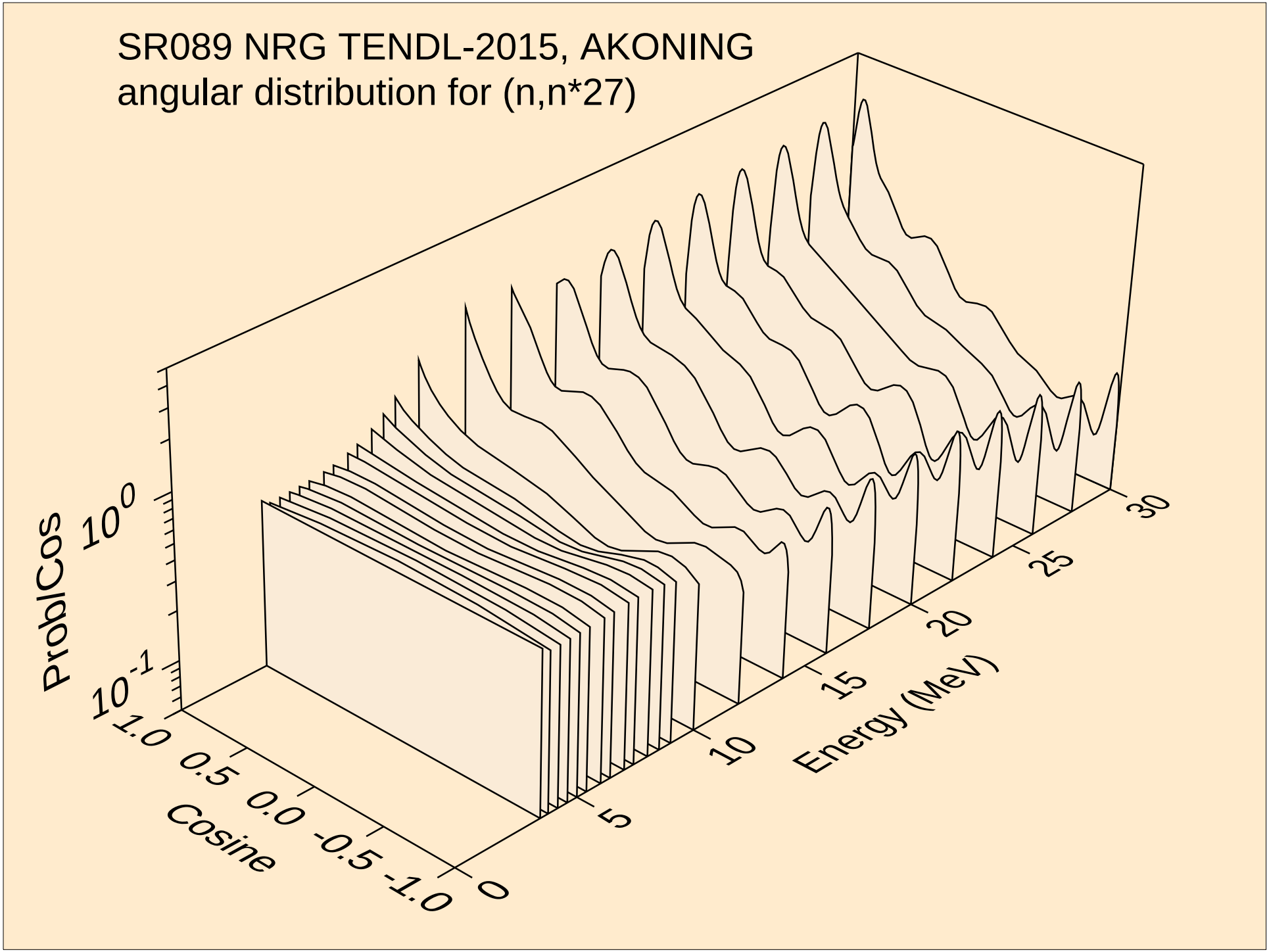

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*22)
Prob|Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

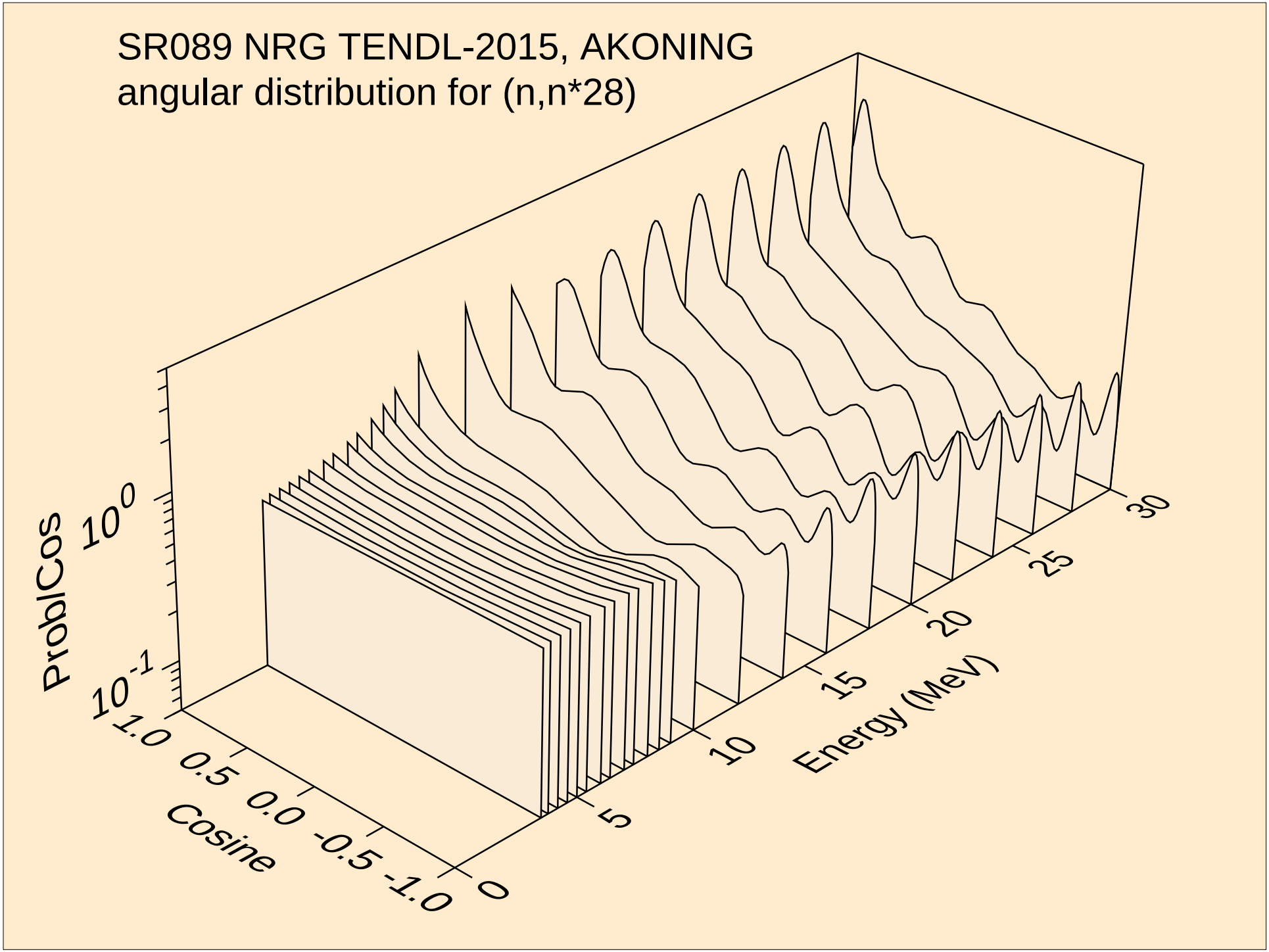

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*23)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

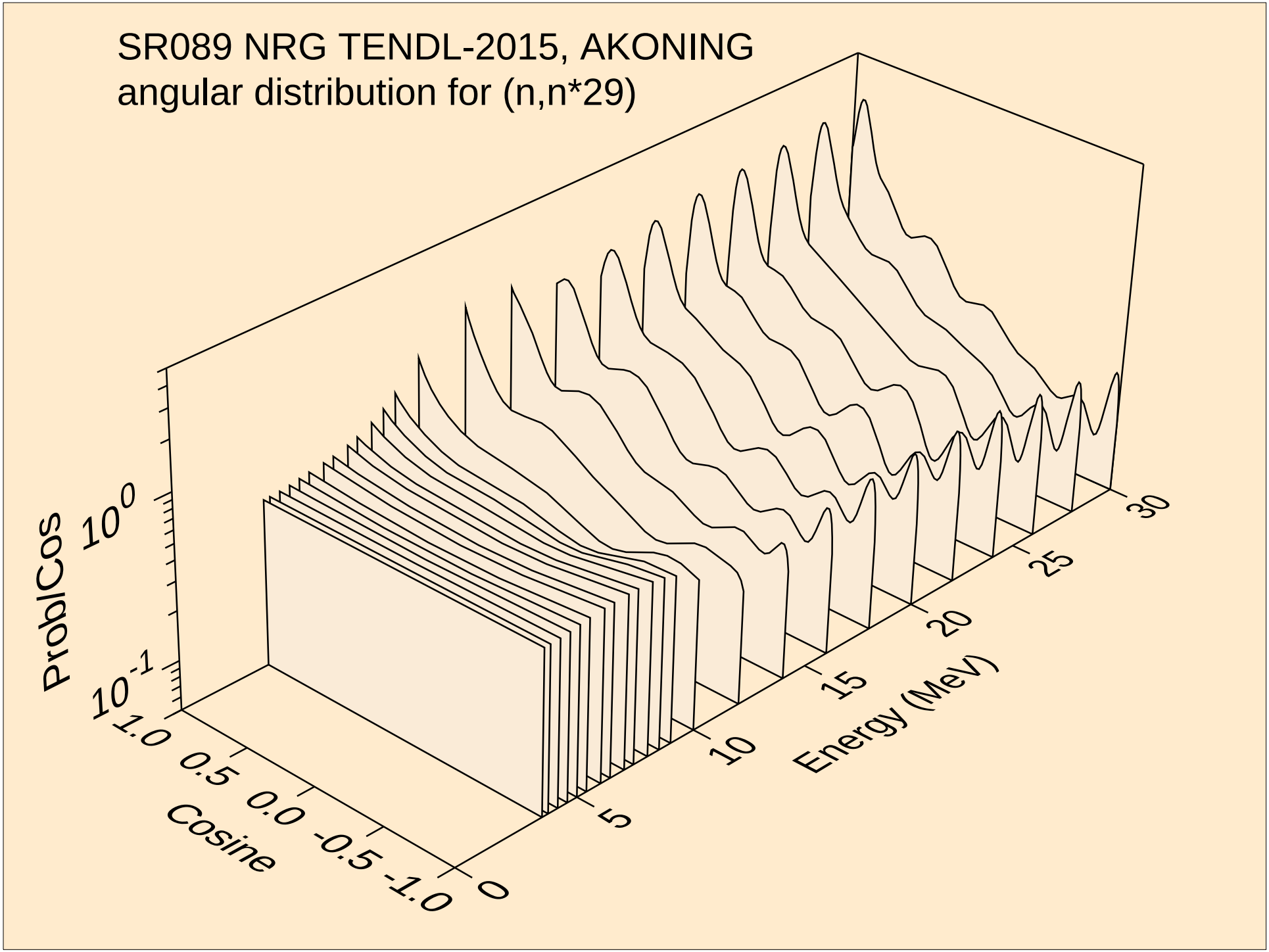

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*24)
$10^0$
Prob\Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

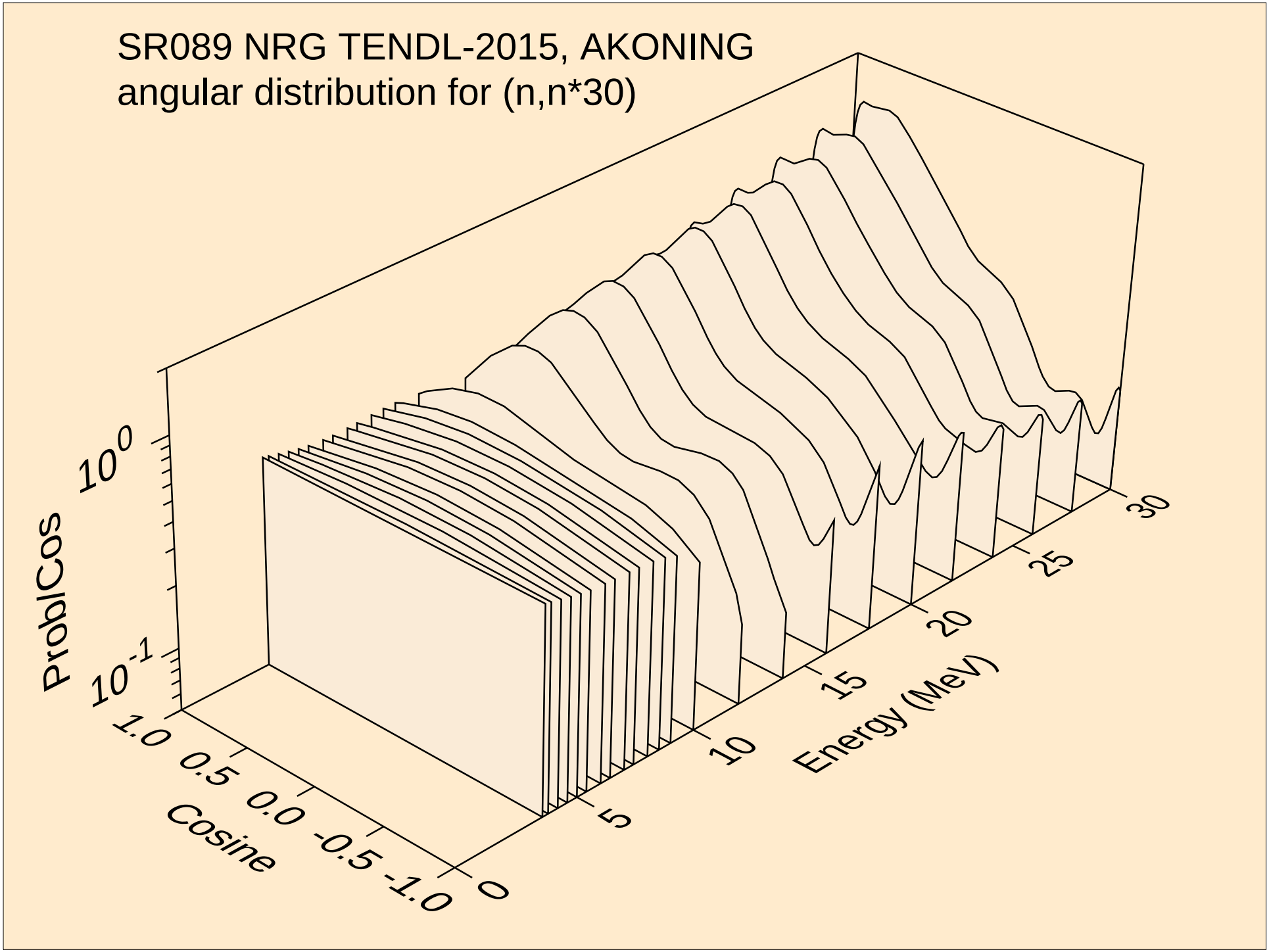

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*25)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

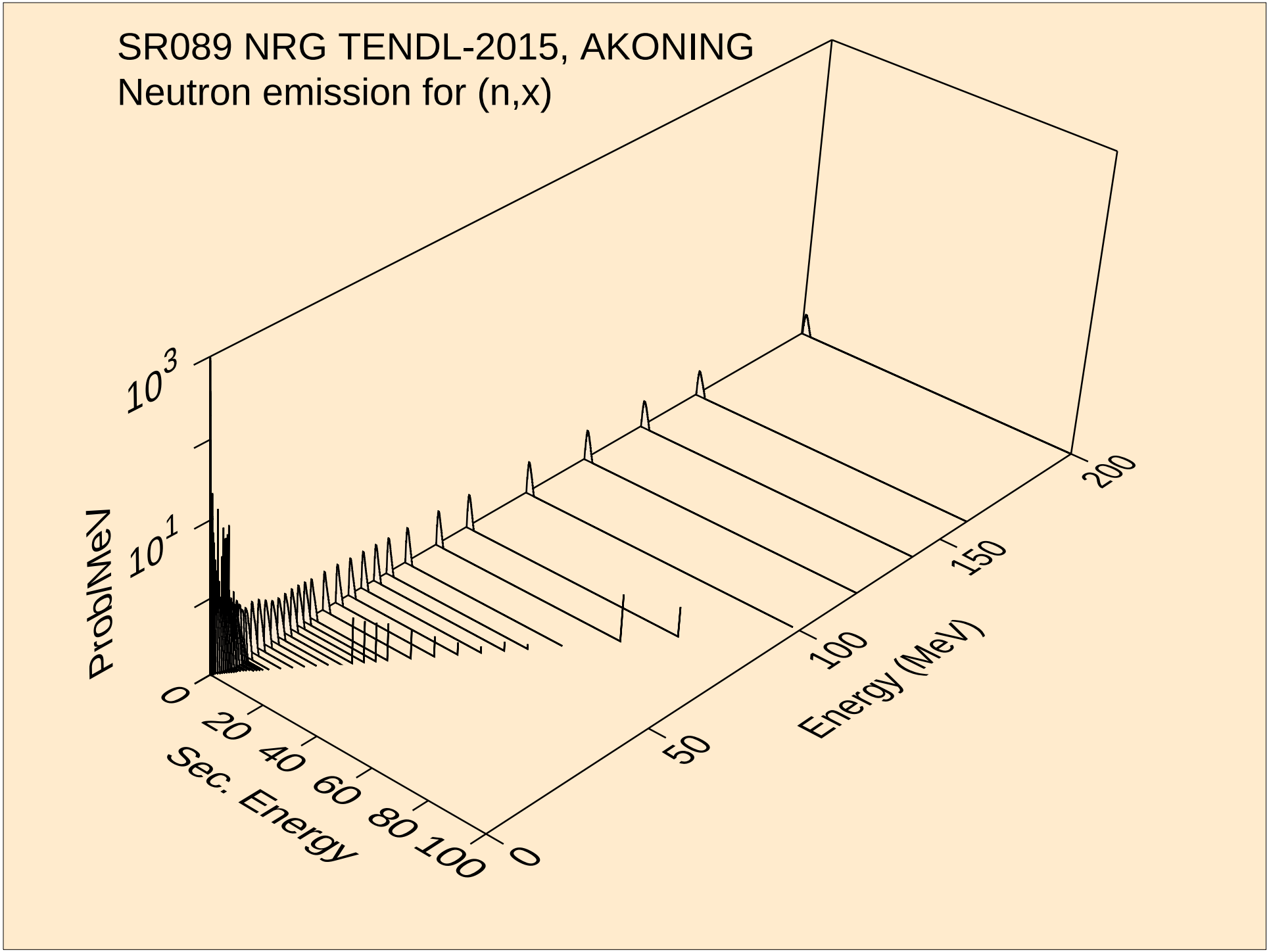

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*26)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

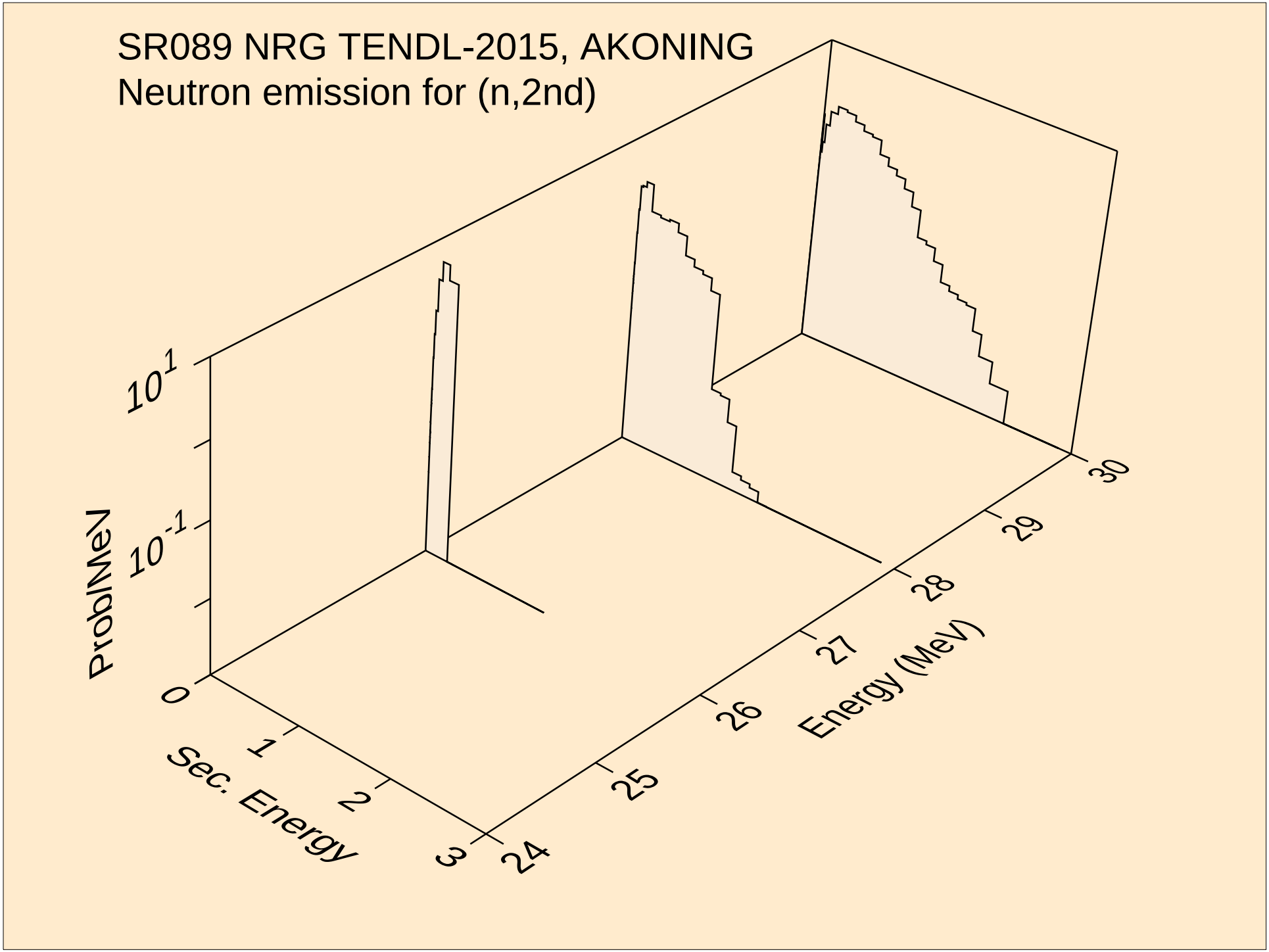

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*27)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

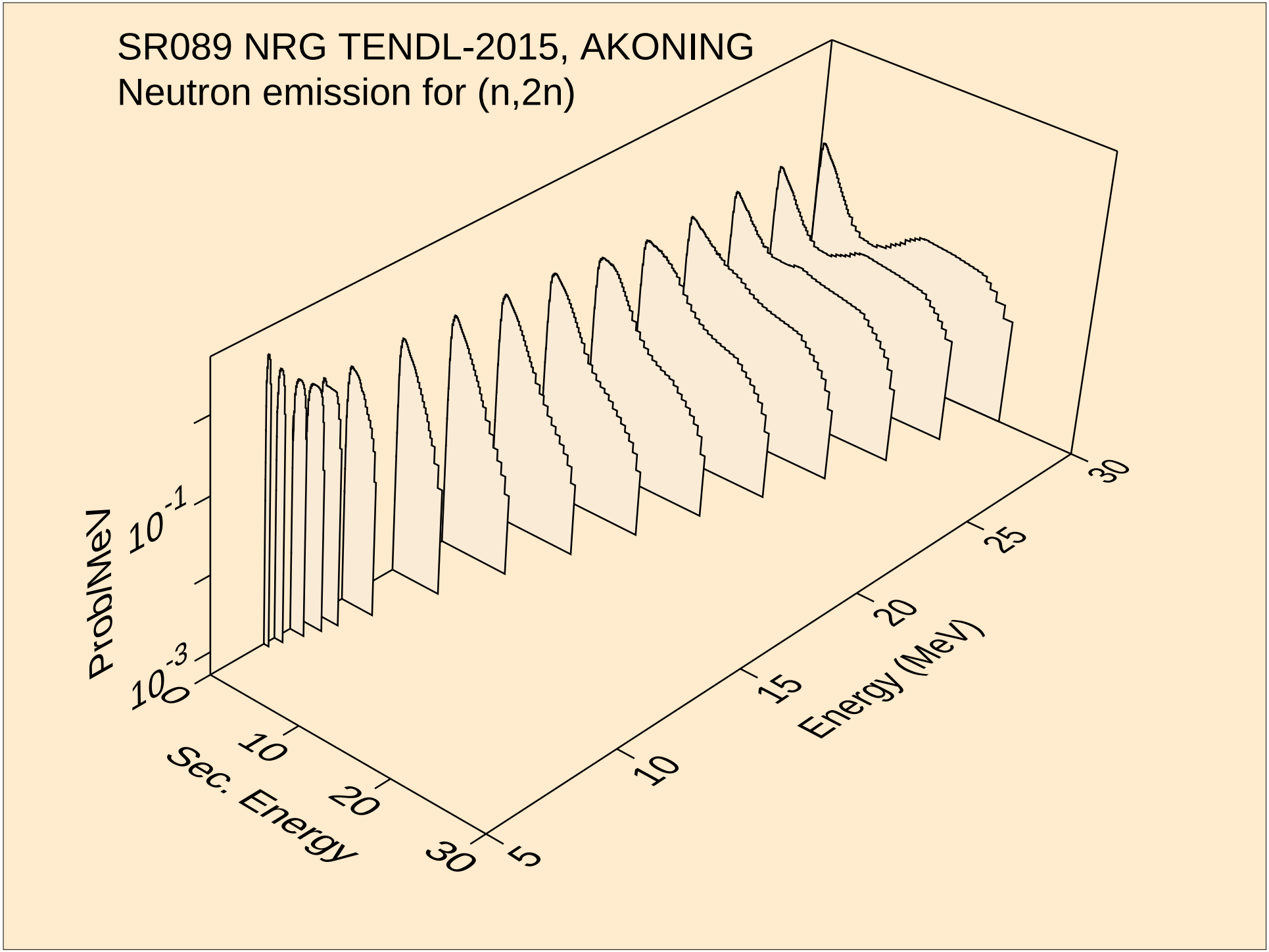

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*28)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

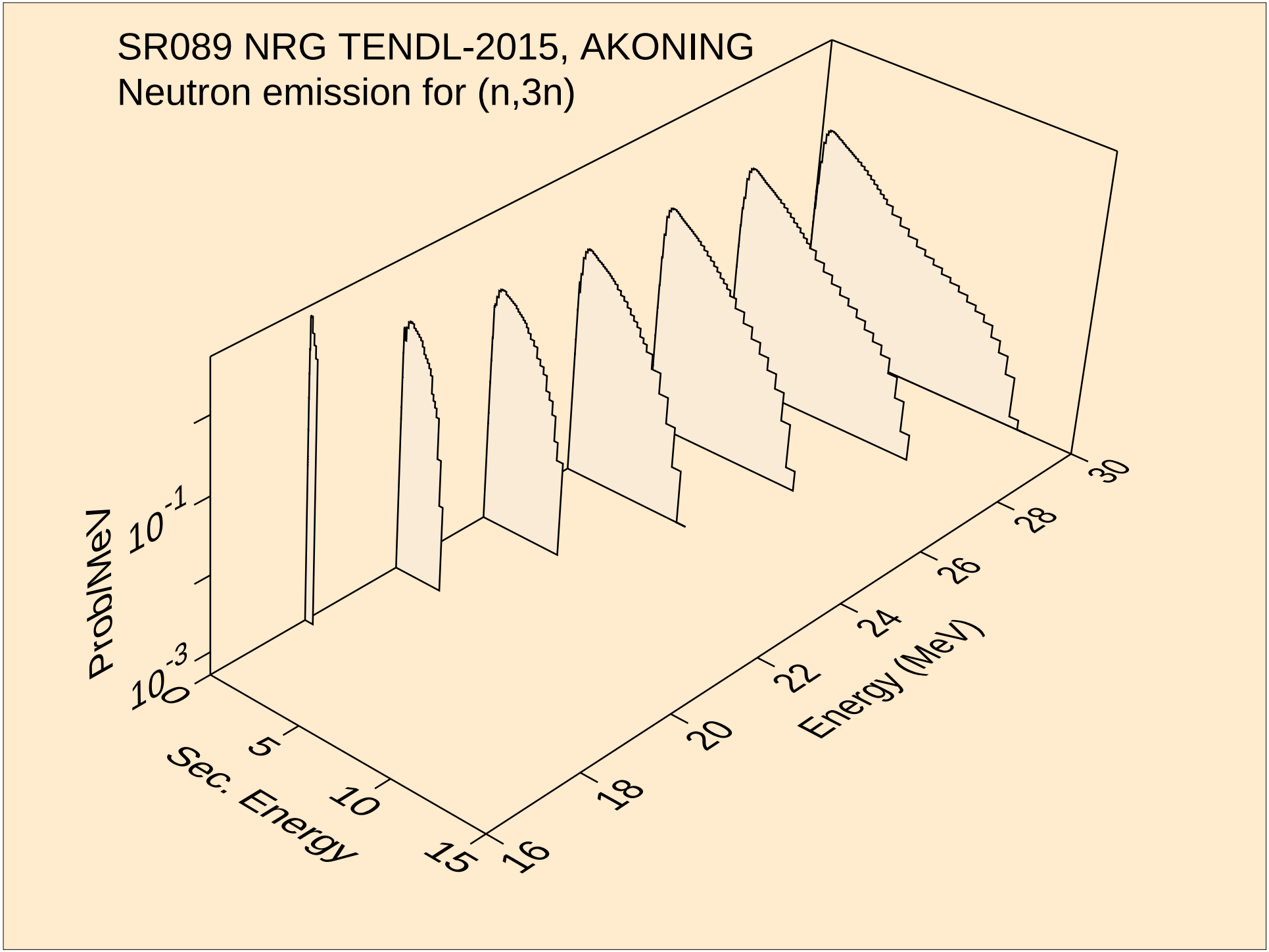

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*29)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

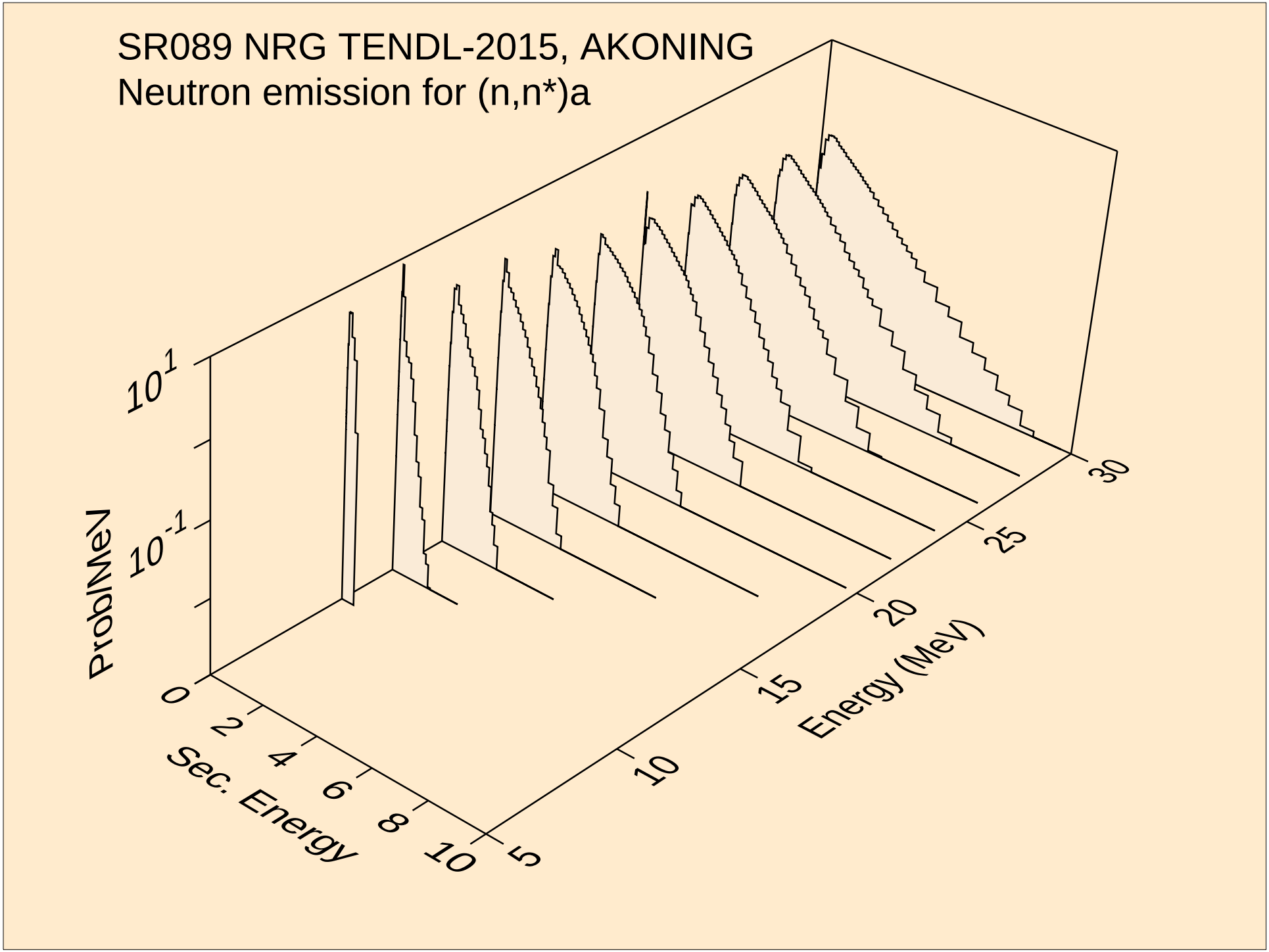

SR089 NRG TENDL-2015, AKONING
angular distribution for (n,n*30)
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
25
30
Energy (MeV)

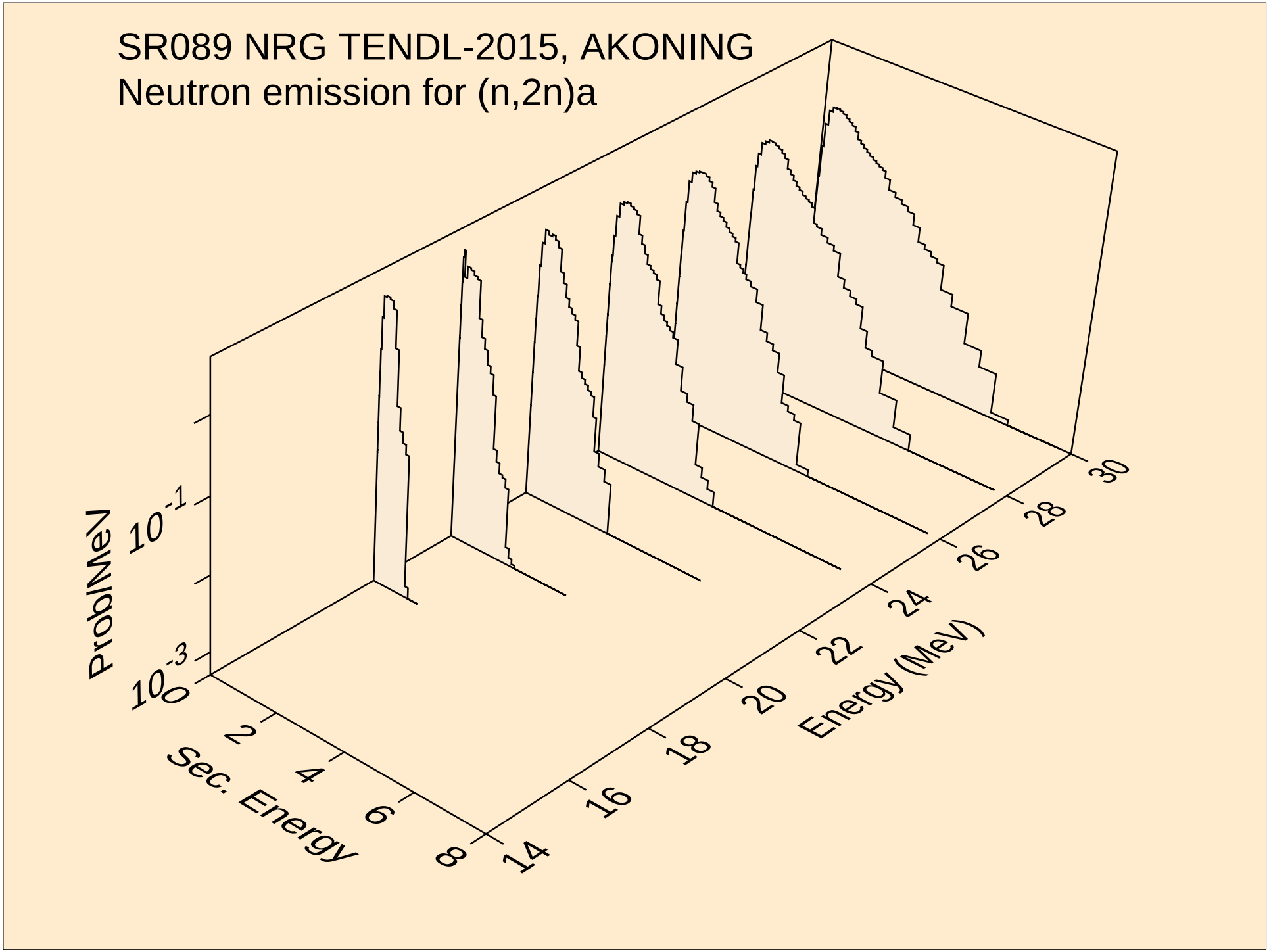

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,x)
Prob/MeV
$10^3$
$10^1$
0
20
40
60
80
100
Sec. Energy
0
50
100
150
200
Energy (MeV)

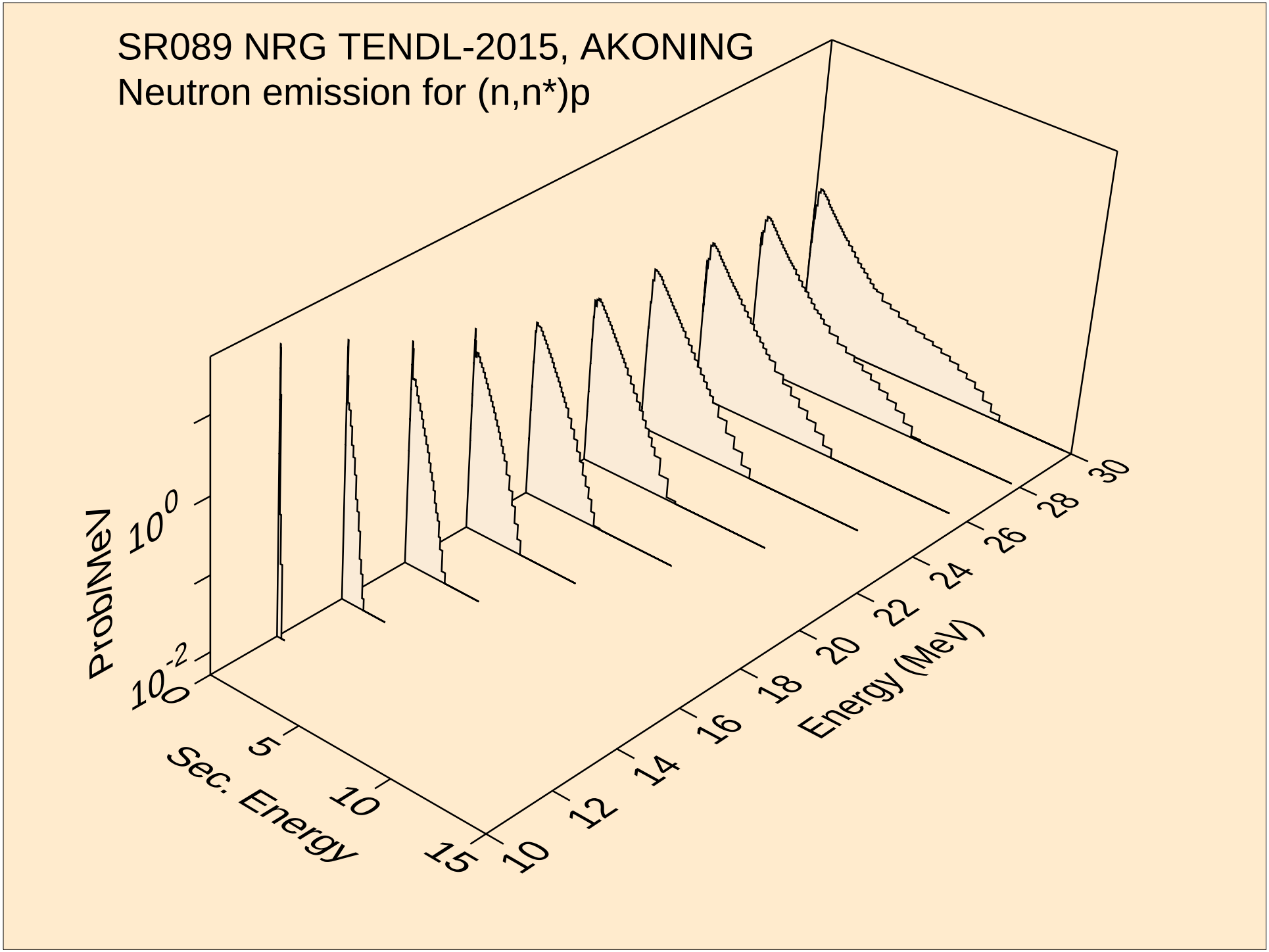

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,2nd)
Prob/MeV
$10^{1}$
$10^{-1}$
0
Sec. Energy
1
2
3
Energy (MeV)
24
25
26
27
28
29
30

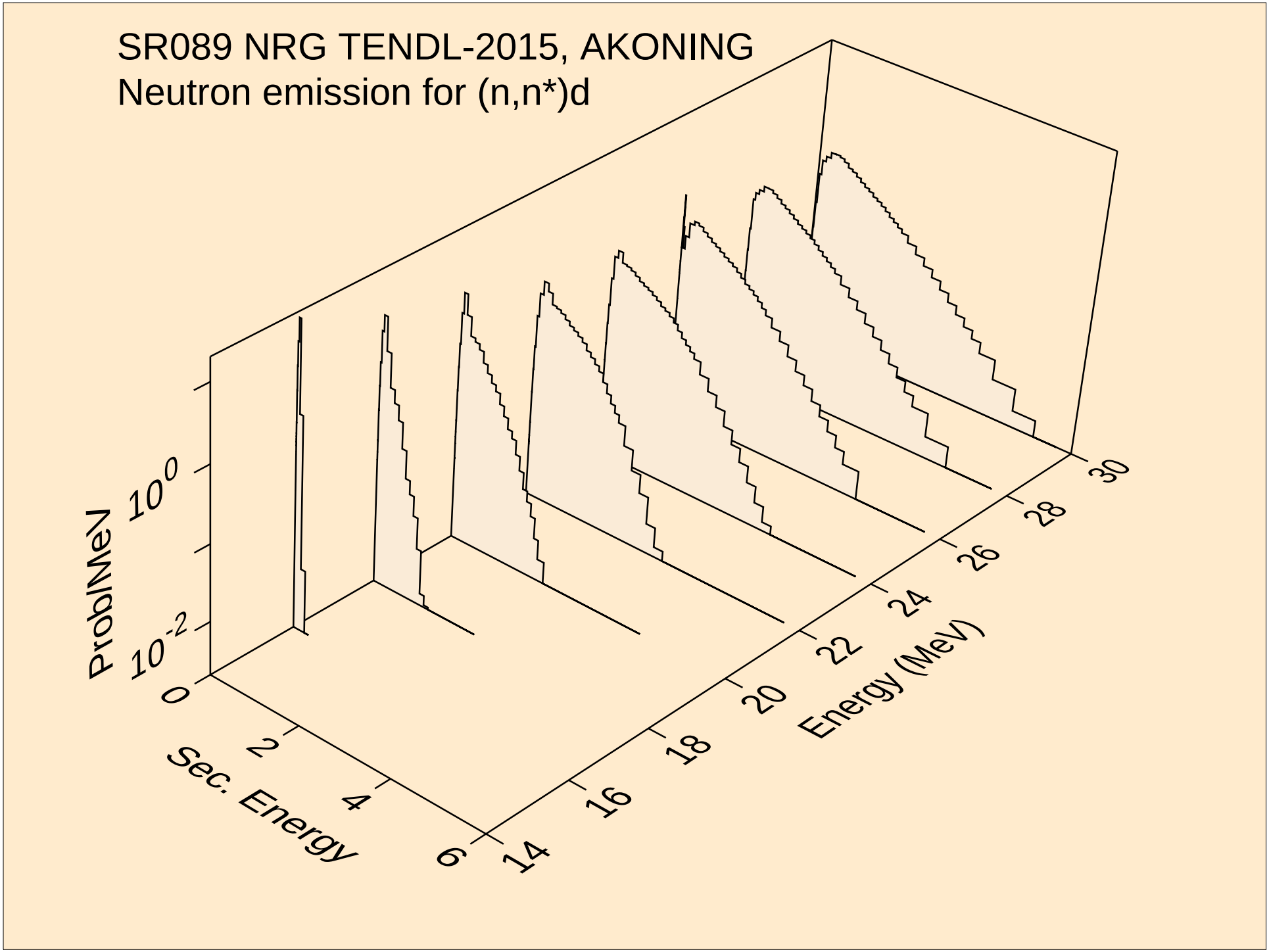

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,2n)
Prob/MeV
10-1
10-3
0
10
20
30
Sec. Energy
5
10
15
20
25
30
Energy (MeV)

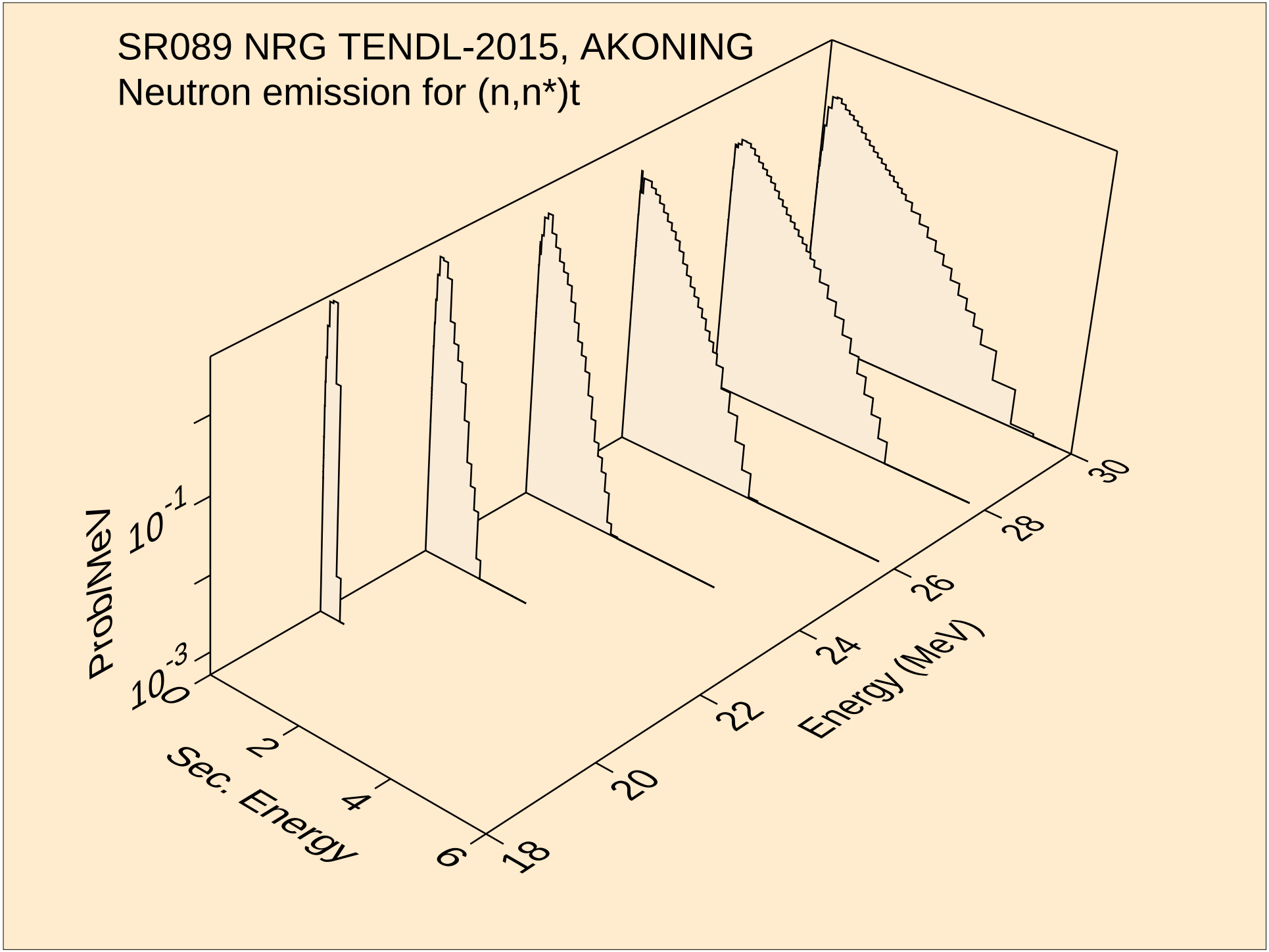

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,3n)
Prob/MeV
10-1
10-3
0
5
10
15
16
18
20
22
24
26
28
30
Sec. Energy
Energy (MeV)

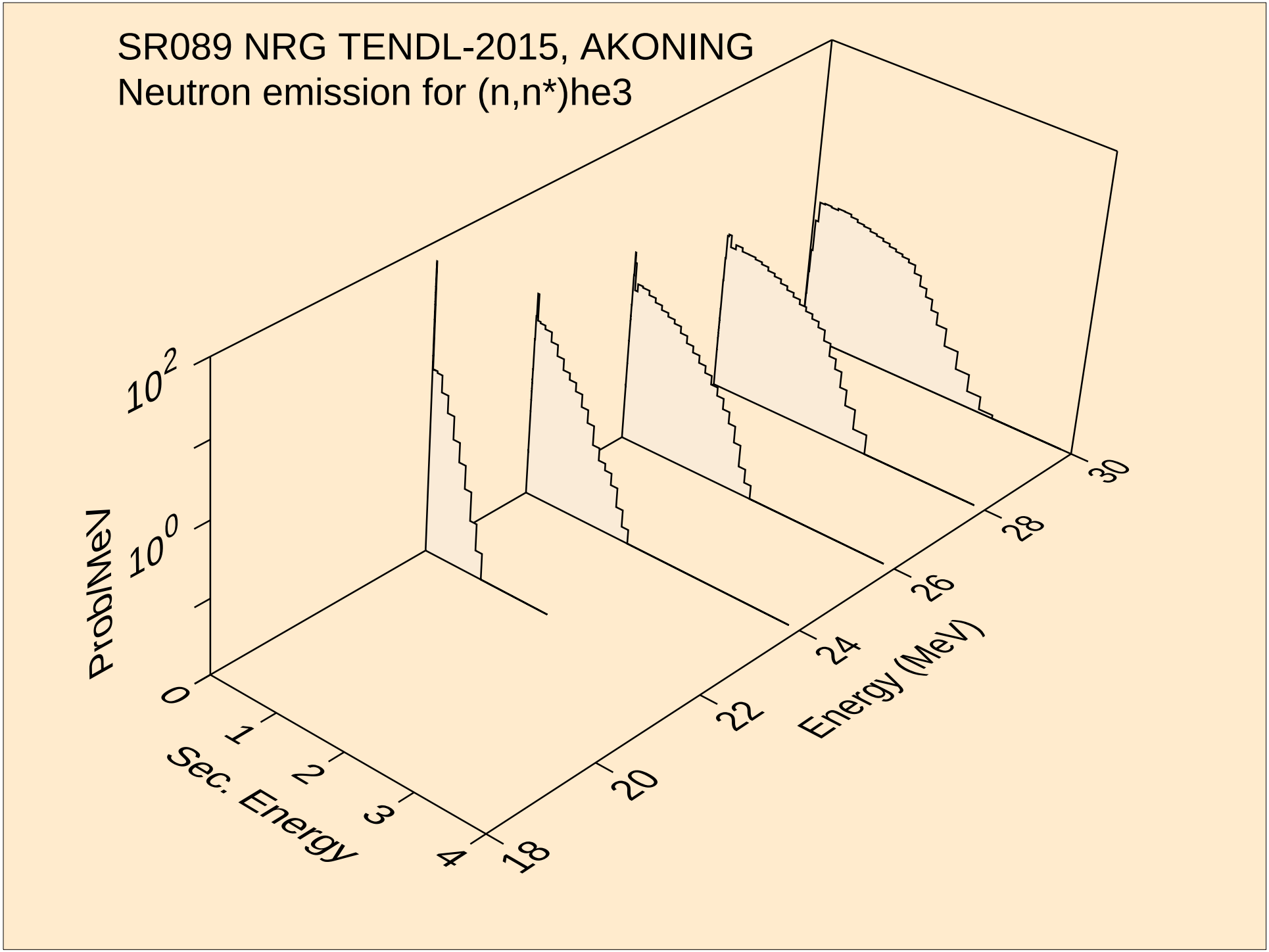

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*)a
Prob/MeV
$10^{1}$
$10^{-1}$
0
2
4
6
8
10
Sec. Energy
5
10
15
20
25
30
Energy (MeV)

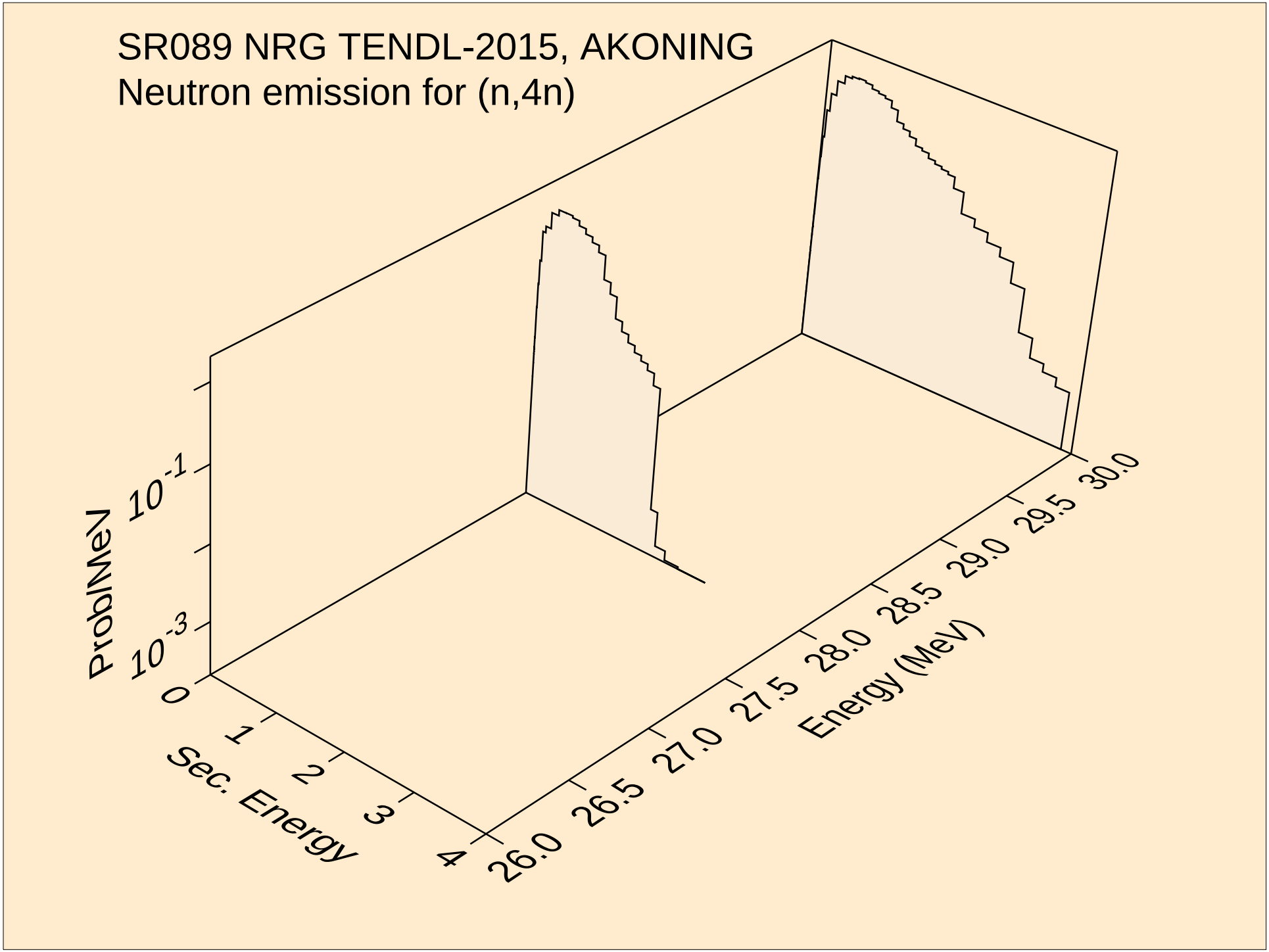

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,2n)a
Prob/MeV
10-1
10-3
0
2
4
6
8
Sec. Energy
14
16
18
20
22
24
26
28
30
Energy (MeV)

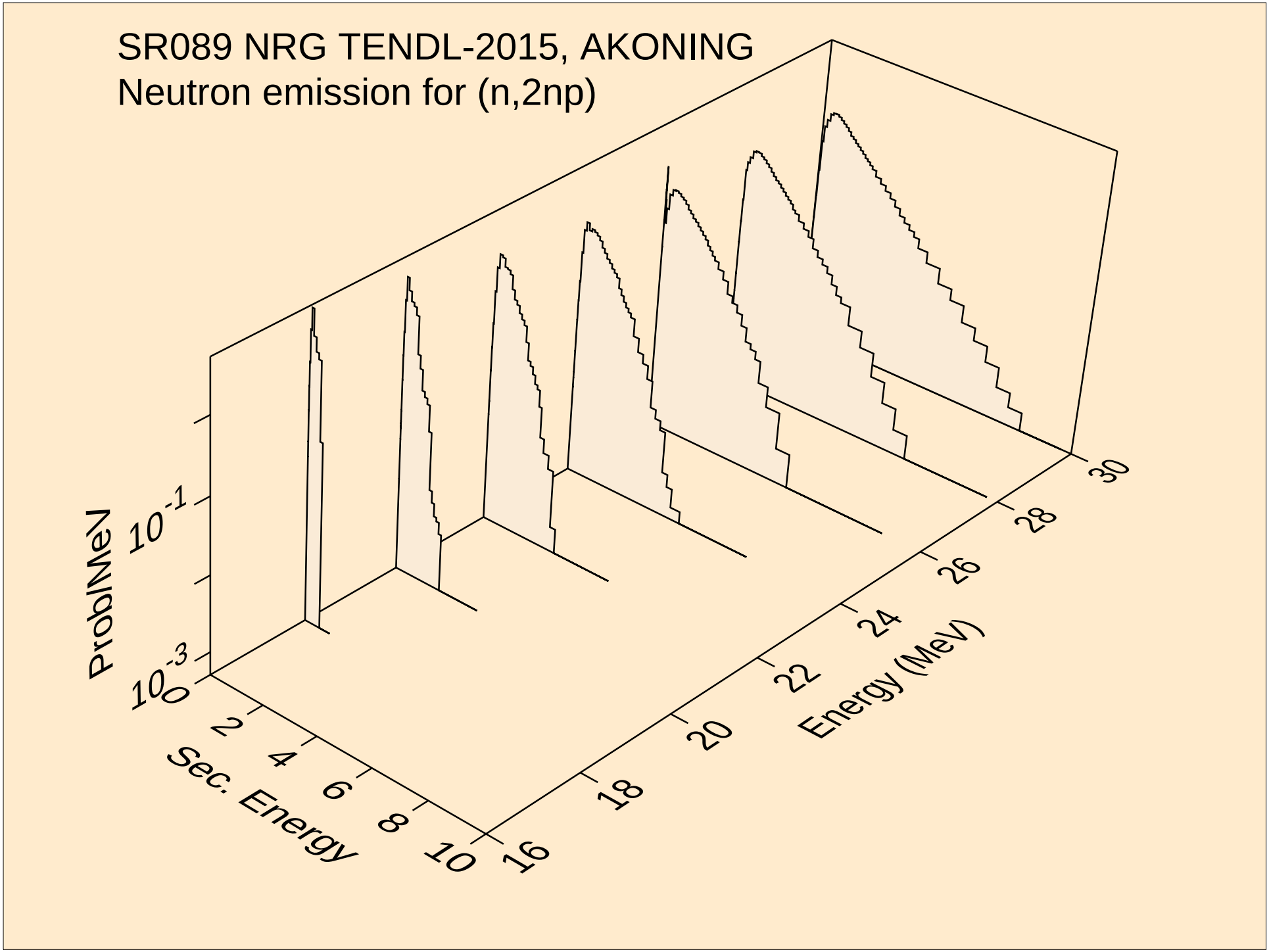

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*)p
Prob/MeV
$10^{0}$
$10^{-2}$
0
5
10
15
Sec. Energy
10
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

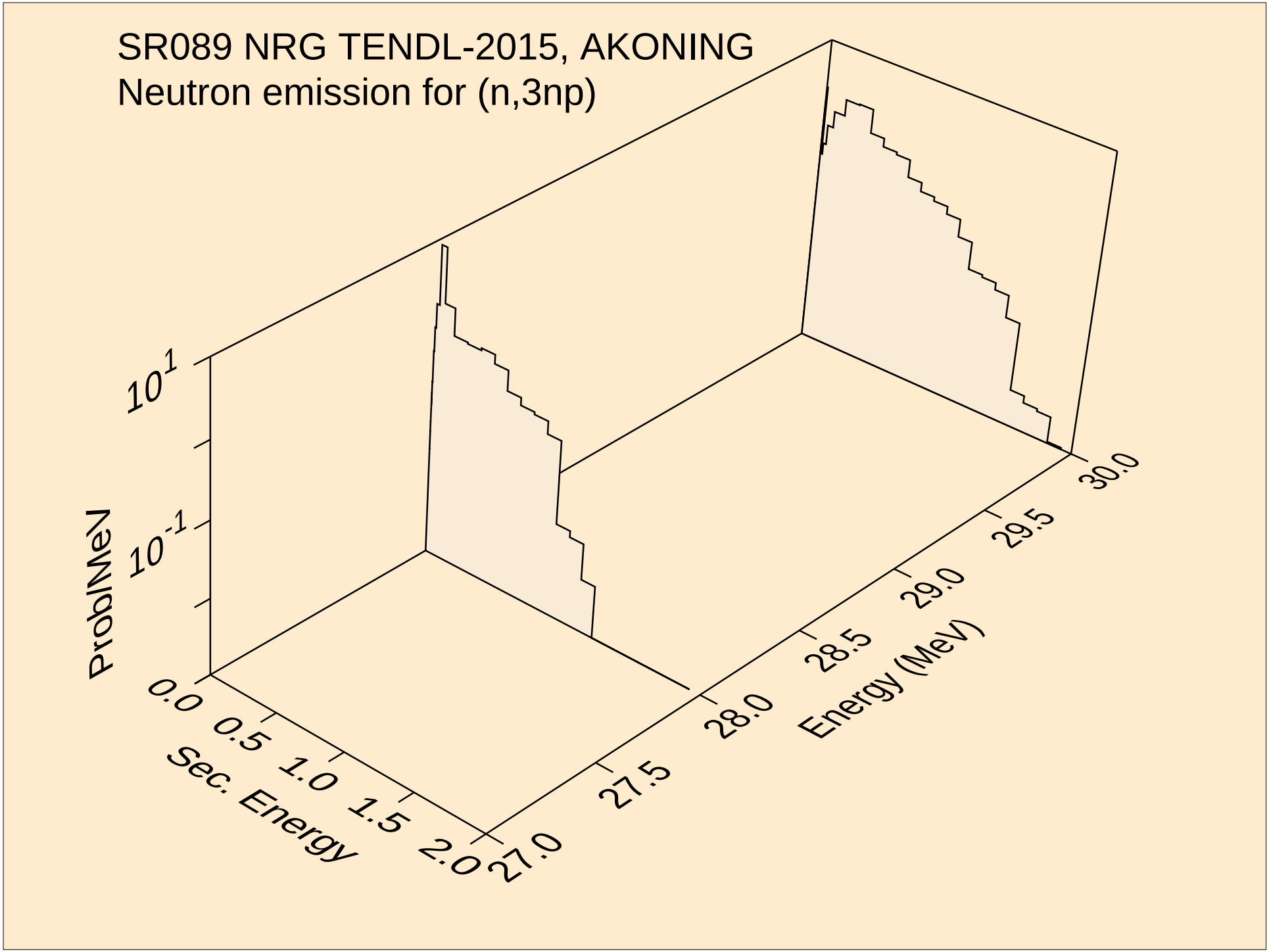

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*)d
Prob/MeV
10^0
10^-2
0
Sec. Energy
2
4
6
14
16
18
20
22
24
26
28
30
Energy (MeV)

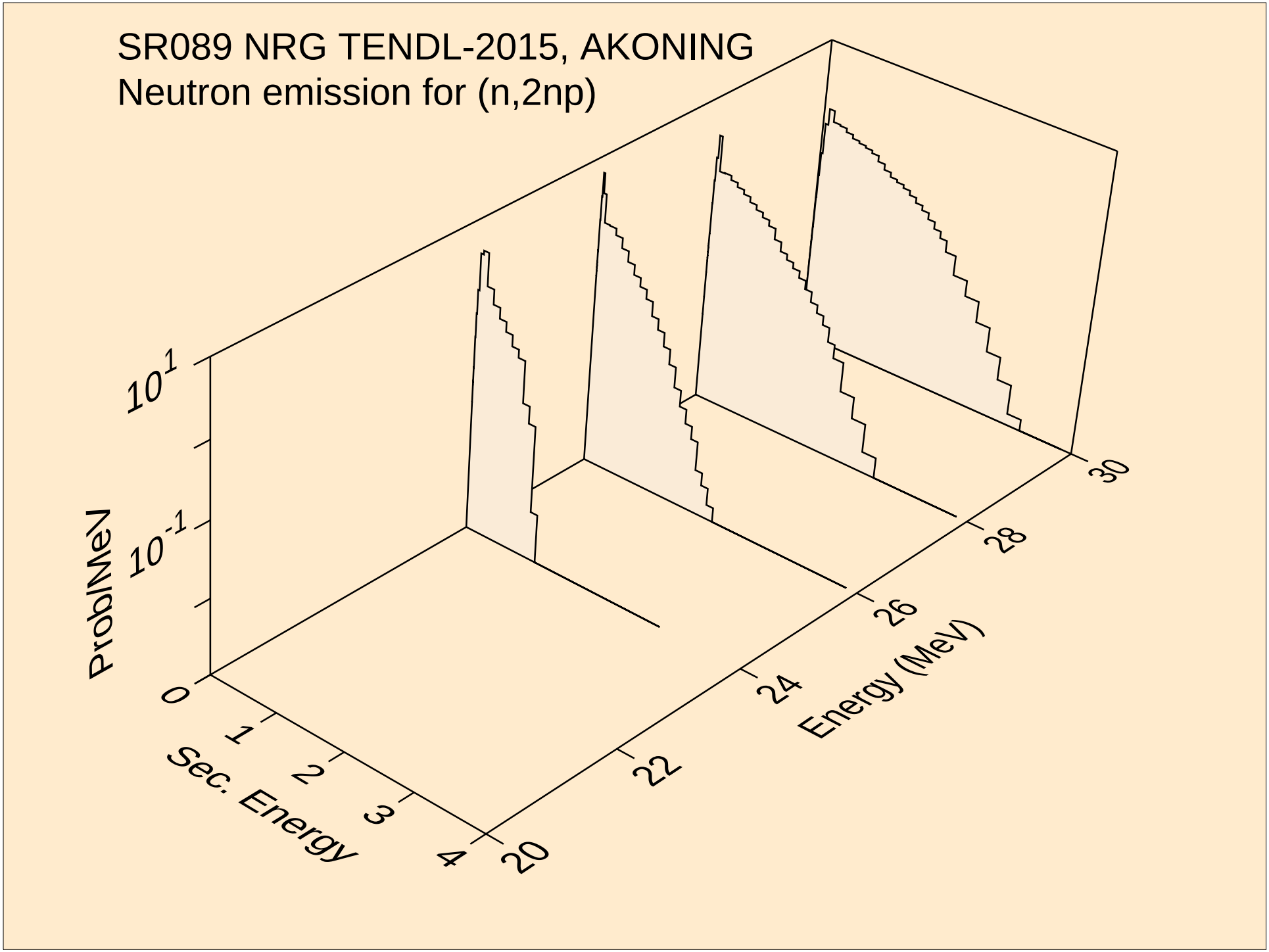

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*)t
Prob/MeV
10-1
10-3
0
2
4
6
Sec. Energy
18
20
22
24
26
28
30
Energy (MeV)

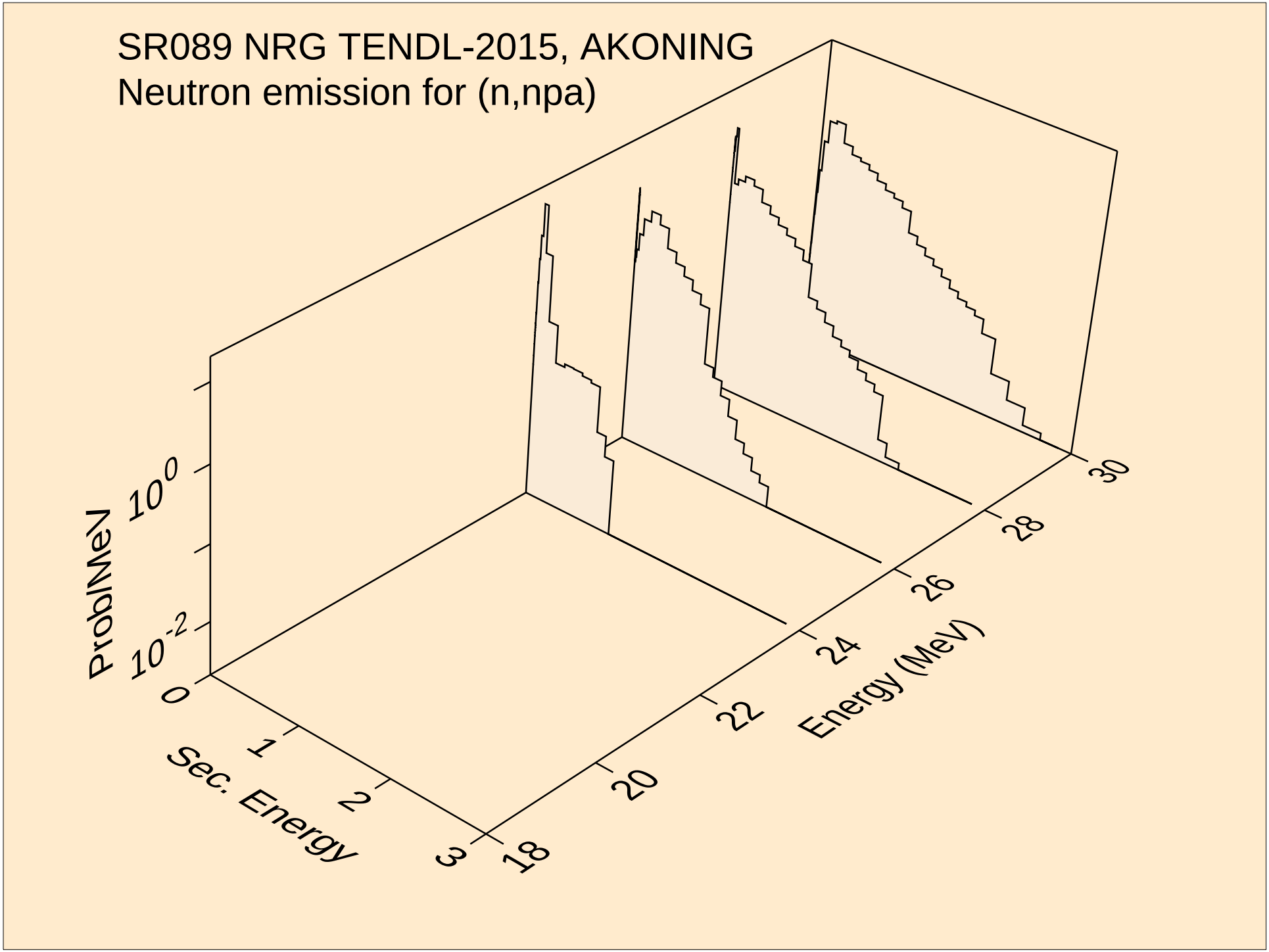

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*)he3
Prob/MeV
$10^2$
$10^0$
0
Sec. Energy
1
2
3
4
Energy (MeV)
18
20
22
24
26
28
30

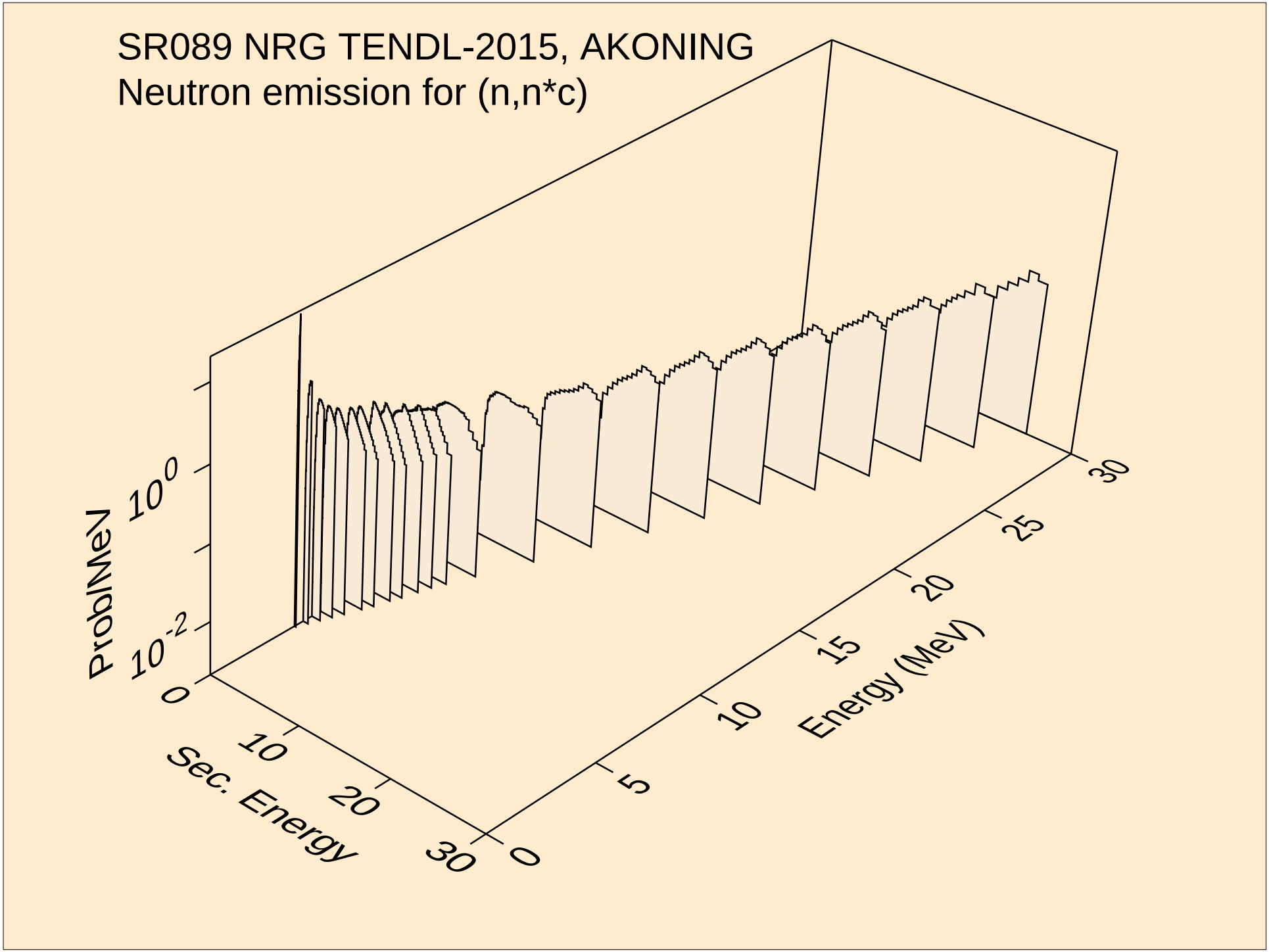

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,4n)
Prob/MeV
10-1
10-3
0
1
2
3
4
Sec. Energy
26.0
26.5
27.0
27.5
28.0
28.5
29.0
29.5
30.0
Energy (MeV)

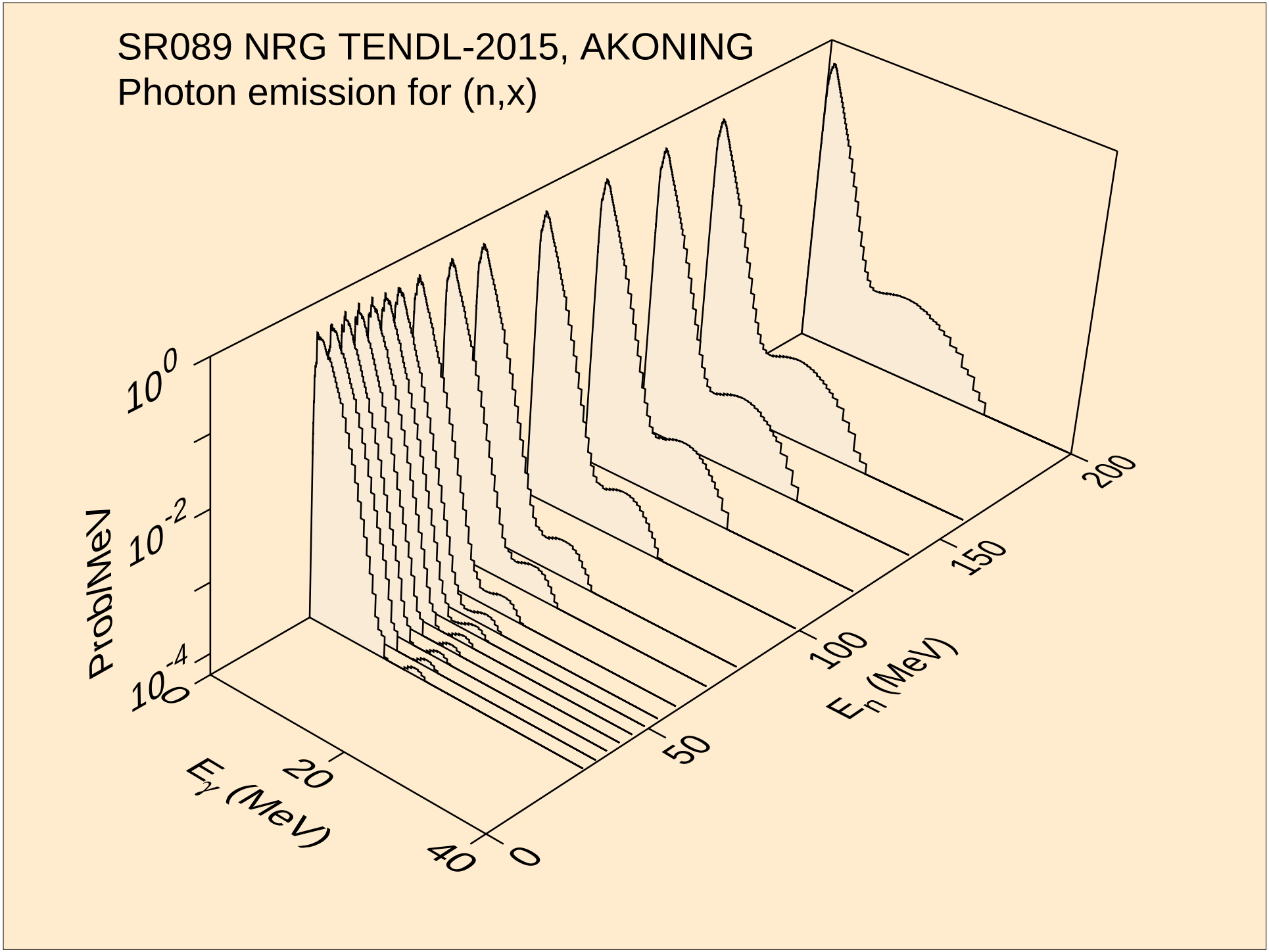

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,2np)
Prob/MeV
10-1
10-3
0
2
4
6
8
10
Sec. Energy
16
18
20
22
24
26
28
30
Energy (MeV)

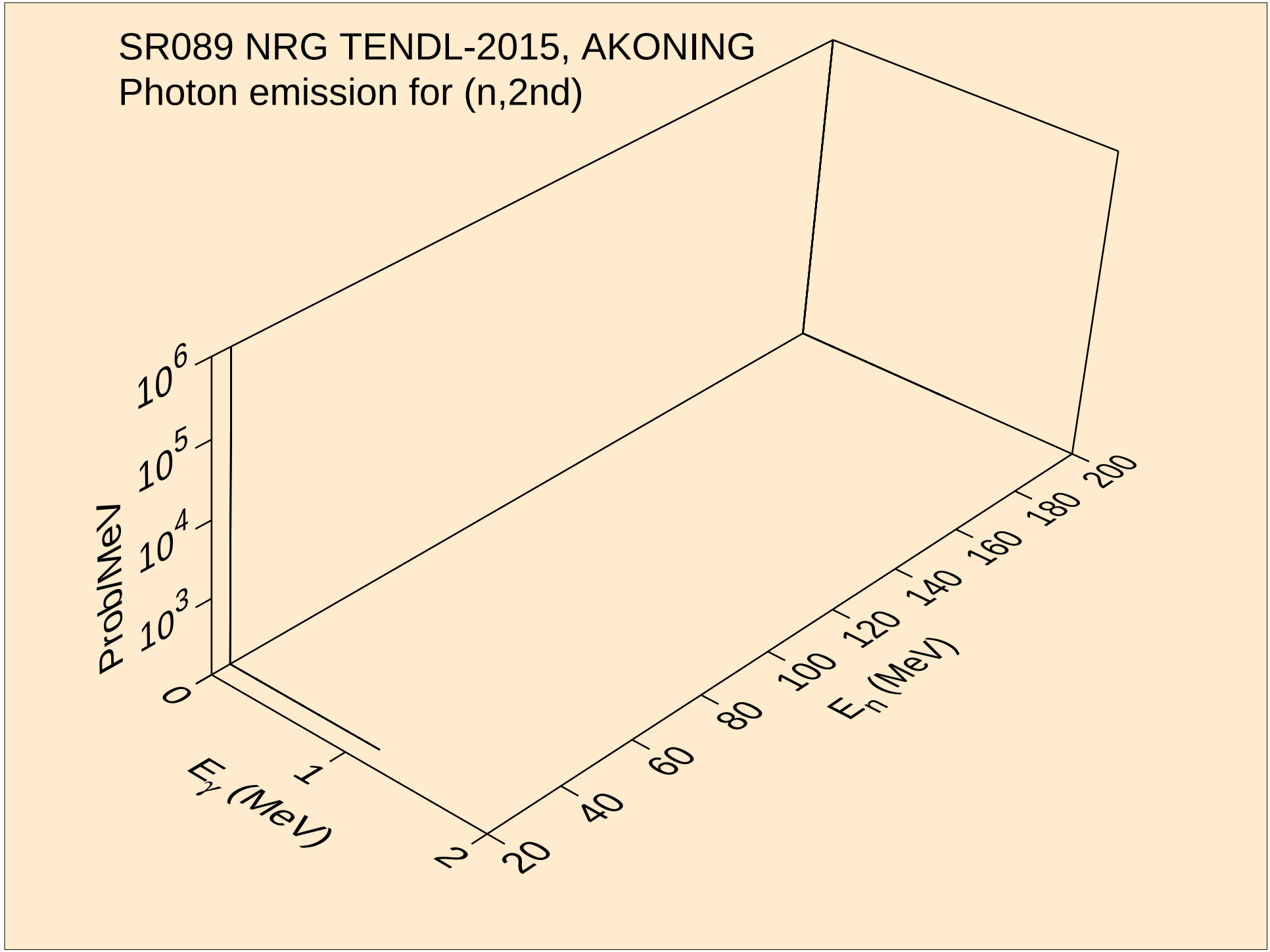

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,3np)
Prob/MeV
$10^{1}$
$10^{-1}$
0.0
0.5
1.0
1.5
2.0
Sec. Energy
27.0
27.5
28.0
28.5
29.0
29.5
30.0
Energy (MeV)

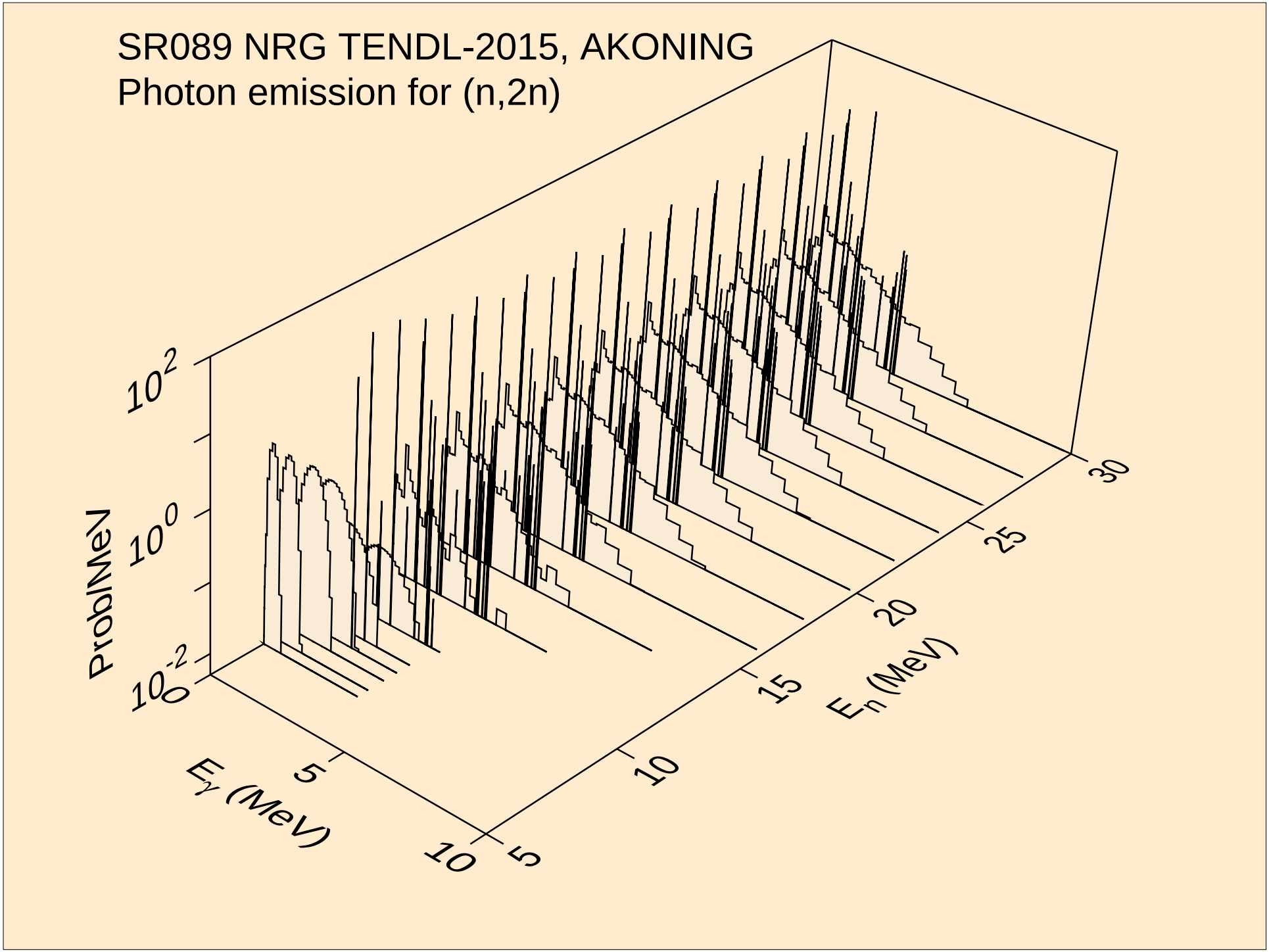

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,2np)
Prob/MeV
$10^{1}$
$10^{-1}$
0
1
2
3
4
Sec. Energy
20
22
24
26
28
30
Energy (MeV)

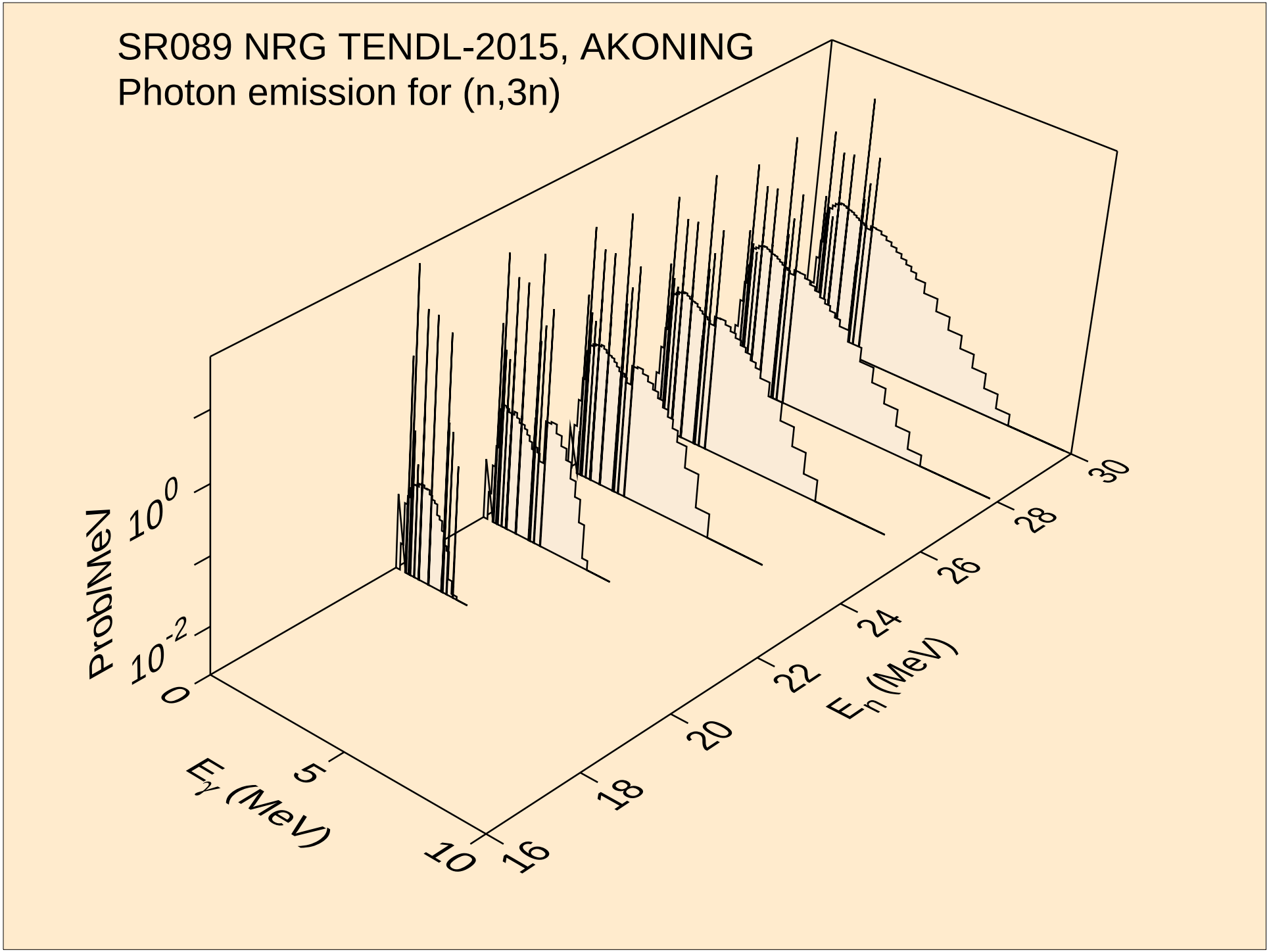

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,npa)
Prob/MeV
$10^{0}$
$10^{-2}$
0
Sec. Energy
1
2
3
Energy (MeV)
18
20
22
24
26
28
30

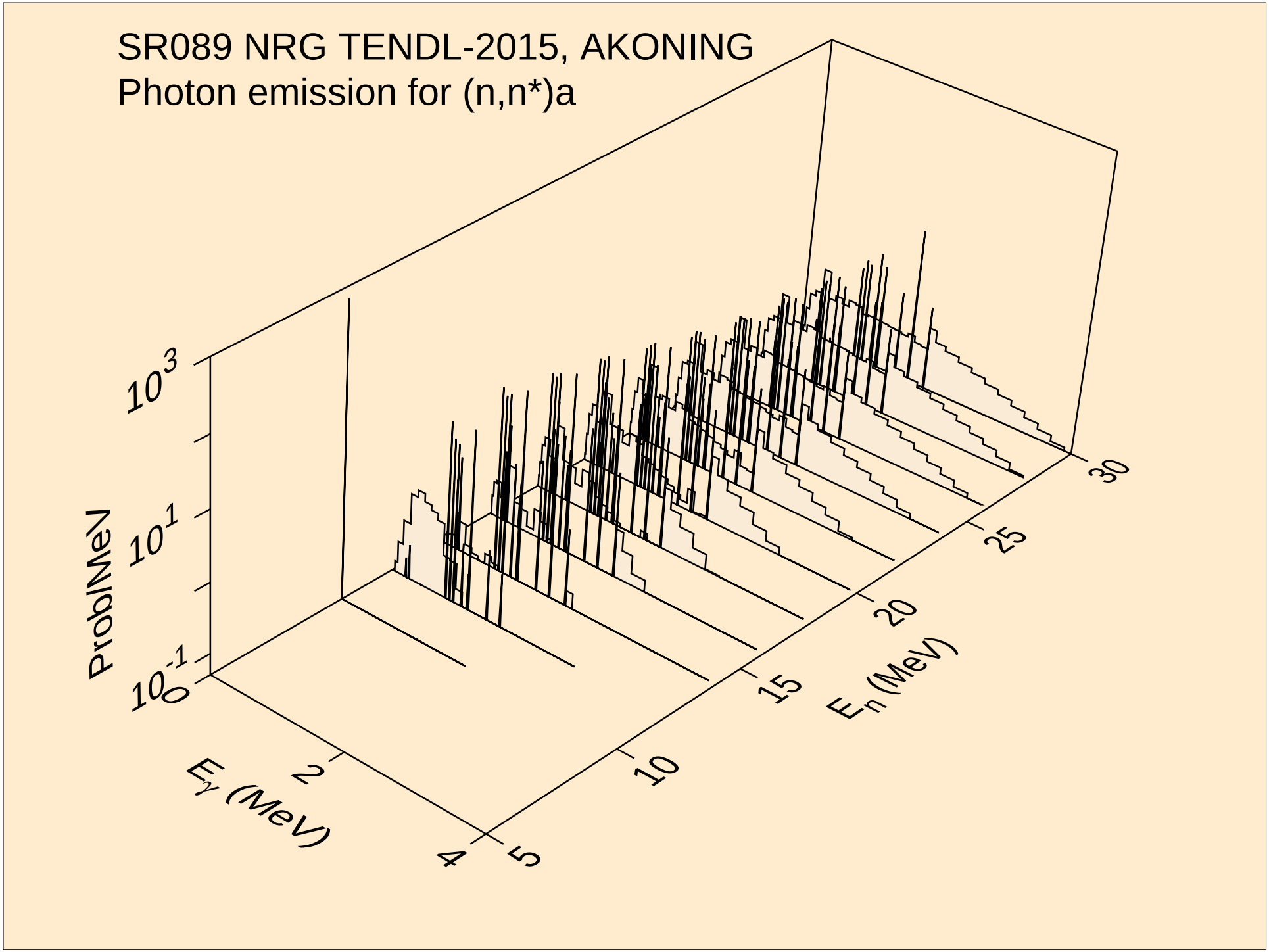

SR089 NRG TENDL-2015, AKONING
Neutron emission for (n,n*c)
Prob/MeV
$10^{0}$
$10^{-2}$
0
10
20
30
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)

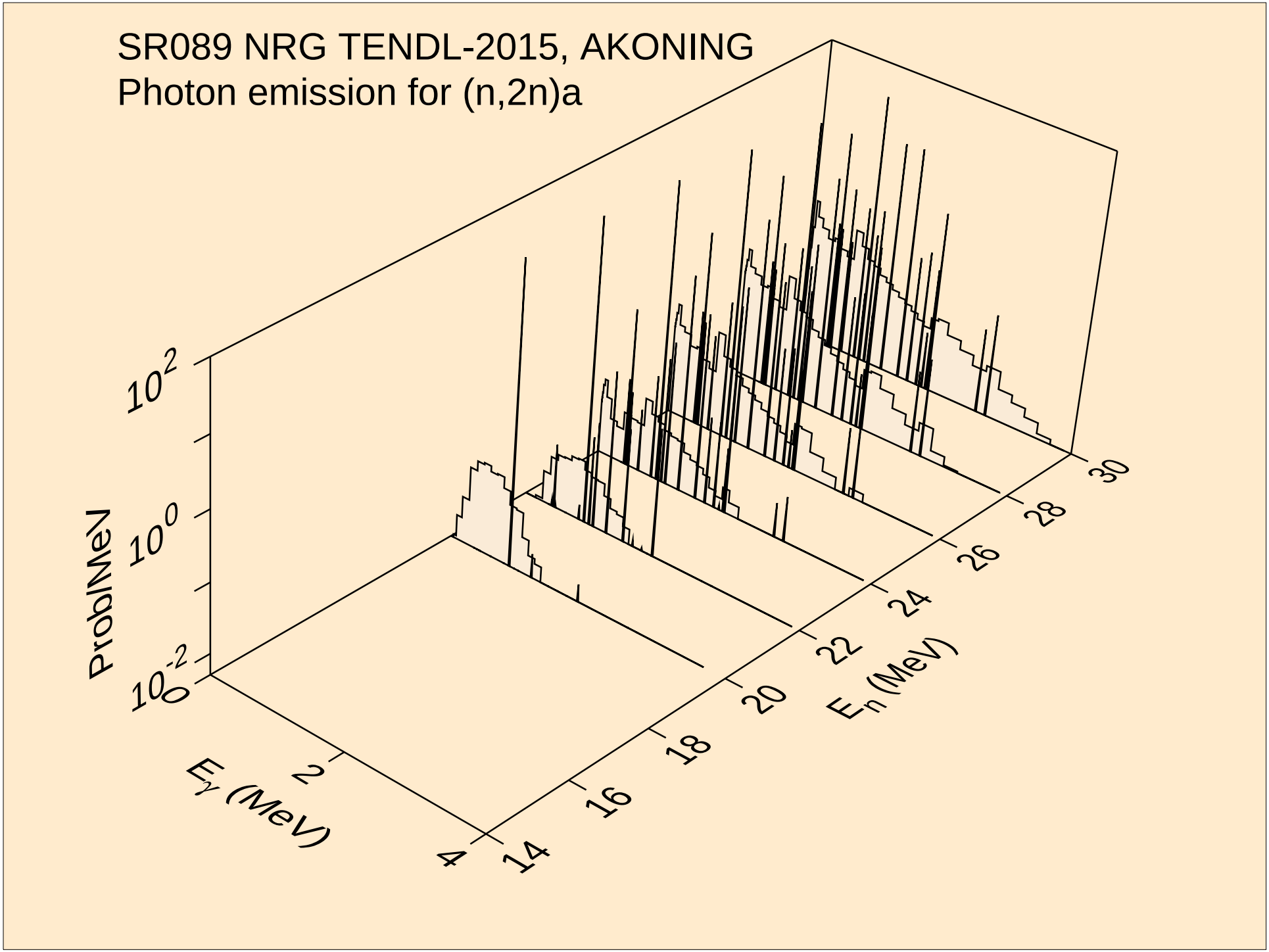

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,x)
Prob/MeV
$10^{0}$
$10^{-2}$
$10^{-4}$
$E_\gamma$ (MeV)
0
20
40
$E_n$ (MeV)
50
100
150
200

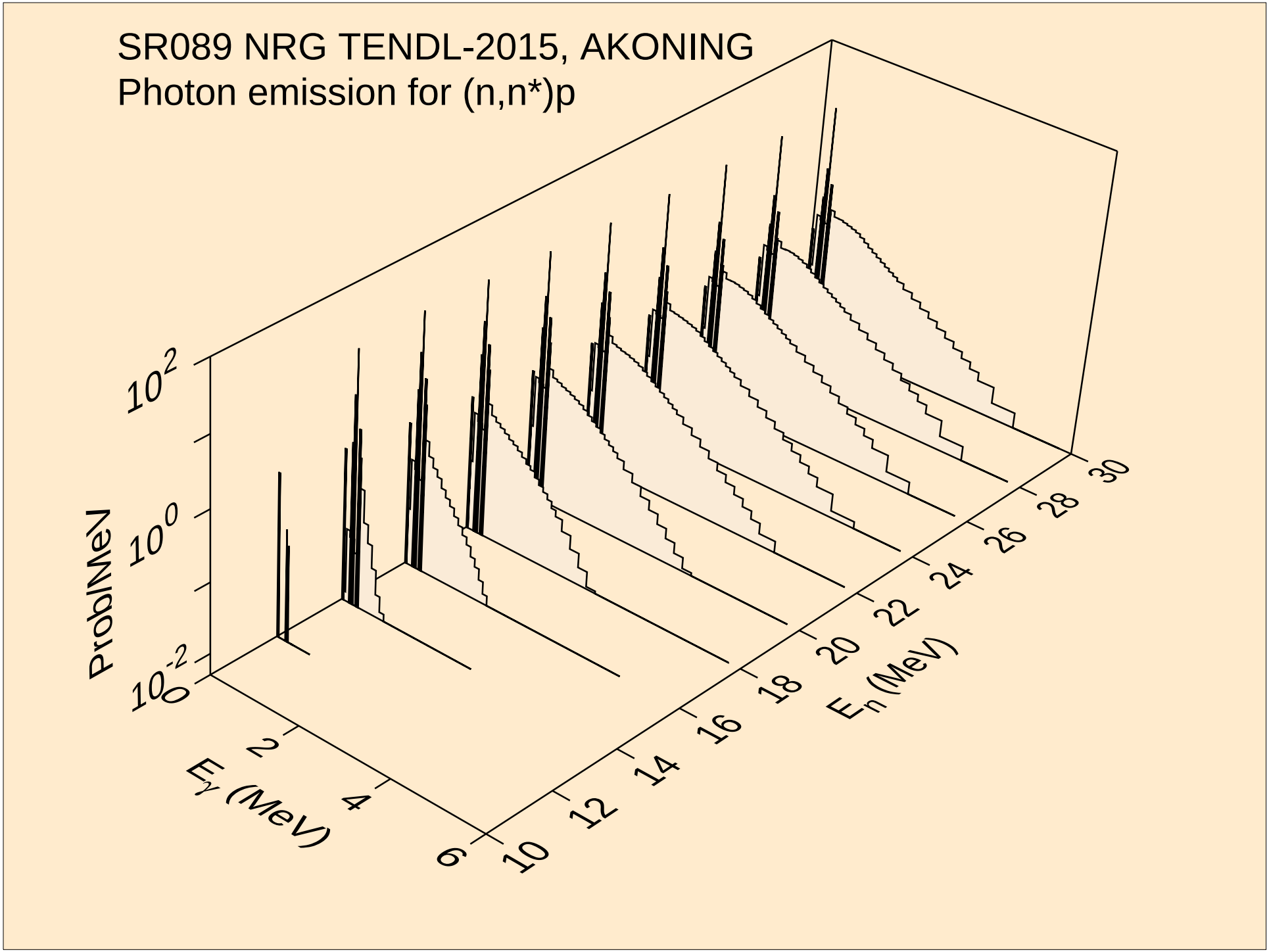

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2nd)
Prob/MeV
$10^6$
$10^5$
$10^4$
$10^3$
0
$E_\gamma$ (MeV)
1
2
20
40
60
80
100
120
140
160
180
200
$E_n$ (MeV)

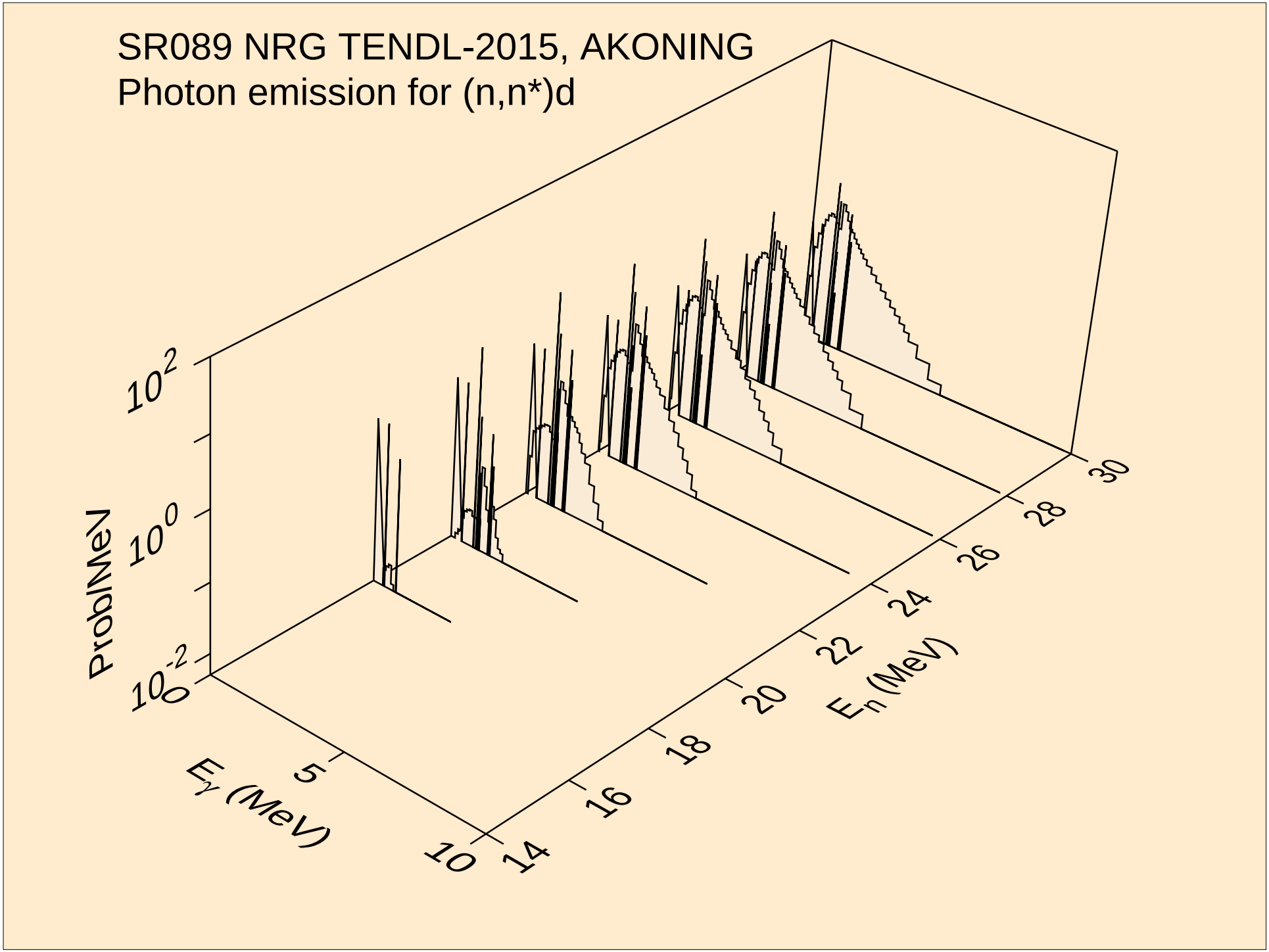

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2n)
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
5
10
$E_\gamma$ (MeV)
5
10
15
20
25
30
$E_n$ (MeV)

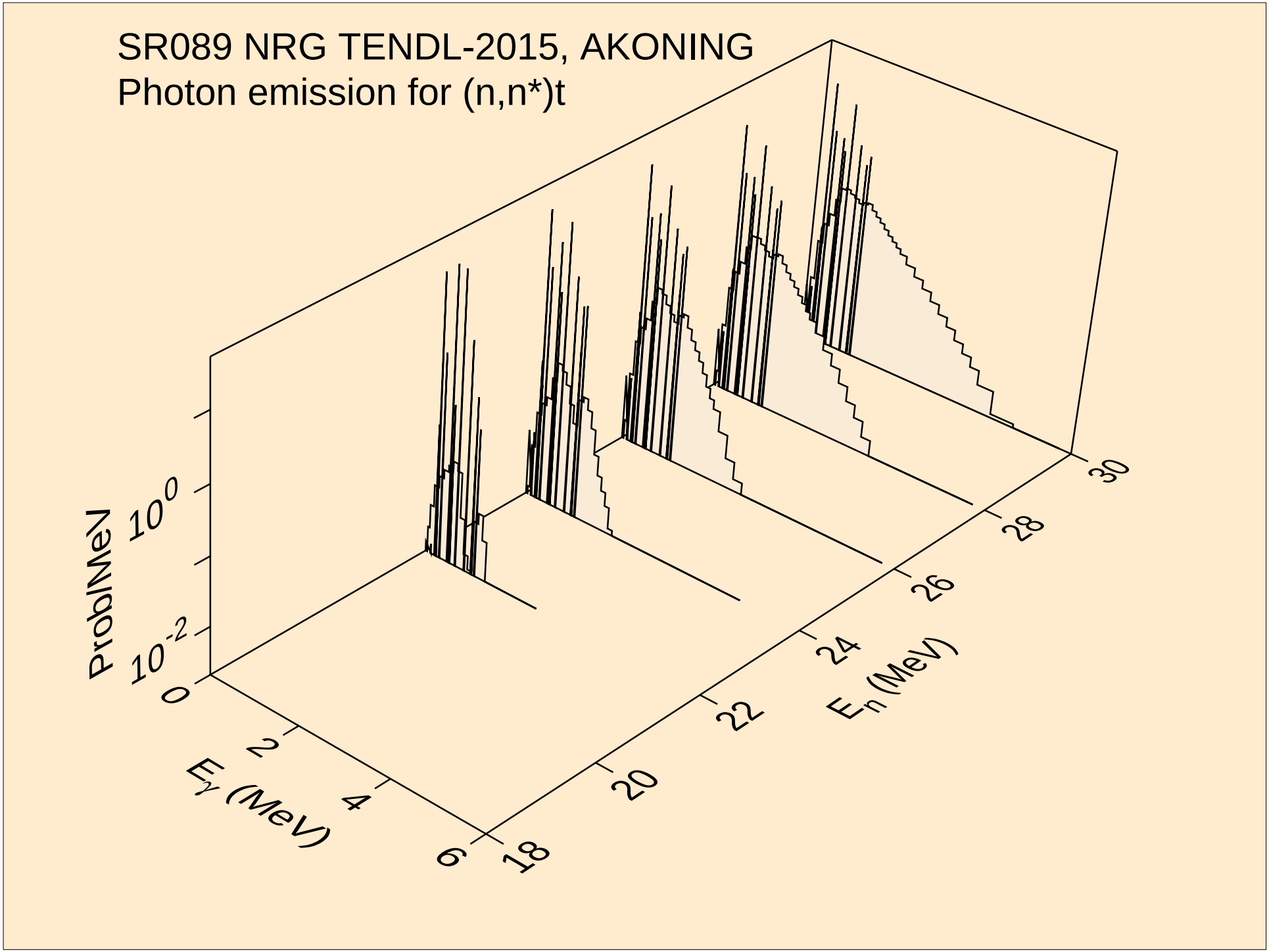

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,3n)
Prob/MeV
$10^{0}$
$10^{-2}$
0
$E_\gamma$ (MeV)
5
10
16
18
20
22
24
26
28
30
$E_n$ (MeV)

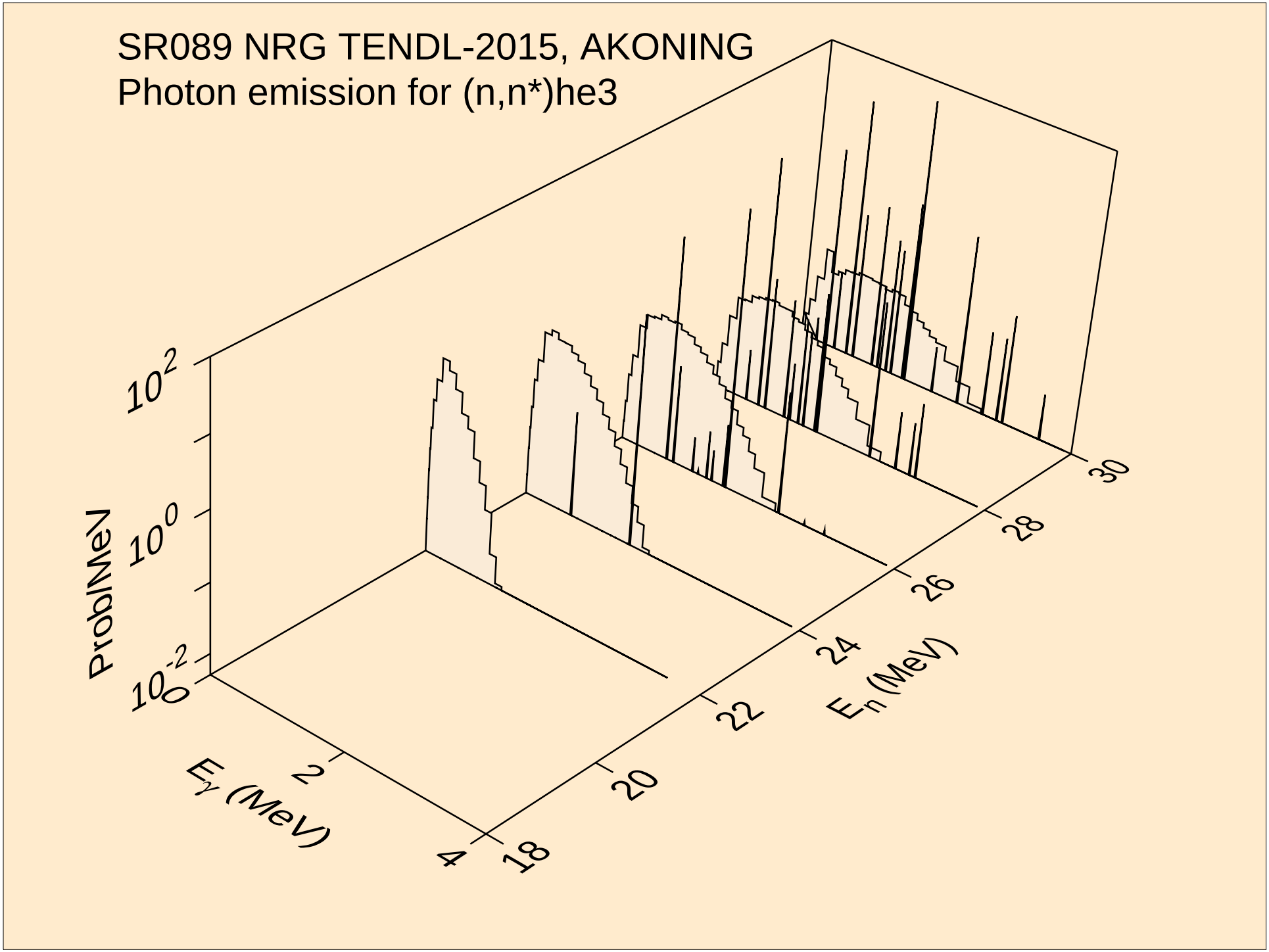

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*)a
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
5
10
15
20
25
30
$E_n$ (MeV)

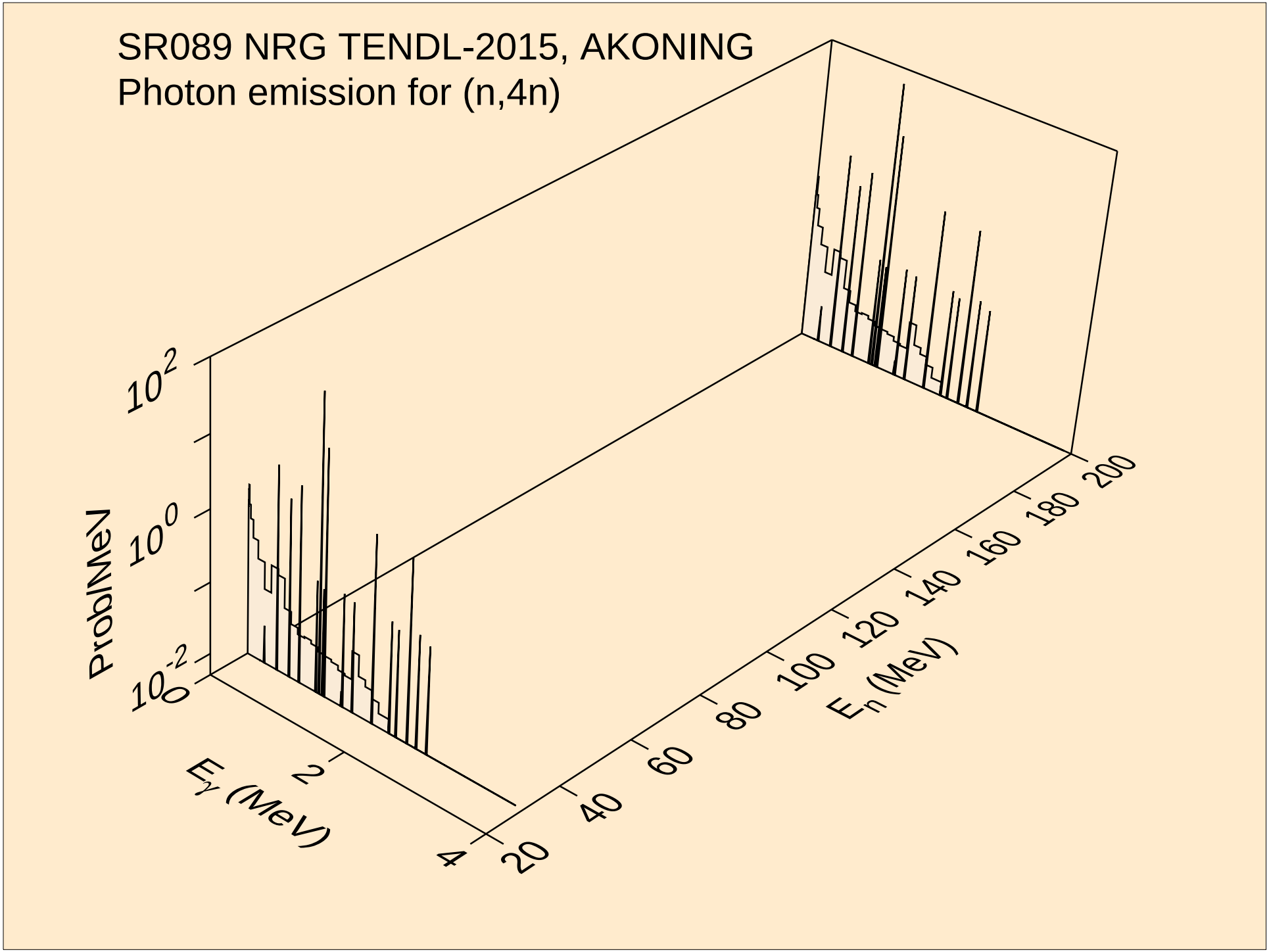

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2n)a
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
2
4
$E_\gamma$ (MeV)
14
16
18
20
22
24
26
28
30
$E_n$ (MeV)

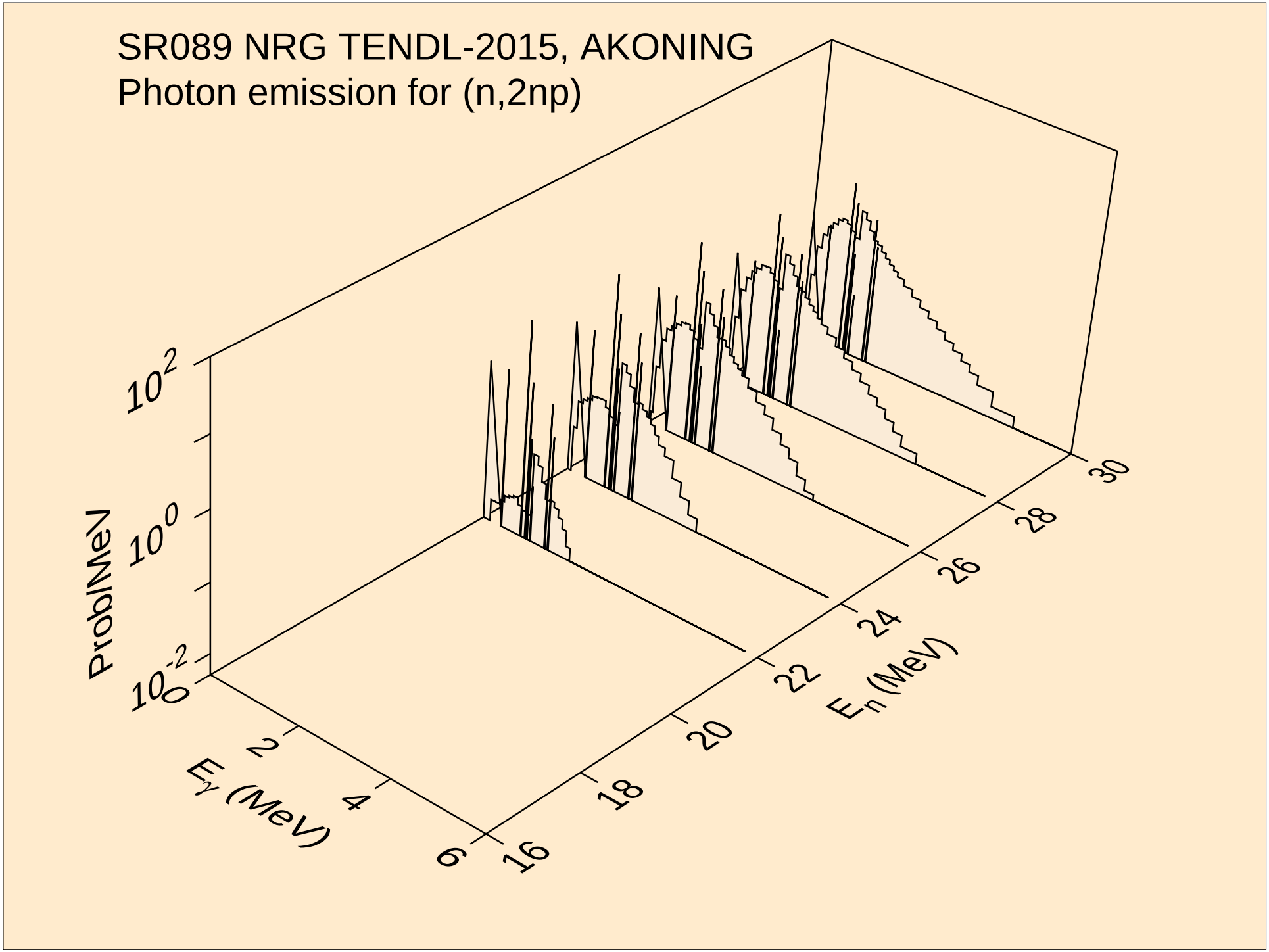

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*)p
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
2
4
6
$E_\gamma$ (MeV)
10
12
14
16
18
20
22
24
26
28
30
$E_n$ (MeV)


SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*)d
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
5
10
$E_\gamma$ (MeV)
14
16
18
20
22
24
26
28
30
$E_n$ (MeV)

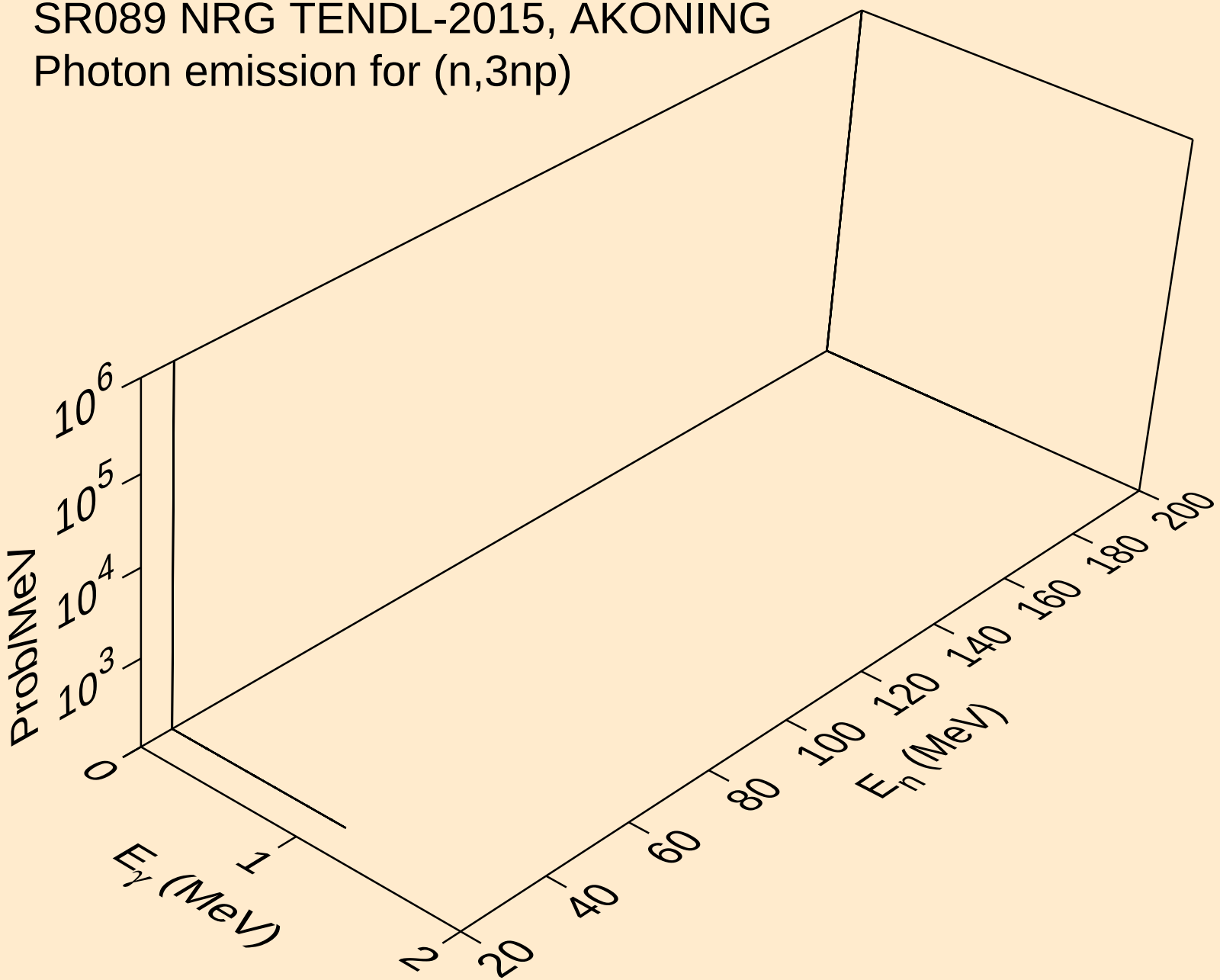

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*)t
Prob/MeV
10^0
10^-2
0
2
4
6
E_γ (MeV)
18
20
22
24
26
28
30
E_n (MeV)

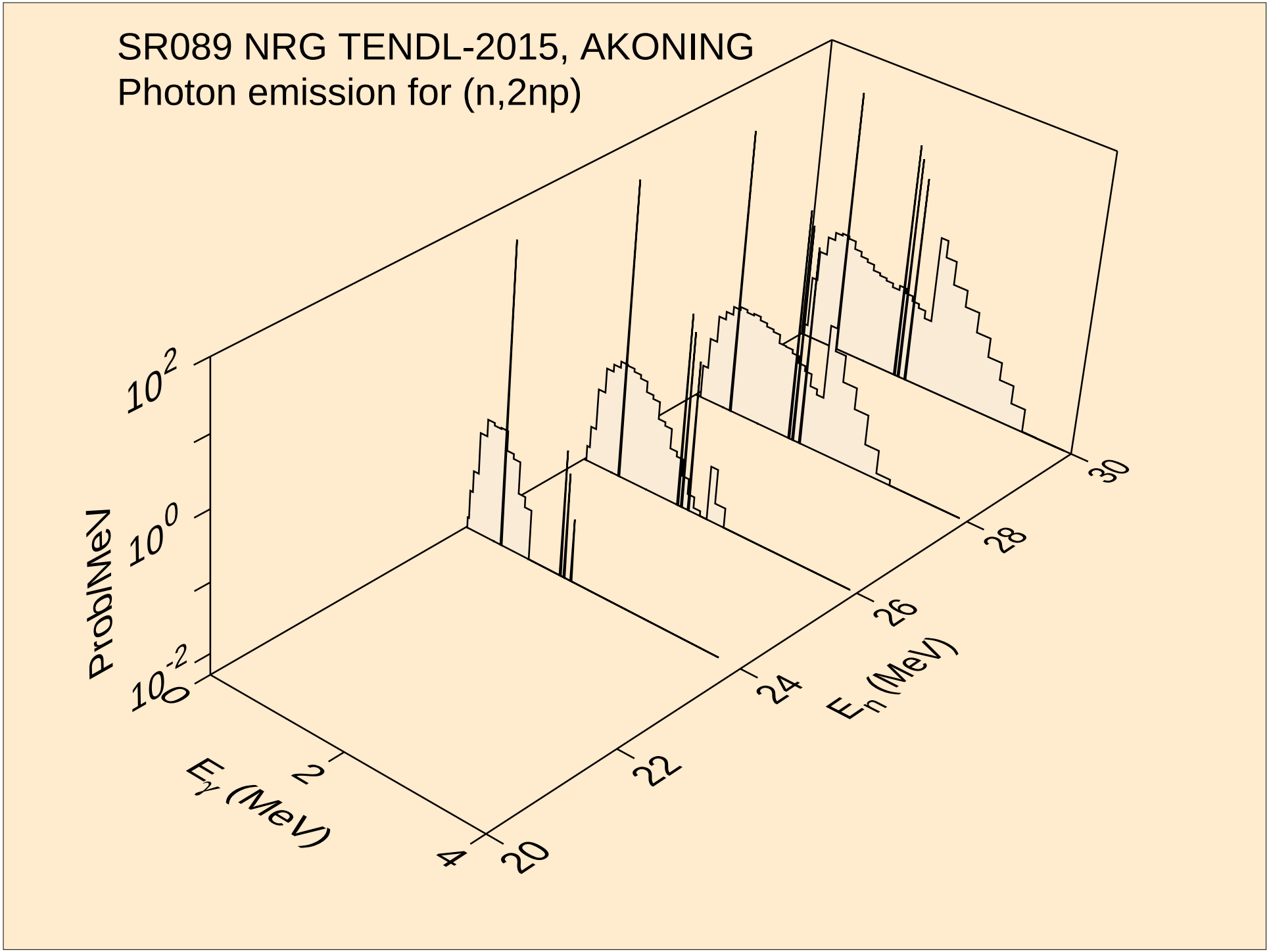

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*)he3
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
$E_\gamma$ (MeV)
0
2
4
$E_n$ (MeV)
18
20
22
24
26
28
30

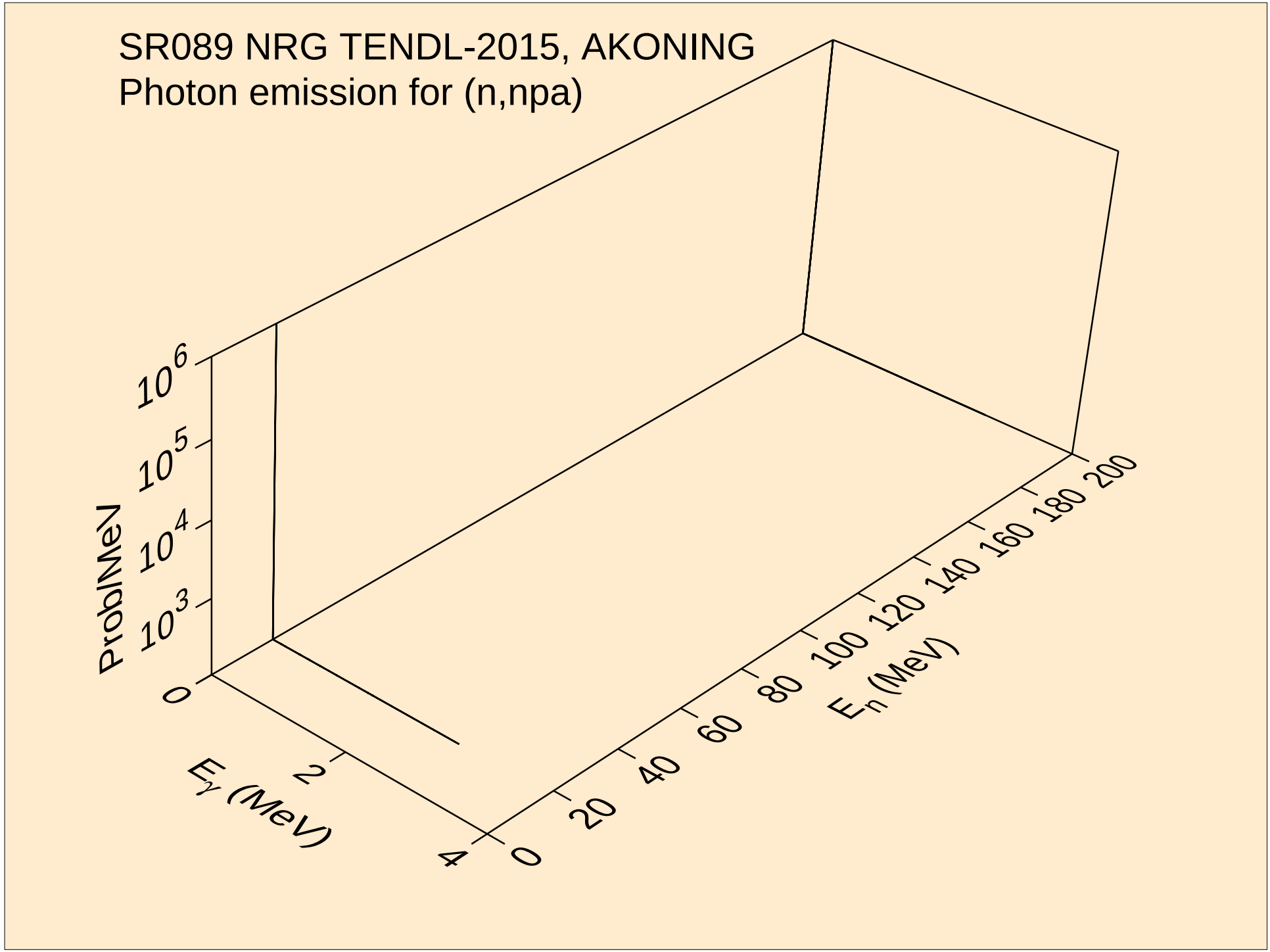

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,4n)
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
2
4
$E_\gamma$ (MeV)
20
40
60
80
100
120
140
160
180
200
$E_n$ (MeV)

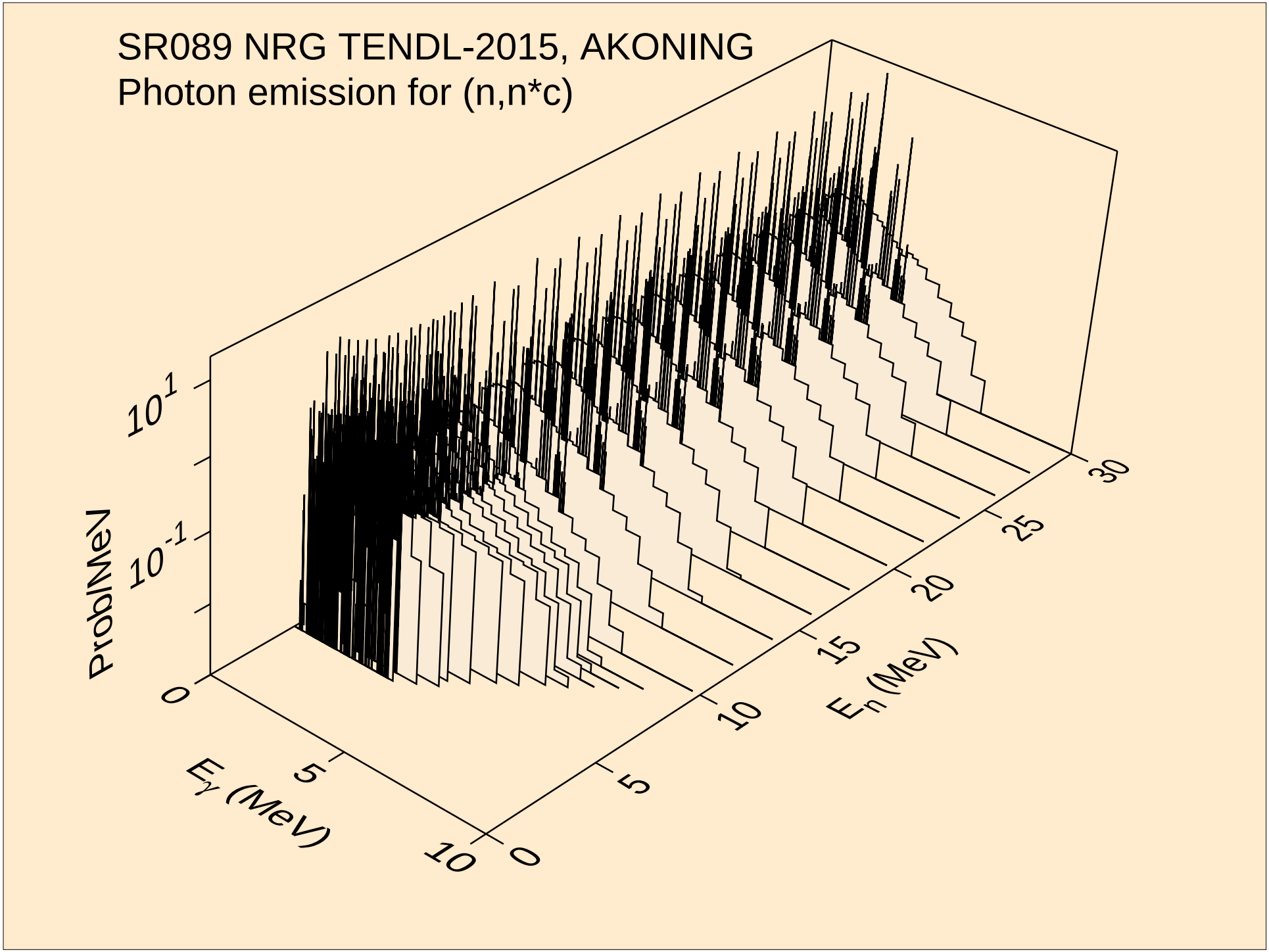

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2np)
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
0
2
4
6
$E_\gamma$ (MeV)
16
18
20
22
24
26
28
30
$E_n$ (MeV)

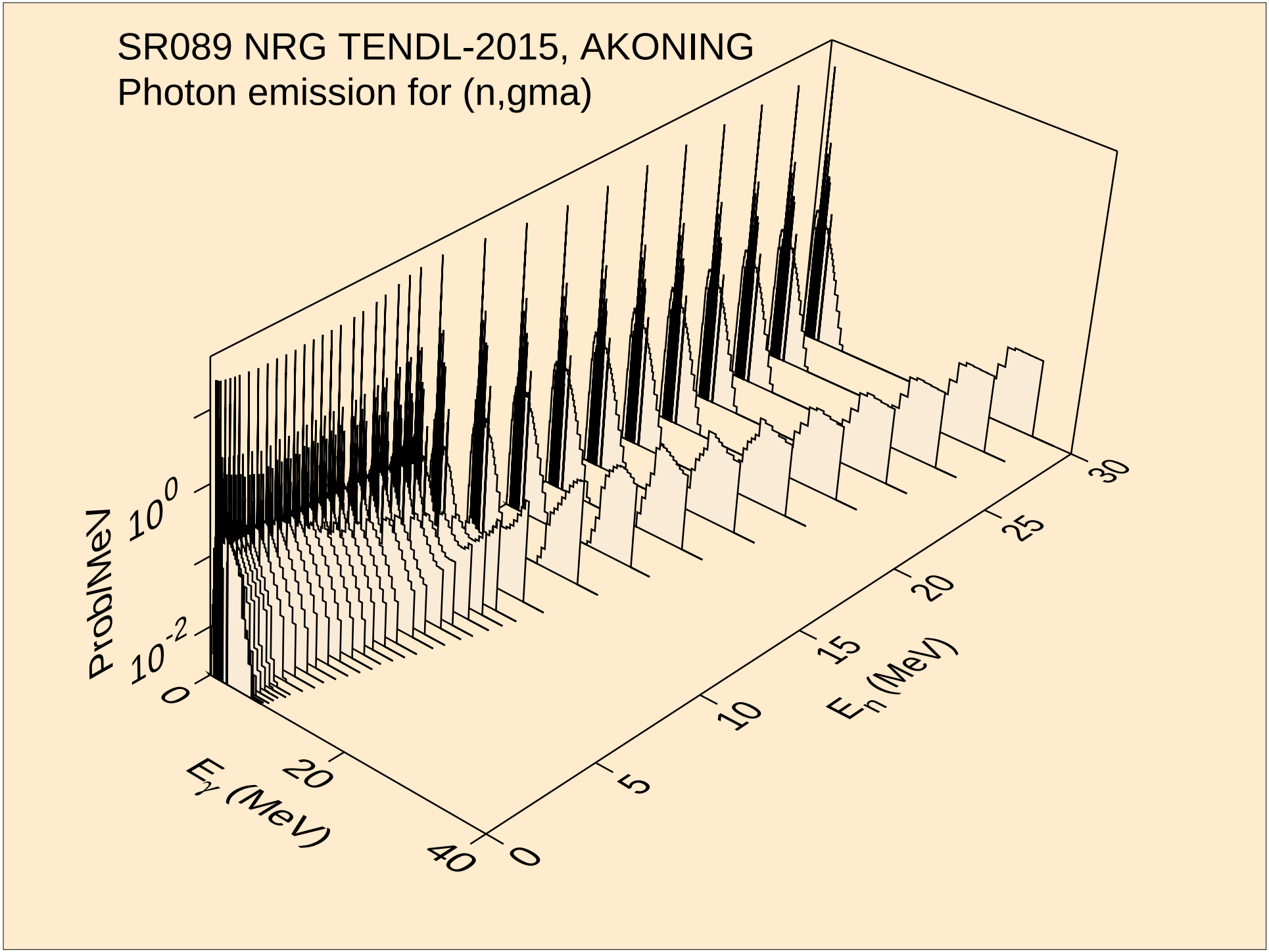
SR089 NRG TENDL-2015, AKONING
Photon emission for (n,3np)

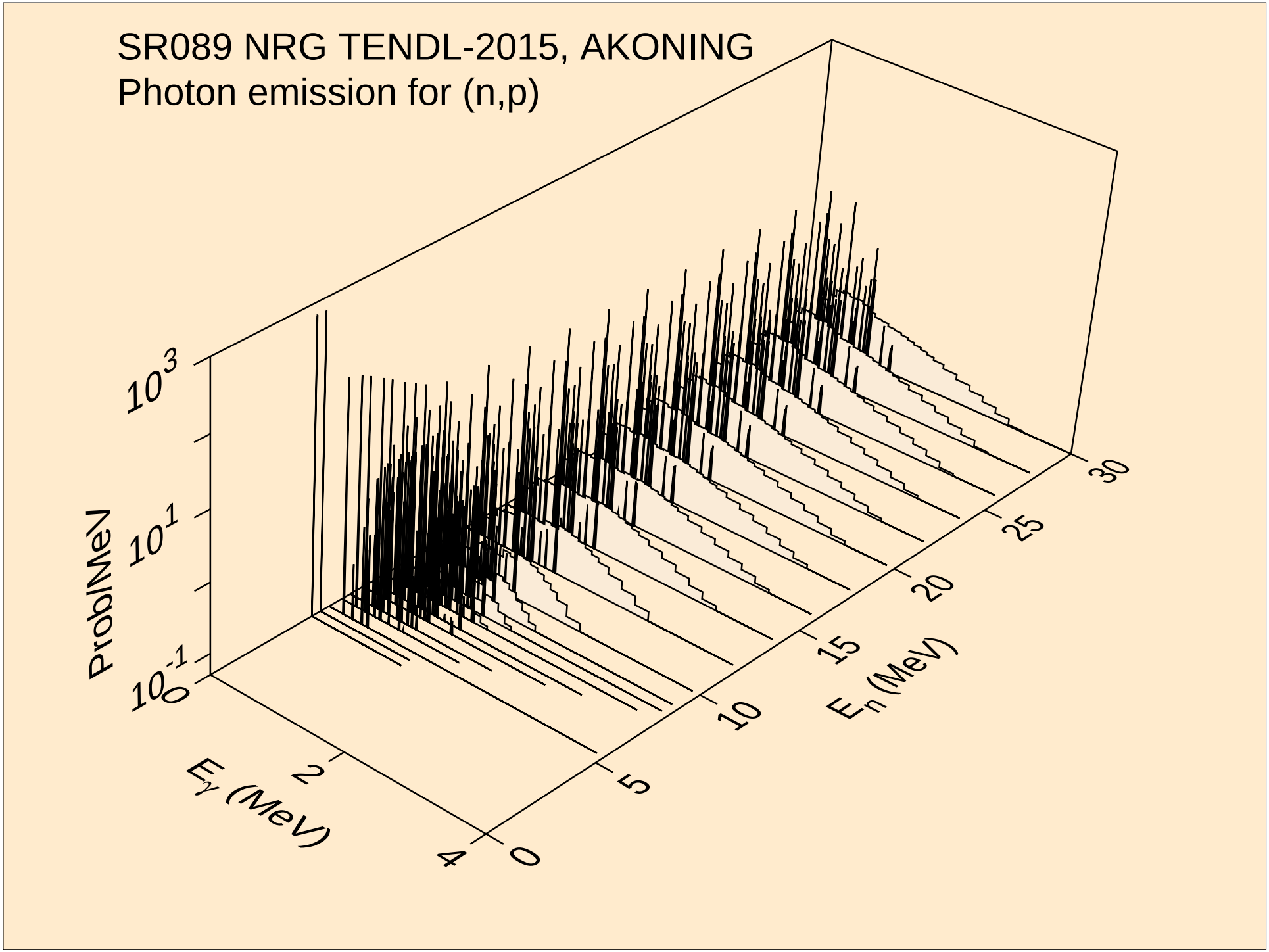


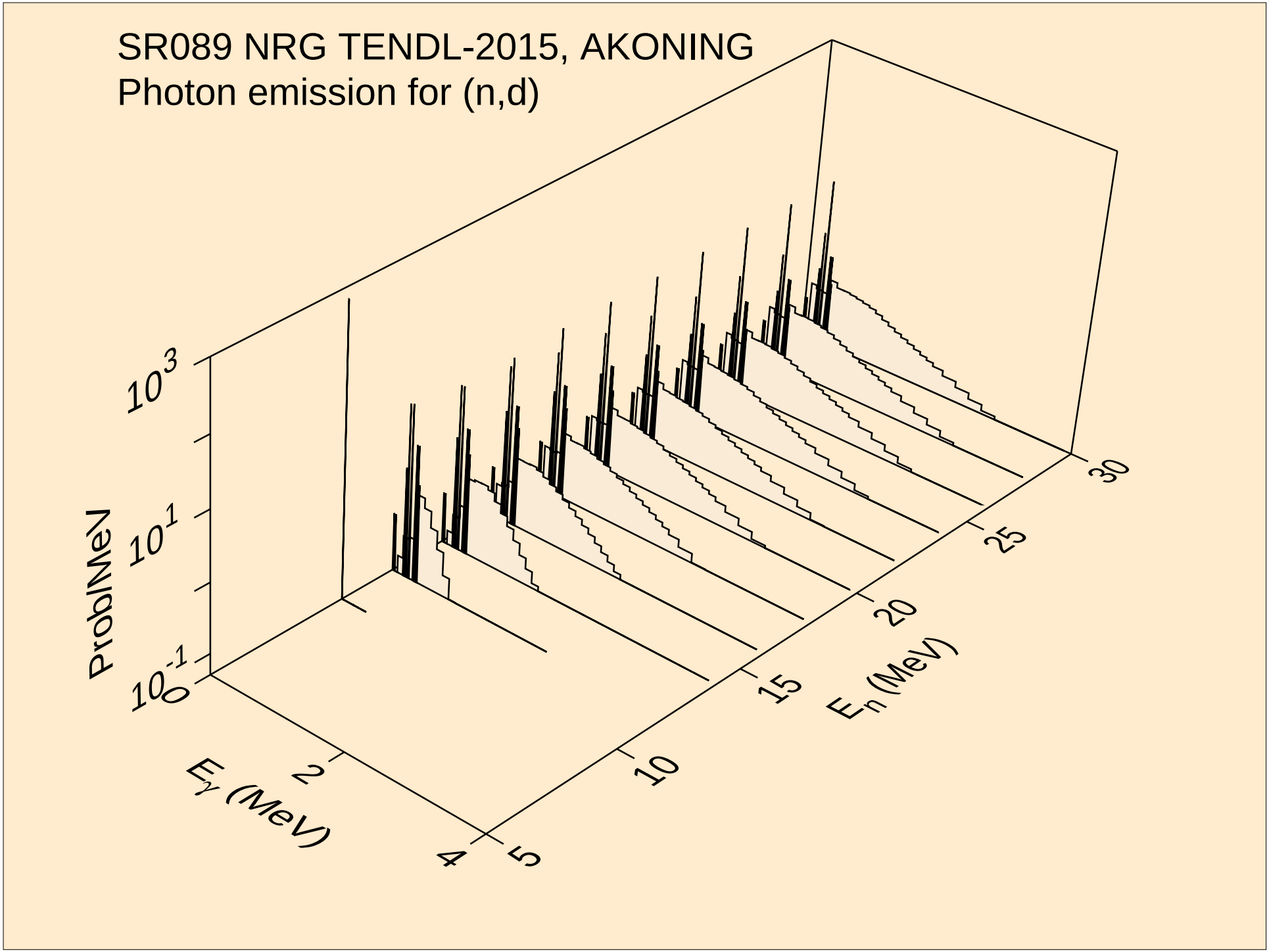

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2np)
Prob/MeV
$10^{2}$
$10^{0}$
$10^{-2}$
$E_\gamma$ (MeV)
0
2
4
$E_n$ (MeV)
20
22
24
26
28
30

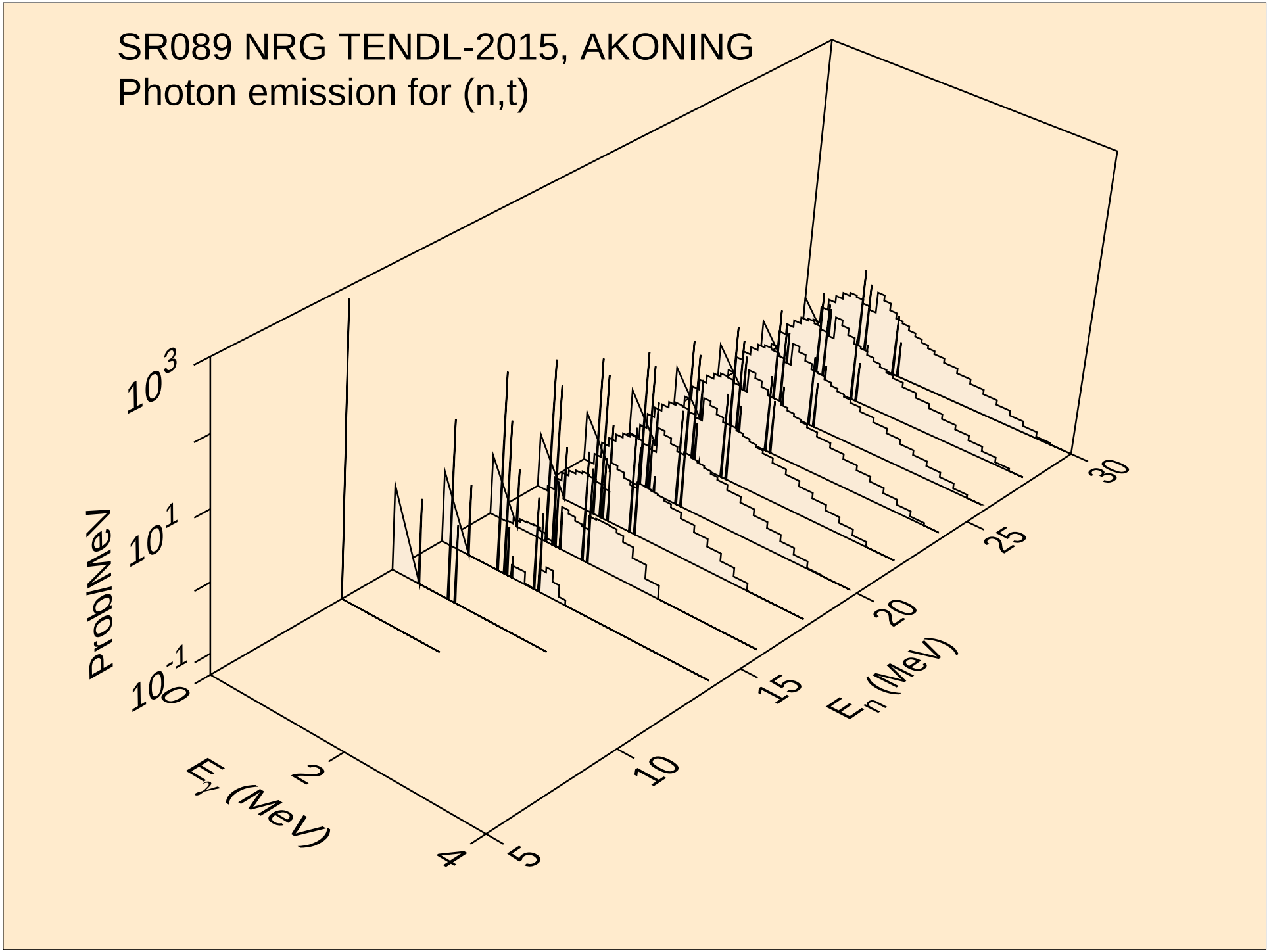

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,npa)
Prob/MeV
$10^6$
$10^5$
$10^4$
$10^3$
0
$E_\gamma$ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
$E_n$ (MeV)

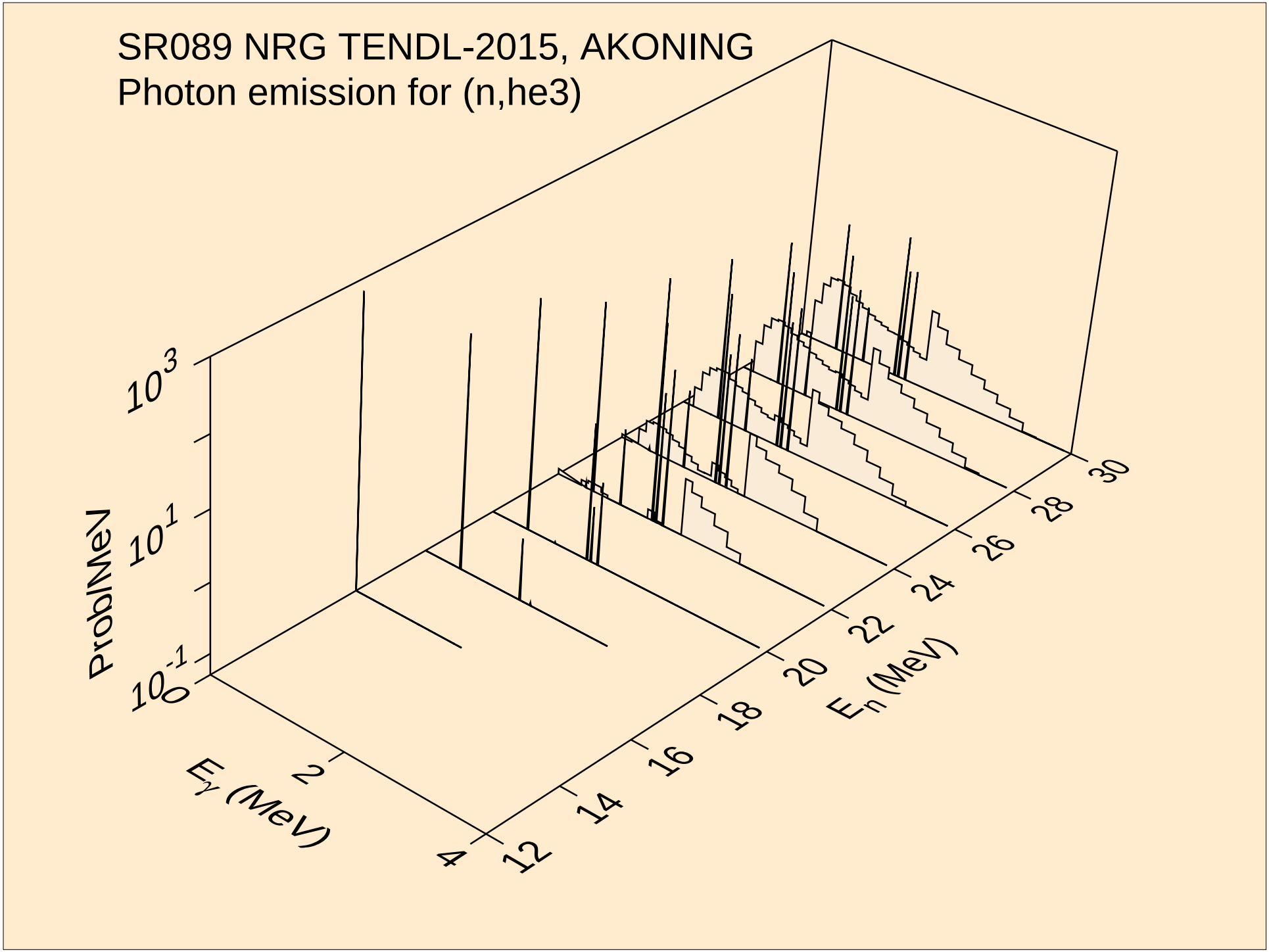

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,n*c)
Prob/MeV
$10^{1}$
$10^{-1}$
0
5
10
$E_\gamma$ (MeV)
0
5
10
15
20
25
30
$E_n$ (MeV)

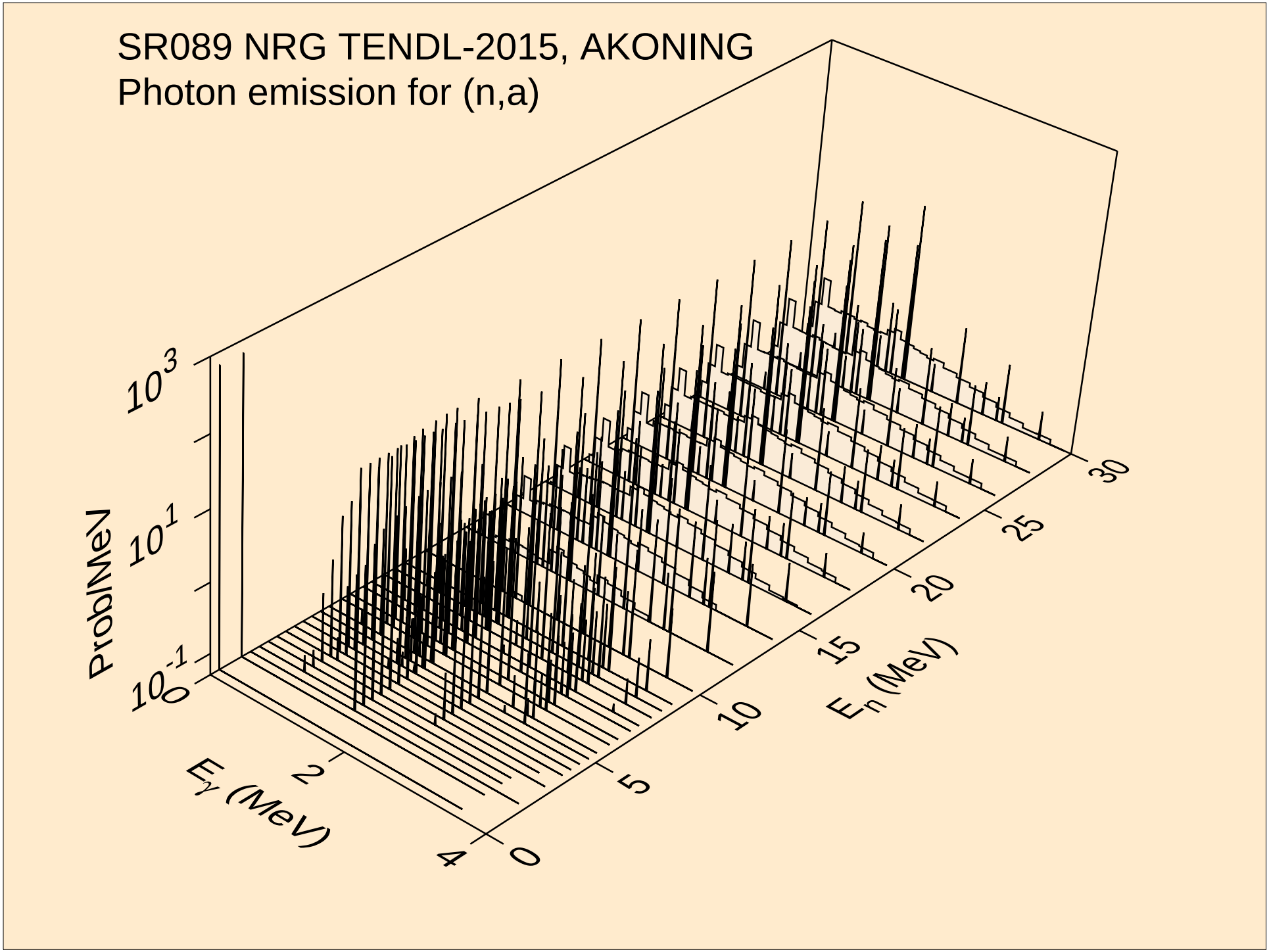

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,gma)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
20
40
0
5
10
15
20
25
30
E_n (MeV)

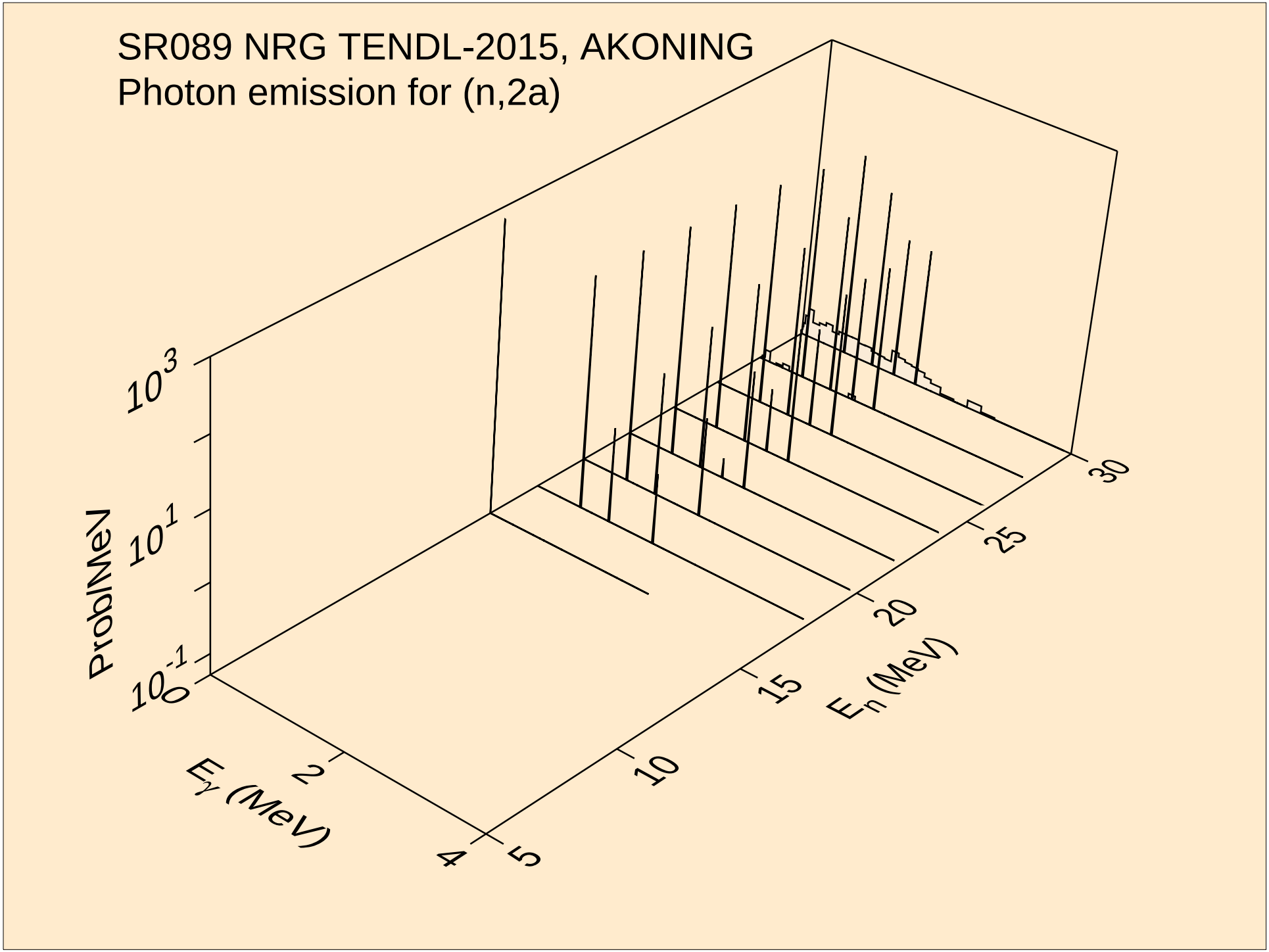

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,p)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
$E_\gamma$ (MeV)
0
2
4
$E_n$ (MeV)
0
5
10
15
20
25
30

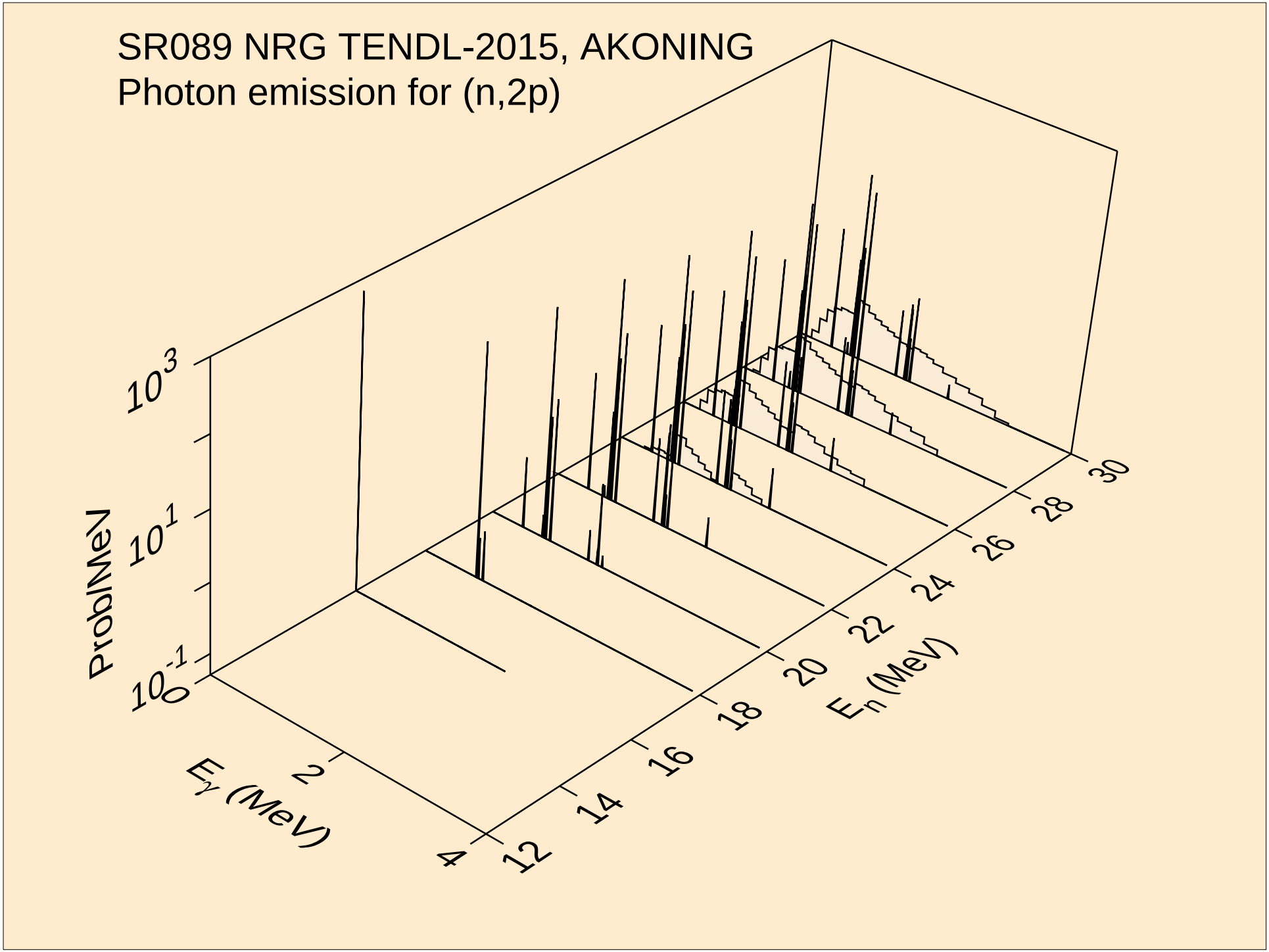

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,d)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
5
10
15
20
25
30
$E_n$ (MeV)

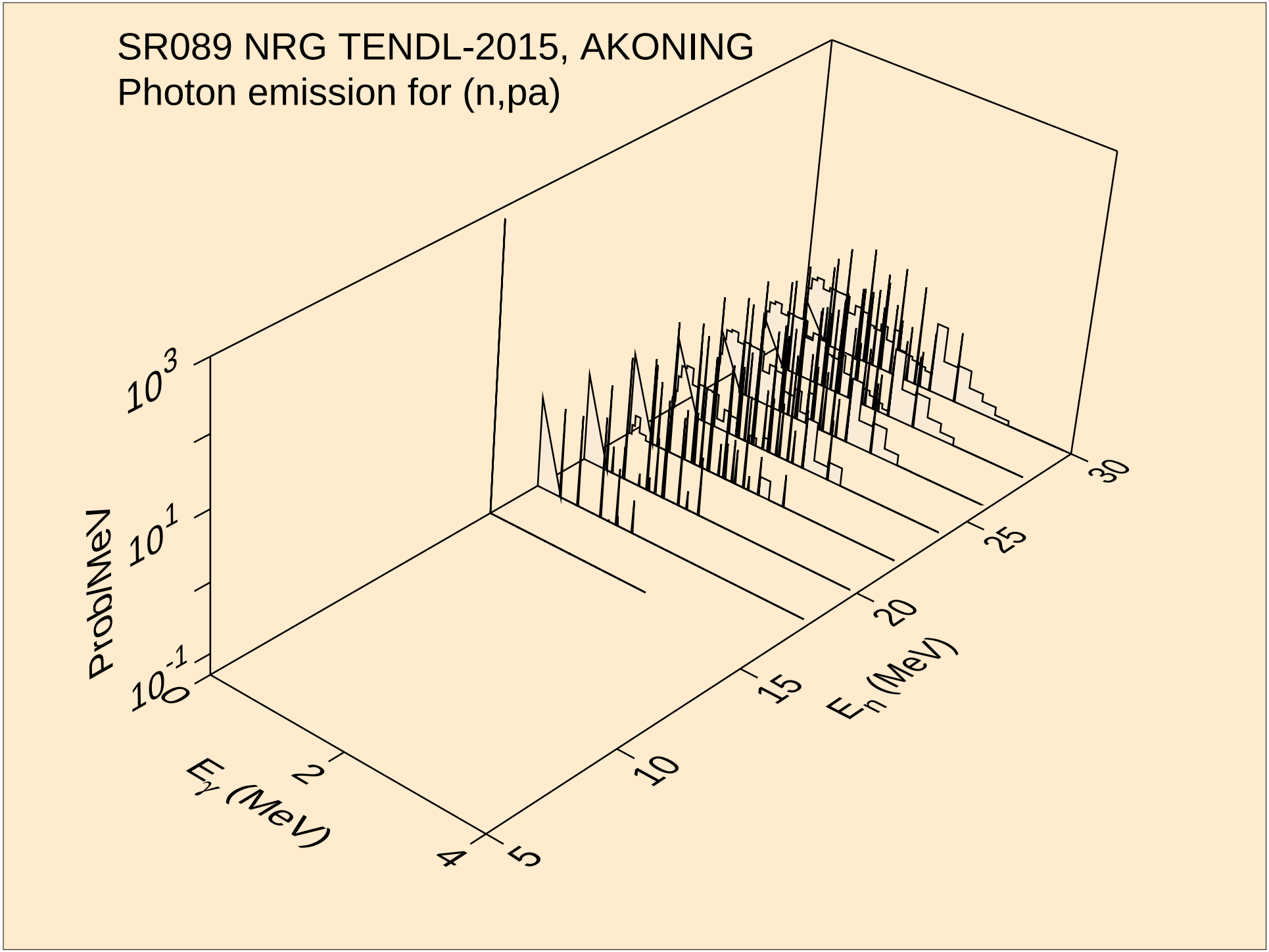

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,t)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
5
10
15
20
25
30
$E_n$ (MeV)

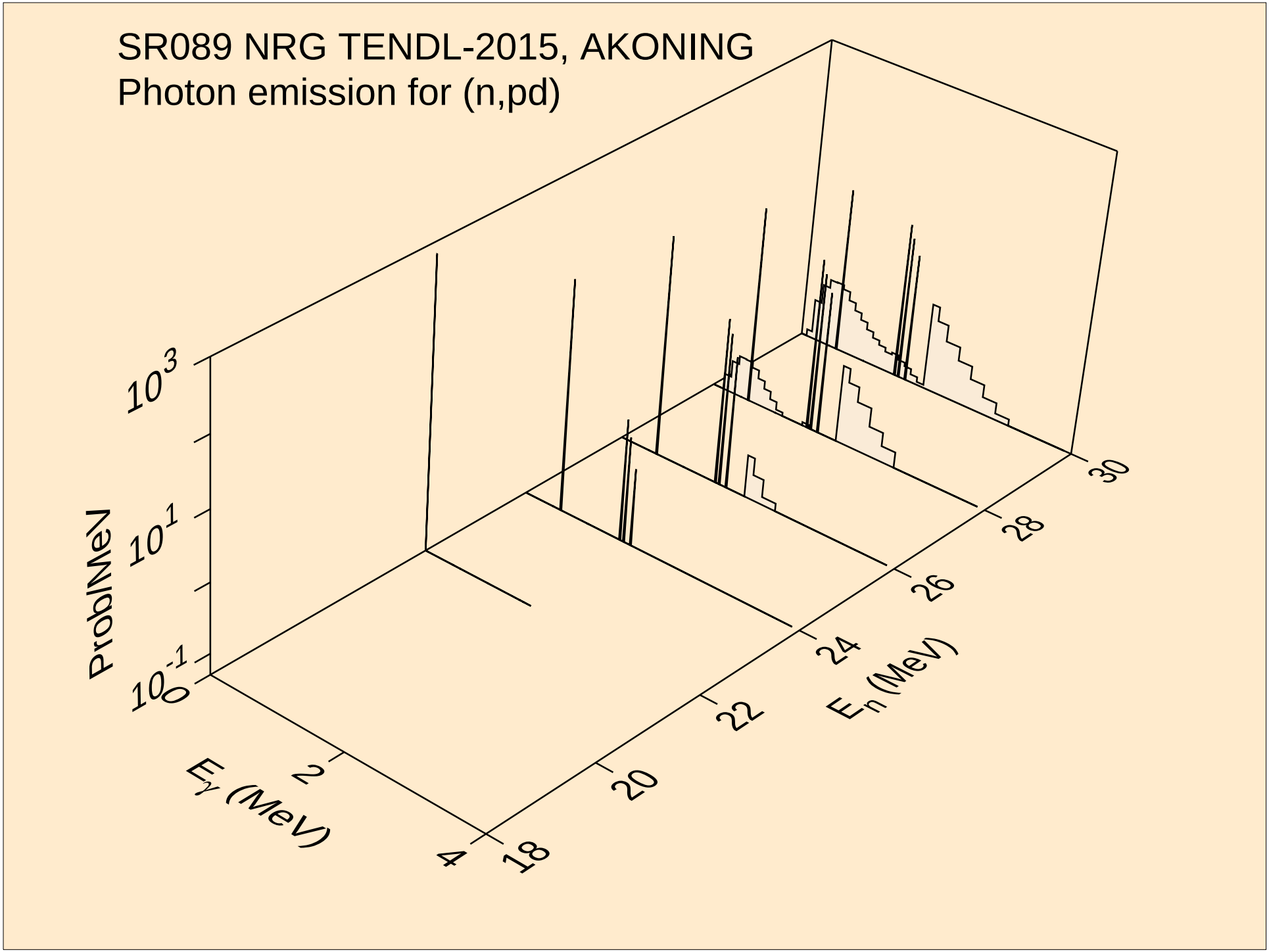

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,he3)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
$E_\gamma$ (MeV)
0
2
4
$E_n$ (MeV)
12
14
16
18
20
22
24
26
28
30

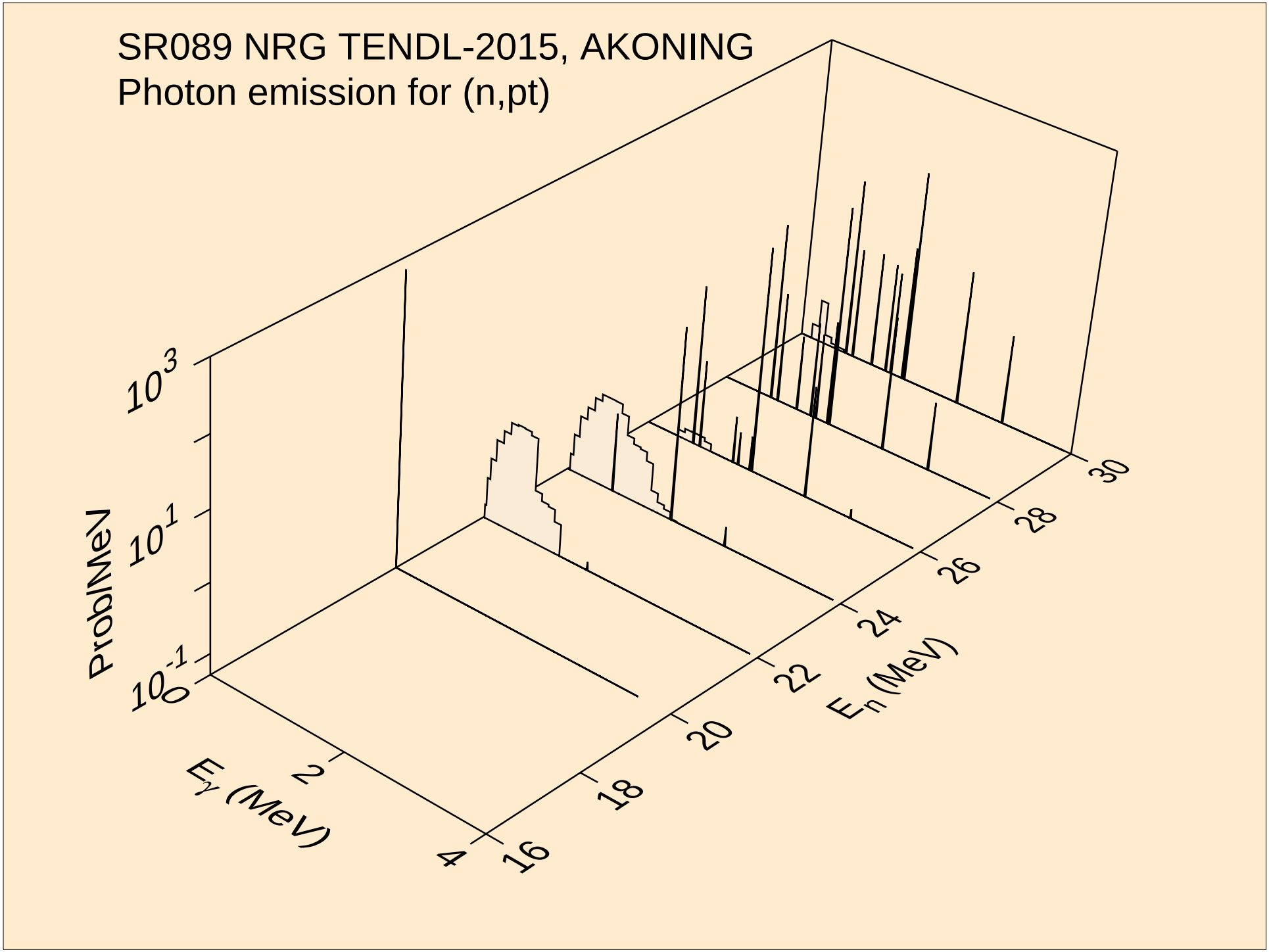

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,a)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
$E_\gamma$ (MeV)
0
2
4
$E_n$ (MeV)
0
5
10
15
20
25
30

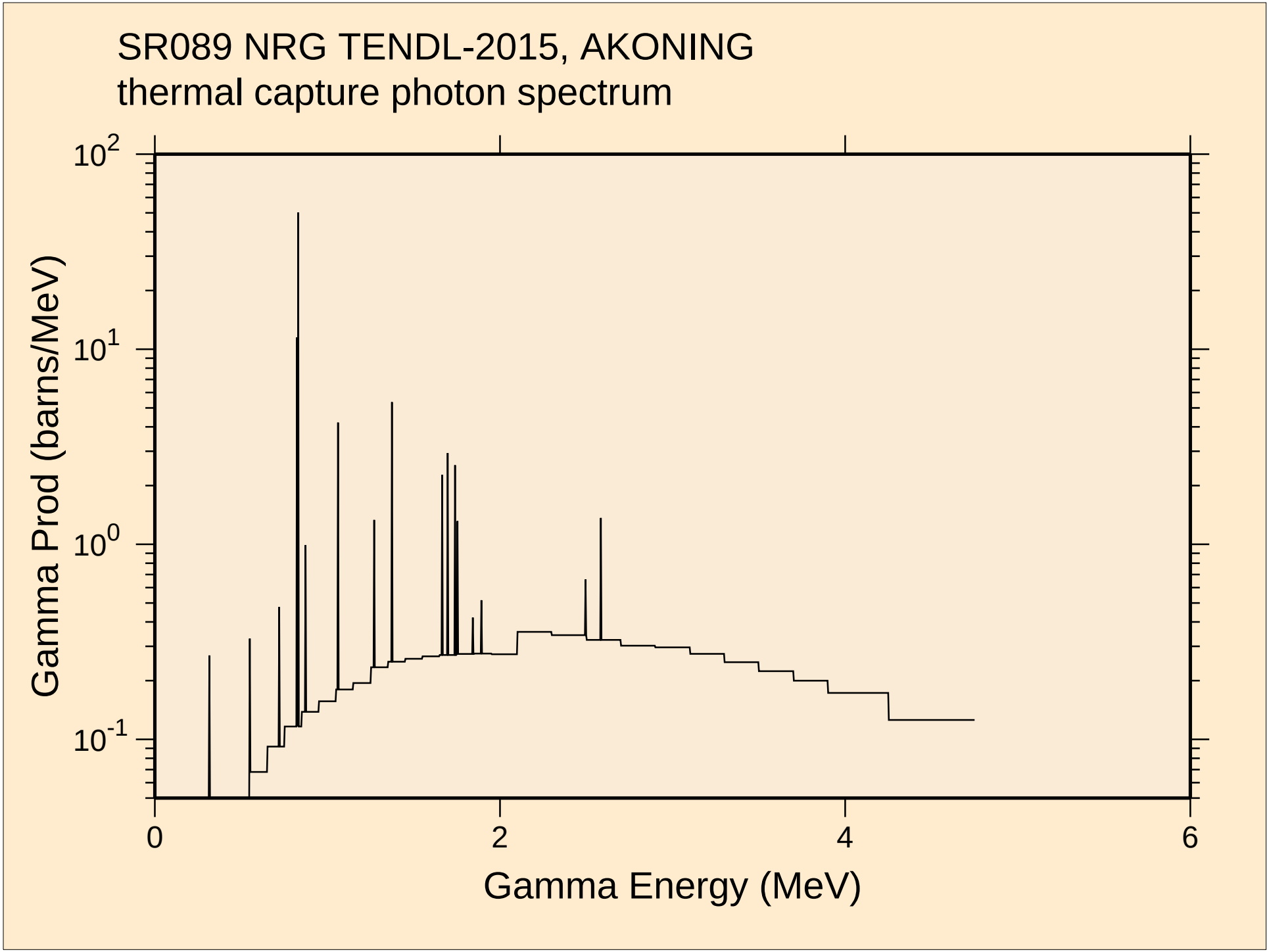

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2a)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
$E_\gamma$ (MeV)
2
4
5
10
15
20
25
30
$E_n$ (MeV)

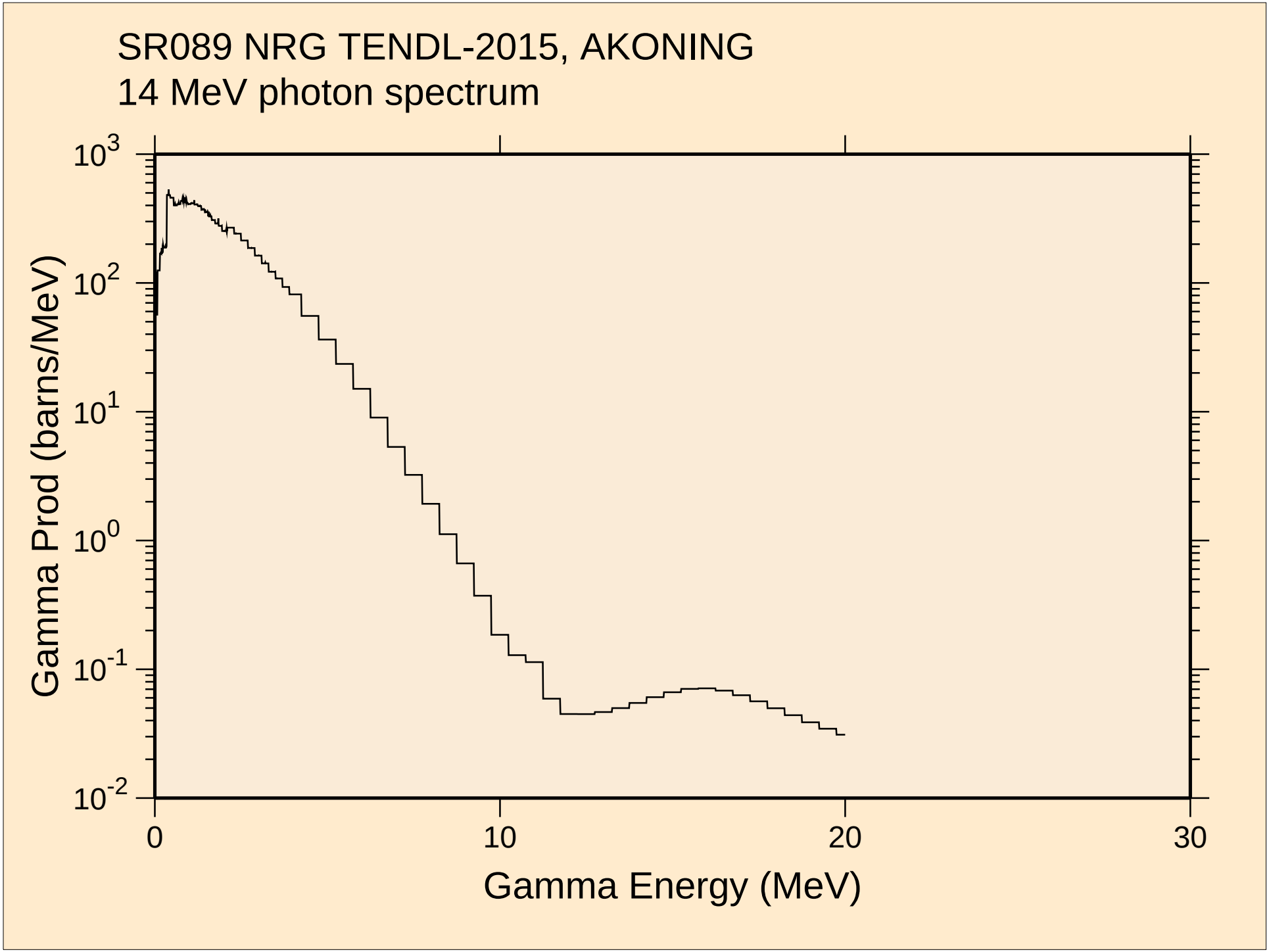

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,2p)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
12
14
16
18
20
22
24
26
28
30
$E_n$ (MeV)

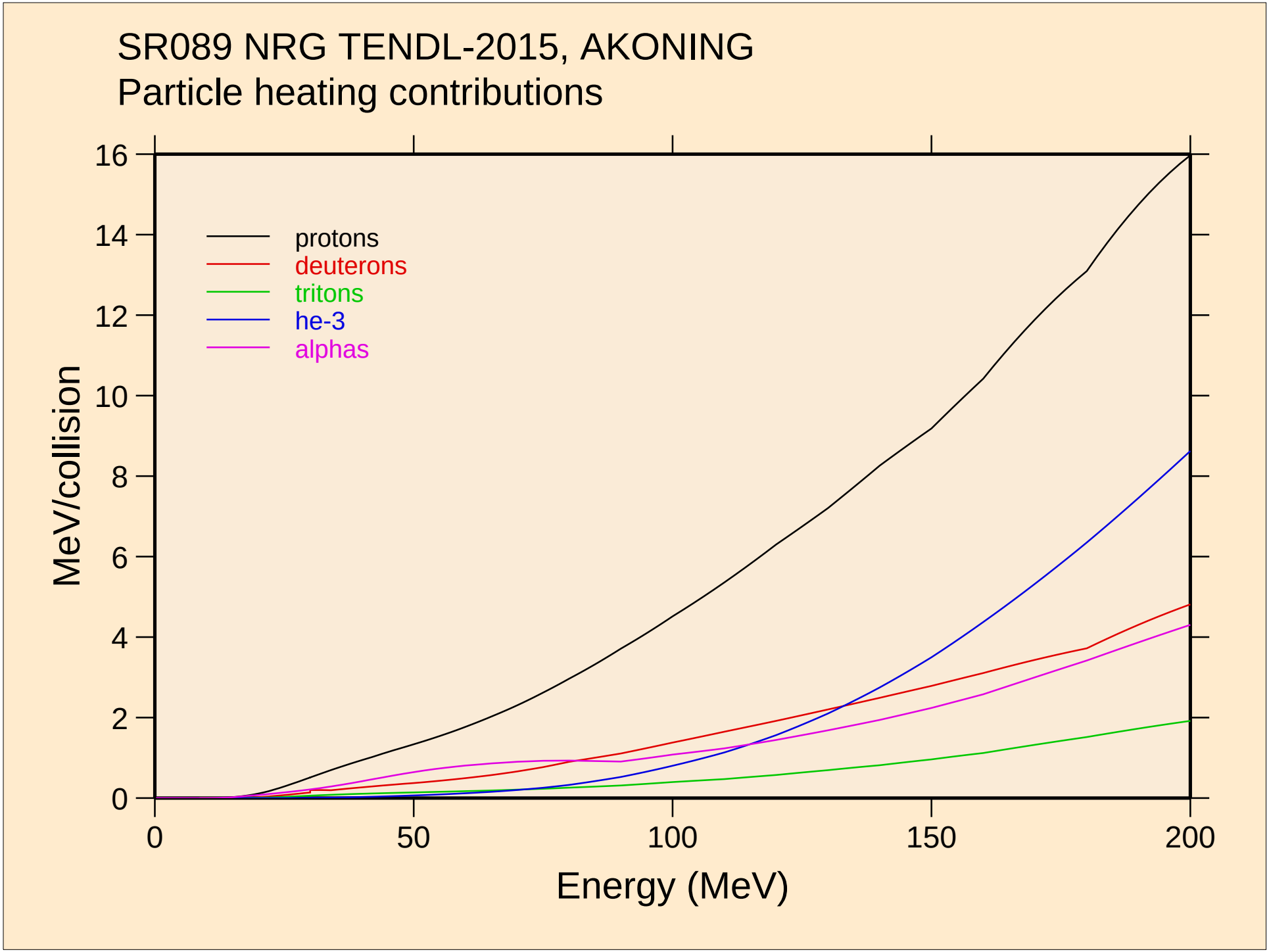

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,pa)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
5
10
15
20
25
30
$E_n$ (MeV)

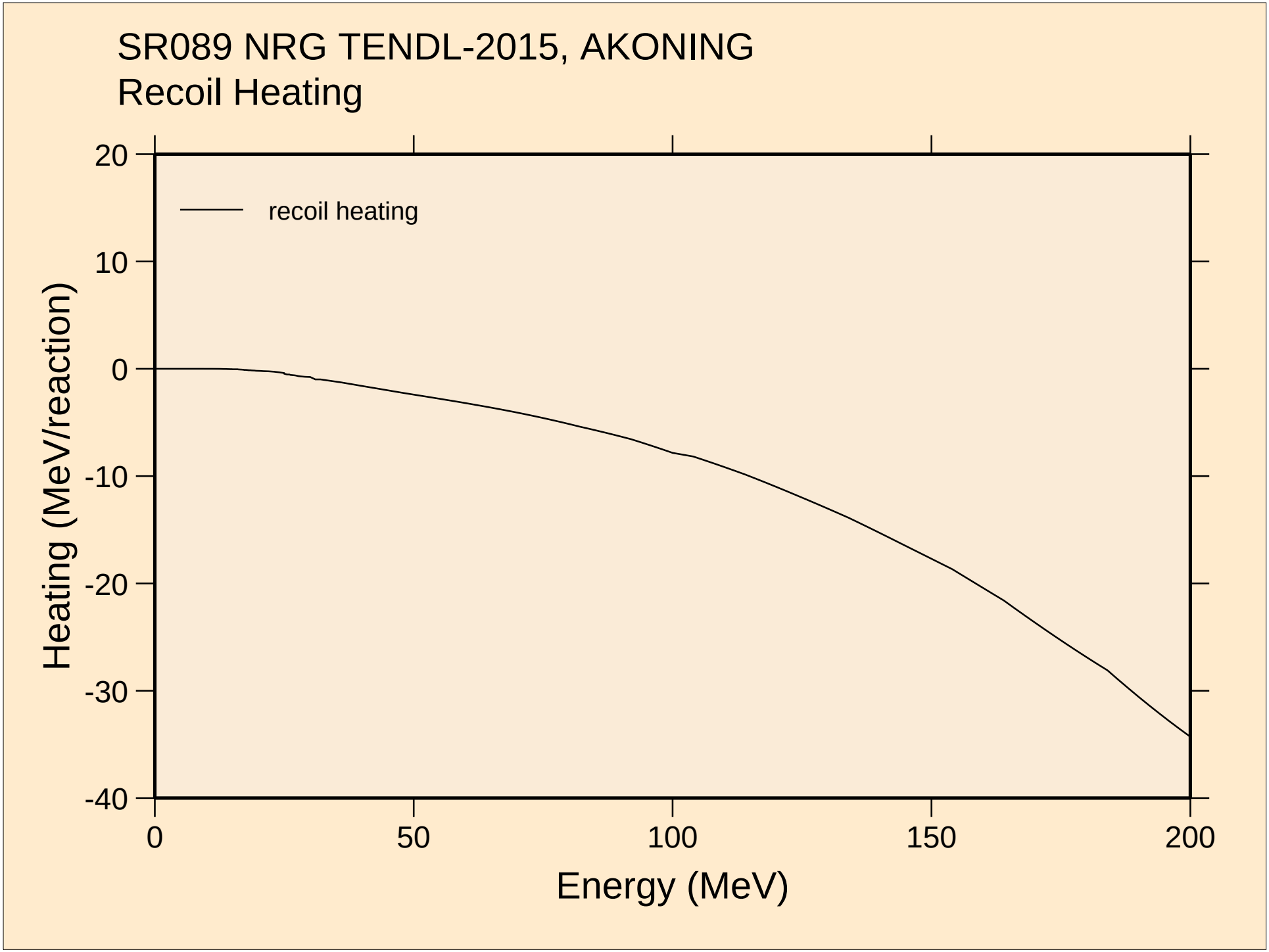

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,pd)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
18
20
22
24
26
28
30
$E_n$ (MeV)

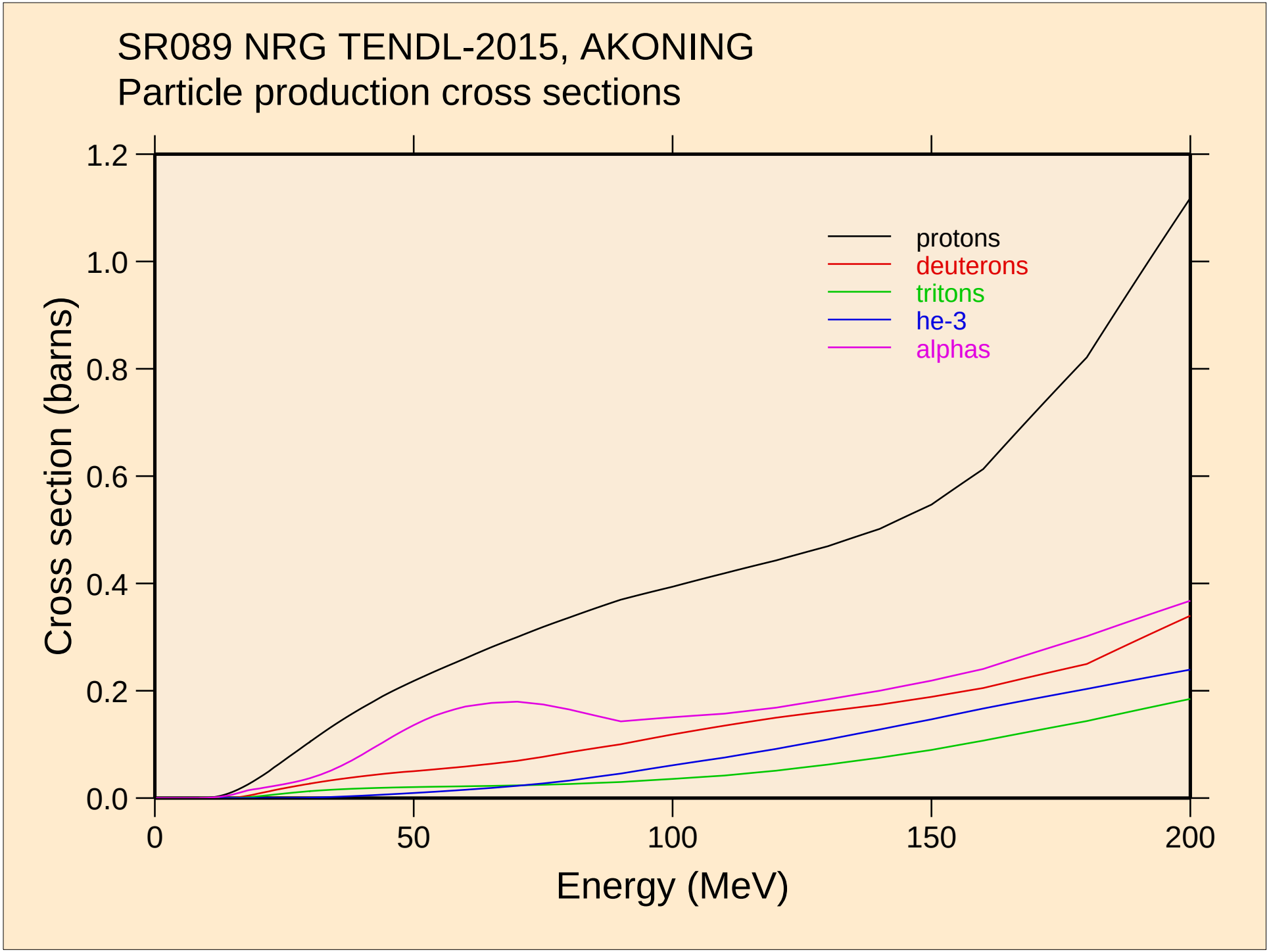

SR089 NRG TENDL-2015, AKONING
Photon emission for (n,pt)
Prob/MeV
$10^{3}$
$10^{1}$
$10^{-1}$
0
2
4
$E_\gamma$ (MeV)
16
18
20
22
24
26
28
30
$E_n$ (MeV)

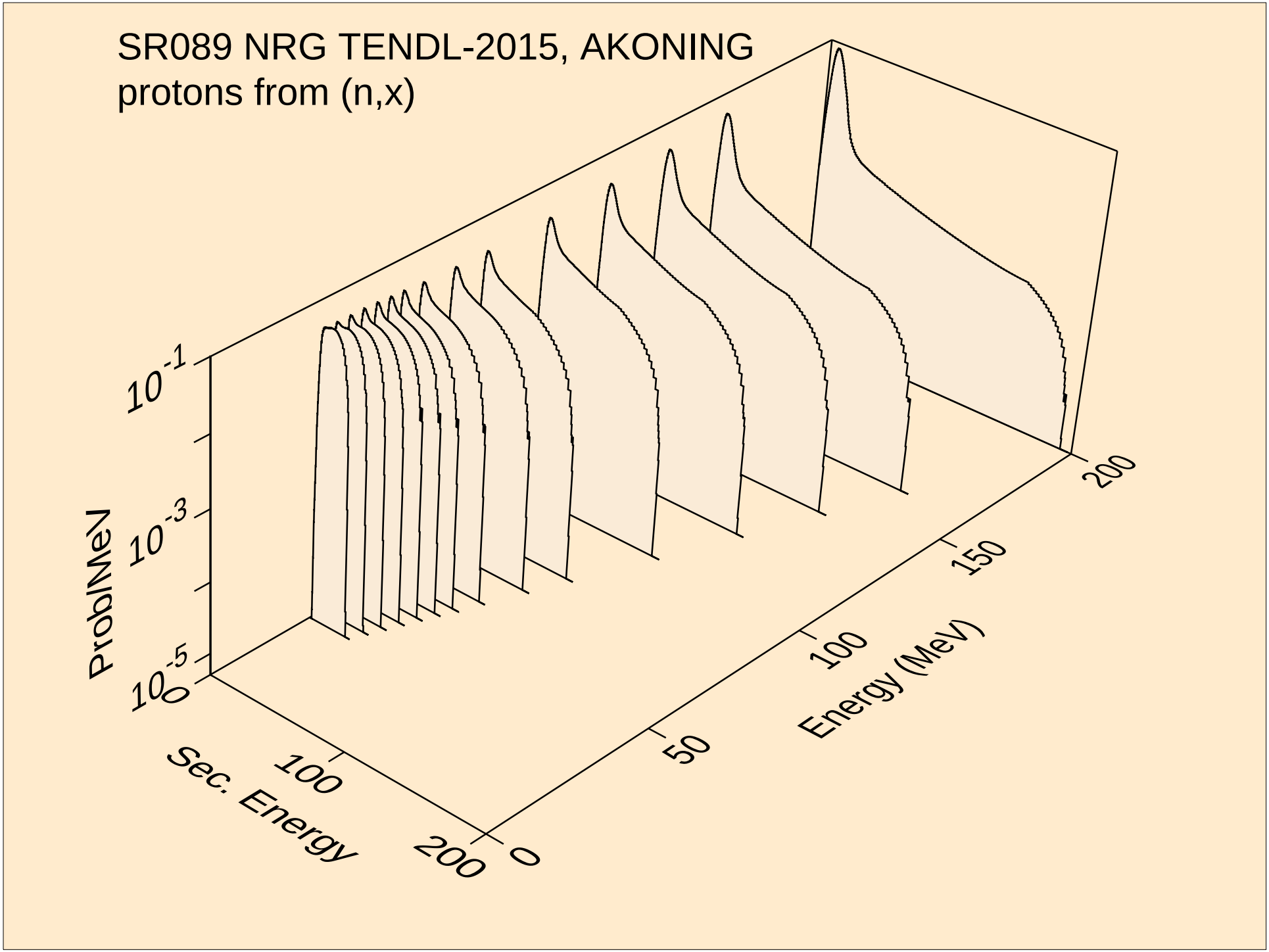

SR089 NRG TENDL-2015, AKONING
thermal capture photon spectrum
Gamma Prod (barns/MeV)
$10^2$
$10^1$
$10^0$
$10^{-1}$
0
2
4
6
Gamma Energy (MeV)

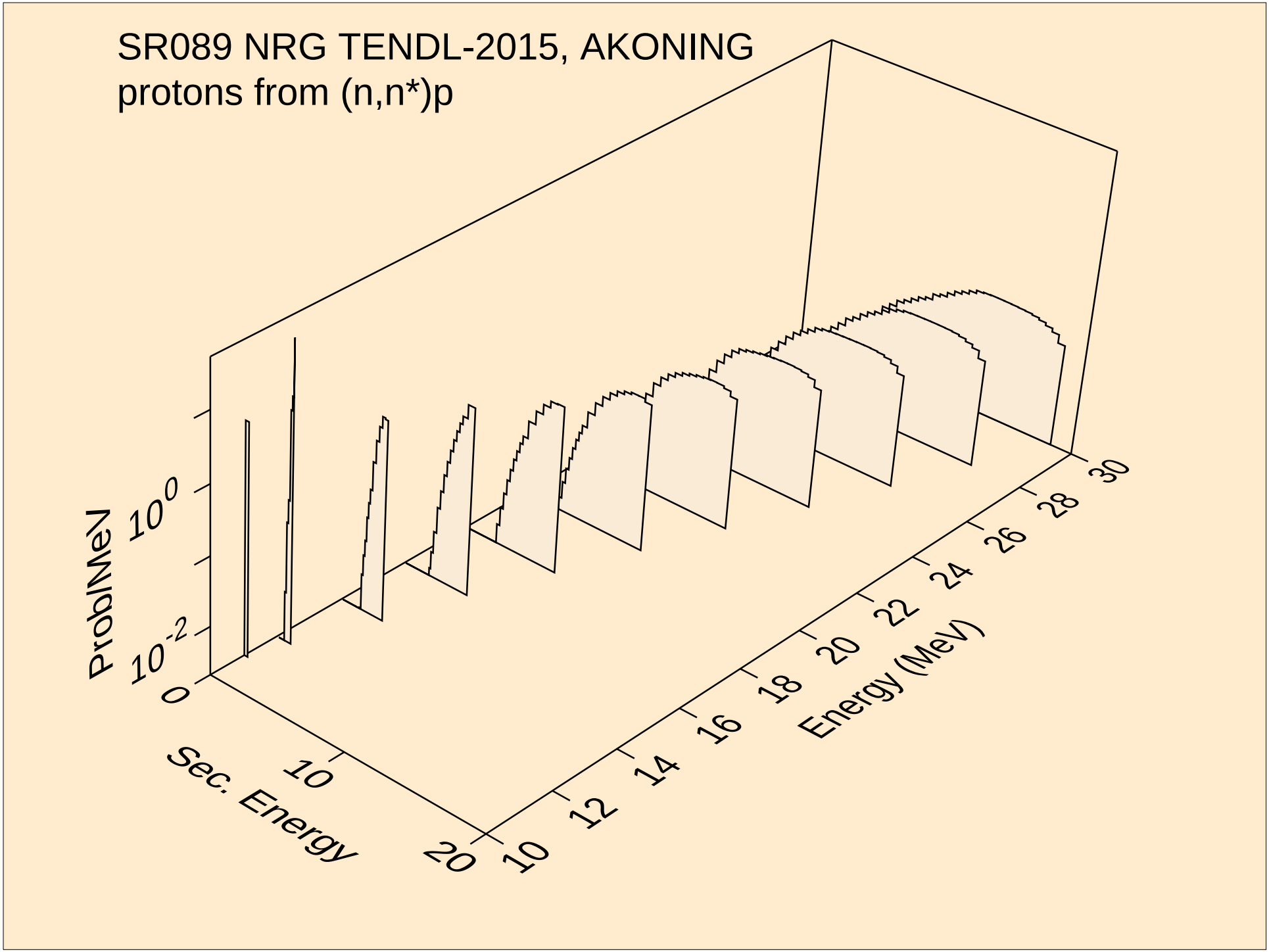

SR089 NRG TENDL-2015, AKONING
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^3
10^2
10^1
10^0
10^-1
10^-2
0
10
20
30
Gamma Energy (MeV)

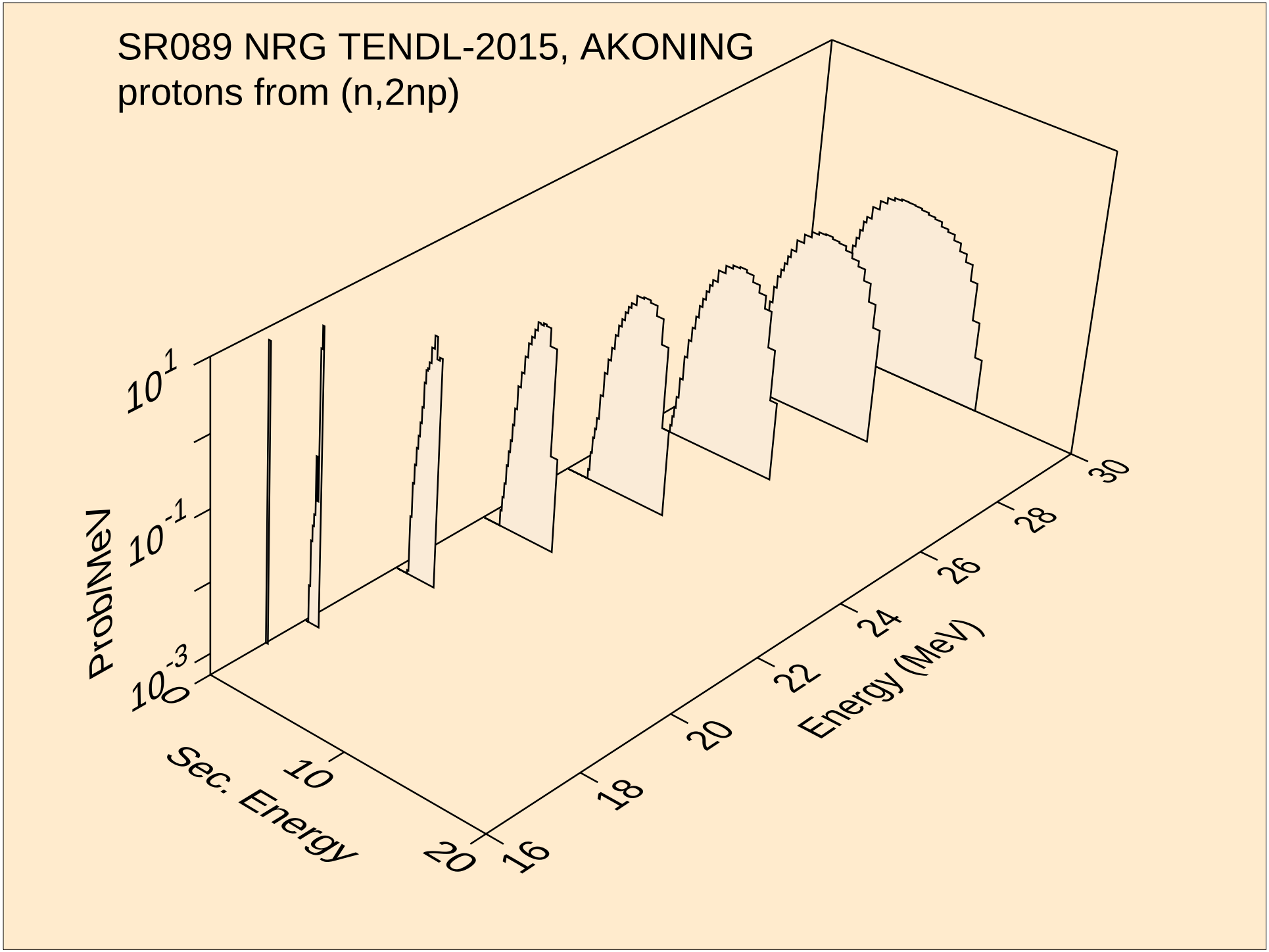

SR089 NRG TENDL-2015, AKONING
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
2
4
6
8
10
12
14
16
0
50
100
150
200

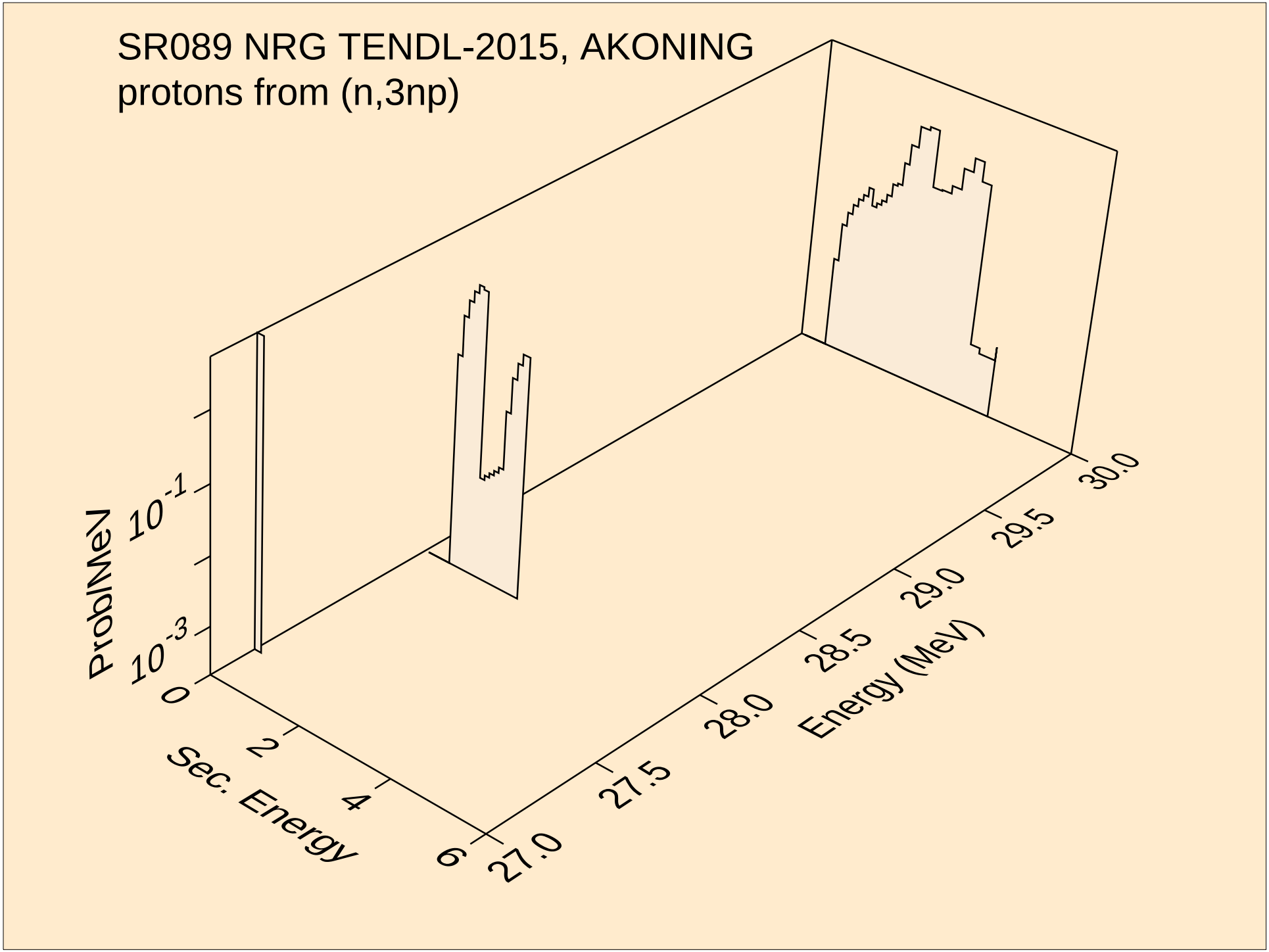

SR089 NRG TENDL-2015, AKONING
Recoil Heating
recoil heating
Heating (MeV/reaction)
20
10
0
-10
-20
-30
-40
0
50
100
150
200
Energy (MeV)

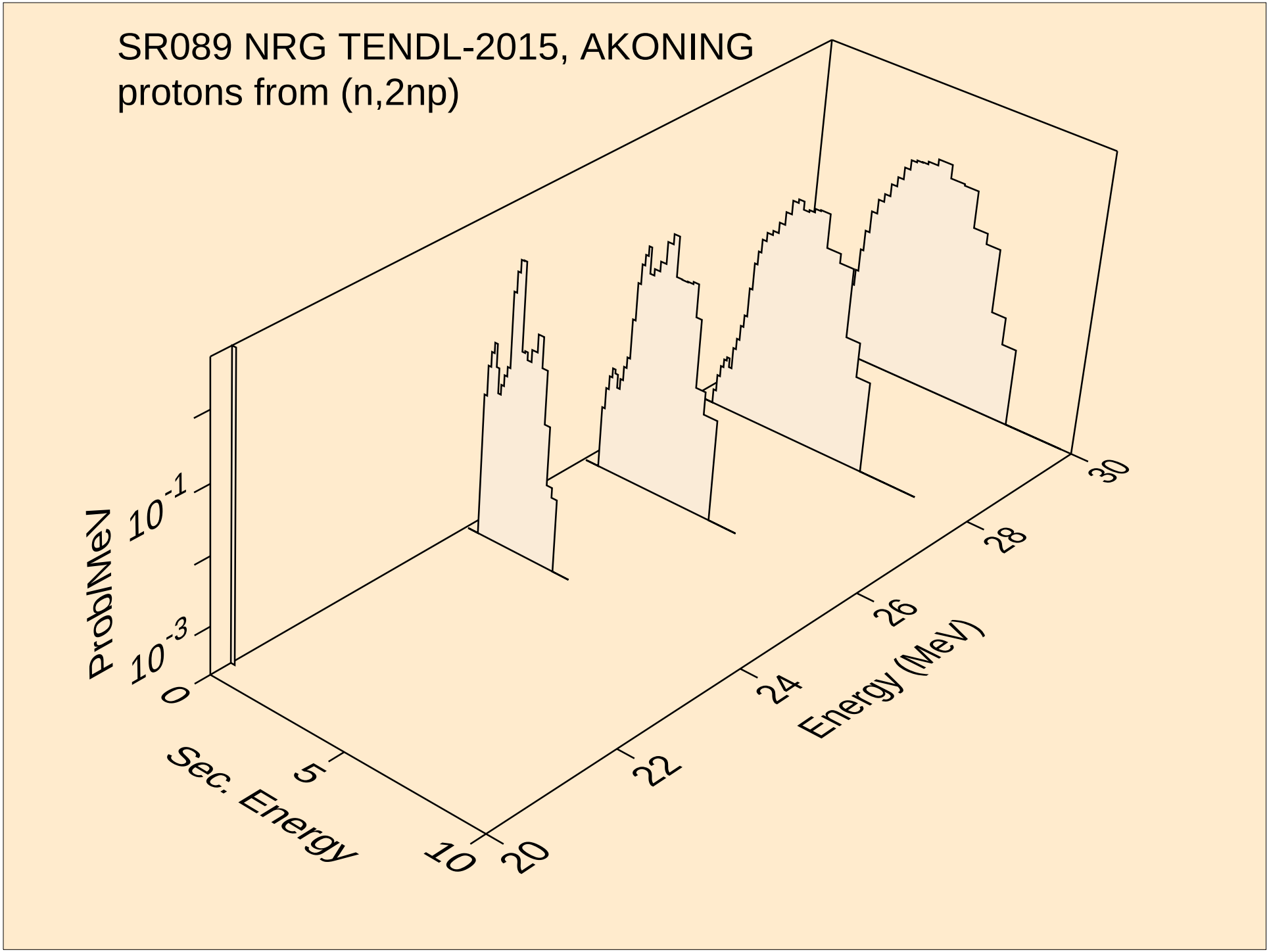

SR089 NRG TENDL-2015, AKONING
Particle production cross sections
Cross section (barns)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
Energy (MeV)
protons
deuterons
tritons
he-3
alphas

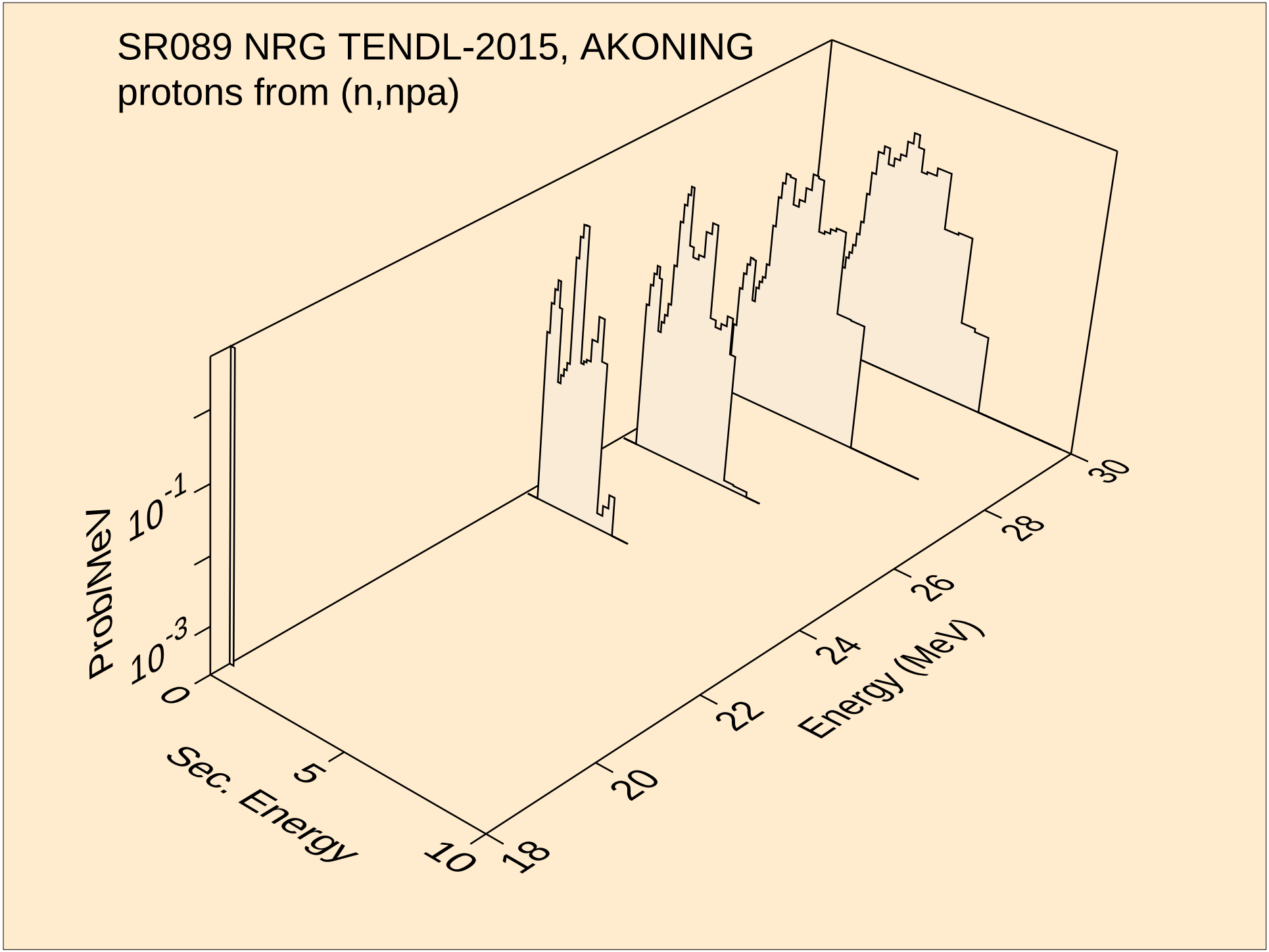

SR089 NRG TENDL-2015, AKONING
protons from (n,x)
Prob/MeV
10-1
10-3
10-5
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

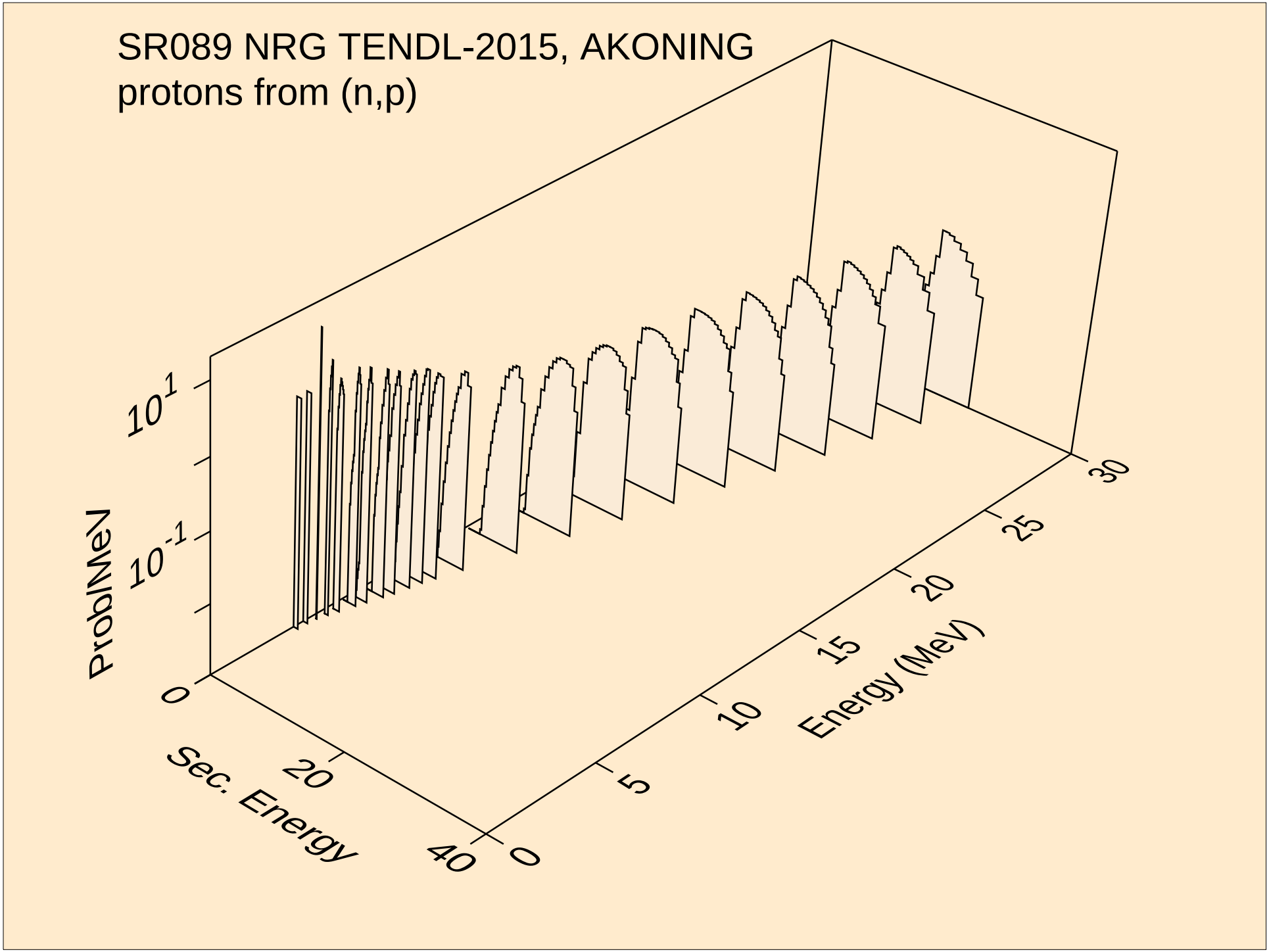

SR089 NRG TENDL-2015, AKONING
protons from (n,n*)p
Prob/MeV
10^0
10^-2
0
Sec. Energy
10
20
Energy (MeV)
10
12
14
16
18
20
22
24
26
28
30

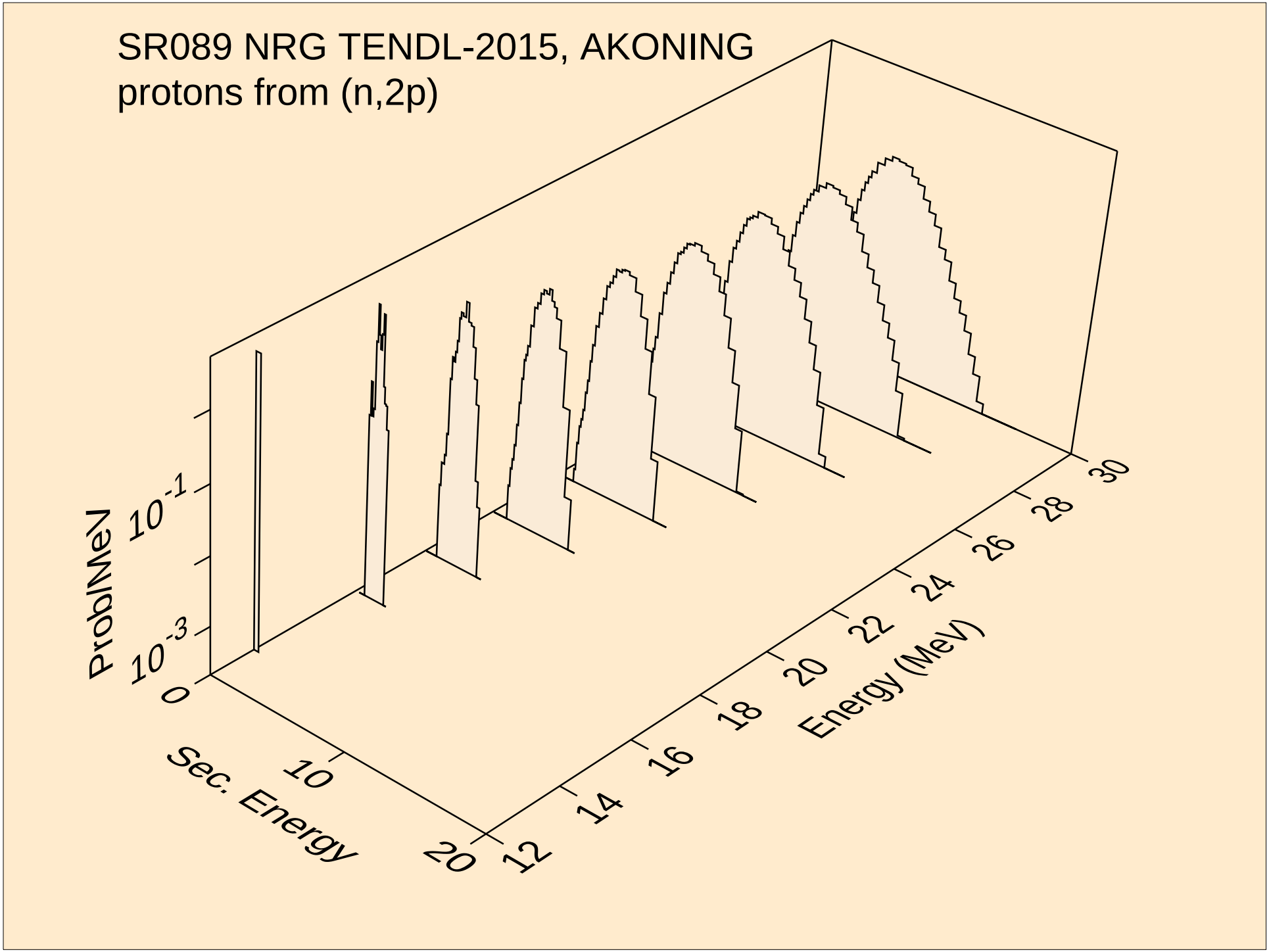

SR089 NRG TENDL-2015, AKONING
protons from (n,2np)
Prob/MeV
$10^{1}$
$10^{-1}$
$10^{-3}$
0
Sec. Energy
10
20
Energy (MeV)
16
18
20
22
24
26
28
30

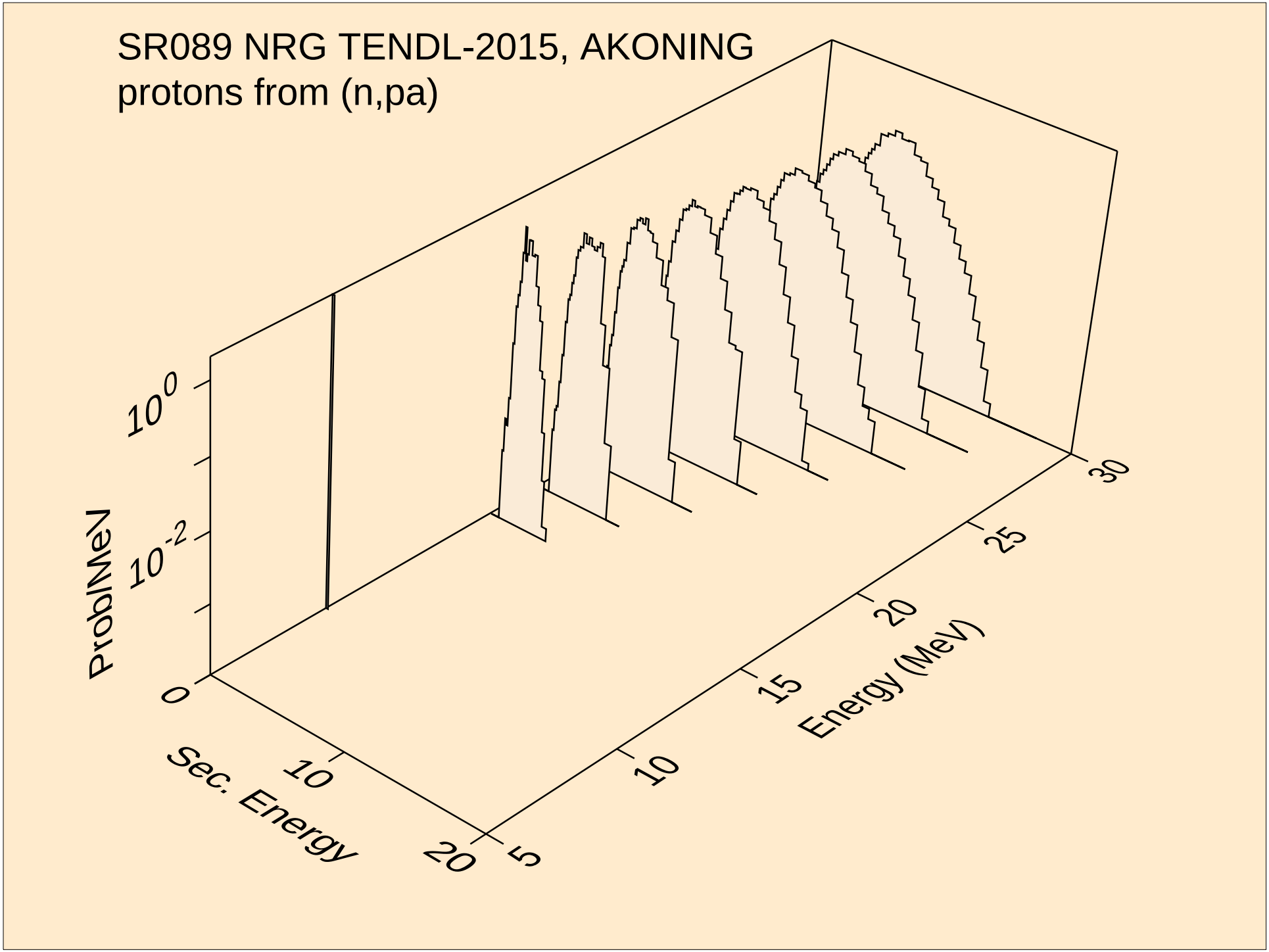

SR089 NRG TENDL-2015, AKONING
protons from (n,3np)
Prob/MeV
10-1
10-3
0
Sec. Energy
2
4
6
27.0
27.5
28.0
28.5
29.0
29.5
30.0
Energy (MeV)

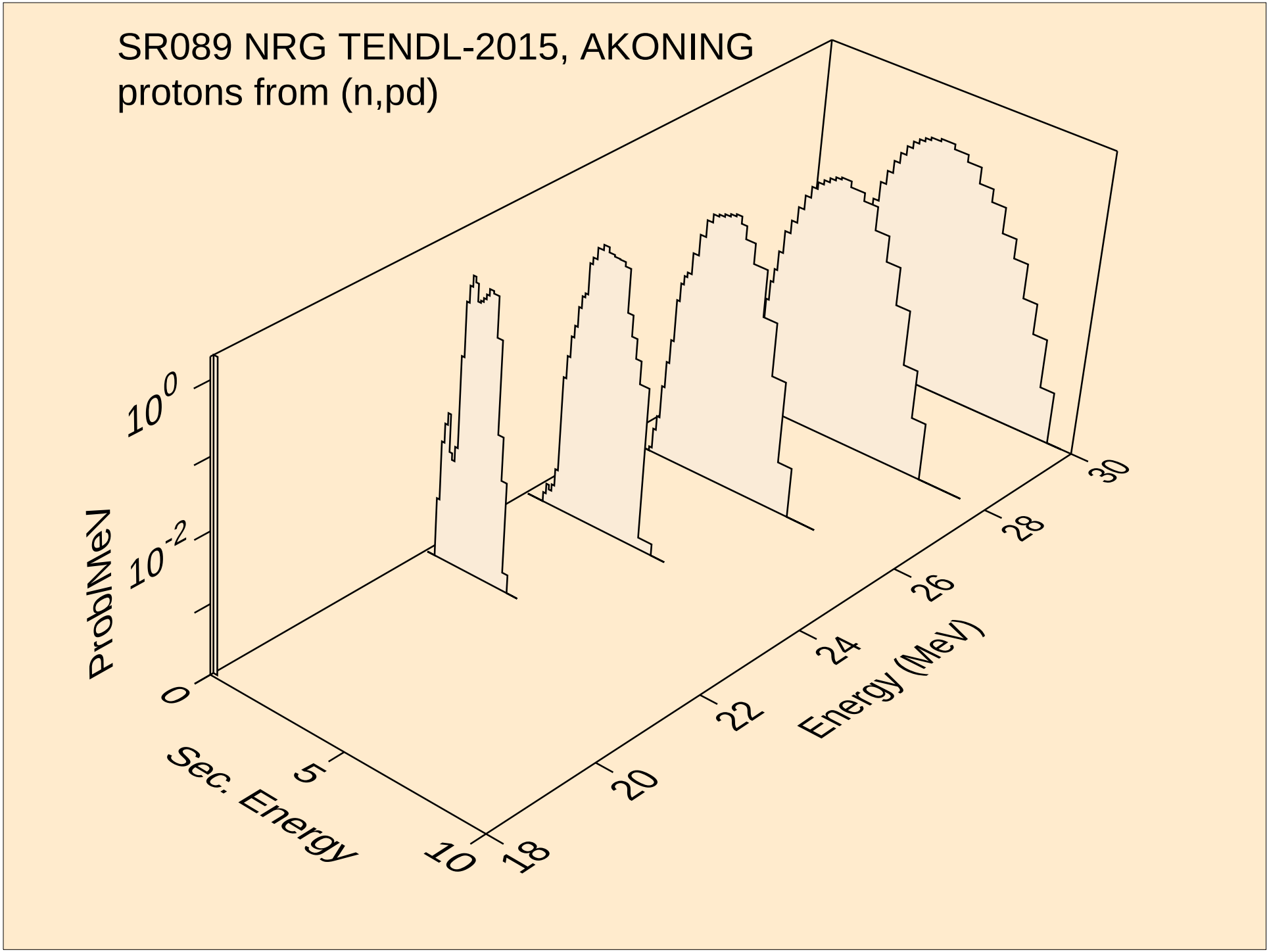

SR089 NRG TENDL-2015, AKONING
protons from (n,2np)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
20
22
24
26
28
30
Energy (MeV)

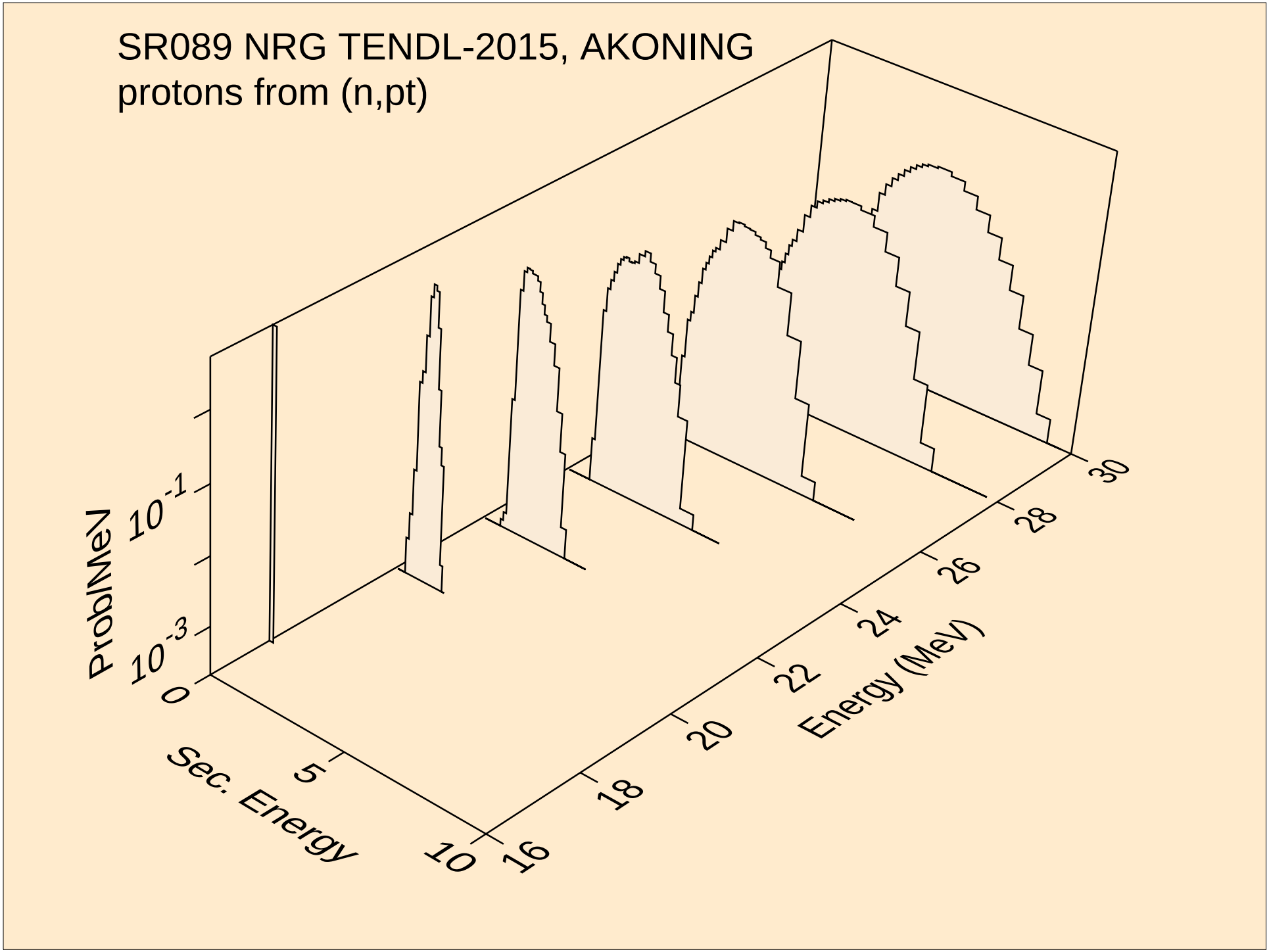

SR089 NRG TENDL-2015, AKONING
protons from (n,npa)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
18
20
22
24
26
28
30
Energy (MeV)

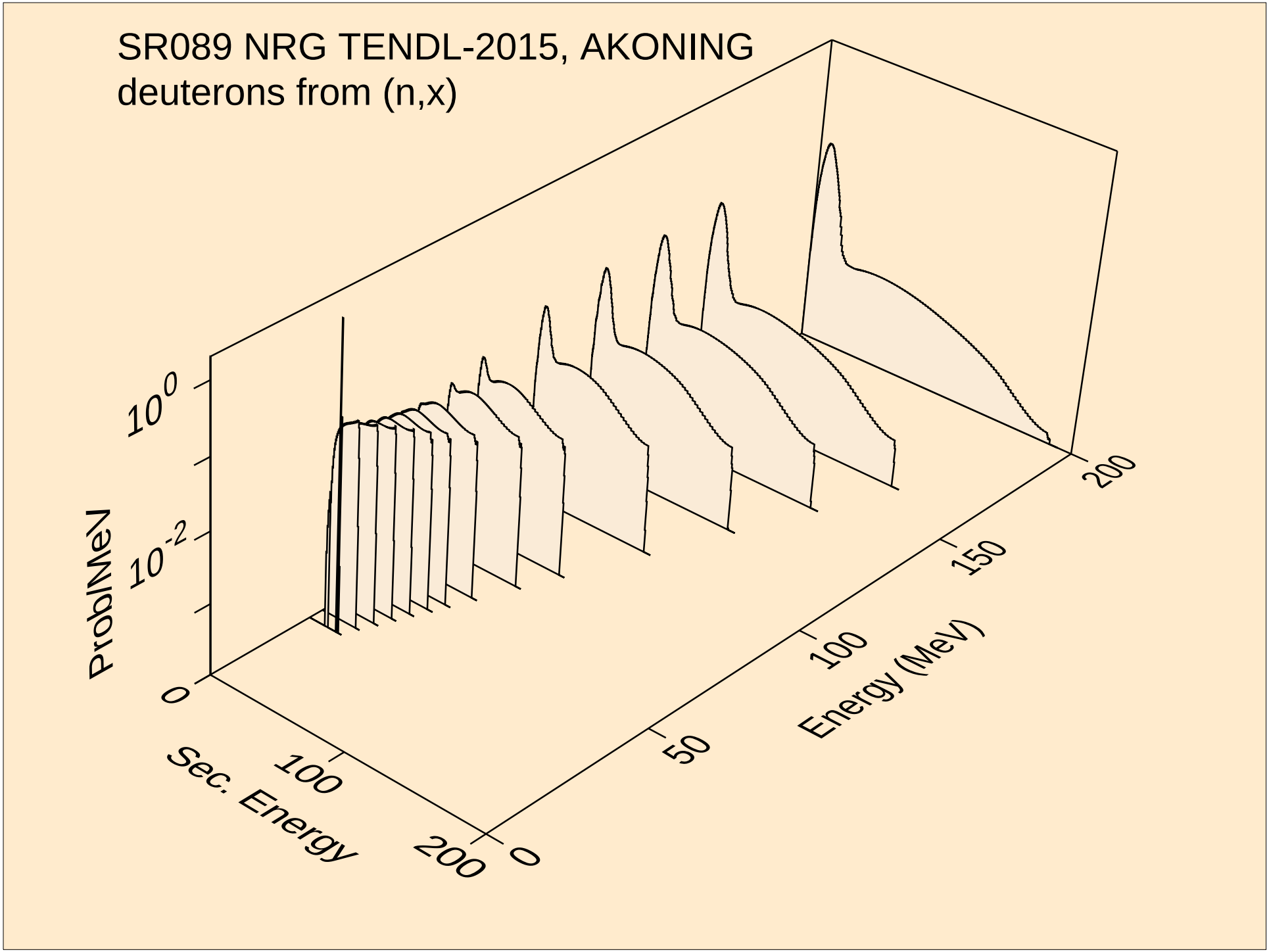

SR089 NRG TENDL-2015, AKONING
protons from (n,p)
Prob/MeV
$10^{1}$
$10^{-1}$
0
20
40
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)

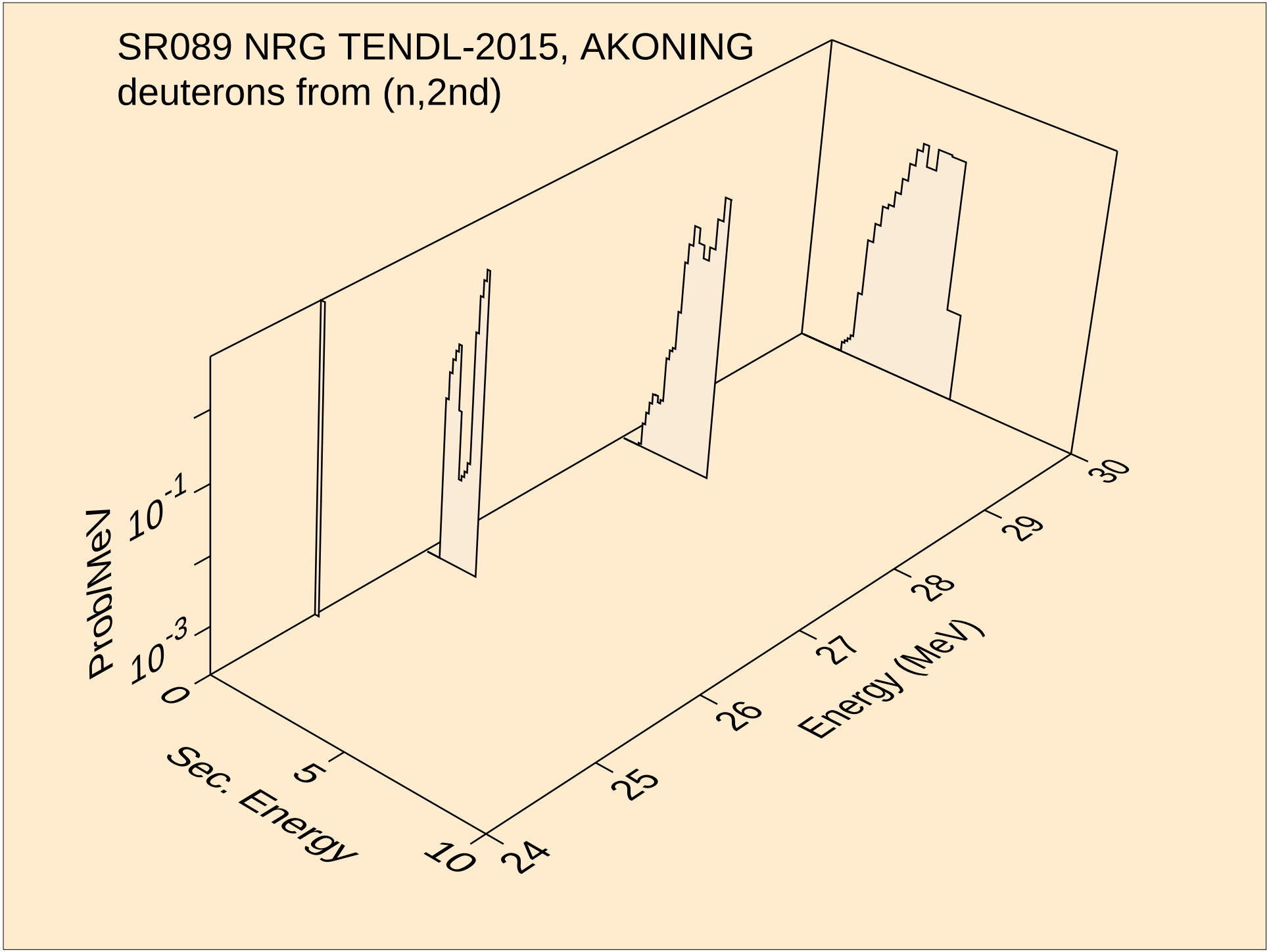

SR089 NRG TENDL-2015, AKONING
protons from (n,2p)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

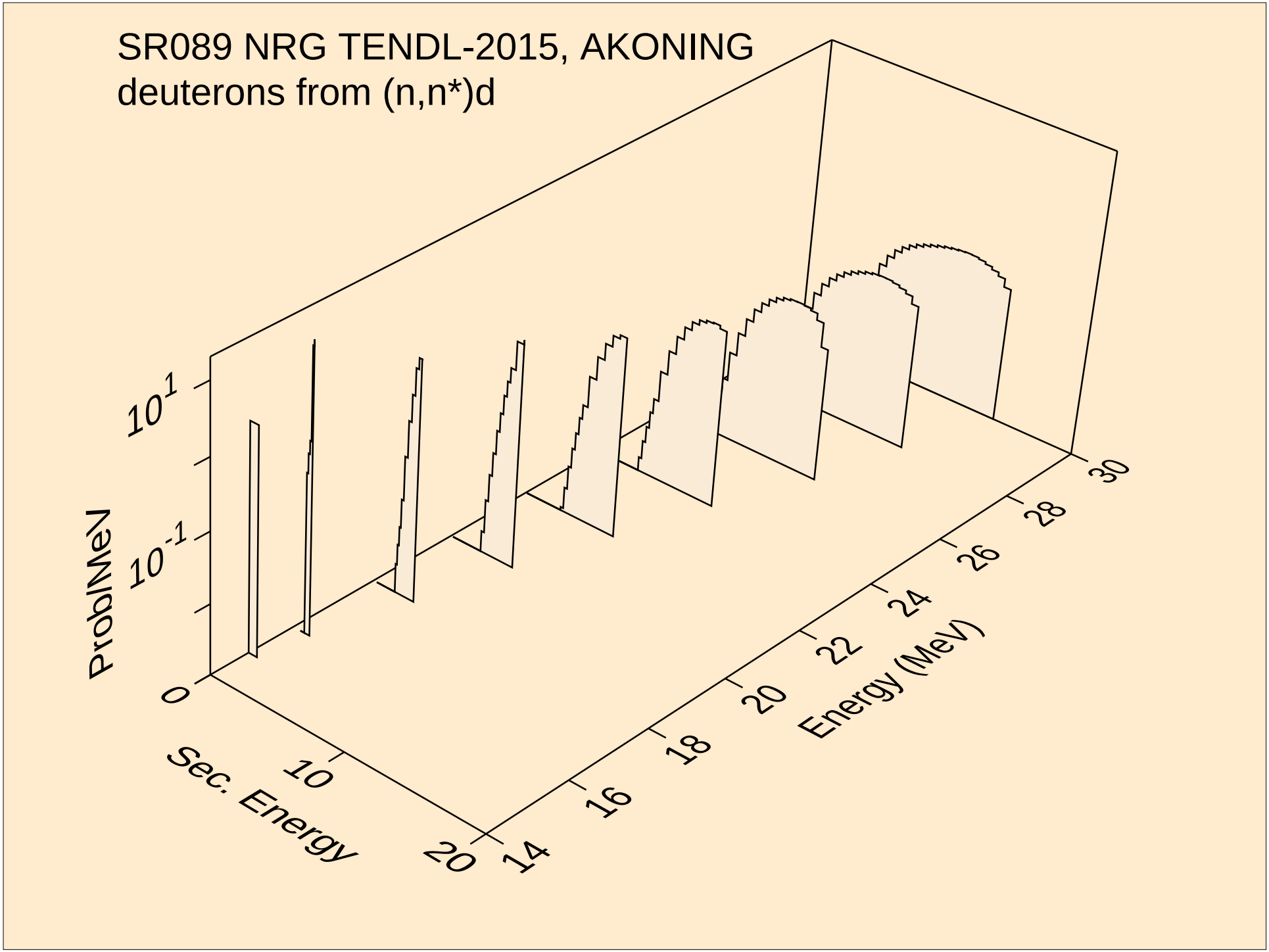

SR089 NRG TENDL-2015, AKONING
protons from (n,pa)
Prob/MeV
10^0
10^-2
0
Sec. Energy
10
20
5
10
15
20
25
30
Energy (MeV)

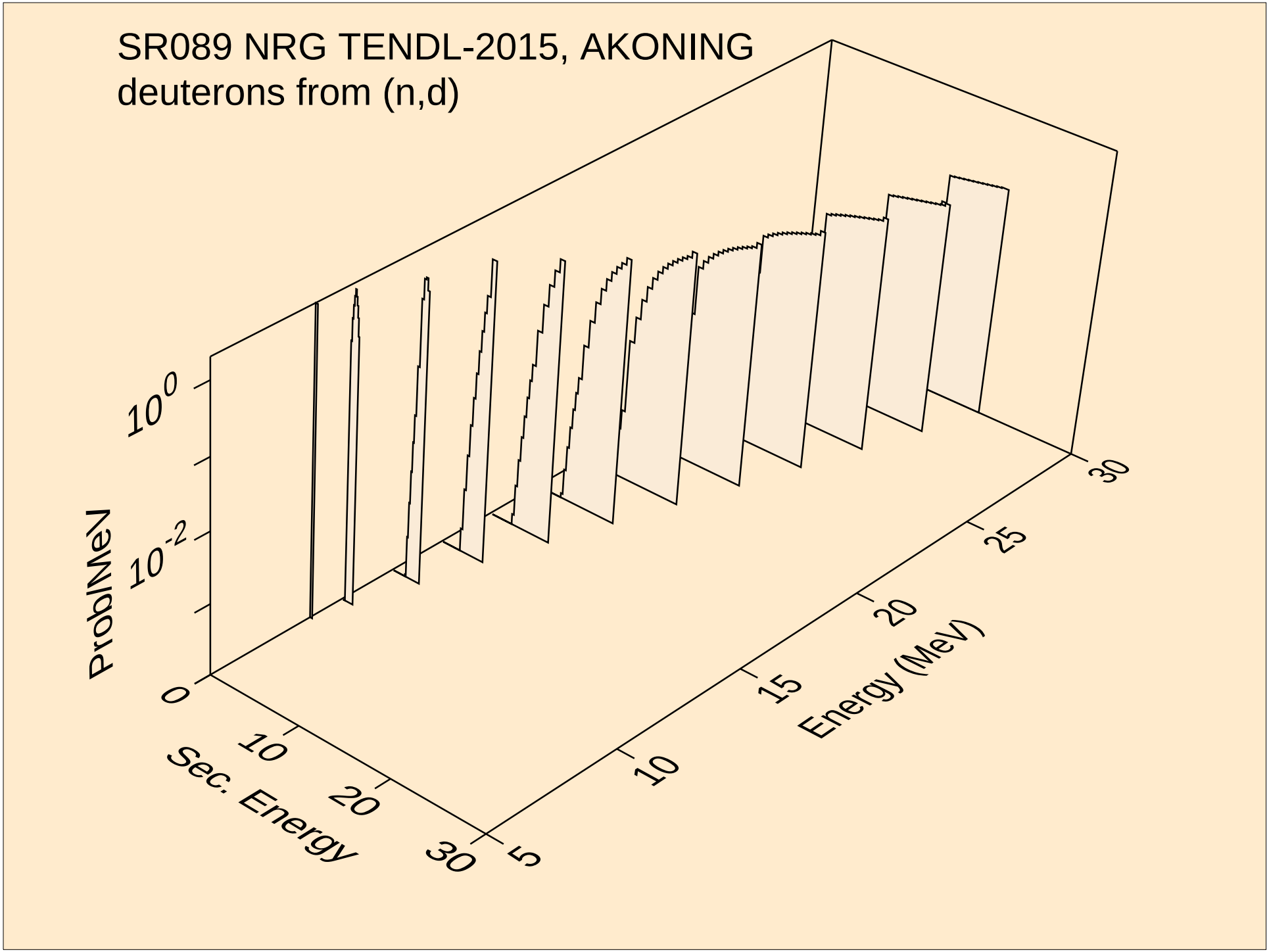

SR089 NRG TENDL-2015, AKONING
protons from (n,pd)
Prob/MeV
$10^{0}$
$10^{-2}$
0
Sec. Energy
5
10
18
20
22
24
26
28
30
Energy (MeV)

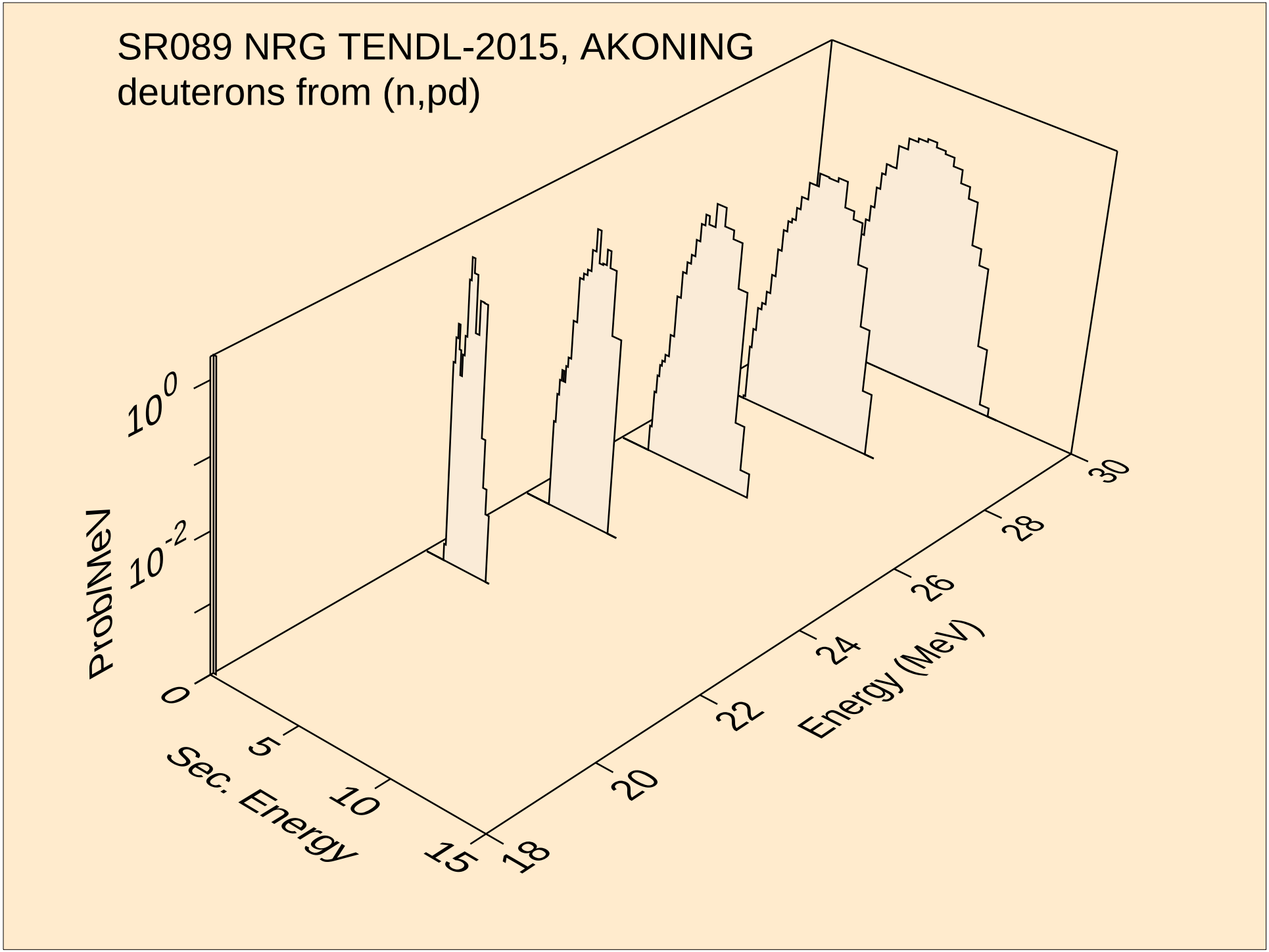

SR089 NRG TENDL-2015, AKONING
protons from (n,pt)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
16
18
20
22
24
26
28
30
Energy (MeV)

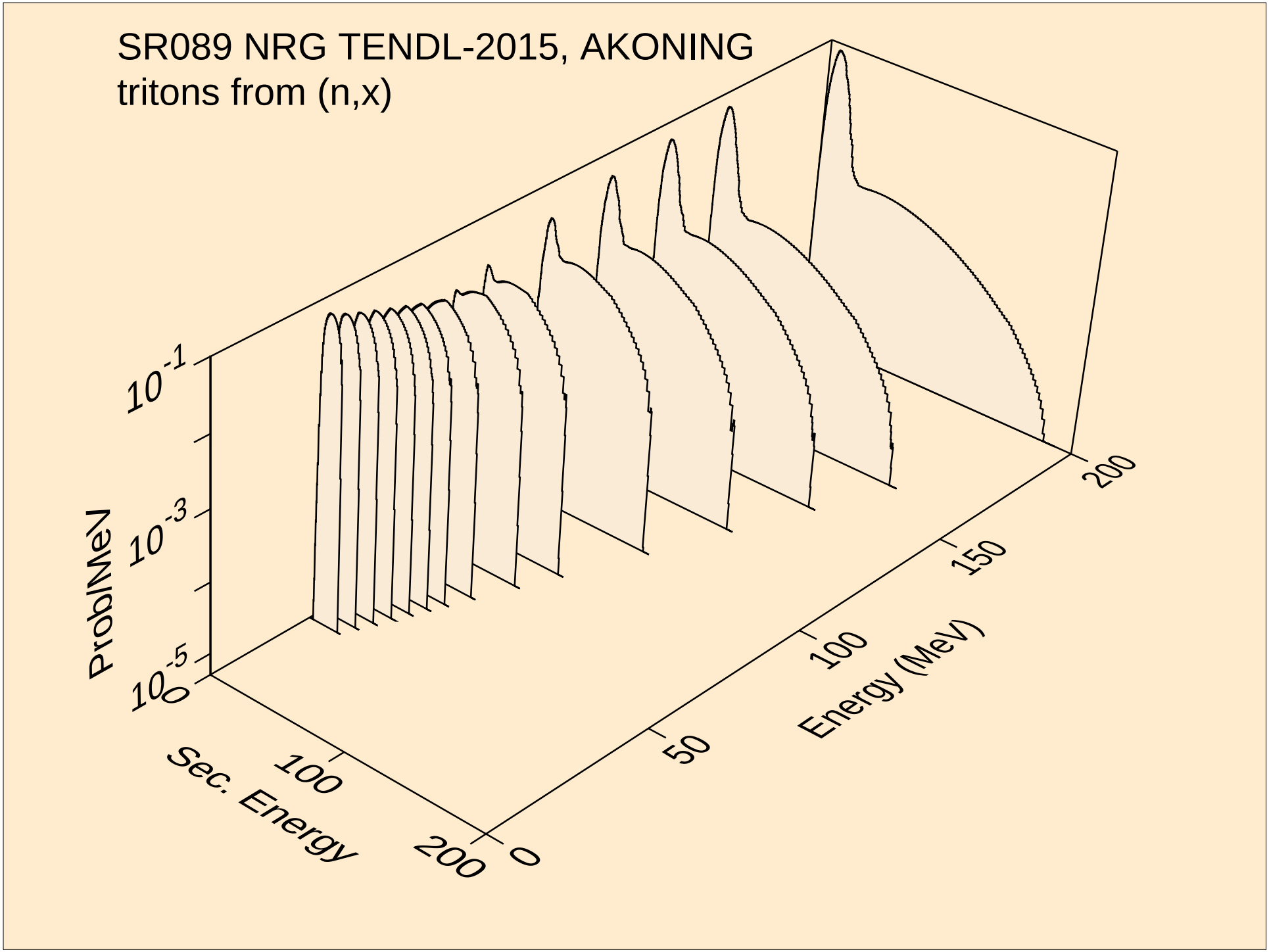

SR089 NRG TENDL-2015, AKONING
deuterons from (n,x)
Prob/MeV
10^0
10^-2
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

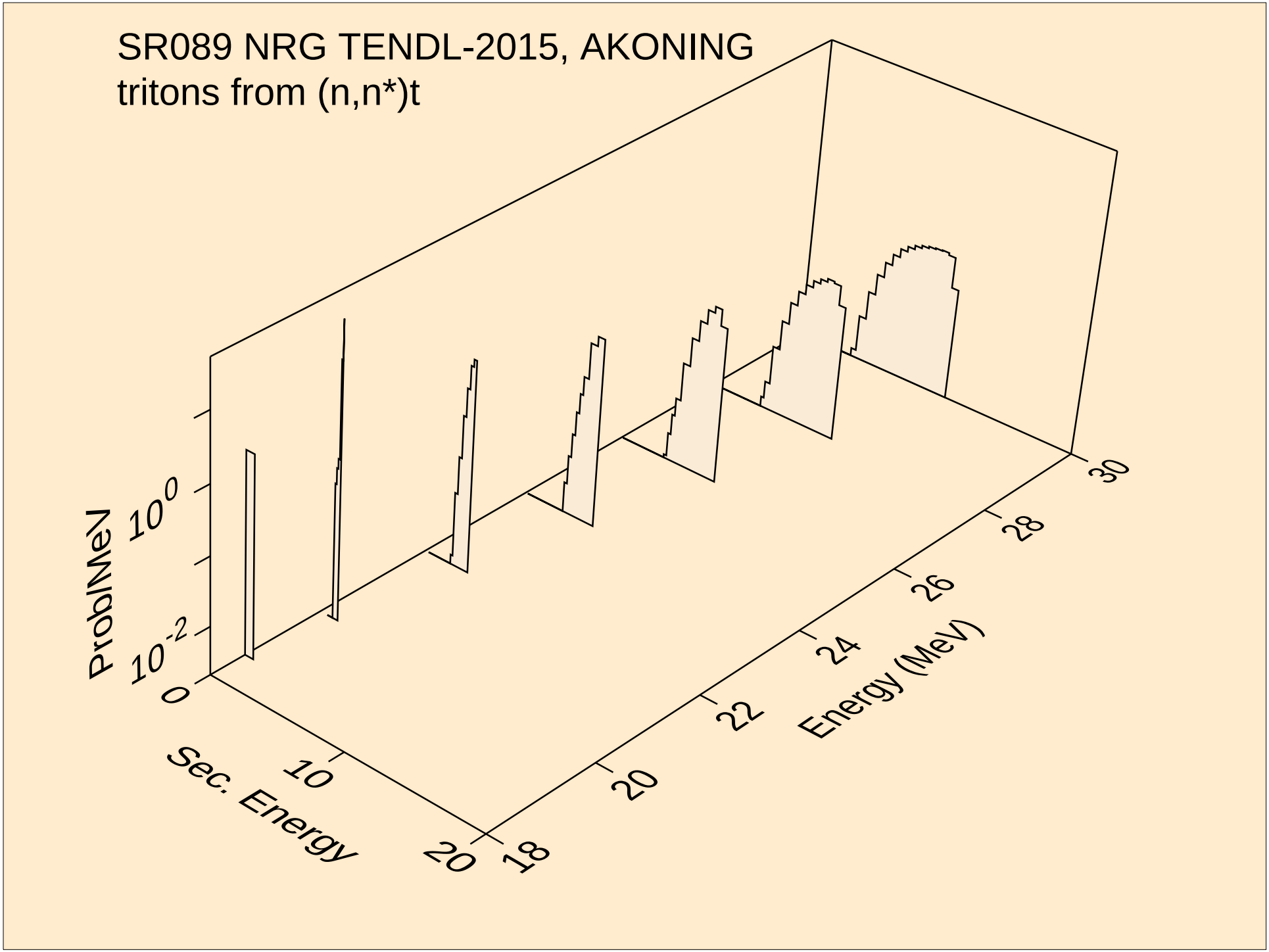

SR089 NRG TENDL-2015, AKONING
deuterons from (n,2nd)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
24
25
26
27
28
29
30
Energy (MeV)

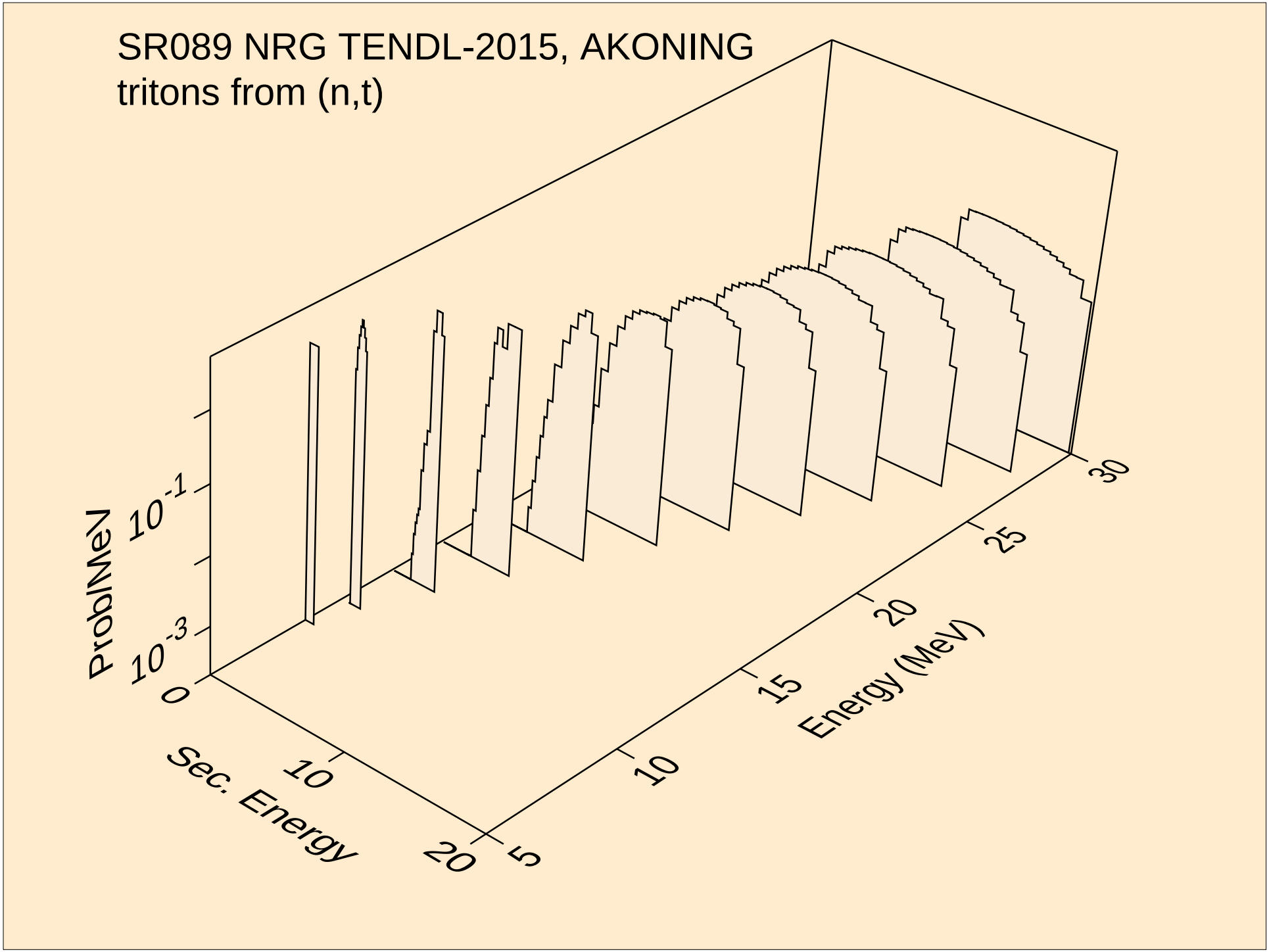

SR089 NRG TENDL-2015, AKONING
deuterons from (n,n*)d
Prob/MeV
10^1
10^-1
0
Sec. Energy
10
20
14
16
18
20
22
24
26
28
30
Energy (MeV)

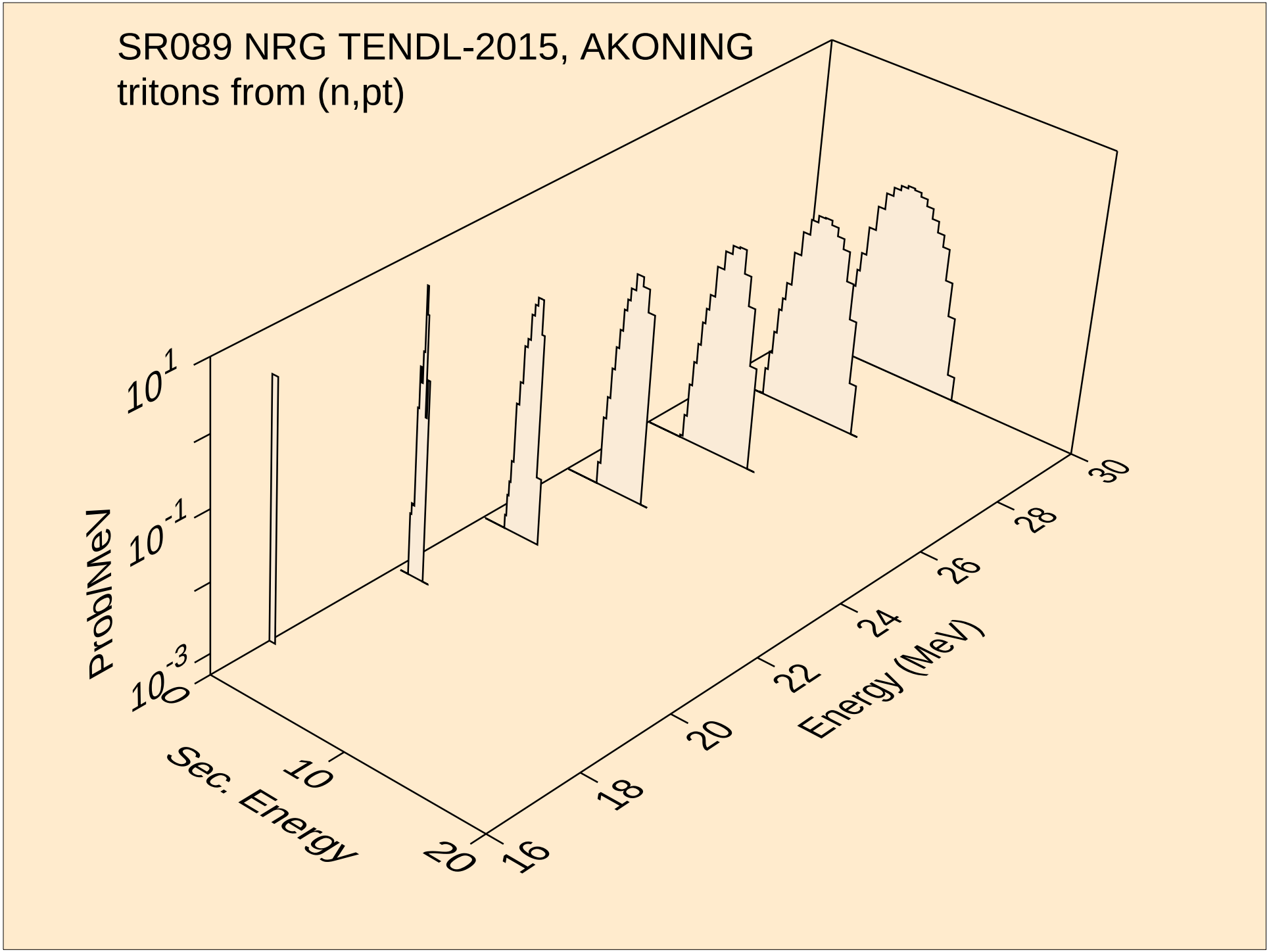

SR089 NRG TENDL-2015, AKONING
deuterons from (n,d)
Prob/MeV
$10^{0}$
$10^{-2}$
0
Sec. Energy
10
20
30
5
10
15
20
25
30
Energy (MeV)

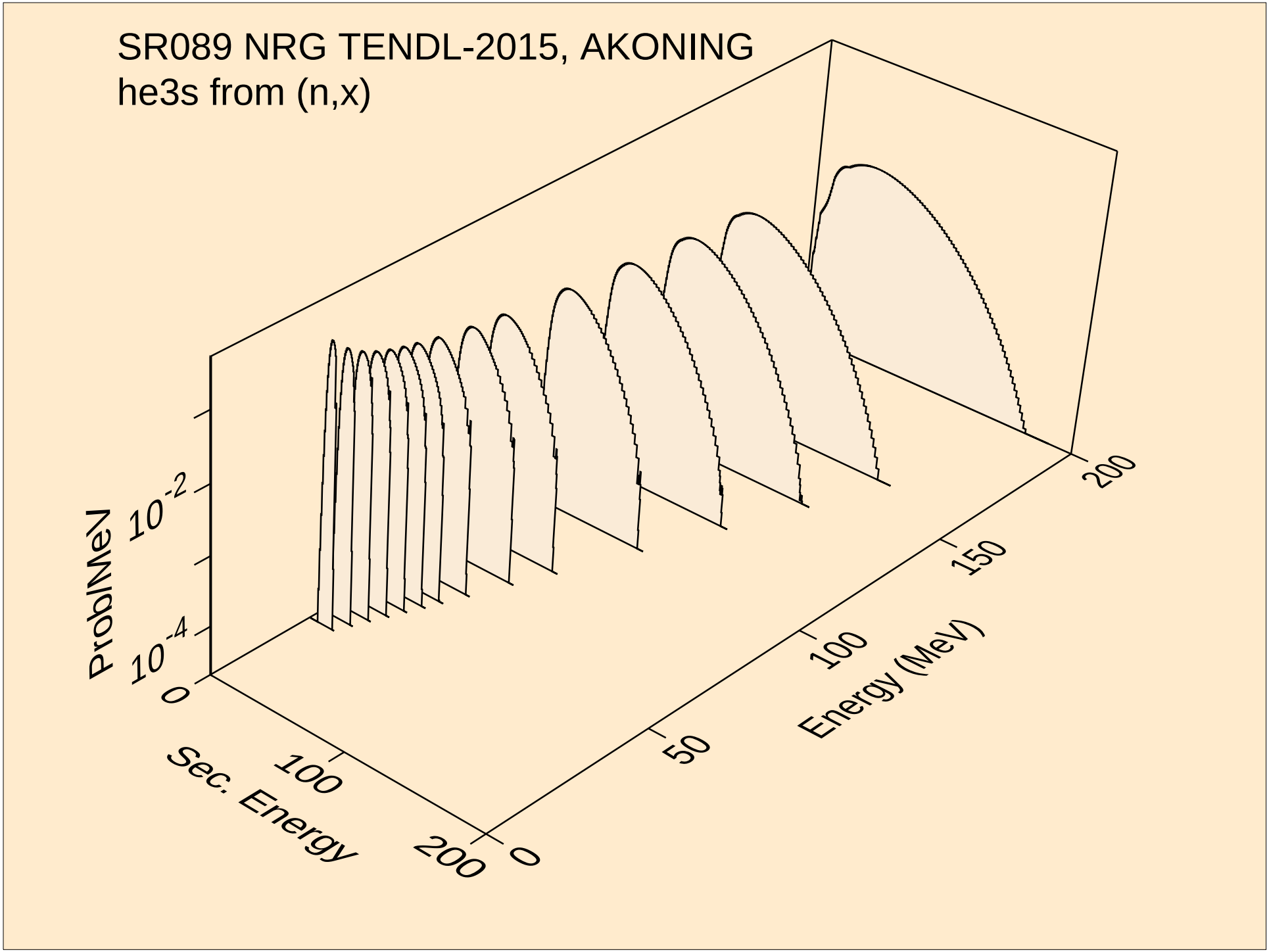

SR089 NRG TENDL-2015, AKONING
deuterons from (n,pd)
Prob/MeV
$10^{0}$
$10^{-2}$
0
5
10
15
18
Sec. Energy
20
22
24
26
28
30
Energy (MeV)

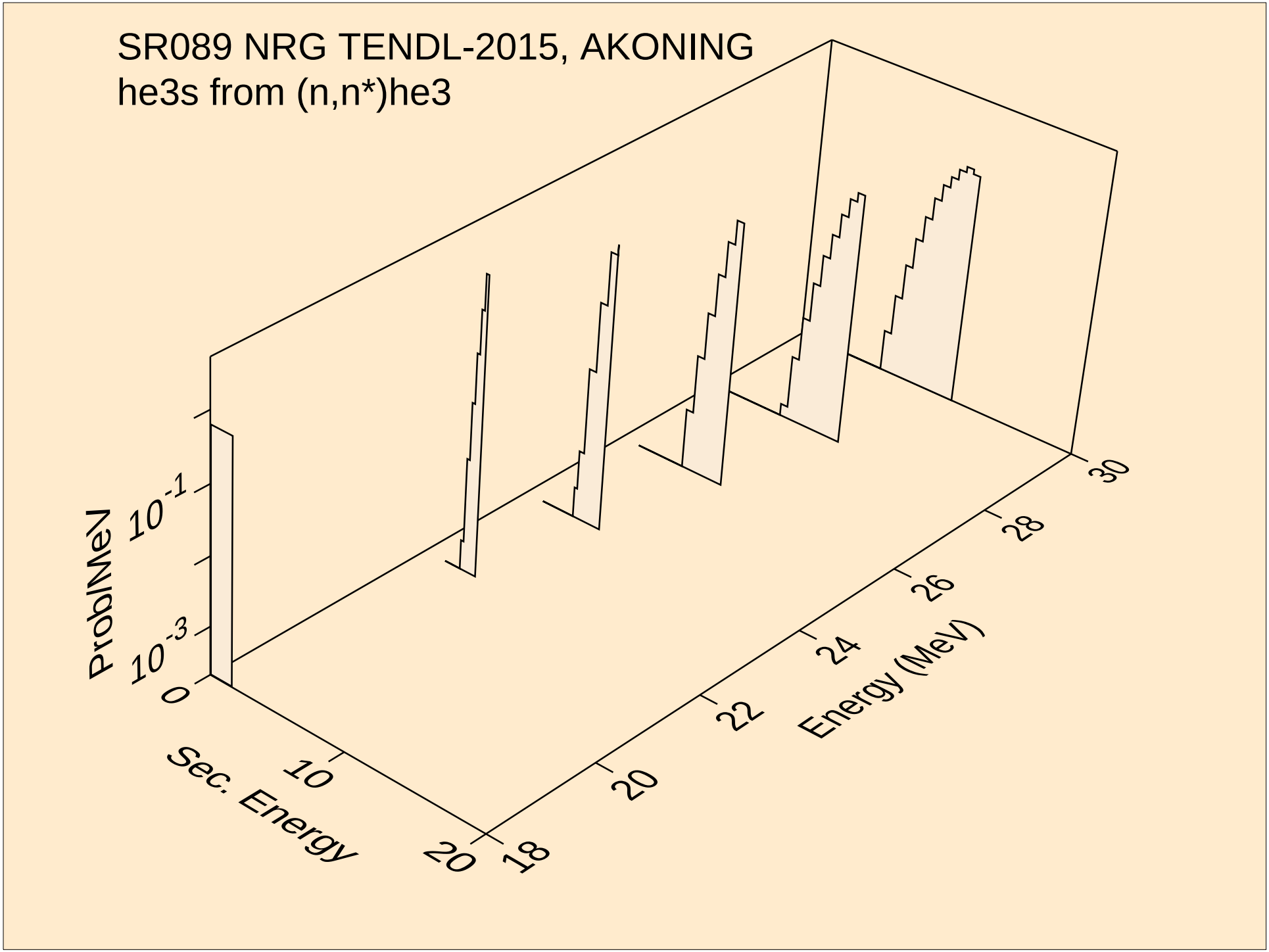

SR089 NRG TENDL-2015, AKONING
tritons from (n,x)
Prob/MeV
10-1
10-3
10-5
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

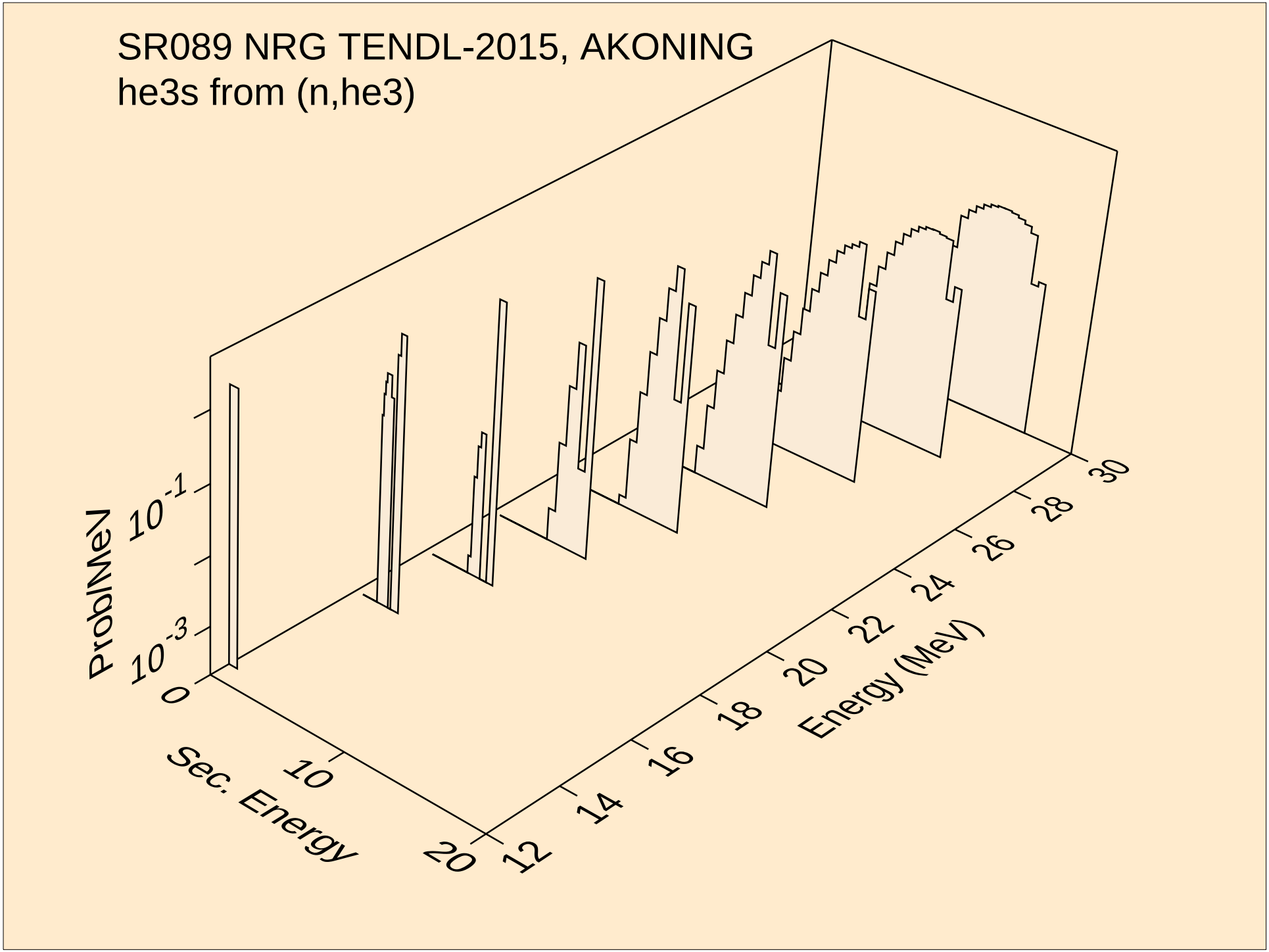

SR089 NRG TENDL-2015, AKONING
tritons from (n,n*)t
Prob/MeV
10^0
10^-2
0
Sec. Energy
10
20
18
20
22
24
26
28
30
Energy (MeV)

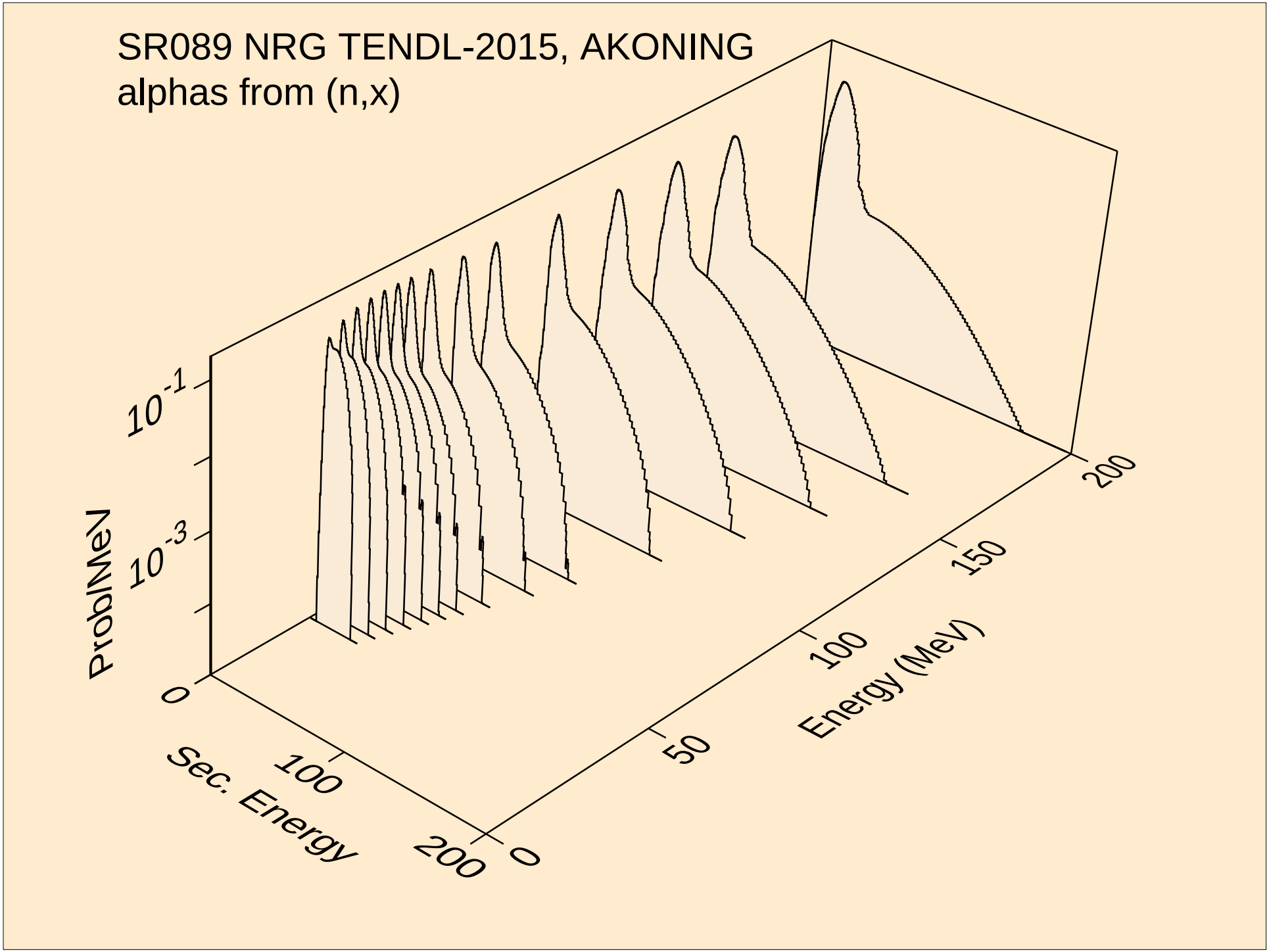

SR089 NRG TENDL-2015, AKONING
tritons from (n,t)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
5
10
15
20
25
30
Energy (MeV)

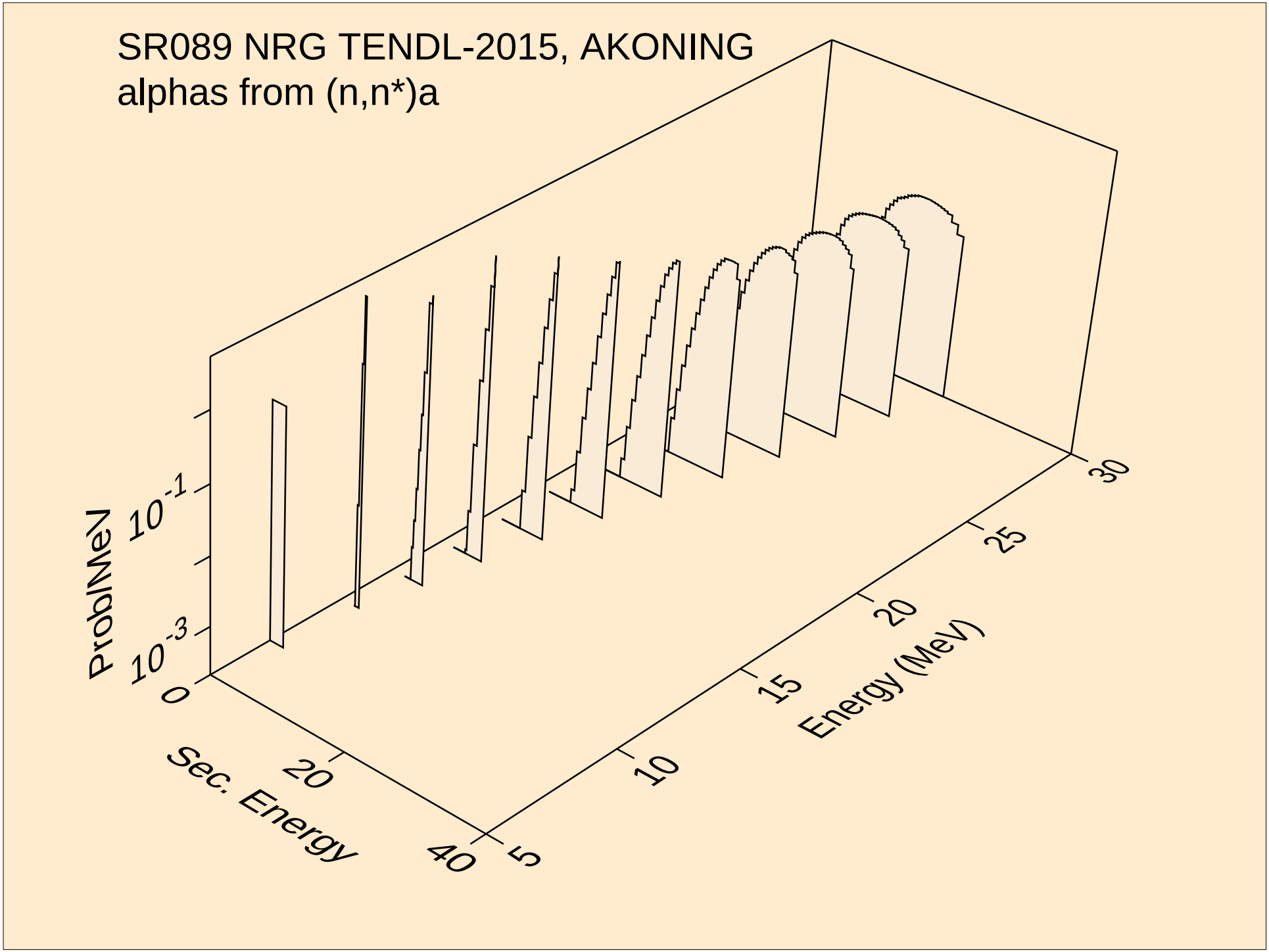

SR089 NRG TENDL-2015, AKONING
tritons from (n,pt)
Prob/MeV
$10^{1}$
$10^{-1}$
$10^{-3}$
0
Sec. Energy
10
20
16
18
20
22
24
26
28
30
Energy (MeV)

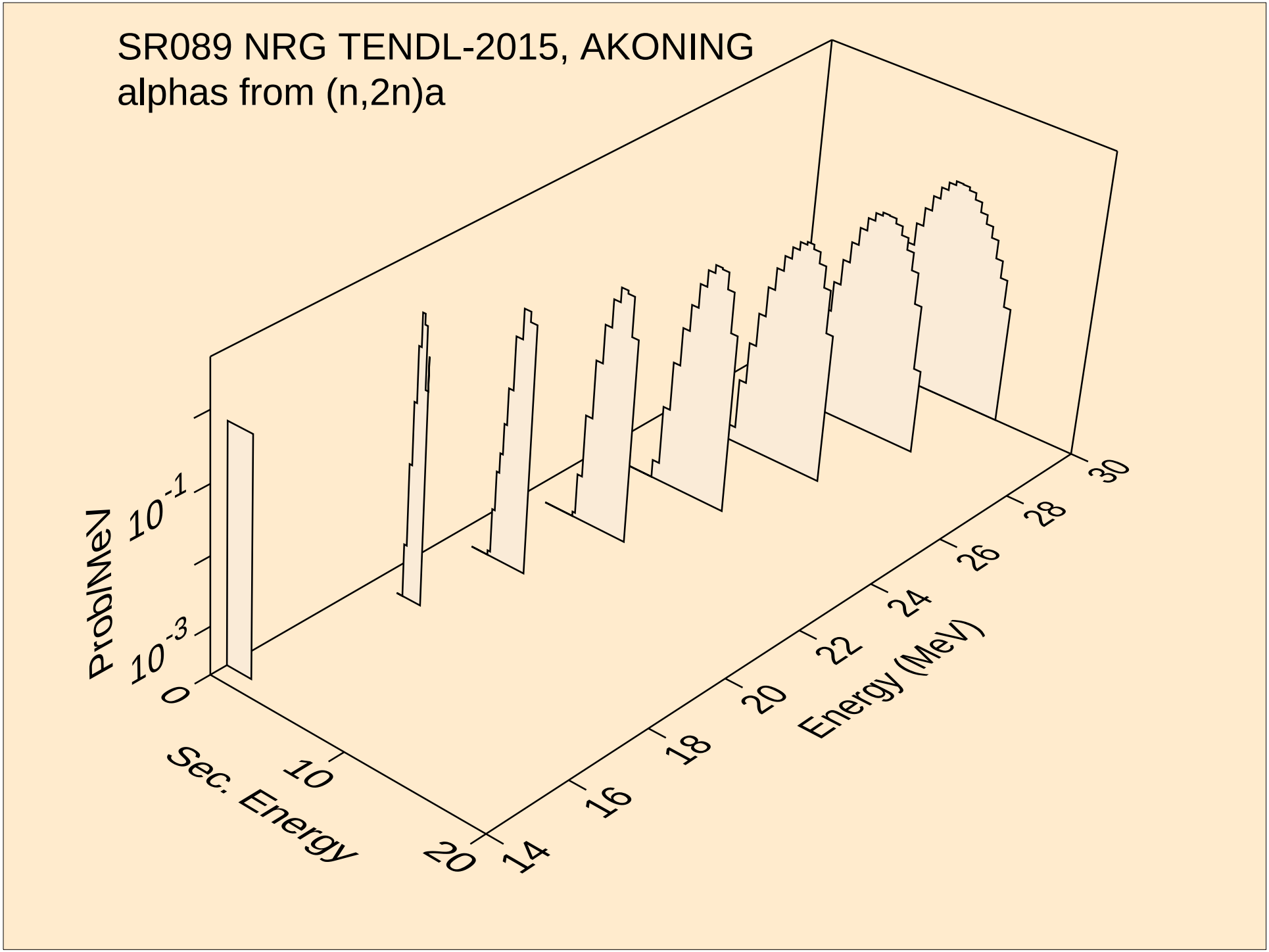

SR089 NRG TENDL-2015, AKONING
he3s from (n,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

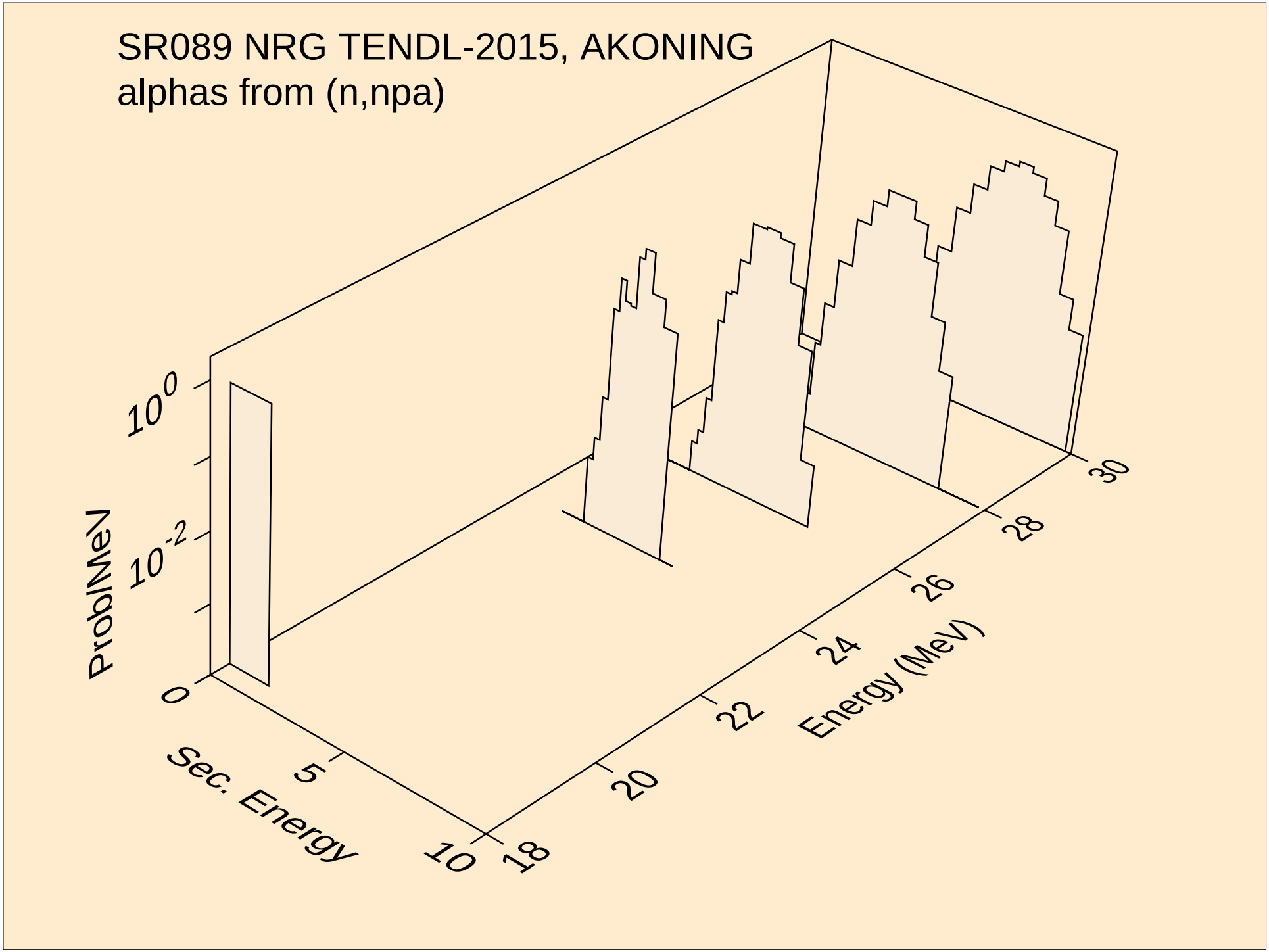

SR089 NRG TENDL-2015, AKONING
he3s from (n,n*)he3
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
18
20
22
24
26
28
30
Energy (MeV)

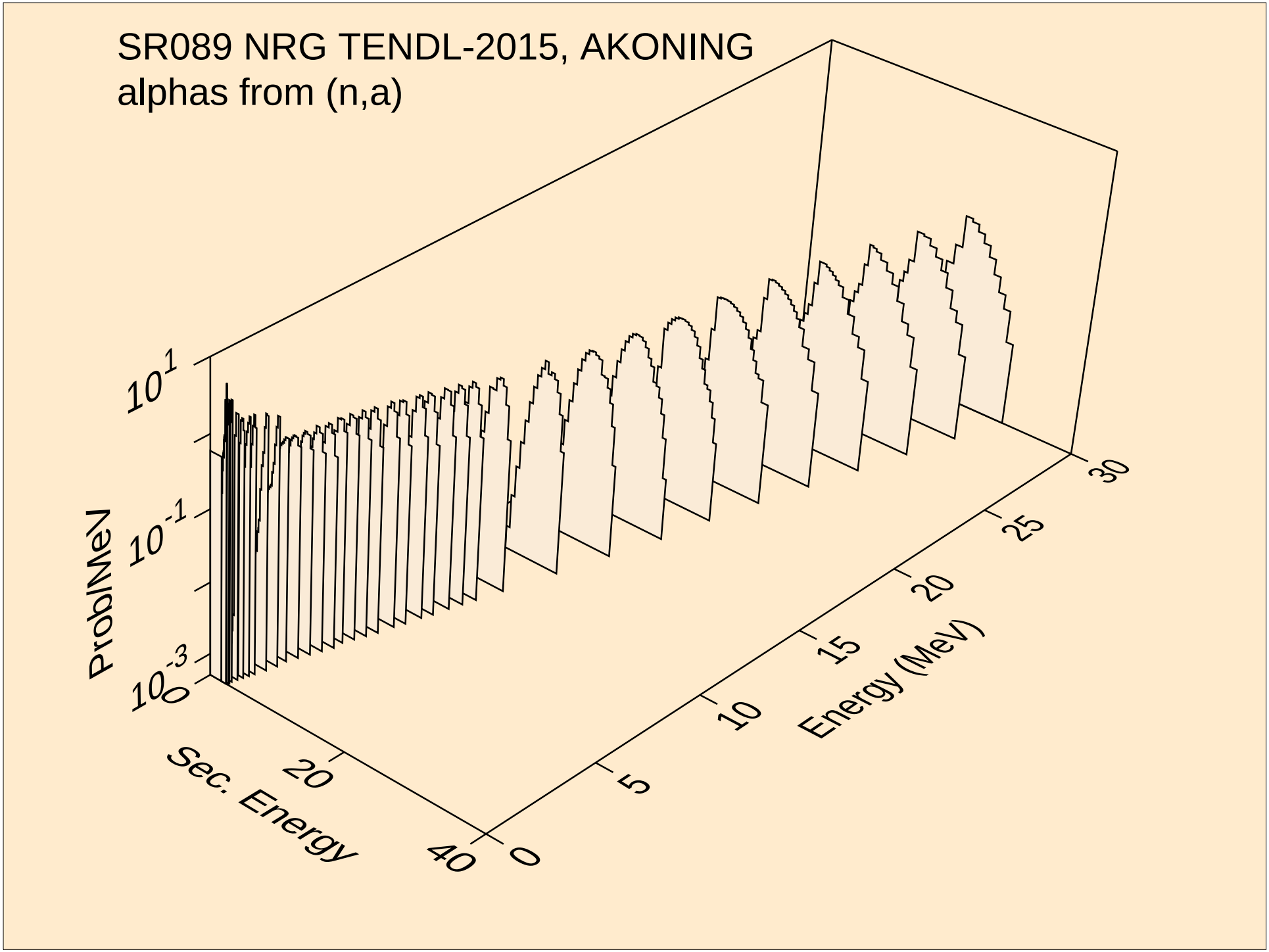

SR089 NRG TENDL-2015, AKONING
he3s from (n,he3)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
12
14
16
18
20
22
24
26
28
30
Energy (MeV)

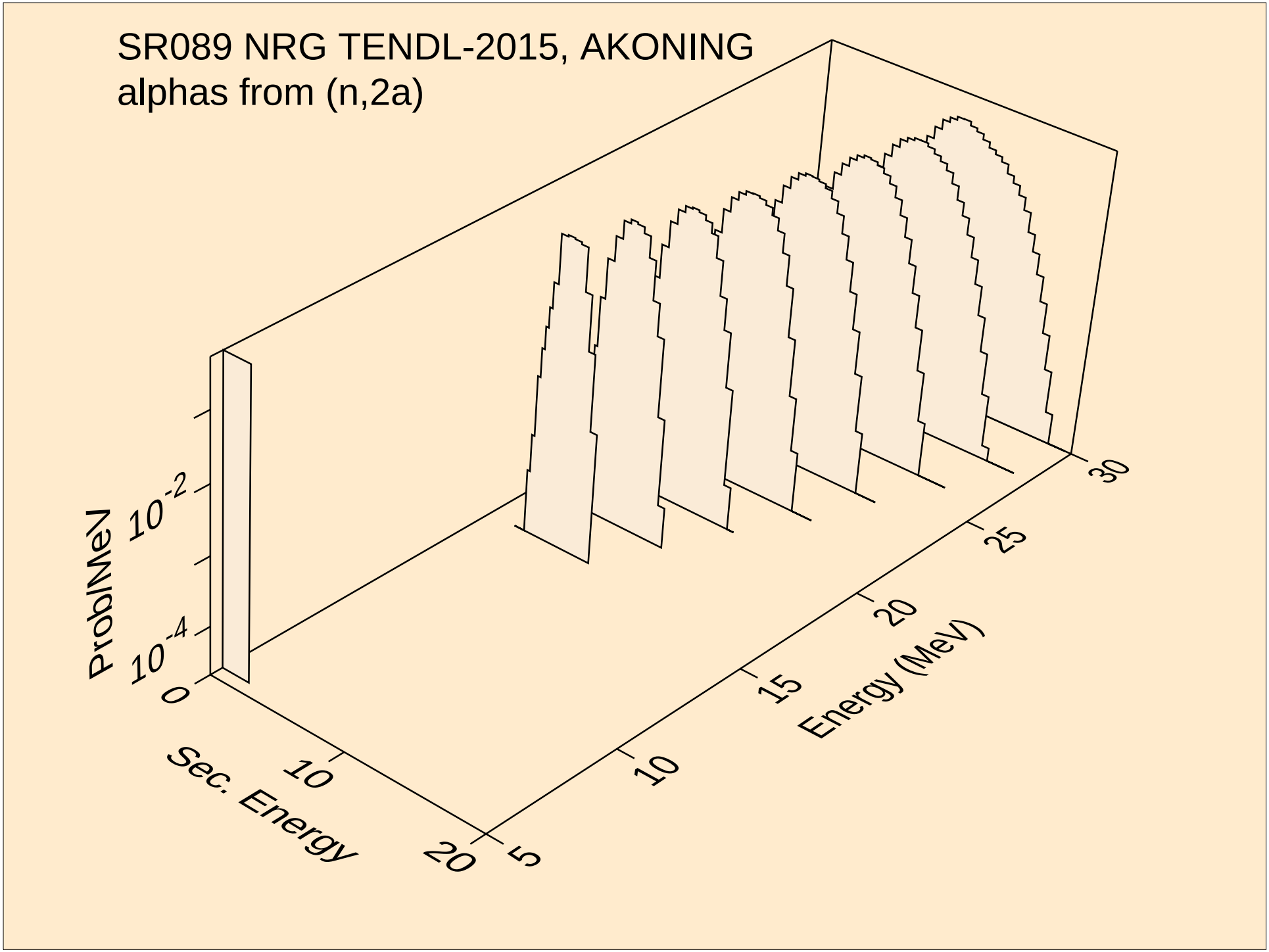

SR089 NRG TENDL-2015, AKONING
alphas from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

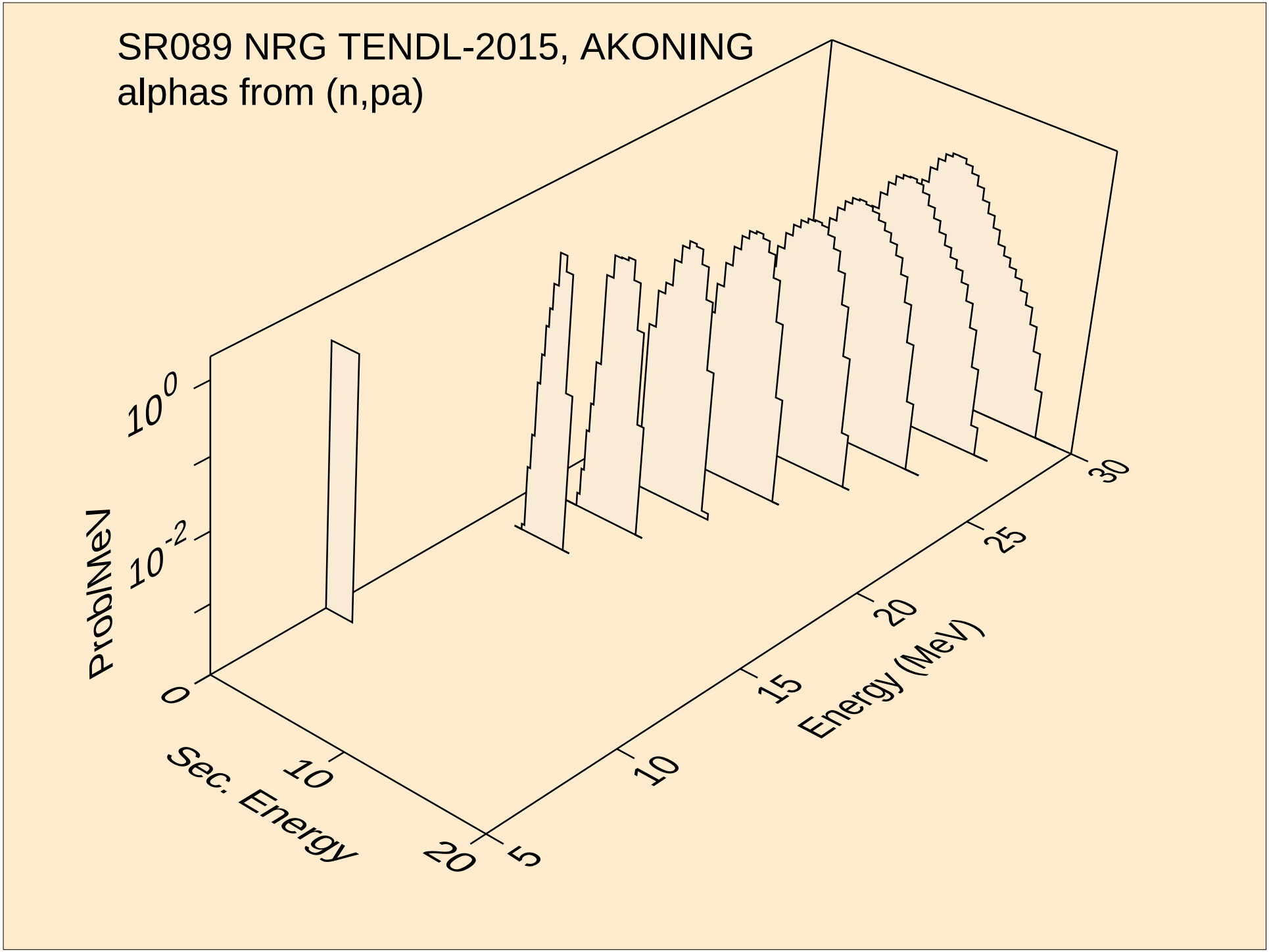

SR089 NRG TENDL-2015, AKONING
alphas from (n,n*)a
Prob/MeV
10-1
10-3
0
Sec. Energy
20
40
5
10
15
20
25
30
Energy (MeV)


SR089 NRG TENDL-2015, AKONING
alphas from (n,2n)a
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
14
16
18
20
22
24
26
28
30
Energy (MeV)


SR089 NRG TENDL-2015, AKONING
alphas from (n,npa)
Prob/MeV
$10^{0}$
$10^{-2}$
0
Sec. Energy
5
10
18
20
22
24
26
28
30
Energy (MeV)


SR089 NRG TENDL-2015, AKONING
alphas from (n,a)
Prob/MeV
10^1
10^-1
10^-3
0
20
40
Sec. Energy
0
5
10
15
20
25
30
Energy (MeV)


SR089 NRG TENDL-2015, AKONING
alphas from (n,2a)
Prob/MeV
10-2
10-4
0
Sec. Energy
10
20
5
10
15
20
25
30
Energy (MeV)


SR089 NRG TENDL-2015, AKONING
alphas from (n,pa)
Prob/MeV
$10^{0}$
$10^{-2}$
0
Sec. Energy
10
20
5
10
15
20
25
30
Energy (MeV)