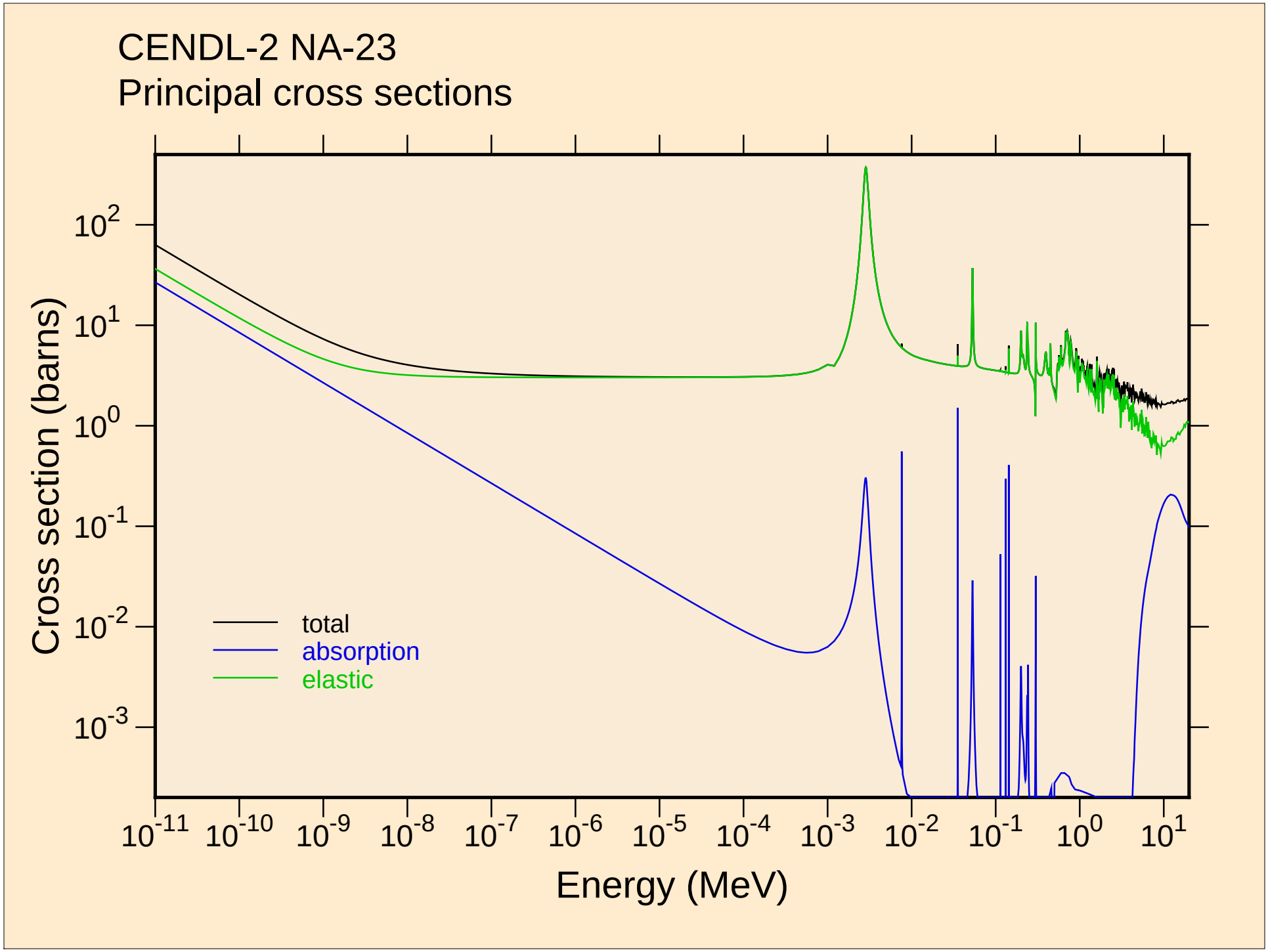
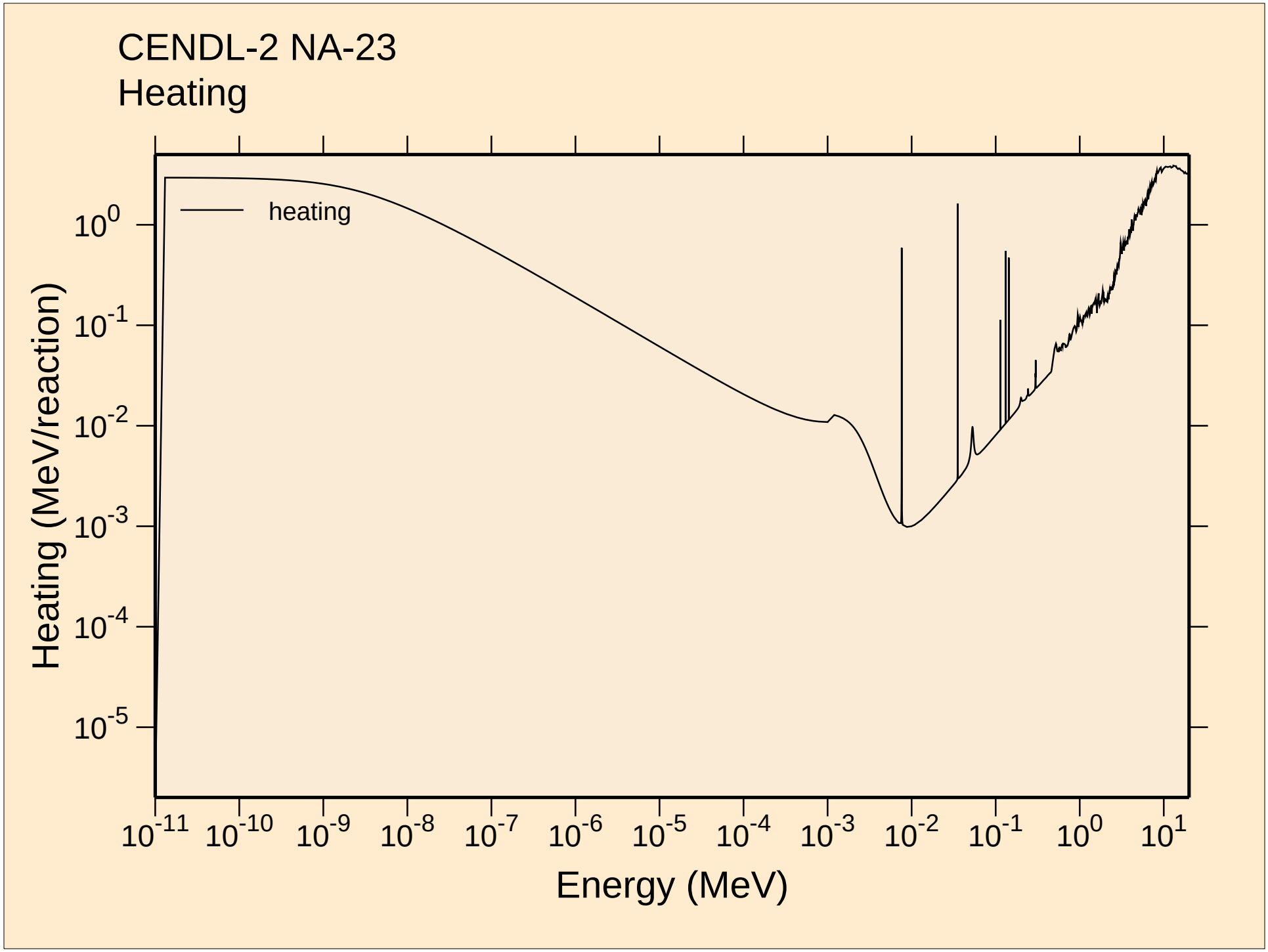
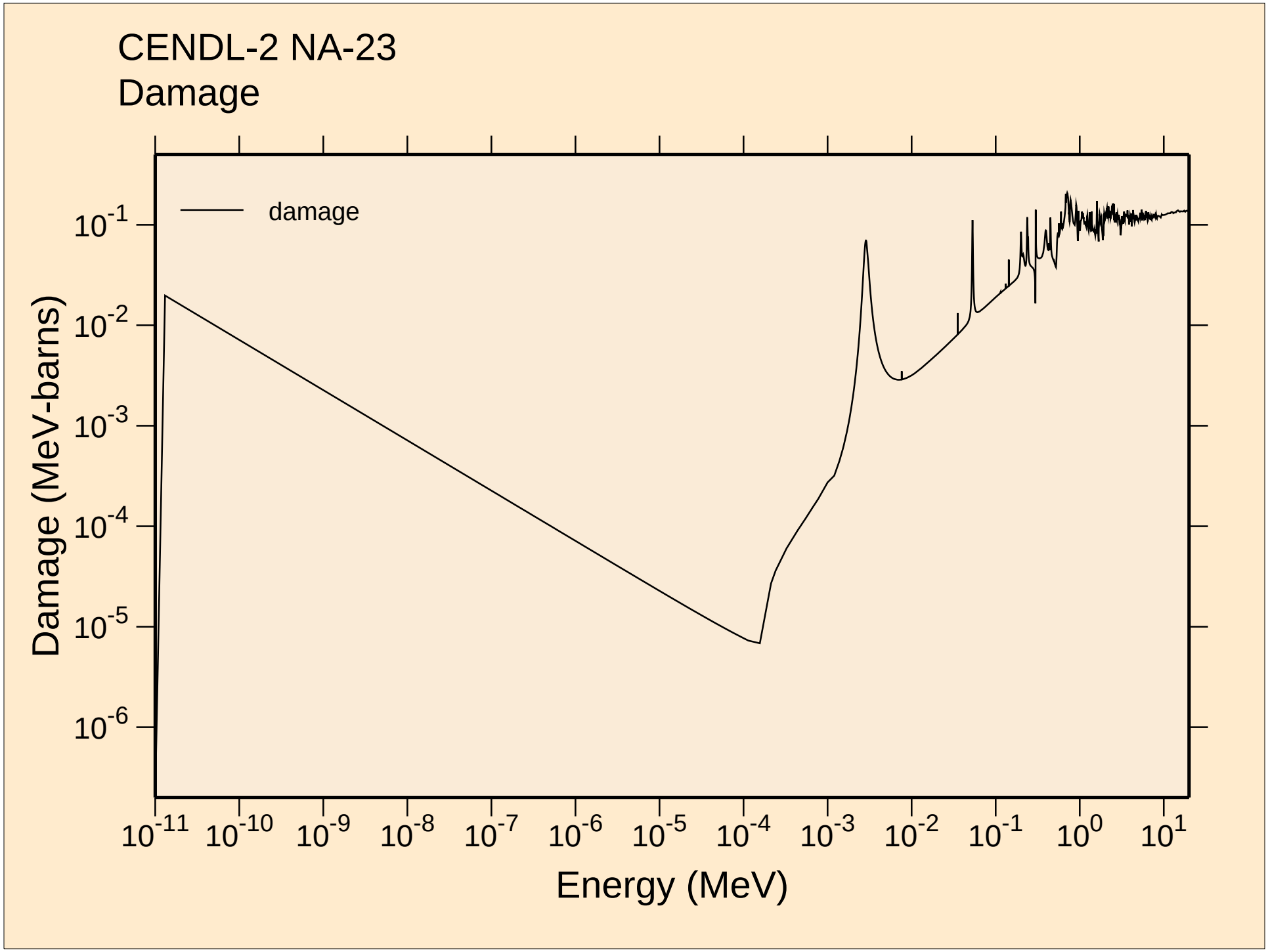
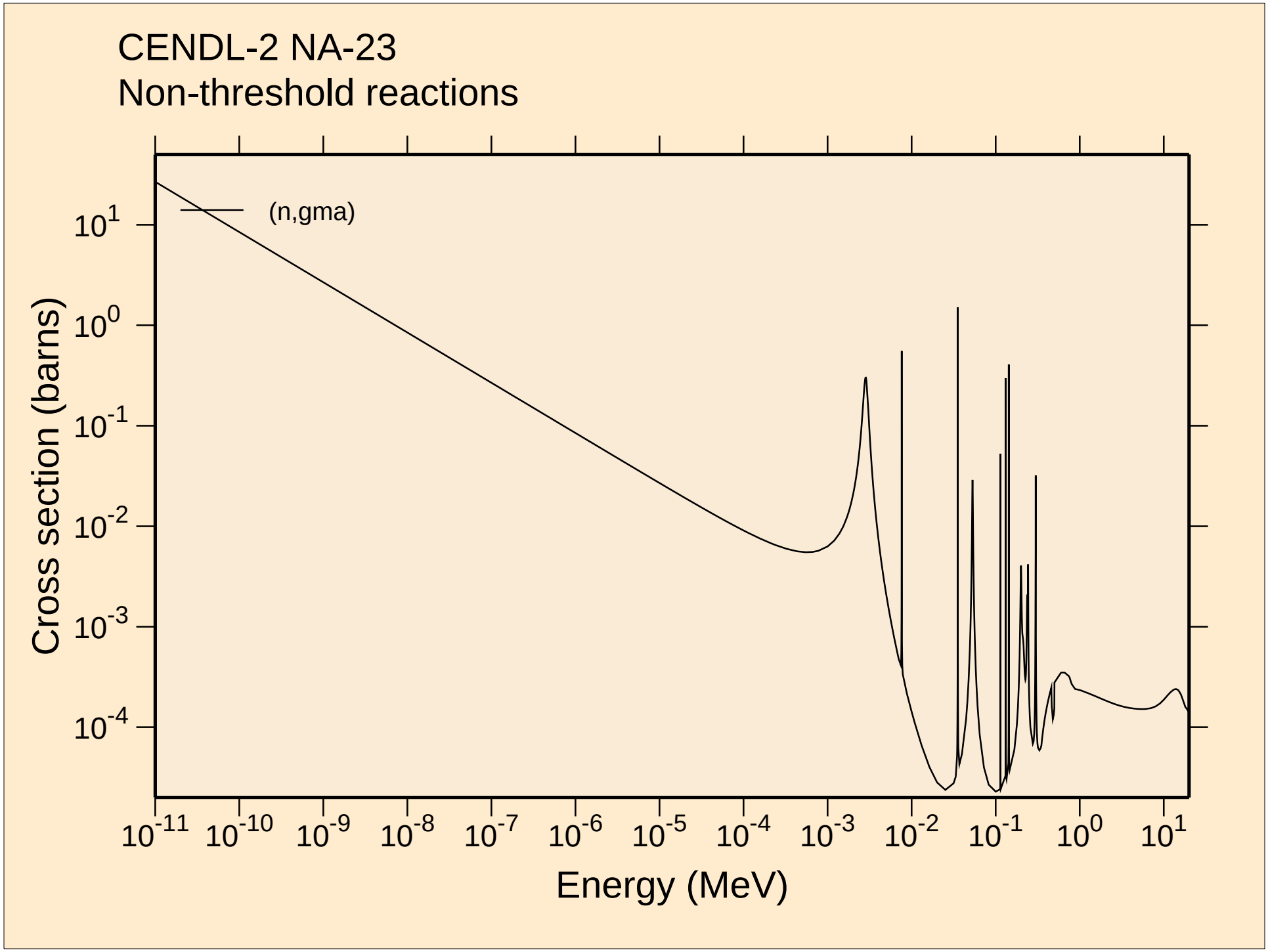
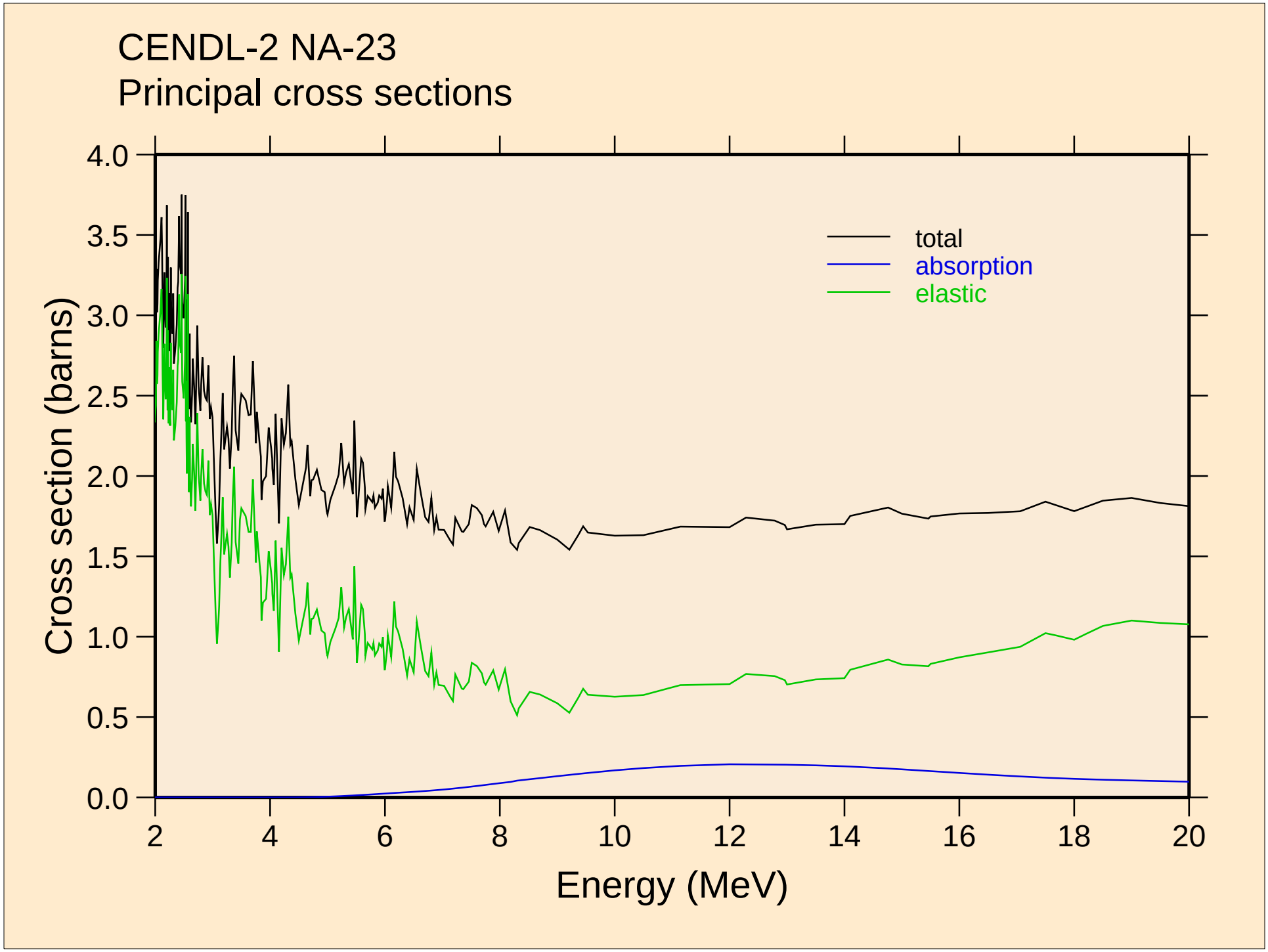
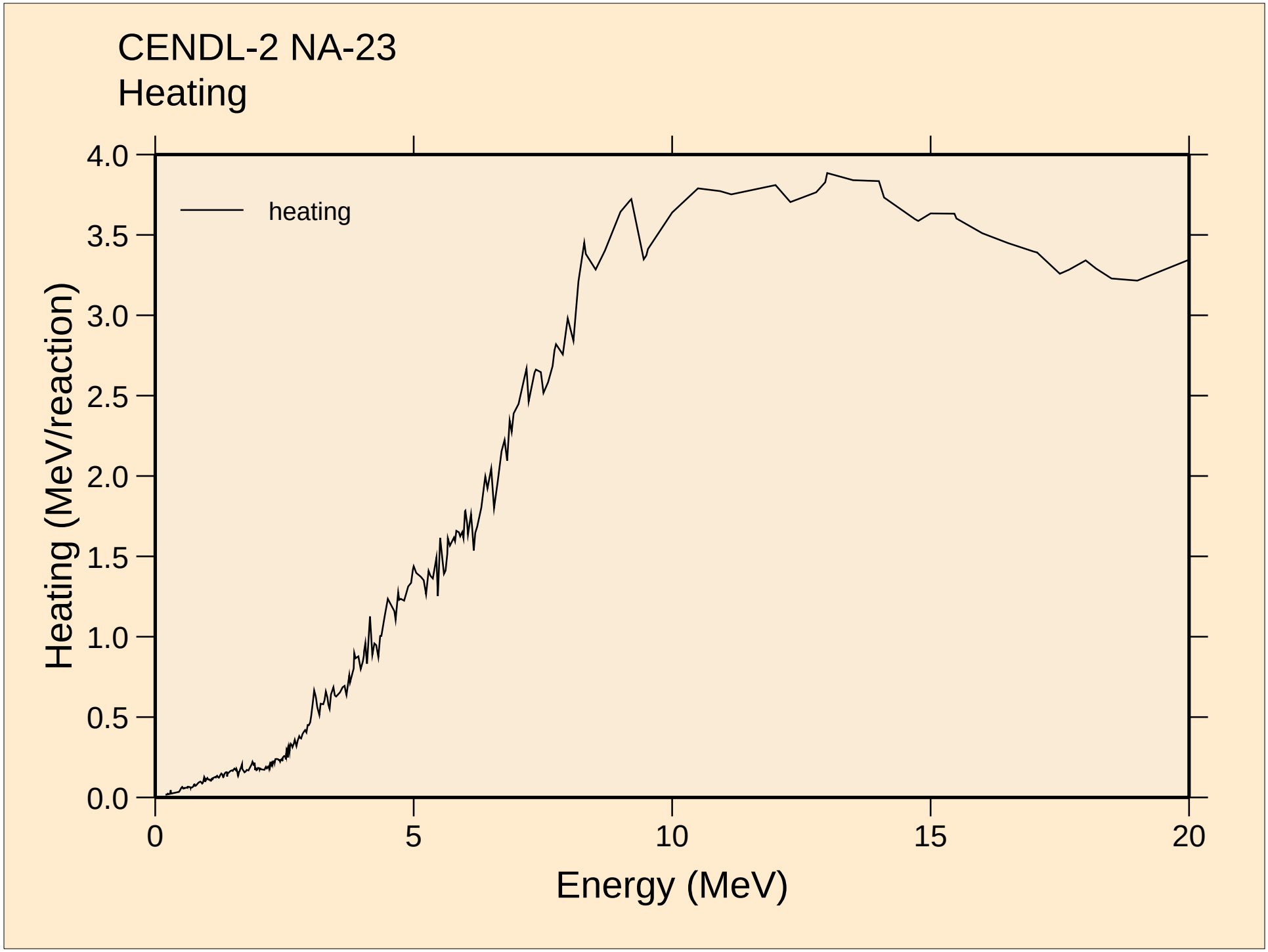

CENDL-2 NA-23
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-11}
10^{-10}
10^{-9}
10^{-8}
10^{-7}
10^{-6}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}

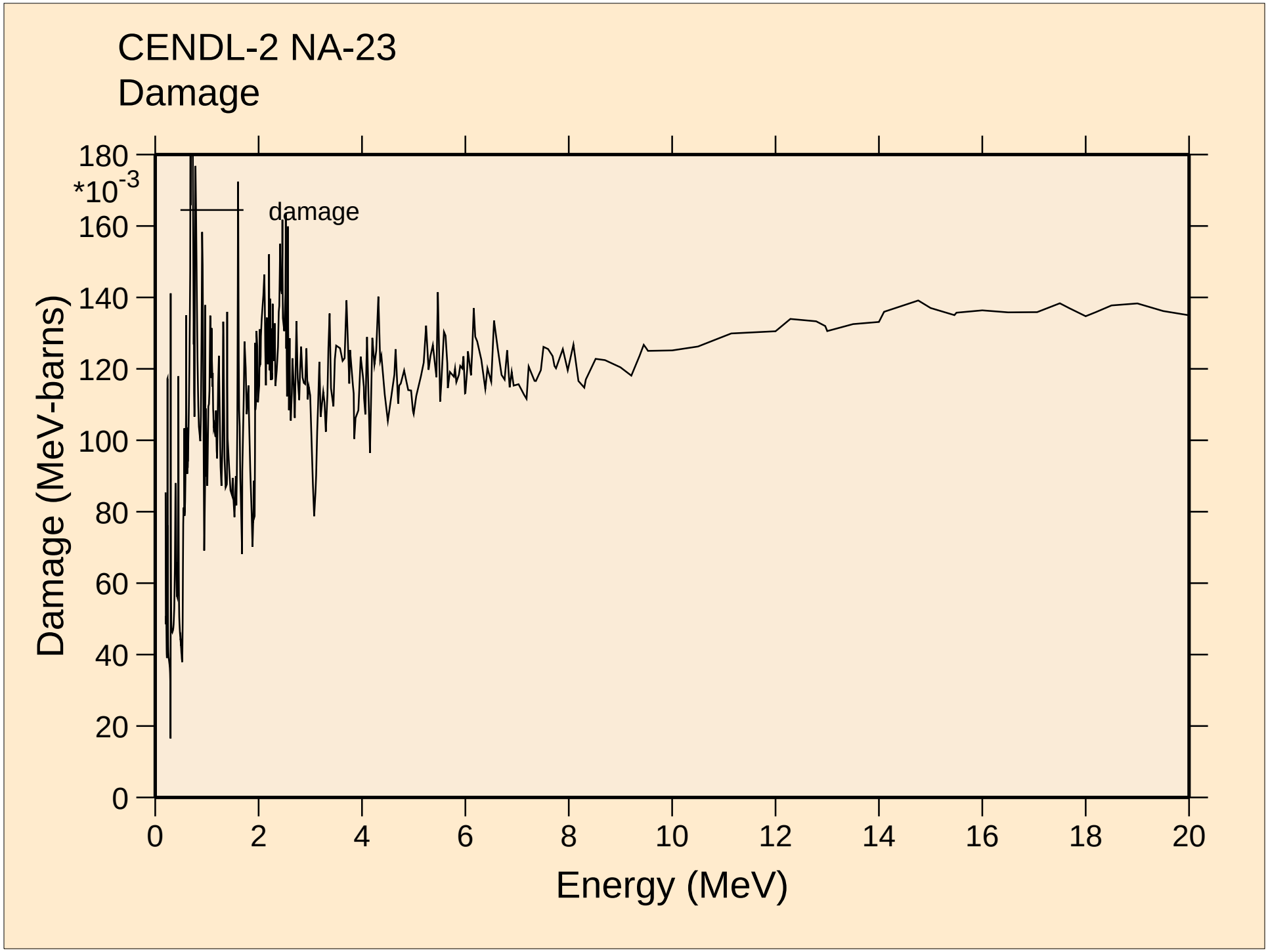

CENDL-2 NA-23
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

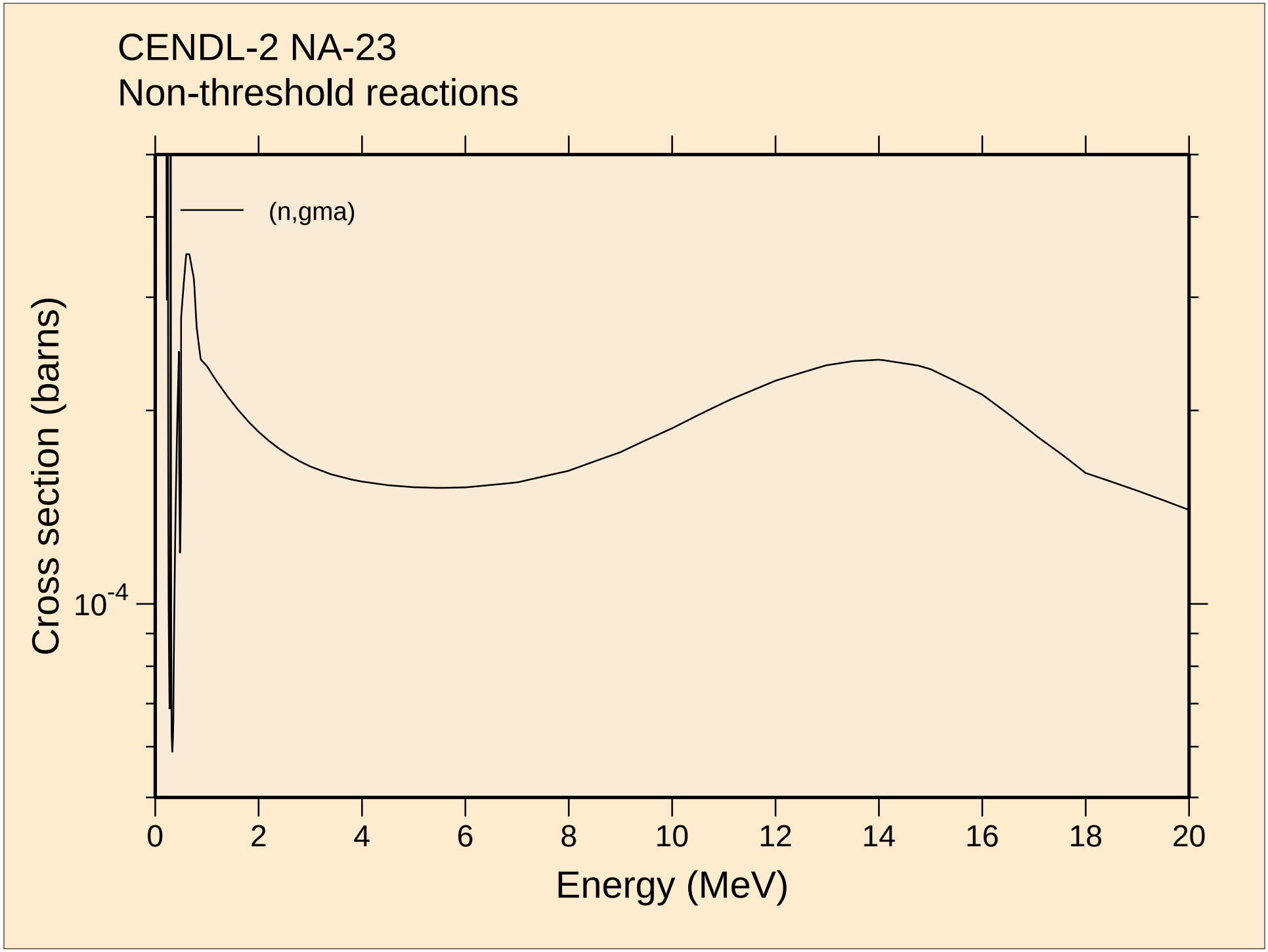

CENDL-2 NA-23
Damage
damage
Damage (MeV-barns)
Energy (MeV)
10-1
10-2
10-3
10-4
10-5
10-6
10-11
10-10
10-9
10-8
10-7
10-6
10-5
10-4
10-3
10-2
10-1
100
101

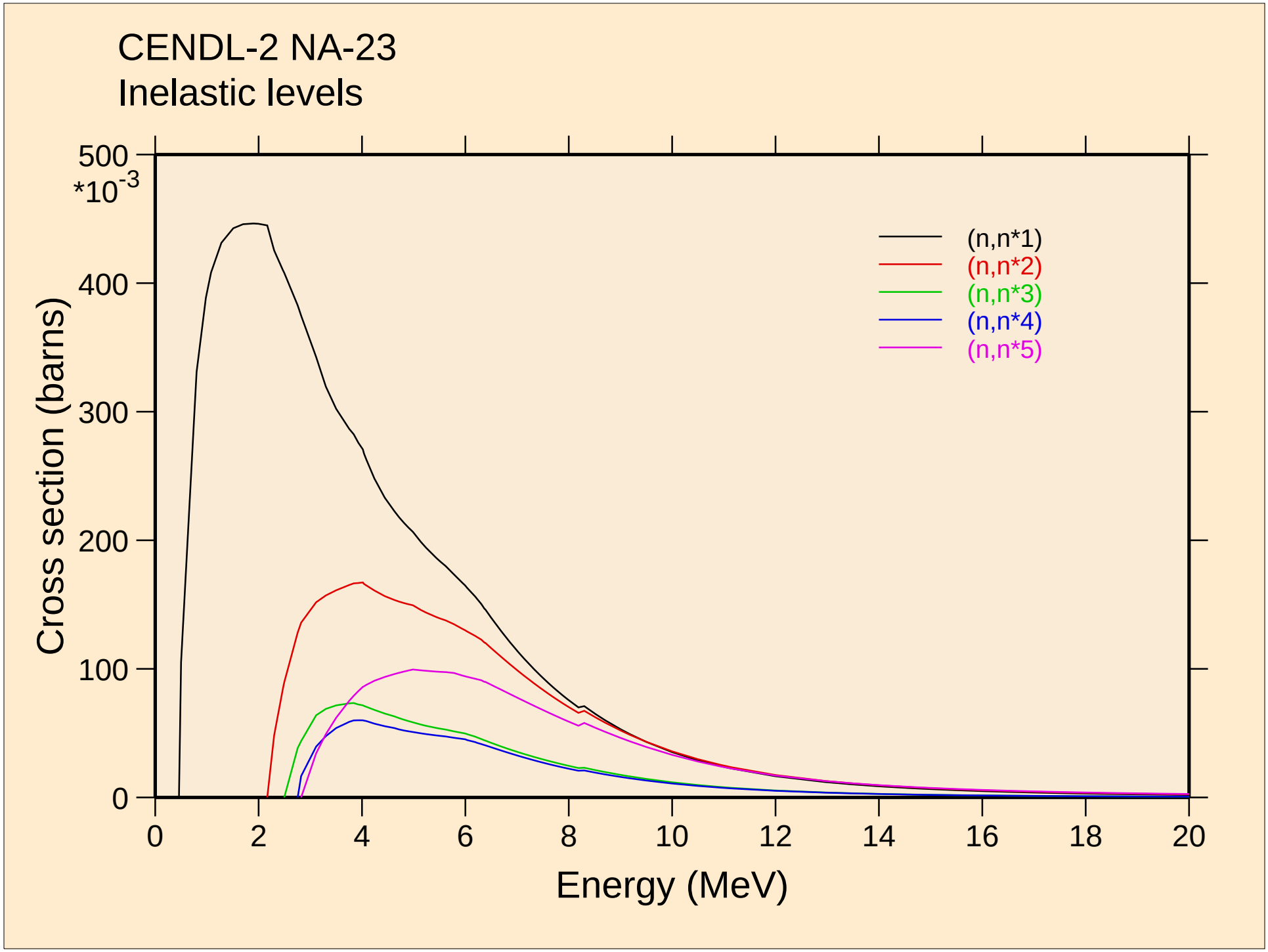

CENDL-2 NA-23
Non-threshold reactions
(n,gma)
Cross section (barns)
Energy (MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

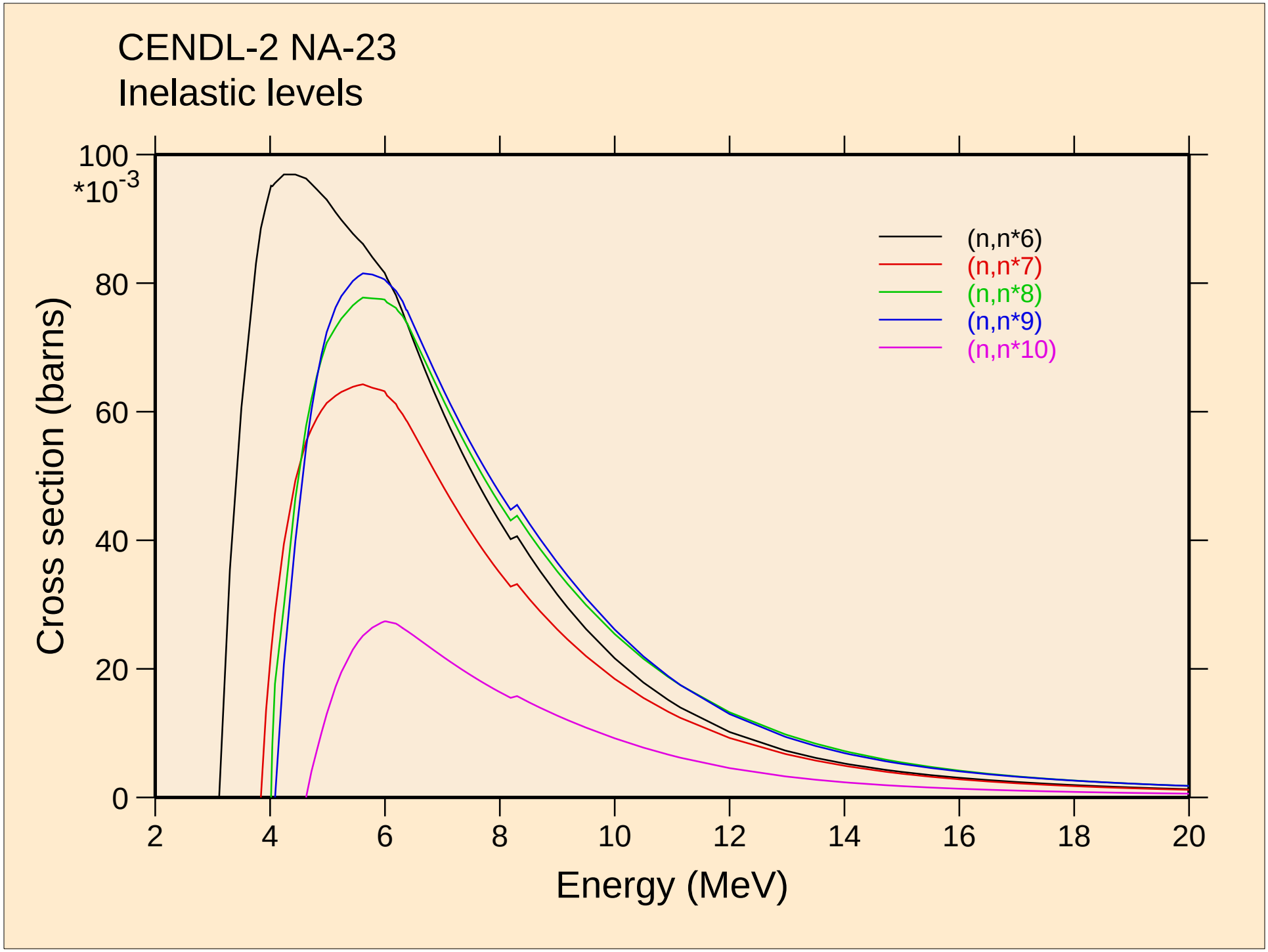

CENDL-2 NA-23
Principal cross sections
total
absorption
elastic
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
2
4
6
8
10
12
14
16
18
20

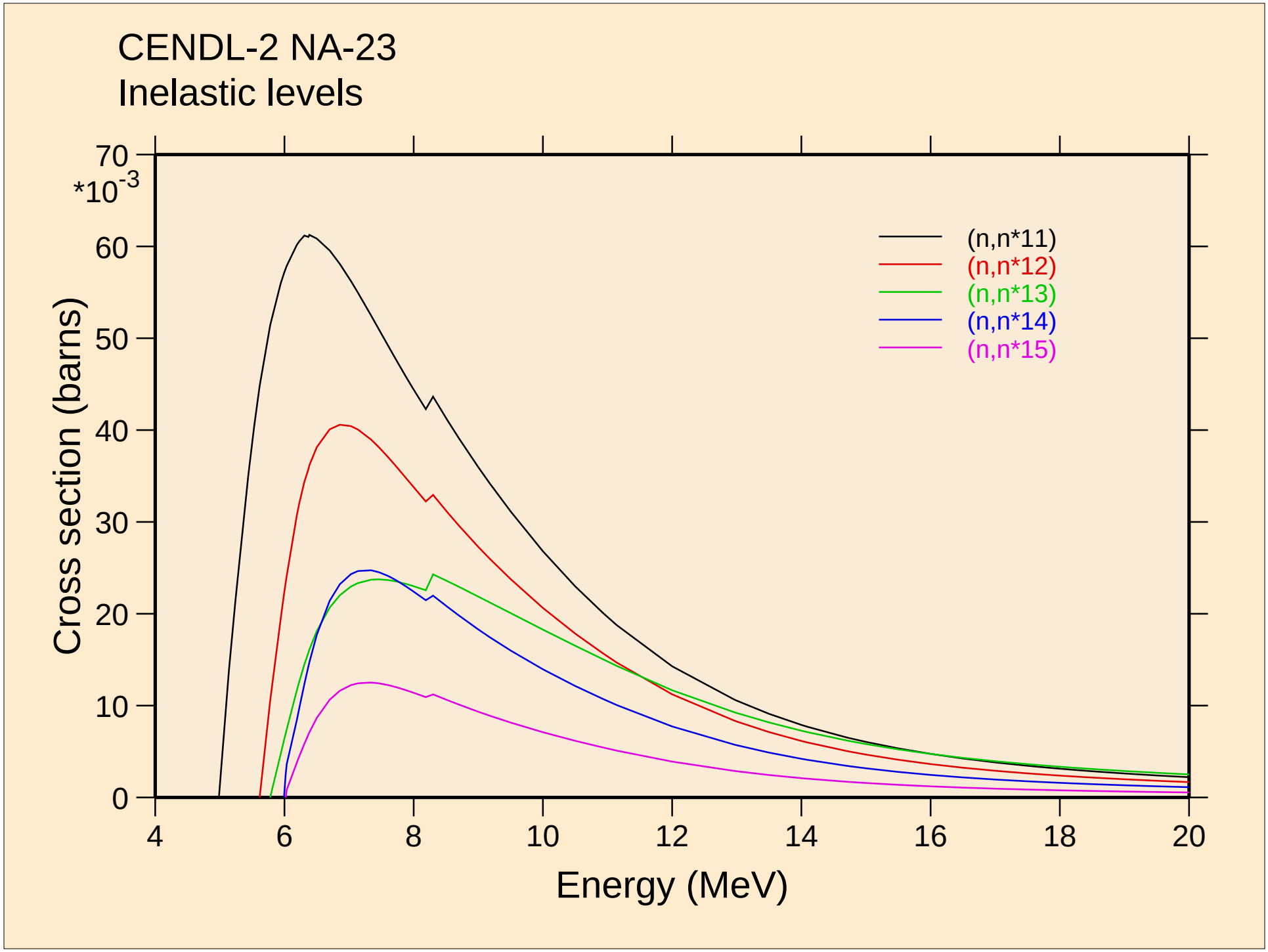

CENDL-2 NA-23
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
5
10
15
20

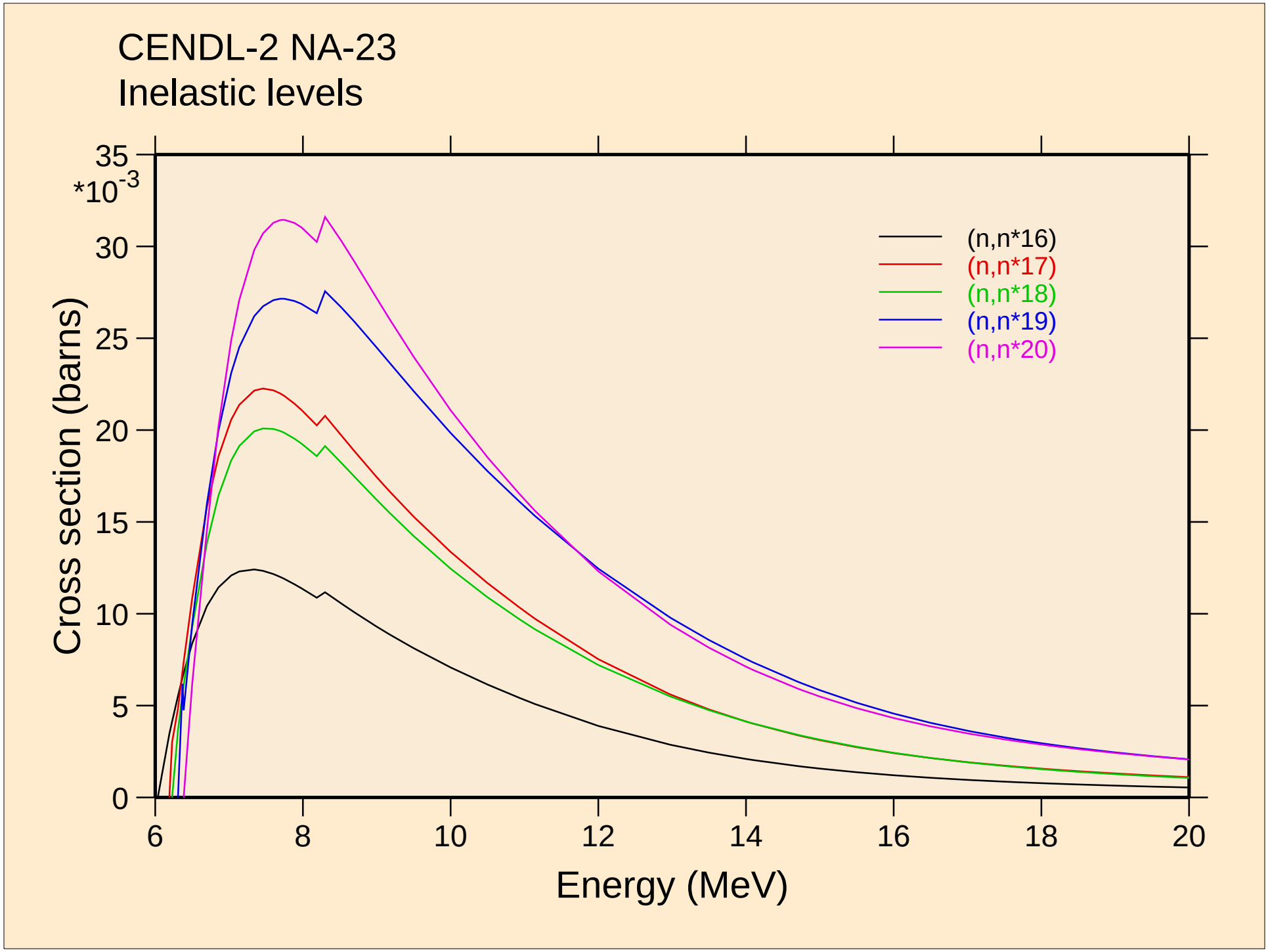

CENDL-2 NA-23
Damage
damage
*10-3
Damage (MeV-barns)
Energy (MeV)
0
20
40
60
80
100
120
140
160
180
0
2
4
6
8
10
12
14
16
18
20

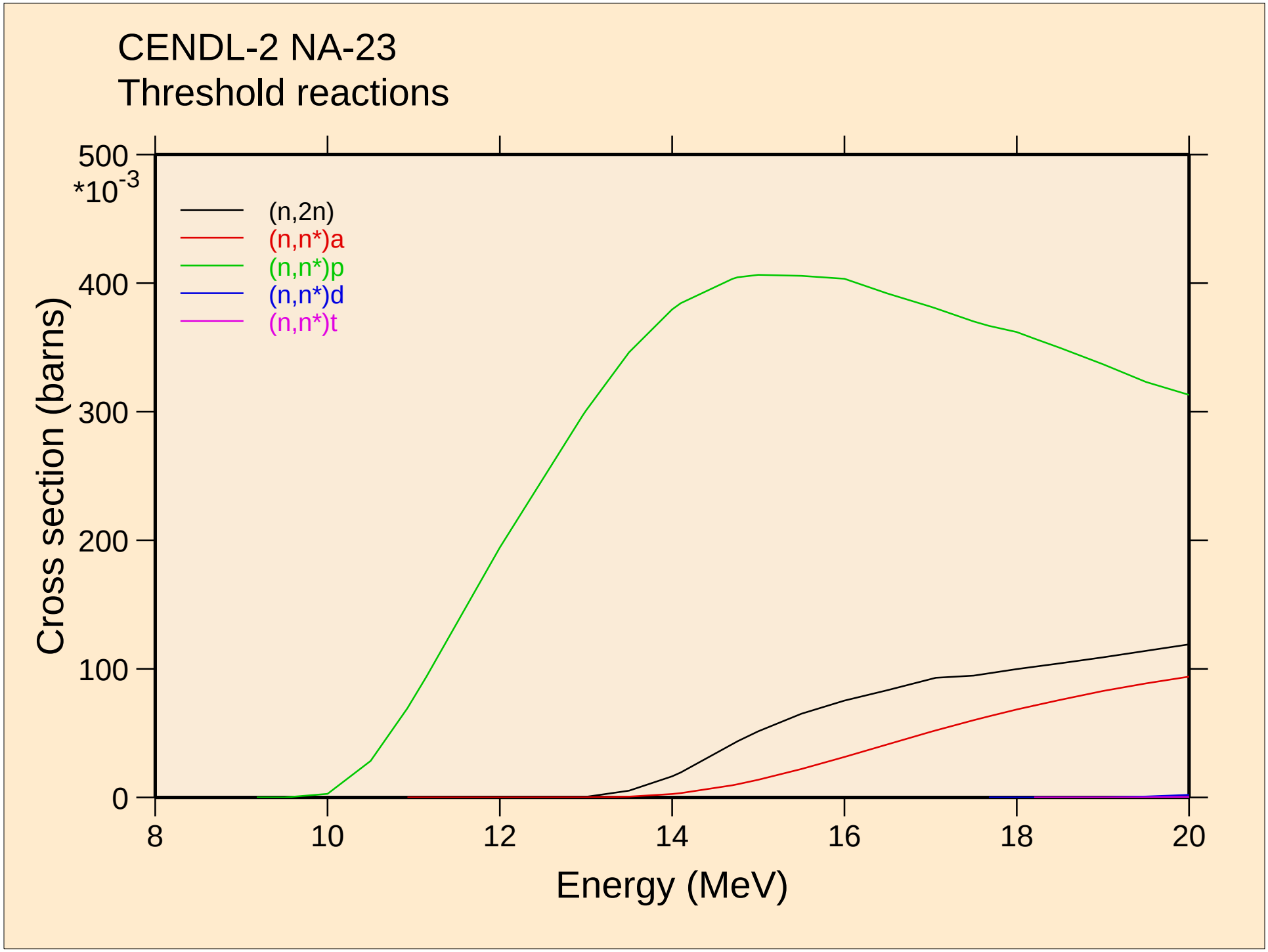

CENDL-2 NA-23
Non-threshold reactions
(n,gma)
Cross section (barns)
10-4
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

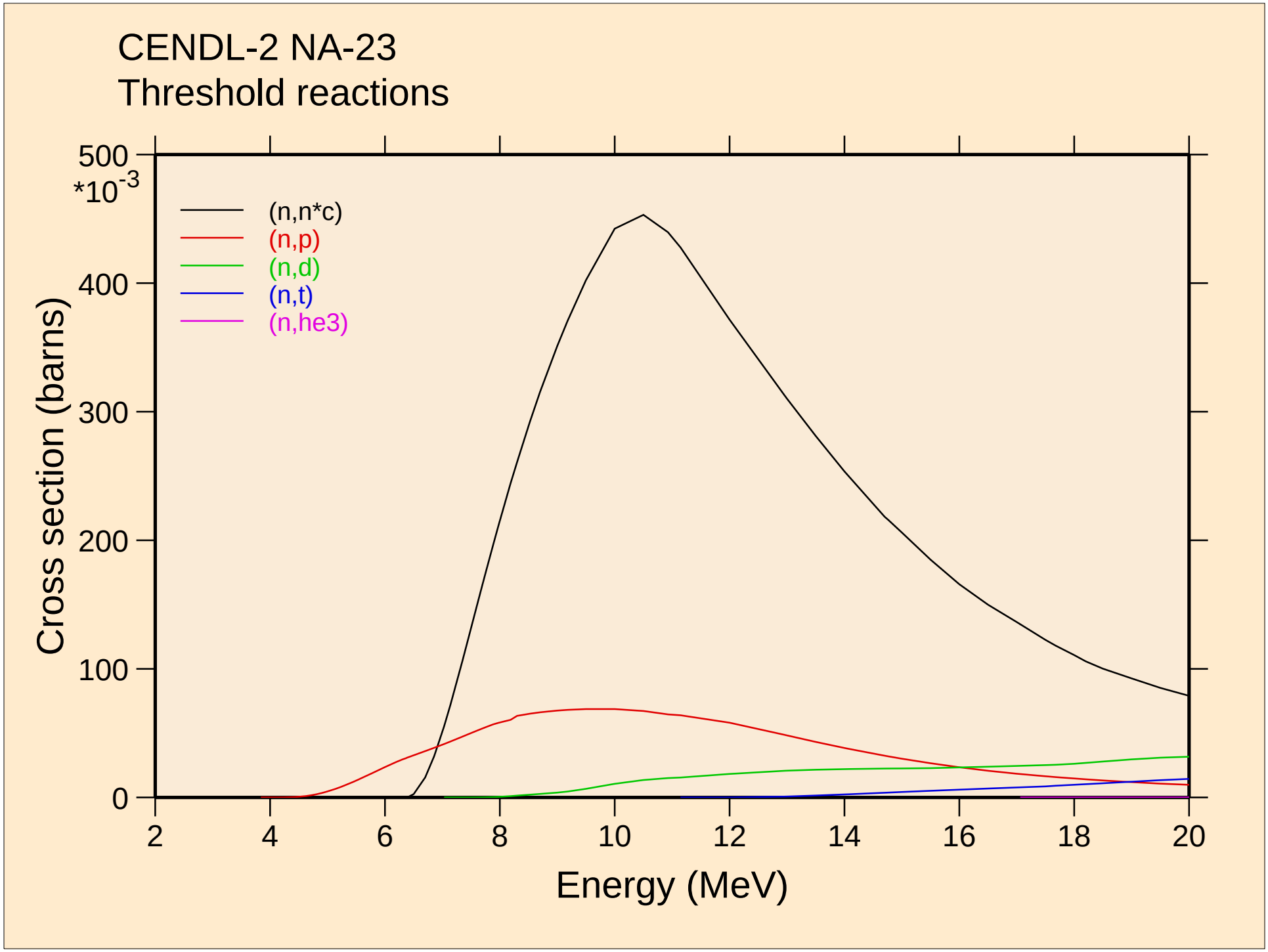

CENDL-2 NA-23
Inelastic levels
500
*10-3
400
300
200
100
0
Cross section (barns)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

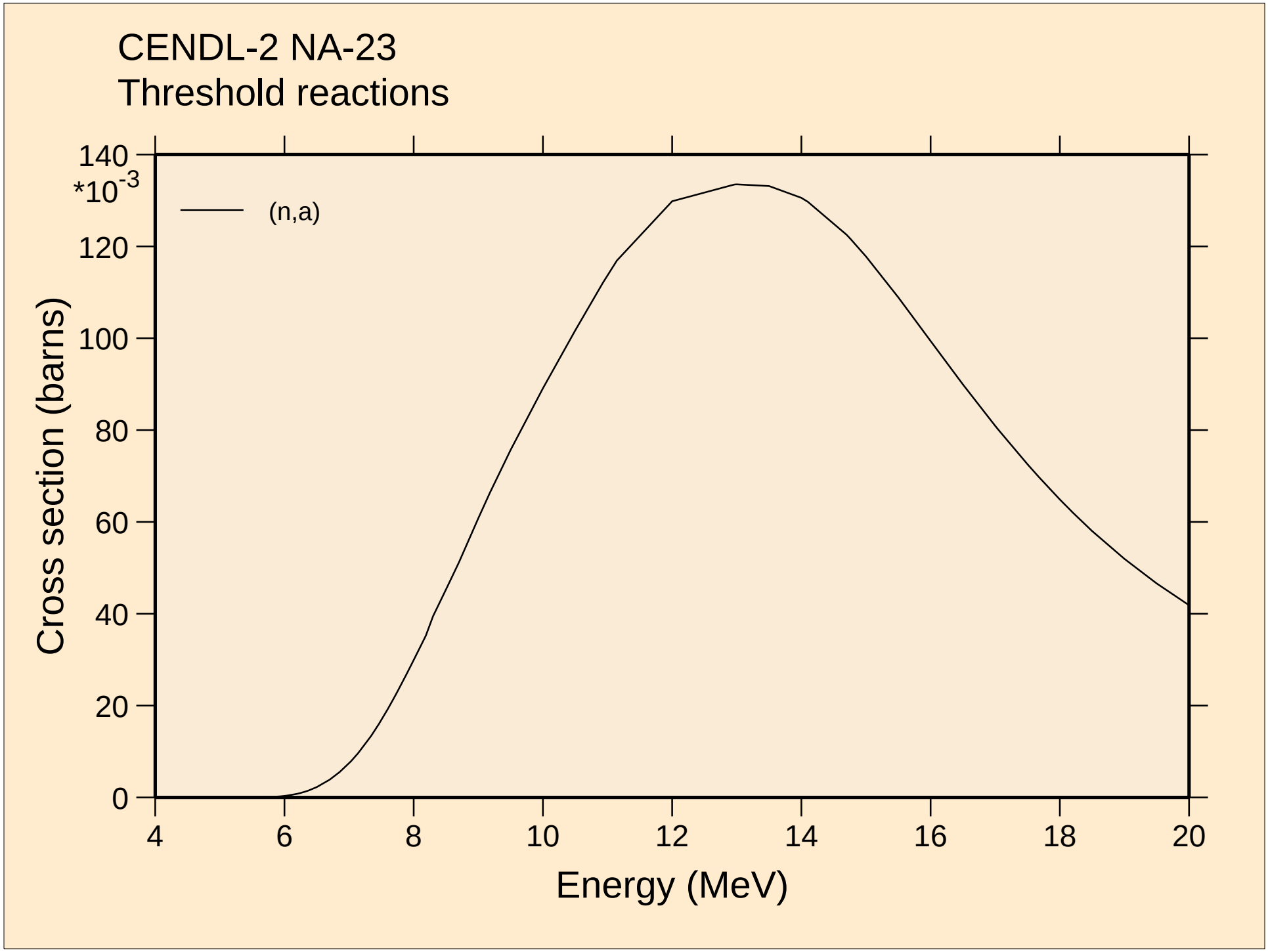

CENDL-2 NA-23
Inelastic levels
100
*10-3
80
60
40
20
0
Cross section (barns)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

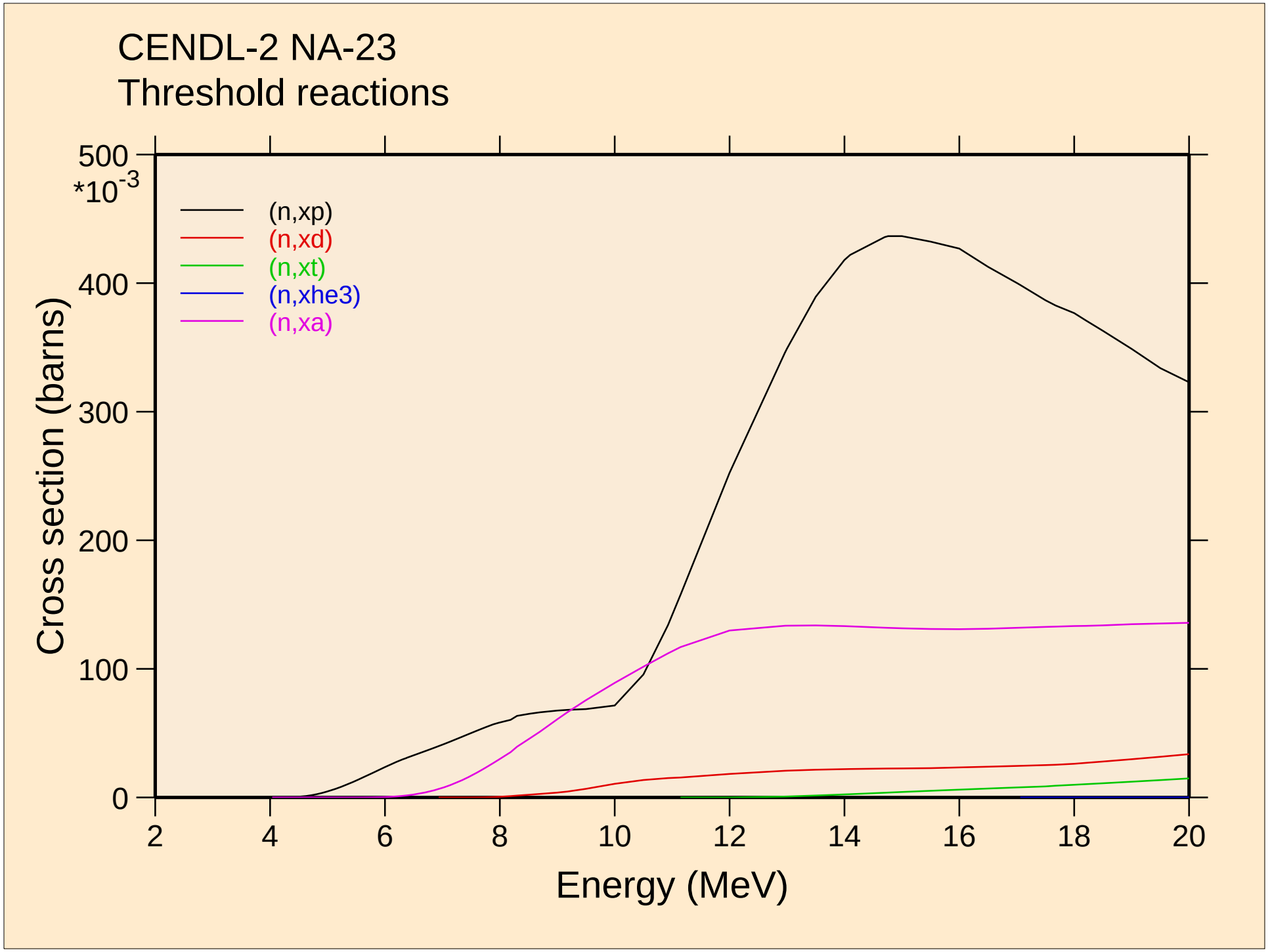

CENDL-2 NA-23
Inelastic levels
70
*10-3
60
50
40
30
20
10
0
Cross section (barns)
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

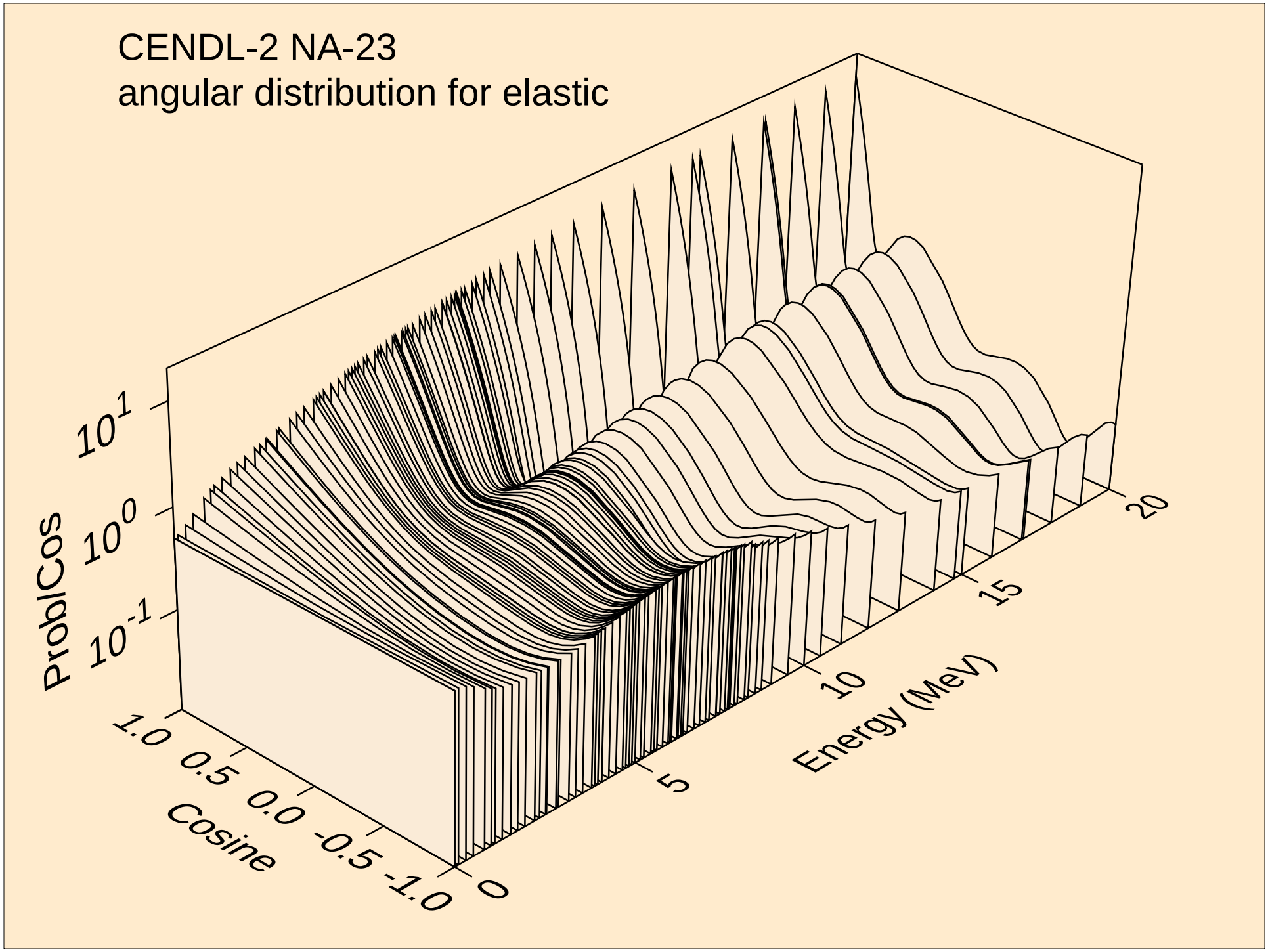

CENDL-2 NA-23
Inelastic levels
*10-3
35
30
25
20
15
10
5
0
Cross section (barns)
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

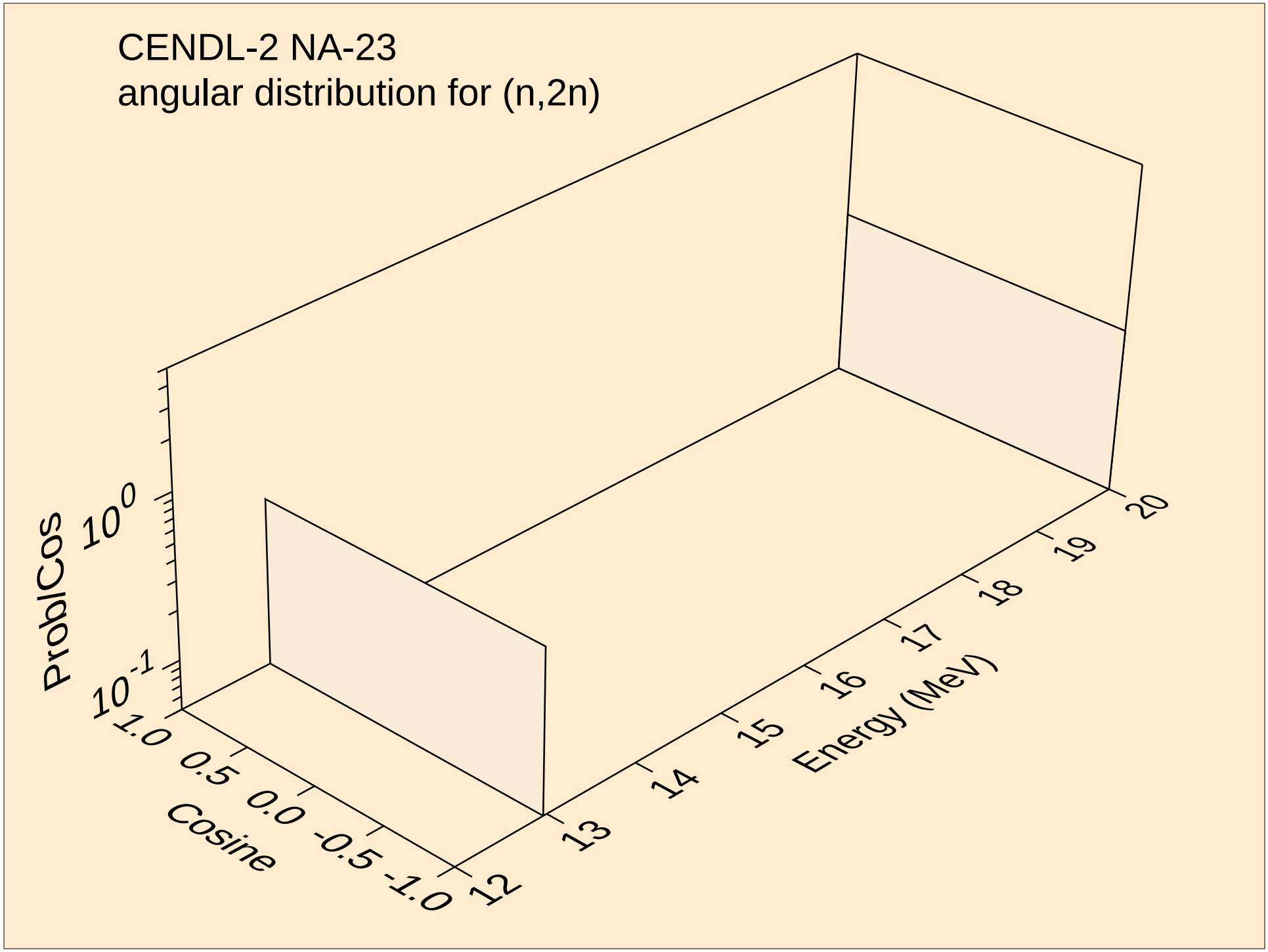

CENDL-2 NA-23
Threshold reactions
500
*10-3
400
300
200
100
0
Cross section (barns)
(n,2n)
(n,n*)a
(n,n*)p
(n,n*)d
(n,n*)t
8
10
12
14
16
18
20
Energy (MeV)

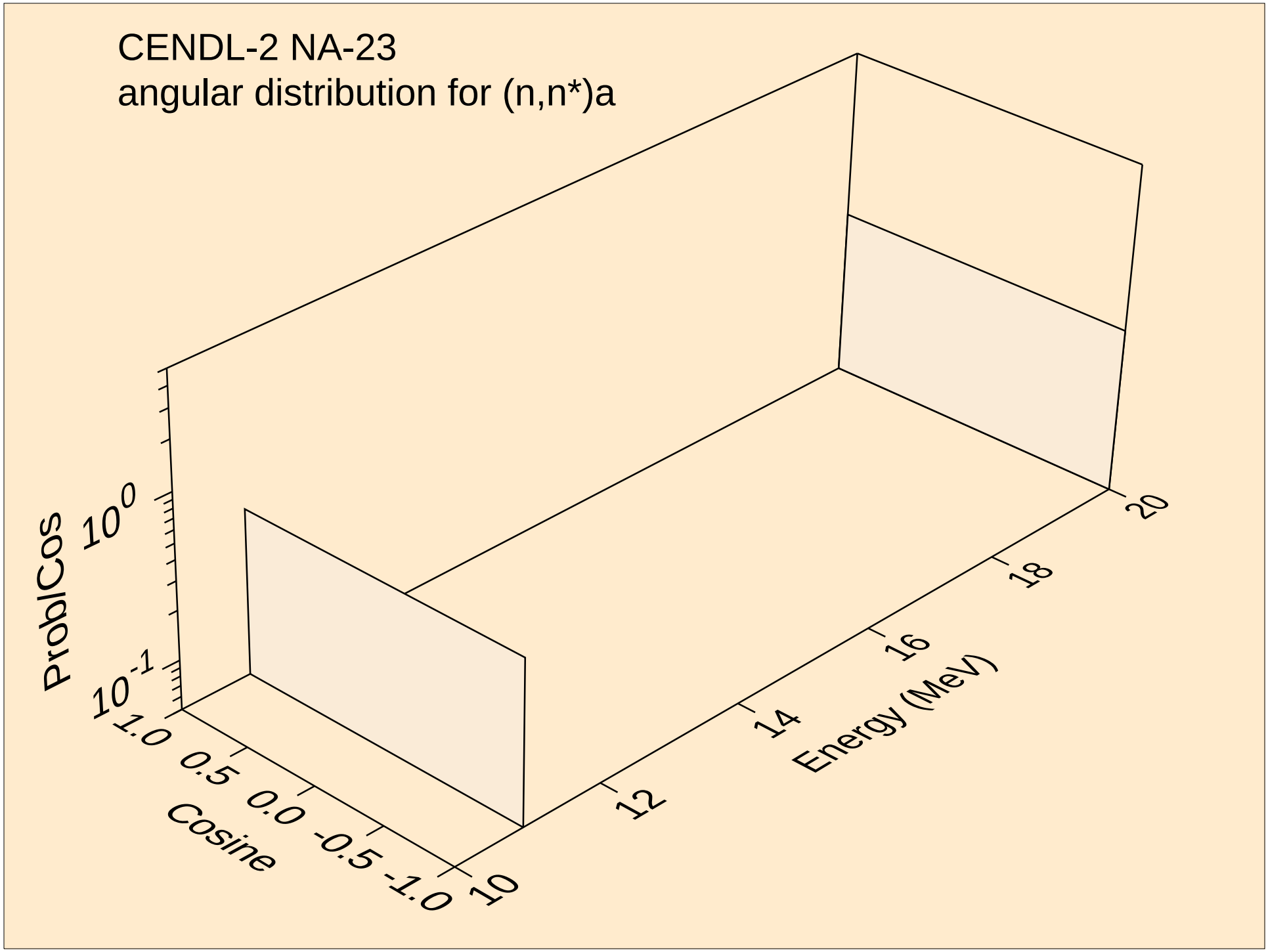

CENDL-2 NA-23
Threshold reactions
(n,n*c)
(n,p)
(n,d)
(n,t)
(n,he3)
Cross section (barns)
*10-3
500
400
300
200
100
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

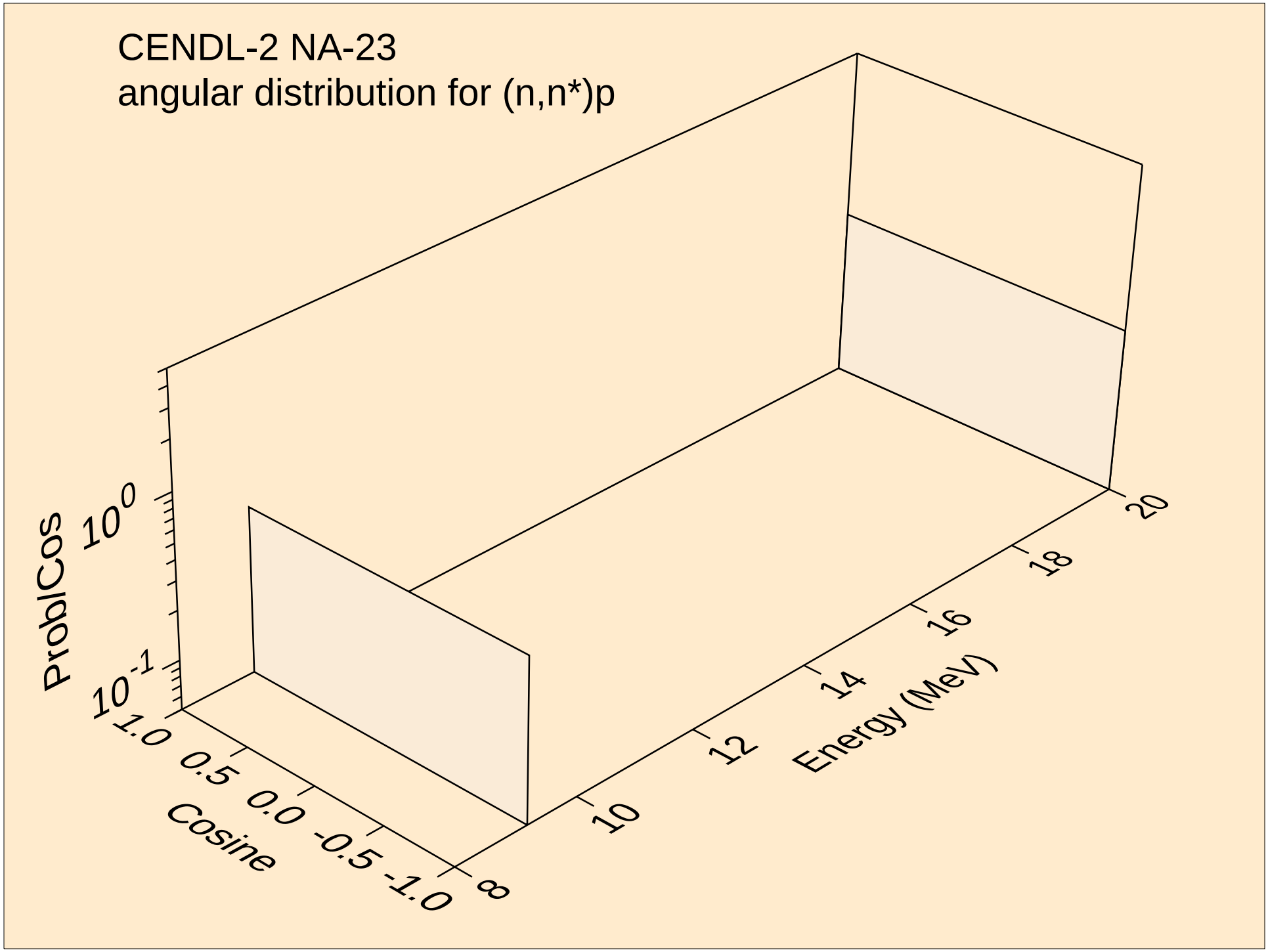

CENDL-2 NA-23
Threshold reactions
(n,a)
Cross section (barns)
*10-3
140
120
100
80
60
40
20
0
4
6
8
10
12
14
16
18
20
Energy (MeV)

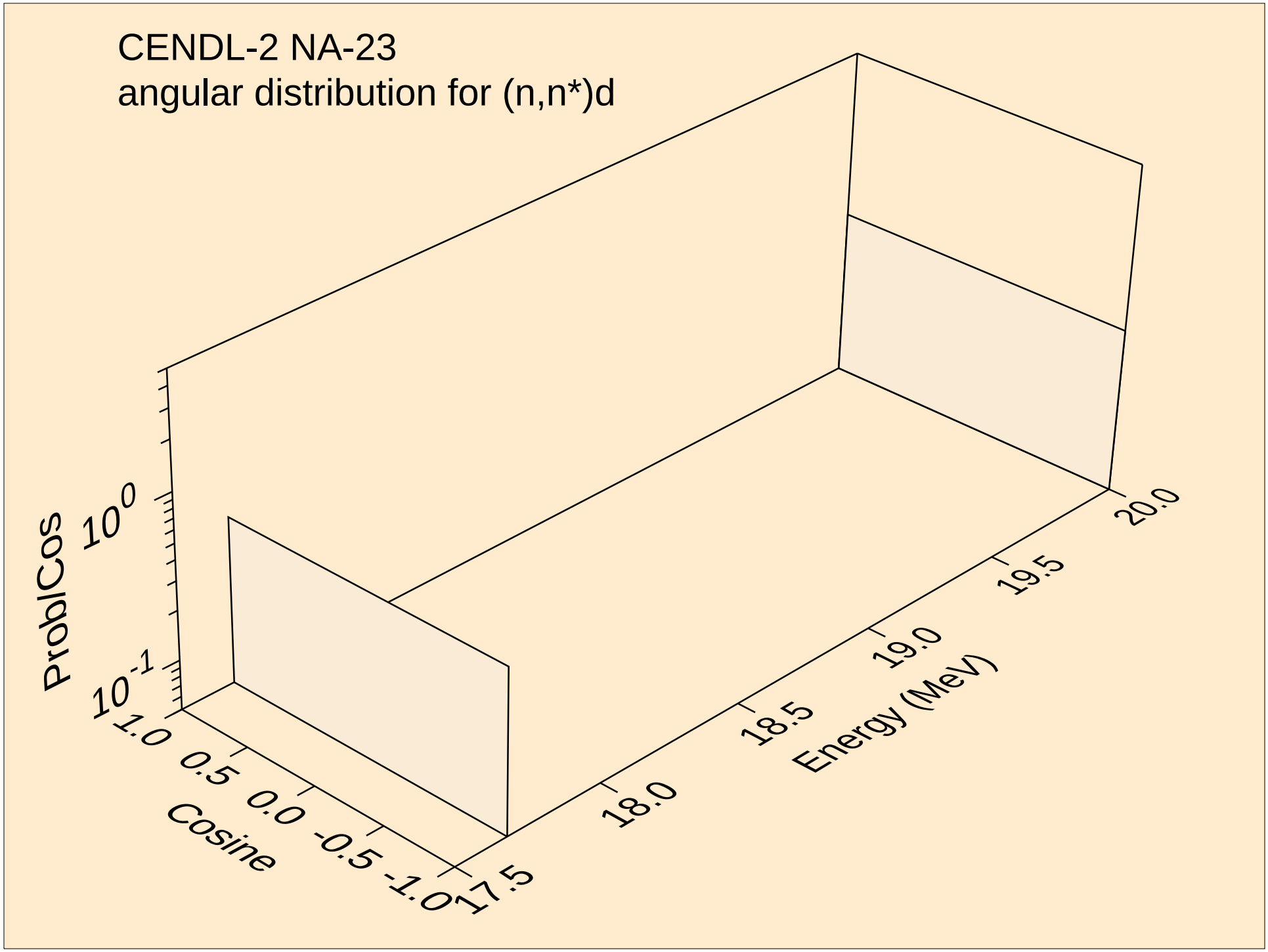

CENDL-2 NA-23
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,xa)
Cross section (barns)
*10-3
500
400
300
200
100
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

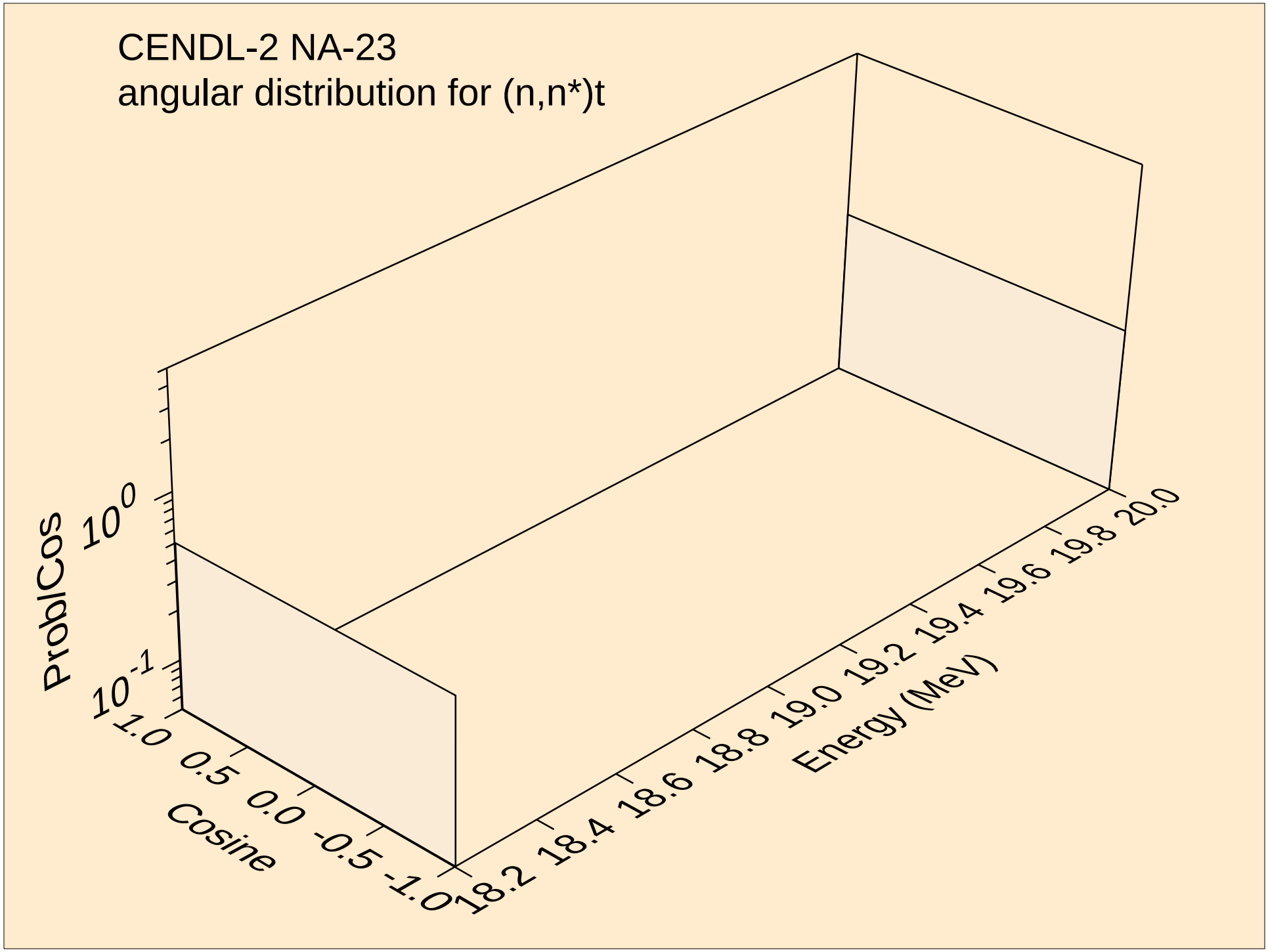

CENDL-2 NA-23
angular distribution for elastic
ProblCos
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

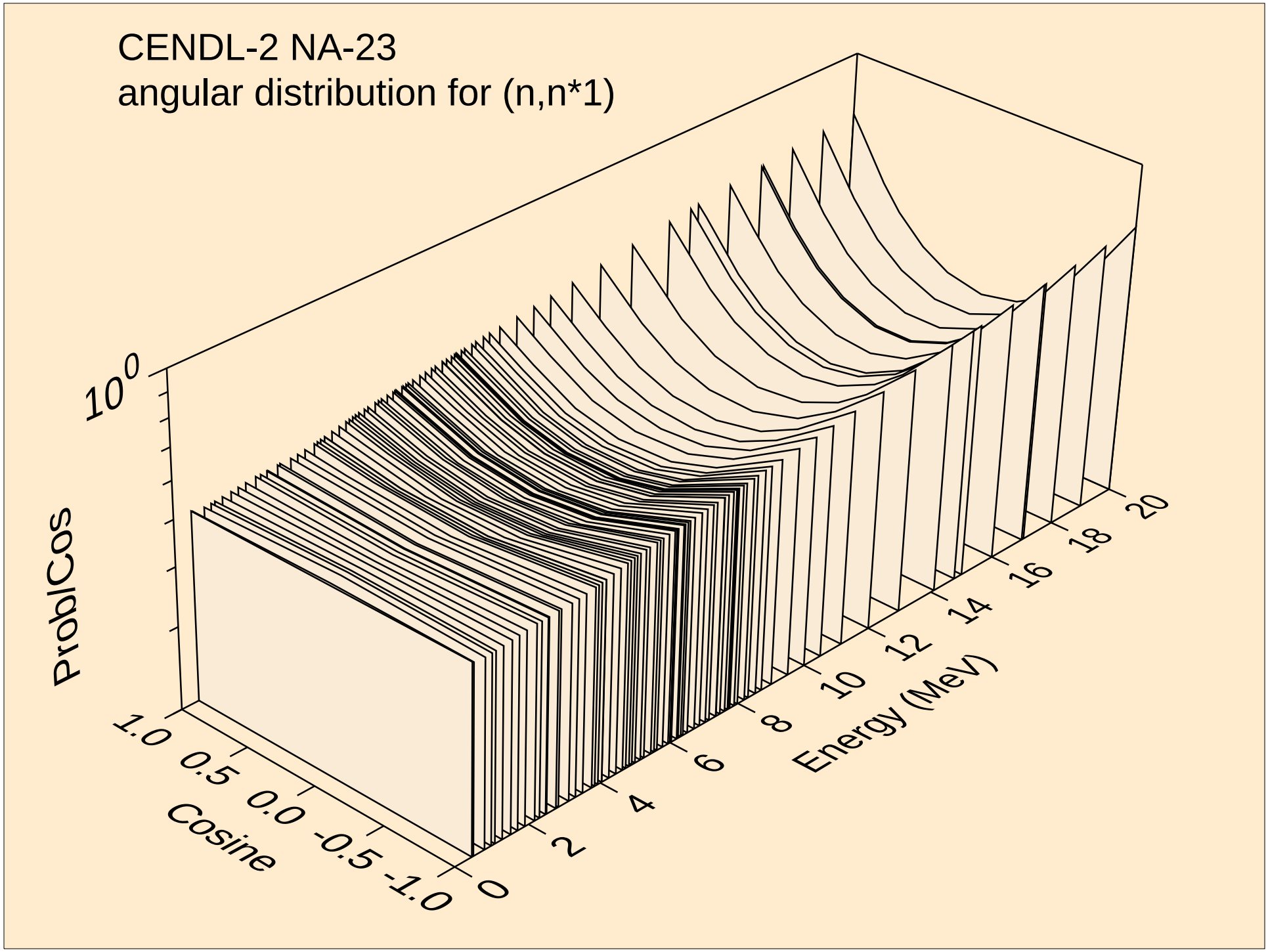

CENDL-2 NA-23
angular distribution for (n,2n)
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
12
13
14
15
16
17
18
19
20
Energy (MeV)

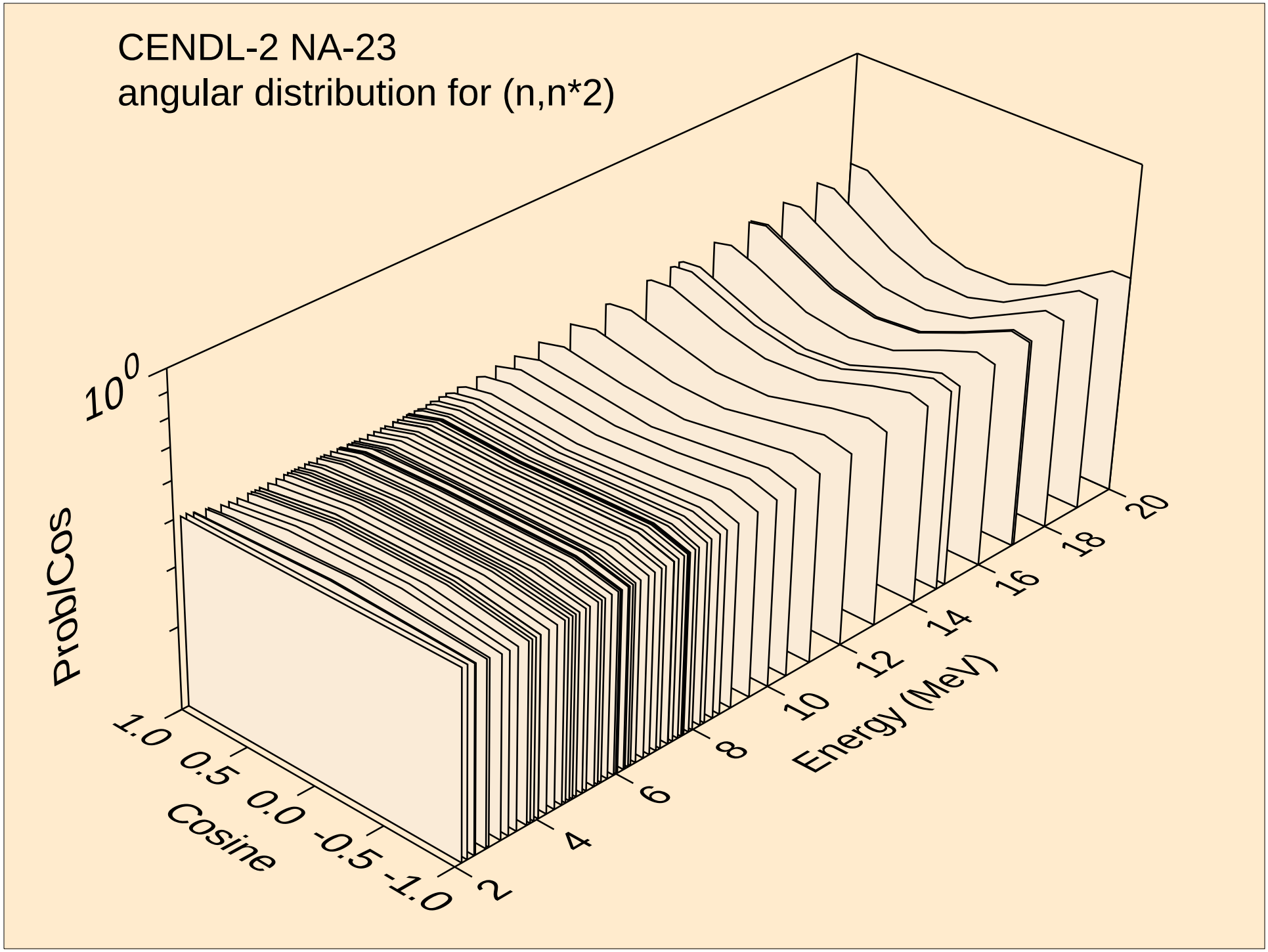

CENDL-2 NA-23
angular distribution for (n,n*)a
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
10
12
14
16
18
20
Energy (MeV)

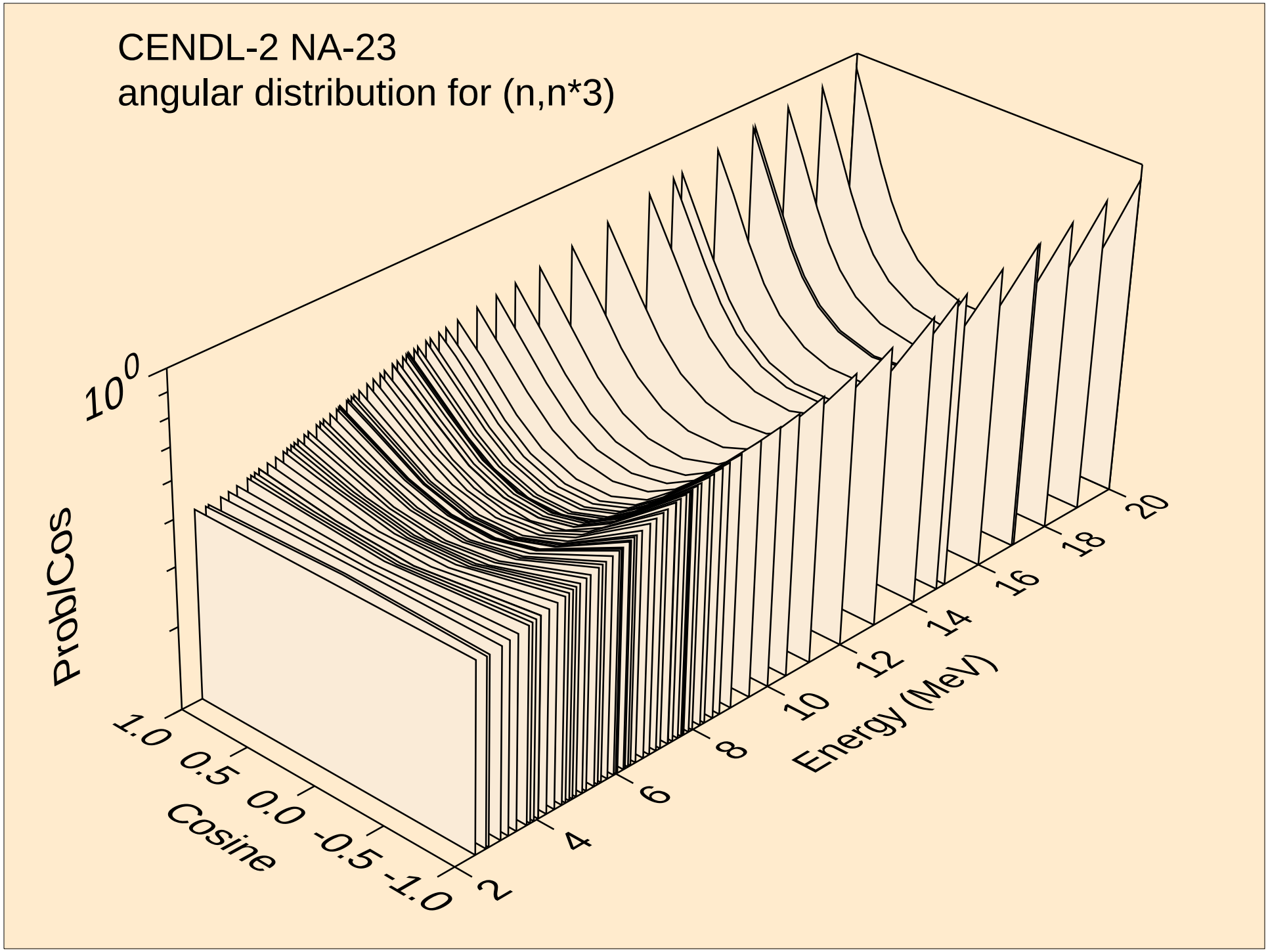

CENDL-2 NA-23
angular distribution for (n,n*)p
Prob/Cos
10^0
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

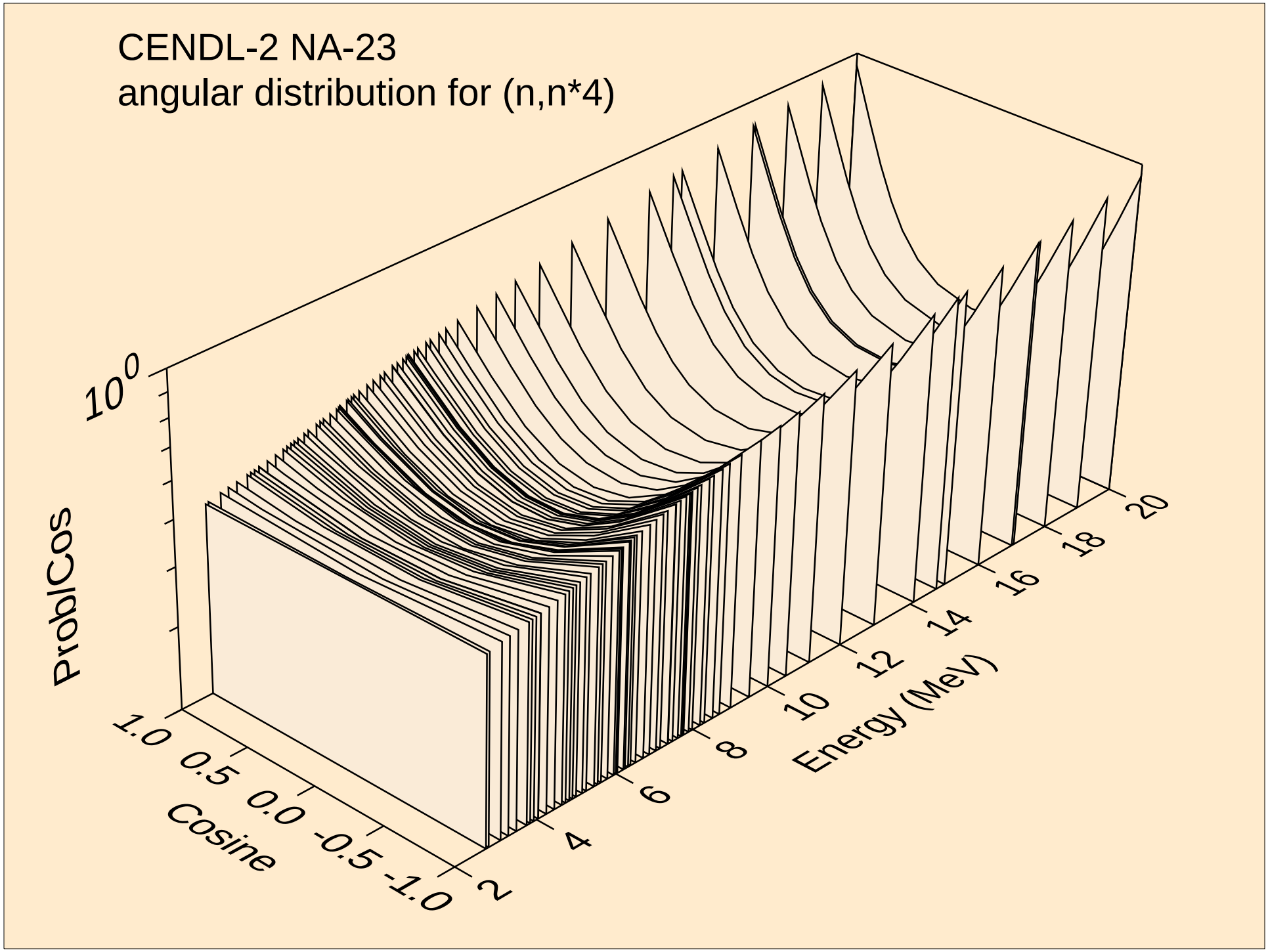

CENDL-2 NA-23
angular distribution for (n,n*)d
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
17.5
18.0
18.5
19.0
19.5
20.0
Energy (MeV)

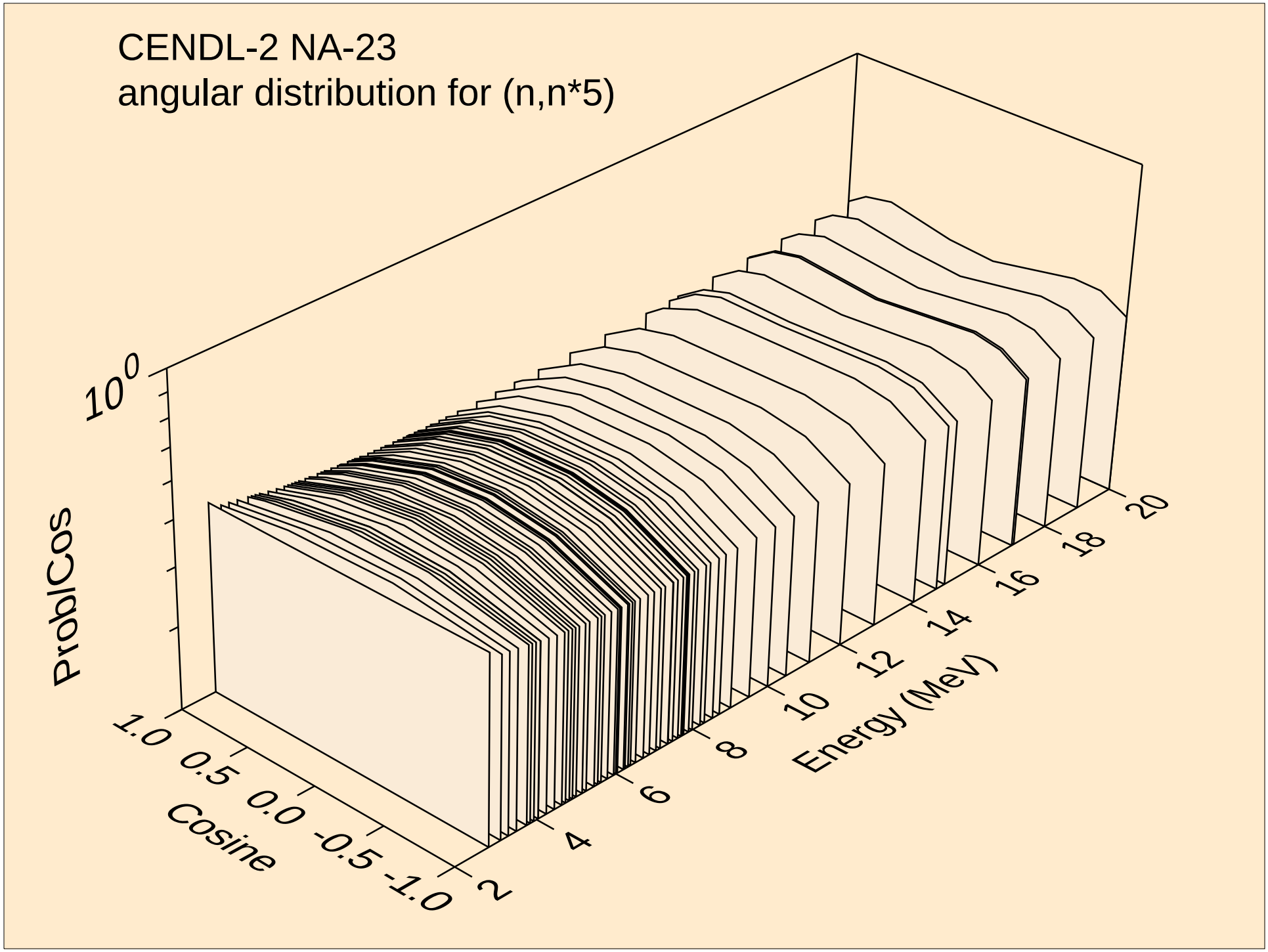

CENDL-2 NA-23
angular distribution for (n,n*)t
Prob/Cos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
18.2
18.4
18.6
18.8
19.0
19.2
19.4
19.6
19.8
20.0
Energy (MeV)

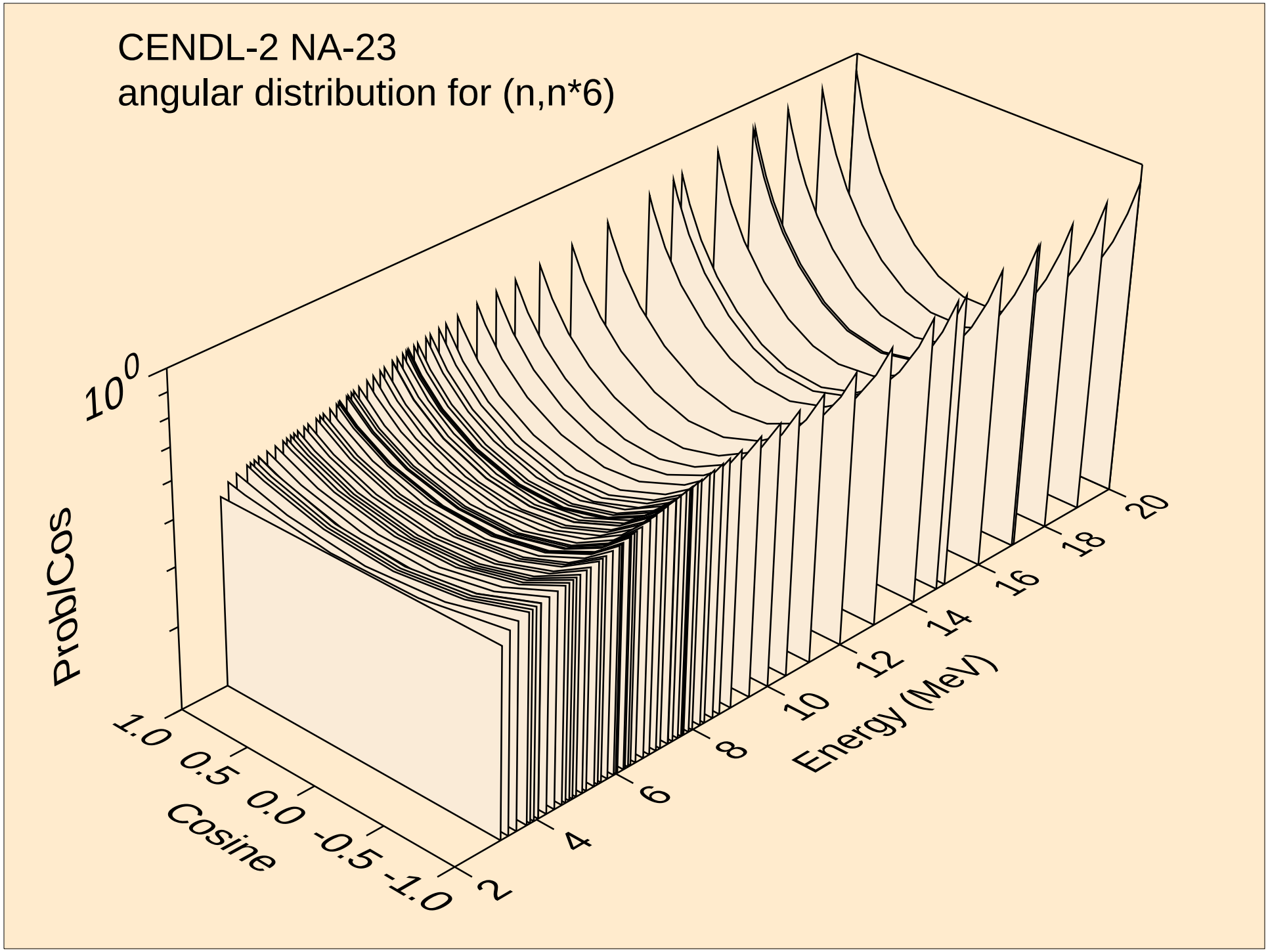

CENDL-2 NA-23
angular distribution for (n,n*1)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

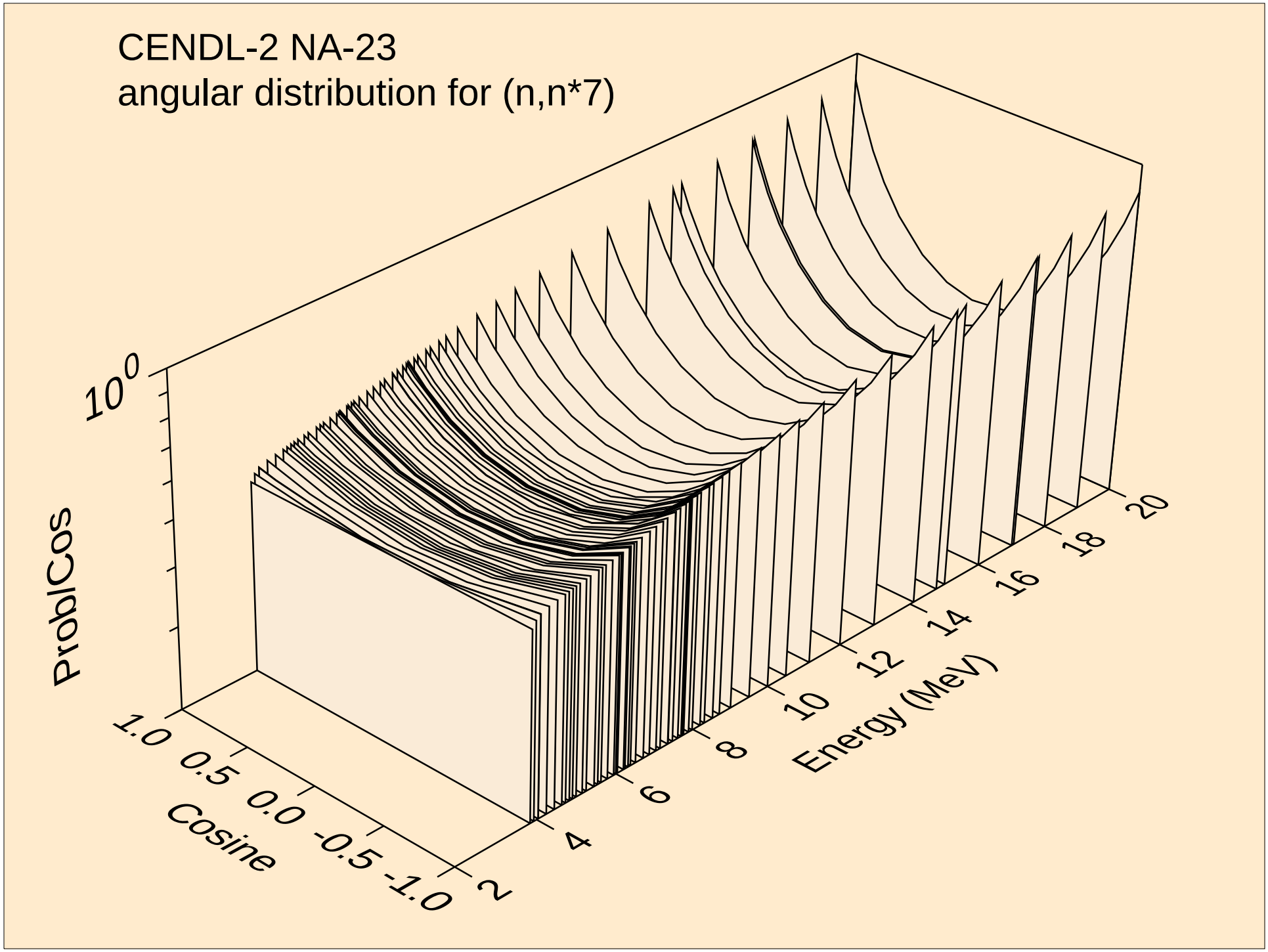

CENDL-2 NA-23
angular distribution for (n,n*2)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

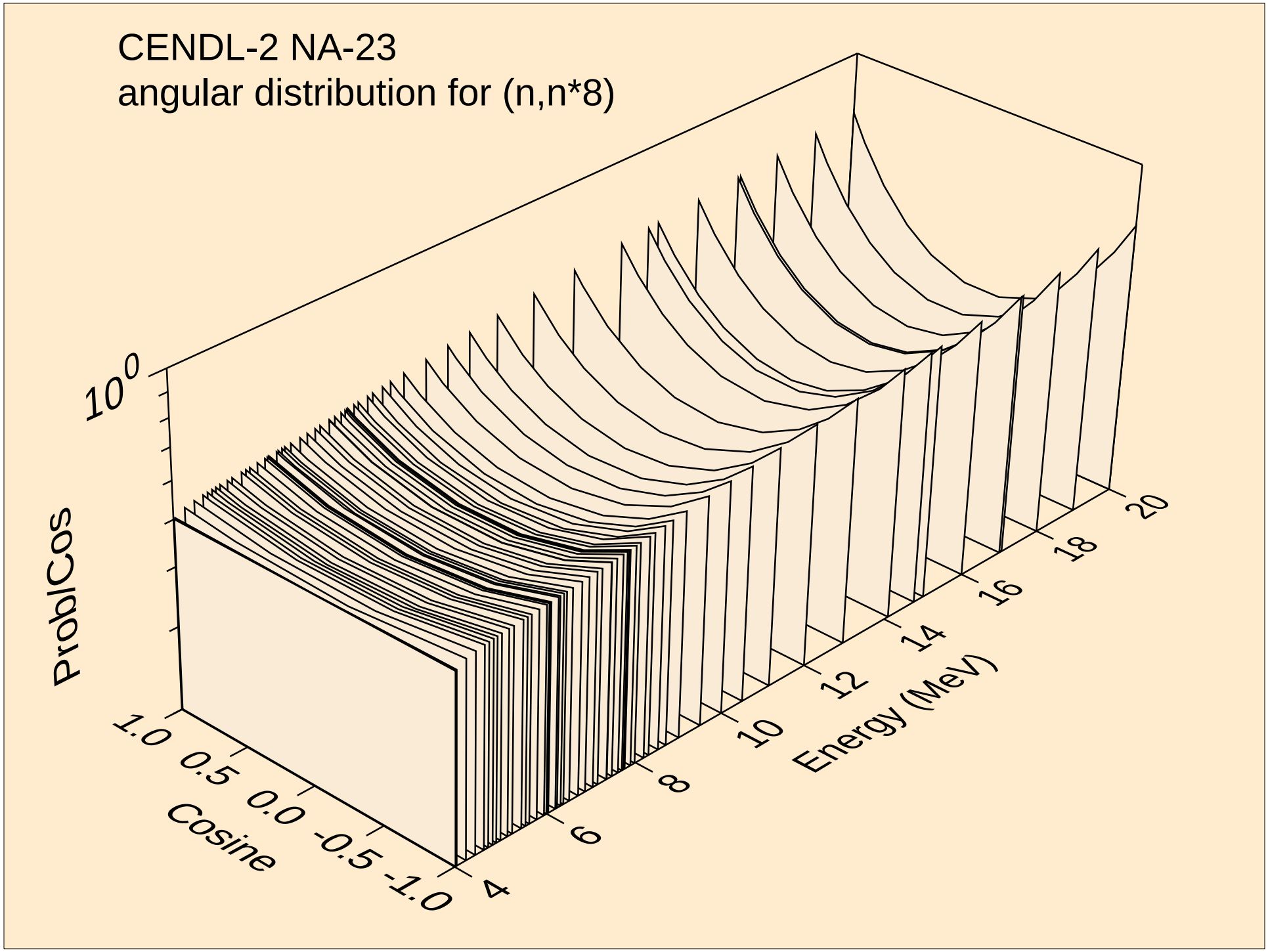

CENDL-2 NA-23
angular distribution for (n,n*3)
ProbCos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

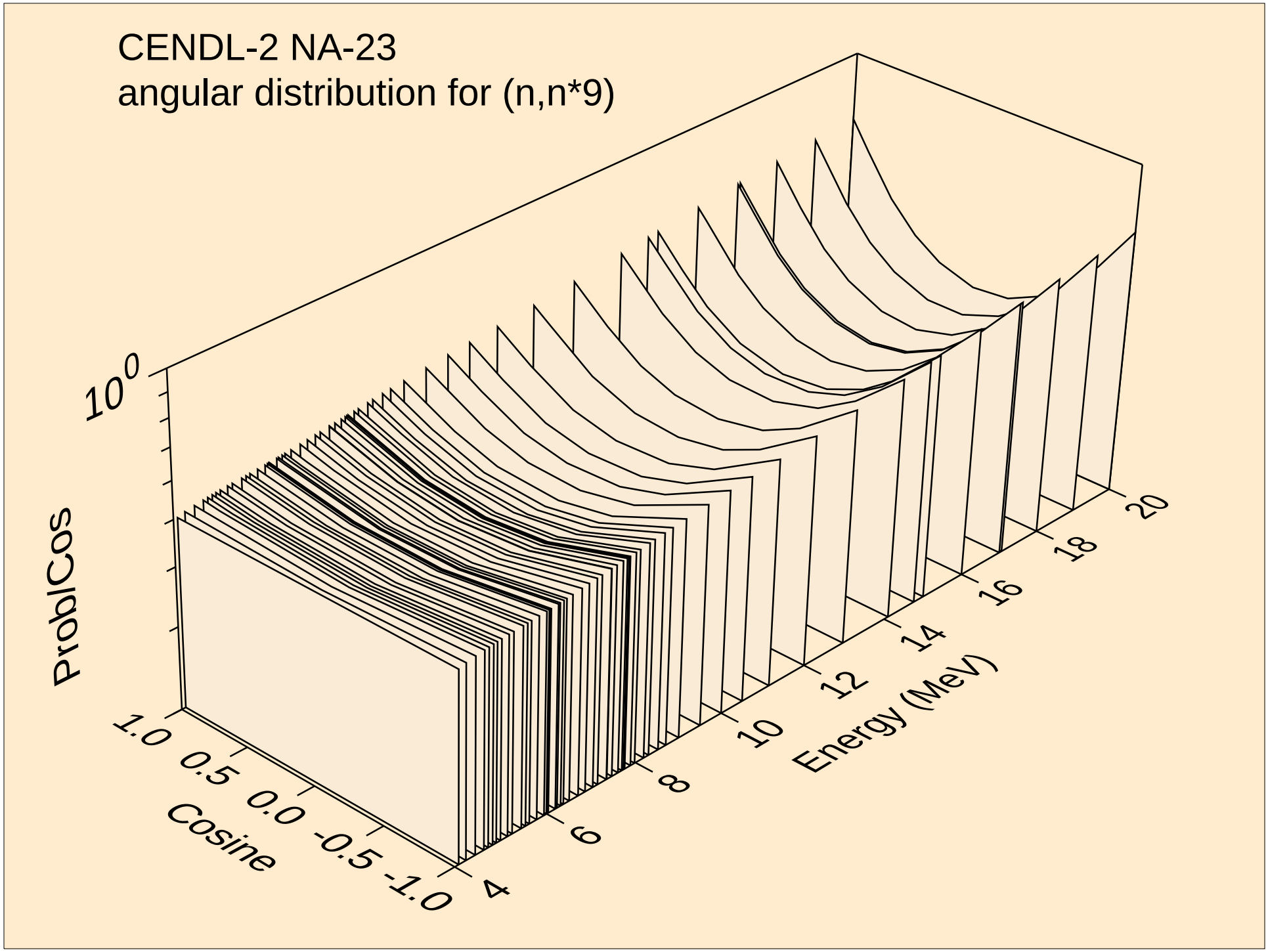

CENDL-2 NA-23
angular distribution for (n,n*4)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

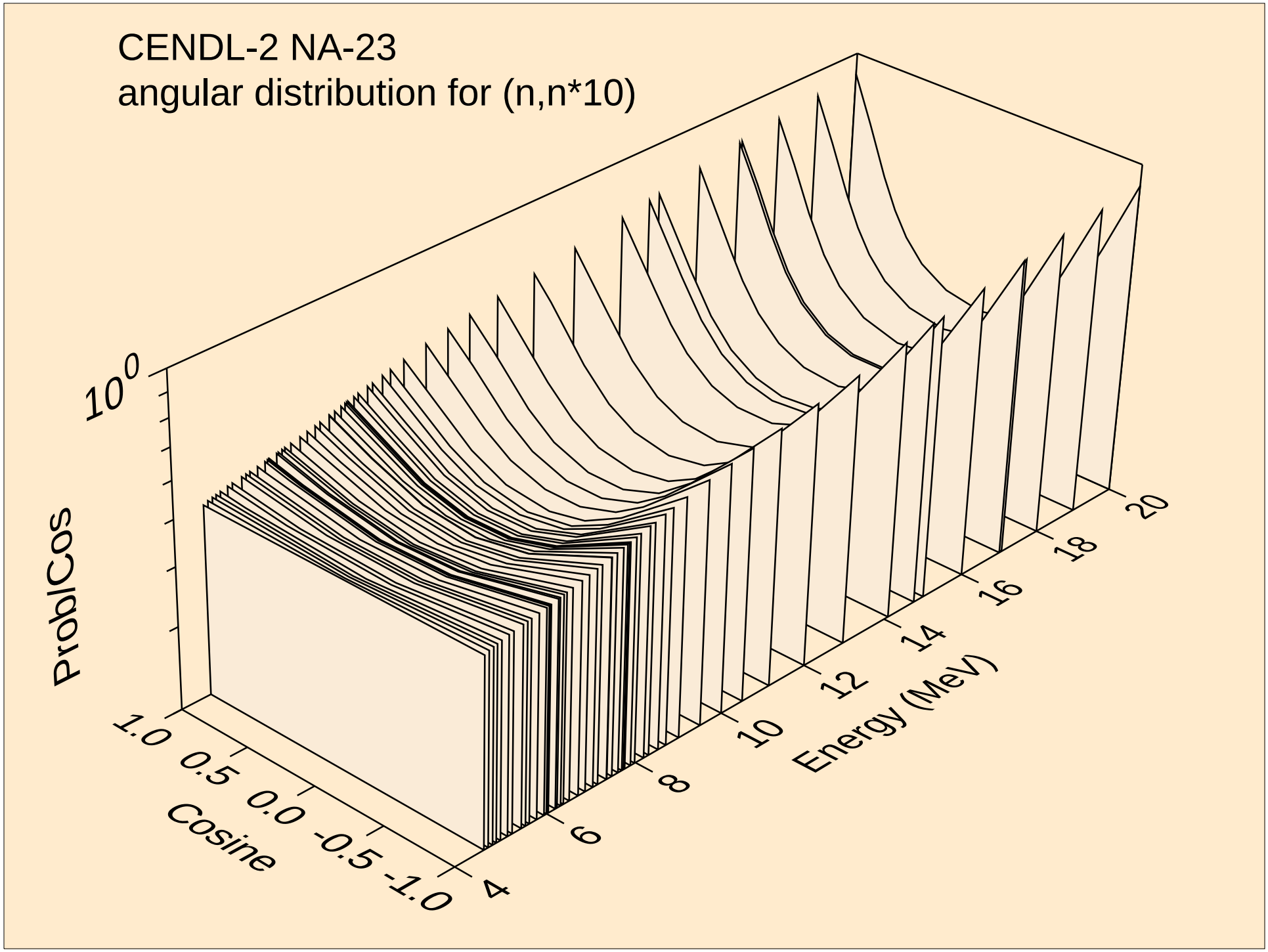

CENDL-2 NA-23
angular distribution for (n,n*5)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

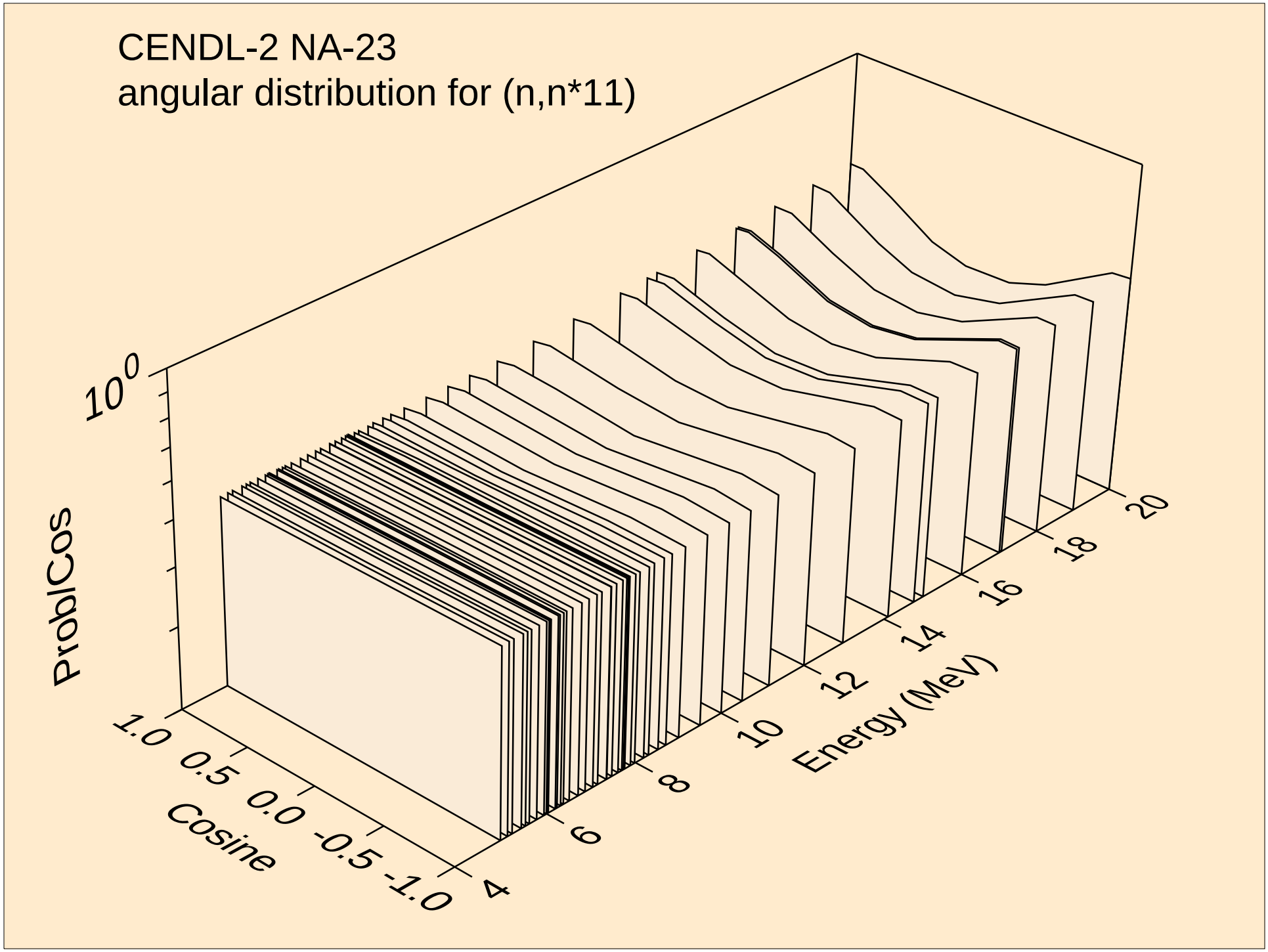

CENDL-2 NA-23
angular distribution for (n,n*6)
ProbCos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

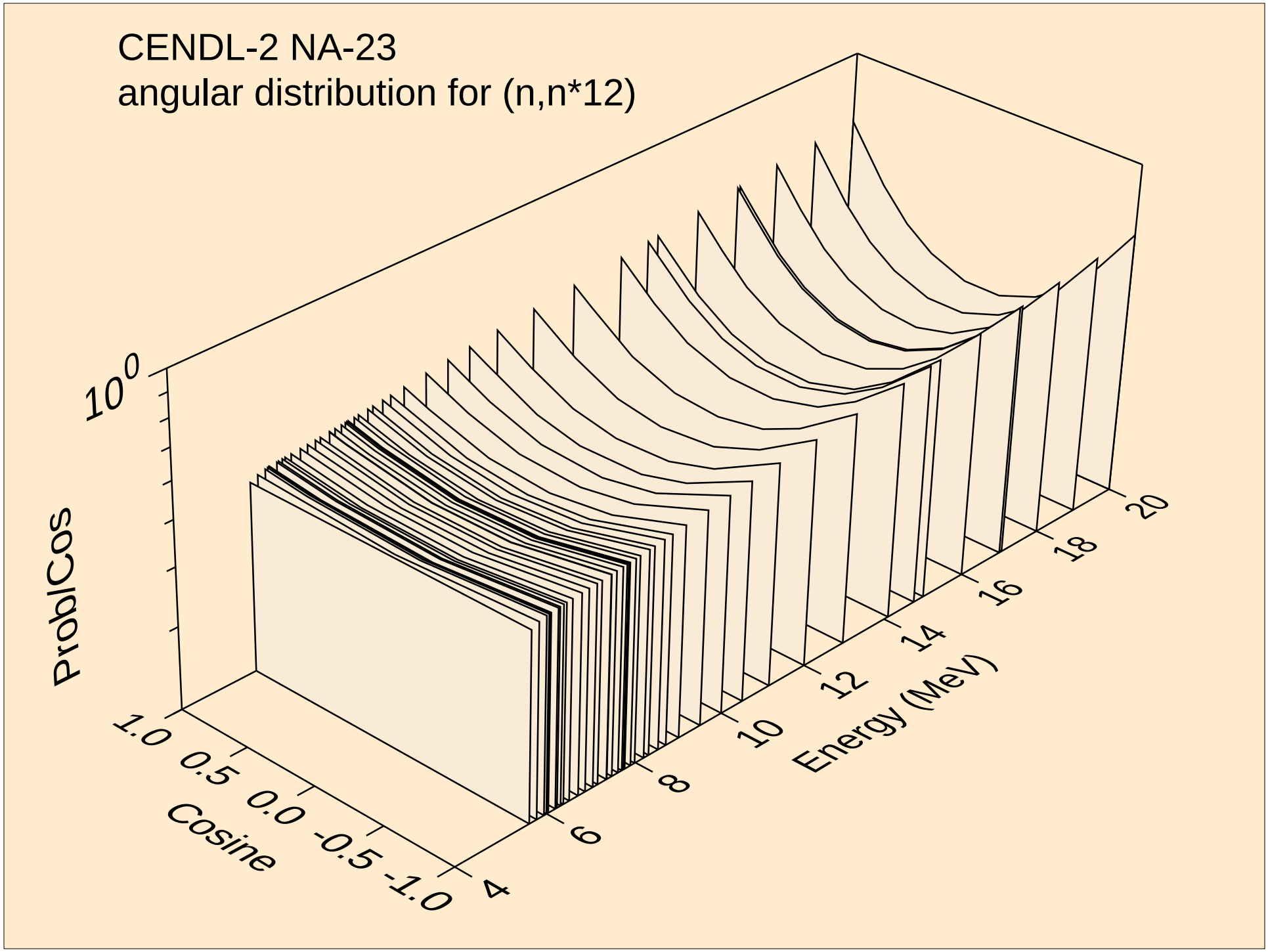

CENDL-2 NA-23
angular distribution for (n,n*7)
ProbCos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

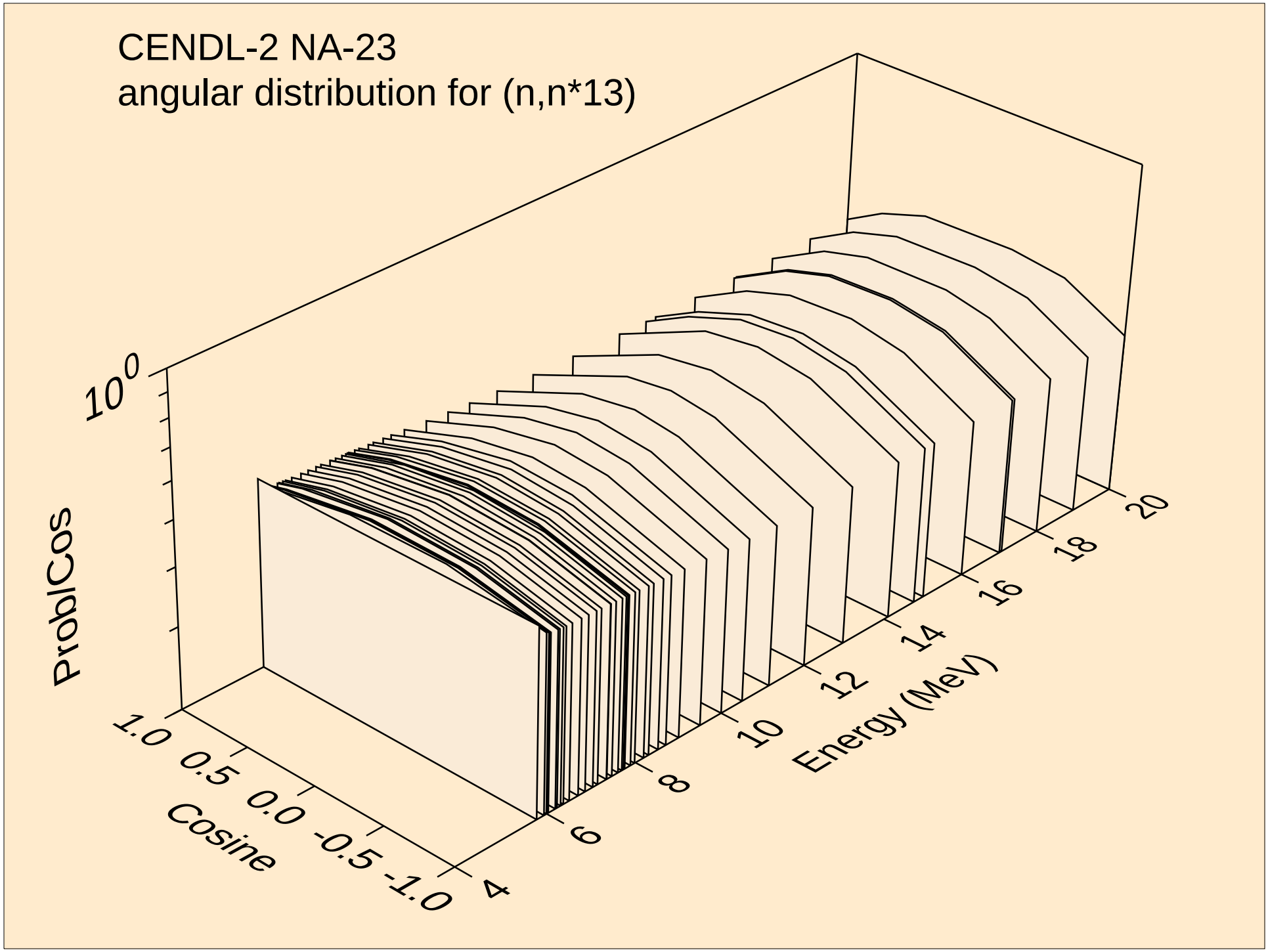

CENDL-2 NA-23
angular distribution for (n,n*8)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

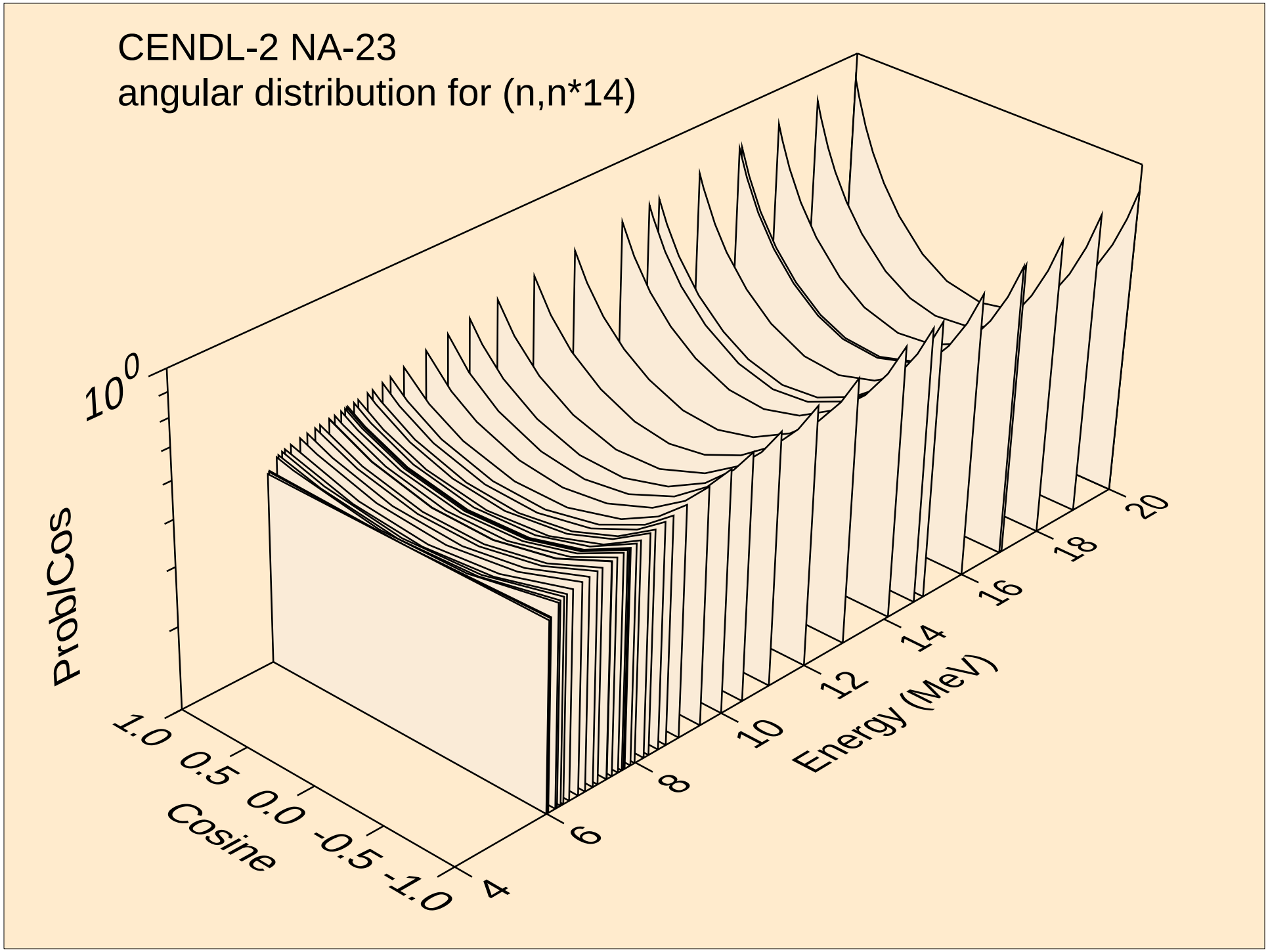

CENDL-2 NA-23
angular distribution for (n,n*9)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

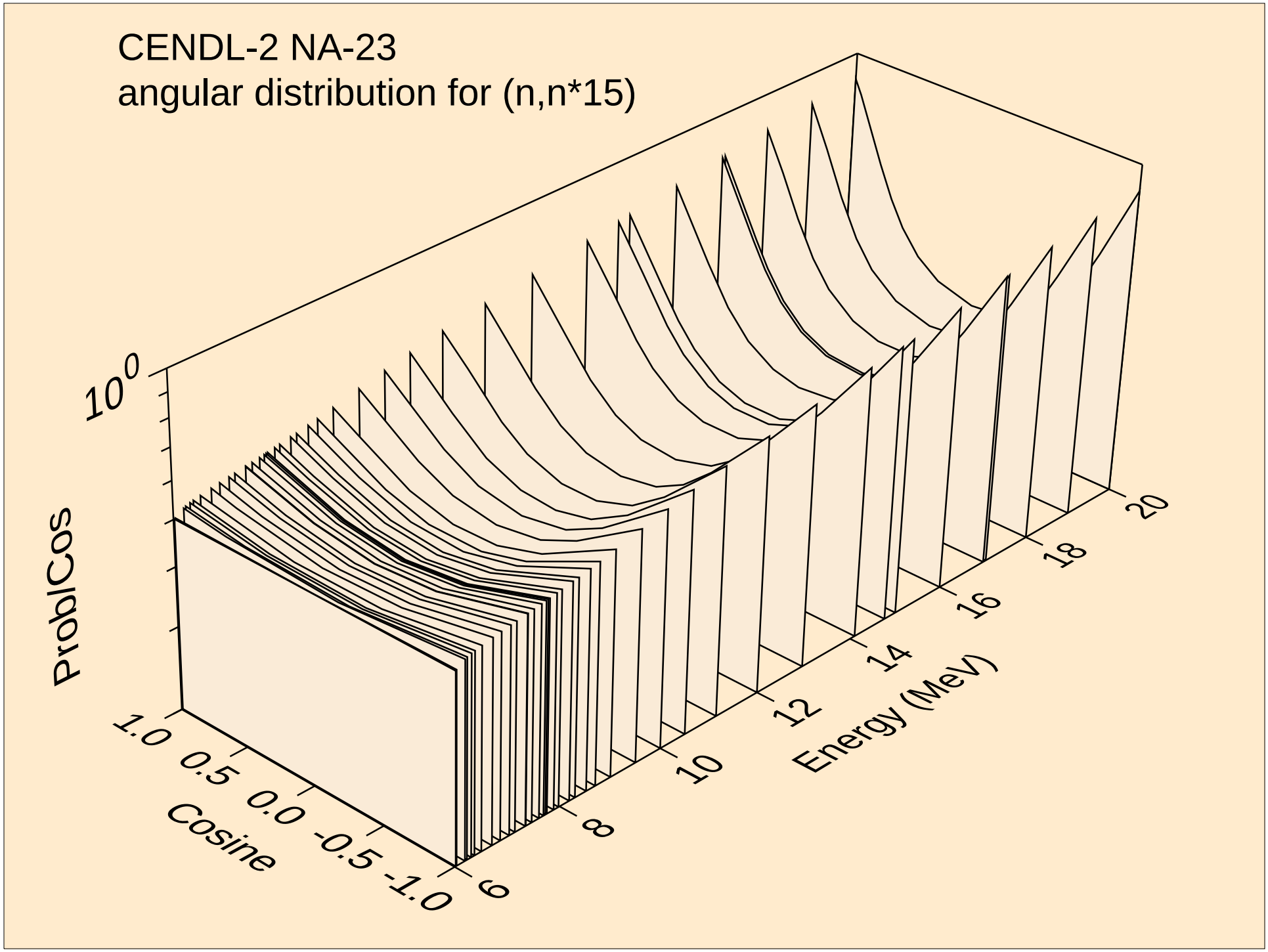

CENDL-2 NA-23
angular distribution for (n,n*10)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

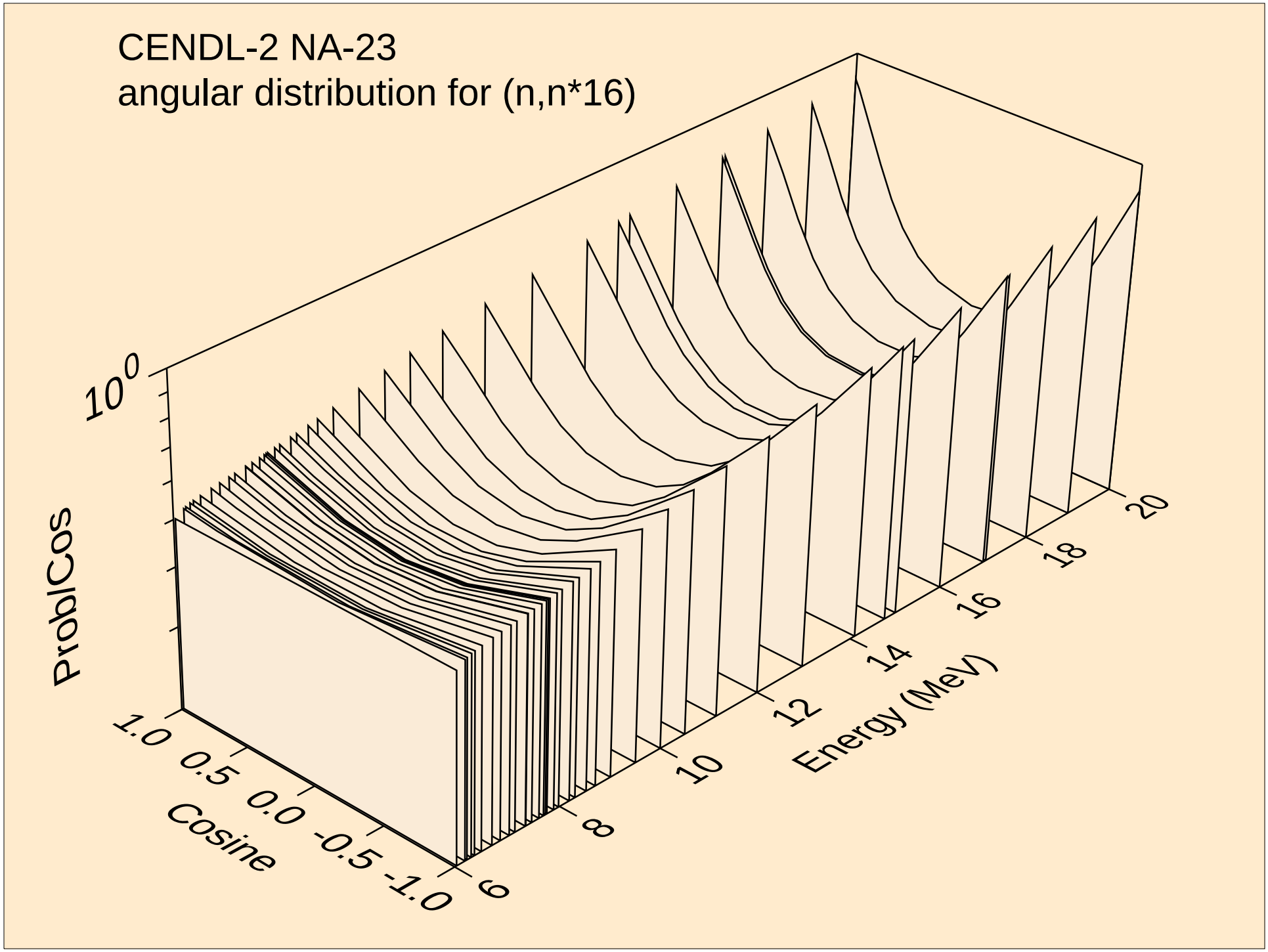

CENDL-2 NA-23
angular distribution for (n,n*11)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

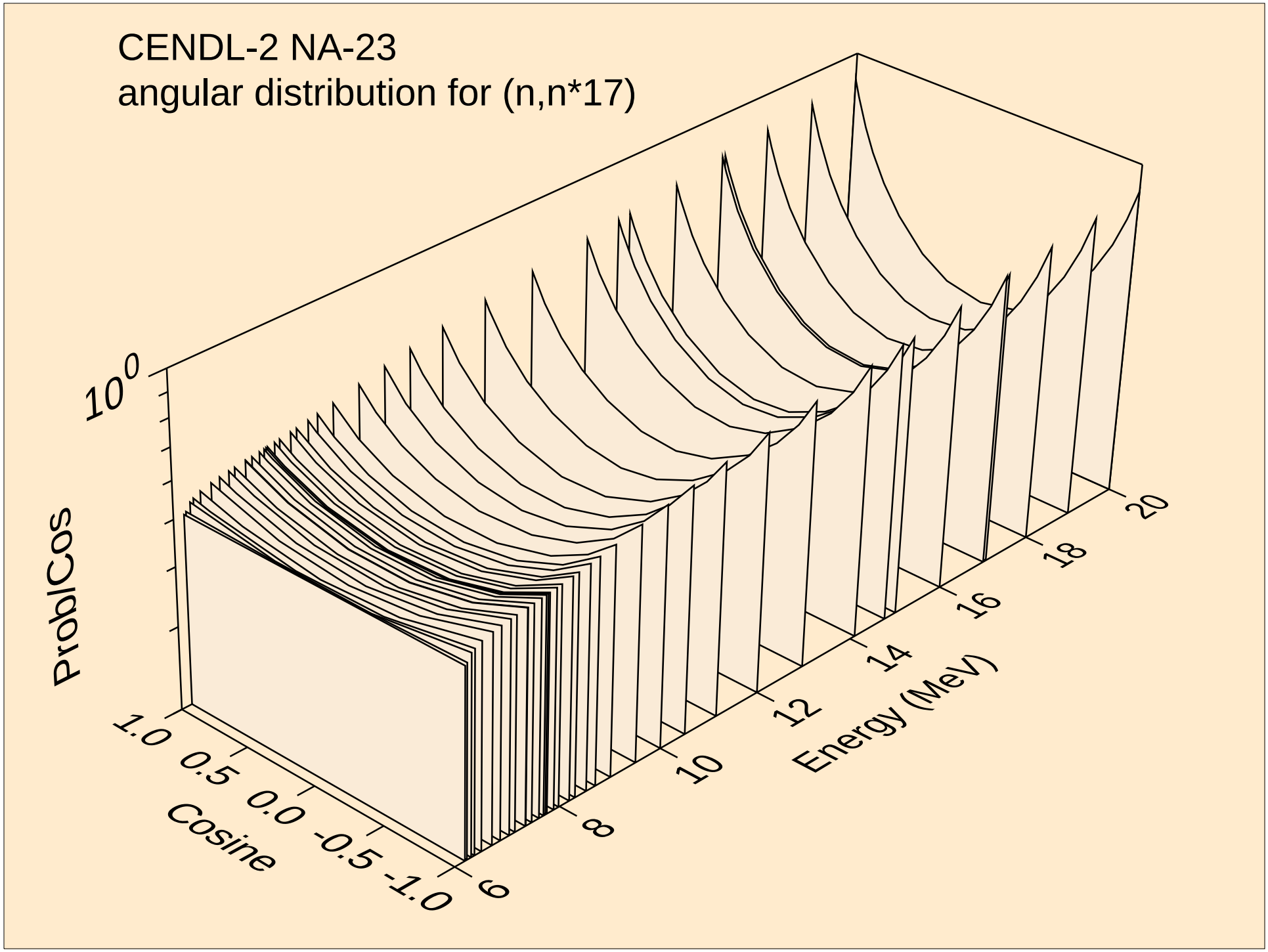

CENDL-2 NA-23
angular distribution for (n,n*12)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

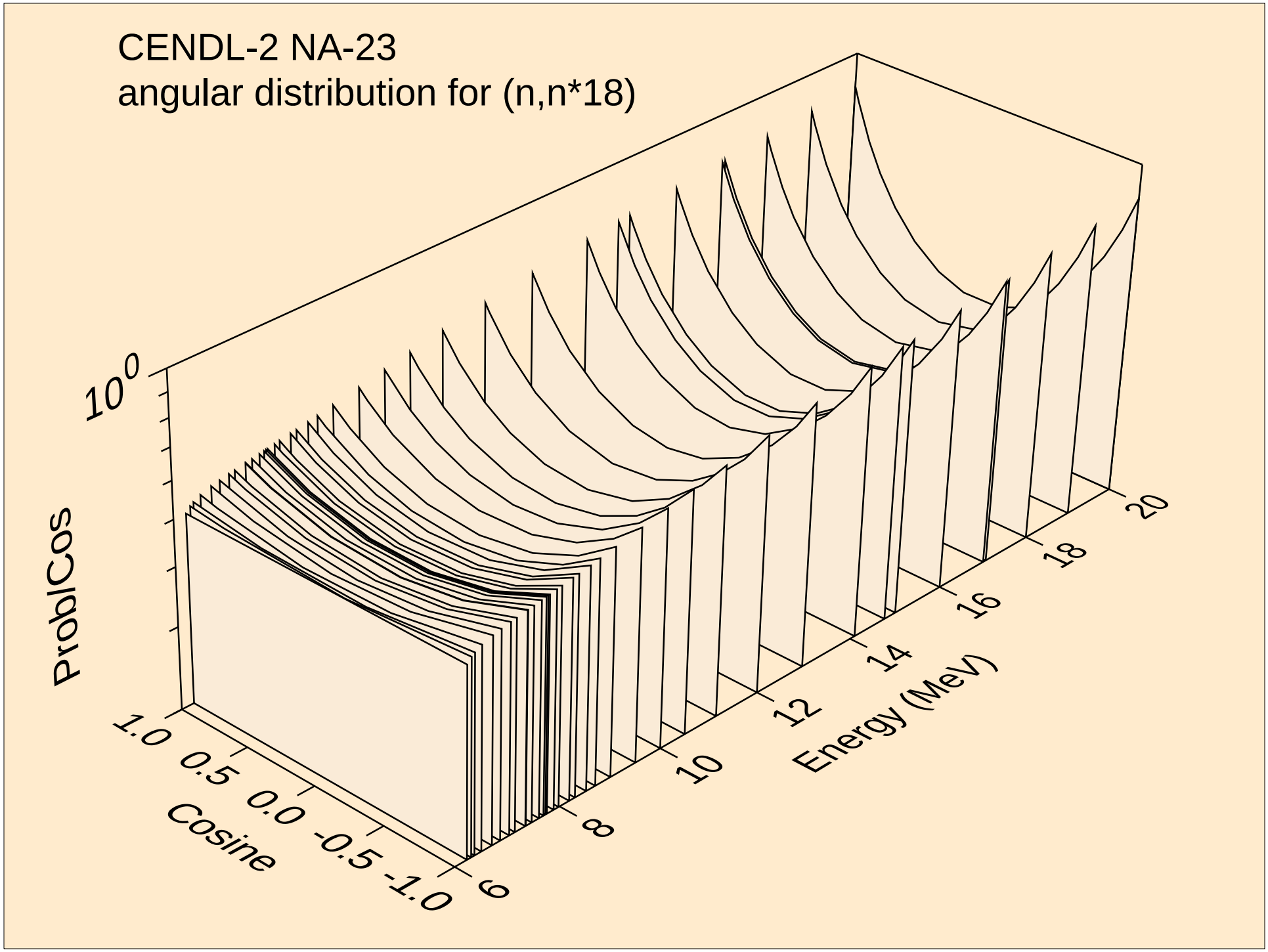

CENDL-2 NA-23
angular distribution for (n,n*13)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

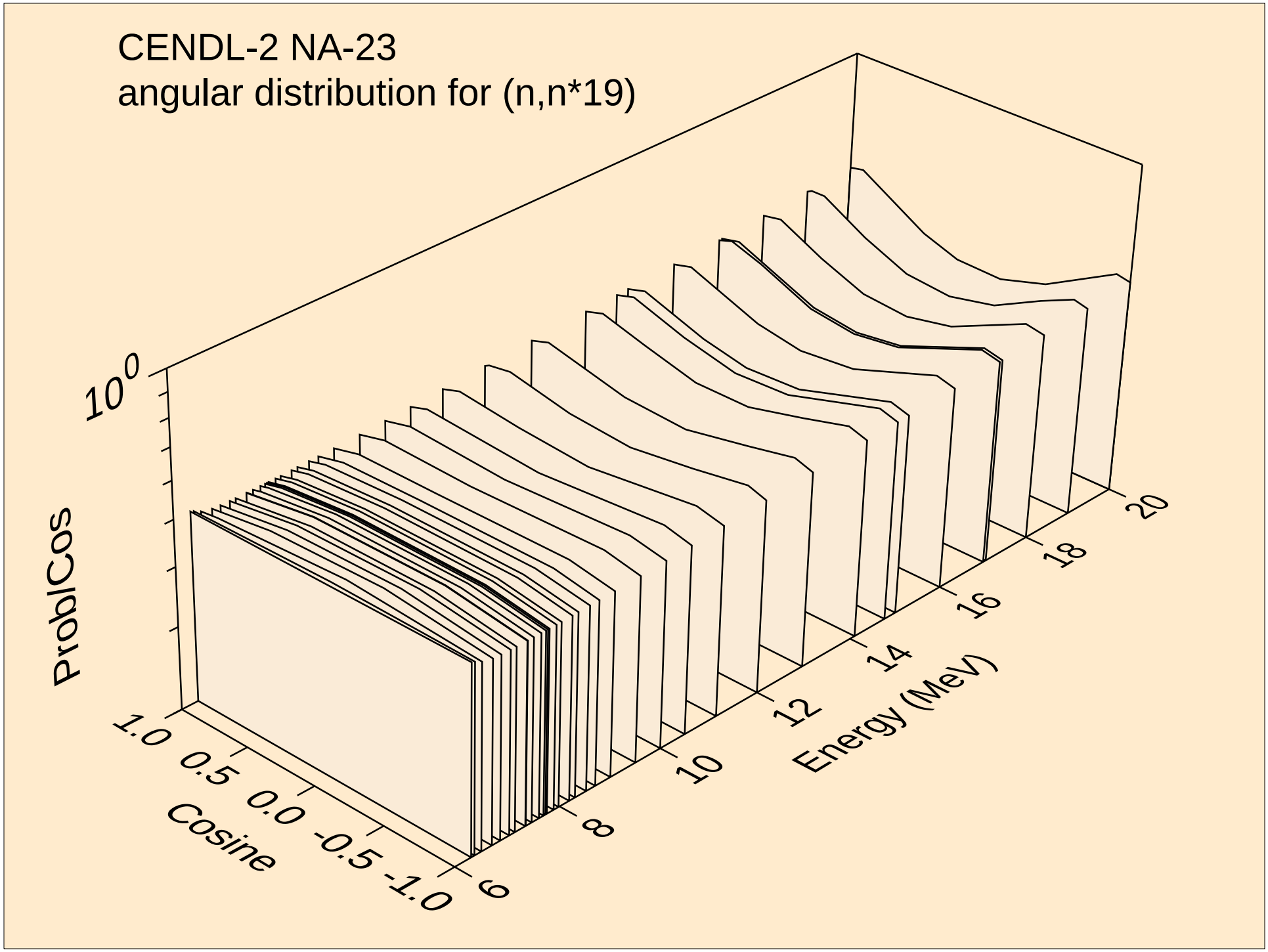

CENDL-2 NA-23
angular distribution for (n,n*14)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

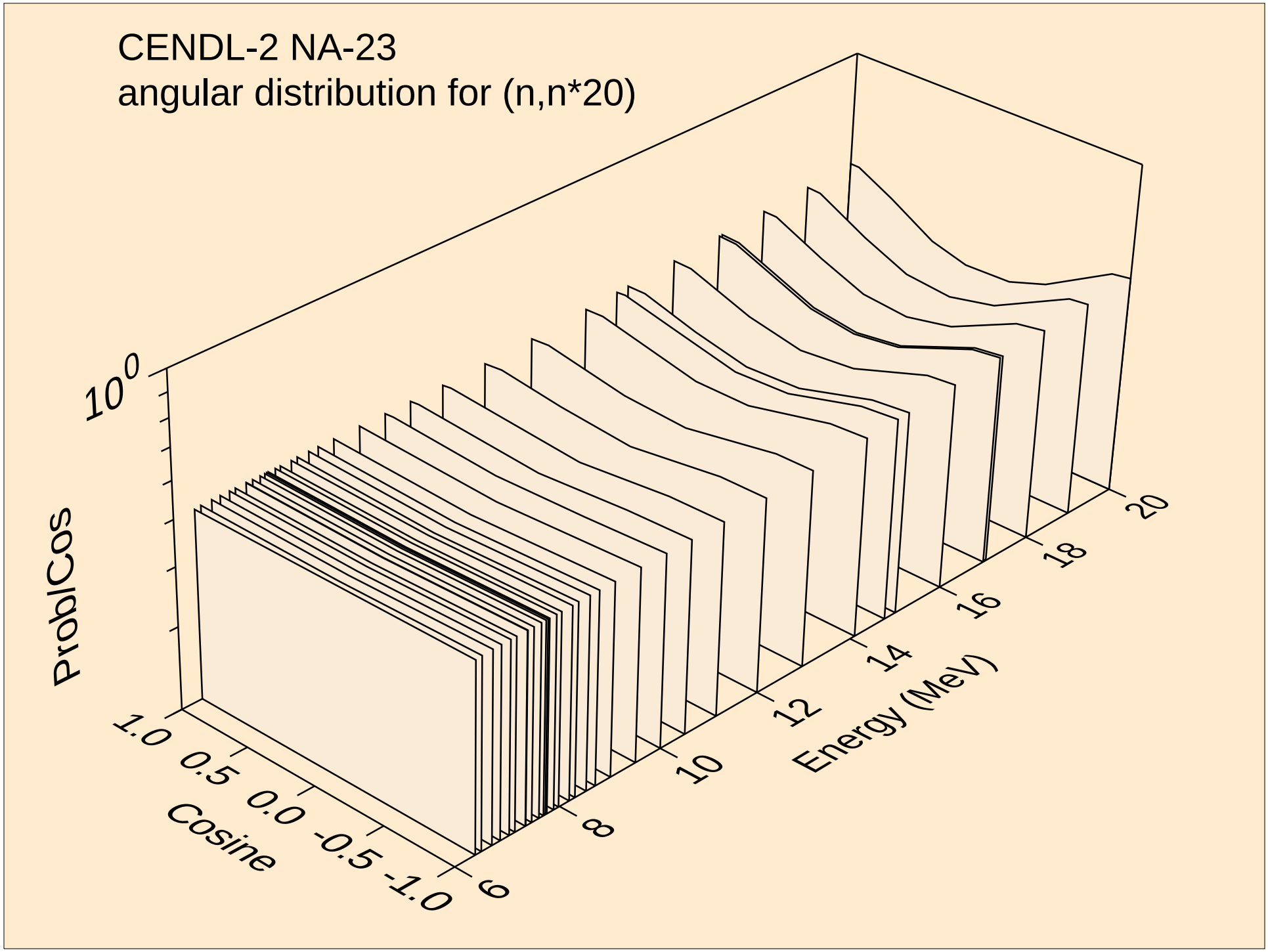

CENDL-2 NA-23
angular distribution for (n,n*15)
ProbCos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
6
8
10
12
14
16
18
20

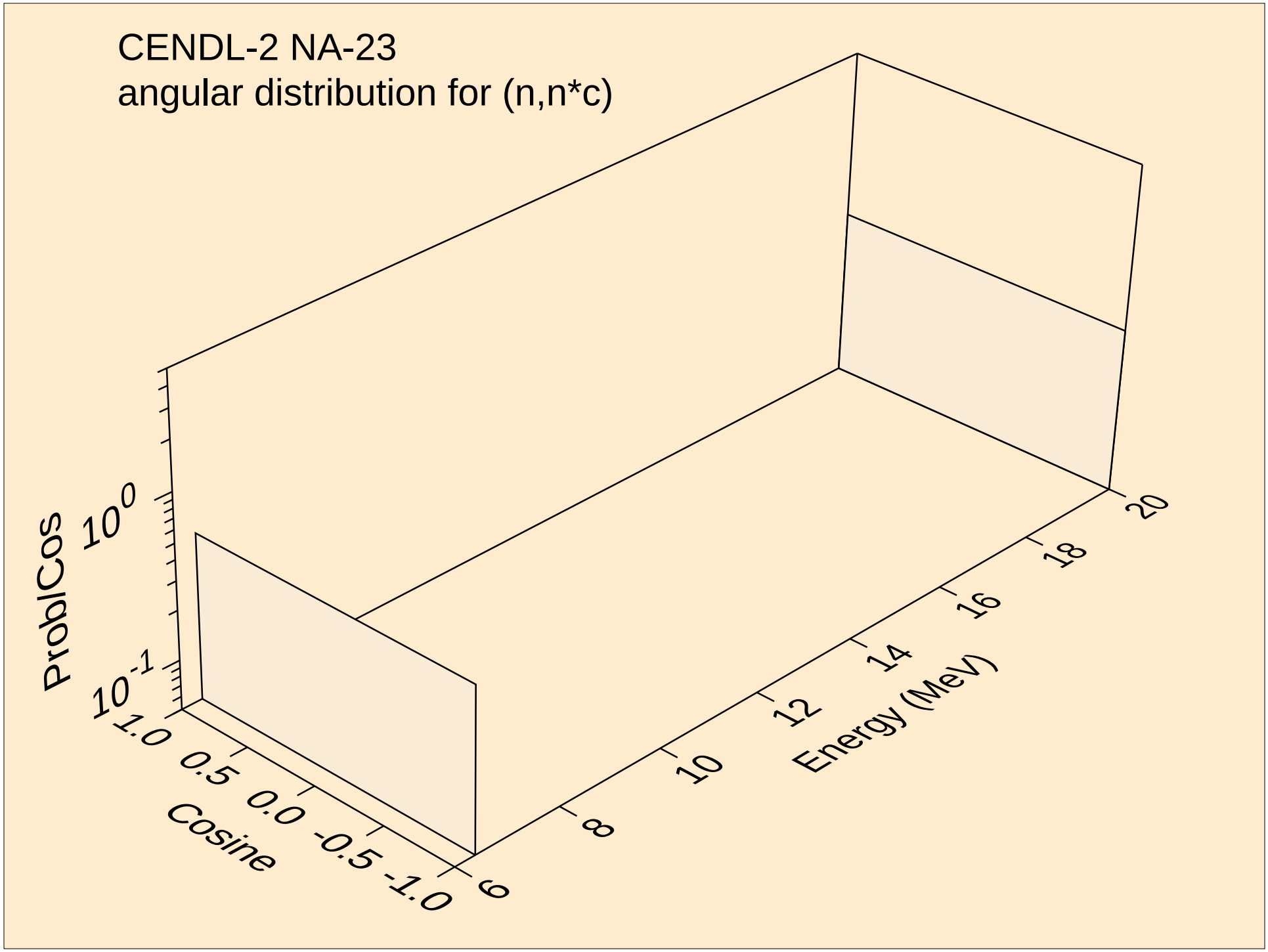

CENDL-2 NA-23
angular distribution for (n,n*16)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)

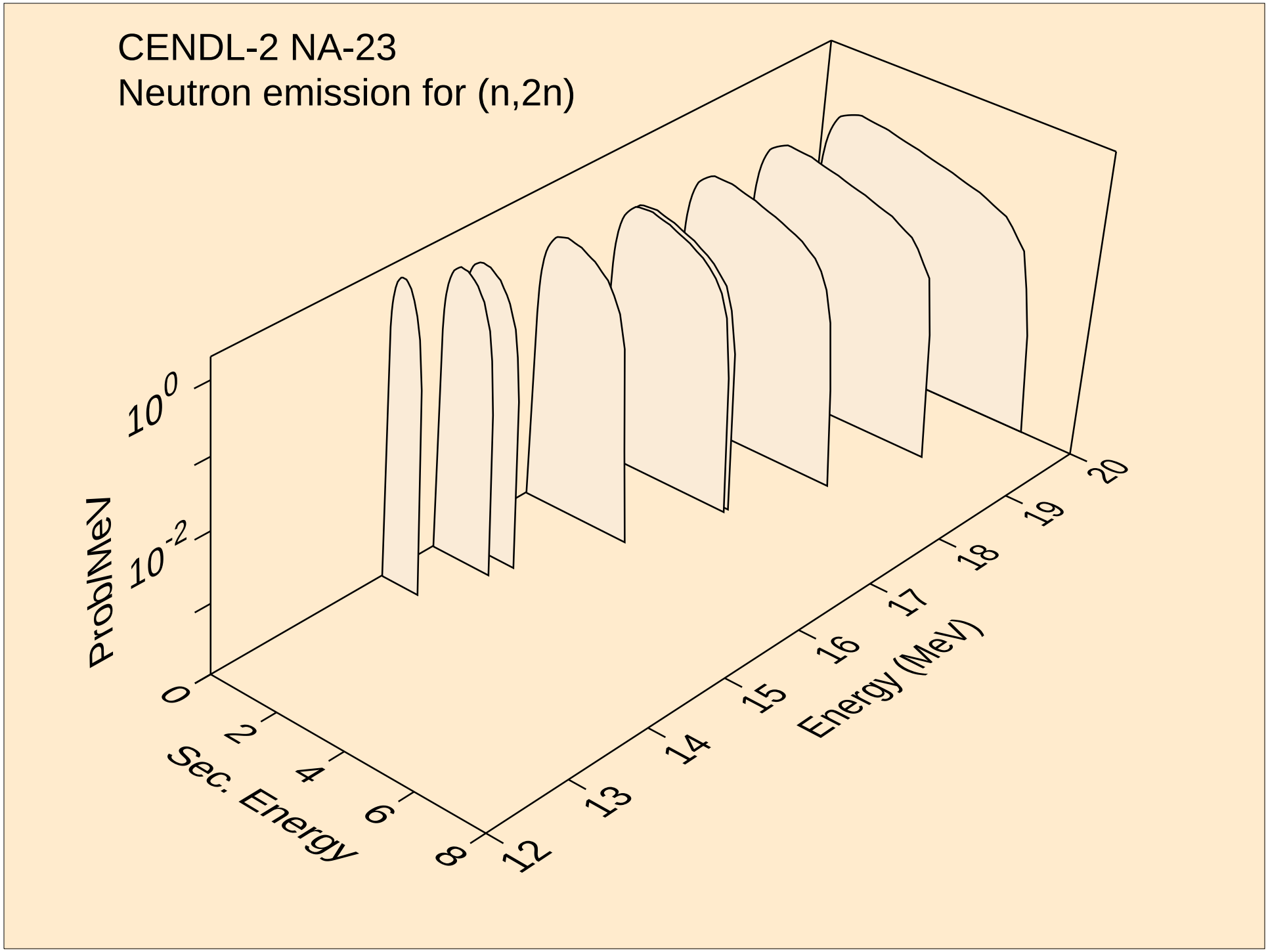

CENDL-2 NA-23
angular distribution for (n,n*17)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)


CENDL-2 NA-23
angular distribution for (n,n*18)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)

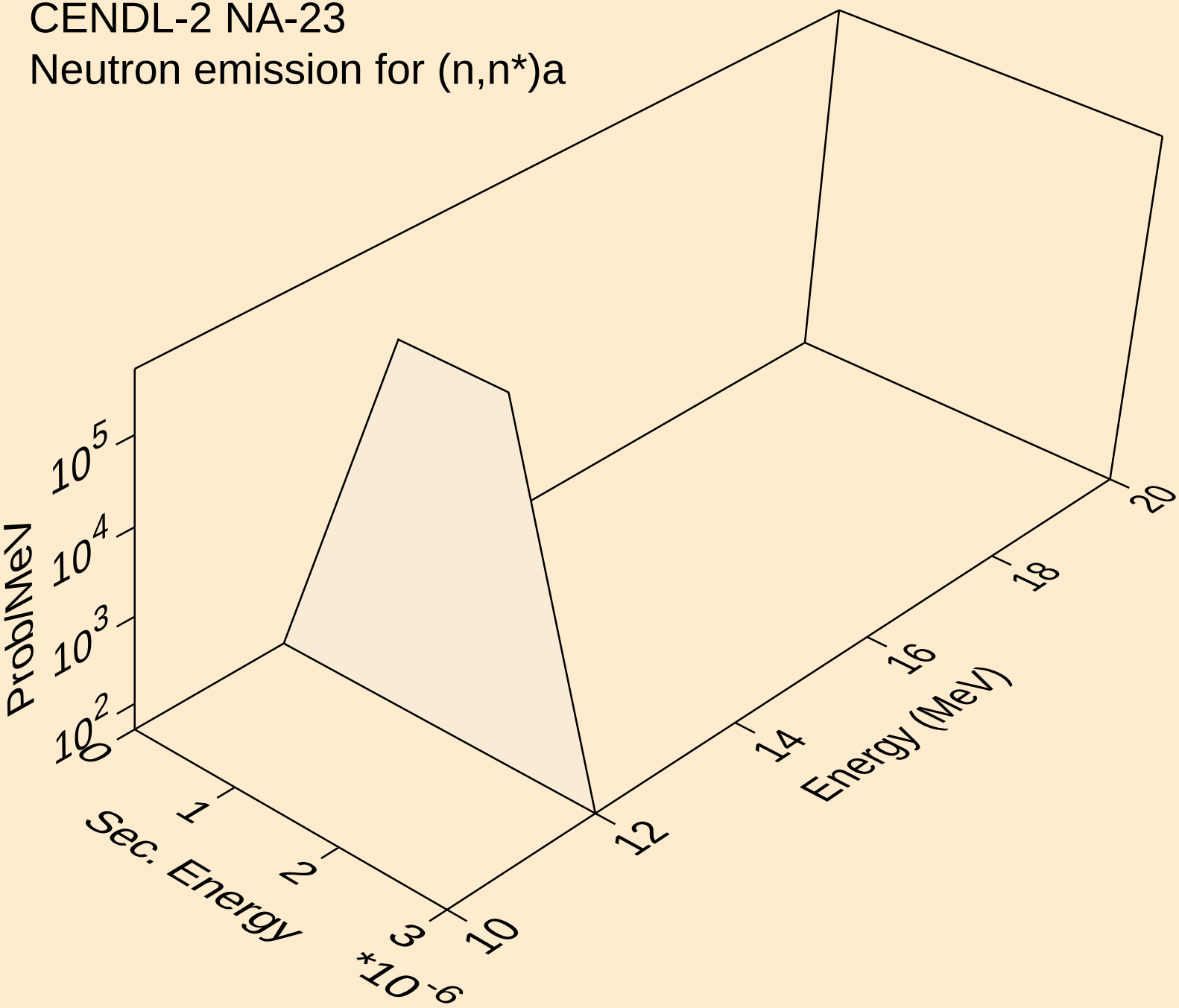

CENDL-2 NA-23
angular distribution for (n,n*19)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)


CENDL-2 NA-23
angular distribution for (n,n*20)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)

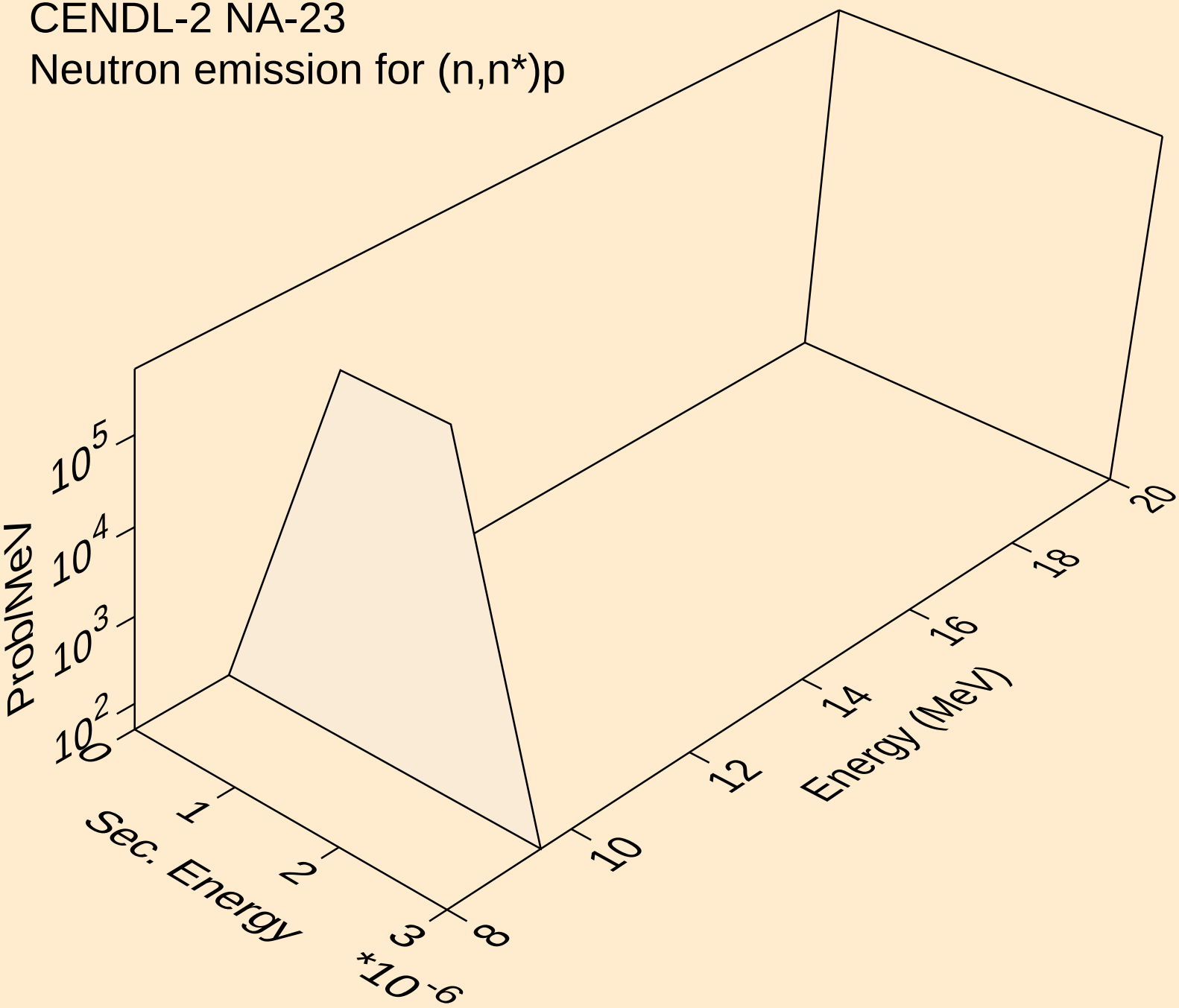

CENDL-2 NA-23
angular distribution for (n,n*c)
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)

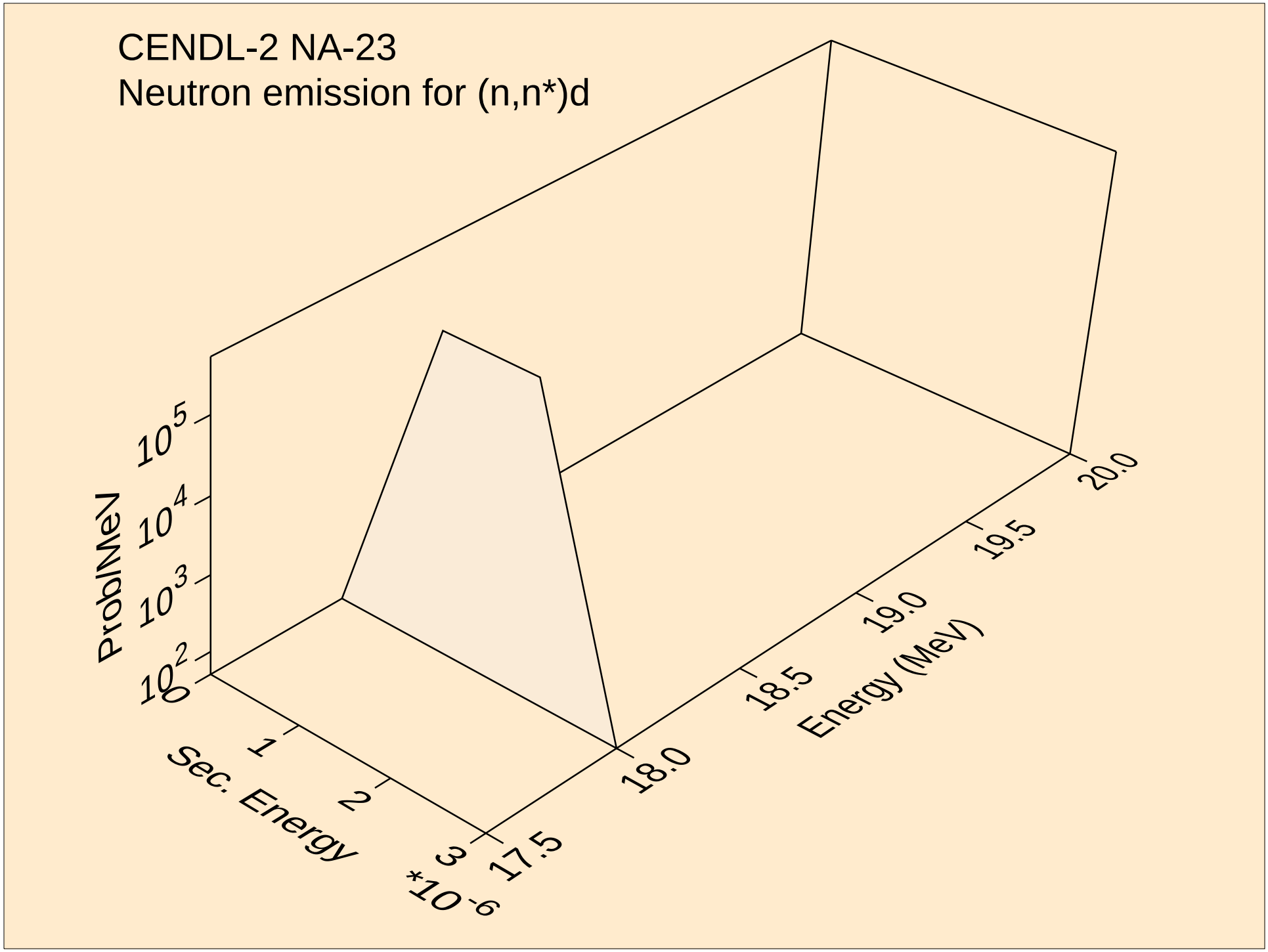

CENDL-2 NA-23
Neutron emission for (n,2n)
Prob/MeV
10^0
10^{-2}
0
2
4
6
8
Sec. Energy
12
13
14
15
16
17
18
19
20
Energy (MeV)

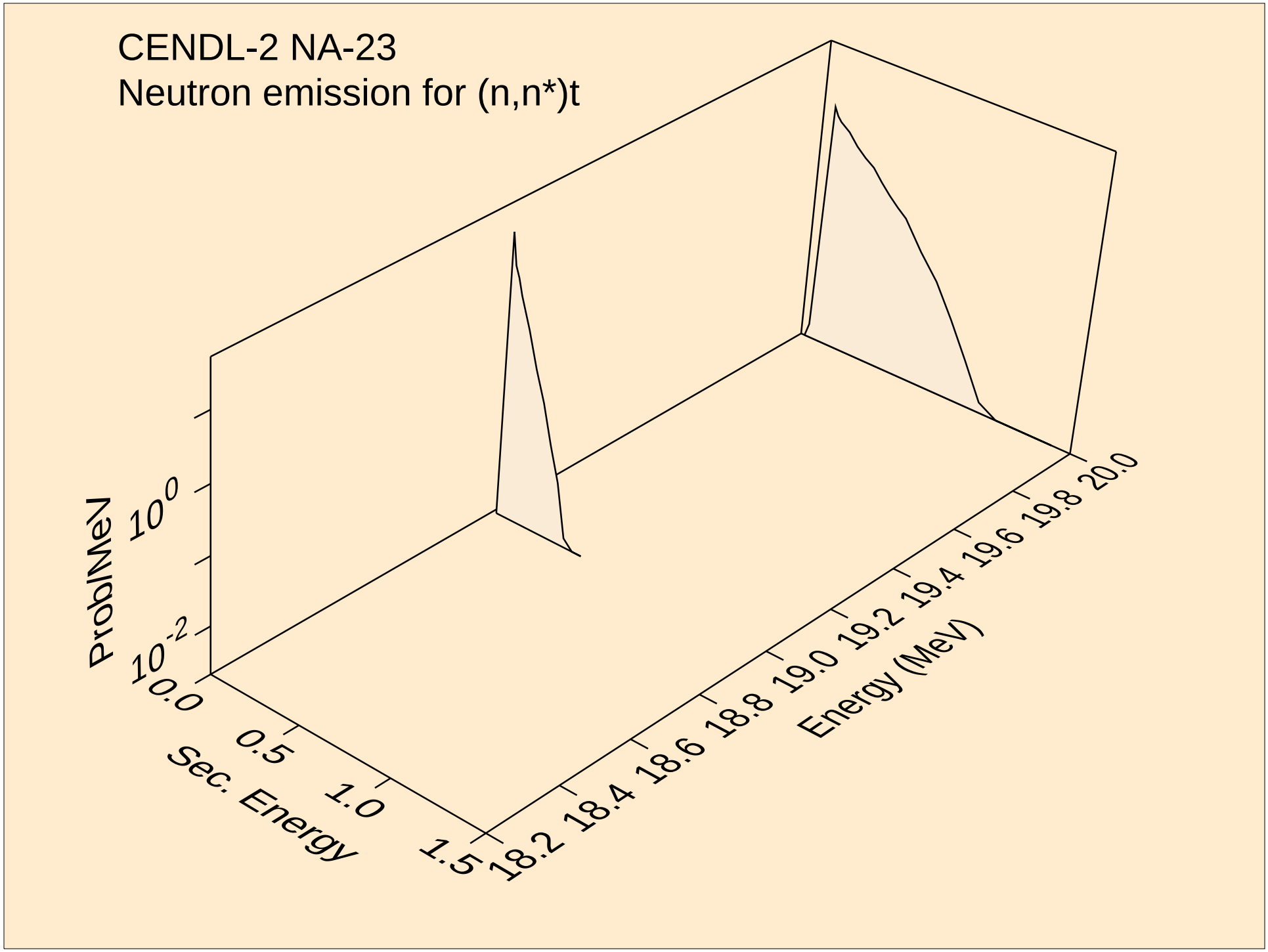
CENDL-2 NA-23
Neutron emission for (n,n*)a

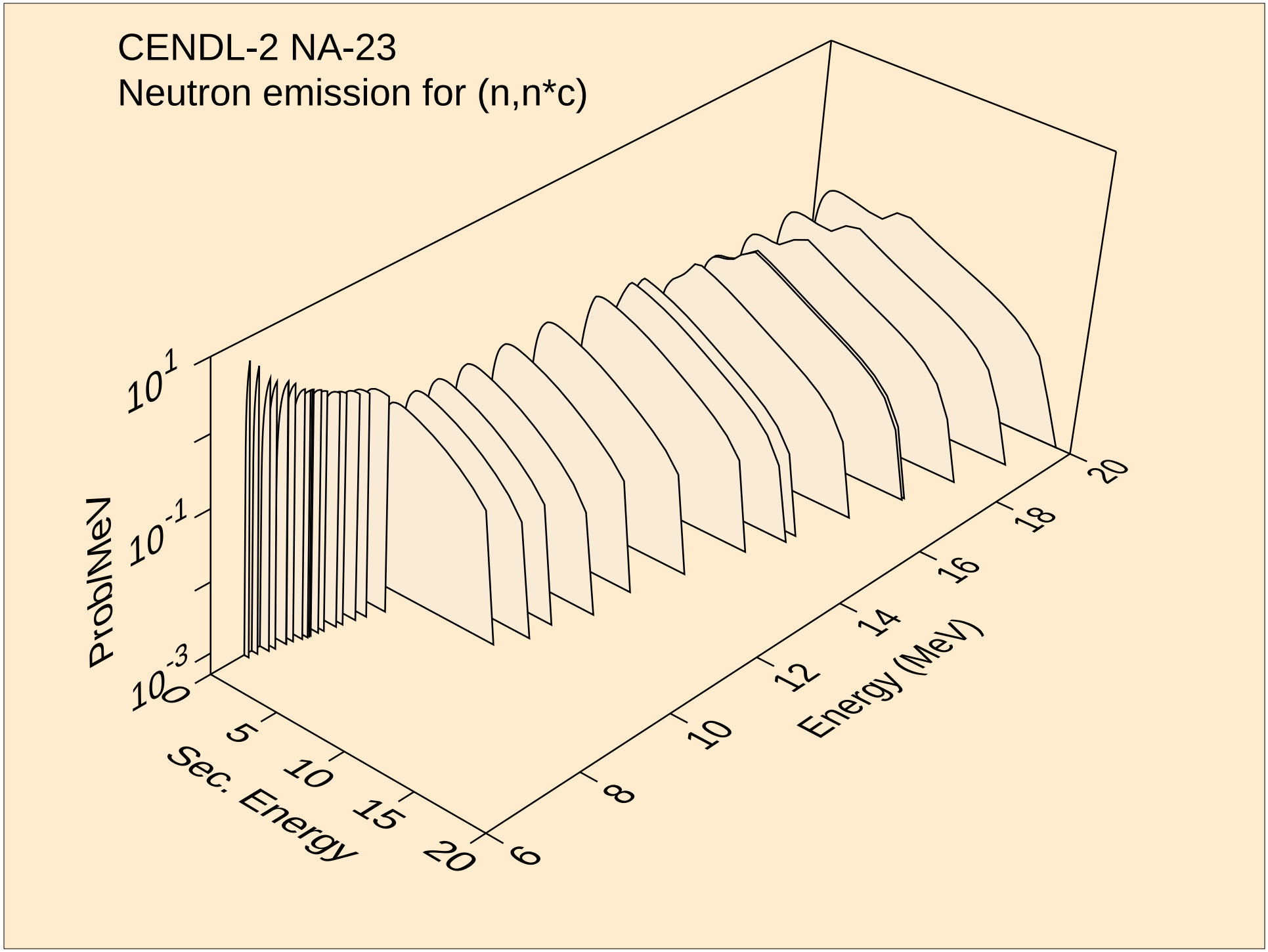


CENDL-2 NA-23
Neutron emission for (n,n*)p




CENDL-2 NA-23
Neutron emission for (n,n*)d
Prob/MeV
10^5
10^4
10^3
10^2
0
1
2
3
Sec. Energy
*10^{-6}
17.5
18.0
18.5
19.0
19.5
20.0
Energy (MeV)


CENDL-2 NA-23
Neutron emission for (n,n*)t
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
1.5
Sec. Energy
18.2
18.4
18.6
18.8
19.0
19.2
19.4
19.6
19.8
20.0
Energy (MeV)


CENDL-2 NA-23
Neutron emission for (n,n*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
5
10
15
20
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)