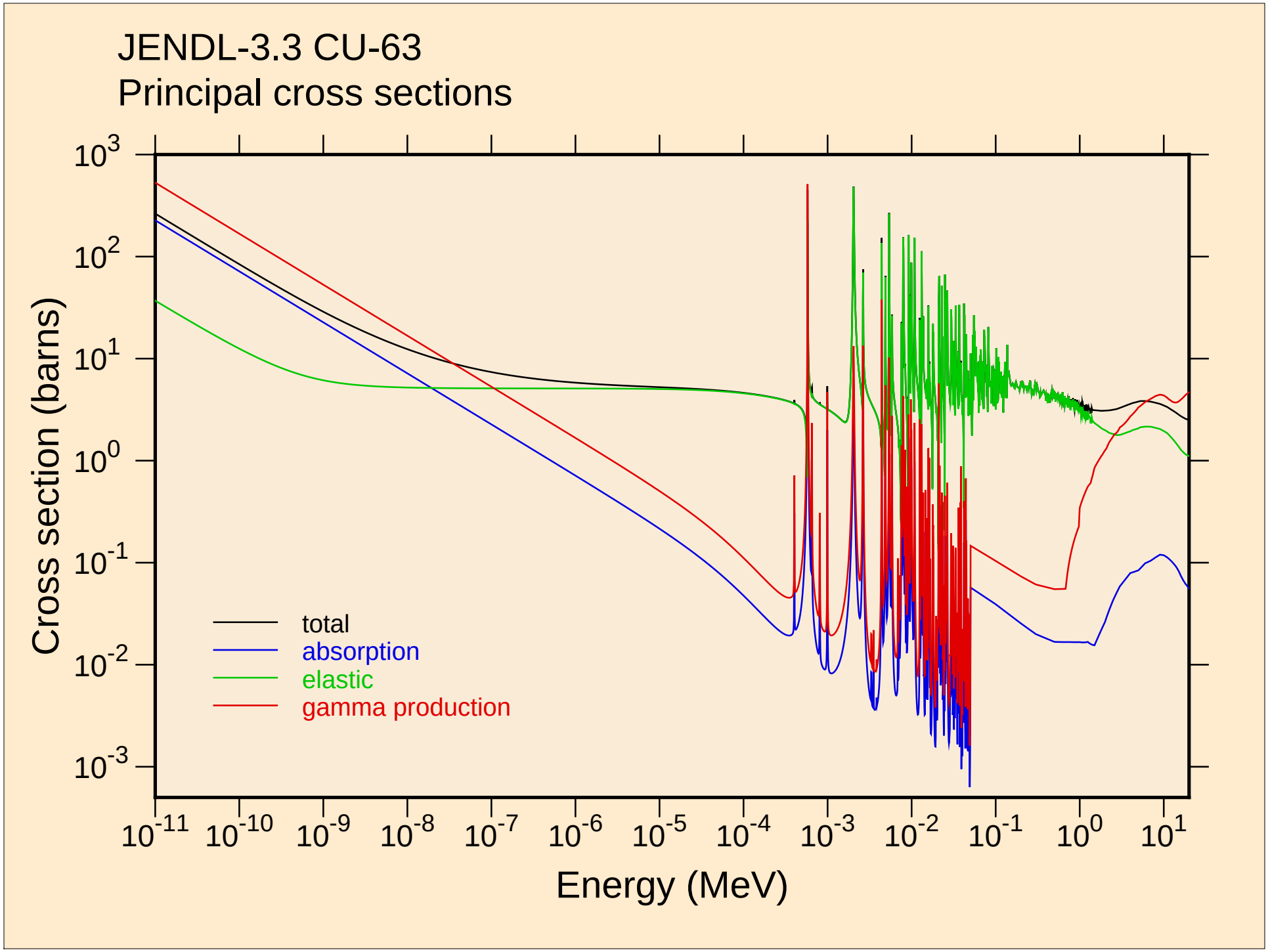
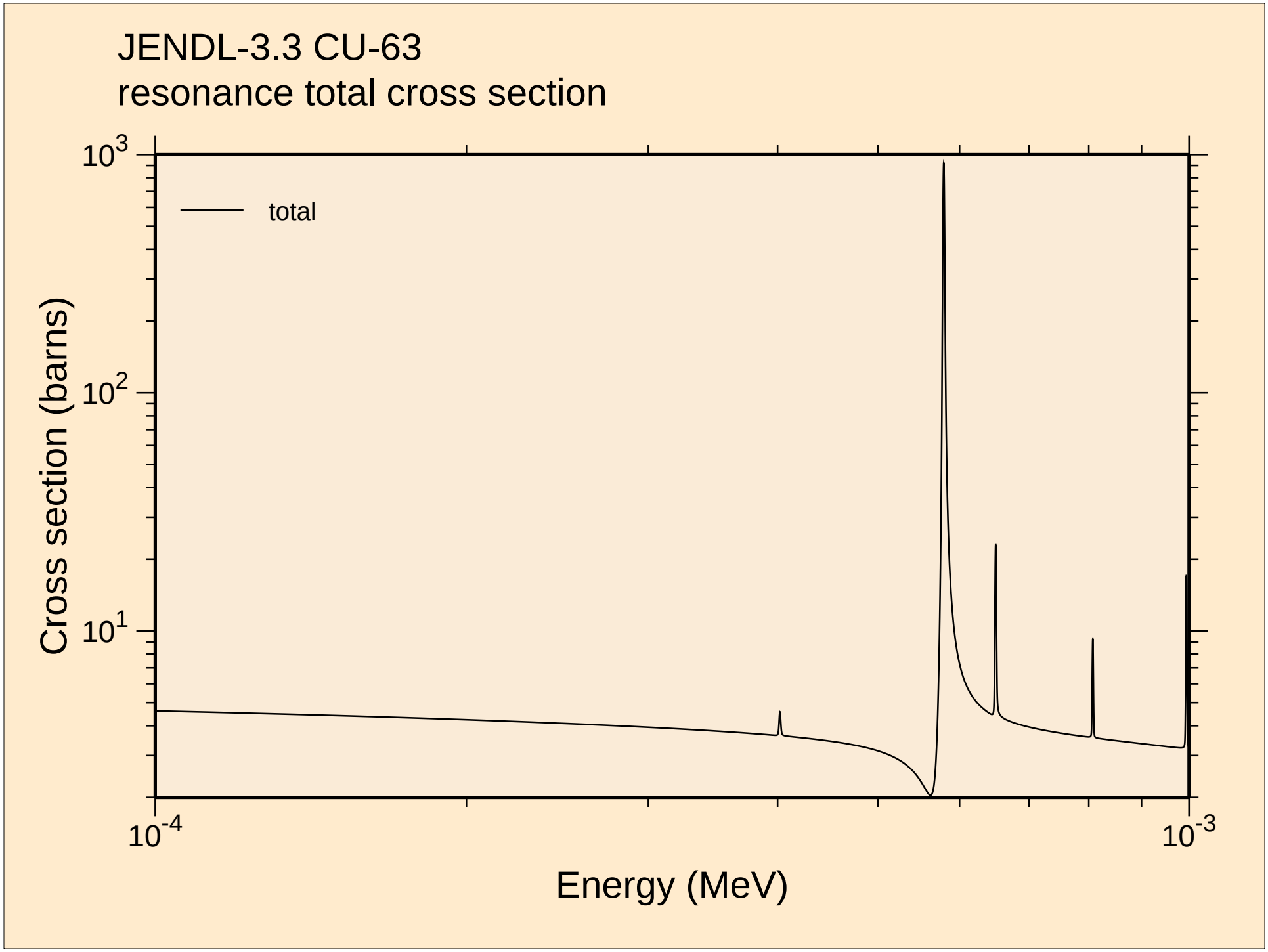
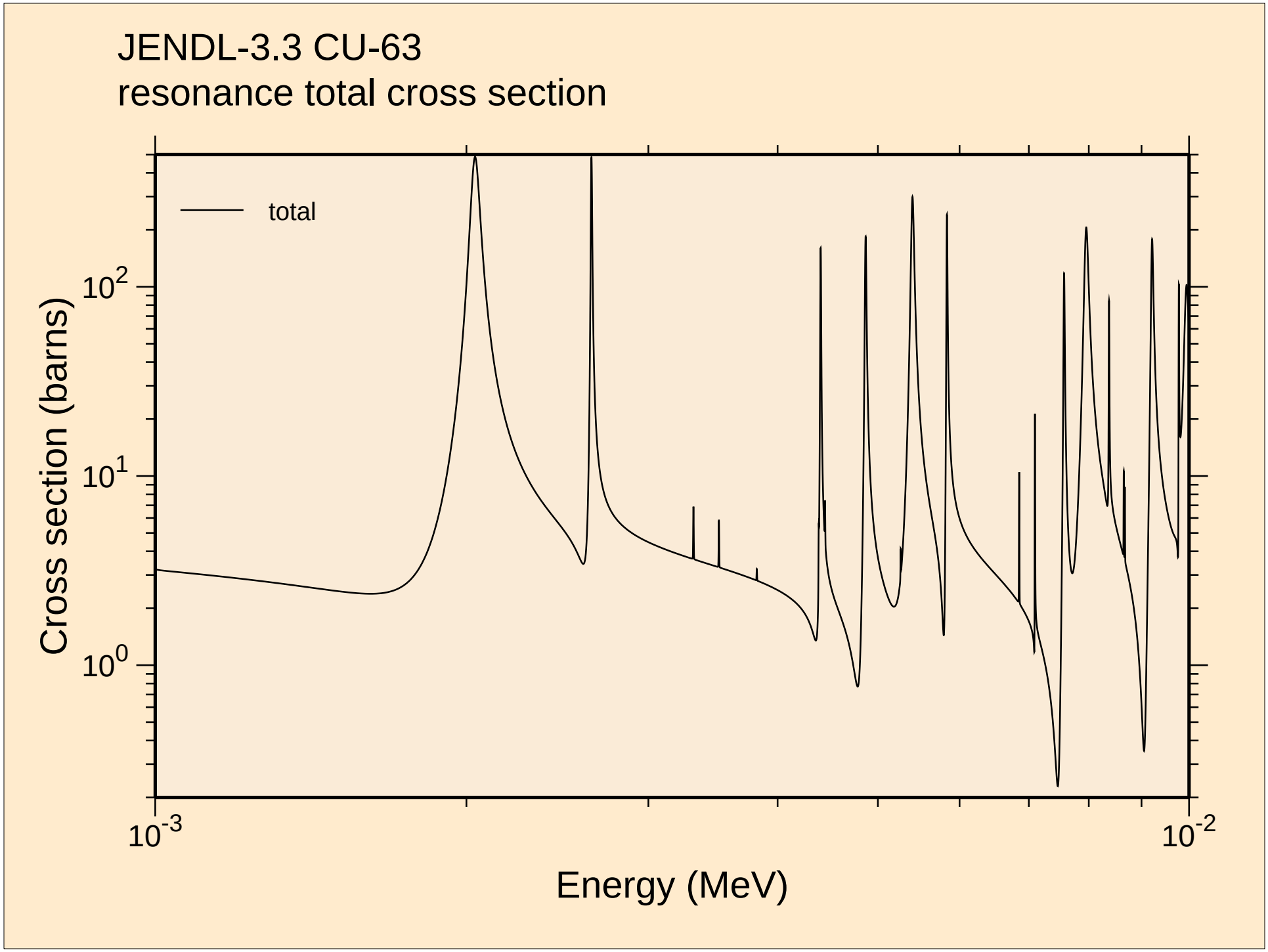
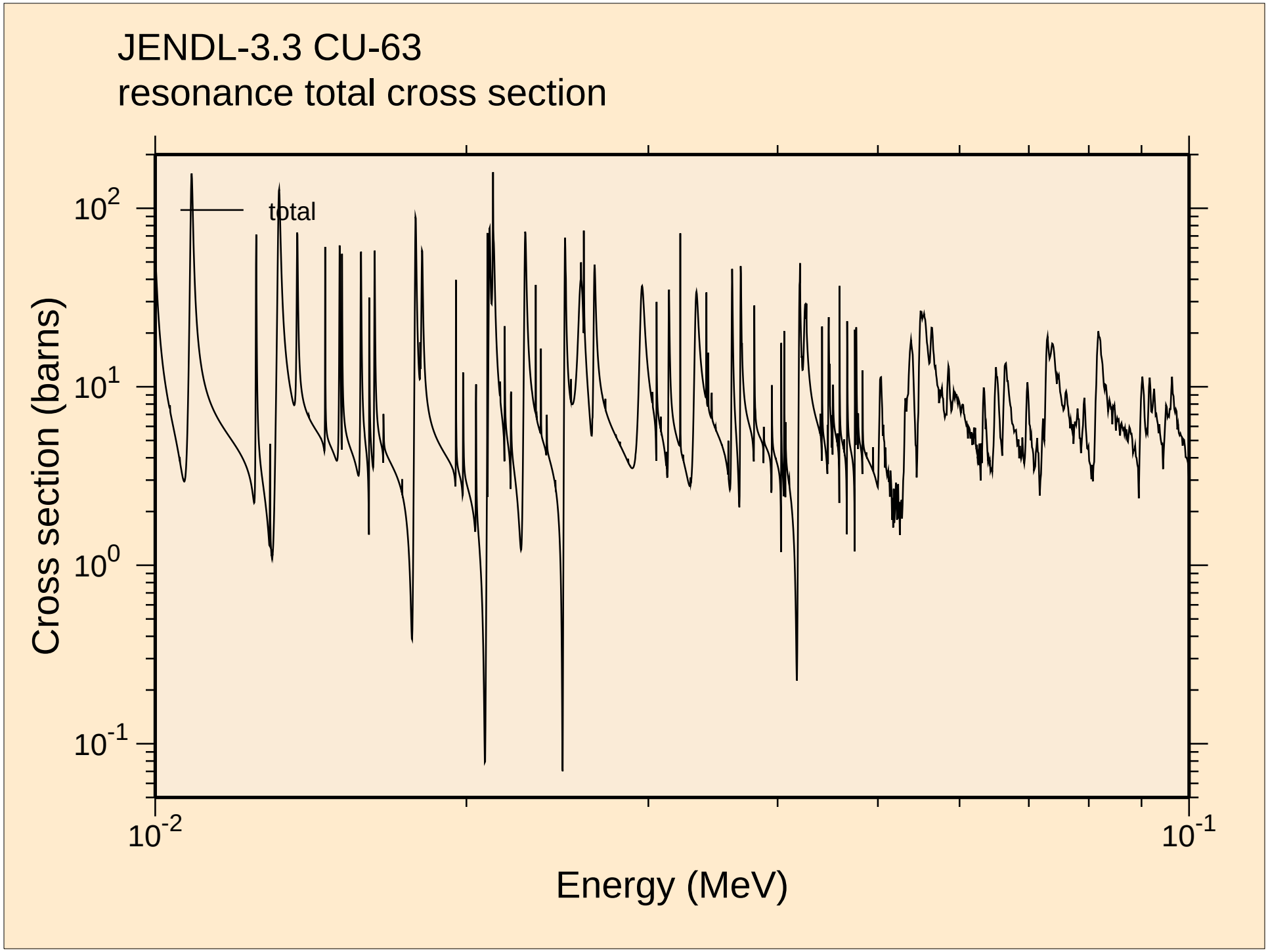
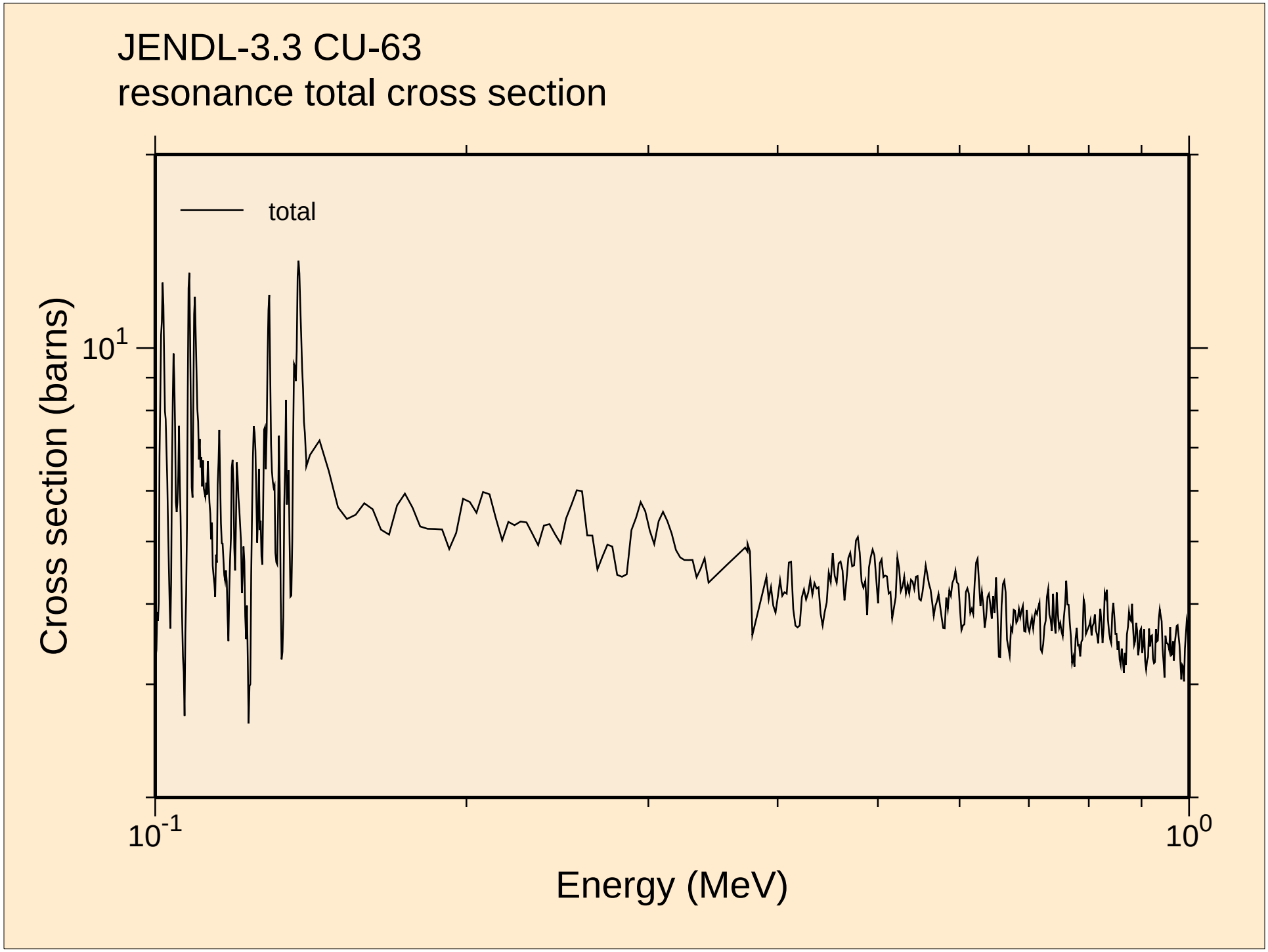
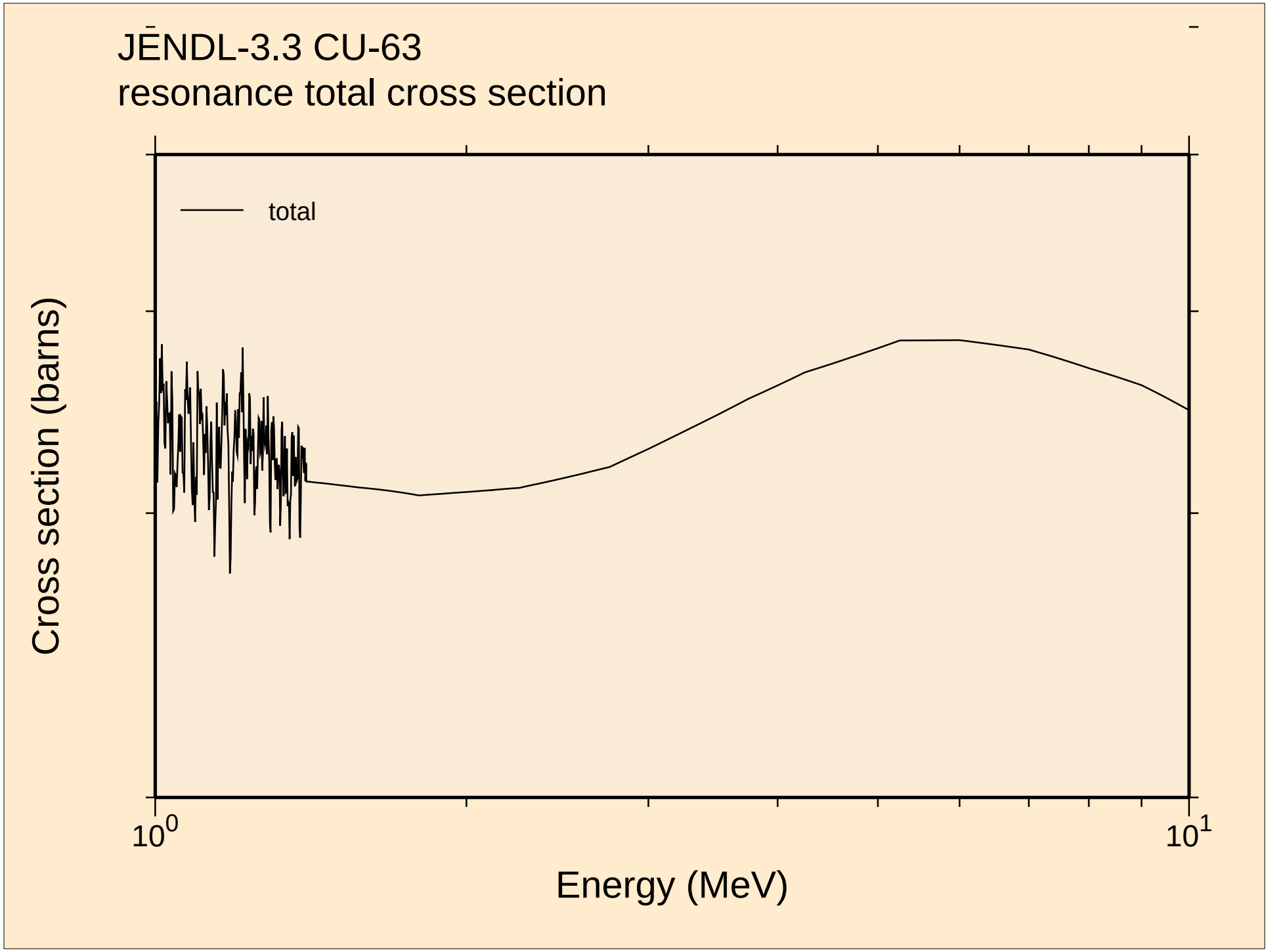

JENDL-3.3 CU-63
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-11}
10^{-10}
10^{-9}
10^{-8}
10^{-7}
10^{-6}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}

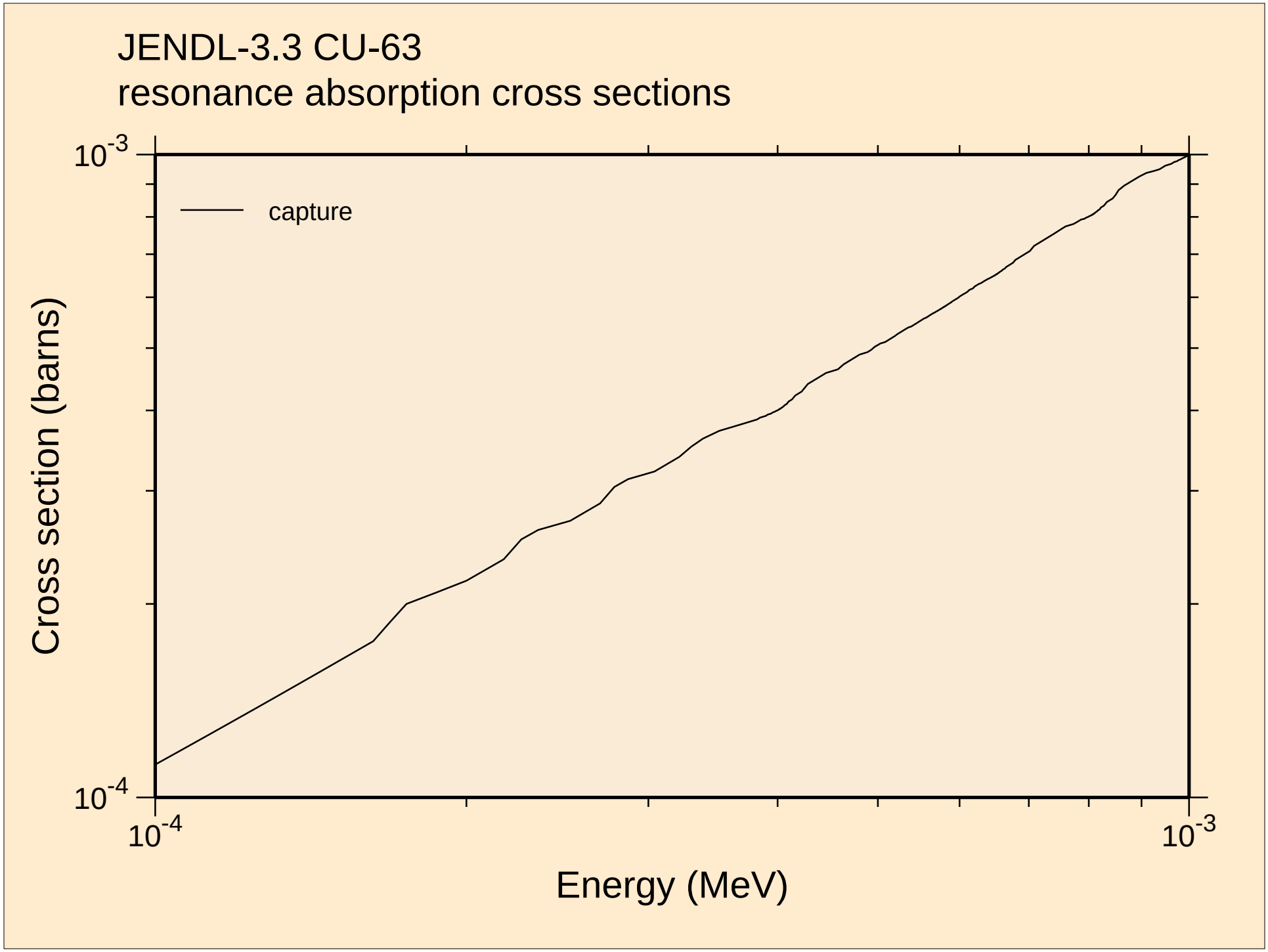

JENDL-3.3 CU-63
resonance total cross section
total
Cross section (barns)
10^3
10^2
10^1
10^{-4}
10^{-3}
Energy (MeV)

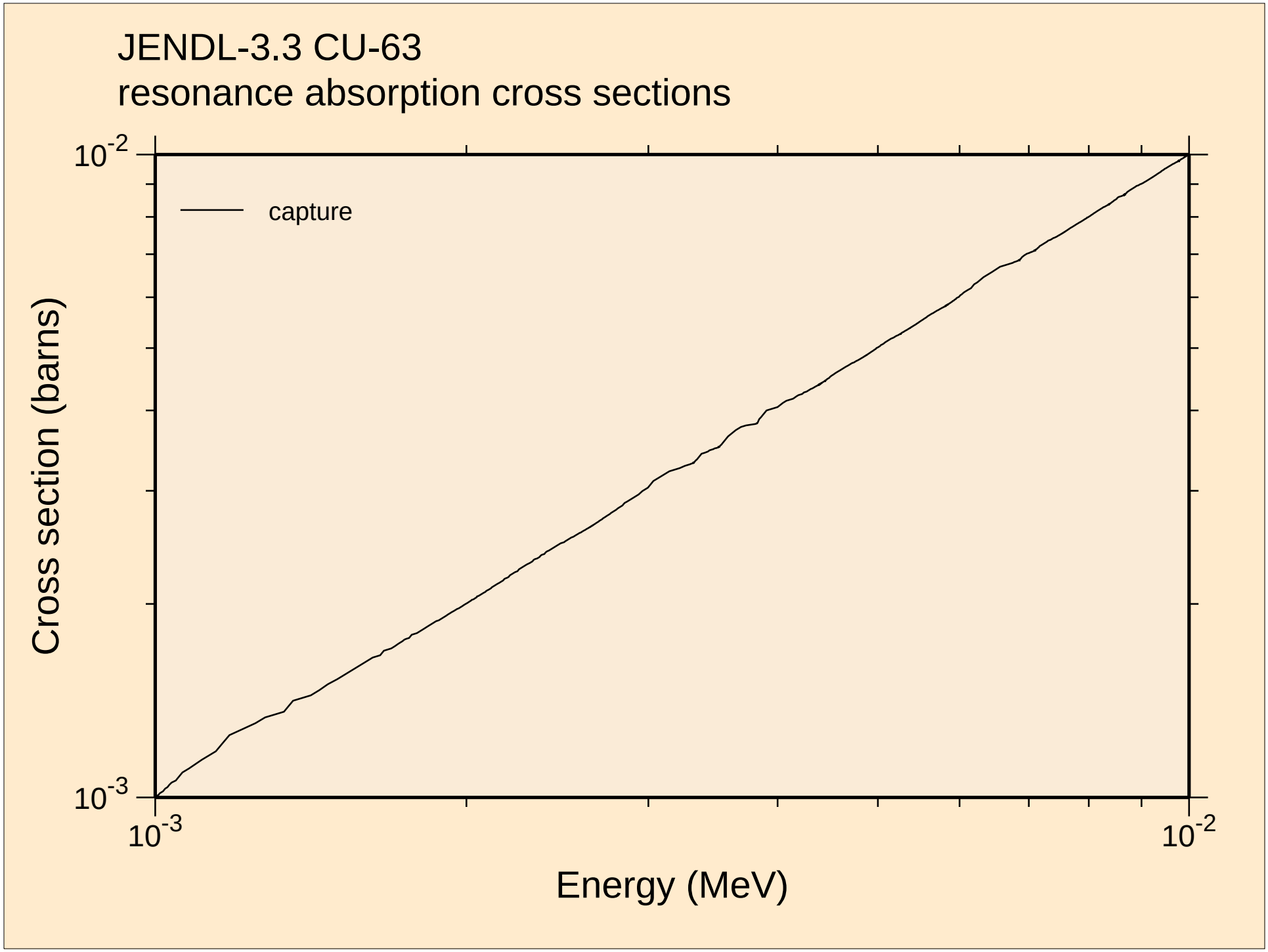

JENDL-3.3 CU-63
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^{-3}
10^{-2}
Energy (MeV)

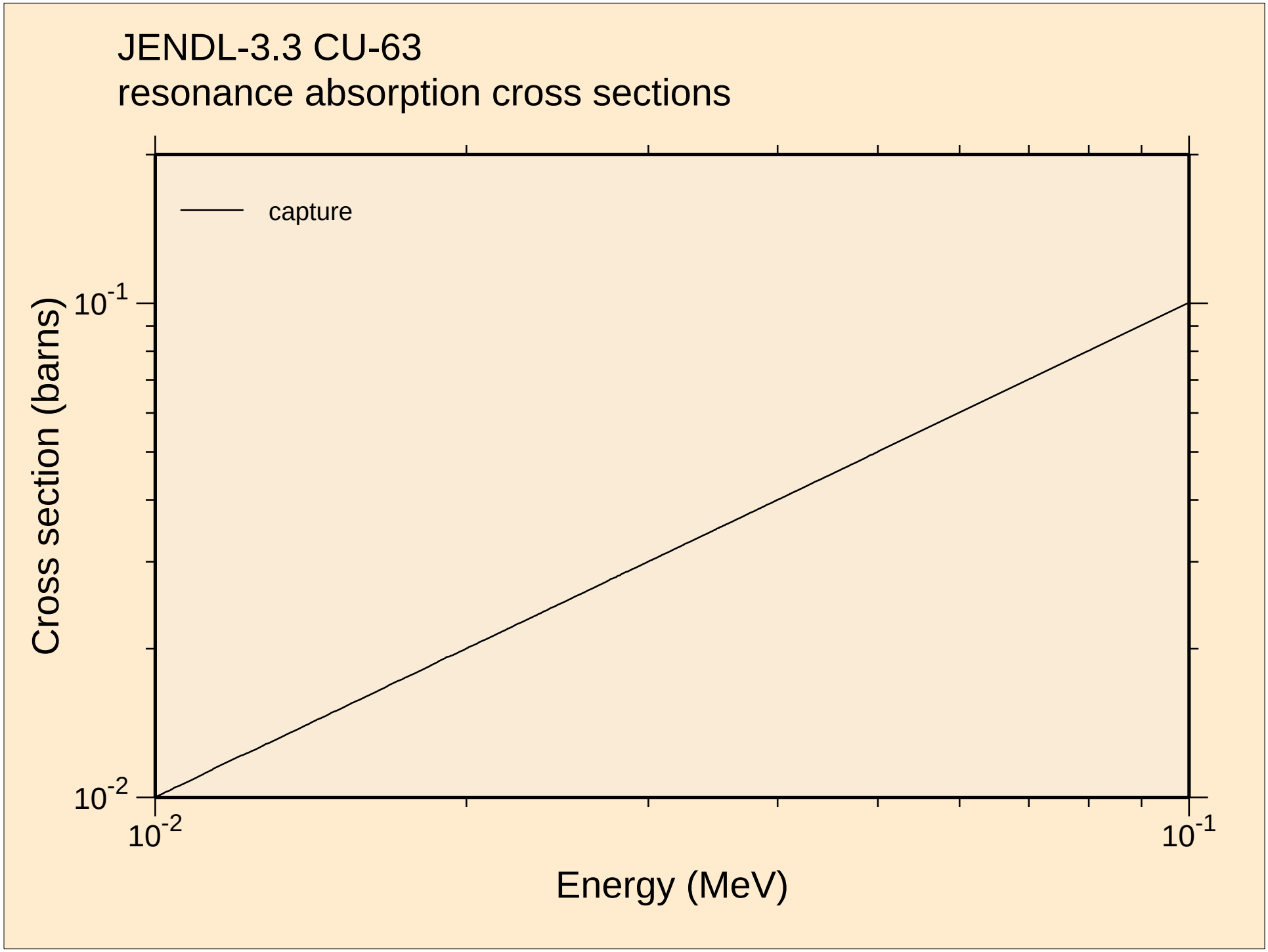

JENDL-3.3 CU-63
resonance total cross section
total
Cross section (barns)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-1}
Energy (MeV)

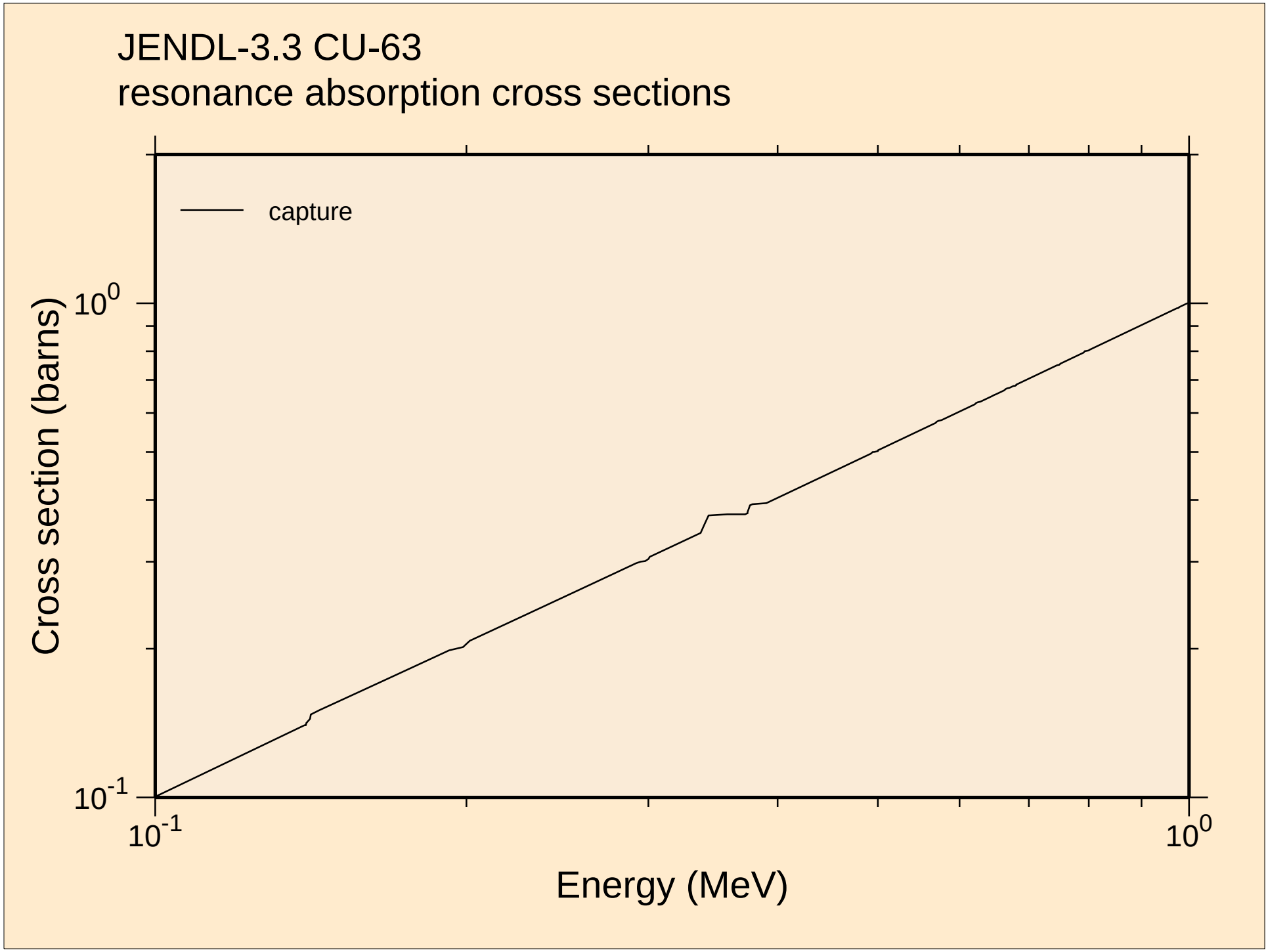

JENDL-3.3 CU-63
resonance total cross section
total
Cross section (barns)
10^1
10^{-1}
10^0
Energy (MeV)

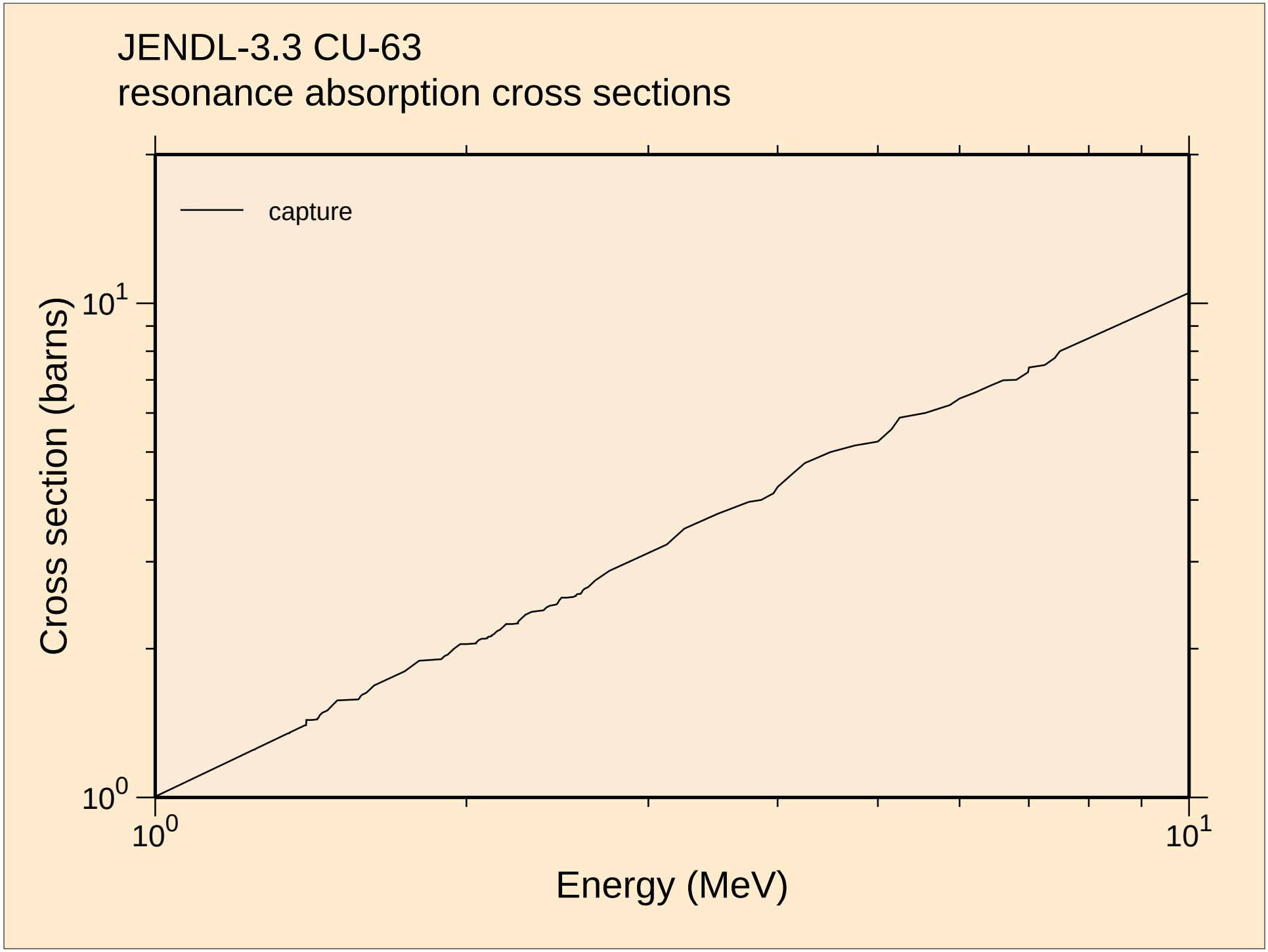

JENDL-3.3 CU-63
resonance total cross section
total
Cross section (barns)
10^0
10^1
Energy (MeV)

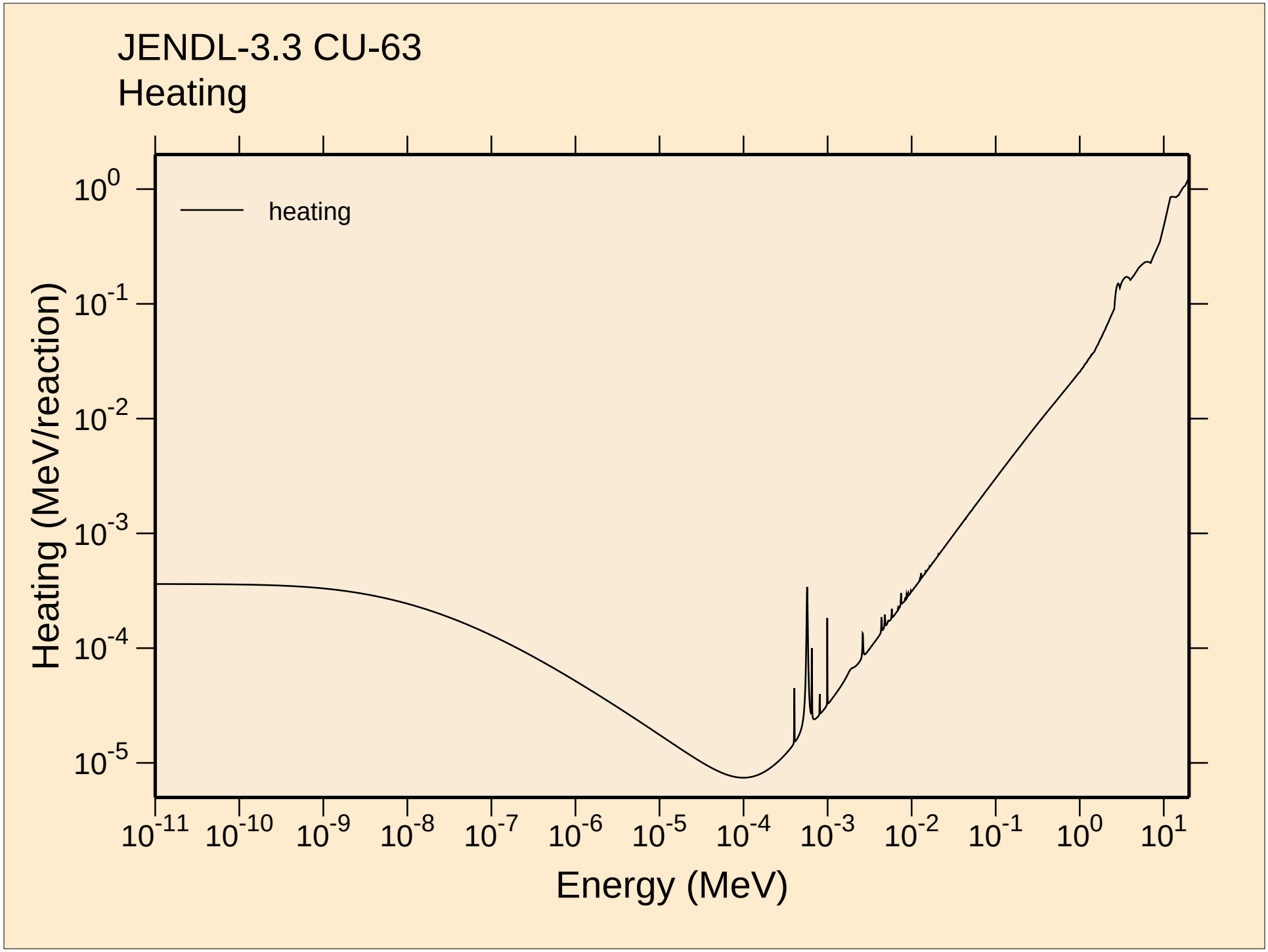

JENDL-3.3 CU-63
resonance absorption cross sections
capture
Cross section (barns)
Energy (MeV)
10-3
10-4
10-4
10-3

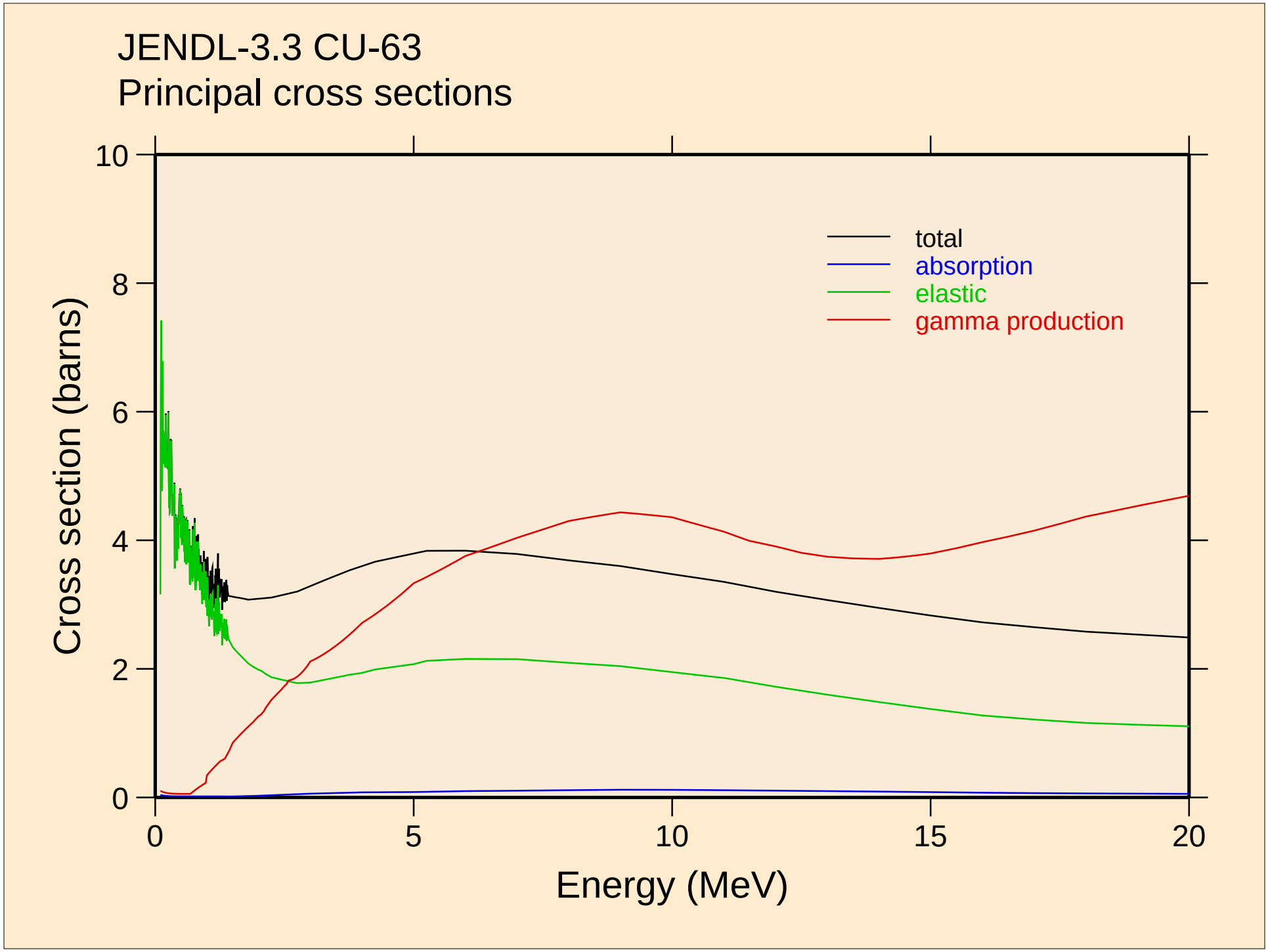

JENDL-3.3 CU-63
resonance absorption cross sections
capture
Cross section (barns)
Energy (MeV)
10-2
10-3
10-3
10-2

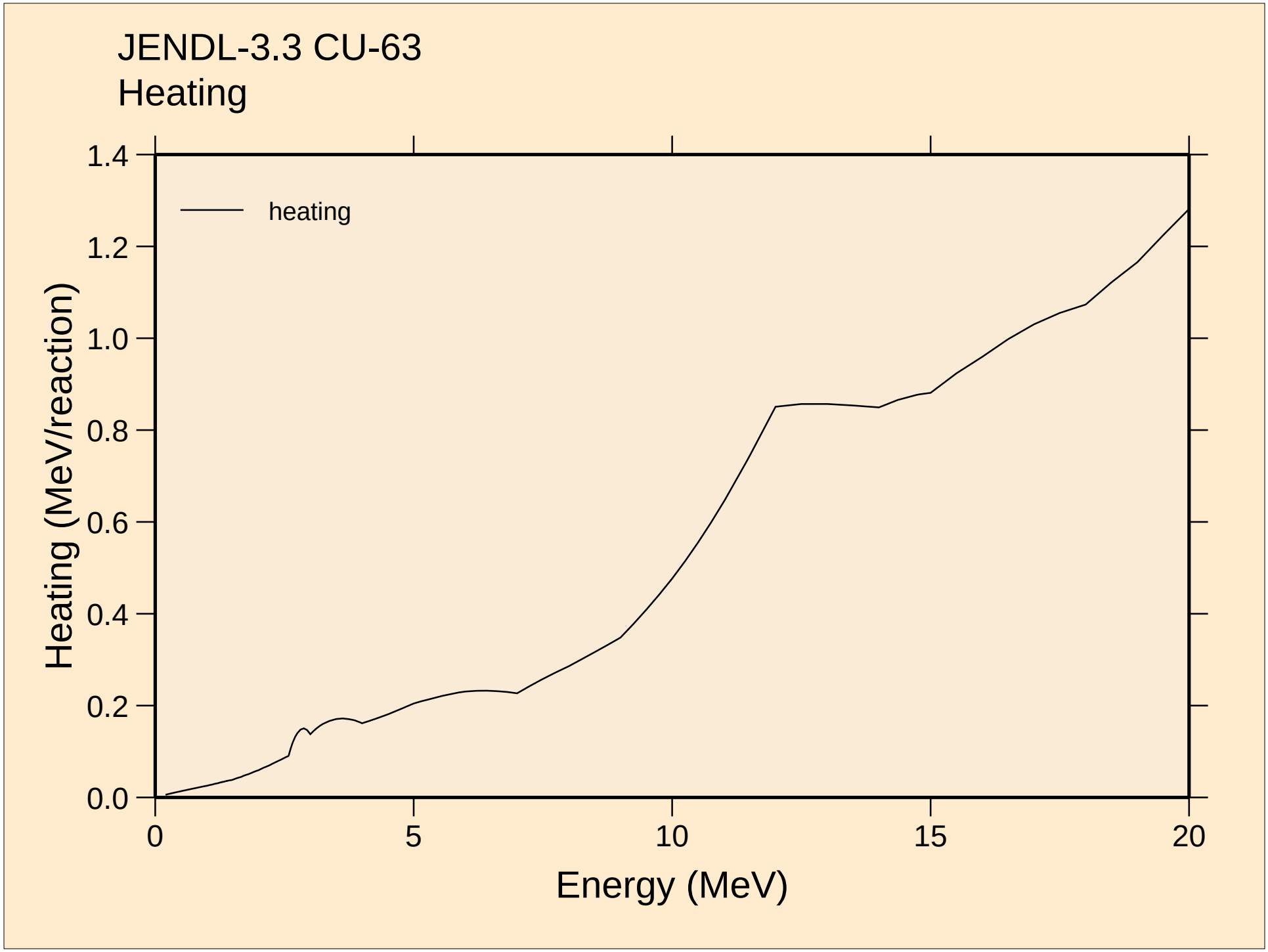

JENDL-3.3 CU-63
resonance absorption cross sections
capture
Cross section (barns)
10-1
10-2
10-2
10-1
Energy (MeV)

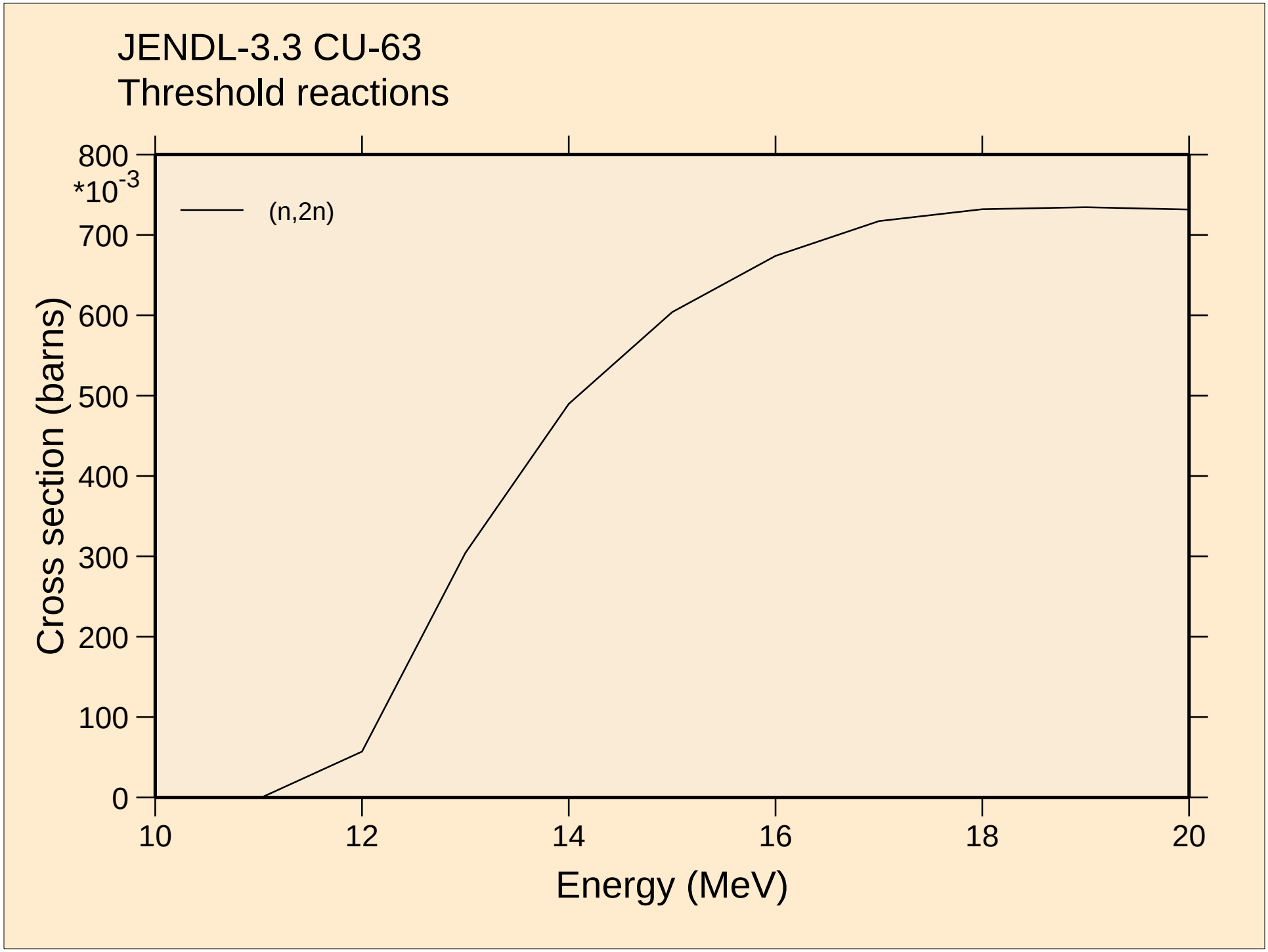

JENDL-3.3 CU-63
resonance absorption cross sections
capture
Cross section (barns)
10^{0}
10^{-1}
10^{-1}
10^{0}
Energy (MeV)

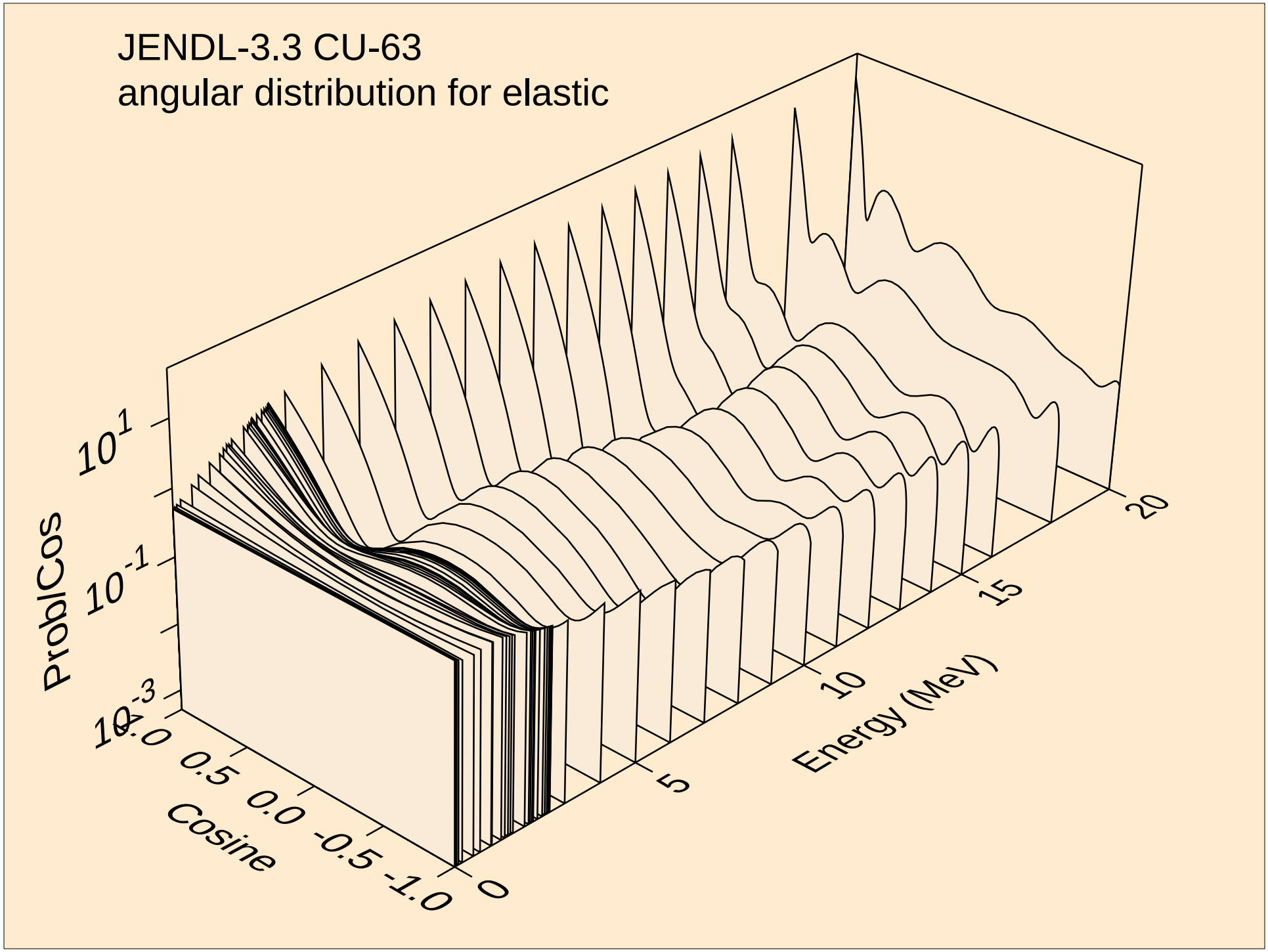

JENDL-3.3 CU-63
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^0
10^1
Energy (MeV)

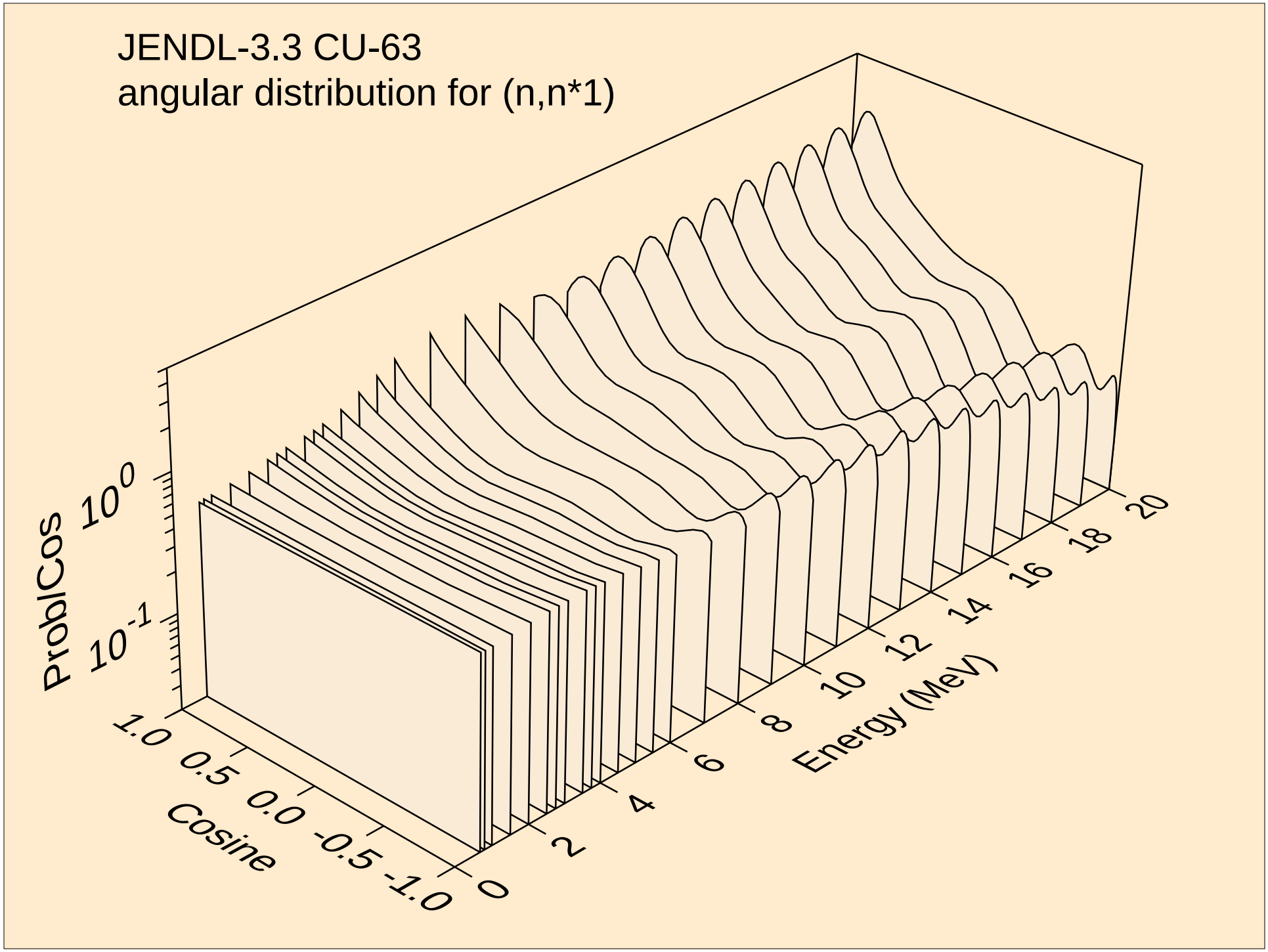

JENDL-3.3 CU-63
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

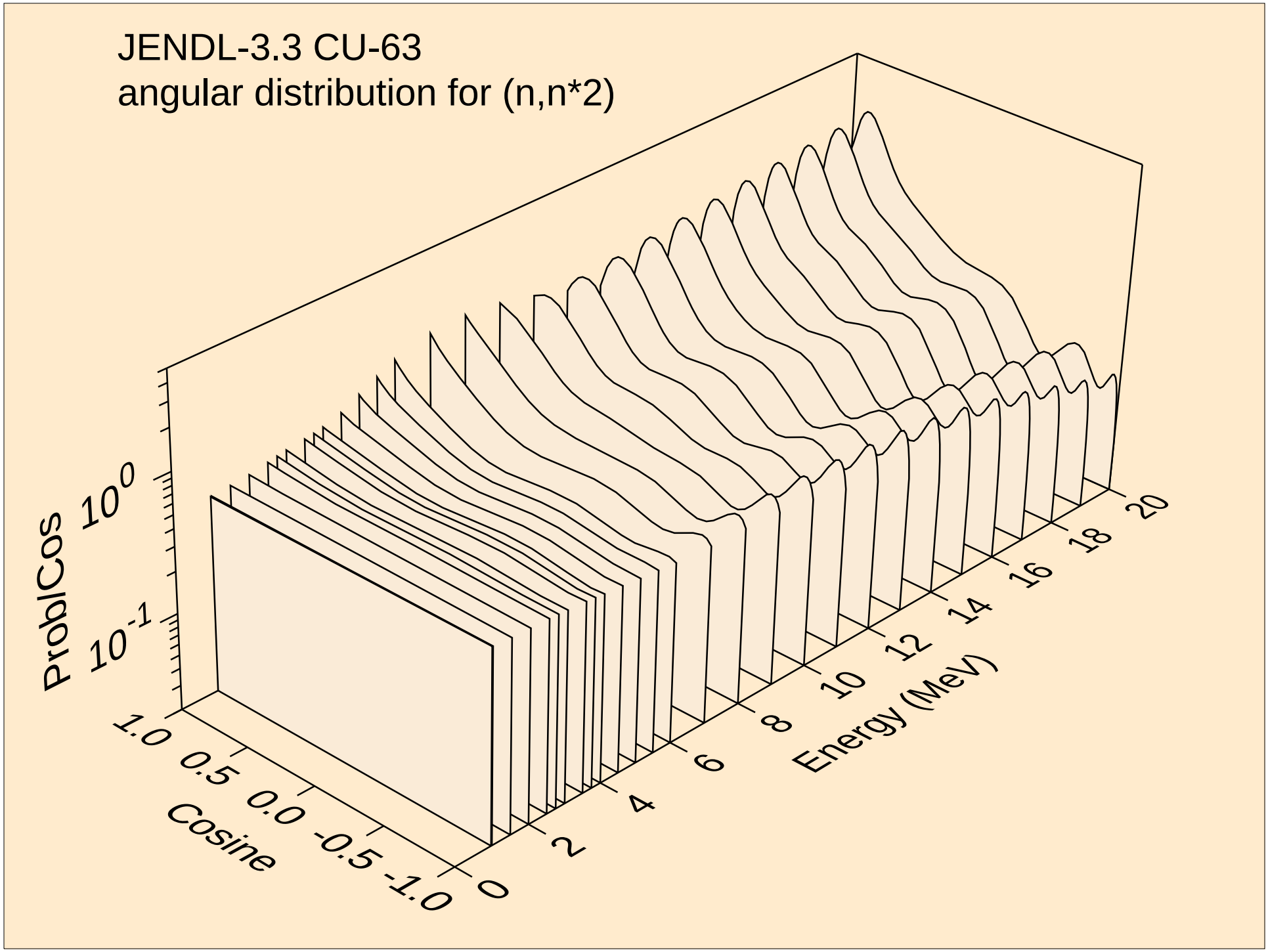

JENDL-3.3 CU-63
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
0
2
4
6
8
10
0
5
10
15
20

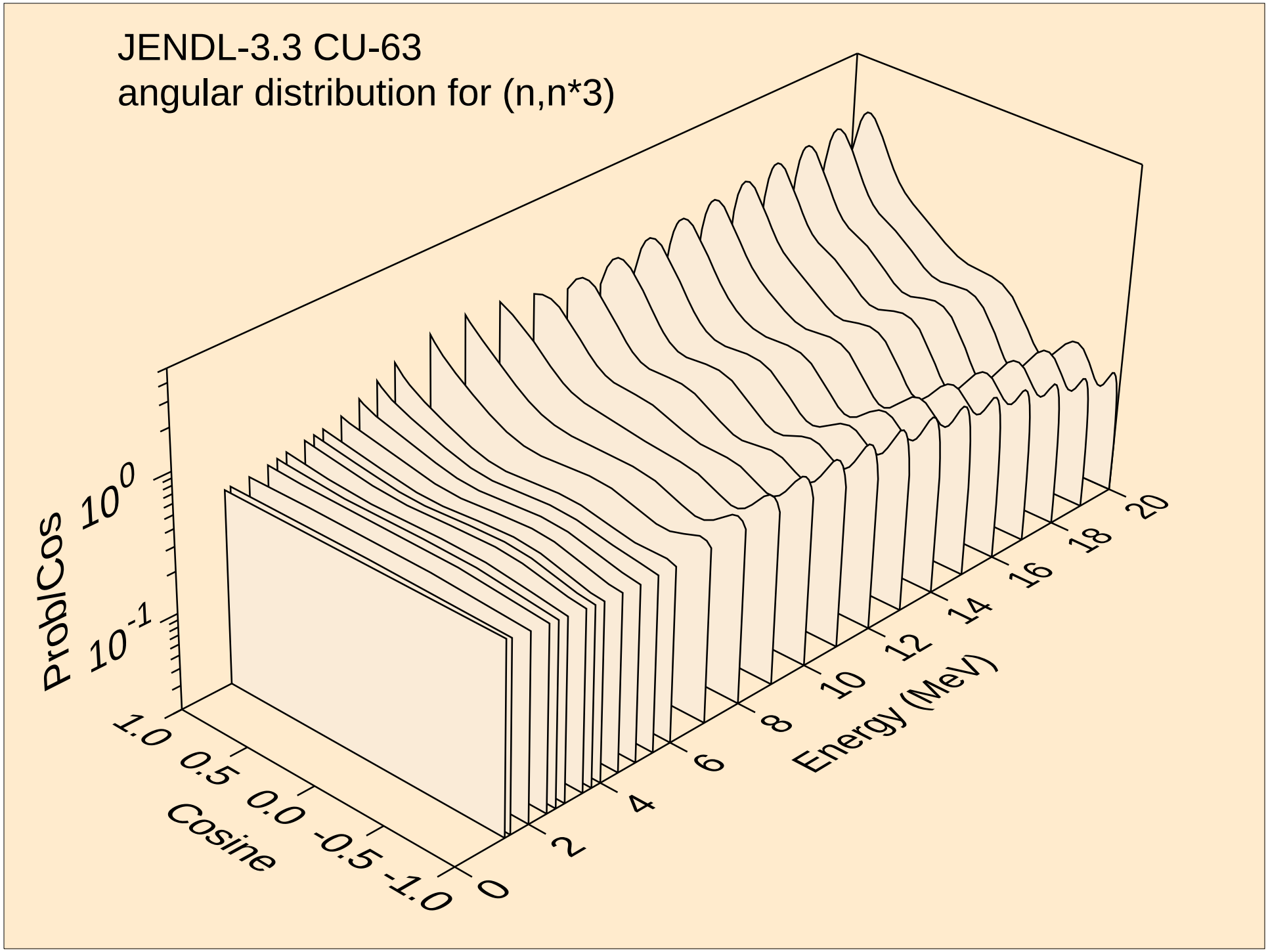

JENDL-3.3 CU-63
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
5
10
15
20

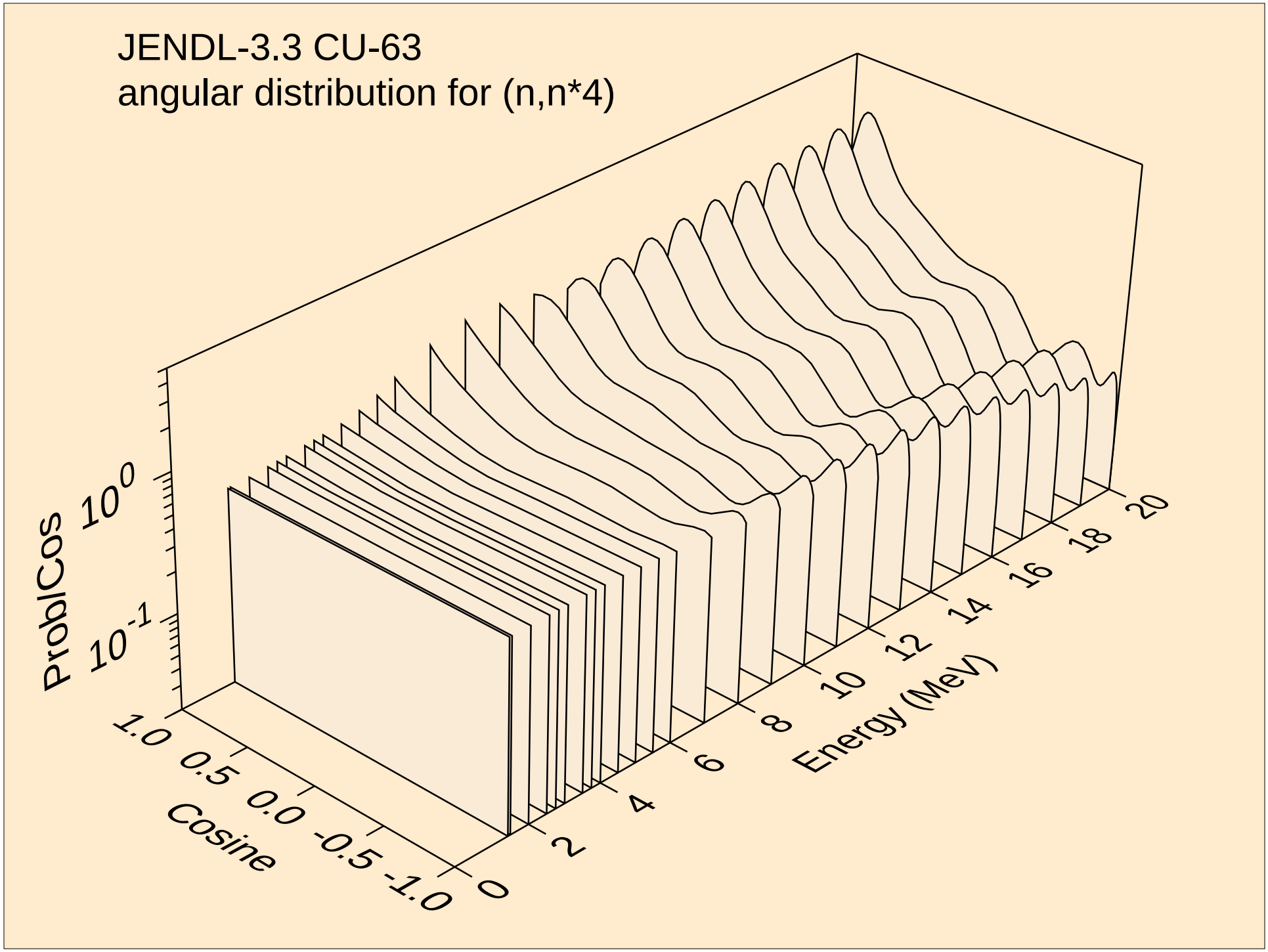

JENDL-3.3 CU-63
Threshold reactions
(n,2n)
Cross section (barns)
*10-3
800
700
600
500
400
300
200
100
0
10
12
14
16
18
20
Energy (MeV)

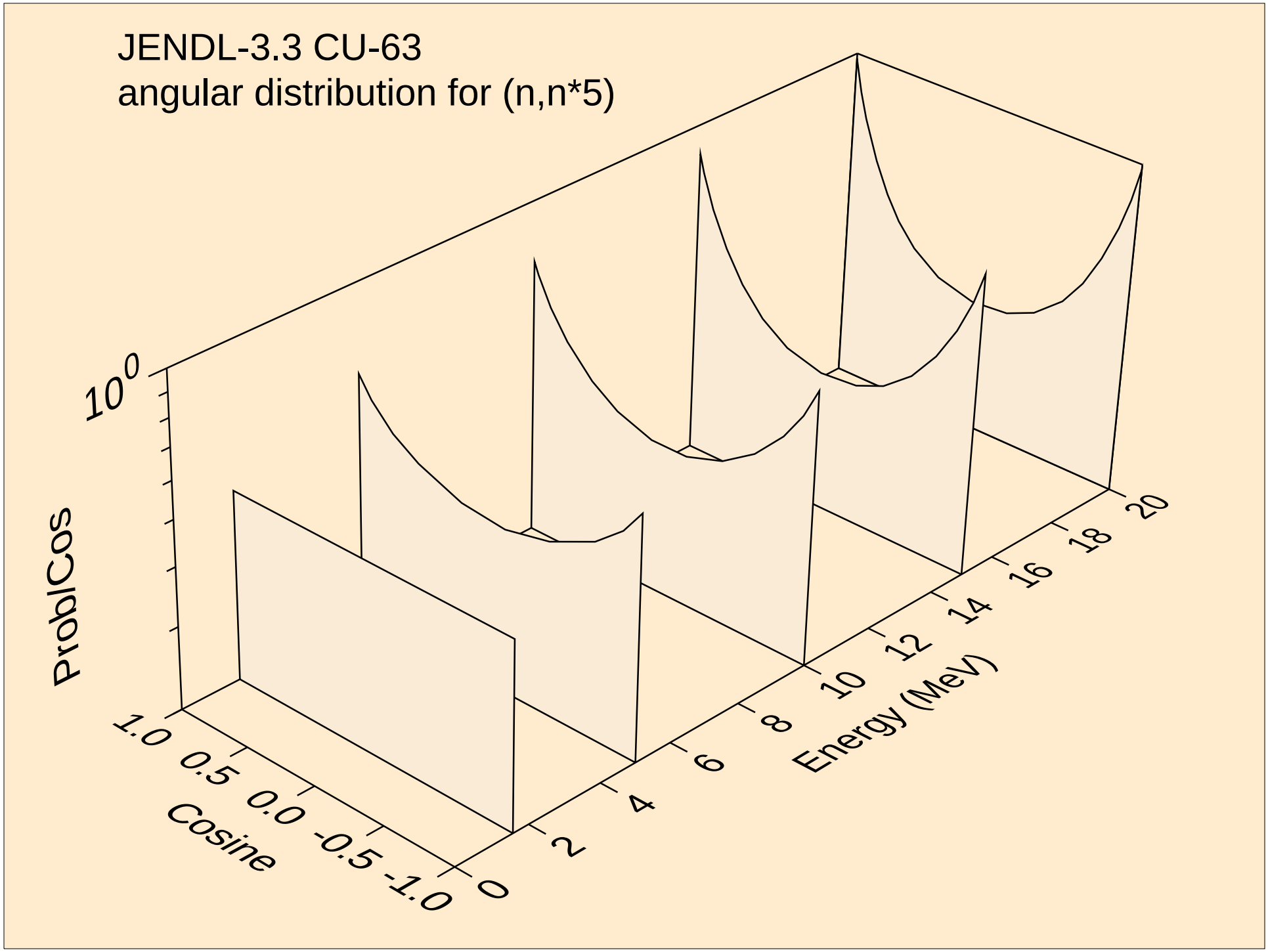

JENDL-3.3 CU-63
angular distribution for elastic
ProblCos
10^{1}
10^{-1}
10^{-3}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

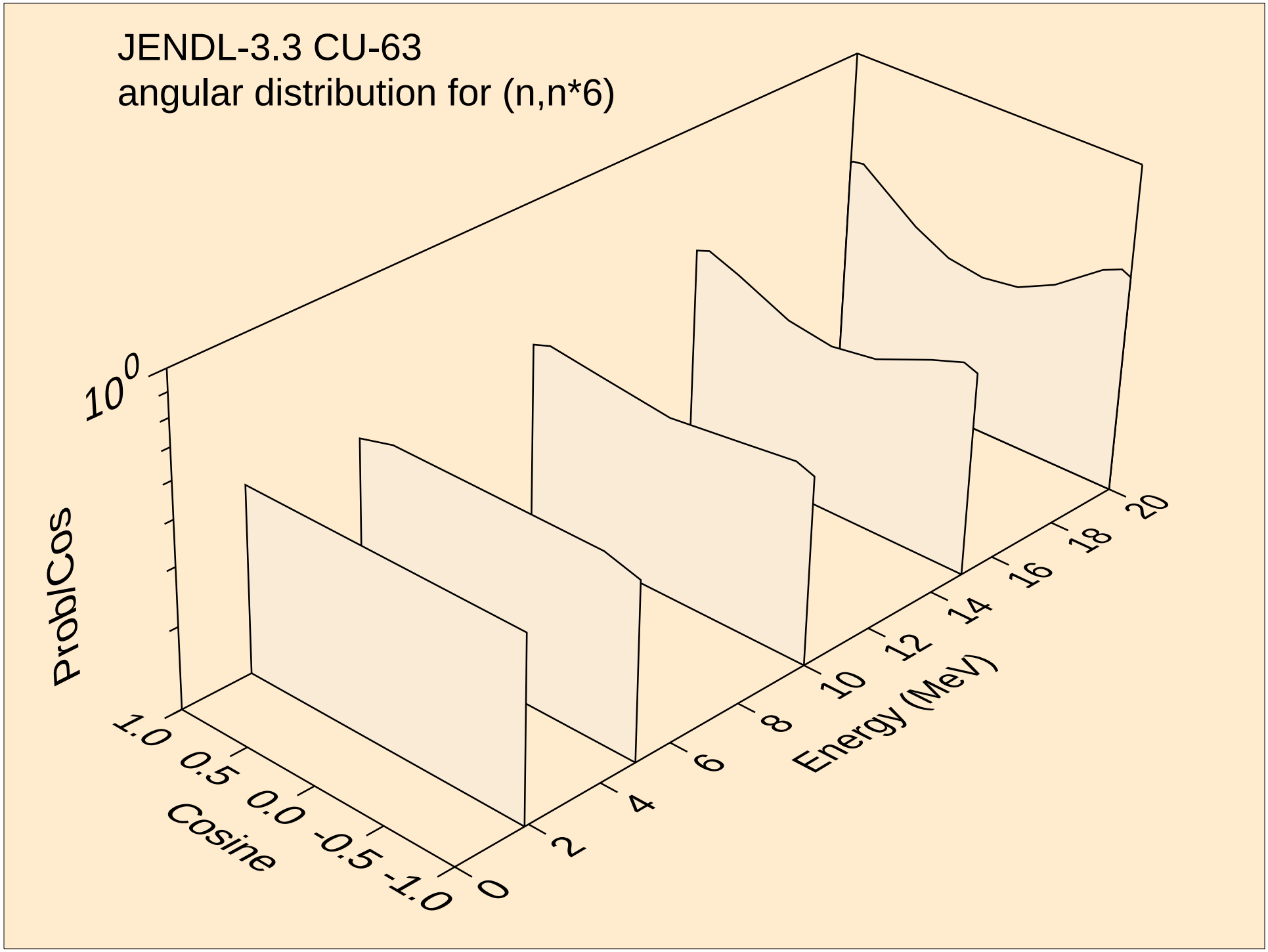

JENDL-3.3 CU-63
angular distribution for (n,n*1)
Prob/Cos
10^0
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

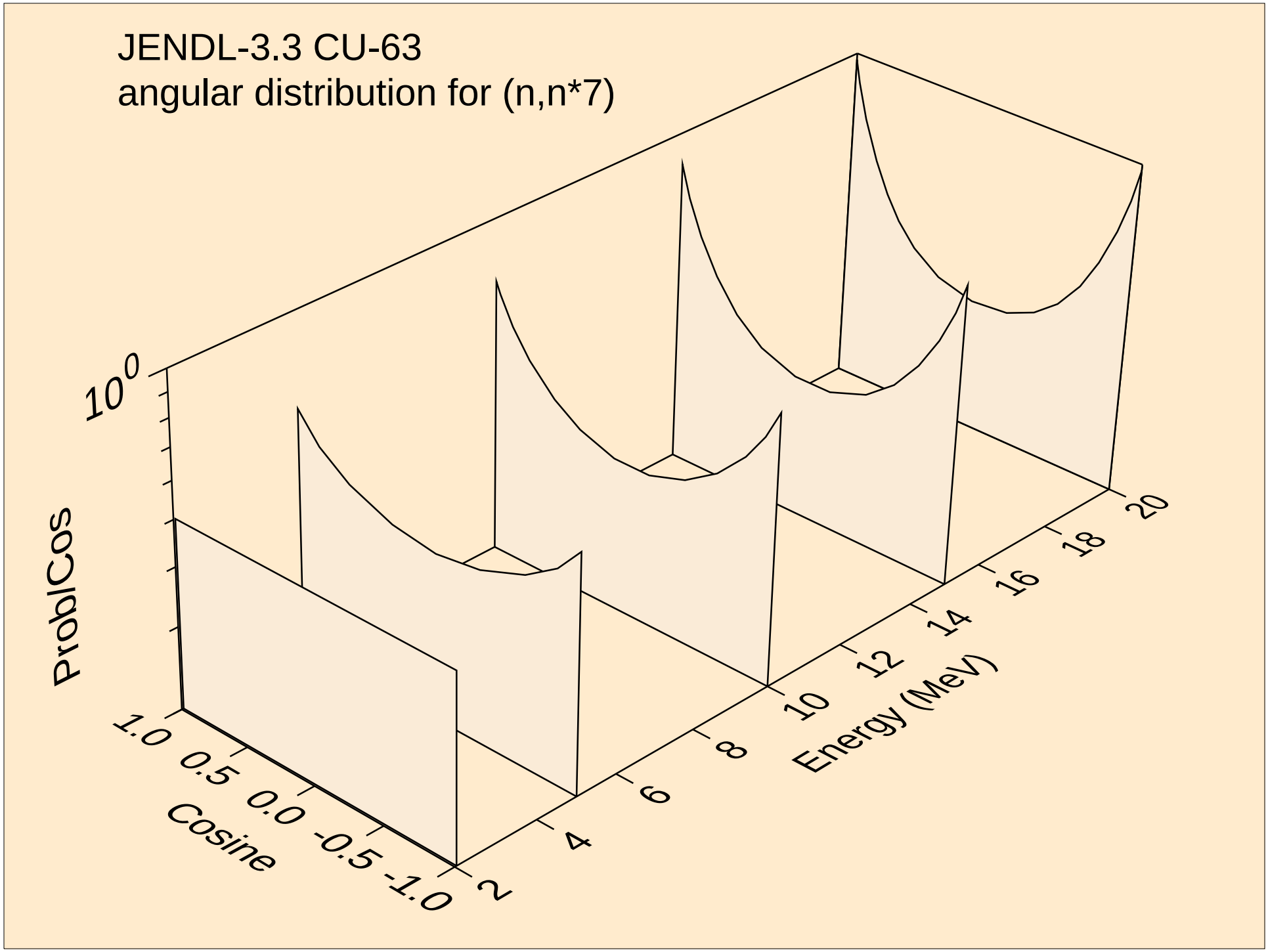

JENDL-3.3 CU-63
angular distribution for (n,n*2)
Prob/Cos
10^0
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

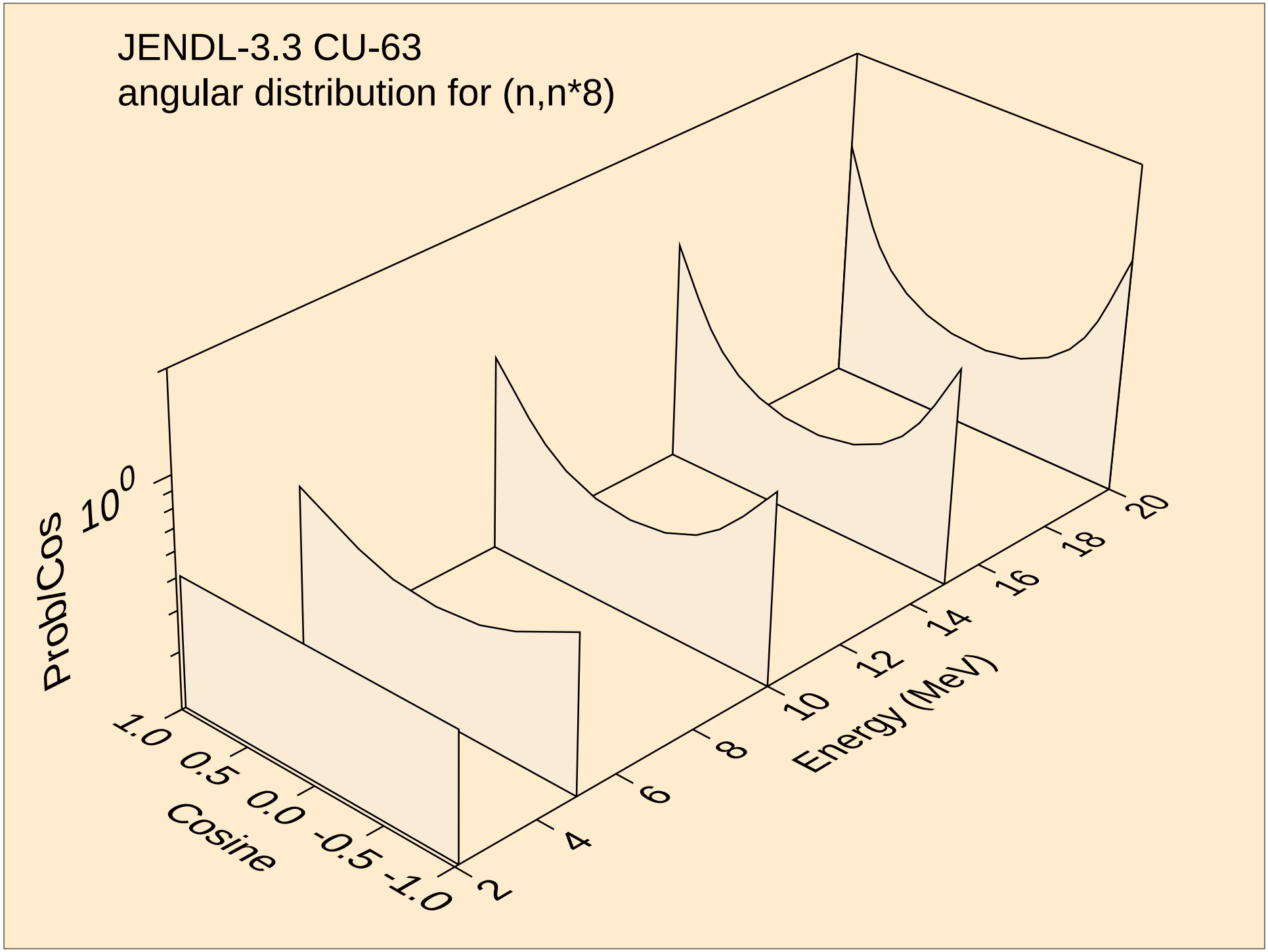

JENDL-3.3 CU-63
angular distribution for (n,n*3)
ProbCos
10^0
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

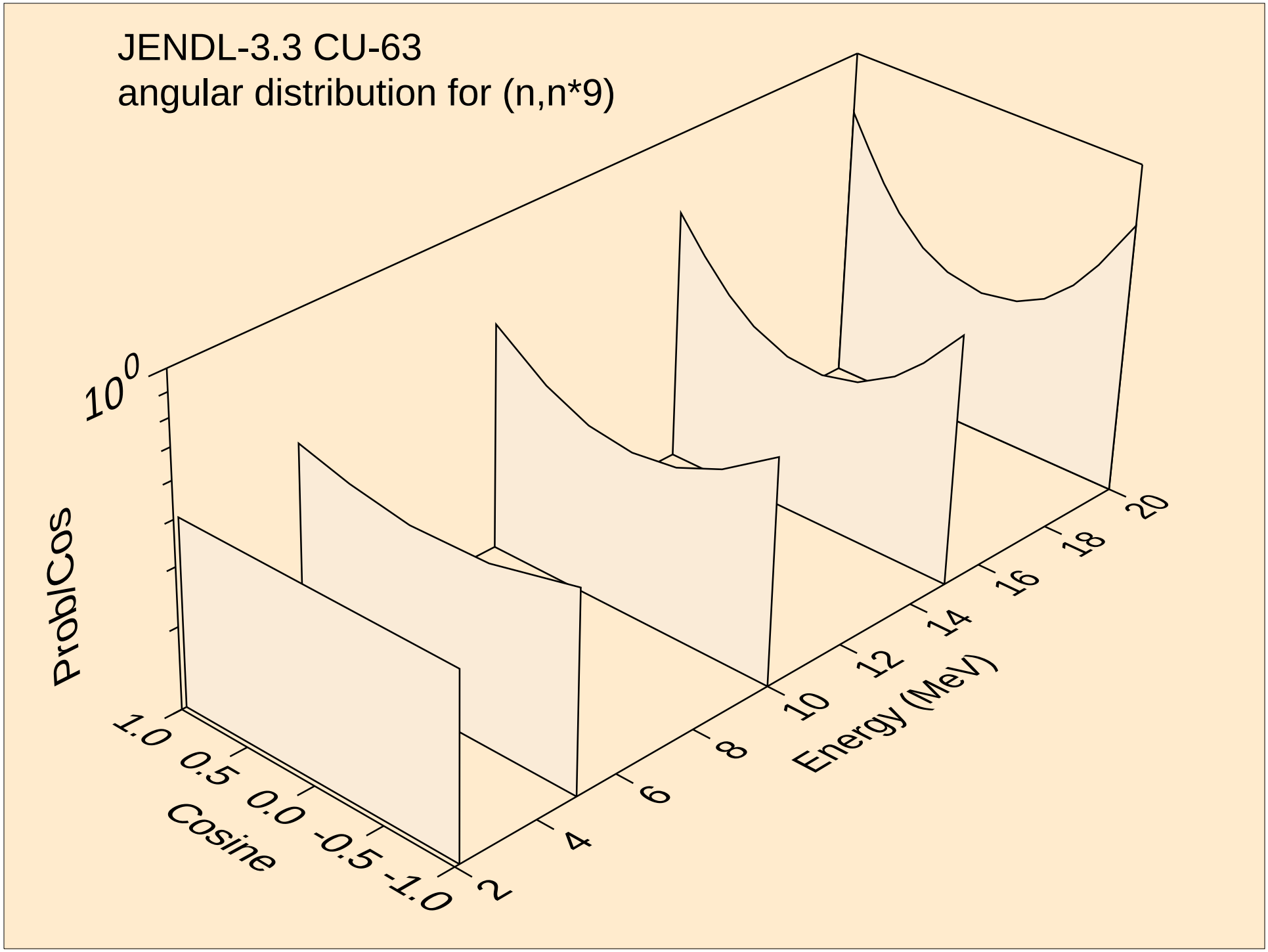

JENDL-3.3 CU-63
angular distribution for (n,n*4)
ProbCos
10^0
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

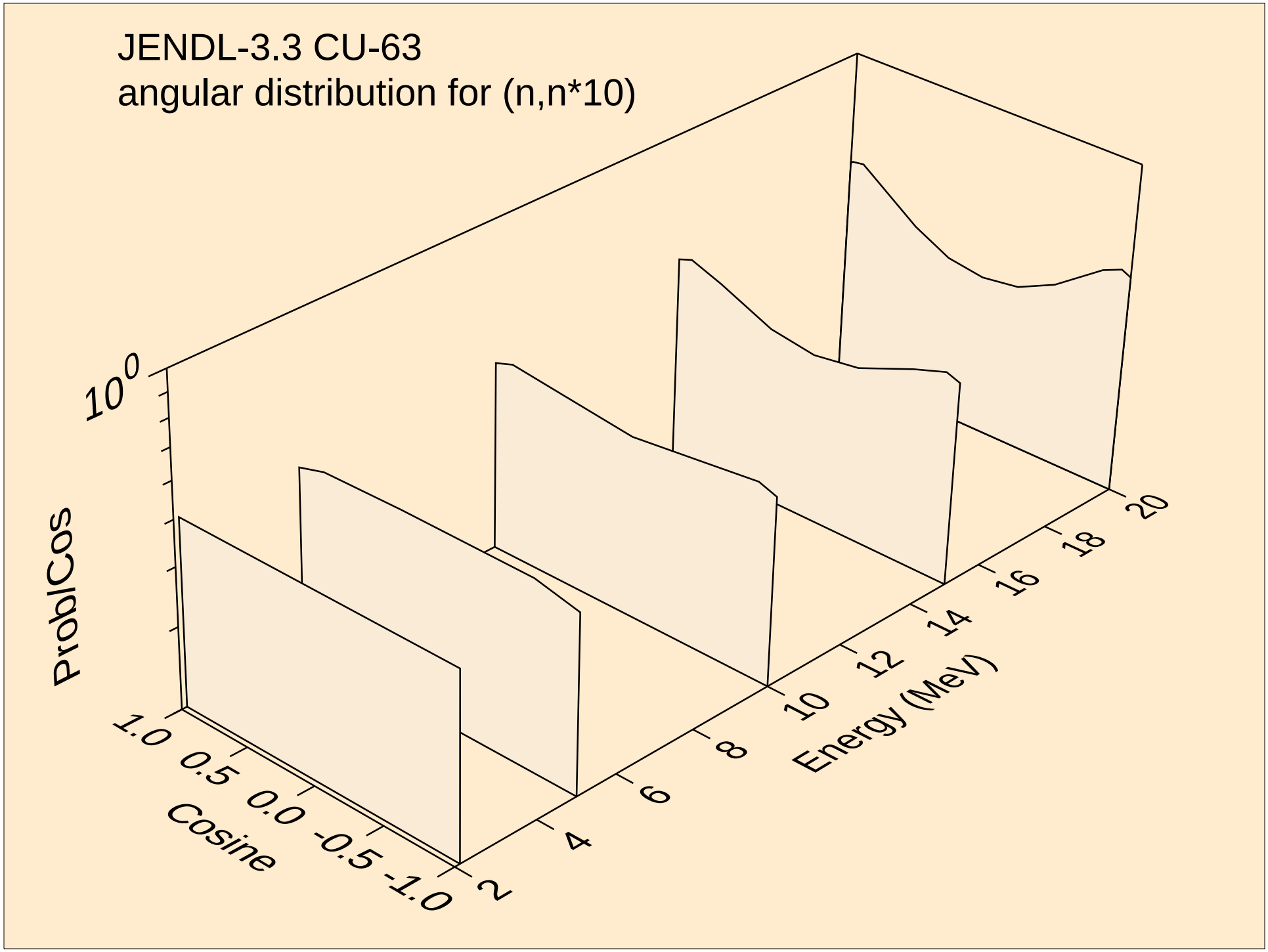

JENDL-3.3 CU-63
angular distribution for (n,n*5)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

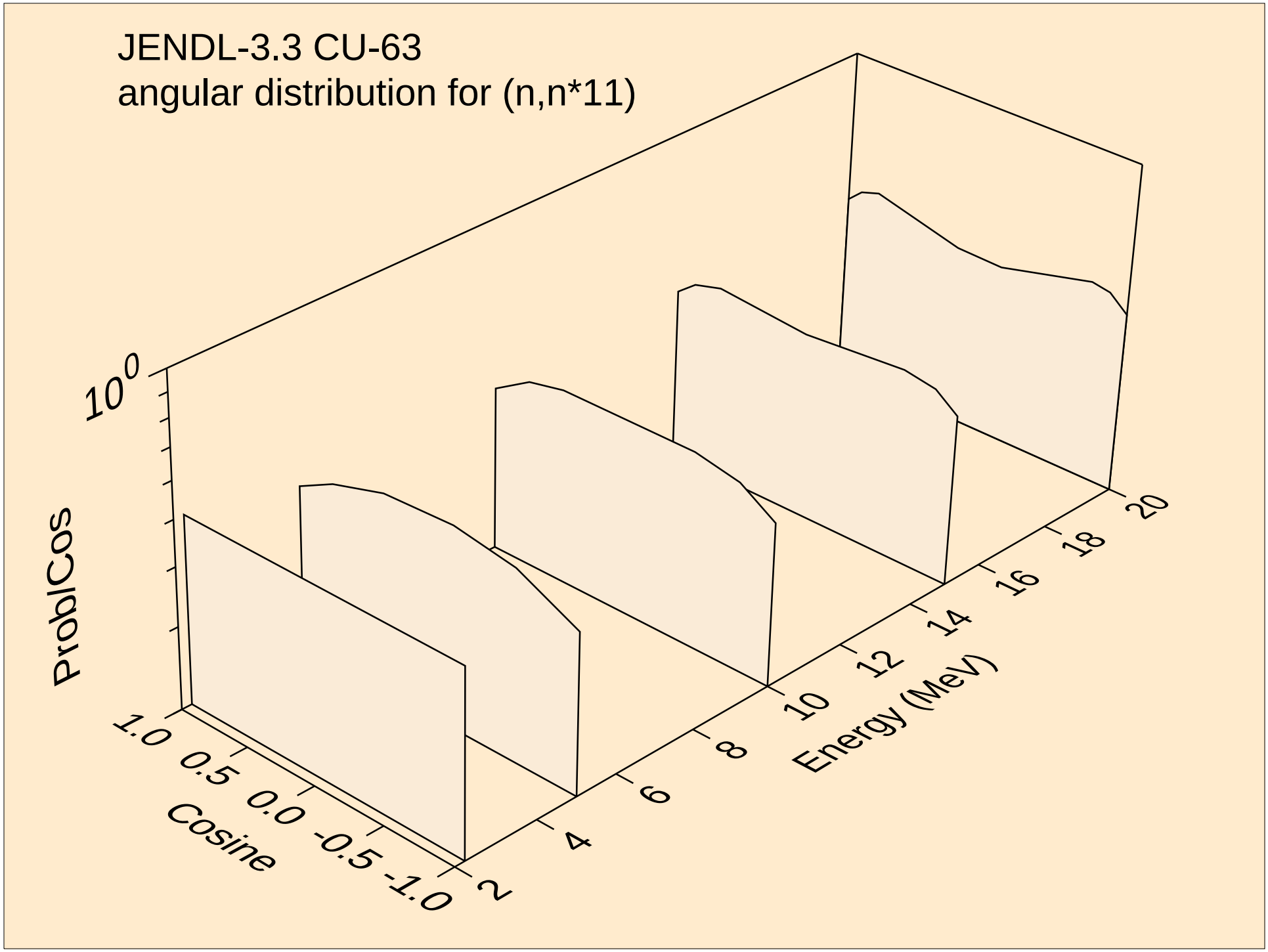

JENDL-3.3 CU-63
angular distribution for (n,n*6)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

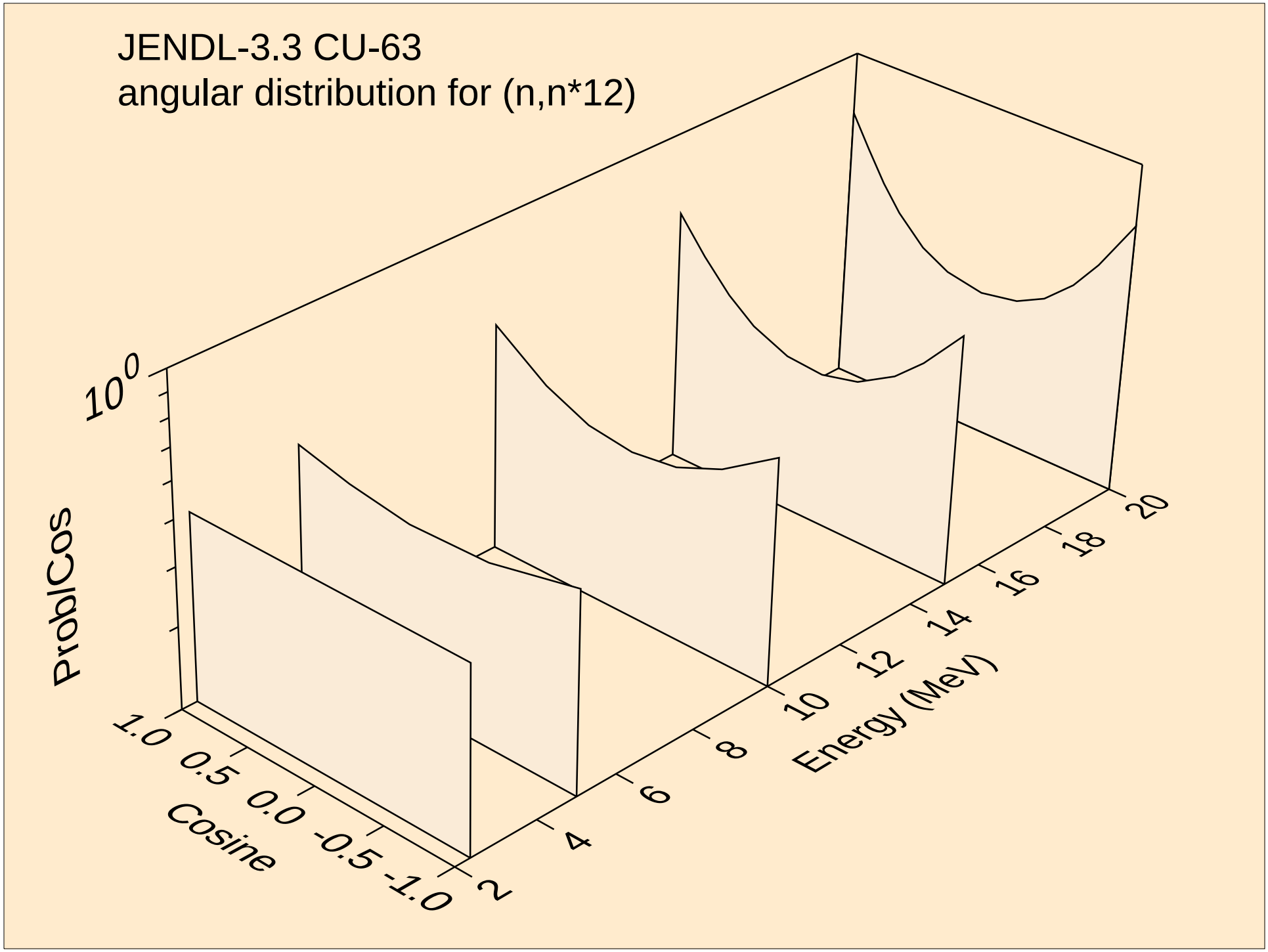

JENDL-3.3 CU-63
angular distribution for (n,n*7)
10^0
Prob/Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

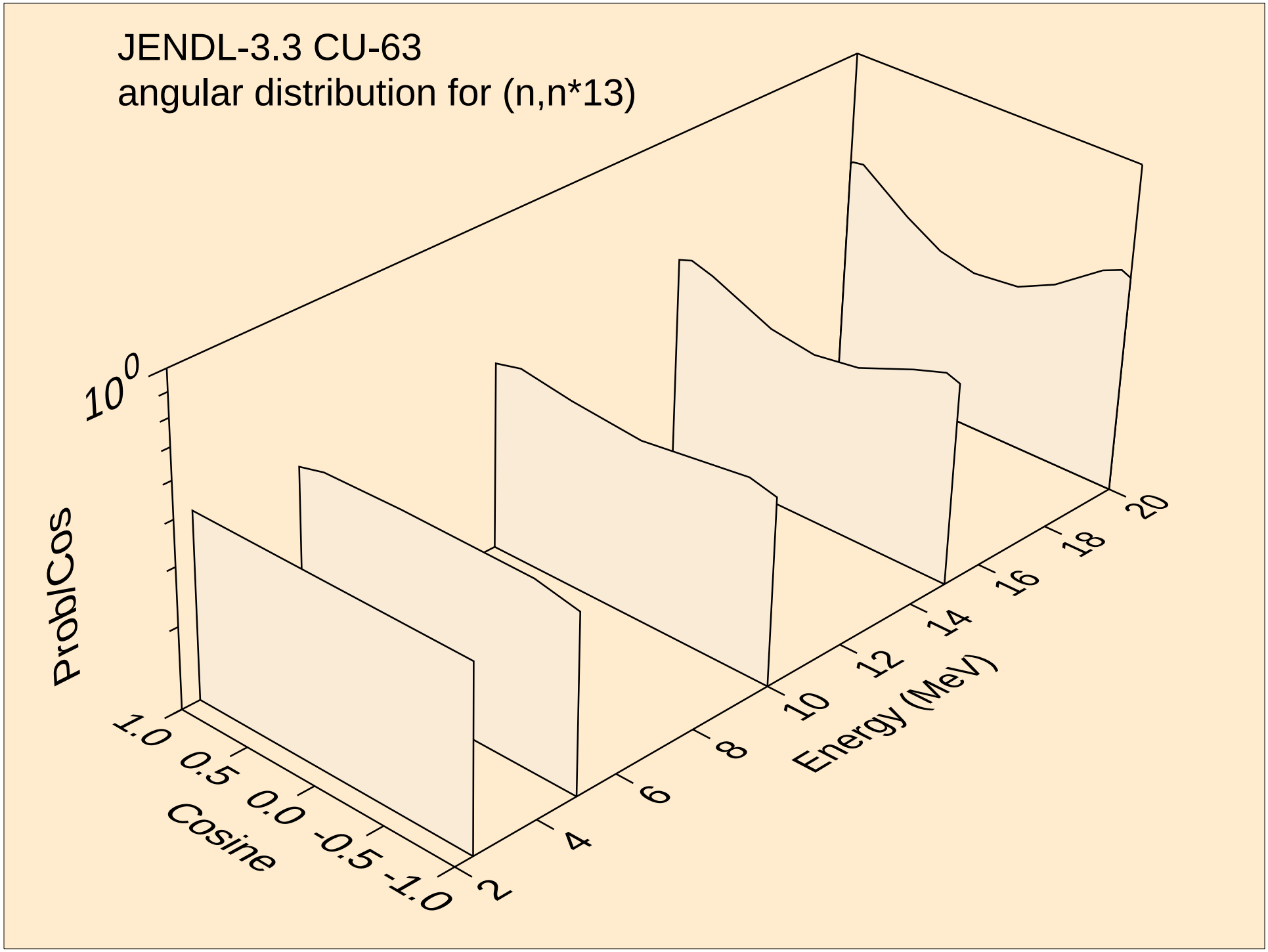

JENDL-3.3 CU-63
angular distribution for (n,n*8)
ProbCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

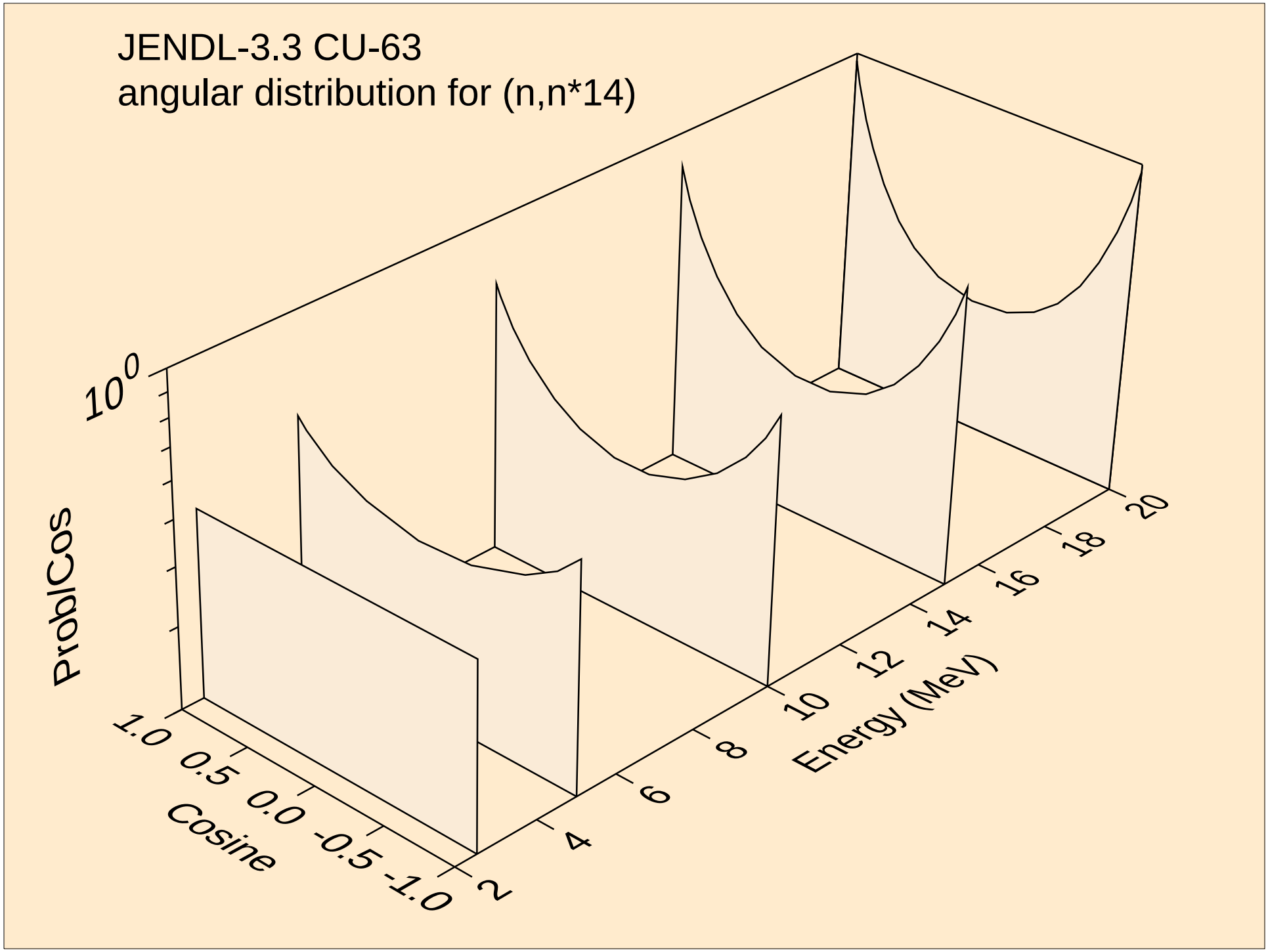

JENDL-3.3 CU-63
angular distribution for (n,n*9)
10^0
Prob/Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

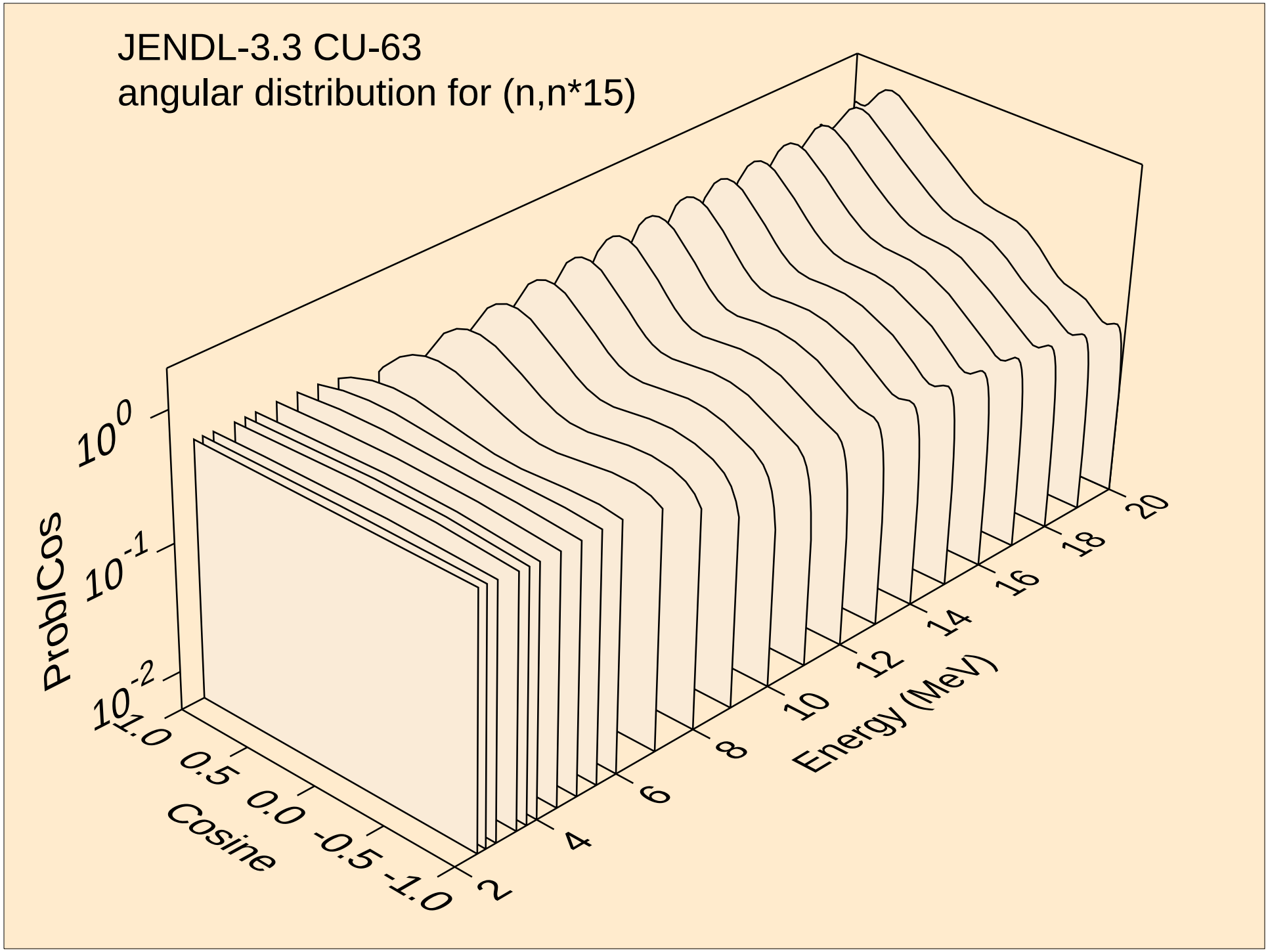

JENDL-3.3 CU-63
angular distribution for (n,n*10)
10^0
Prob/Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

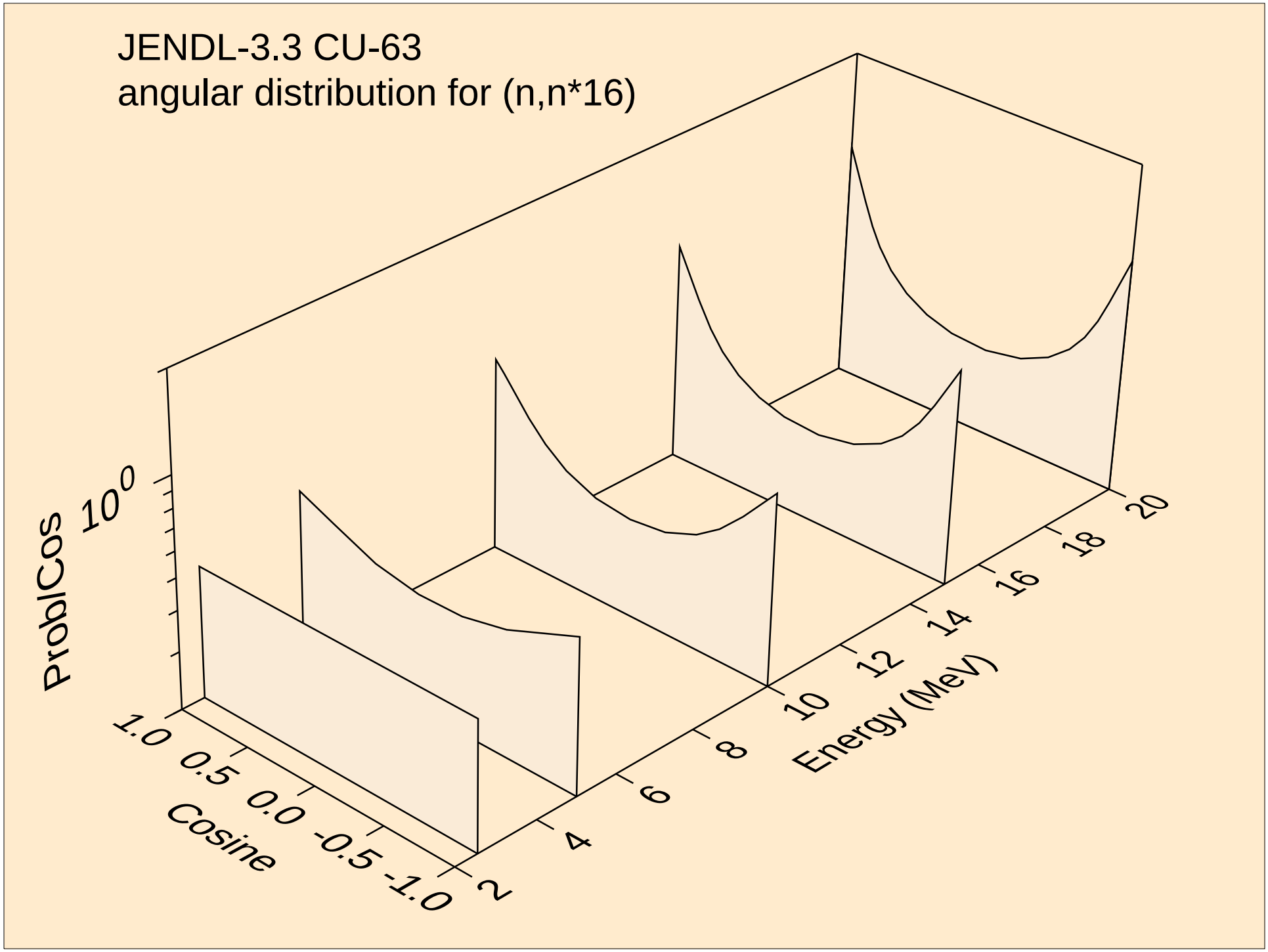

JENDL-3.3 CU-63
angular distribution for (n,n*11)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

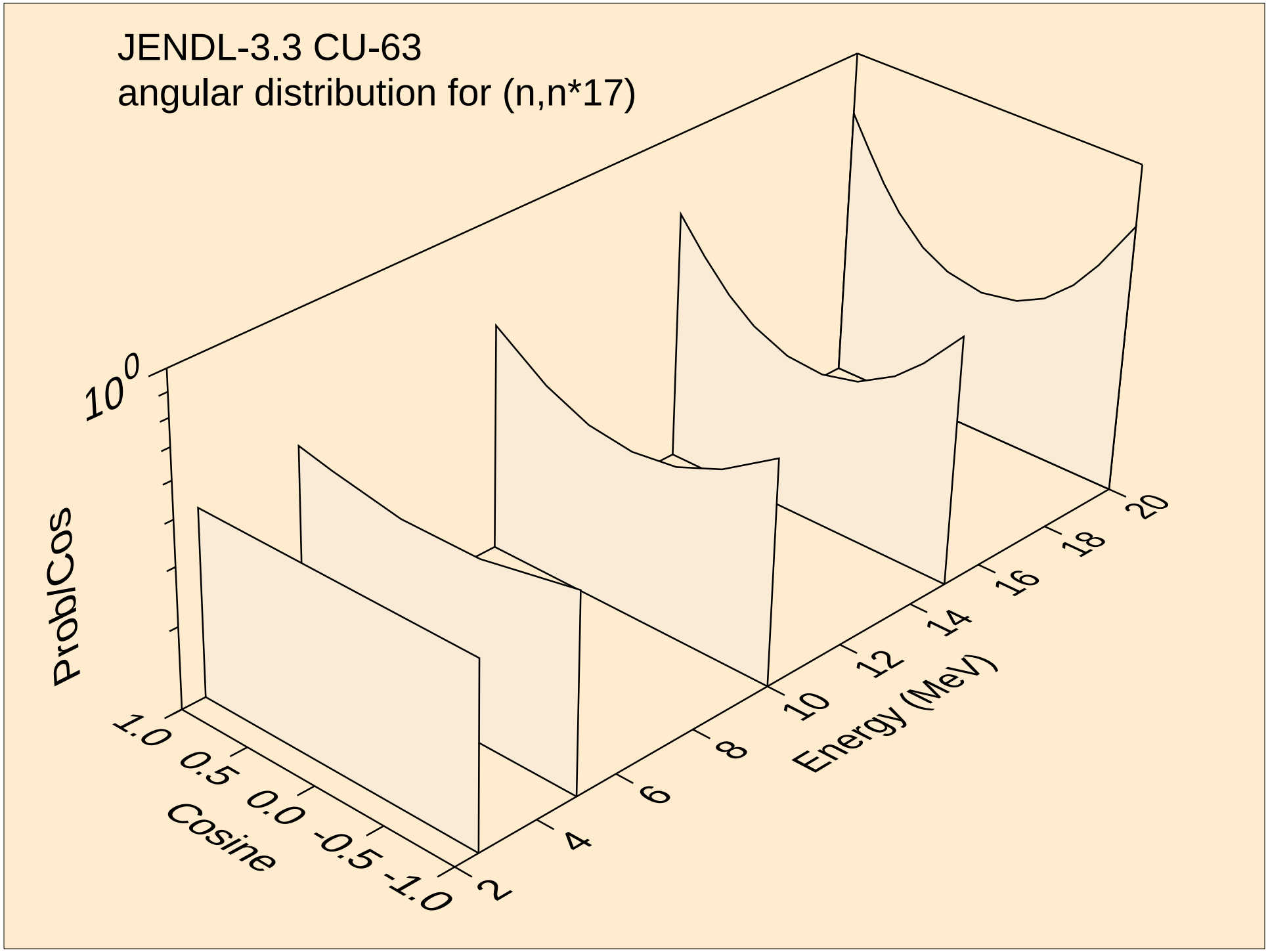

JENDL-3.3 CU-63
angular distribution for (n,n*12)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

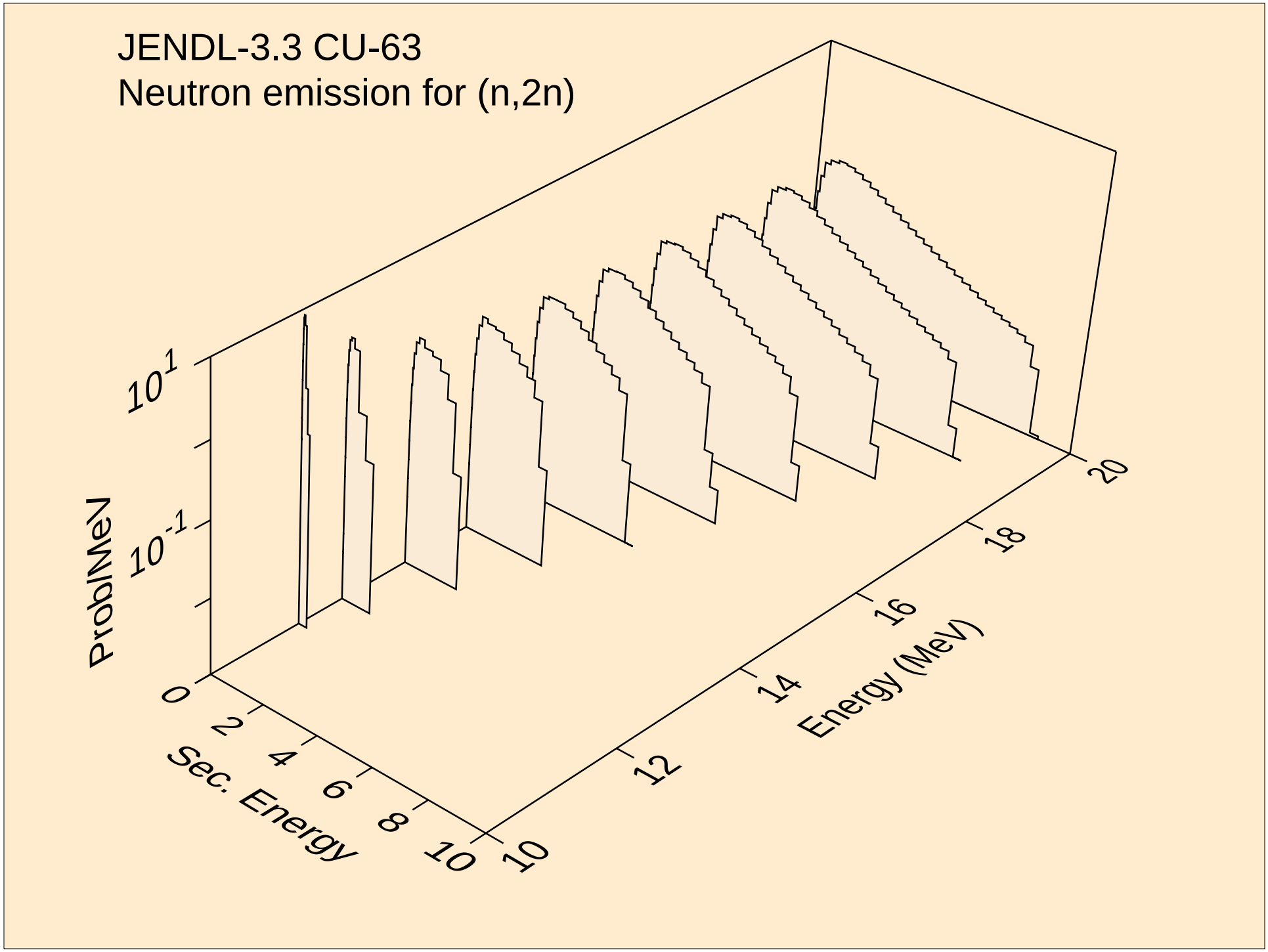

JENDL-3.3 CU-63
angular distribution for (n,n*13)
10^0
Prob/Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

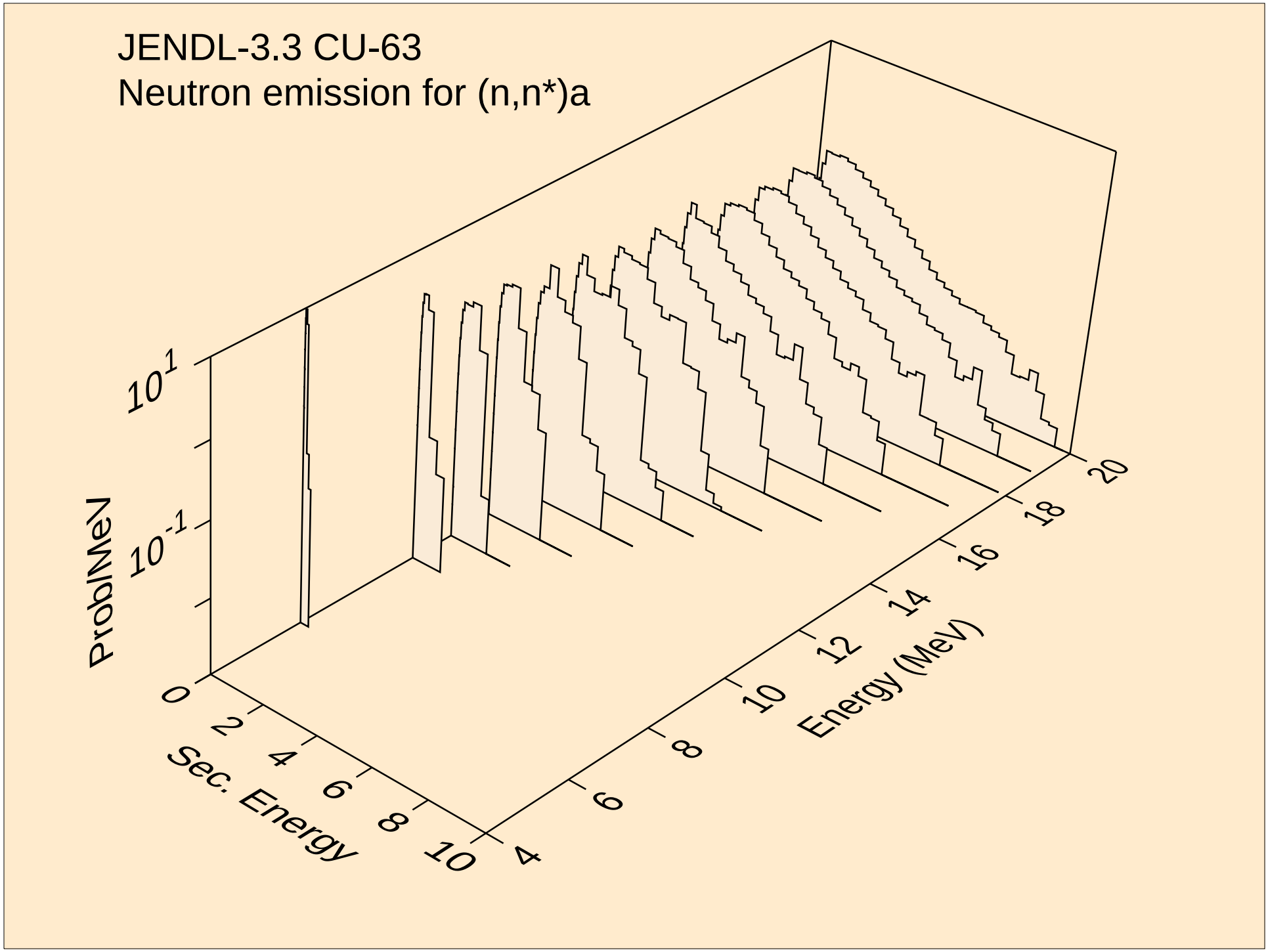

JENDL-3.3 CU-63
angular distribution for (n,n*14)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

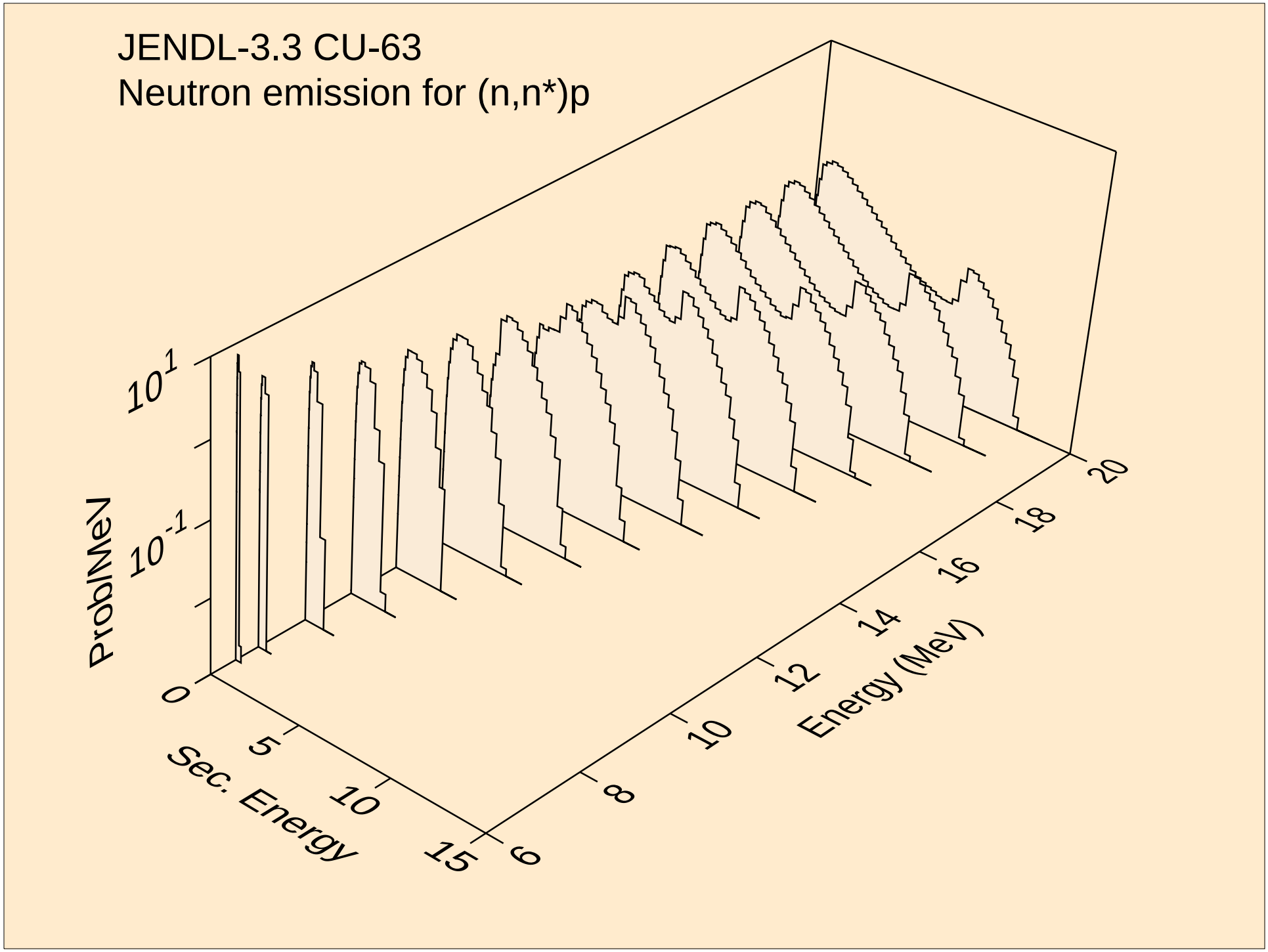

JENDL-3.3 CU-63
angular distribution for (n,n*15)
ProbCos
10^{0}
10^{-1}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

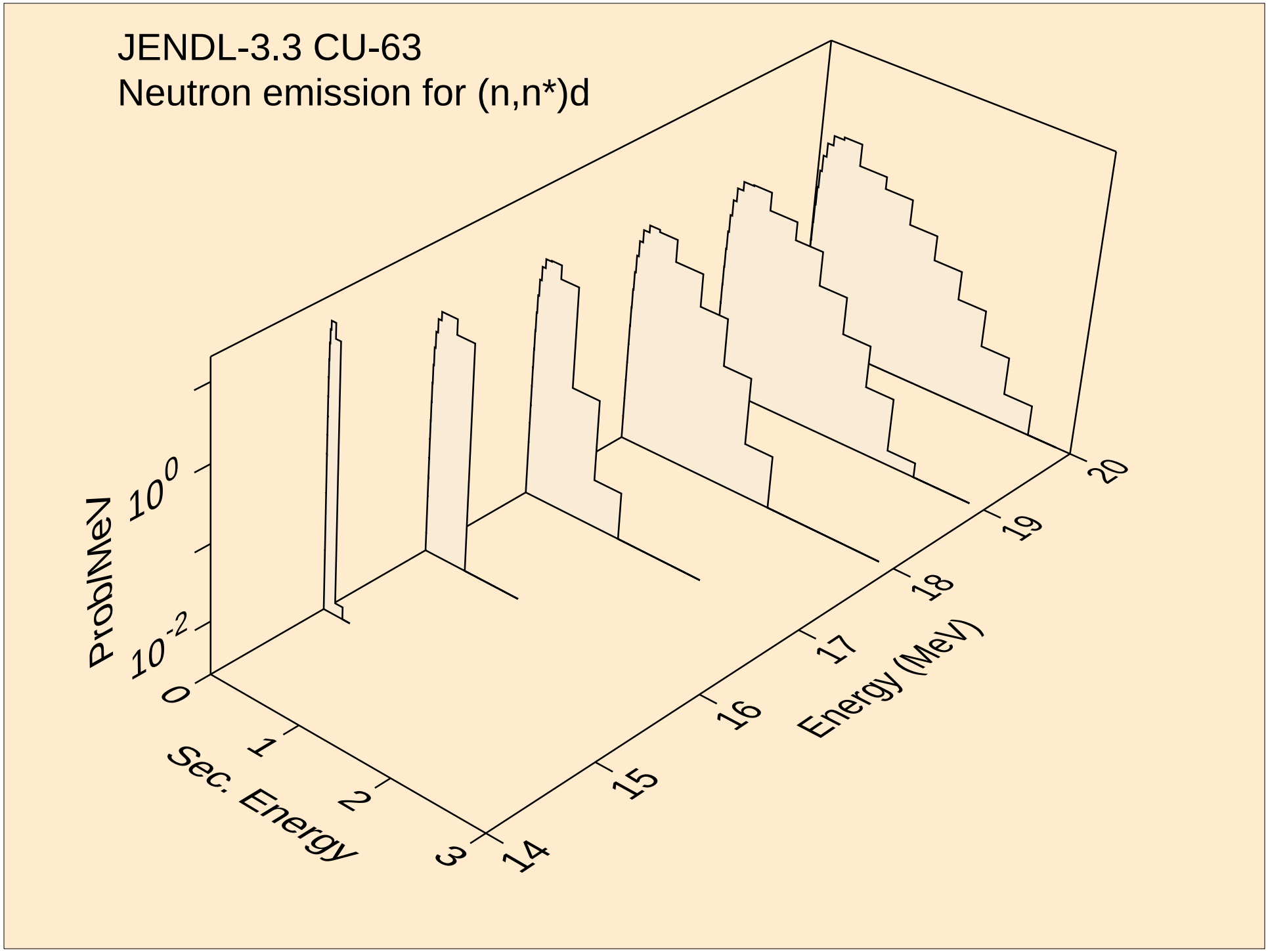

JENDL-3.3 CU-63
angular distribution for (n,n*16)
ProbCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

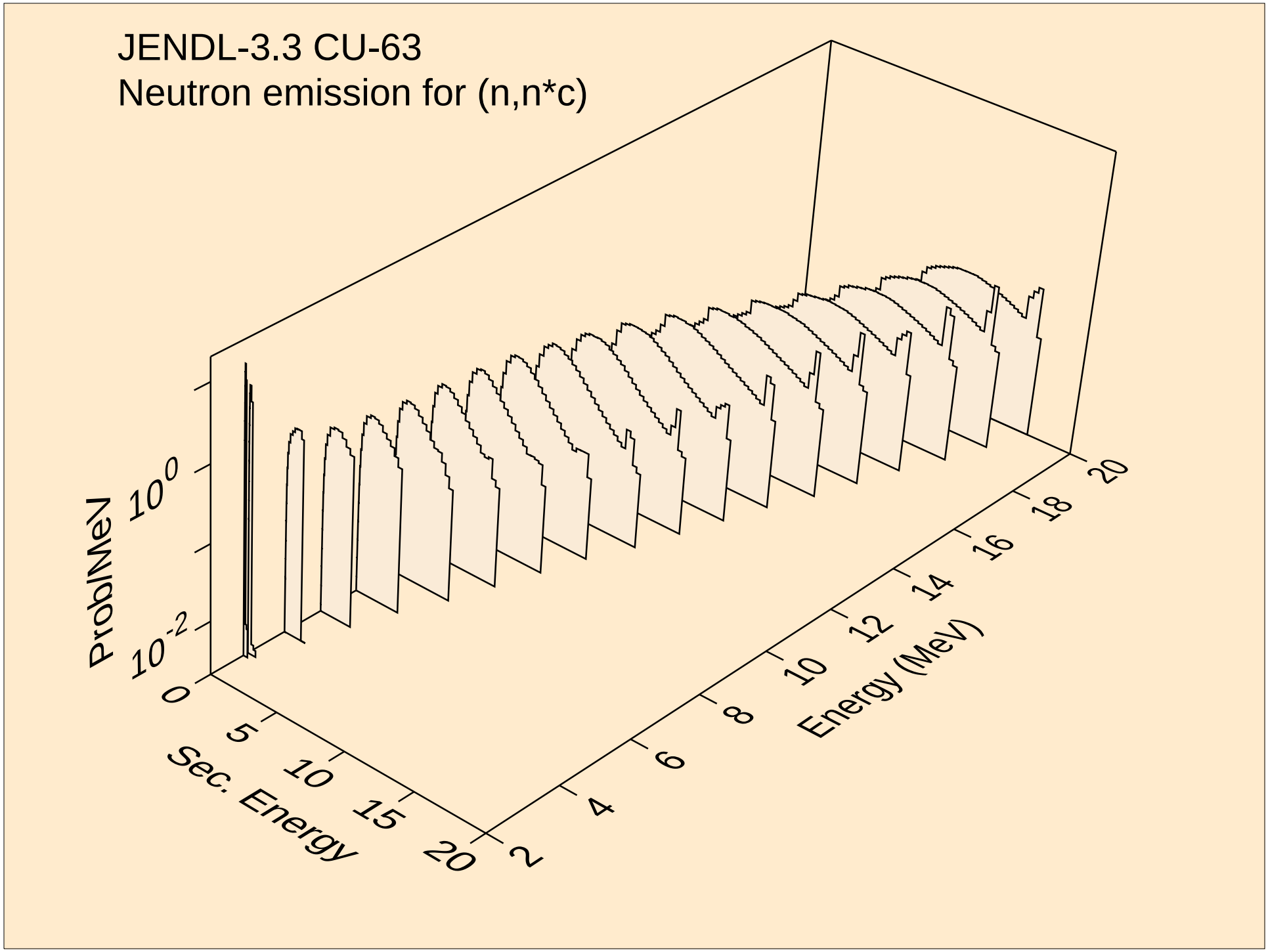

JENDL-3.3 CU-63
angular distribution for (n,n*17)
10^0
Prob|Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

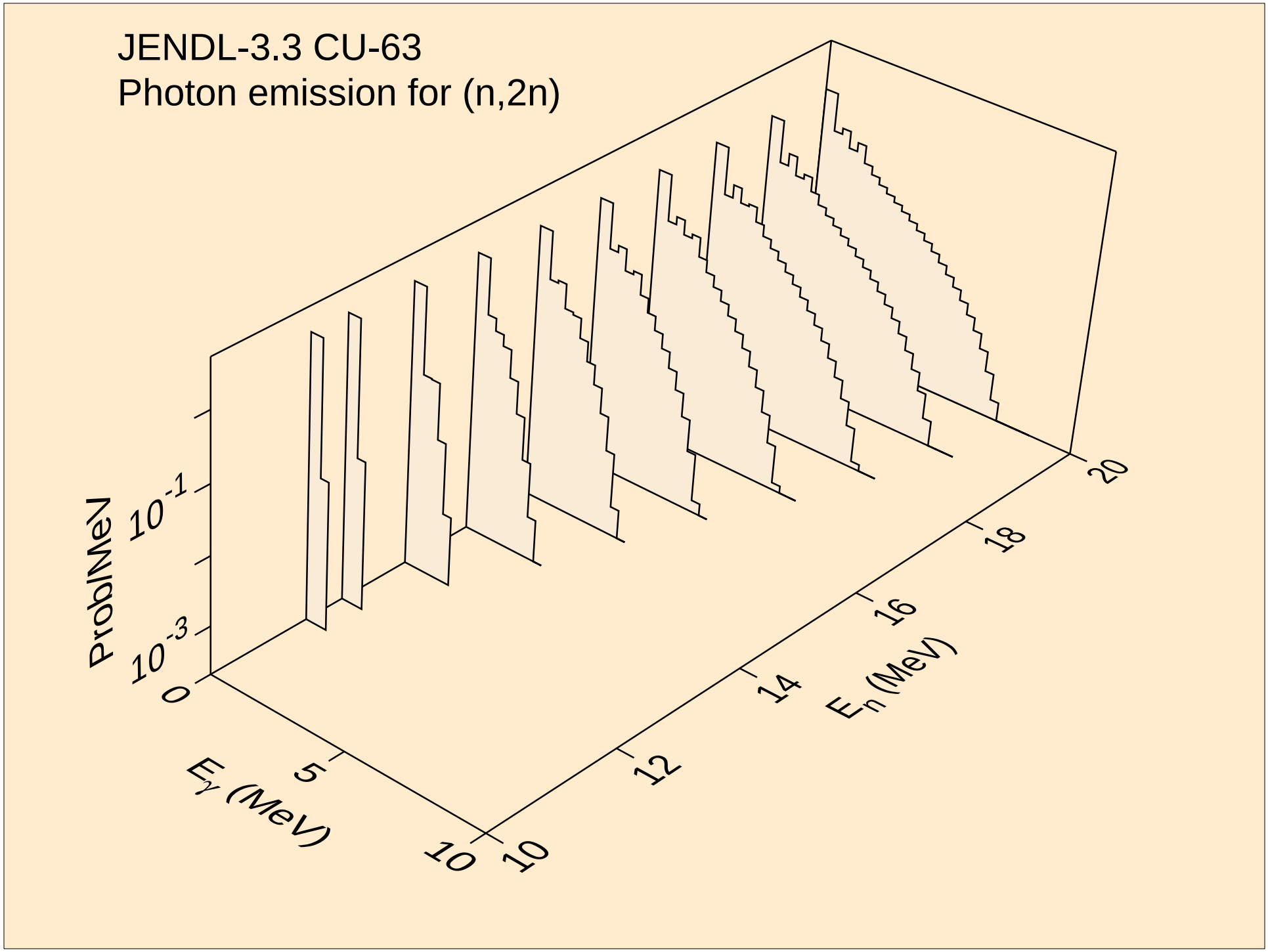

JENDL-3.3 CU-63
Neutron emission for (n,2n)
Prob/MeV
10^{1}
10^{-1}
0
Sec. Energy
2
4
6
8
10
Energy (MeV)
10
12
14
16
18
20

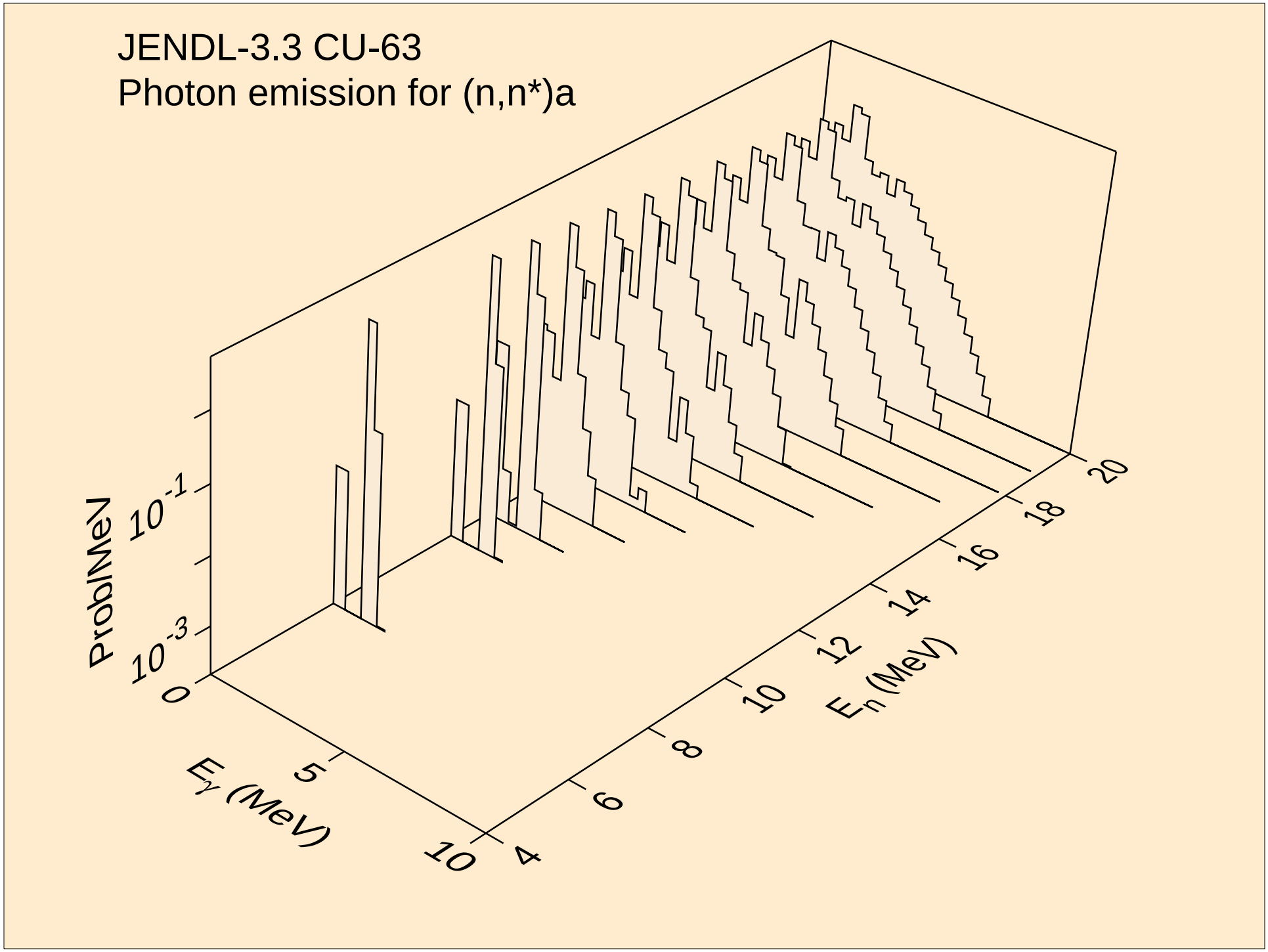

JENDL-3.3 CU-63
Neutron emission for (n,n*)a
Prob/MeV
10^1
10^-1
0
Sec. Energy
2
4
6
8
10
Energy (MeV)
4
6
8
10
12
14
16
18
20

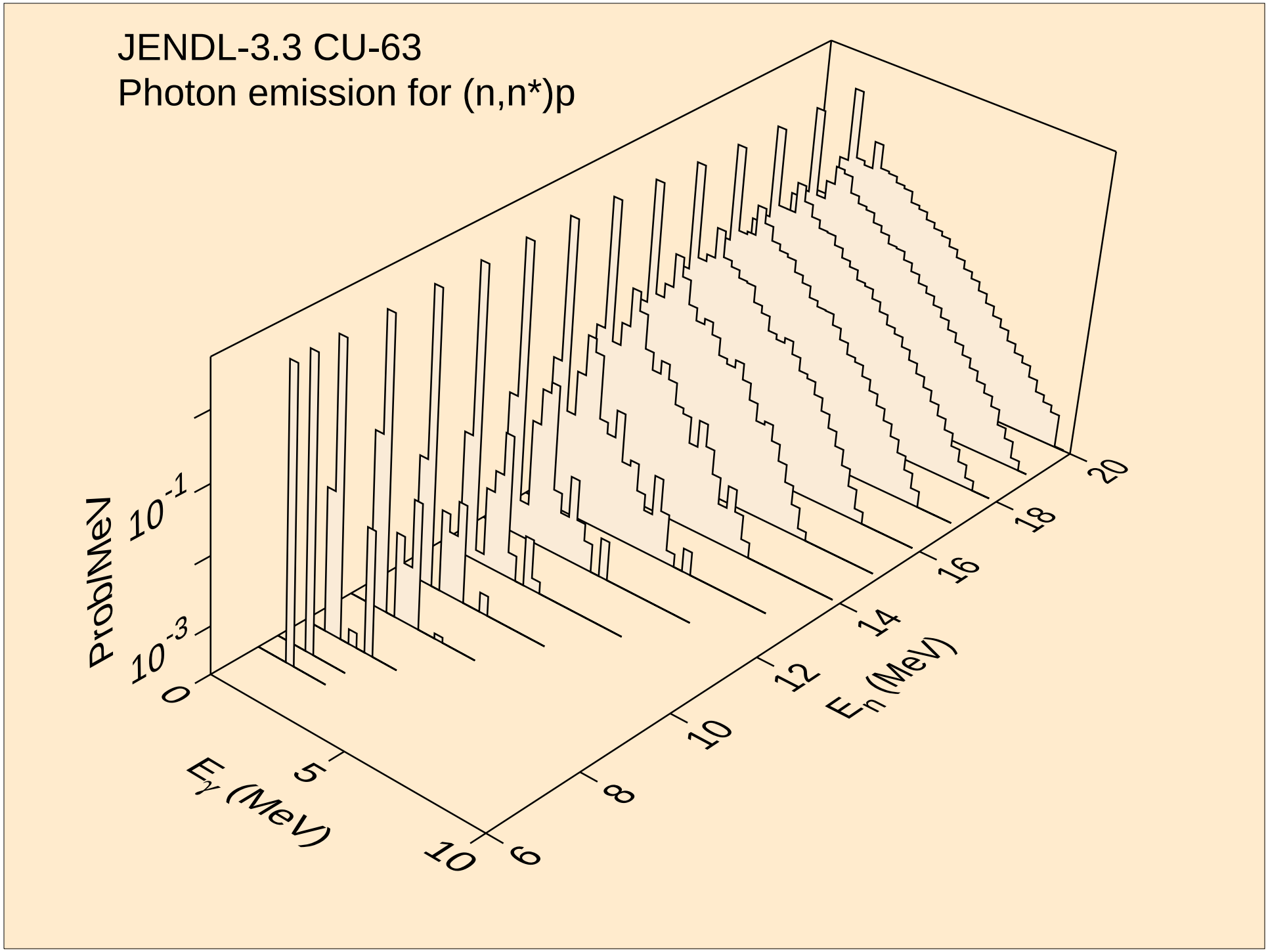

JENDL-3.3 CU-63
Neutron emission for (n,n*)p
Prob/MeV
10^{1}
10^{-1}
0
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

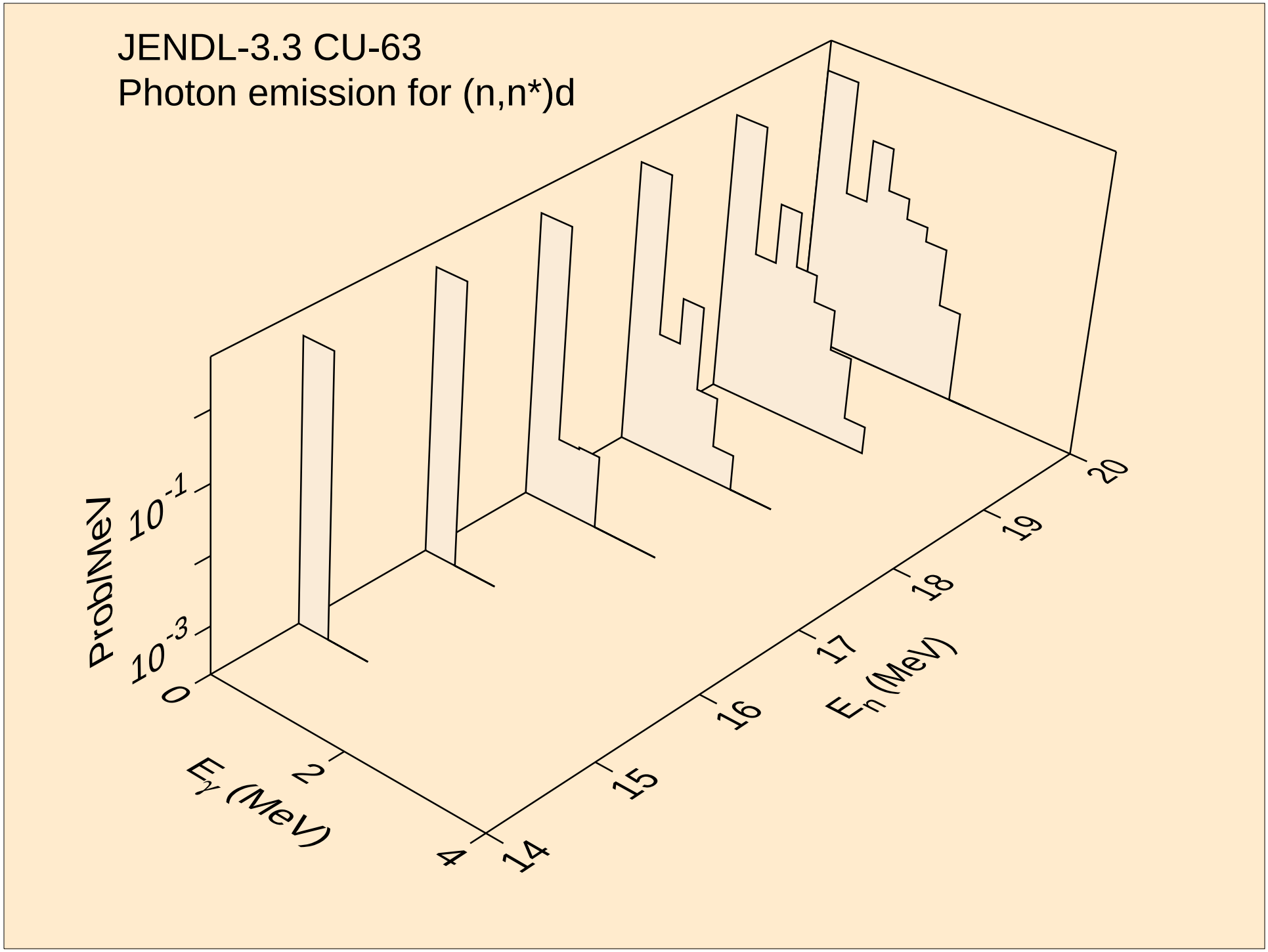

JENDL-3.3 CU-63
Neutron emission for (n,n*)d
Prob/MeV
10^0
10^{-2}
0
Sec. Energy
1
2
3
Energy (MeV)
14
15
16
17
18
19
20

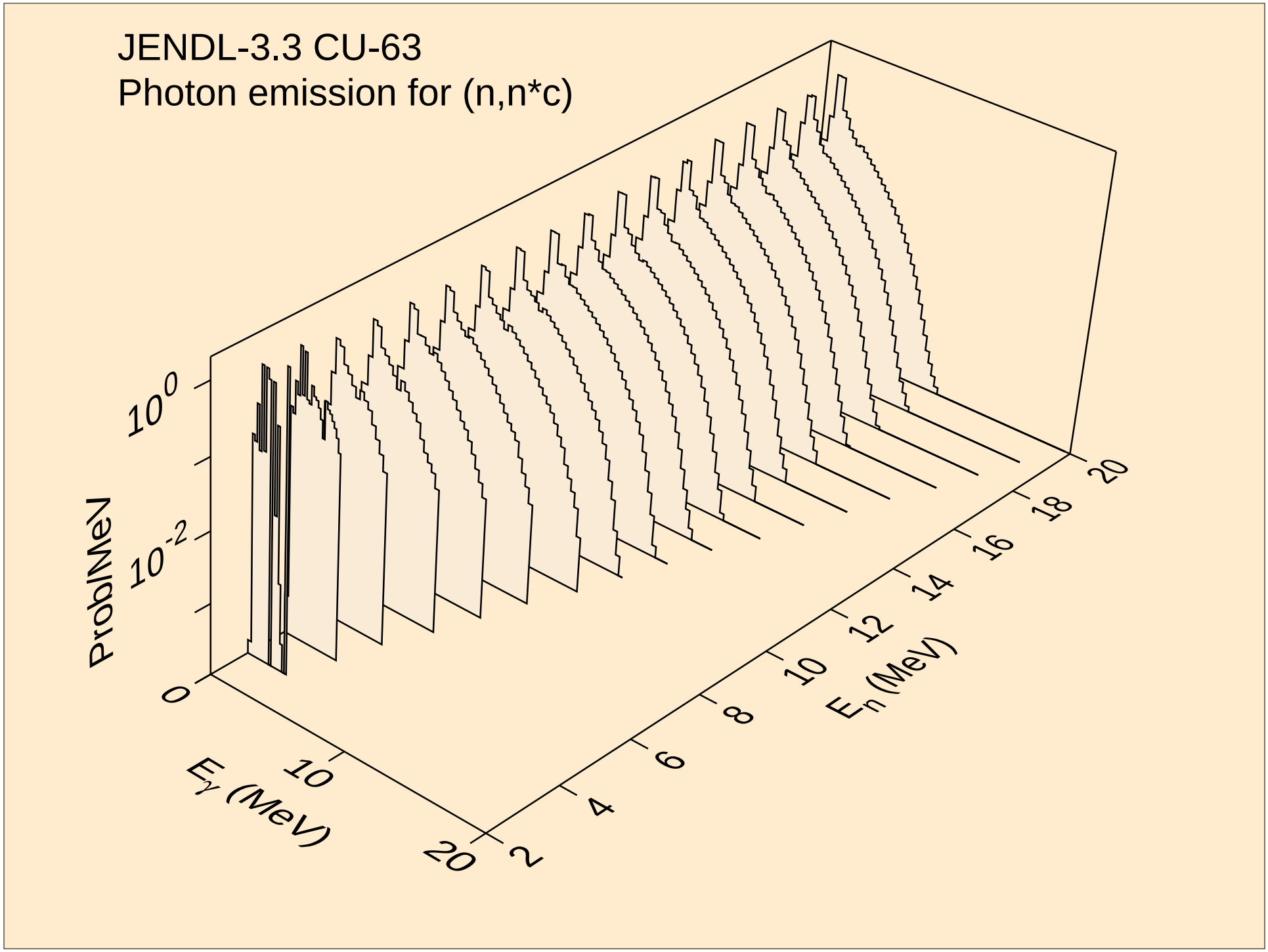

JENDL-3.3 CU-63
Neutron emission for (n,n*c)
Prob/MeV
10^0
10^{-2}
0
5
10
15
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

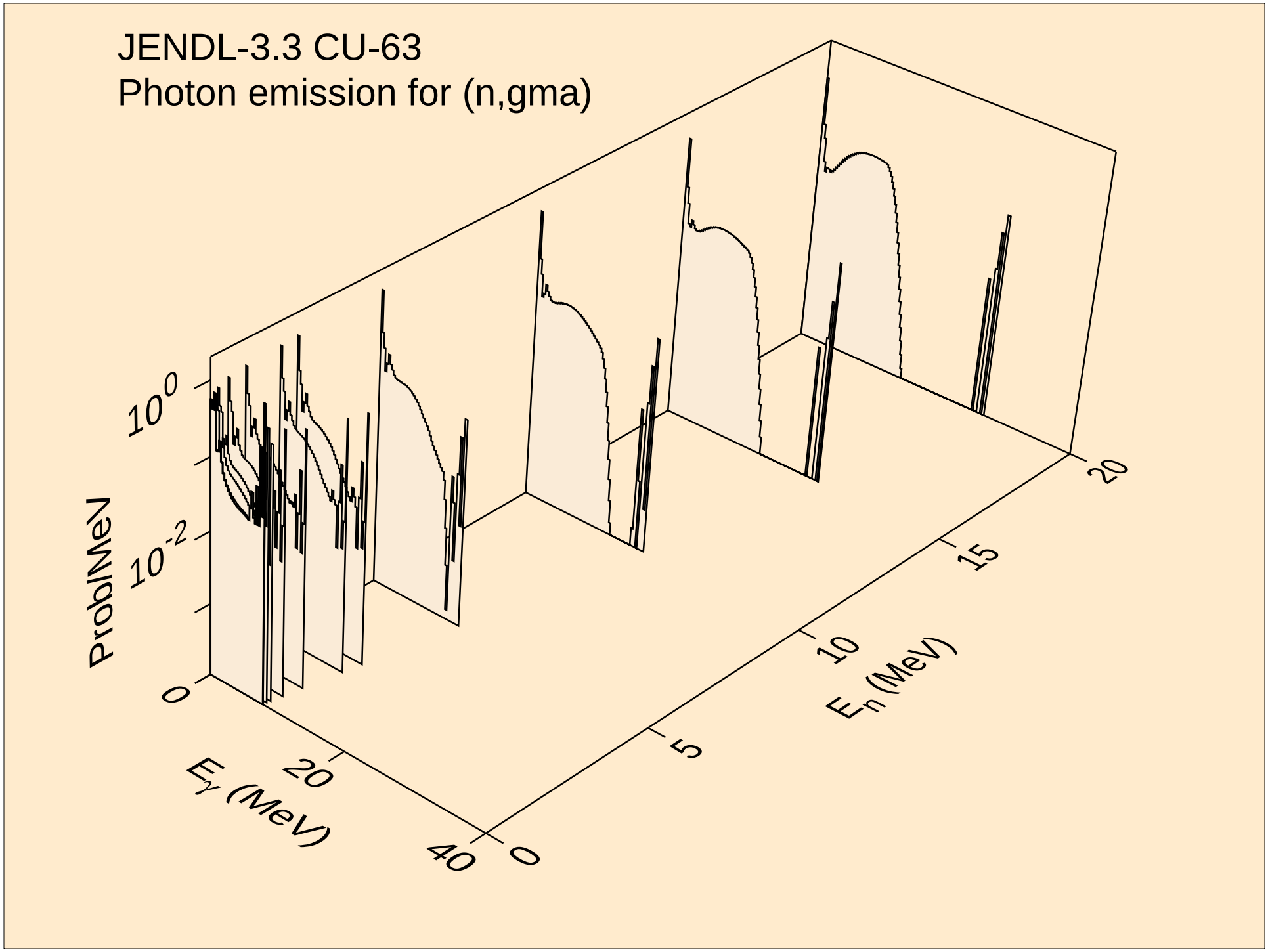

JENDL-3.3 CU-63
Photon emission for (n,2n)
Prob/MeV
10^{-1}
10^{-3}
0
5
10
E_γ (MeV)
10
12
14
16
18
20
E_n (MeV)

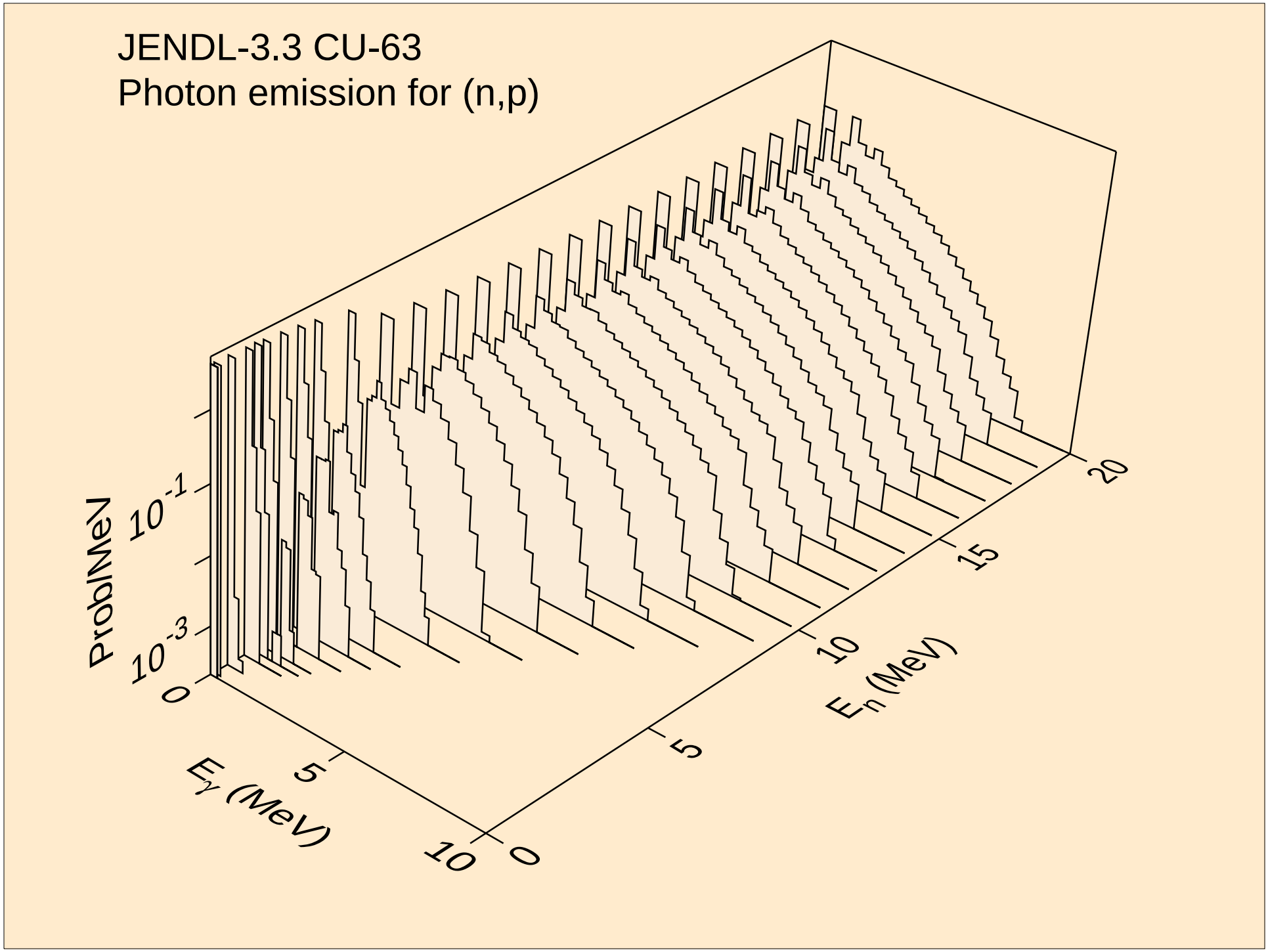

JENDL-3.3 CU-63
Photon emission for (n,n*)a
Prob/MeV
10^-1
10^-3
0
5
10
E_γ (MeV)
4
6
8
10
12
14
16
18
20
E_n (MeV)

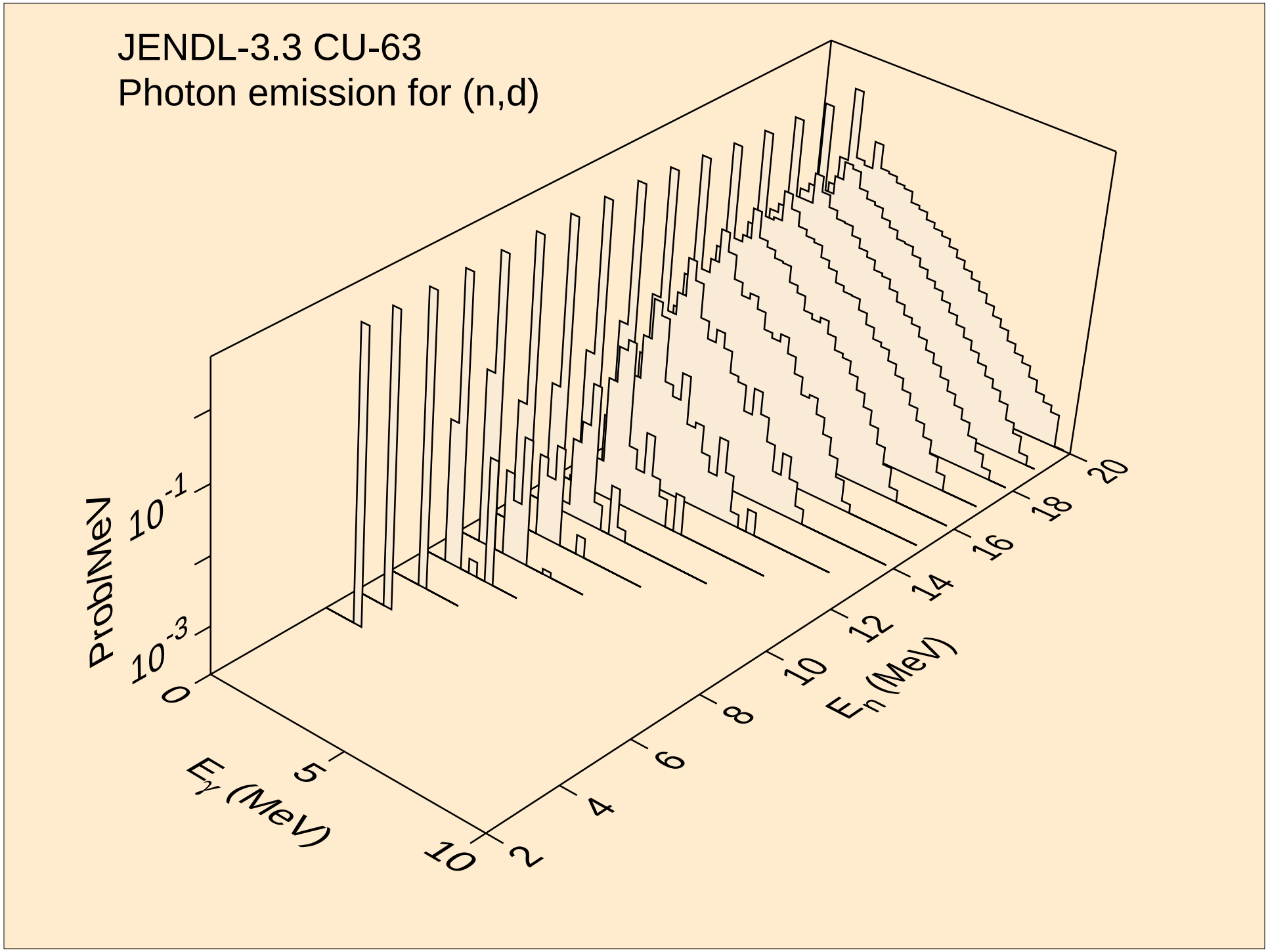

JENDL-3.3 CU-63
Photon emission for (n,n*)p
Prob/MeV
10^-1
10^-3
0
5
10
E_γ (MeV)
6
8
10
12
14
16
18
20
E_n (MeV)

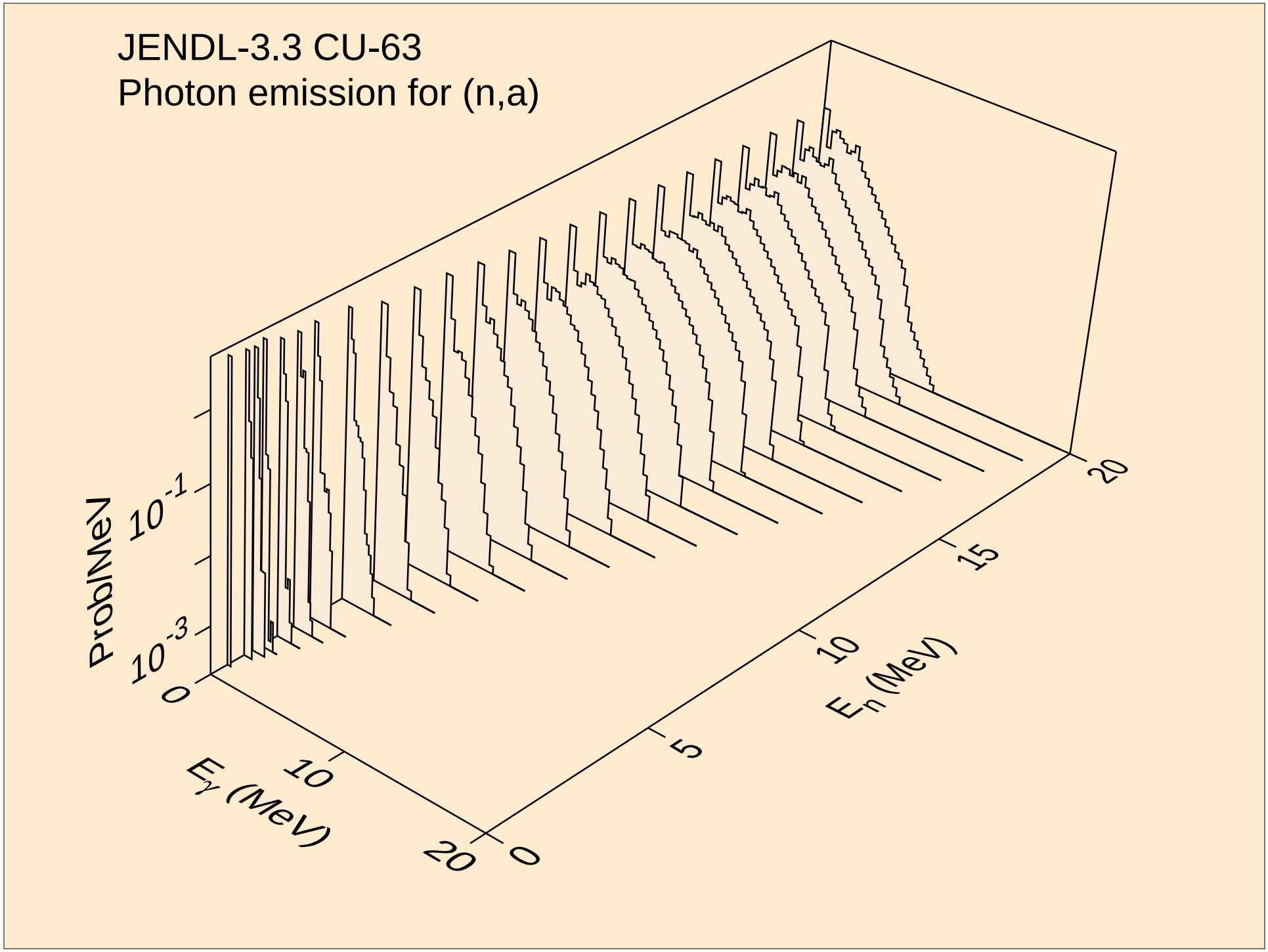

JENDL-3.3 CU-63
Photon emission for (n,n*)d
Prob/MeV
10^-1
10^-3
0
2
4
E_γ (MeV)
14
15
16
17
18
19
20
E_n (MeV)

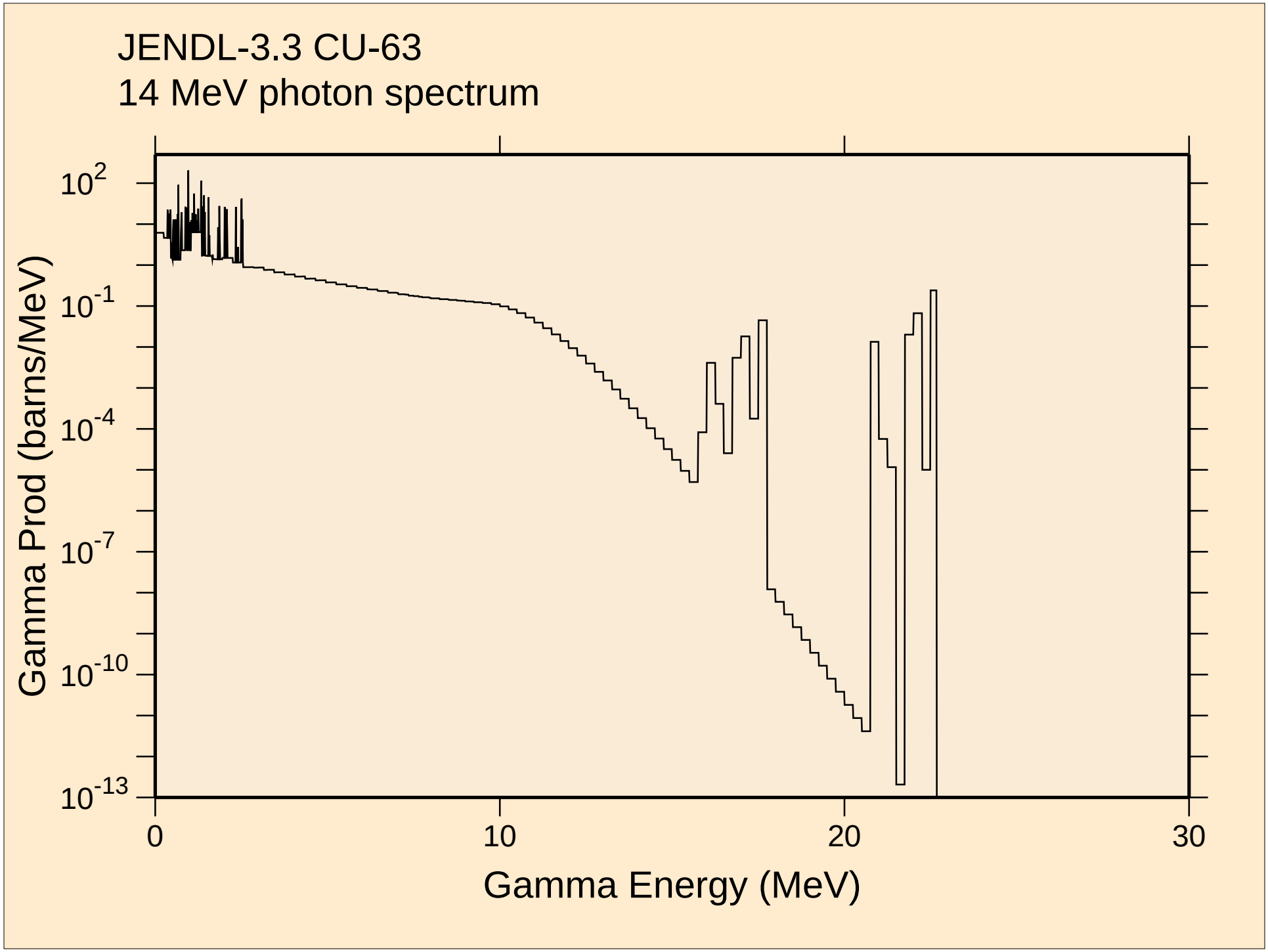

JENDL-3.3 CU-63
Photon emission for (n,n*c)
Prob/MeV
10^0
10^{-2}
0
10
20
E_γ (MeV)
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

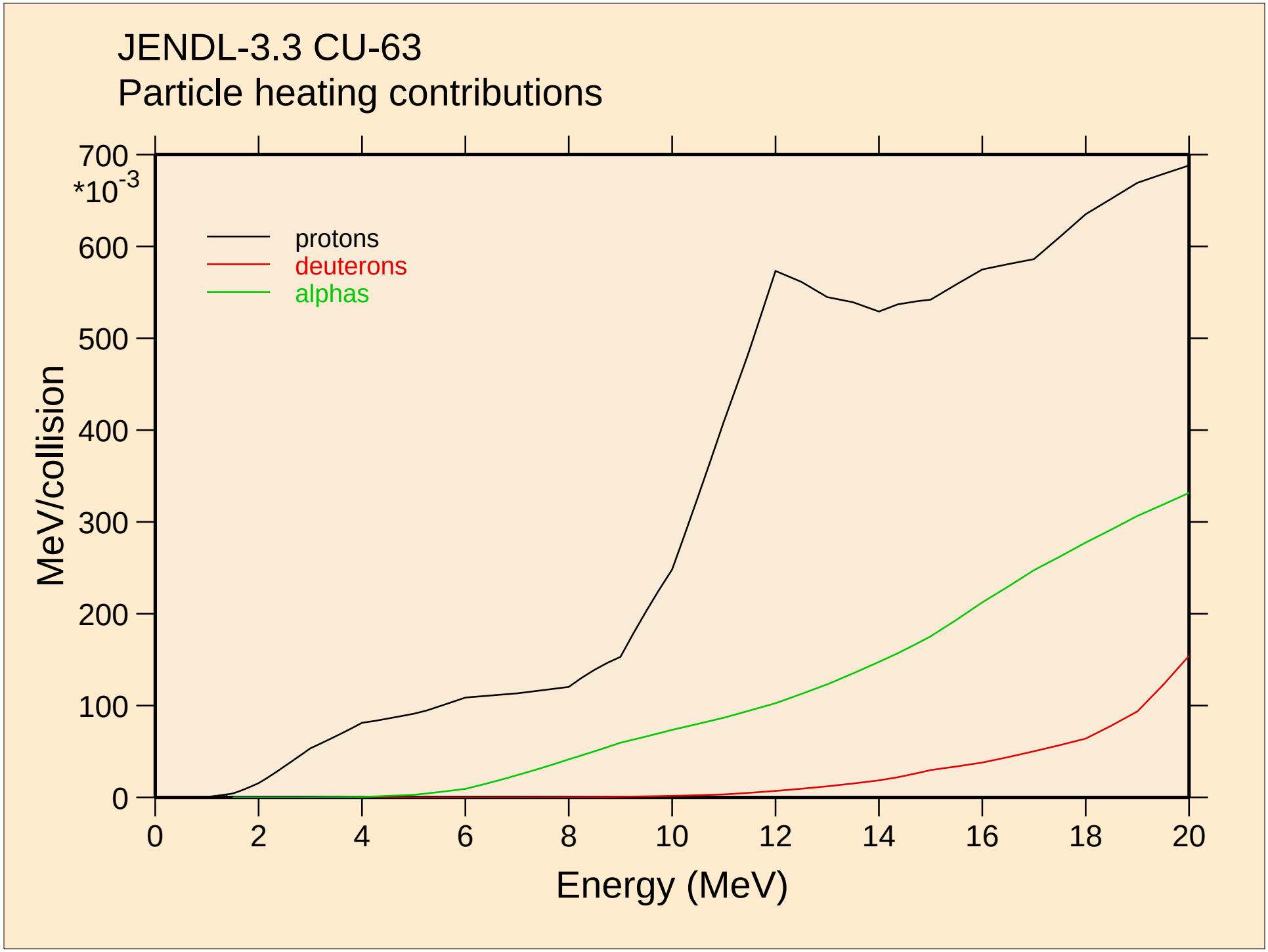

JENDL-3.3 CU-63
Photon emission for (n,gma)
Prob/MeV
10^0
10^{-2}
0
E_γ (MeV)
20
40
E_n (MeV)
0
5
10
15
20

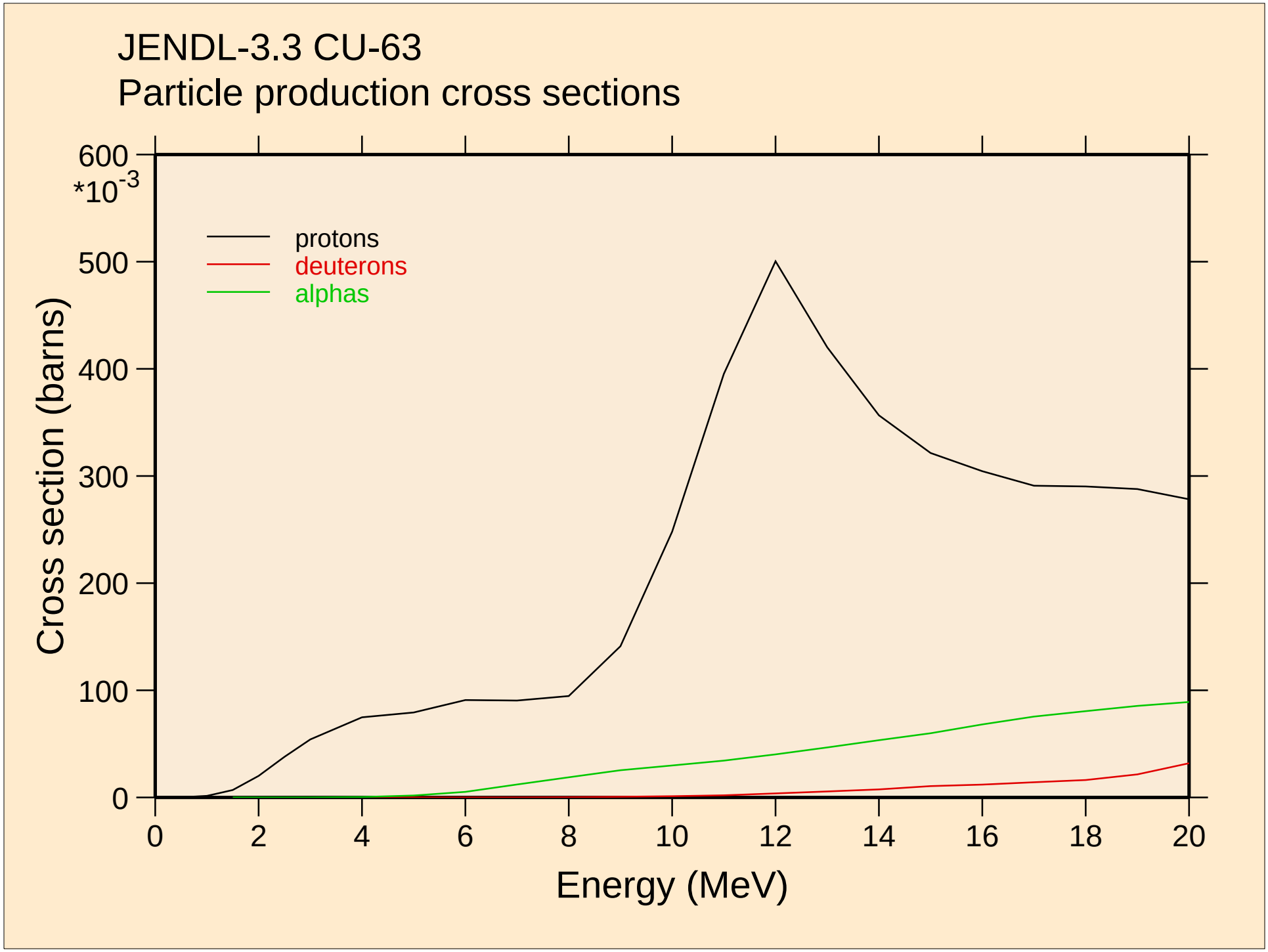

JENDL-3.3 CU-63
Photon emission for (n,p)
Prob/MeV
10^{-1}
10^{-3}
0
E_γ (MeV)
5
10
0
5
10
15
20
E_n (MeV)

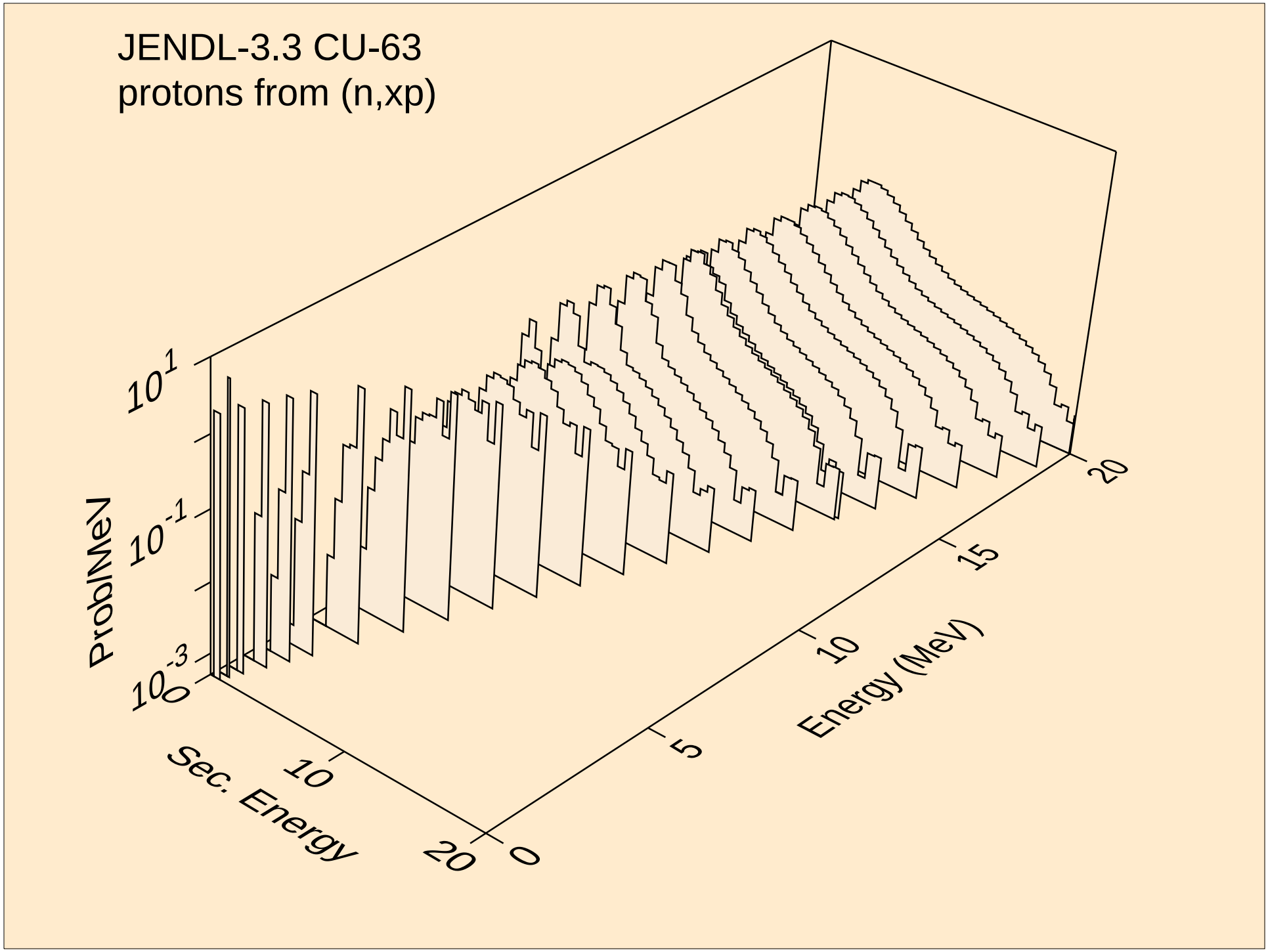

JENDL-3.3 CU-63
Photon emission for (n,d)
Prob/MeV
10^{-1}
10^{-3}
0
5
10
E_γ (MeV)
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

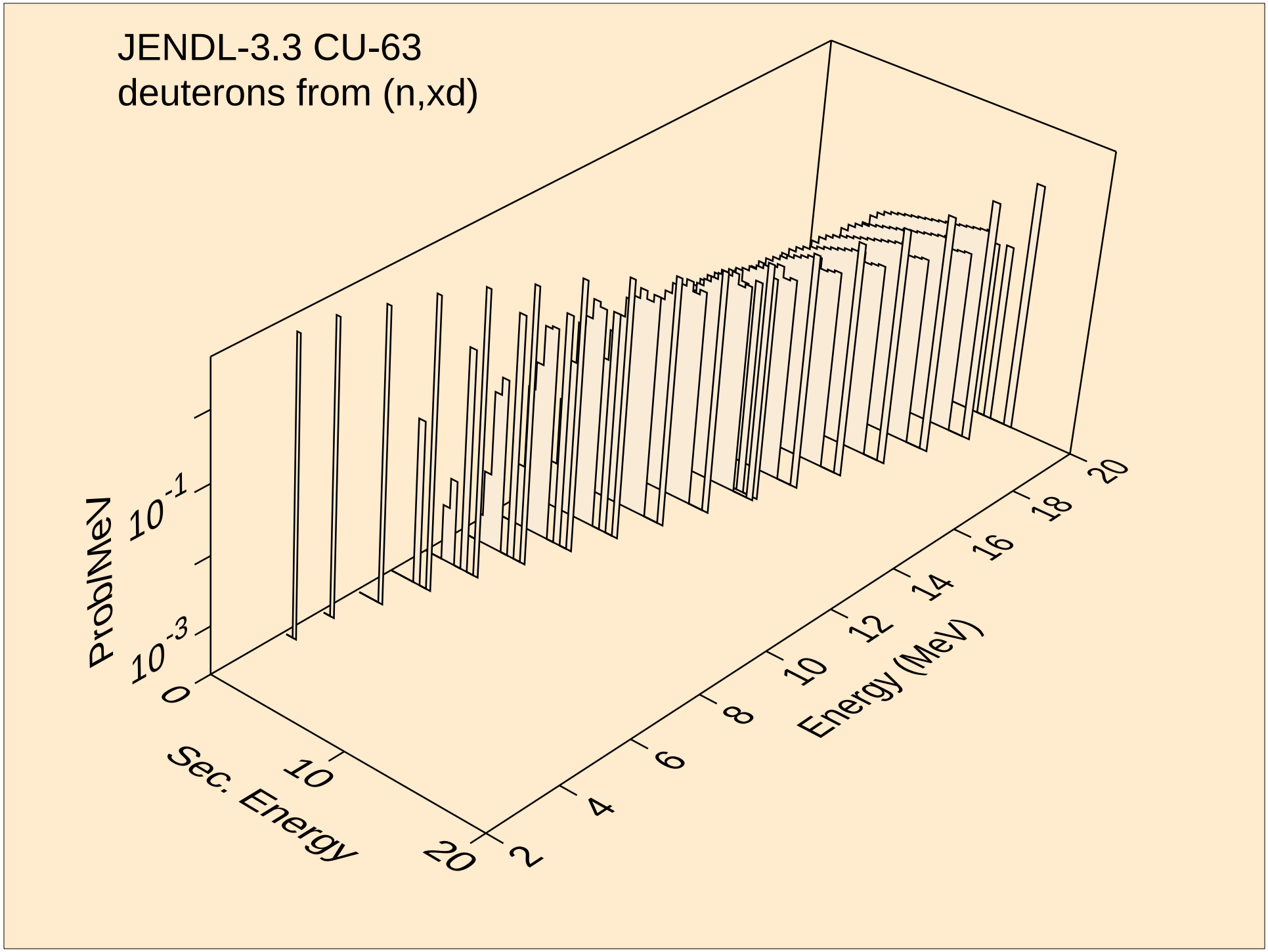

JENDL-3.3 CU-63
Photon emission for (n,a)
Prob/MeV
10^{-1}
10^{-3}
0
E_γ (MeV)
10
20
0
5
10
15
20
E_n (MeV)

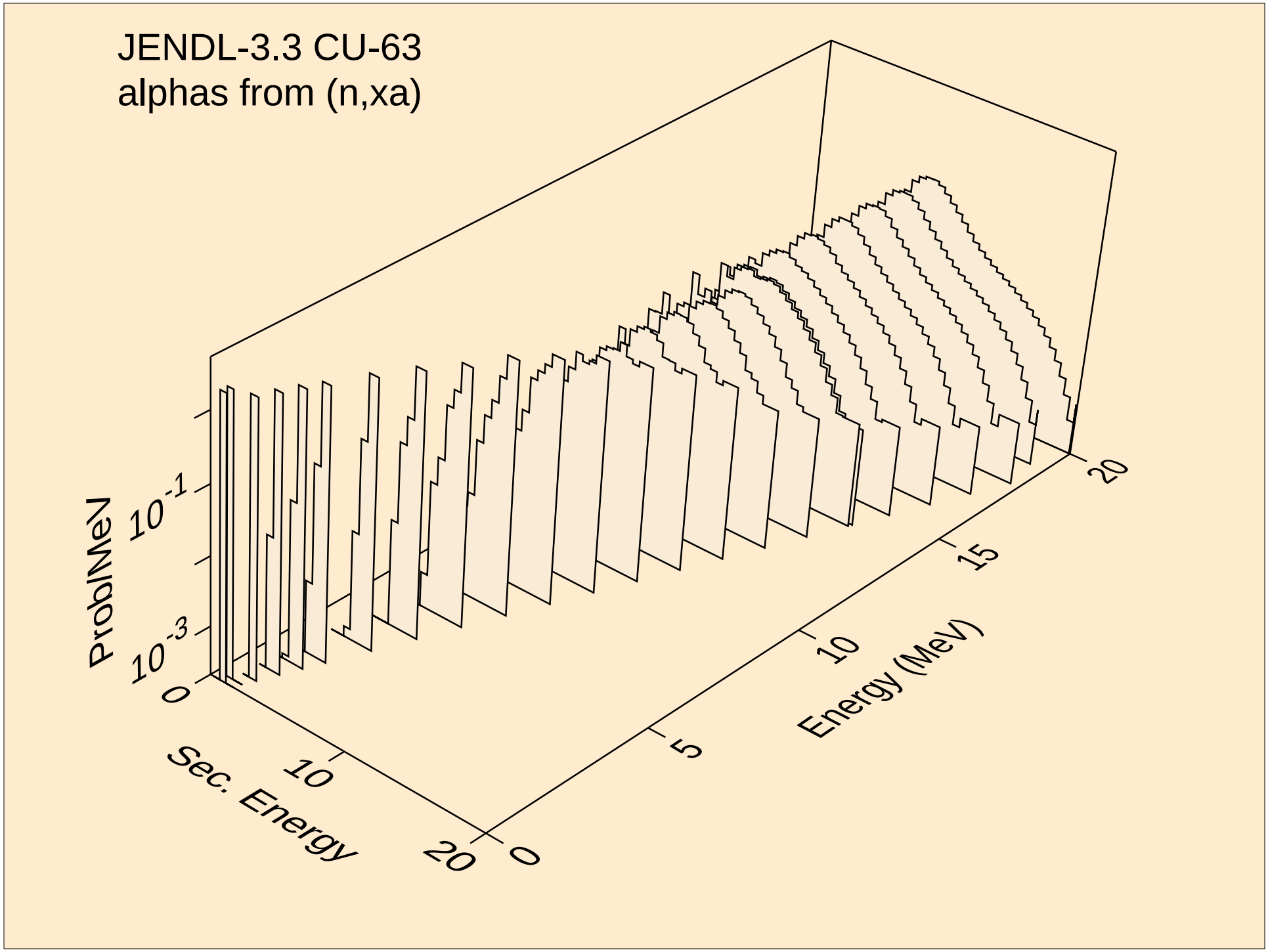

JENDL-3.3 CU-63
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^2
10^-1
10^-4
10^-7
10^-10
10^-13
0
10
20
30
Gamma Energy (MeV)


JENDL-3.3 CU-63
Particle heating contributions
700
*10-3
600
500
400
300
200
100
0
MeV/collision
protons
deuterons
alphas
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-3.3 CU-63
Particle production cross sections
protons
deuterons
alphas
Cross section (barns)
*10-3
600
500
400
300
200
100
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-3.3 CU-63
protons from (n,xp)
Prob/MeV
10^1
10^-1
10^-3
Sec. Energy
0
10
20
Energy (MeV)
0
5
10
15
20


JENDL-3.3 CU-63
deuterons from (n,xd)
Prob/MeV
10^{-1}
10^{-3}
0
Sec. Energy
10
20
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-3.3 CU-63
alphas from (n,xa)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
0
5
10
15
20
Energy (MeV)