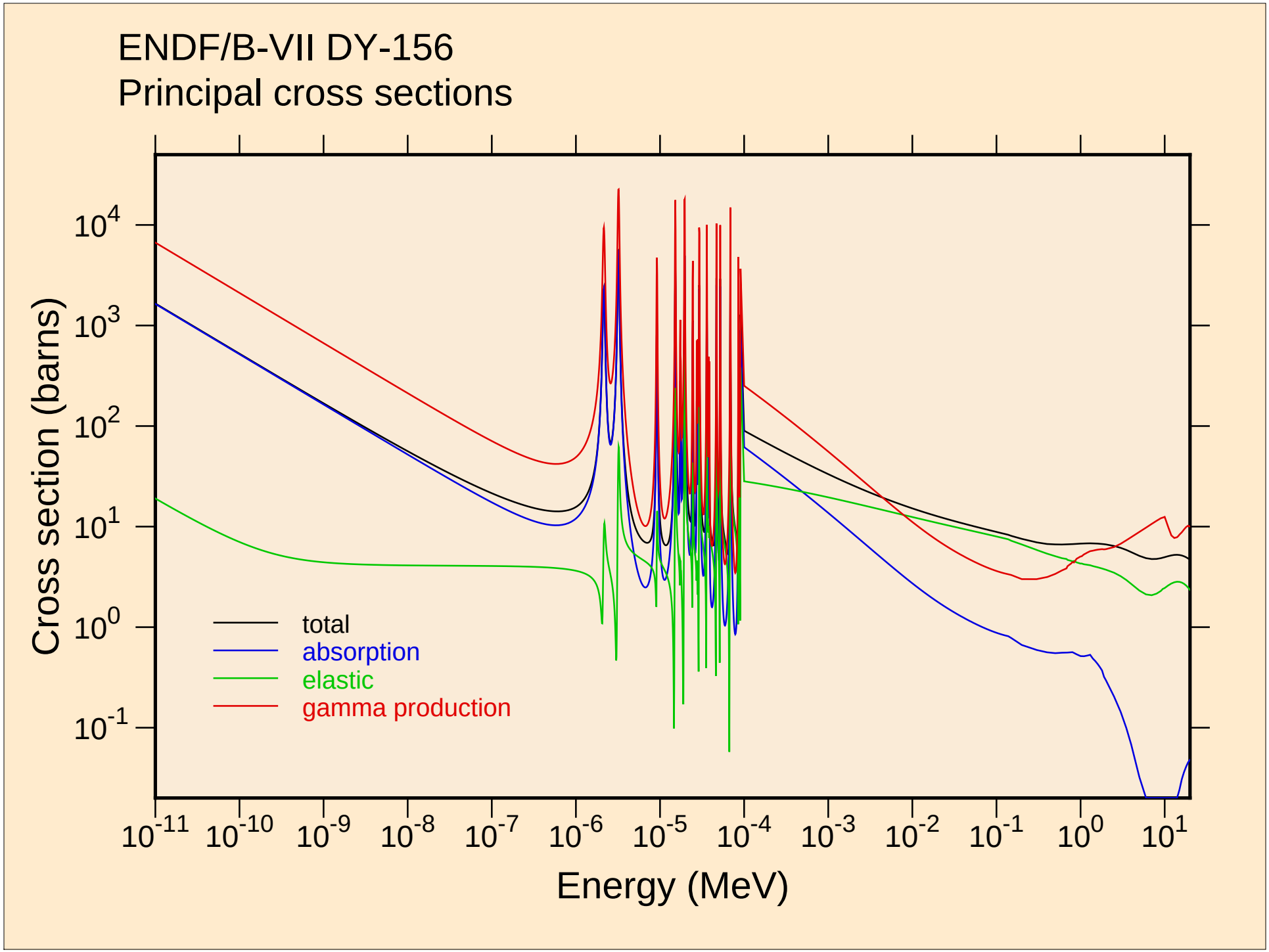
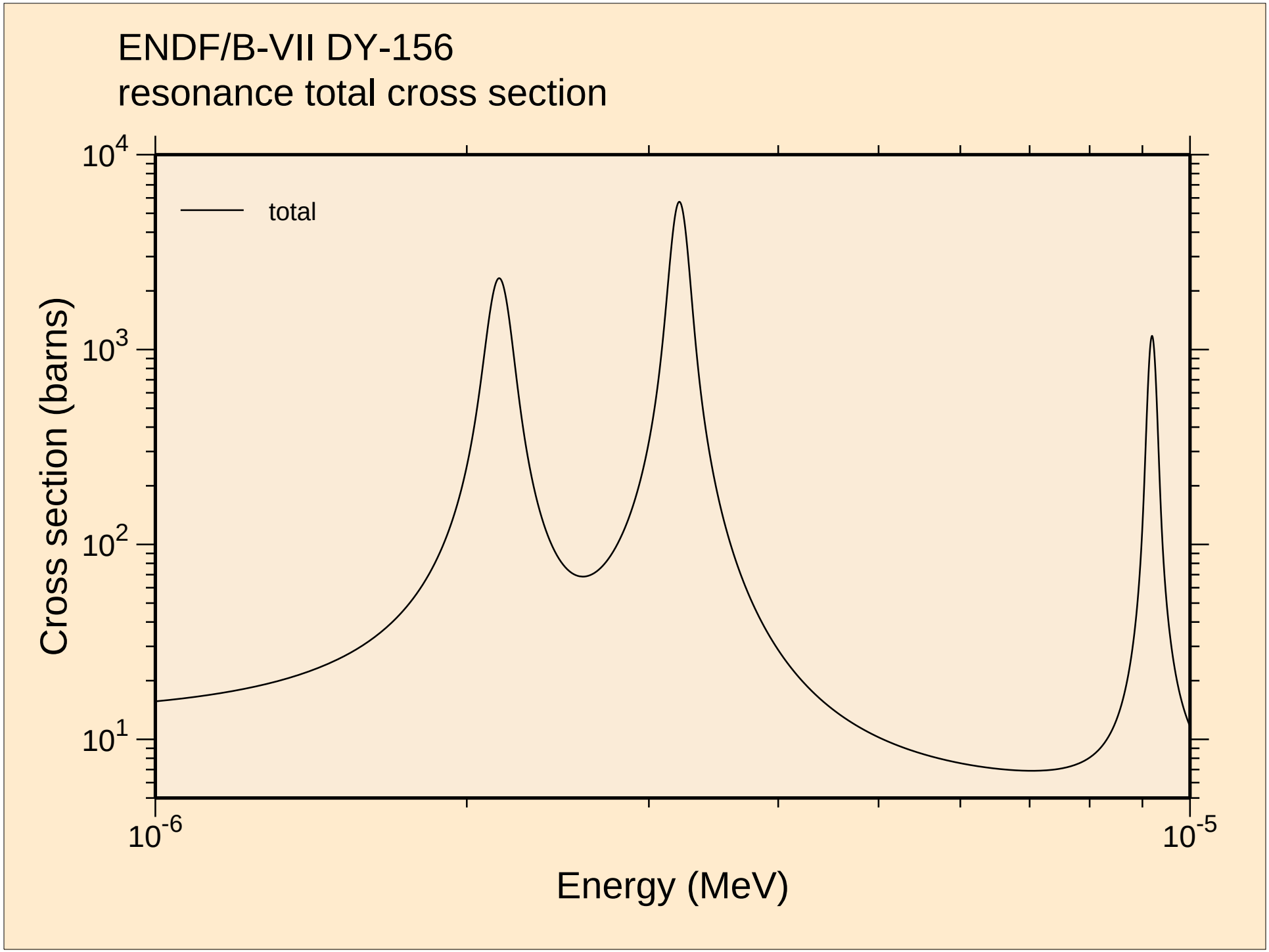
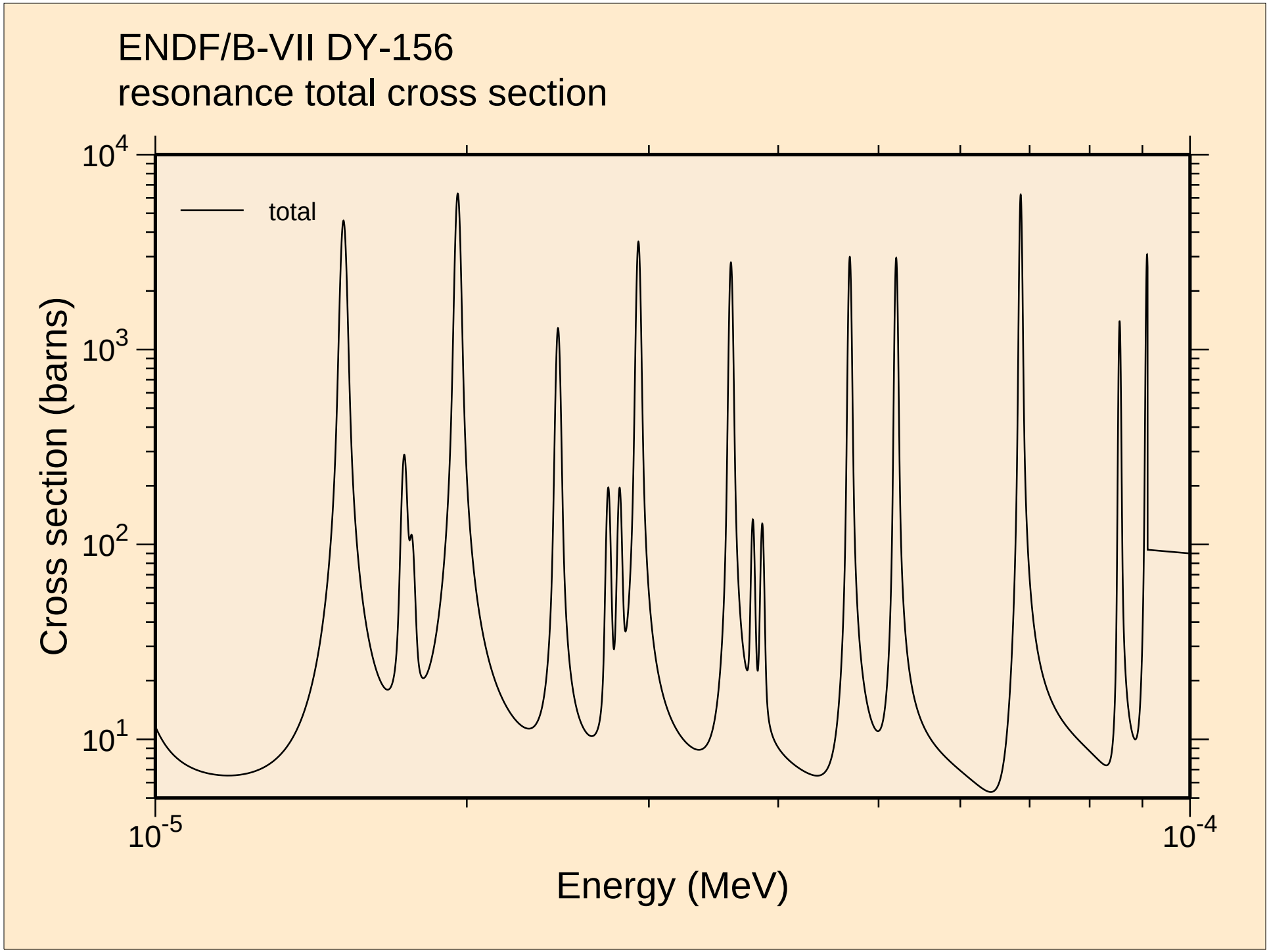
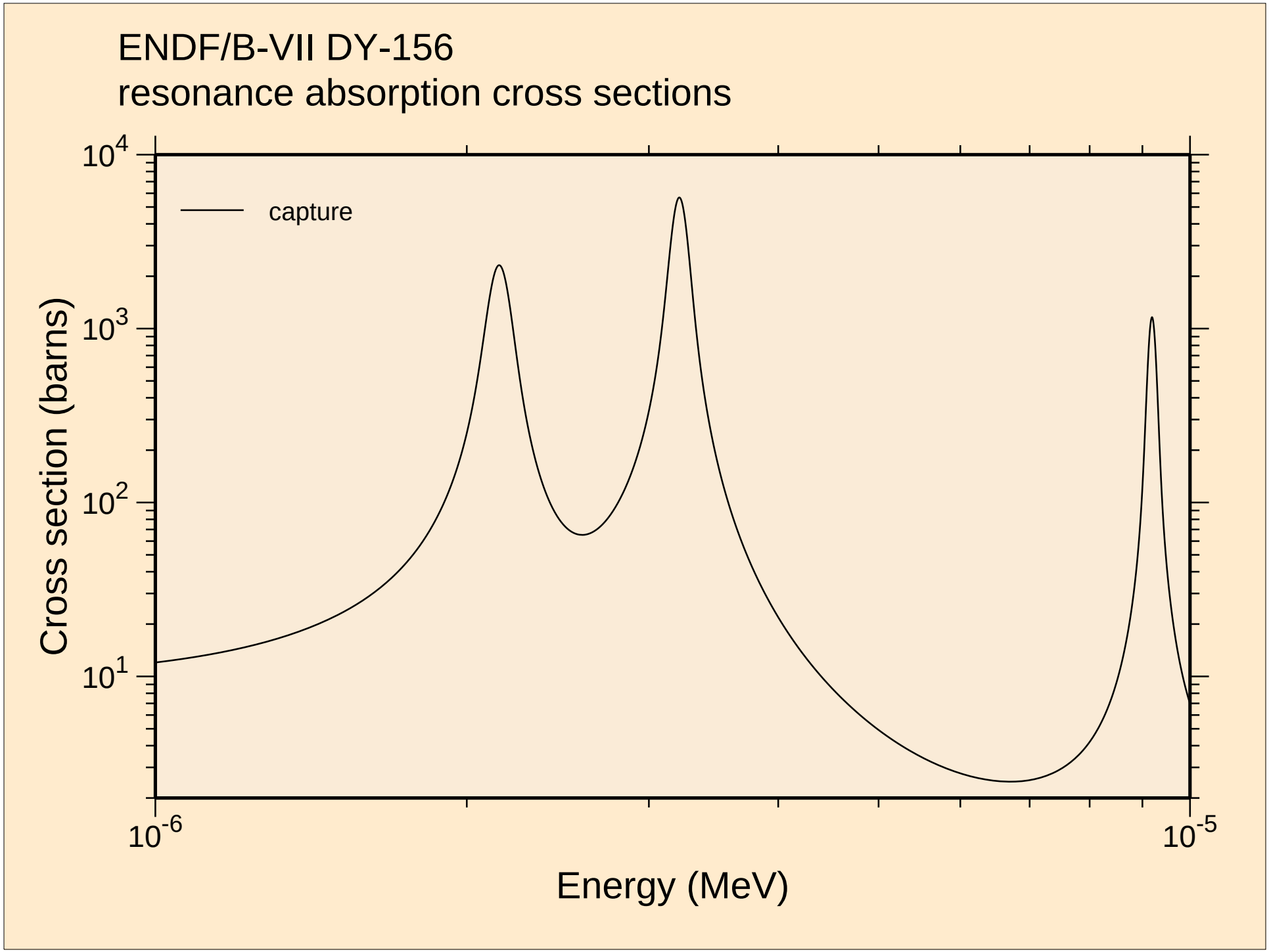
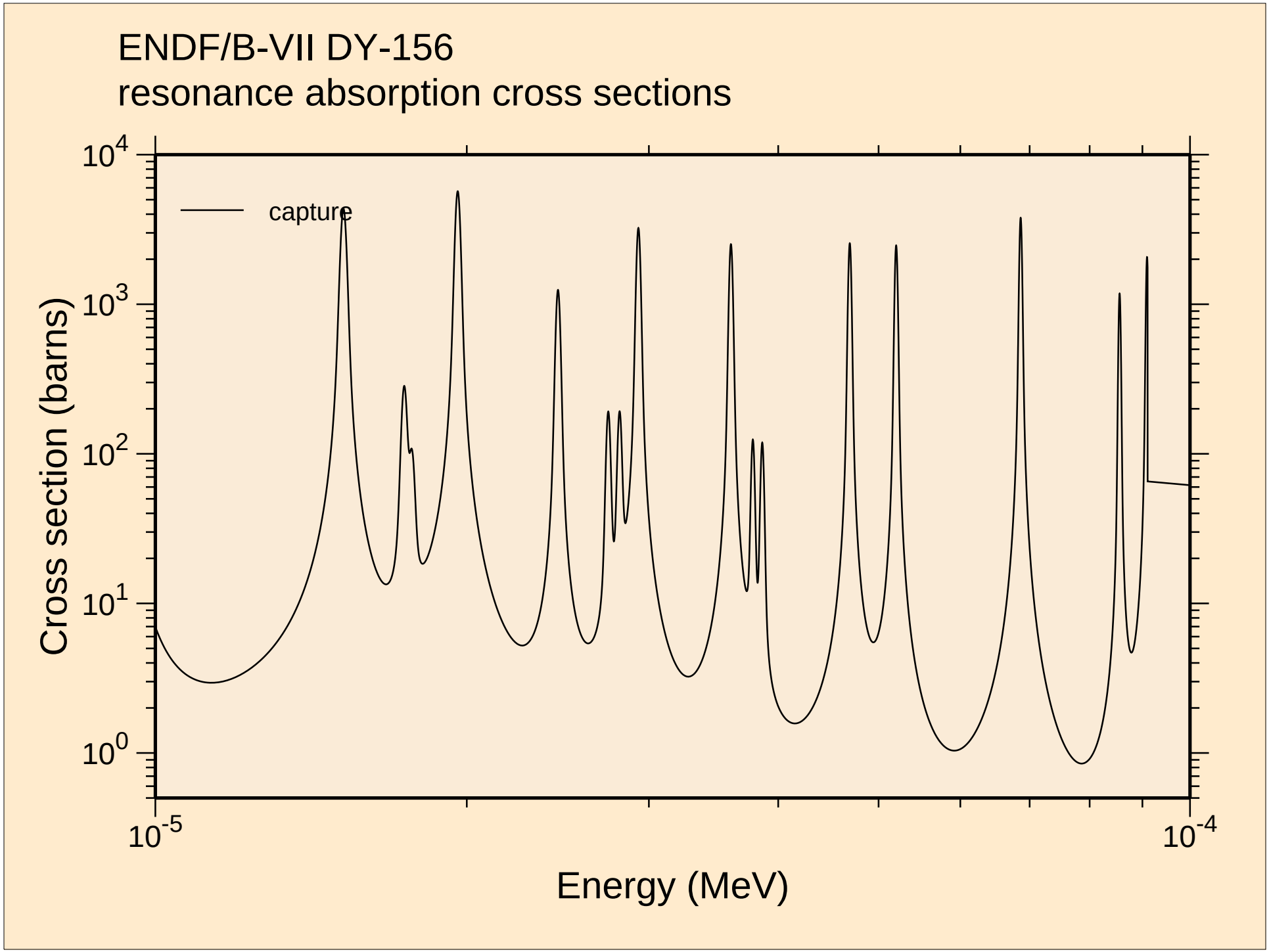

ENDF/B-VII DY-156
Principal cross sections
Cross section (barns)
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
total
absorption
elastic
gamma production
10^{-11} 10^{-10} 10^{-9} 10^{-8} 10^{-7} 10^{-6} 10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^{0} 10^{1}
Energy (MeV)

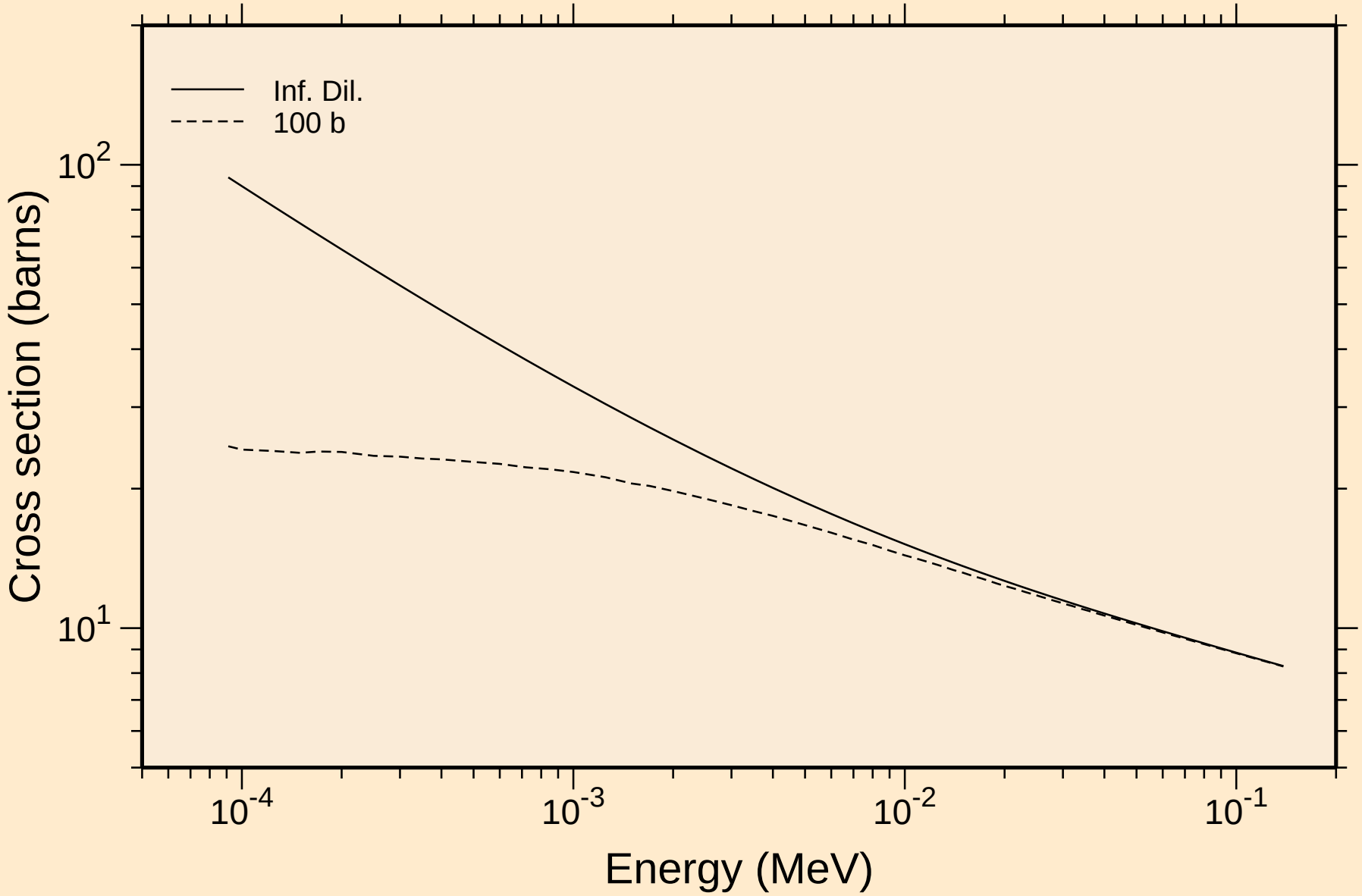

ENDF/B-VII DY-156
resonance total cross section
total
Cross section (barns)
10^4
10^3
10^2
10^1
10^{-6}
10^{-5}
Energy (MeV)


ENDF/B-VII DY-156
resonance total cross section
total
Cross section (barns)
10^4
10^3
10^2
10^1
10^{-5}
10^{-4}
Energy (MeV)

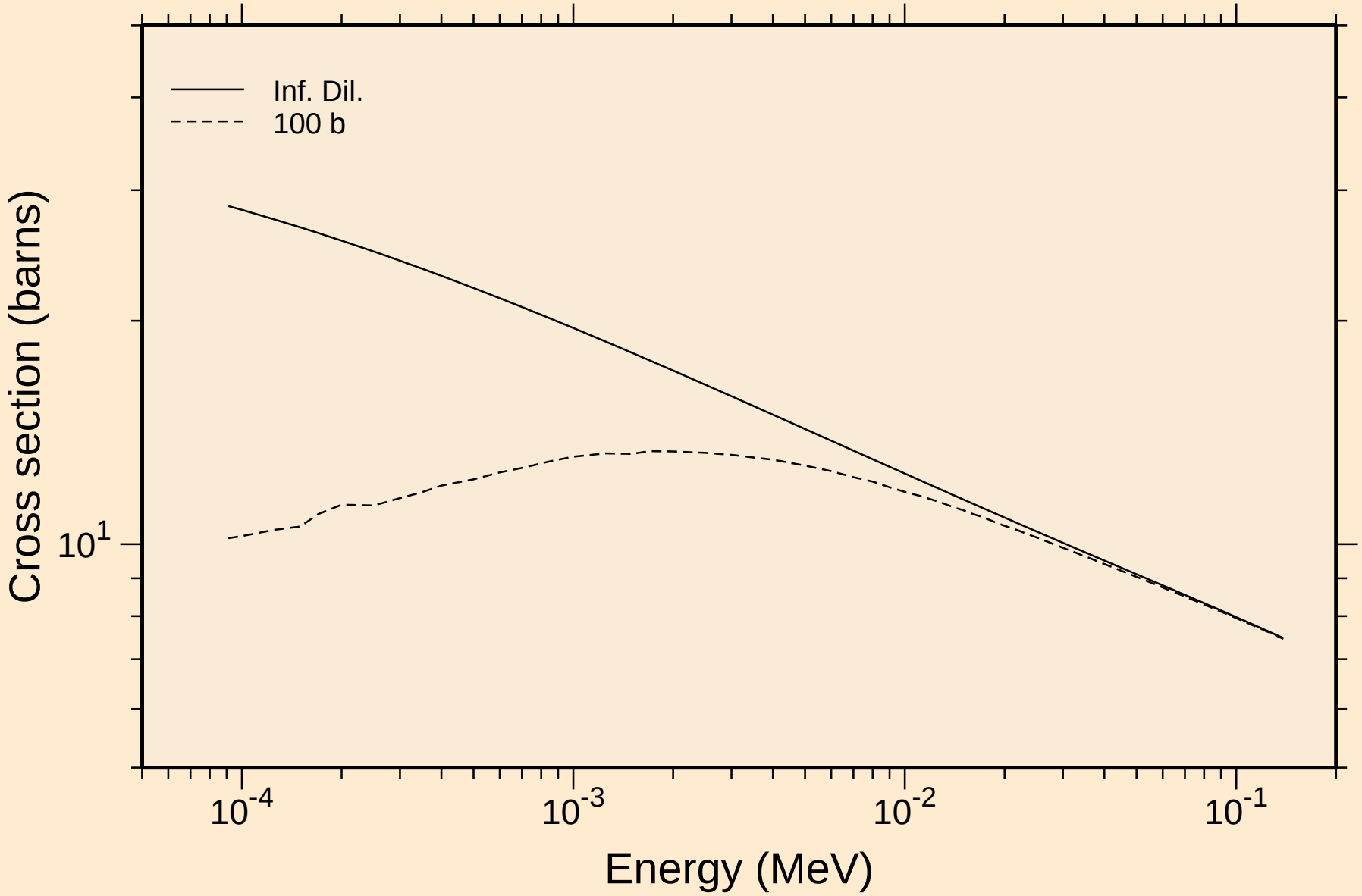

ENDF/B-VII DY-156
resonance absorption cross sections
capture
Cross section (barns)
10^4
10^3
10^2
10^1
10^{-6}
10^{-5}
Energy (MeV)

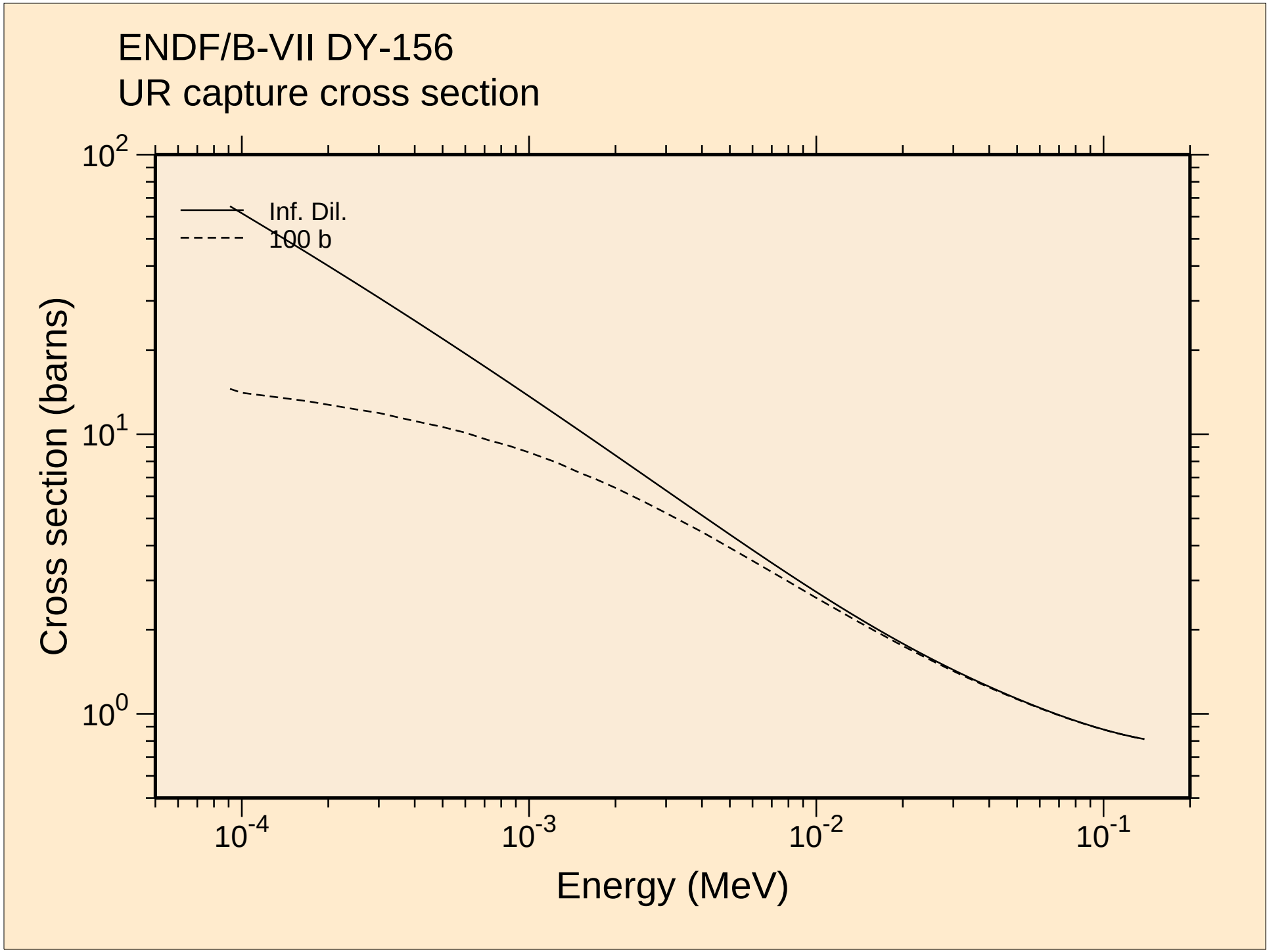

ENDF/B-VII DY-156
resonance absorption cross sections
capture
Cross section (barns)
10^4
10^3
10^2
10^1
10^0
10^{-5}
10^{-4}
Energy (MeV)

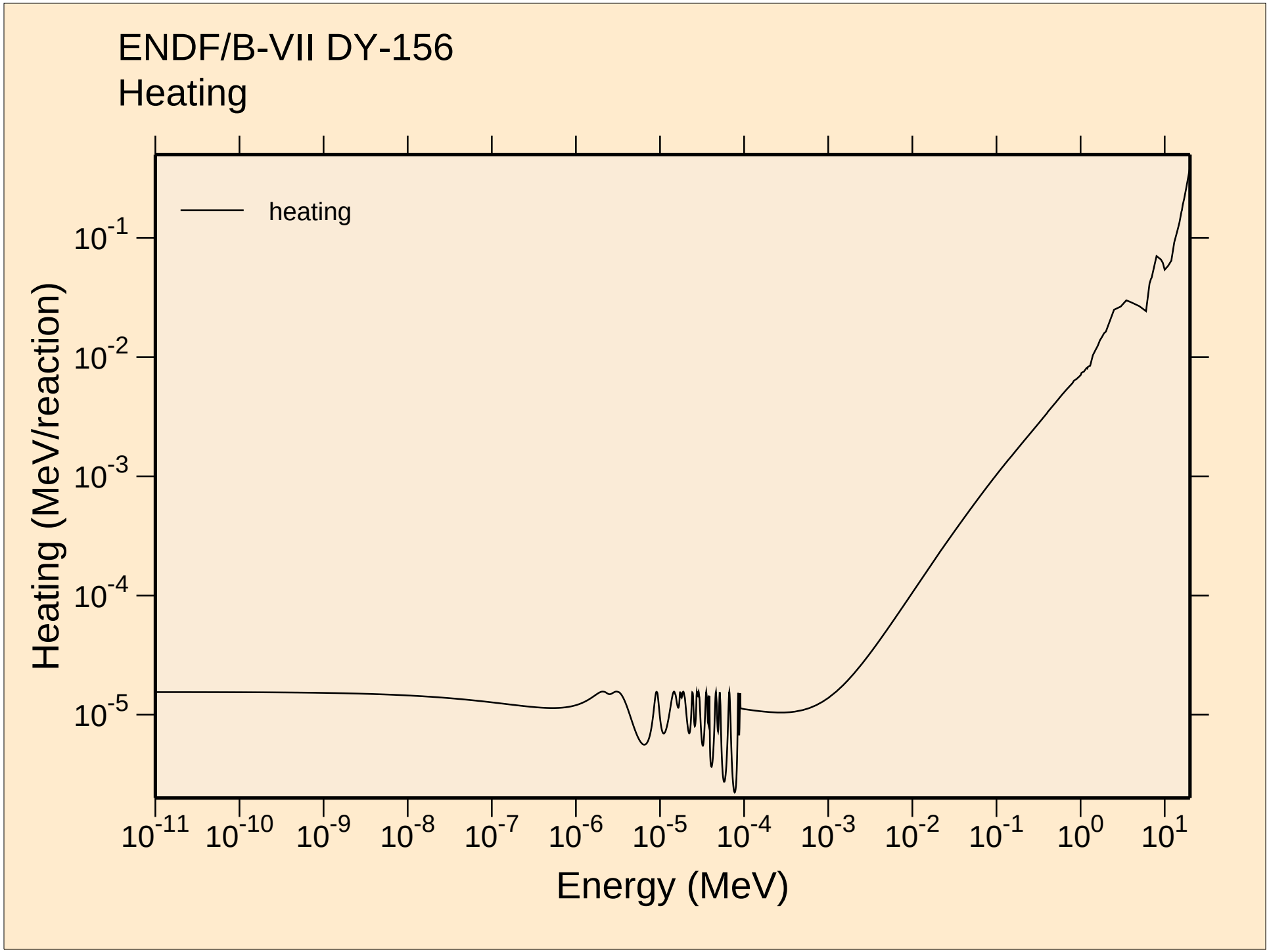
ENDF/B-VII DY-156
UR total cross section

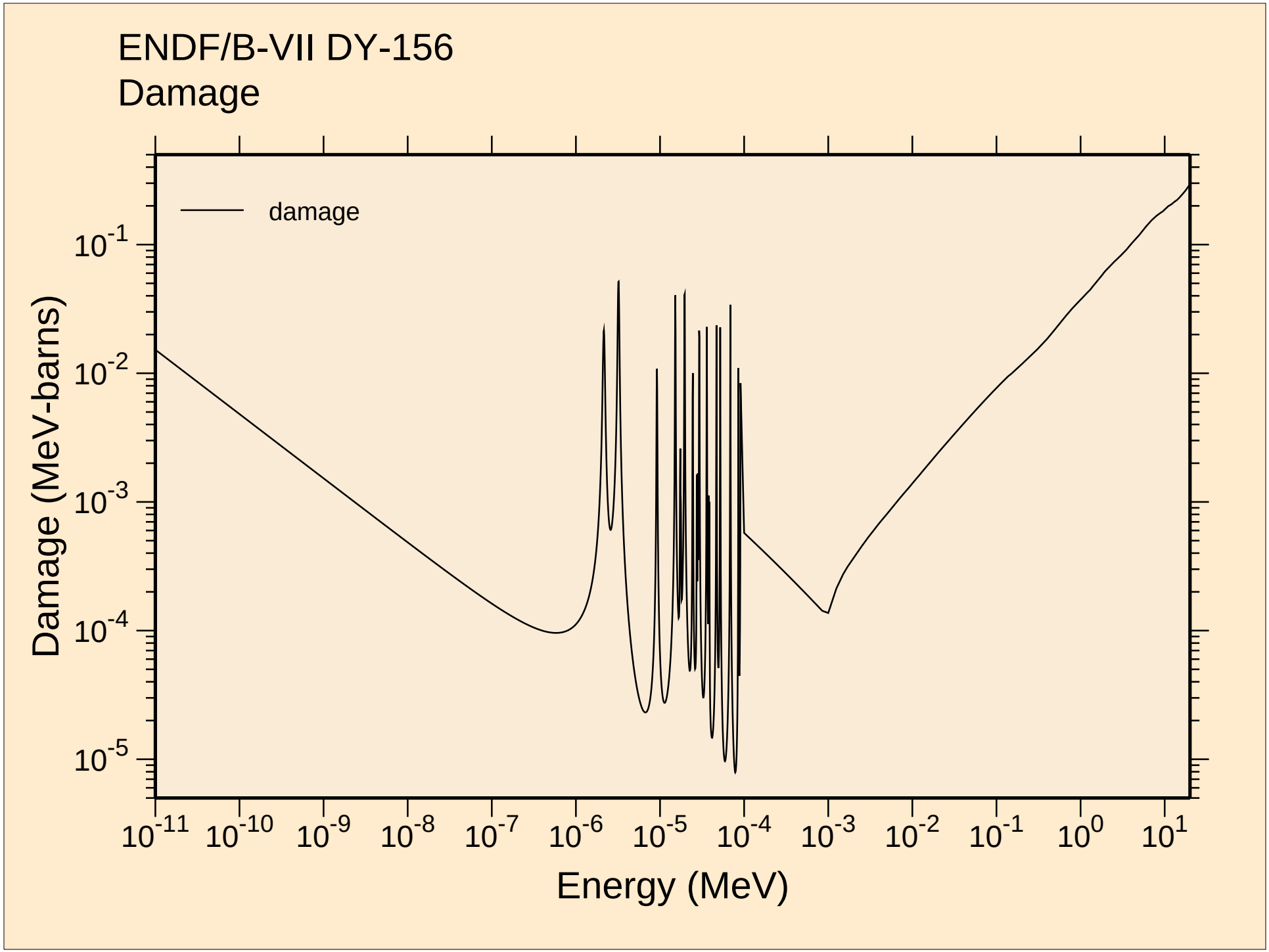


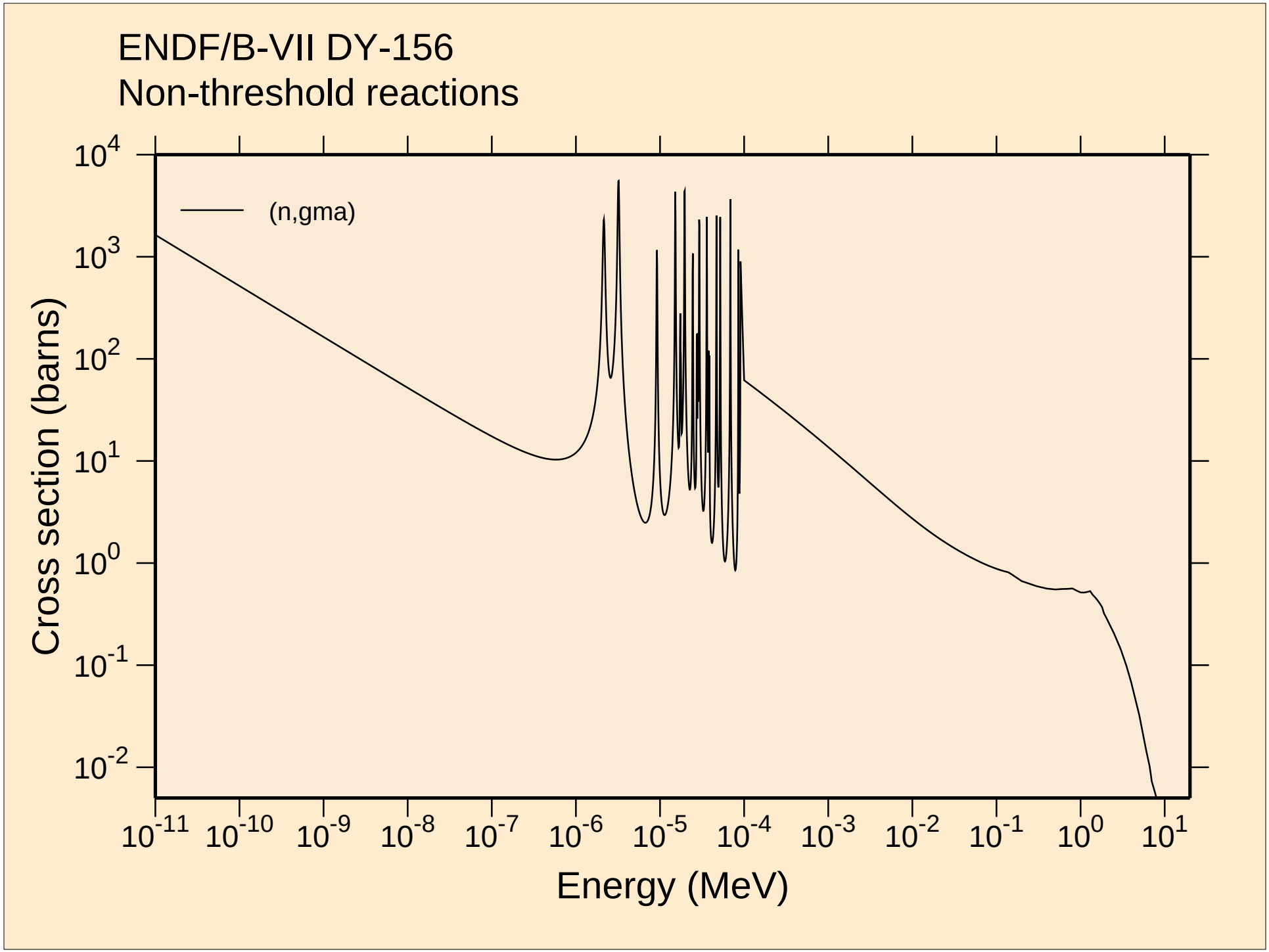
ENDF/B-VII DY-156
UR elastic cross section

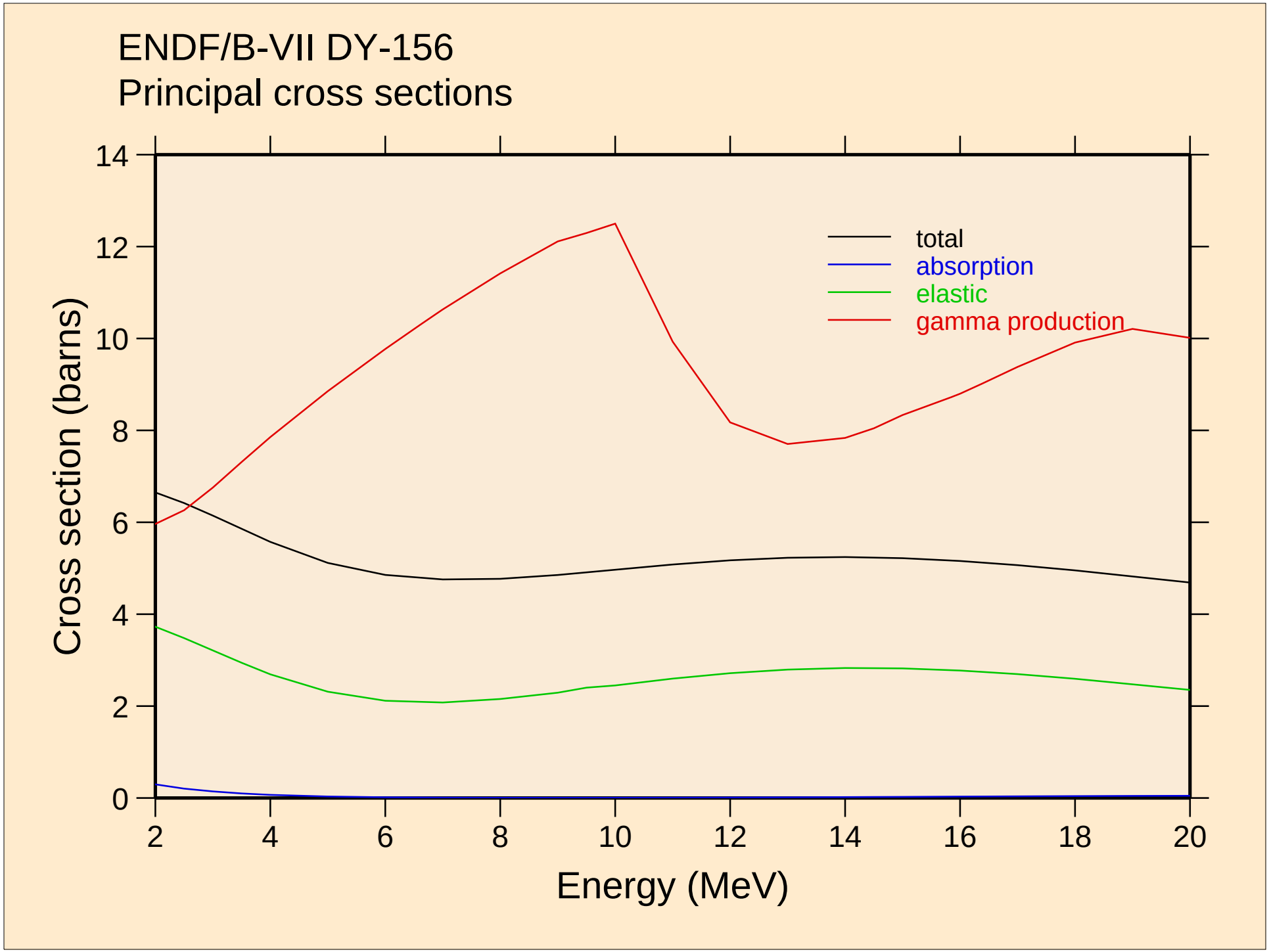


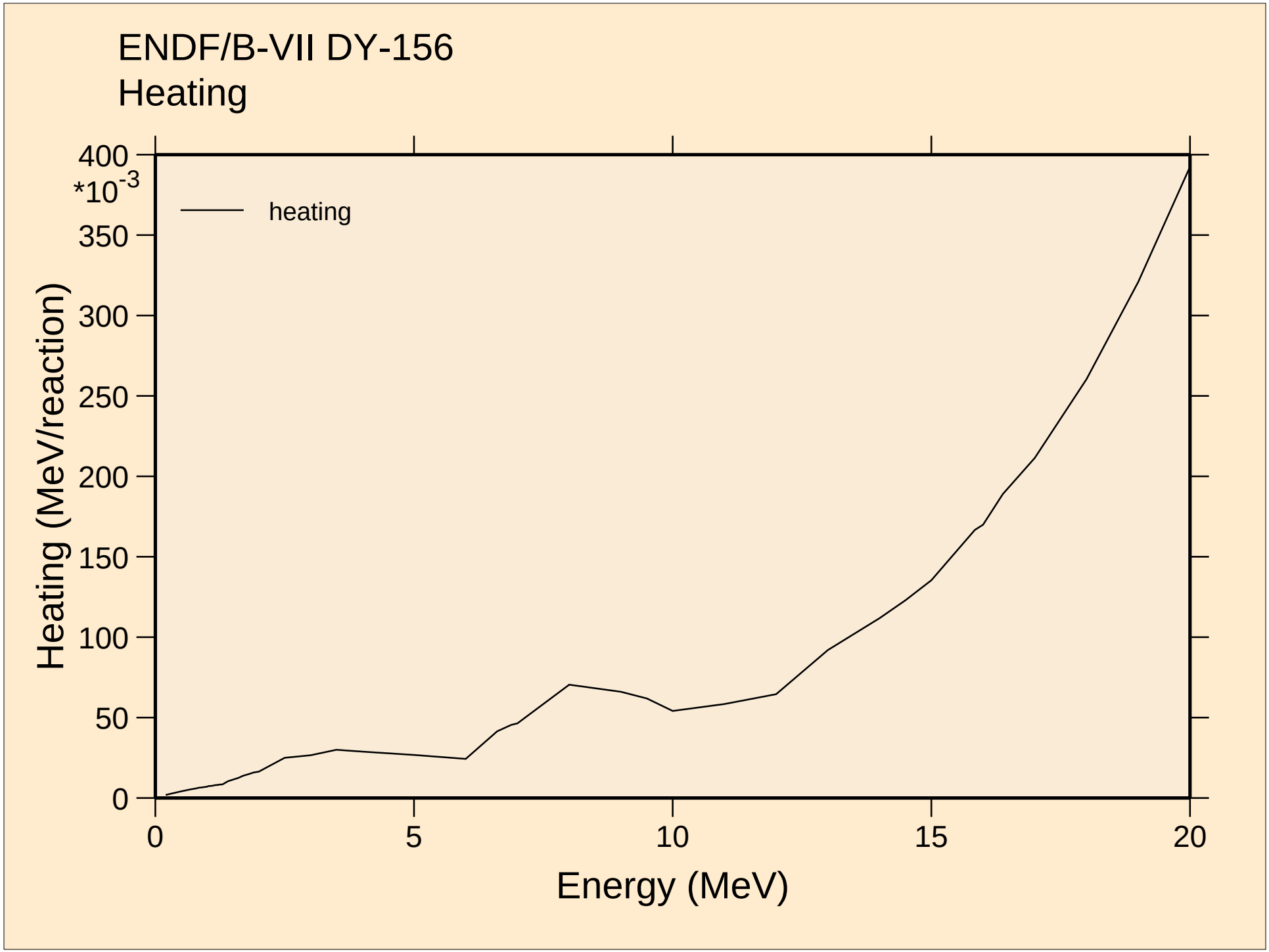

ENDF/B-VII DY-156
UR capture cross section
Inf. Dil.
100 b
Cross section (barns)
10^2
10^1
10^0
10^{-4}
10^{-3}
10^{-2}
10^{-1}
Energy (MeV)

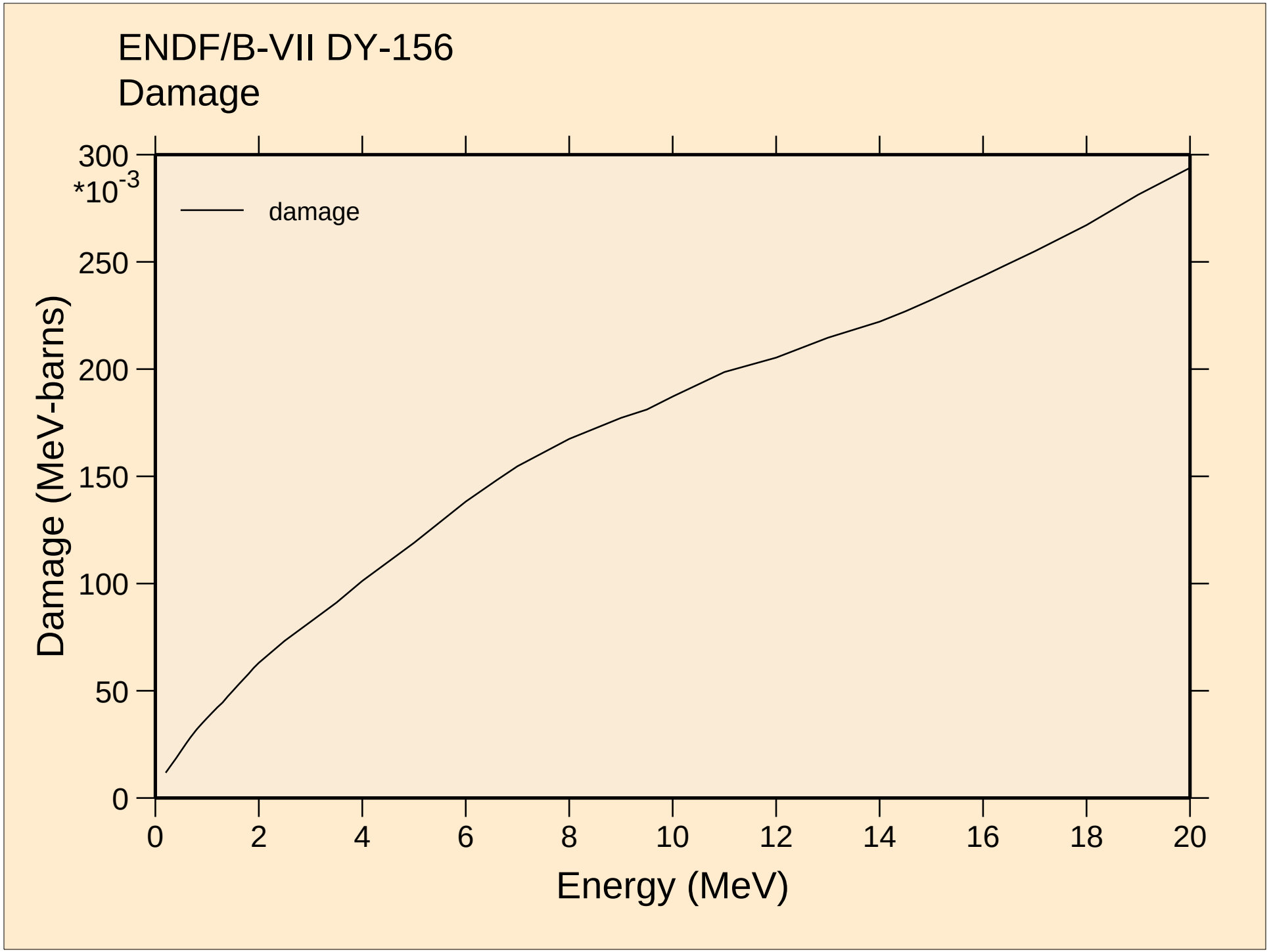

ENDF/B-VII DY-156
Heating
heating
Heating (MeV/reaction)
10-1
10-2
10-3
10-4
10-5
10-11 10-10 10-9 10-8 10-7 10-6 10-5 10-4 10-3 10-2 10-1 100 101
Energy (MeV)

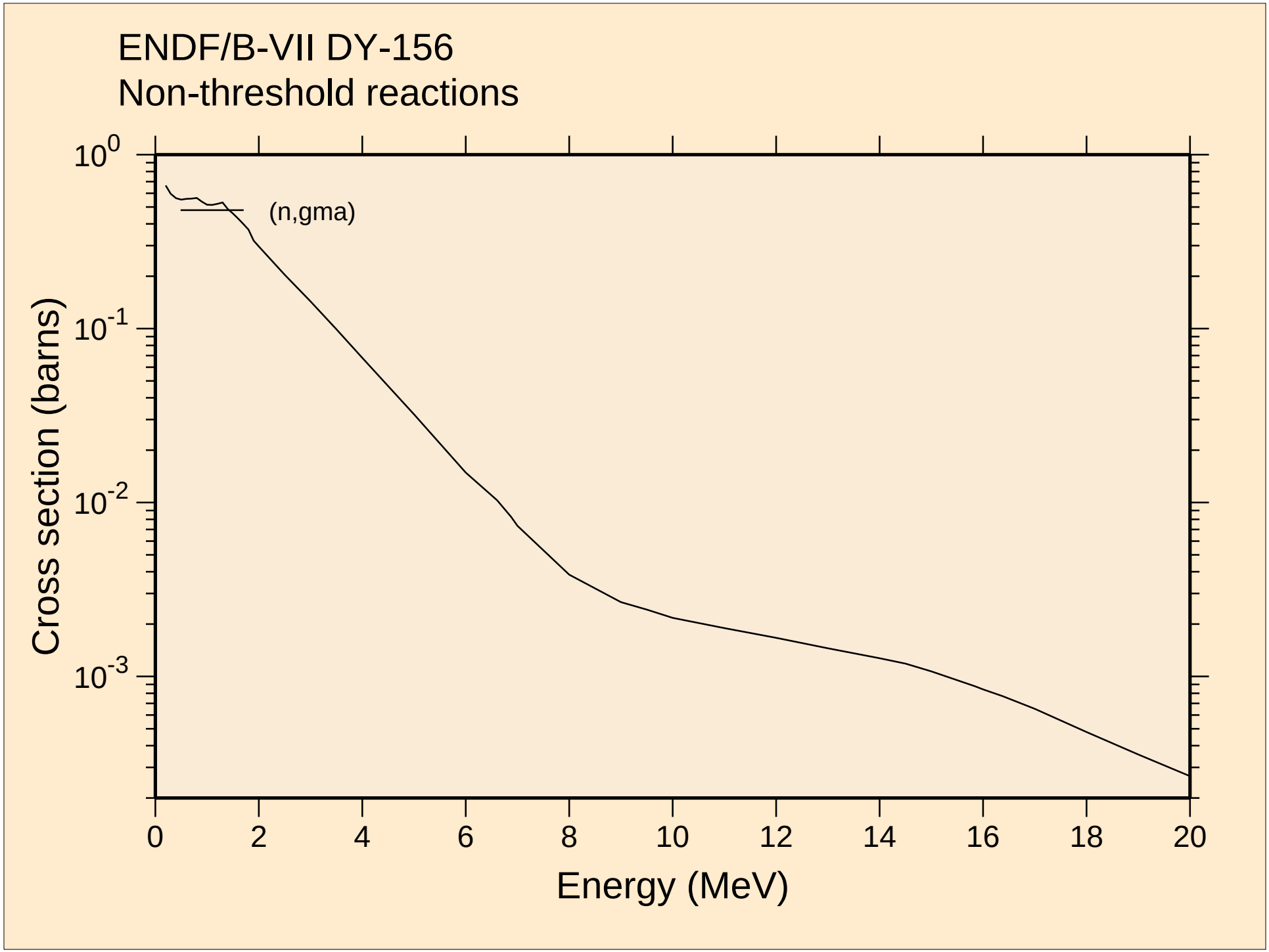

ENDF/B-VII DY-156
Damage
damage
Damage (MeV-barns)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-11} 10^{-10} 10^{-9} 10^{-8} 10^{-7} 10^{-6} 10^{-5} 10^{-4} 10^{-3} 10^{-2} 10^{-1} 10^{0} 10^{1}
Energy (MeV)

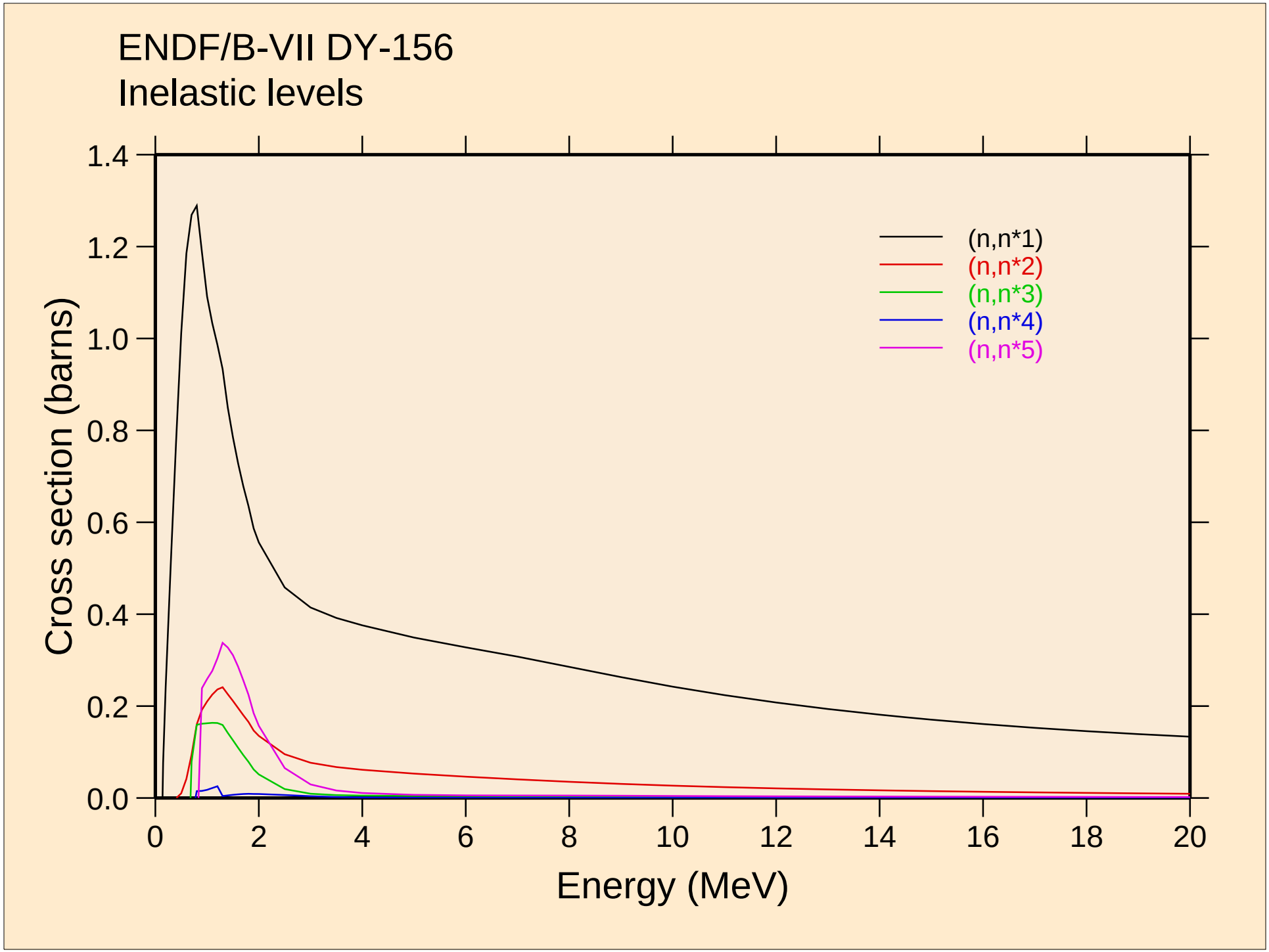

ENDF/B-VII DY-156
Non-threshold reactions
(n,gma)
Cross section (barns)
Energy (MeV)
10^4
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

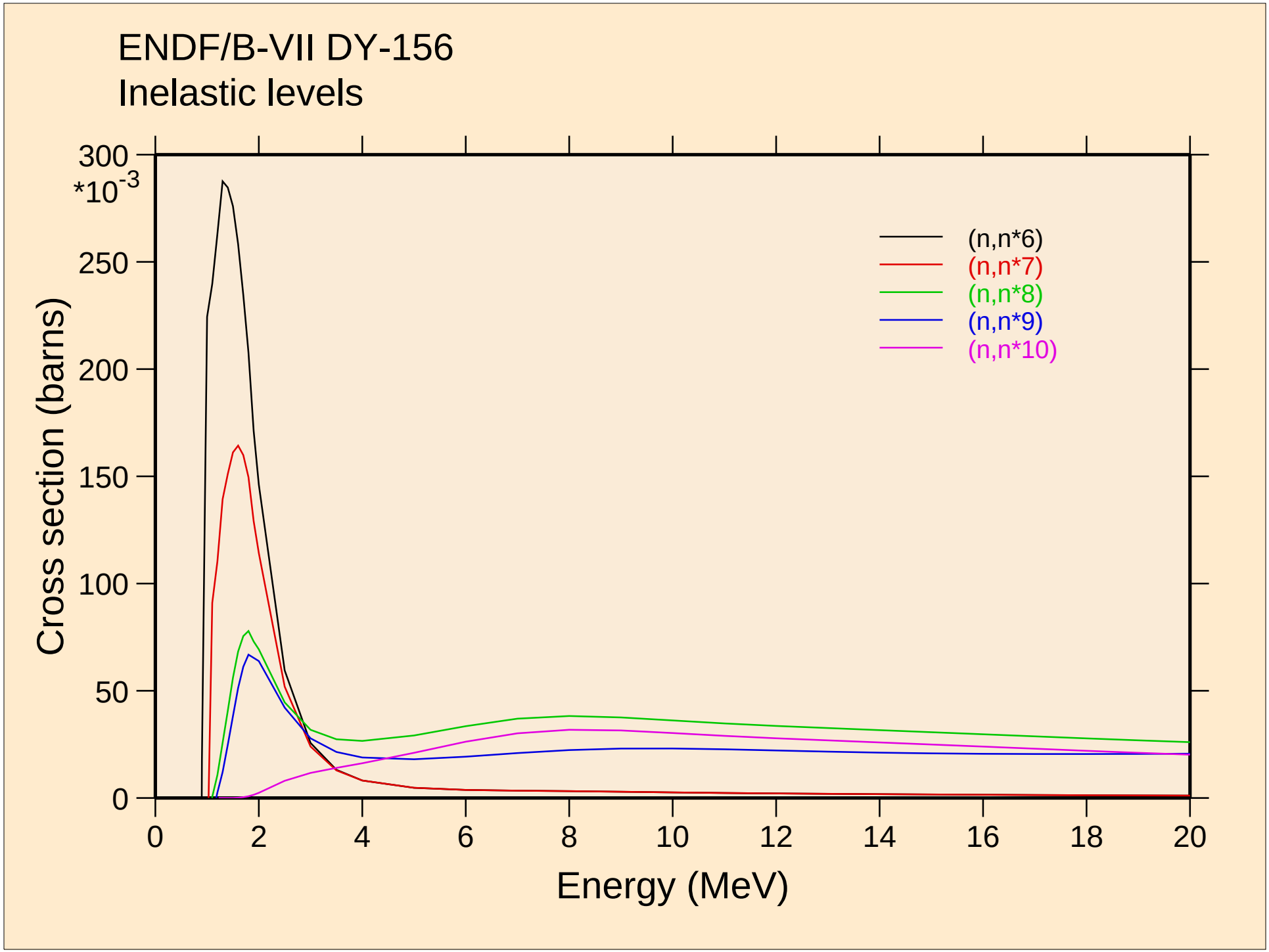

ENDF/B-VII DY-156
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
0
2
4
6
8
10
12
14
2
4
6
8
10
12
14
16
18
20

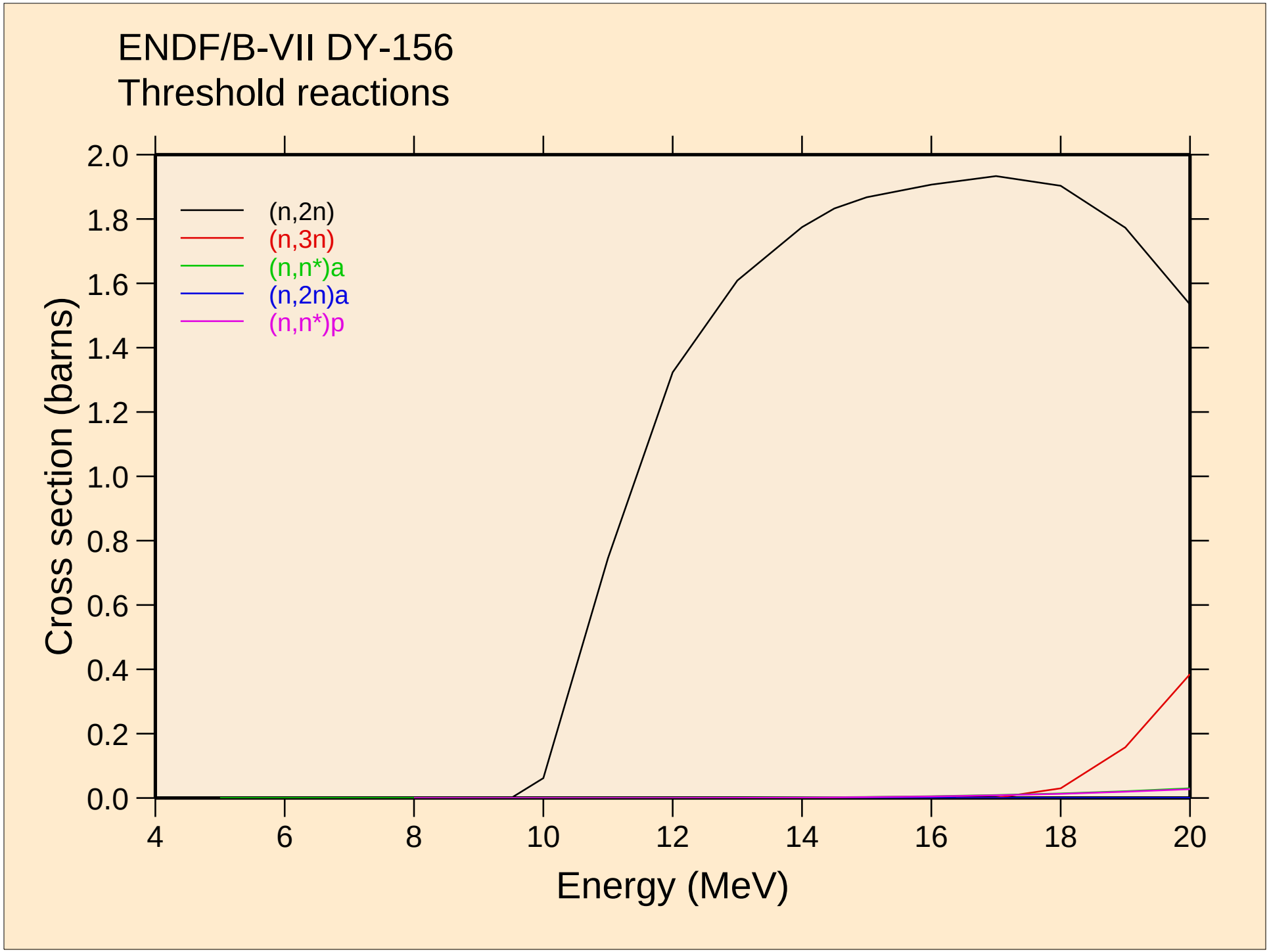

ENDF/B-VII DY-156
Heating
400
*10-3
350
300
250
200
150
100
50
0
heating
Heating (MeV/reaction)
0
5
10
15
20
Energy (MeV)

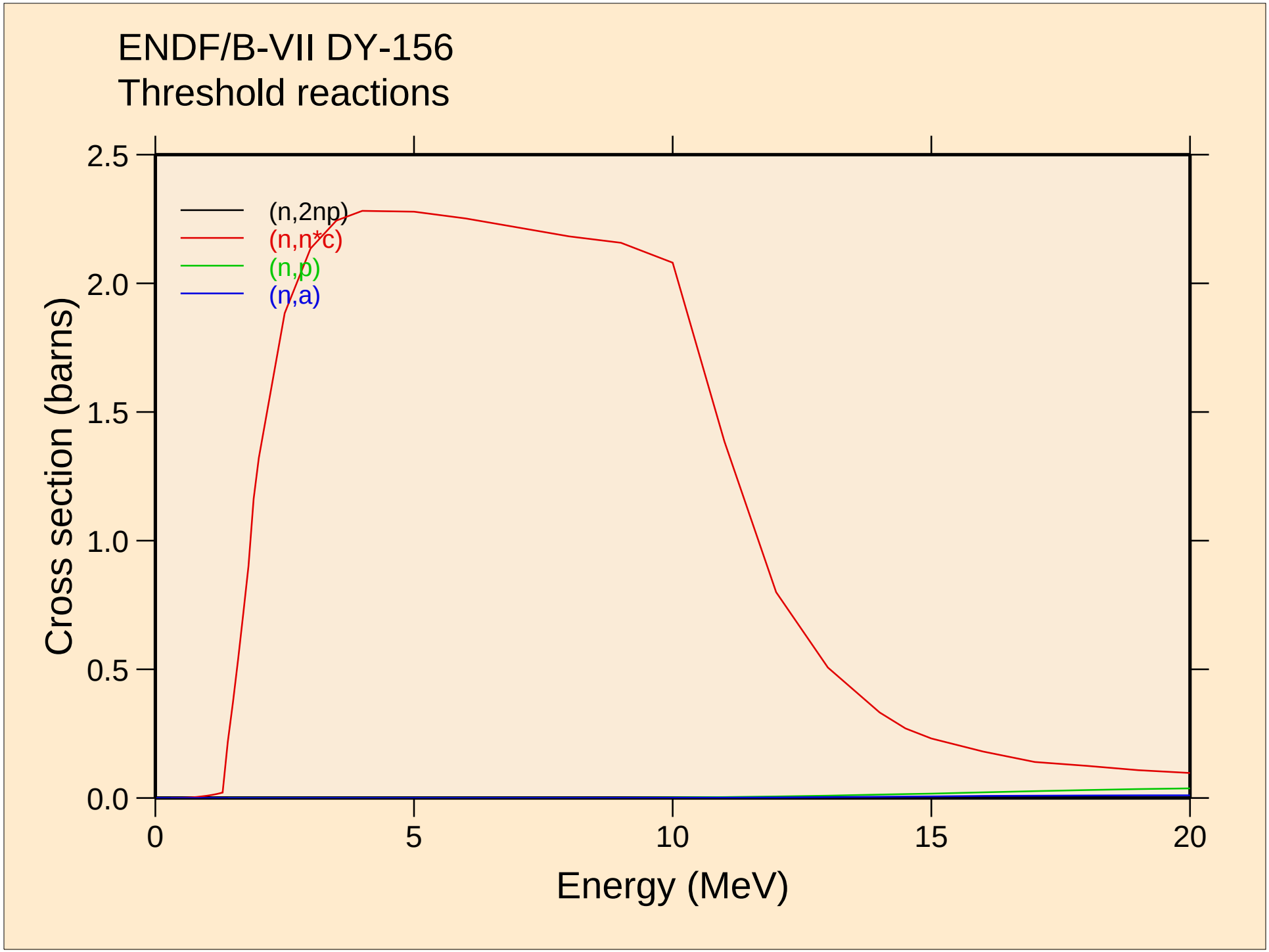

ENDF/B-VII DY-156
Damage
300
*10-3
250
200
150
100
50
0
damage
Damage (MeV-barns)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

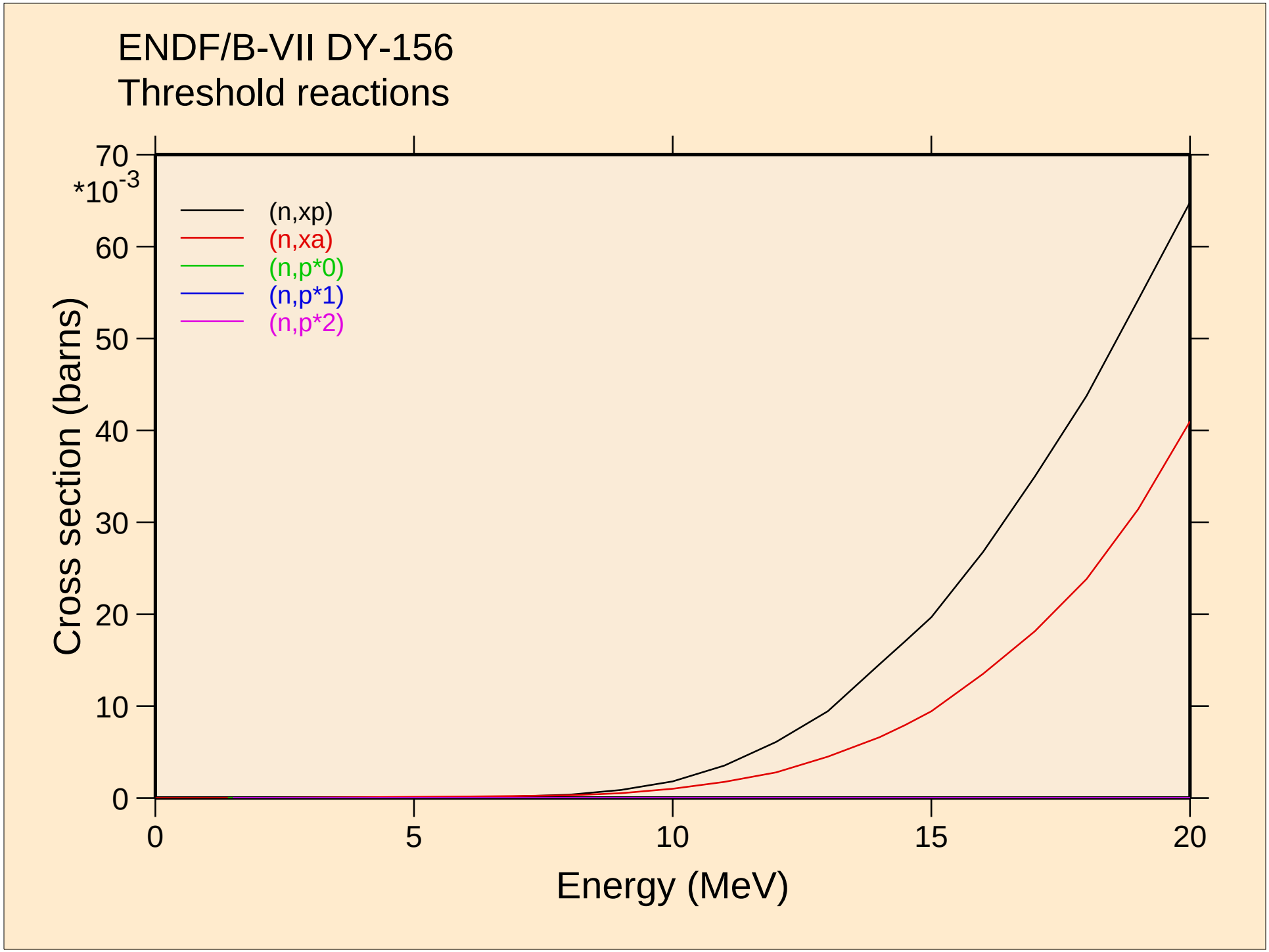

ENDF/B-VII DY-156
Non-threshold reactions
(n,gma)
Cross section (barns)
10^0
10^-1
10^-2
10^-3
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

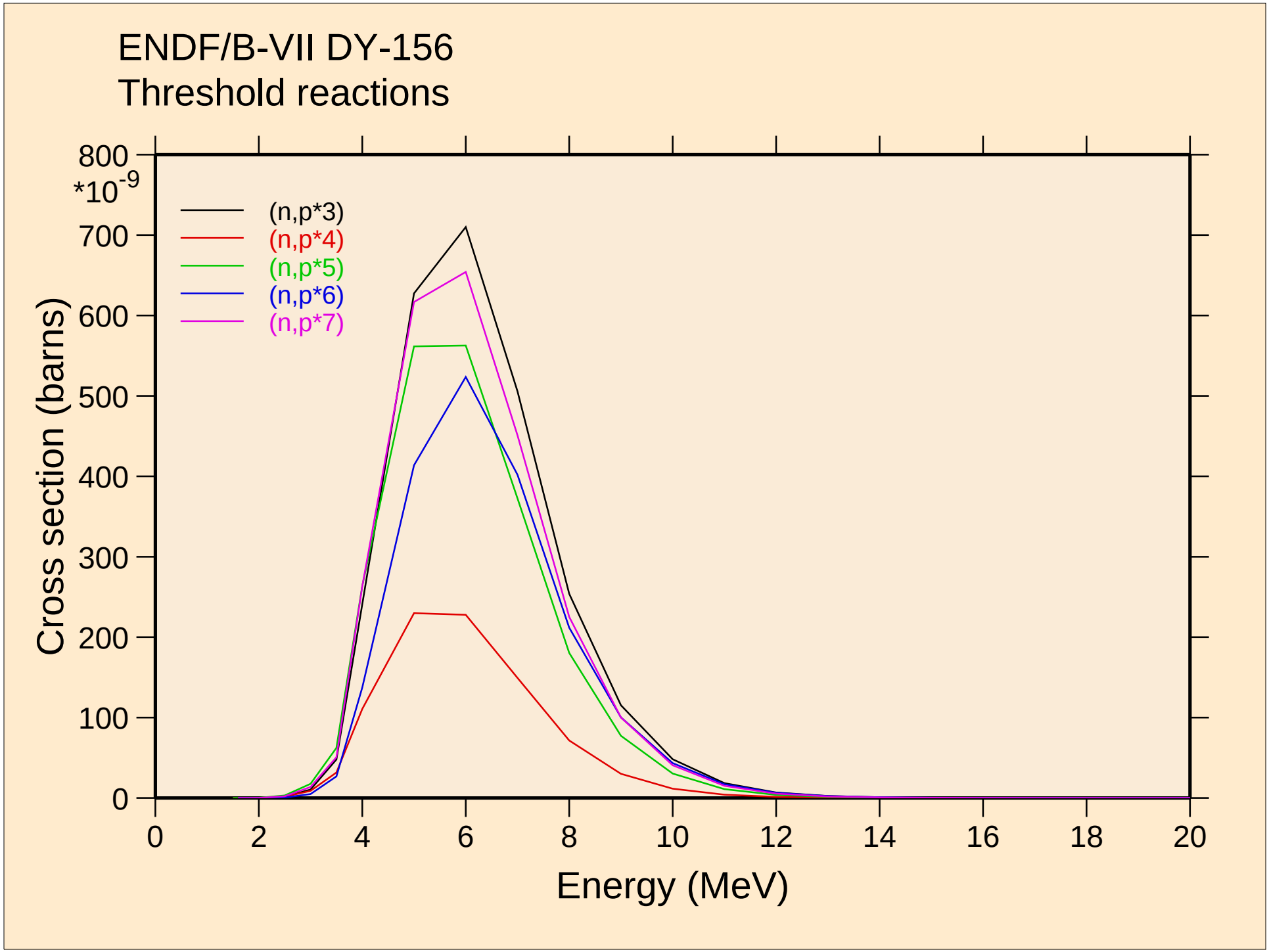

ENDF/B-VII DY-156
Inelastic levels
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
2
4
6
8
10
12
14
16
18
20
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

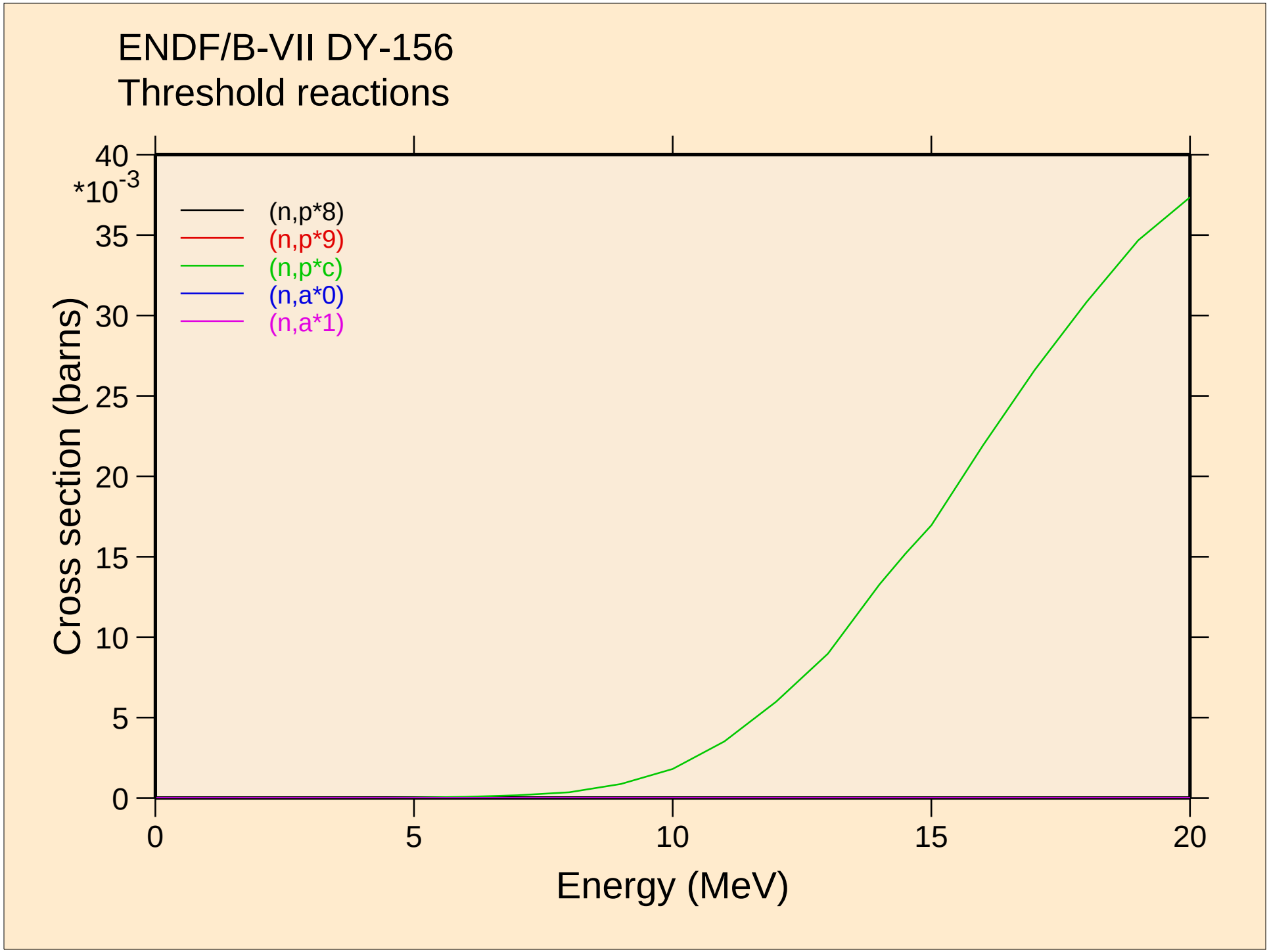

ENDF/B-VII DY-156
Inelastic levels
Cross section (barns)
*10-3
300
250
200
150
100
50
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

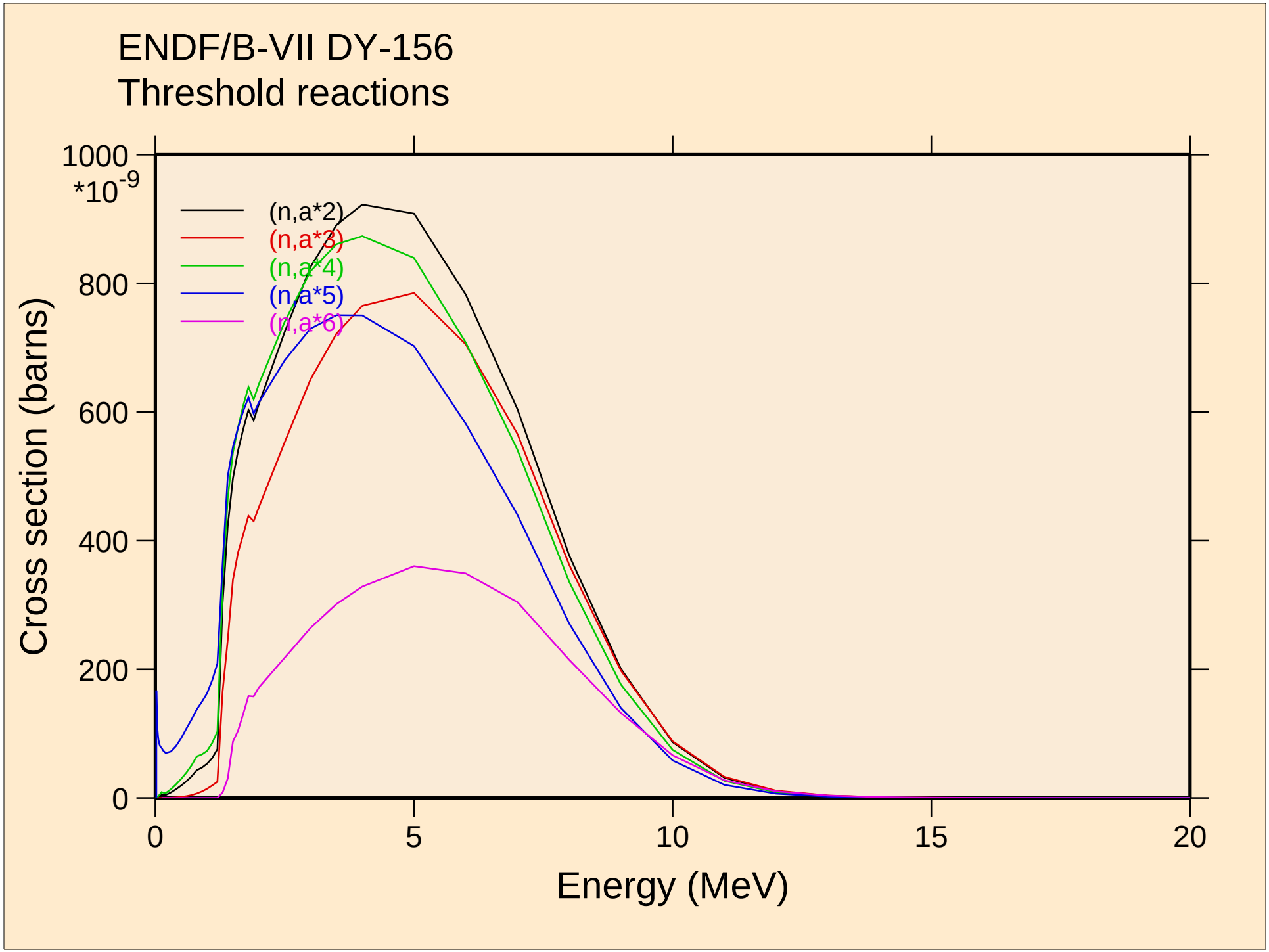

ENDF/B-VII DY-156
Threshold reactions
(n,2n)
(n,3n)
(n,n*)a
(n,2n)a
(n,n*)p
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
4
6
8
10
12
14
16
18
20

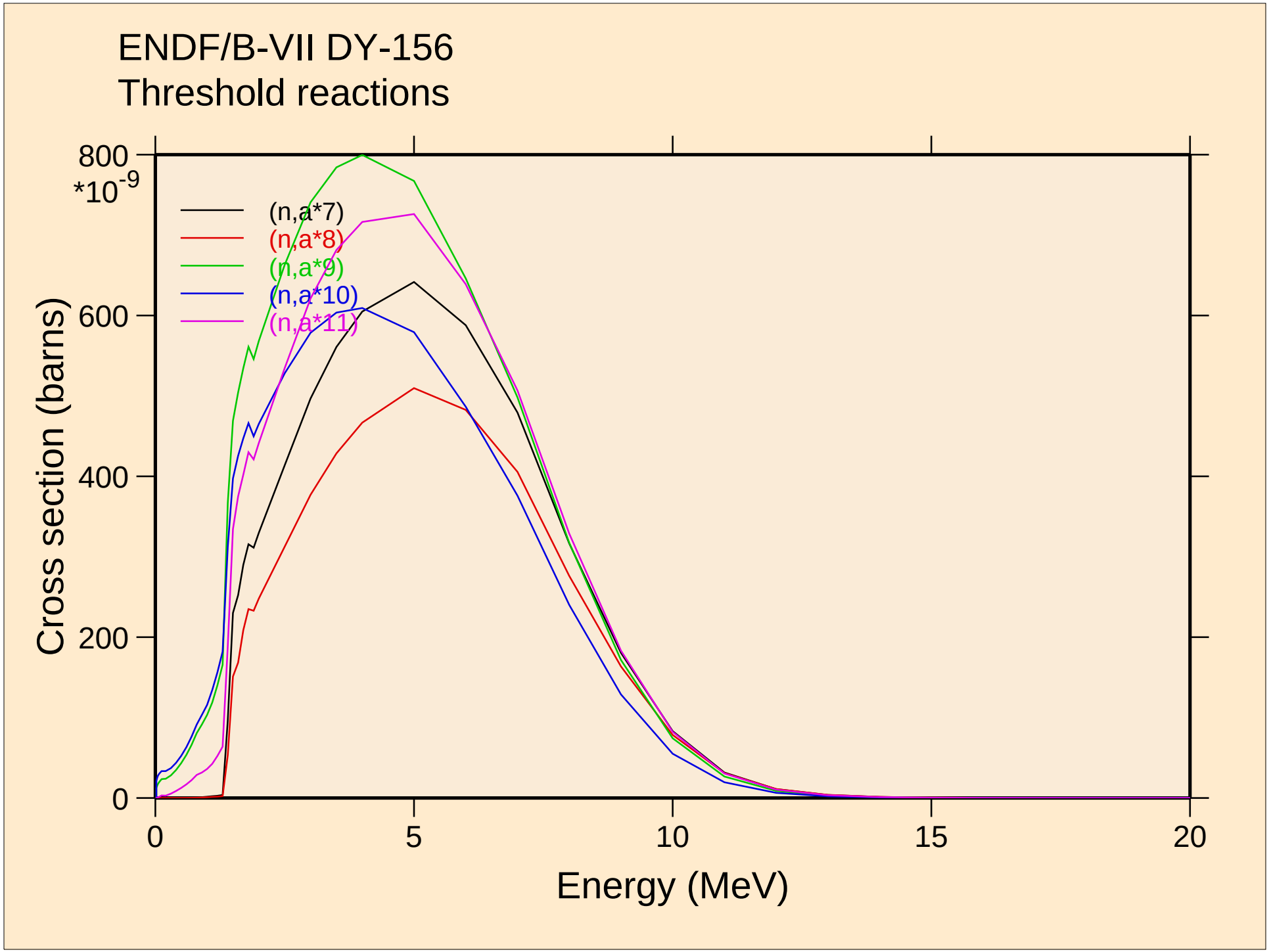

ENDF/B-VII DY-156
Threshold reactions
(n,2np)
(n,n*c)
(n,p)
(n,a)
Cross section (barns)
2.5
2.0
1.5
1.0
0.5
0.0
0
5
10
15
20
Energy (MeV)

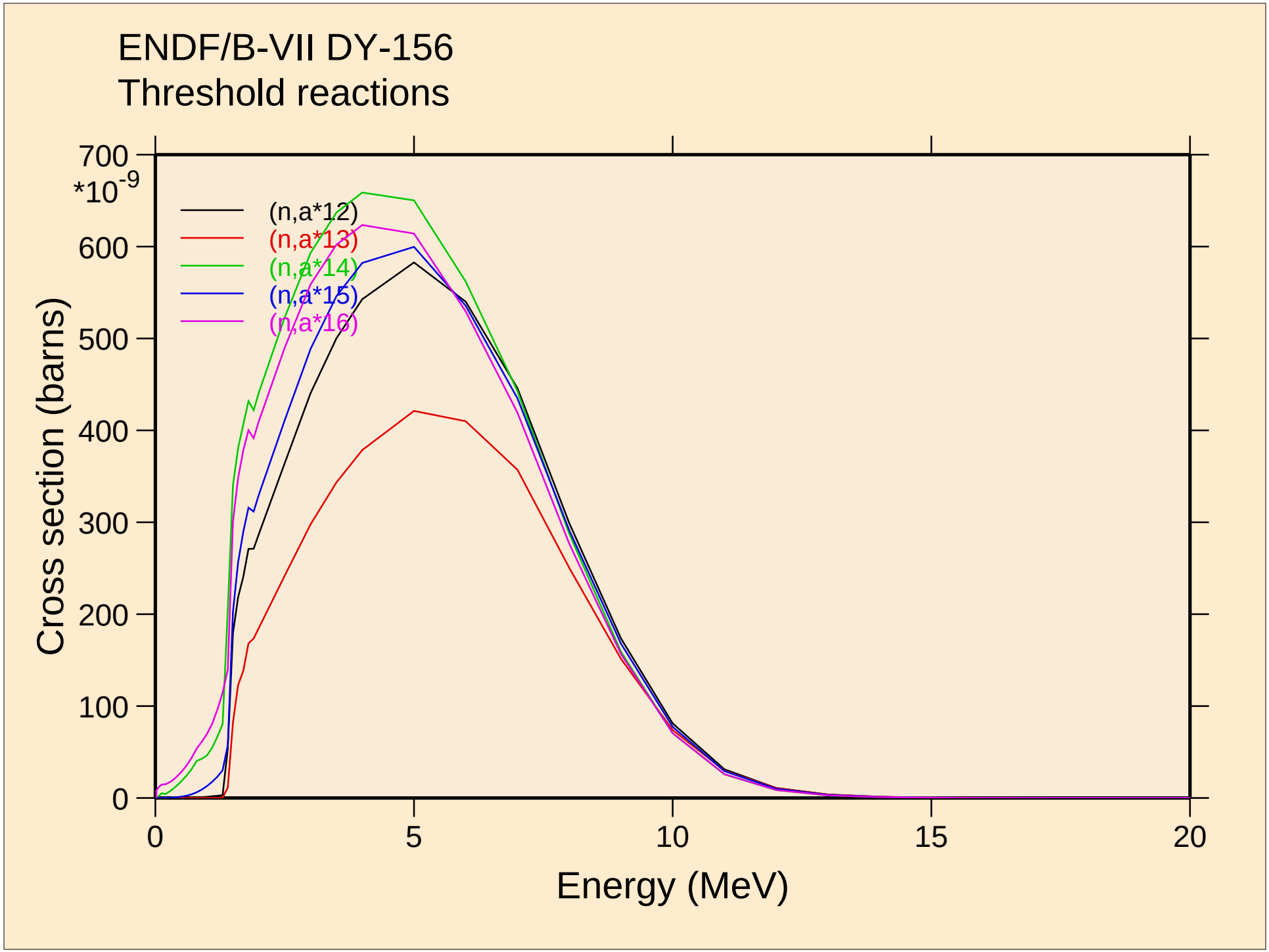

ENDF/B-VII DY-156
Threshold reactions
70
*10-3
60
50
40
30
20
10
0
Cross section (barns)
(n,xp)
(n,xa)
(n,p*0)
(n,p*1)
(n,p*2)
0
5
10
15
20
Energy (MeV)

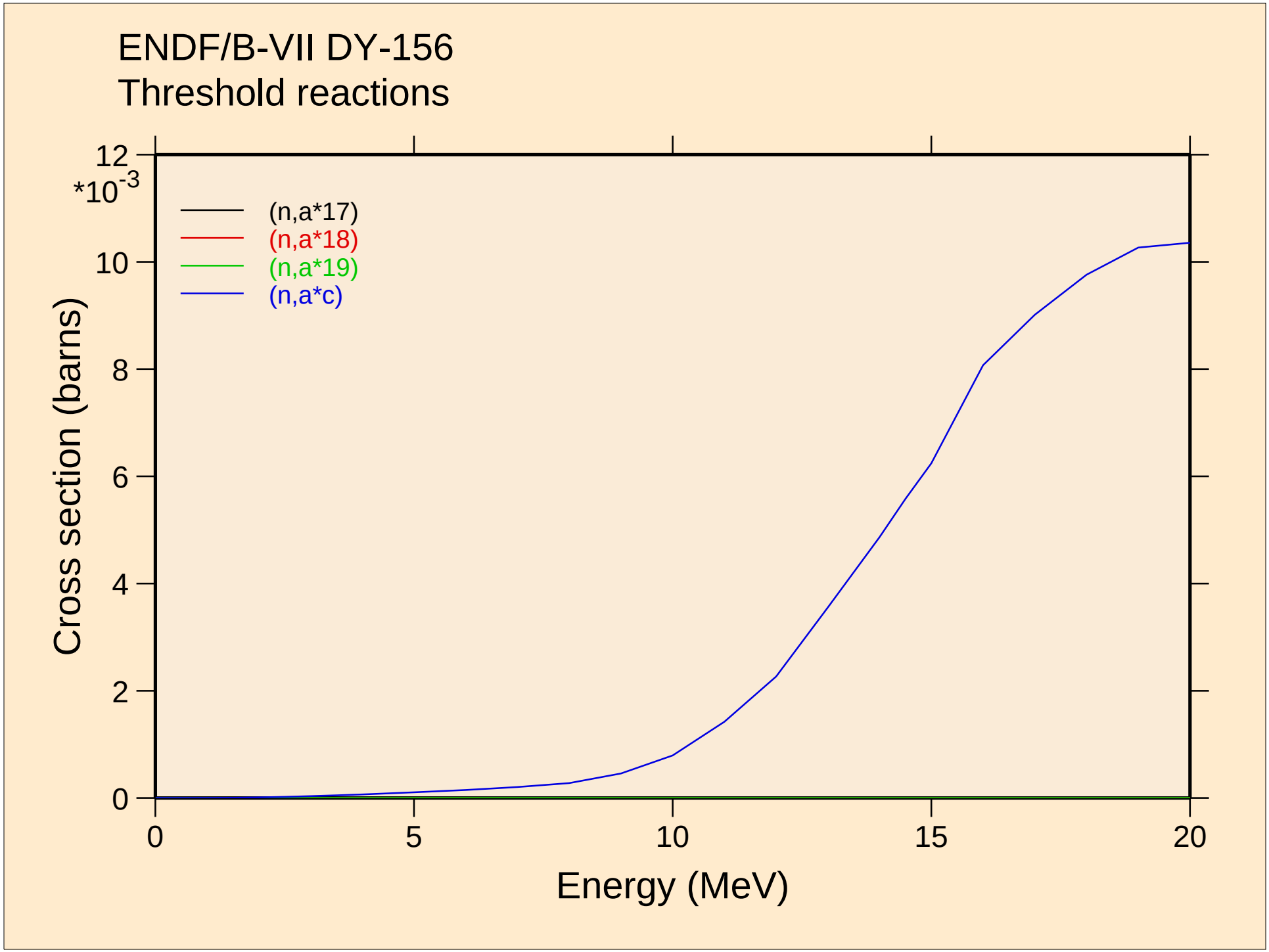

ENDF/B-VII DY-156
Threshold reactions
800
*10-9
700
600
500
400
300
200
100
0
Cross section (barns)
(n,p*3)
(n,p*4)
(n,p*5)
(n,p*6)
(n,p*7)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

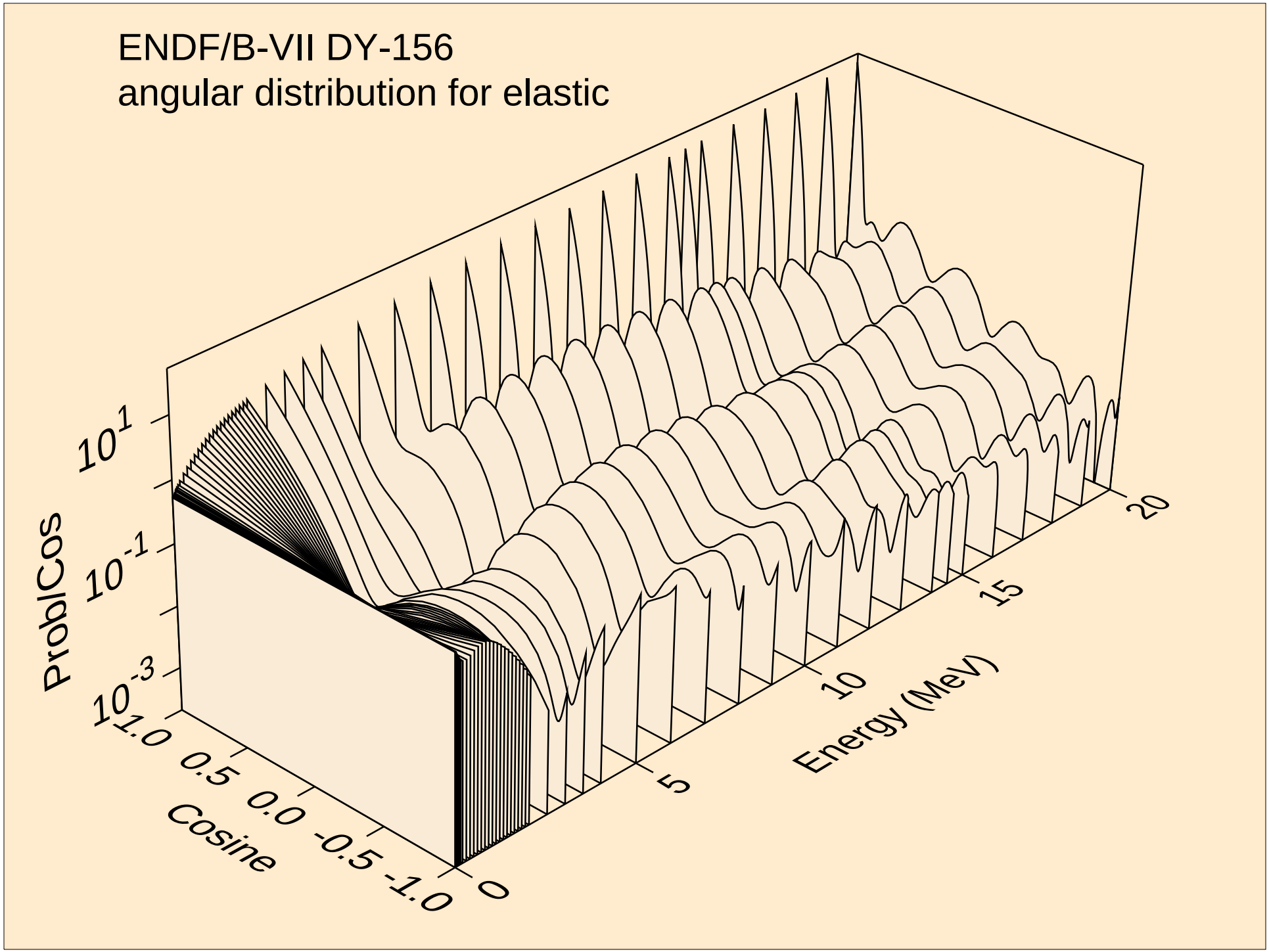

ENDF/B-VII DY-156
Threshold reactions
Cross section (barns)
*10-3
40
35
30
25
20
15
10
5
0
0
5
10
15
20
Energy (MeV)
(n,p*8)
(n,p*9)
(n,p*c)
(n,a*0)
(n,a*1)

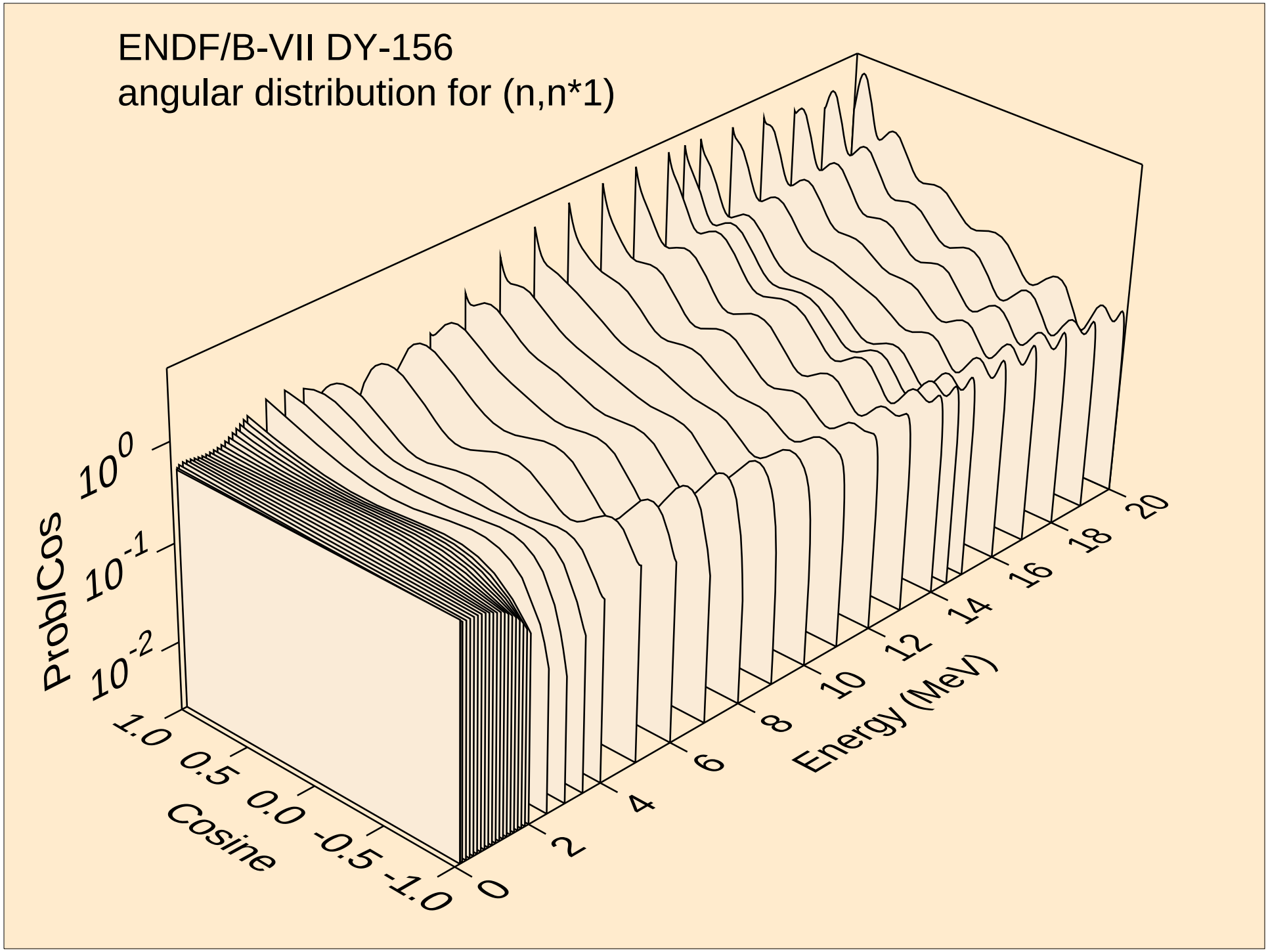

ENDF/B-VII DY-156
Threshold reactions
1000
*10-9
800
600
400
200
0
Cross section (barns)
(n,a*2)
(n,a*3)
(n,a*4)
(n,a*5)
(n,a*6)
0
5
10
15
20
Energy (MeV)

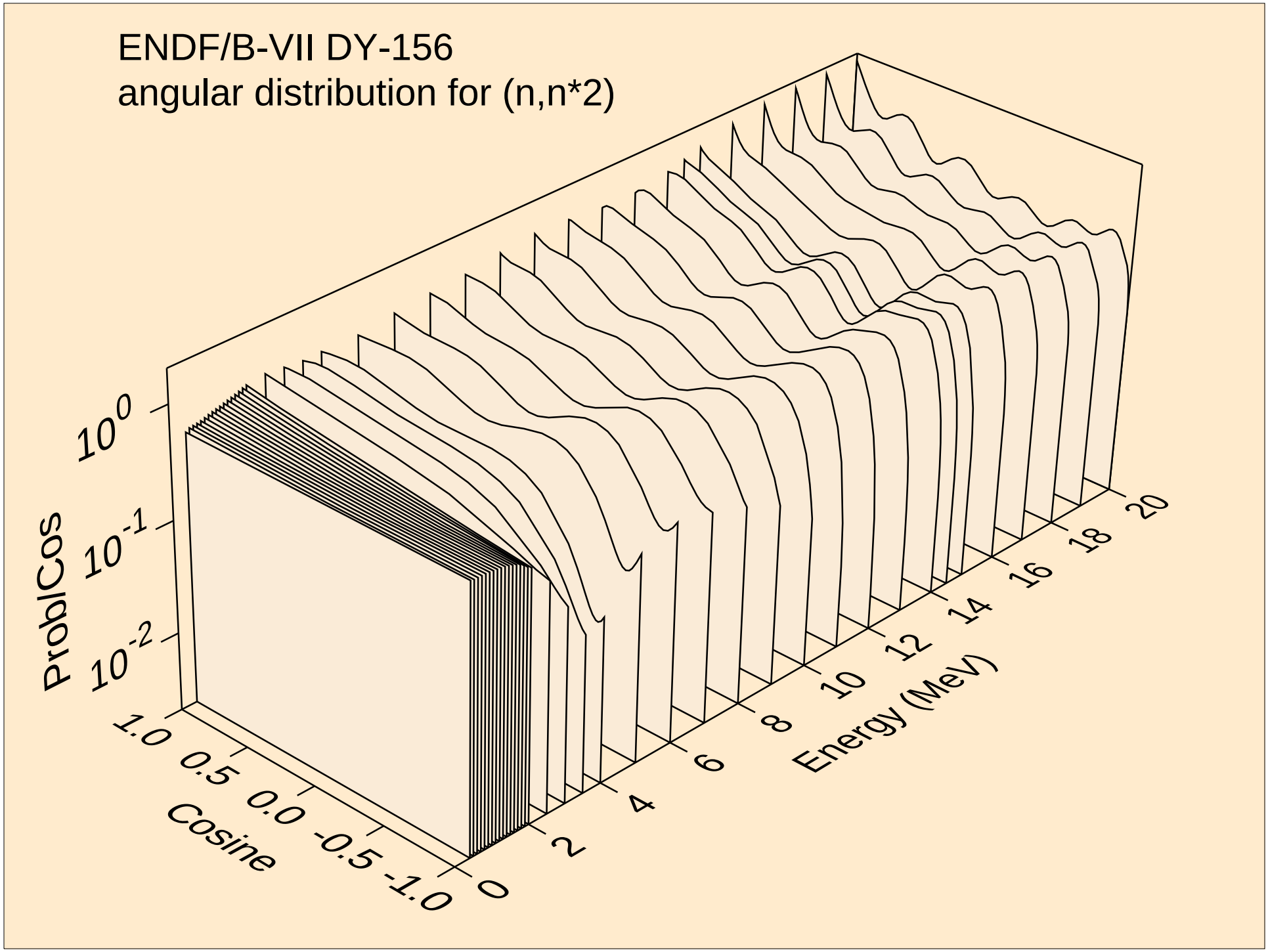

ENDF/B-VII DY-156
Threshold reactions
800
*10-9
600
400
200
0
Cross section (barns)
(n,a*7)
(n,a*8)
(n,a*9)
(n,a*10)
(n,a*11)
0
5
10
15
20
Energy (MeV)

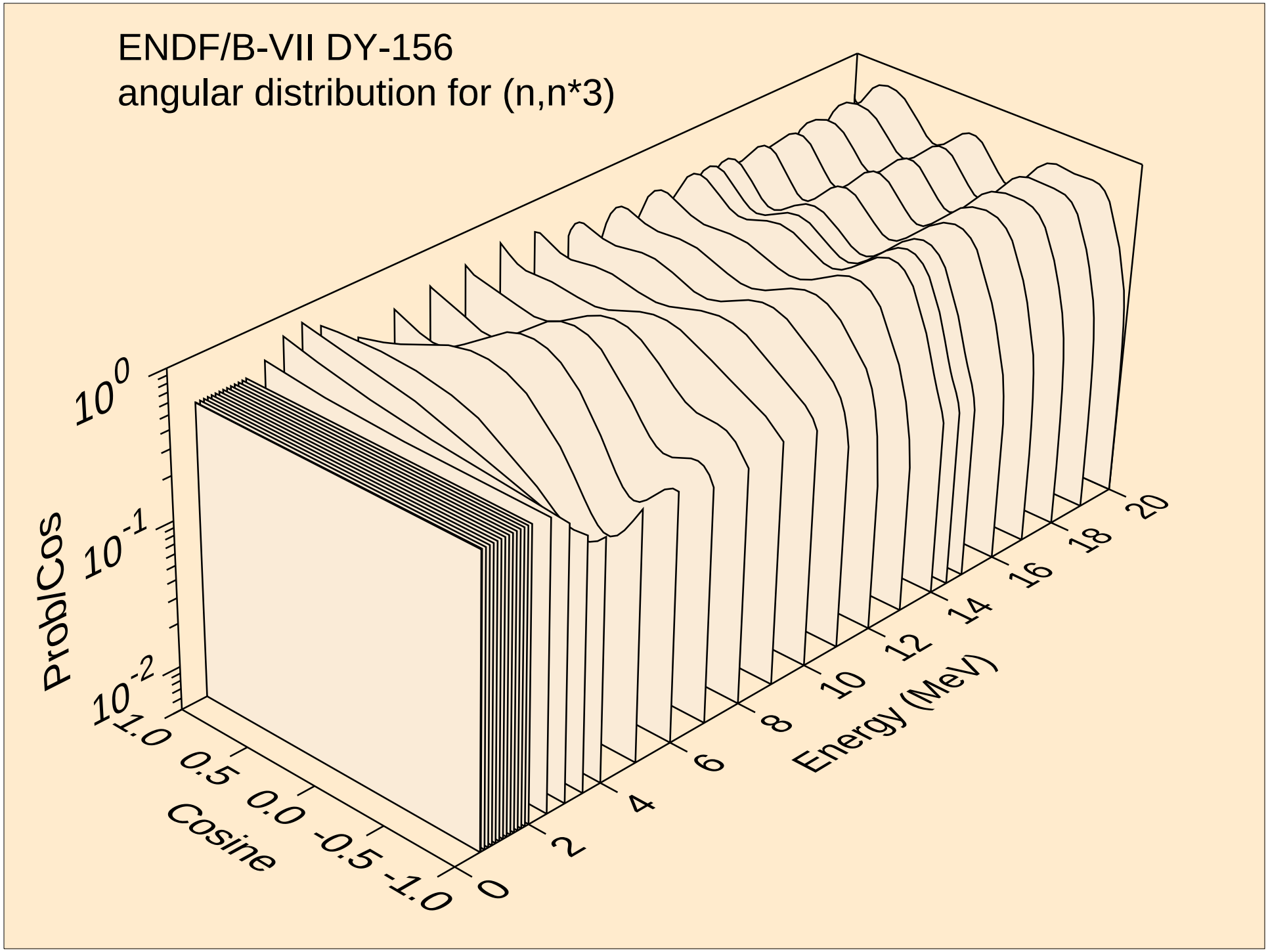

ENDF/B-VII DY-156
Threshold reactions
700
*10-9
600
500
400
300
200
100
0
Cross section (barns)
(n,a*12)
(n,a*13)
(n,a*14)
(n,a*15)
(n,a*16)
0
5
10
15
20
Energy (MeV)

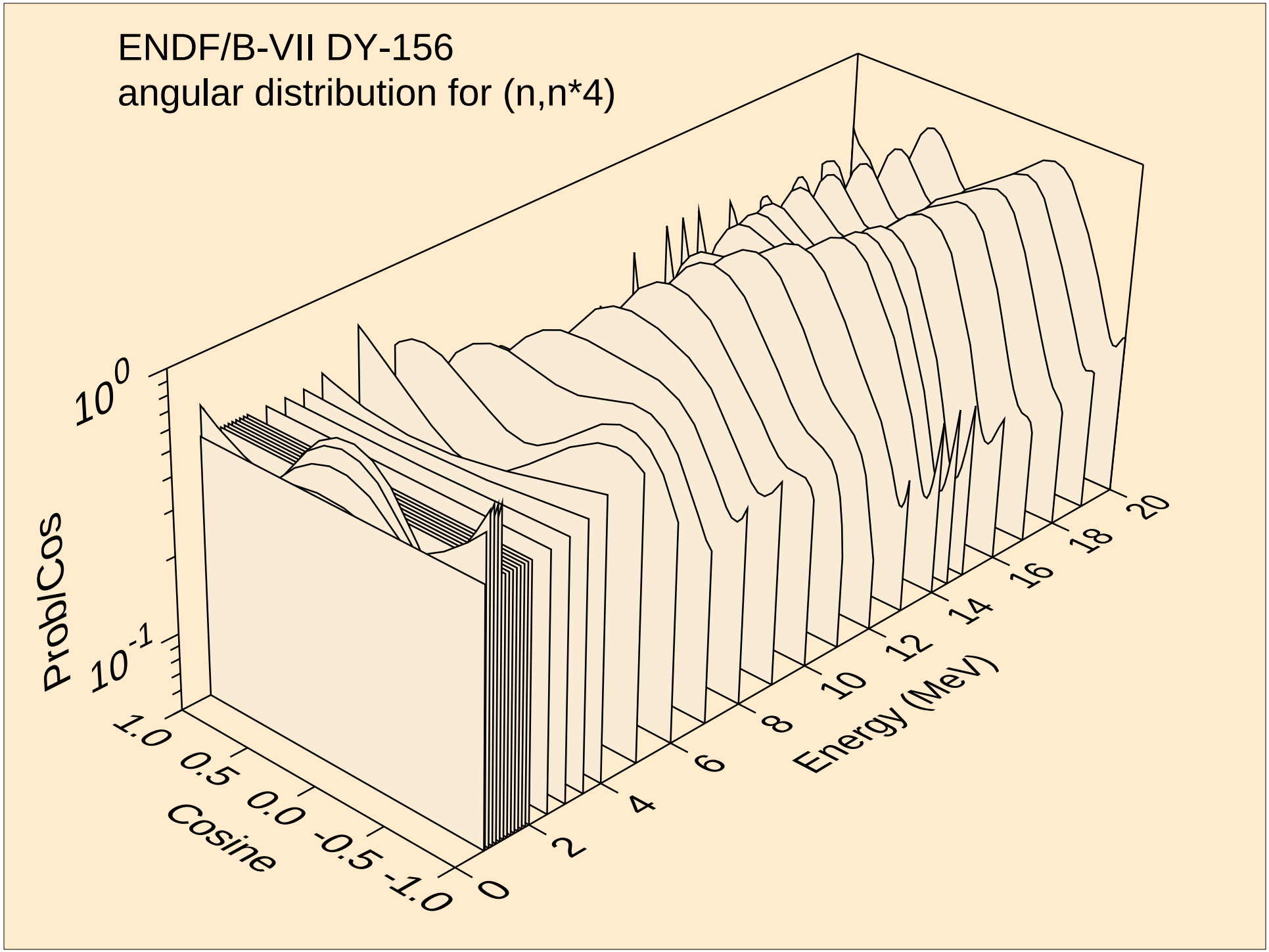

ENDF/B-VII DY-156
Threshold reactions
12
*10-3
10
8
6
4
2
0
Cross section (barns)
(n,a*17)
(n,a*18)
(n,a*19)
(n,a*c)
0
5
10
15
20
Energy (MeV)

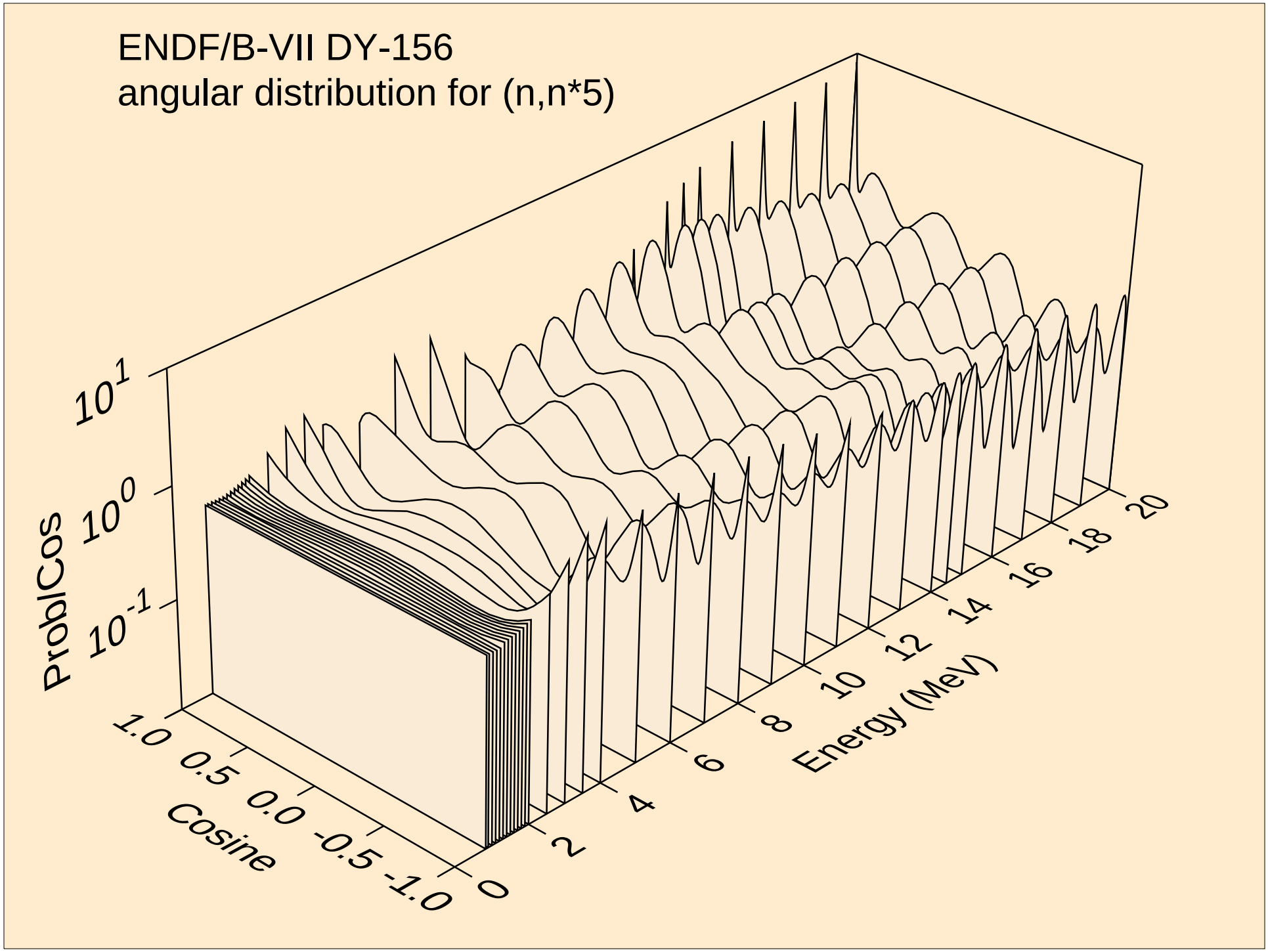

ENDF/B-VII DY-156
angular distribution for elastic
ProbICos
10^{1}
10^{-1}
10^{-3}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

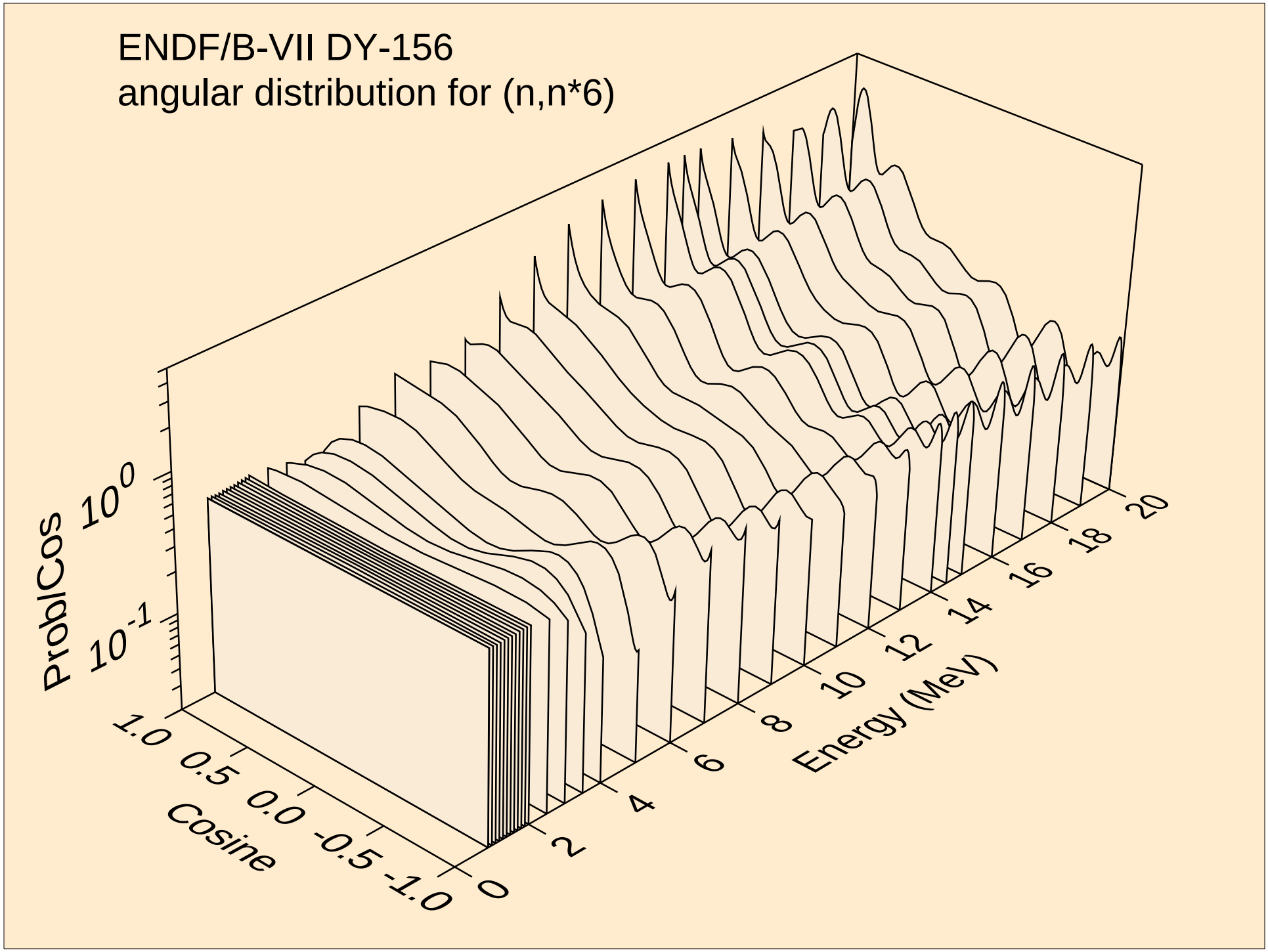

ENDF/B-VII DY-156
angular distribution for (n,n*1)
Prob\Cos
10^{0}
10^{-1}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

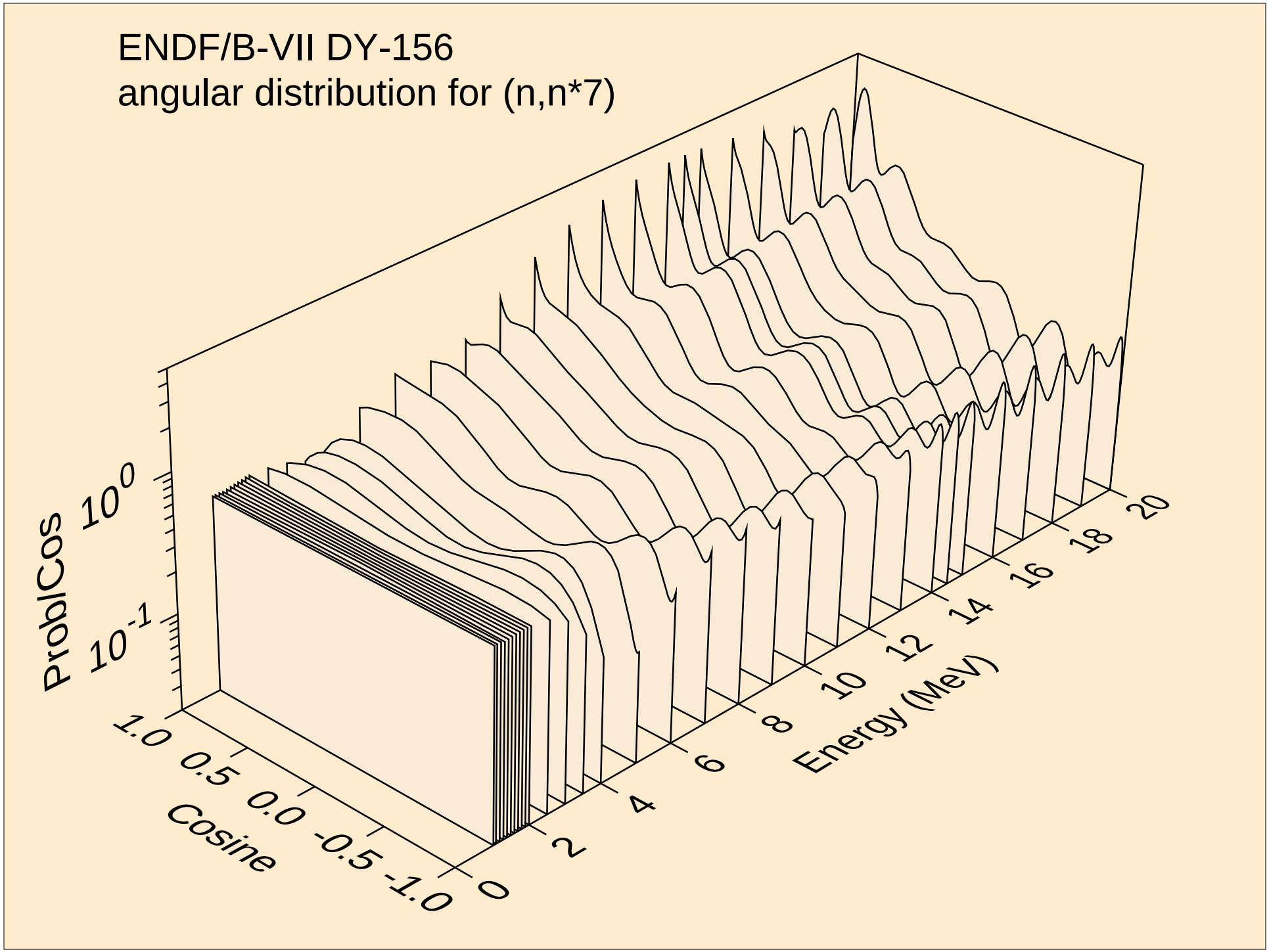

ENDF/B-VII DY-156
angular distribution for (n,n*2)
ProbCos
10^{0}
10^{-1}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

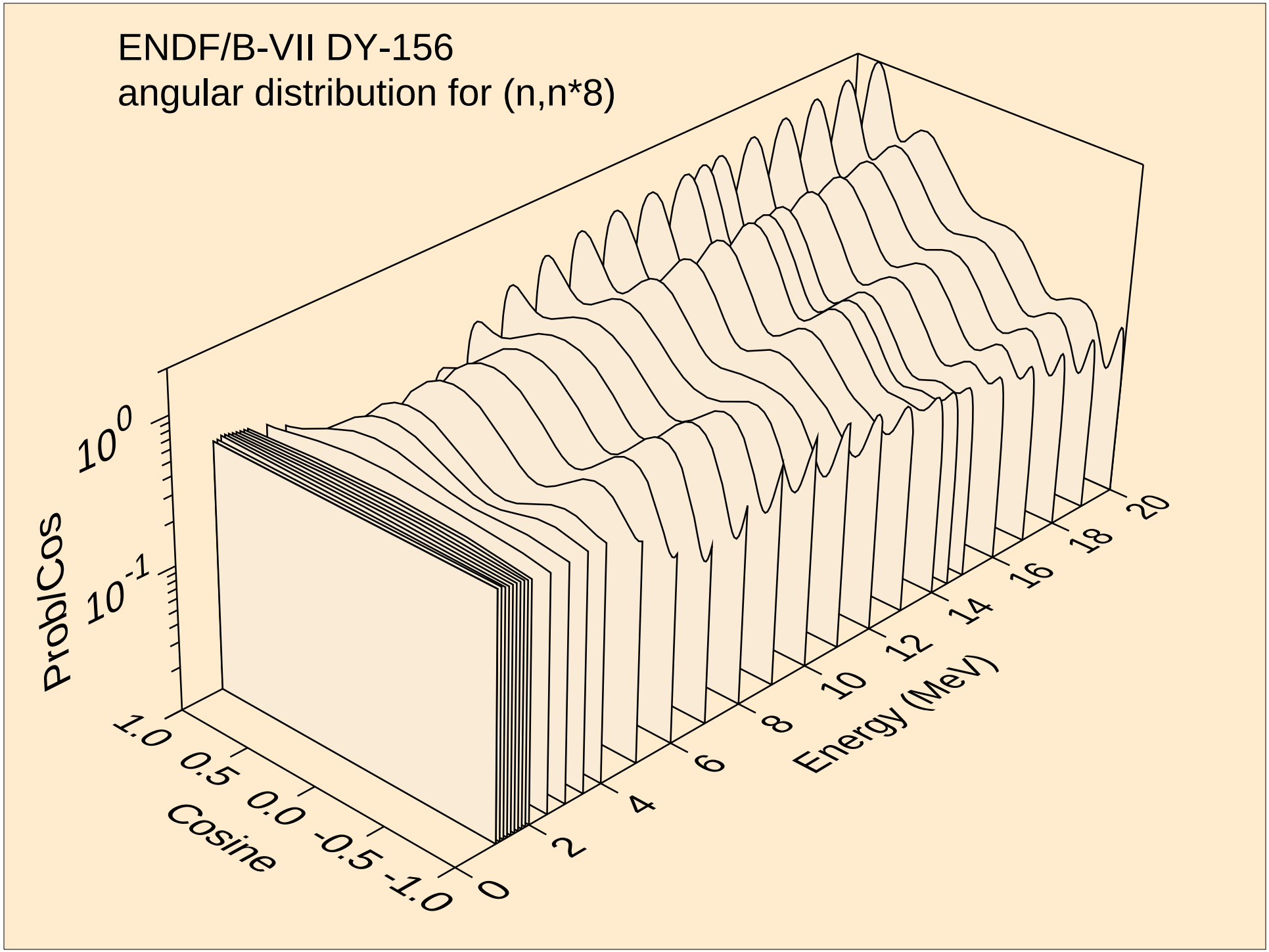

ENDF/B-VII DY-156
angular distribution for (n,n*3)
ProbCos
10^{0}
10^{-1}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

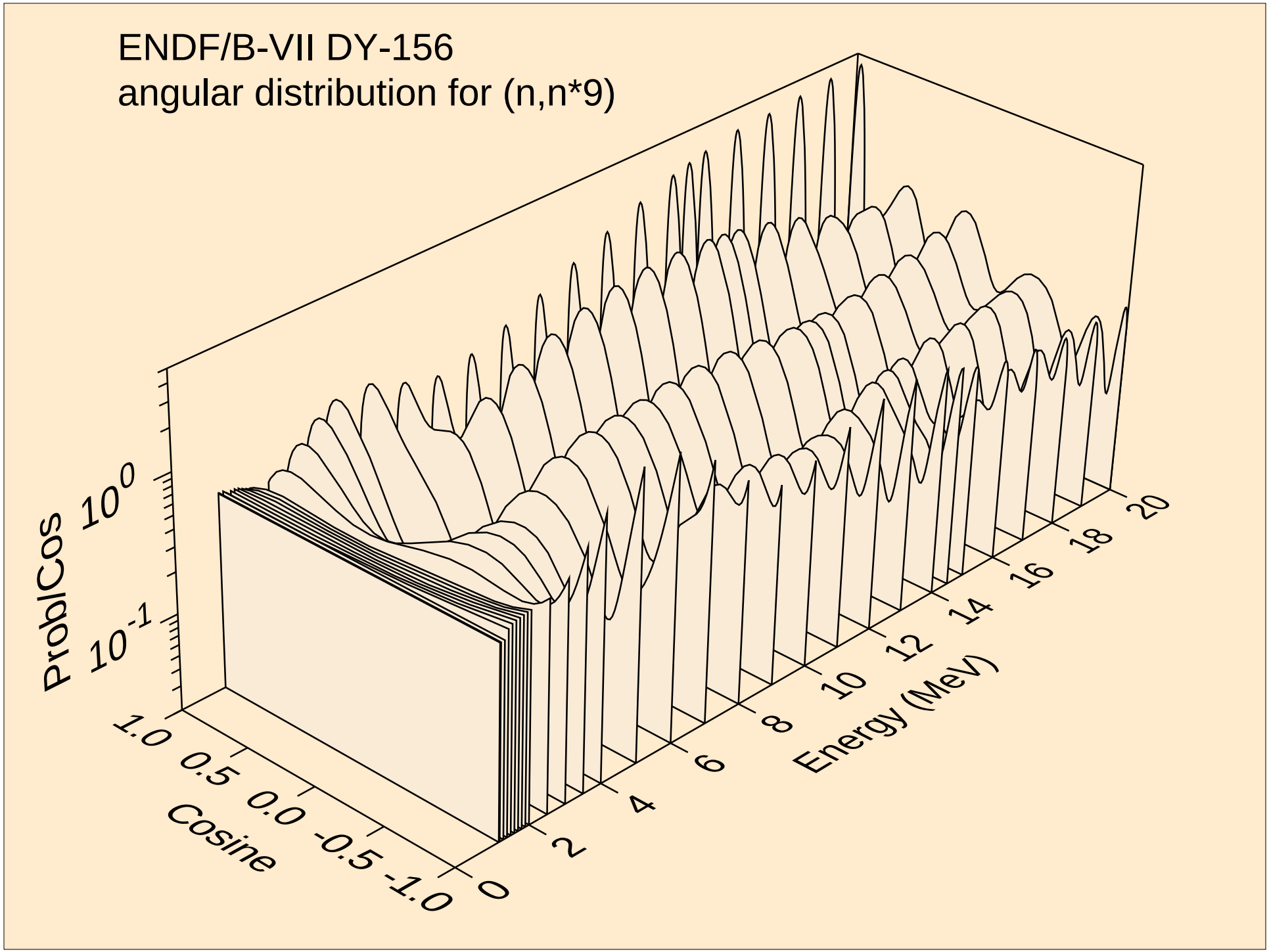

ENDF/B-VII DY-156
angular distribution for (n,n*4)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

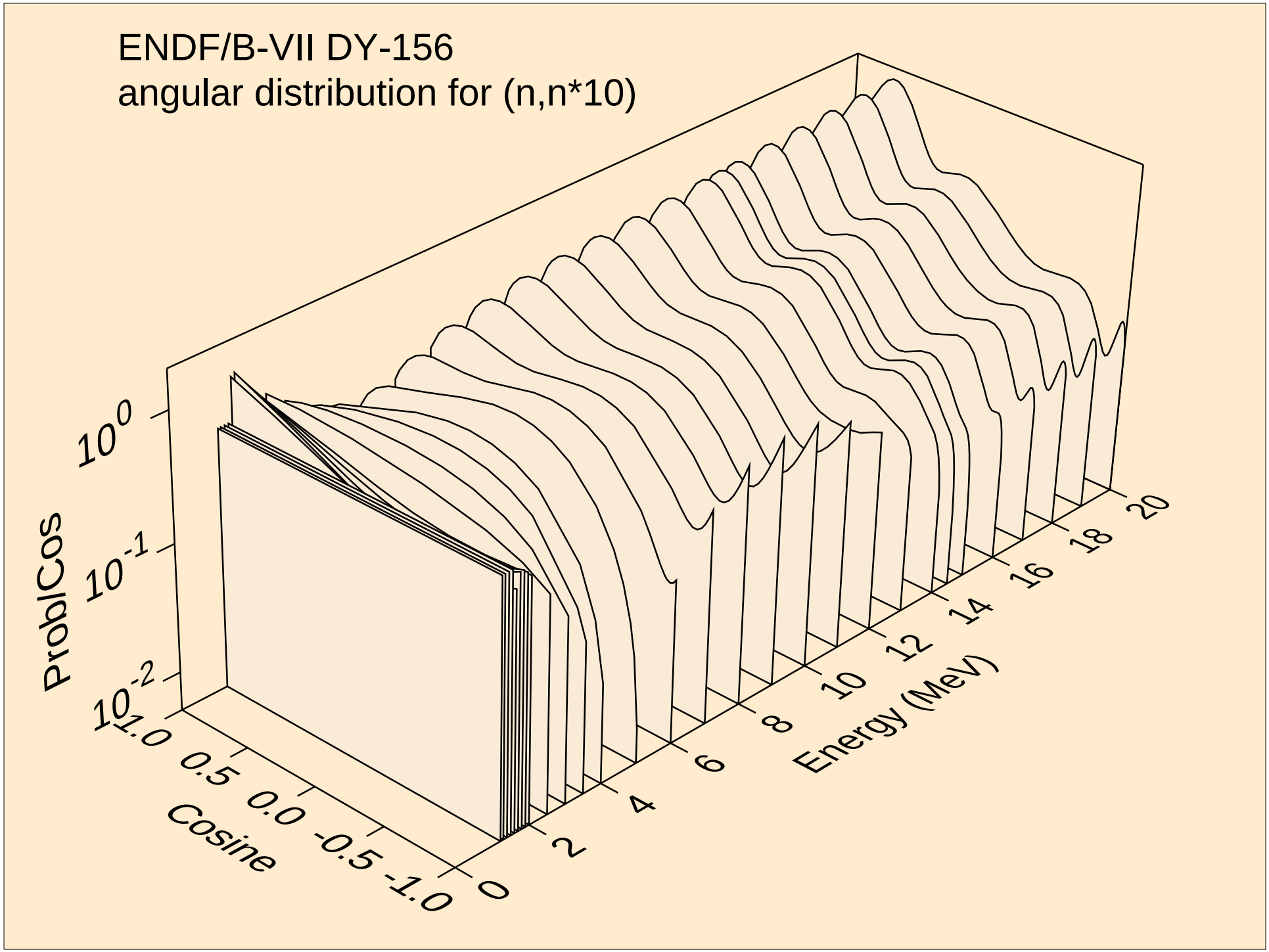

ENDF/B-VII DY-156
angular distribution for (n,n*5)
Prob\Cos
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

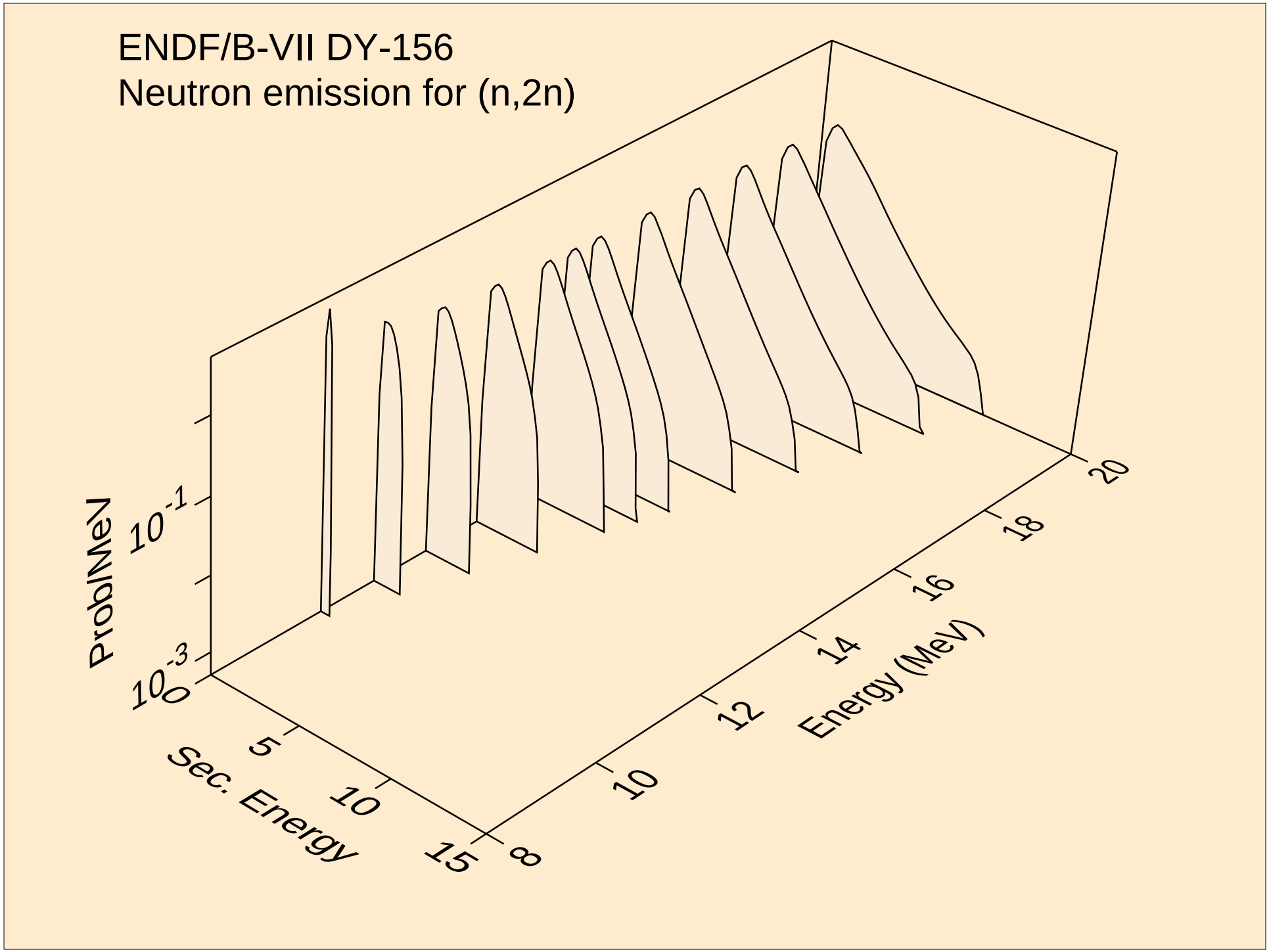

ENDF/B-VII DY-156
angular distribution for (n,n*6)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

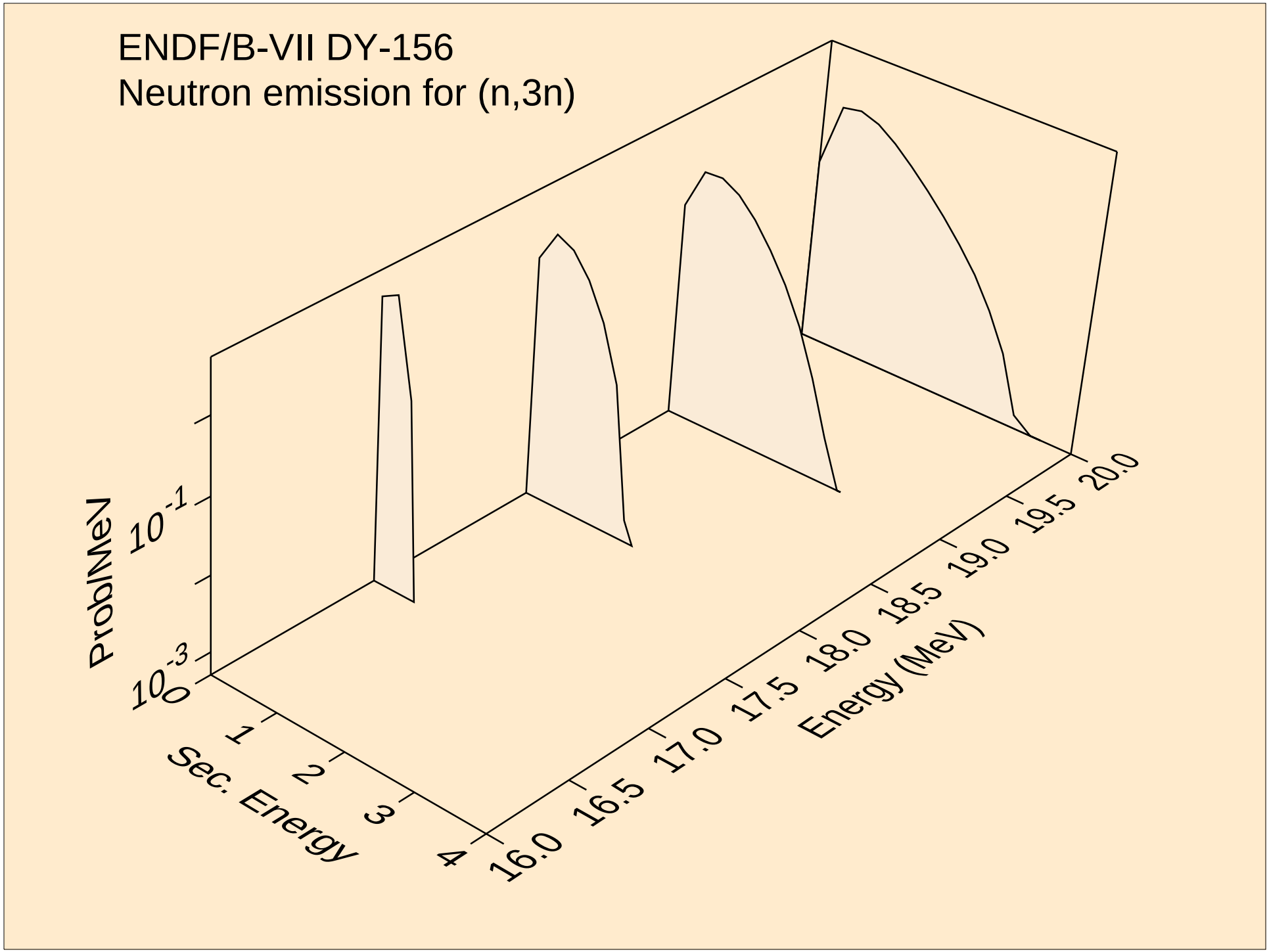

ENDF/B-VII DY-156
angular distribution for (n,n*7)
Prob\Cos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

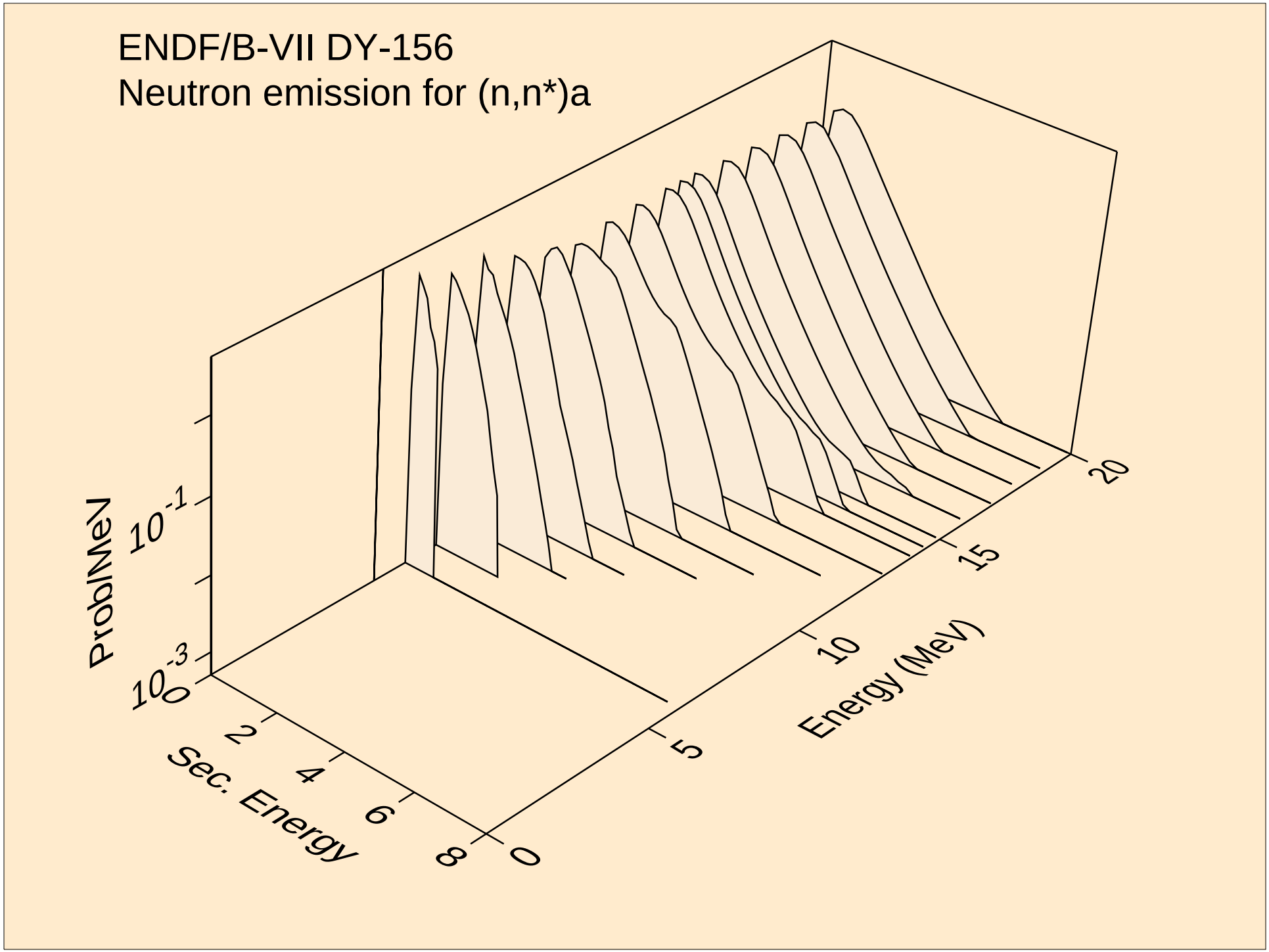

ENDF/B-VII DY-156
angular distribution for (n,n*8)
Prob\Cos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

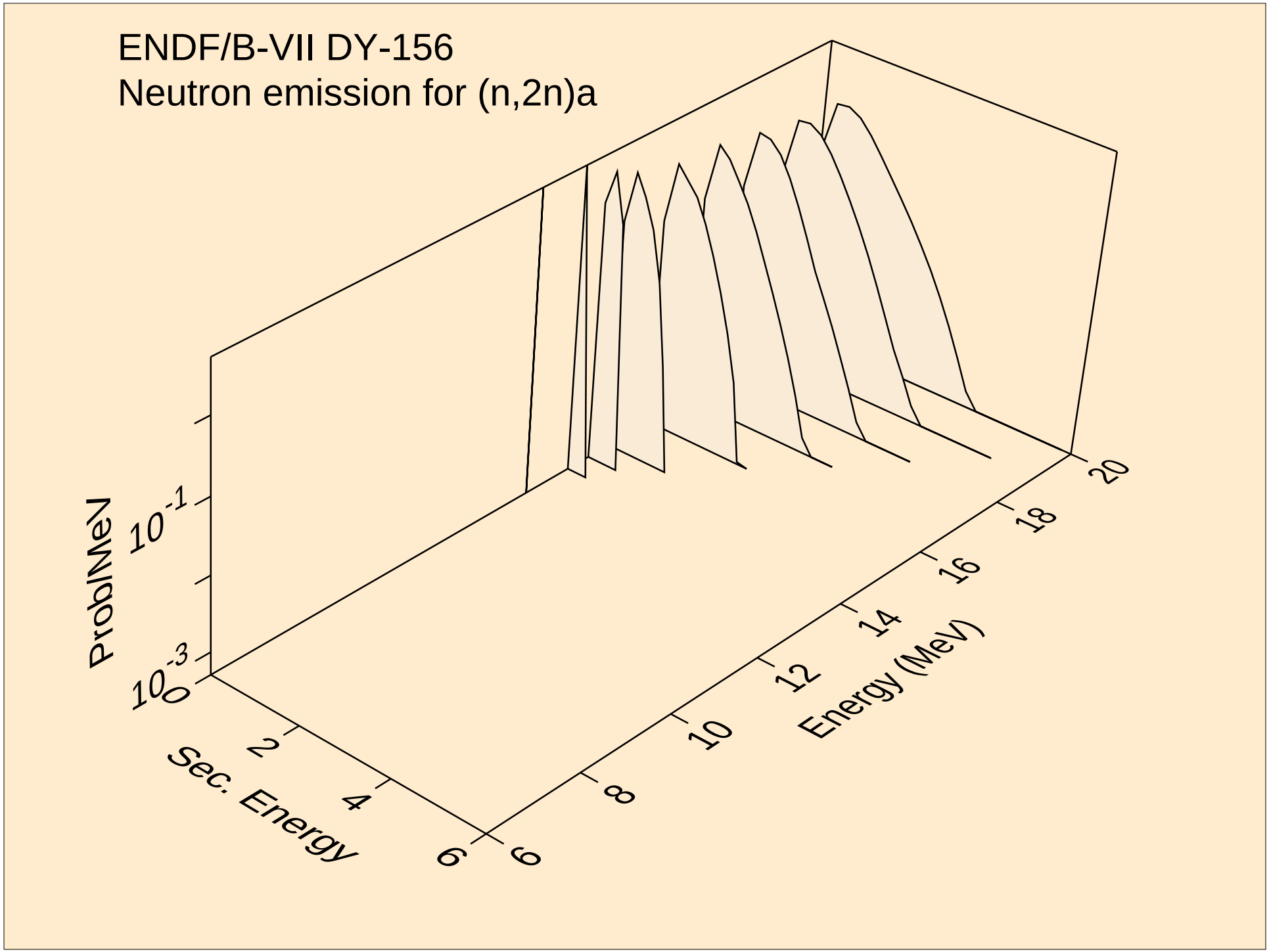

ENDF/B-VII DY-156
angular distribution for (n,n*9)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

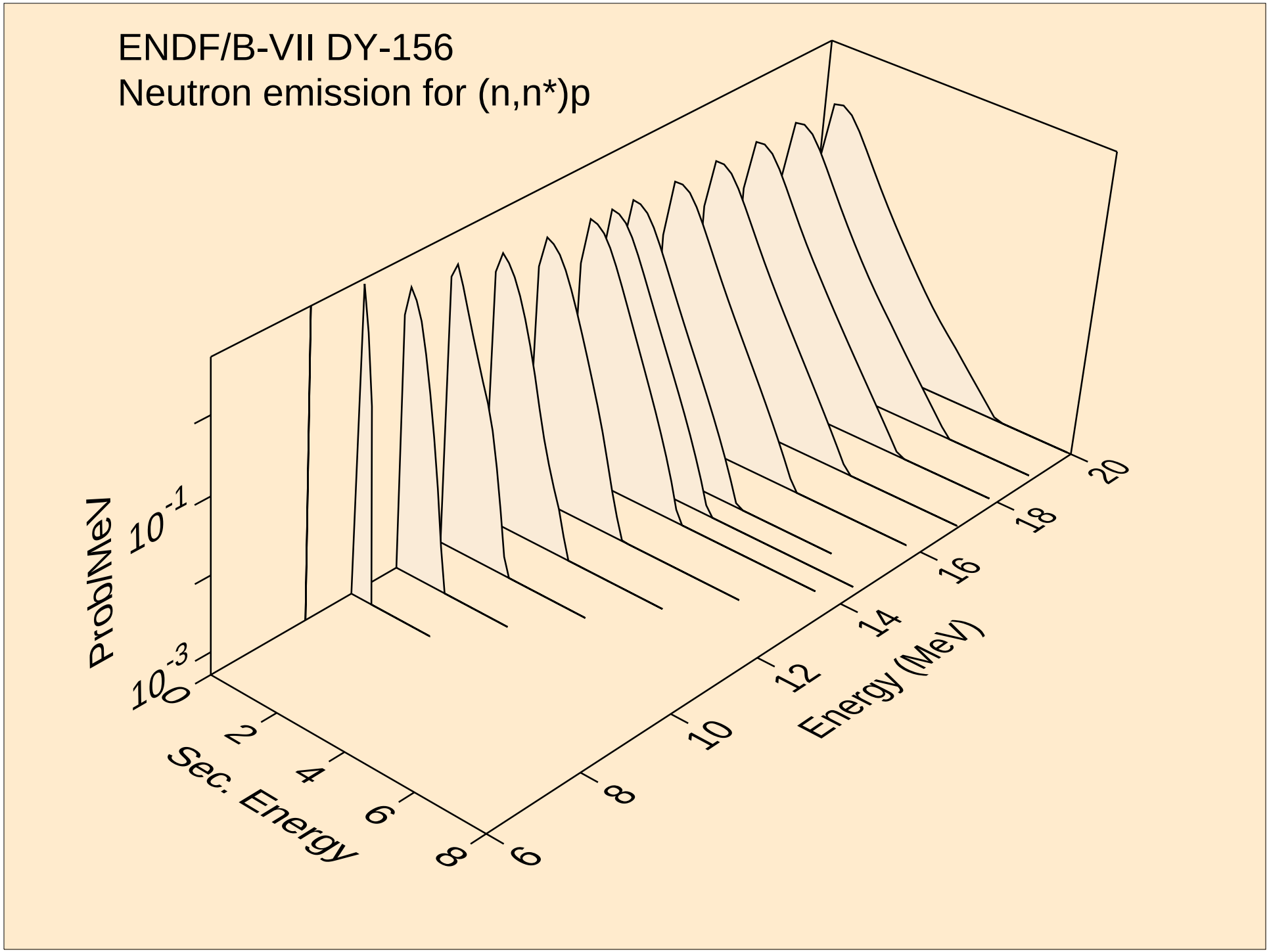

ENDF/B-VII DY-156
angular distribution for (n,n*10)
ProbCos
10^{0}
10^{-1}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

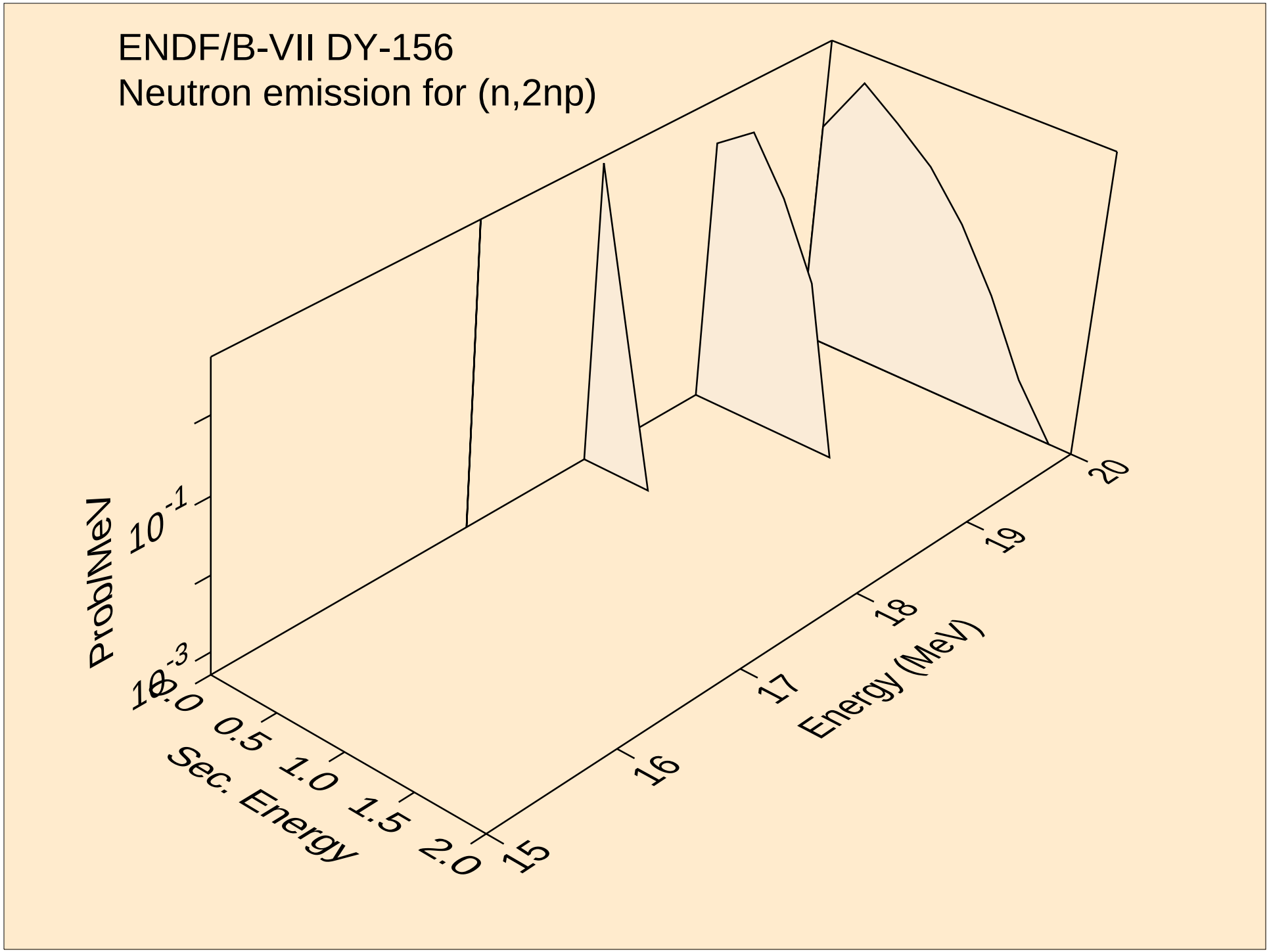

ENDF/B-VII DY-156
Neutron emission for (n,2n)
Prob/MeV
10^-1
10^-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

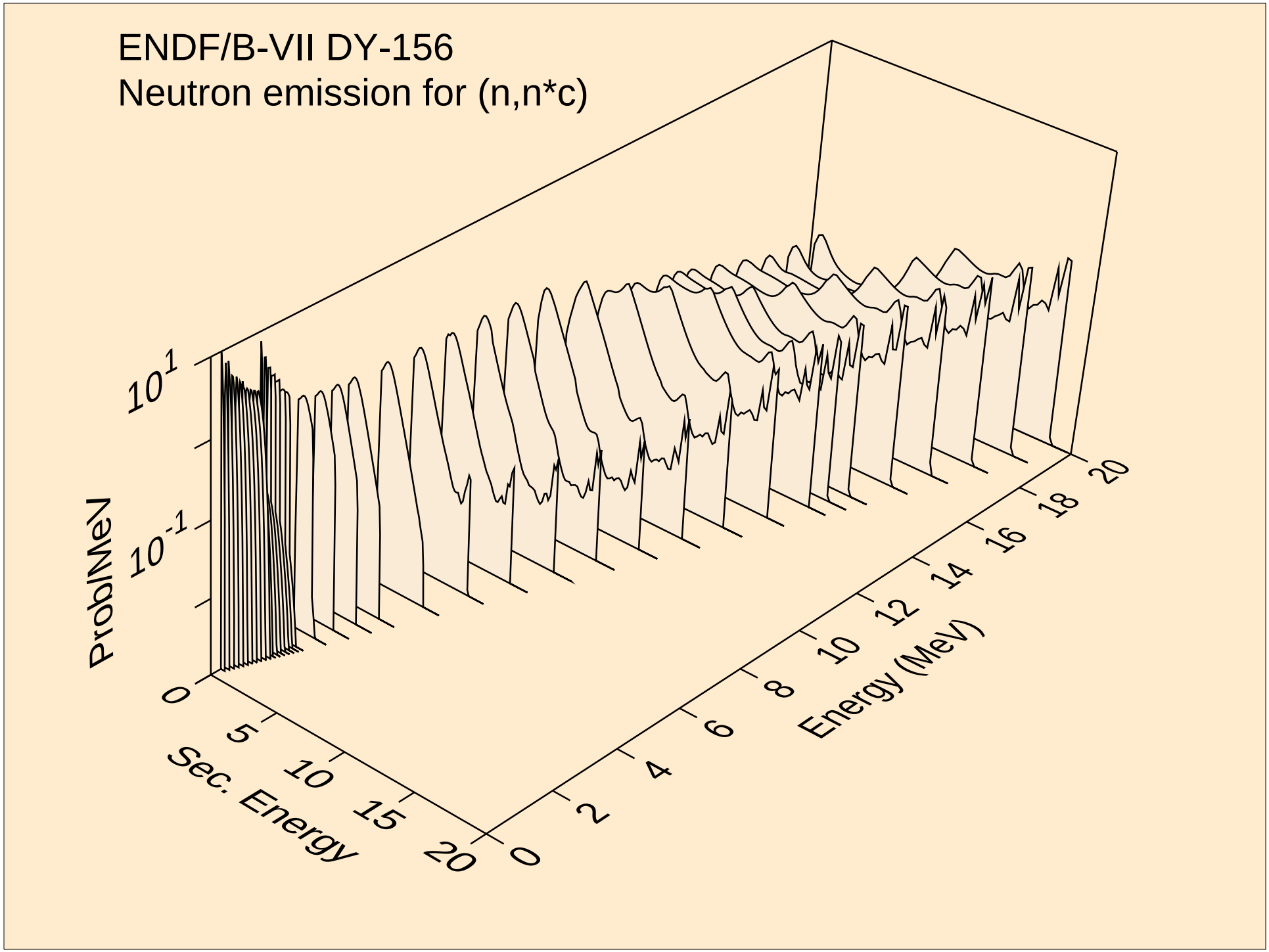

ENDF/B-VII DY-156
Neutron emission for (n,3n)
Prob/MeV
10-1
10-3
0
1
2
3
4
Sec. Energy
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
Energy (MeV)

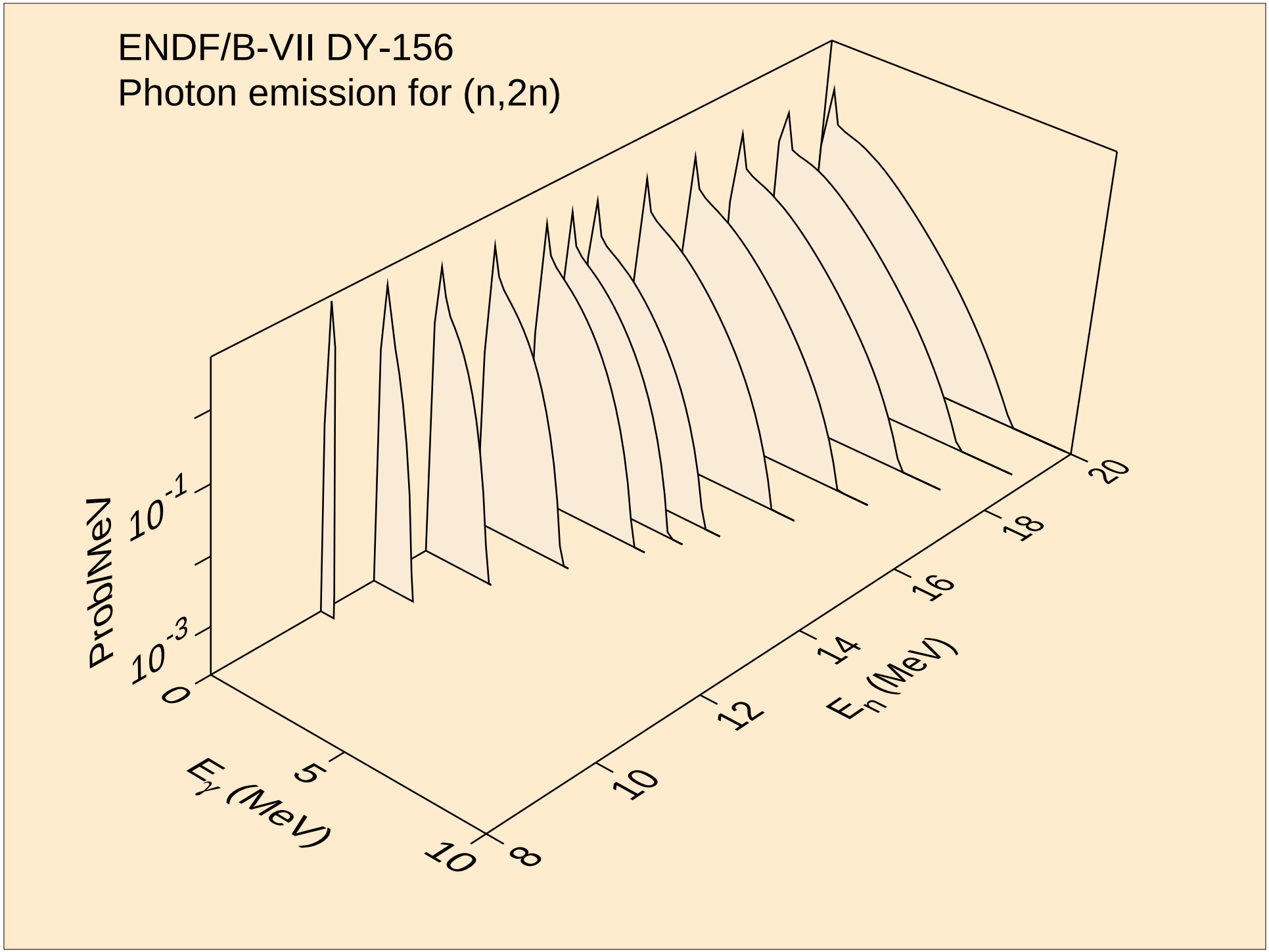

ENDF/B-VII DY-156
Neutron emission for (n,n*)a
Prob/MeV
10-1
10-3
0
2
4
6
8
Sec. Energy
0
5
10
15
20
Energy (MeV)

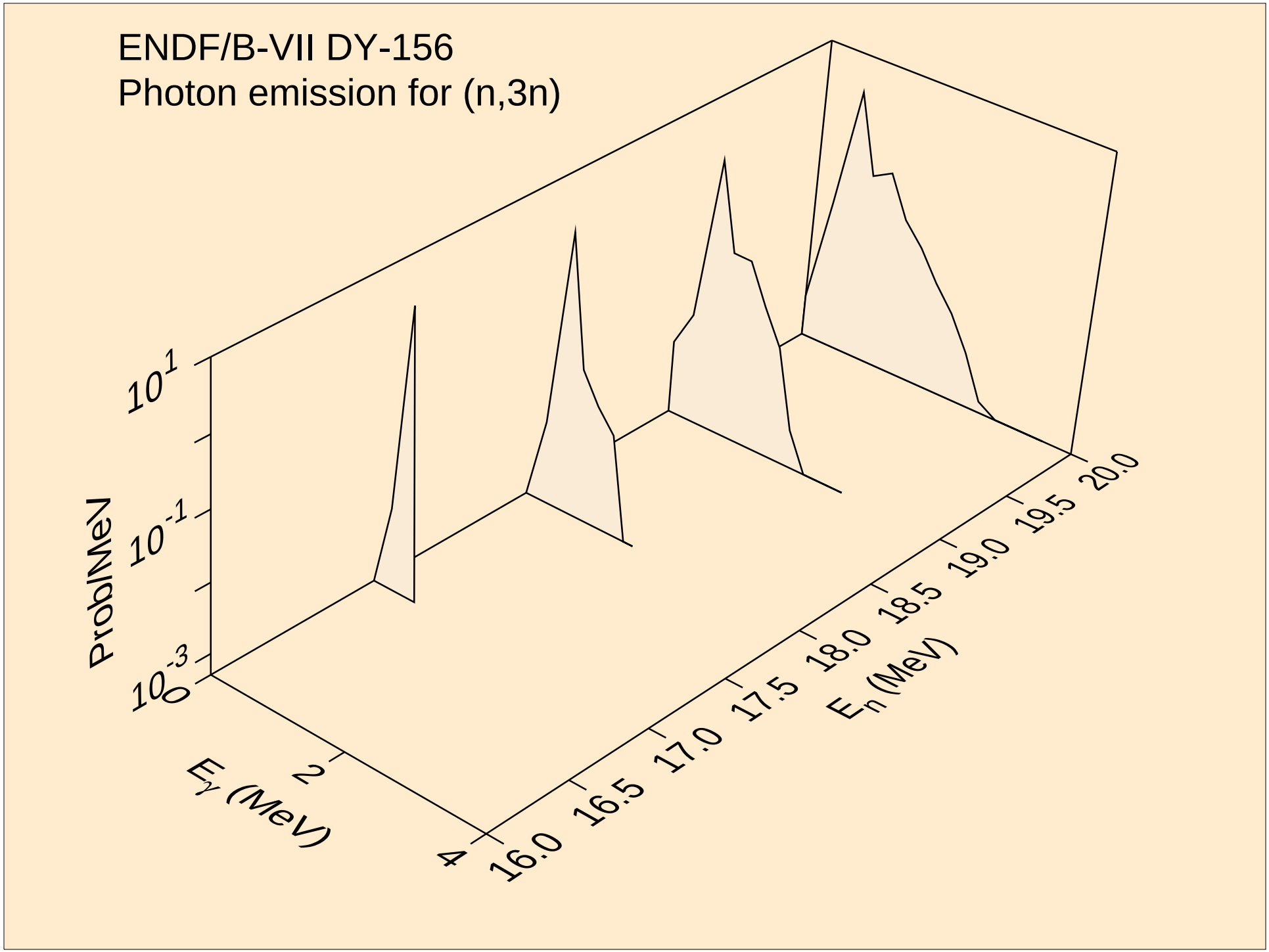

ENDF/B-VII DY-156
Neutron emission for (n,2n)a
Prob/MeV
10-1
10-3
0
2
4
6
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

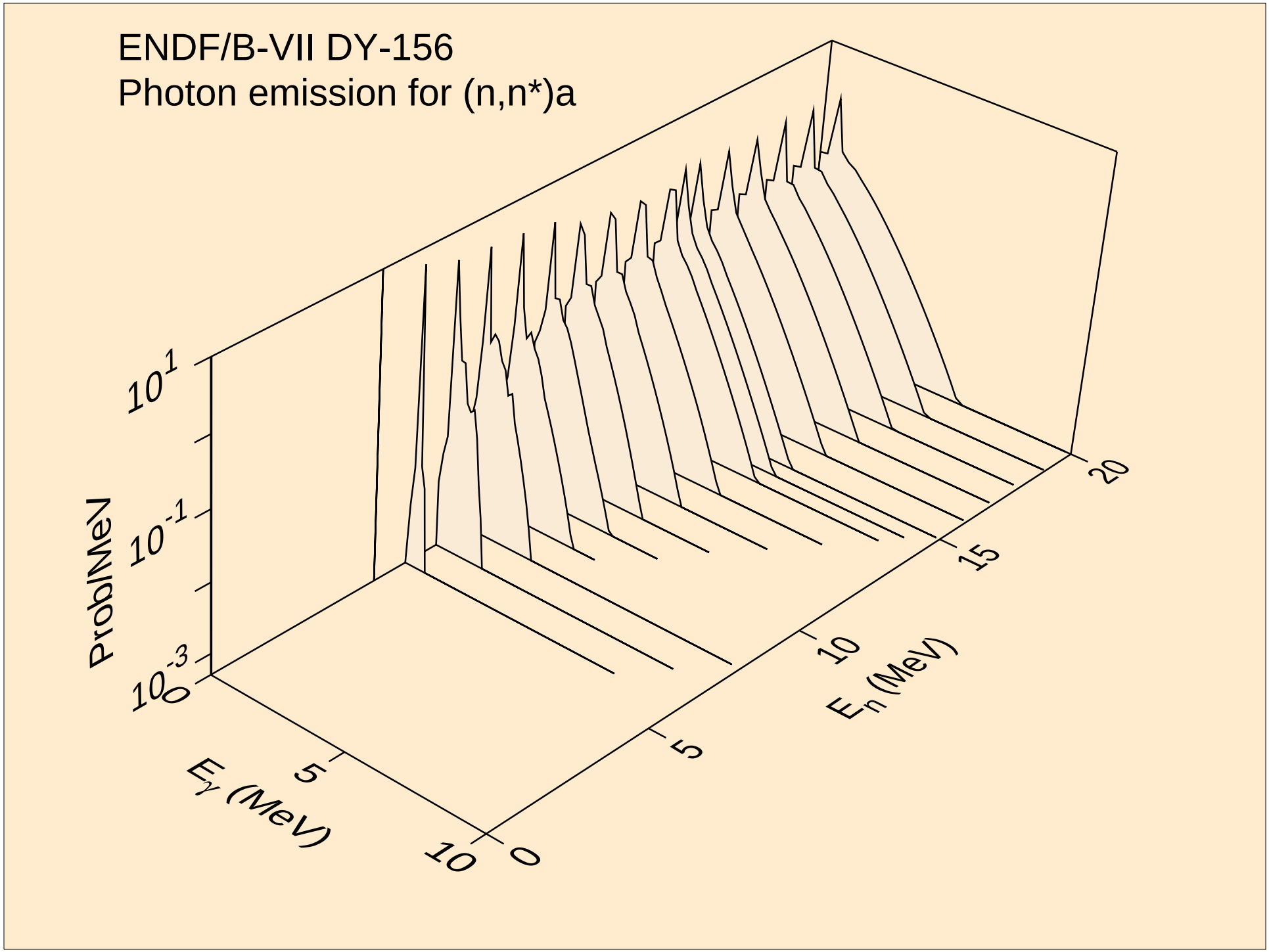

ENDF/B-VII DY-156
Neutron emission for (n,n*)p
Prob/MeV
10-1
10-3
0
2
4
6
8
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

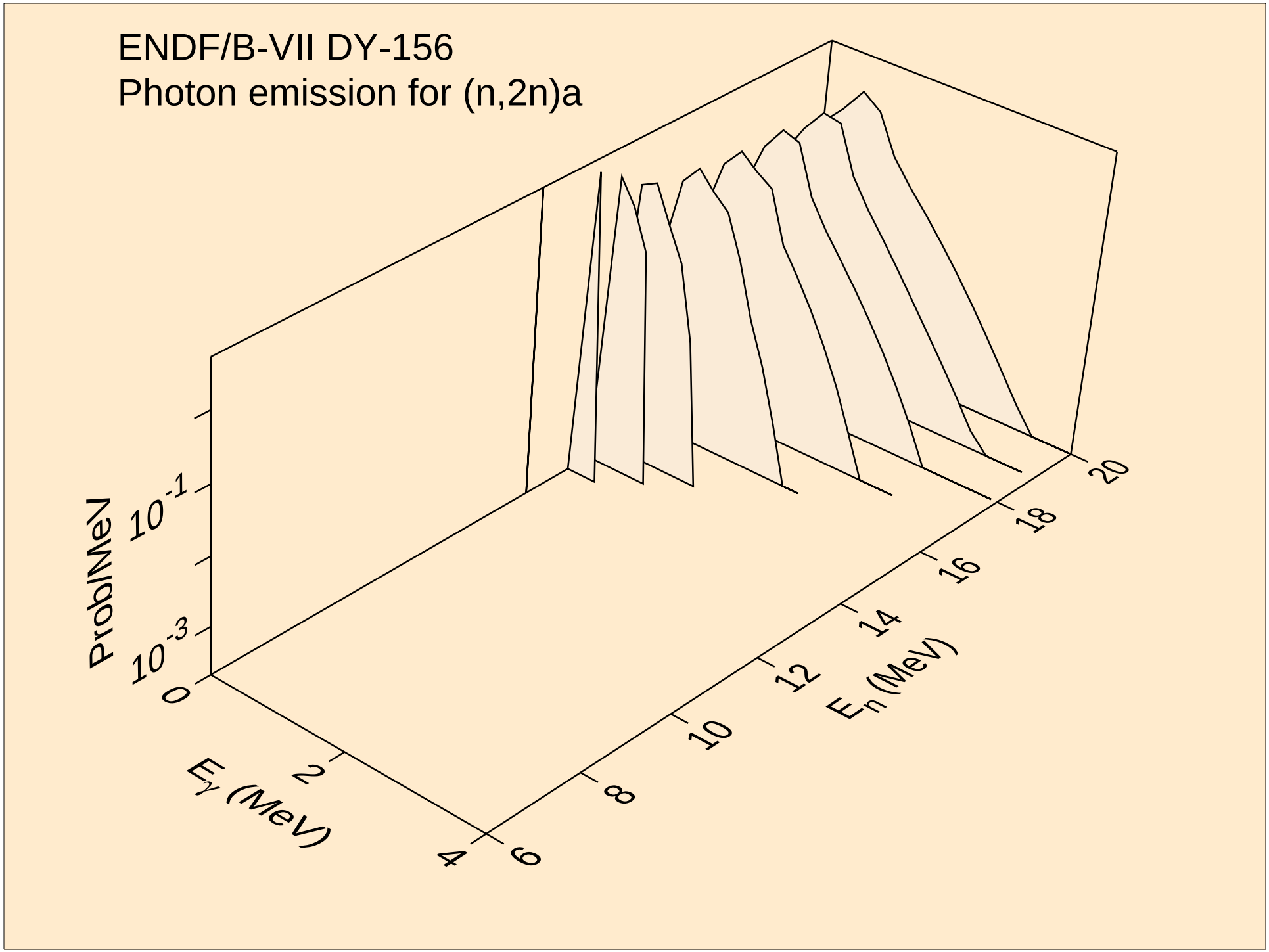

ENDF/B-VII DY-156
Neutron emission for (n,2np)
Prob/MeV
10-1
10-3
0.0
0.5
1.0
1.5
2.0
Sec. Energy
15
16
17
18
19
20
Energy (MeV)

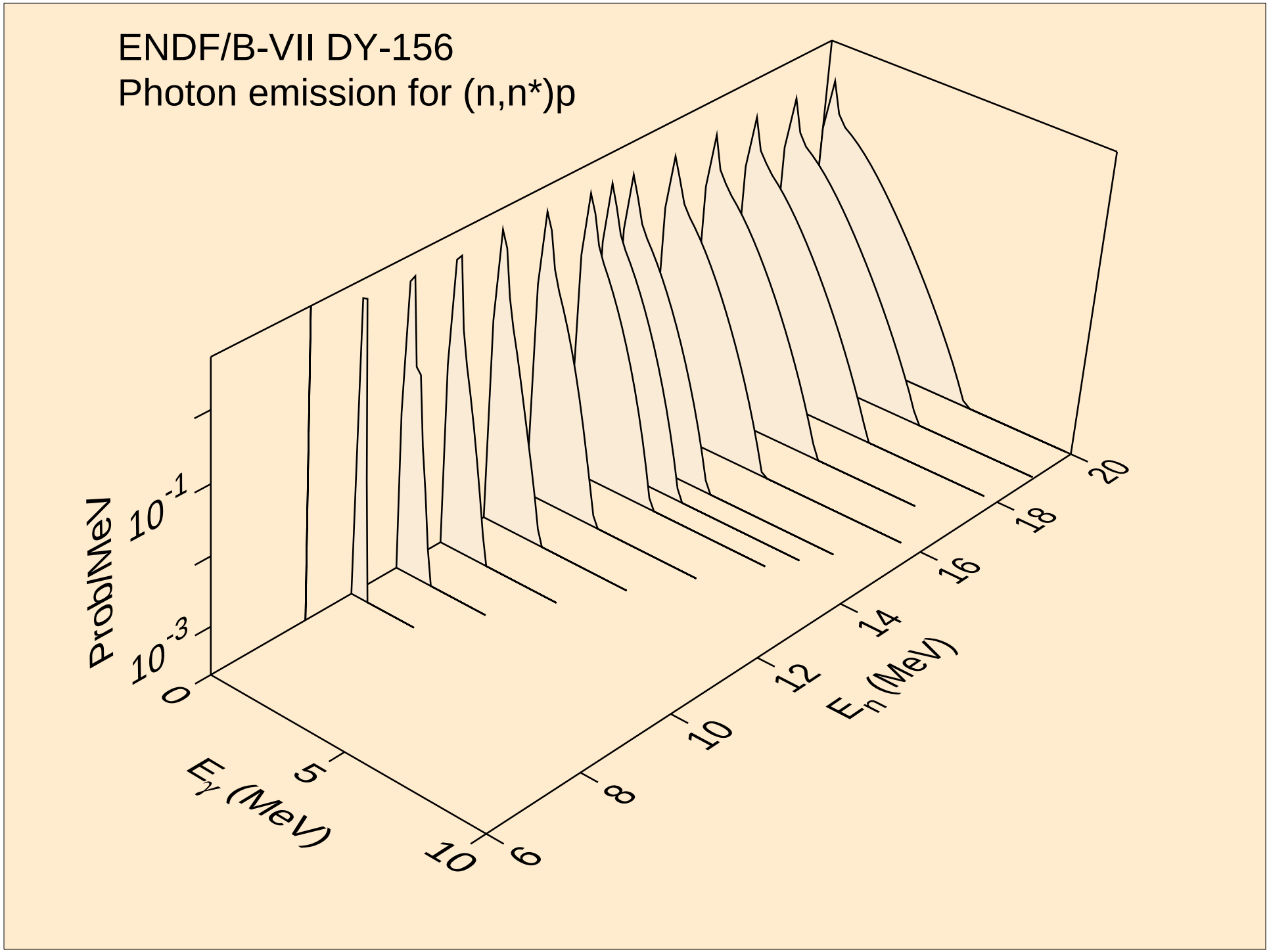

ENDF/B-VII DY-156
Neutron emission for (n,n*c)
Prob/MeV
10^{1}
10^{-1}
0
5
10
15
20
Sec. Energy
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

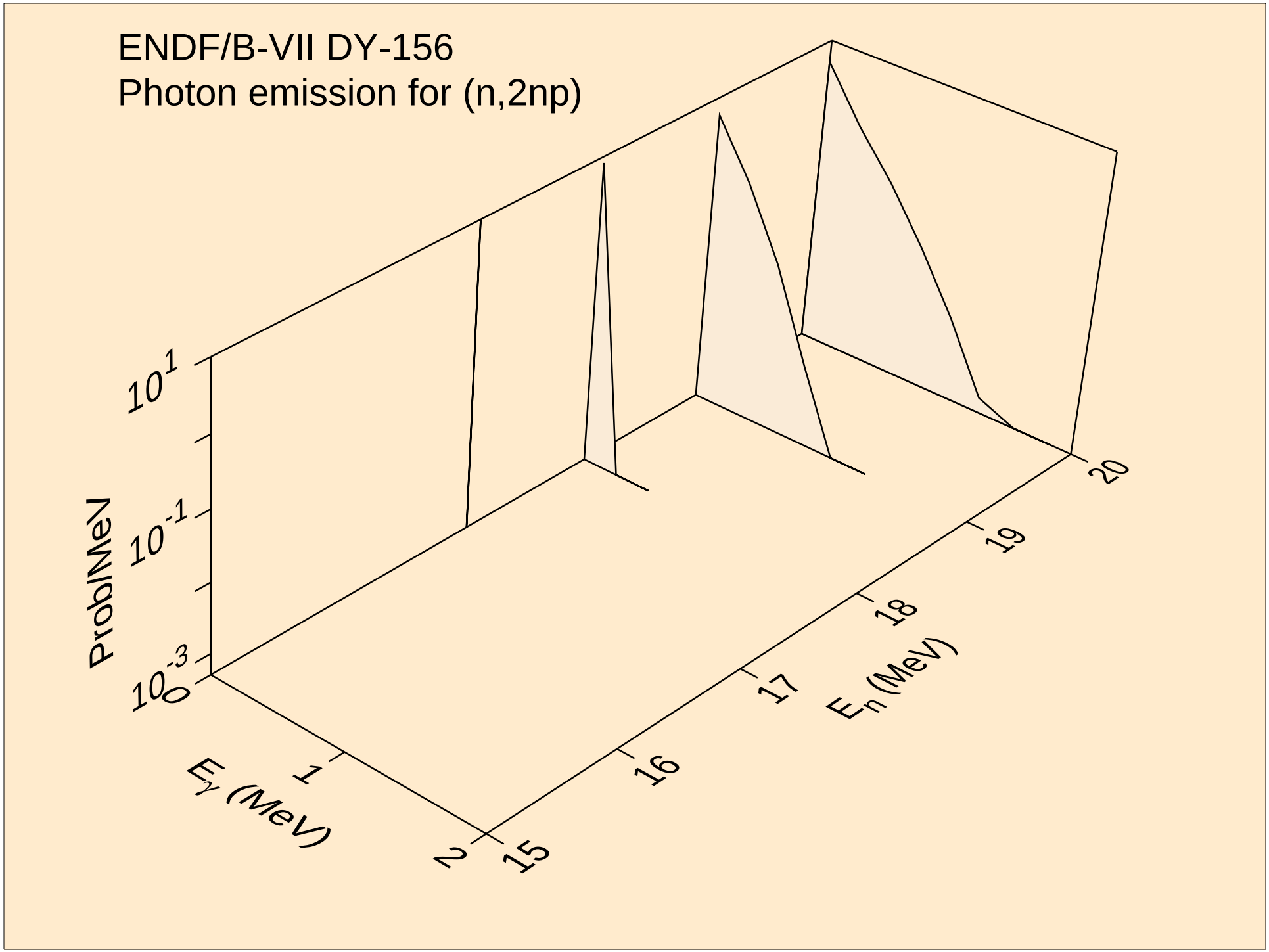

ENDF/B-VII DY-156
Photon emission for (n,2n)
Prob/MeV
10^-1
10^-3
0
5
10
E_γ (MeV)
8
10
12
14
16
18
20
E_n (MeV)

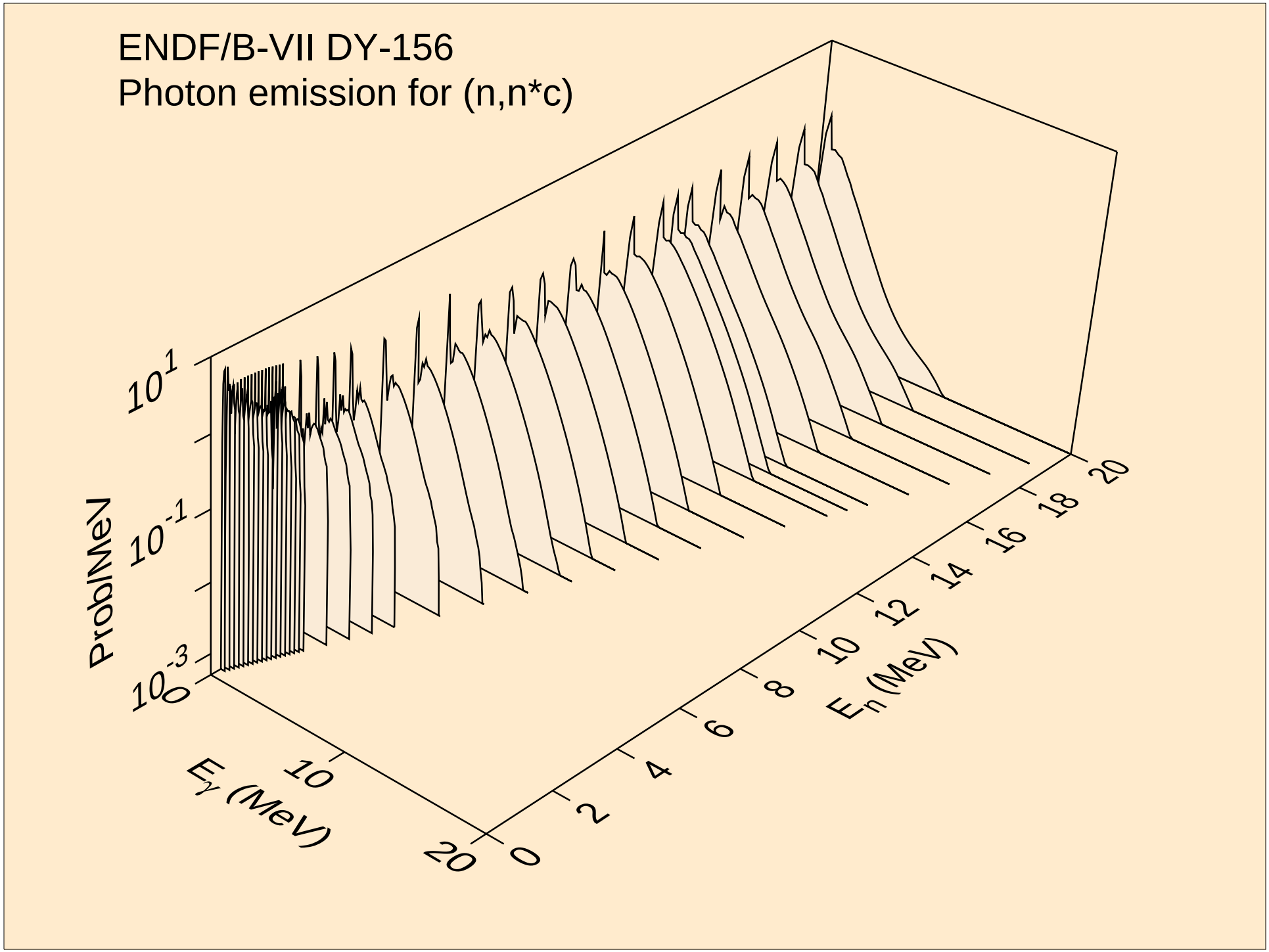

ENDF/B-VII DY-156
Photon emission for (n,3n)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
2
4
E_γ (MeV)
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
E_n (MeV)

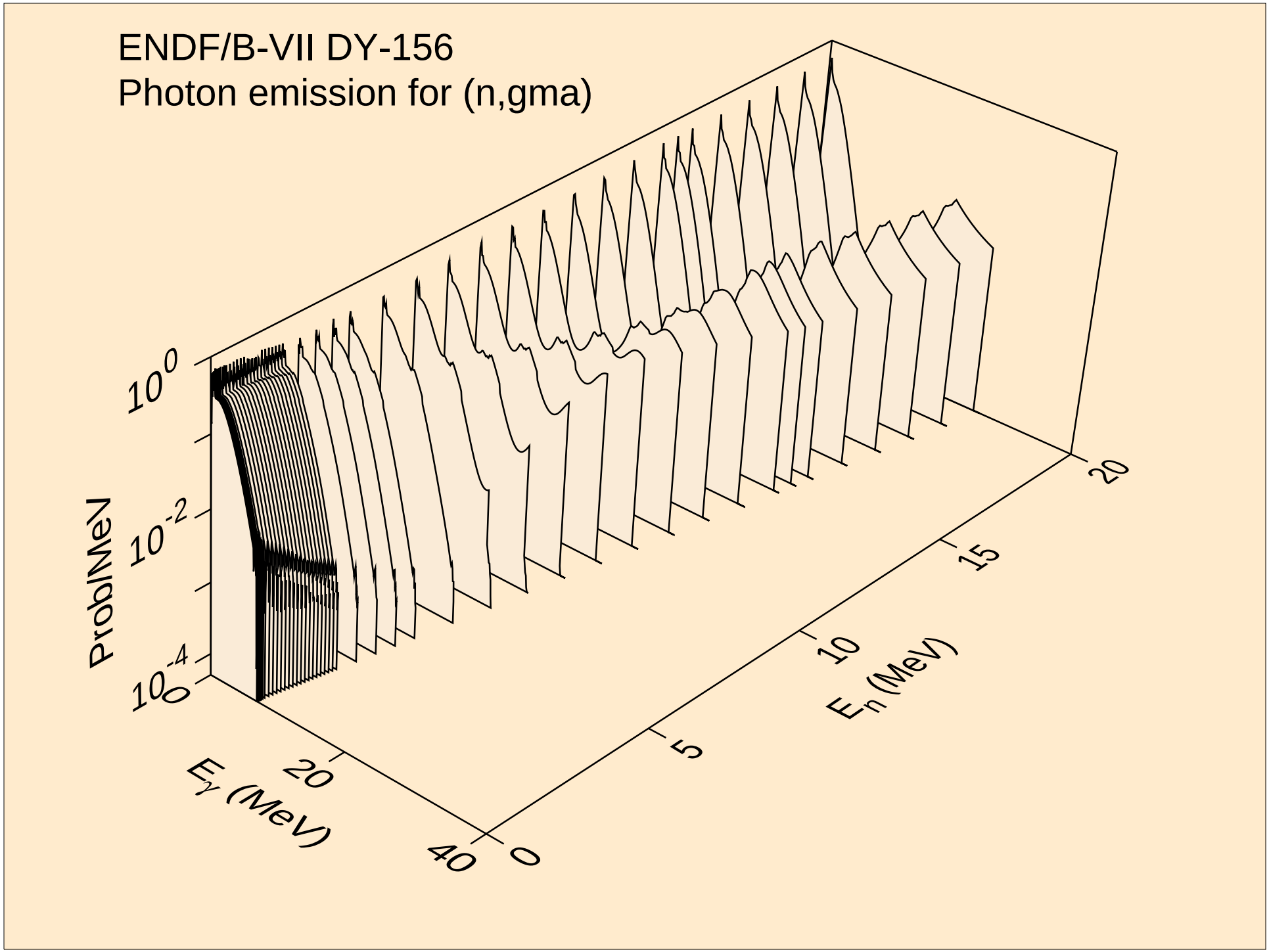

ENDF/B-VII DY-156
Photon emission for (n,n*)a
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
5
10
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

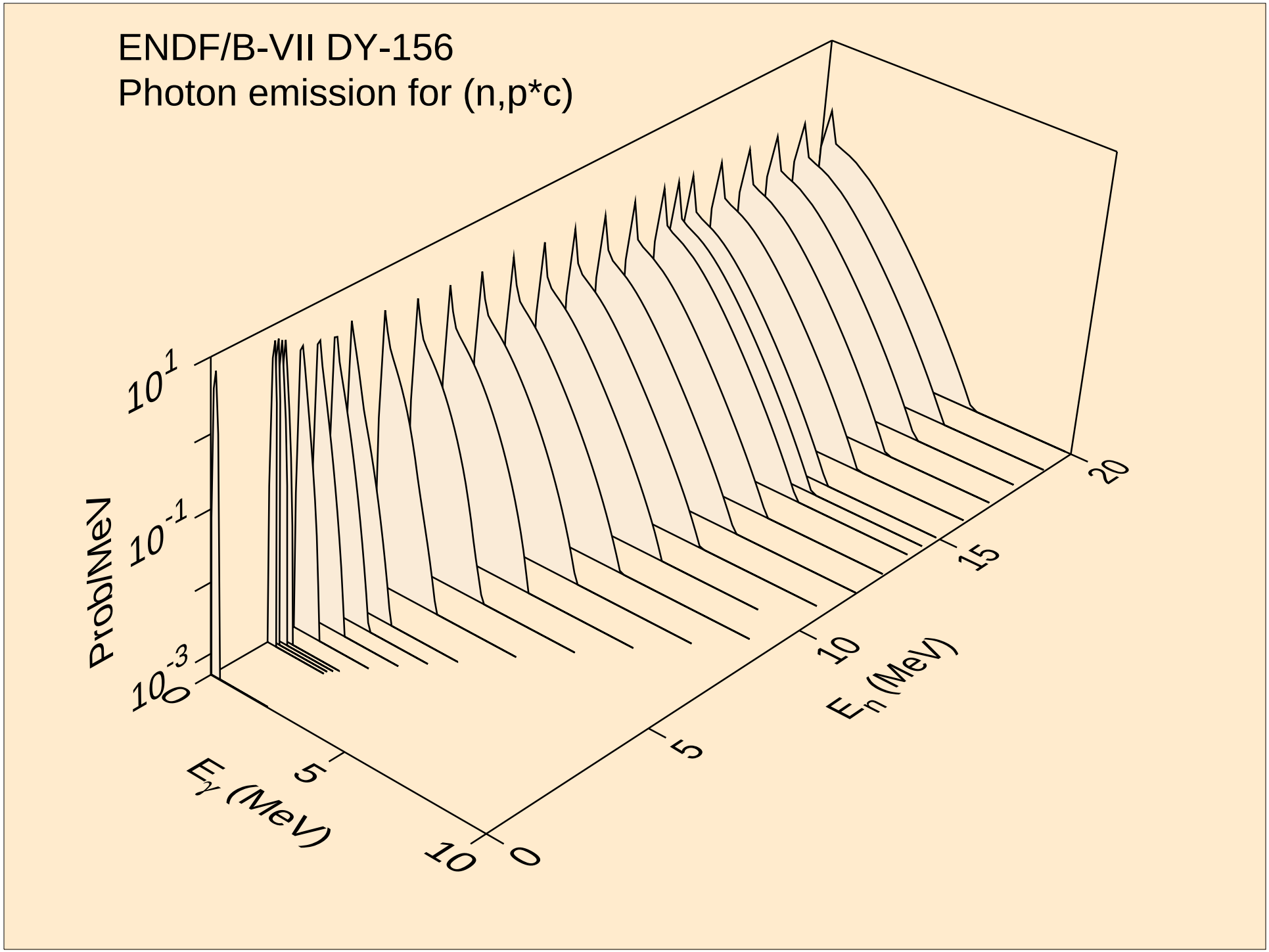

ENDF/B-VII DY-156
Photon emission for (n,2n)a
Prob/MeV
10-1
10-3
0
2
4
Eγ (MeV)
6
8
10
12
14
16
18
20
En (MeV)

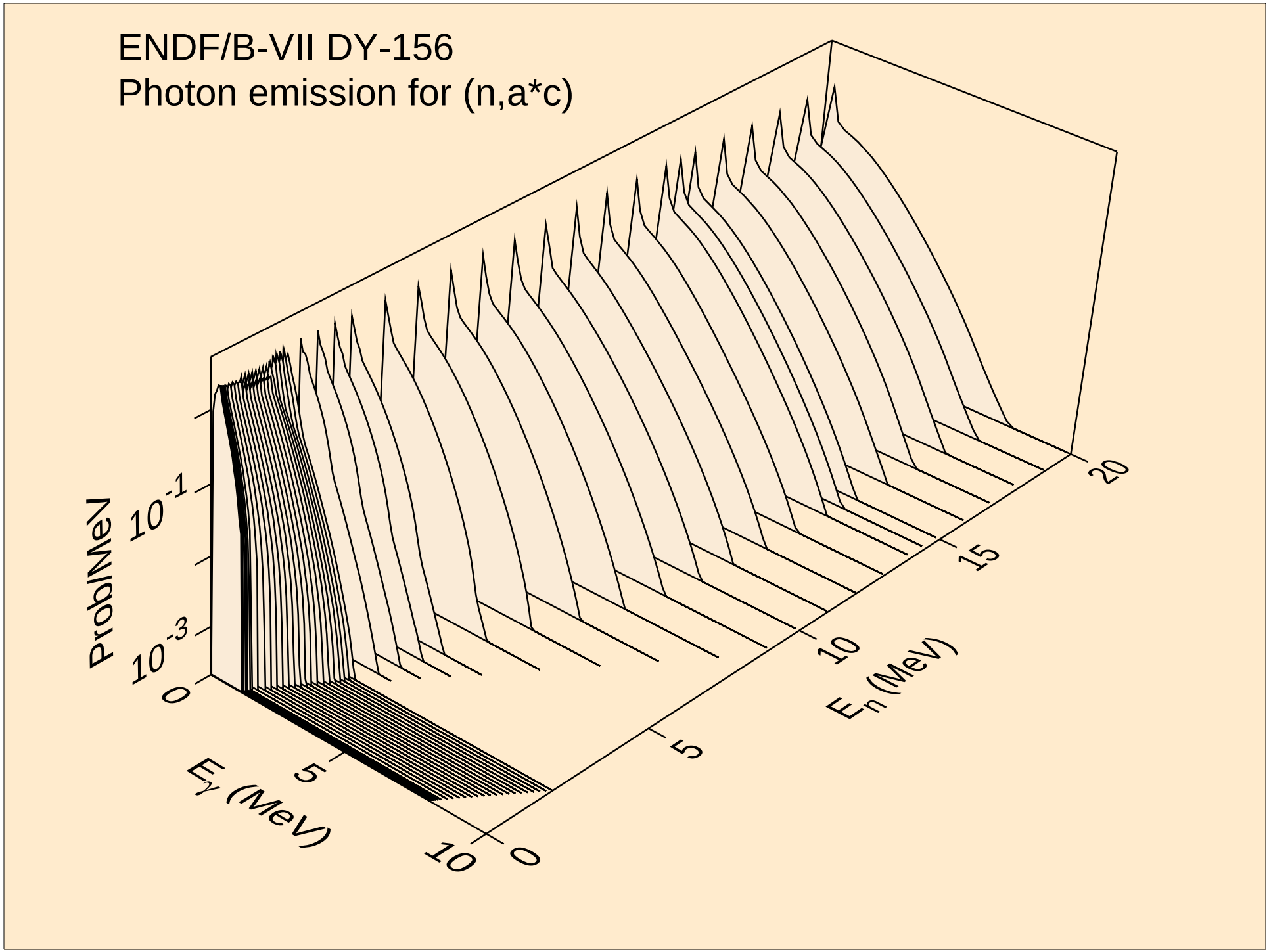

ENDF/B-VII DY-156
Photon emission for (n,n*)p
Prob/MeV
10^-1
10^-3
0
E_γ (MeV)
5
10
6
8
10
12
14
16
18
20
E_n (MeV)

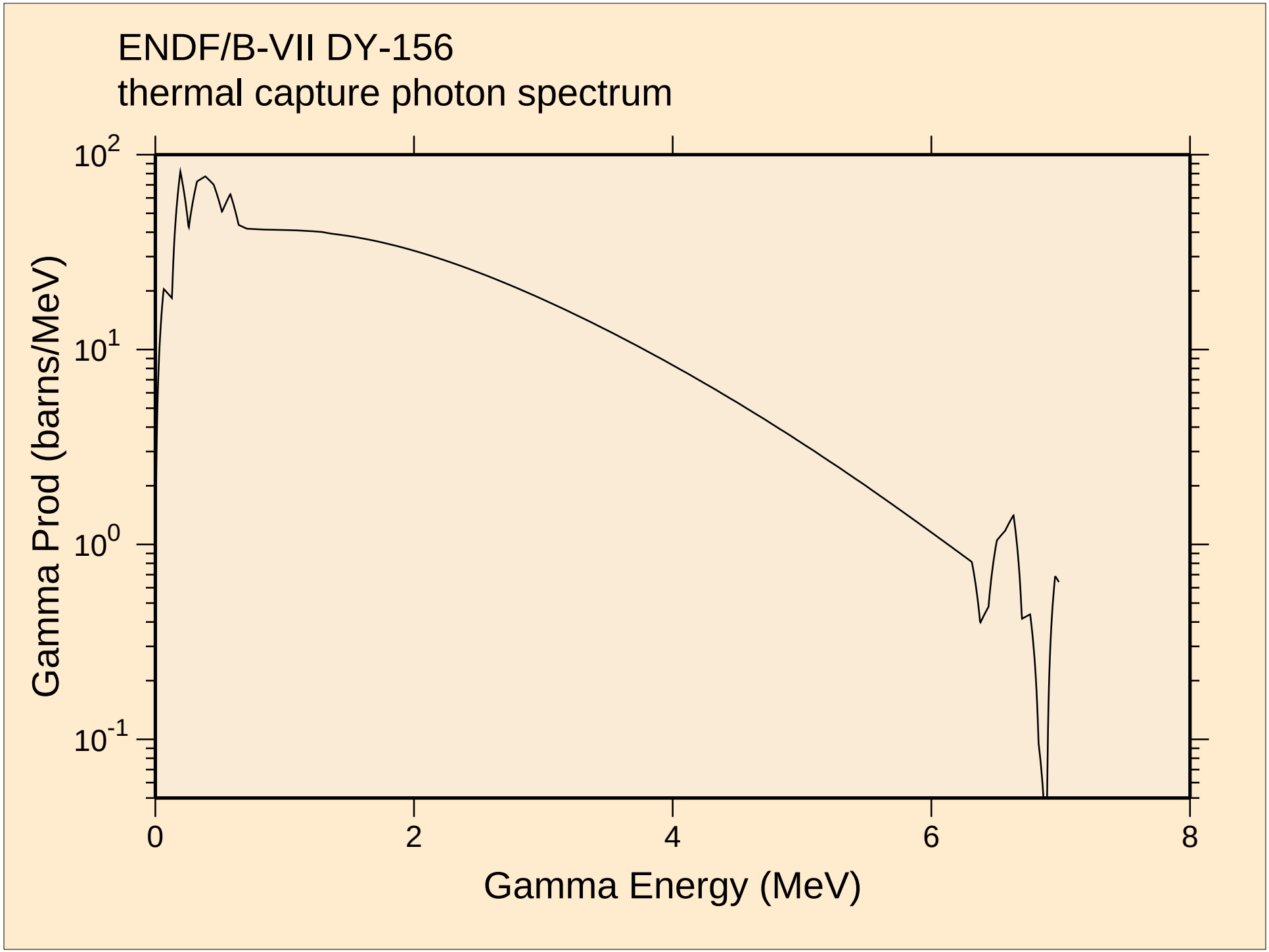

ENDF/B-VII DY-156
Photon emission for (n,2np)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
1
2
E_γ (MeV)
15
16
17
18
19
20
E_n (MeV)

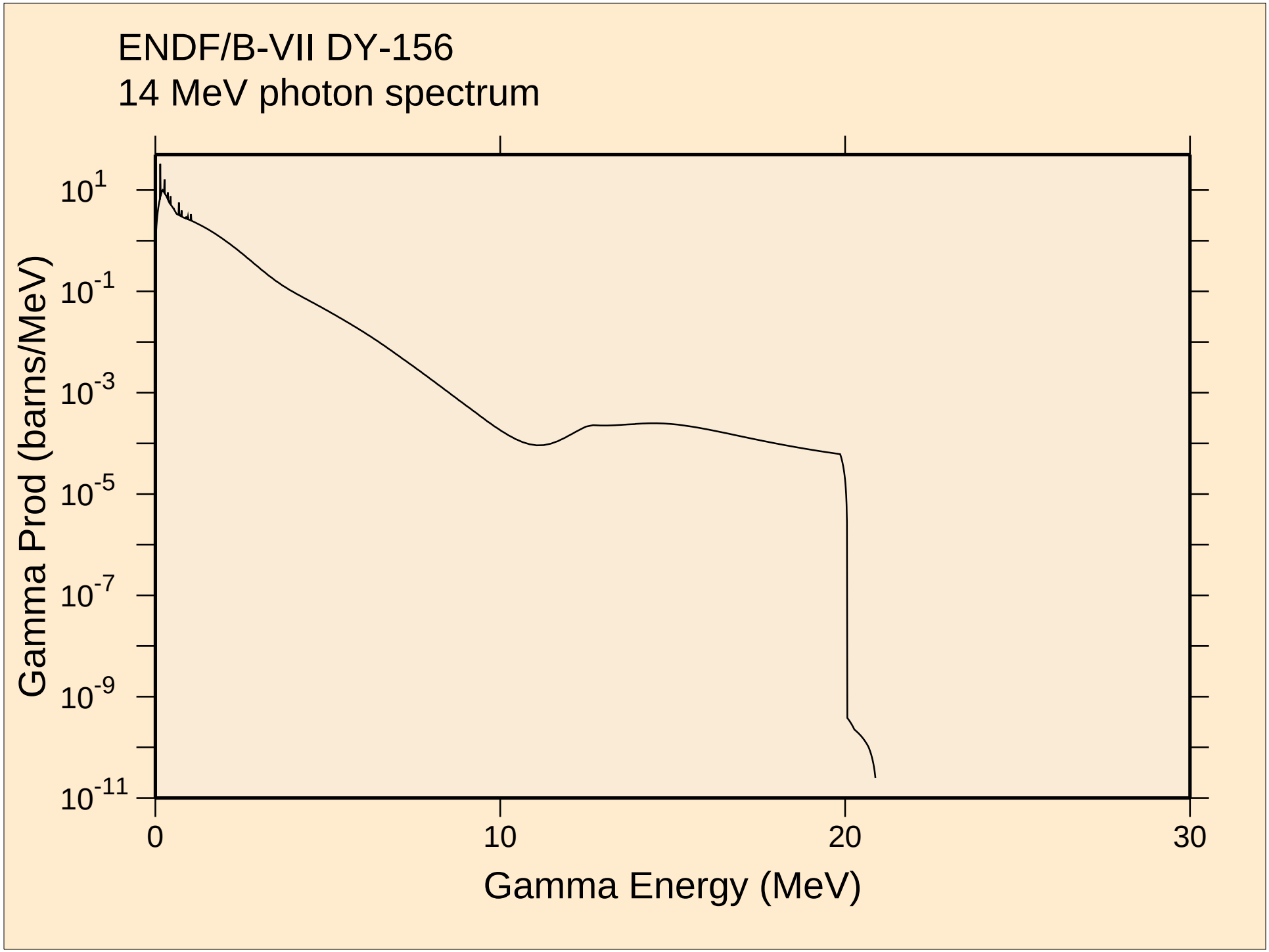

ENDF/B-VII DY-156
Photon emission for (n,n*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
E_γ (MeV)
0
10
20
E_n (MeV)
0
2
4
6
8
10
12
14
16
18
20

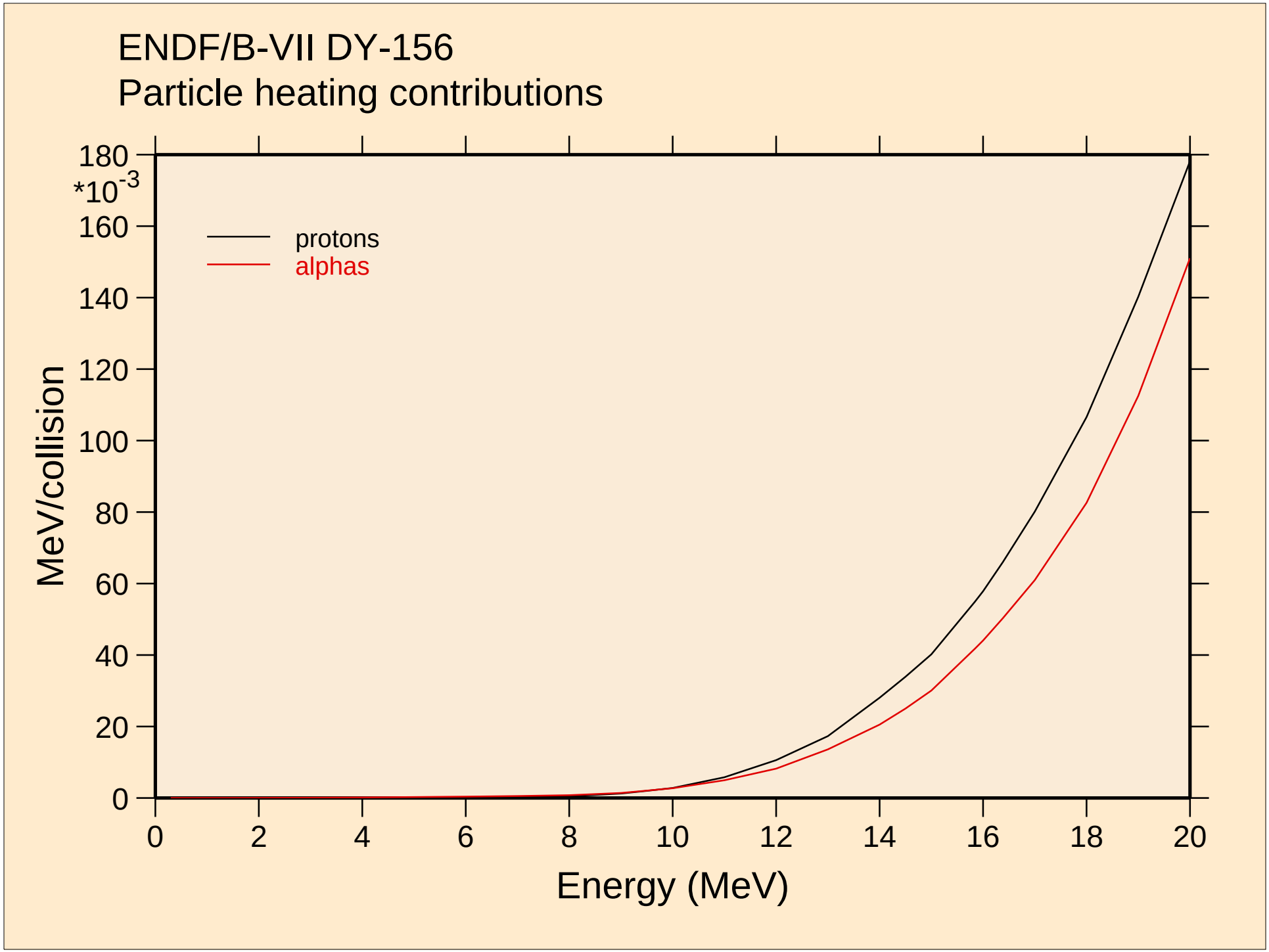

ENDF/B-VII DY-156
Photon emission for (n,gma)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
0
20
40
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

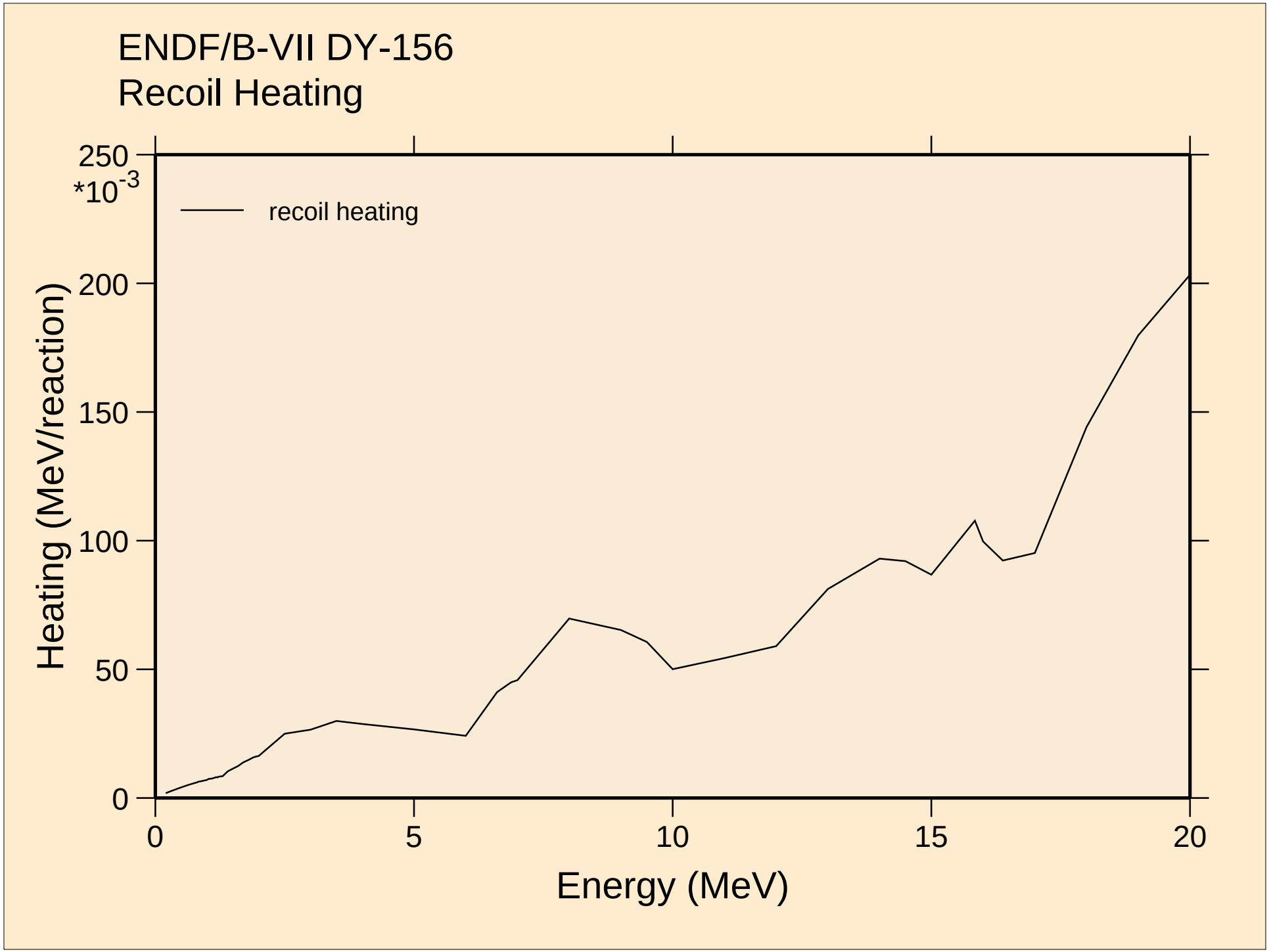

ENDF/B-VII DY-156
Photon emission for (n,p*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
5
10
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

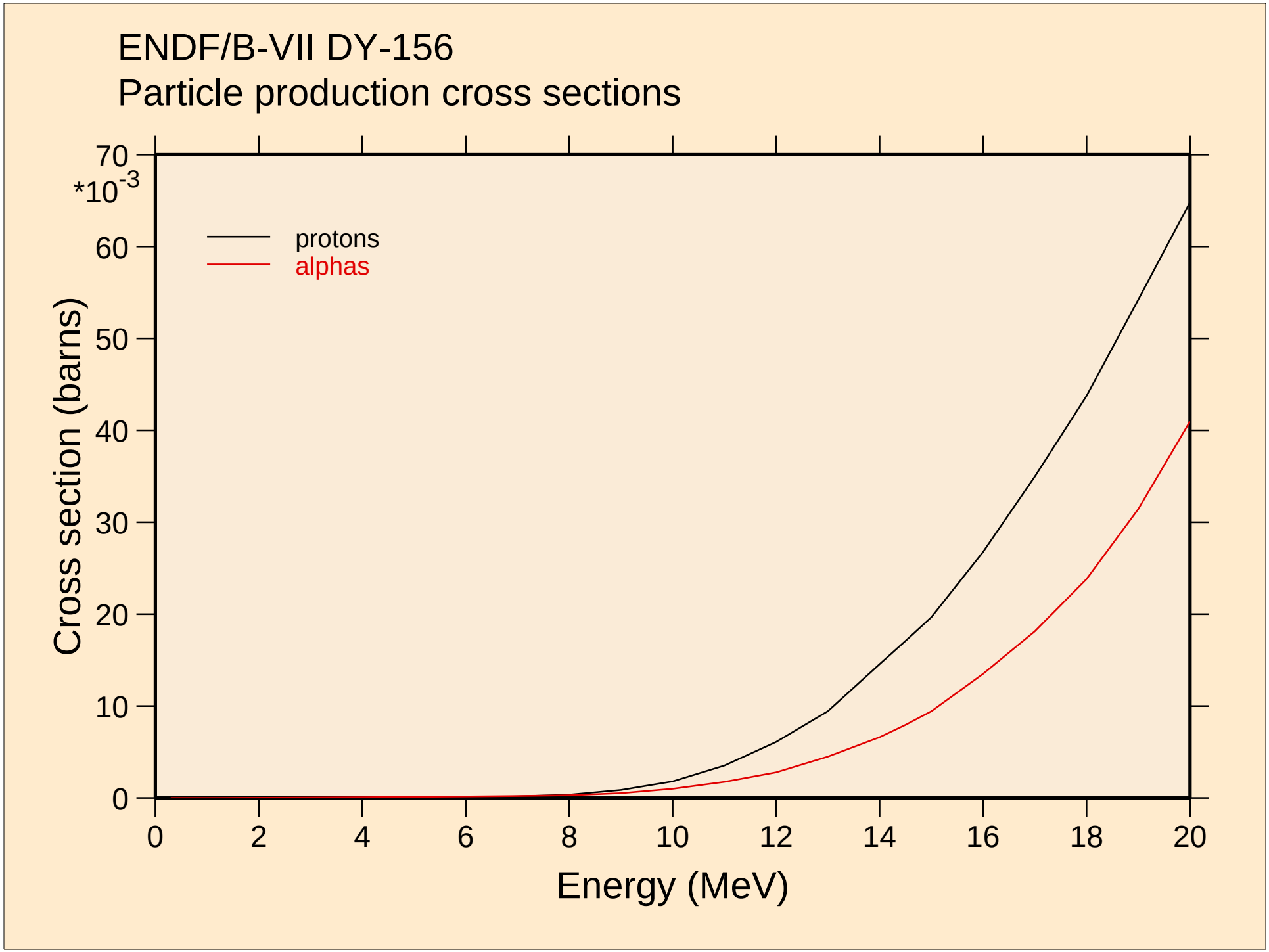

ENDF/B-VII DY-156
Photon emission for (n,a*c)
Prob/MeV
10-1
10-3
0
Eγ (MeV)
5
10
0
5
10
15
20
En (MeV)

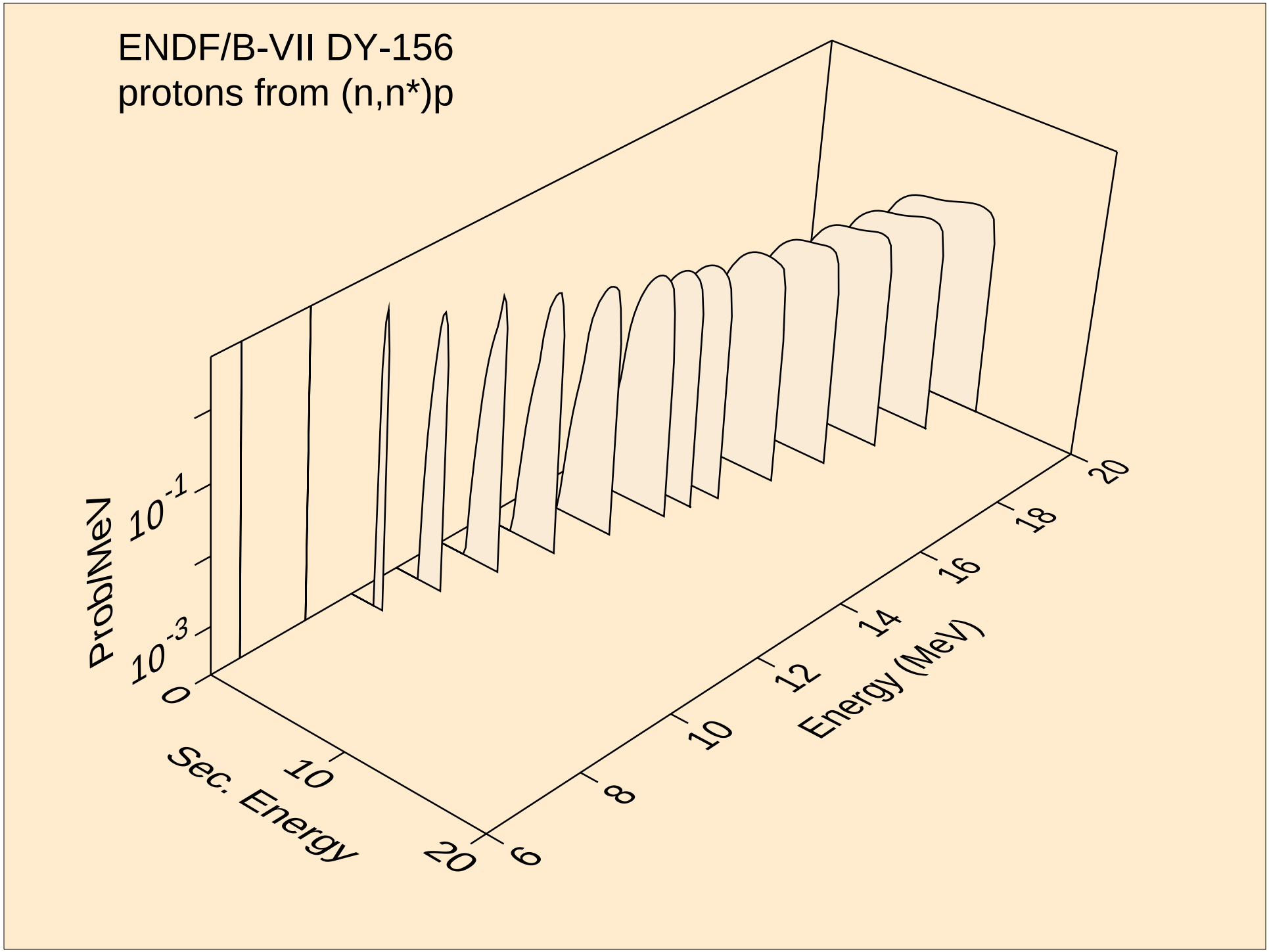

ENDF/B-VII DY-156
thermal capture photon spectrum
Gamma Prod (barns/MeV)
10^2
10^1
10^0
10^{-1}
0
2
4
6
8
Gamma Energy (MeV)

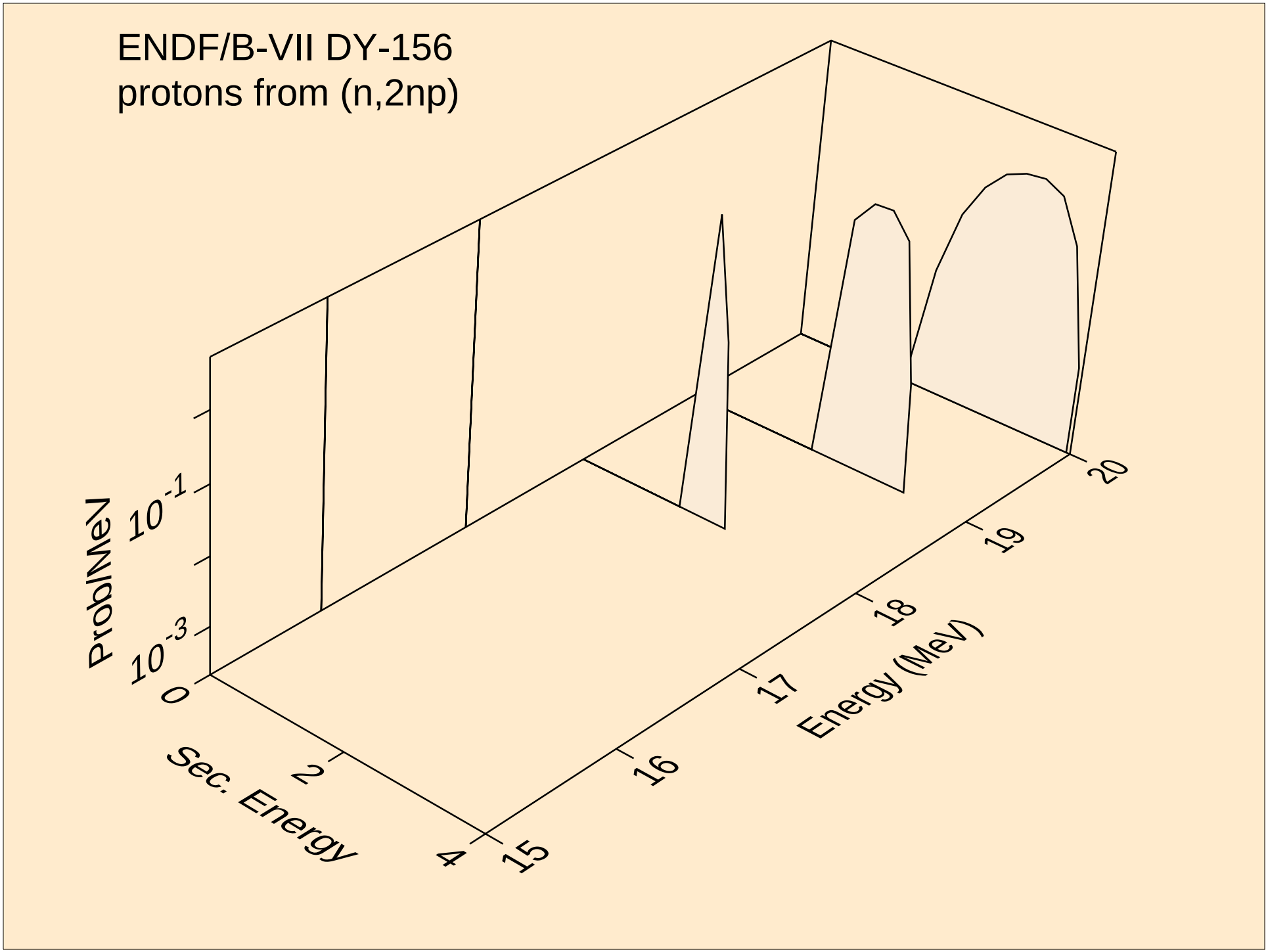

ENDF/B-VII DY-156
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^1
10^-1
10^-3
10^-5
10^-7
10^-9
10^-11
0
10
20
30
Gamma Energy (MeV)

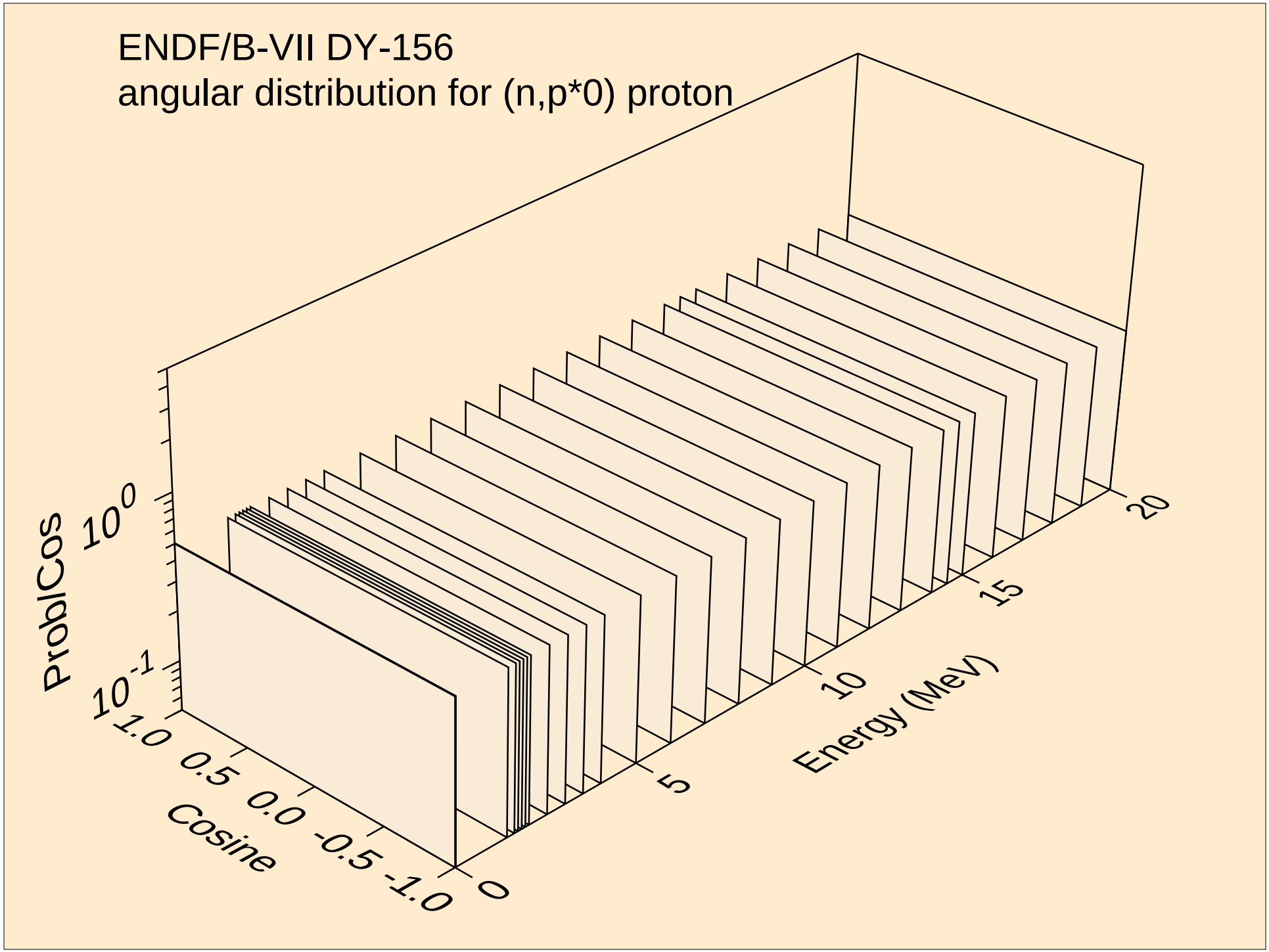

ENDF/B-VII DY-156
Particle heating contributions
protons
alphas
MeV/collision
*10-3
180
160
140
120
100
80
60
40
20
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

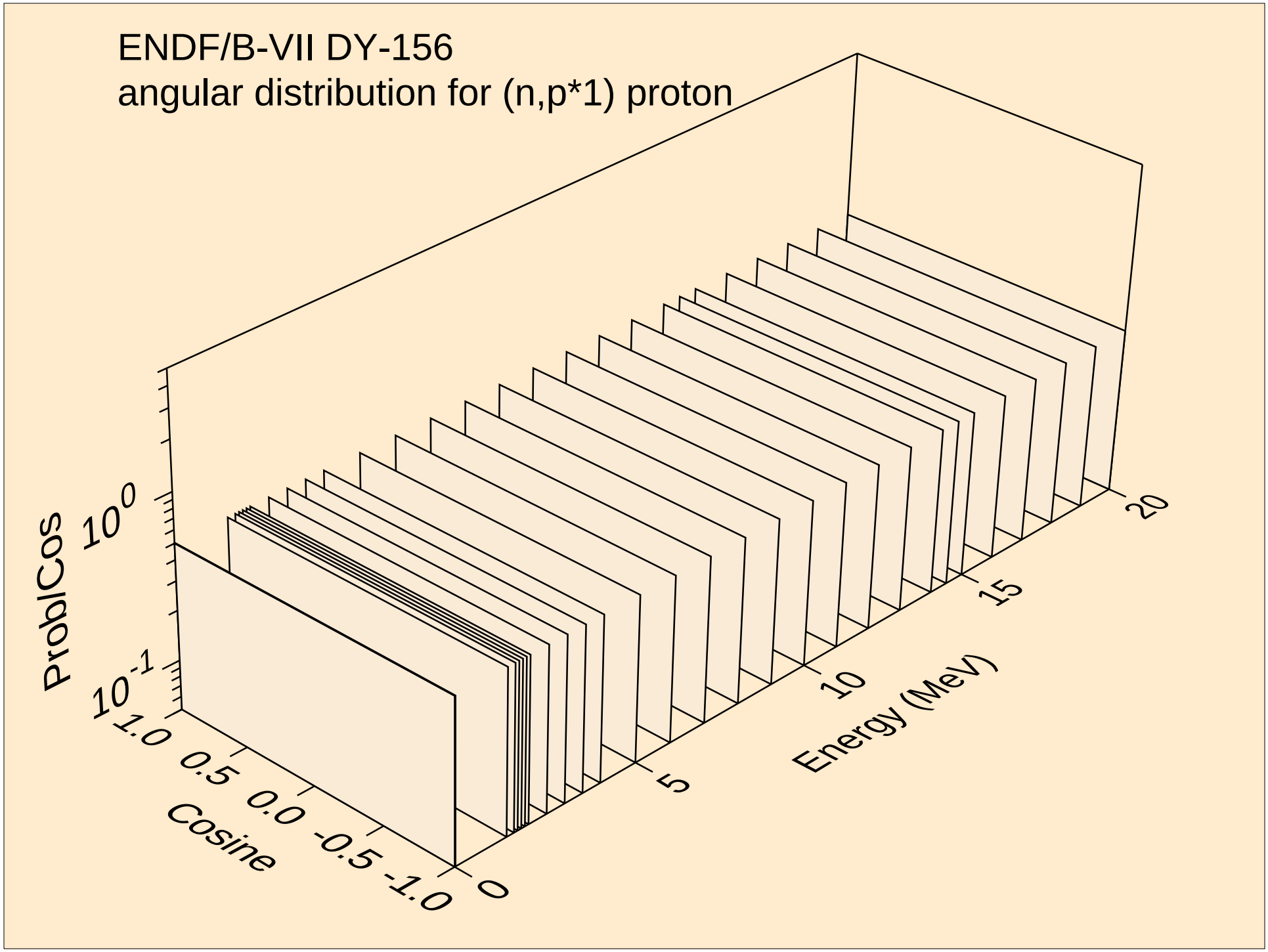

ENDF/B-VII DY-156
Recoil Heating
250
*10-3
200
150
100
50
0
recoil heating
Heating (MeV/reaction)
0
5
10
15
20
Energy (MeV)

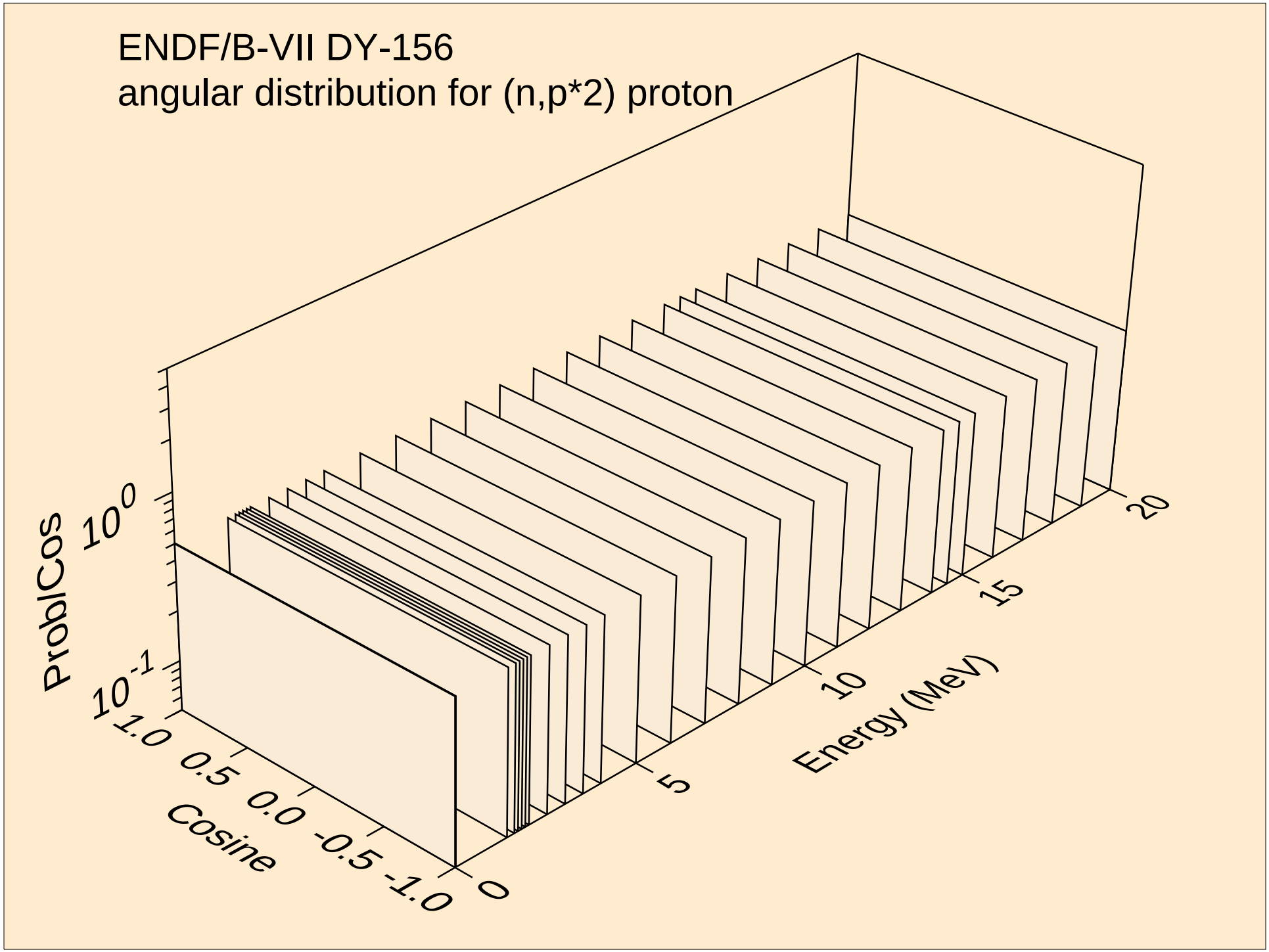

ENDF/B-VII DY-156
Particle production cross sections
protons
alphas
Cross section (barns)
*10-3
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

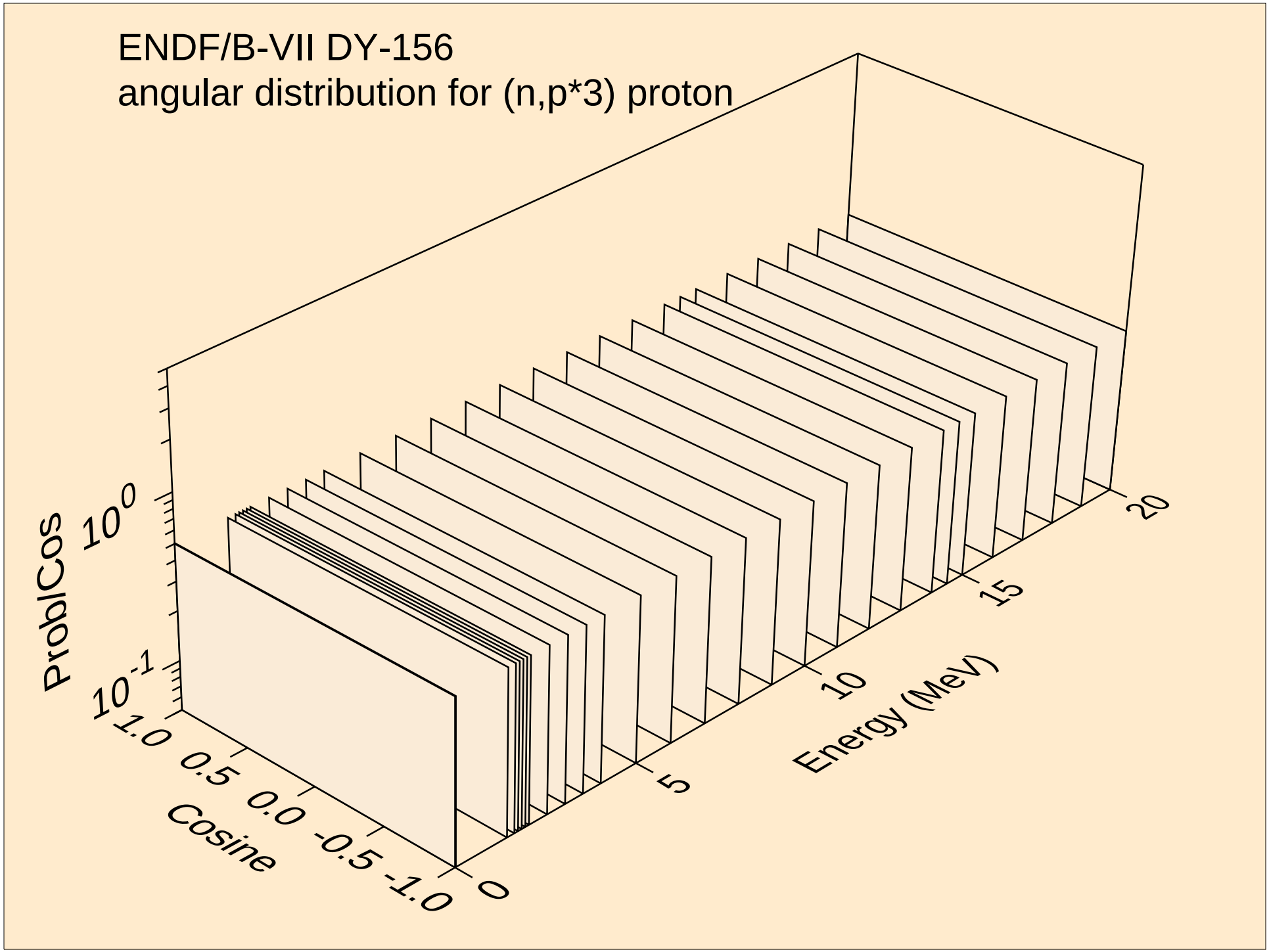

ENDF/B-VII DY-156
protons from (n,n*)p
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
6
8
10
12
14
16
18
20
Energy (MeV)

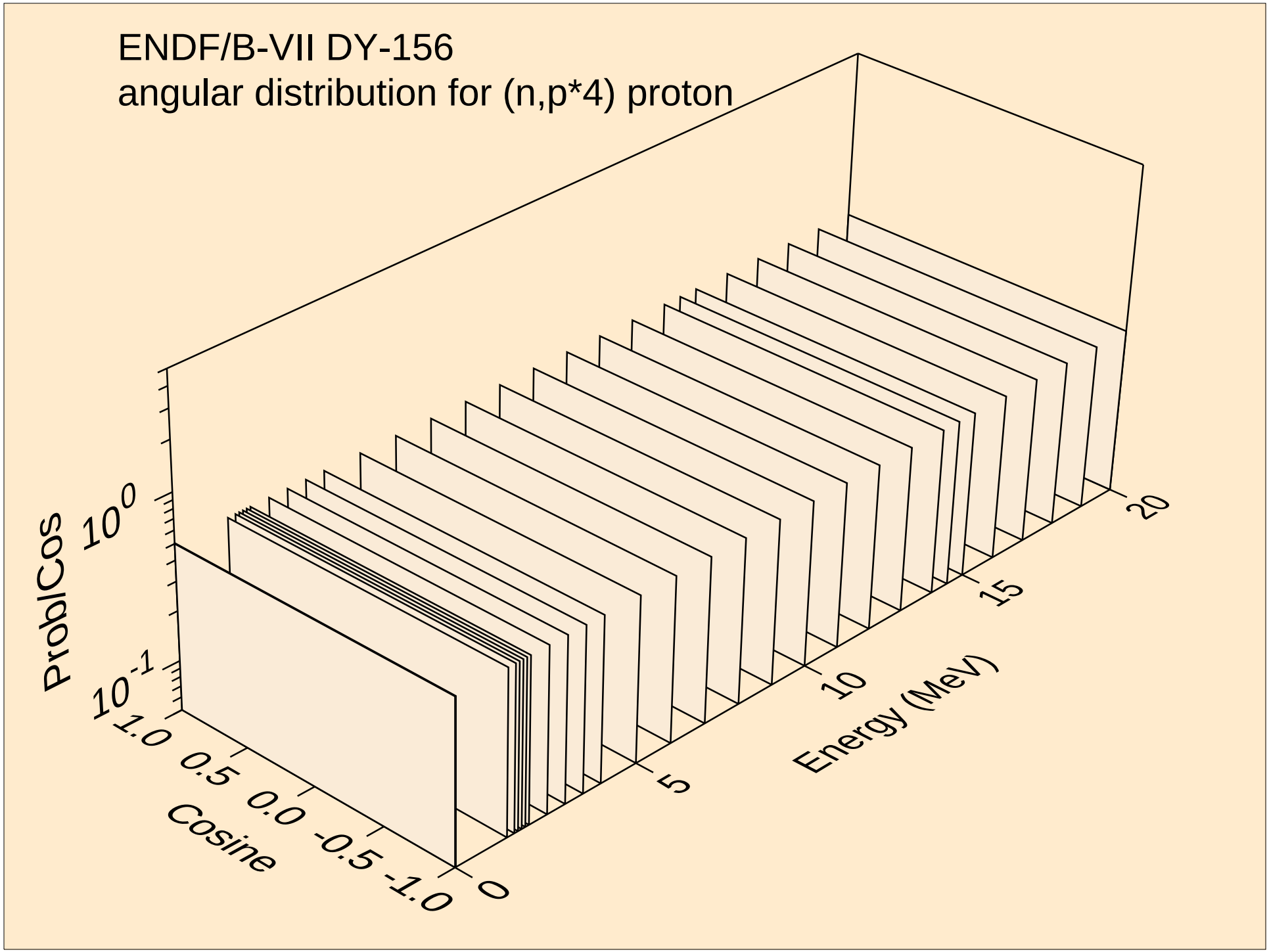

ENDF/B-VII DY-156
protons from (n,2np)
Prob/MeV
10-1
10-3
0
Sec. Energy
2
4
15
16
17
18
19
20
Energy (MeV)

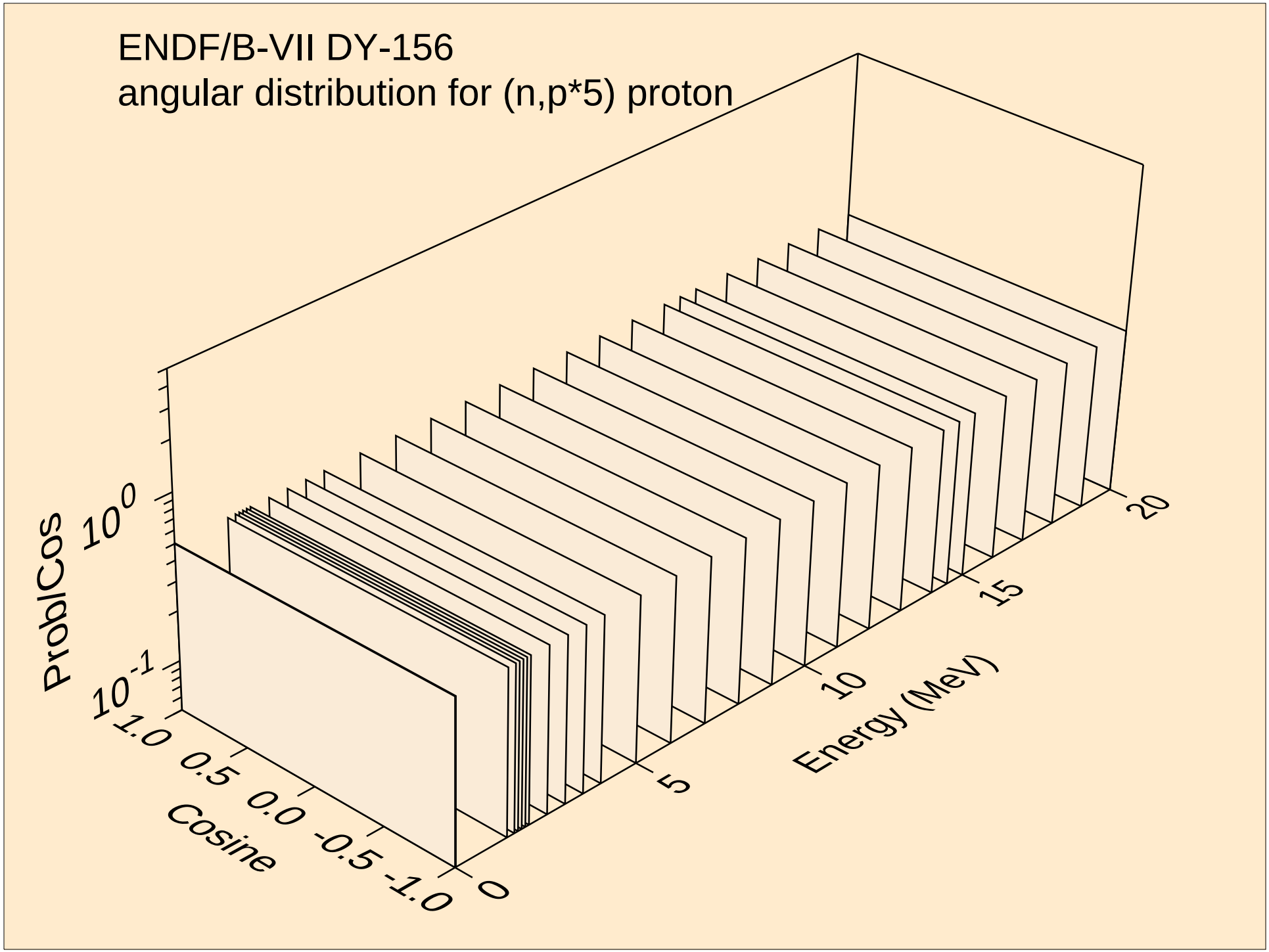

ENDF/B-VII DY-156
angular distribution for (n,p*0) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

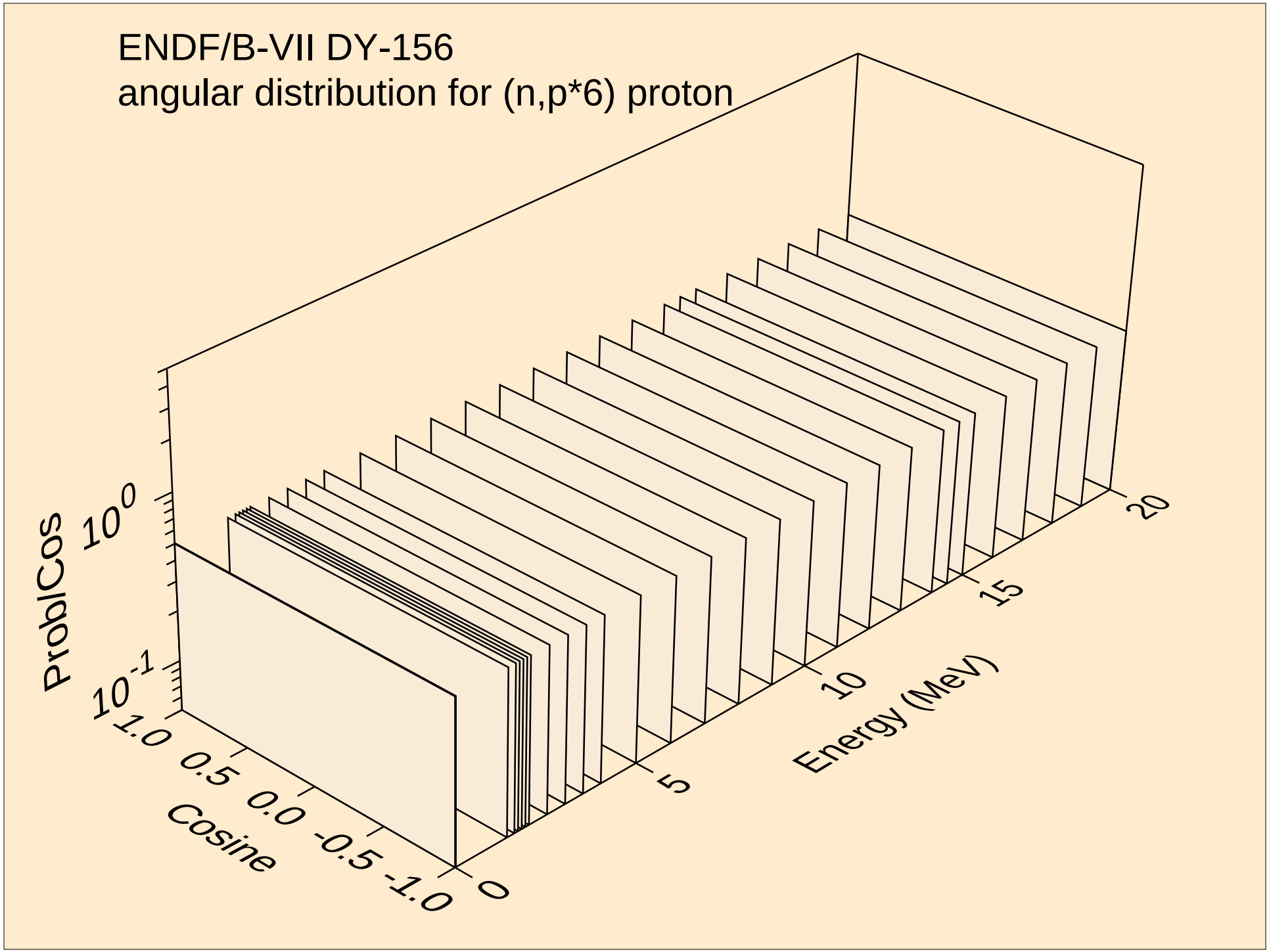

ENDF/B-VII DY-156
angular distribution for (n,p*1) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

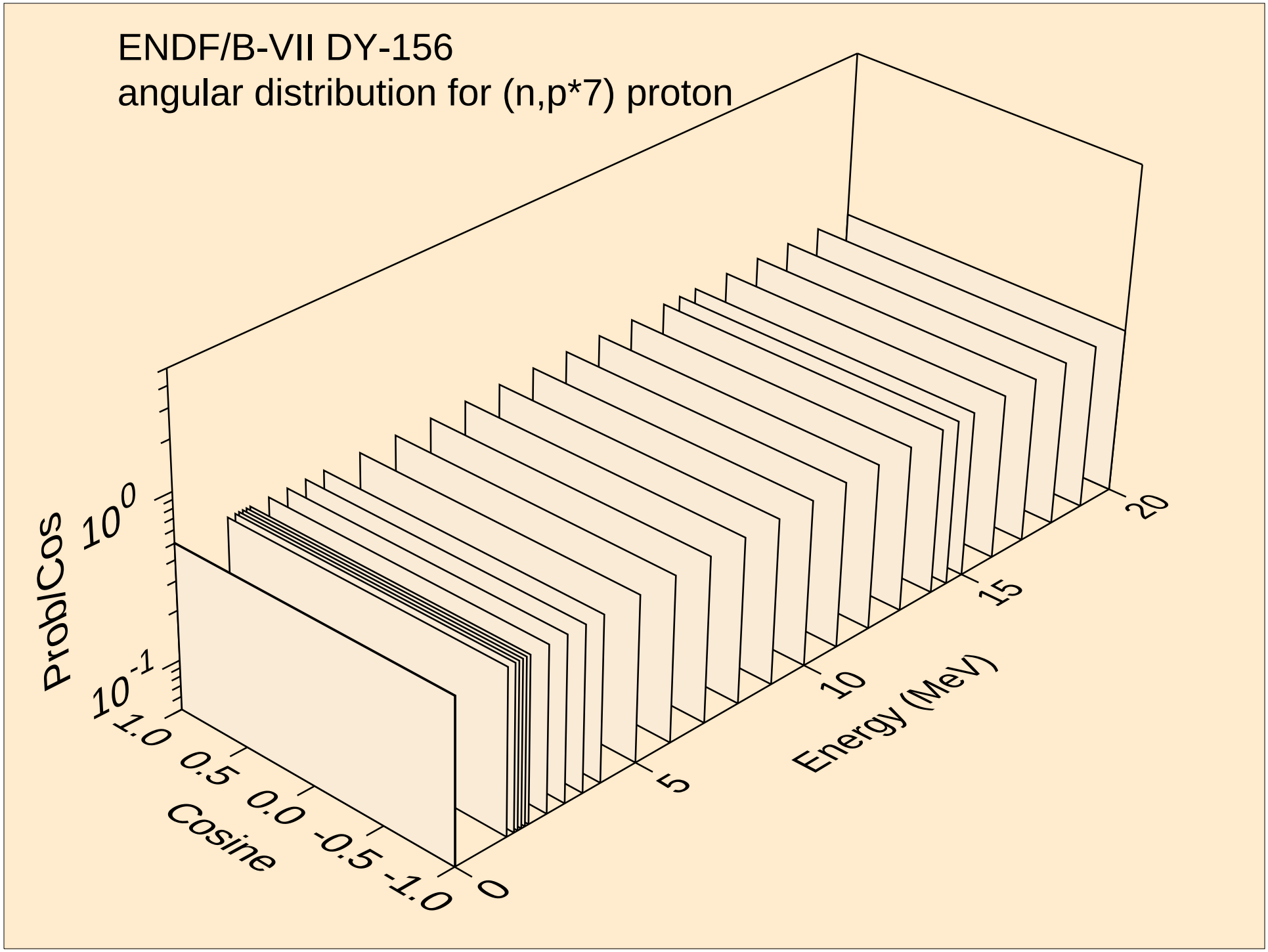

ENDF/B-VII DY-156
angular distribution for (n,p*2) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

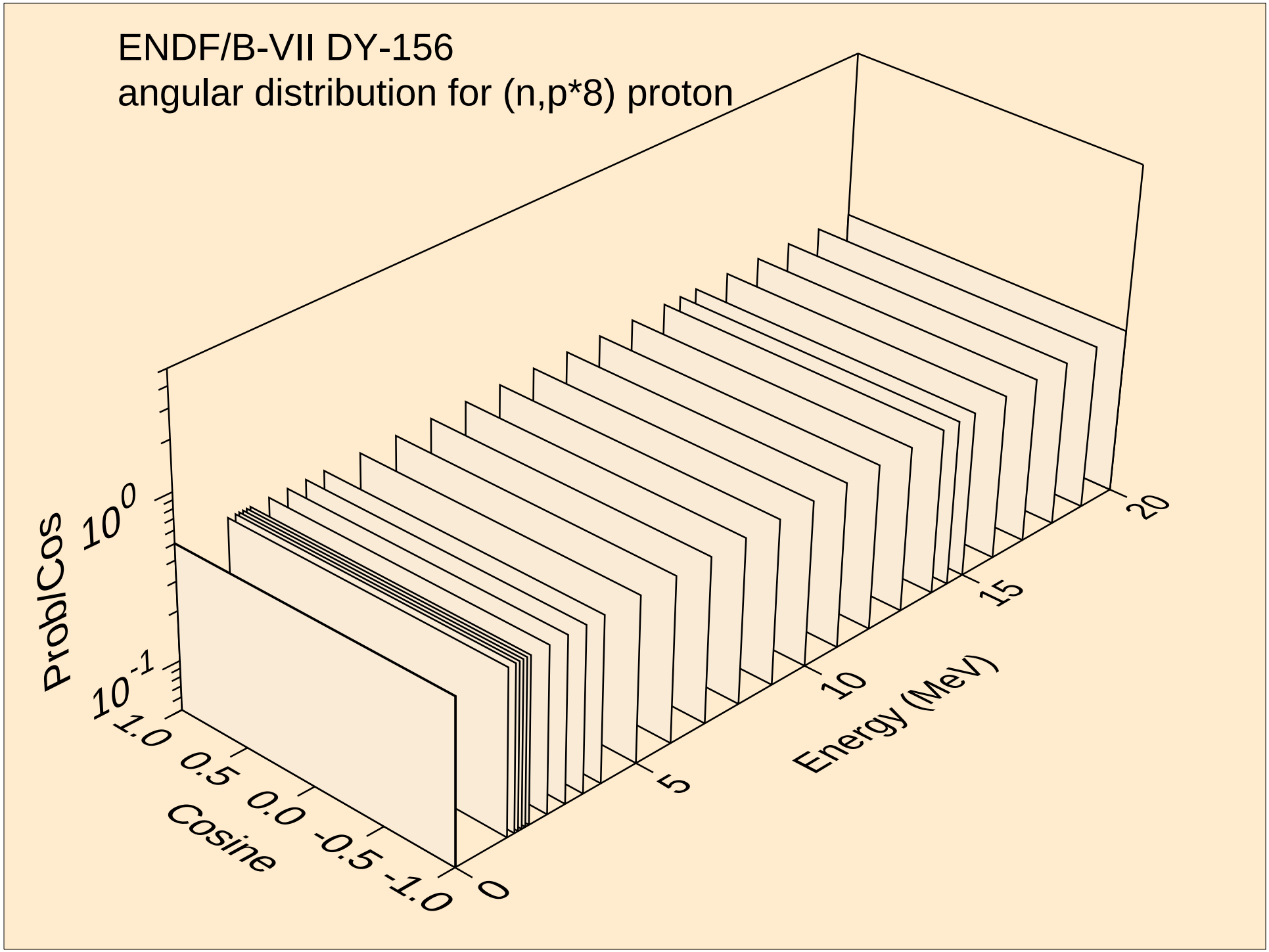

ENDF/B-VII DY-156
angular distribution for (n,p*3) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

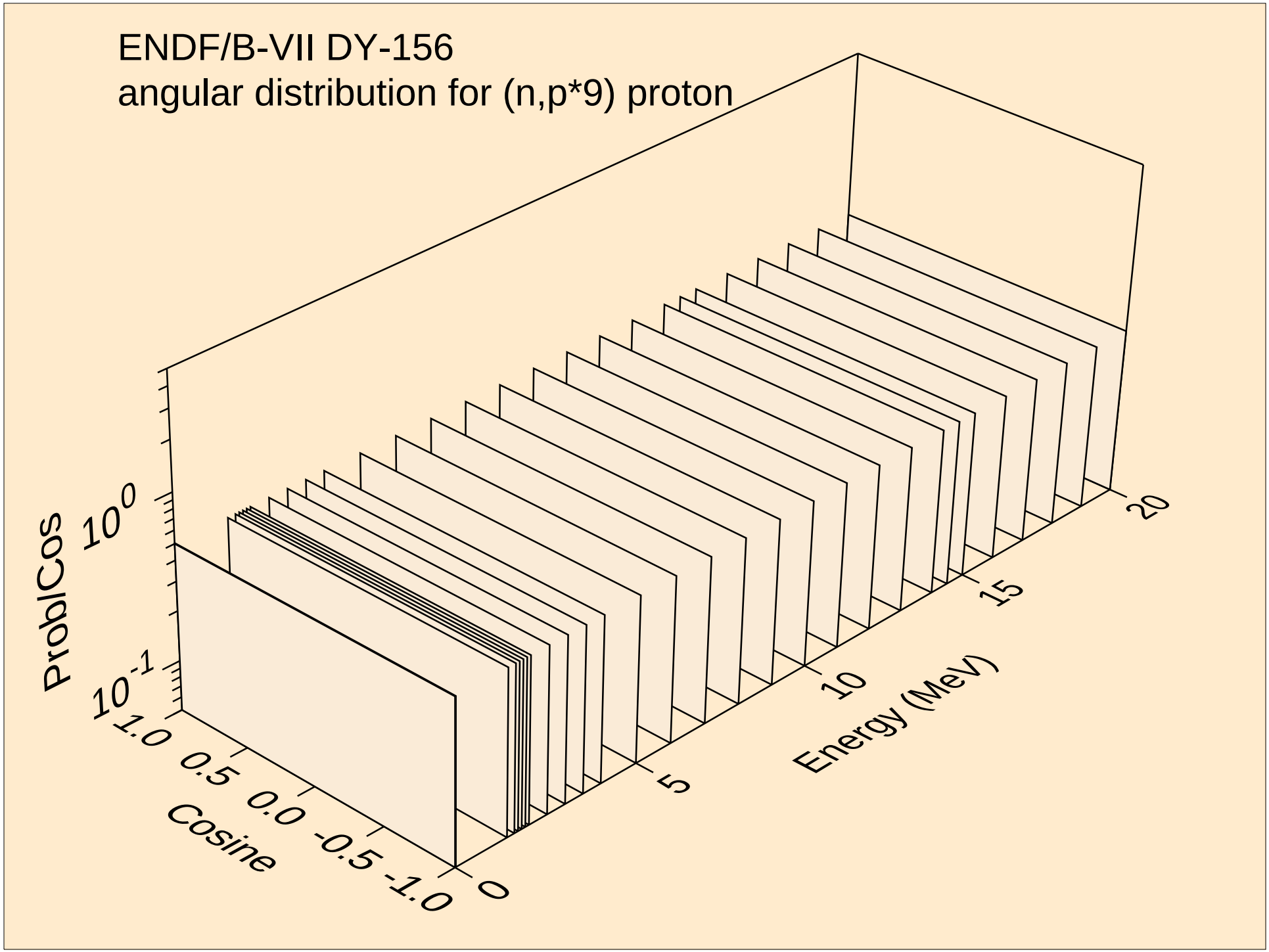

ENDF/B-VII DY-156
angular distribution for (n,p*4) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

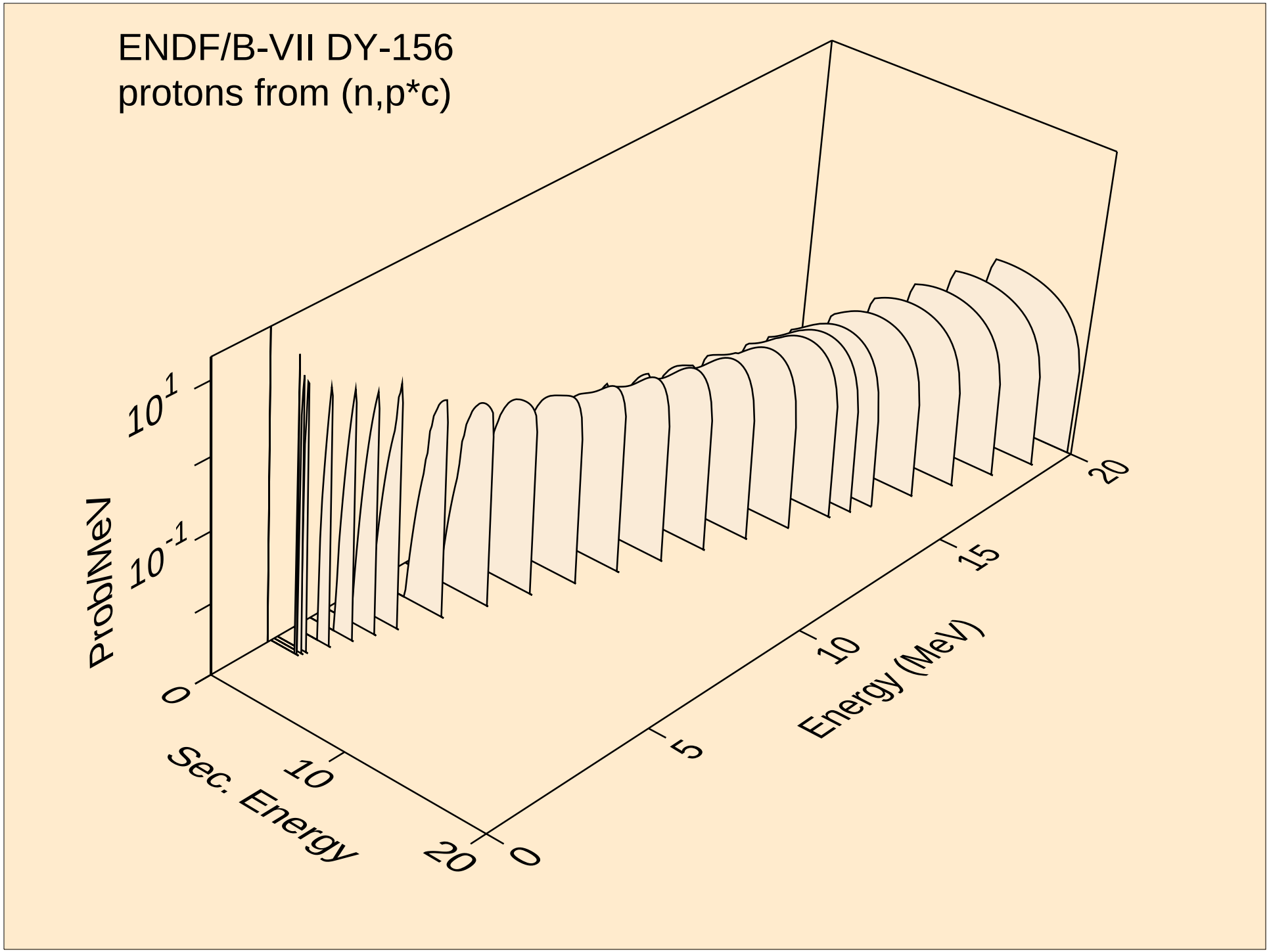

ENDF/B-VII DY-156
angular distribution for (n,p*5) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

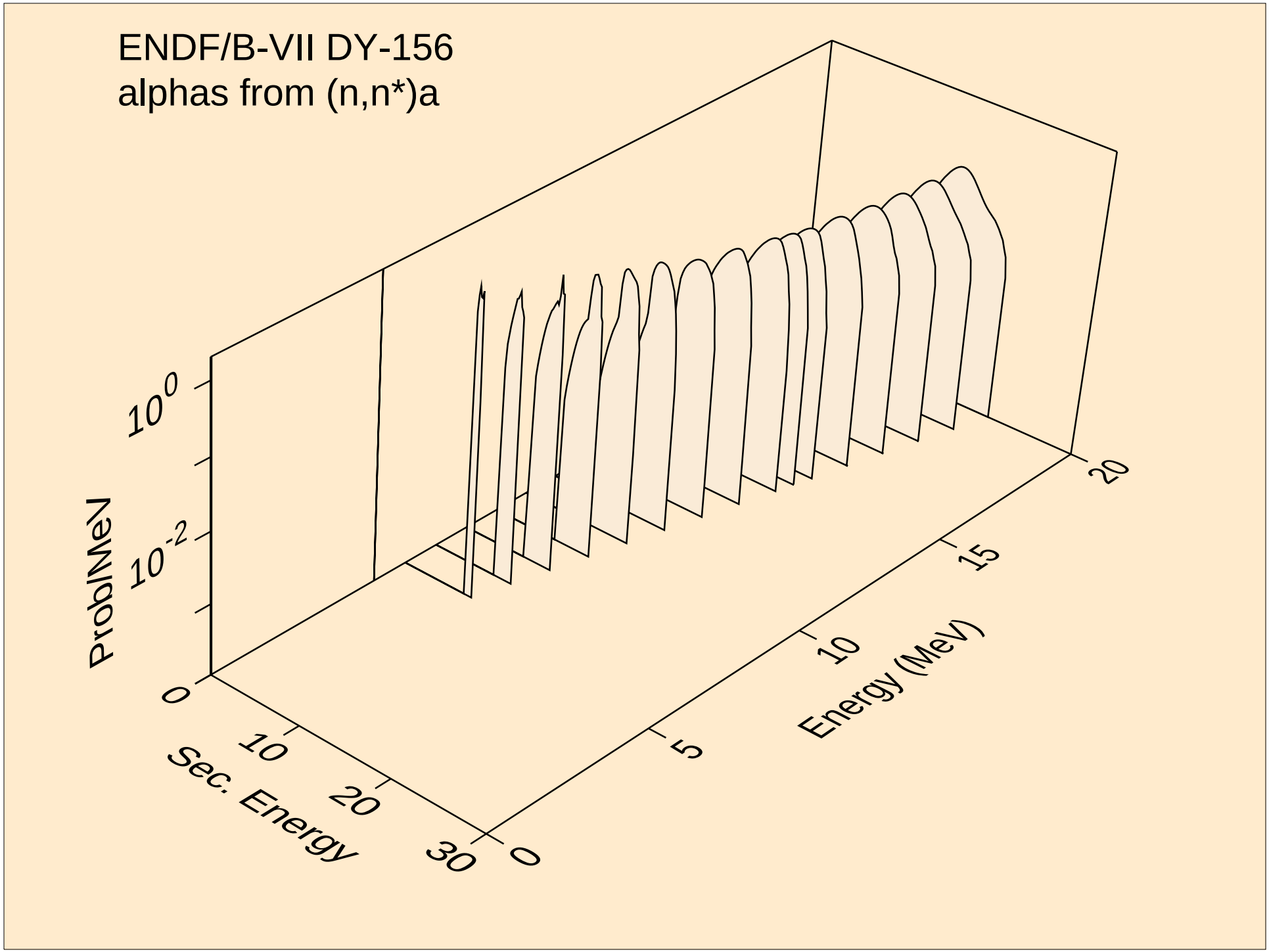

ENDF/B-VII DY-156
angular distribution for (n,p*6) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

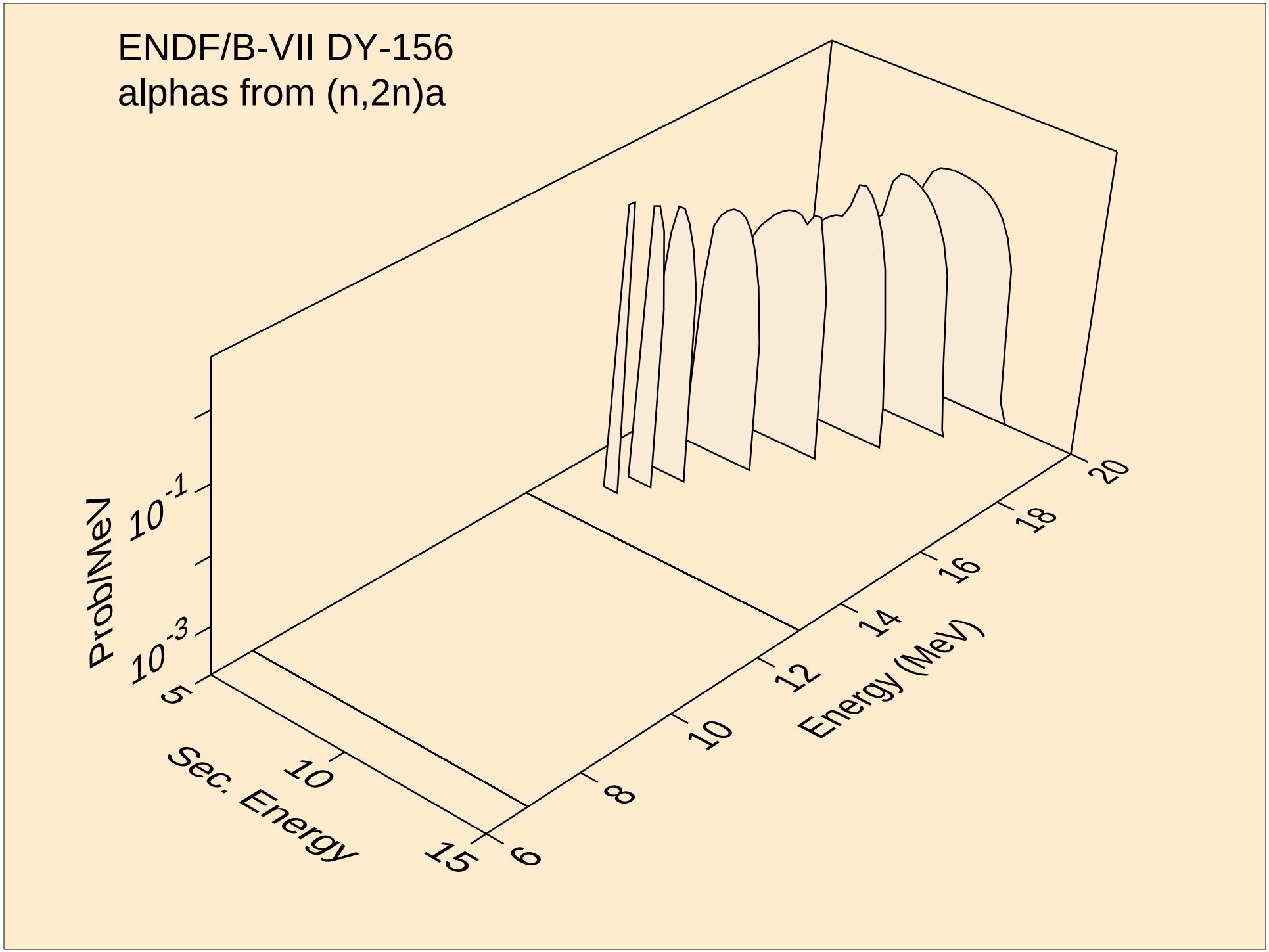

ENDF/B-VII DY-156
angular distribution for (n,p*7) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

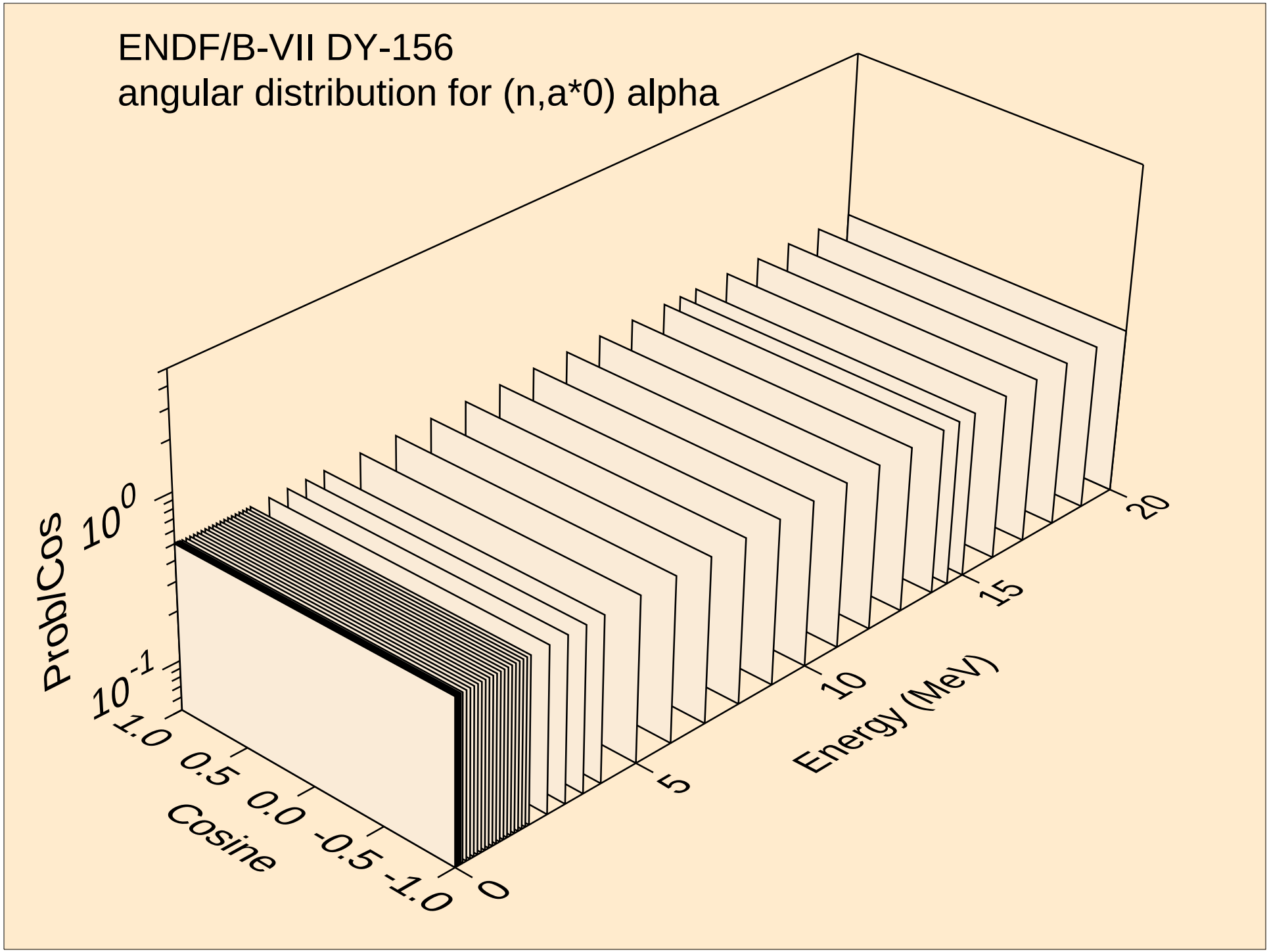

ENDF/B-VII DY-156
angular distribution for (n,p*8) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

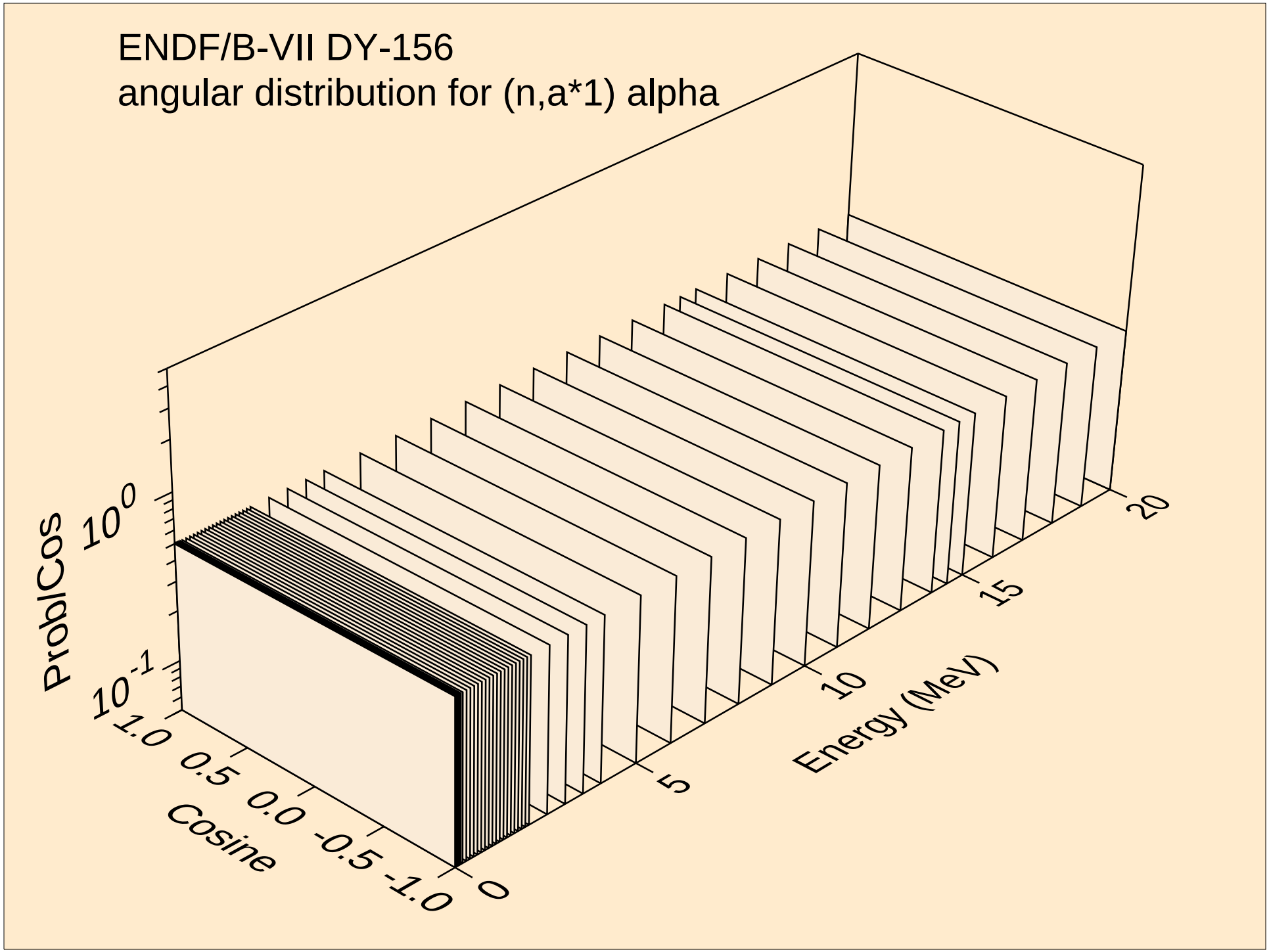

ENDF/B-VII DY-156
angular distribution for (n,p*9) proton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

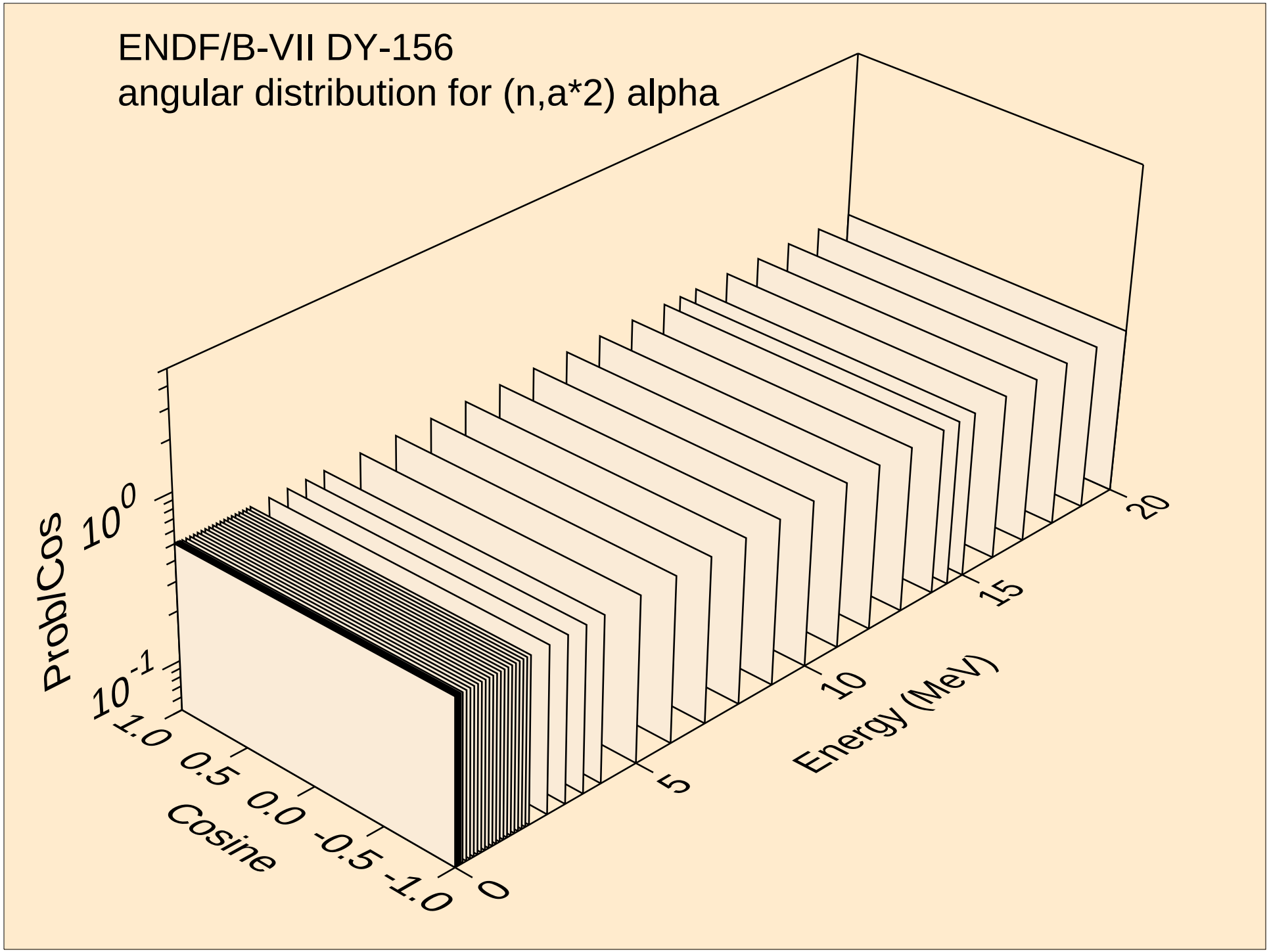

ENDF/B-VII DY-156
protons from (n,p*c)
Prob/MeV
10^{1}
10^{-1}
0
10
Sec. Energy
20
0
5
10
15
20
Energy (MeV)

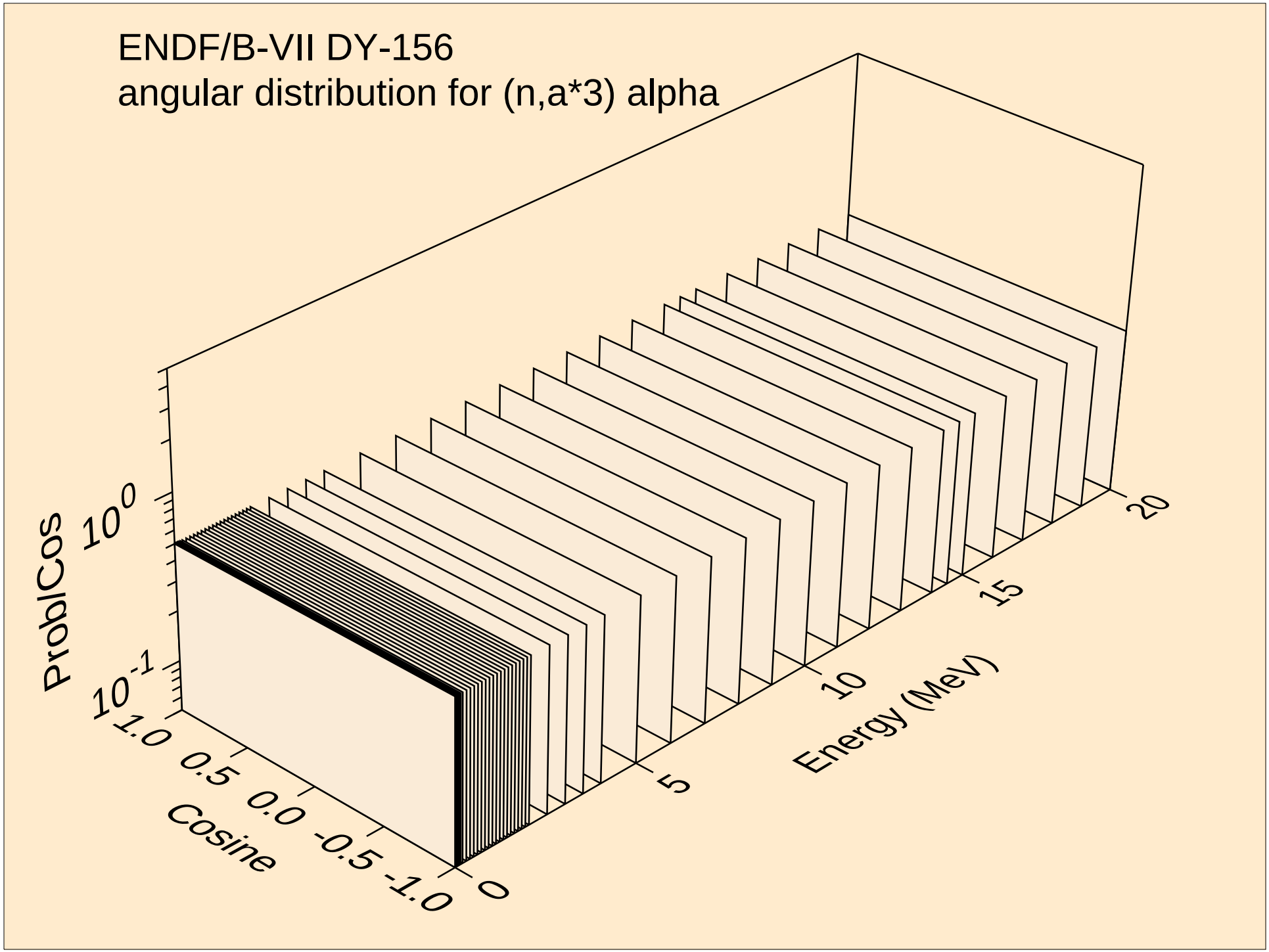

ENDF/B-VII DY-156
alphas from (n,n*)a
Prob/MeV
10^{0}
10^{-2}
0
10
20
30
Sec. Energy
0
5
10
15
20
Energy (MeV)

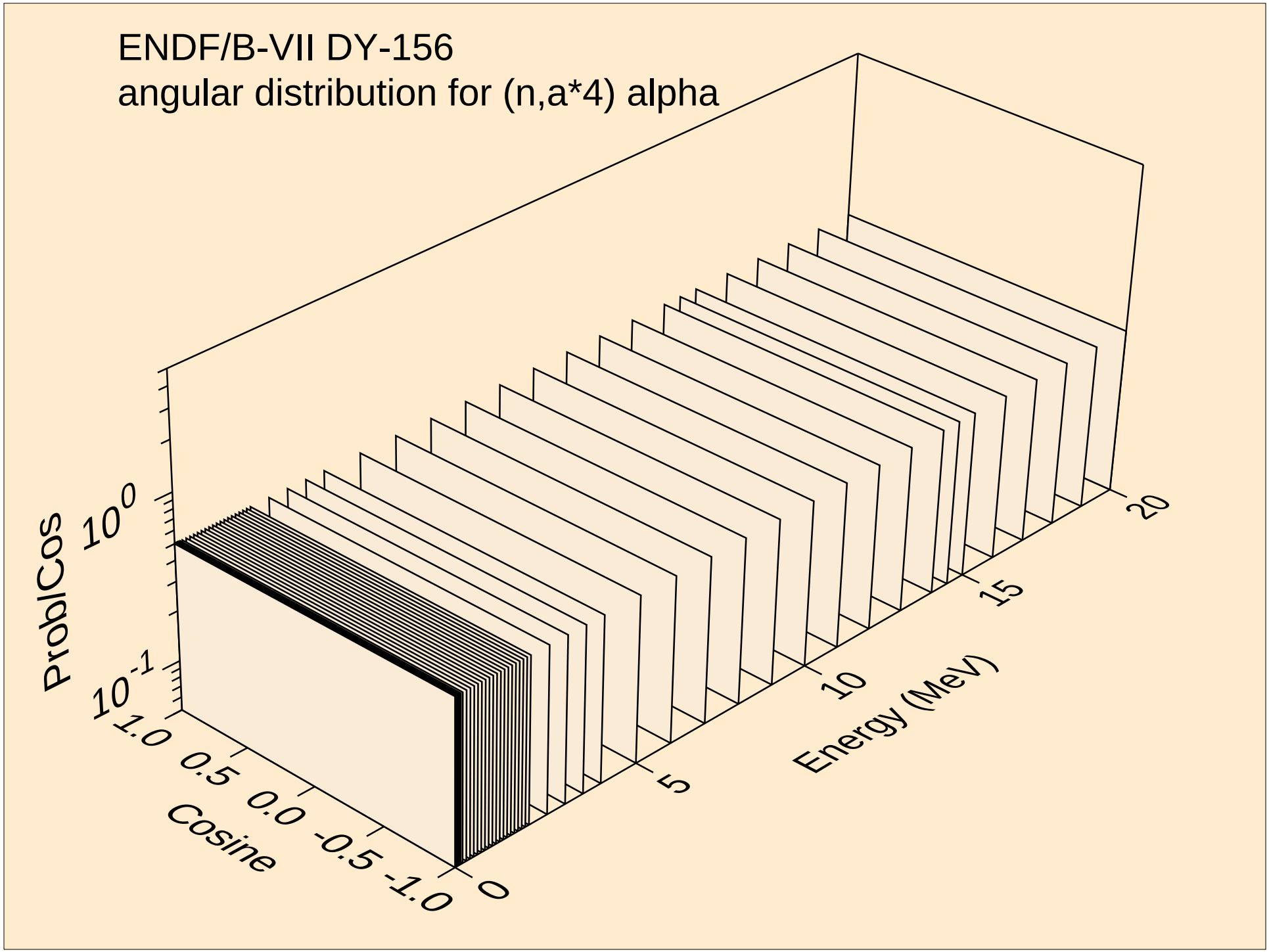

ENDF/B-VII DY-156
alphas from (n,2n)a
Prob/MeV
10^-1
10^-3
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

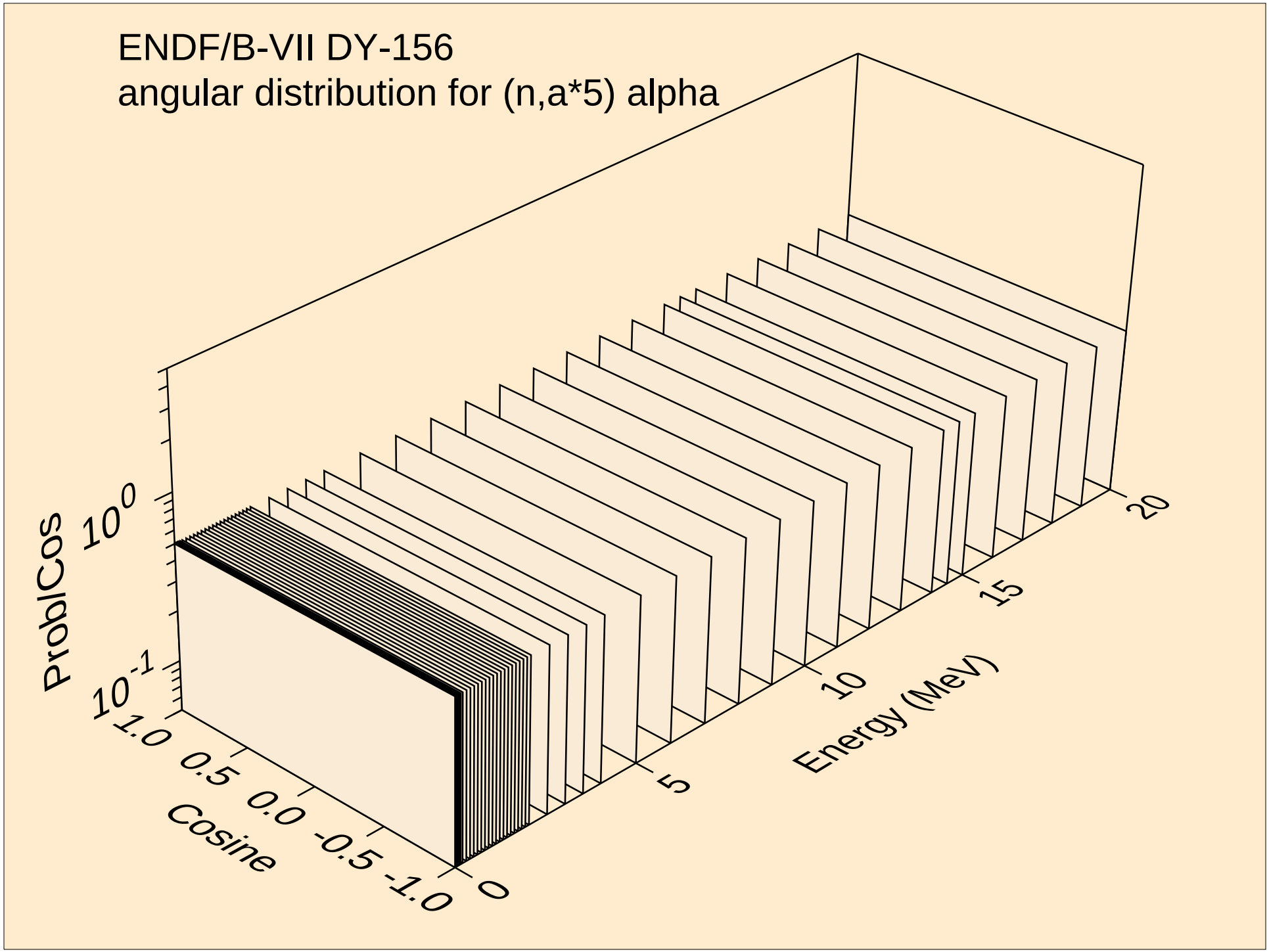

ENDF/B-VII DY-156
angular distribution for (n,a*0) alpha
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

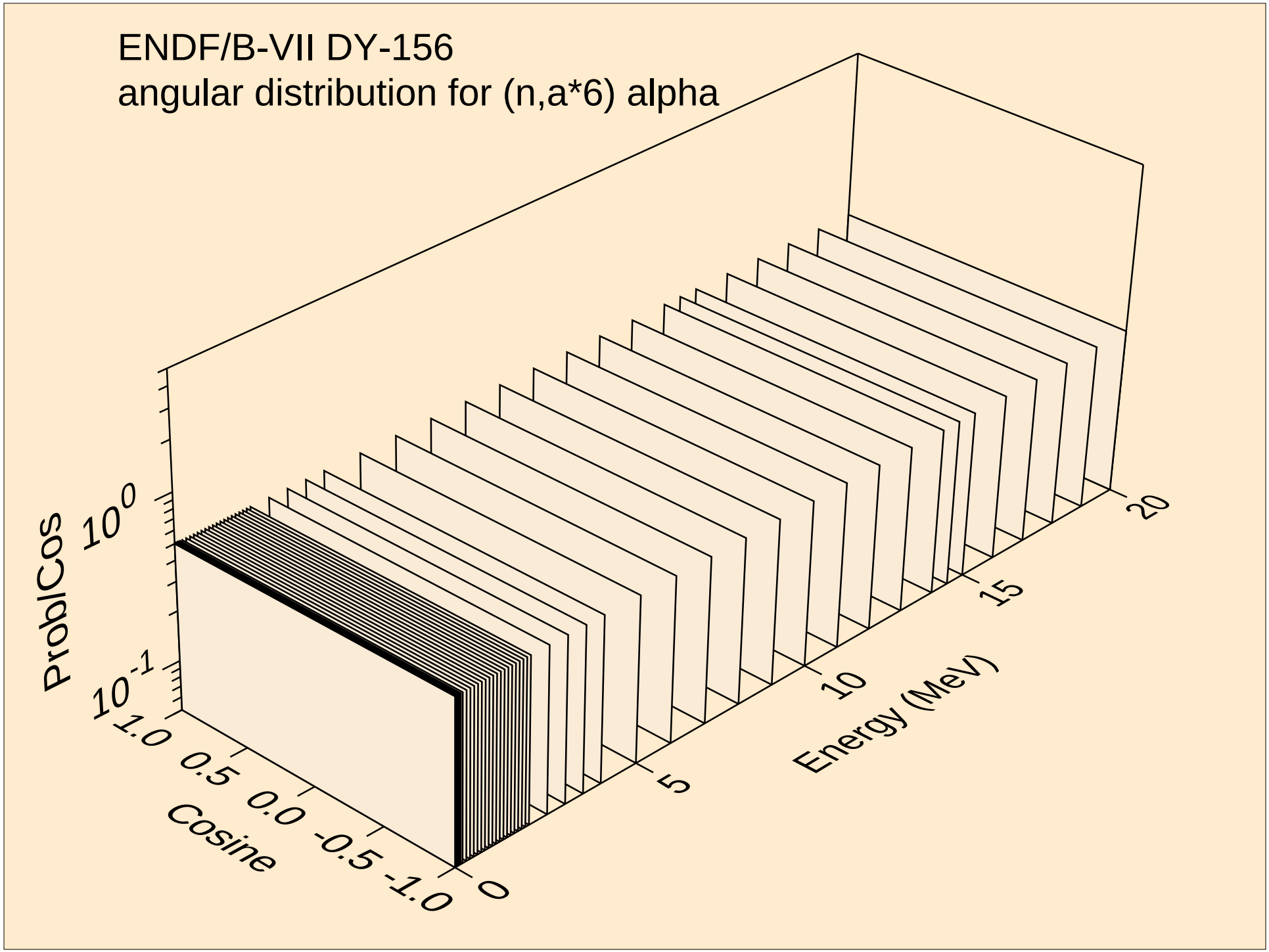

ENDF/B-VII DY-156
angular distribution for (n,a*1) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

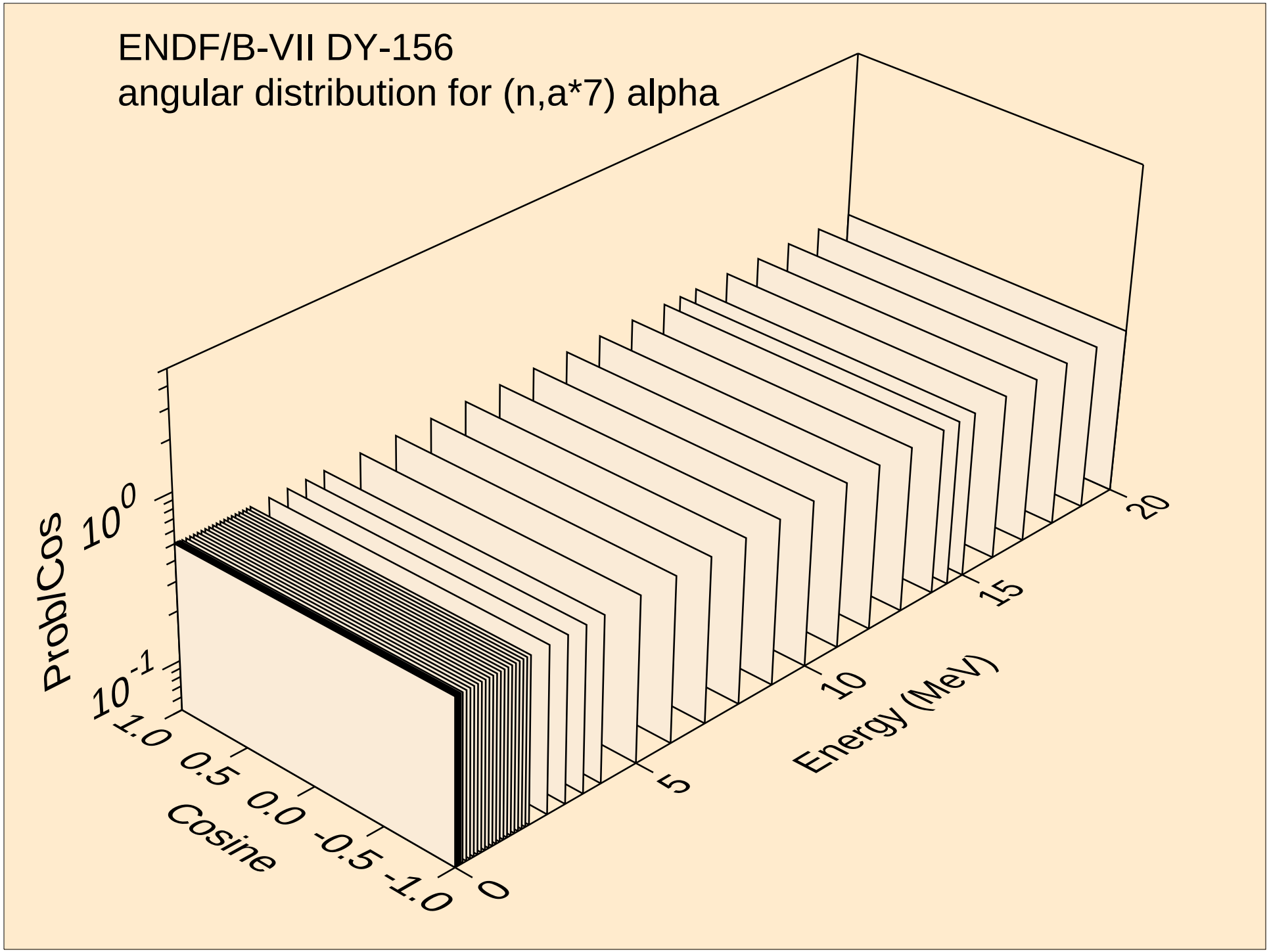

ENDF/B-VII DY-156
angular distribution for (n,a*2) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

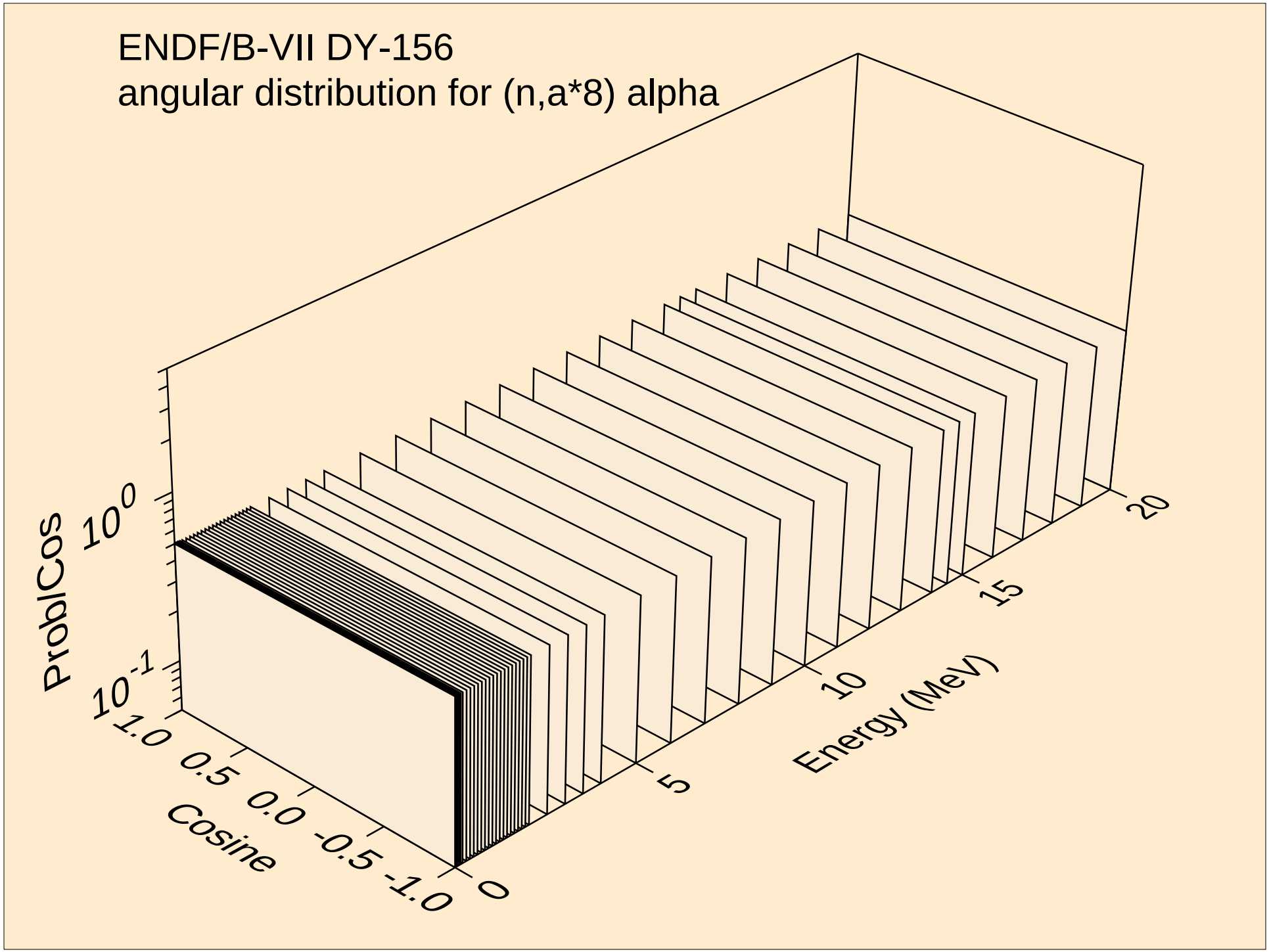

ENDF/B-VII DY-156
angular distribution for (n,a*3) alpha
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

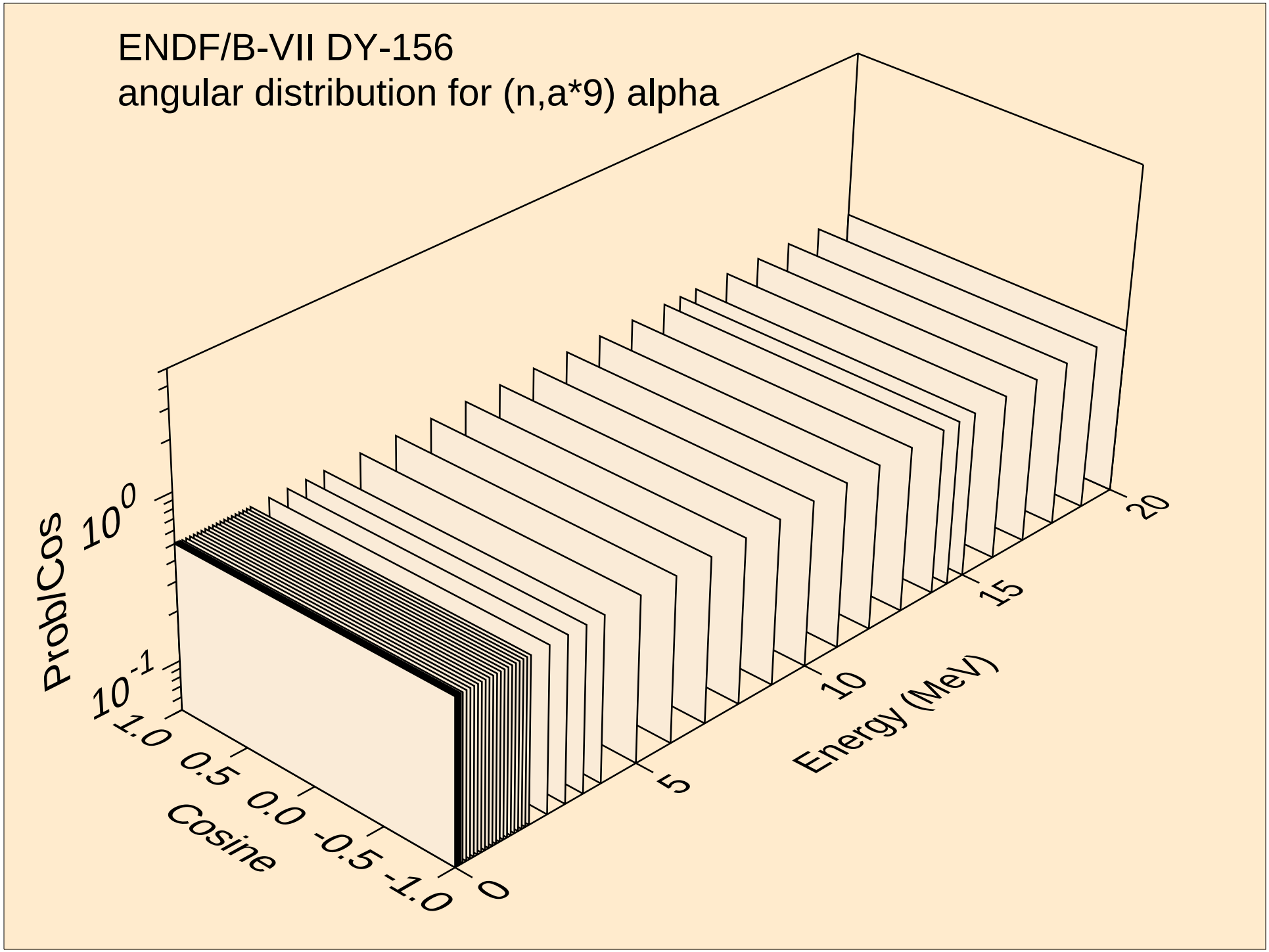

ENDF/B-VII DY-156
angular distribution for (n,a*4) alpha
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

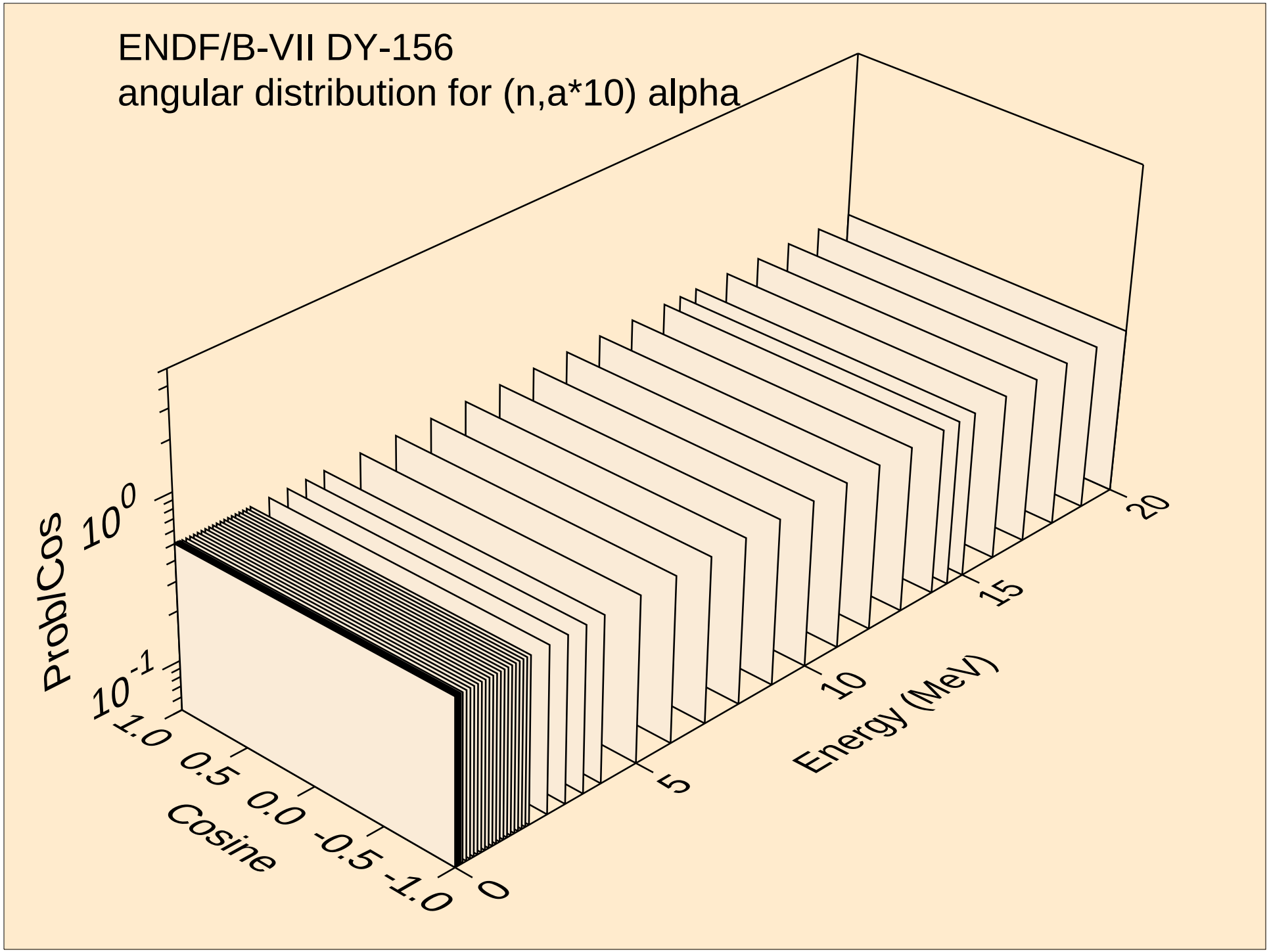

ENDF/B-VII DY-156
angular distribution for (n,a*5) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

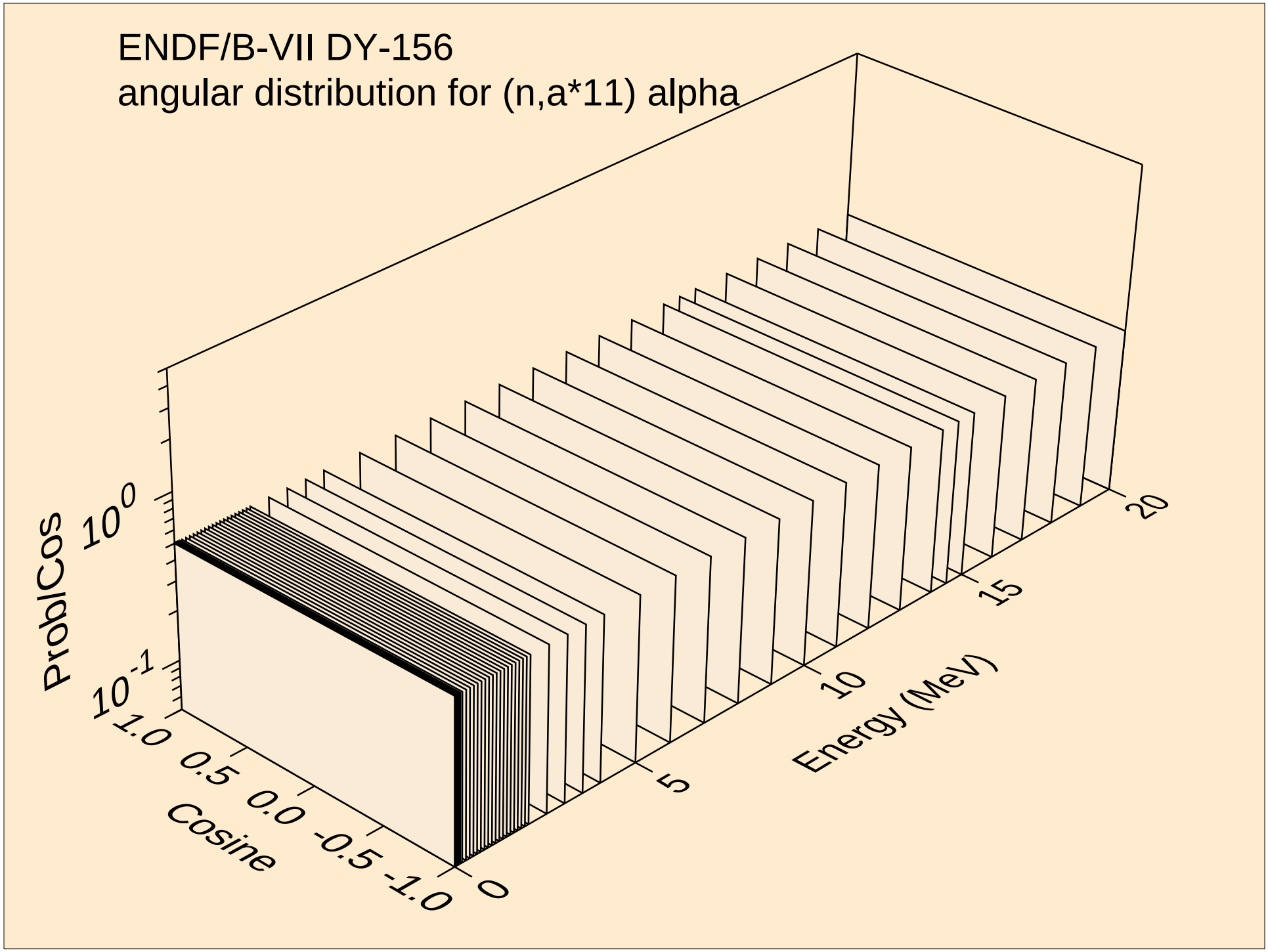

ENDF/B-VII DY-156
angular distribution for (n,a*6) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

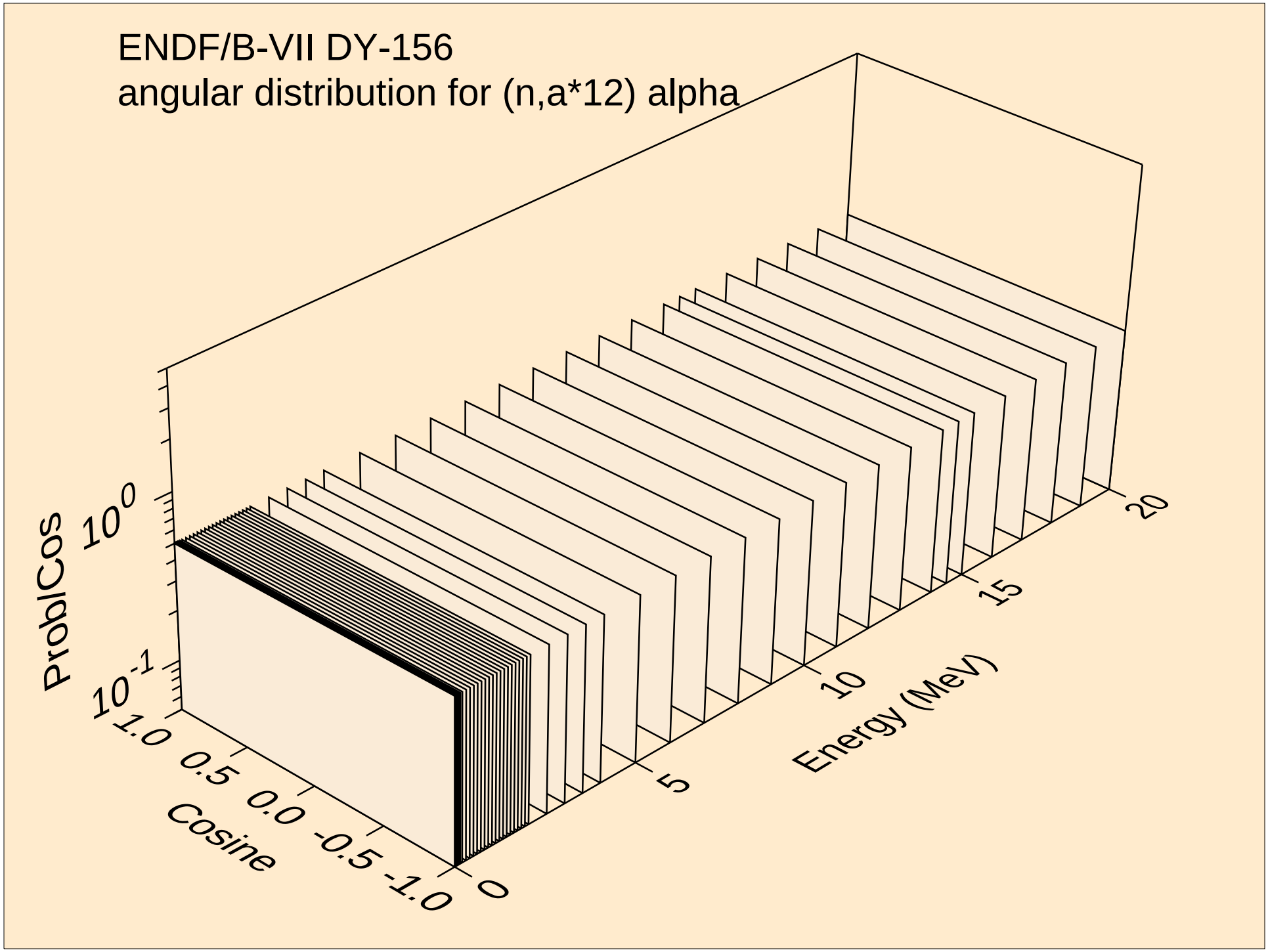

ENDF/B-VII DY-156
angular distribution for (n,a*7) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

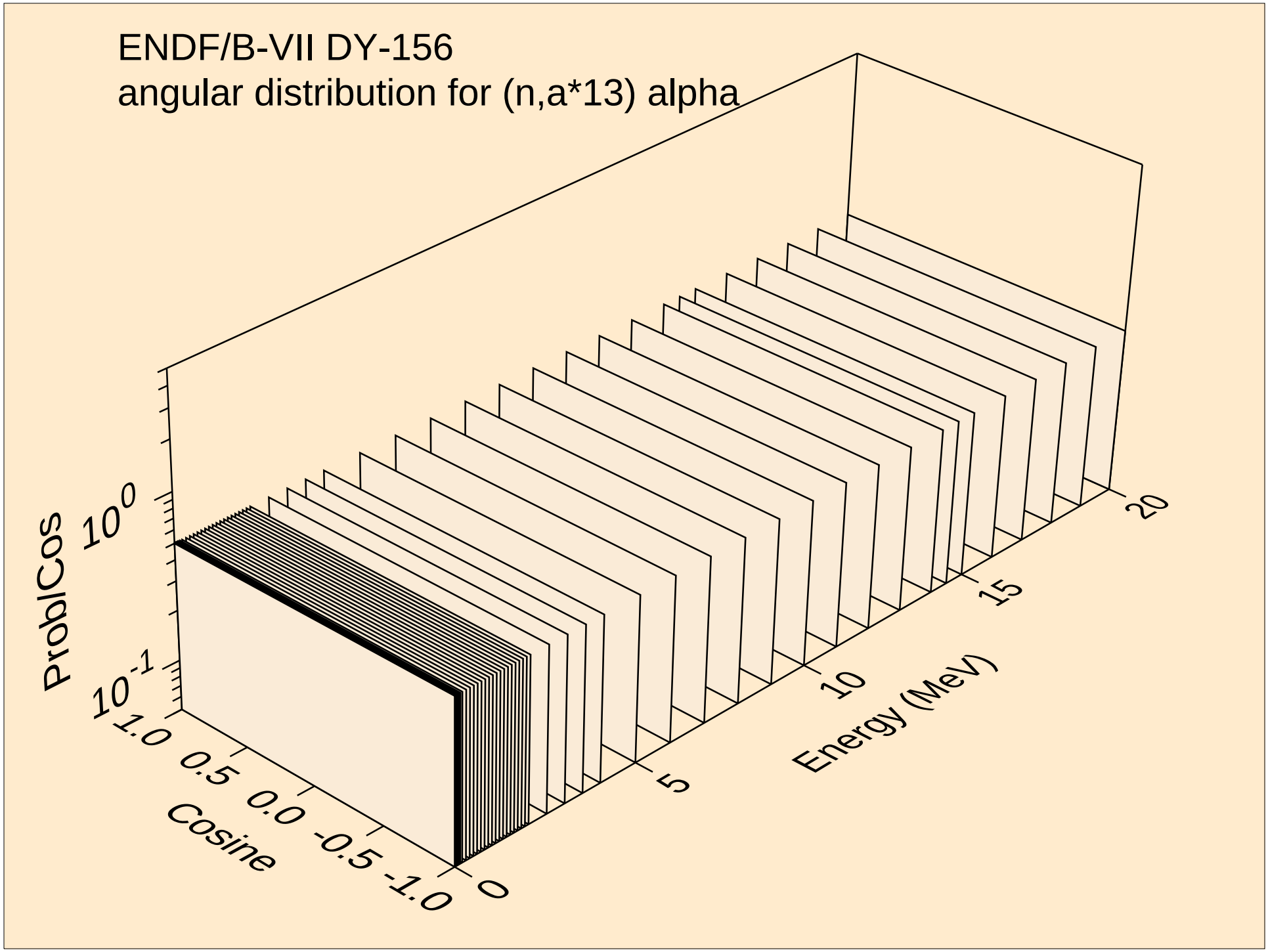

ENDF/B-VII DY-156
angular distribution for (n,a*8) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

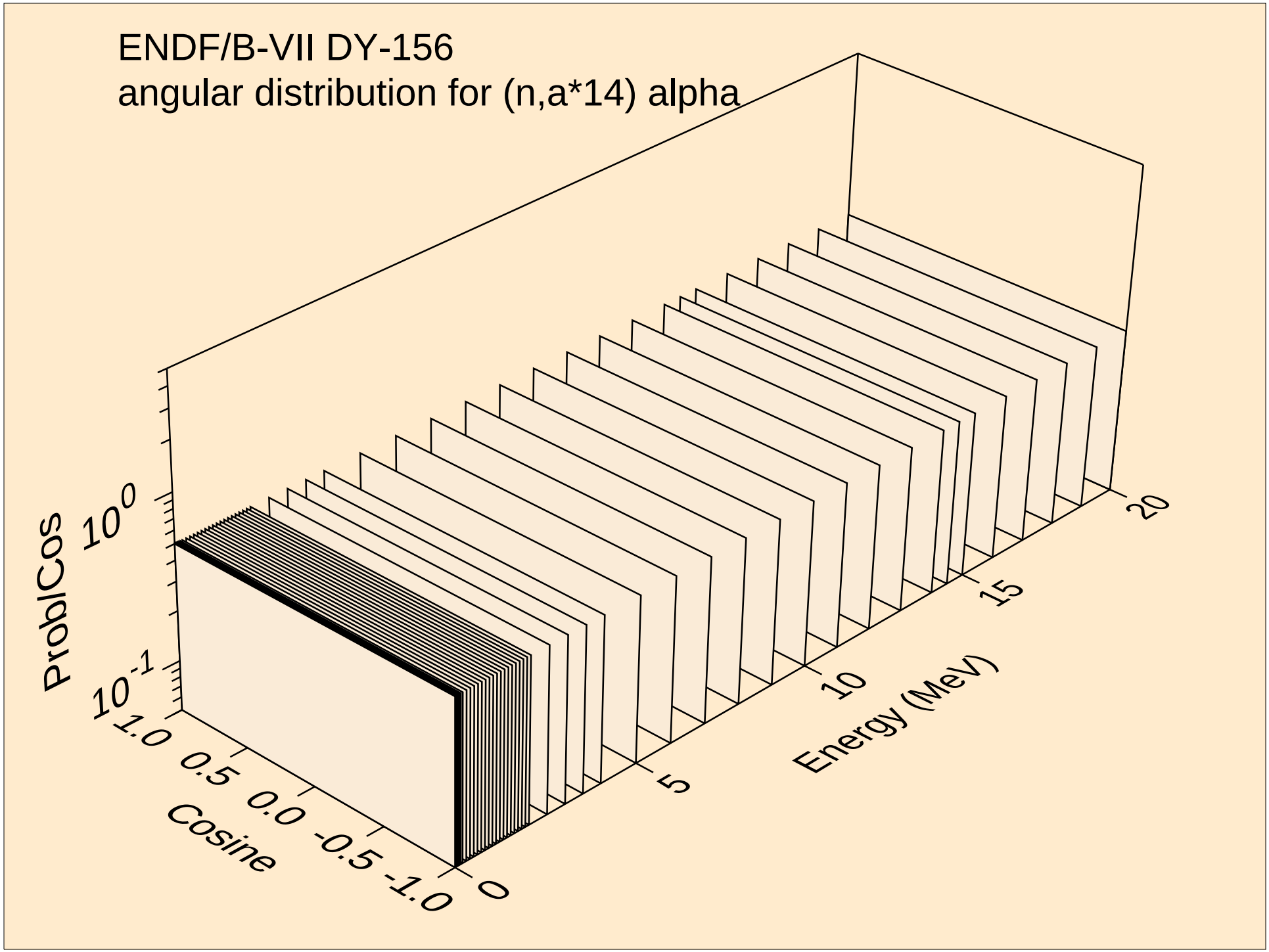

ENDF/B-VII DY-156
angular distribution for (n,a*9) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

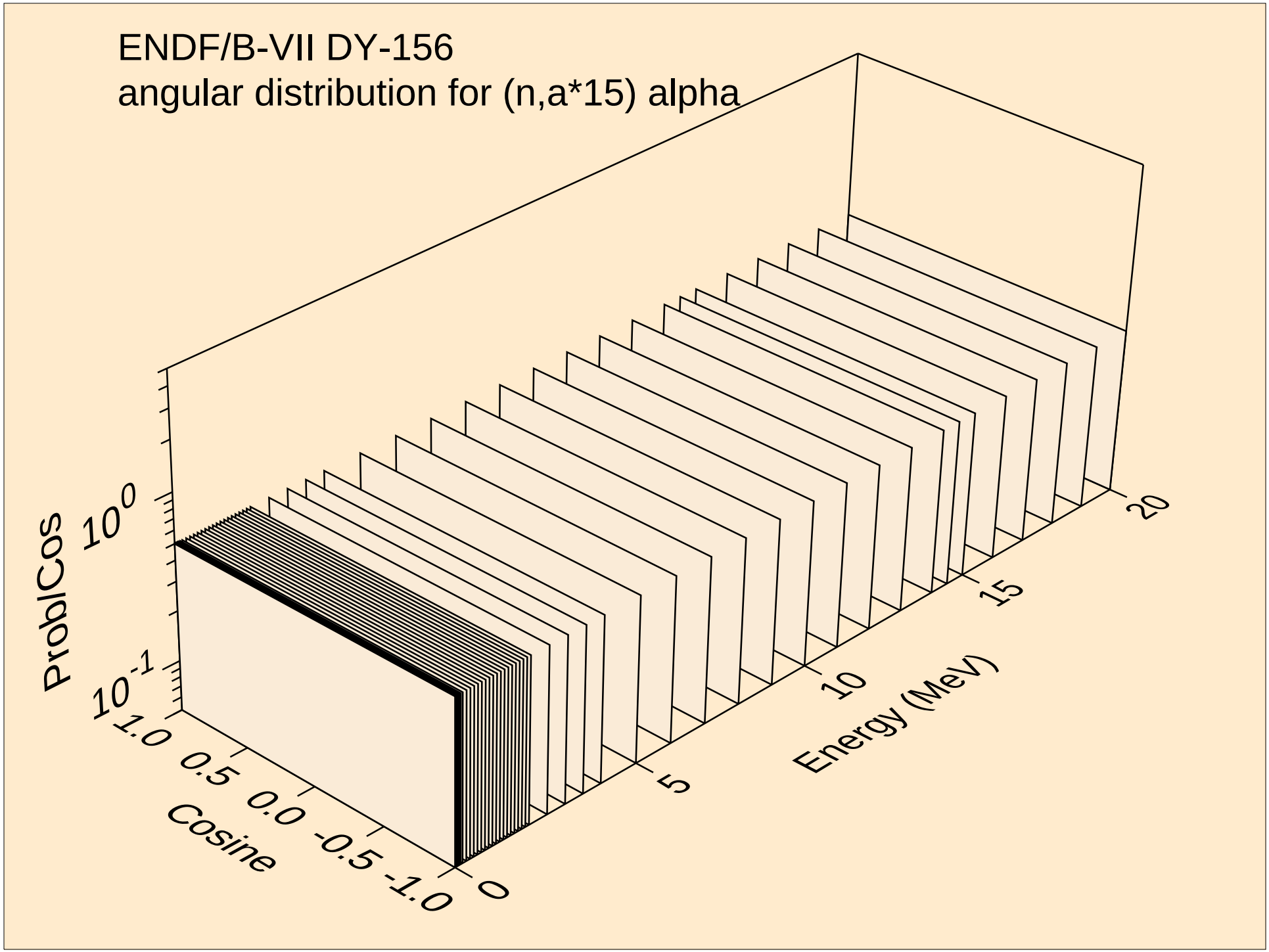

ENDF/B-VII DY-156
angular distribution for (n,a*10) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

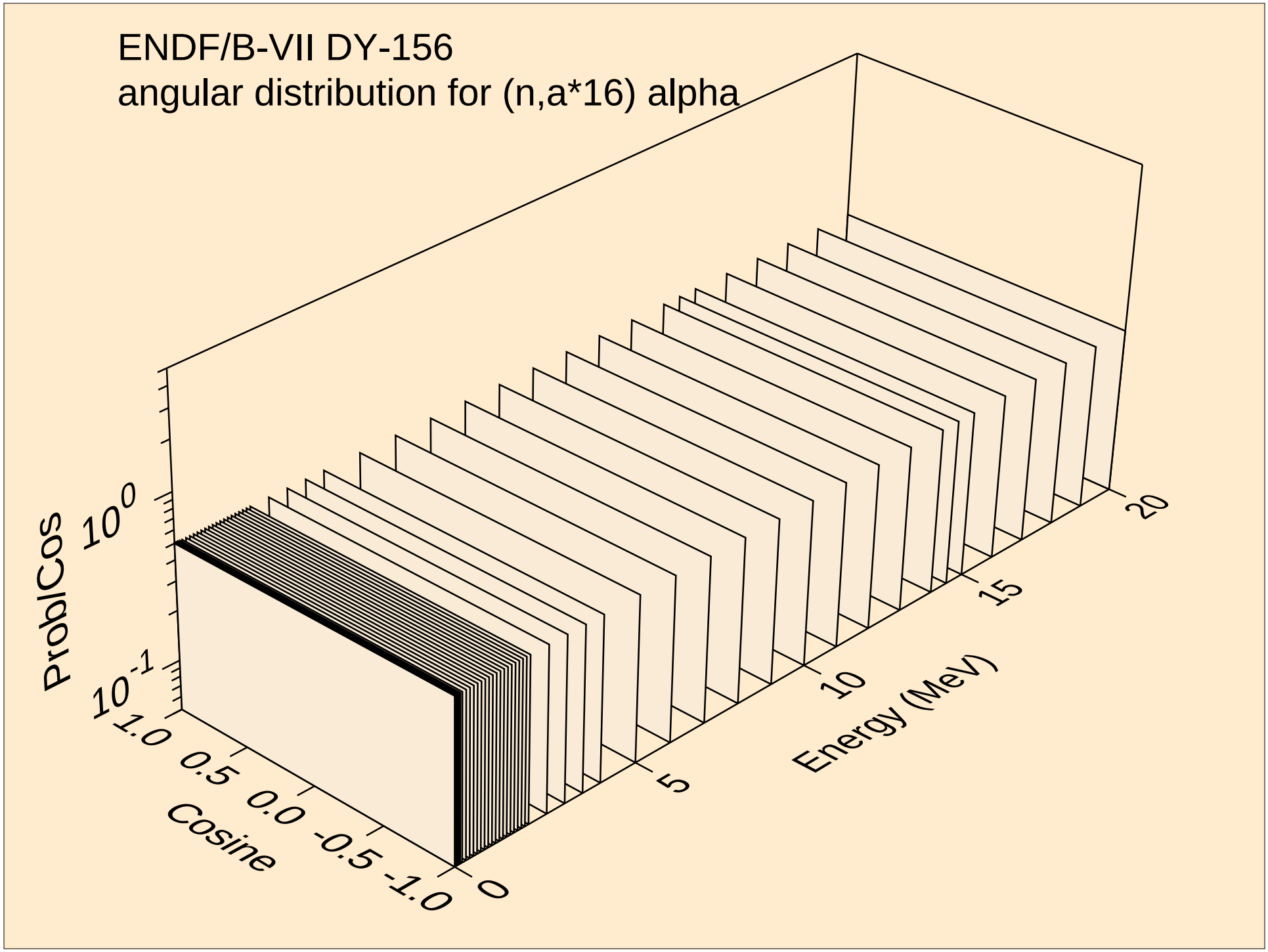

ENDF/B-VII DY-156
angular distribution for (n,a*11) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

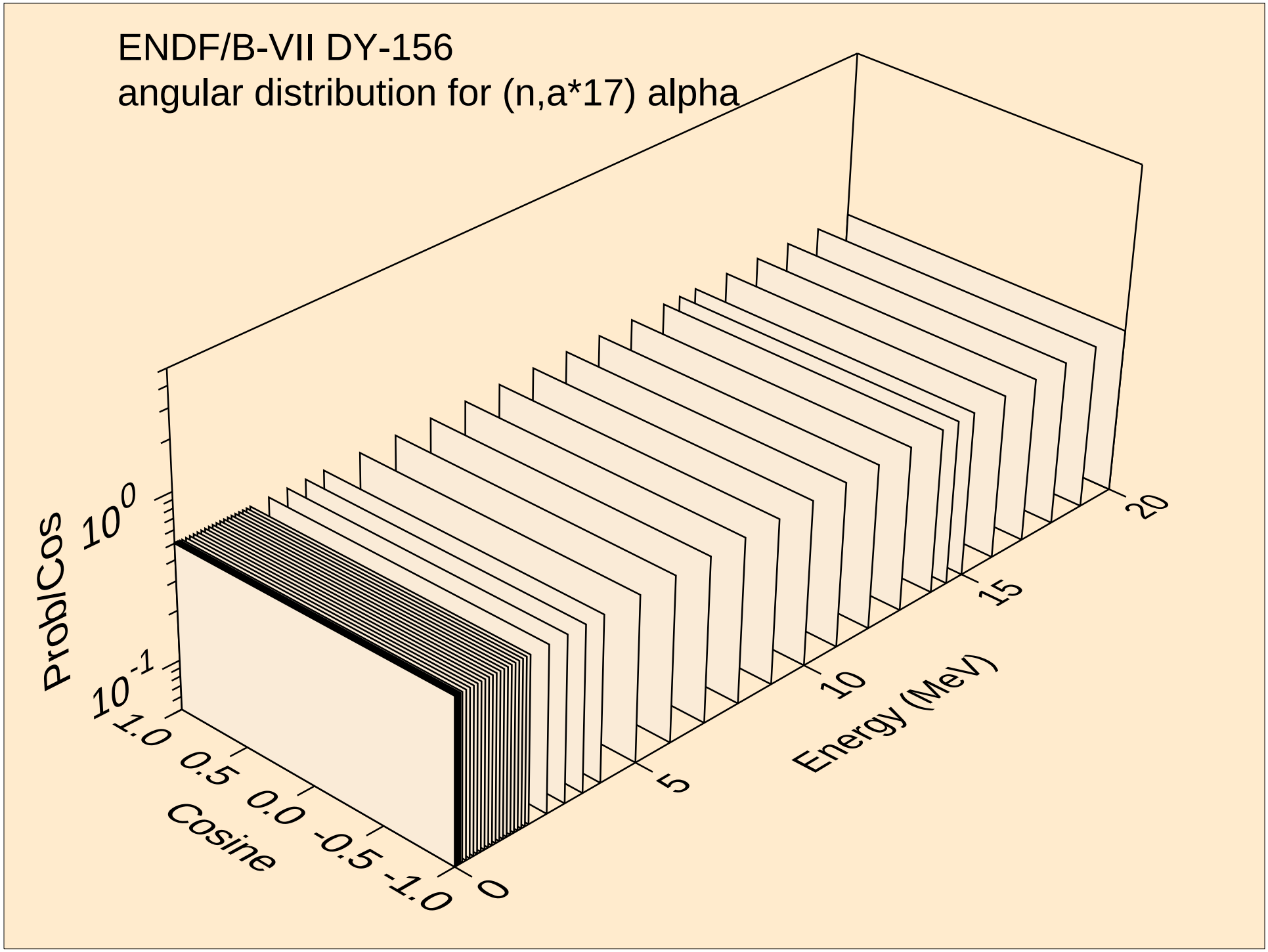

ENDF/B-VII DY-156
angular distribution for (n,a*12) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

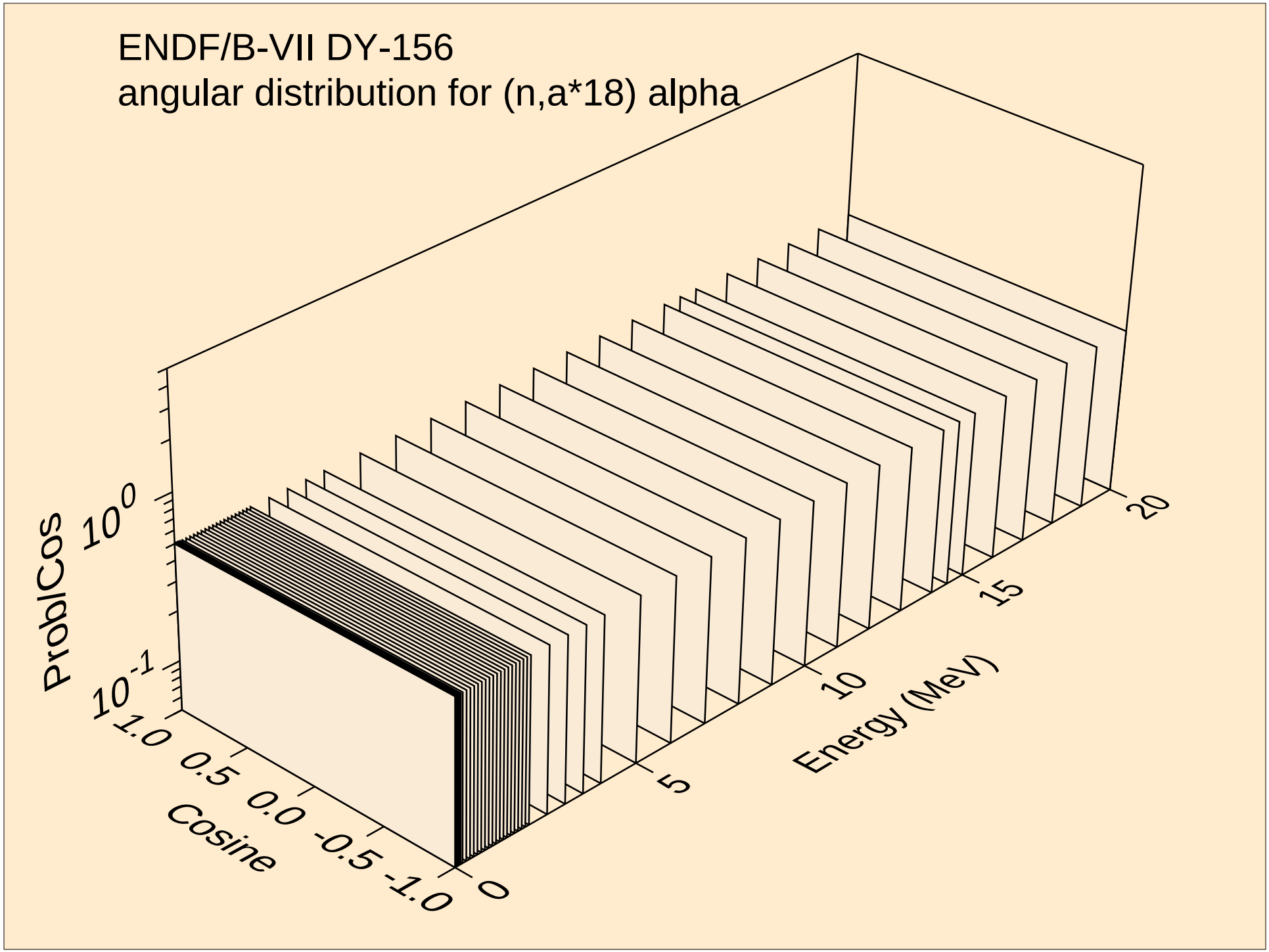

ENDF/B-VII DY-156
angular distribution for (n,a*13) alpha
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

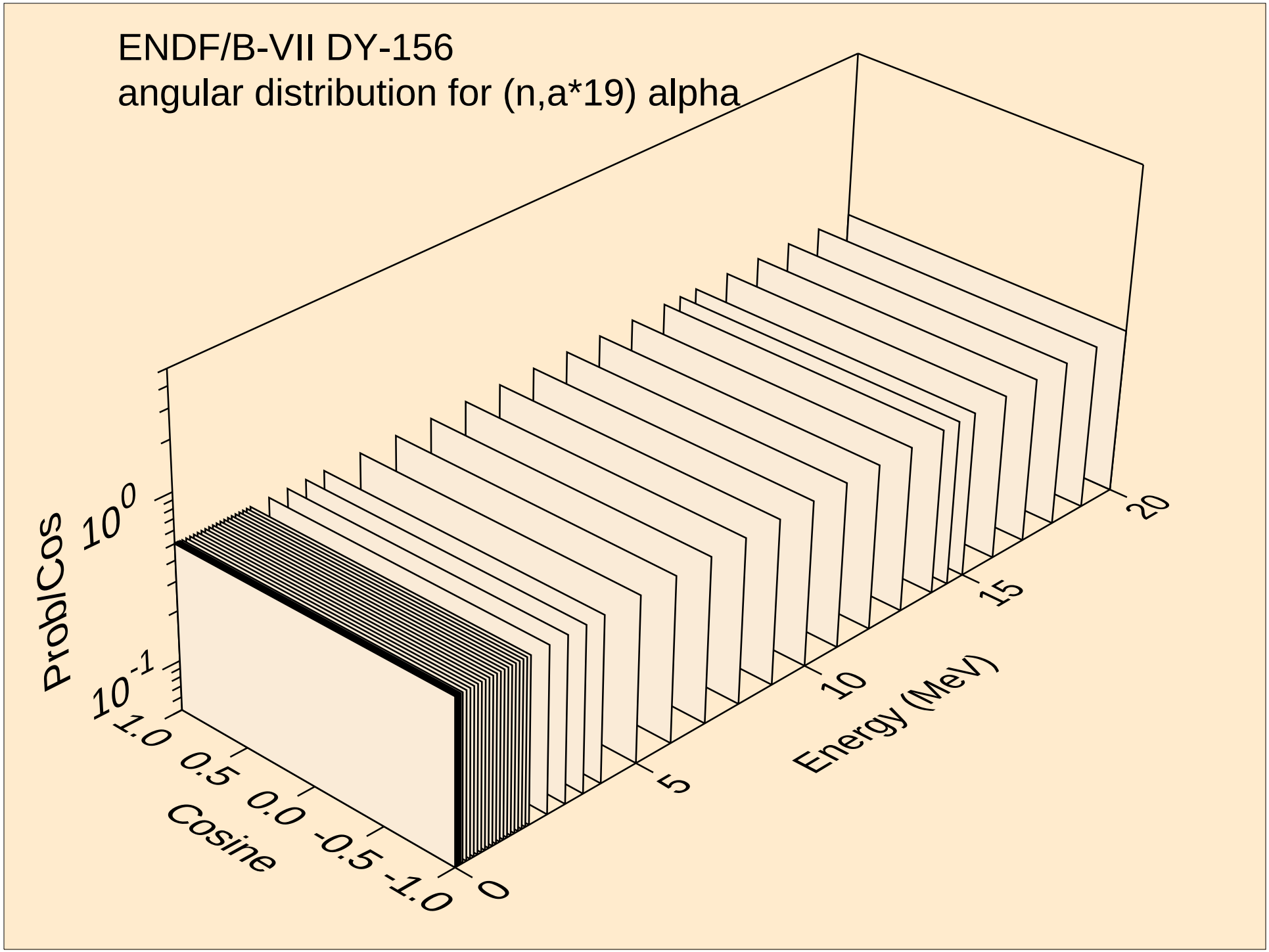

ENDF/B-VII DY-156
angular distribution for (n,a*14) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

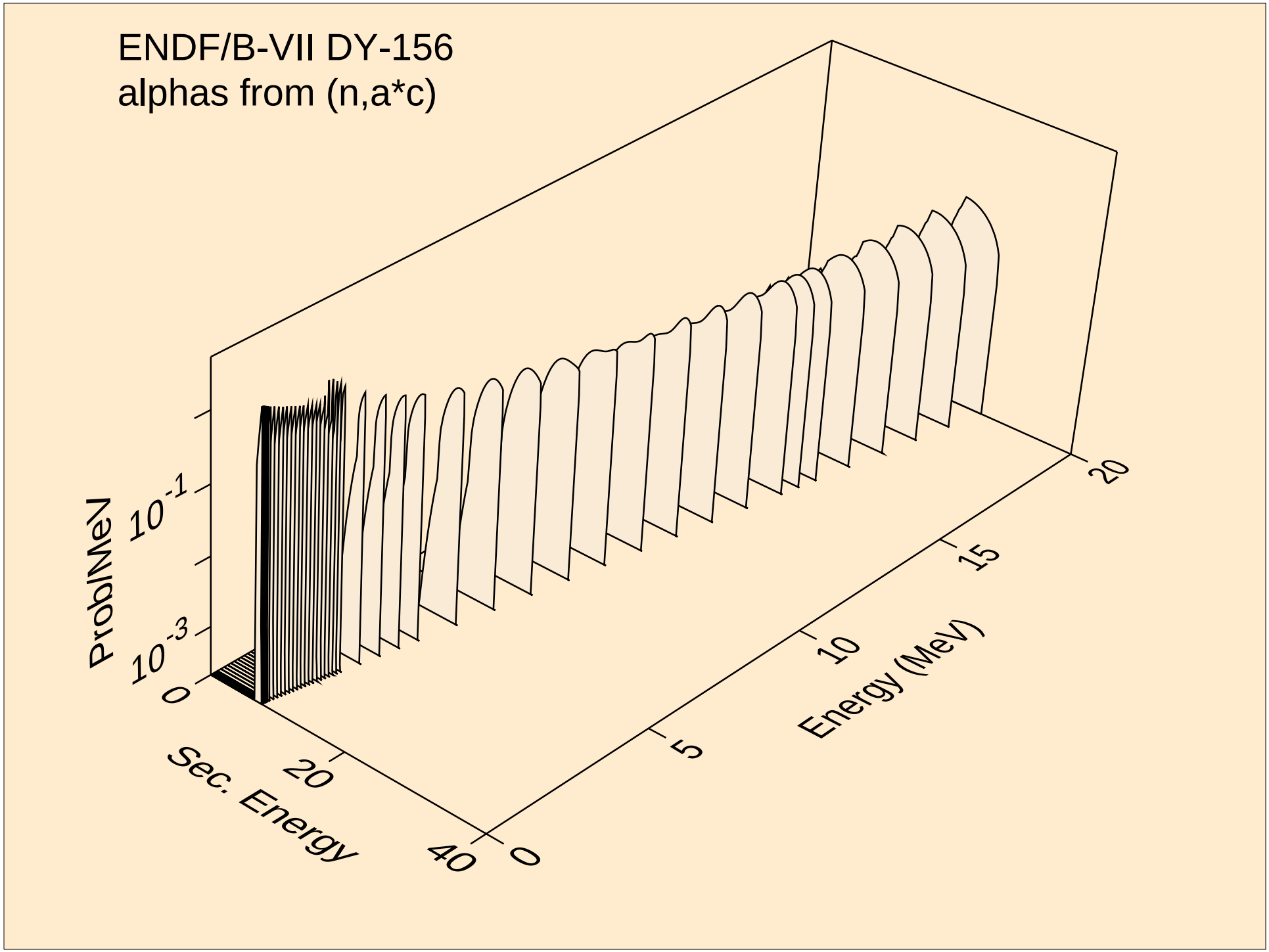

ENDF/B-VII DY-156
angular distribution for (n,a*15) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


ENDF/B-VII DY-156
angular distribution for (n,a*16) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


ENDF/B-VII DY-156
angular distribution for (n,a*17) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


ENDF/B-VII DY-156
angular distribution for (n,a*18) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


ENDF/B-VII DY-156
angular distribution for (n,a*19) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


ENDF/B-VII DY-156
alphas from (n,a*c)
Prob/MeV
10-1
10-3
0
Sec. Energy
20
40
0
5
10
15
20
Energy (MeV)