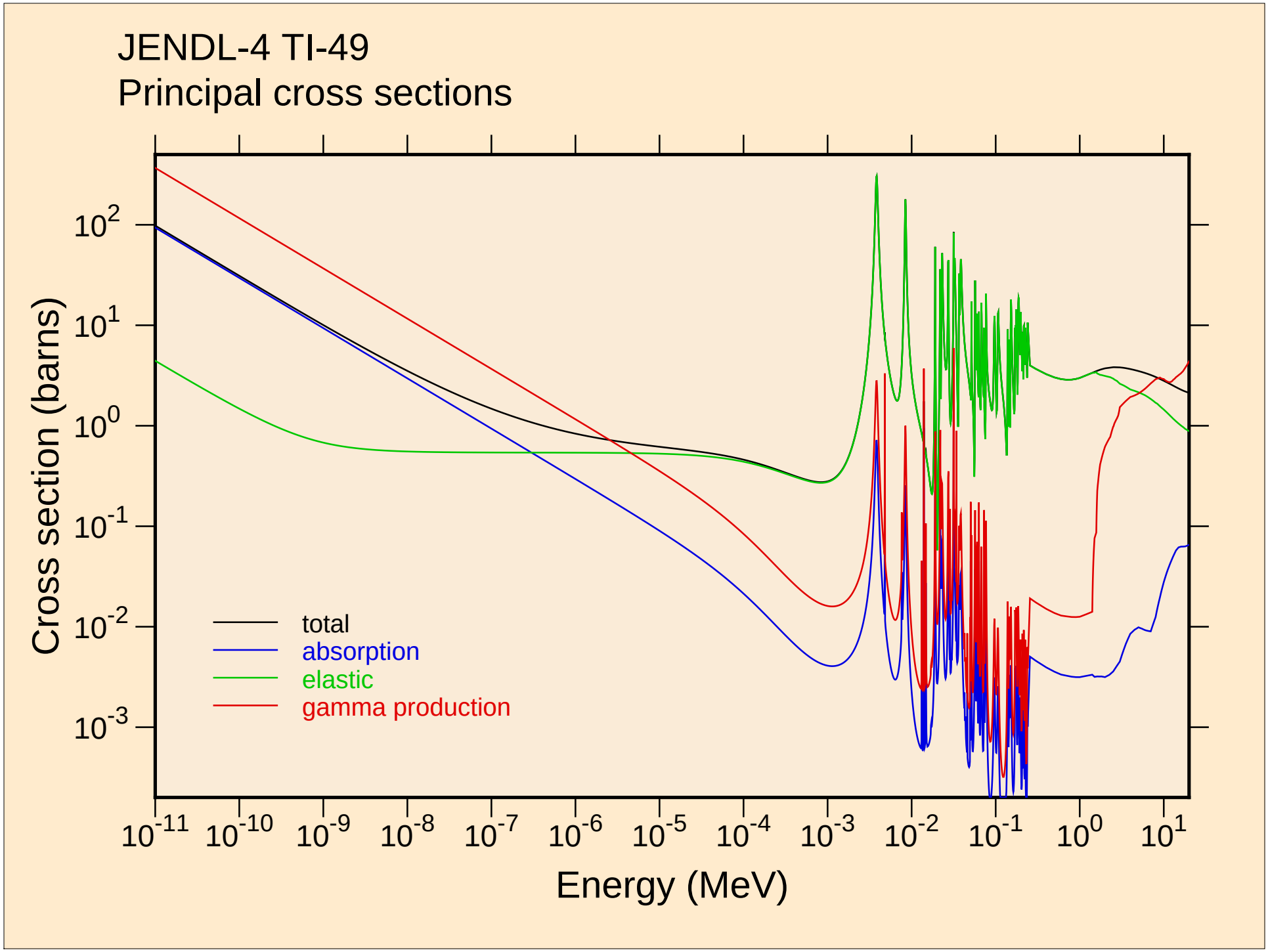
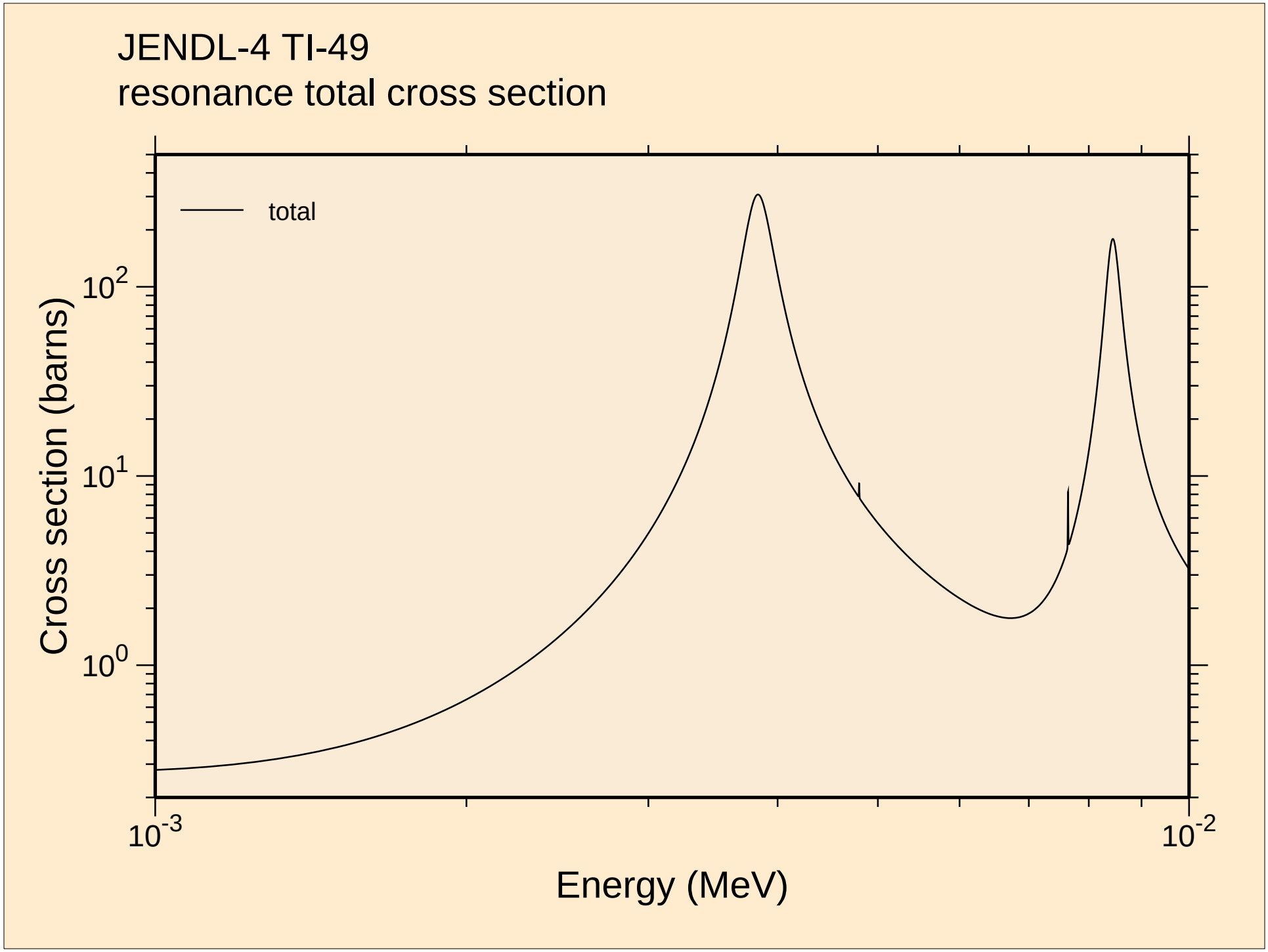
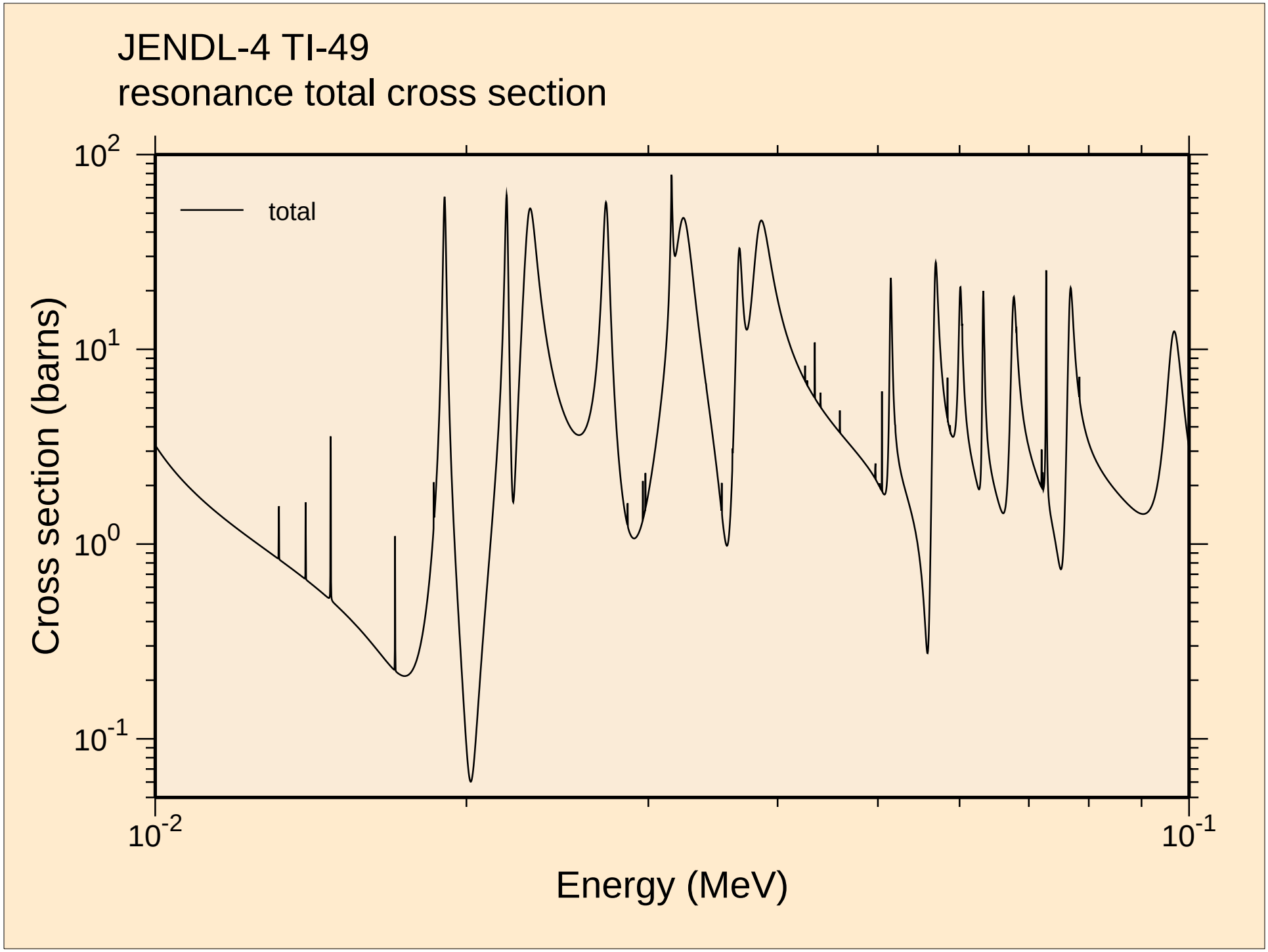
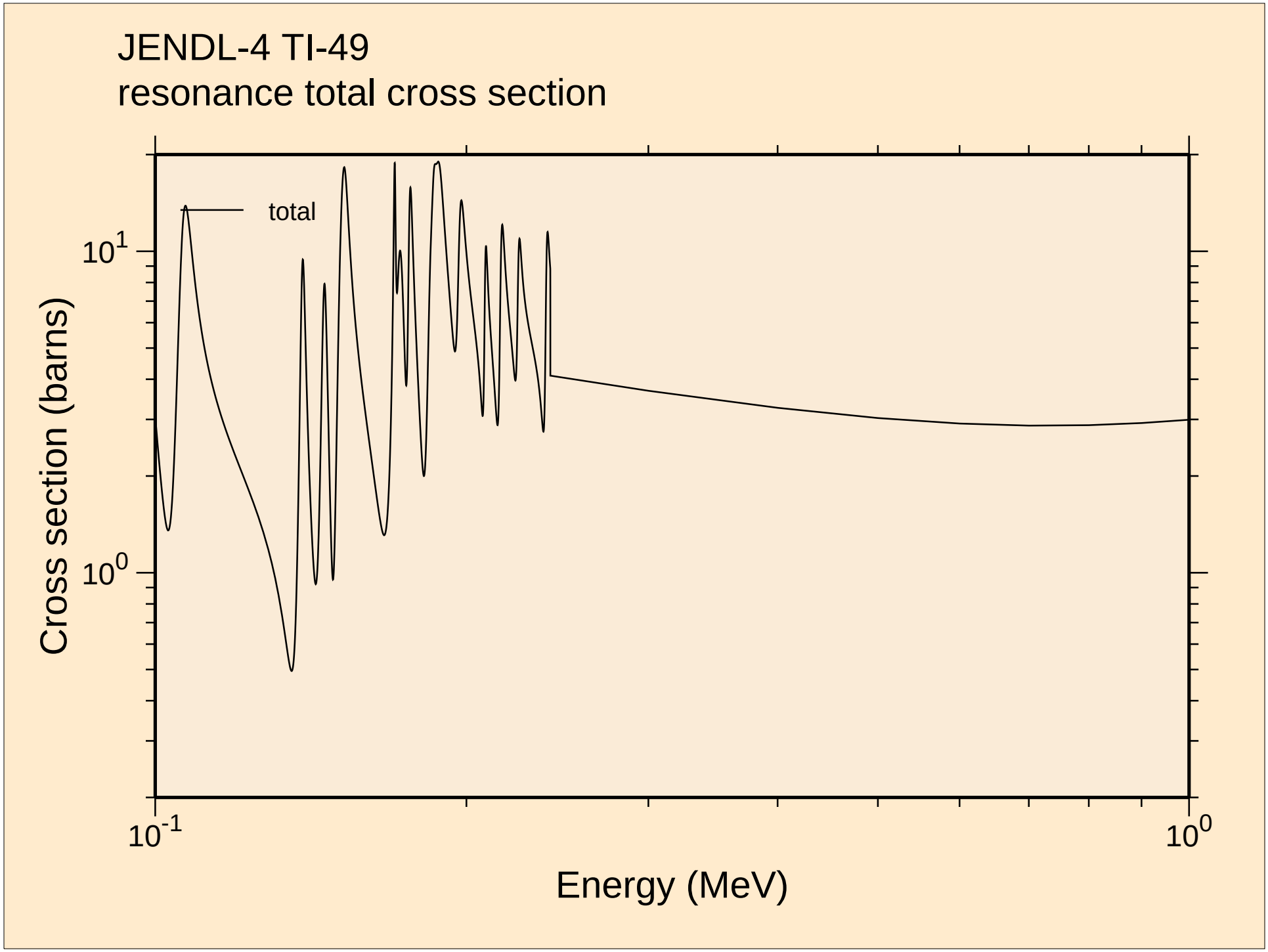
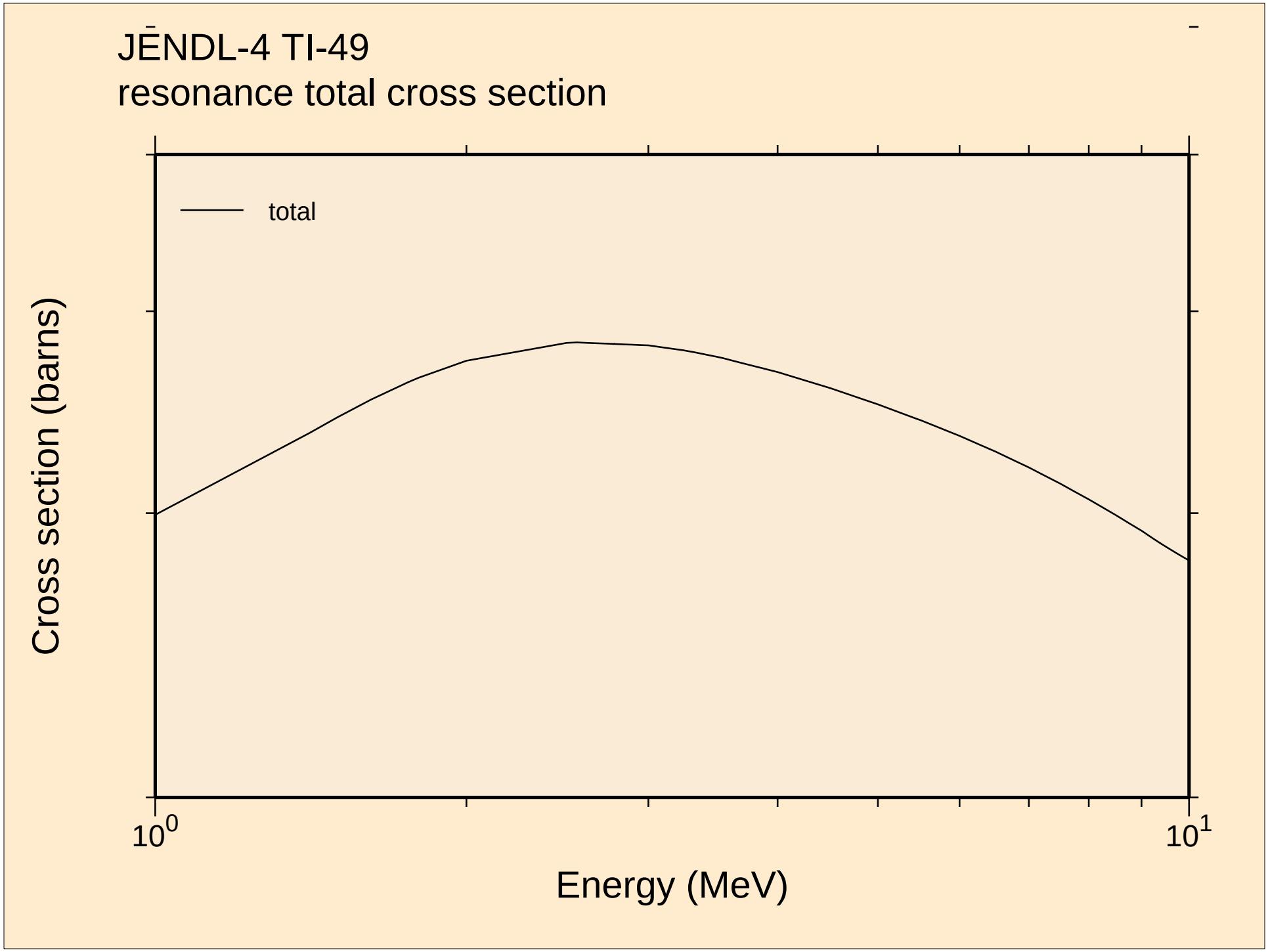

JENDL-4 TI-49
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-11}
10^{-10}
10^{-9}
10^{-8}
10^{-7}
10^{-6}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
10^{0}
10^{1}

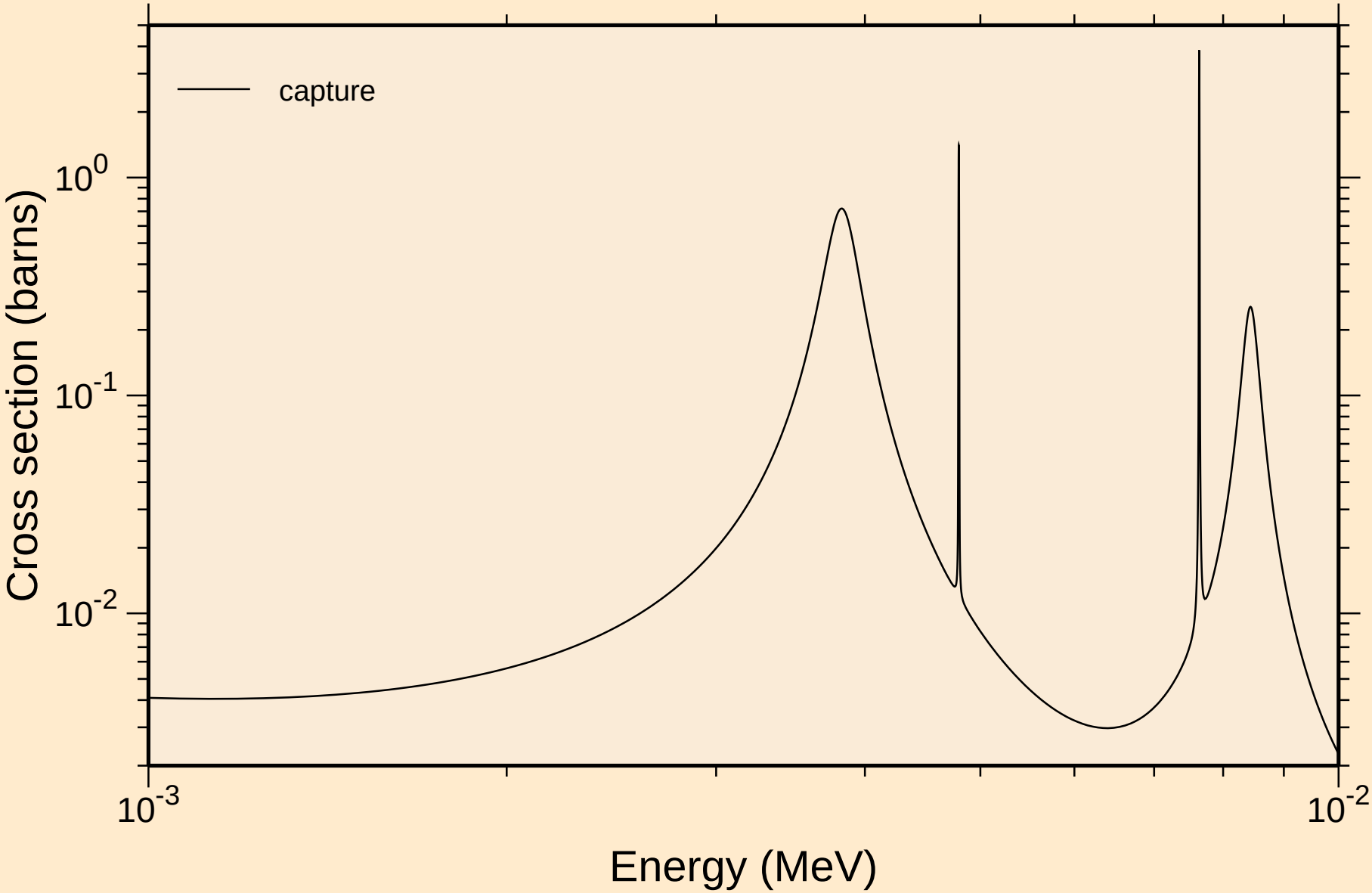

JENDL-4 TI-49
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^{-3}
10^{-2}
Energy (MeV)


JENDL-4 TI-49
resonance total cross section
total
Cross section (barns)
Energy (MeV)
10^2
10^1
10^0
10^-1
10^-2
10^-1

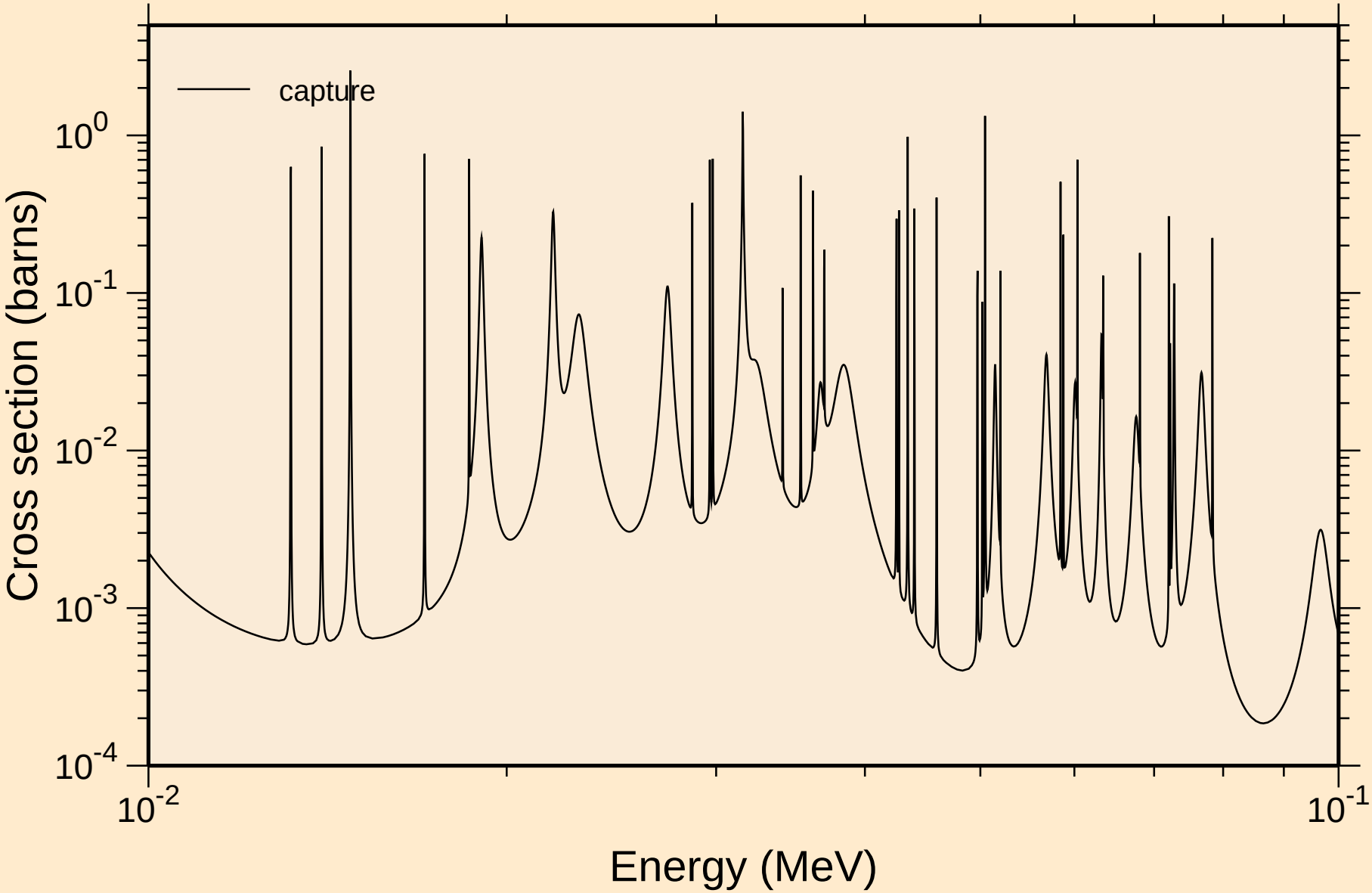

JENDL-4 TI-49
resonance total cross section
total
Cross section (barns)
10^1
10^0
10^{-1}
10^0
Energy (MeV)

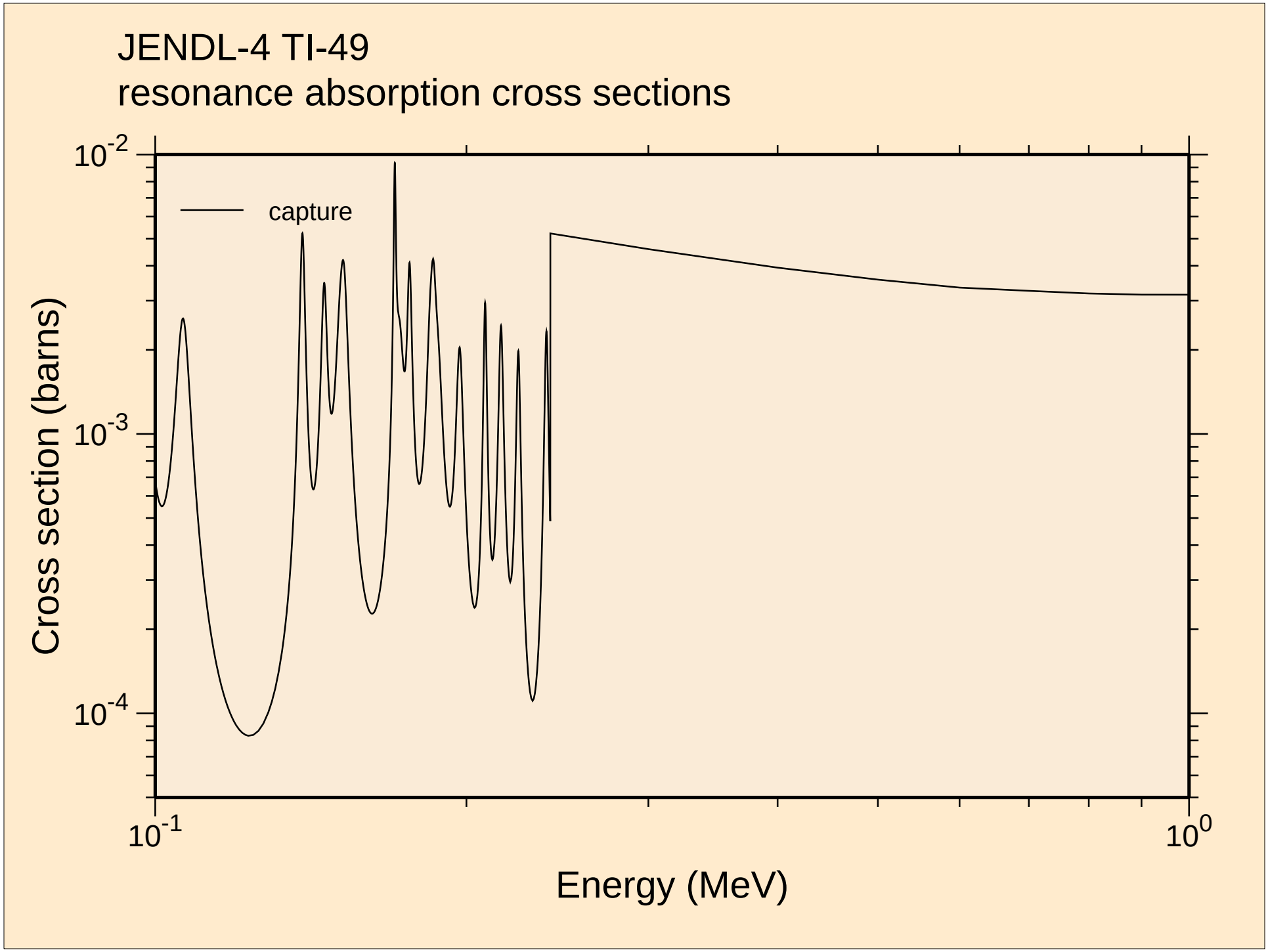

JĒNDL-4 TI-49
resonance total cross section
total
Cross section (barns)
10^0
10^1
Energy (MeV)

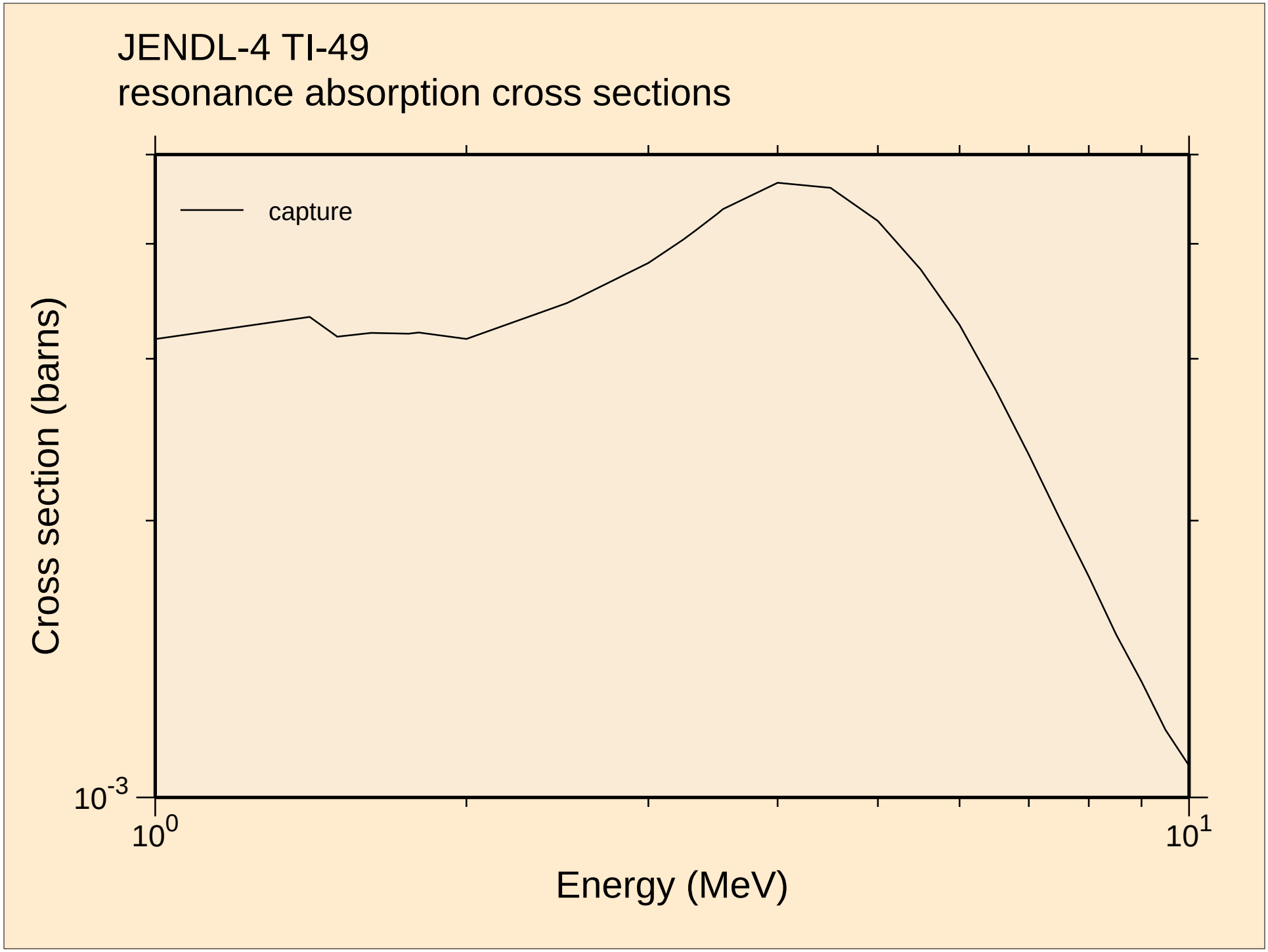
JENDL-4 TI-49
resonance absorption cross sections

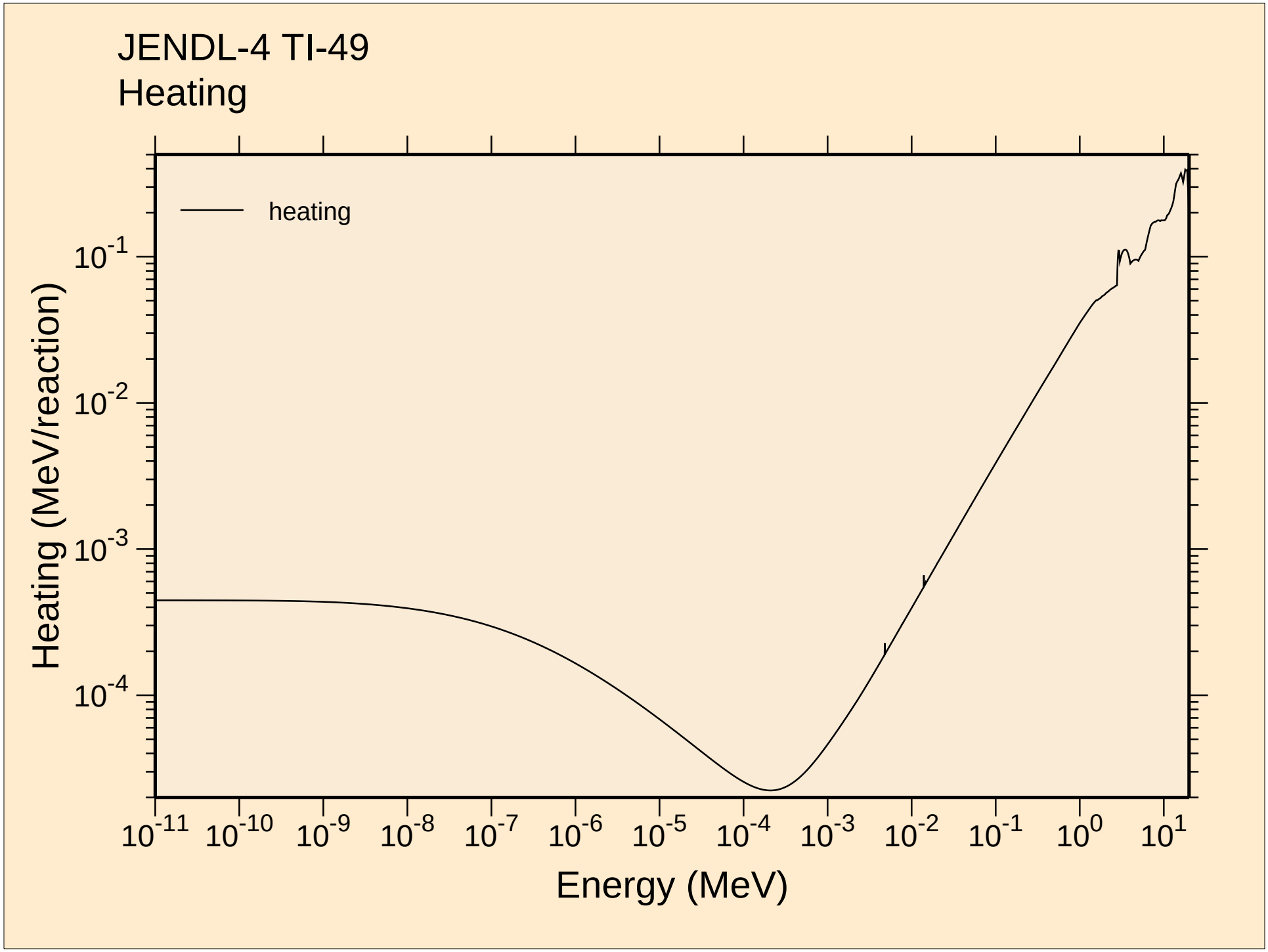


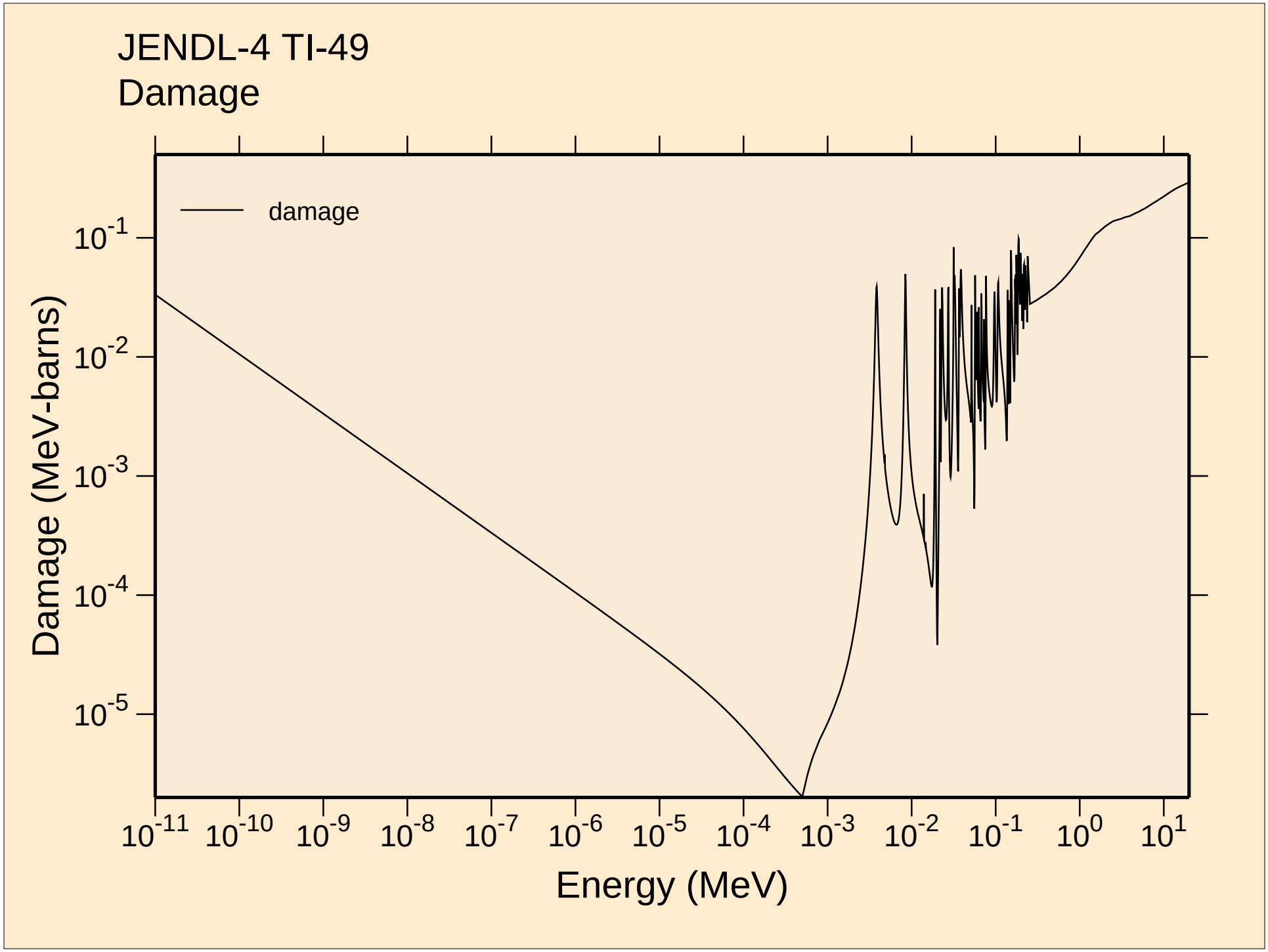
JENDL-4 TI-49
resonance absorption cross sections

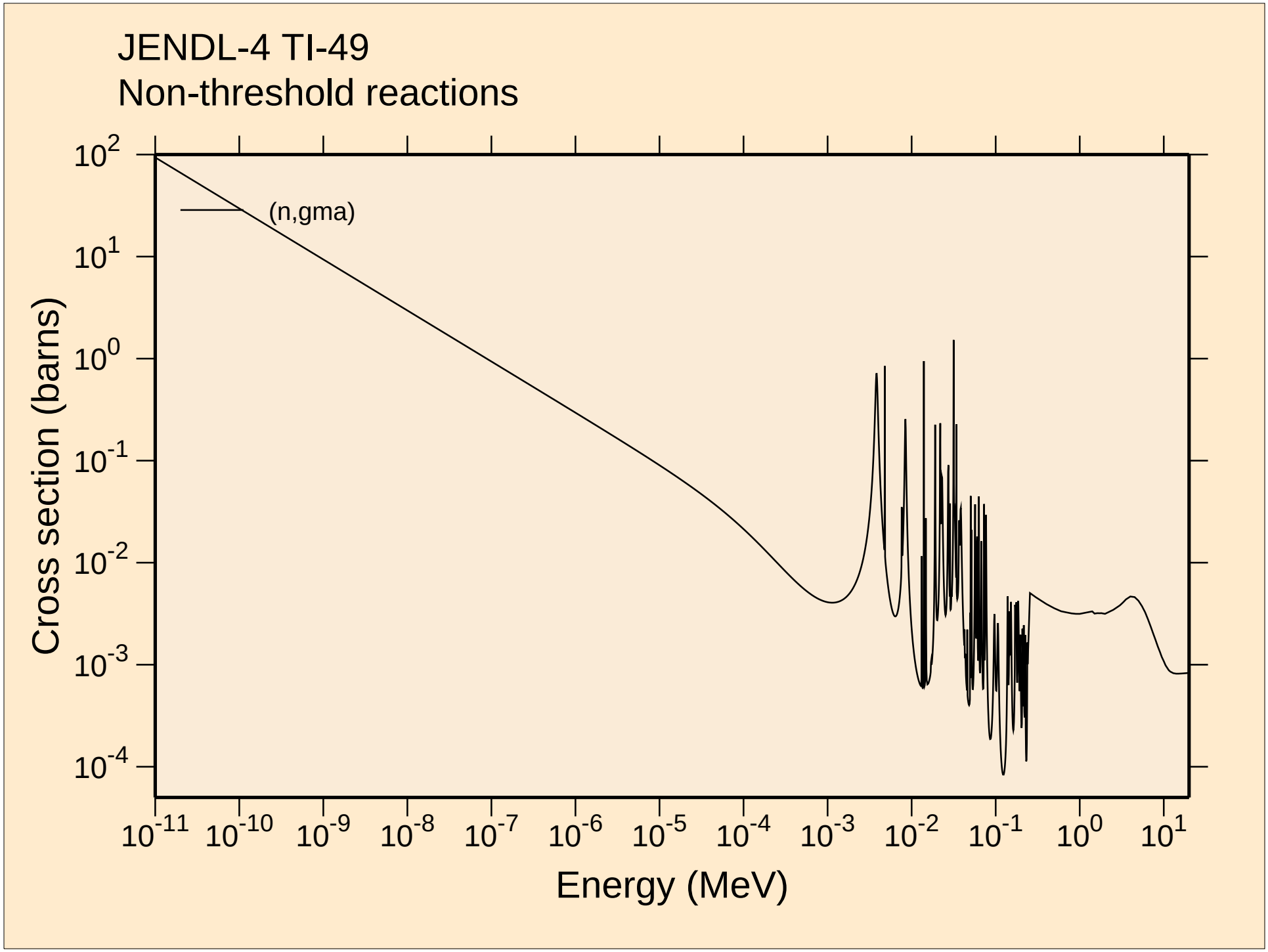


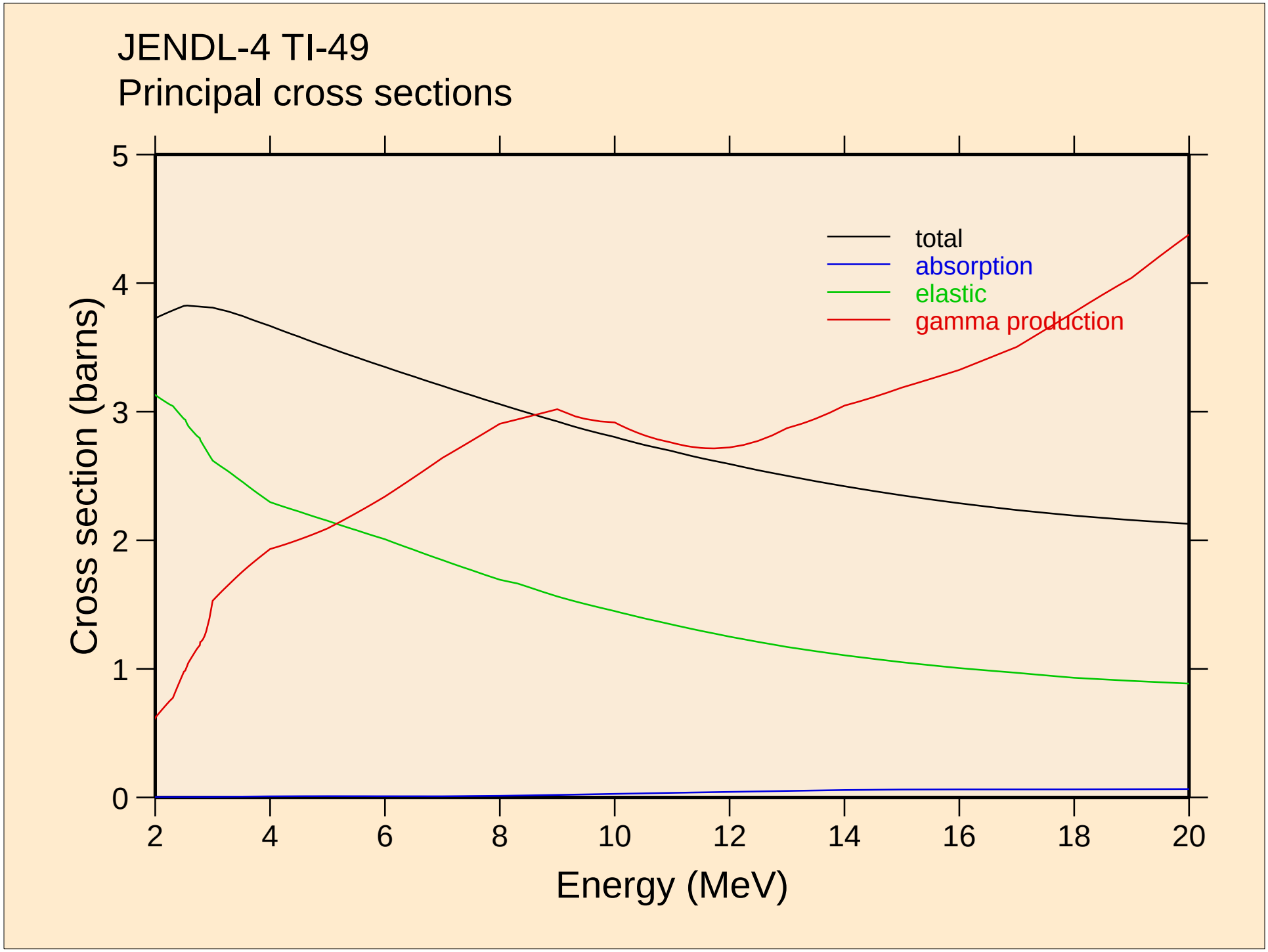

JENDL-4 TI-49
resonance absorption cross sections
capture
Cross section (barns)
10-2
10-3
10-4
10-1
100
Energy (MeV)

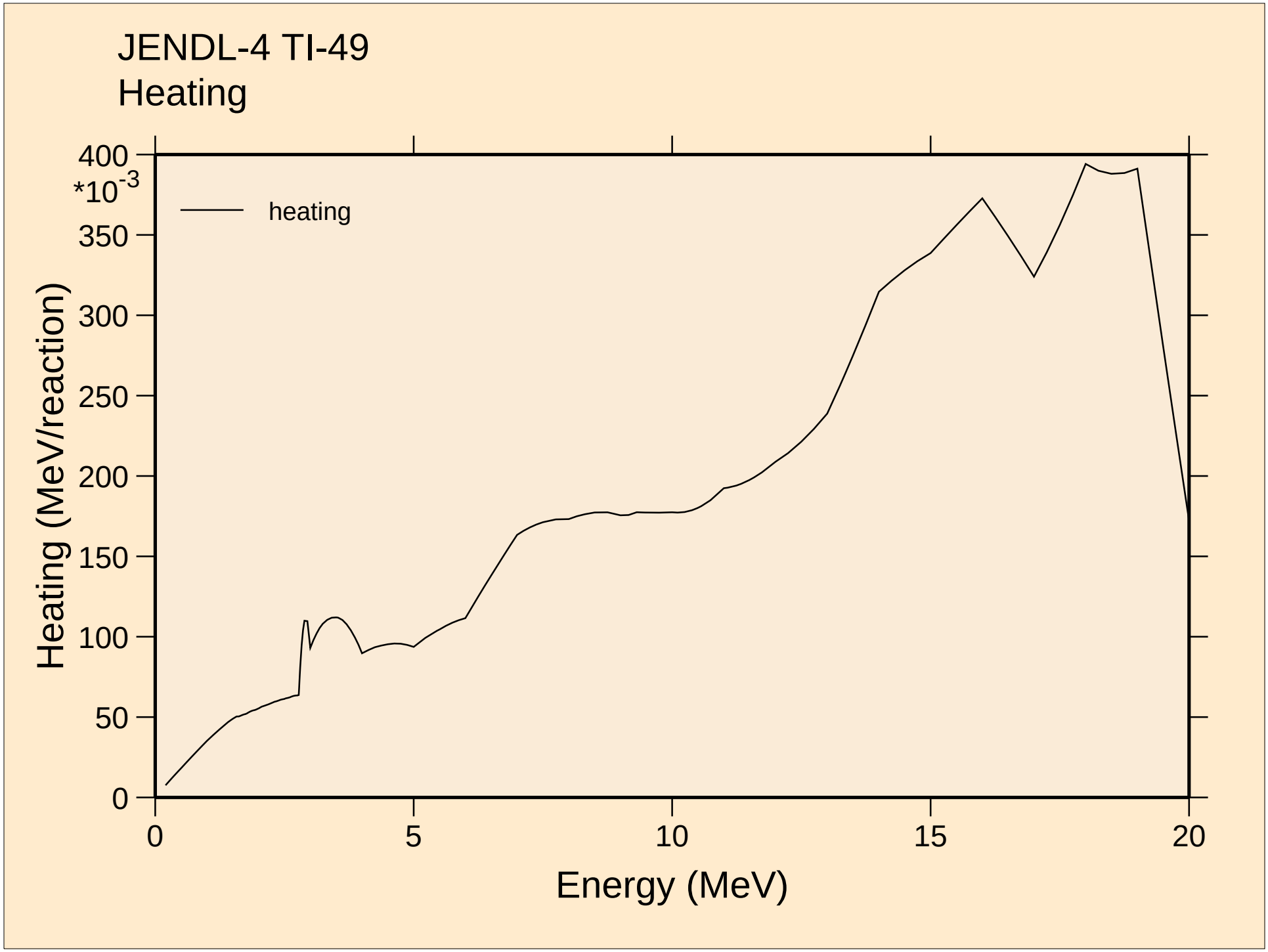

JENDL-4 TI-49
resonance absorption cross sections
capture
Cross section (barns)
10^{-3}
10^{0}
10^{1}
Energy (MeV)

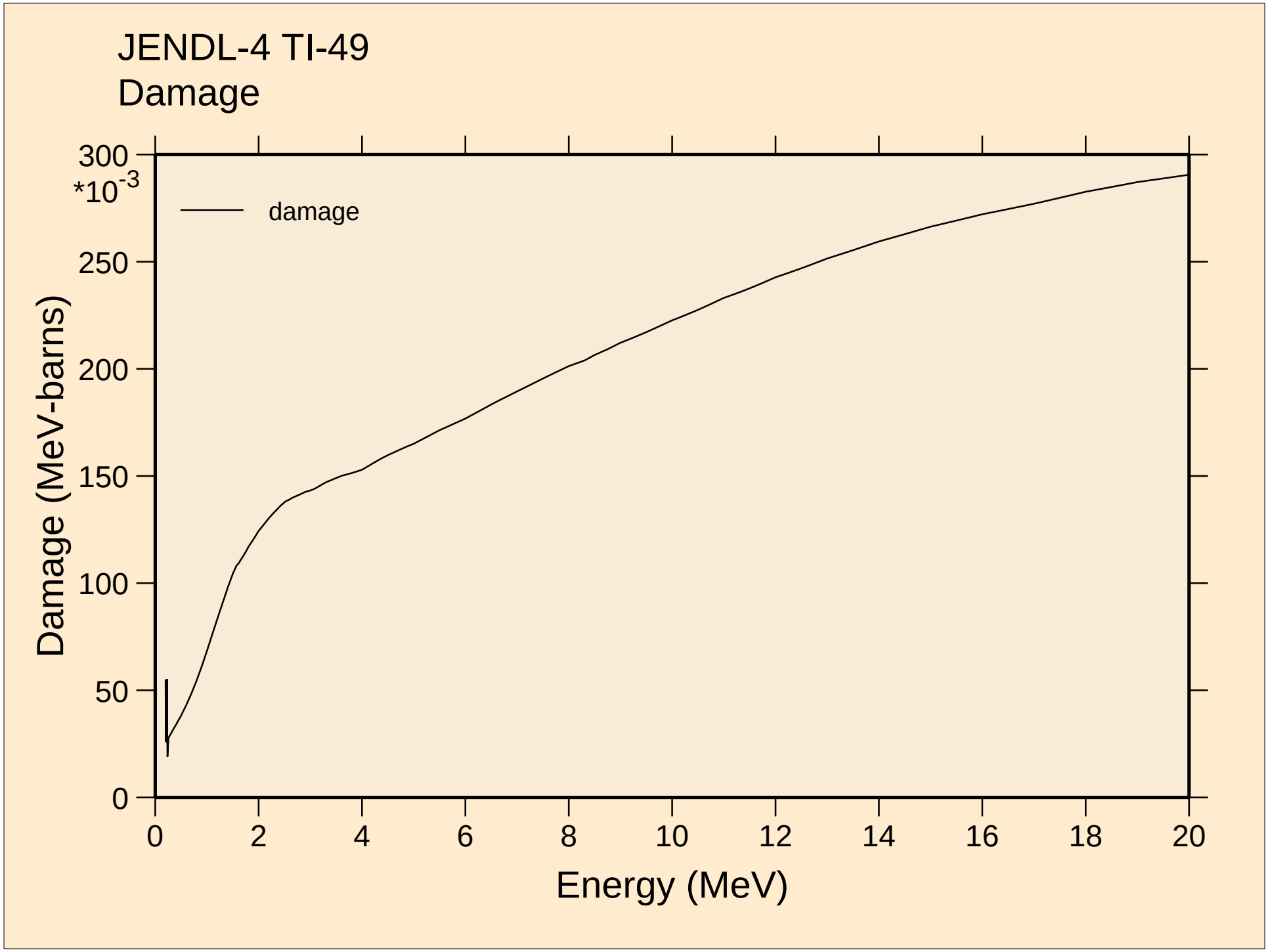

JENDL-4 TI-49
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
10-1
10-2
10-3
10-4
10-11
10-10
10-9
10-8
10-7
10-6
10-5
10-4
10-3
10-2
10-1
100
101

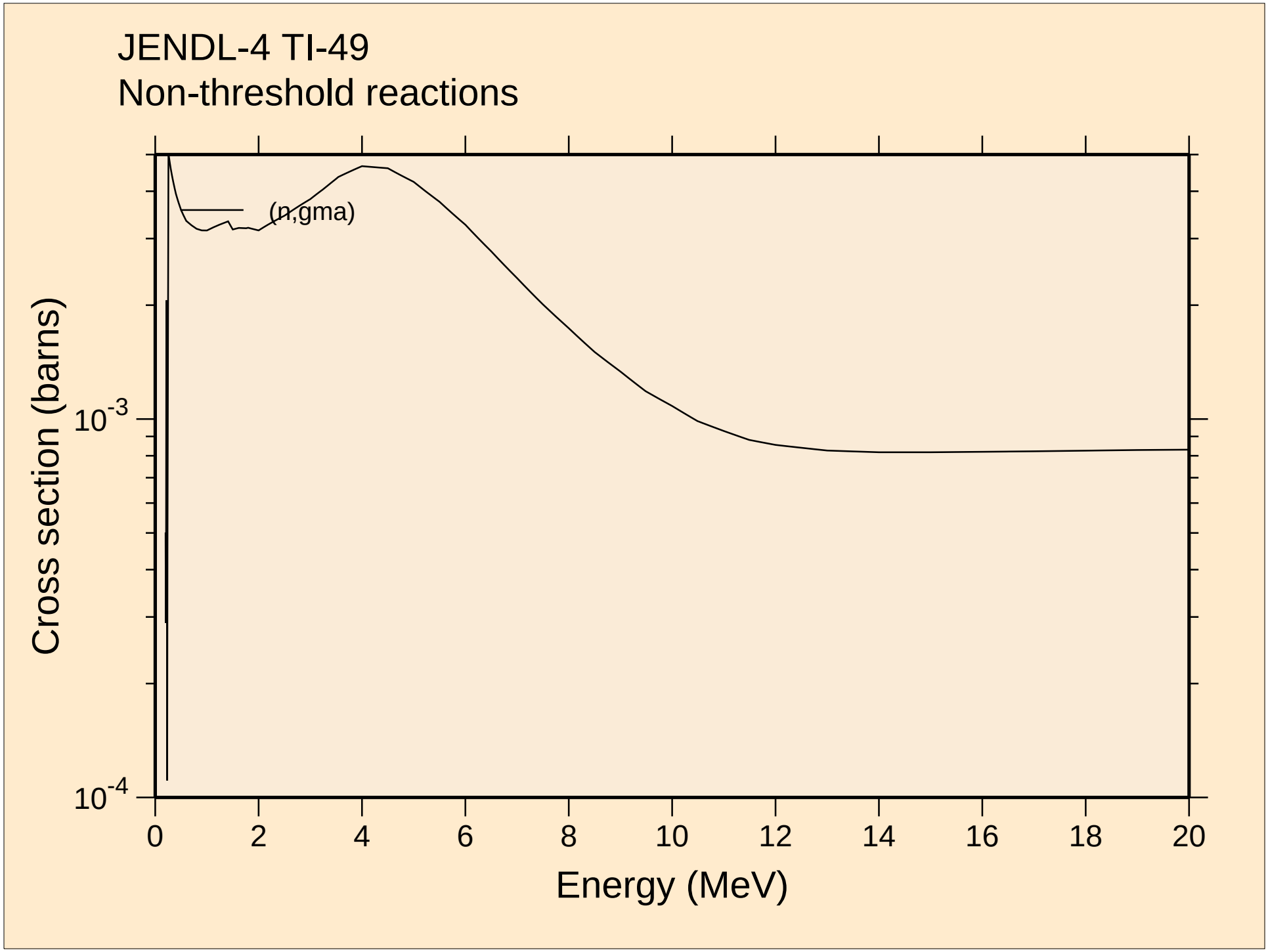

JENDL-4 TI-49
Damage
damage
Damage (MeV-barns)
Energy (MeV)
10-1
10-2
10-3
10-4
10-5
10-11
10-10
10-9
10-8
10-7
10-6
10-5
10-4
10-3
10-2
10-1
100
101

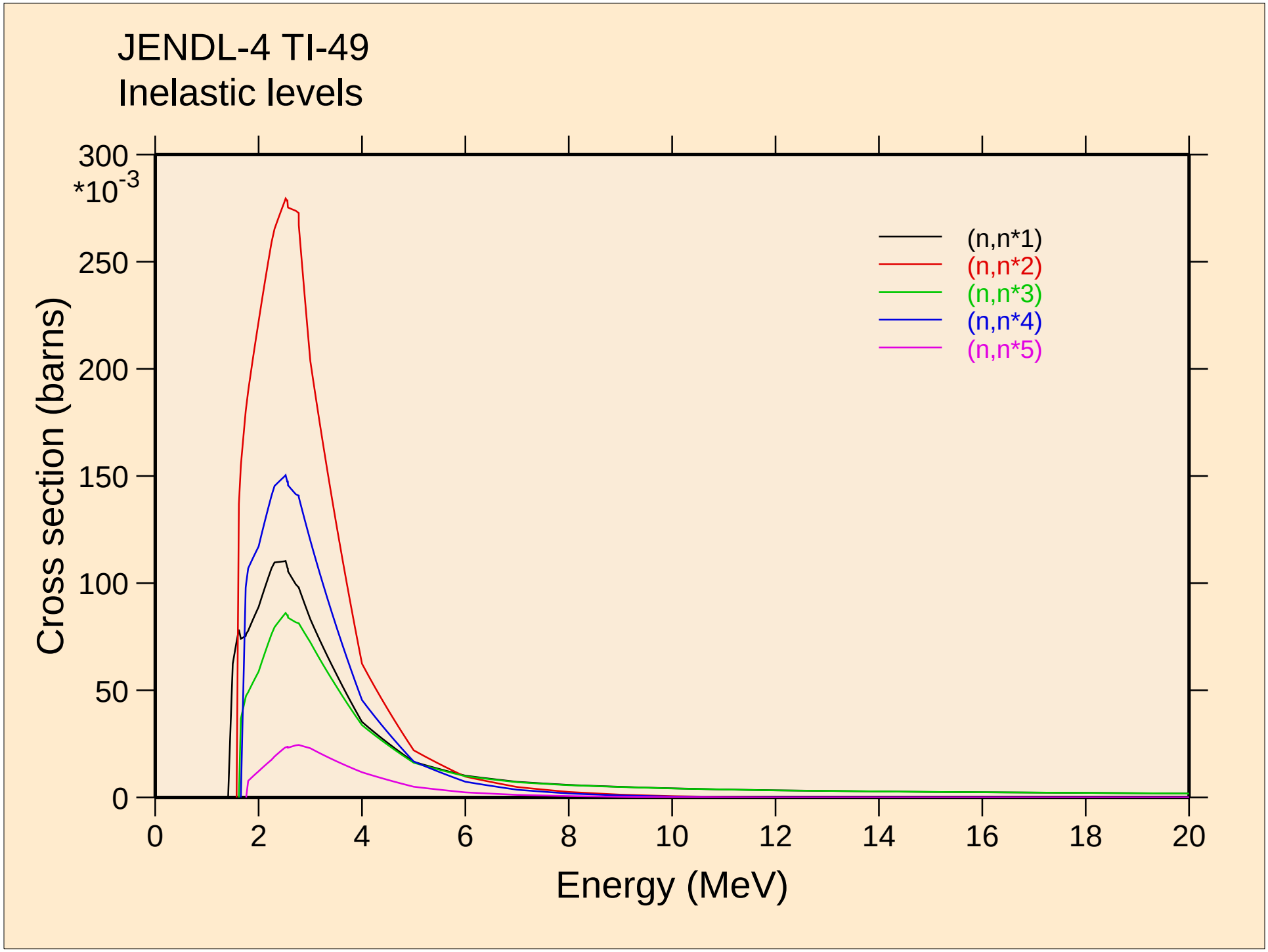

JENDL-4 TI-49
Non-threshold reactions
(n,gma)
Cross section (barns)
Energy (MeV)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

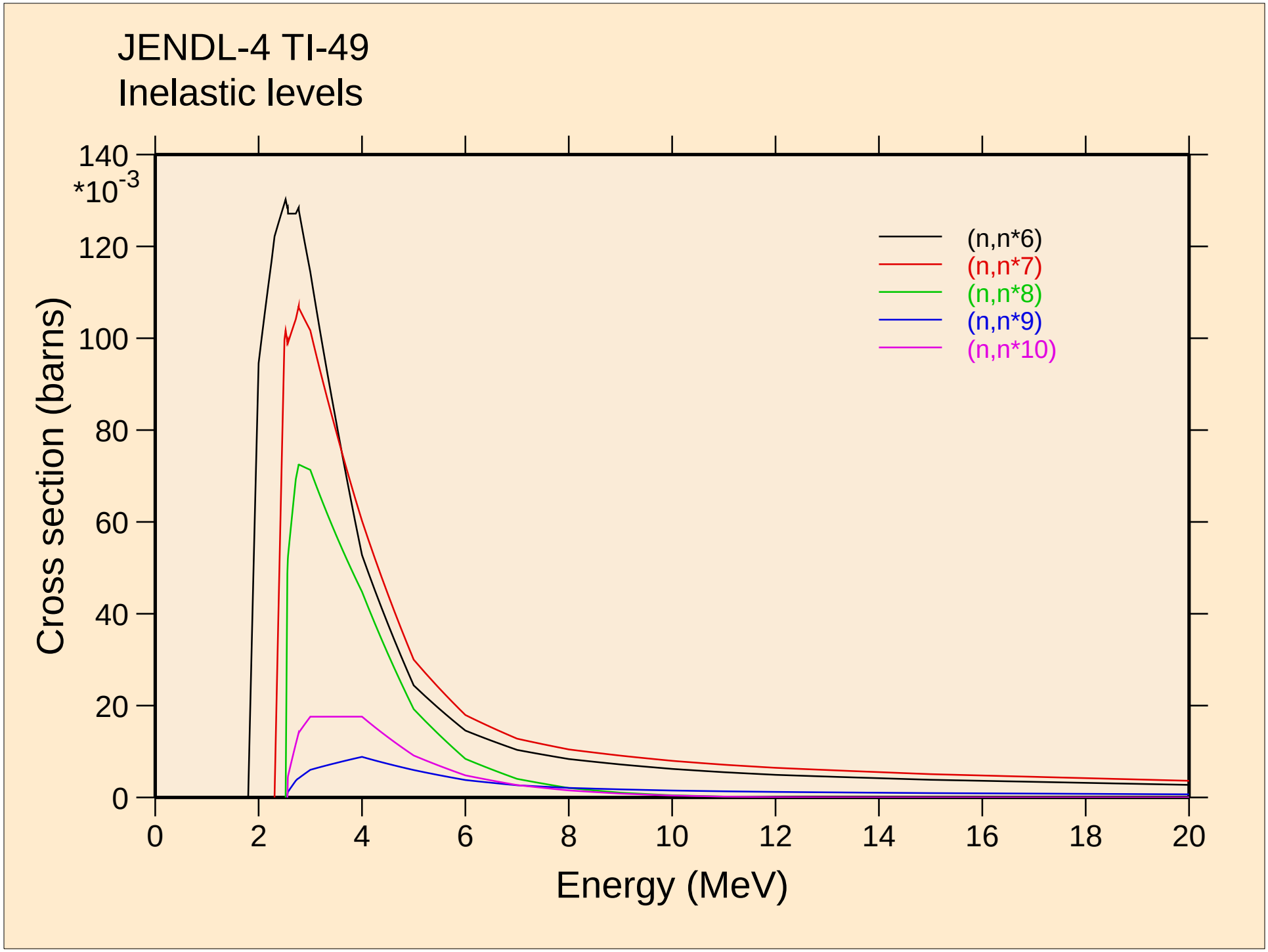

JENDL-4 TI-49
Principal cross sections
total
absorption
elastic
gamma production
Cross section (barns)
Energy (MeV)
0
1
2
3
4
5
2
4
6
8
10
12
14
16
18
20

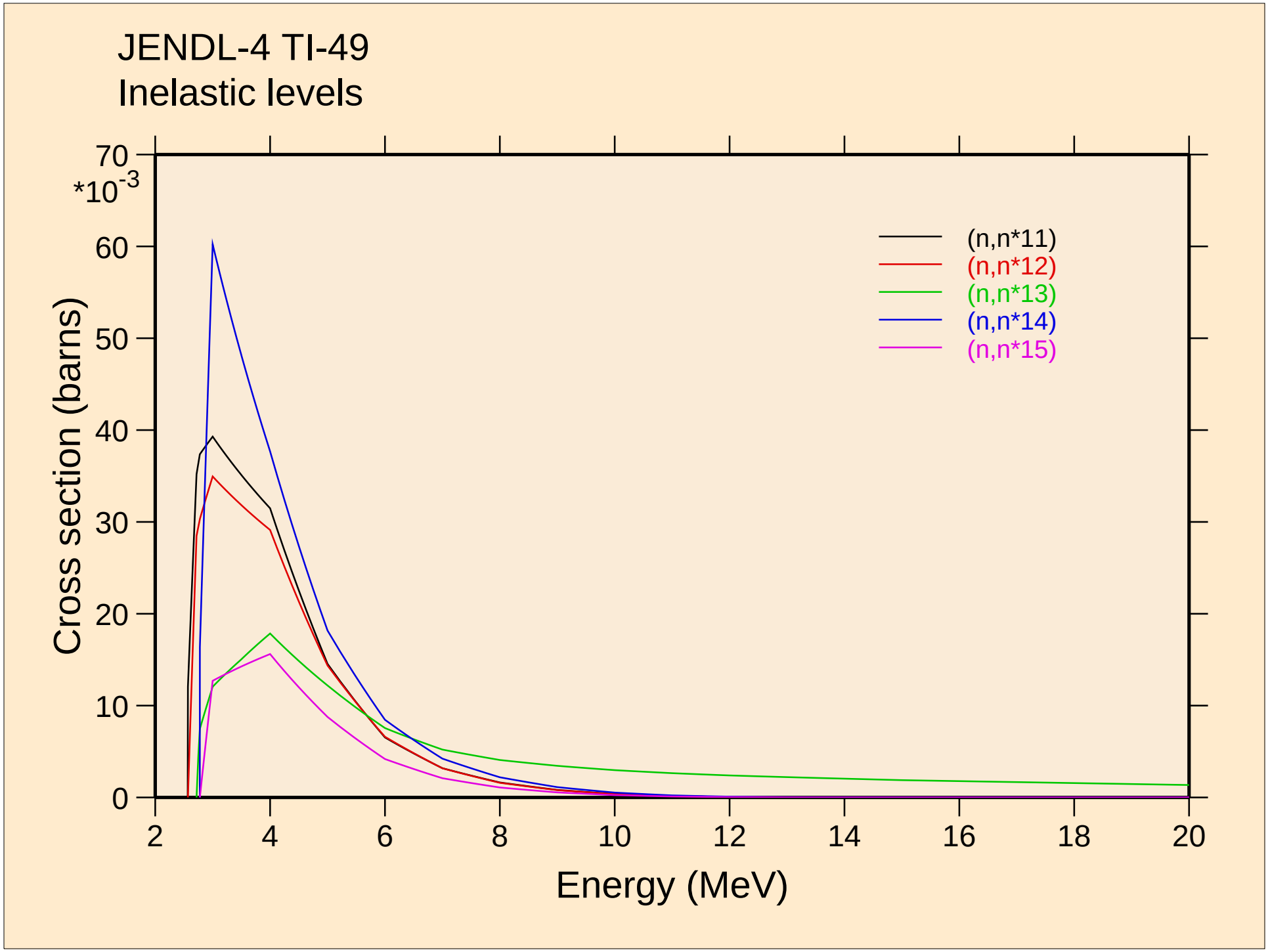

JENDL-4 TI-49
Heating
heating
*10-3
400
350
300
250
200
150
100
50
0
Heating (MeV/reaction)
0
5
10
15
20
Energy (MeV)

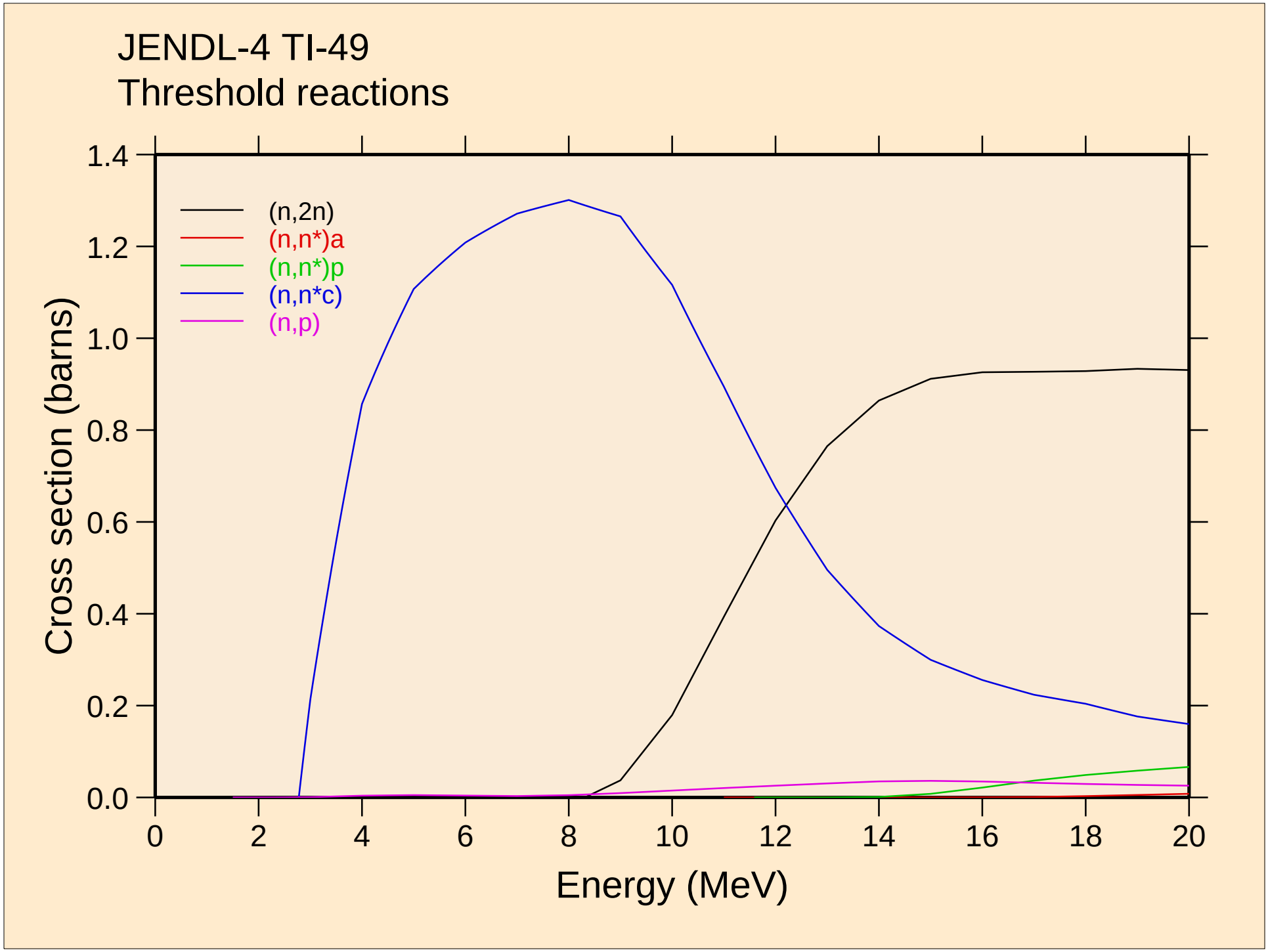

JENDL-4 TI-49
Damage
damage
*10-3
300
250
200
150
100
50
0
Damage (MeV-barns)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

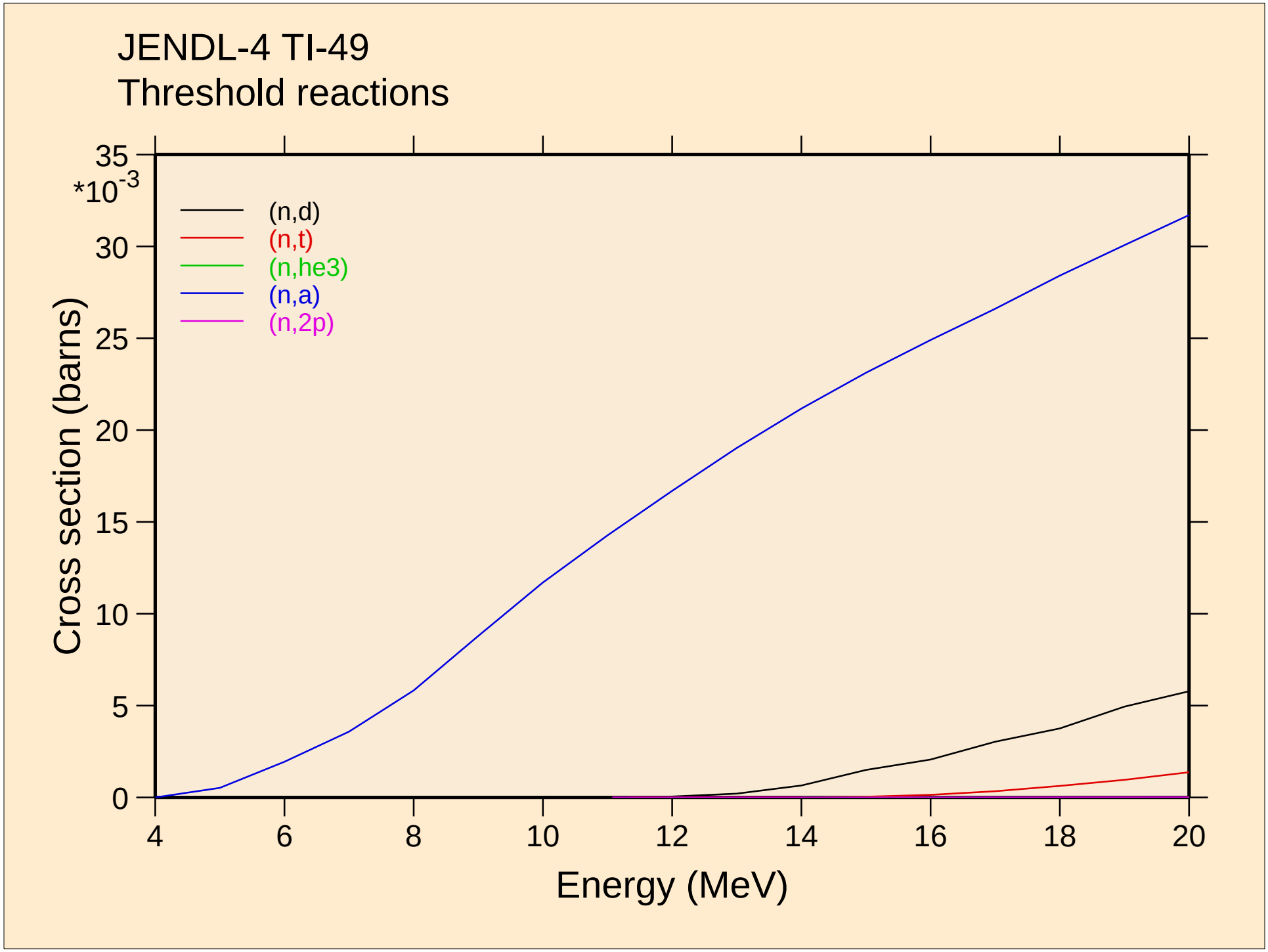

JENDL-4 TI-49
Non-threshold reactions
(n,gma)
Cross section (barns)
10-3
10-4
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

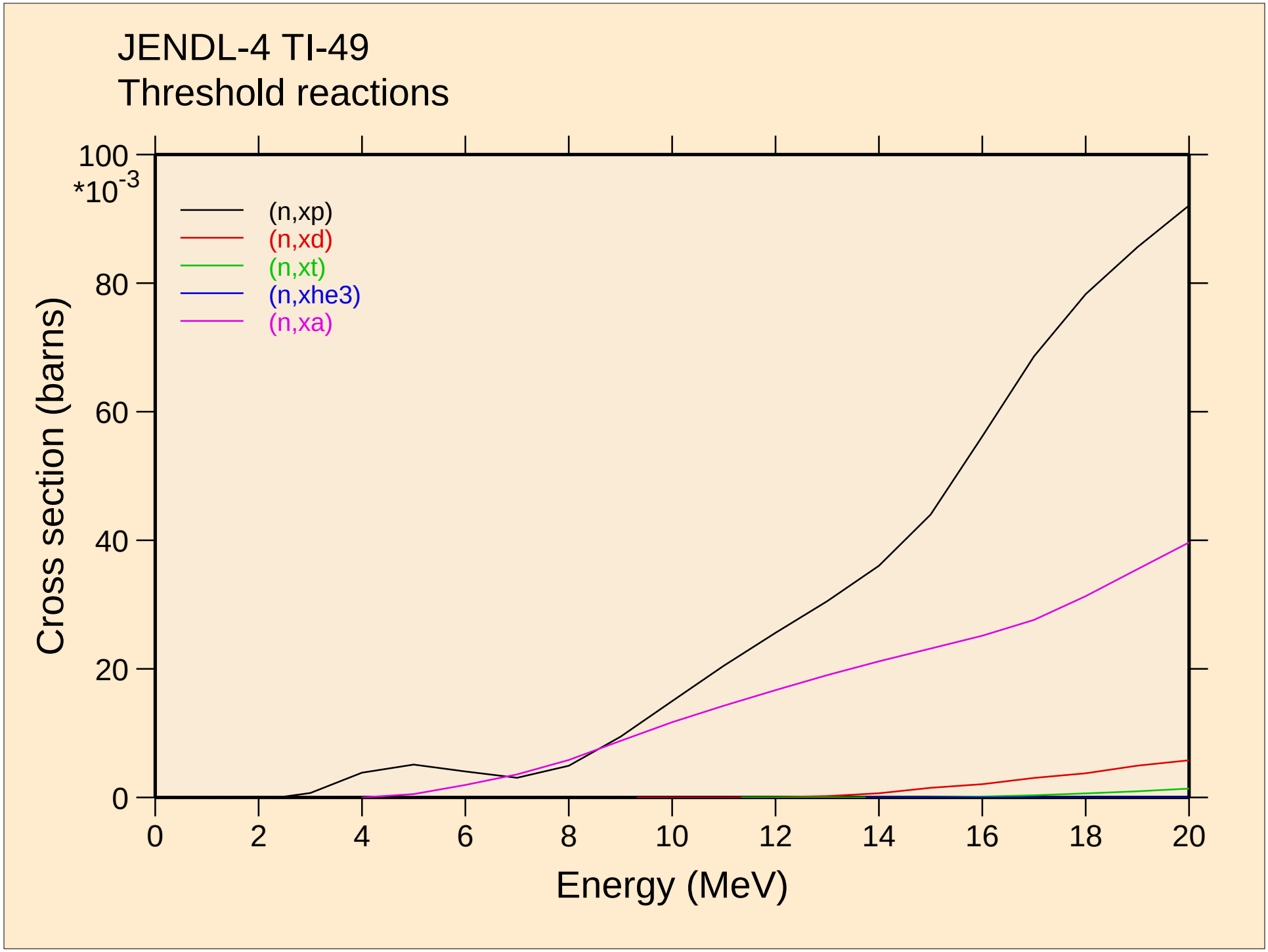

JENDL-4 TI-49
Inelastic levels
Cross section (barns)
*10-3
300
250
200
150
100
50
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

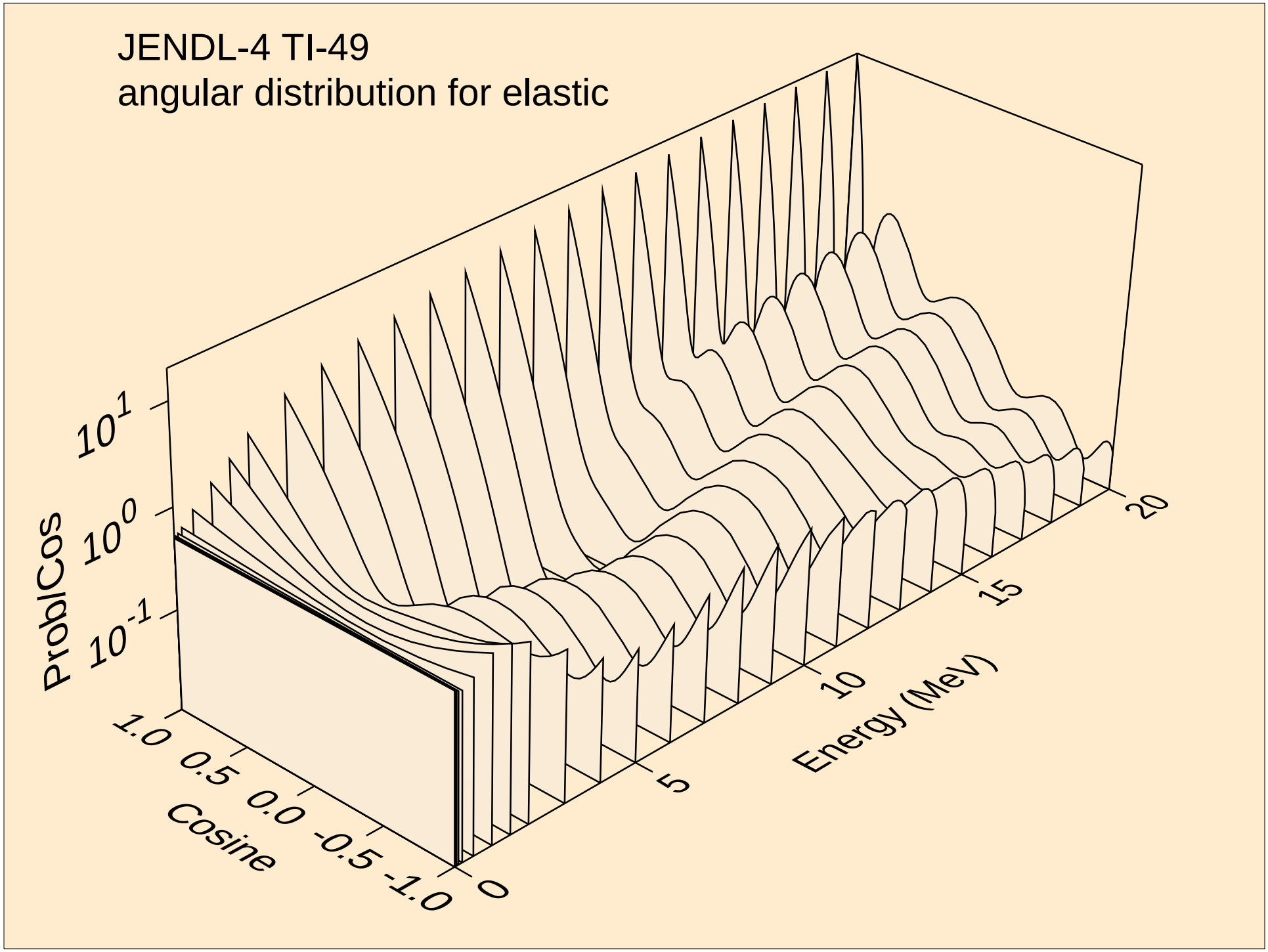

JENDL-4 TI-49
Inelastic levels
Cross section (barns)
*10^-3
140
120
100
80
60
40
20
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

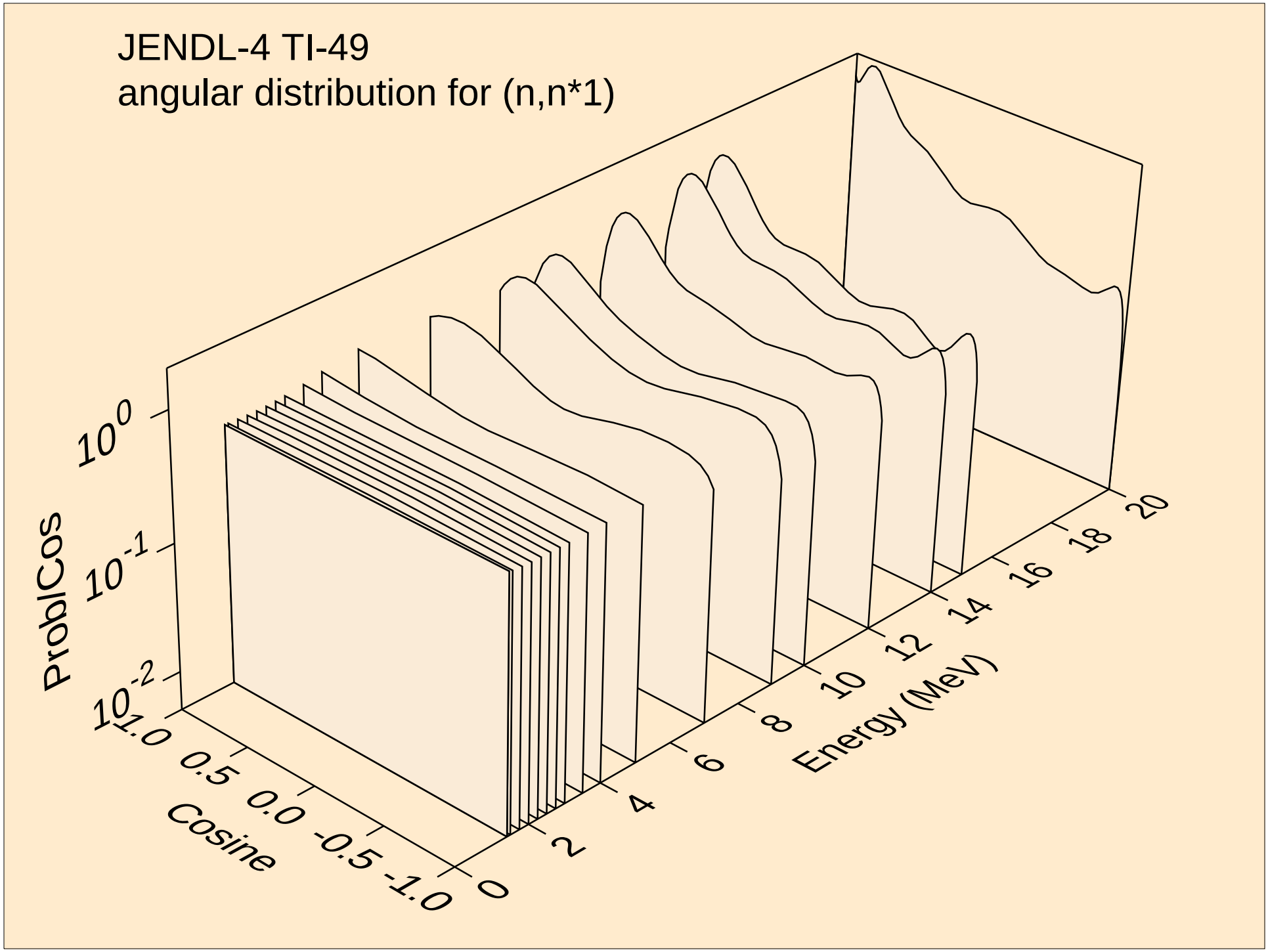

JENDL-4 TI-49
Inelastic levels
70
*10-3
60
50
40
30
20
10
0
Cross section (barns)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

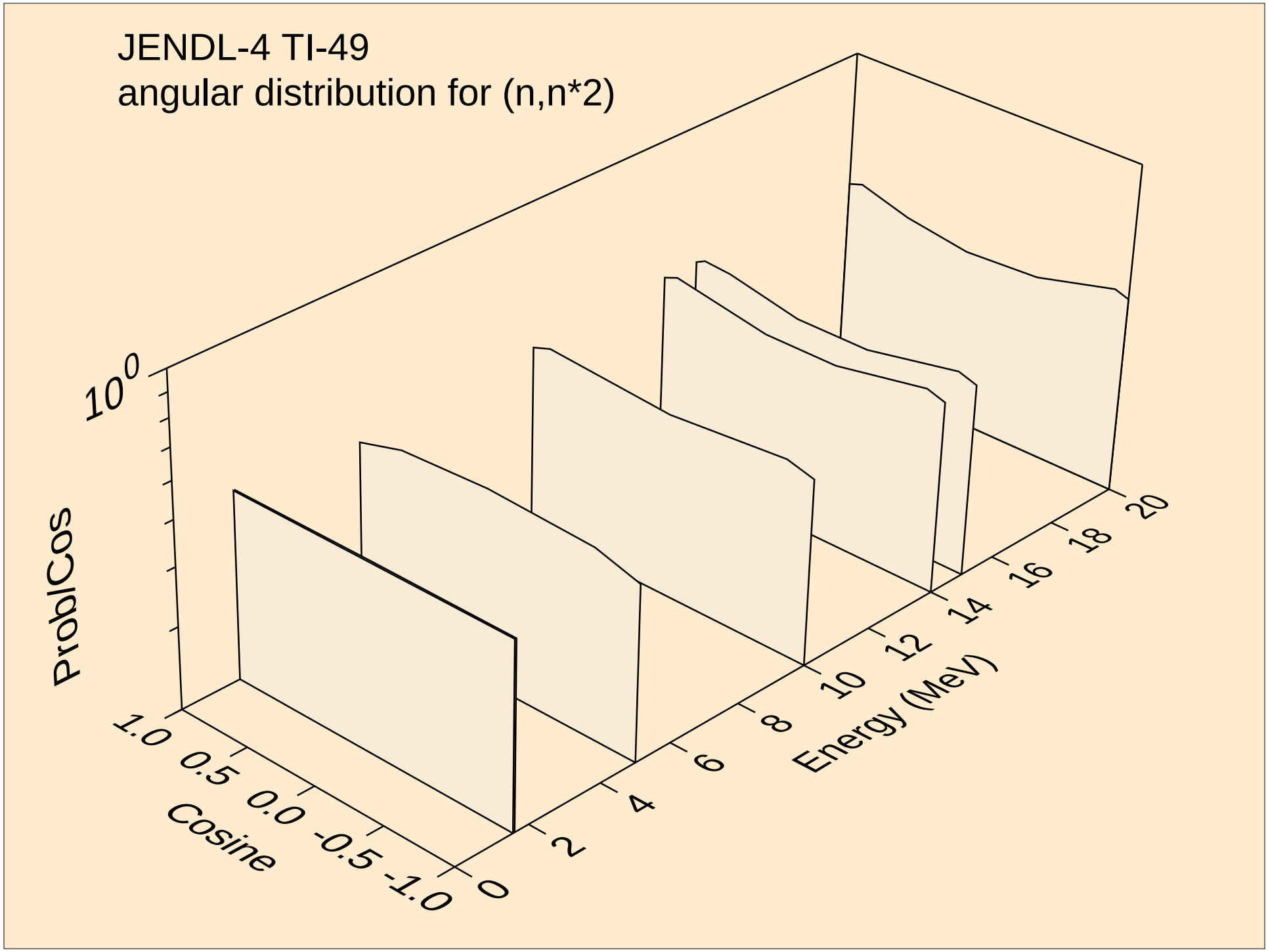

JENDL-4 TI-49
Threshold reactions
(n,2n)
(n,n*)a
(n,n*)p
(n,n*c)
(n,p)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
2
4
6
8
10
12
14
16
18
20

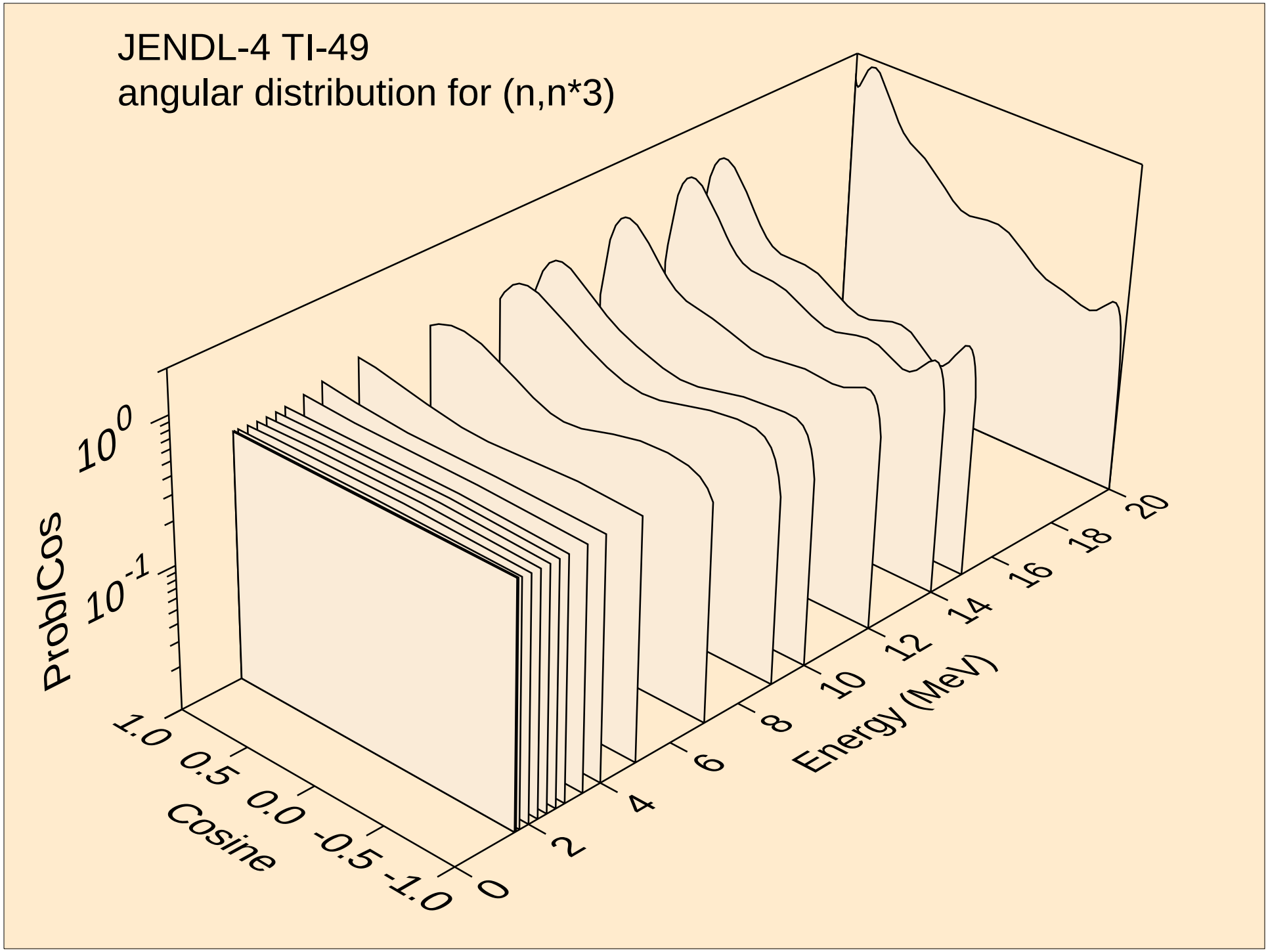

JENDL-4 TI-49
Threshold reactions
*10-3
(n,d)
(n,t)
(n,he3)
(n,a)
(n,2p)
Cross section (barns)
Energy (MeV)
0
5
10
15
20
25
30
35
4
6
8
10
12
14
16
18
20

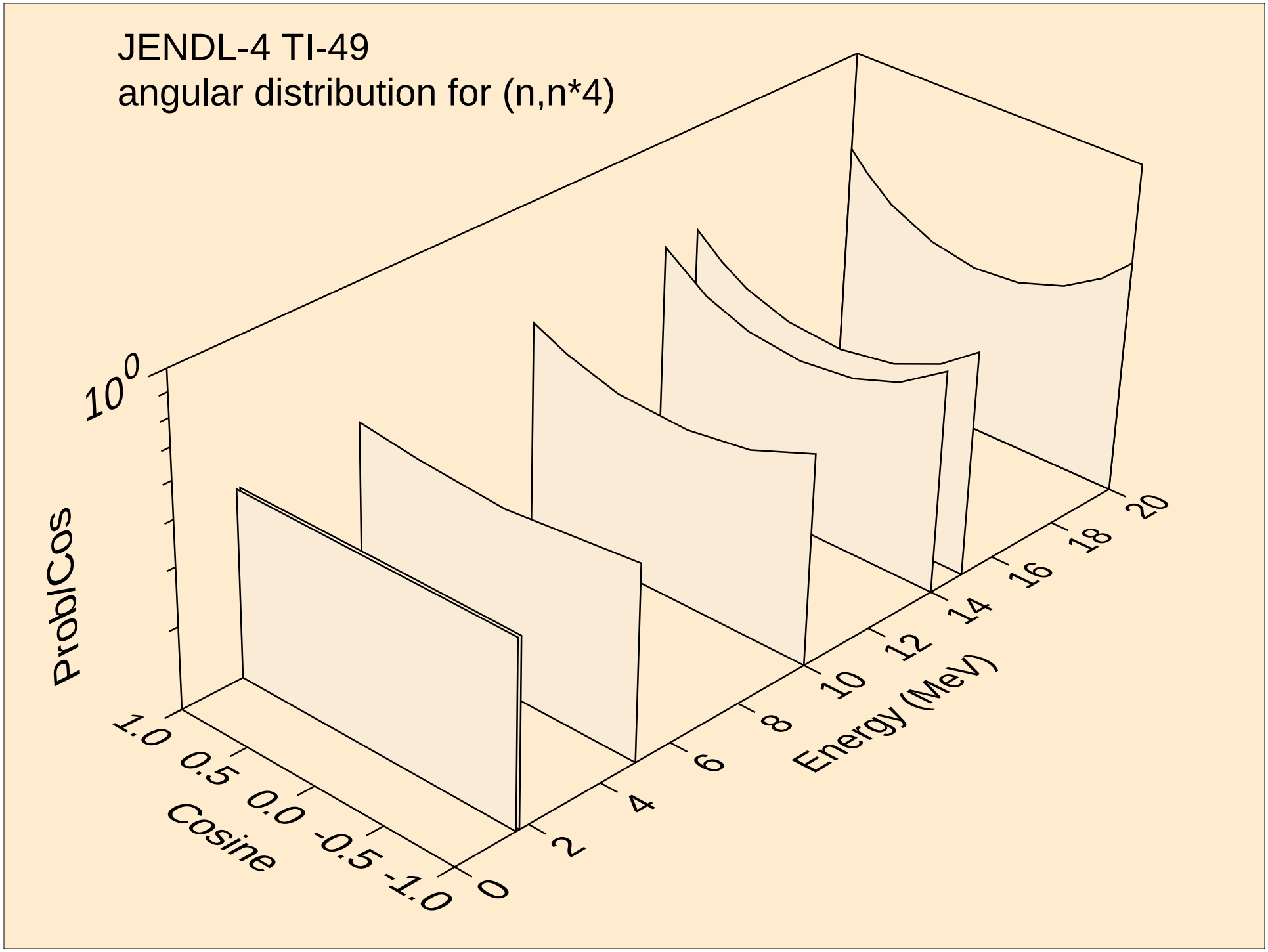

JENDL-4 TI-49
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,xa)
Cross section (barns)
*10-3
100
80
60
40
20
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

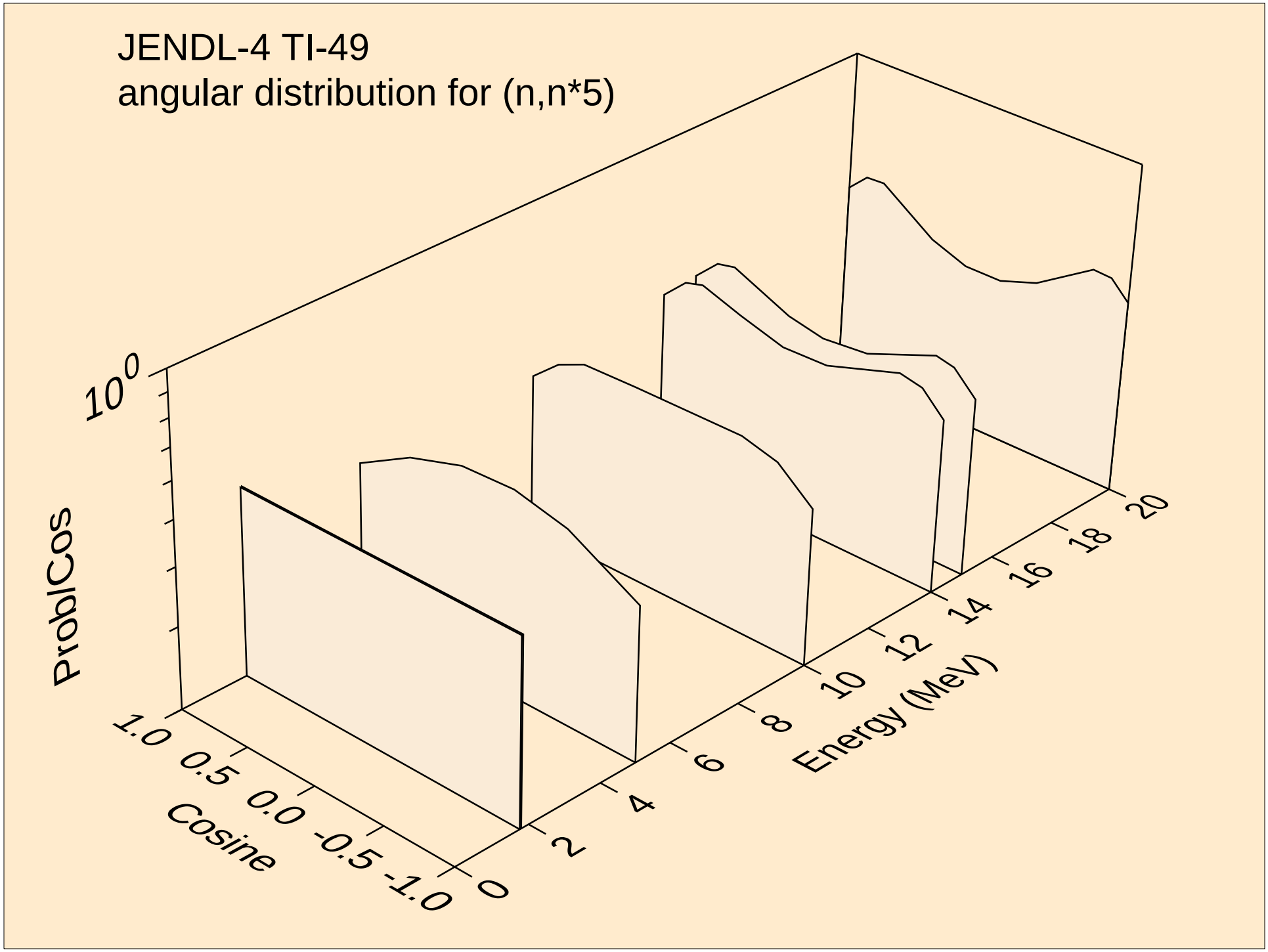

JENDL-4 TI-49
angular distribution for elastic
ProblCos
10^{1}
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
5
10
15
20

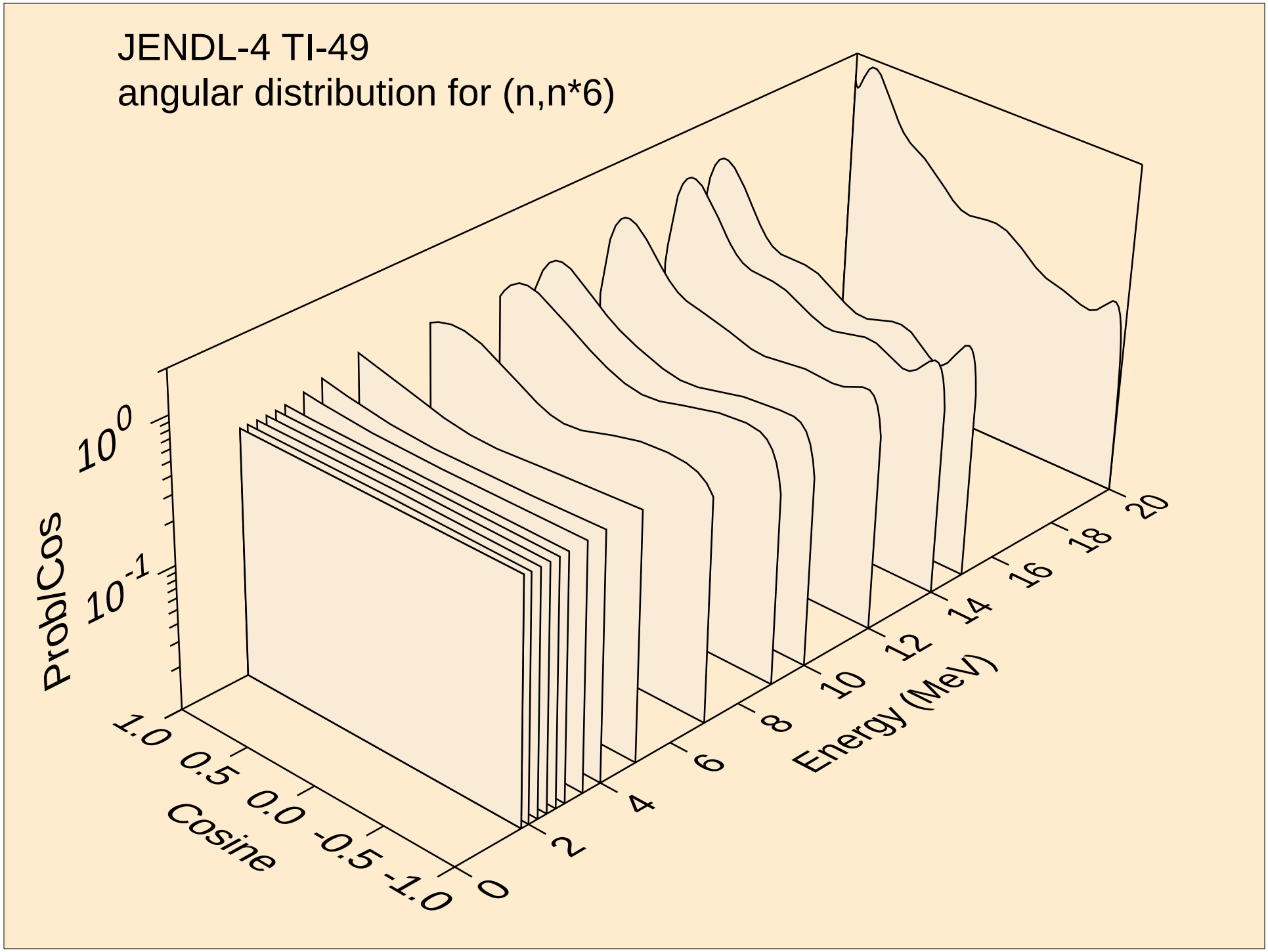

JENDL-4 TI-49
angular distribution for (n,n*1)
ProbCos
10^{0}
10^{-1}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

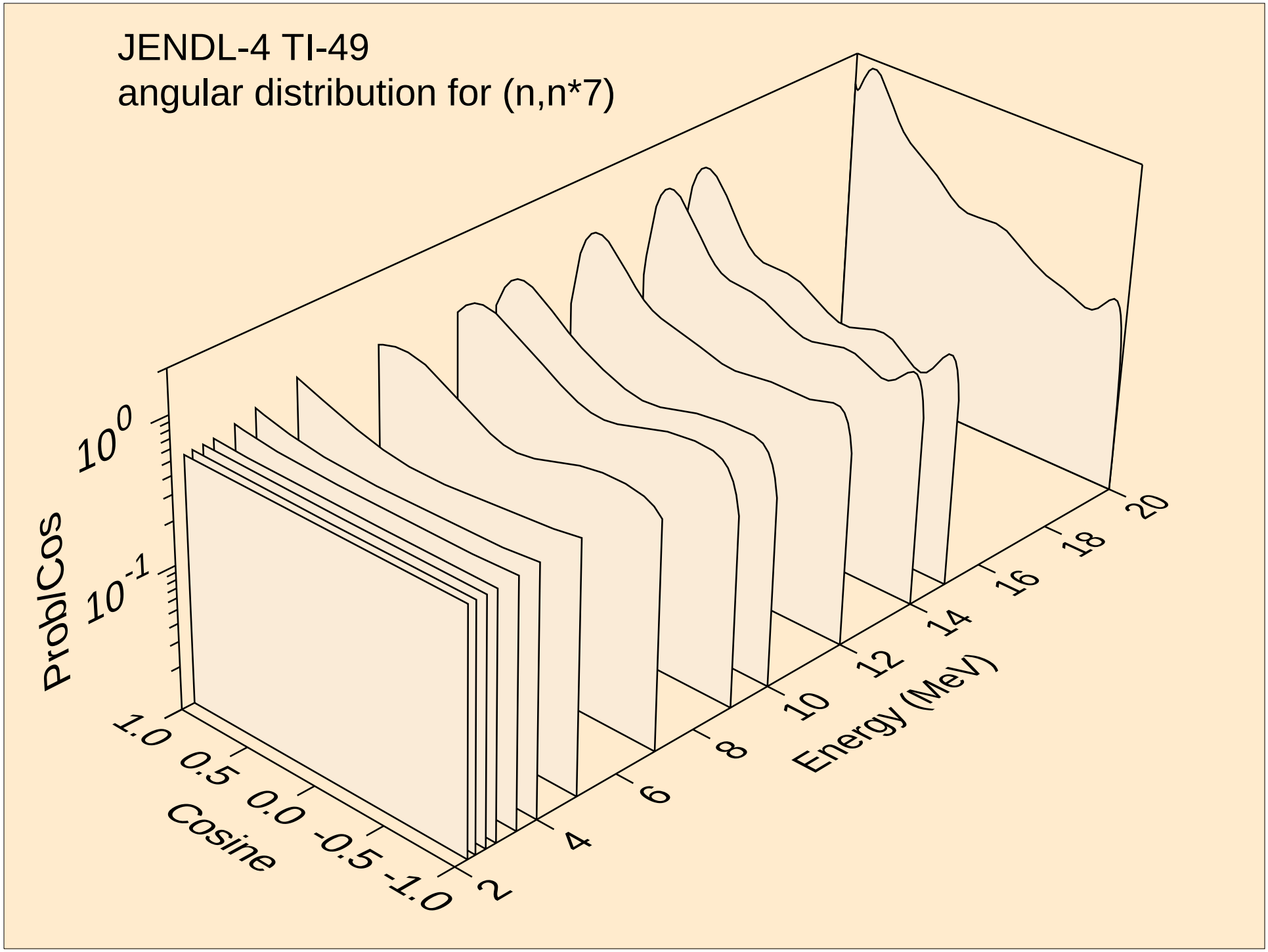

JENDL-4 TI-49
angular distribution for (n,n*2)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

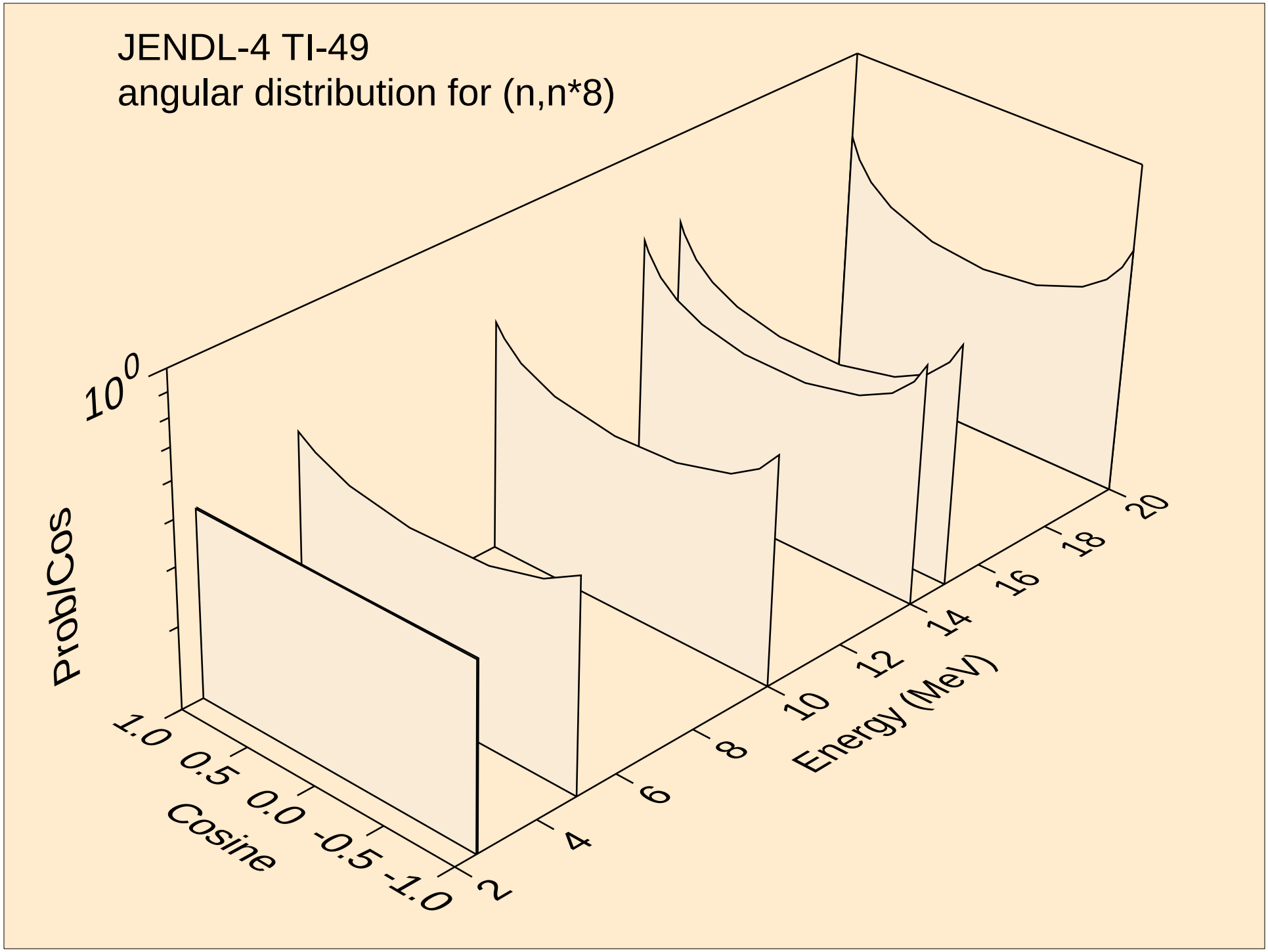

JENDL-4 TI-49
angular distribution for (n,n*3)
ProbCos
10^0
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

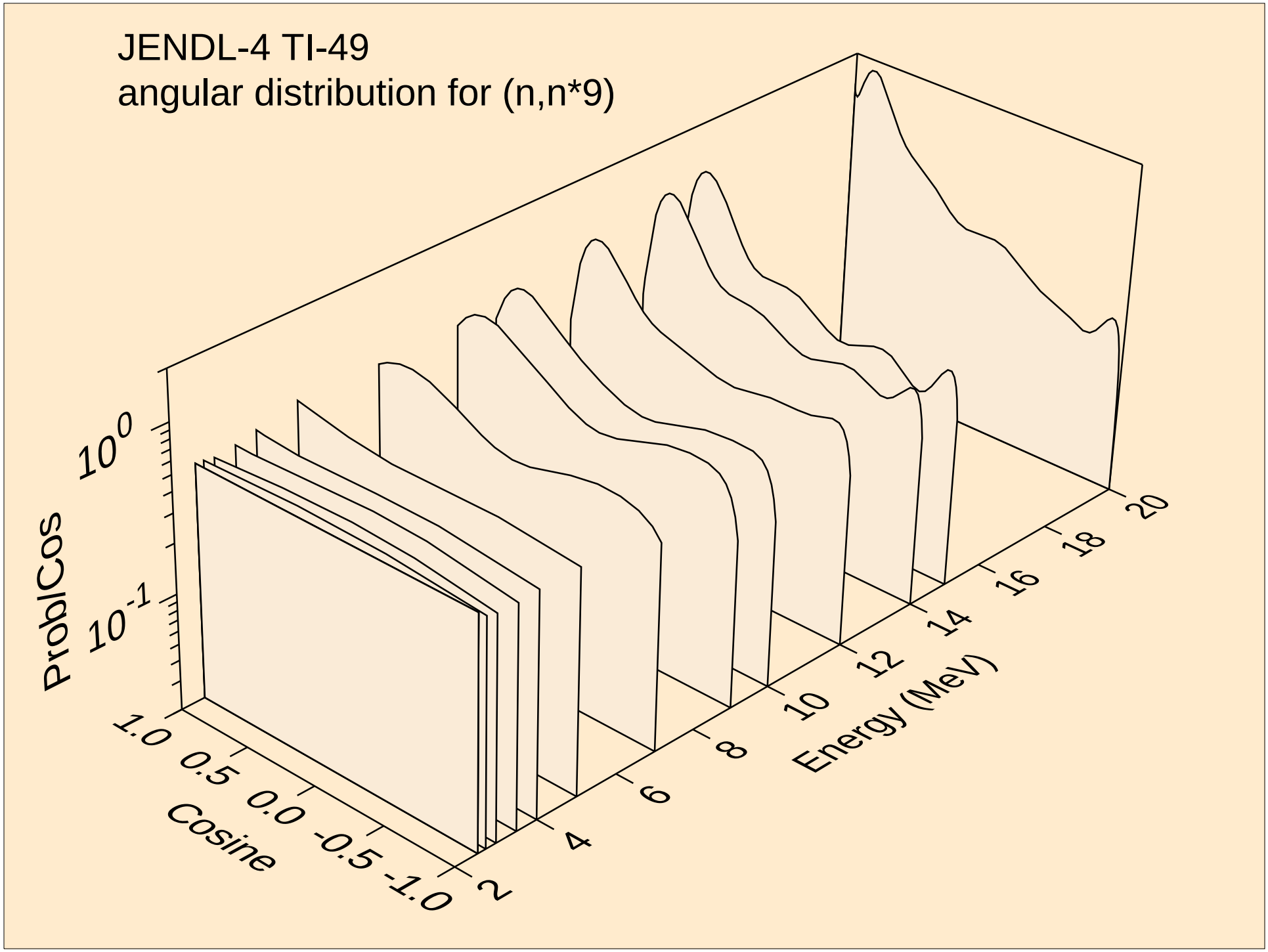

JENDL-4 TI-49
angular distribution for (n,n*4)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

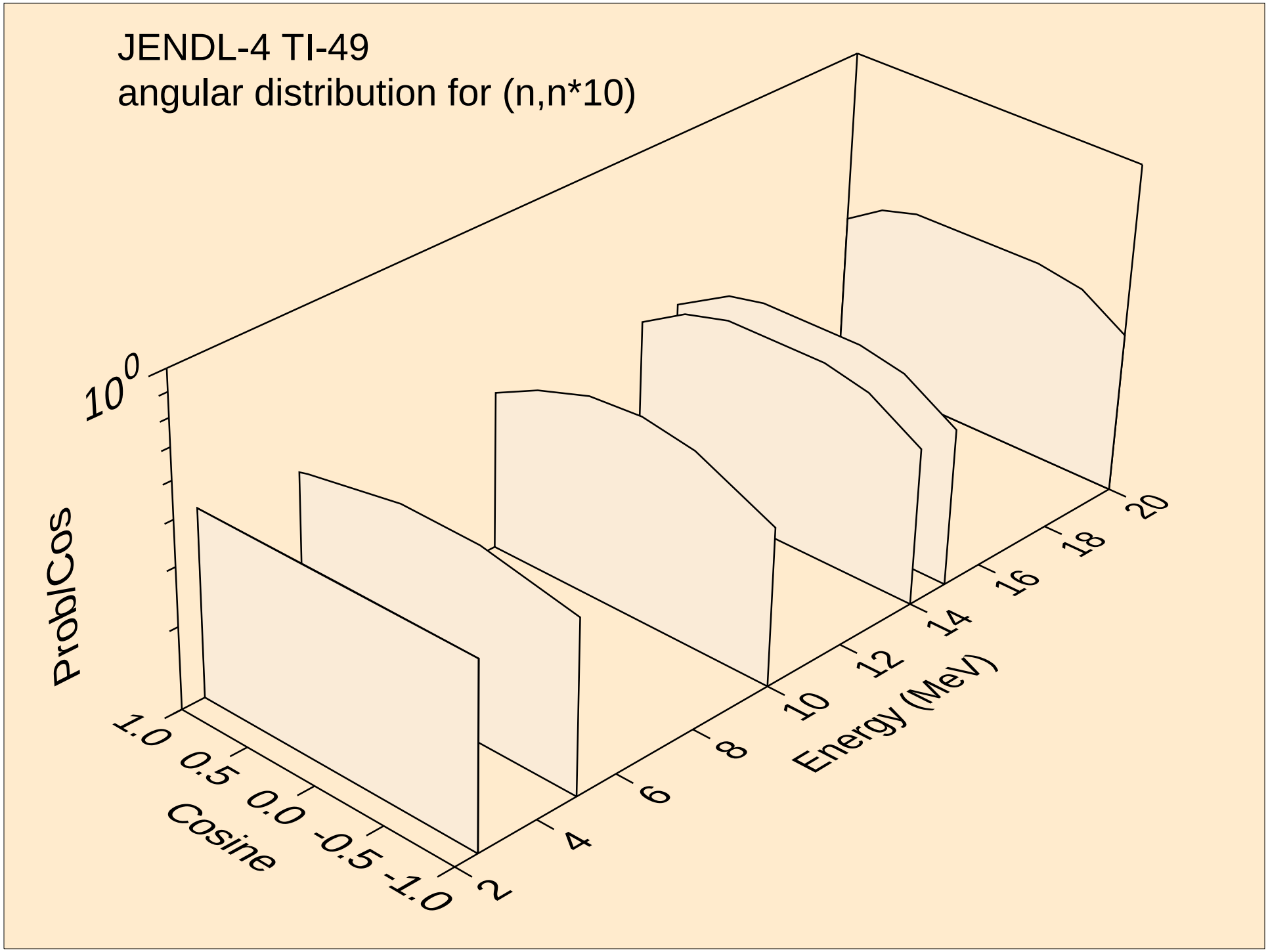

JENDL-4 TI-49
angular distribution for (n,n*5)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

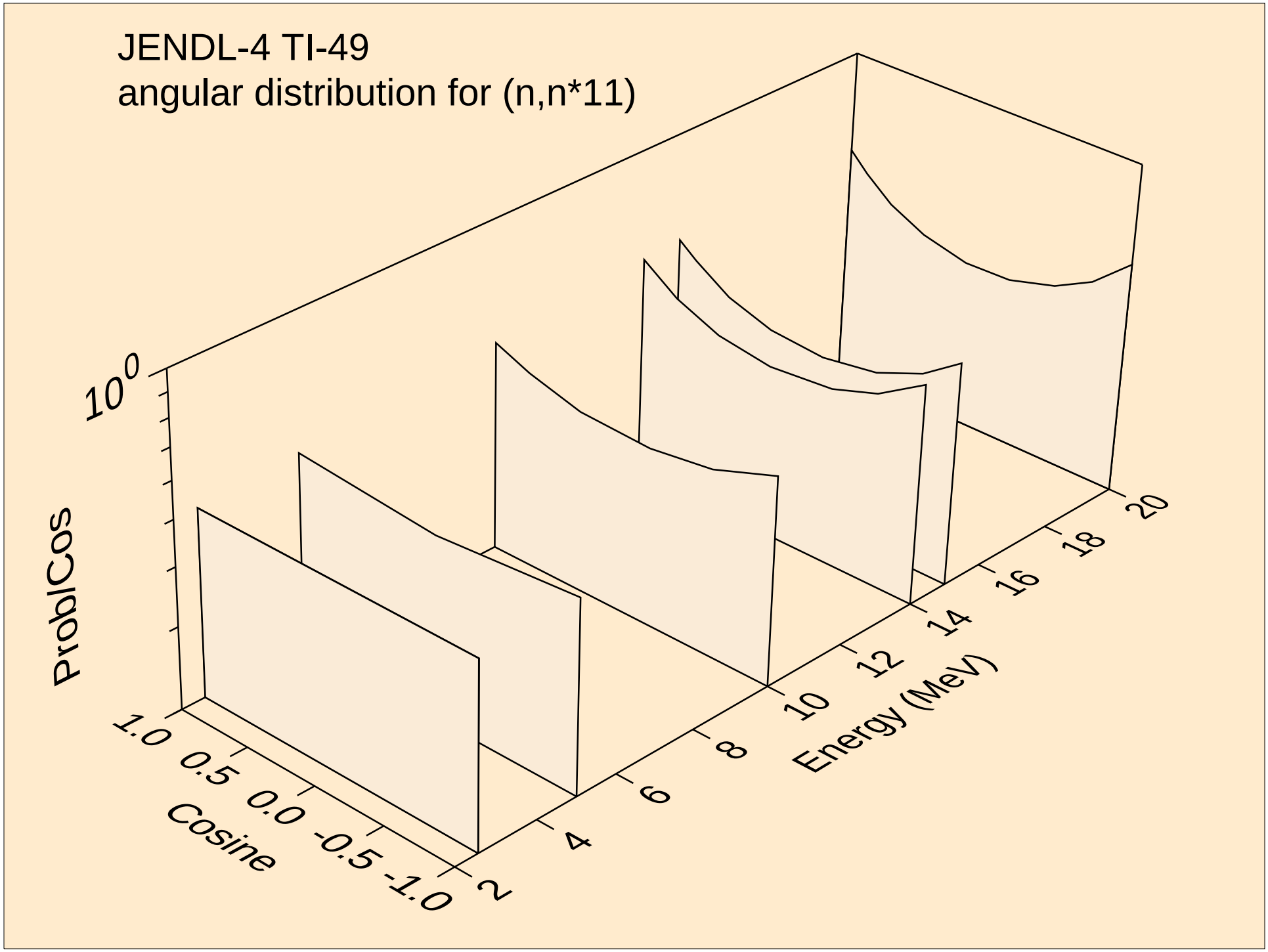

JENDL-4 TI-49
angular distribution for (n,n*6)
ProbCos
10^0
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

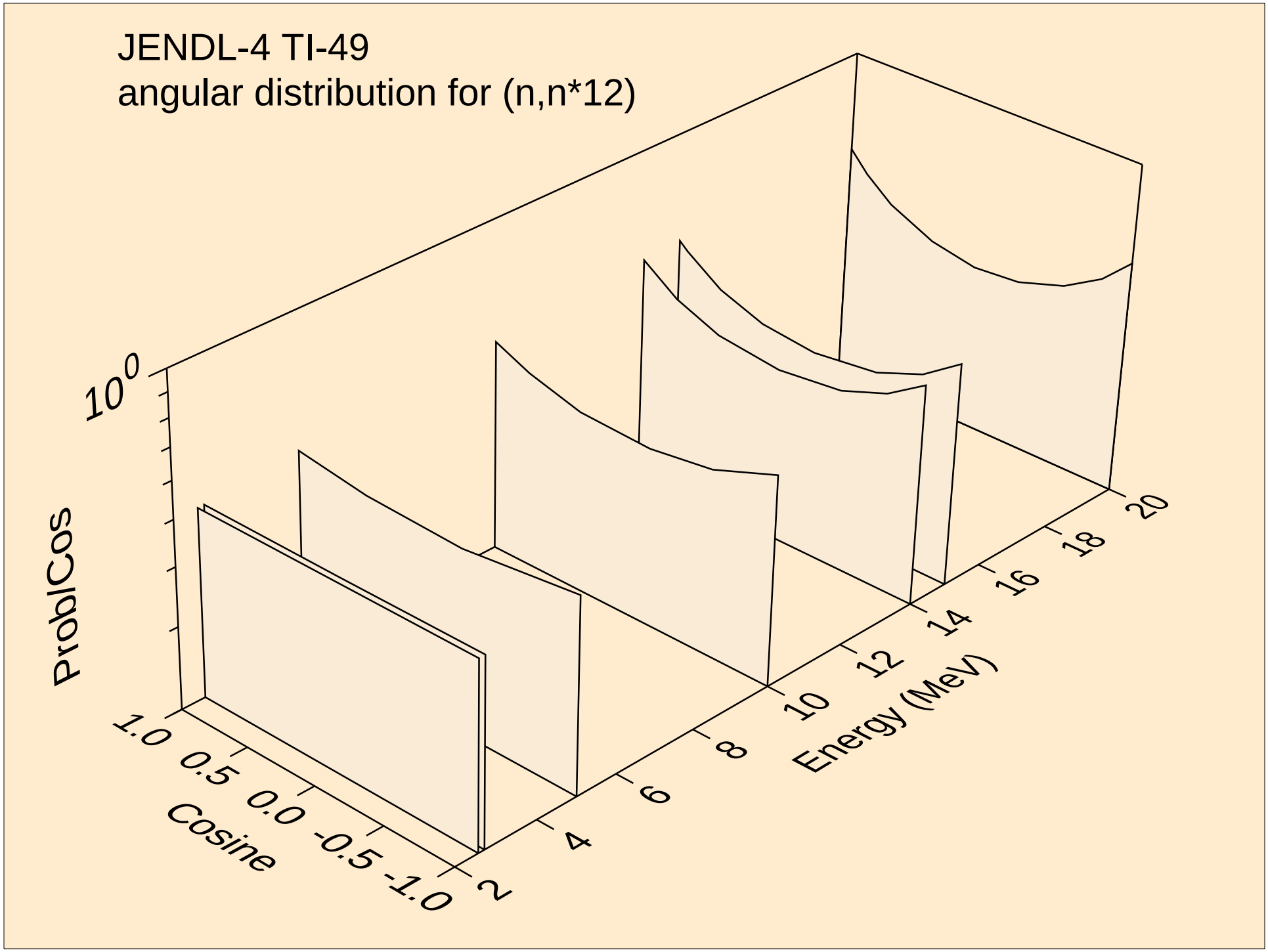

JENDL-4 TI-49
angular distribution for (n,n*7)
ProbCos
10^0
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

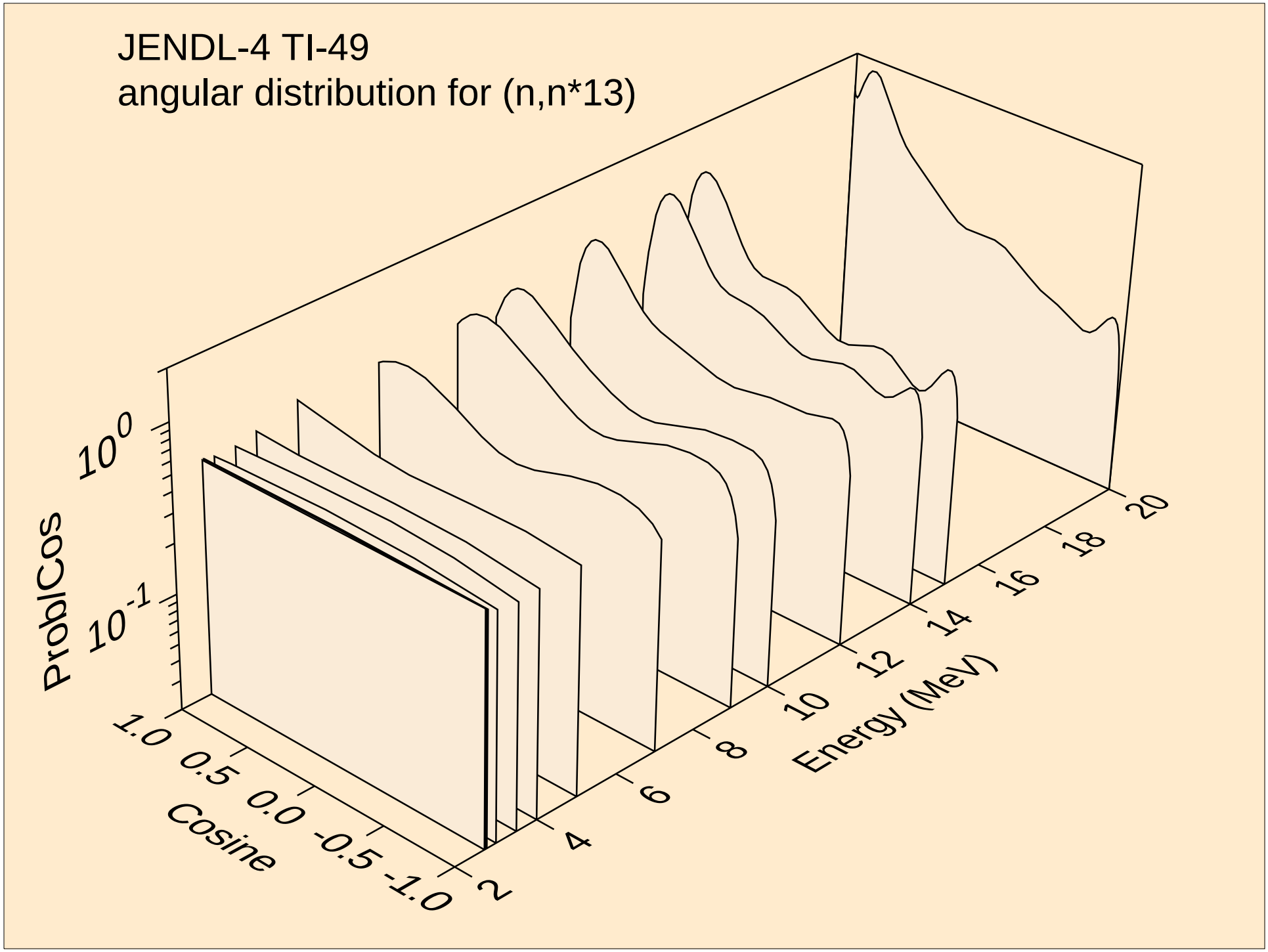

JENDL-4 TI-49
angular distribution for (n,n*8)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

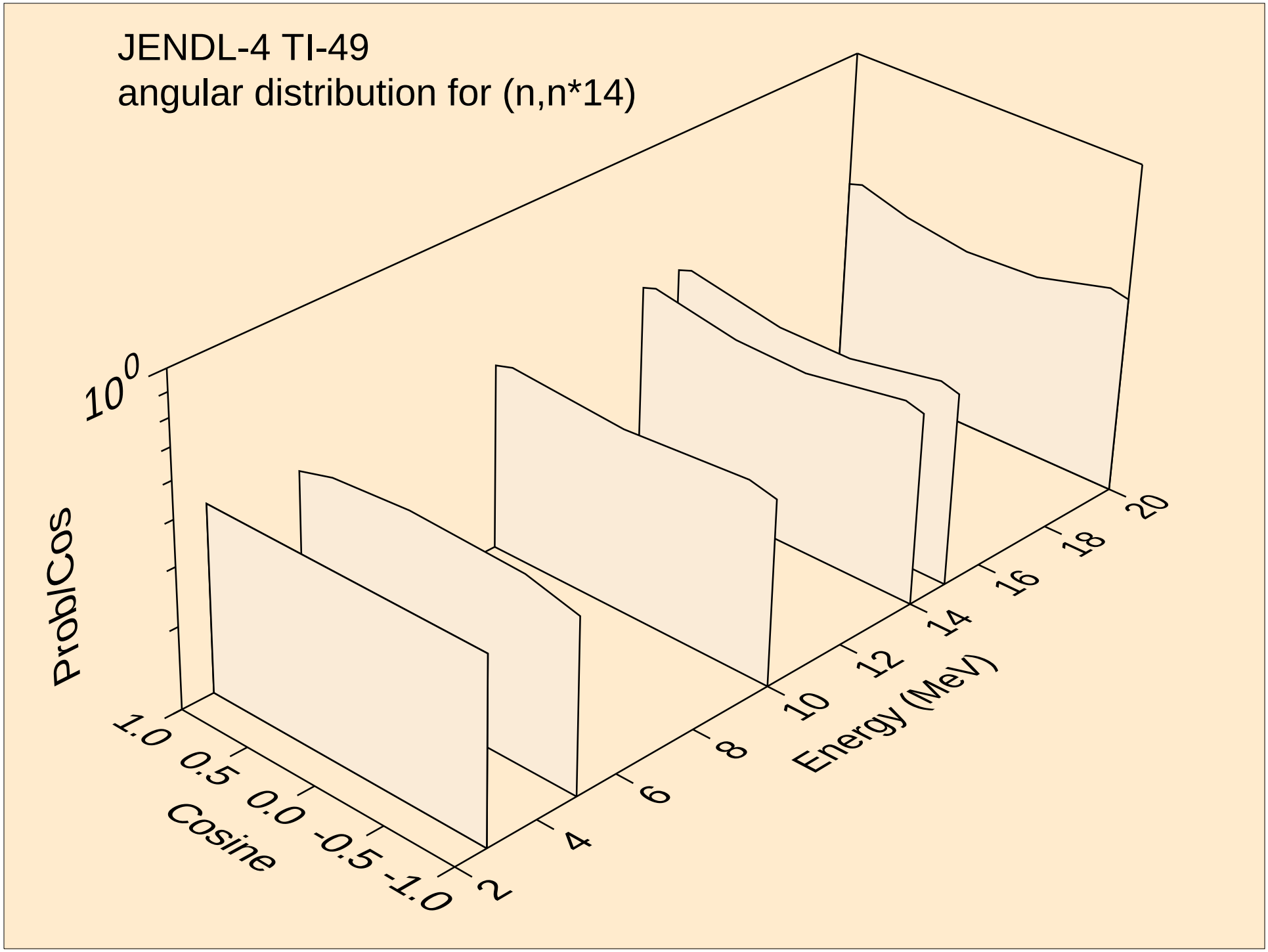

JENDL-4 TI-49
angular distribution for (n,n*9)
ProbCos
10^0
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

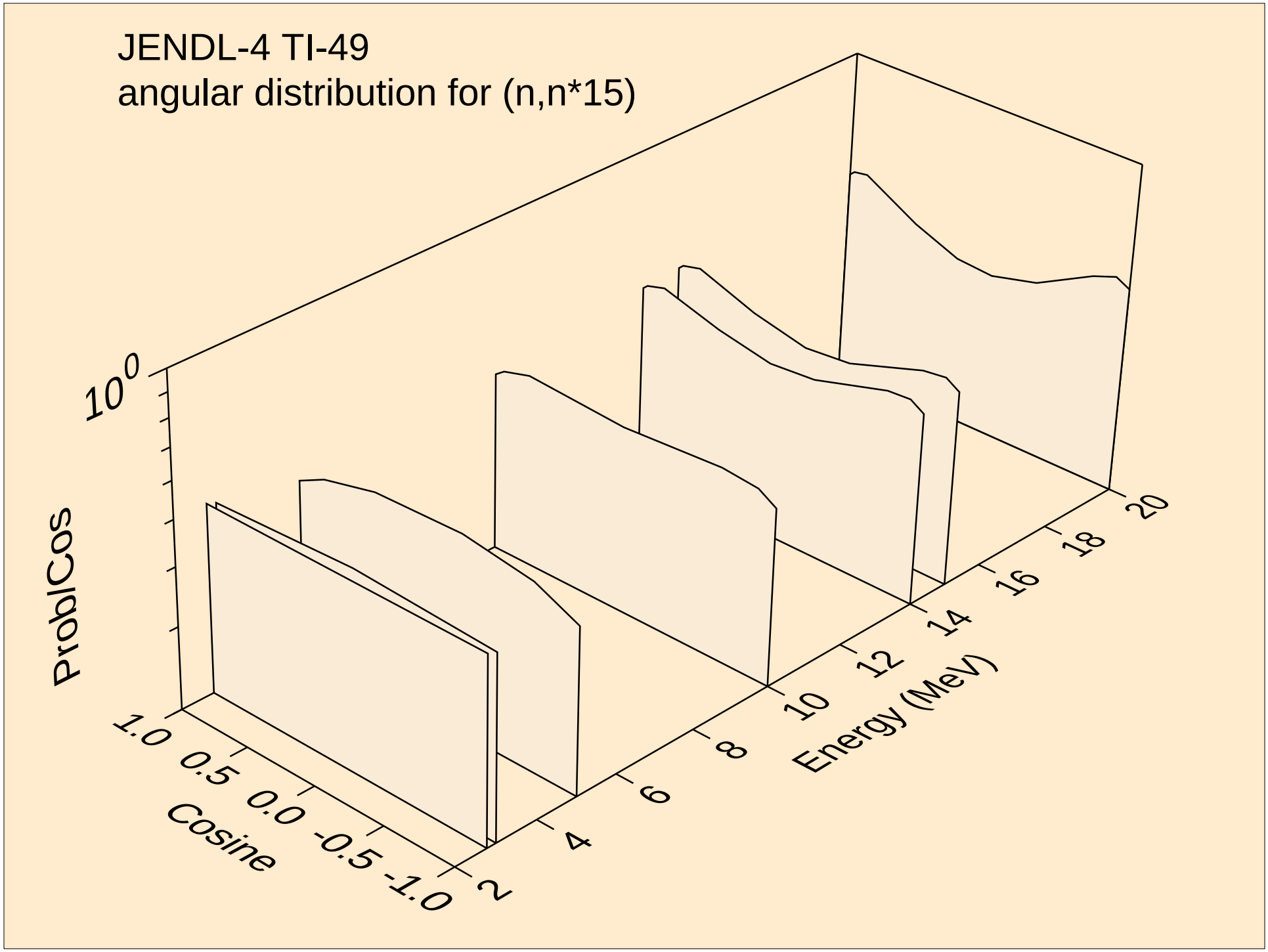

JENDL-4 TI-49
angular distribution for (n,n*10)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

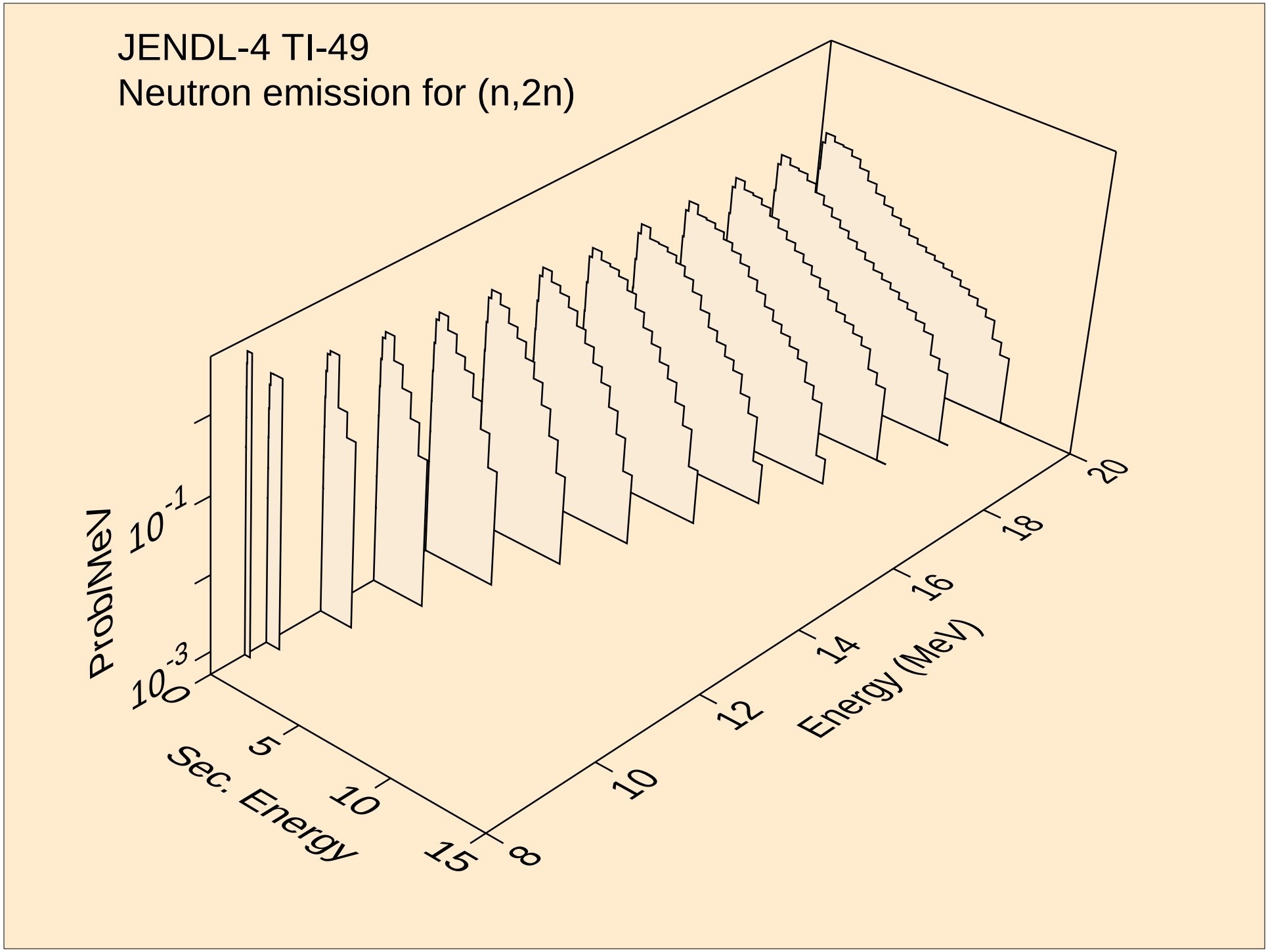

JENDL-4 TI-49
angular distribution for (n,n*11)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

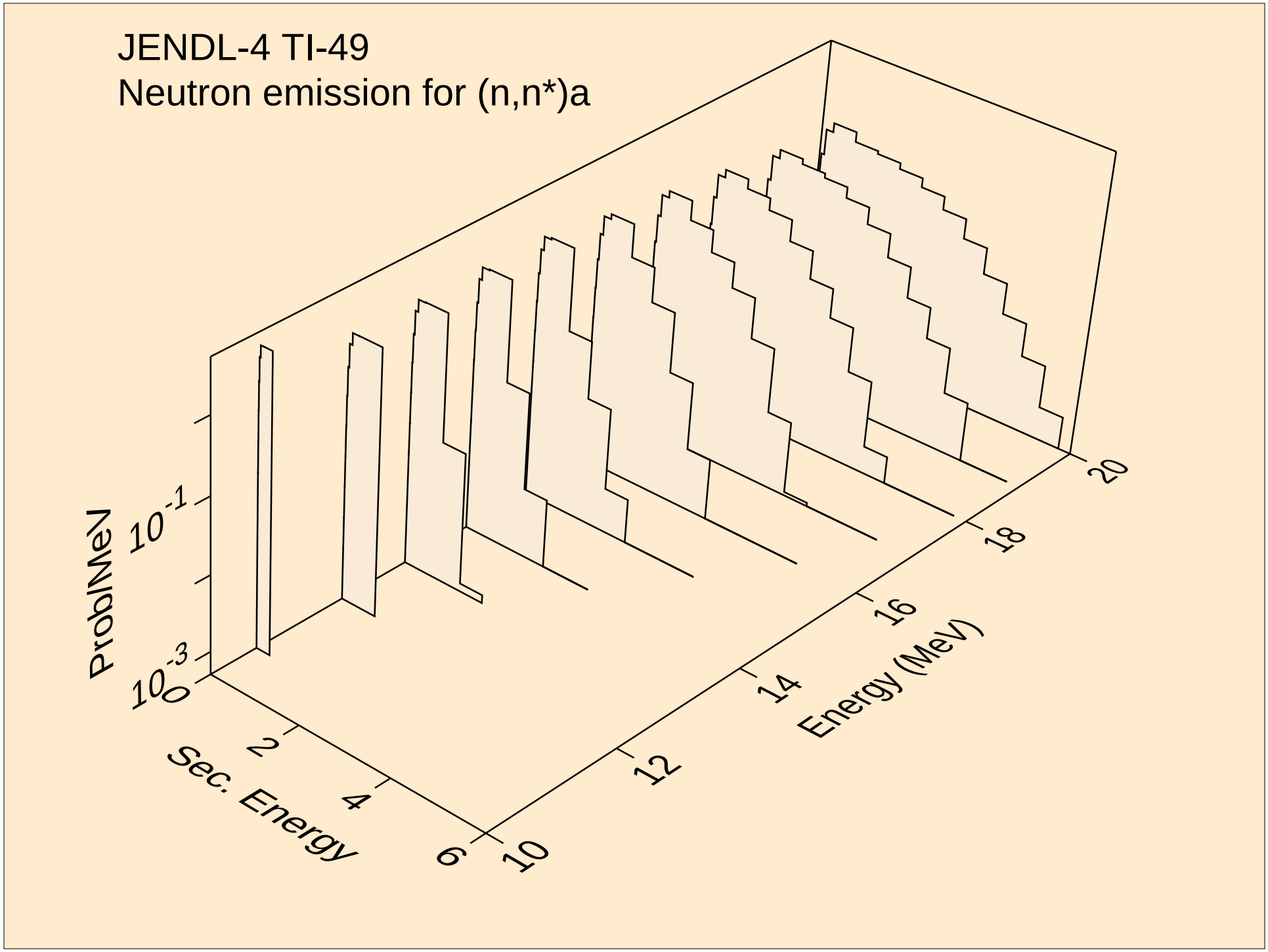

JENDL-4 TI-49
angular distribution for (n,n*12)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

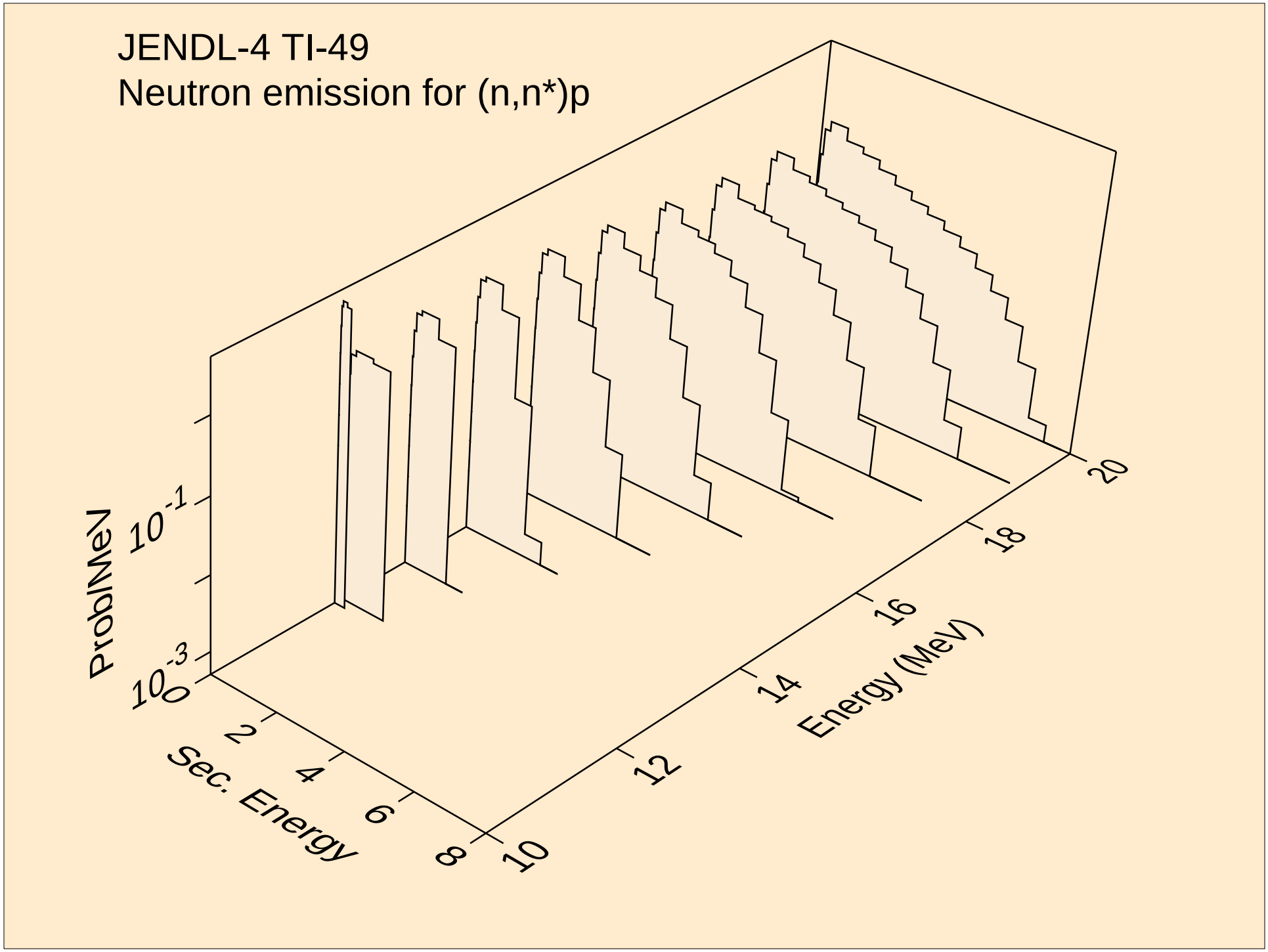

JENDL-4 TI-49
angular distribution for (n,n*13)
Prob/Cos
10^0
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

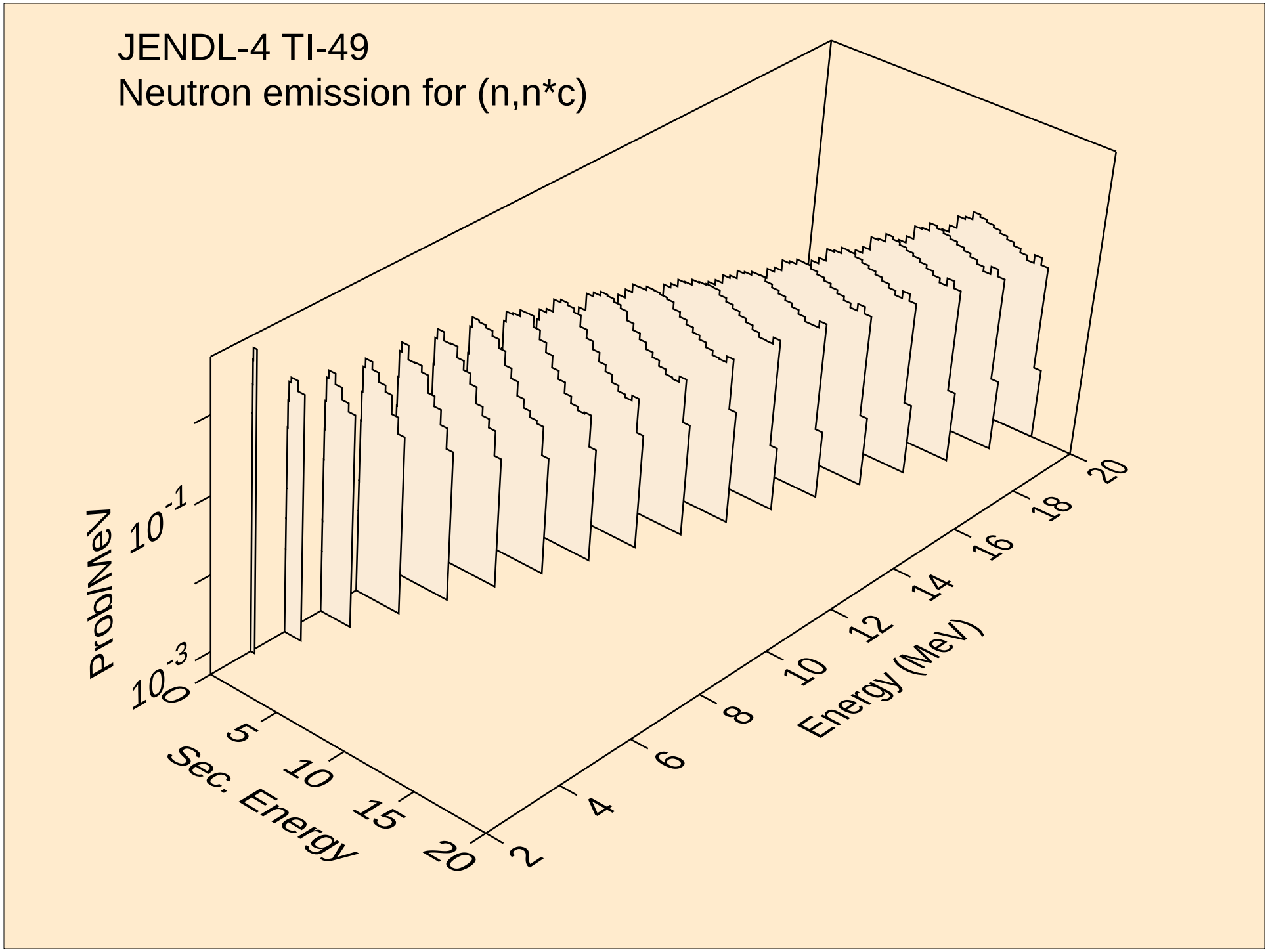

JENDL-4 TI-49
angular distribution for (n,n*14)
10^0
ProbCos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
angular distribution for (n,n*15)
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)

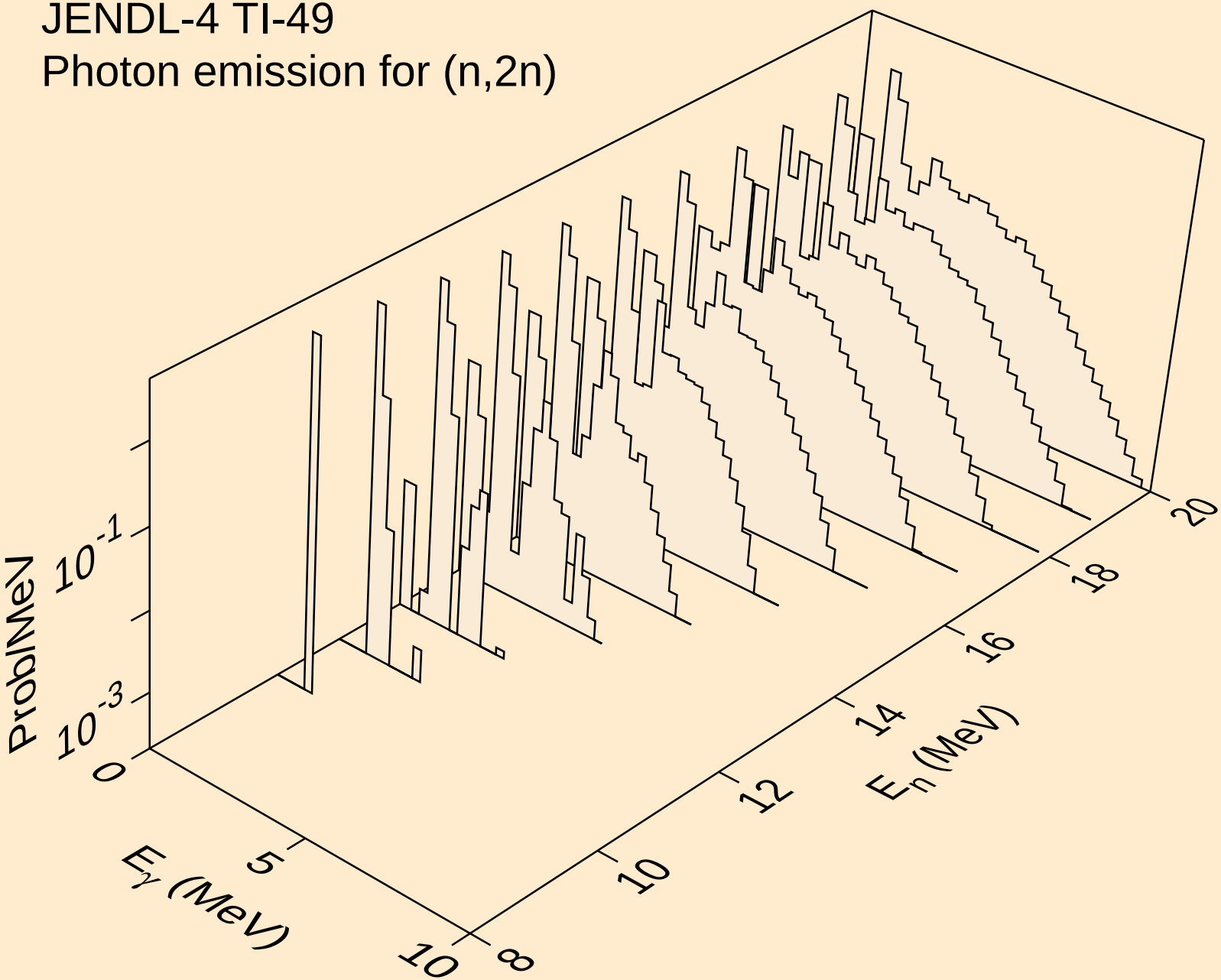

JENDL-4 TI-49
Neutron emission for (n,2n)
Prob/MeV
10^-1
10^-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
Neutron emission for (n,n*)a
Prob/MeV
10^{-1}
10^{-3}
0
2
4
6
Sec. Energy
10
12
14
16
18
20
Energy (MeV)

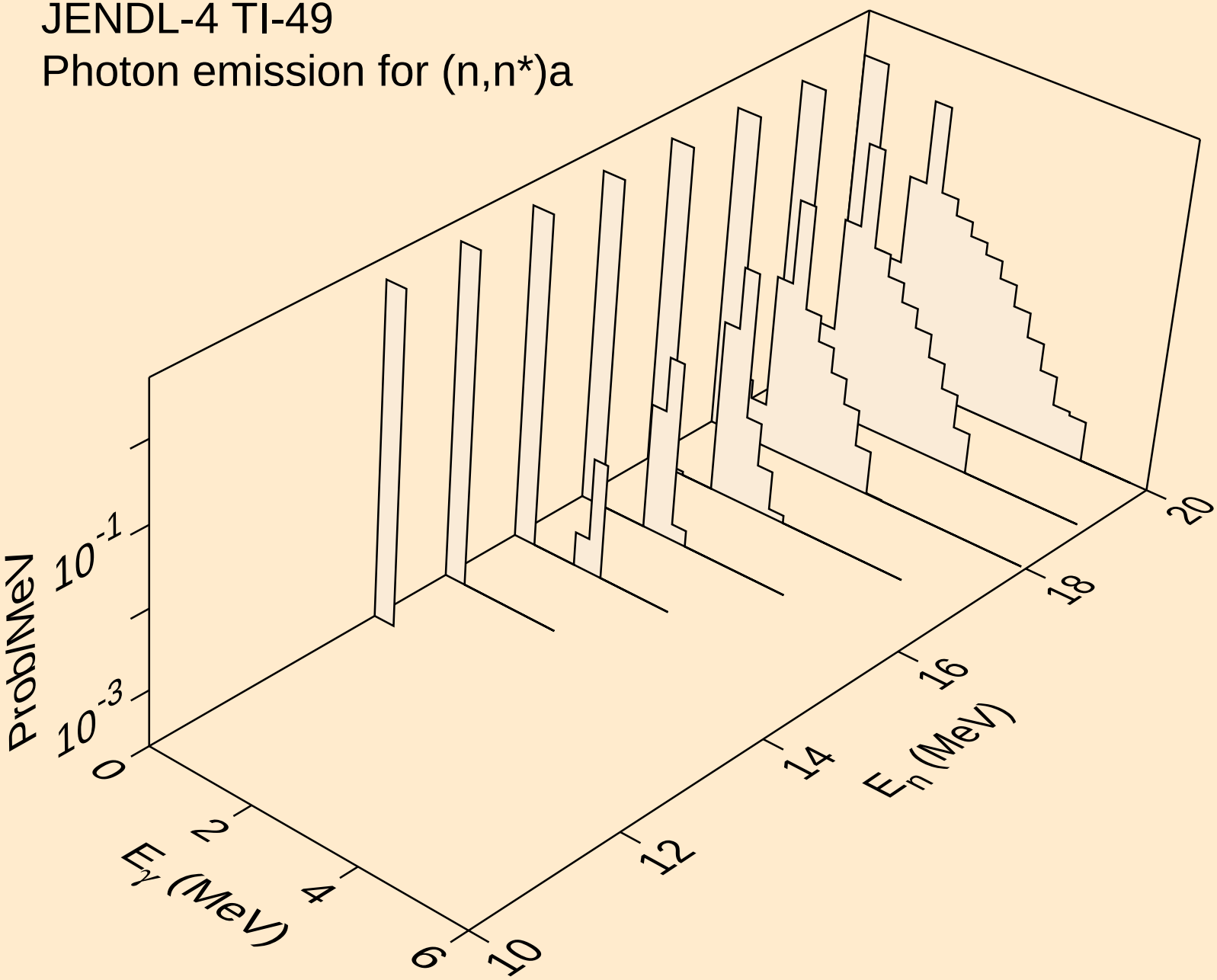

JENDL-4 TI-49
Neutron emission for (n,n*)p
Prob/MeV
10^-1
10^-3
0
2
4
6
8
10
Sec. Energy
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
Neutron emission for (n,n*c)
Prob/MeV
10^{-1}
10^{-3}
0
5
10
15
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

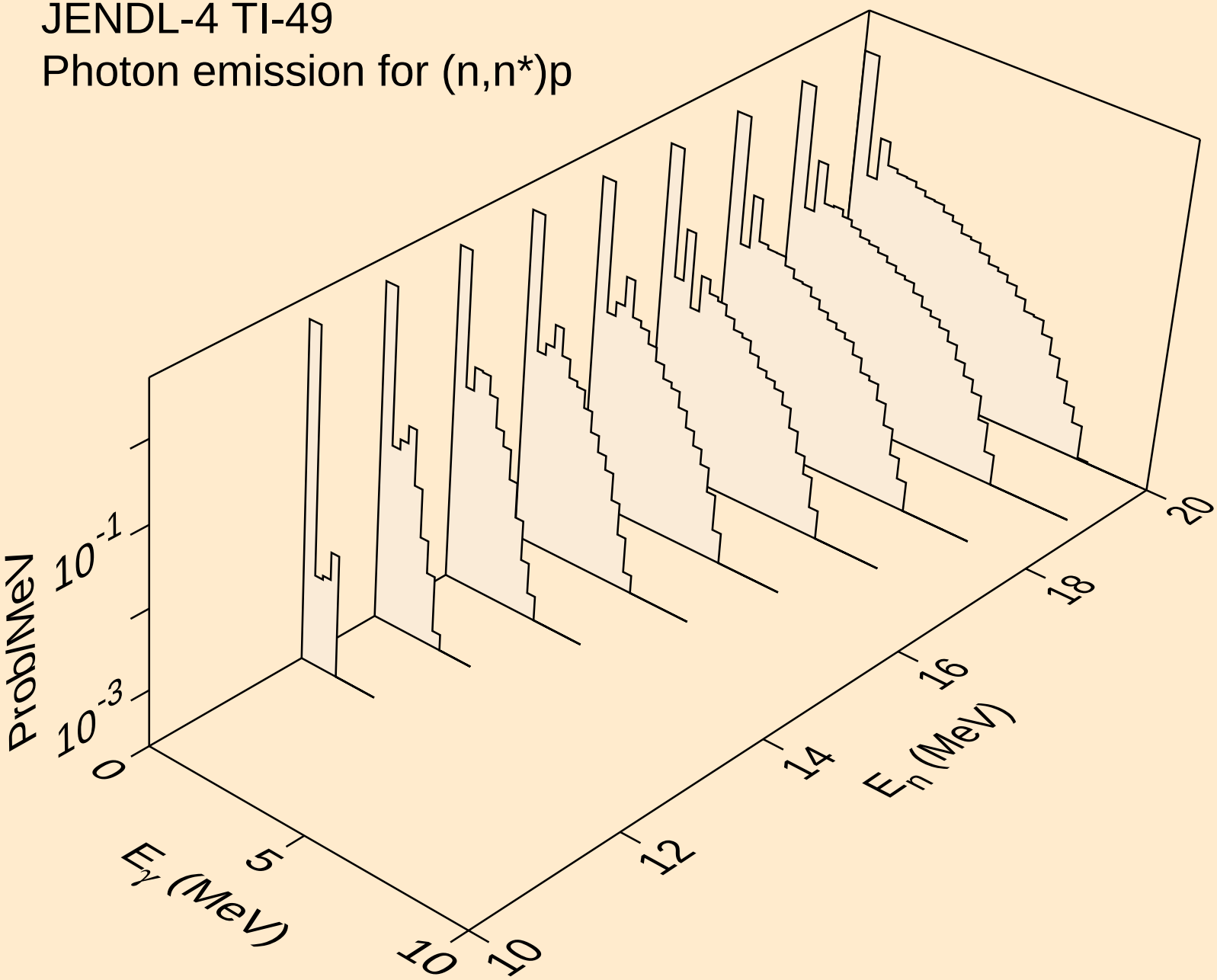
JENDL-4 TI-49
Photon emission for (n,2n)



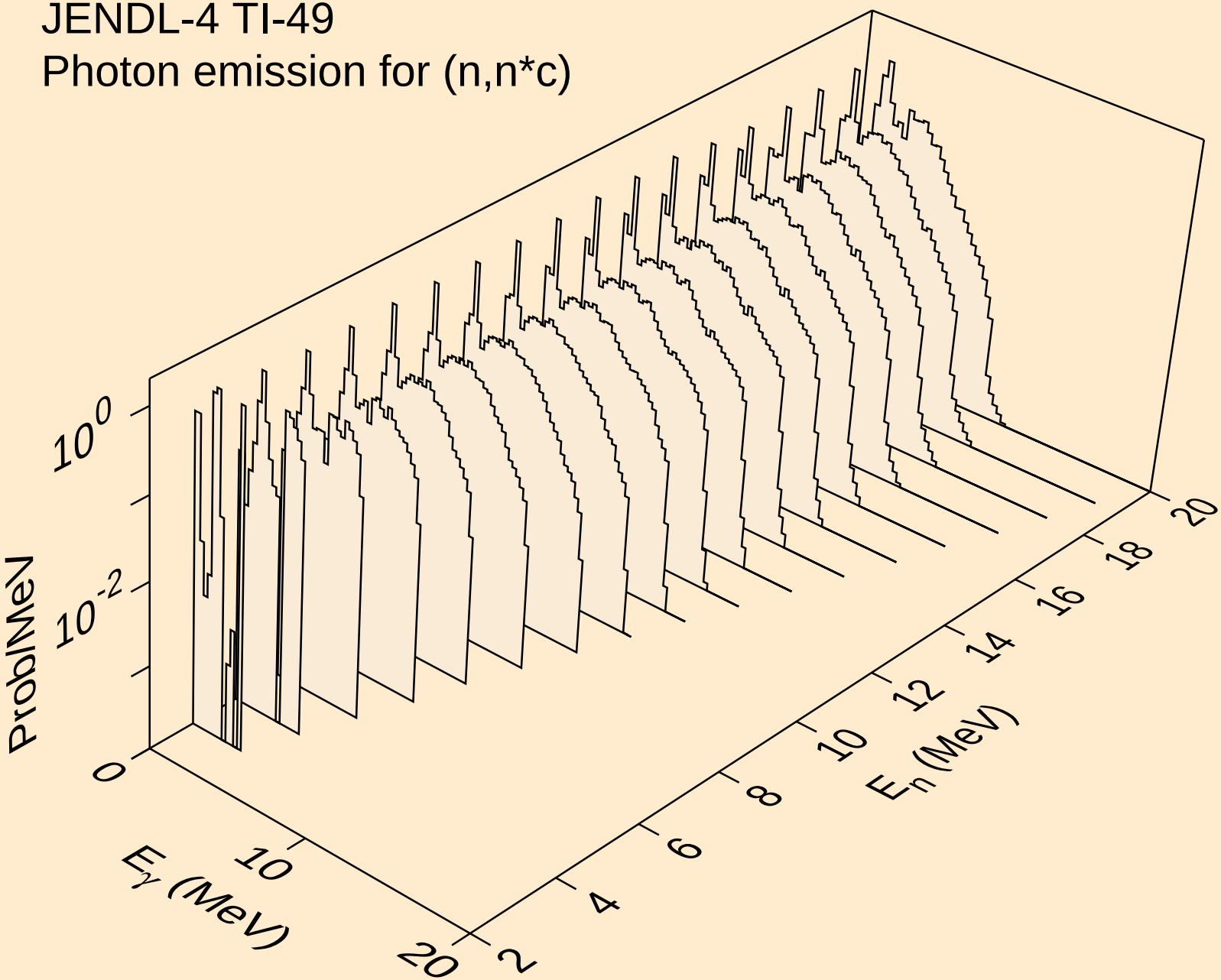
JENDL-4 TI-49
Photon emission for (n,n*)a

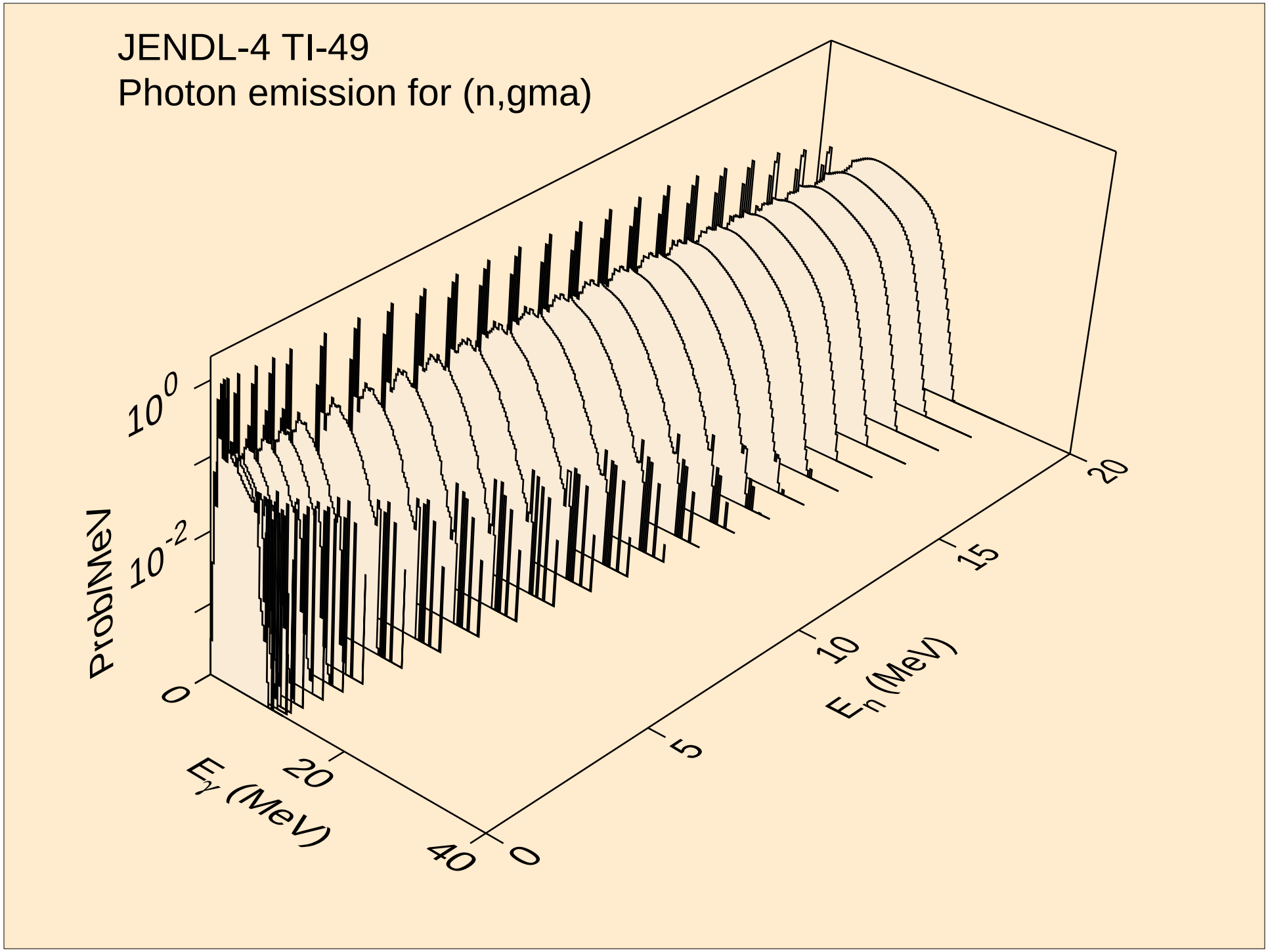


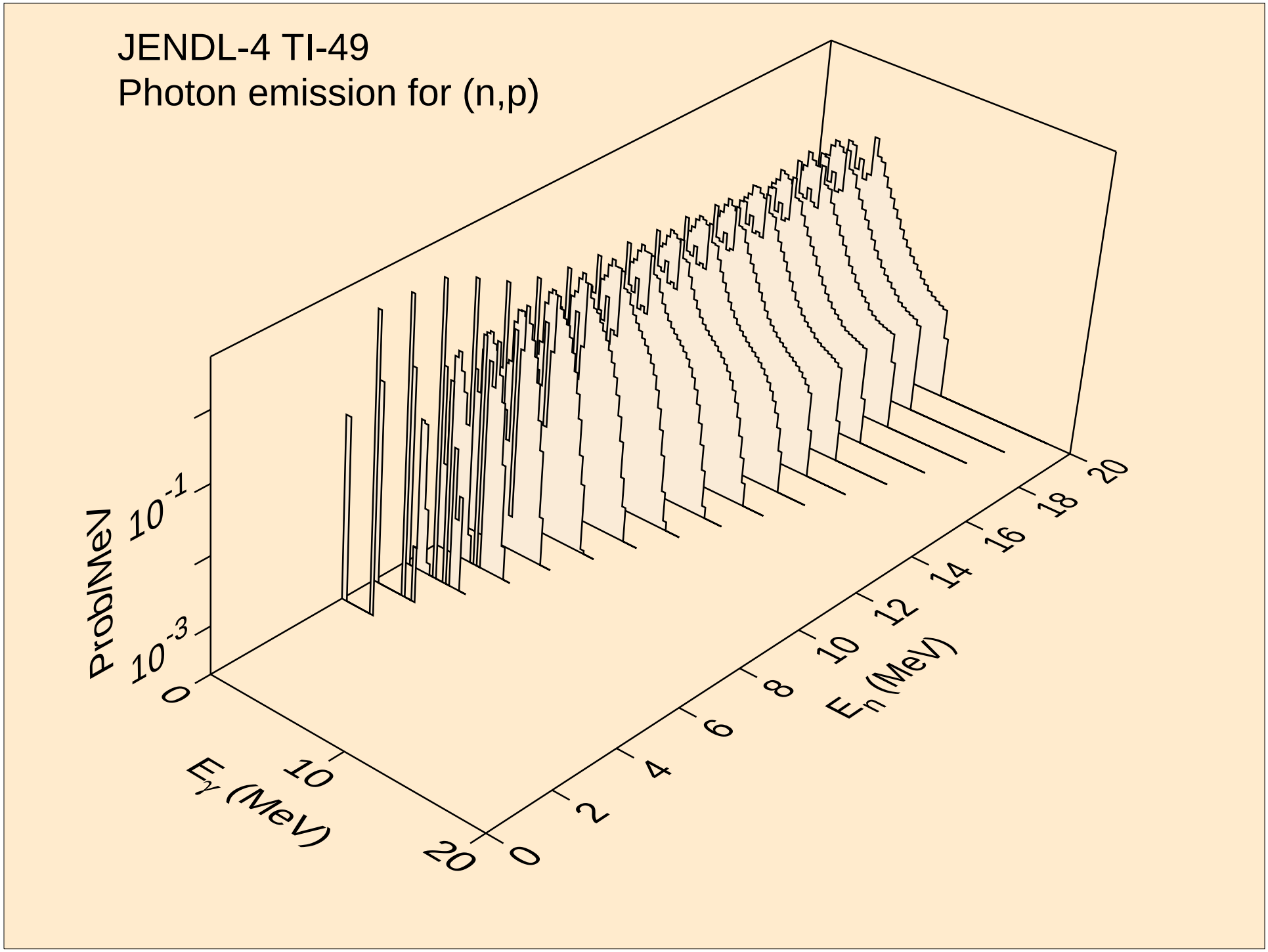
JENDL-4 TI-49
Photon emission for (n,n*)p



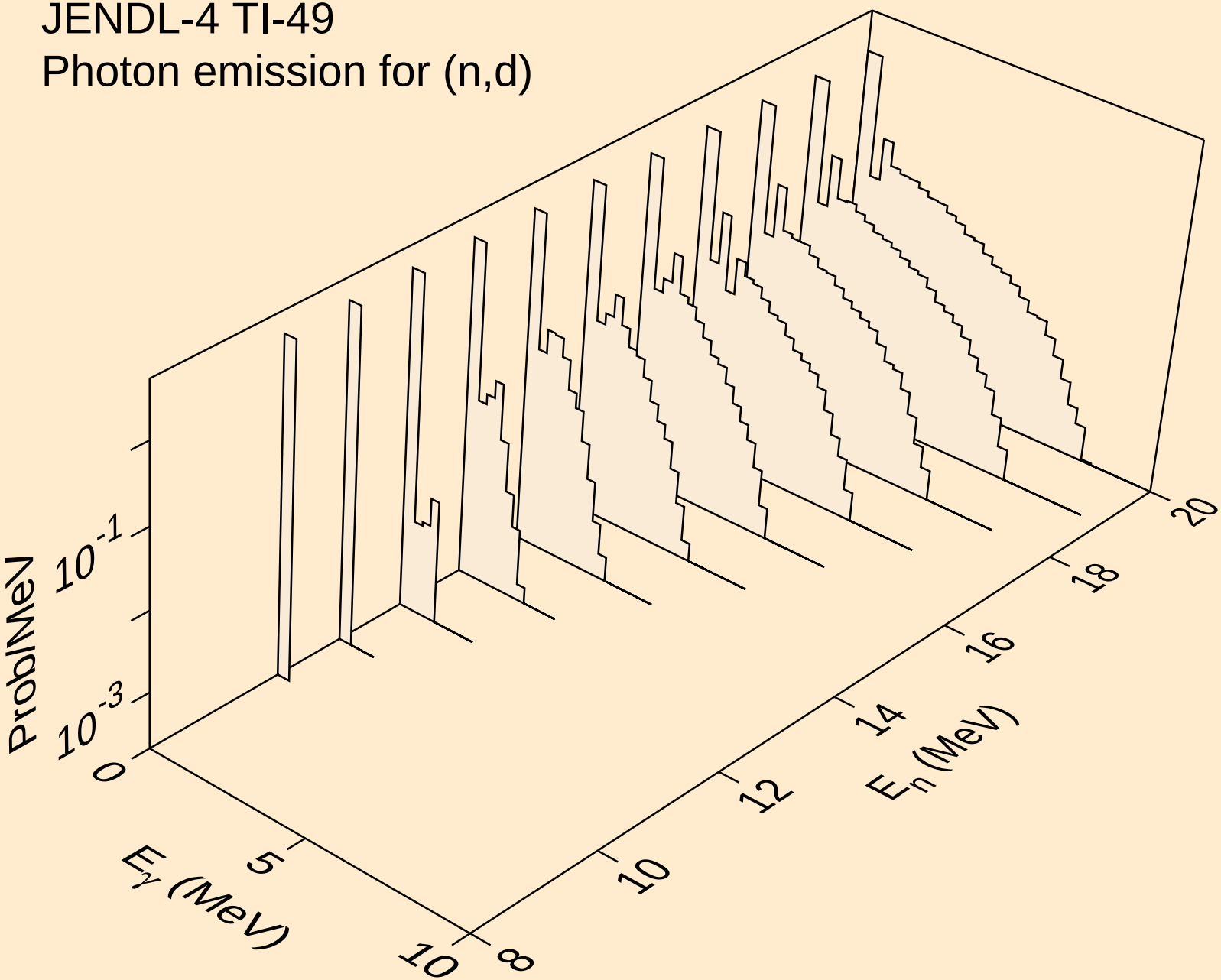
JENDL-4 TI-49
Photon emission for (n,n*c)

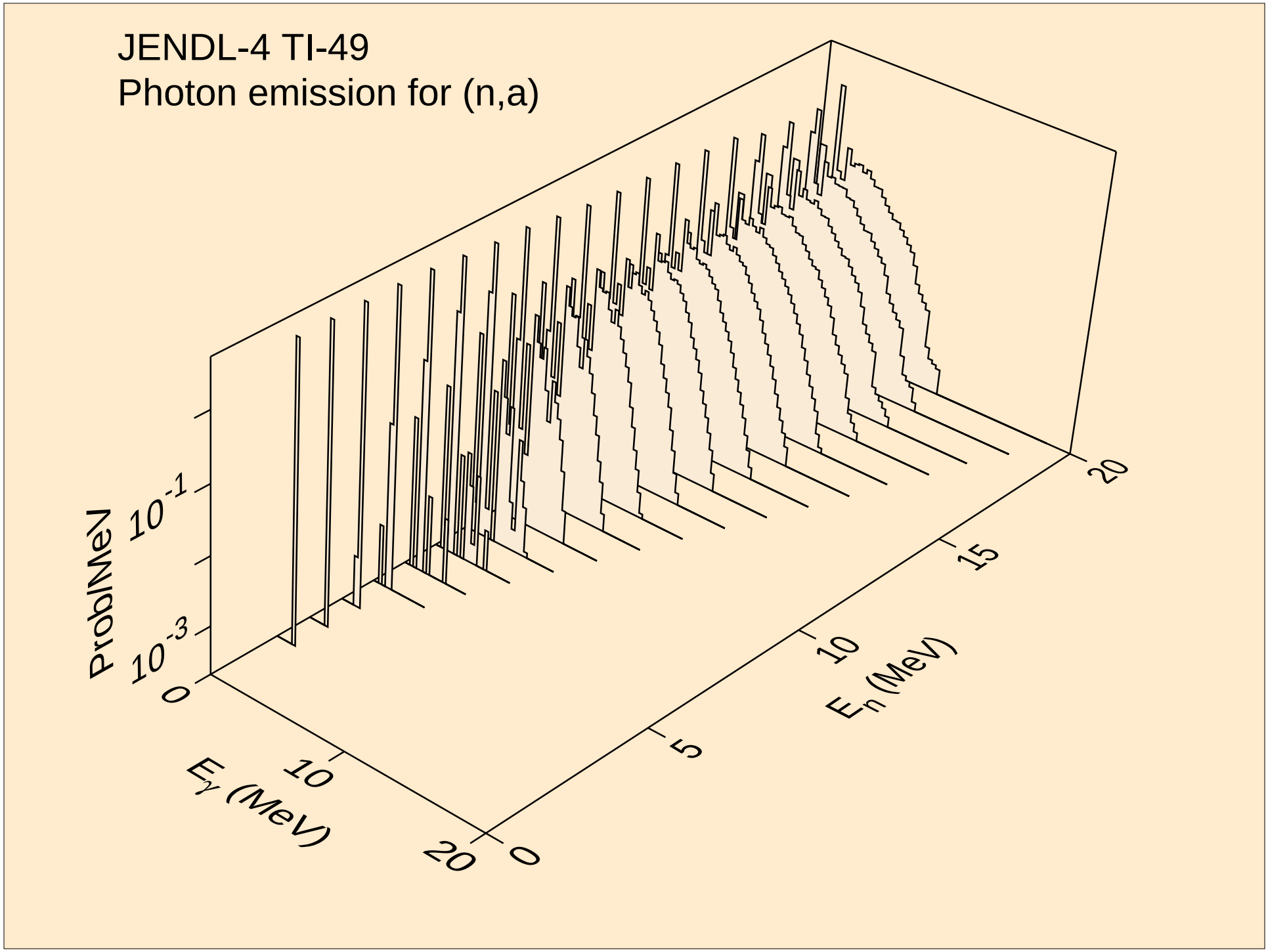


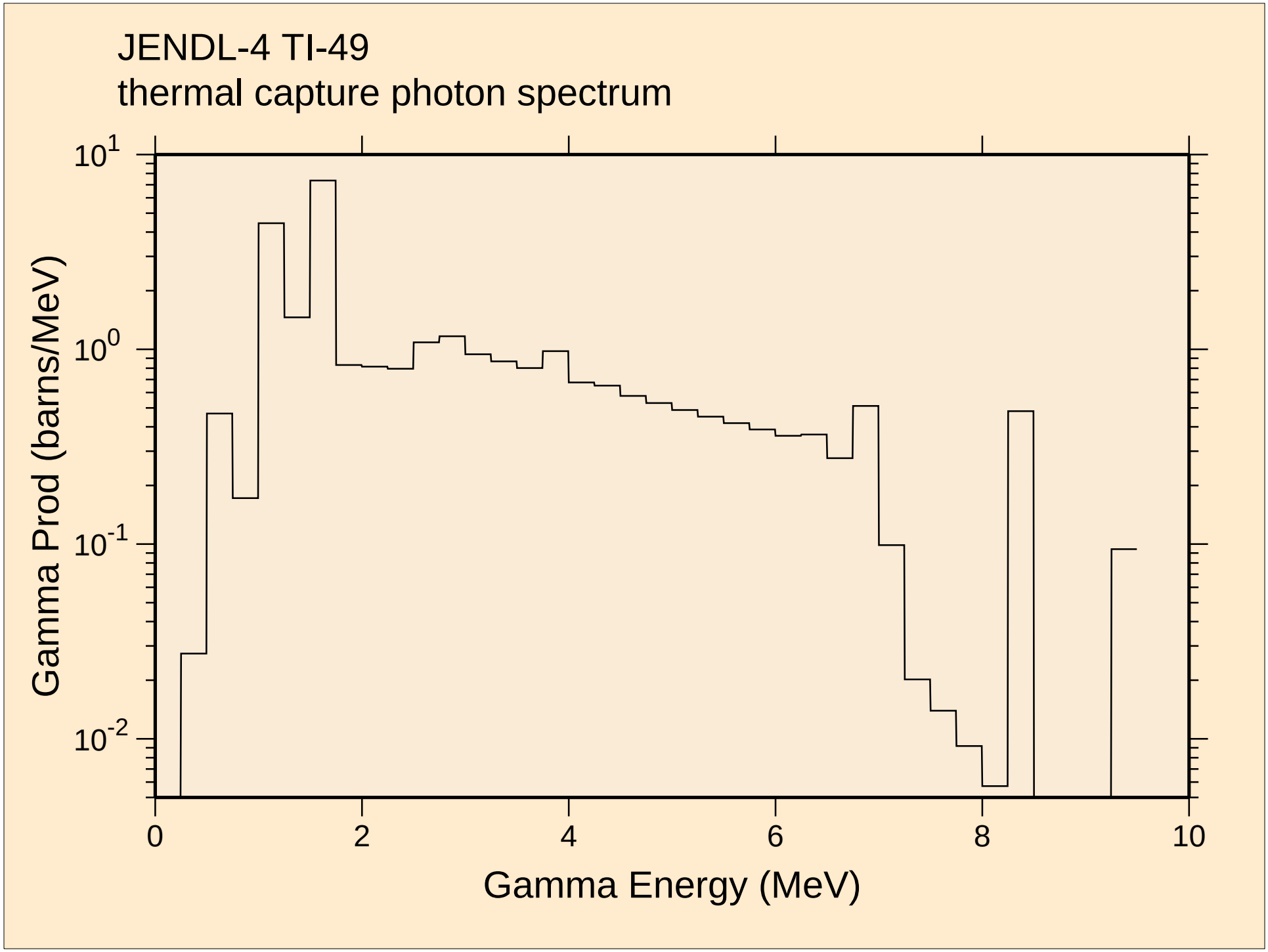

JENDL-4 TI-49
Photon emission for (n,gma)
Prob/MeV
10^0
10^{-2}
0
20
40
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

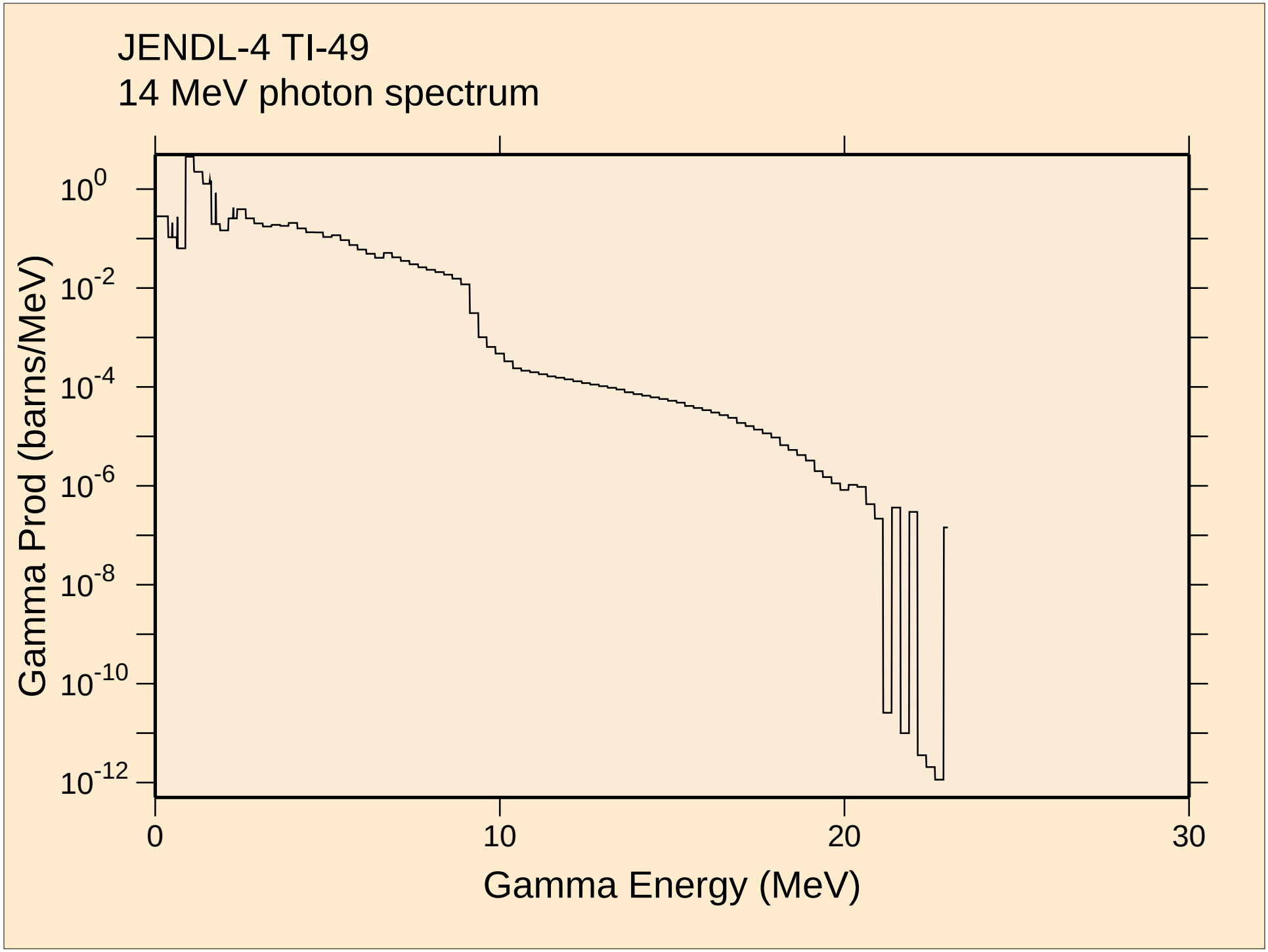

JENDL-4 TI-49
Photon emission for (n,p)
Prob/MeV
10^{-1}
10^{-3}
0
10
20
E_γ (MeV)
0
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

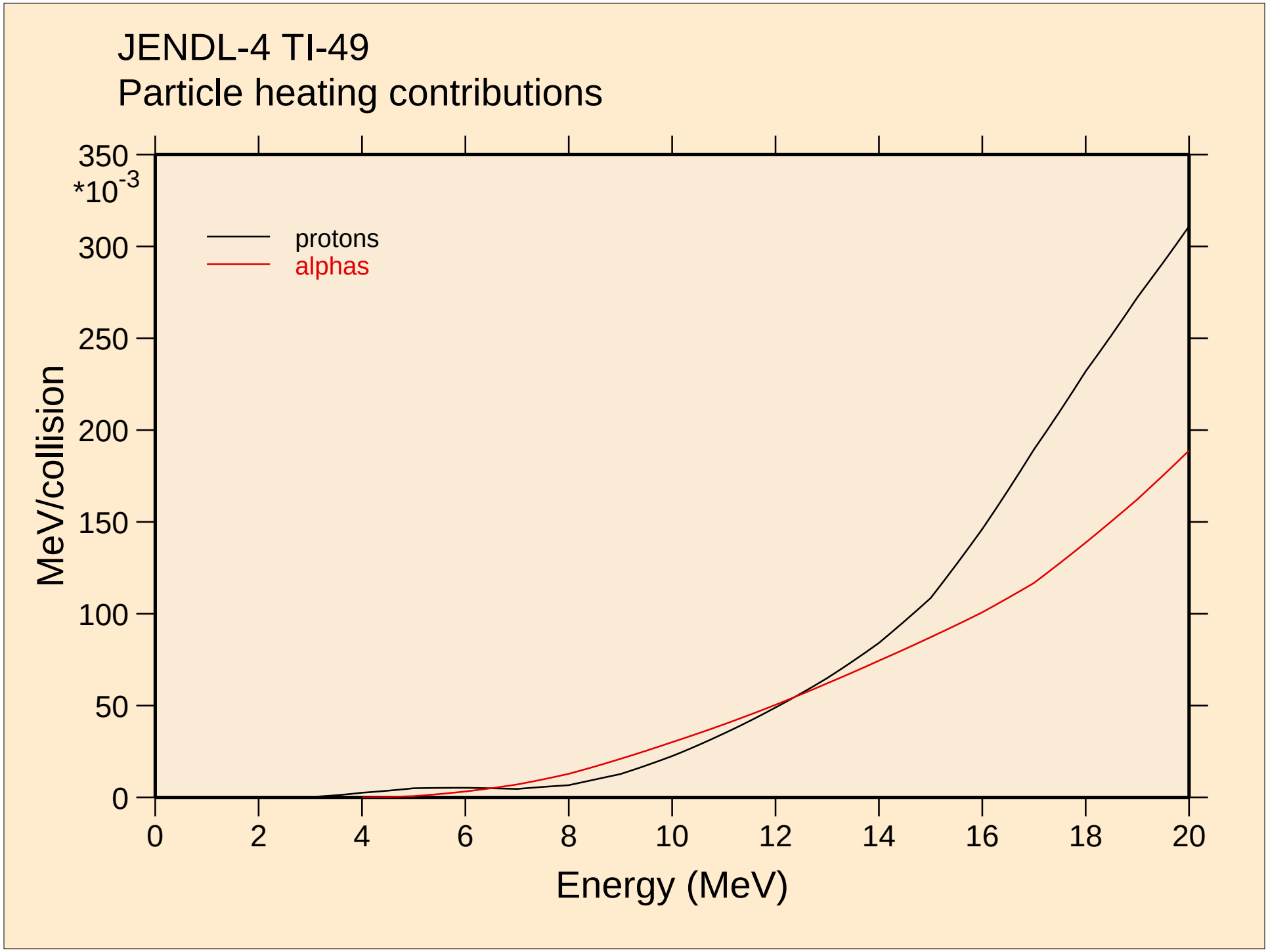
JENDL-4 TI-49
Photon emission for (n,d)

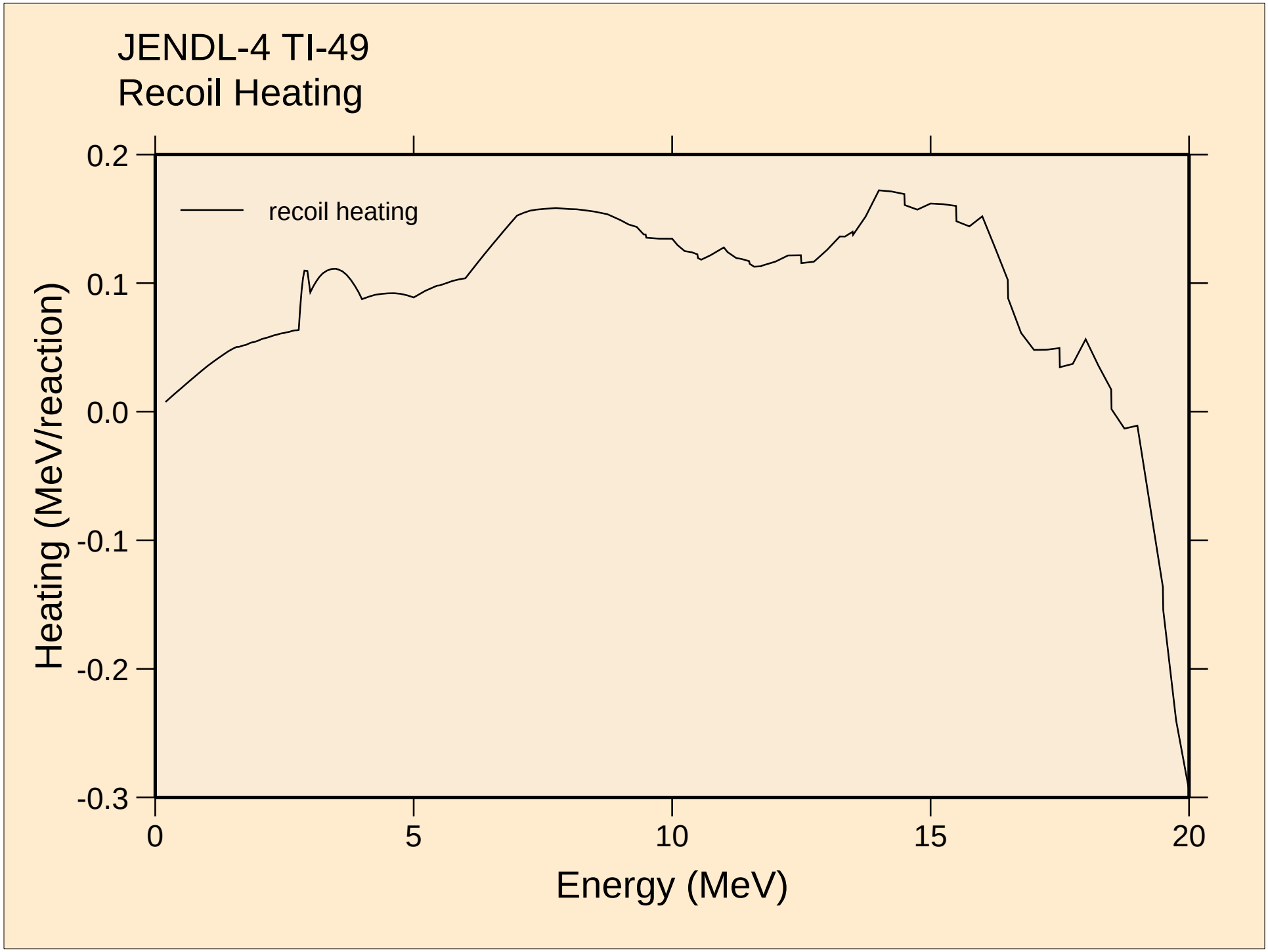


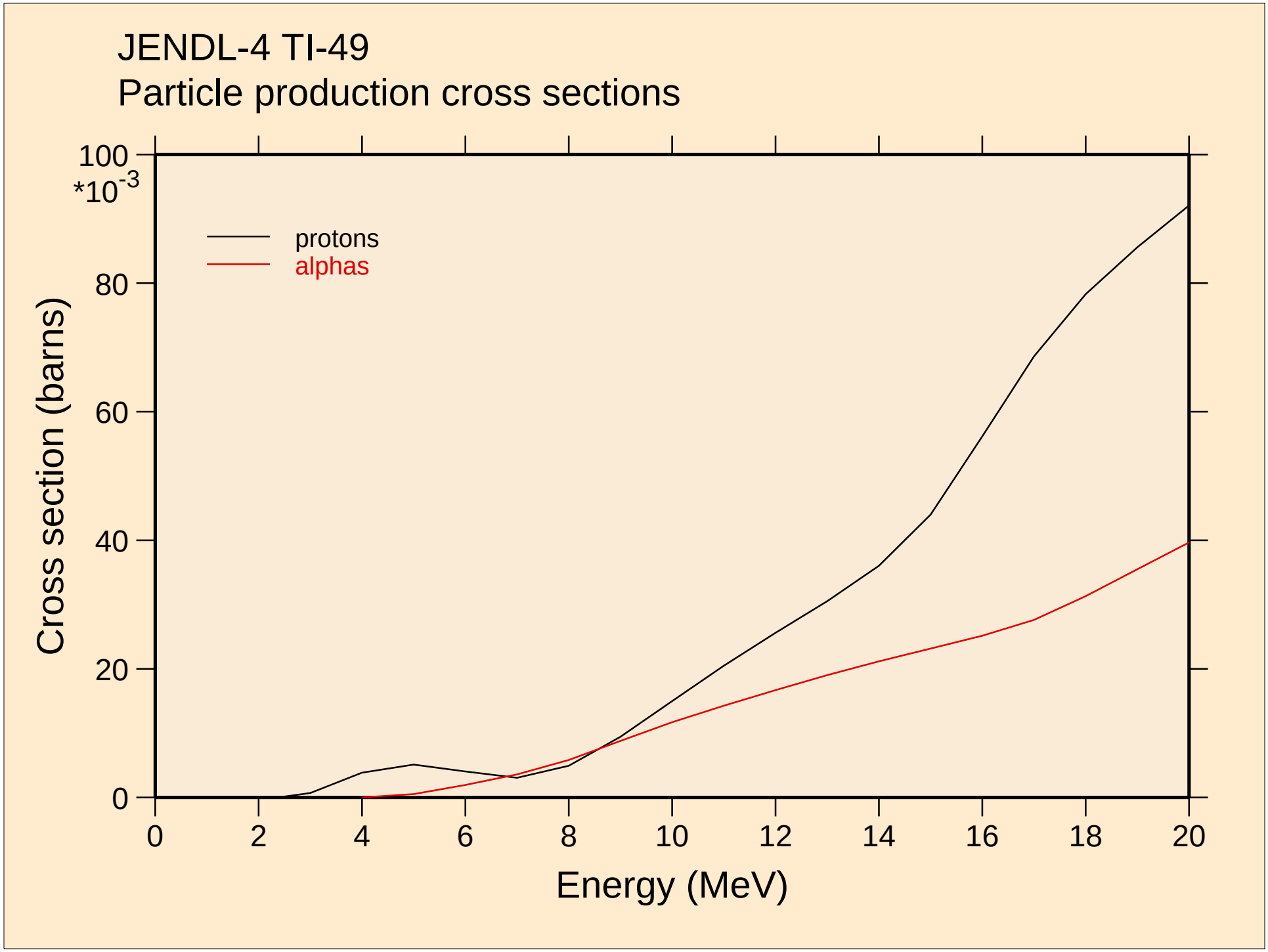

JENDL-4 TI-49
Photon emission for (n,a)
Prob/MeV
10^{-1}
10^{-3}
0
10
20
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

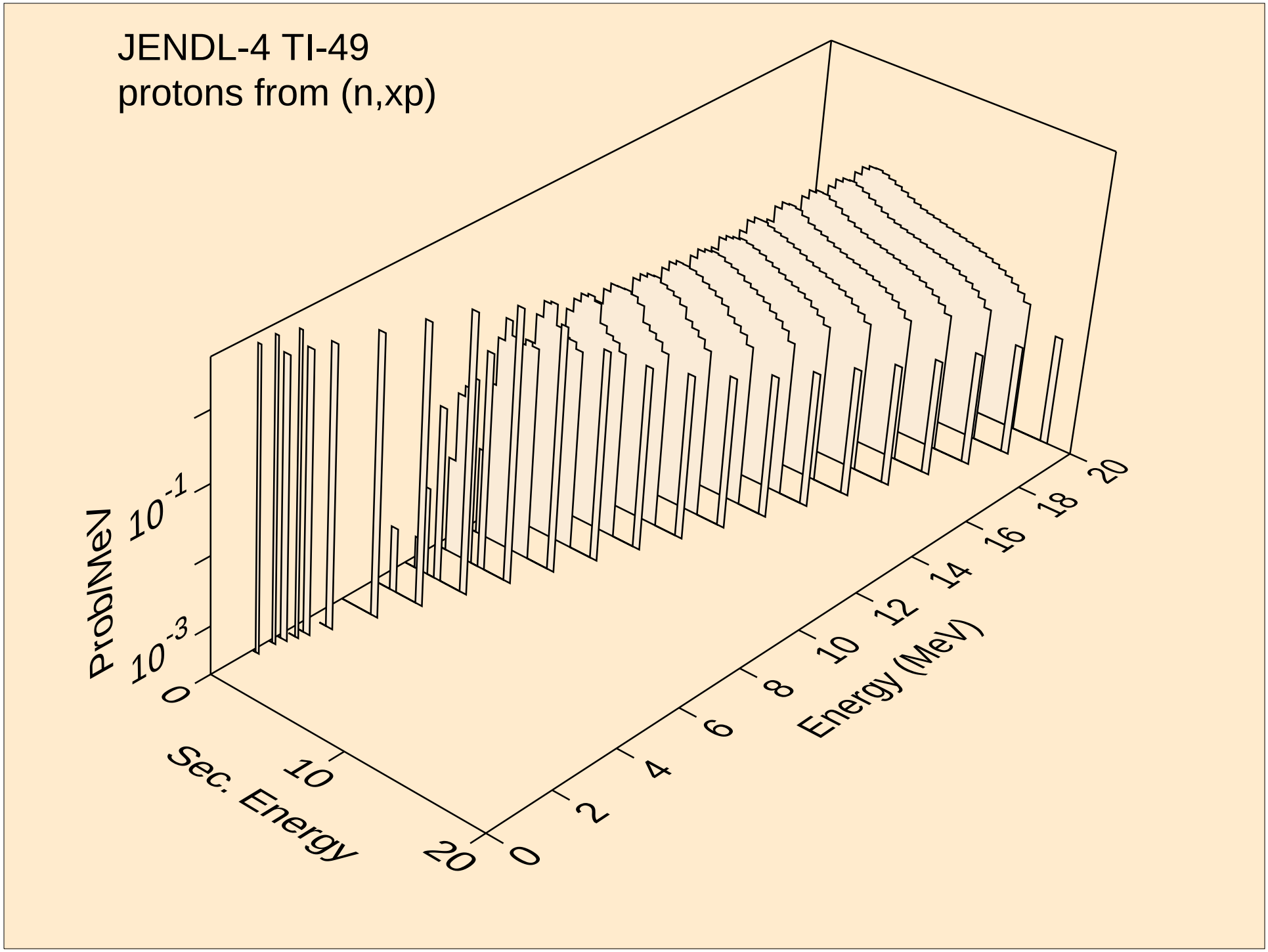

JENDL-4 TI-49
thermal capture photon spectrum
Gamma Prod (barns/MeV)
10^1
10^0
10^-1
10^-2
0
2
4
6
8
10
Gamma Energy (MeV)

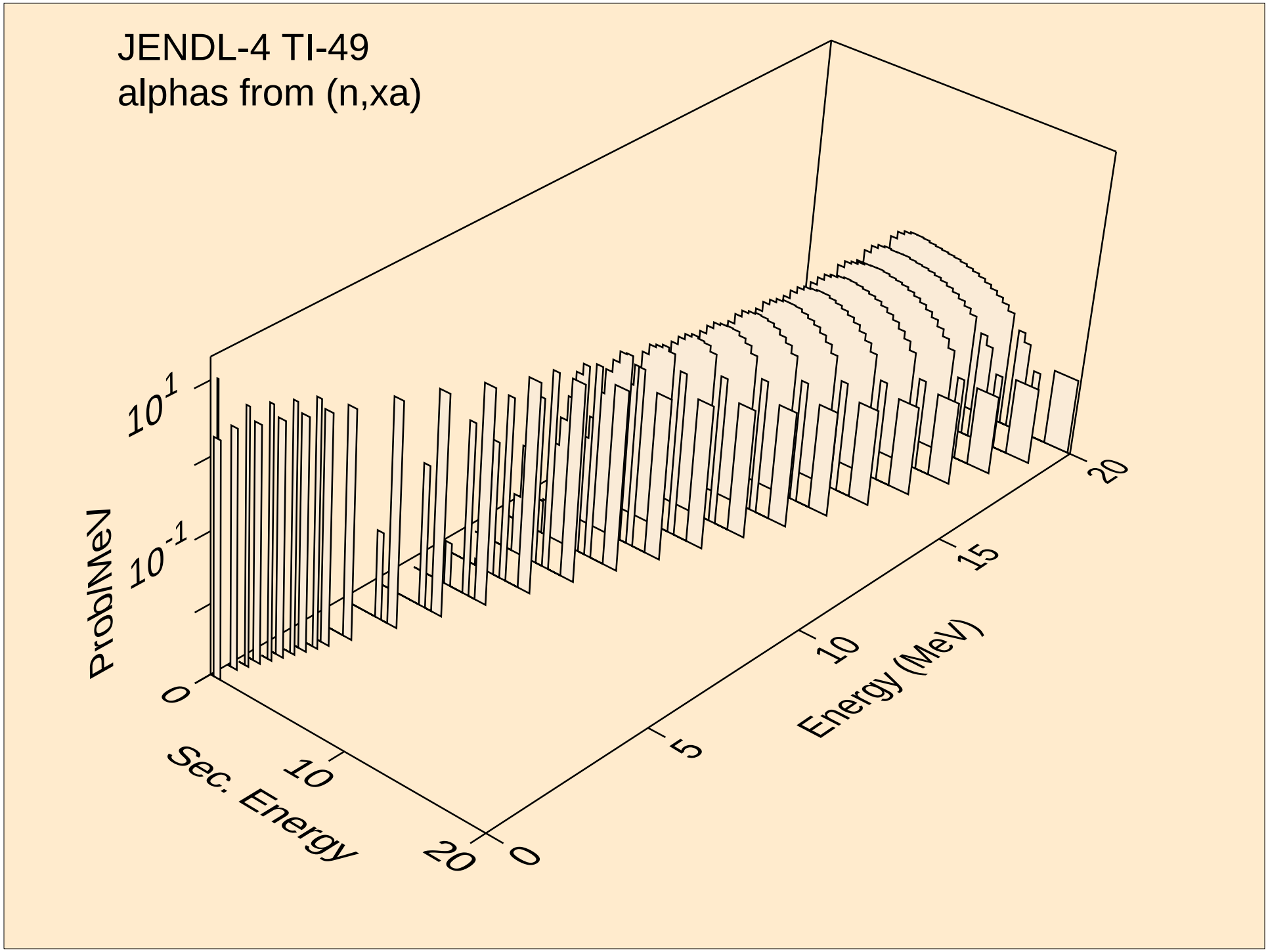

JENDL-4 TI-49
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^0
10^-2
10^-4
10^-6
10^-8
10^-10
10^-12
0
10
20
30
Gamma Energy (MeV)


JENDL-4 TI-49
Particle heating contributions
*10-3
350
300
250
200
150
100
50
0
MeV/collision
protons
alphas
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
Recoil Heating
recoil heating
Heating (MeV/reaction)
0.2
0.1
0.0
-0.1
-0.2
-0.3
0
5
10
15
20
Energy (MeV)


JENDL-4 TI-49
Particle production cross sections
100
*10-3
80
60
40
20
0
Cross section (barns)
protons
alphas
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
protons from (n,xp)
Prob/MeV
10^-1
10^-3
0
10
20
Sec. Energy
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JENDL-4 TI-49
alphas from (n,xa)
Prob/MeV
10^1
10^-1
0
Sec. Energy
10
20
0
5
10
15
20
Energy (MeV)