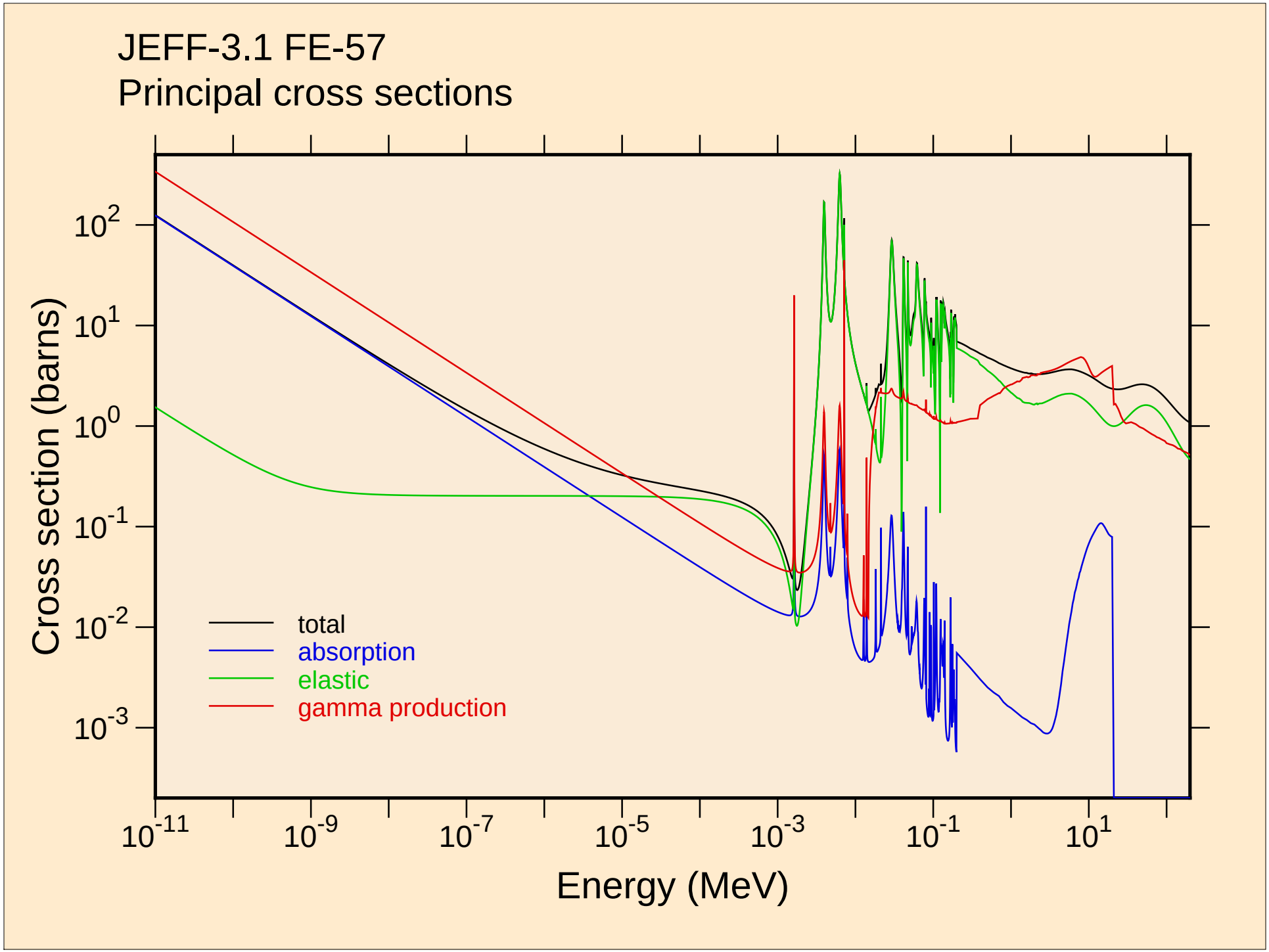
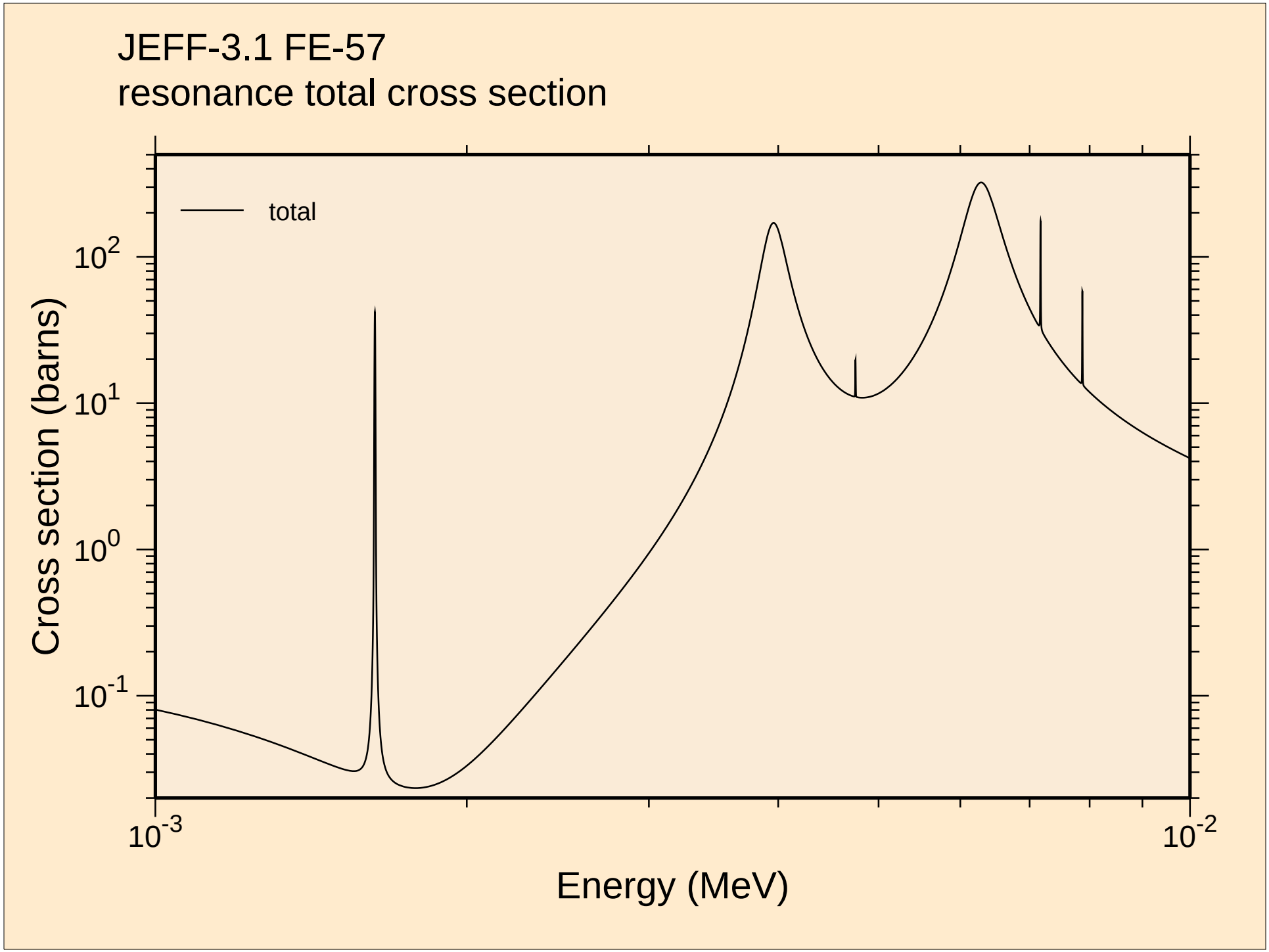
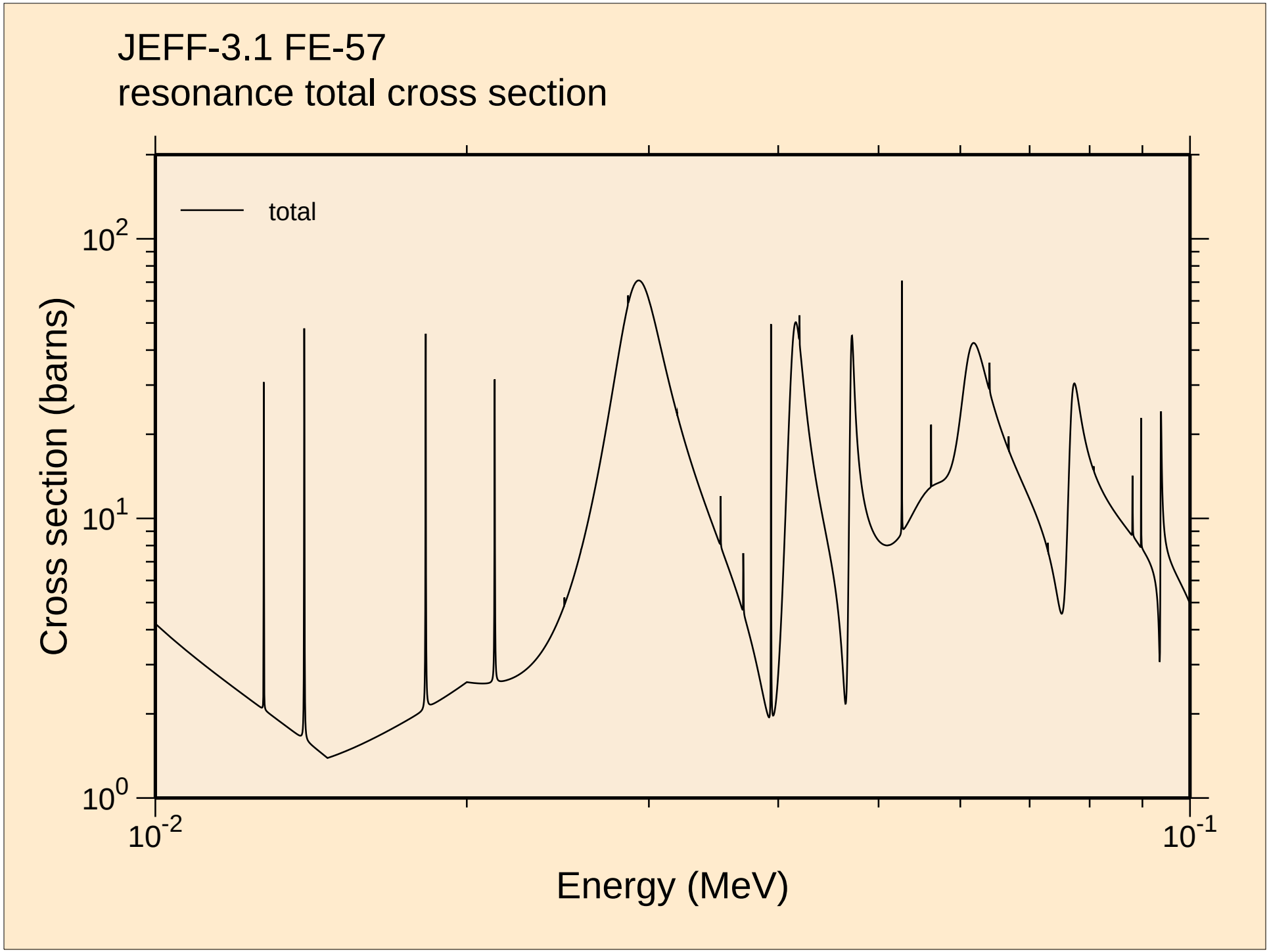
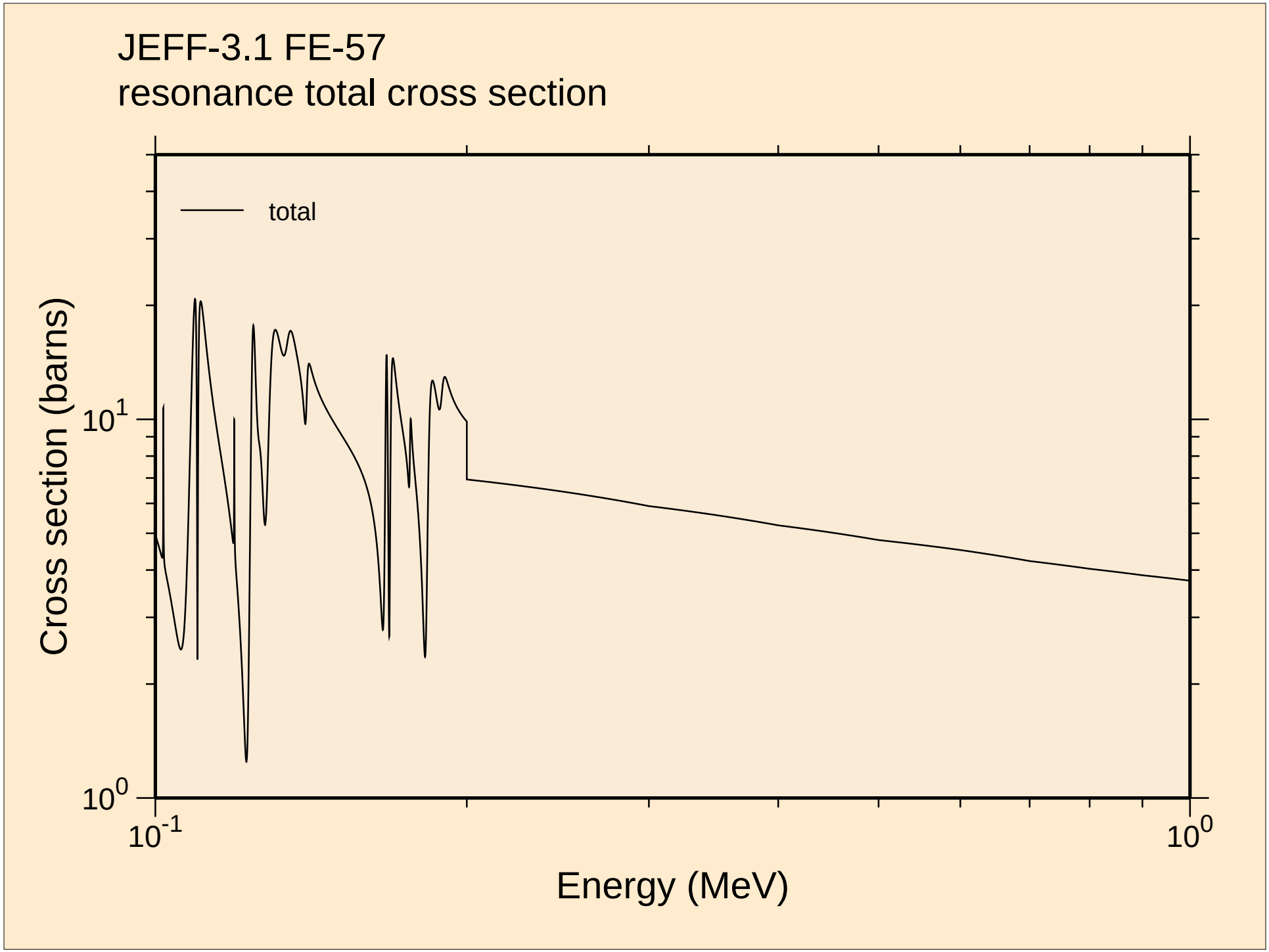
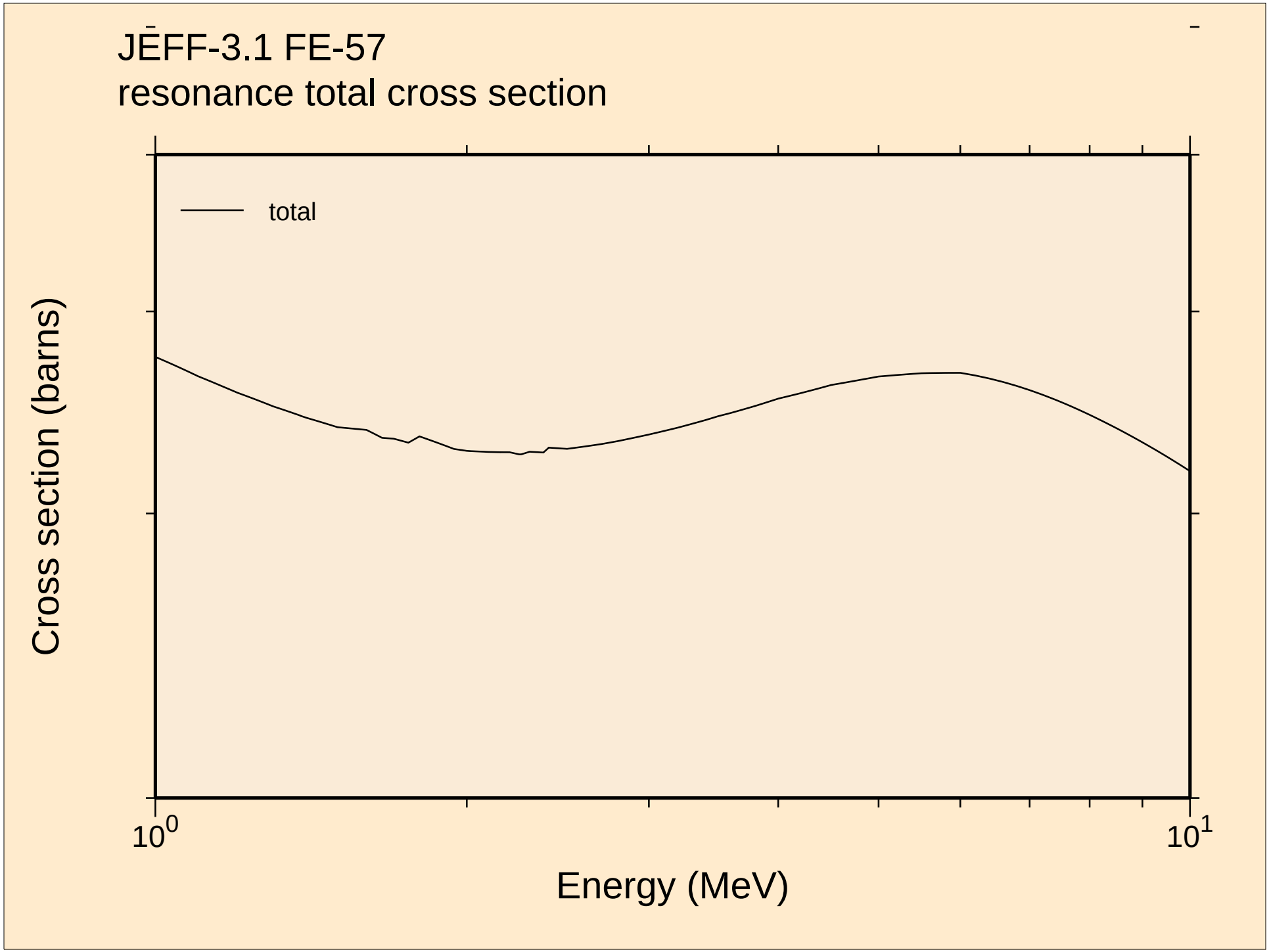
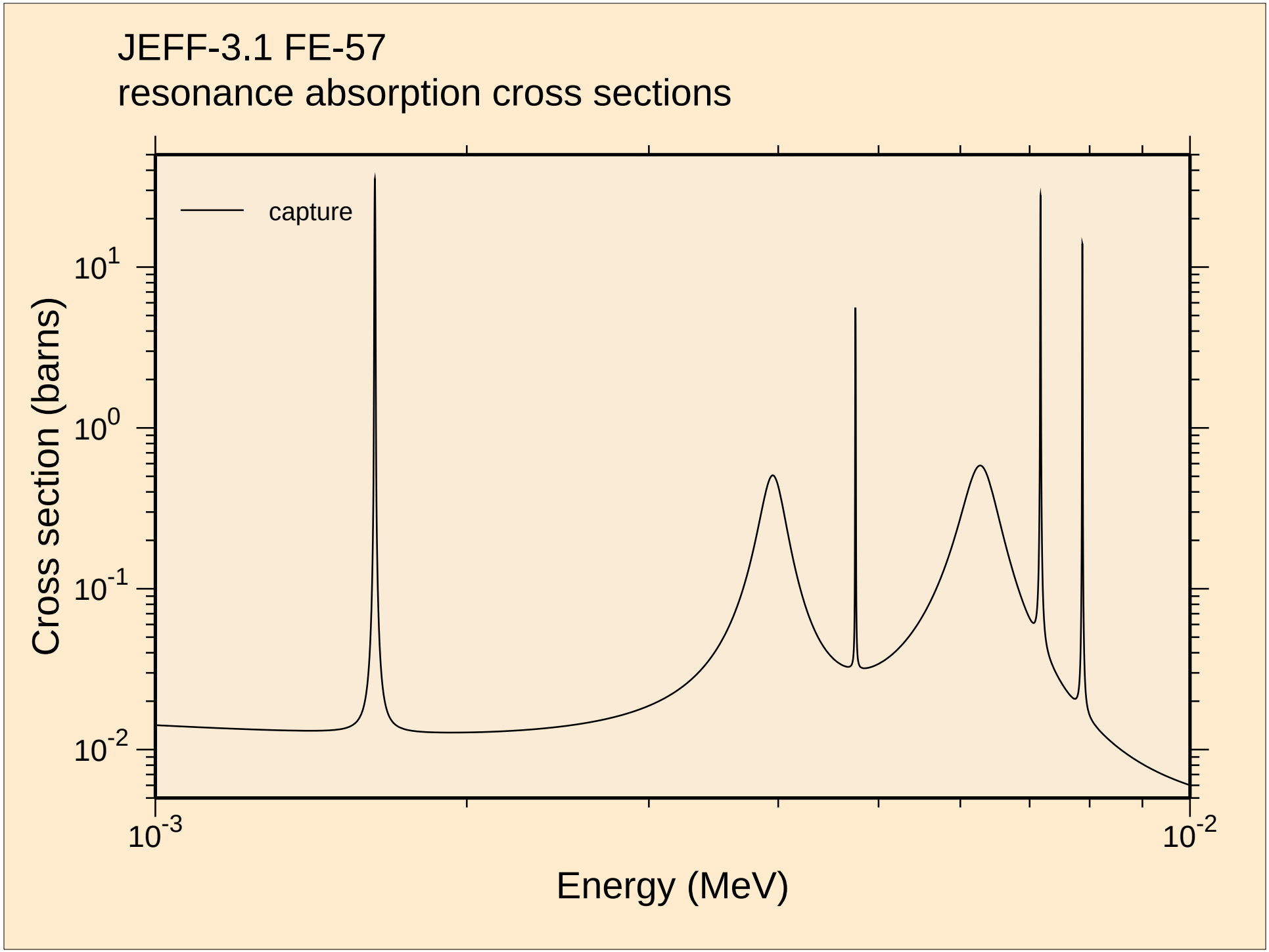

JEFF-3.1 FE-57
Principal cross sections
Cross section (barns)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
total
absorption
elastic
gamma production
10^{-11}
10^{-9}
10^{-7}
10^{-5}
10^{-3}
10^{-1}
10^{1}
Energy (MeV)


JEFF-3.1 FE-57
resonance total cross section
total
Cross section (barns)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-3}
10^{-2}
Energy (MeV)

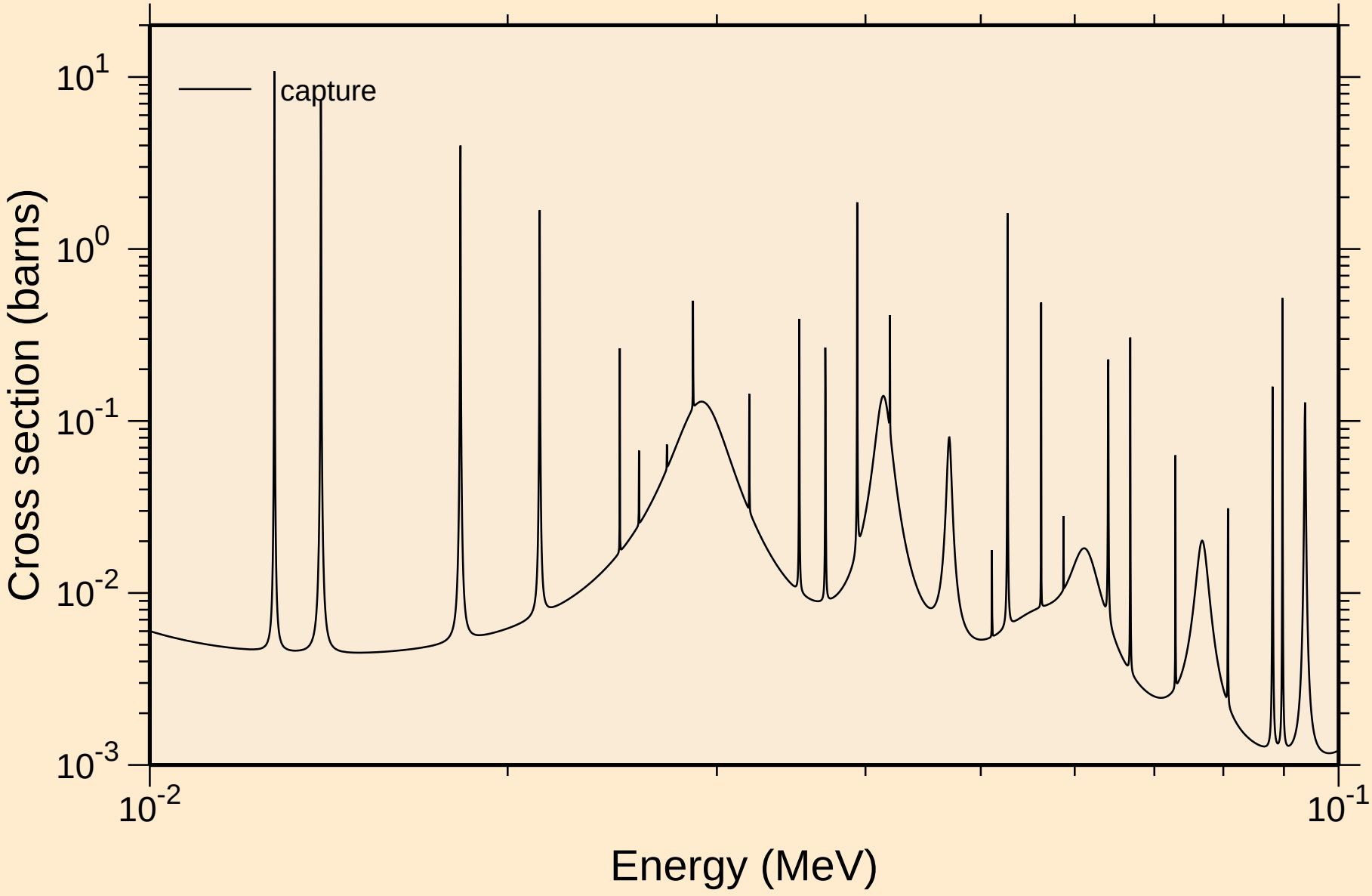

JEFF-3.1 FE-57
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^{-2}
10^{-1}
Energy (MeV)

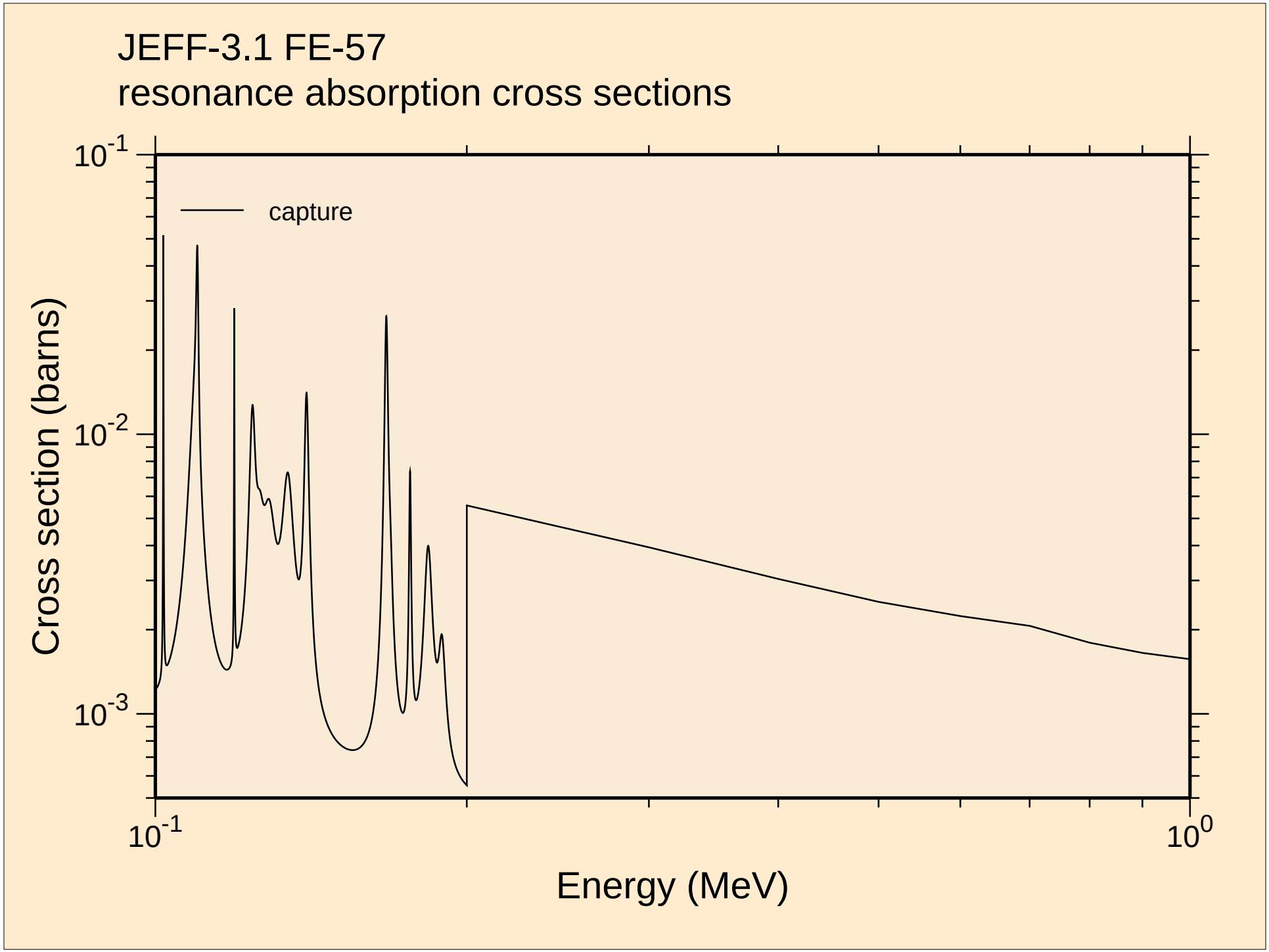

JEFF-3.1 FE-57
resonance total cross section
total
Cross section (barns)
10^1
10^0
10^{-1}
10^0
Energy (MeV)


JEFF-3.1 FE-57
resonance total cross section
total
Cross section (barns)
10^0
10^1
Energy (MeV)

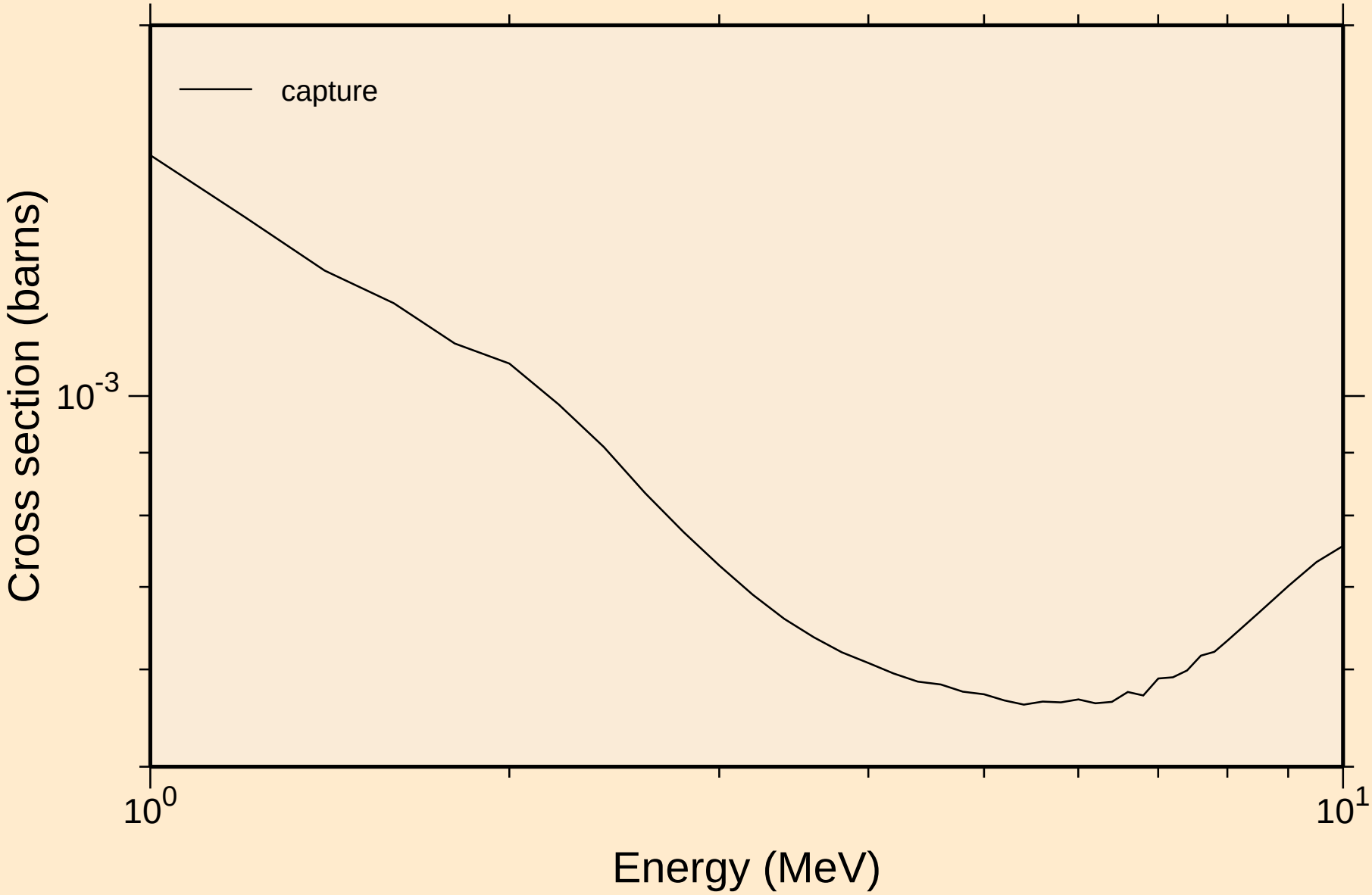

JEFF-3.1 FE-57
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-2
Energy (MeV)

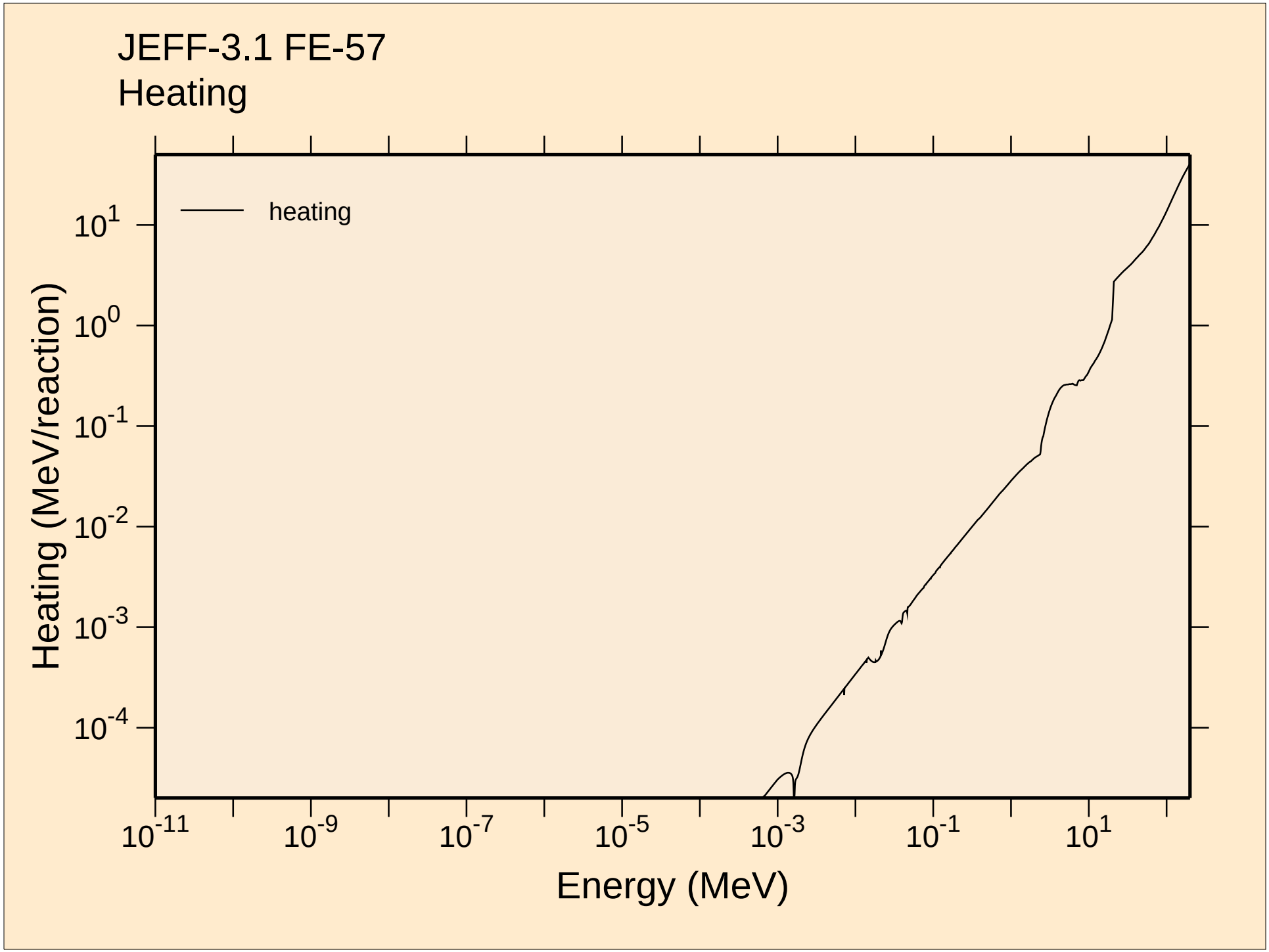
JEFF-3.1 FE-57
resonance absorption cross sections

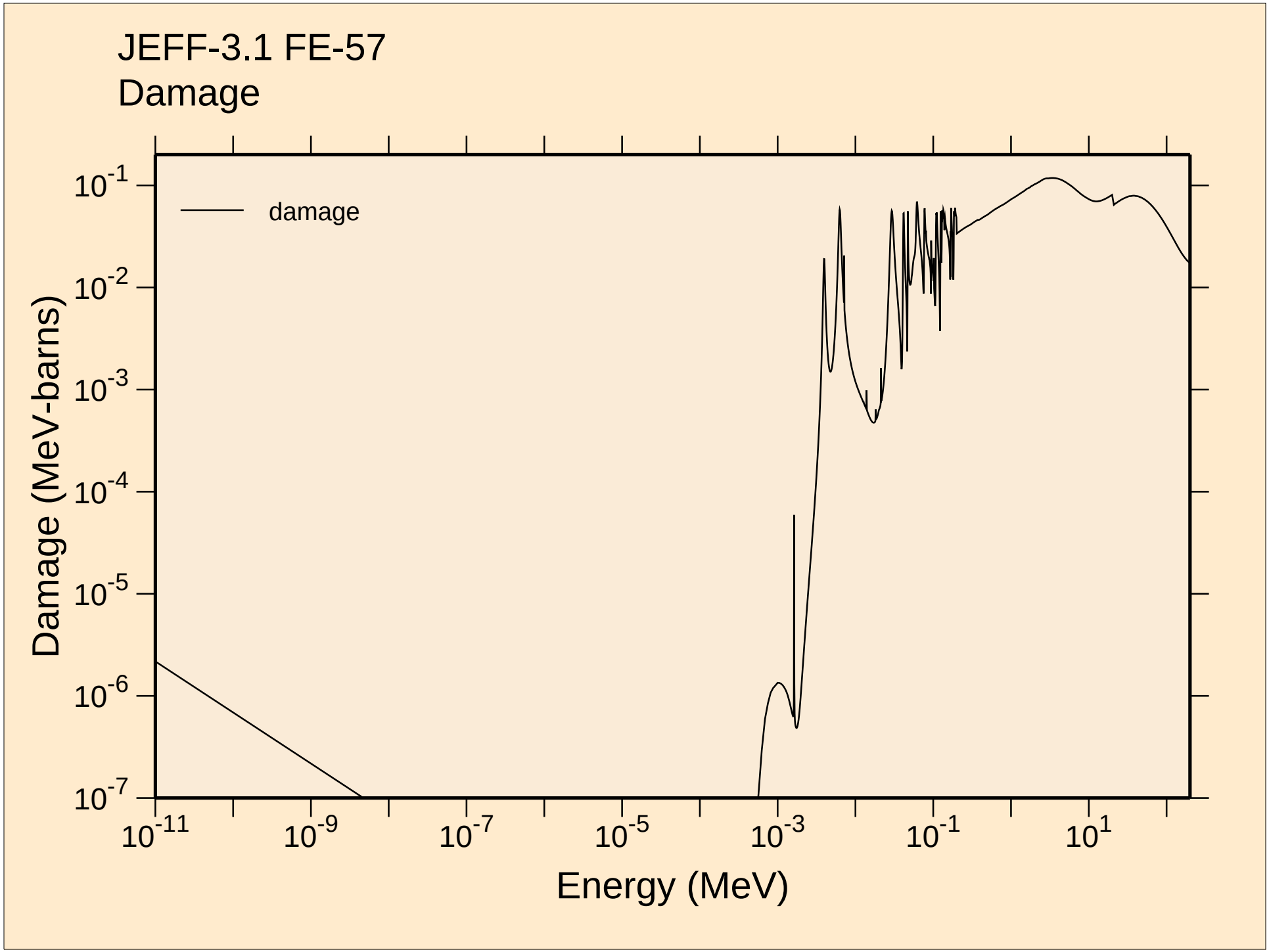


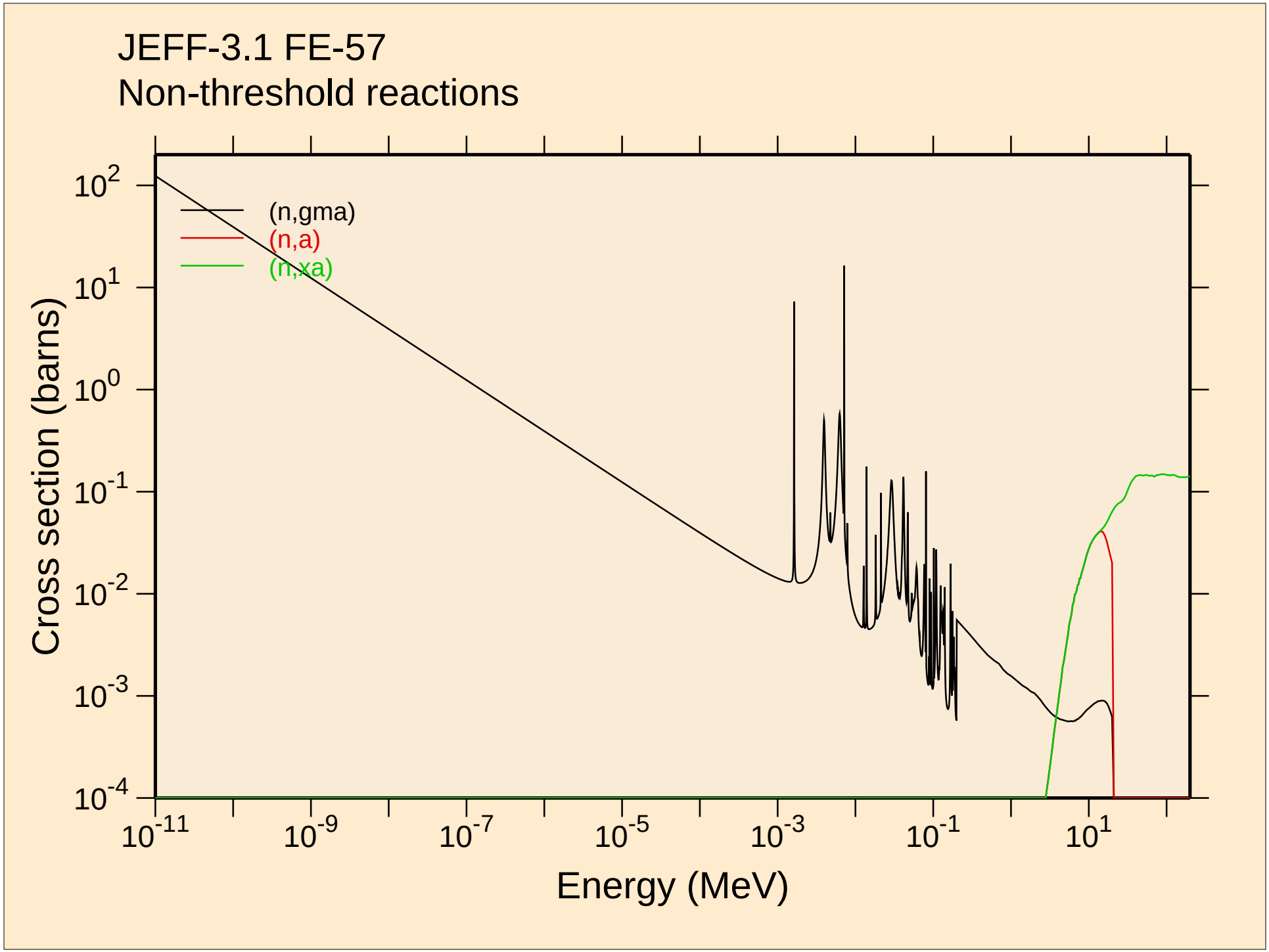

JEFF-3.1 FE-57
resonance absorption cross sections
capture
Cross section (barns)
10-1
10-2
10-3
10-1
100
Energy (MeV)

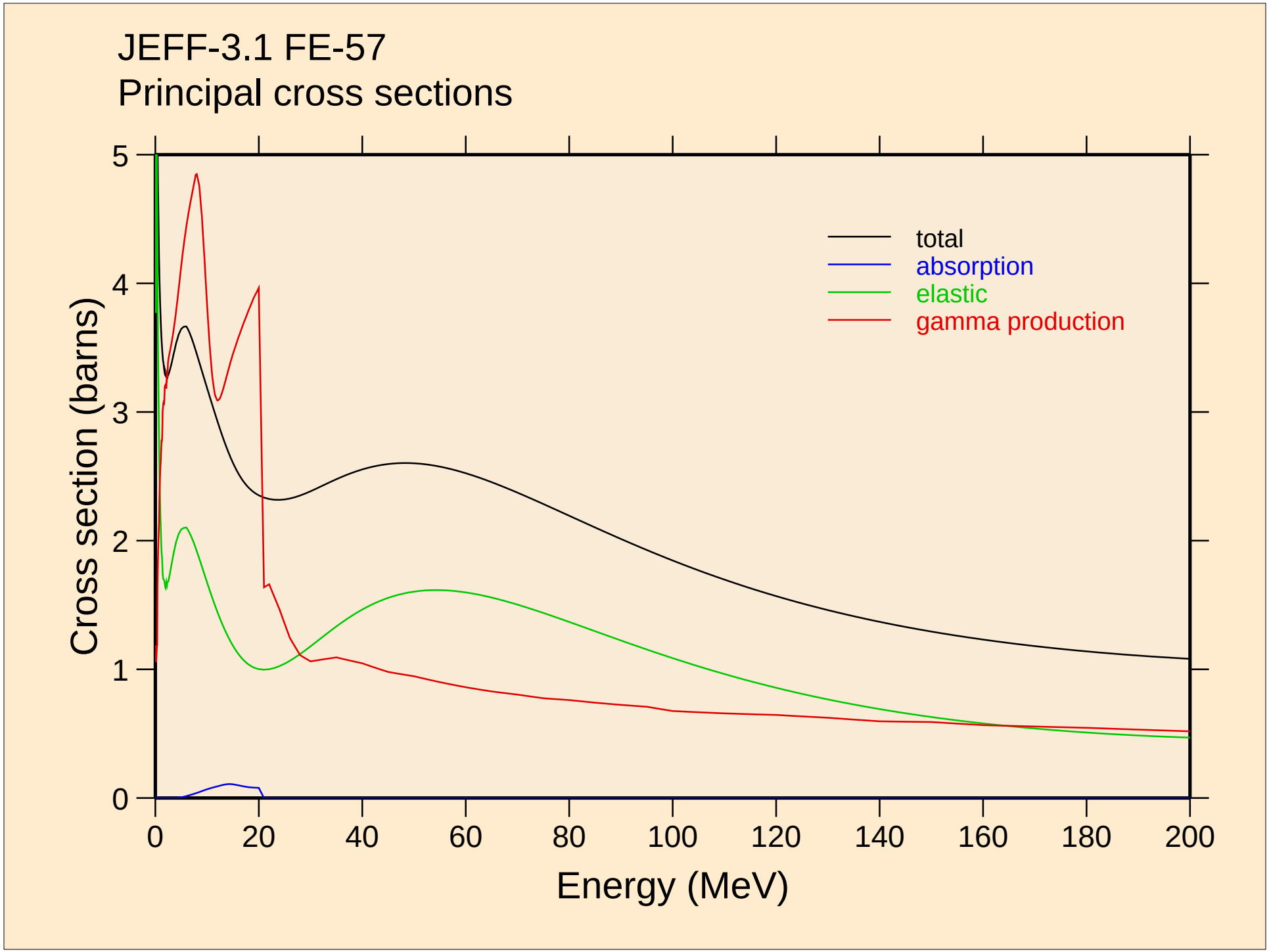
JEFF-3.1 FE-57
resonance absorption cross sections

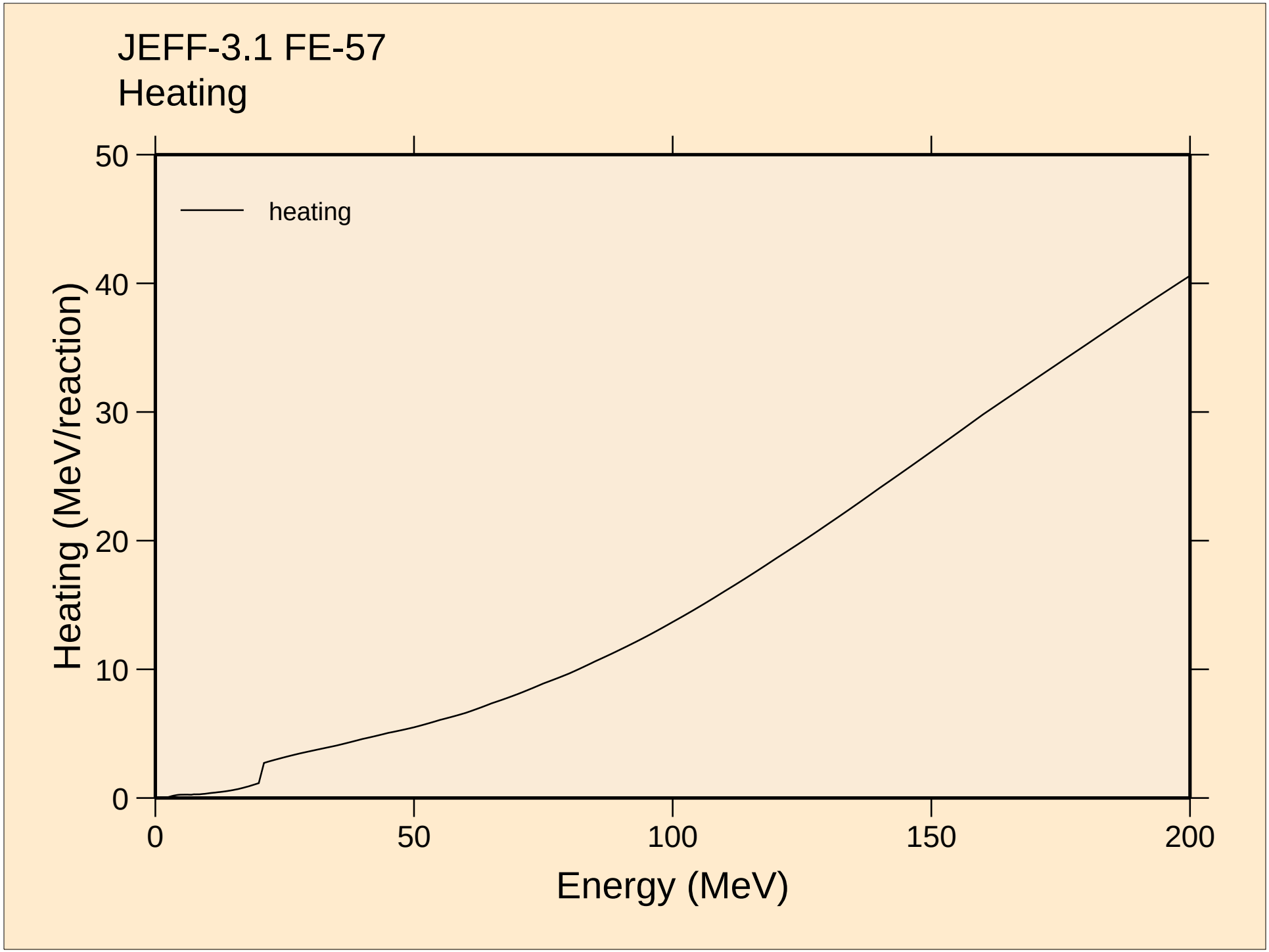


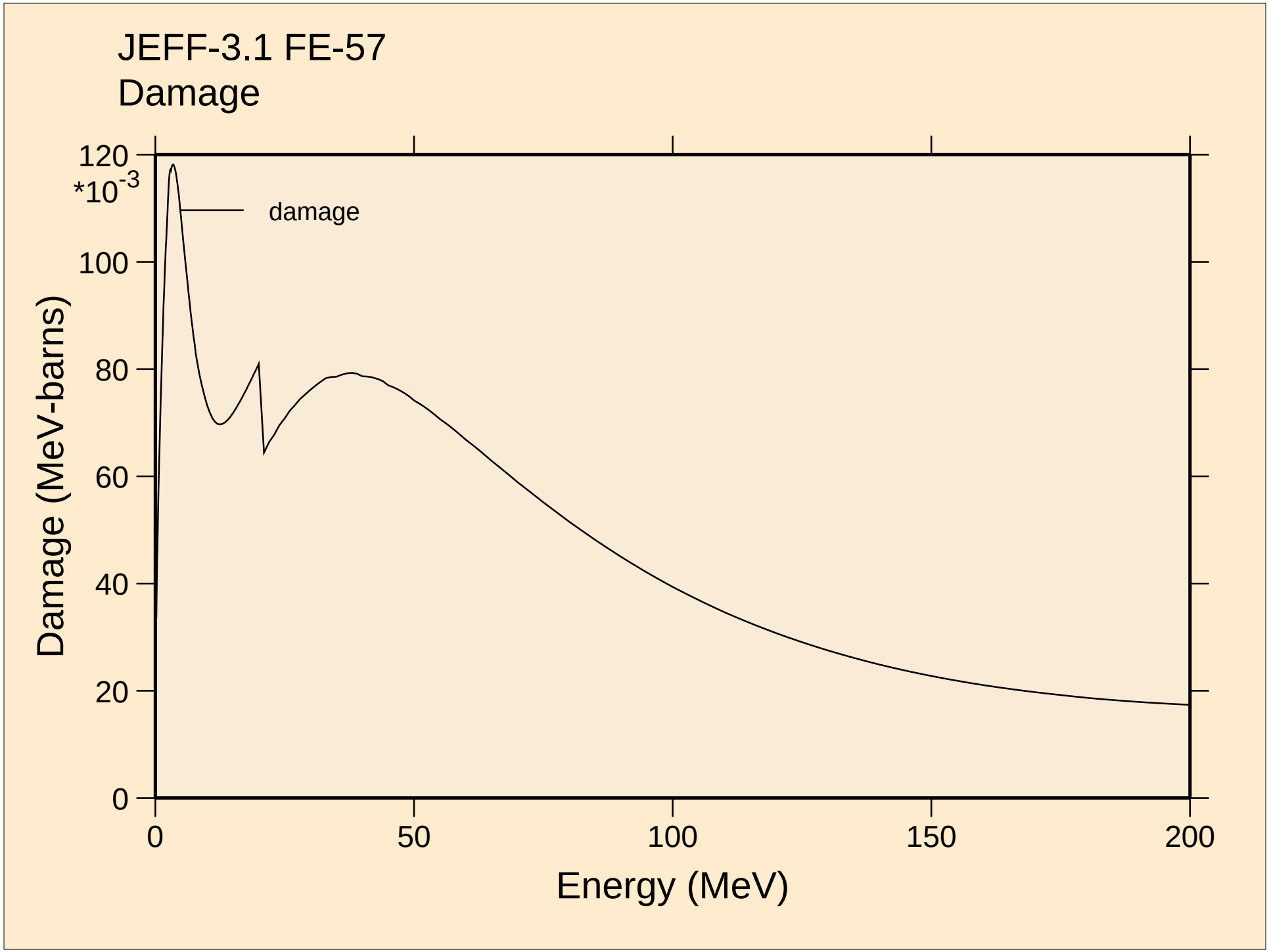

JEFF-3.1 FE-57
Heating
heating
Heating (MeV/reaction)
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-11}
10^{-9}
10^{-7}
10^{-5}
10^{-3}
10^{-1}
10^{1}
Energy (MeV)

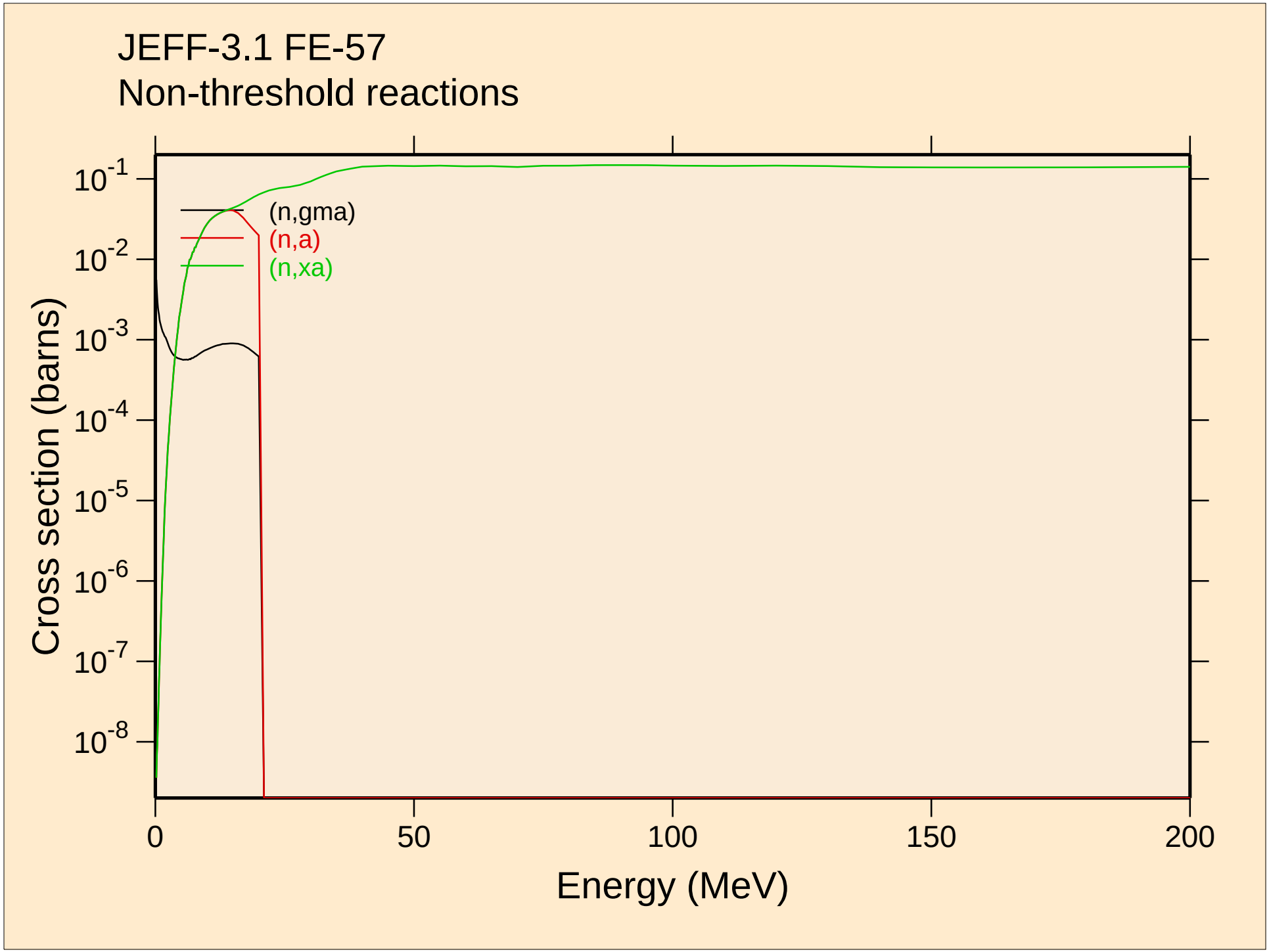

JEFF-3.1 FE-57
Damage
damage
Damage (MeV-barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-7
10-11
10-9
10-7
10-5
10-3
10-1
101
Energy (MeV)

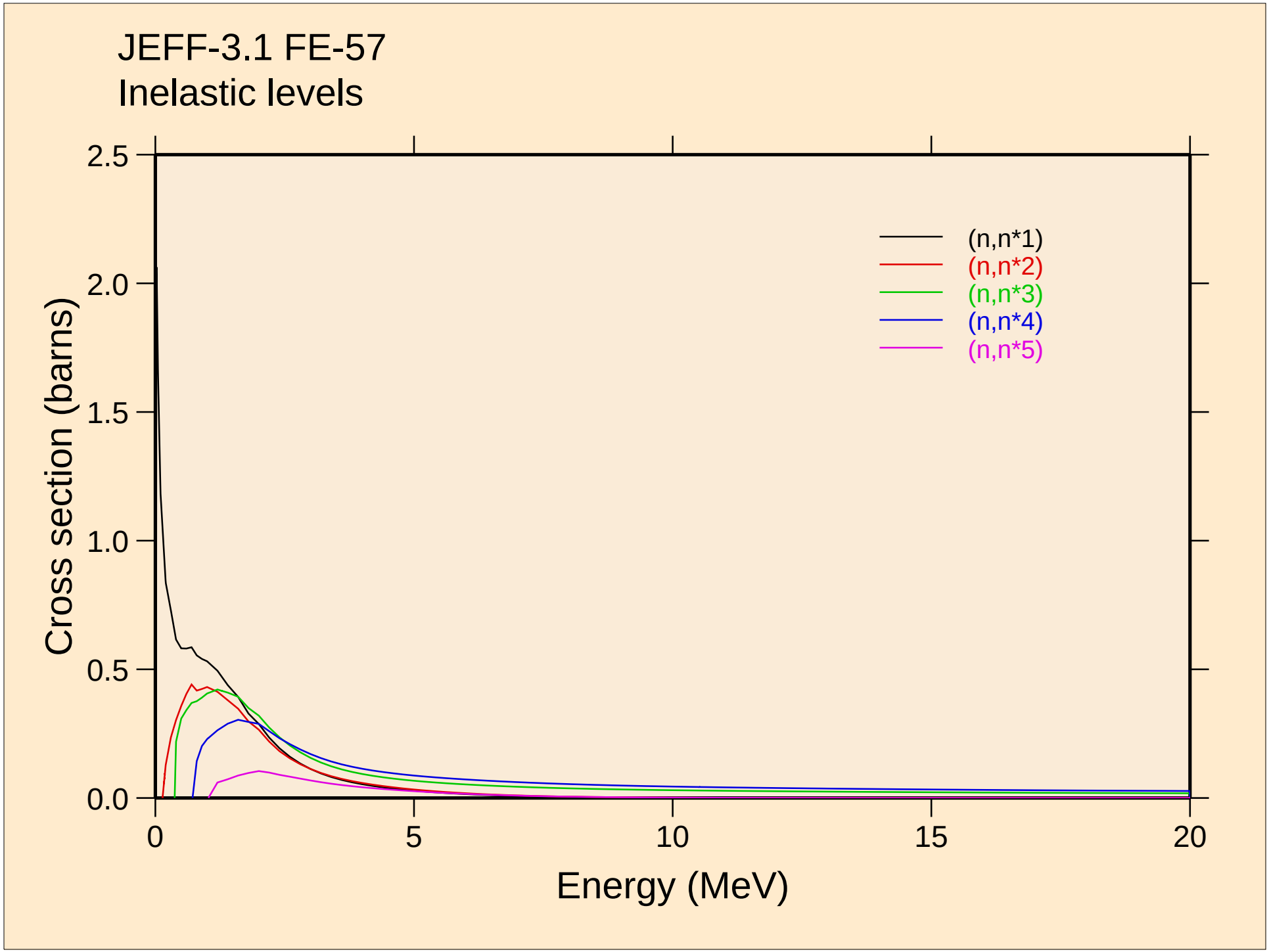

JEFF-3.1 FE-57
Non-threshold reactions
(n,gma)
(n,a)
(n,xa)
Cross section (barns)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

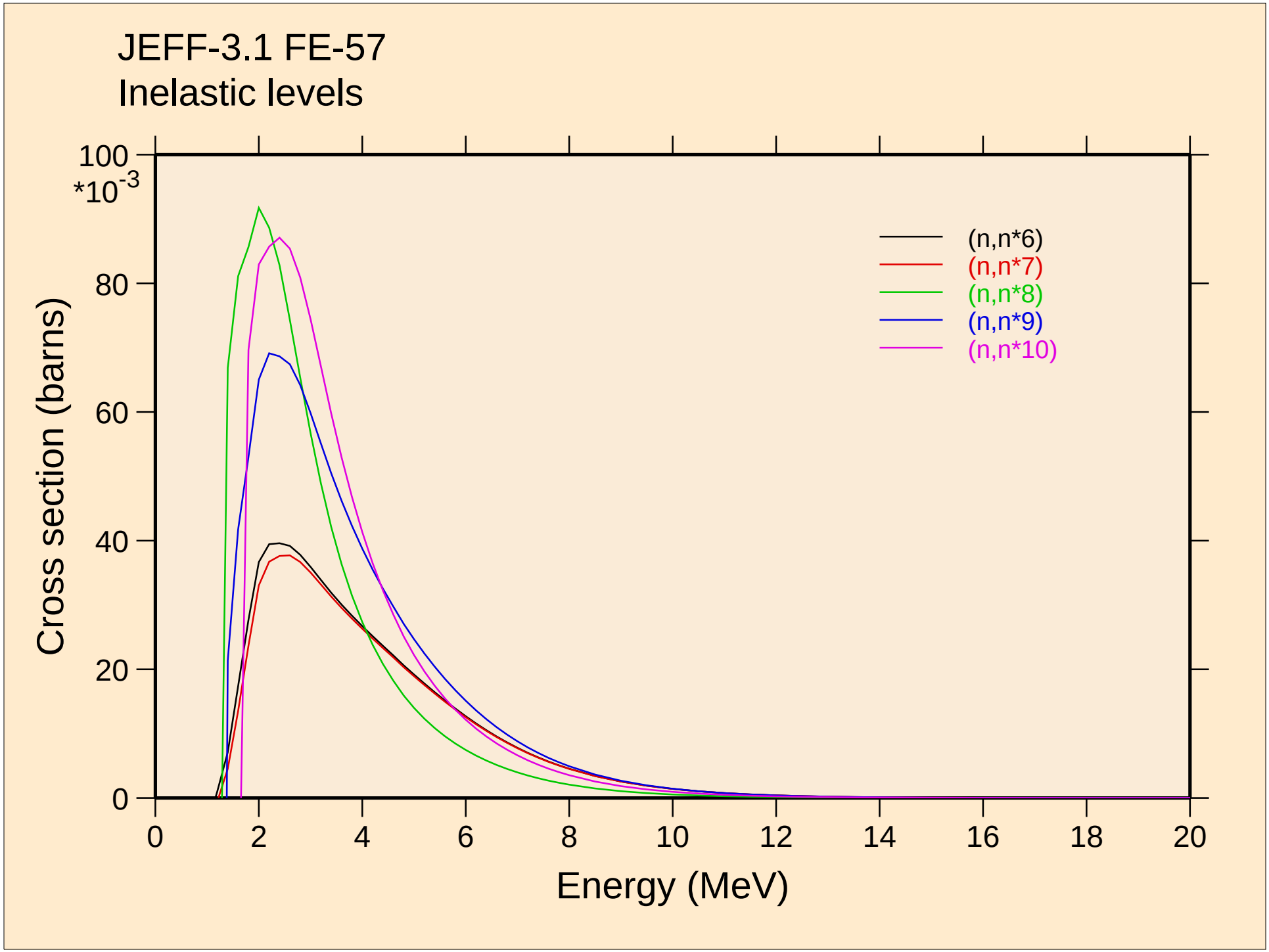

JEFF-3.1 FE-57
Principal cross sections
Cross section (barns)
Energy (MeV)
0
1
2
3
4
5
0
20
40
60
80
100
120
140
160
180
200
total
absorption
elastic
gamma production

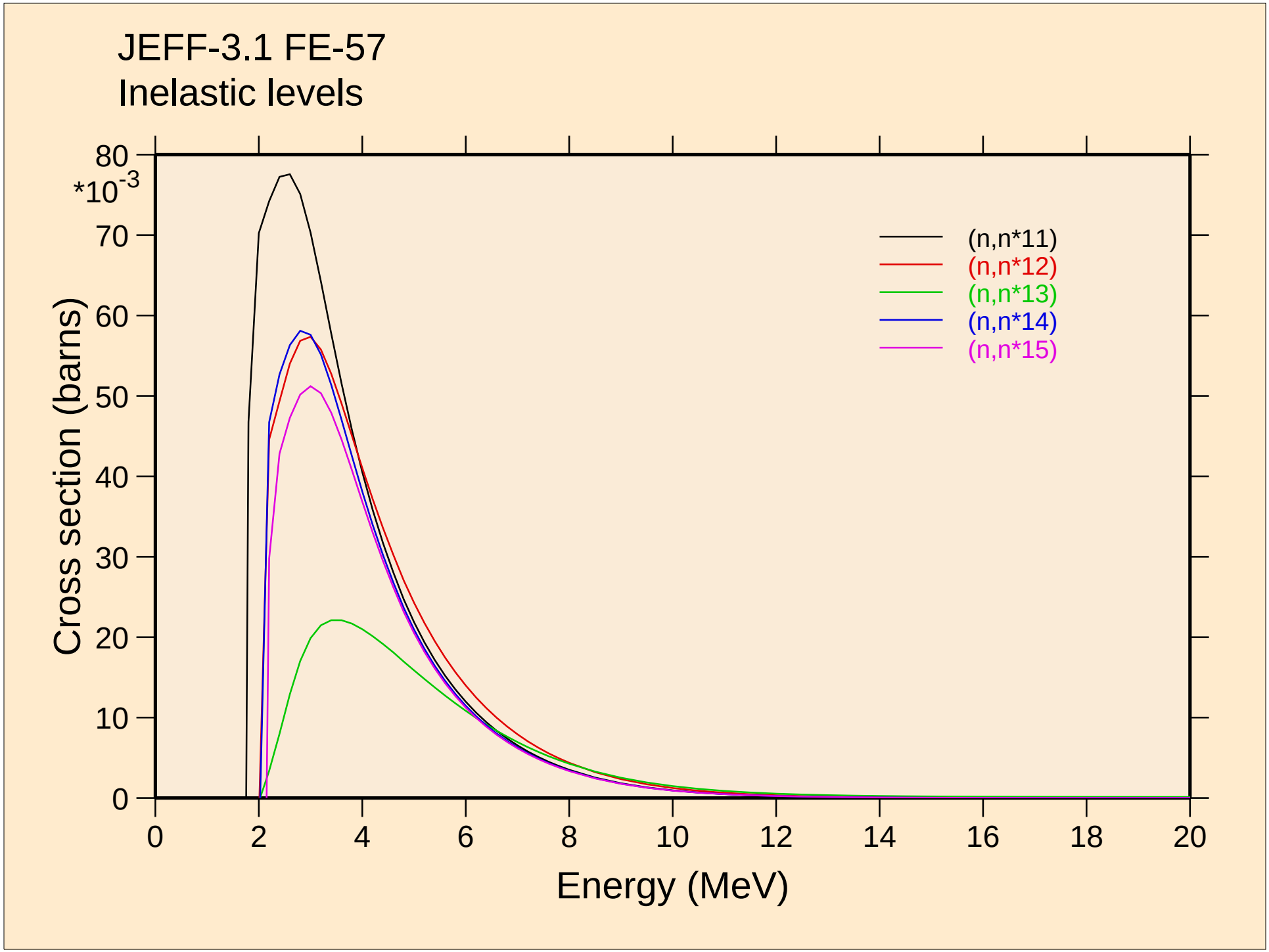

JEFF-3.1 FE-57
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
10
20
30
40
50
0
50
100
150
200

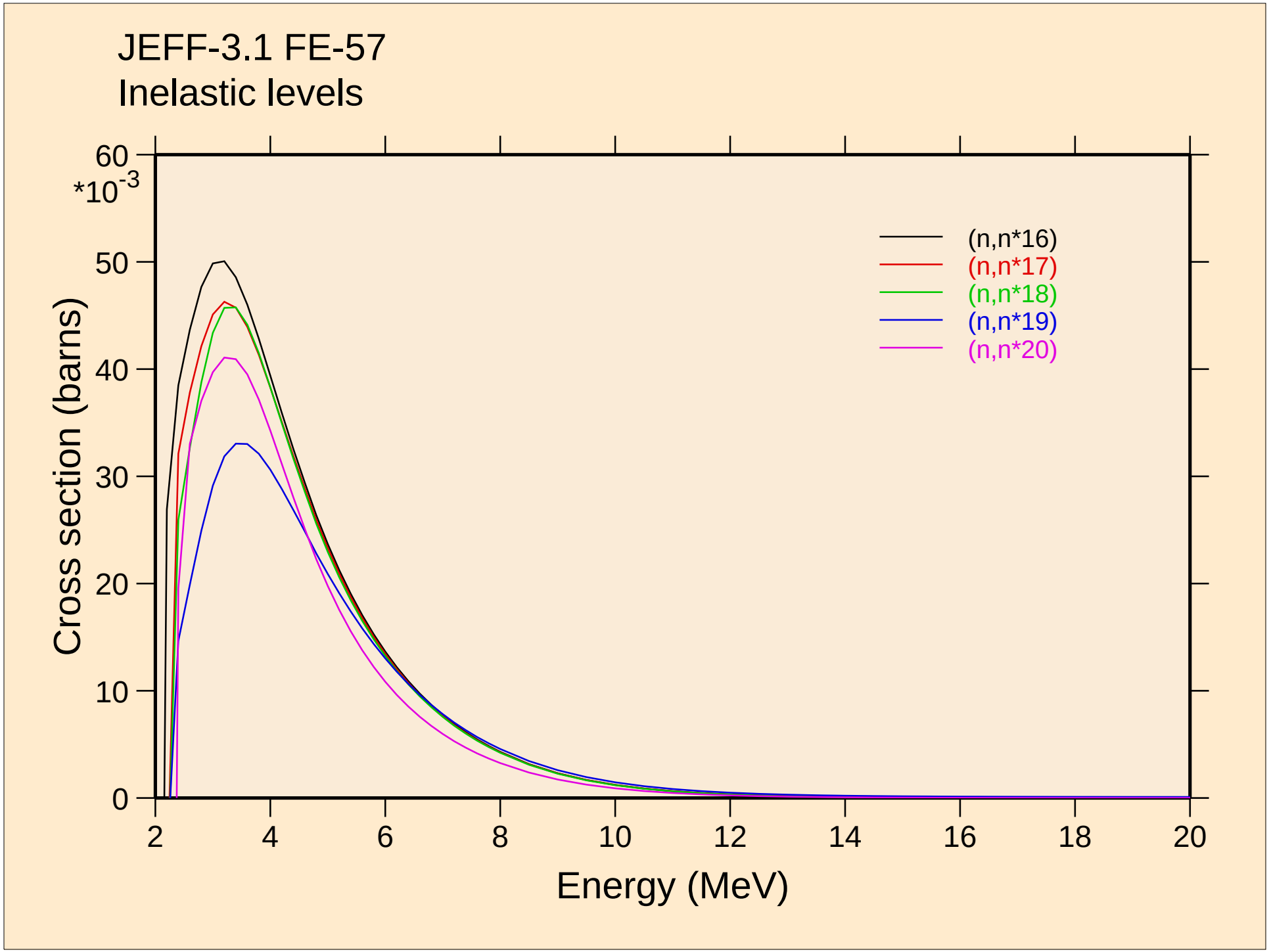

JEFF-3.1 FE-57
Damage
120
*10-3
100
80
60
40
20
0
damage
Damage (MeV-barns)
0
50
100
150
200
Energy (MeV)

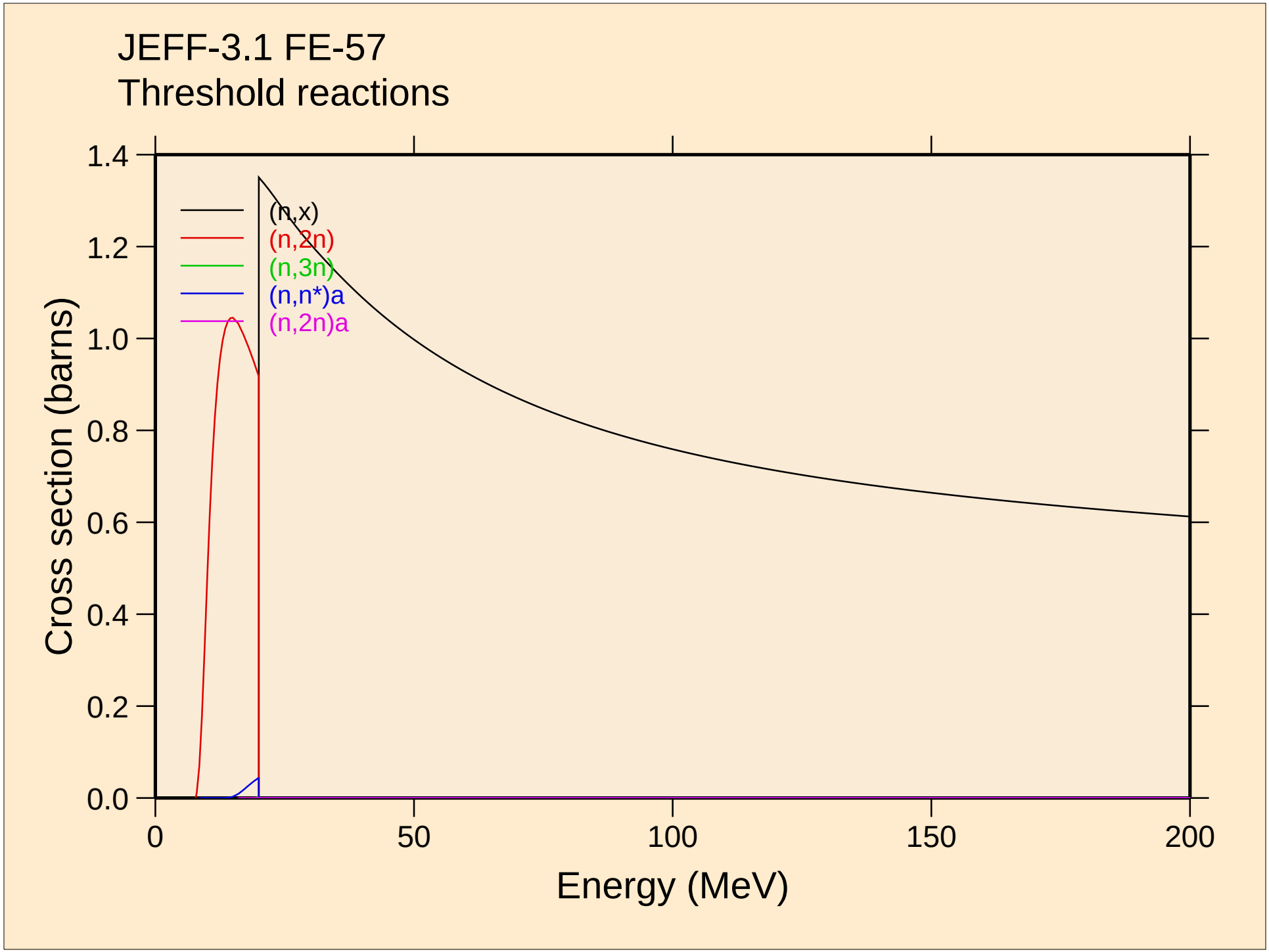

JEFF-3.1 FE-57
Non-threshold reactions
(n,gma)
(n,a)
(n,xa)
Cross section (barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-7
10-8
0
50
100
150
200
Energy (MeV)

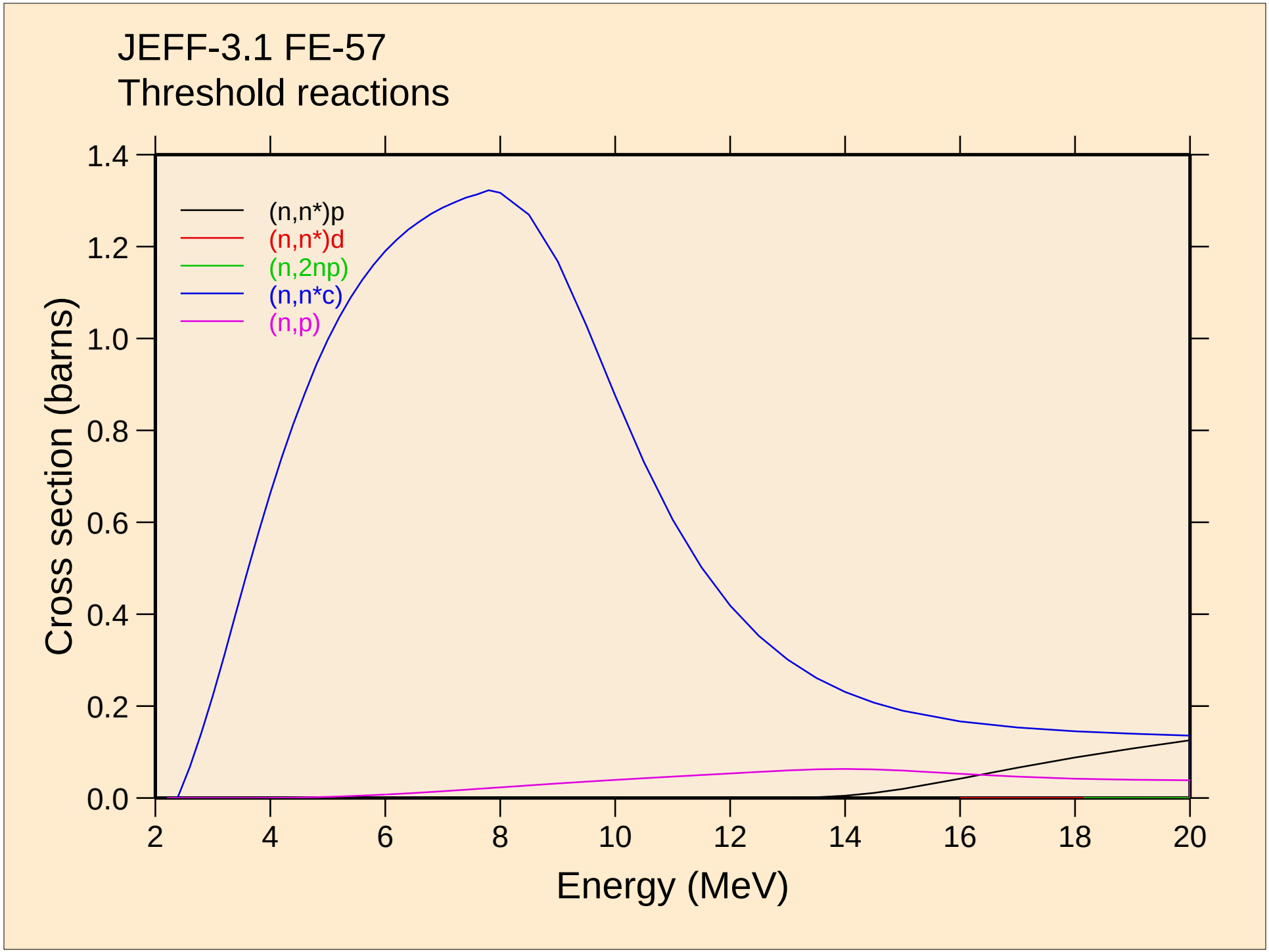

JEFF-3.1 FE-57
Inelastic levels
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
0
5
10
15
20
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

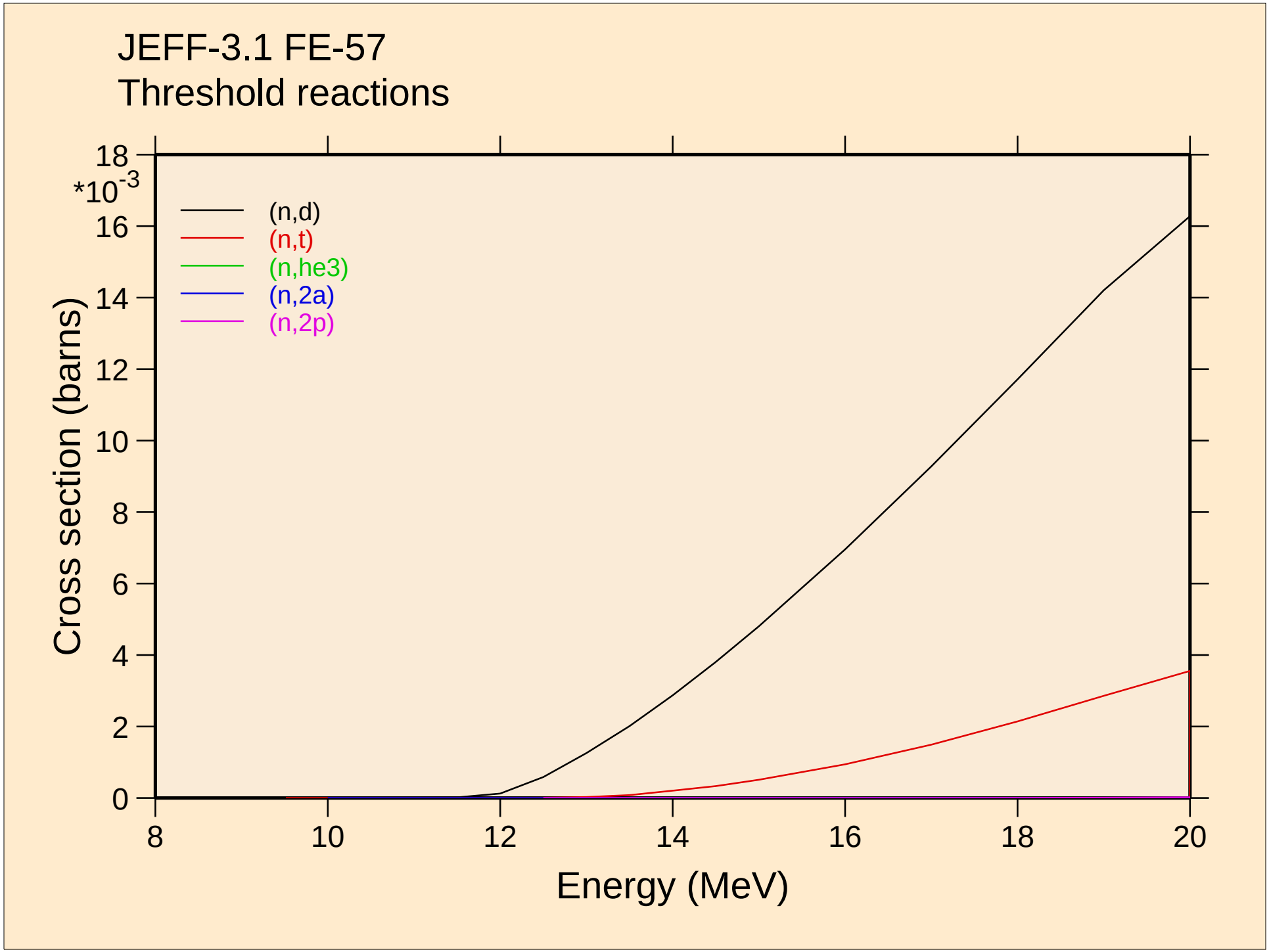

JEFF-3.1 FE-57
Inelastic levels
100
*10-3
80
60
40
20
0
Cross section (barns)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

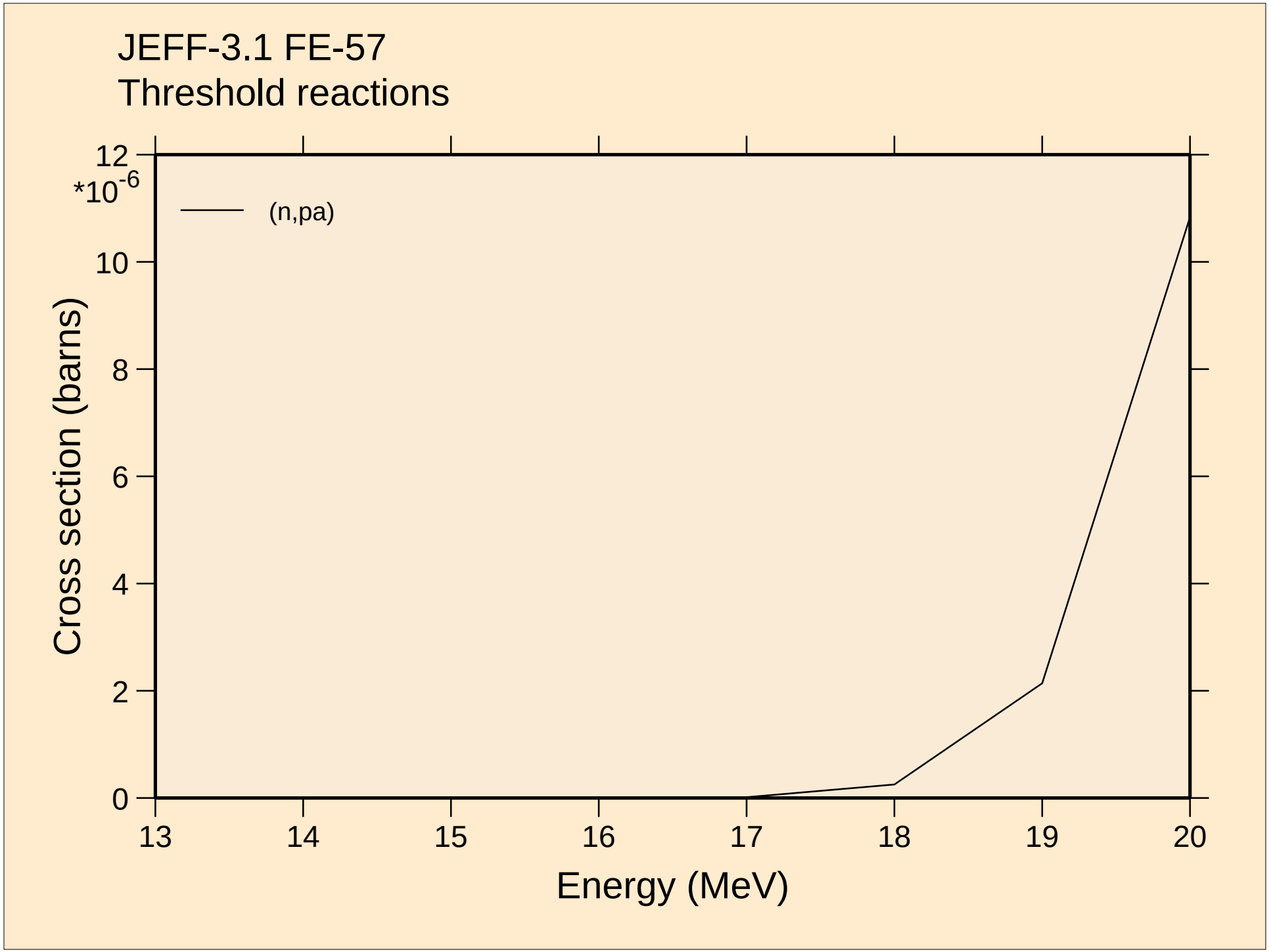

JEFF-3.1 FE-57
Inelastic levels
Cross section (barns)
*10-3
80
70
60
50
40
30
20
10
0
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

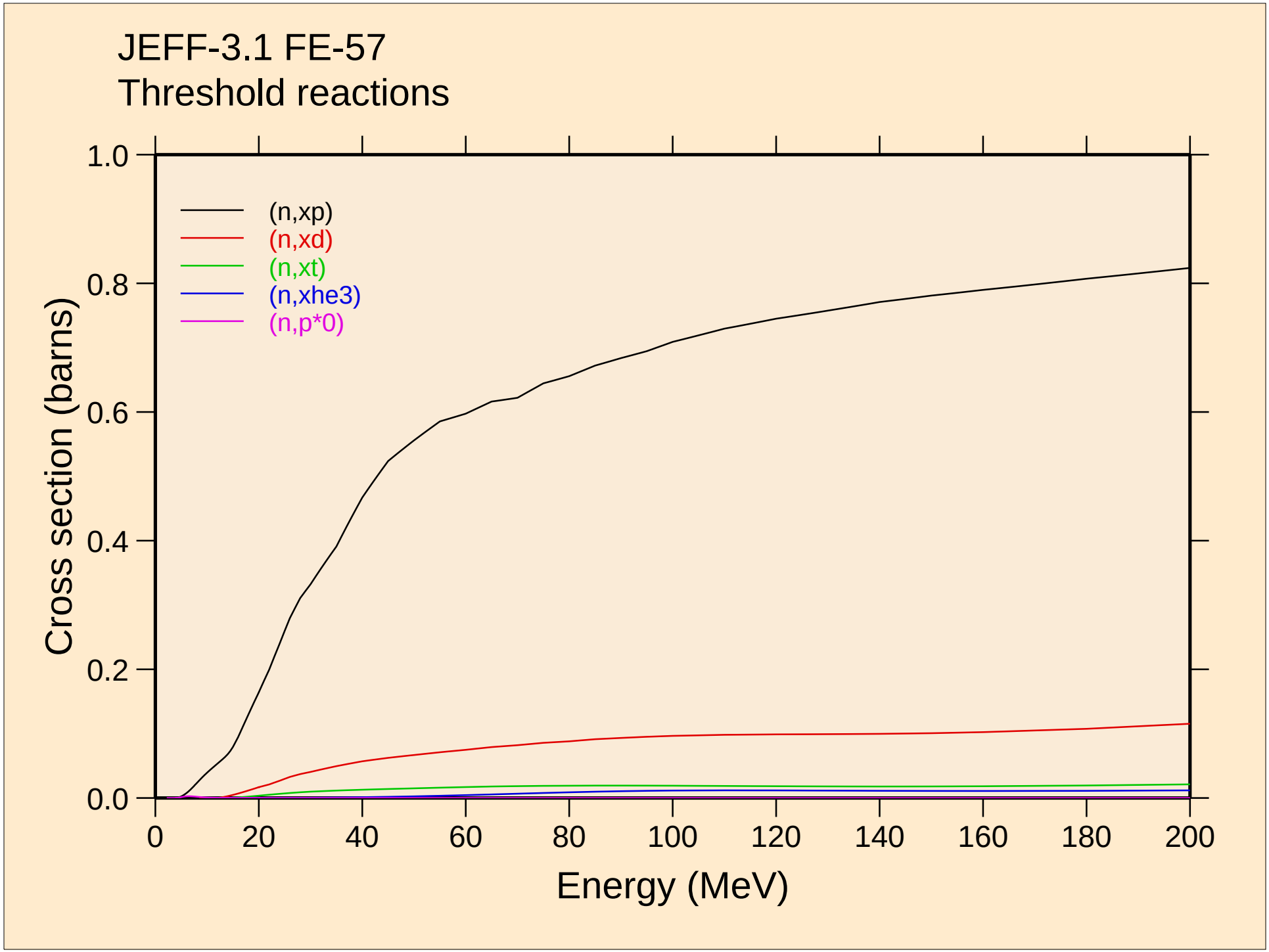

JEFF-3.1 FE-57
Inelastic levels
Cross section (barns)
*10-3
60
50
40
30
20
10
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

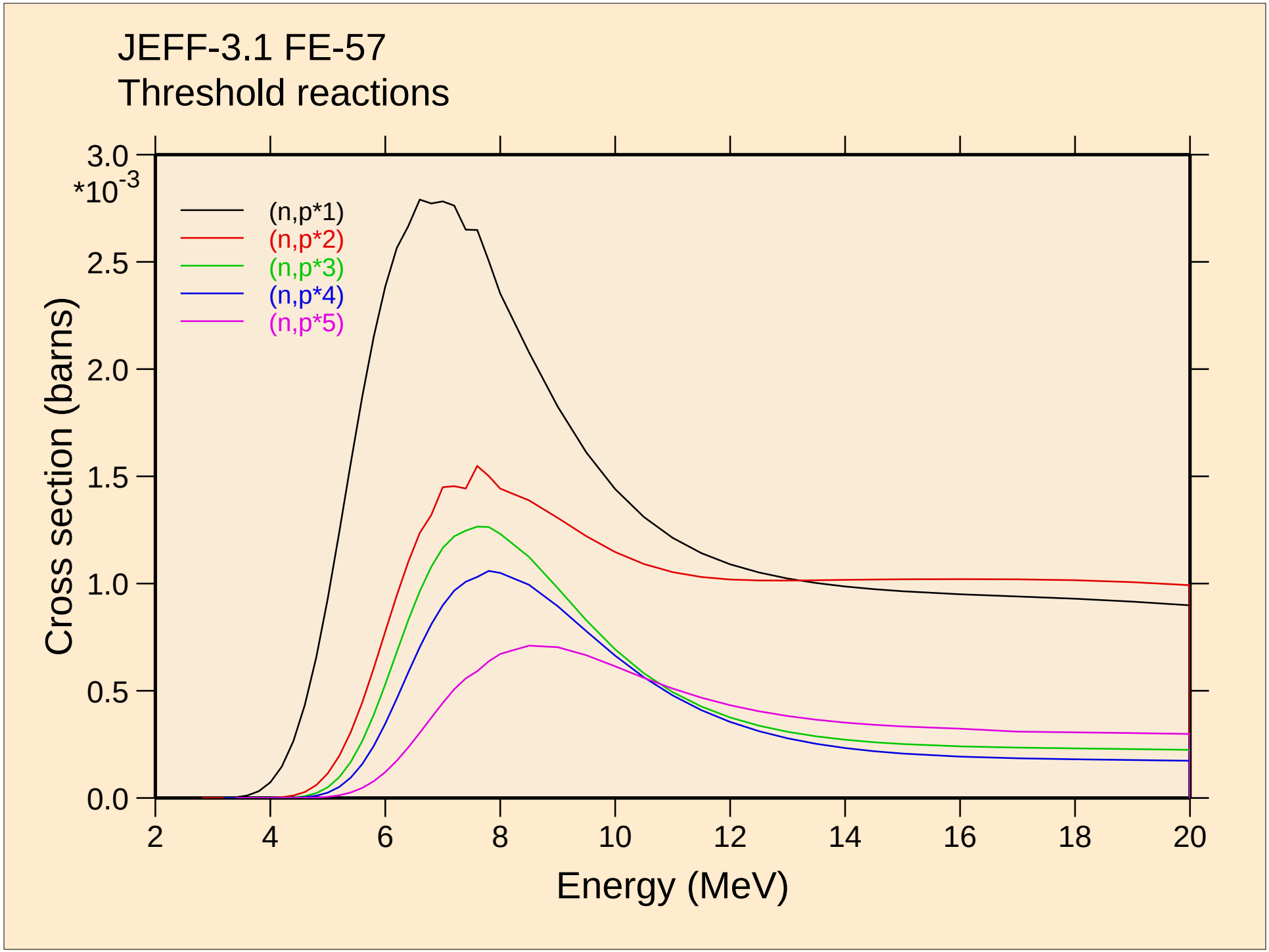

JEFF-3.1 FE-57
Threshold reactions
(n,x)
(n,2n)
(n,3n)
(n,n*)a
(n,2n)a
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
50
100
150
200

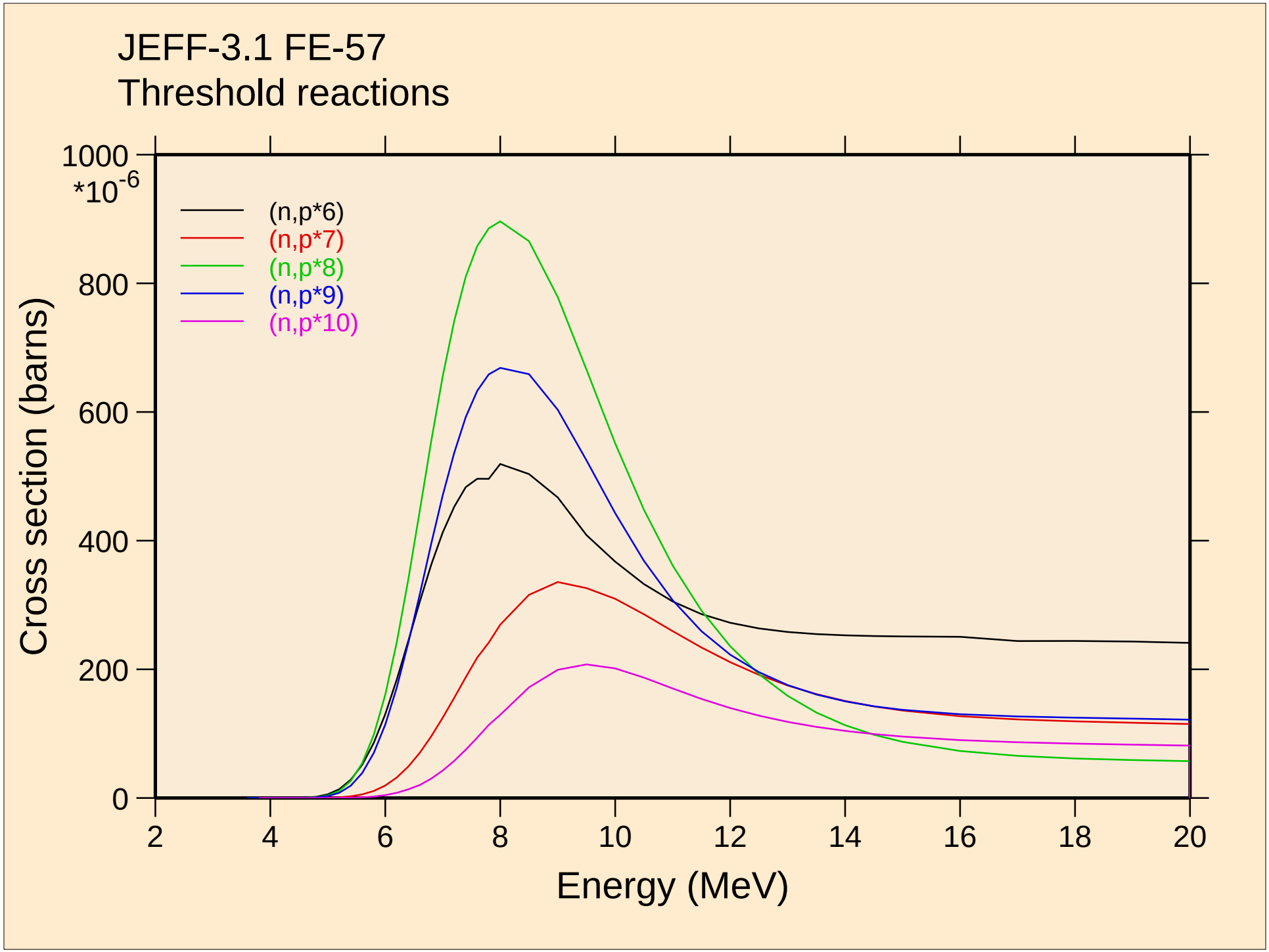

JEFF-3.1 FE-57
Threshold reactions
(n,n*)p
(n,n*)d
(n,2np)
(n,n*c)
(n,p)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
2
4
6
8
10
12
14
16
18
20

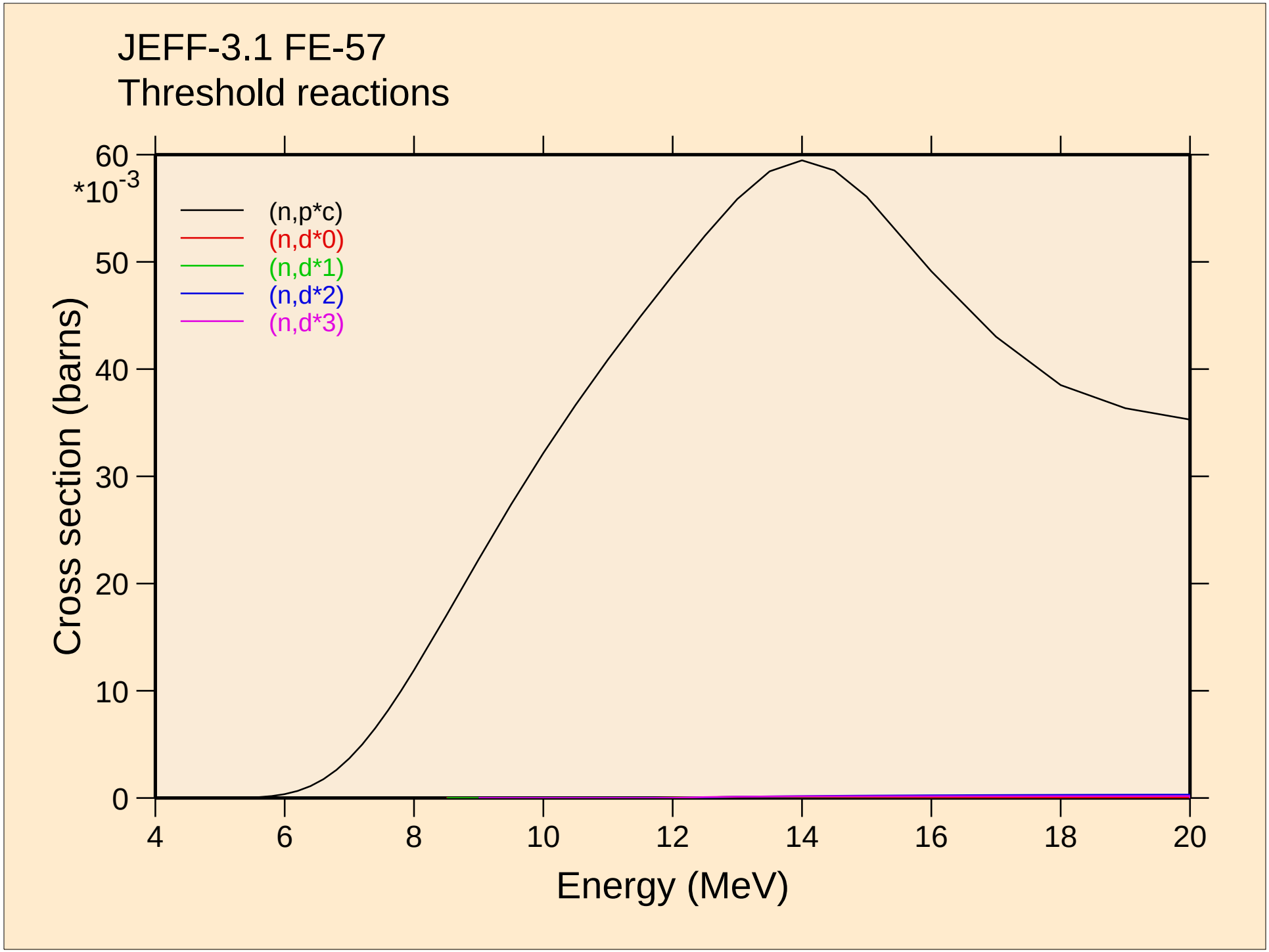

JEFF-3.1 FE-57
Threshold reactions
*10-3
Cross section (barns)
Energy (MeV)
(n,d)
(n,t)
(n,he3)
(n,2a)
(n,2p)
0
2
4
6
8
10
12
14
16
18
8
10
12
14
16
18
20

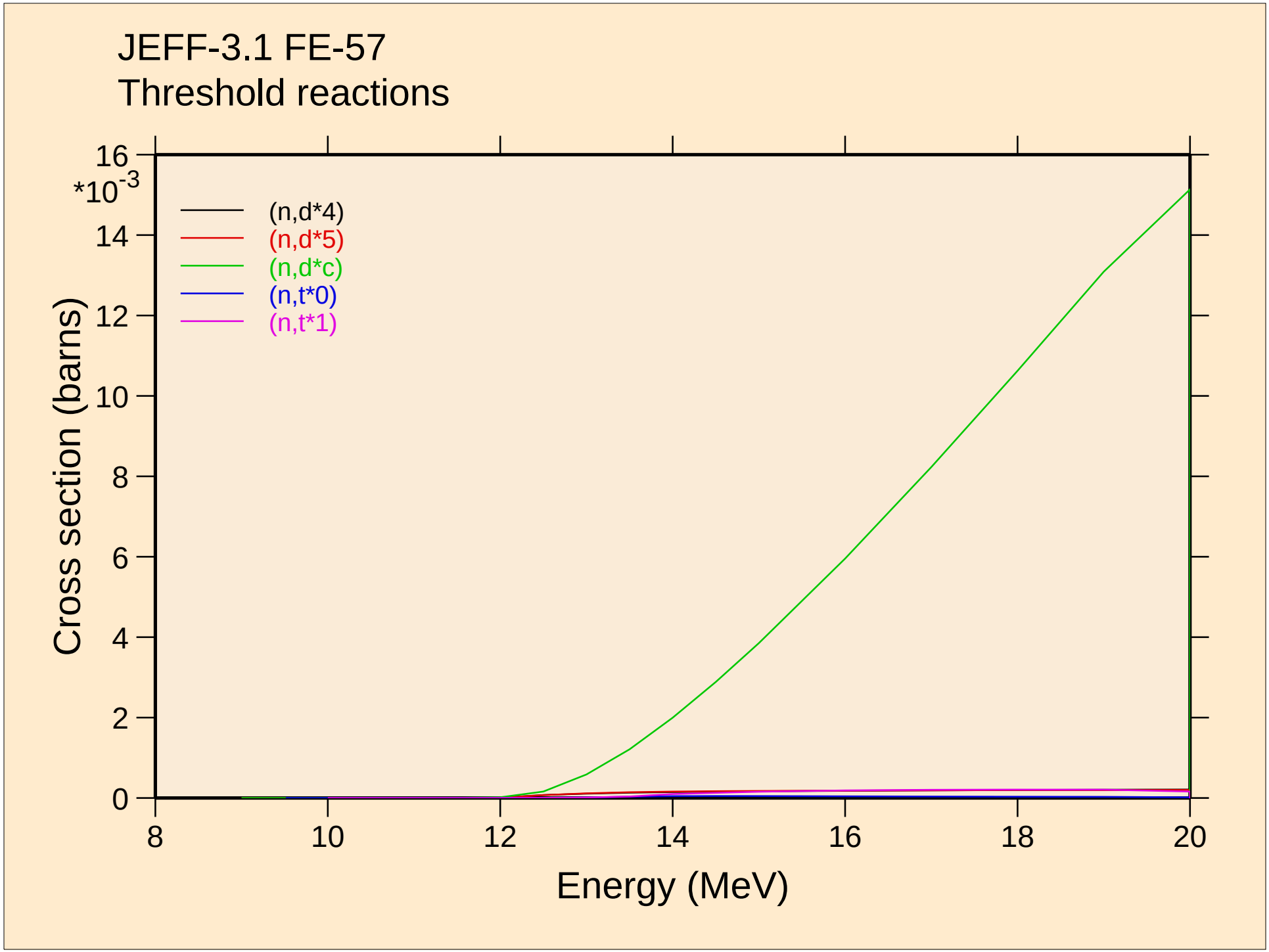

JEFF-3.1 FE-57
Threshold reactions
*10-6
(n,pa)
Cross section (barns)
0
2
4
6
8
10
12
13
14
15
16
17
18
19
20
Energy (MeV)

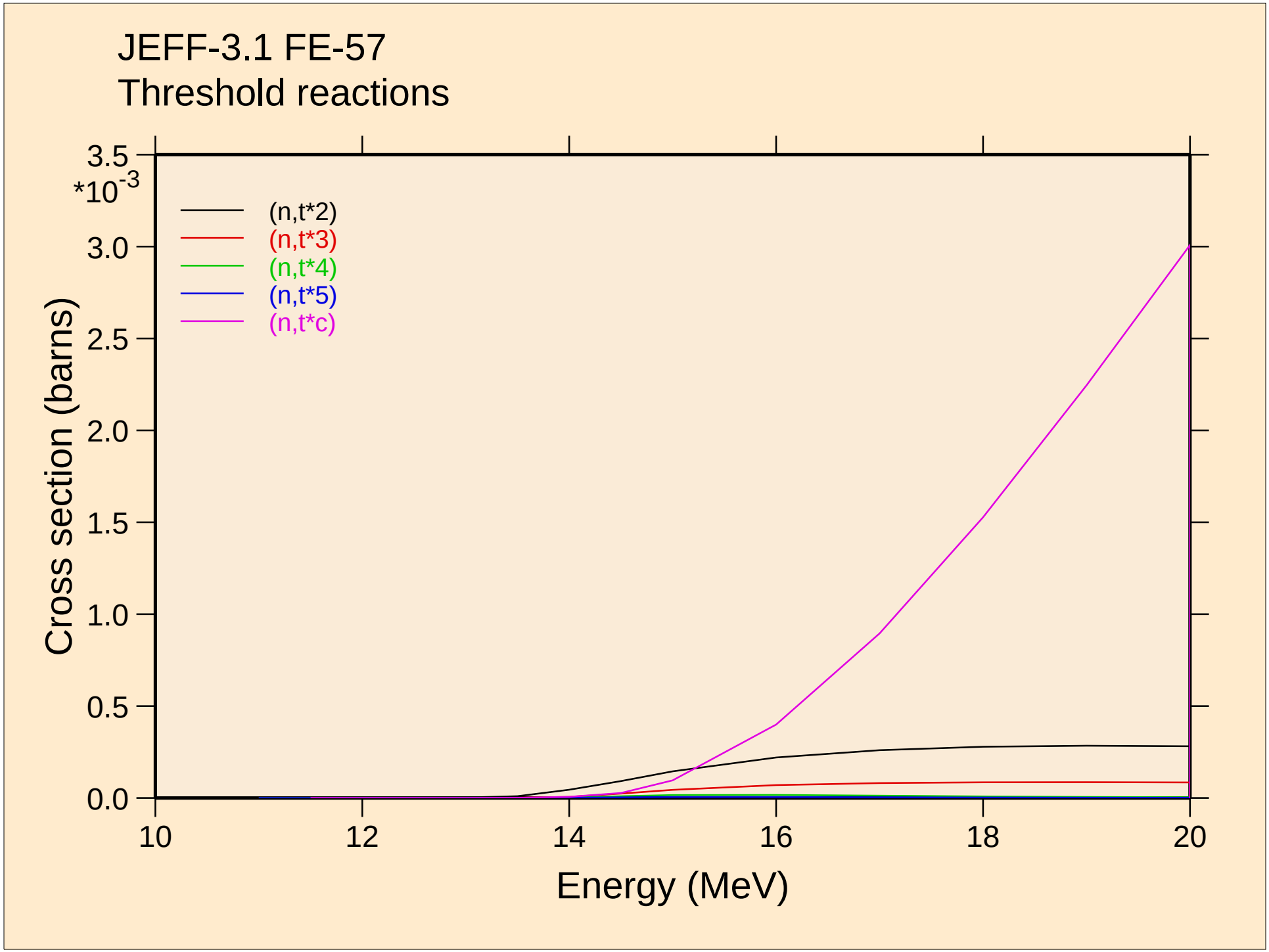

JEFF-3.1 FE-57
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,p*0)
Cross section (barns)
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

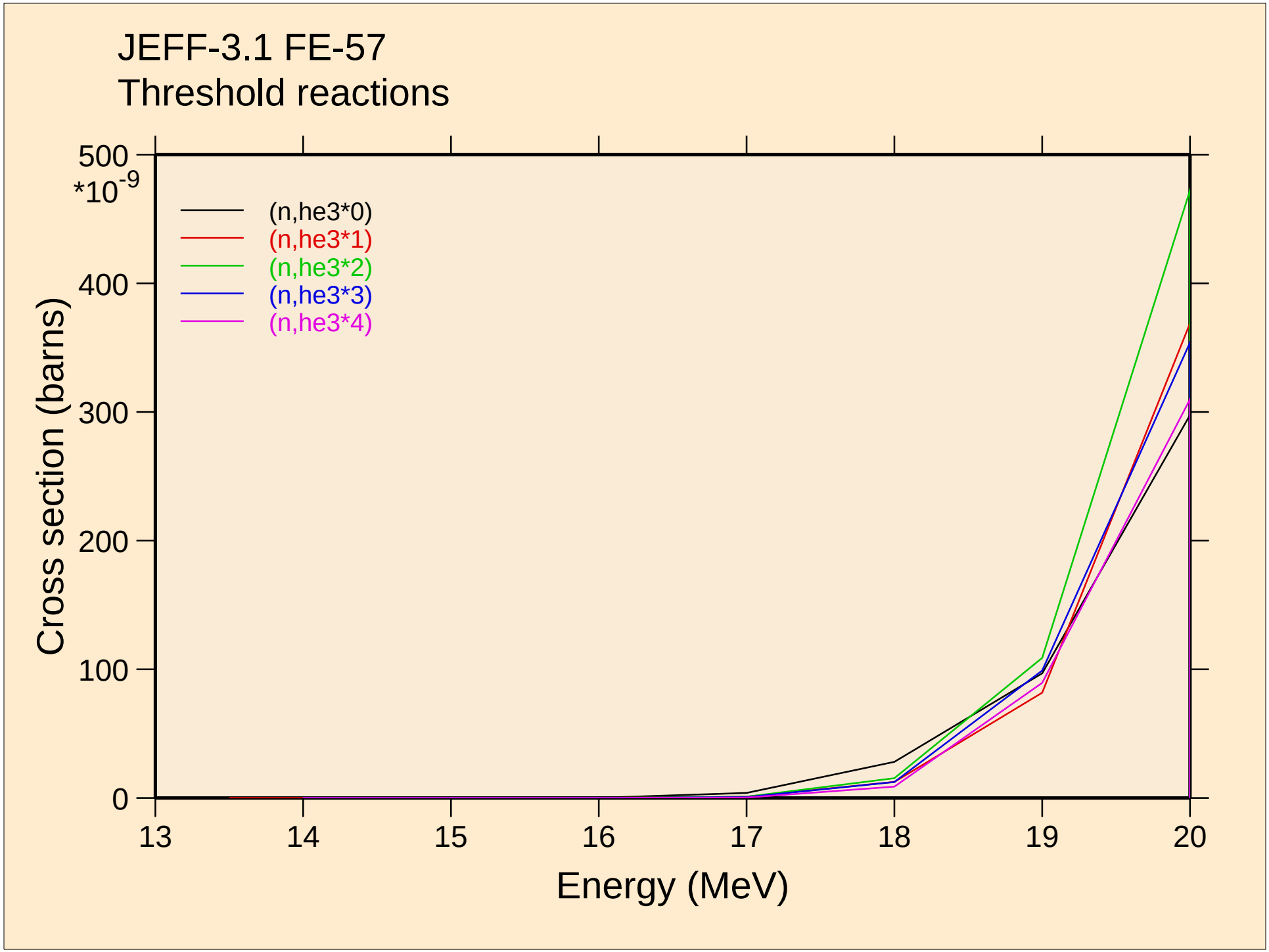

JEFF-3.1 FE-57
Threshold reactions
Cross section (barns)
*10-3
3.0
2.5
2.0
1.5
1.0
0.5
0.0
(n,p*1)
(n,p*2)
(n,p*3)
(n,p*4)
(n,p*5)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

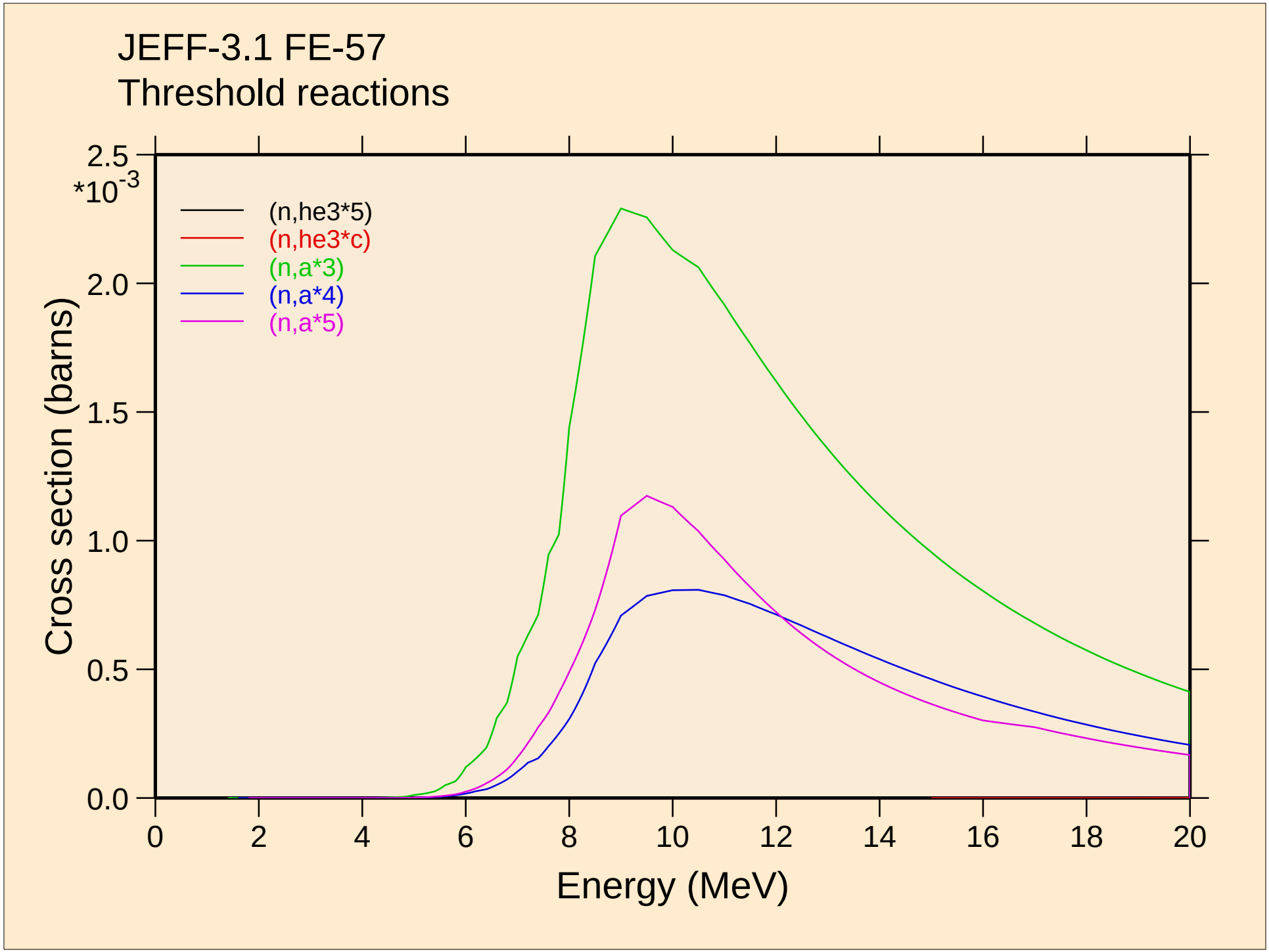

JEFF-3.1 FE-57
Threshold reactions
1000
*10-6
800
600
400
200
0
Cross section (barns)
(n,p*6)
(n,p*7)
(n,p*8)
(n,p*9)
(n,p*10)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

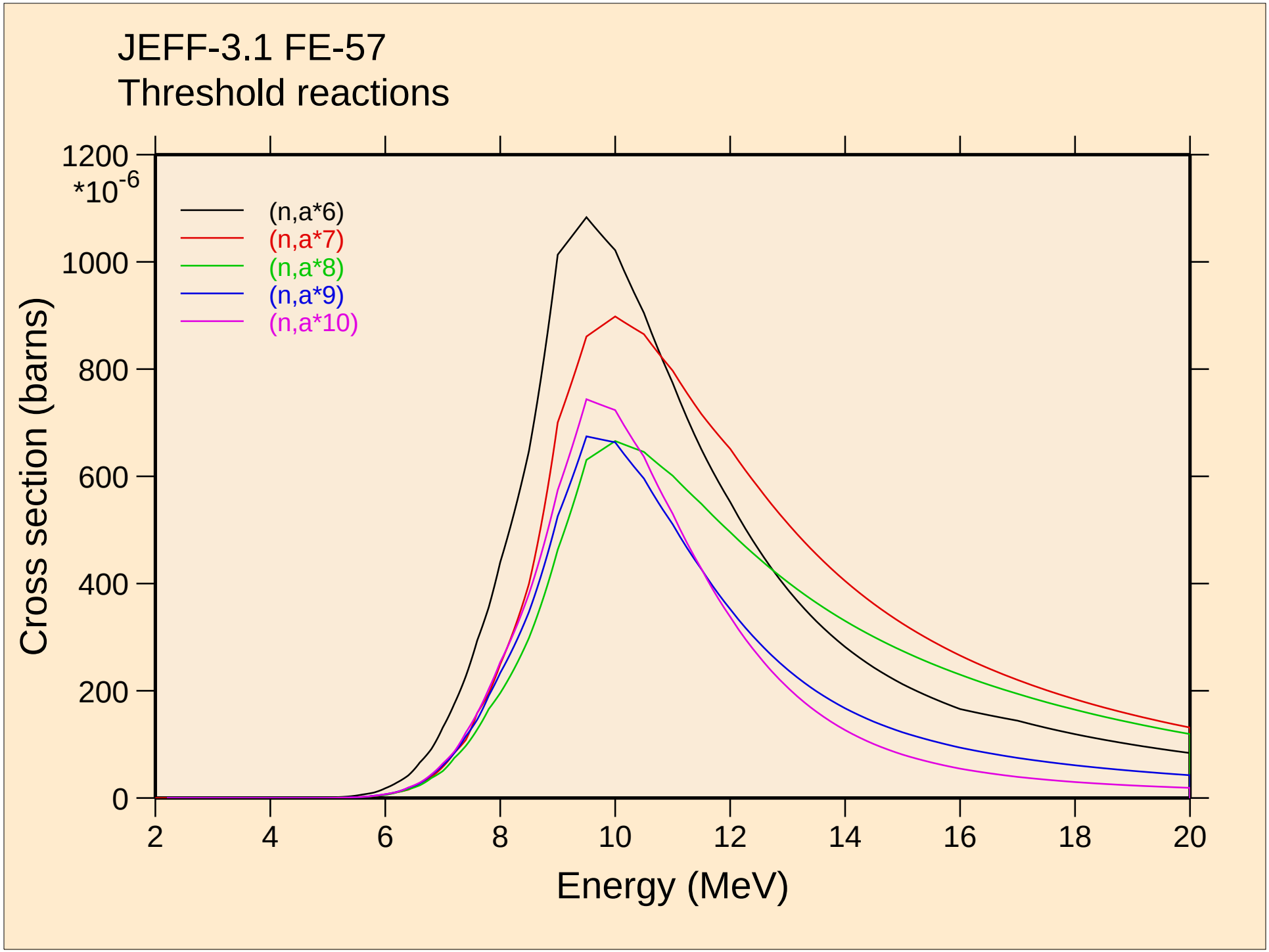

JEFF-3.1 FE-57
Threshold reactions
*10-3
60
50
40
30
20
10
0
Cross section (barns)
(n,p*c)
(n,d*0)
(n,d*1)
(n,d*2)
(n,d*3)
4
6
8
10
12
14
16
18
20
Energy (MeV)

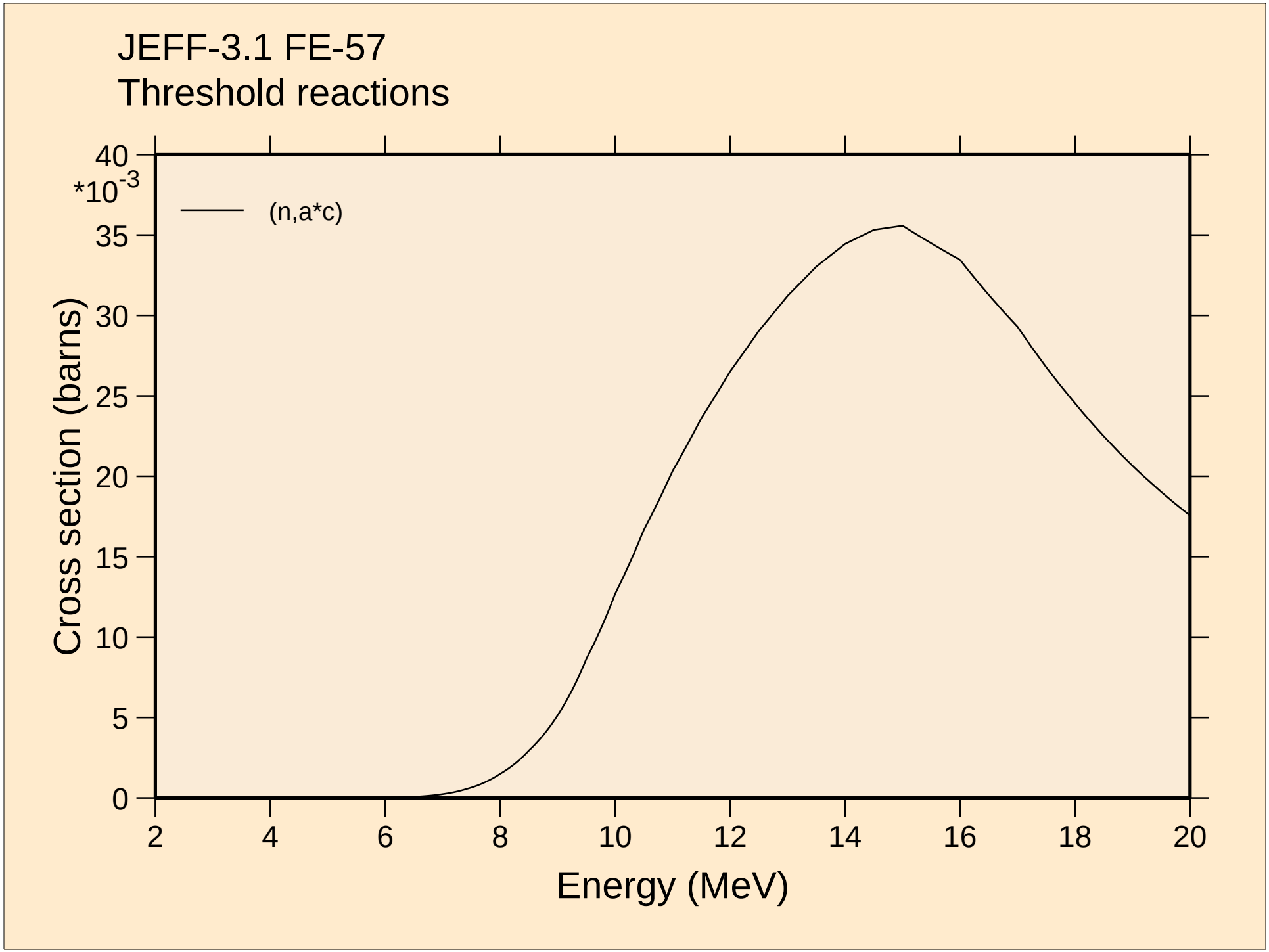

JEFF-3.1 FE-57
Threshold reactions
*10-3
16
14
12
10
8
6
4
2
0
Cross section (barns)
(n,d*4)
(n,d*5)
(n,d*c)
(n,t*0)
(n,t*1)
8
10
12
14
16
18
20
Energy (MeV)

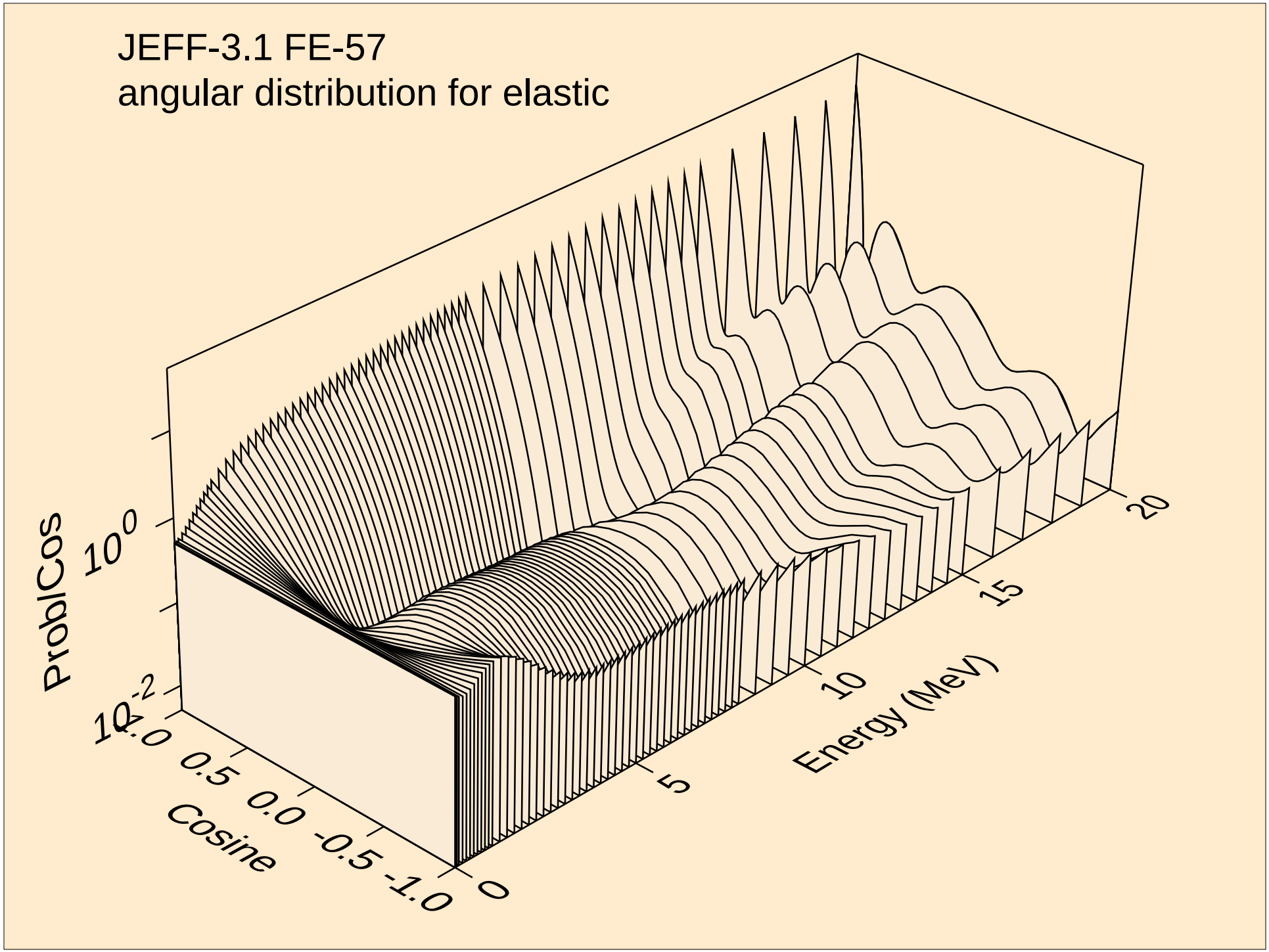

JEFF-3.1 FE-57
Threshold reactions
Cross section (barns)
*10-3
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
(n,t*2)
(n,t*3)
(n,t*4)
(n,t*5)
(n,t*c)
10
12
14
16
18
20
Energy (MeV)

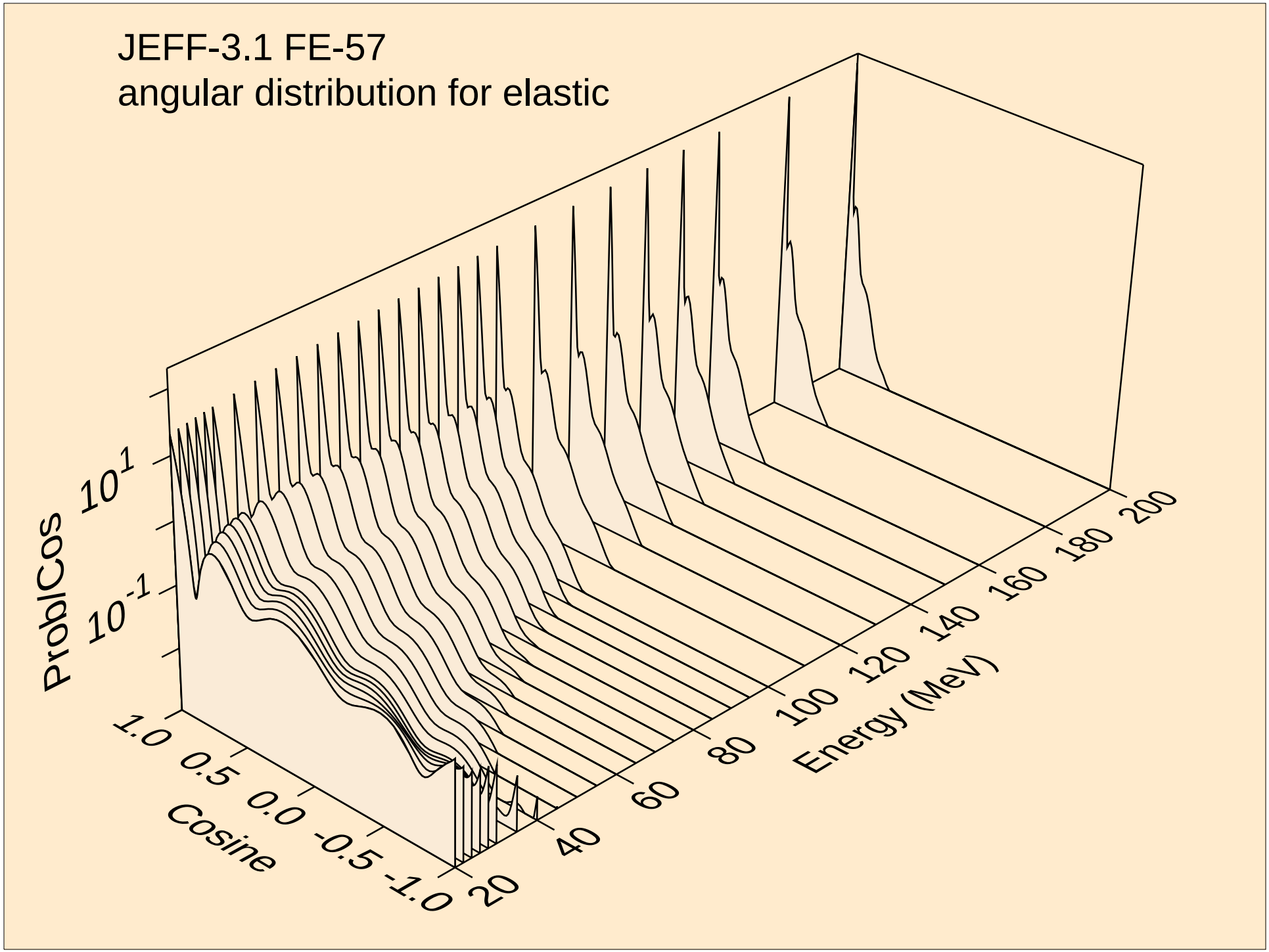

JEFF-3.1 FE-57
Threshold reactions
500
*10-9
400
300
200
100
0
Cross section (barns)
(n,he3*0)
(n,he3*1)
(n,he3*2)
(n,he3*3)
(n,he3*4)
13
14
15
16
17
18
19
20
Energy (MeV)

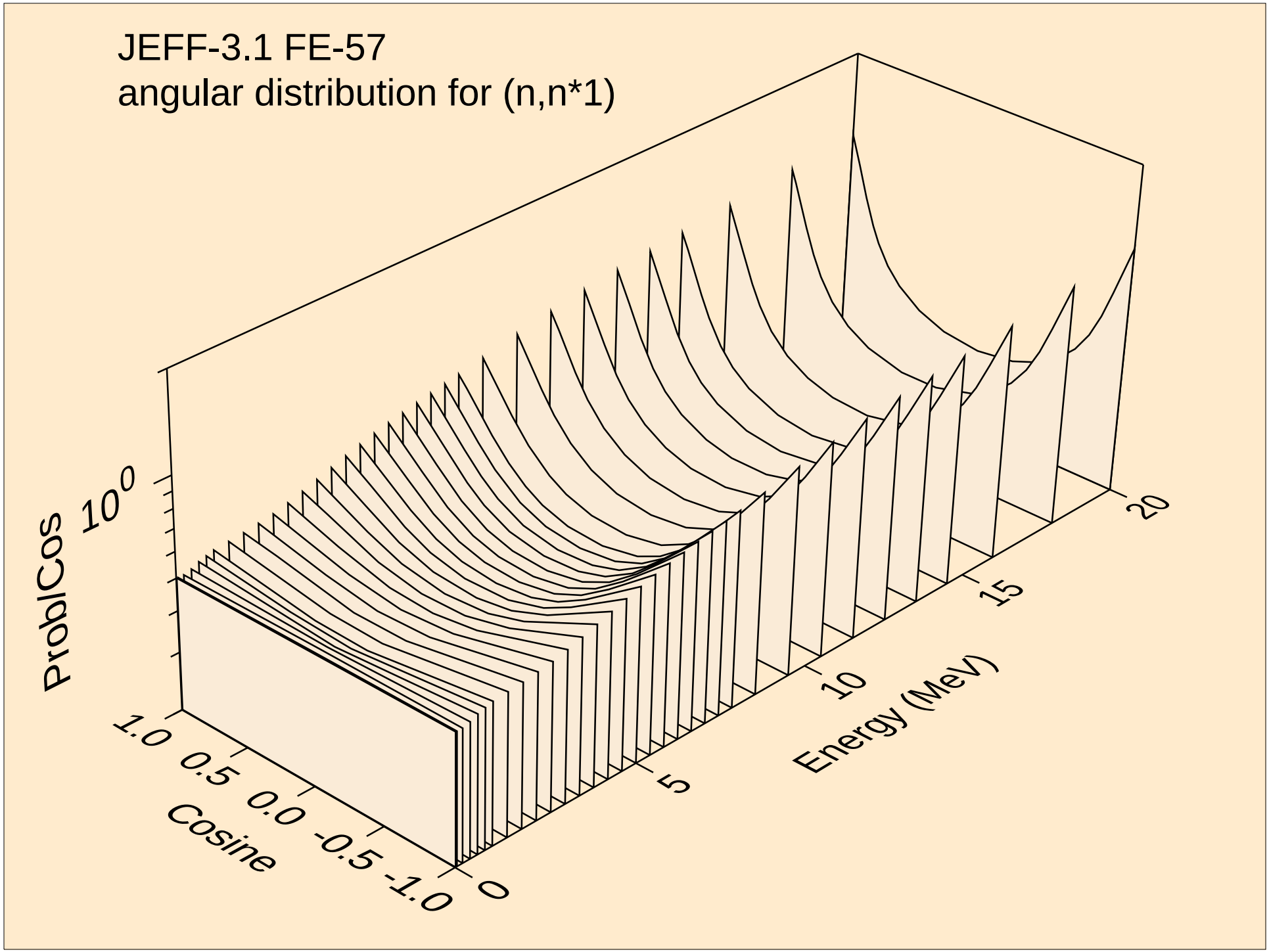

JEFF-3.1 FE-57
Threshold reactions
2.5
*10-3
2.0
1.5
1.0
0.5
0.0
Cross section (barns)
(n,he3*5)
(n,he3*c)
(n,a*3)
(n,a*4)
(n,a*5)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

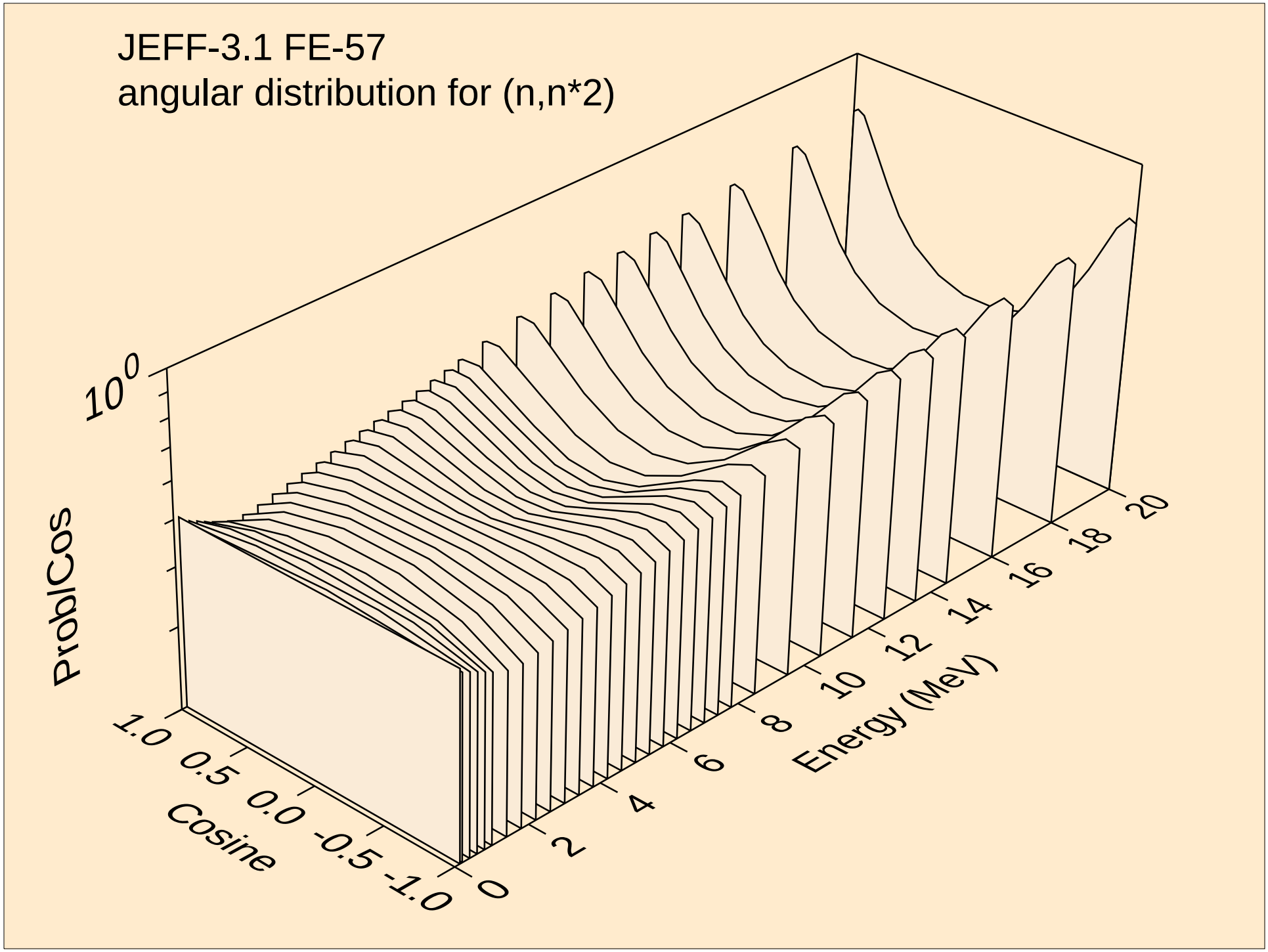

JEFF-3.1 FE-57
Threshold reactions
1200
*10-6
1000
800
600
400
200
0
Cross section (barns)
(n,a*6)
(n,a*7)
(n,a*8)
(n,a*9)
(n,a*10)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

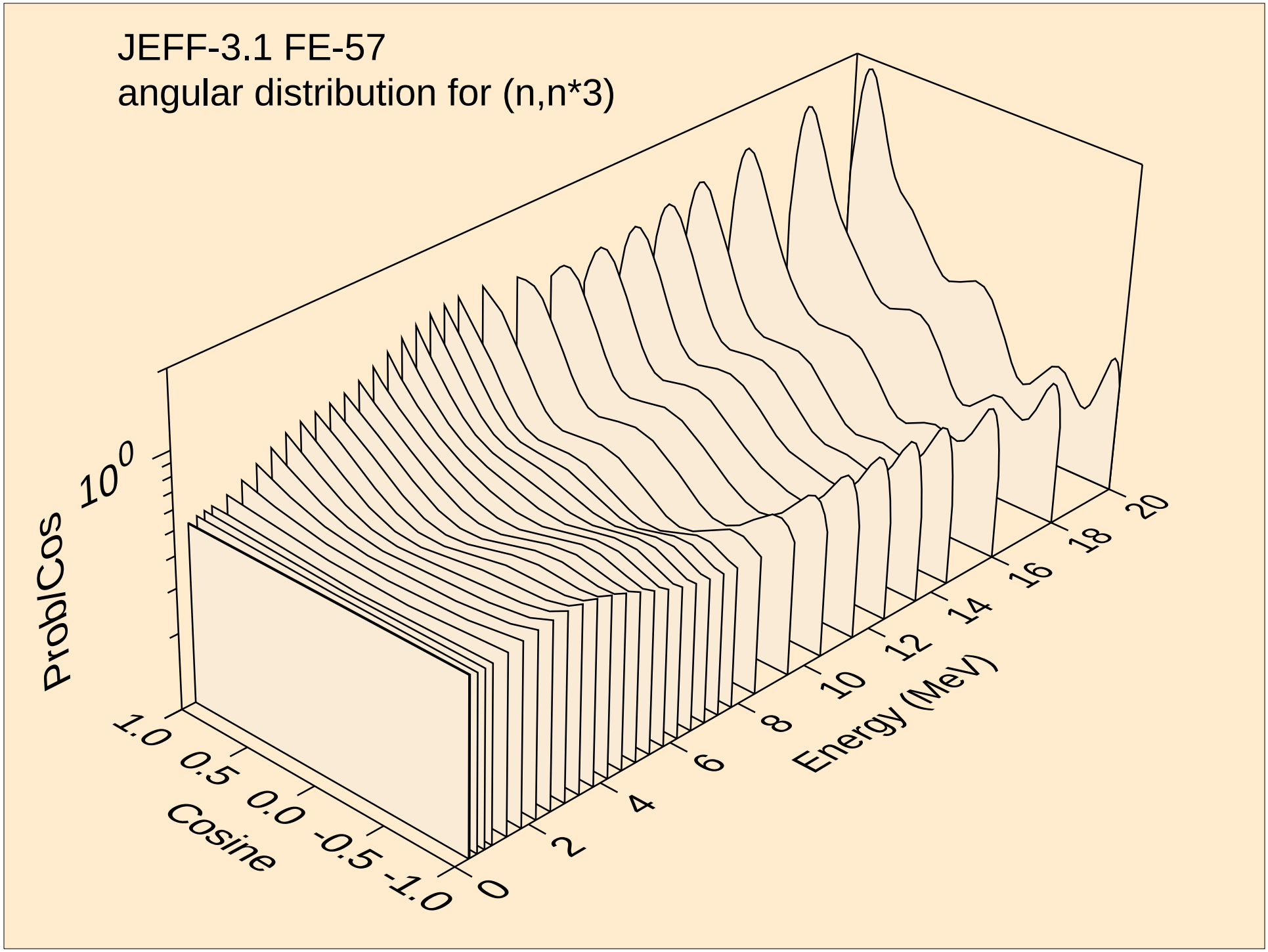

JEFF-3.1 FE-57
Threshold reactions
*10-3
(n,a*c)
Cross section (barns)
Energy (MeV)
0
5
10
15
20
25
30
35
40
2
4
6
8
10
12
14
16
18
20

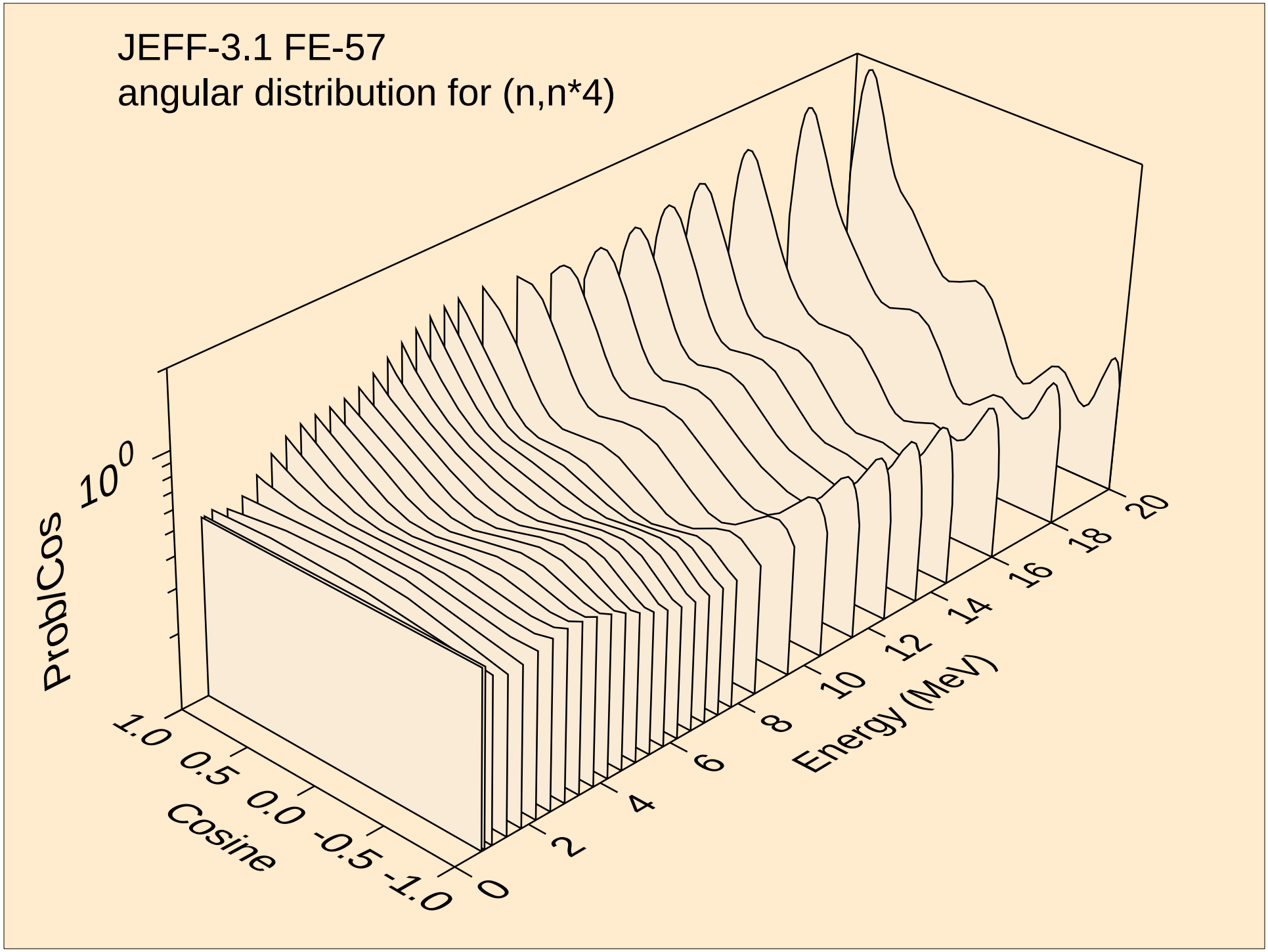

JEFF-3.1 FE-57
angular distribution for elastic
ProblCos
10^0
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

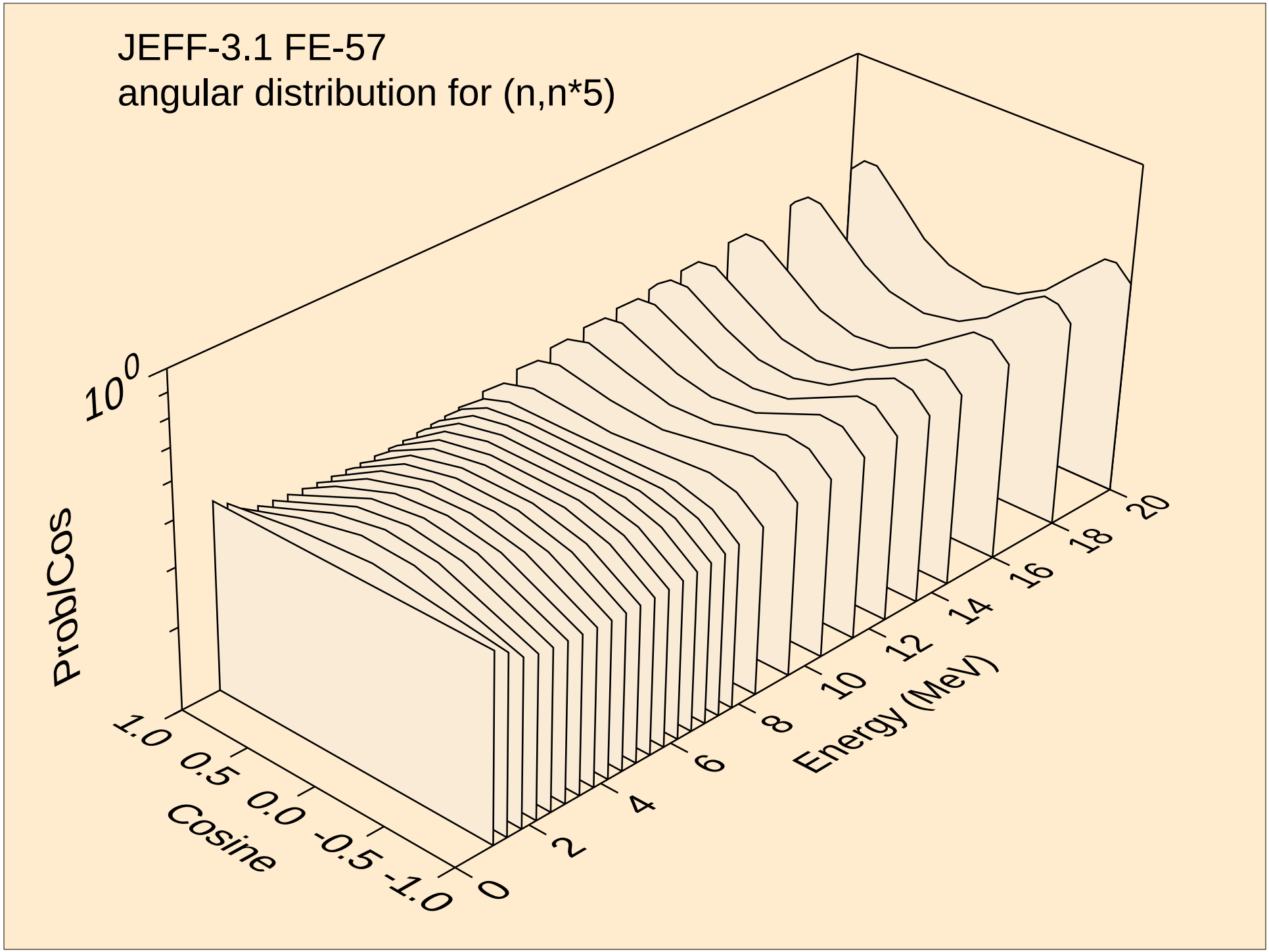

JEFF-3.1 FE-57
angular distribution for elastic
ProbICos
10^{1}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

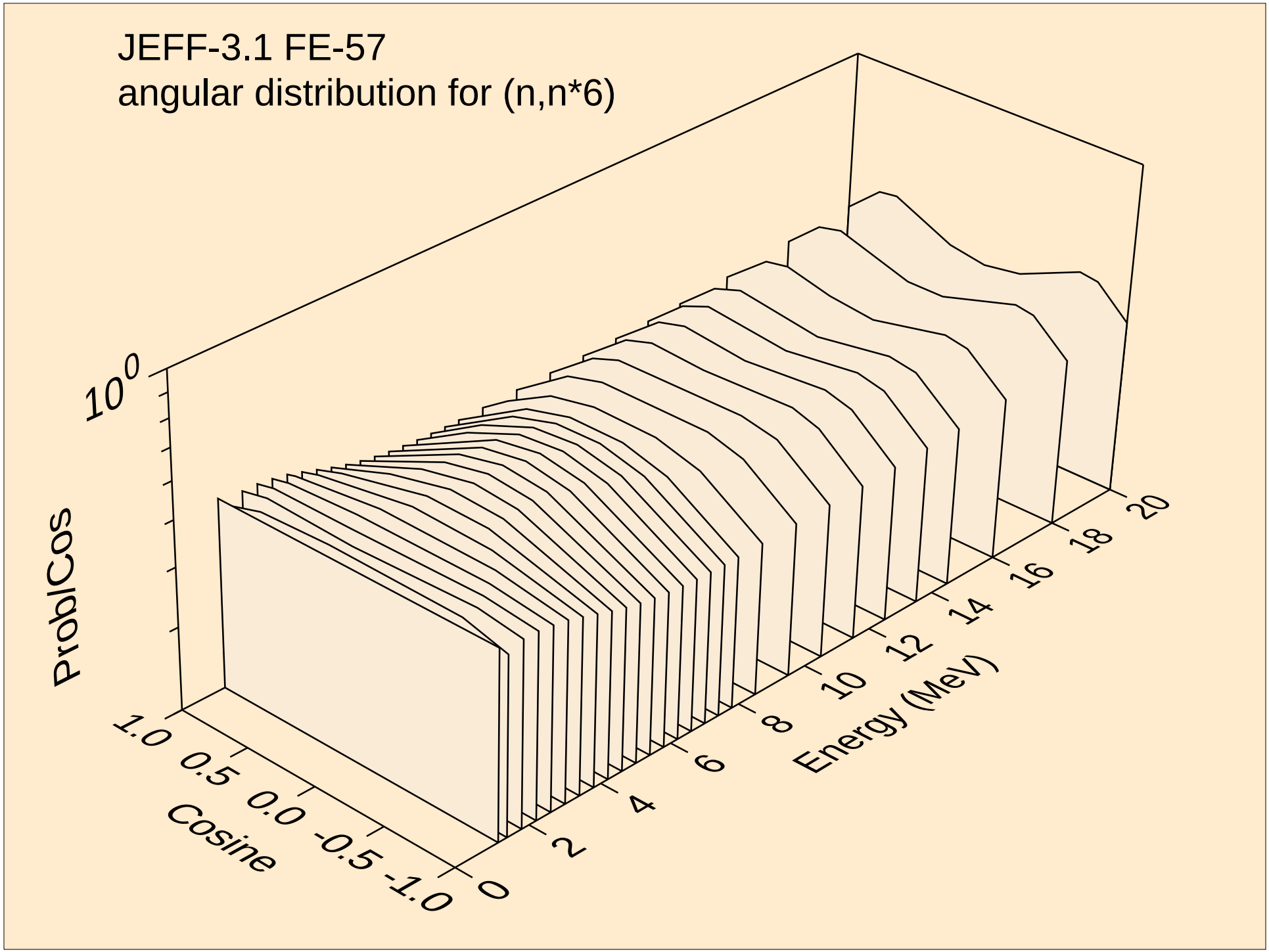

JEFF-3.1 FE-57
angular distribution for (n,n*1)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

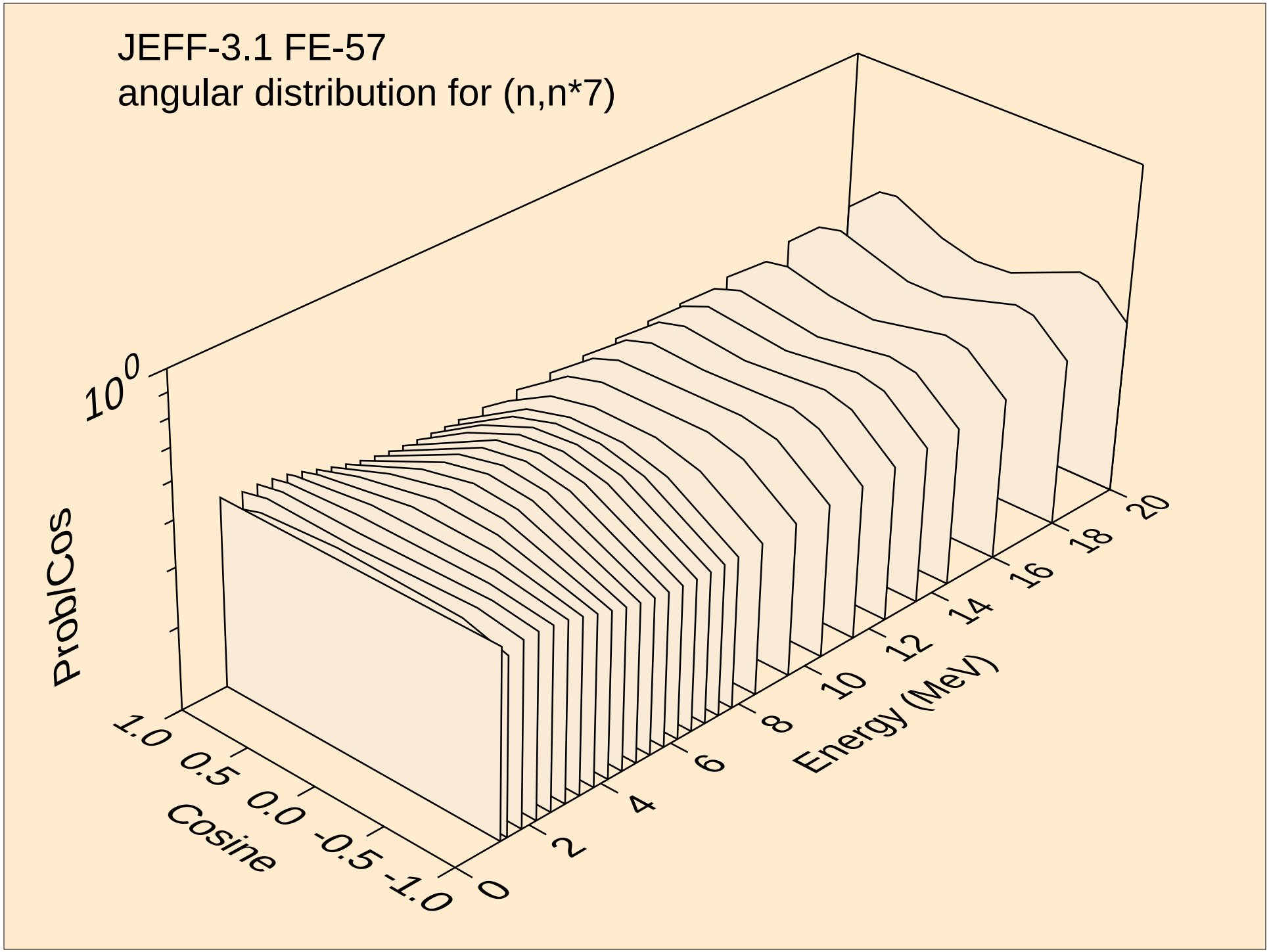

JEFF-3.1 FE-57
angular distribution for (n,n*2)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

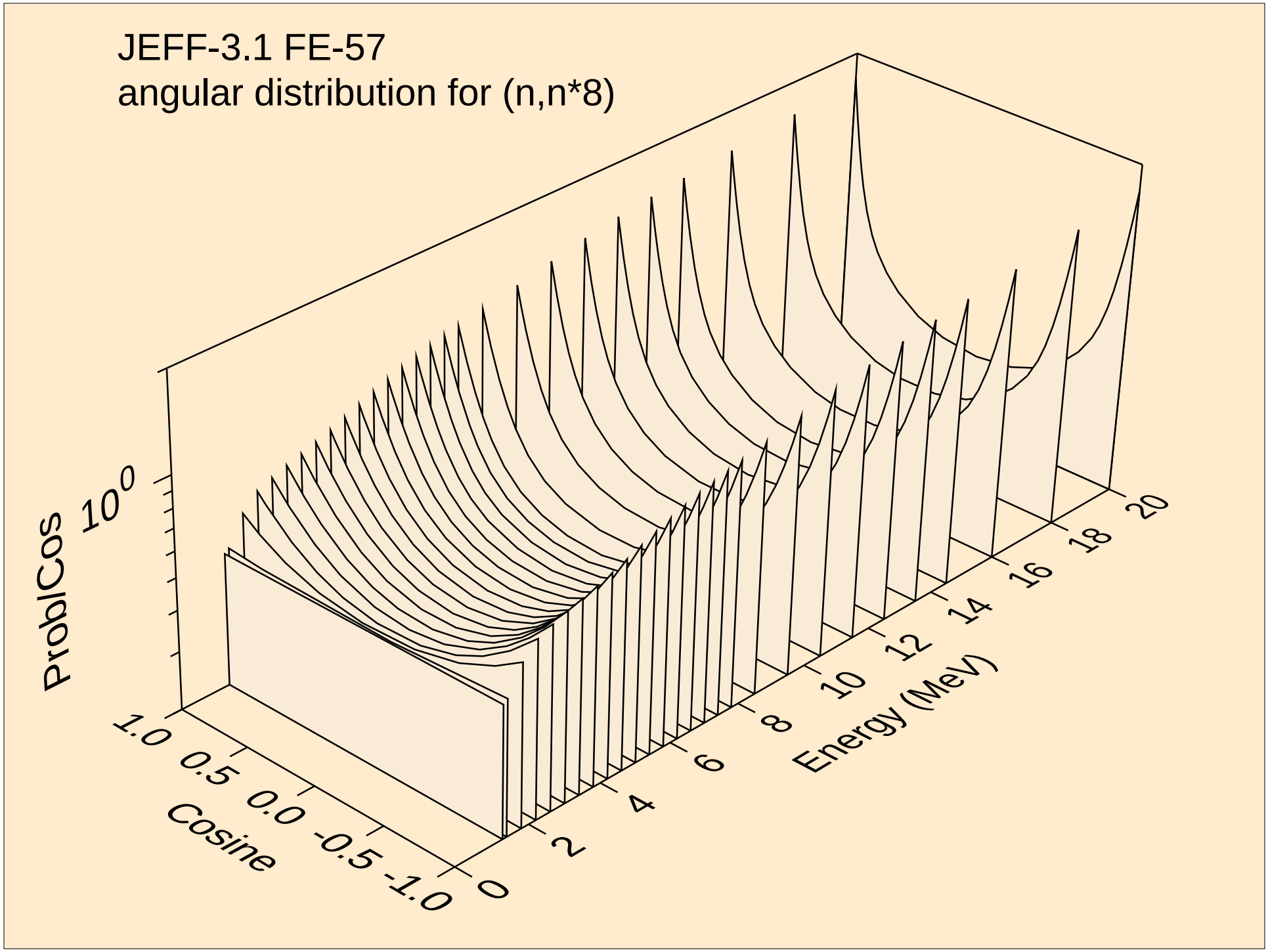

JEFF-3.1 FE-57
angular distribution for (n,n*3)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

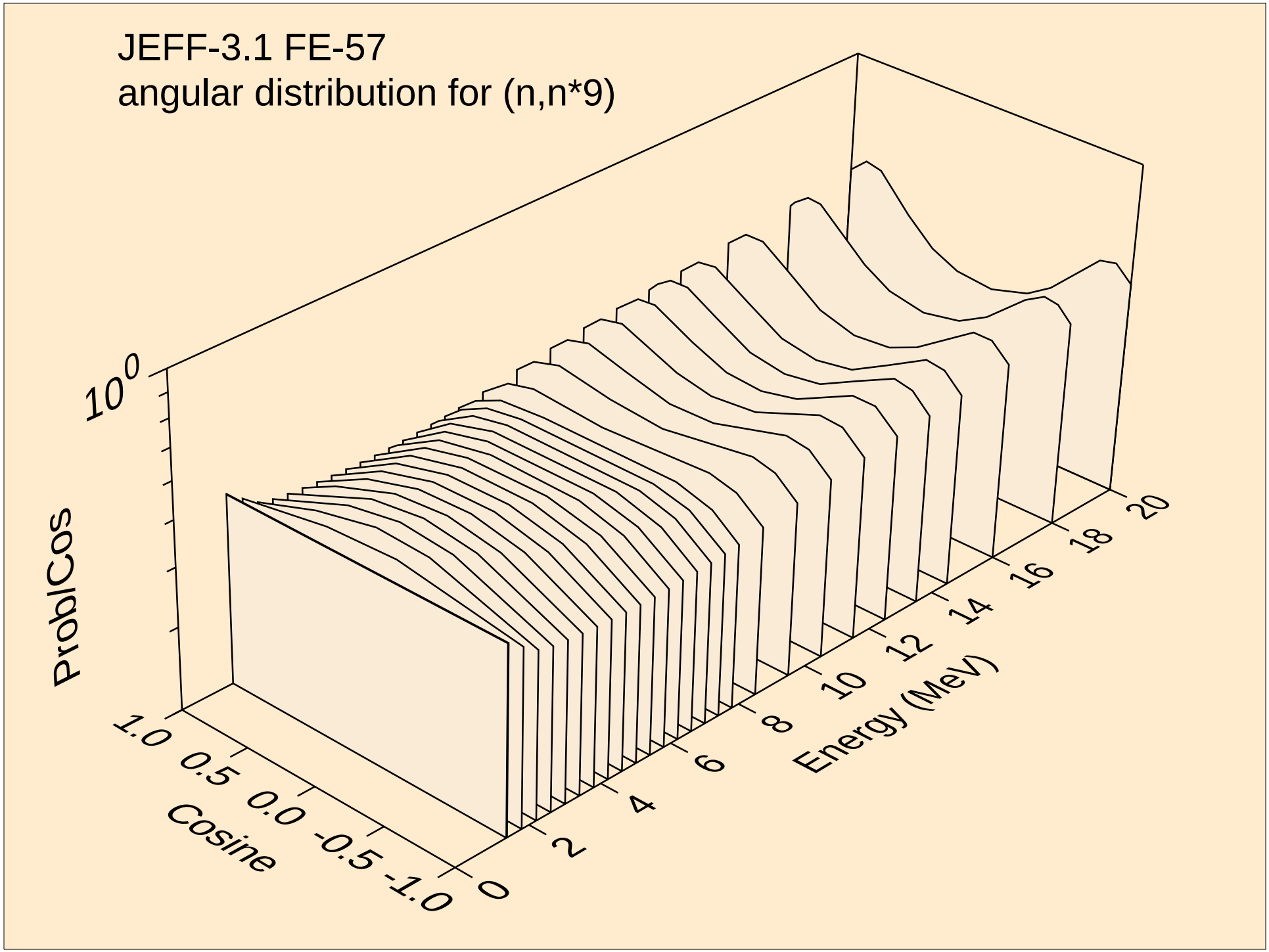

JEFF-3.1 FE-57
angular distribution for (n,n*4)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

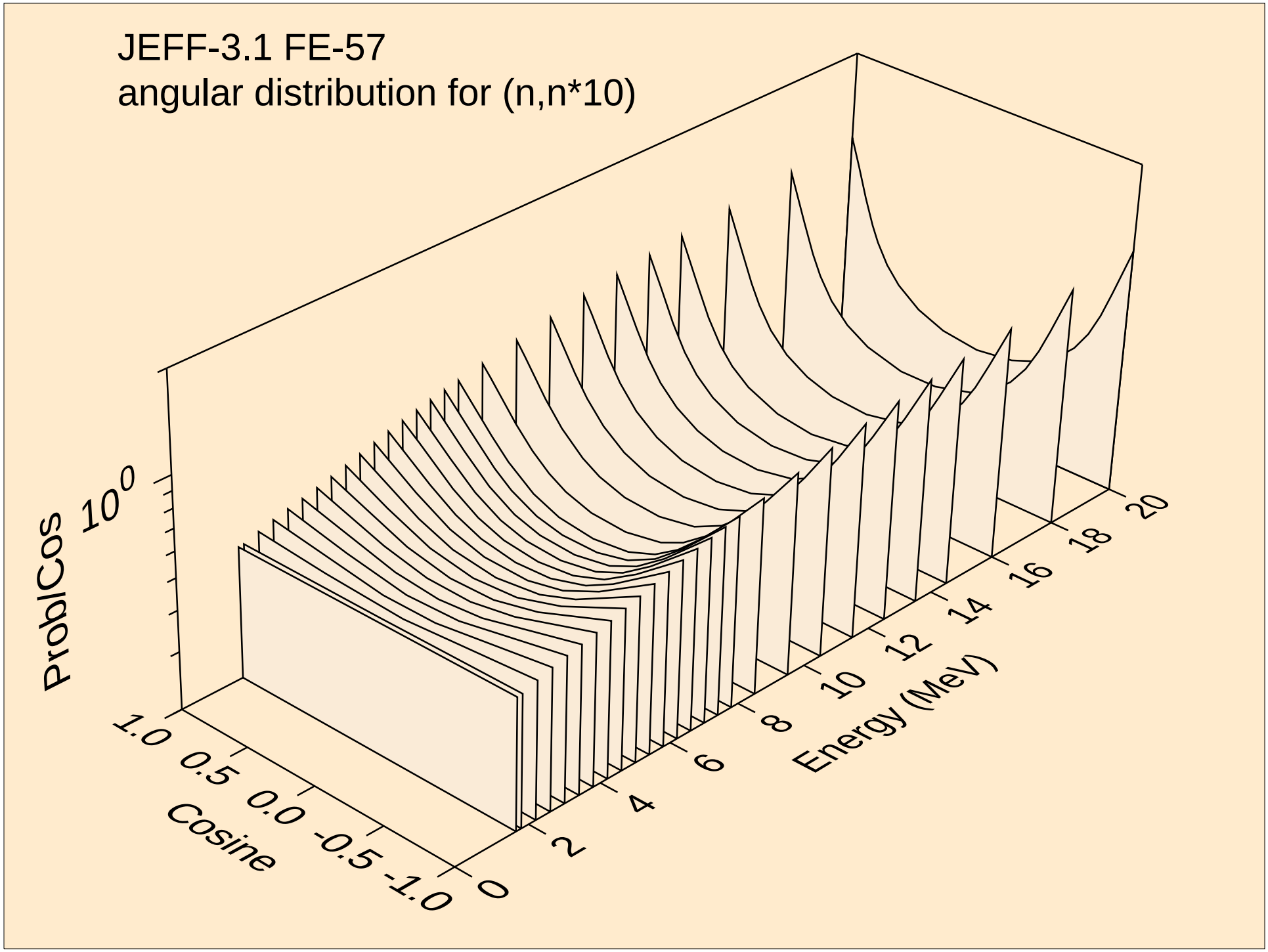

JEFF-3.1 FE-57
angular distribution for (n,n*5)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

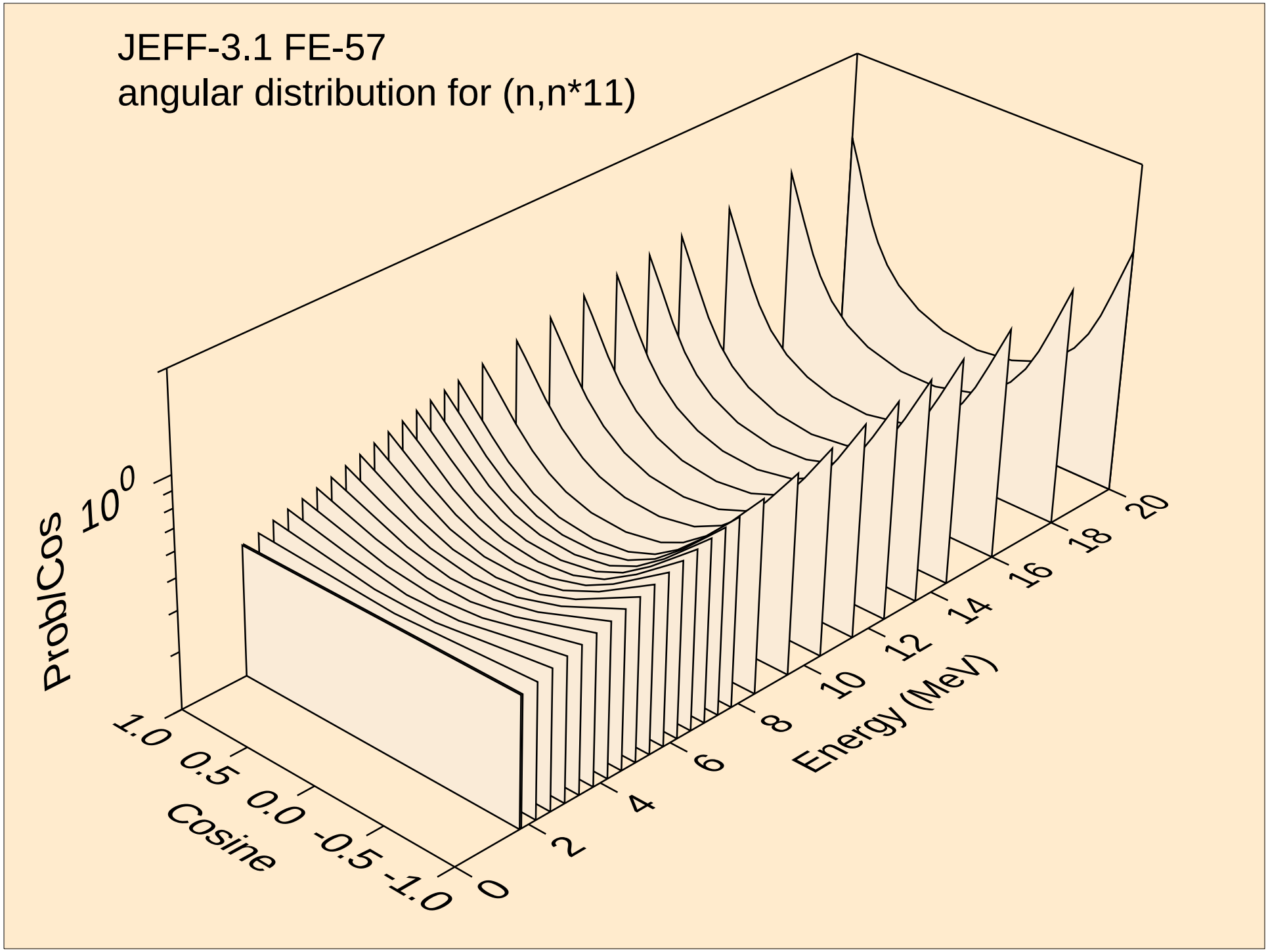

JEFF-3.1 FE-57
angular distribution for (n,n*6)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

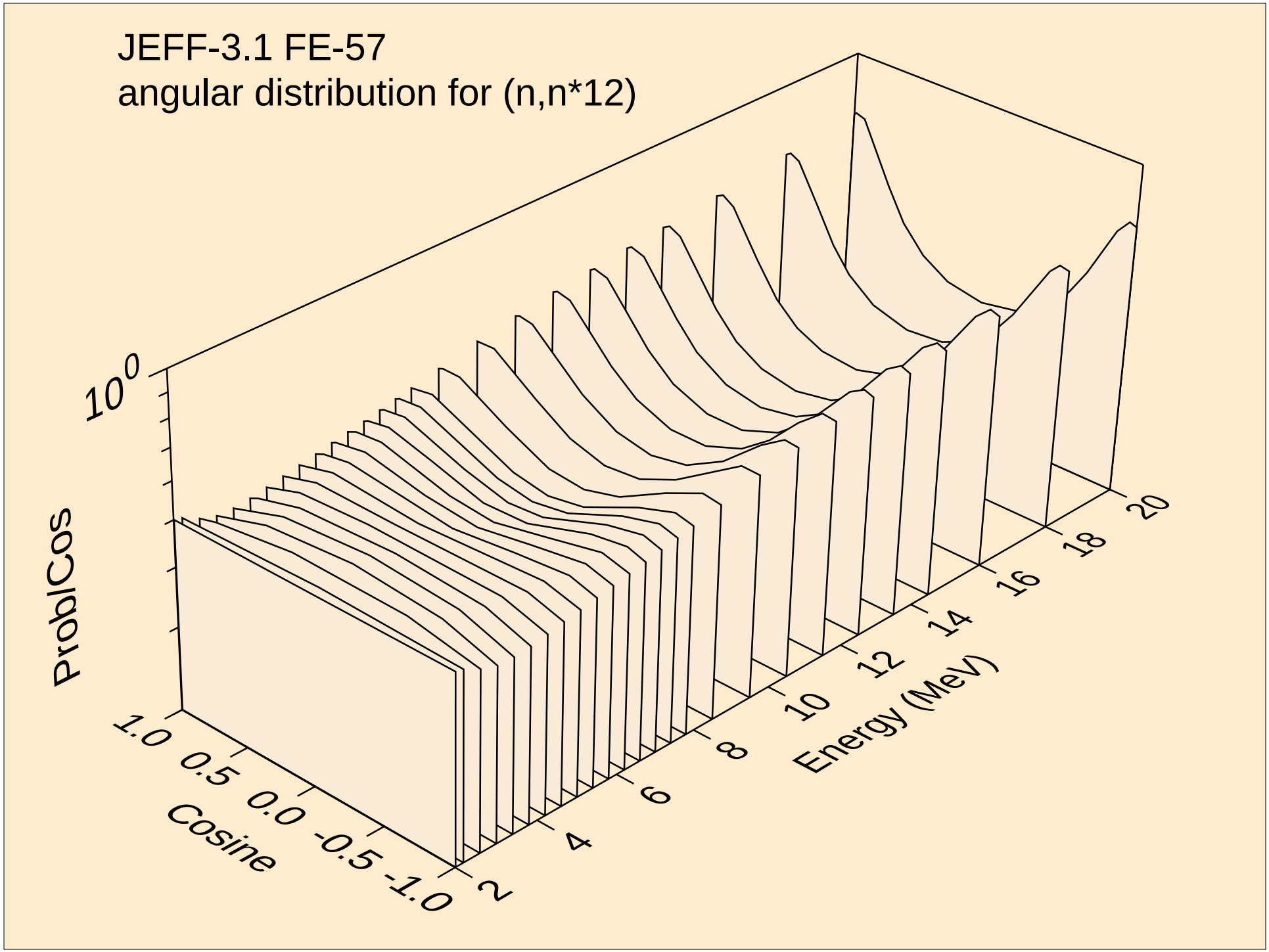

JEFF-3.1 FE-57
angular distribution for (n,n*7)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

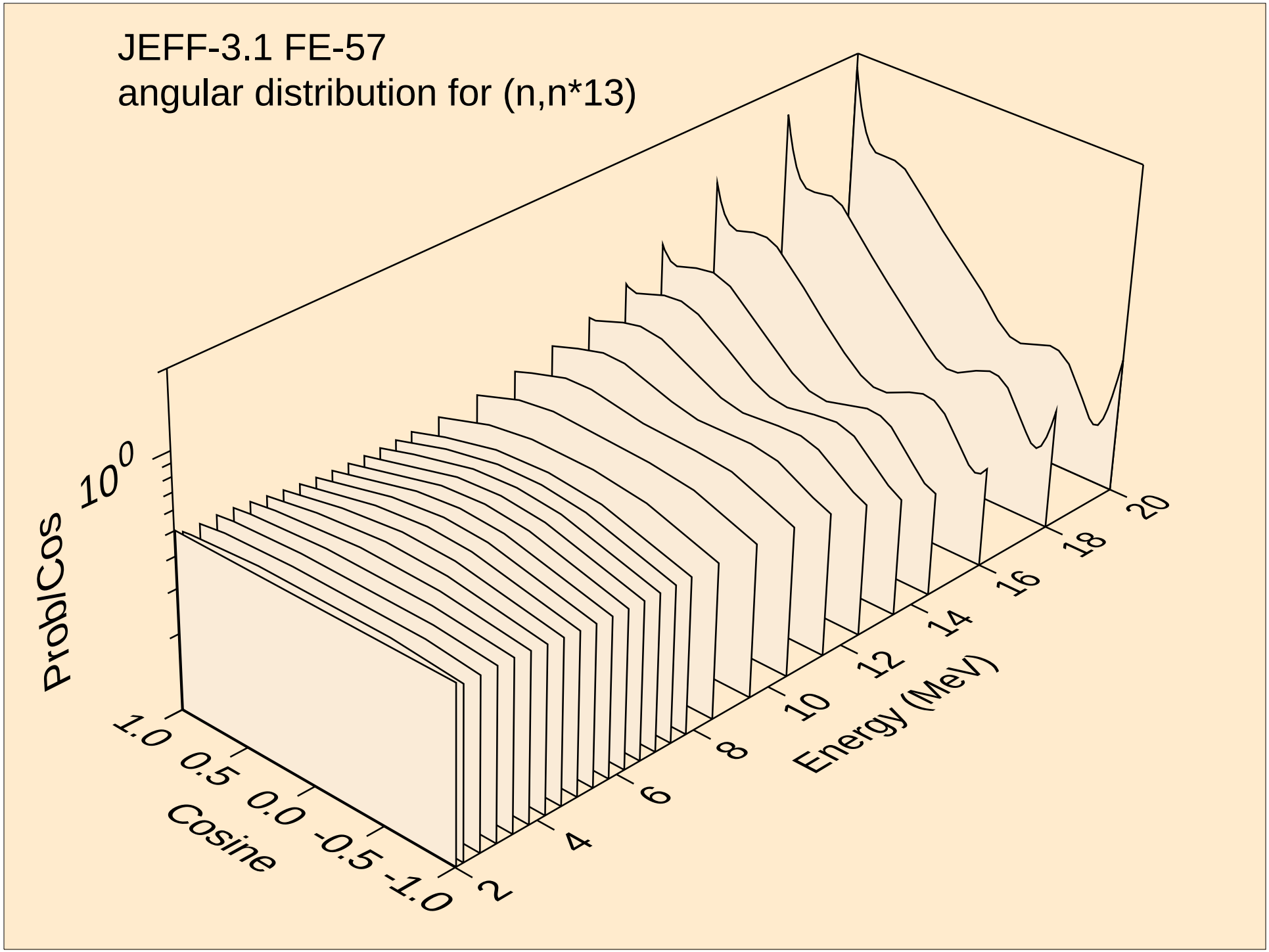

JEFF-3.1 FE-57
angular distribution for (n,n*8)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

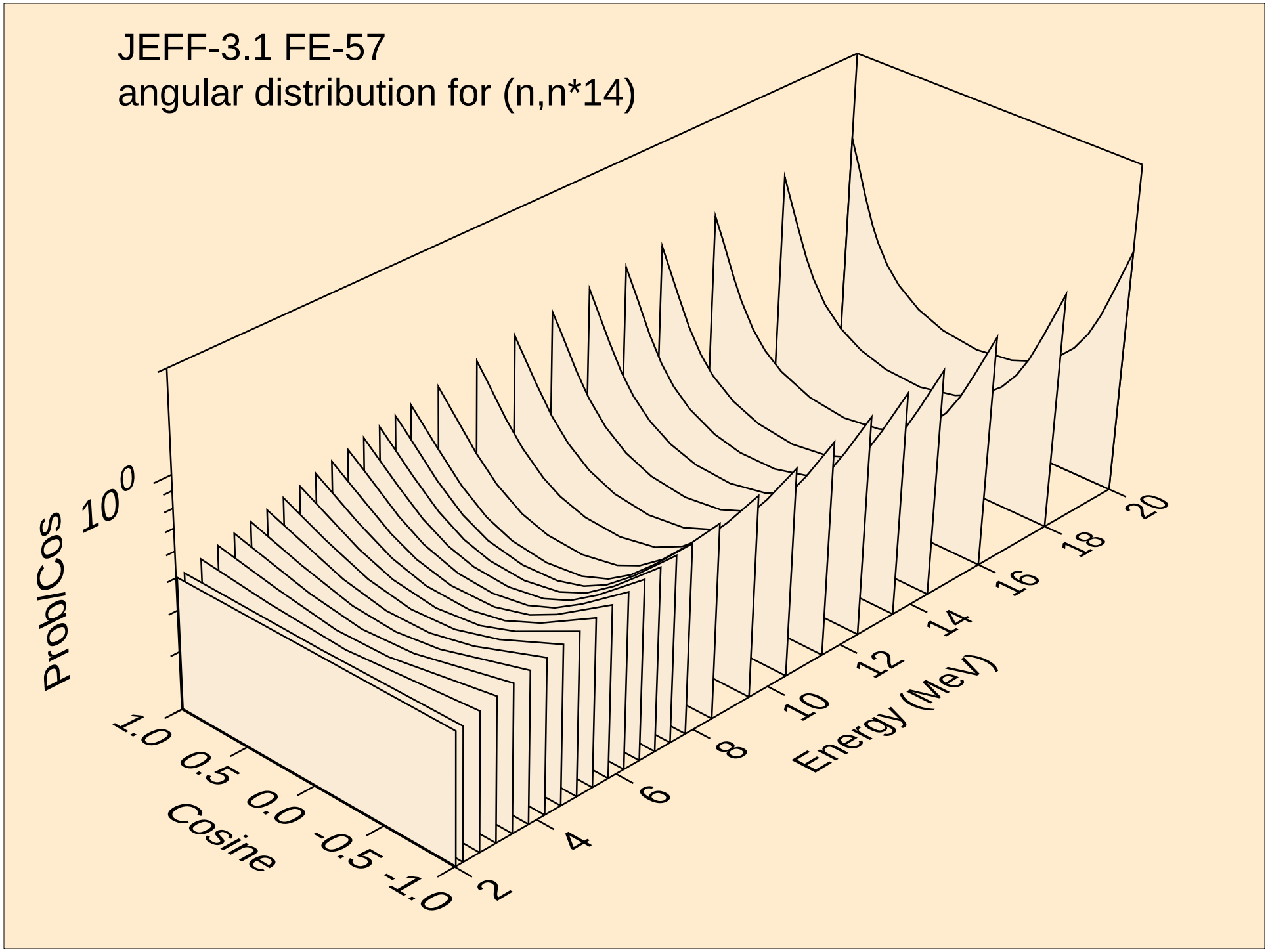

JEFF-3.1 FE-57
angular distribution for (n,n*9)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

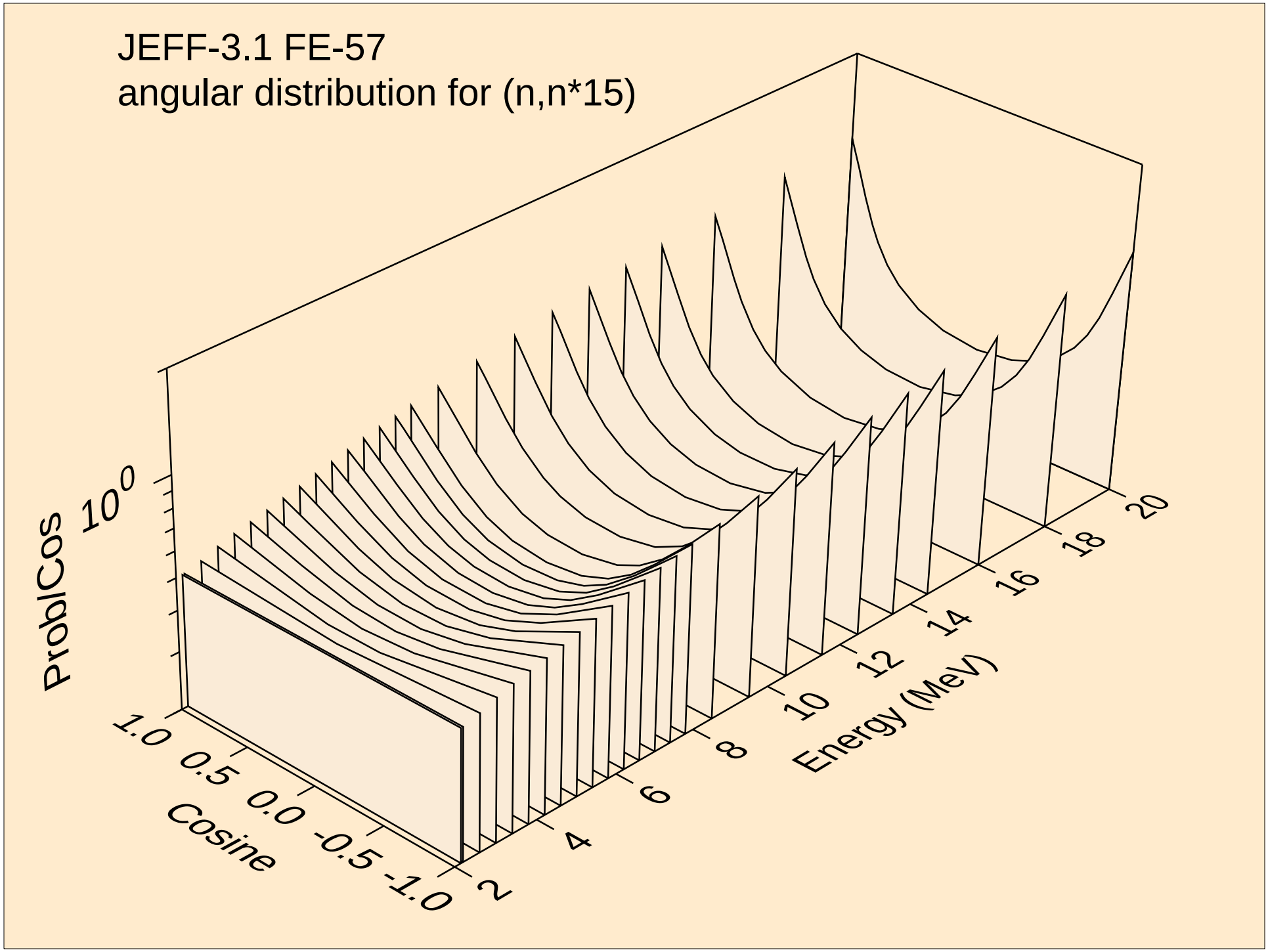

JEFF-3.1 FE-57
angular distribution for (n,n*10)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

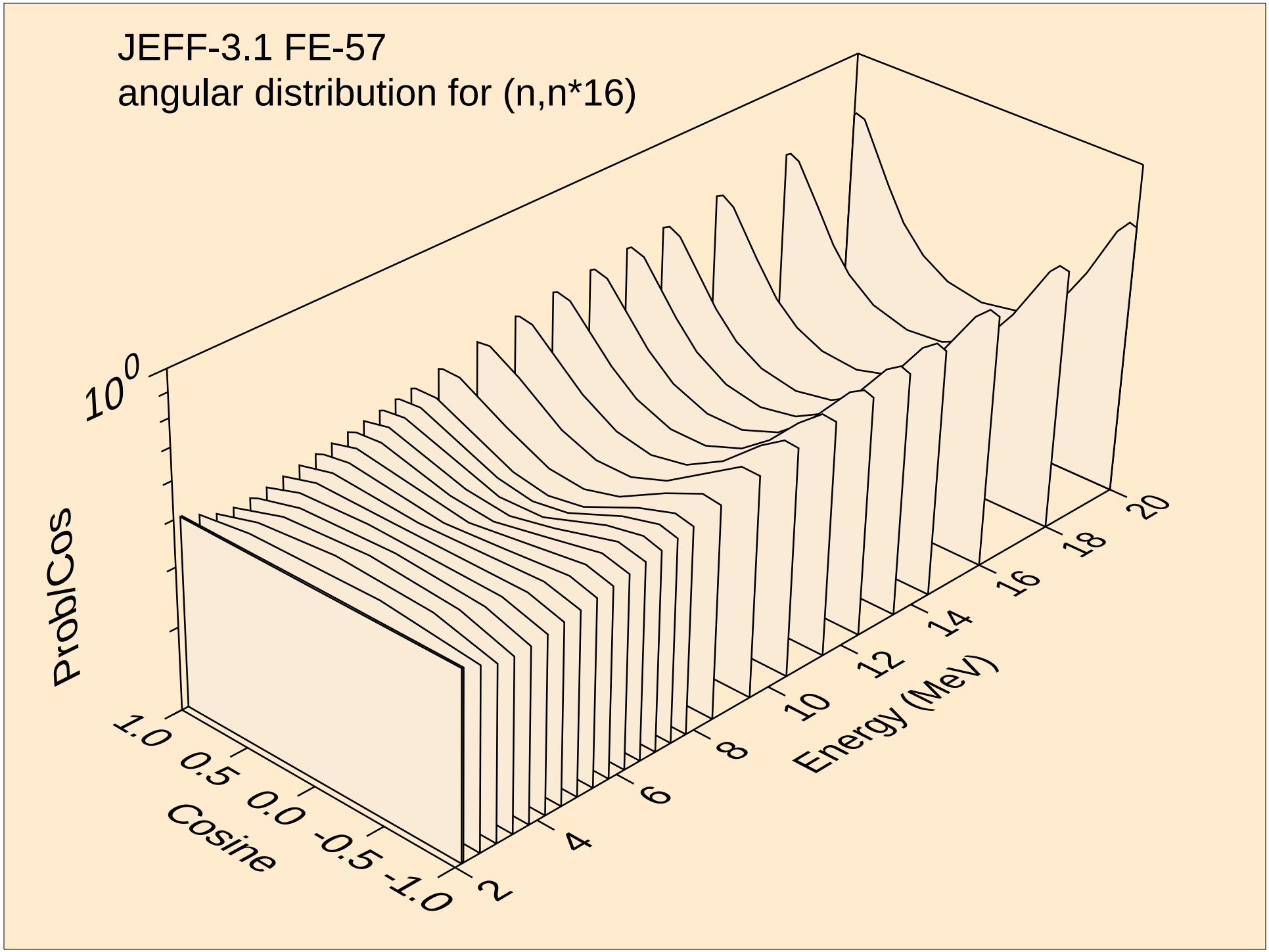

JEFF-3.1 FE-57
angular distribution for (n,n*11)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

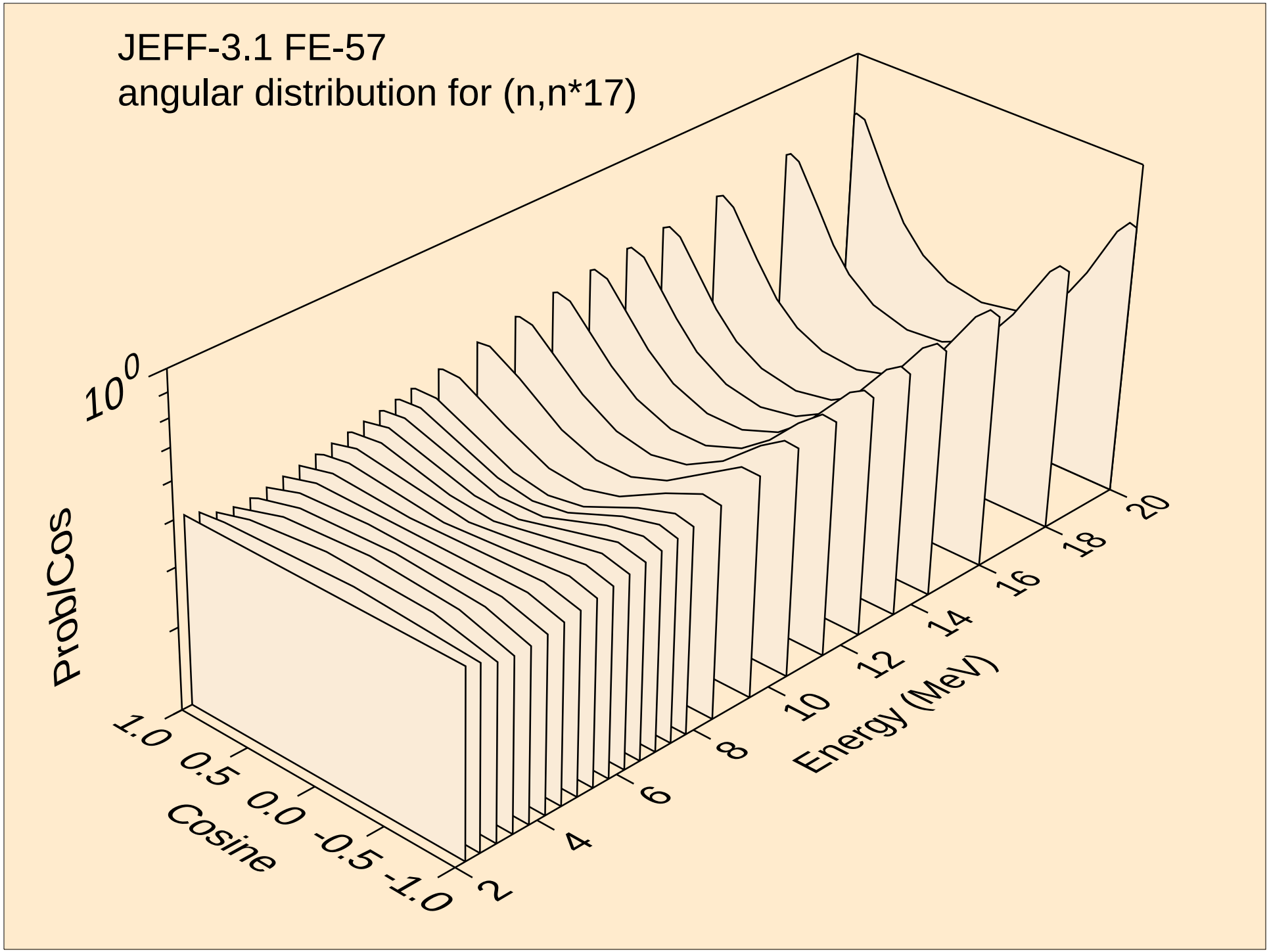

JEFF-3.1 FE-57
angular distribution for (n,n*12)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

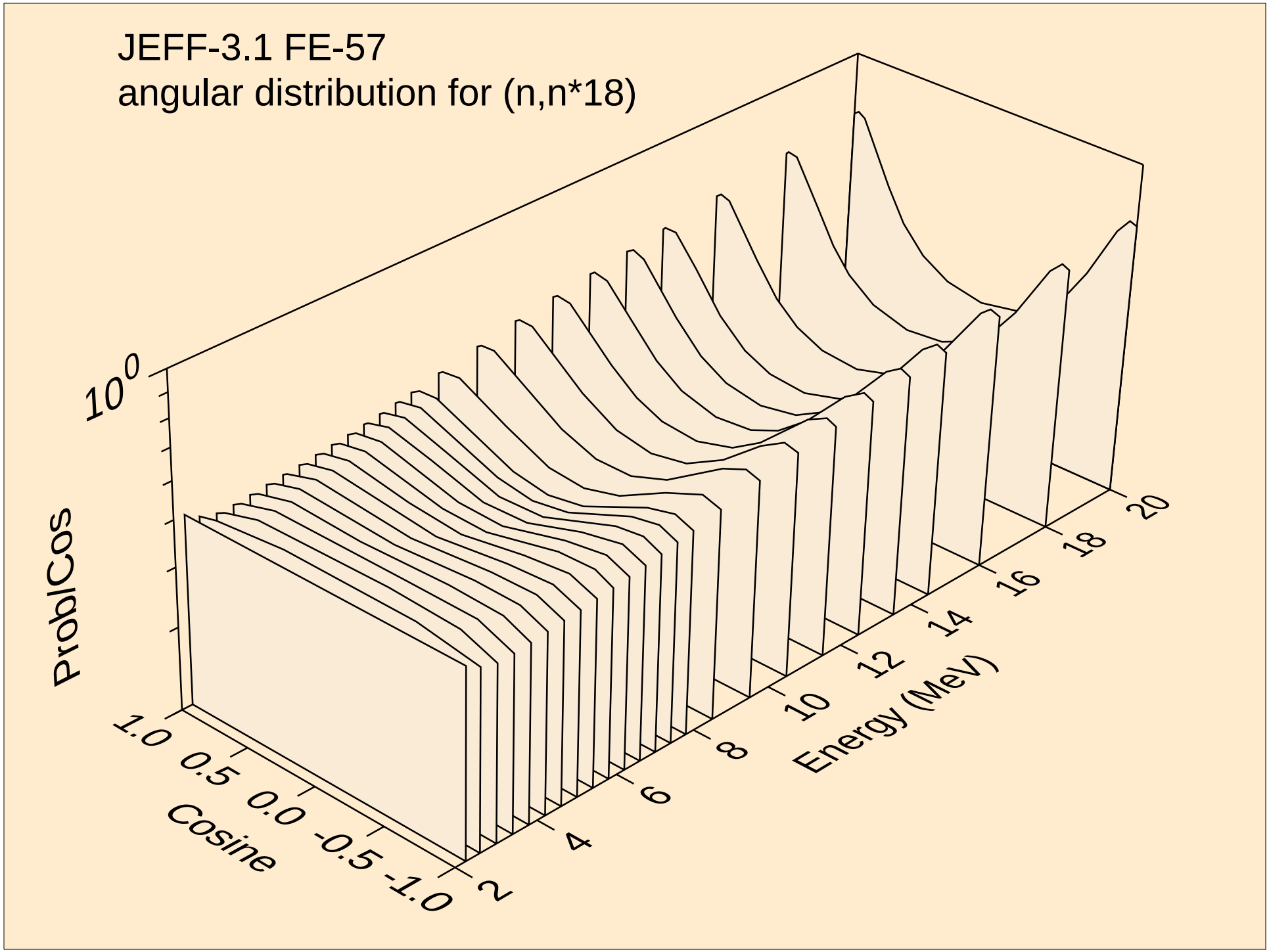

JEFF-3.1 FE-57
angular distribution for (n,n*13)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

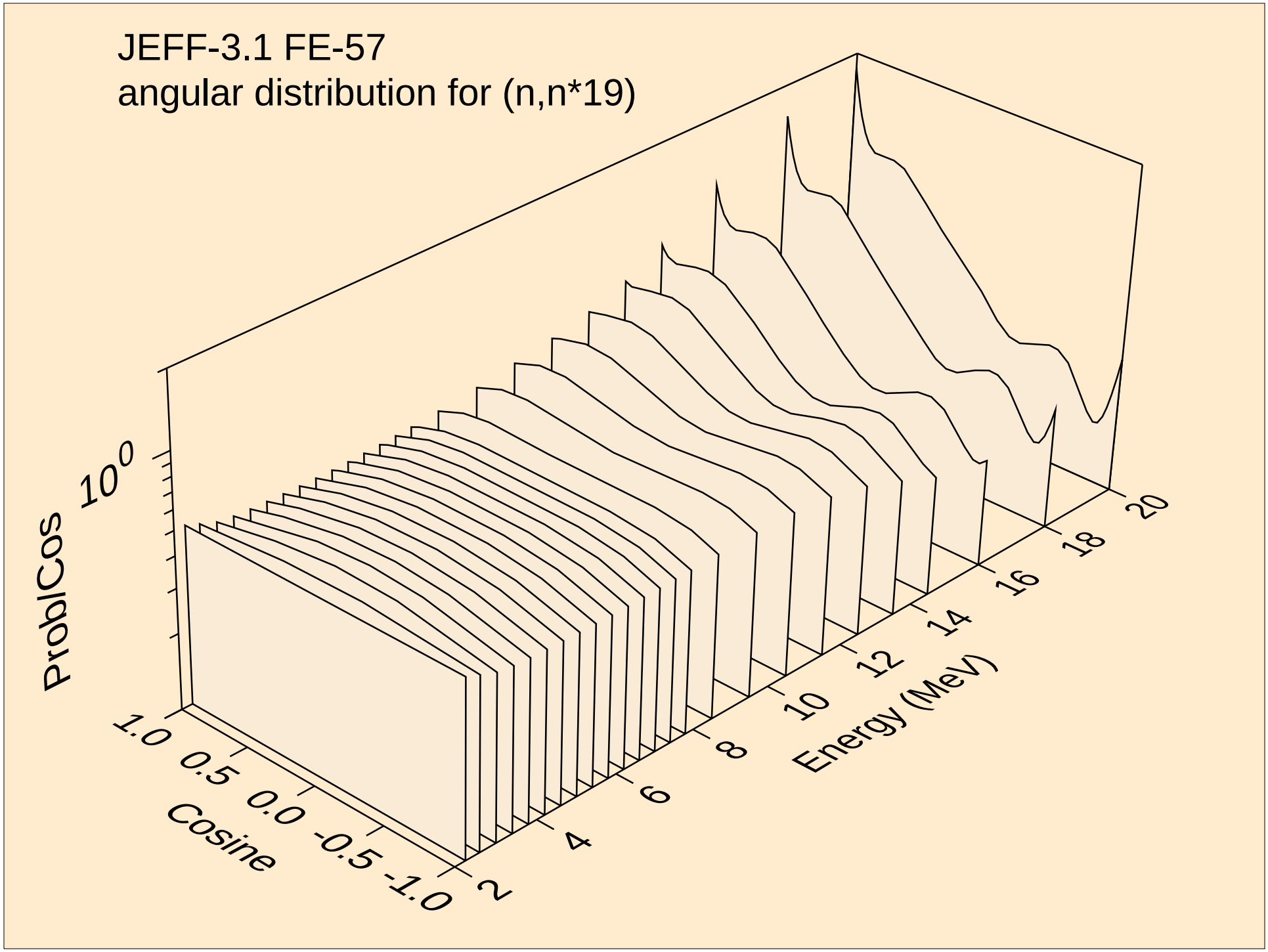

JEFF-3.1 FE-57
angular distribution for (n,n*14)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

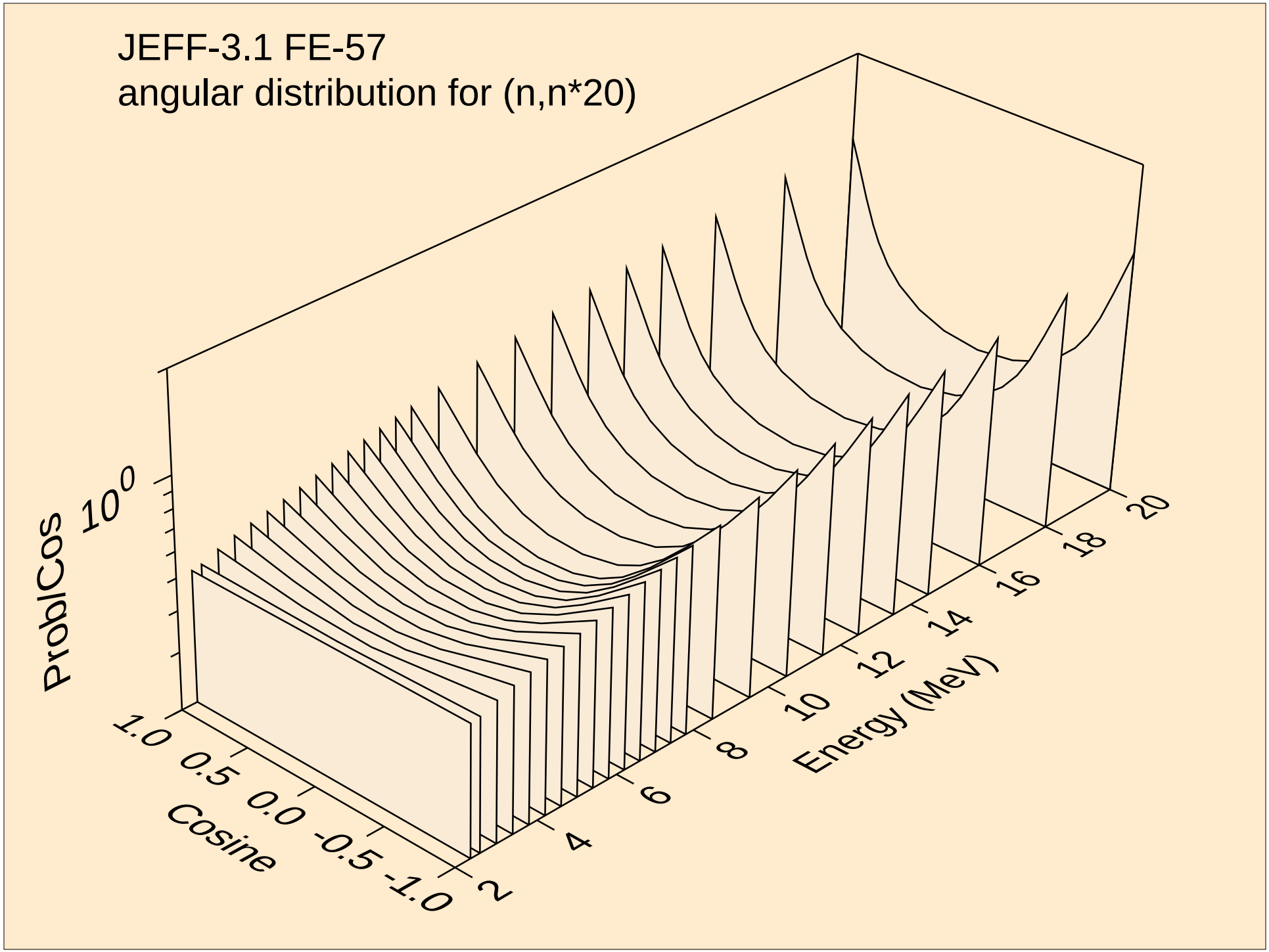

JEFF-3.1 FE-57
angular distribution for (n,n*15)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

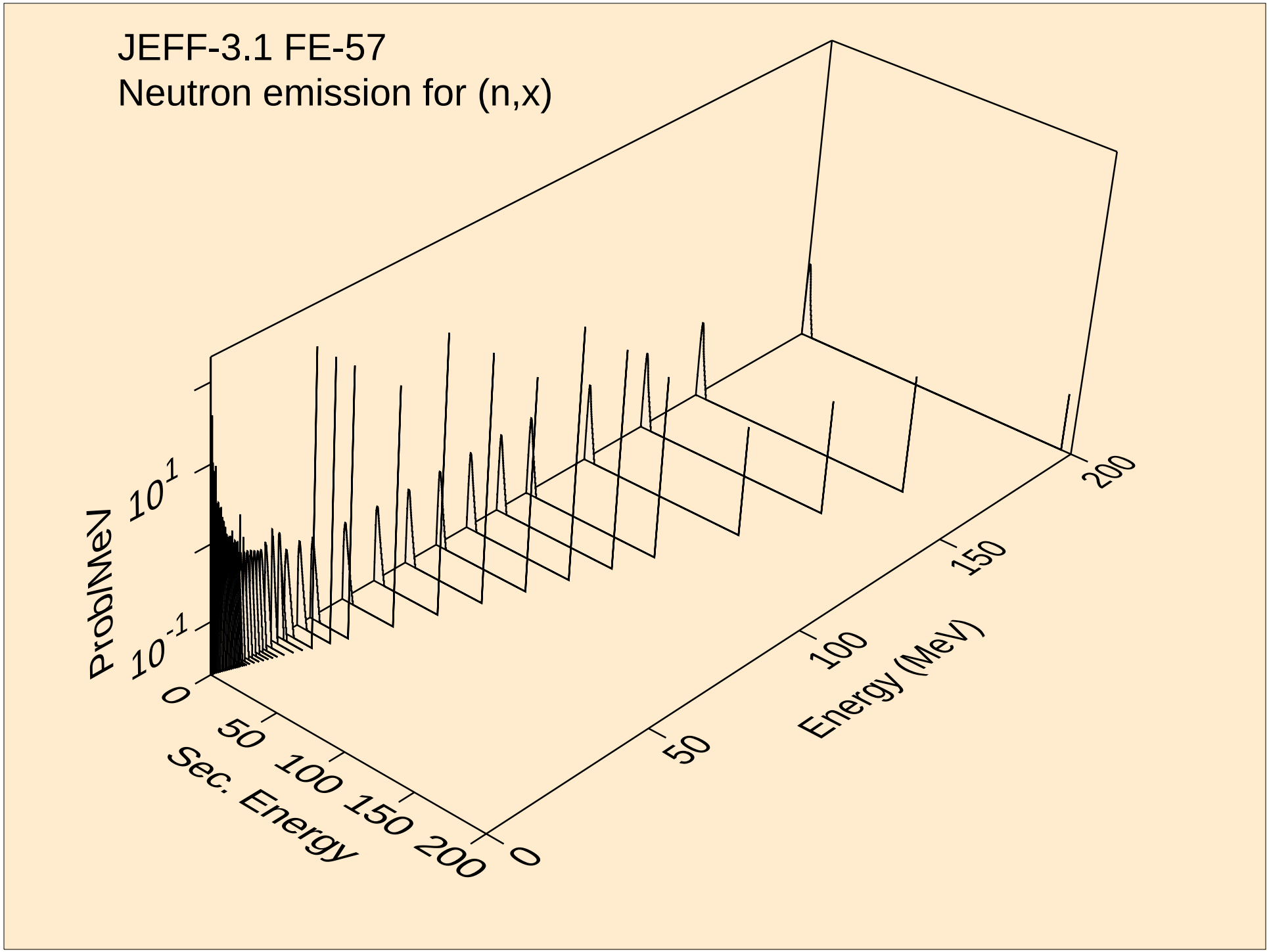

JEFF-3.1 FE-57
angular distribution for (n,n*16)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

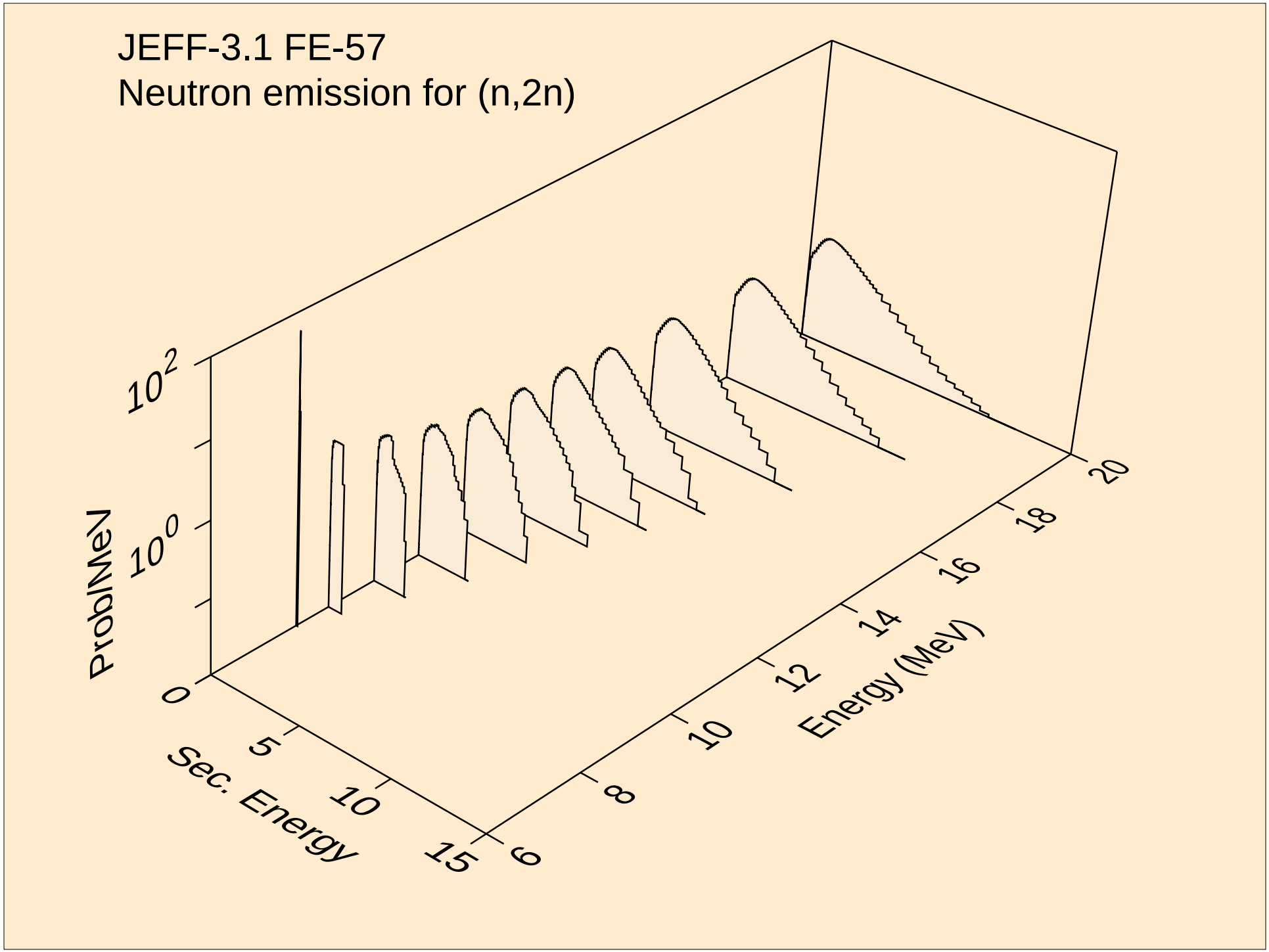

JEFF-3.1 FE-57
angular distribution for (n,n*17)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

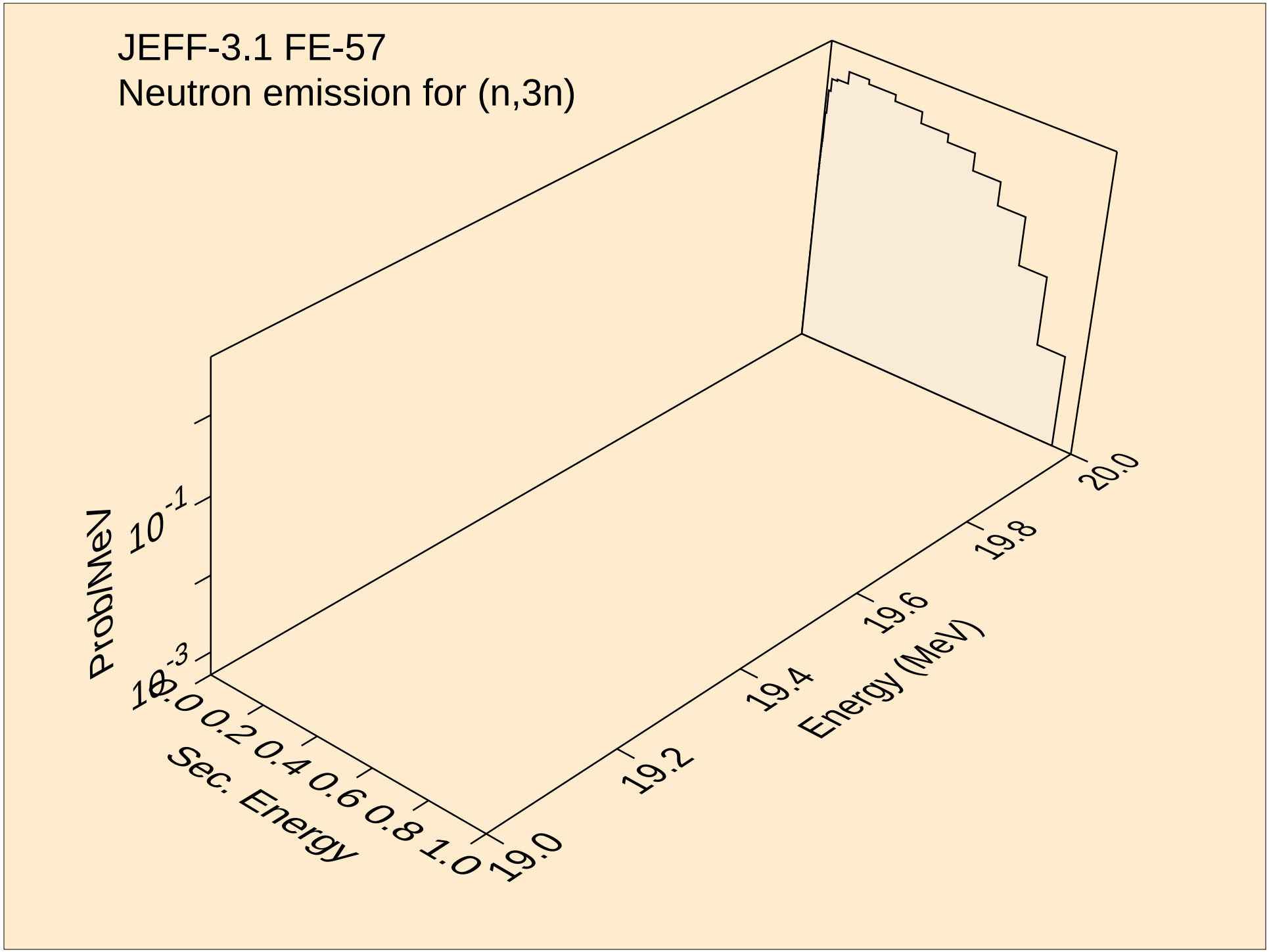

JEFF-3.1 FE-57
angular distribution for (n,n*18)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

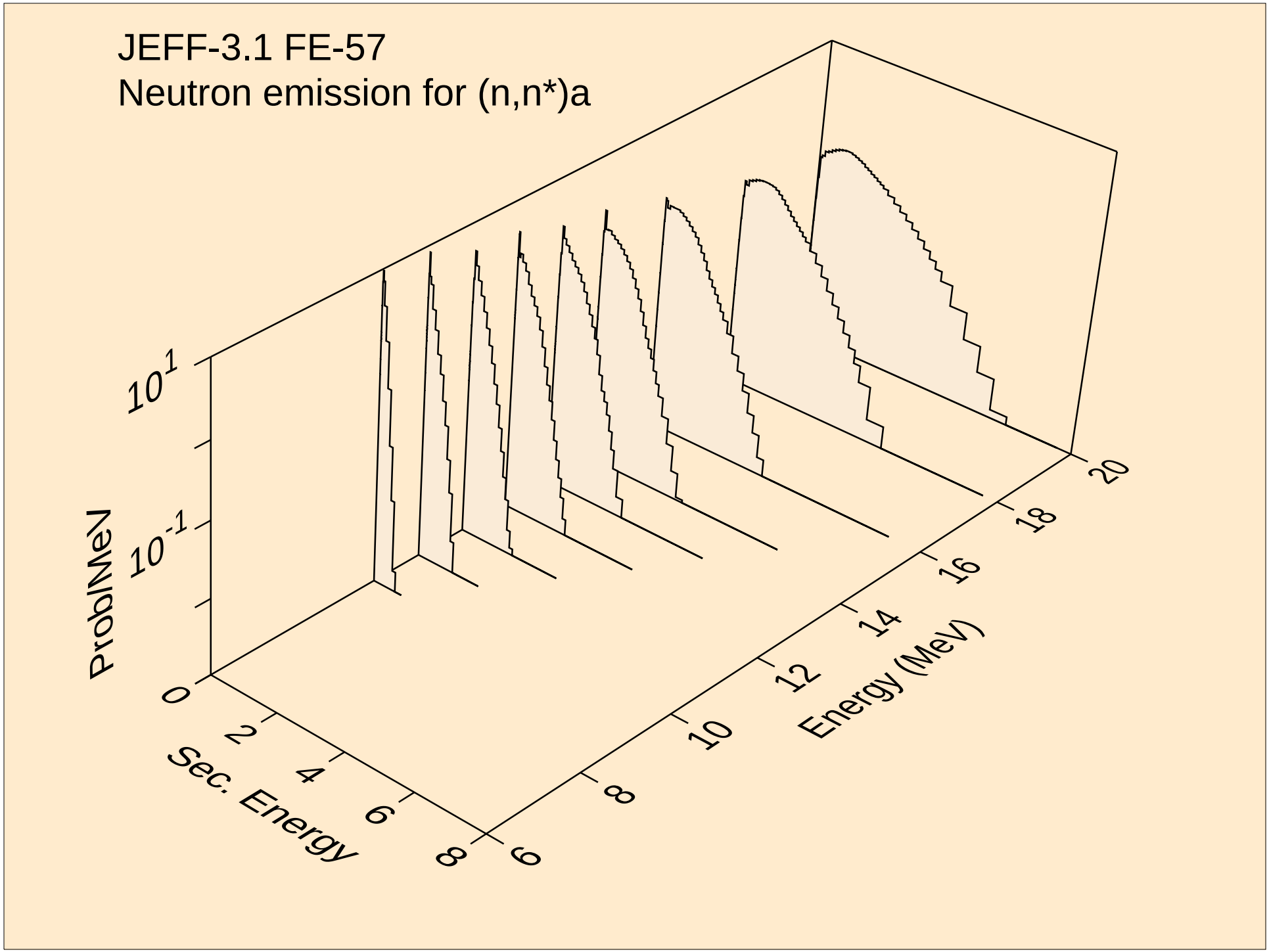

JEFF-3.1 FE-57
angular distribution for (n,n*19)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

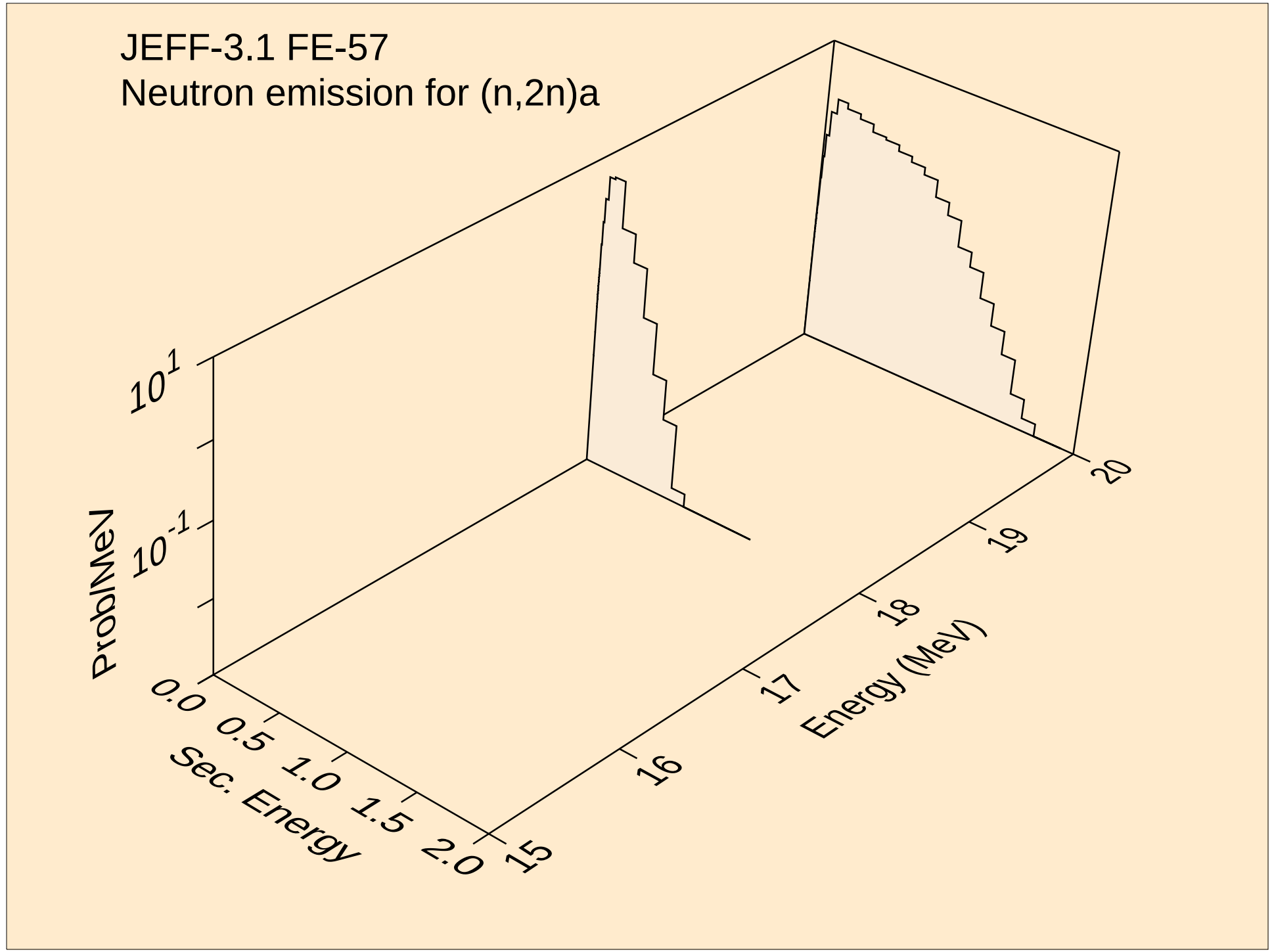

JEFF-3.1 FE-57
angular distribution for (n,n*20)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

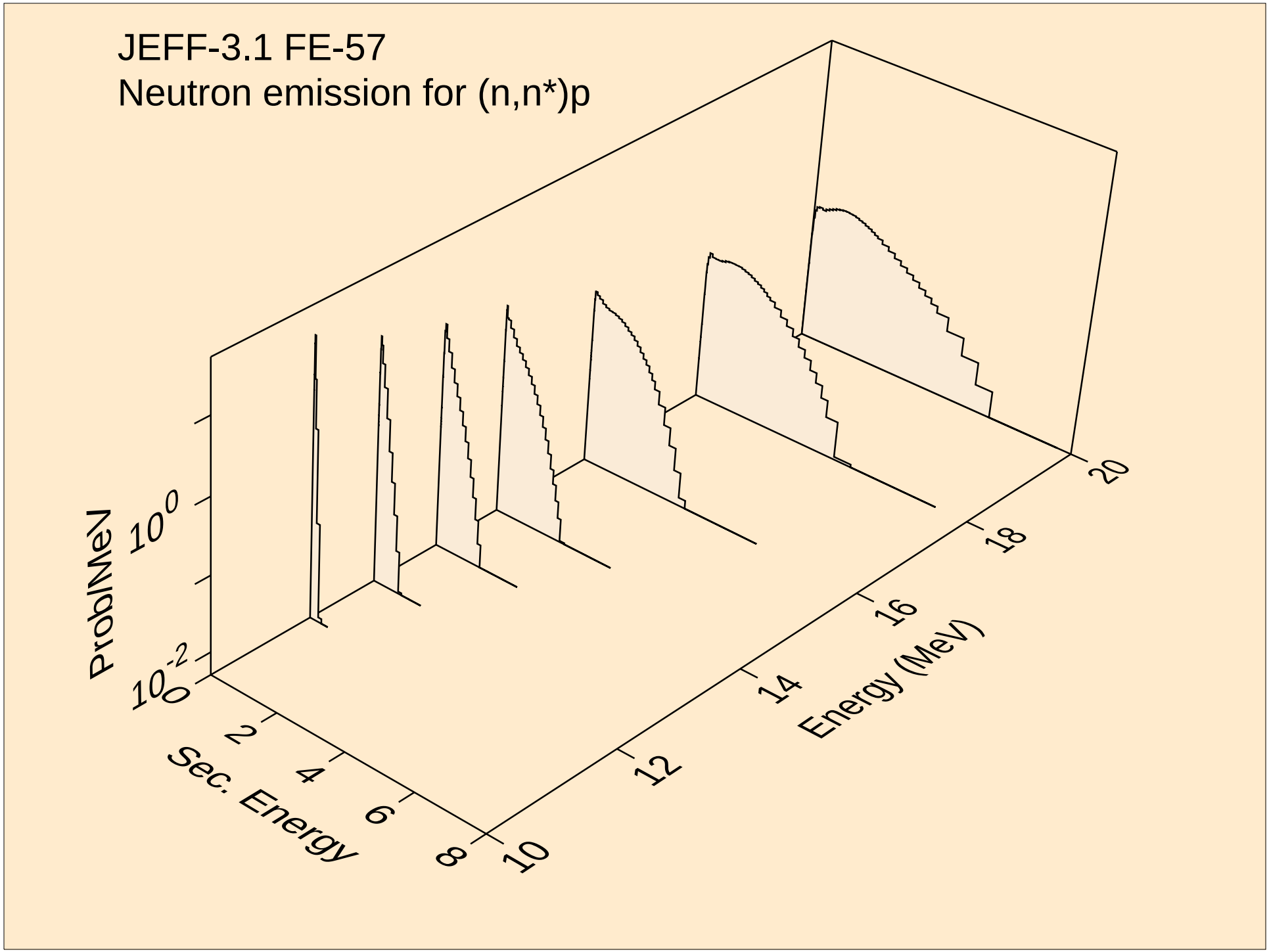

JEFF-3.1 FE-57
Neutron emission for (n,x)
Prob/MeV
10^1
10^-1
0
50
100
150
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

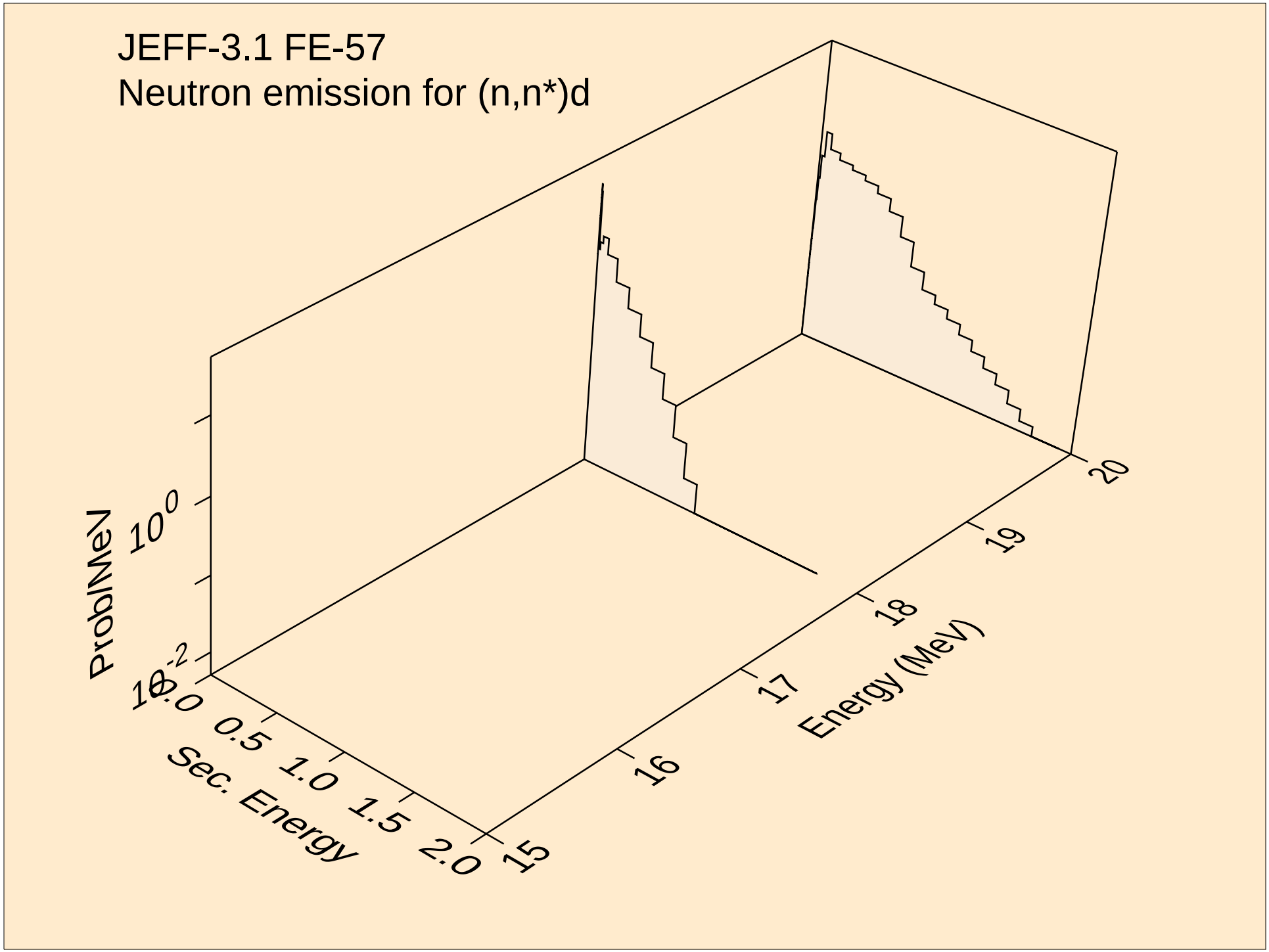

JEFF-3.1 FE-57
Neutron emission for (n,2n)
Prob/MeV
10^2
10^0
0
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

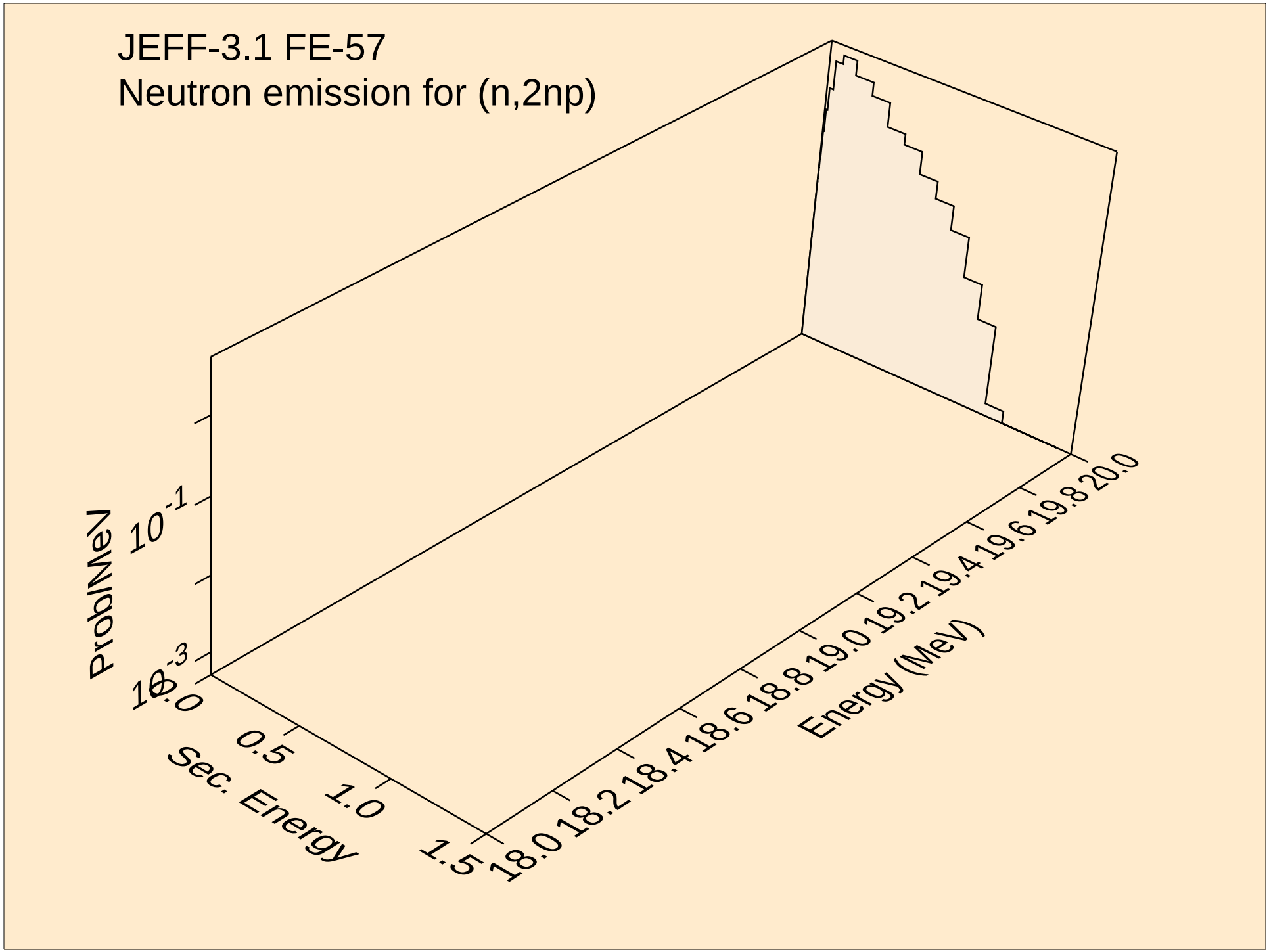

JEFF-3.1 FE-57
Neutron emission for (n,3n)
Prob/MeV
10-1
10-3
0.0
0.2
0.4
0.6
0.8
1.0
Sec. Energy
19.0
19.2
19.4
19.6
19.8
20.0
Energy (MeV)

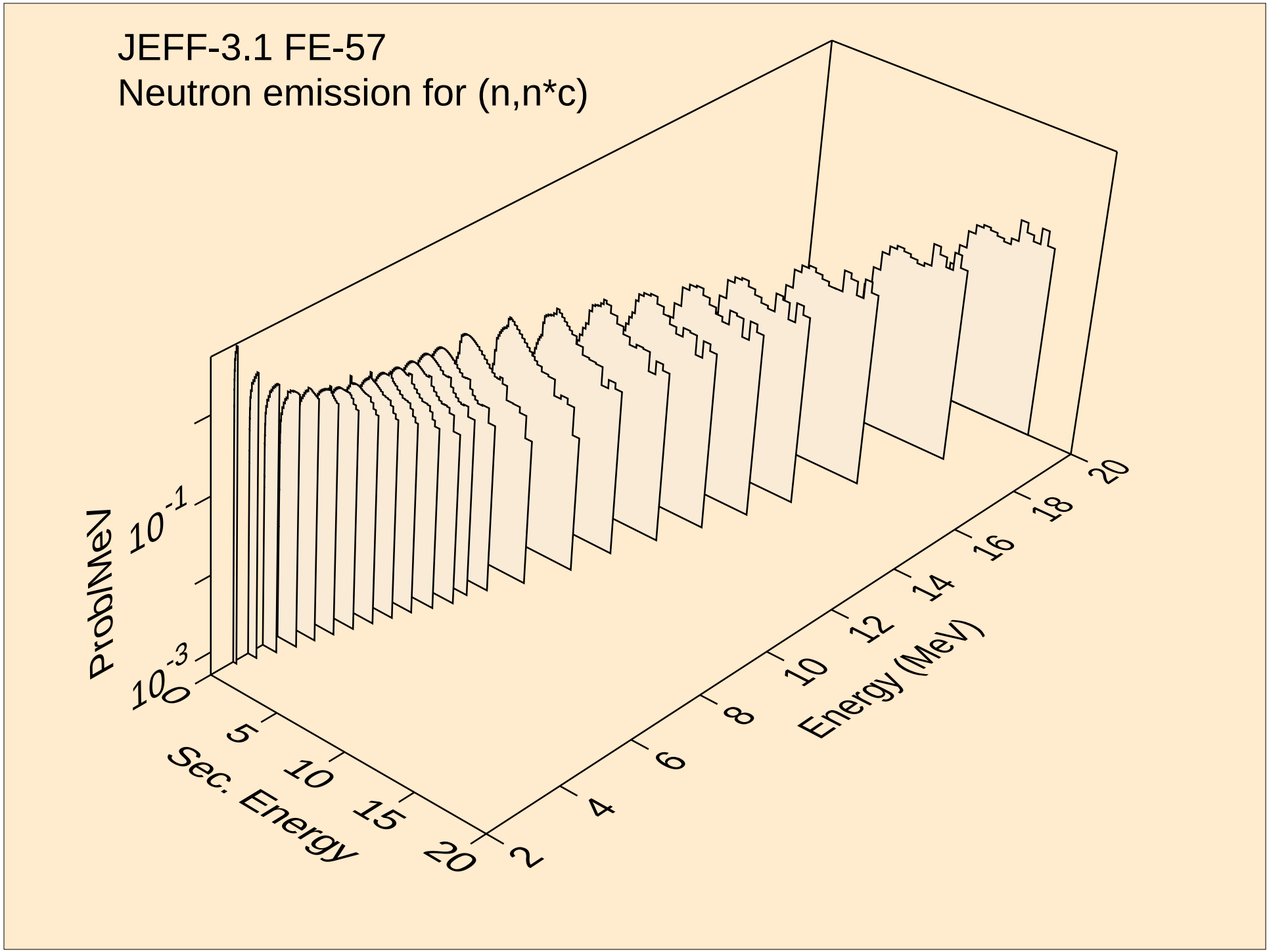

JEFF-3.1 FE-57
Neutron emission for (n,n*)a
Prob/MeV
10^1
10^-1
0
Sec. Energy
2
4
6
8
6
8
10
12
14
16
18
20
Energy (MeV)

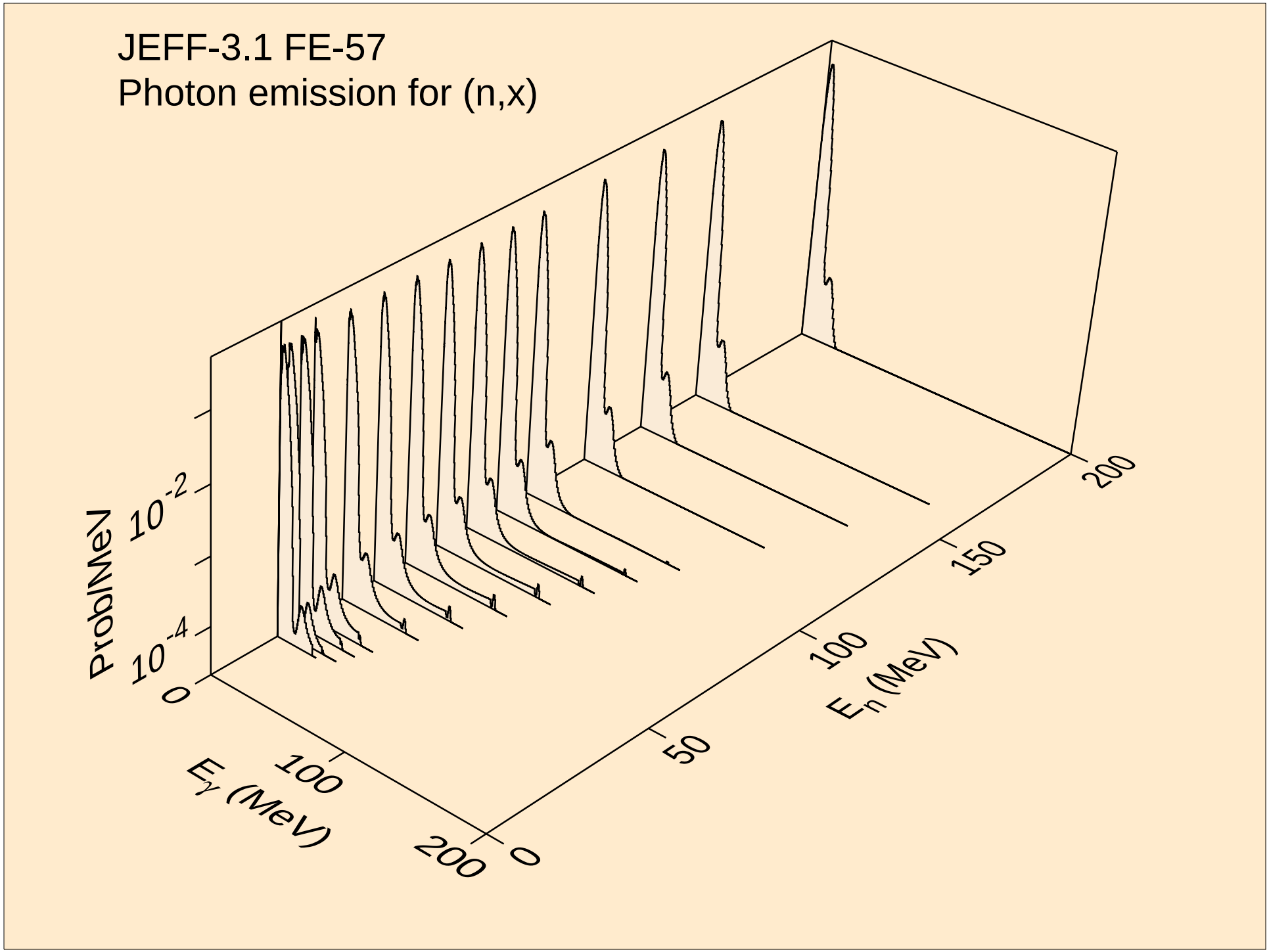

JEFF-3.1 FE-57
Neutron emission for (n,2n)a
Prob/MeV
10^{1}
10^{-1}
0.0
0.5
1.0
1.5
2.0
Sec. Energy
15
16
17
18
19
20
Energy (MeV)

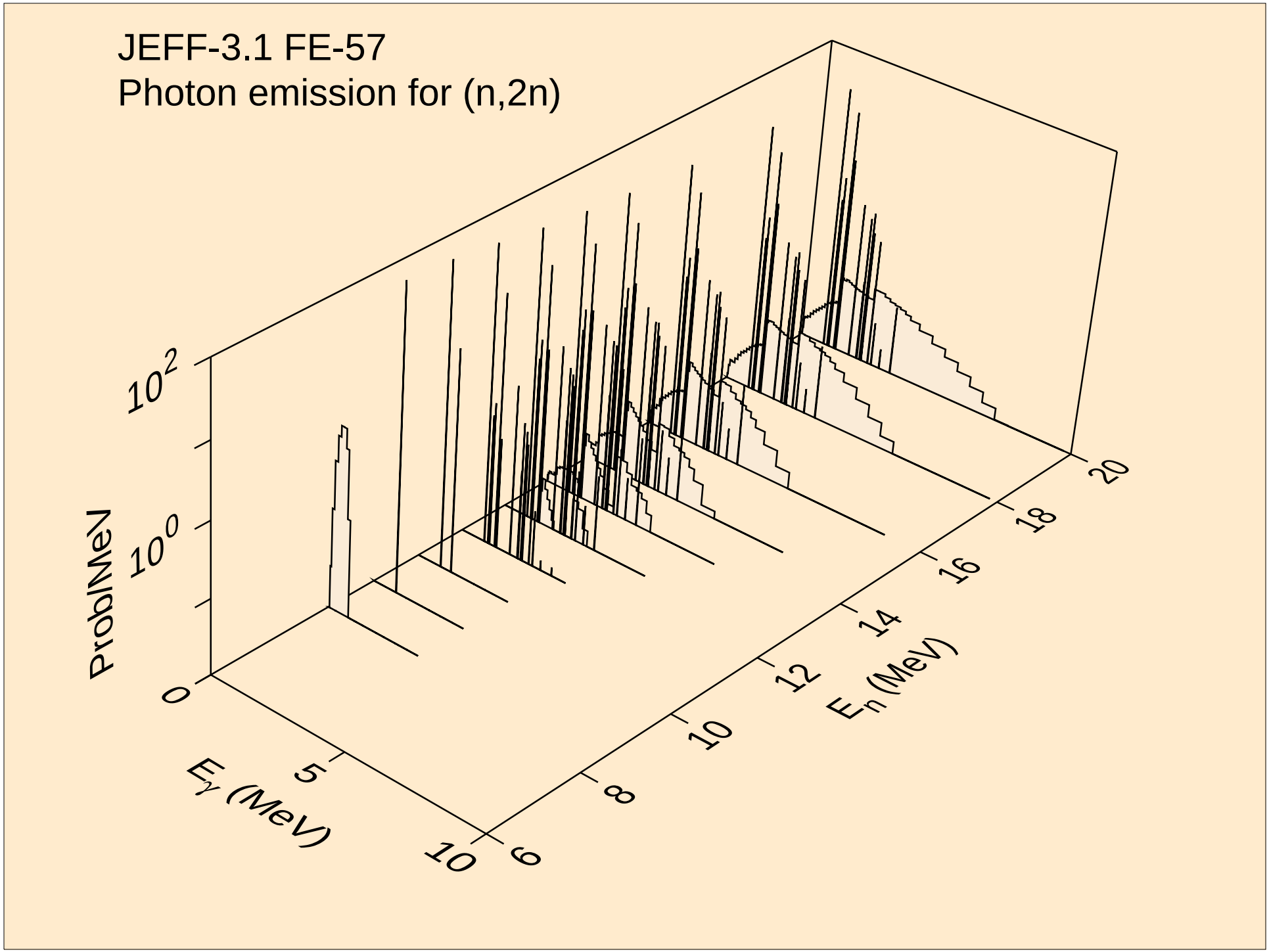

JEFF-3.1 FE-57
Neutron emission for (n,n*)p
Prob/MeV
10^{0}
10^{-2}
0
2
4
6
8
10
Sec. Energy
12
14
16
18
20
Energy (MeV)

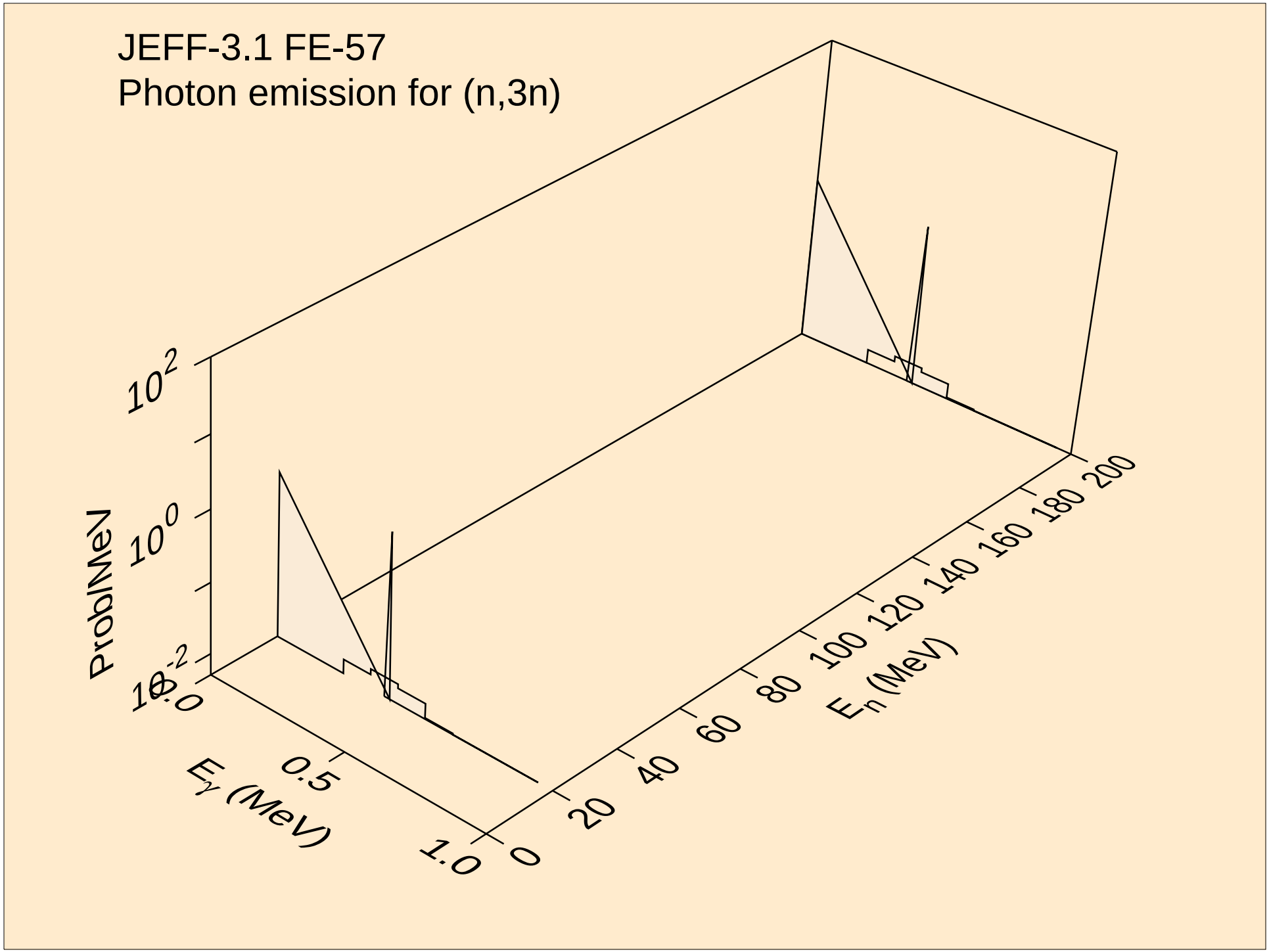

JEFF-3.1 FE-57
Neutron emission for (n,n*)d
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
1.5
2.0
Sec. Energy
15
16
17
18
19
20
Energy (MeV)

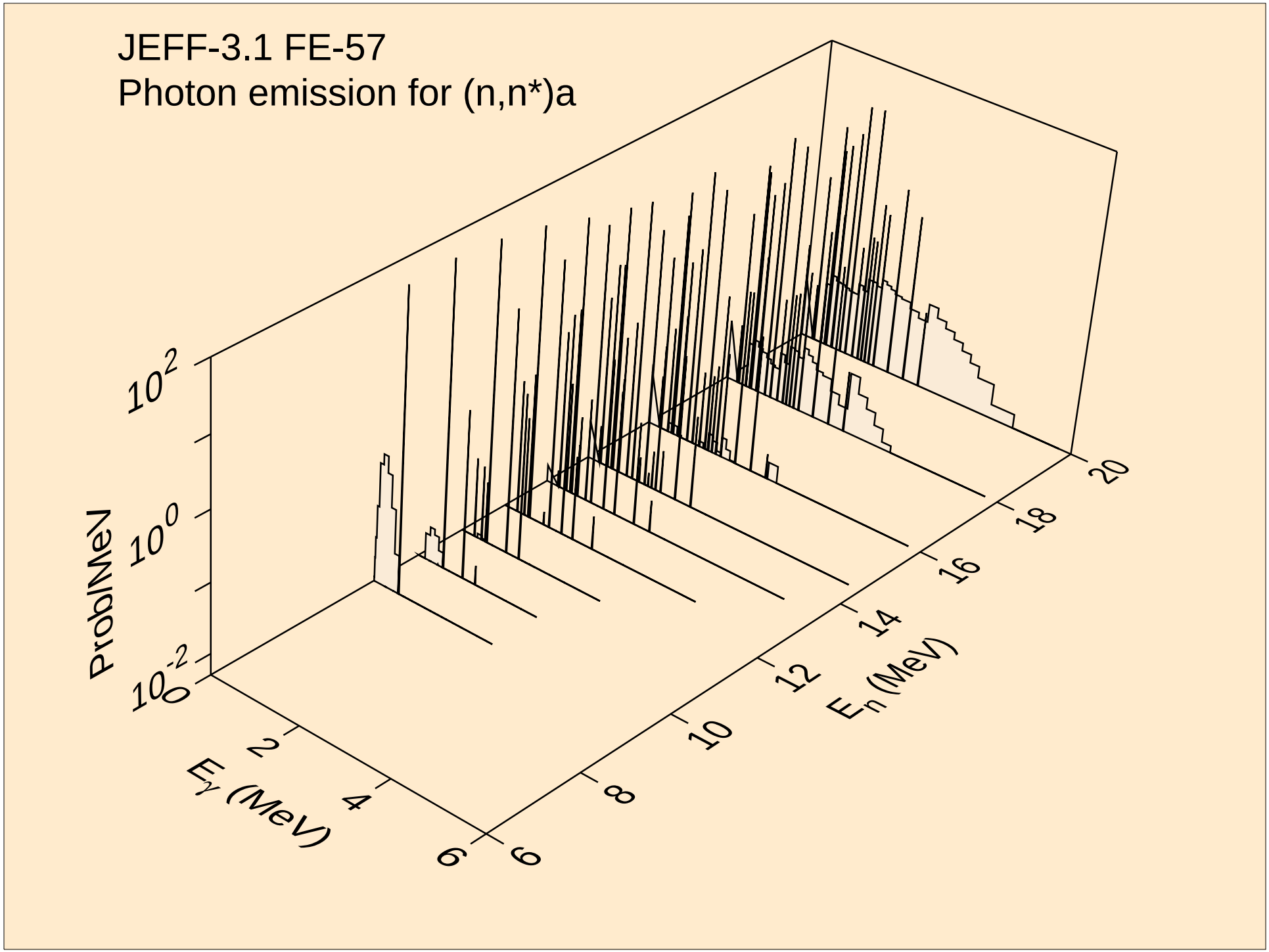

JEFF-3.1 FE-57
Neutron emission for (n,2np)
Prob/MeV
10-1
10-3
0.0
0.5
1.0
1.5
Sec. Energy
18.0
18.2
18.4
18.6
18.8
19.0
19.2
19.4
19.6
19.8
20.0
Energy (MeV)

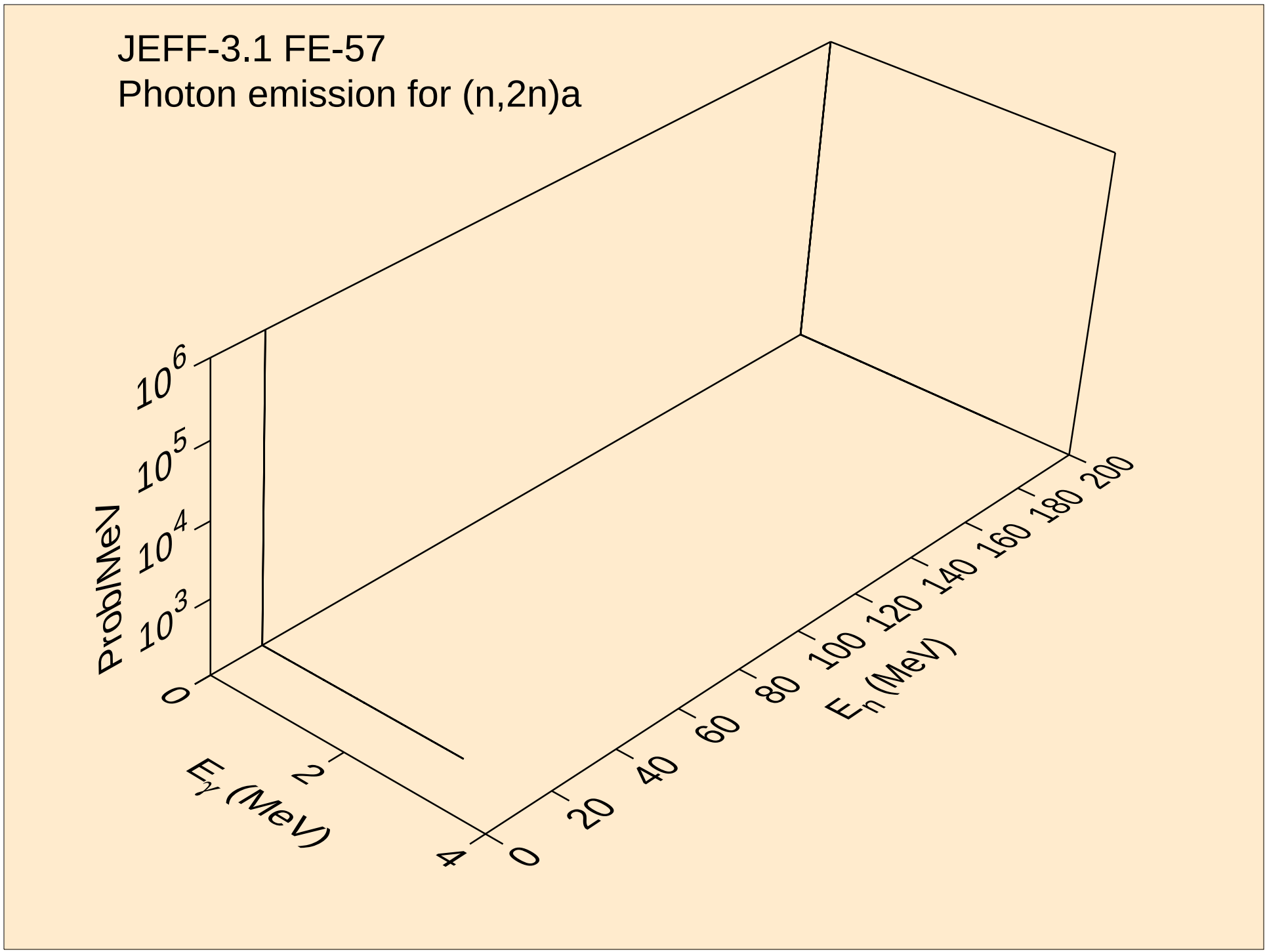

JEFF-3.1 FE-57
Neutron emission for (n,n*c)
Prob/MeV
10-1
10-3
0
5
10
15
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

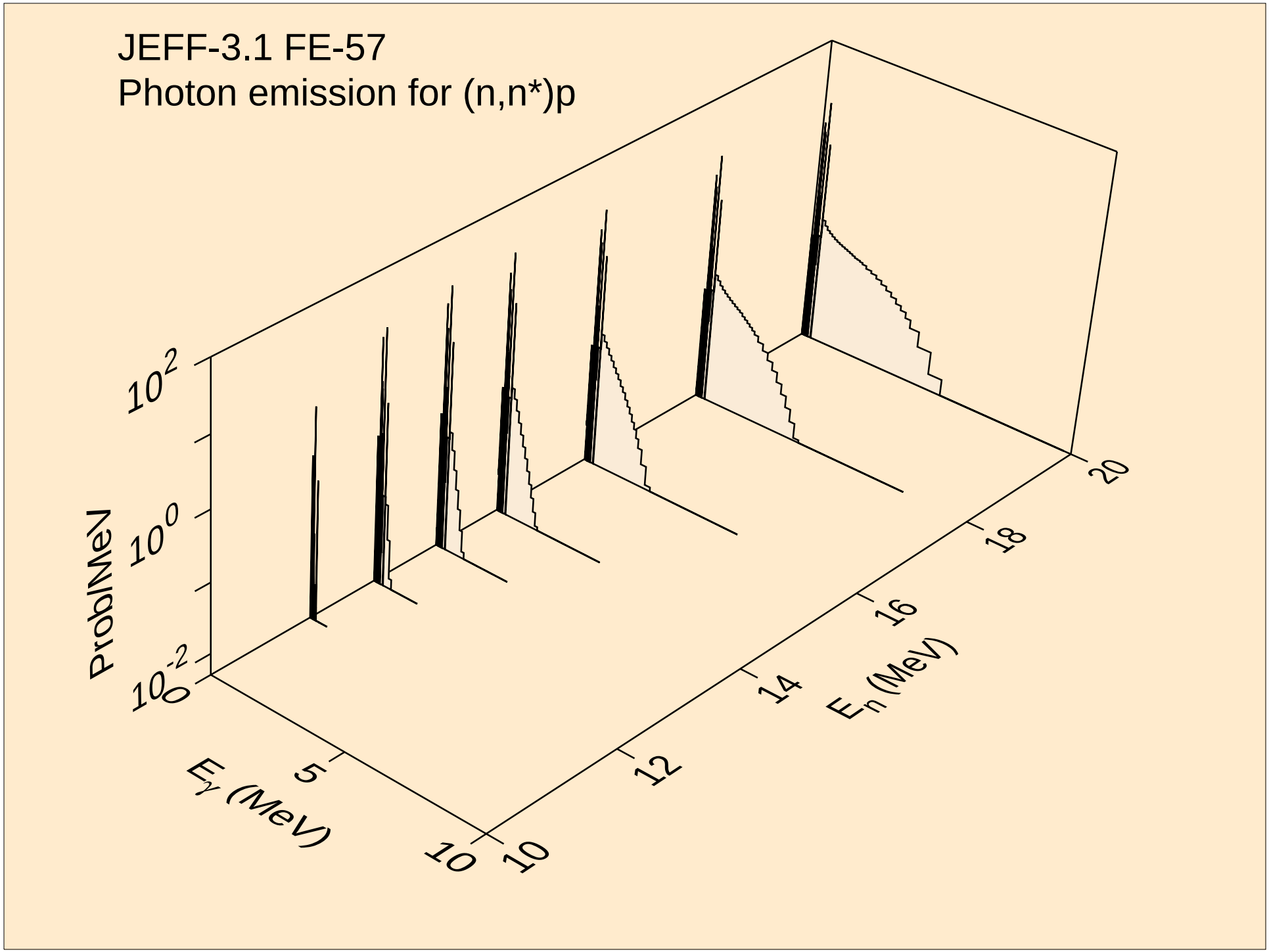

JEFF-3.1 FE-57
Photon emission for (n,x)
Prob/MeV
10-2
10-4
0
100
200
Eγ (MeV)
0
50
100
150
200
En (MeV)

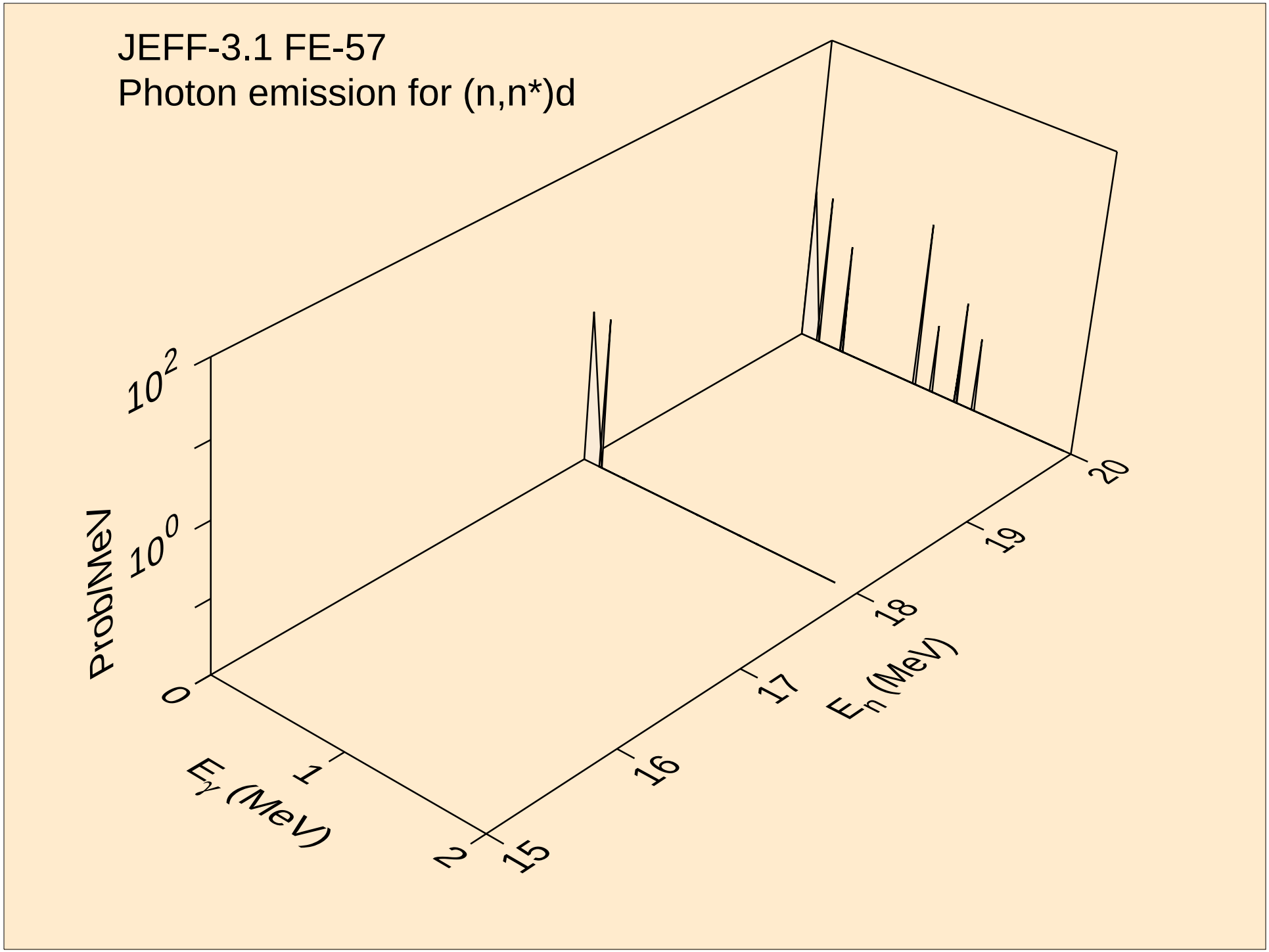

JEFF-3.1 FE-57
Photon emission for (n,2n)
Prob/MeV
10^2
10^0
0
5
10
E_γ (MeV)
6
8
10
12
14
16
18
20
E_n (MeV)

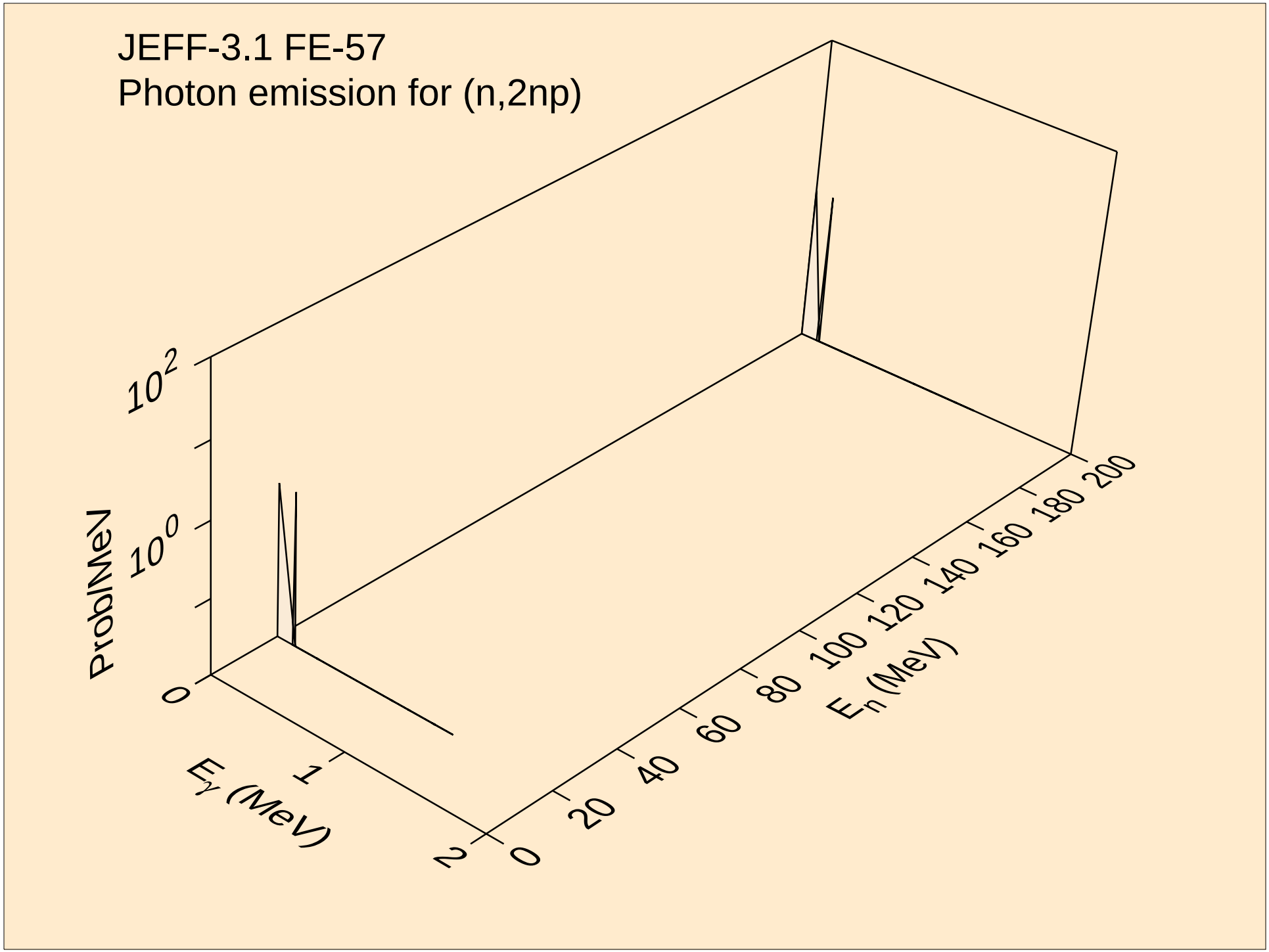

JEFF-3.1 FE-57
Photon emission for (n,3n)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

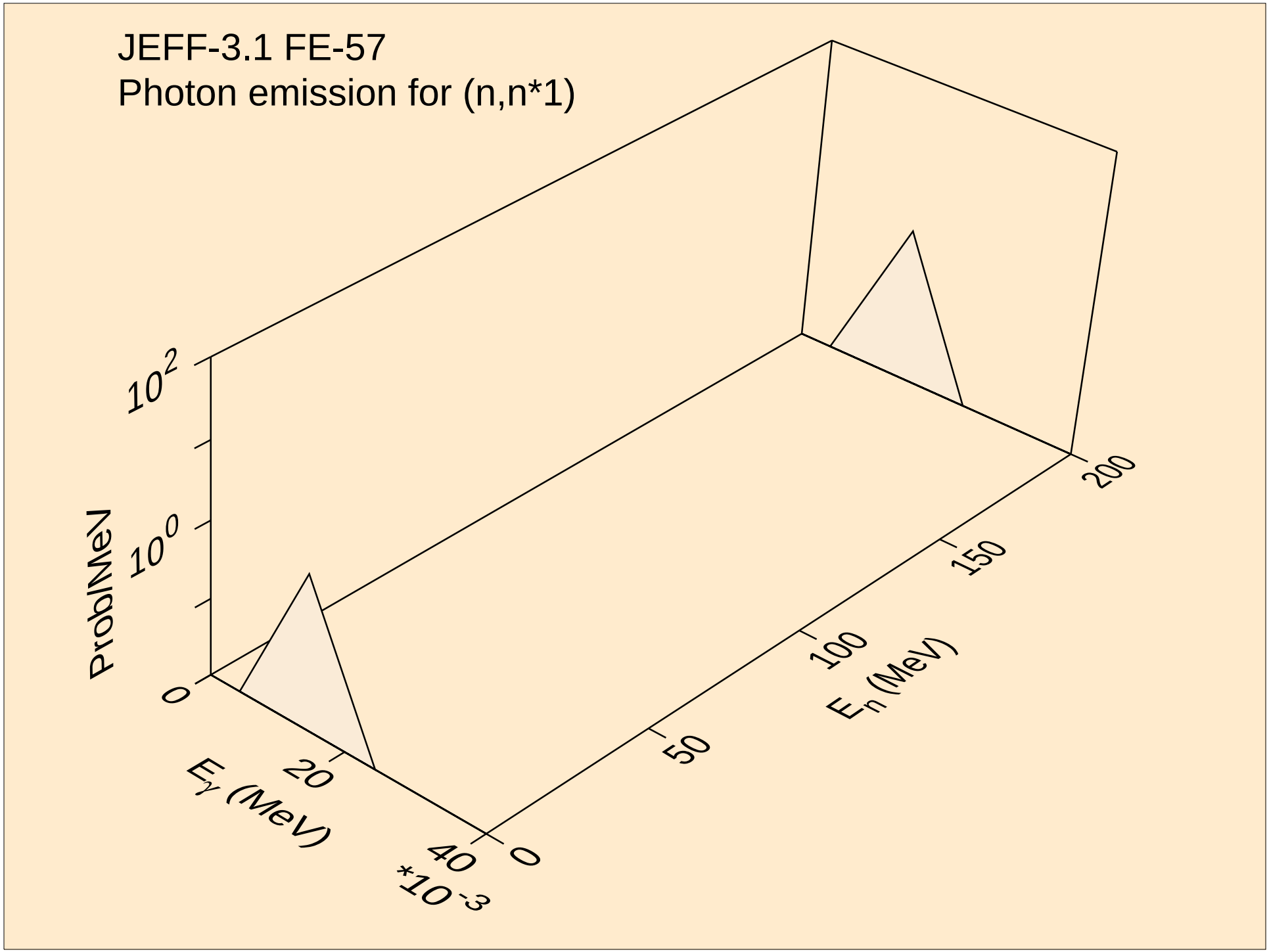

JEFF-3.1 FE-57
Photon emission for (n,n*)a
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
2
4
6
E_γ (MeV)
6
8
10
12
14
16
18
20
E_n (MeV)

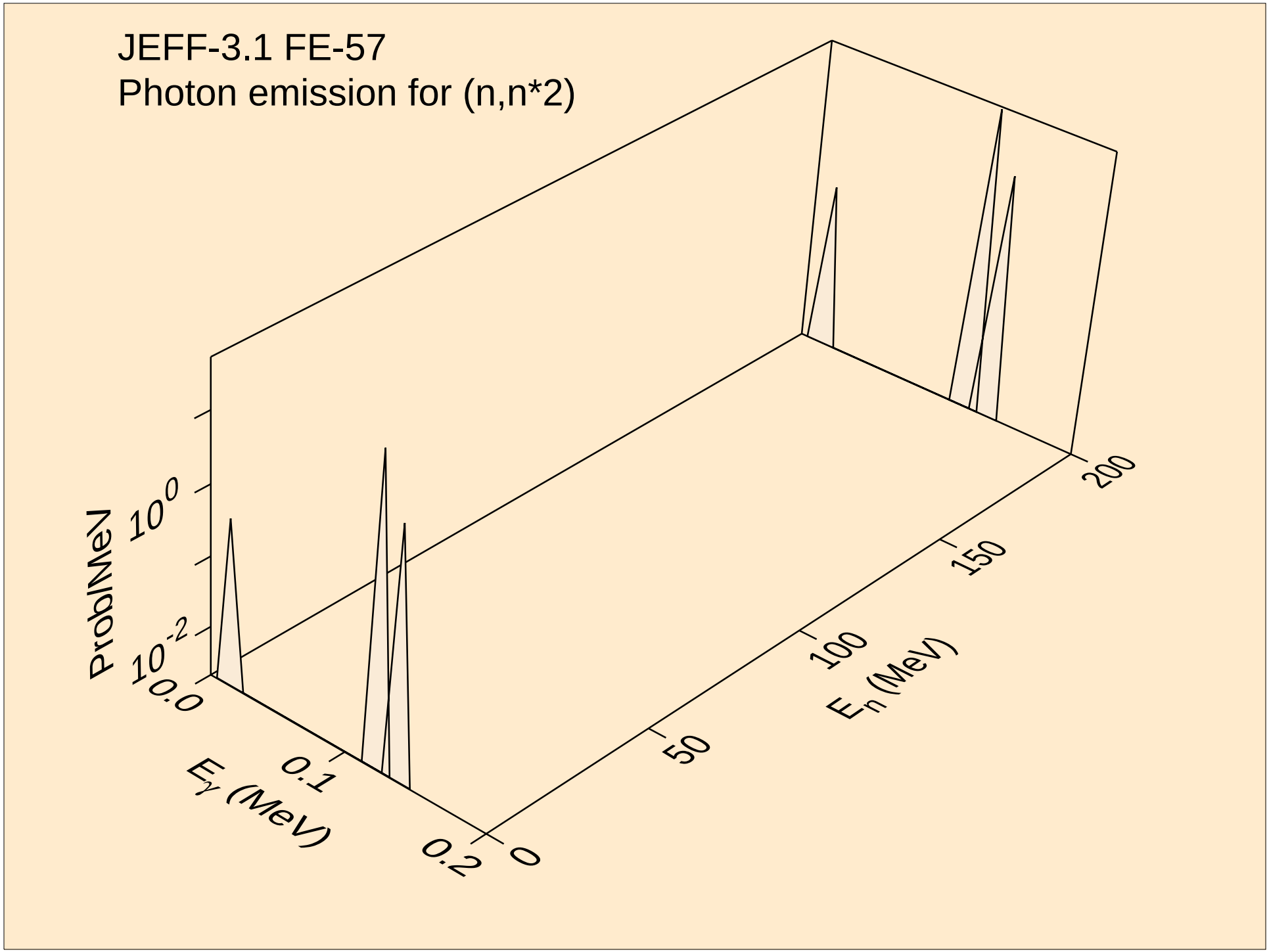

JEFF-3.1 FE-57
Photon emission for (n,2n)a
Prob/MeV
10^6
10^5
10^4
10^3
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

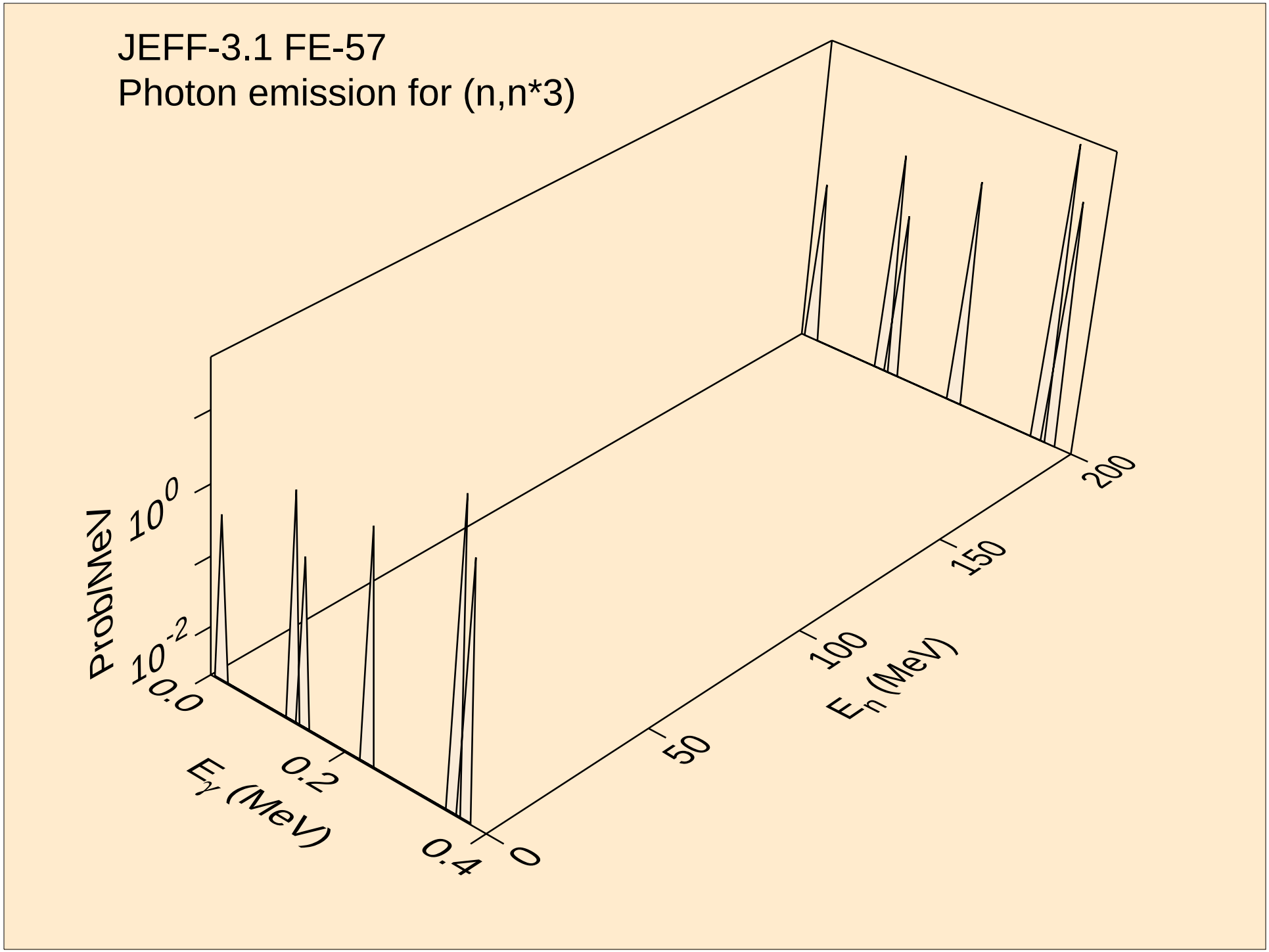

JEFF-3.1 FE-57
Photon emission for (n,n*)p
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
5
10
E_γ (MeV)
10
12
14
16
18
20
E_n (MeV)

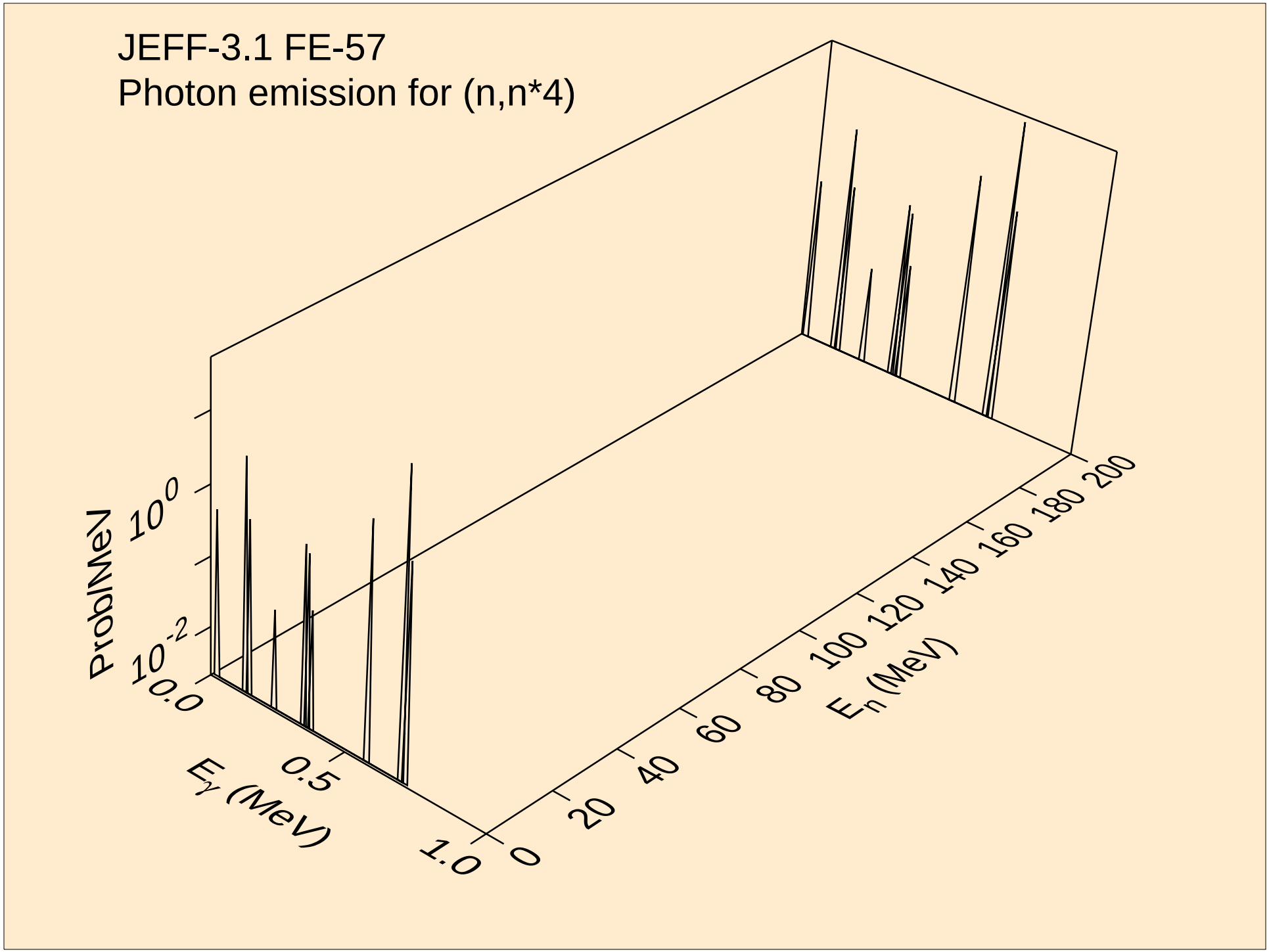

JEFF-3.1 FE-57
Photon emission for (n,n*)d
Prob/MeV
10^2
10^0
0
1
2
E_γ (MeV)
15
16
17
18
19
20
E_n (MeV)

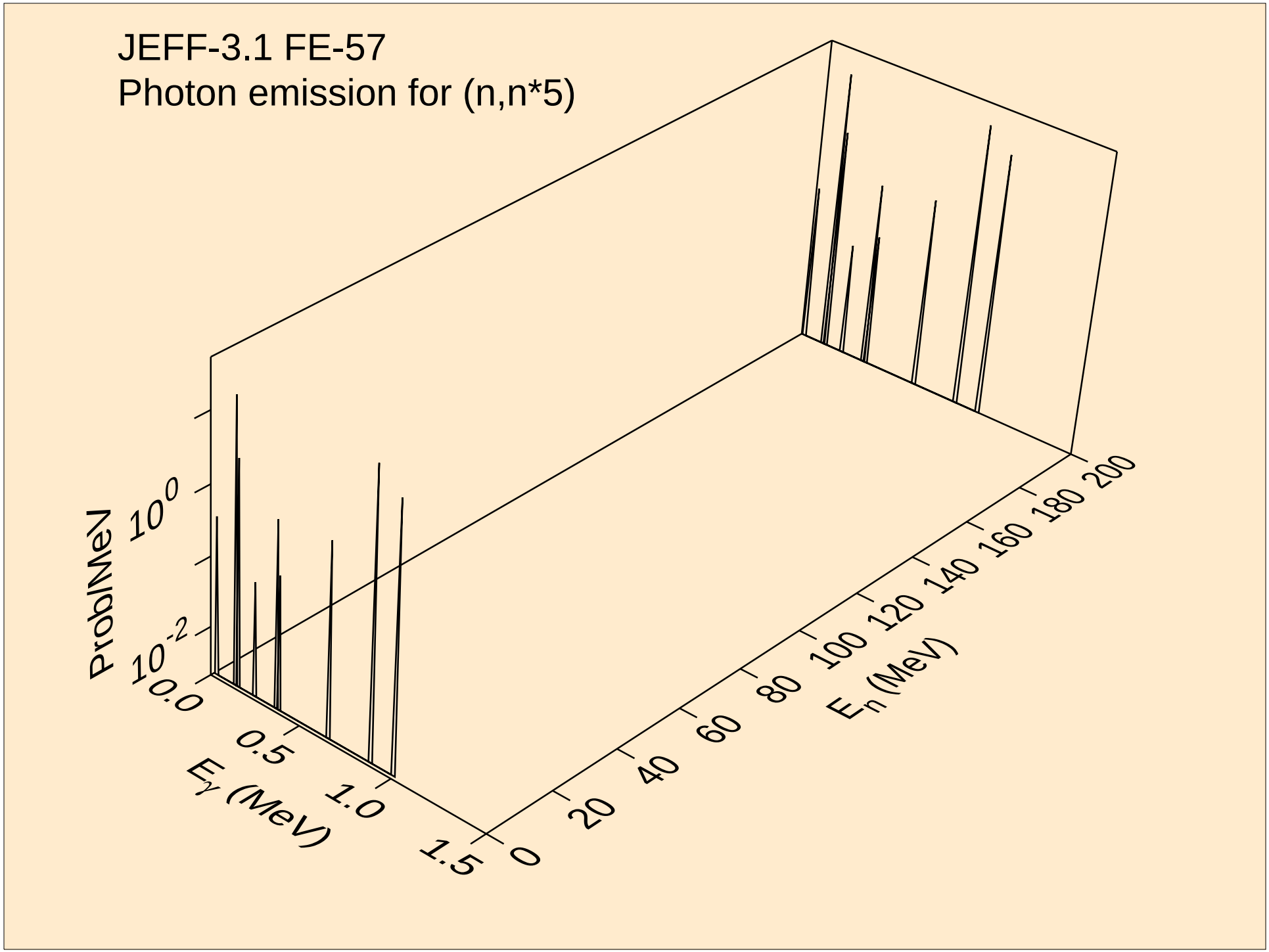

JEFF-3.1 FE-57
Photon emission for (n,2np)
Prob/MeV
10^2
10^0
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

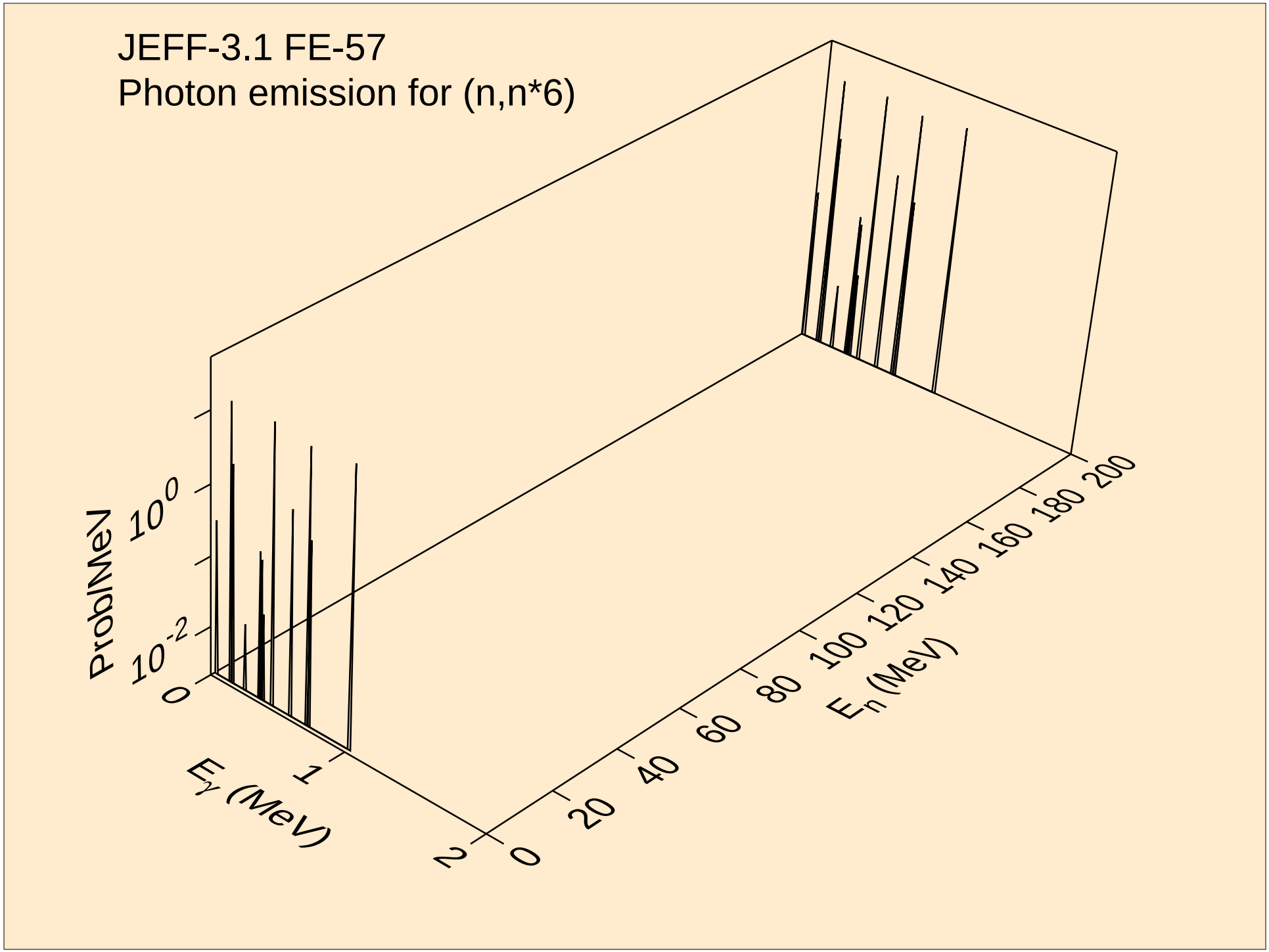

JEFF-3.1 FE-57
Photon emission for (n,n*1)
Prob/MeV
10^2
10^0
0
20
E_γ (MeV)
40
*10 -3
0
50
100
150
200
E_n (MeV)

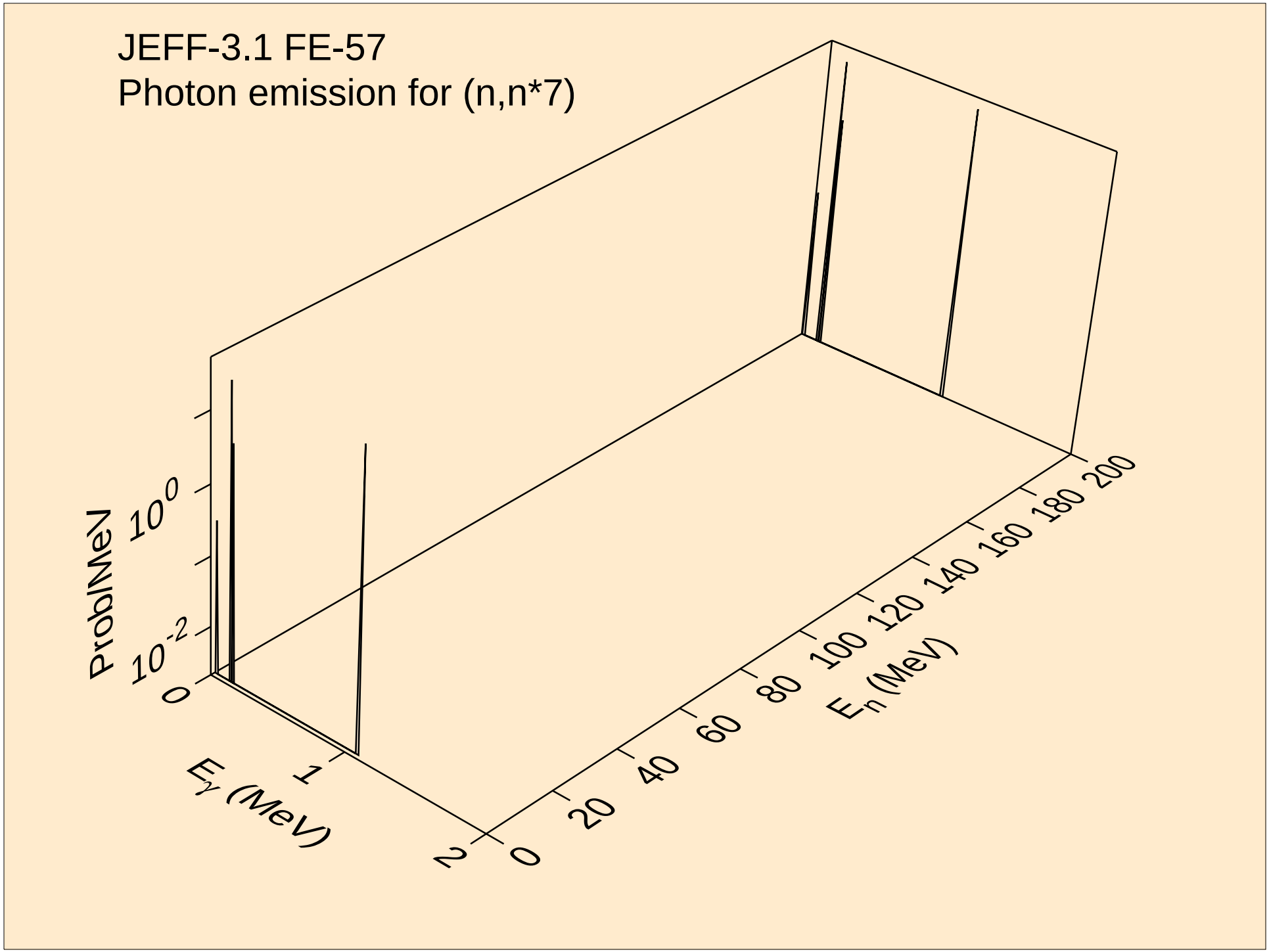

JEFF-3.1 FE-57
Photon emission for (n,n*2)
Prob/MeV
10^0
10^-2
0.0
0.1
0.2
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

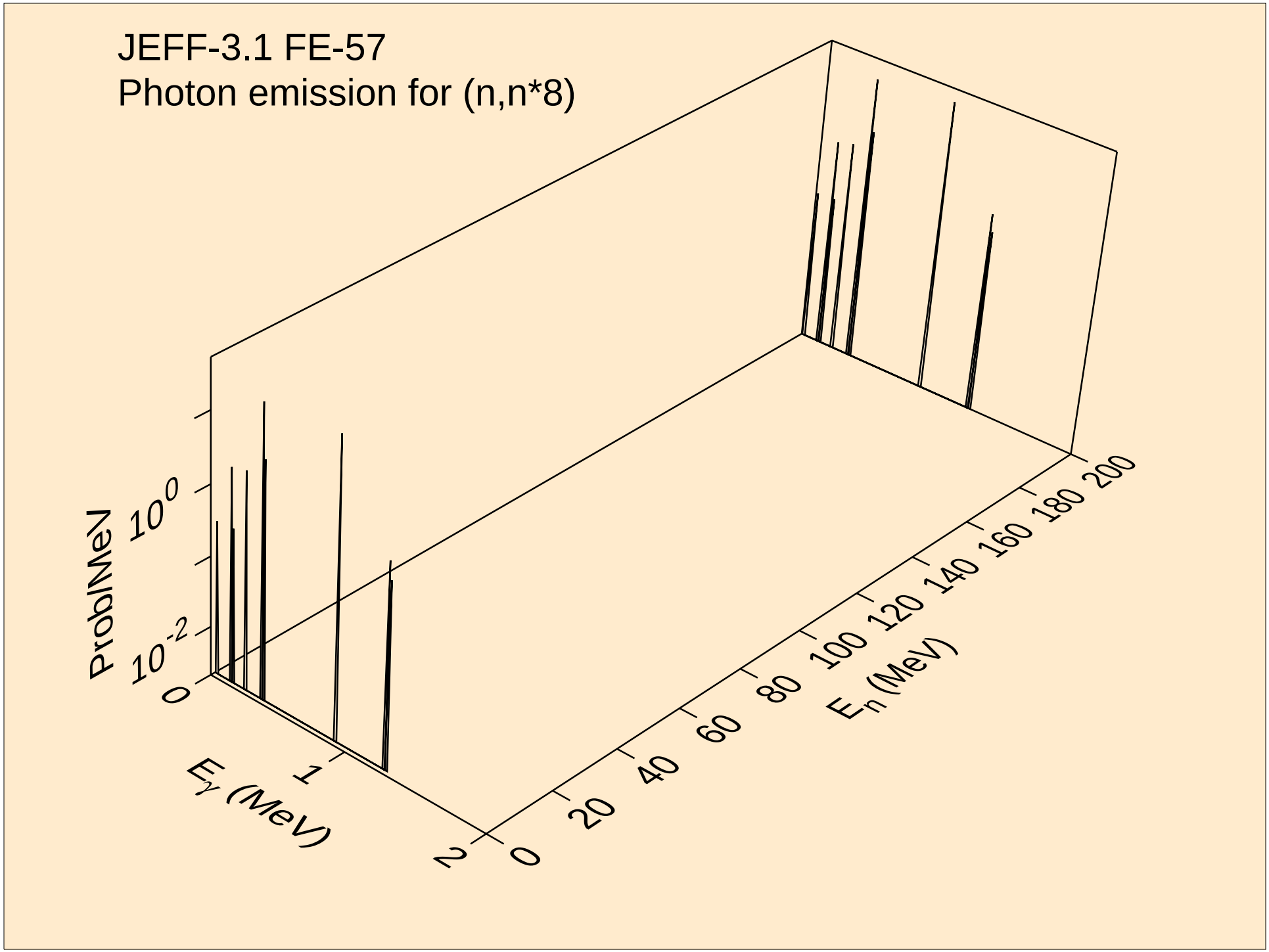

JEFF-3.1 FE-57
Photon emission for (n,n*3)
Prob/MeV
10^0
10^-2
0.0
0.2
0.4
Eγ (MeV)
0
50
100
150
200
En (MeV)

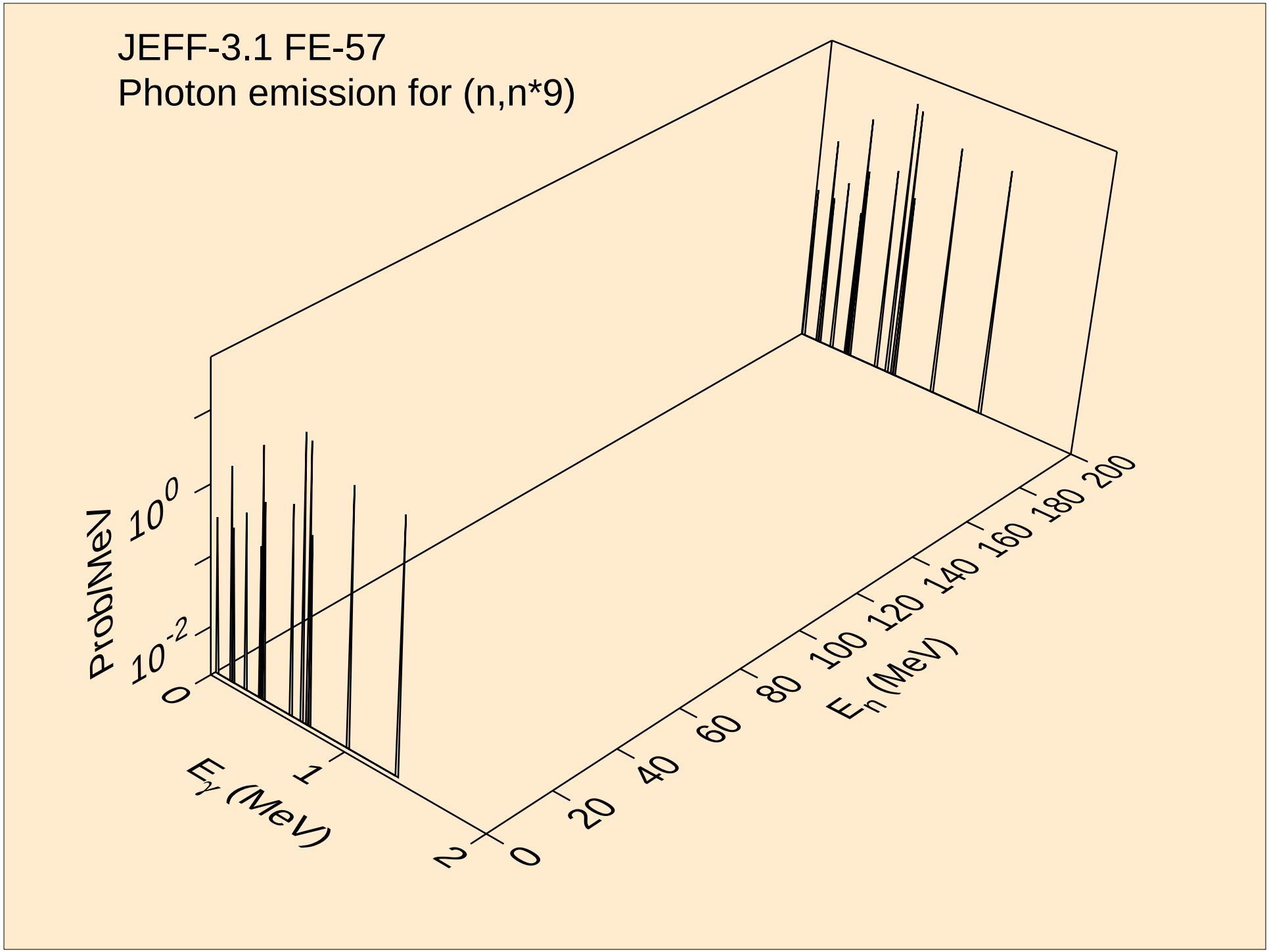

JEFF-3.1 FE-57
Photon emission for (n,n*4)
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

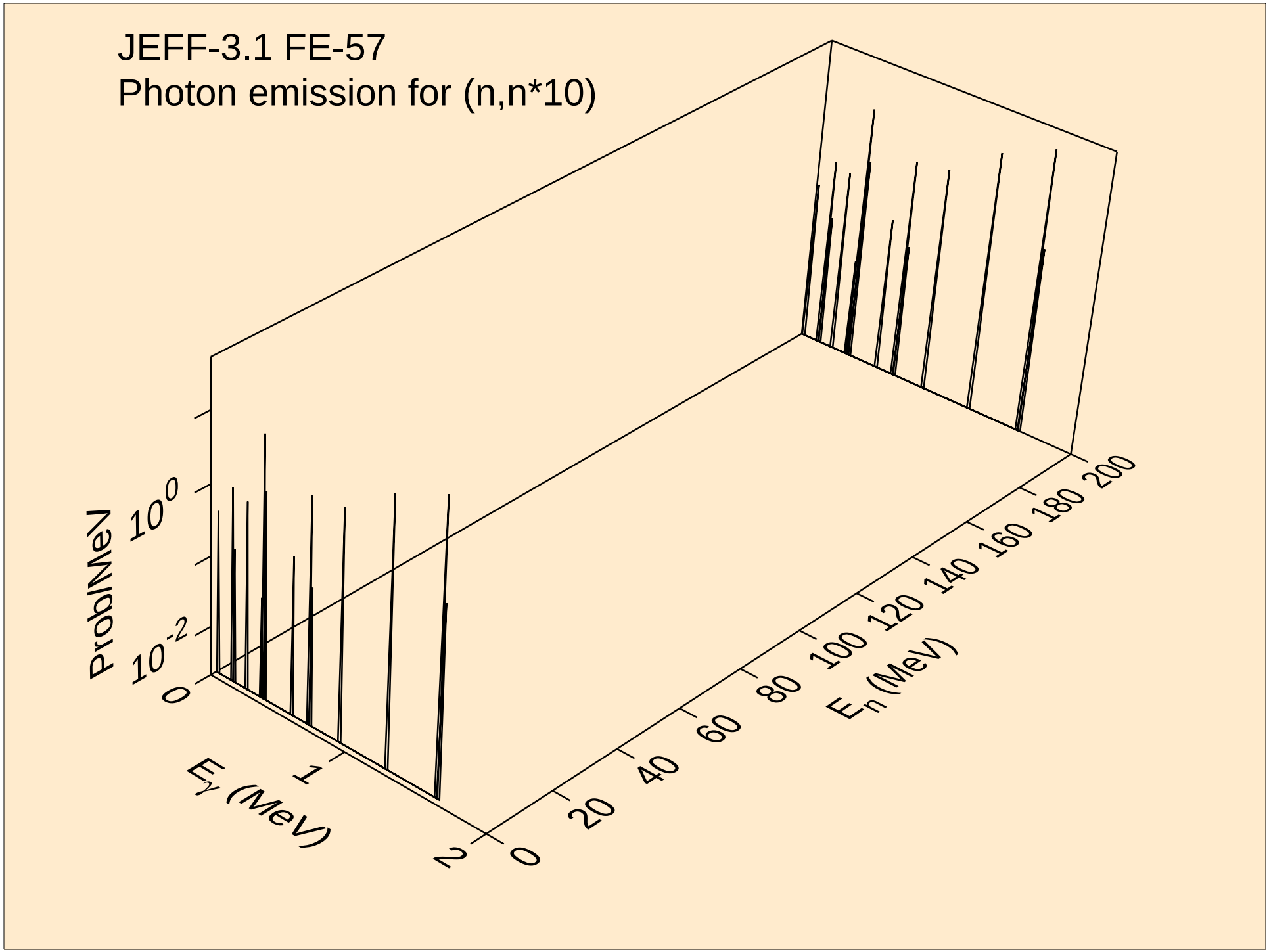

JEFF-3.1 FE-57
Photon emission for (n,n*5)
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
1.5
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

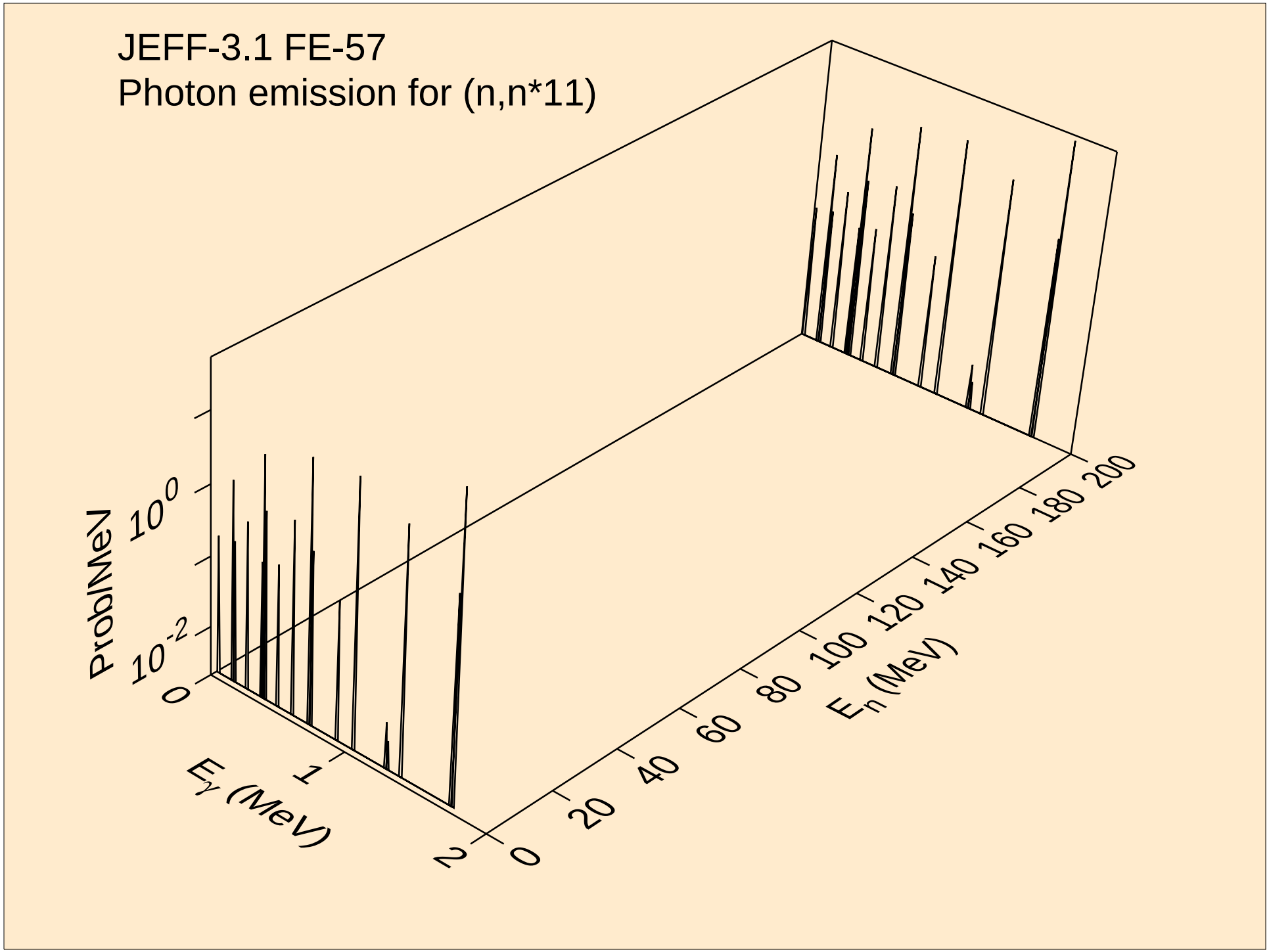

JEFF-3.1 FE-57
Photon emission for (n,n*6)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

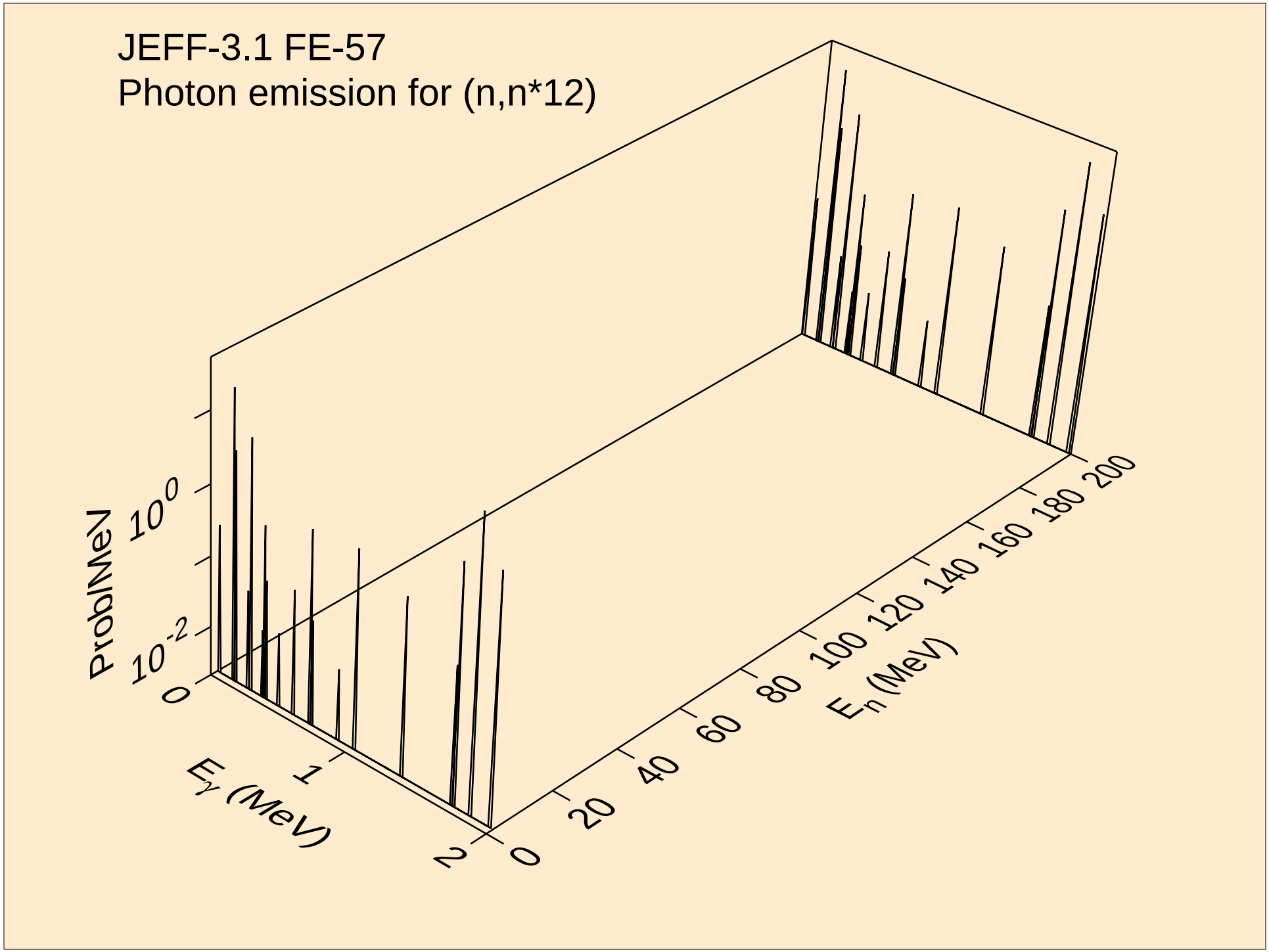

JEFF-3.1 FE-57
Photon emission for (n,n*7)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

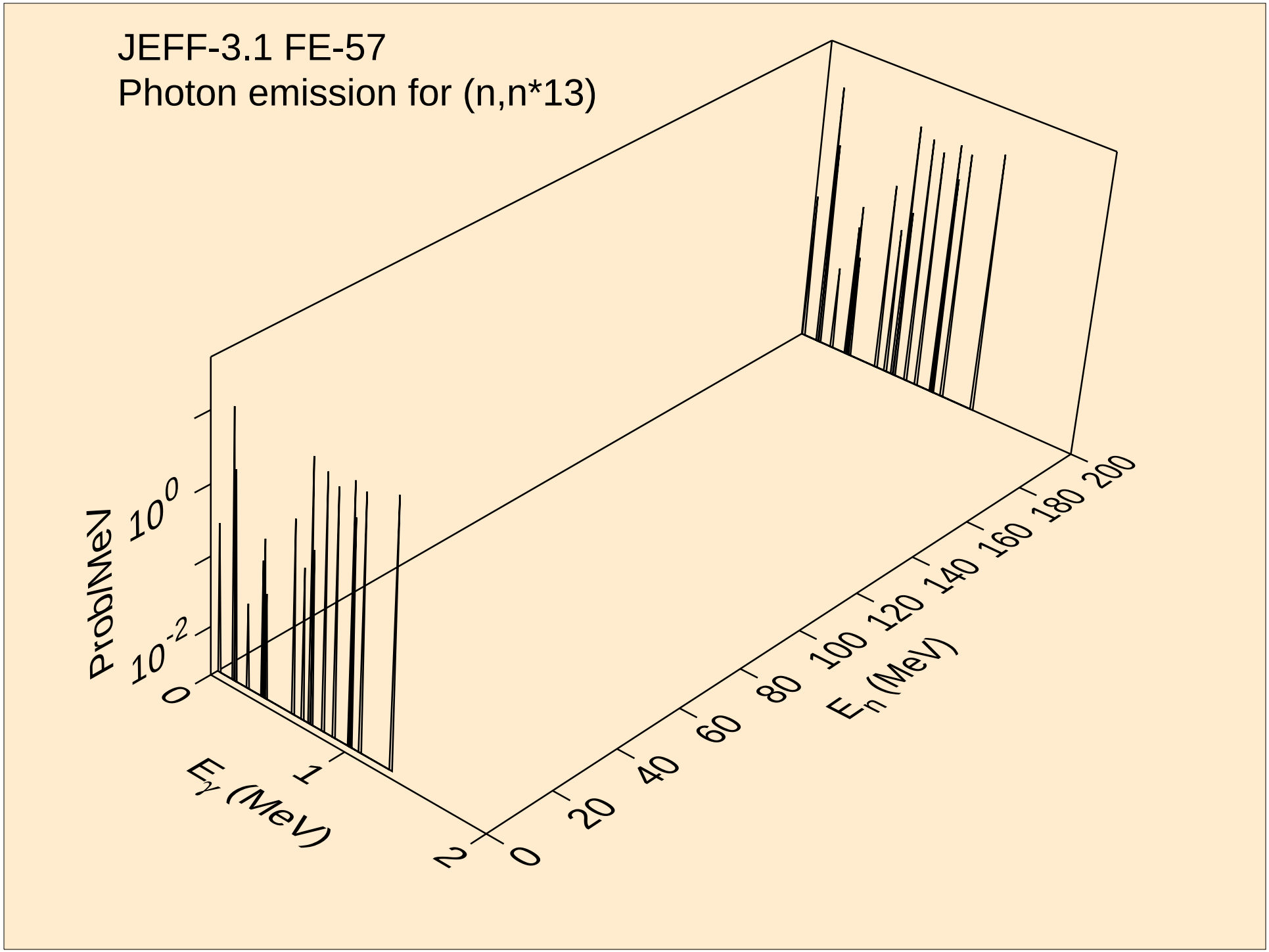

JEFF-3.1 FE-57
Photon emission for (n,n*8)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

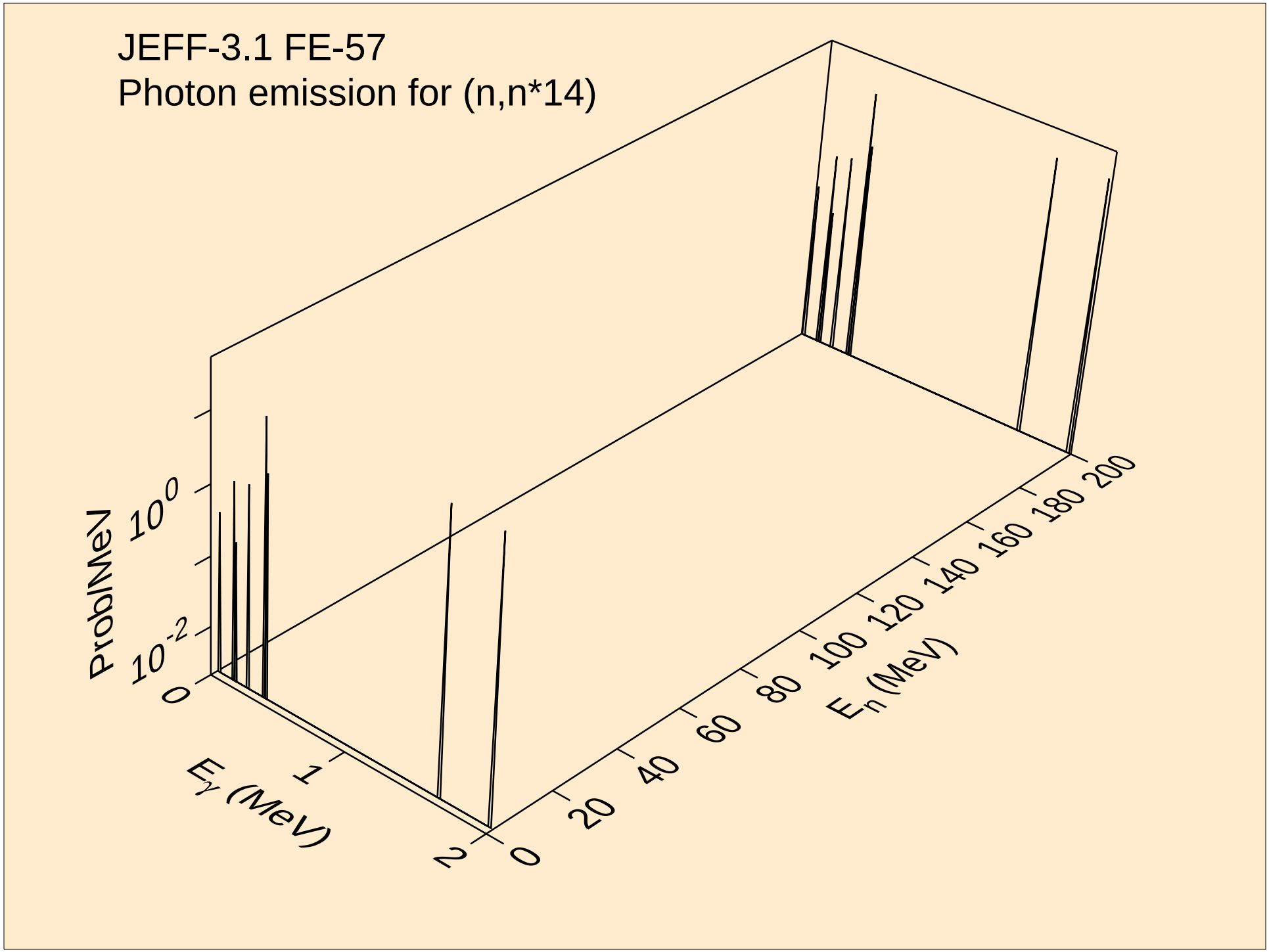

JEFF-3.1 FE-57
Photon emission for (n,n*9)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

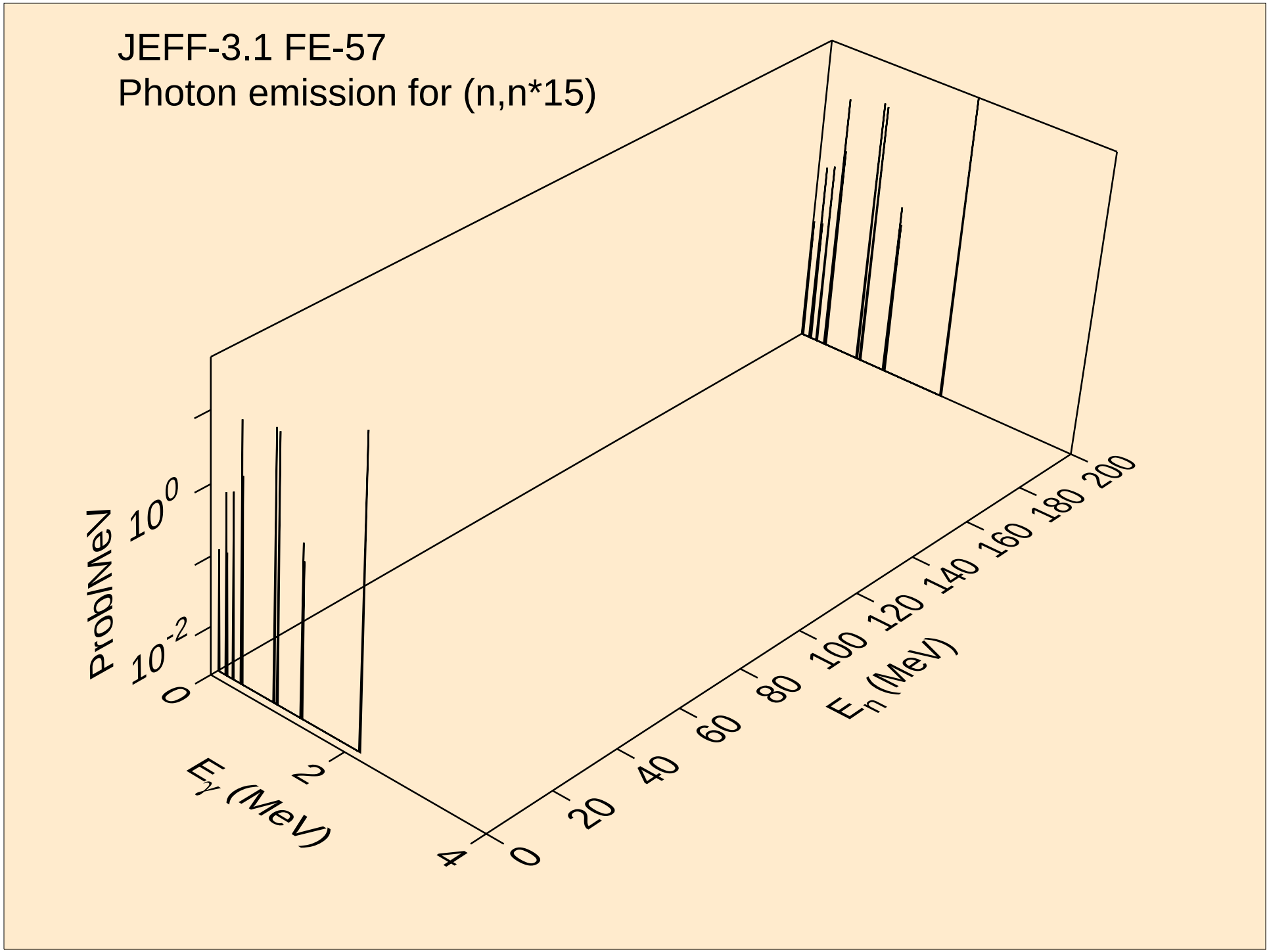

JEFF-3.1 FE-57
Photon emission for (n,n*10)
Prob/MeV
10^0
10^-2
0
1
2
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

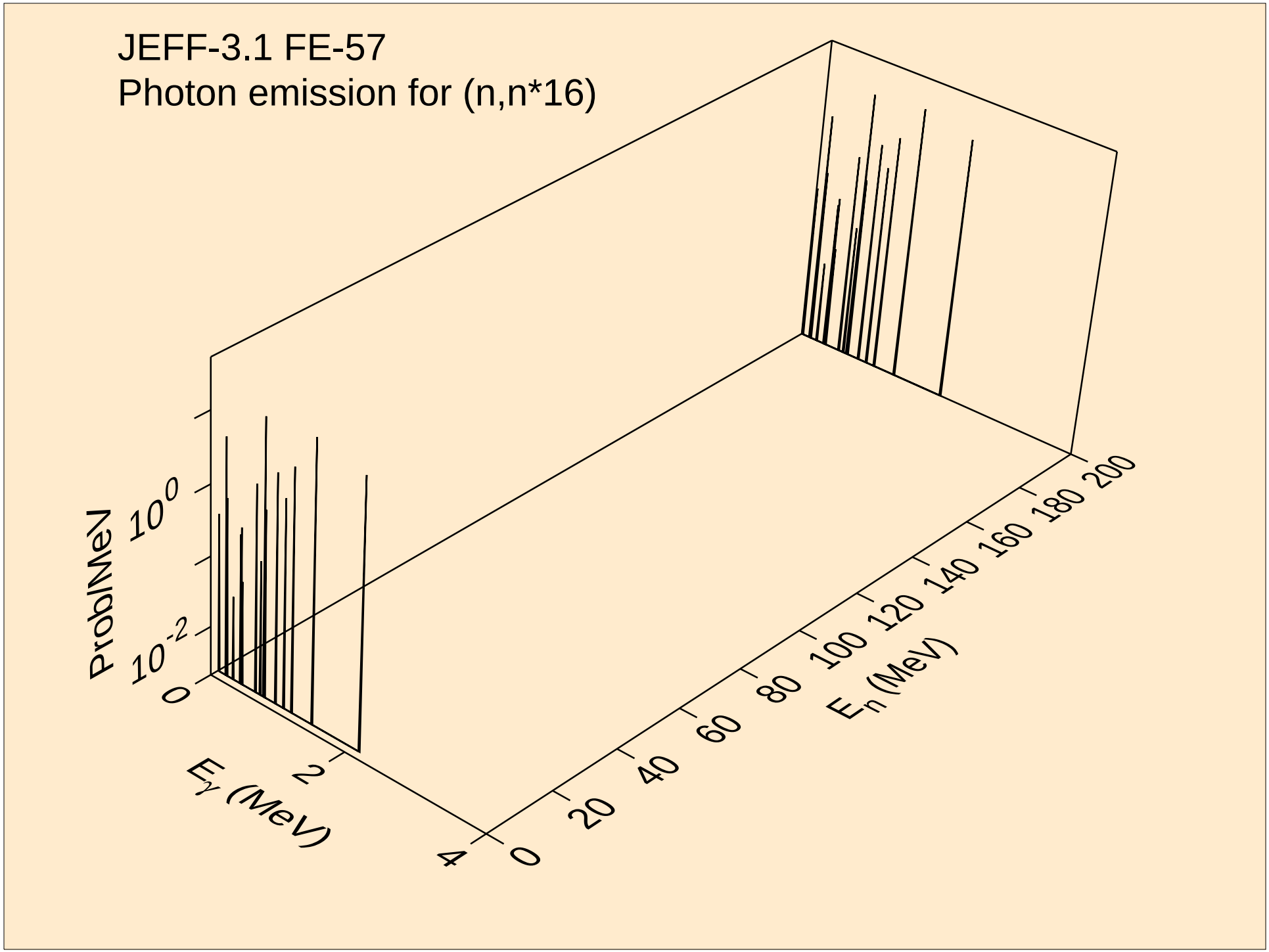

JEFF-3.1 FE-57
Photon emission for (n,n*11)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

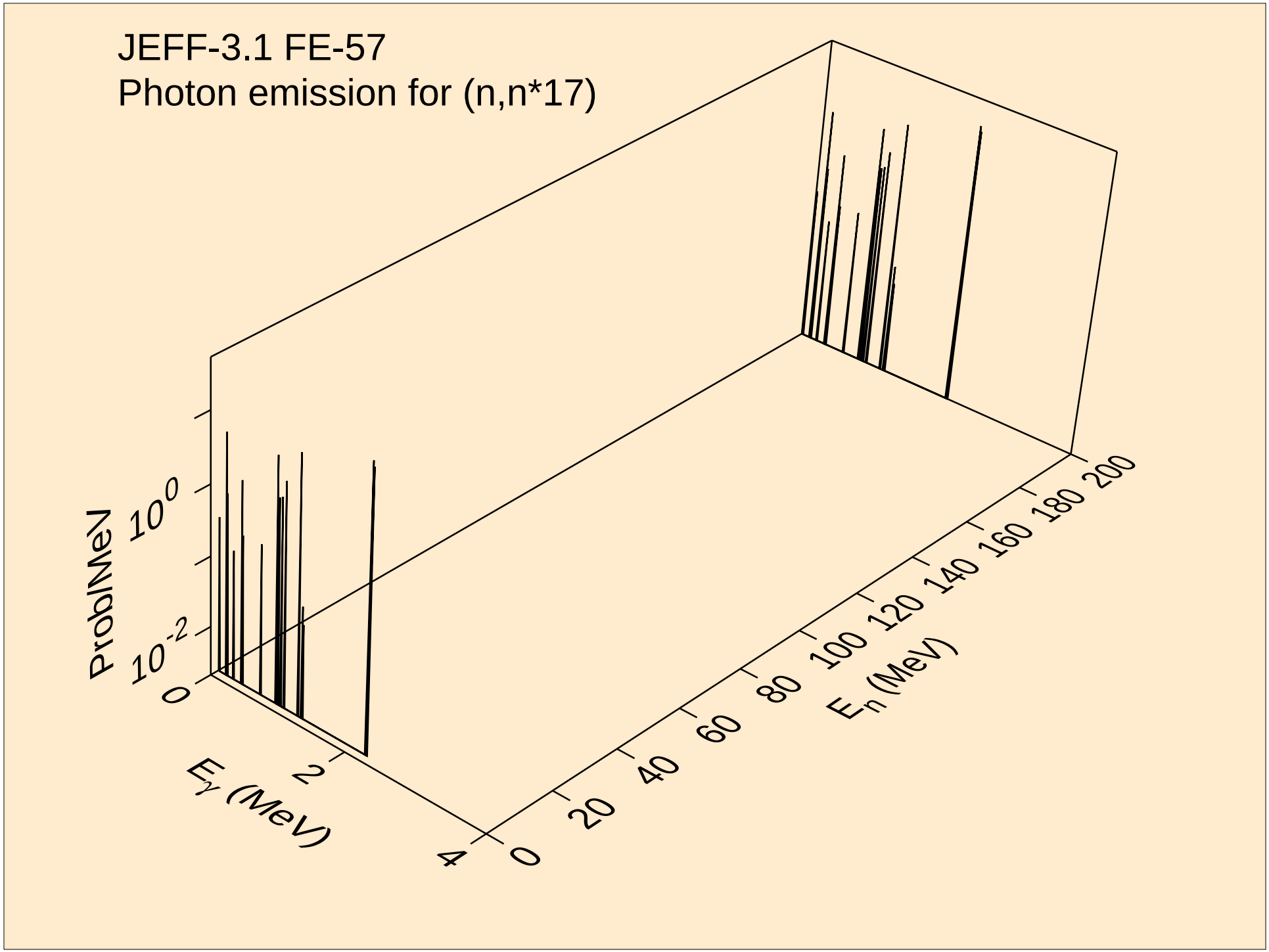

JEFF-3.1 FE-57
Photon emission for (n,n*12)
Prob/MeV
10^0
10^-2
0
1
2
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

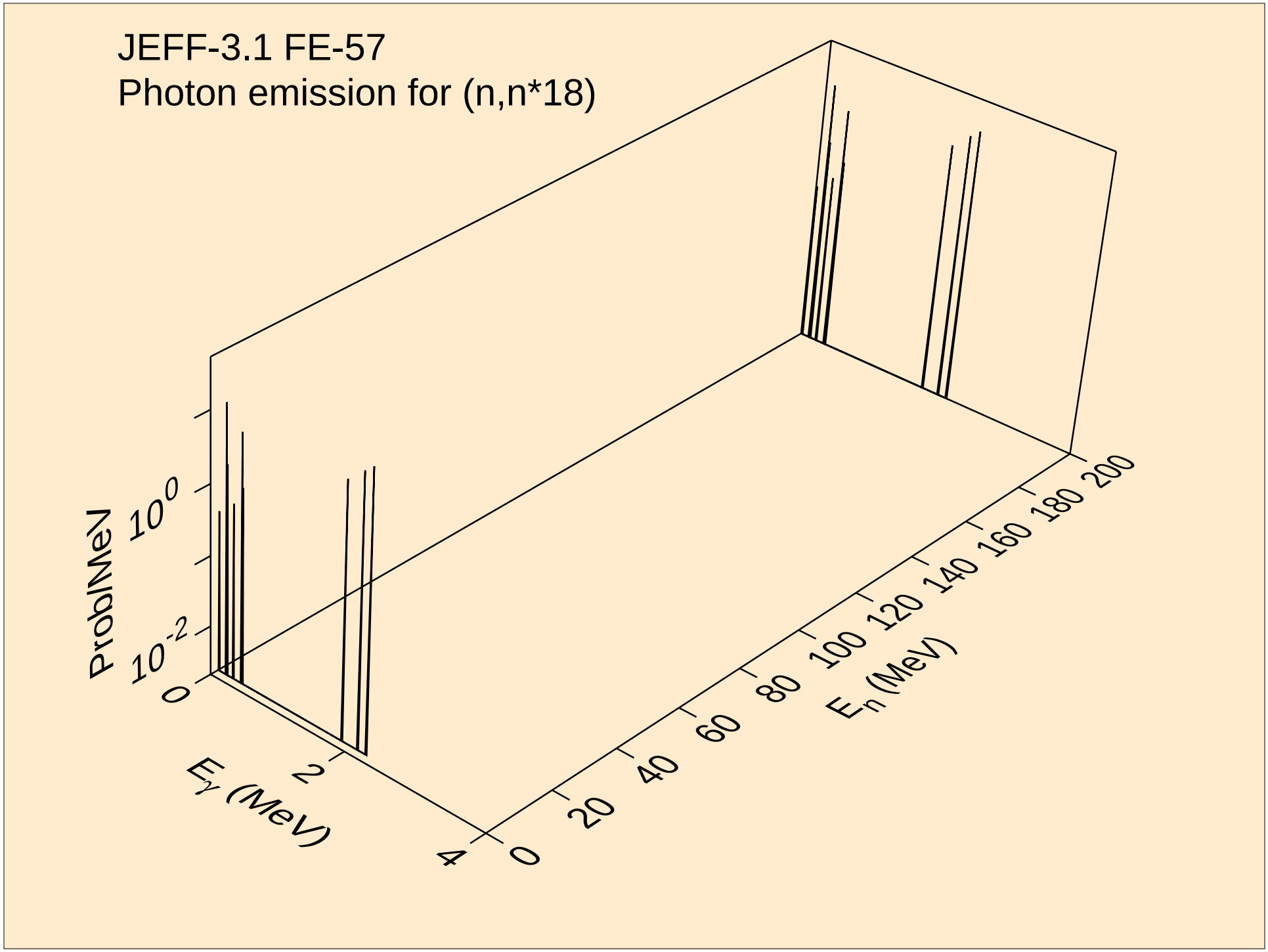

JEFF-3.1 FE-57
Photon emission for (n,n*13)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

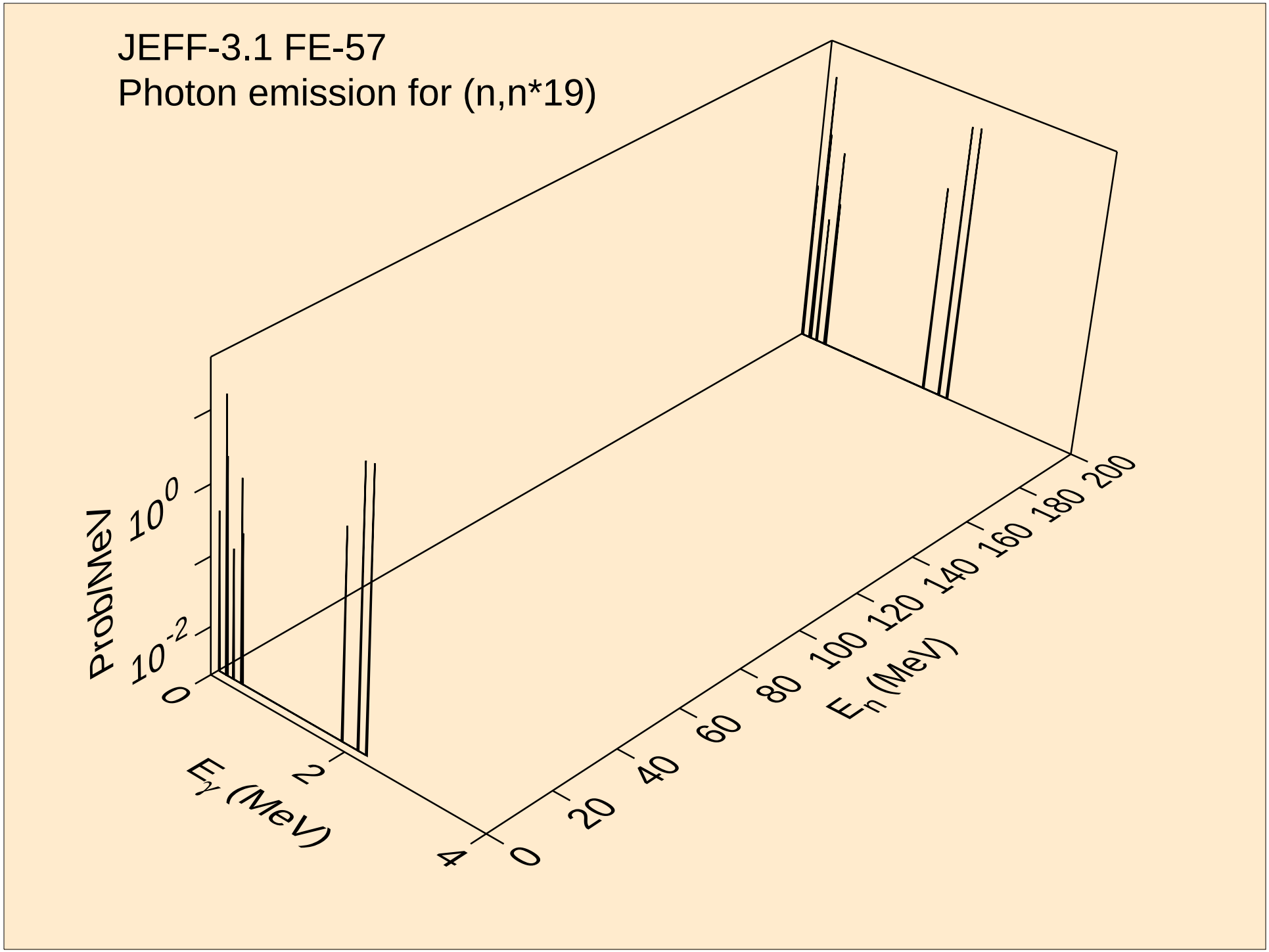

JEFF-3.1 FE-57
Photon emission for (n,n*14)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

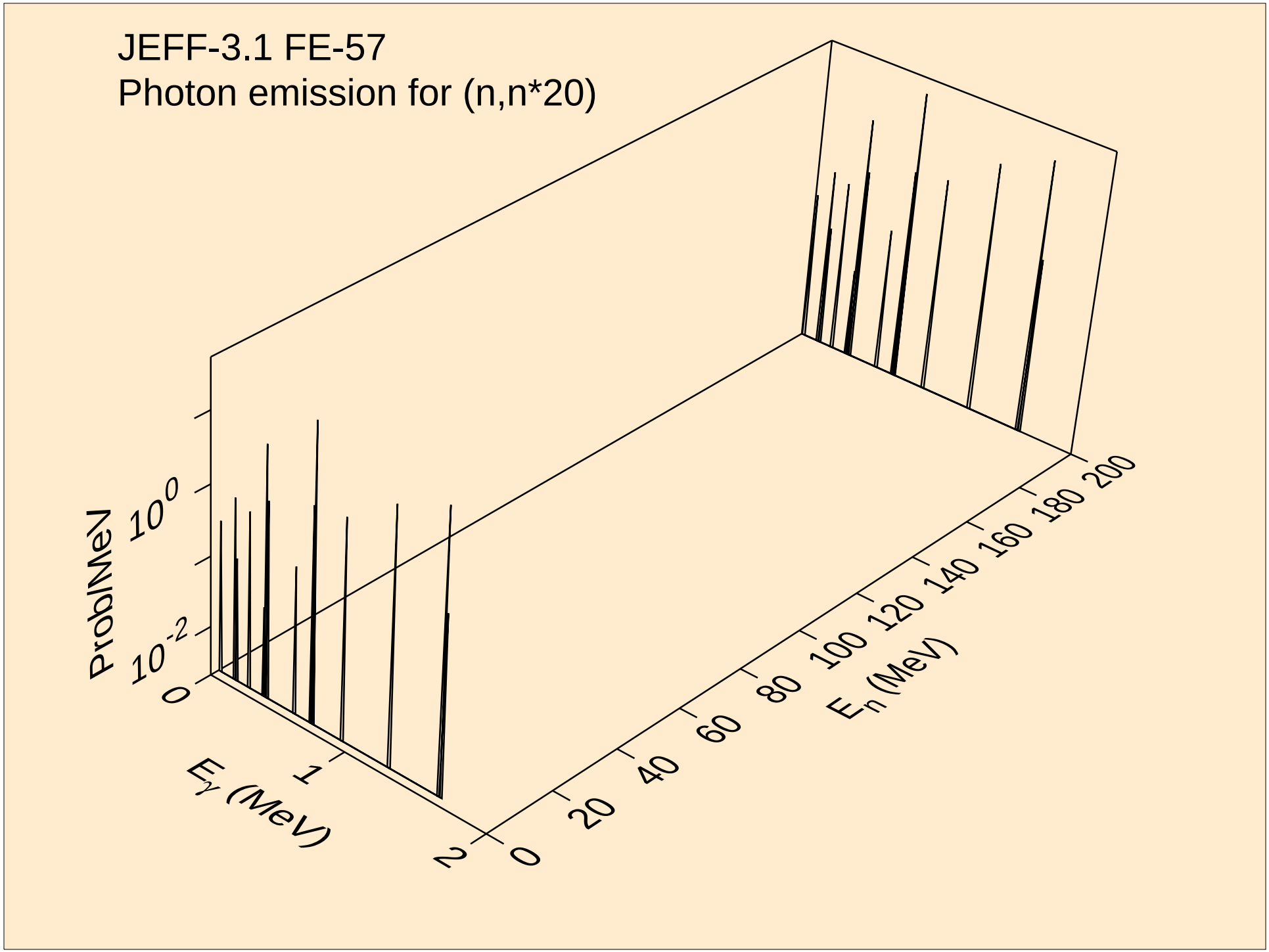

JEFF-3.1 FE-57
Photon emission for (n,n*15)
Prob/MeV
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

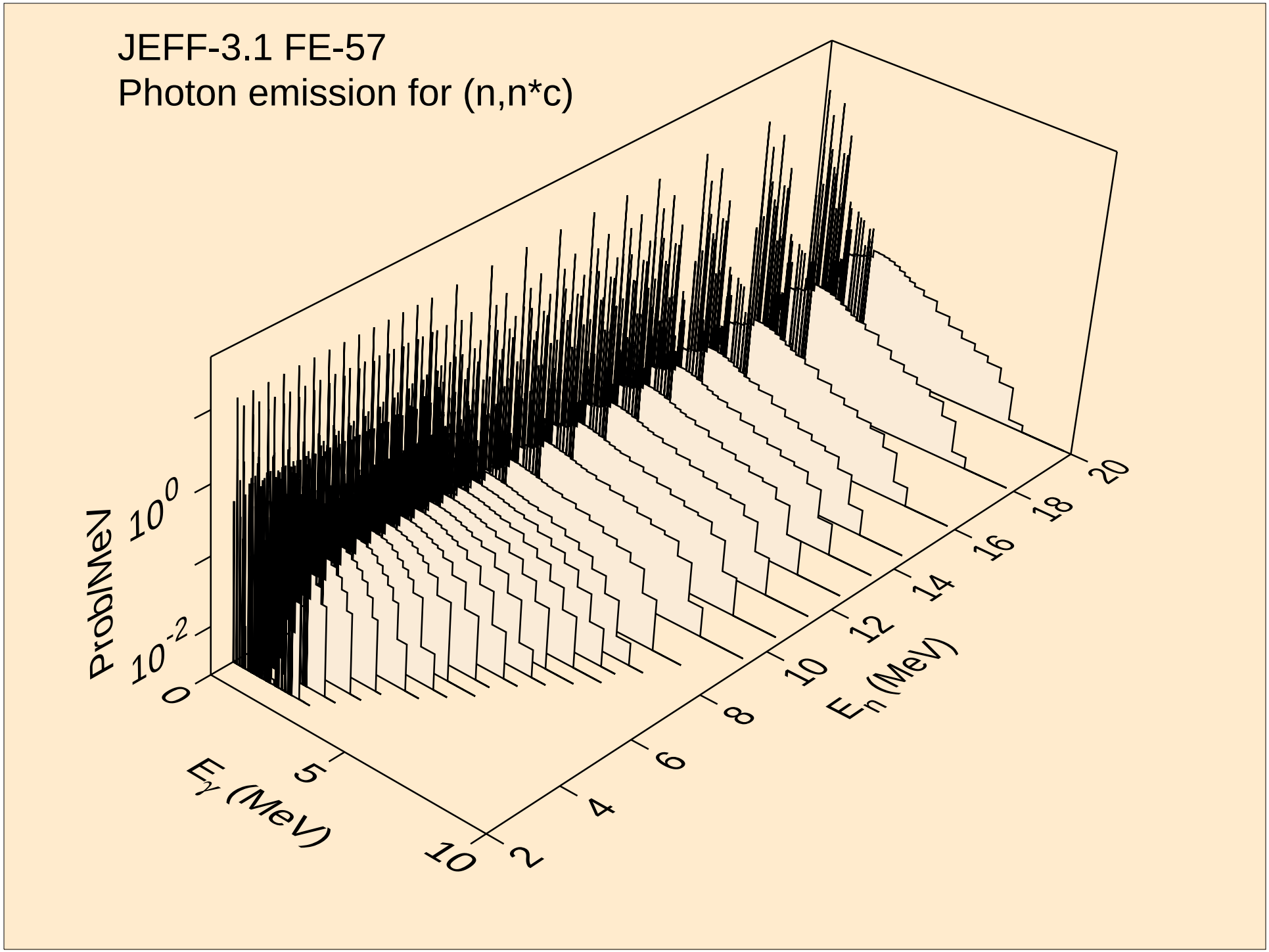

JEFF-3.1 FE-57
Photon emission for (n,n*16)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

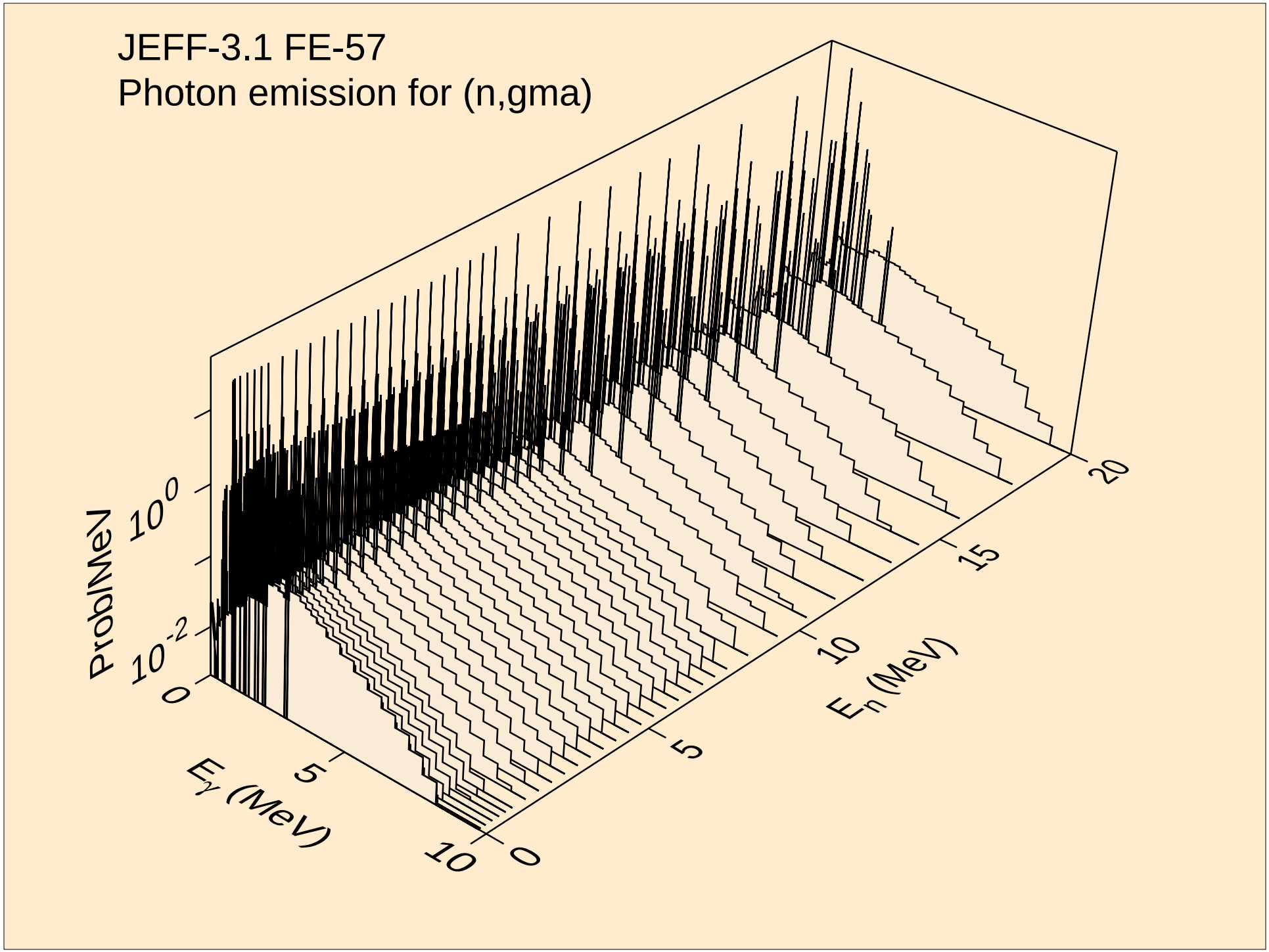

JEFF-3.1 FE-57
Photon emission for (n,n*17)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

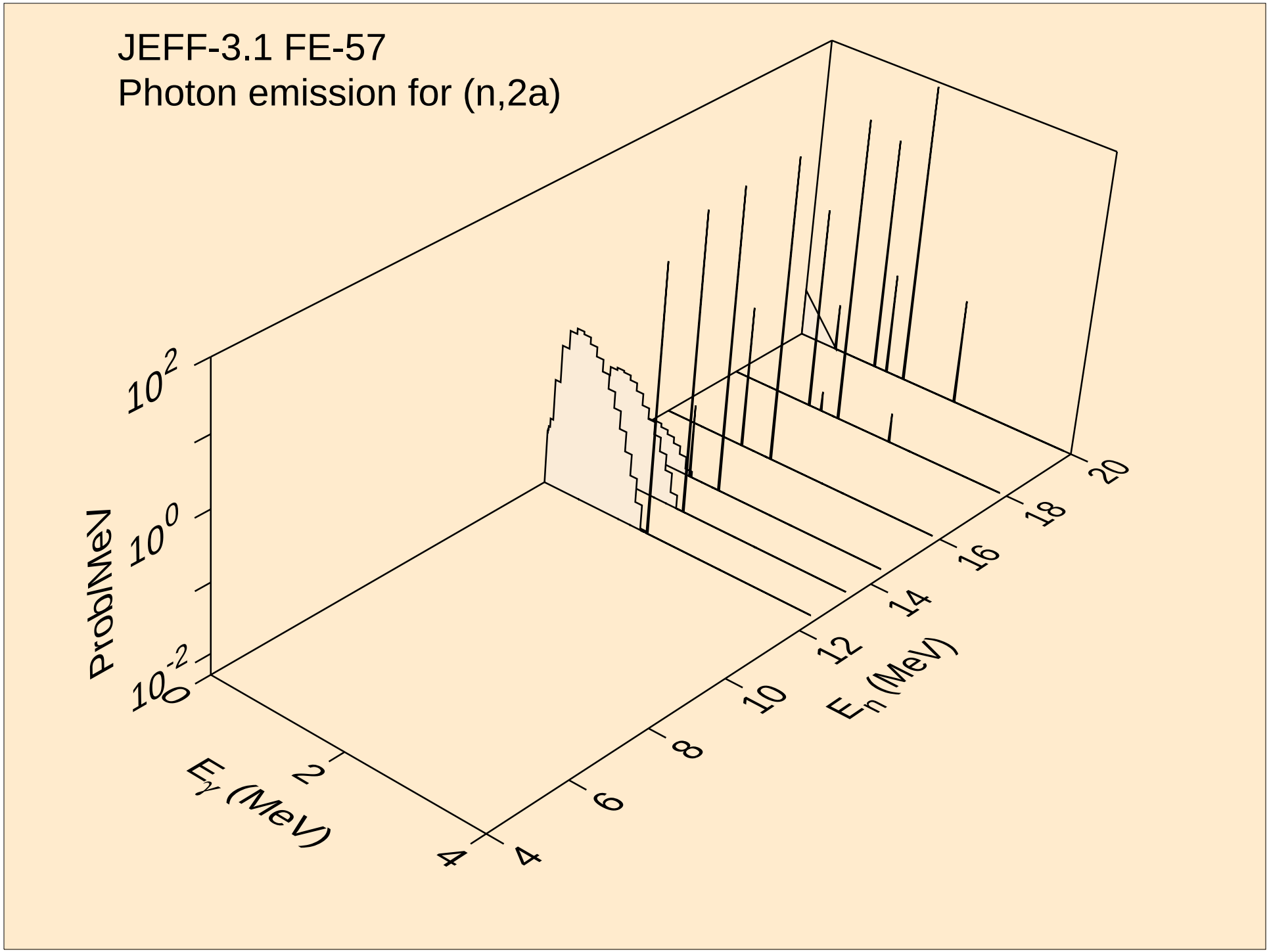

JEFF-3.1 FE-57
Photon emission for (n,n*18)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

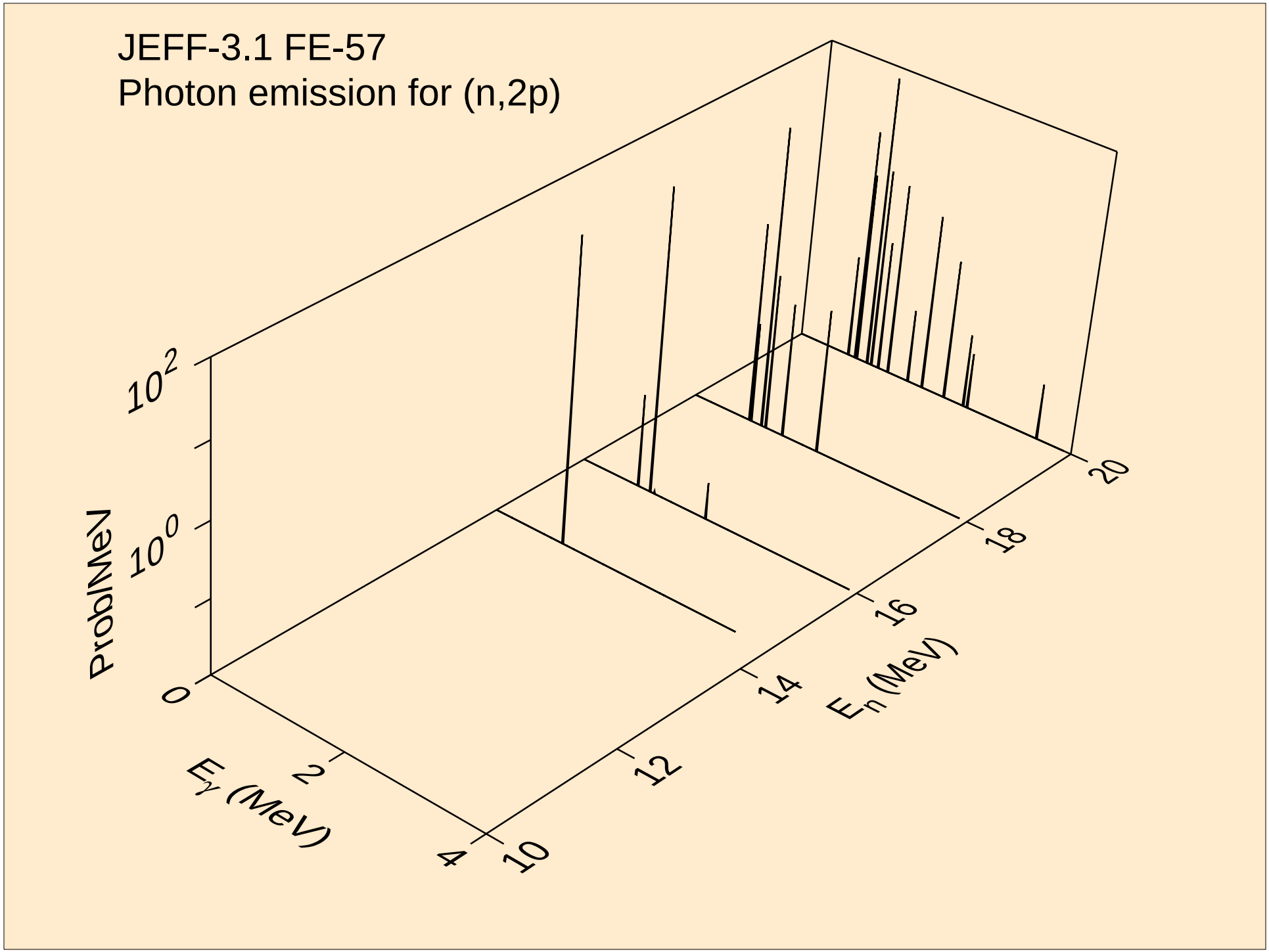

JEFF-3.1 FE-57
Photon emission for (n,n*19)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

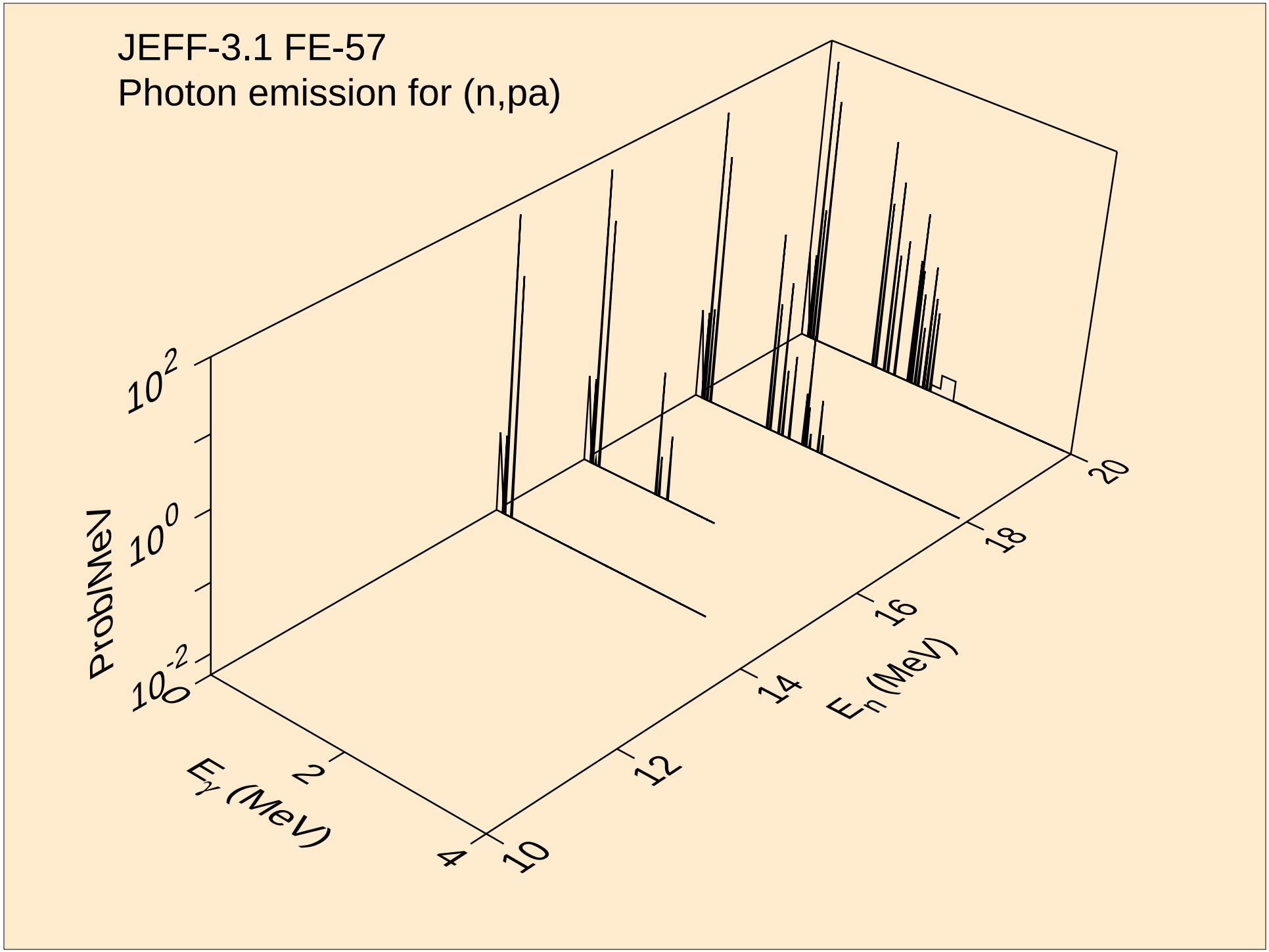

JEFF-3.1 FE-57
Photon emission for (n,n*20)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

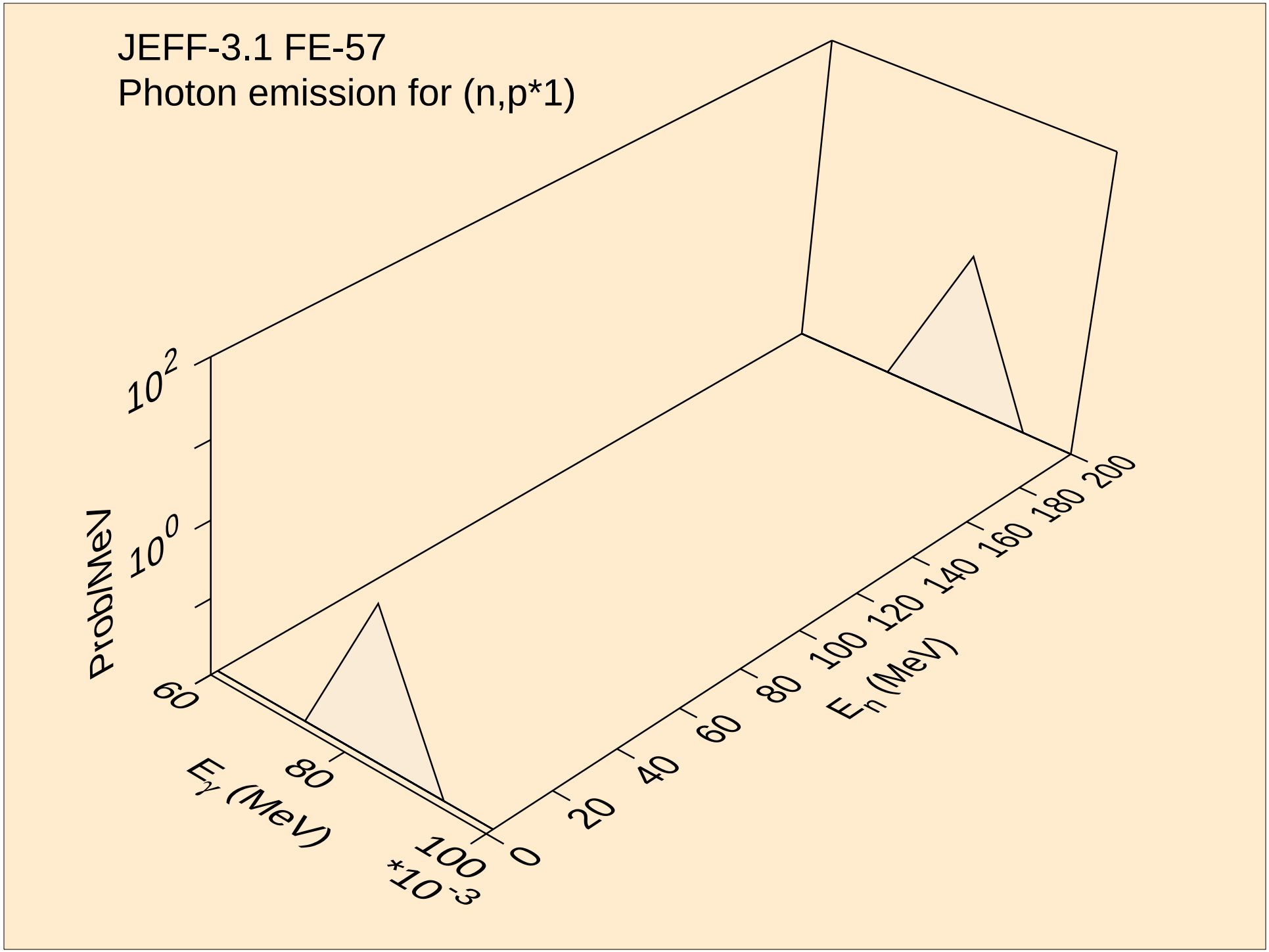

JEFF-3.1 FE-57
Photon emission for (n,n*c)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
5
10
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

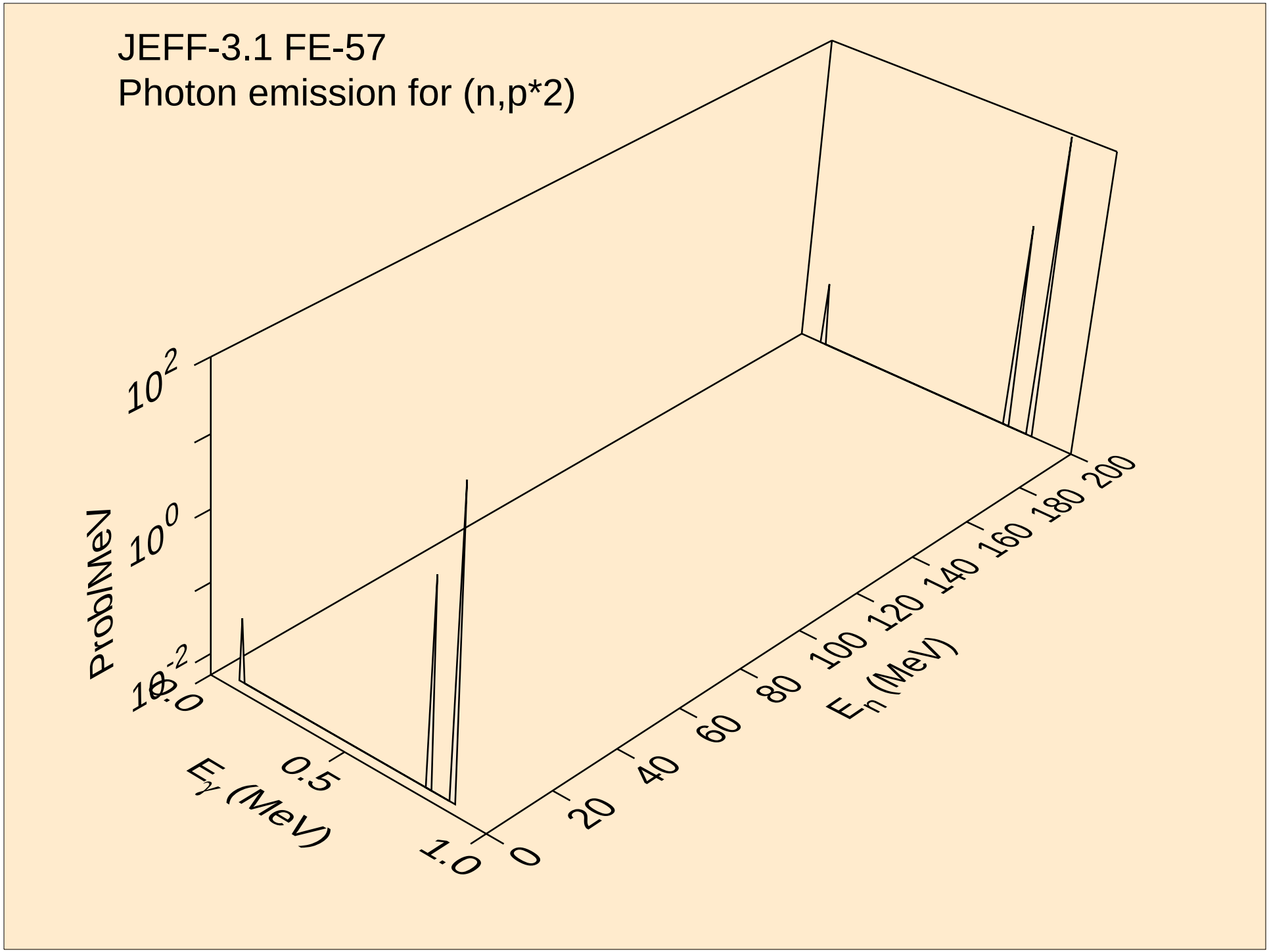

JEFF-3.1 FE-57
Photon emission for (n,gma)
Prob/MeV
10^0
10^-2
0
5
10
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

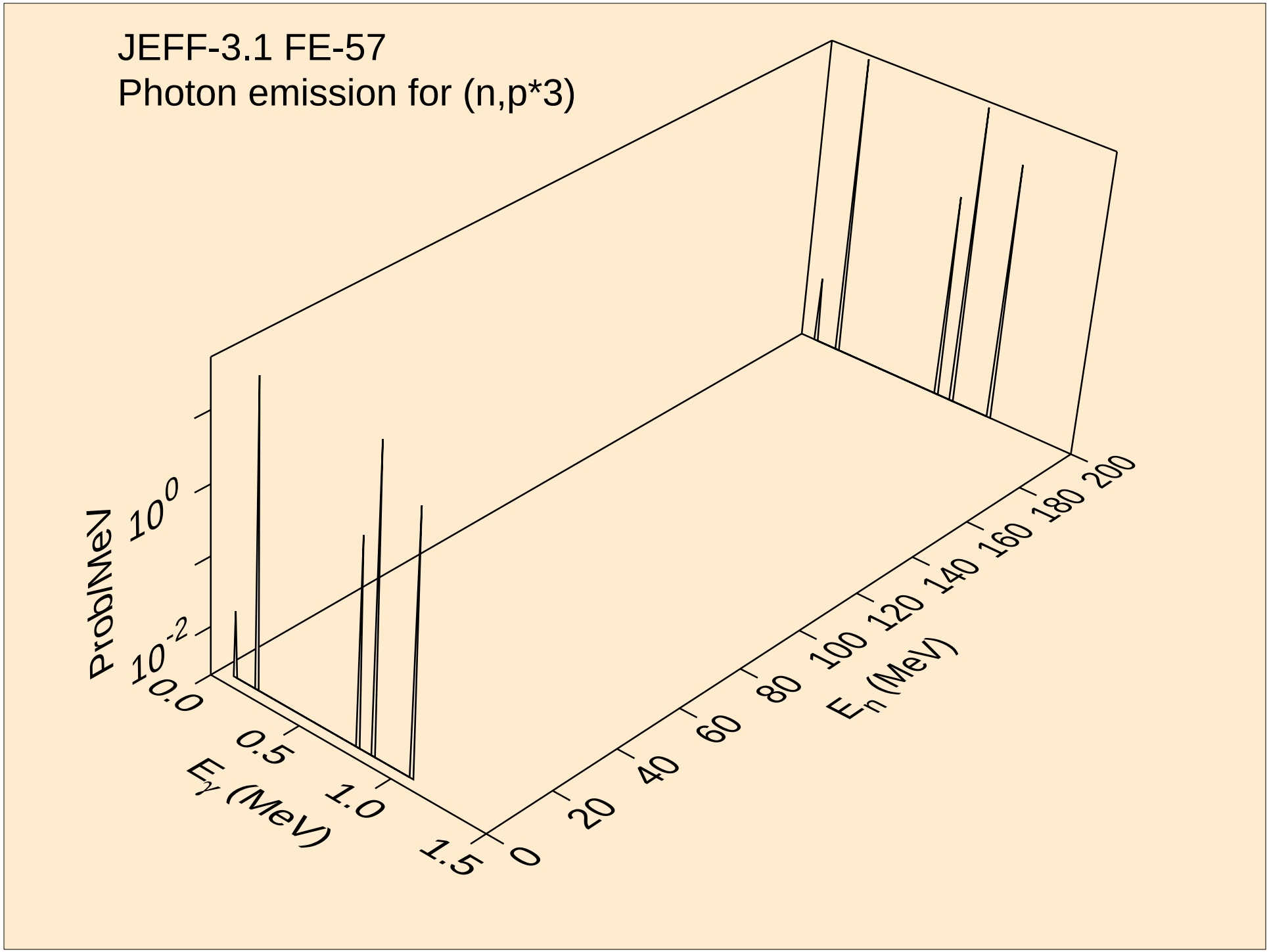

JEFF-3.1 FE-57
Photon emission for (n,2a)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
E_n (MeV)
4
6
8
10
12
14
16
18
20

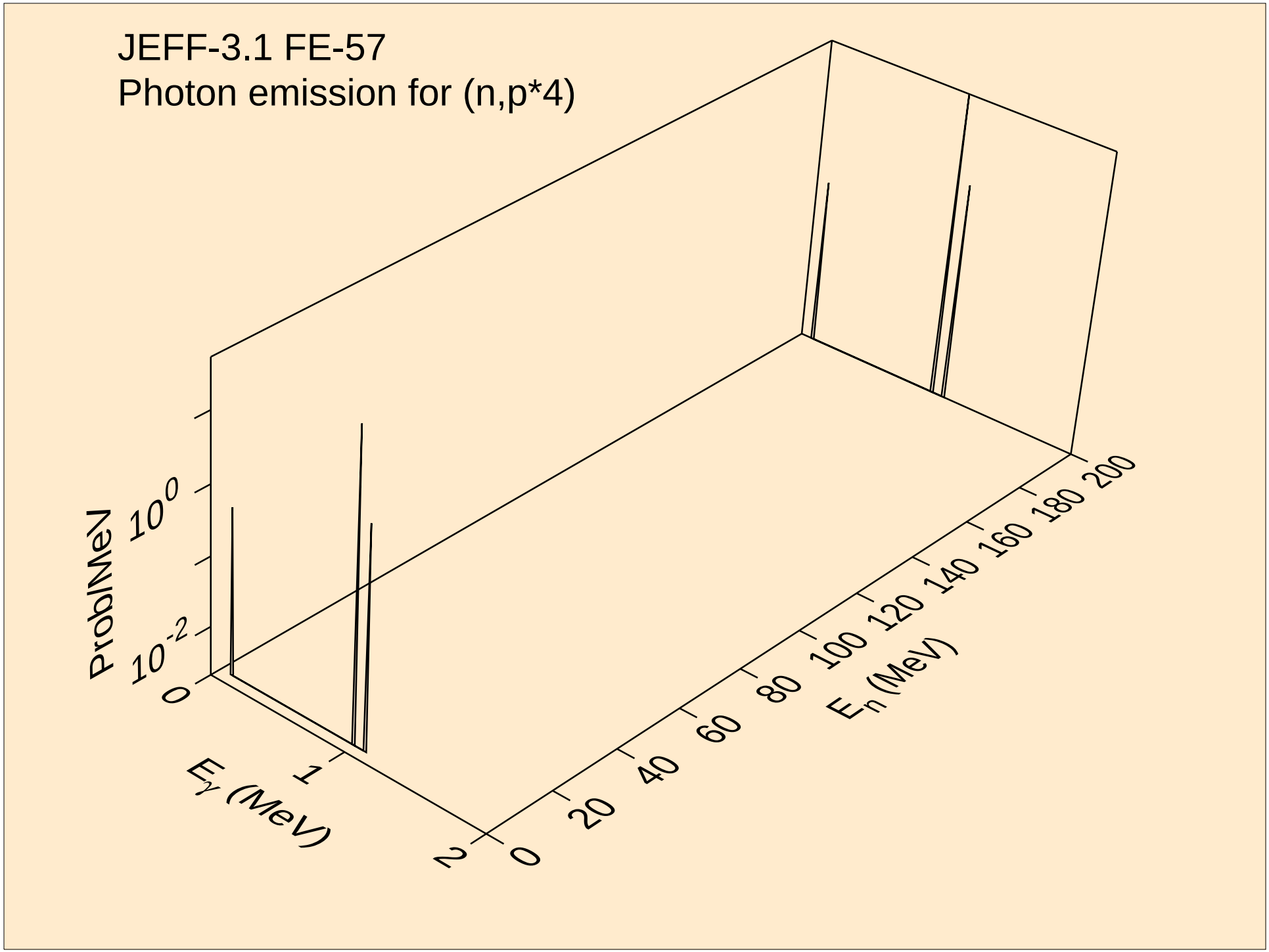

JEFF-3.1 FE-57
Photon emission for (n,2p)
Prob/MeV
10^2
10^0
0
E_γ (MeV)
2
4
10
12
14
16
18
20
E_n (MeV)

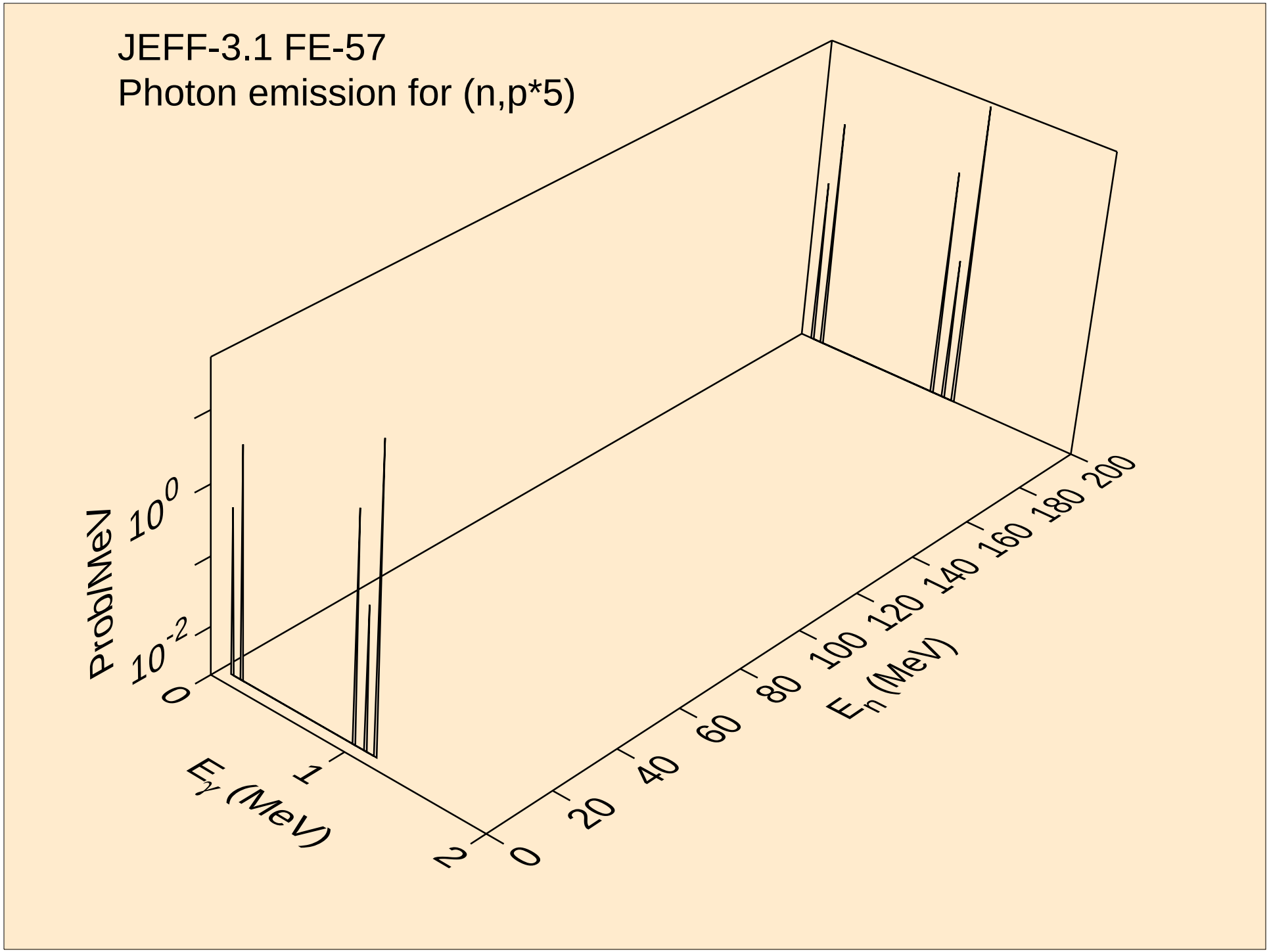

JEFF-3.1 FE-57
Photon emission for (n,pa)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
10
12
14
16
18
20
E_n (MeV)

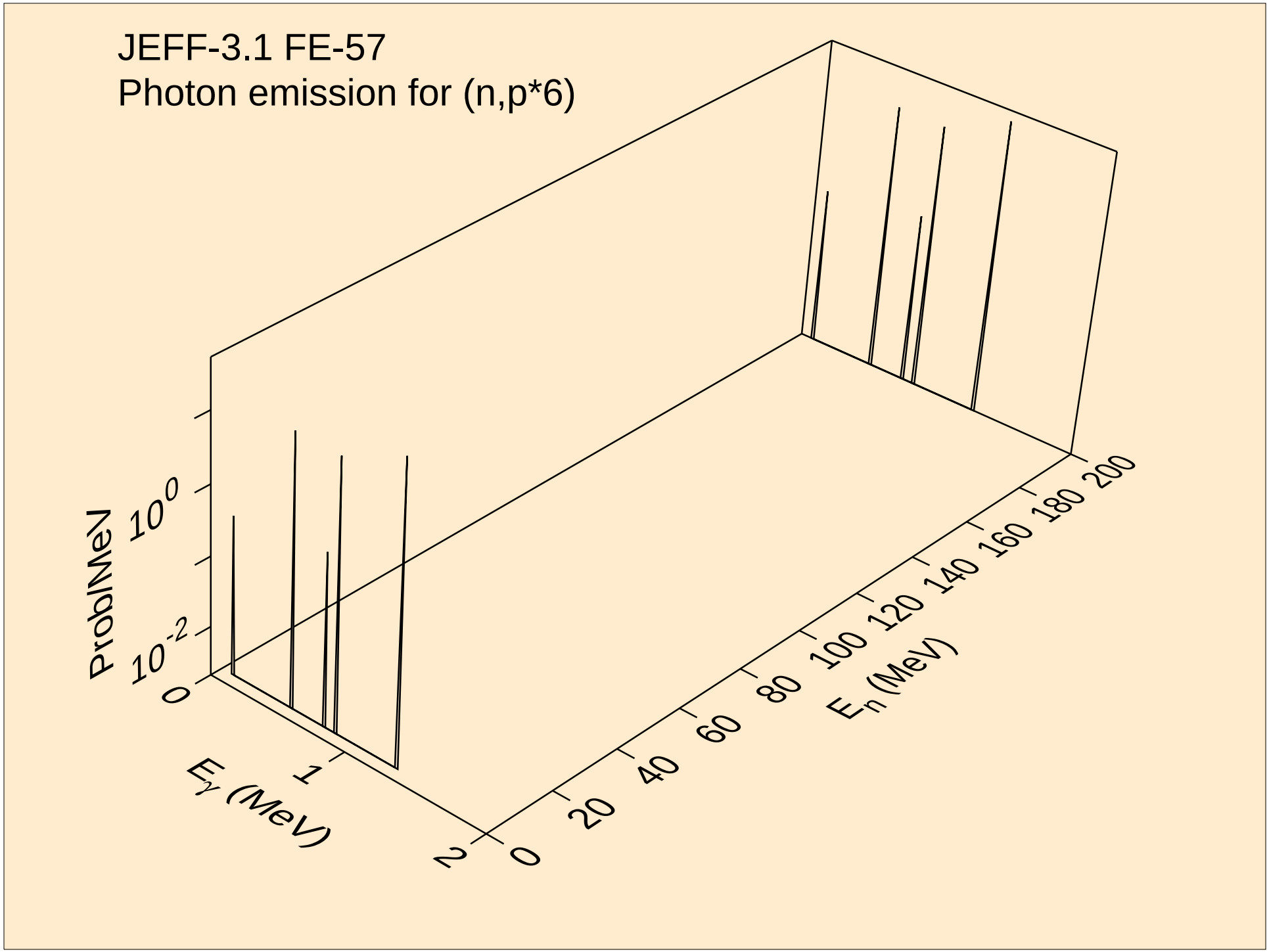

JEFF-3.1 FE-57
Photon emission for (n,p*1)
Prob/MeV
10^2
10^0
60
80
100
*10 -3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

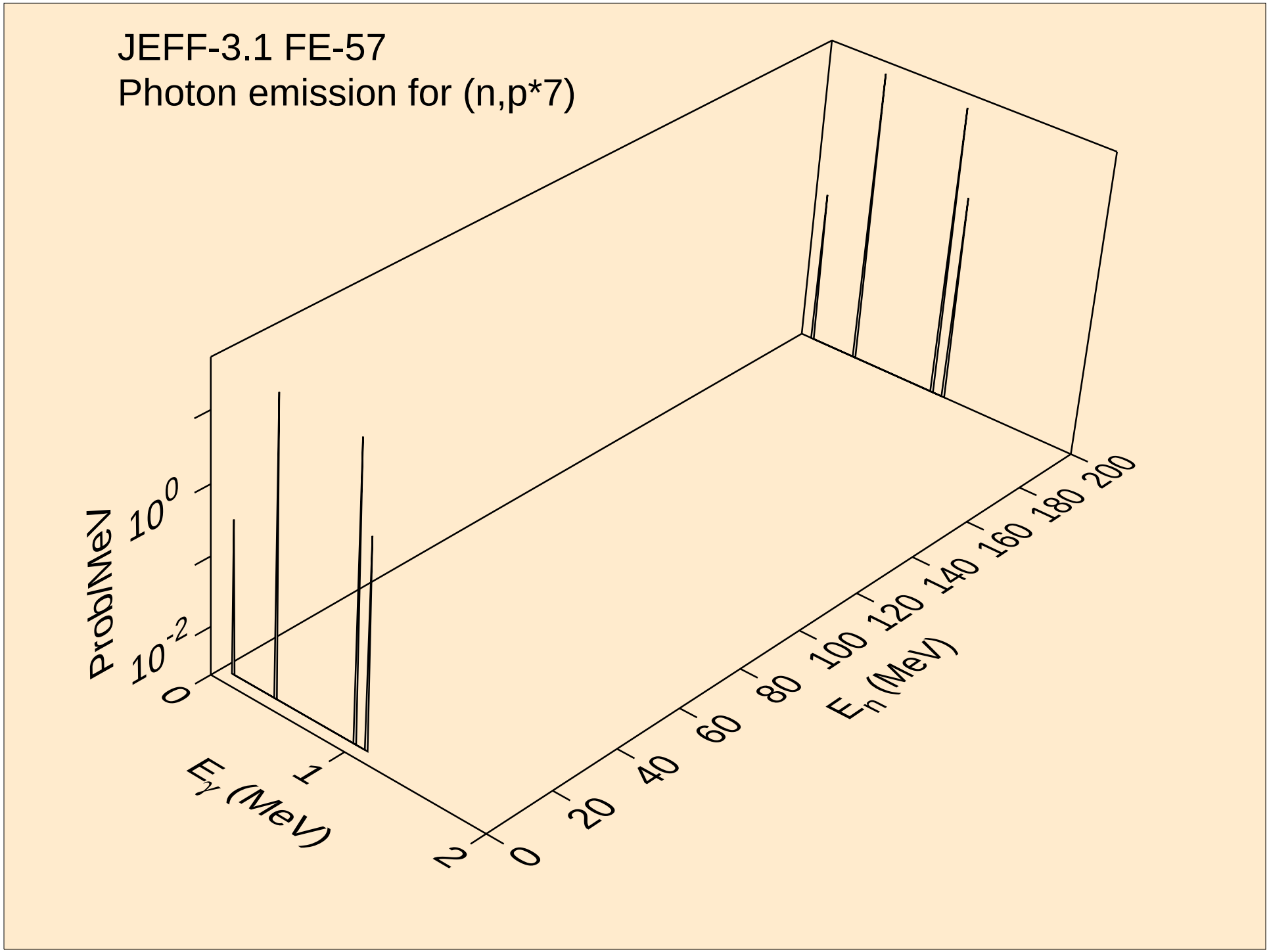

JEFF-3.1 FE-57
Photon emission for (n,p*2)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

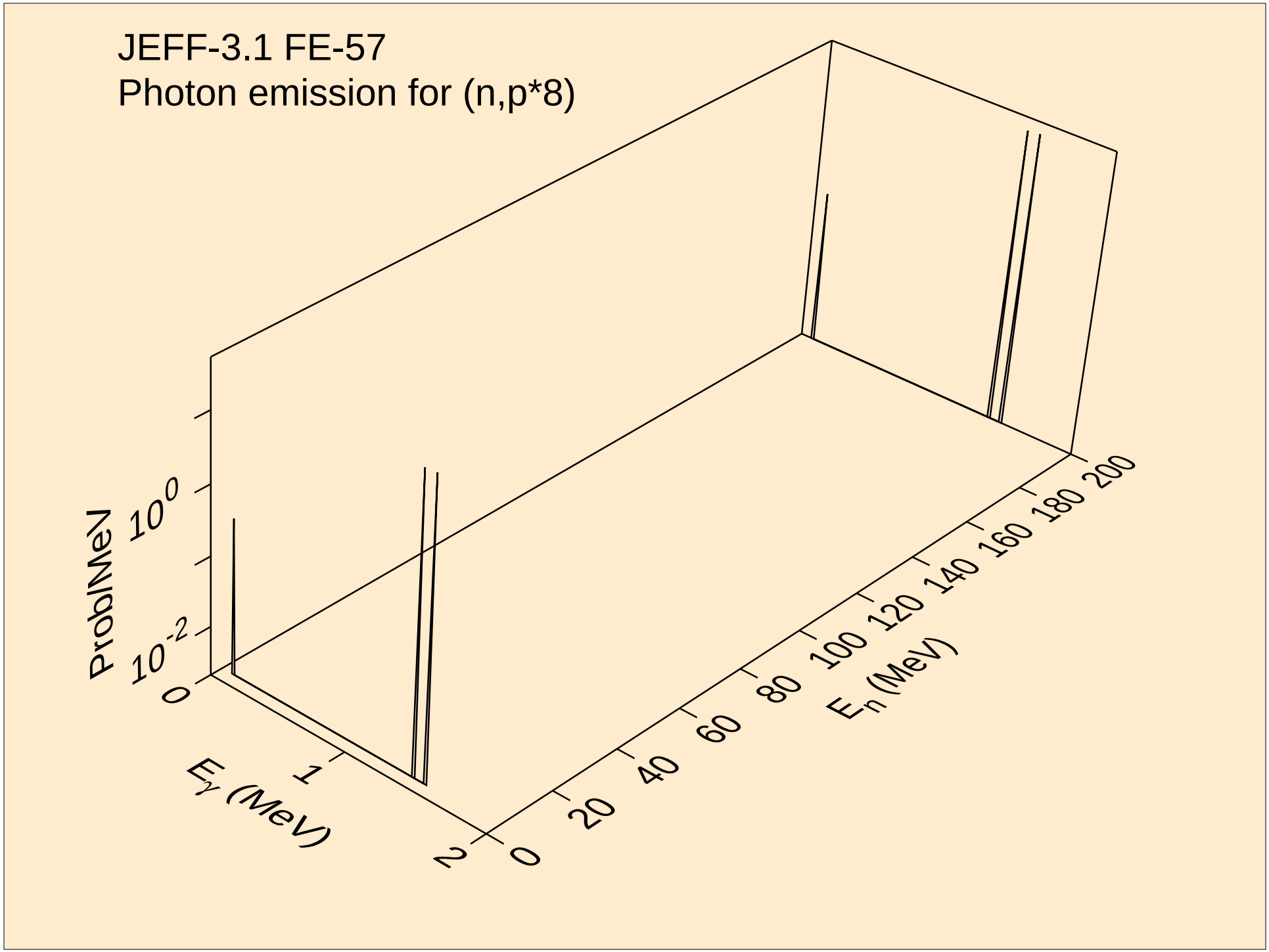

JEFF-3.1 FE-57
Photon emission for (n,p*3)
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
1.5
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

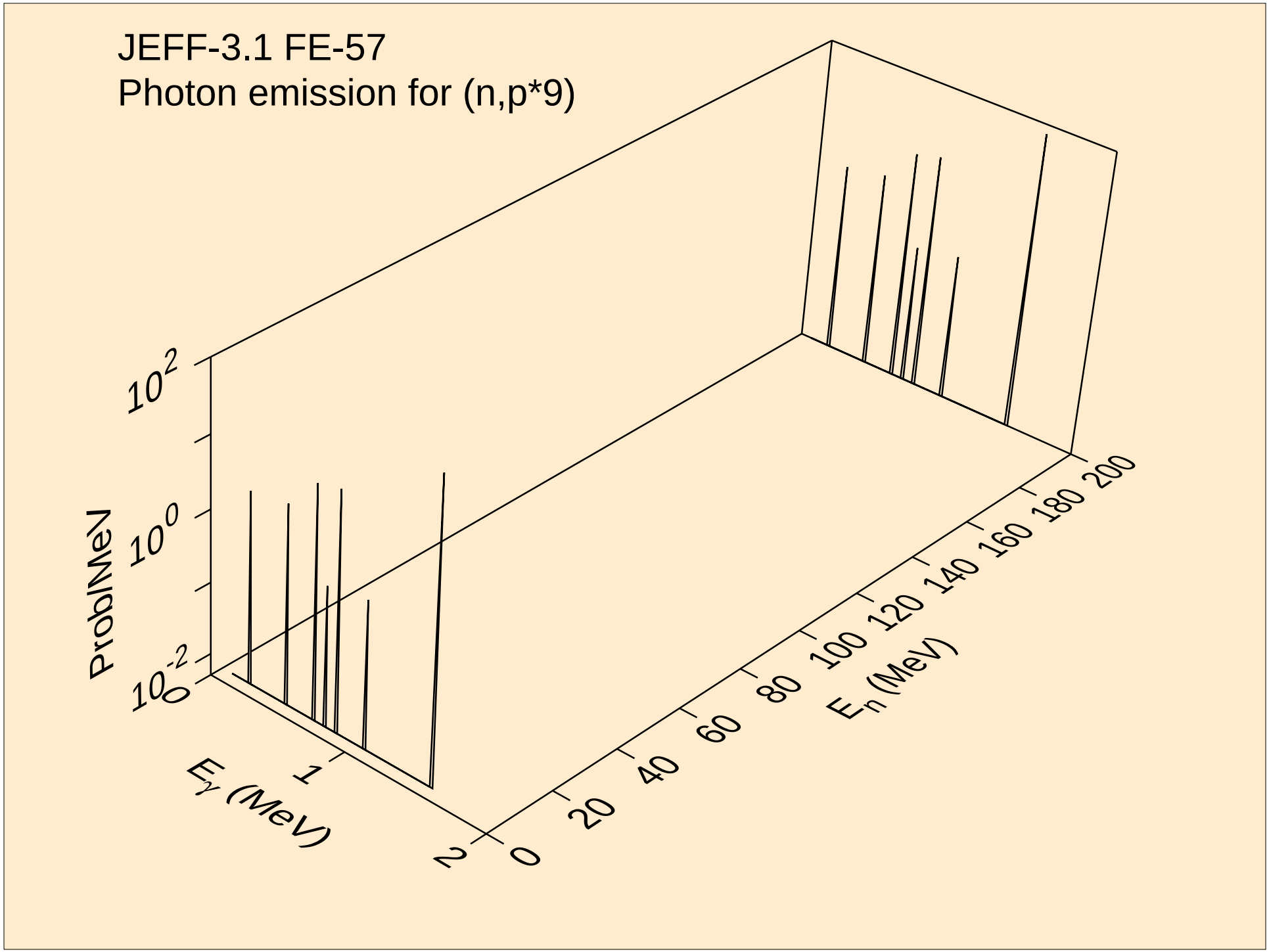

JEFF-3.1 FE-57
Photon emission for (n,p*4)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

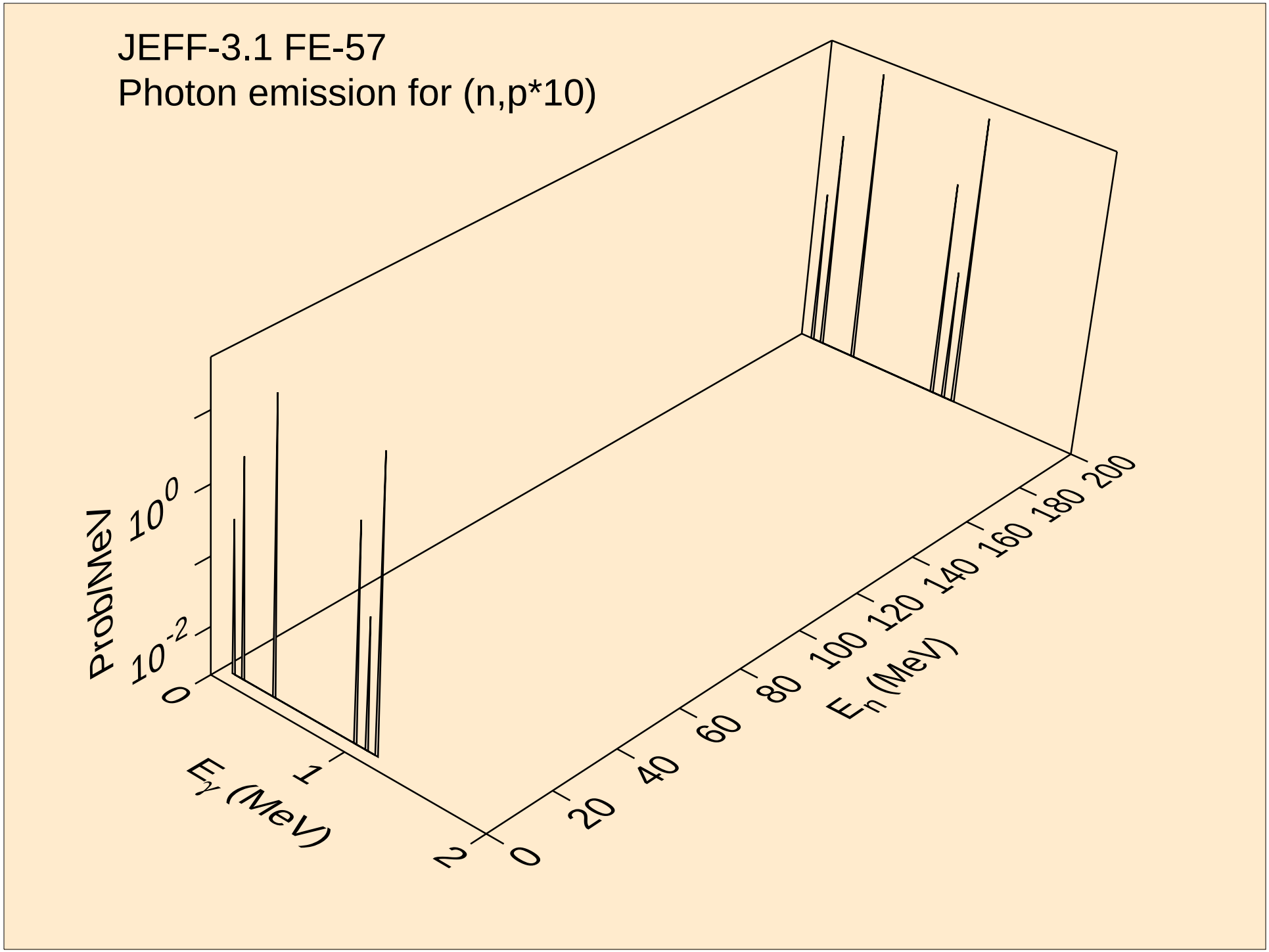

JEFF-3.1 FE-57
Photon emission for (n,p*5)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

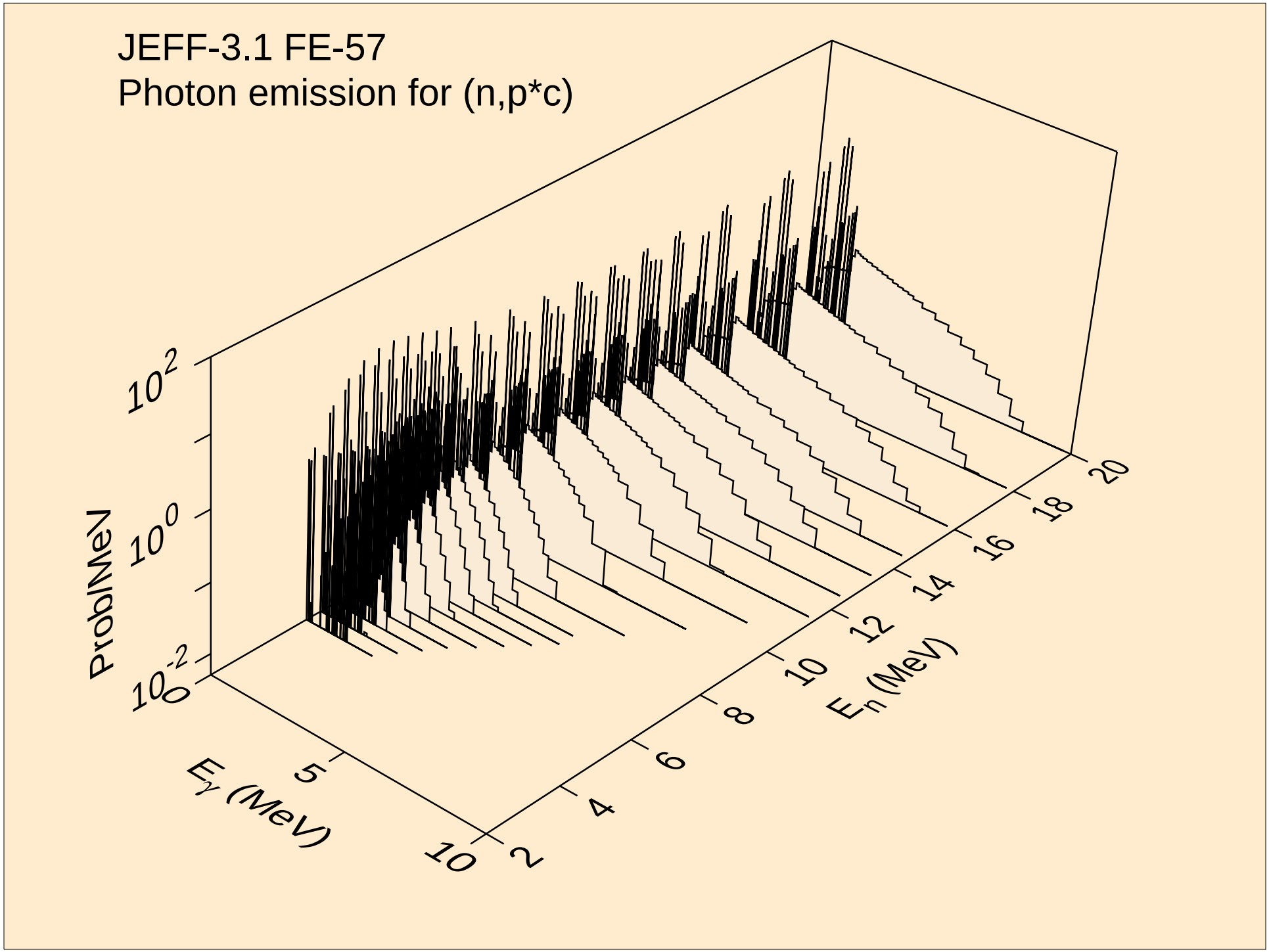

JEFF-3.1 FE-57
Photon emission for (n,p*6)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

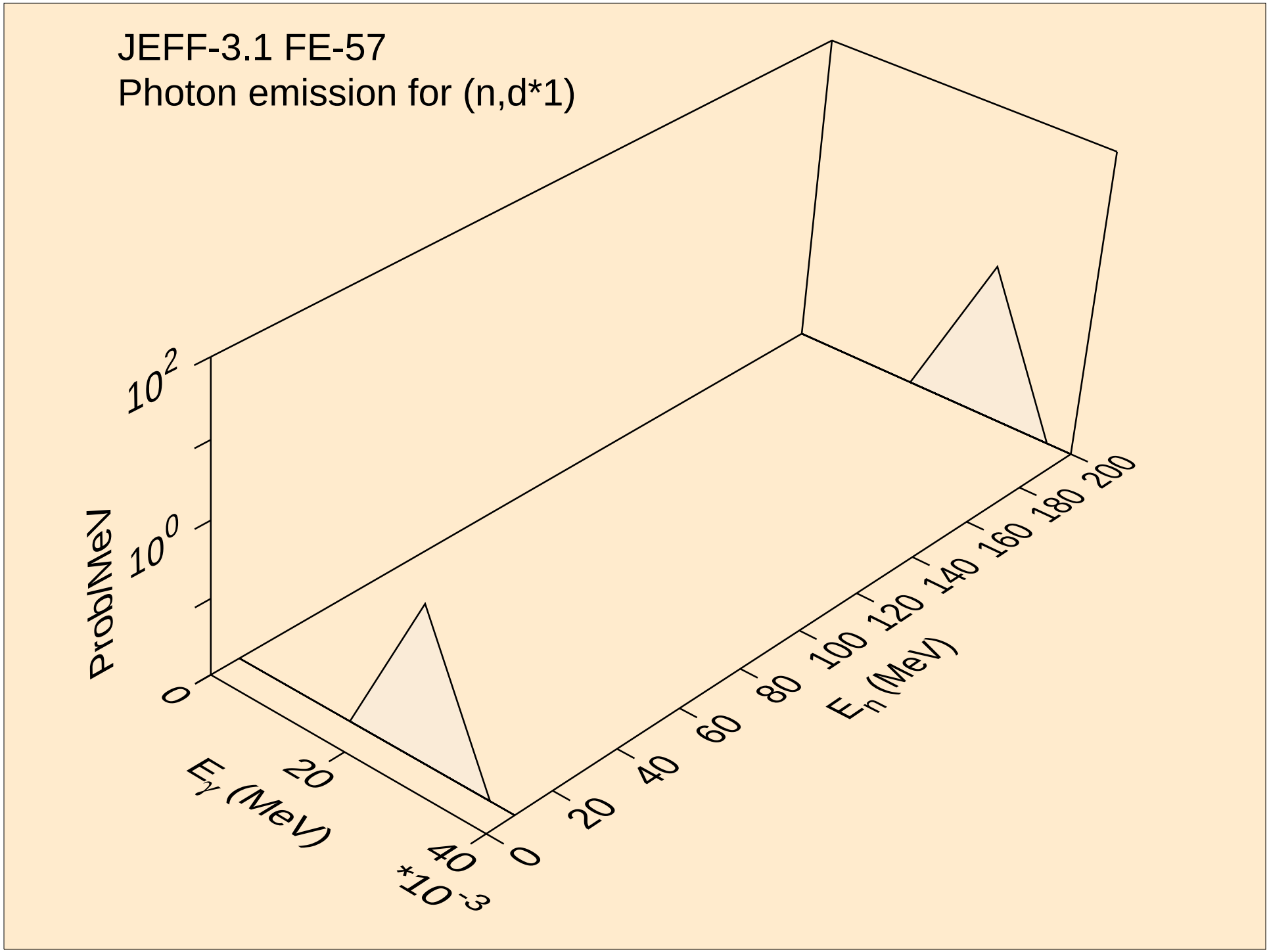

JEFF-3.1 FE-57
Photon emission for (n,p*7)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

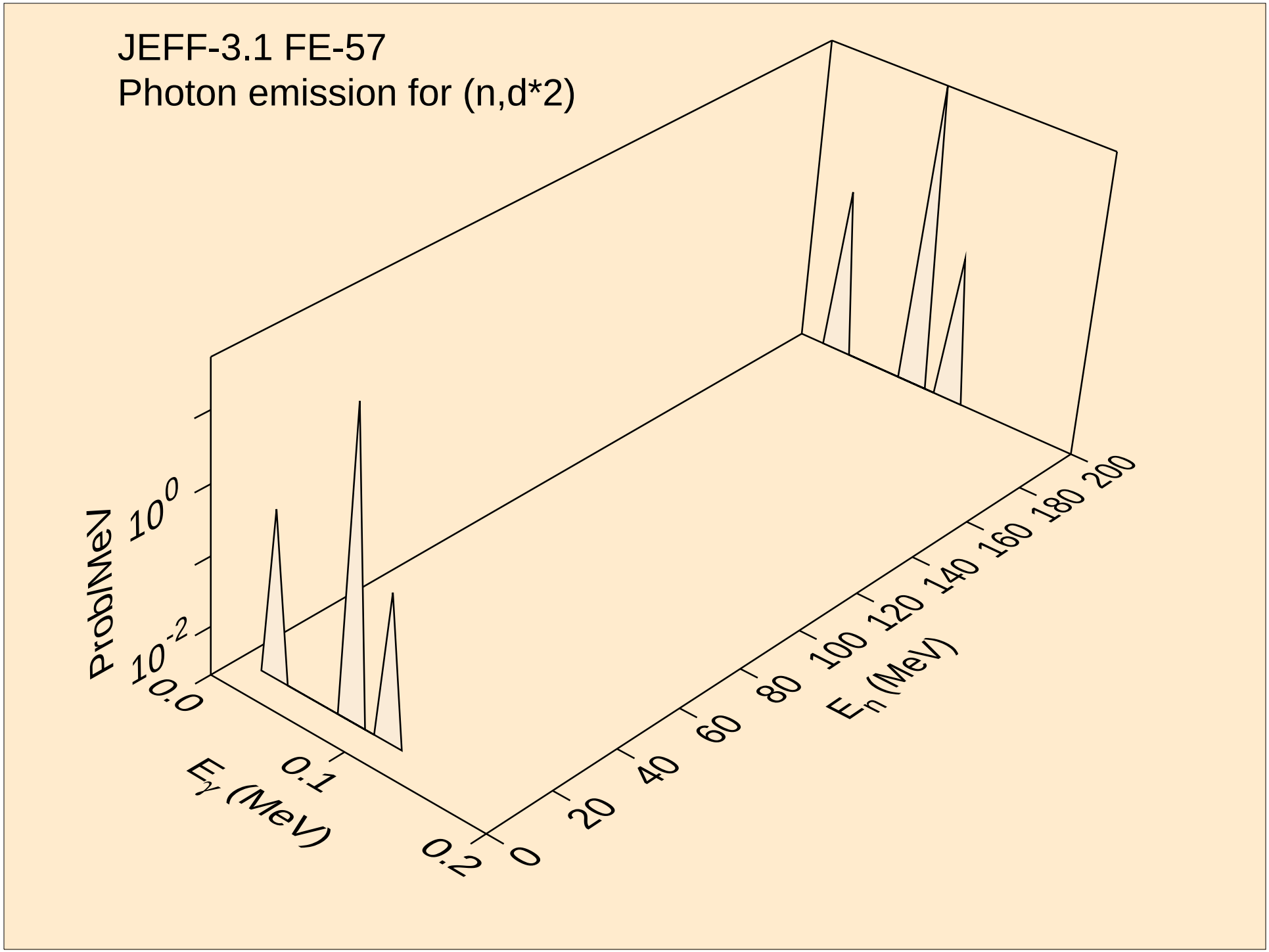

JEFF-3.1 FE-57
Photon emission for (n,p*8)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

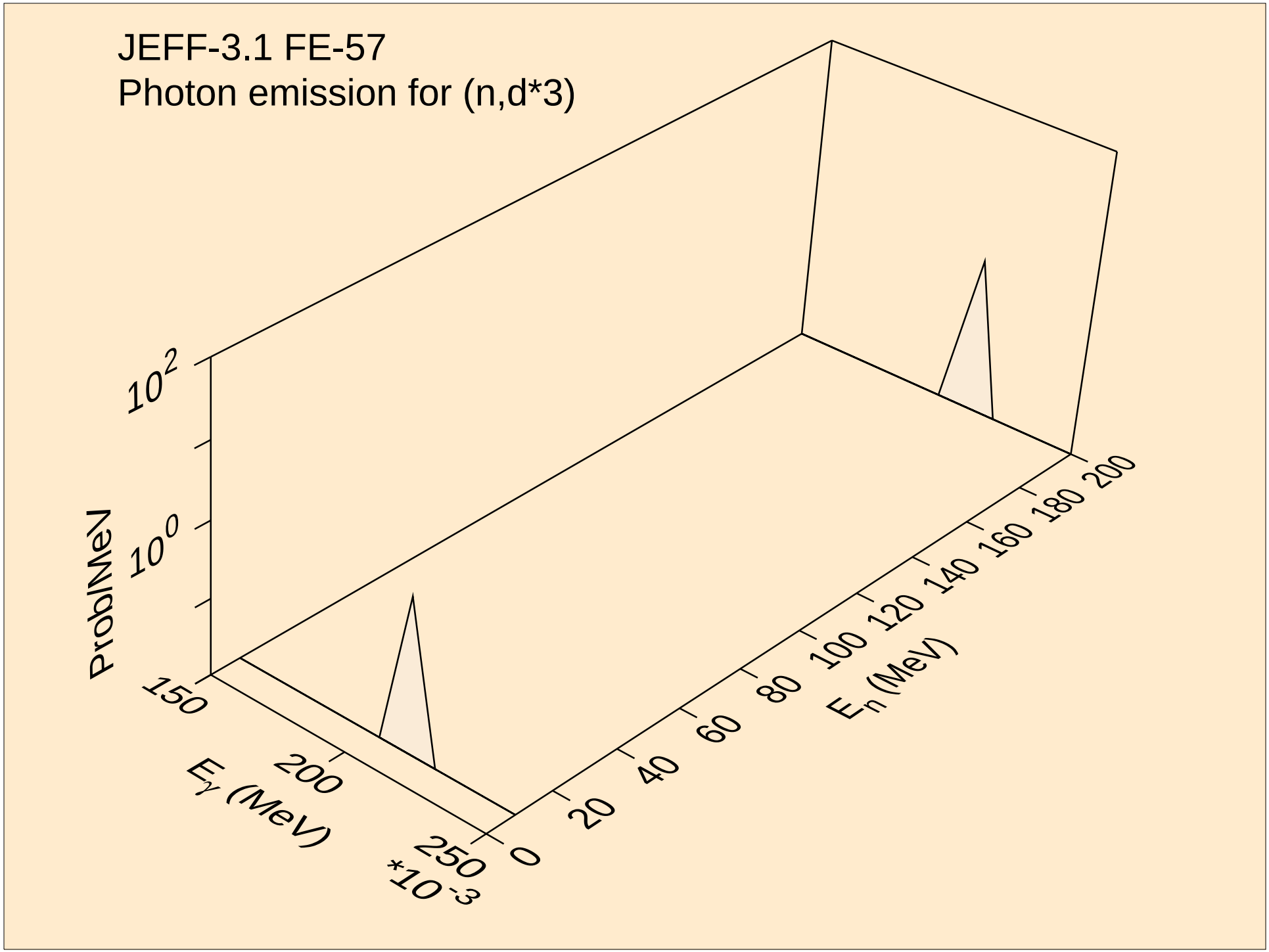

JEFF-3.1 FE-57
Photon emission for (n,p*9)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

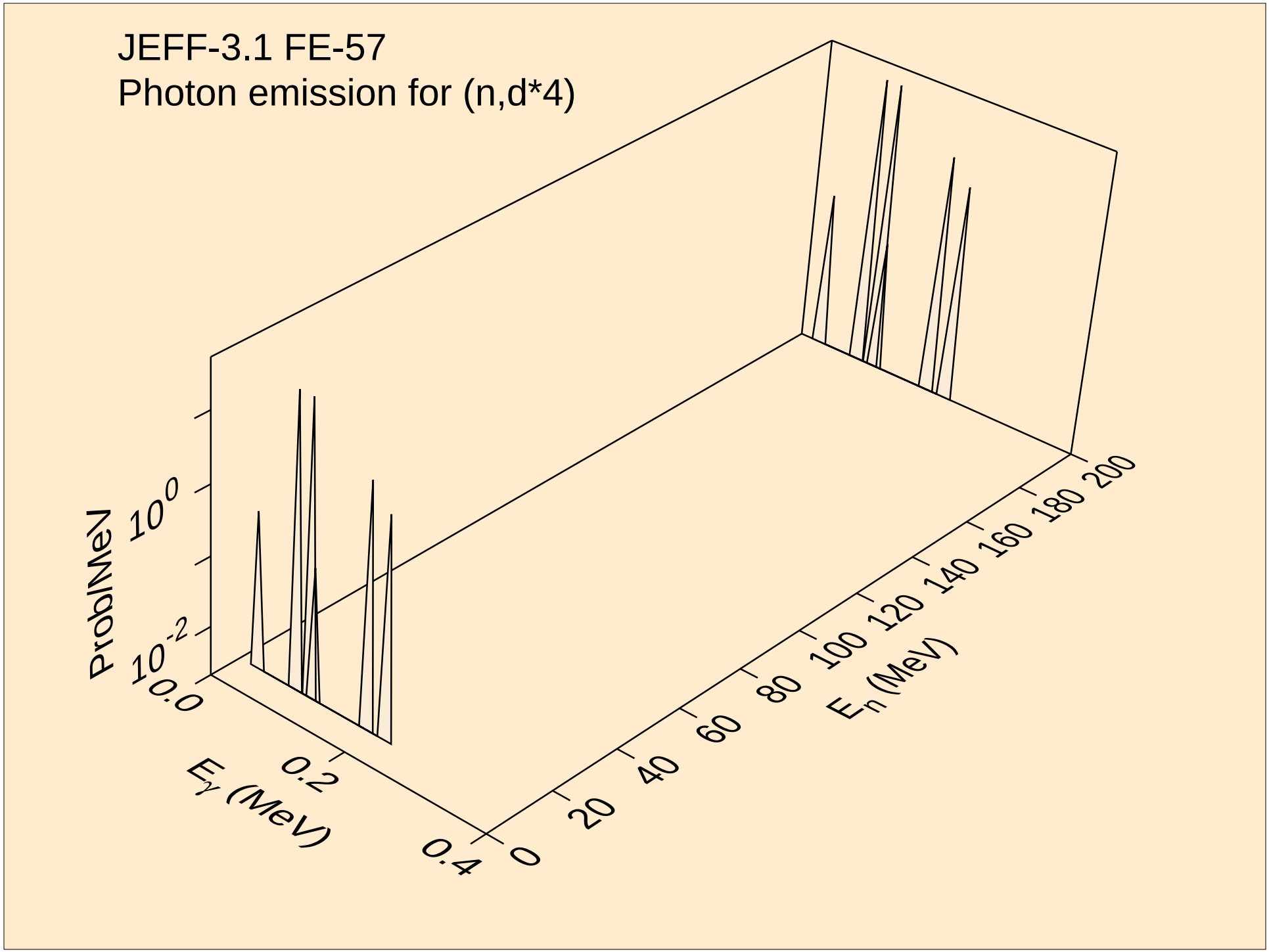

JEFF-3.1 FE-57
Photon emission for (n,p*10)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

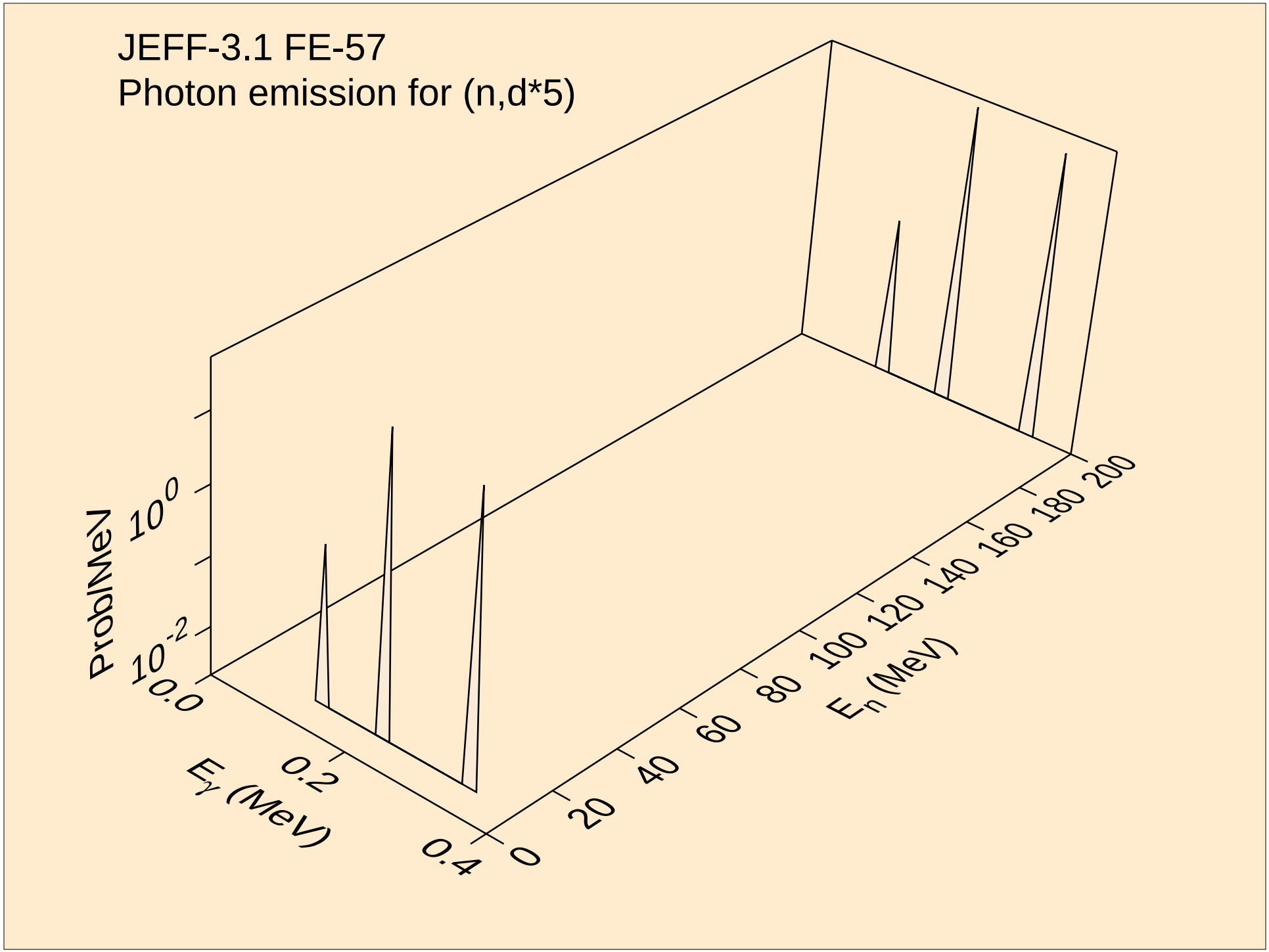

JEFF-3.1 FE-57
Photon emission for (n,p*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
5
10
E_n (MeV)
2
4
6
8
10
12
14
16
18
20

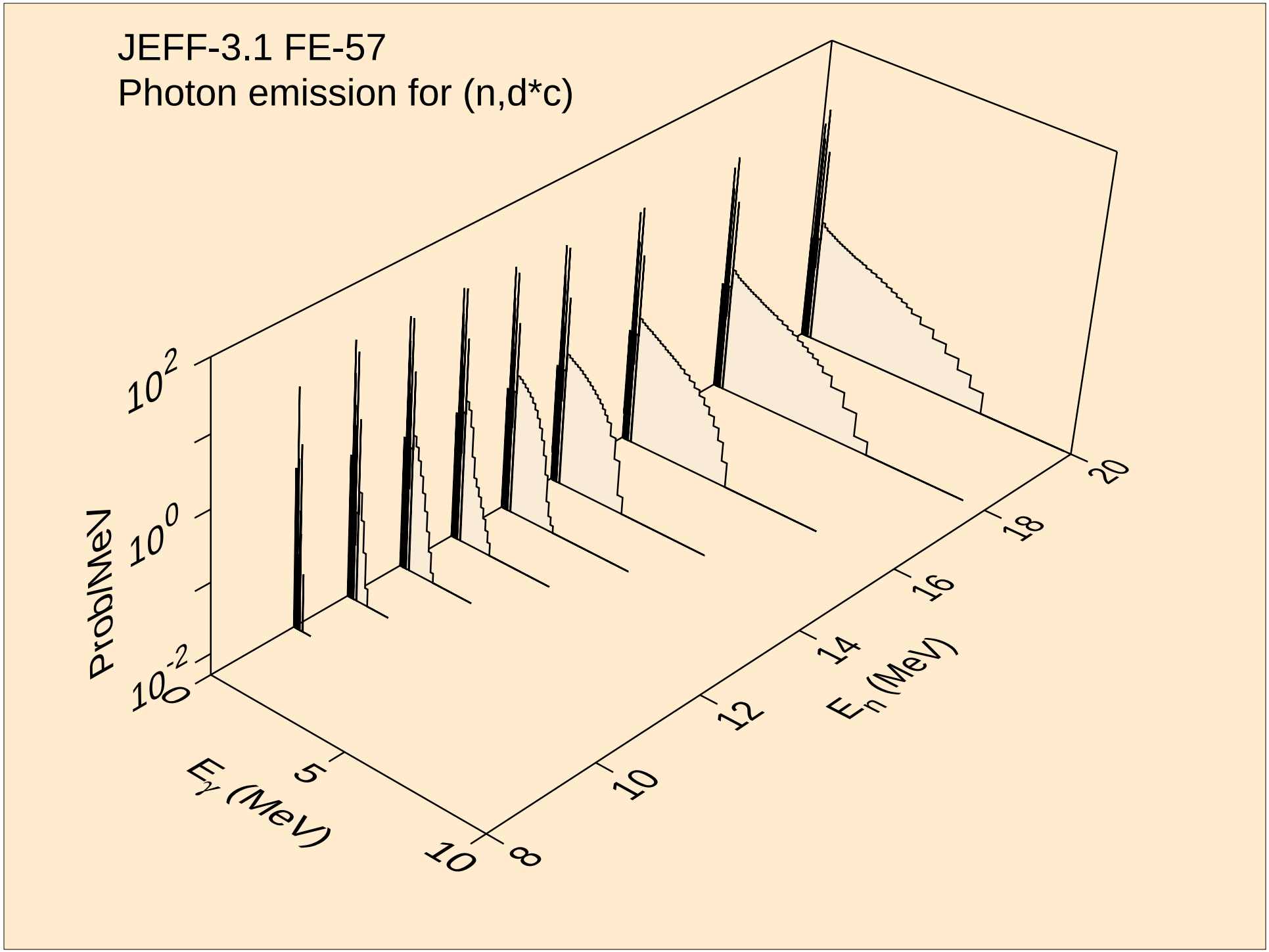

JEFF-3.1 FE-57
Photon emission for (n,d*1)
Prob/MeV
10^2
10^0
0
E_γ (MeV)
20
40
*10 -3
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

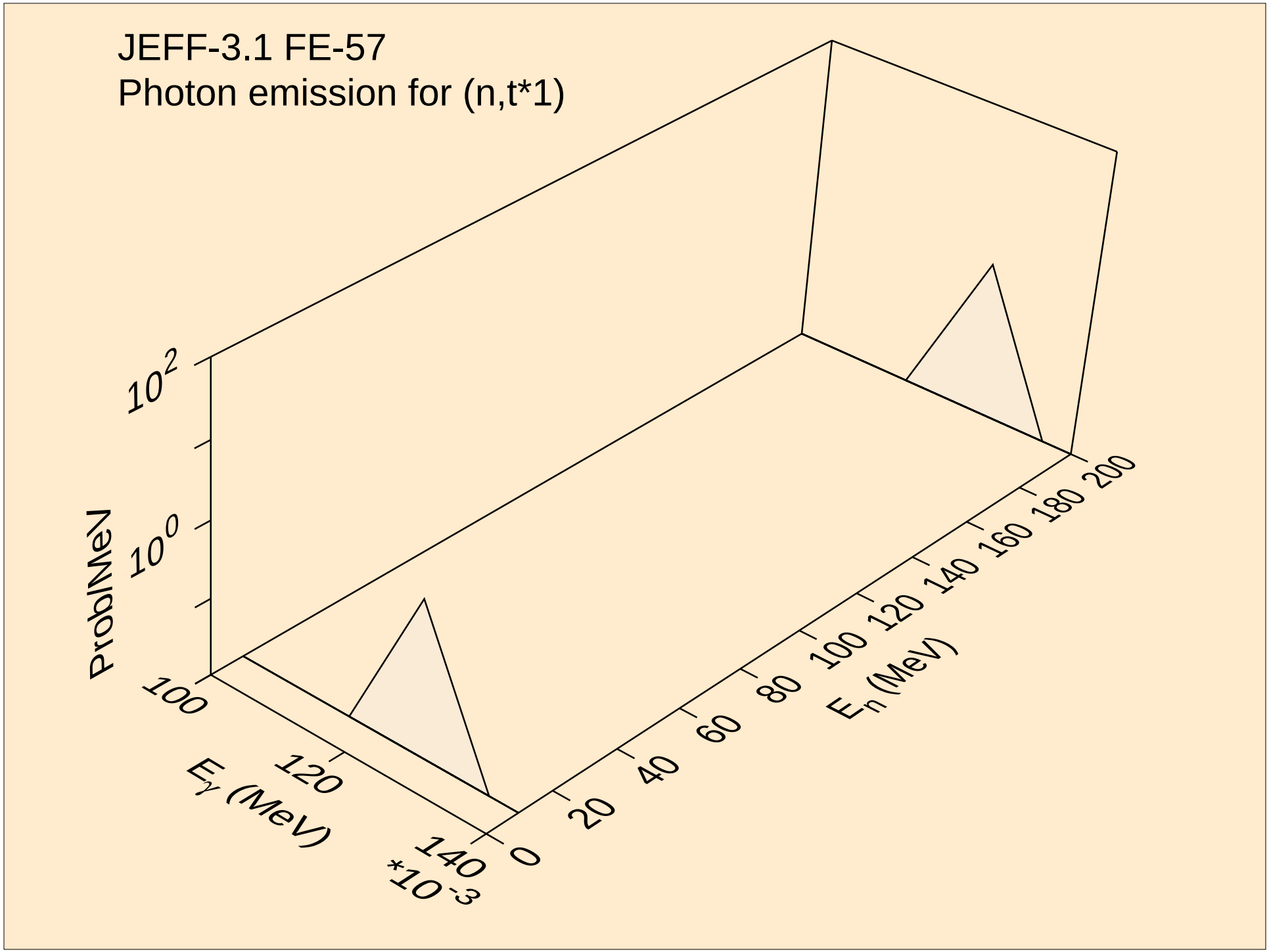

JEFF-3.1 FE-57
Photon emission for (n,d*2)
Prob/MeV
10^{0}
10^{-2}
0.0
0.1
0.2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

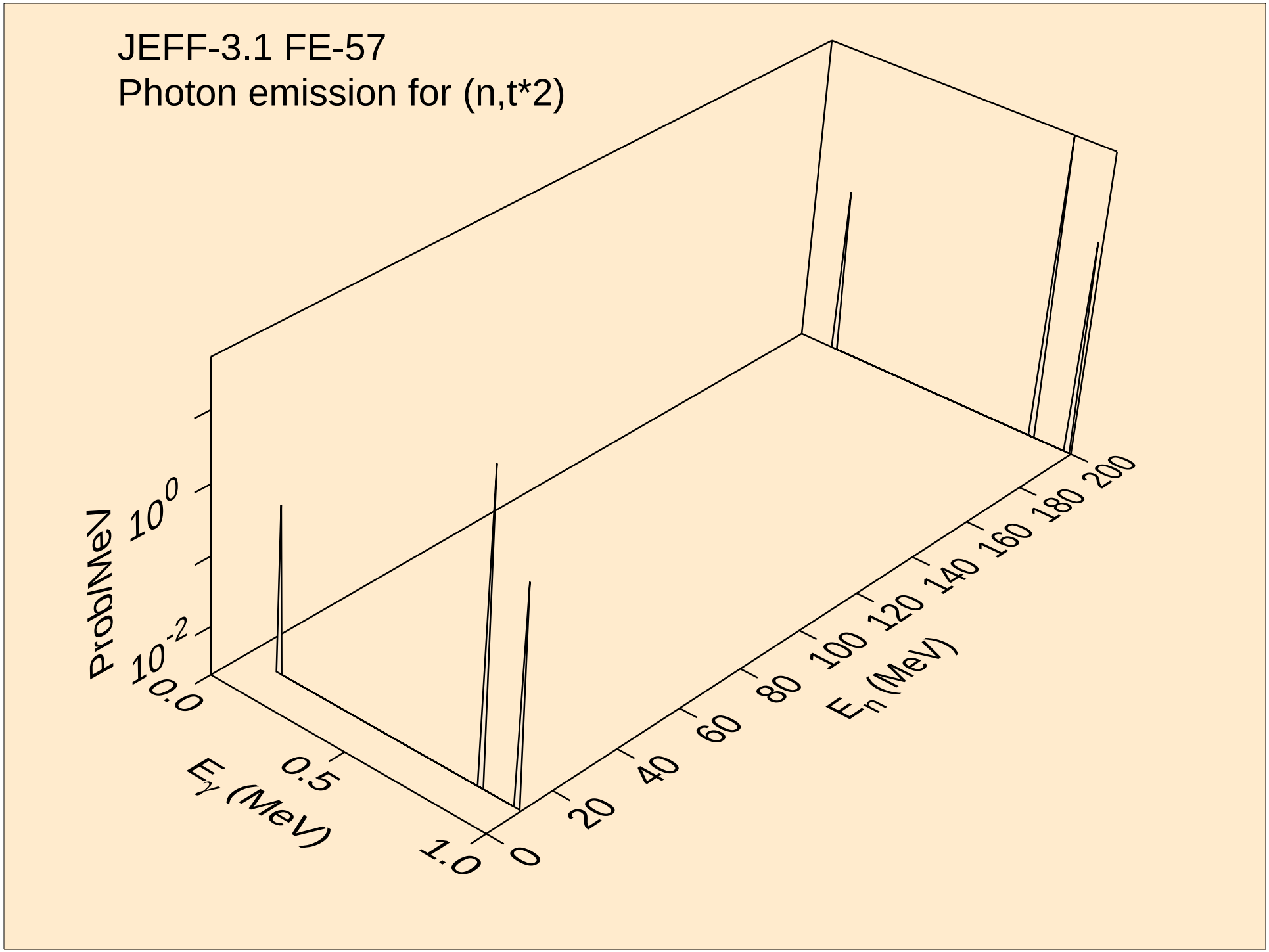

JEFF-3.1 FE-57
Photon emission for (n,d*3)
Prob/MeV
10^2
10^0
150
200
250
E_γ (MeV)
*10 -3
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

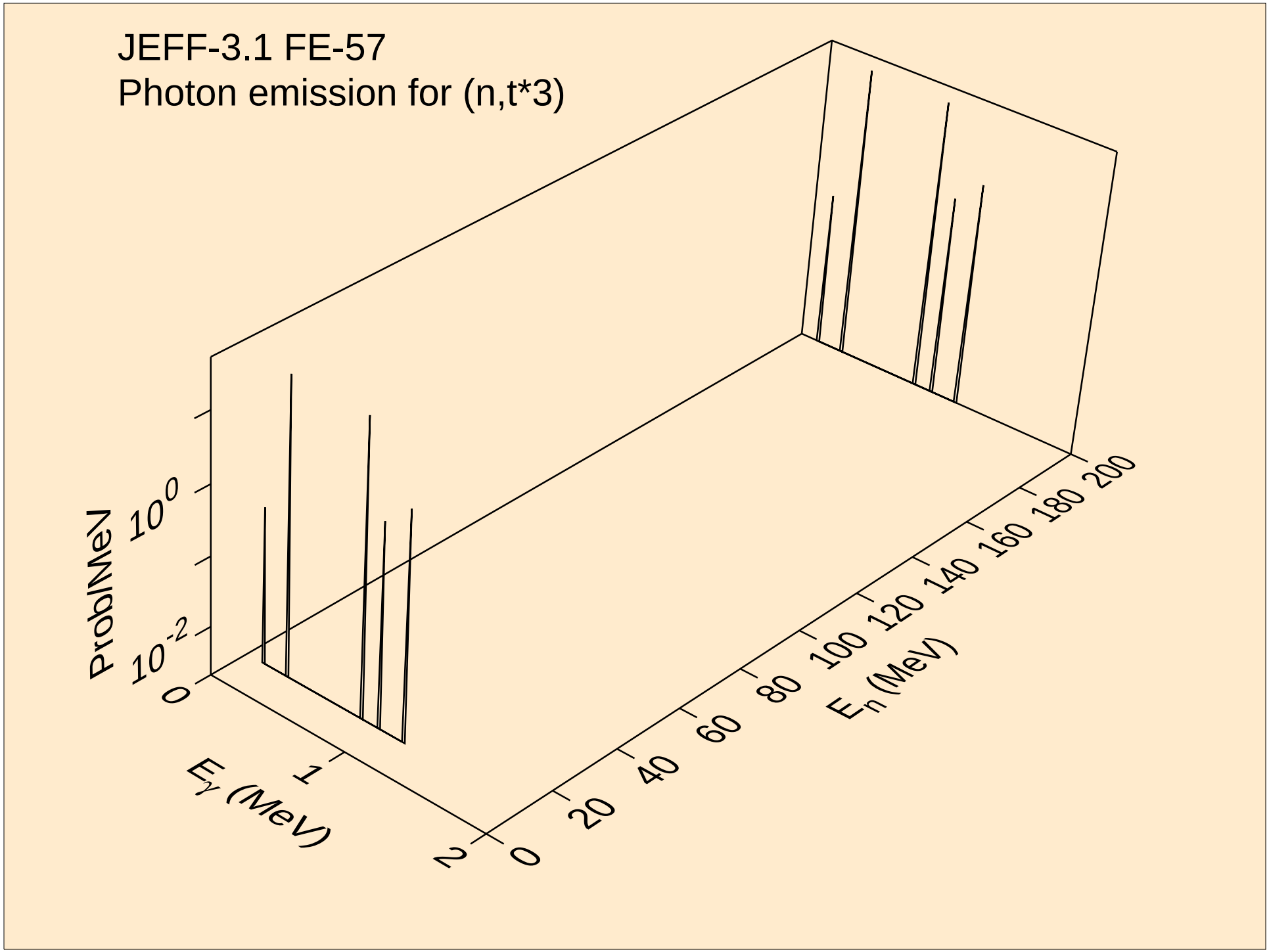

JEFF-3.1 FE-57
Photon emission for (n,d*4)
Prob/MeV
10^0
10^-2
0.0
0.2
0.4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

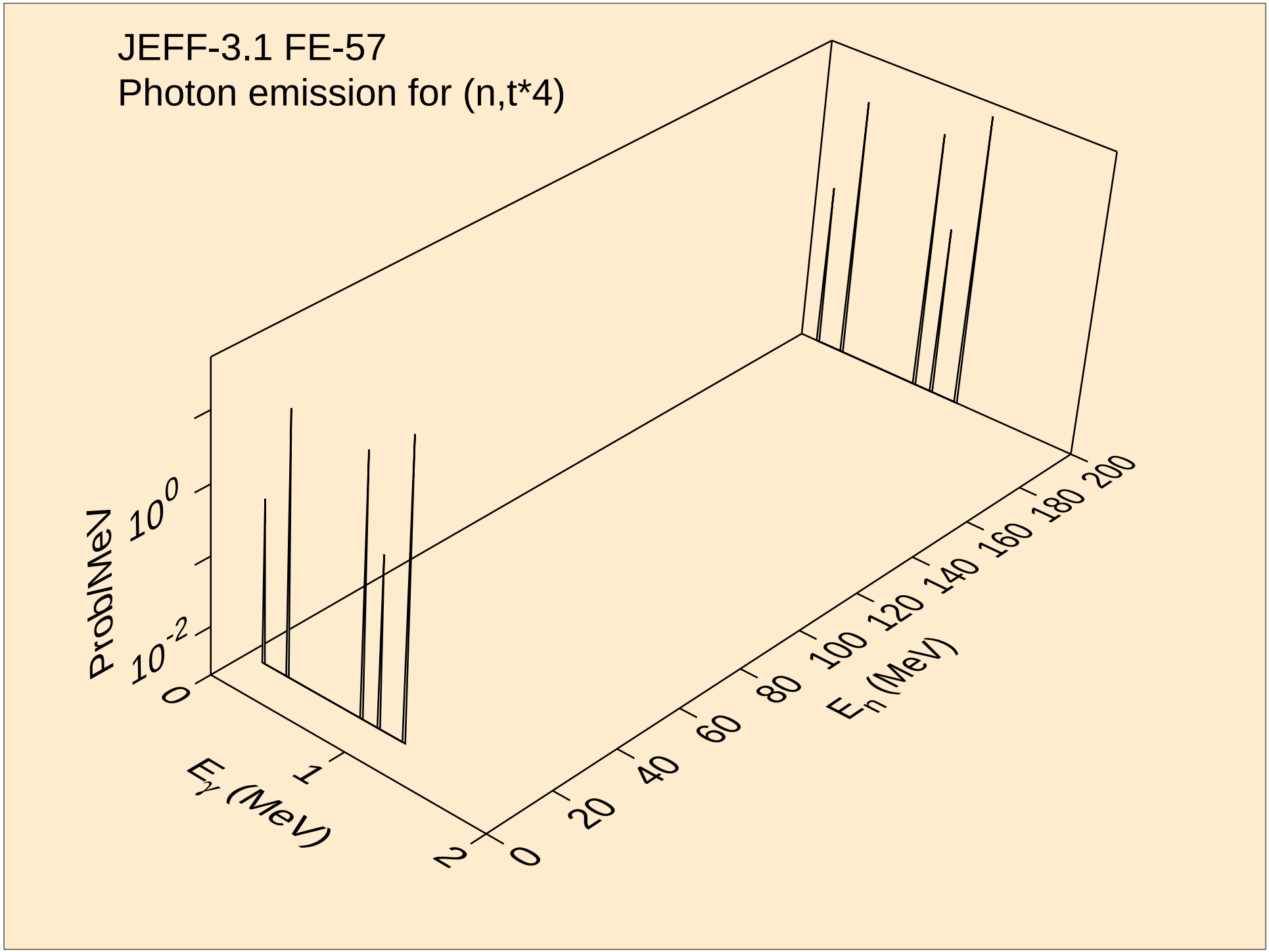

JEFF-3.1 FE-57
Photon emission for (n,d*5)
Prob/MeV
10^{0}
10^{-2}
0.0
0.2
0.4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

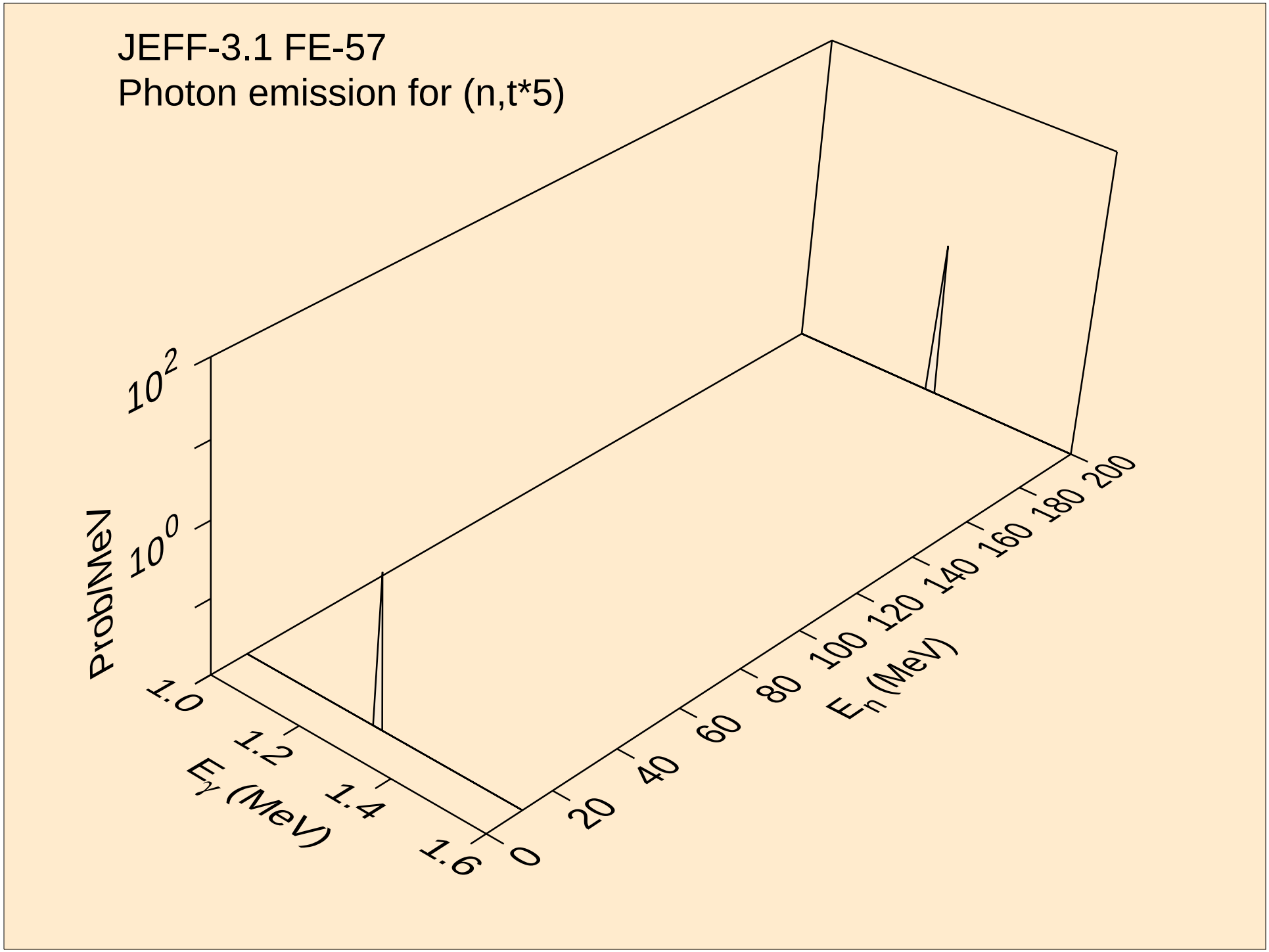

JEFF-3.1 FE-57
Photon emission for (n,d*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
5
10
E_γ (MeV)
8
10
12
14
16
18
20
E_n (MeV)

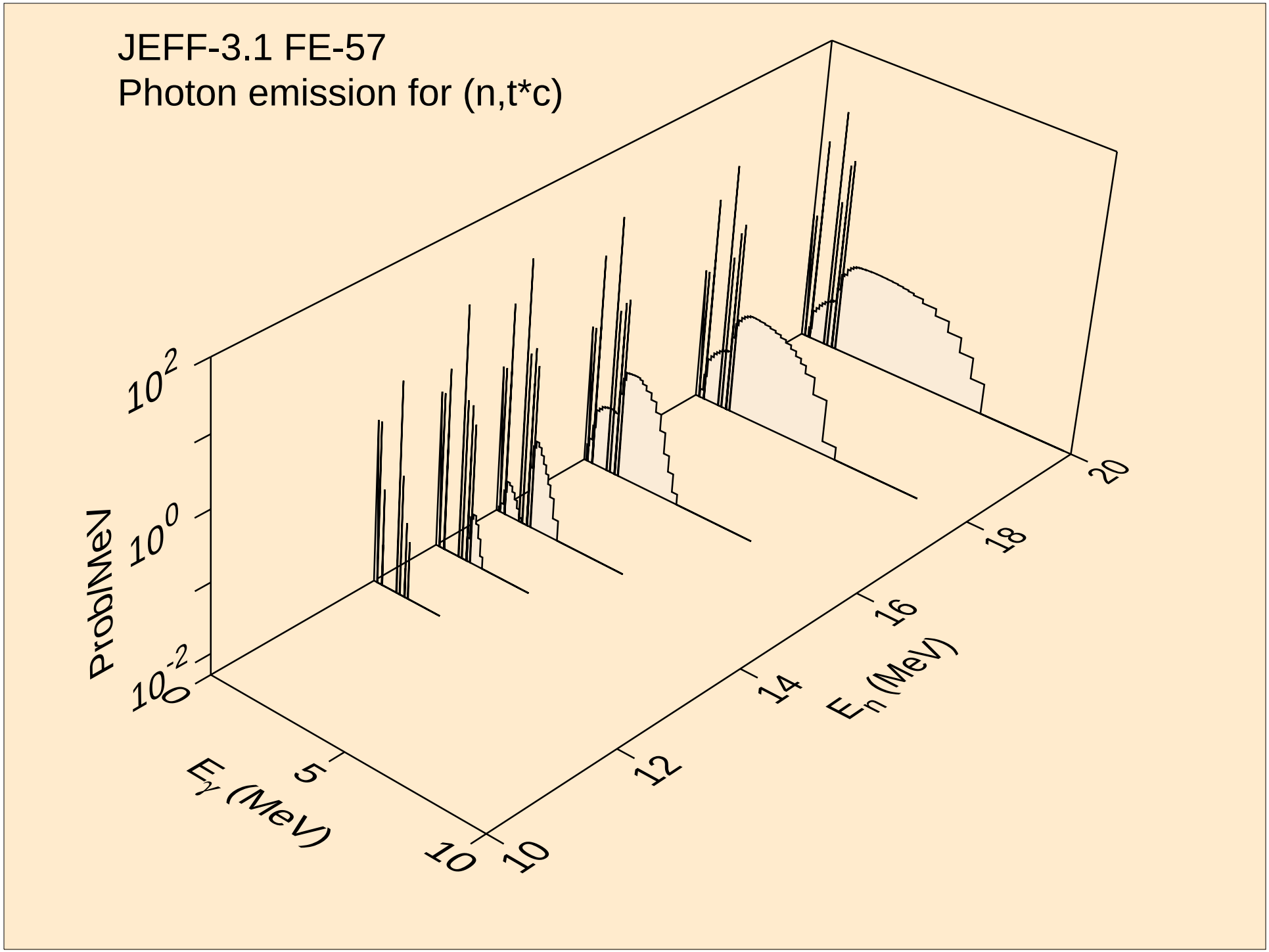

JEFF-3.1 FE-57
Photon emission for (n,t*1)
Prob/MeV
10^2
10^0
100
120
140
E_γ (MeV)
*10 -3
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

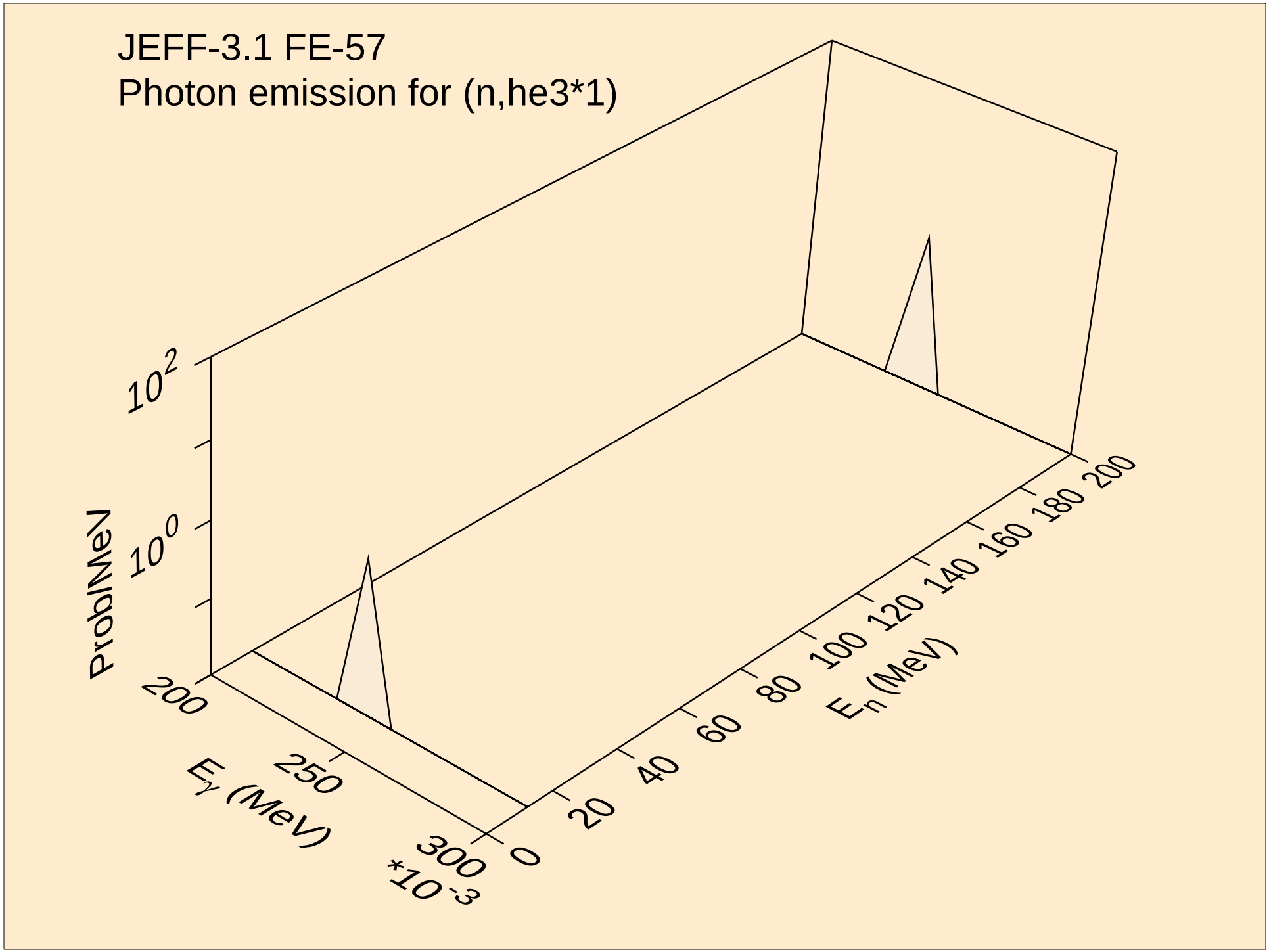

JEFF-3.1 FE-57
Photon emission for (n,t*2)
Prob/MeV
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

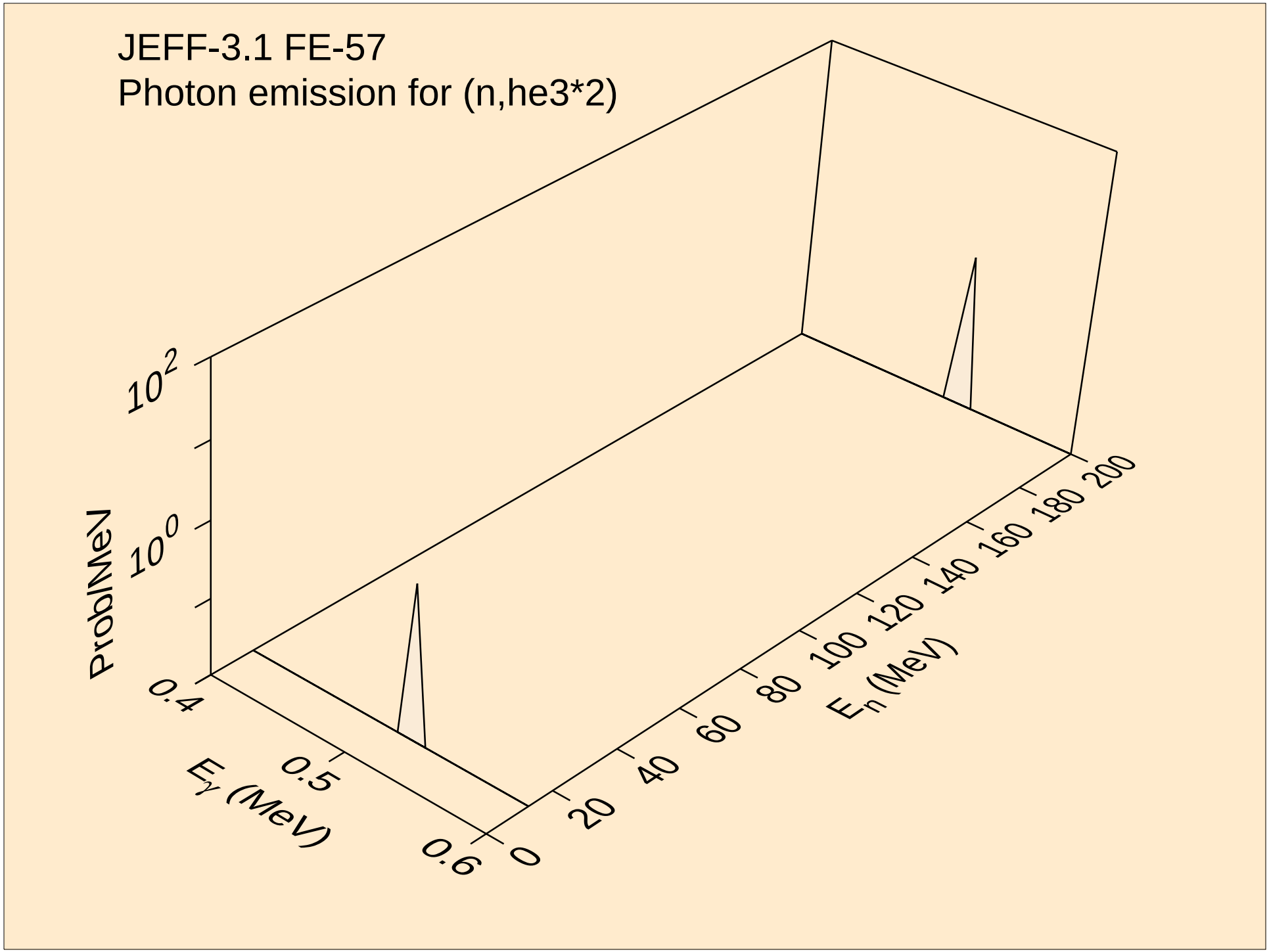

JEFF-3.1 FE-57
Photon emission for (n,t*3)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

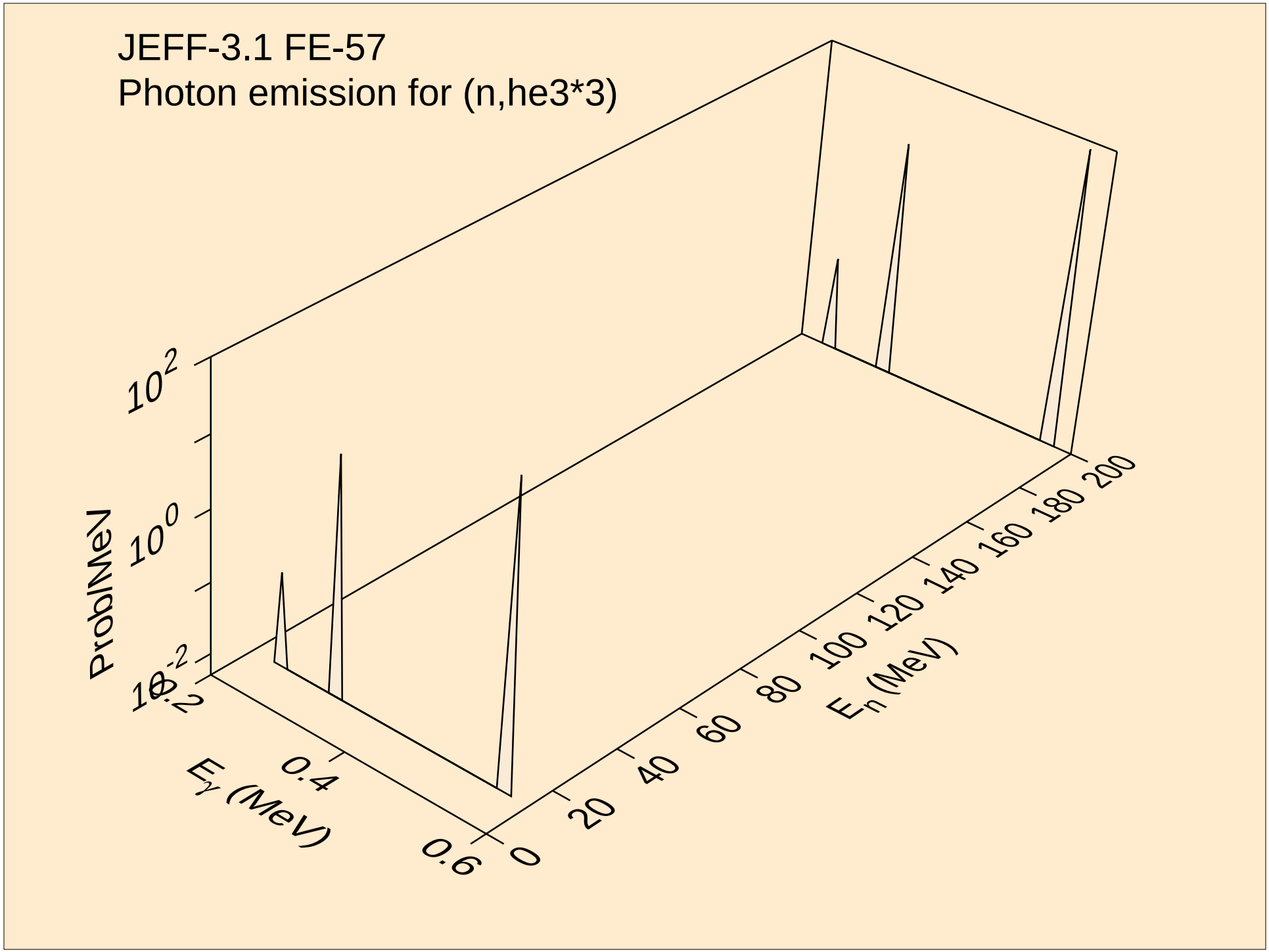

JEFF-3.1 FE-57
Photon emission for (n,t*4)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

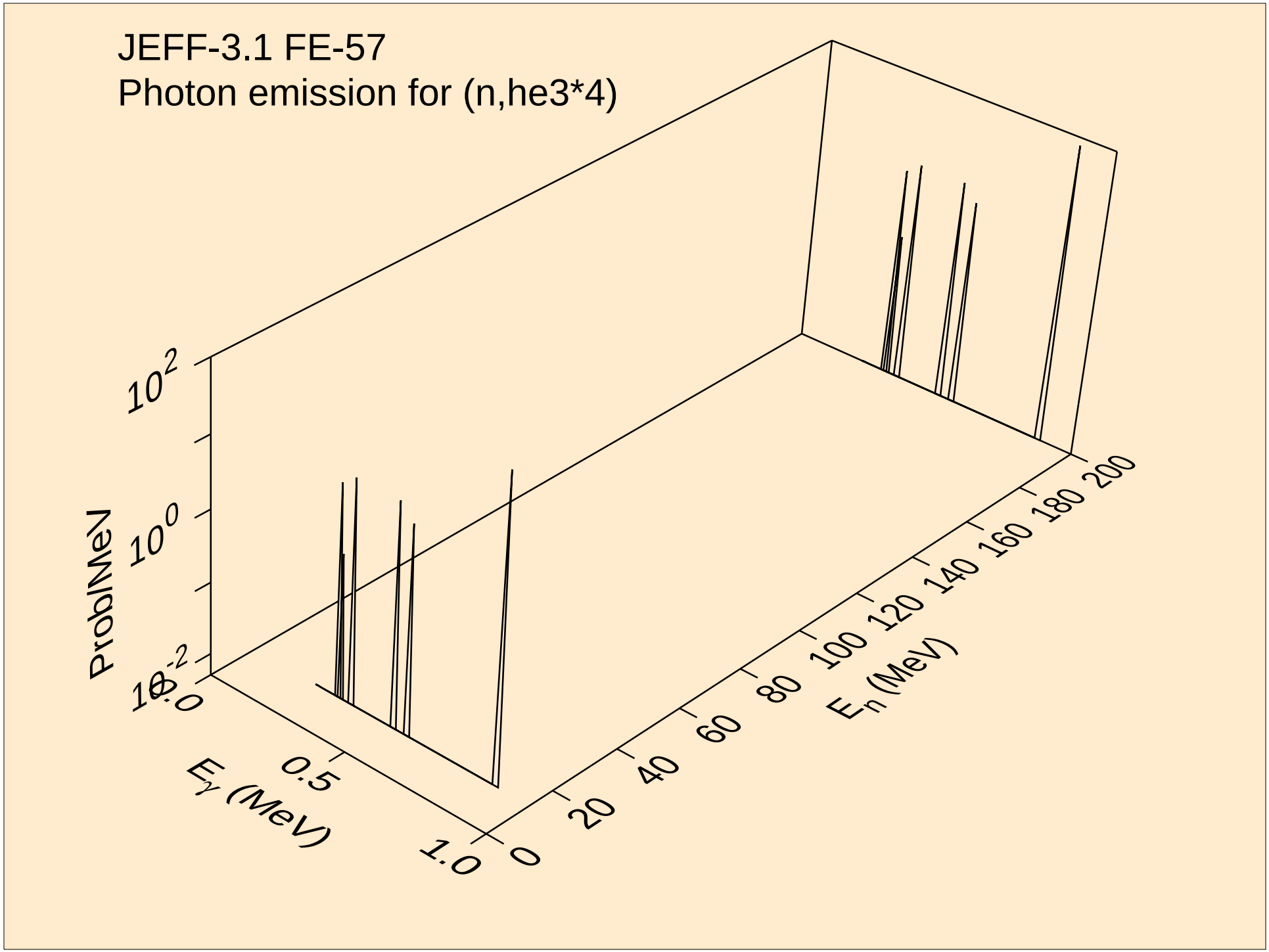

JEFF-3.1 FE-57
Photon emission for (n,t*5)
Prob/MeV
10^2
10^0
1.0
1.2
1.4
1.6
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

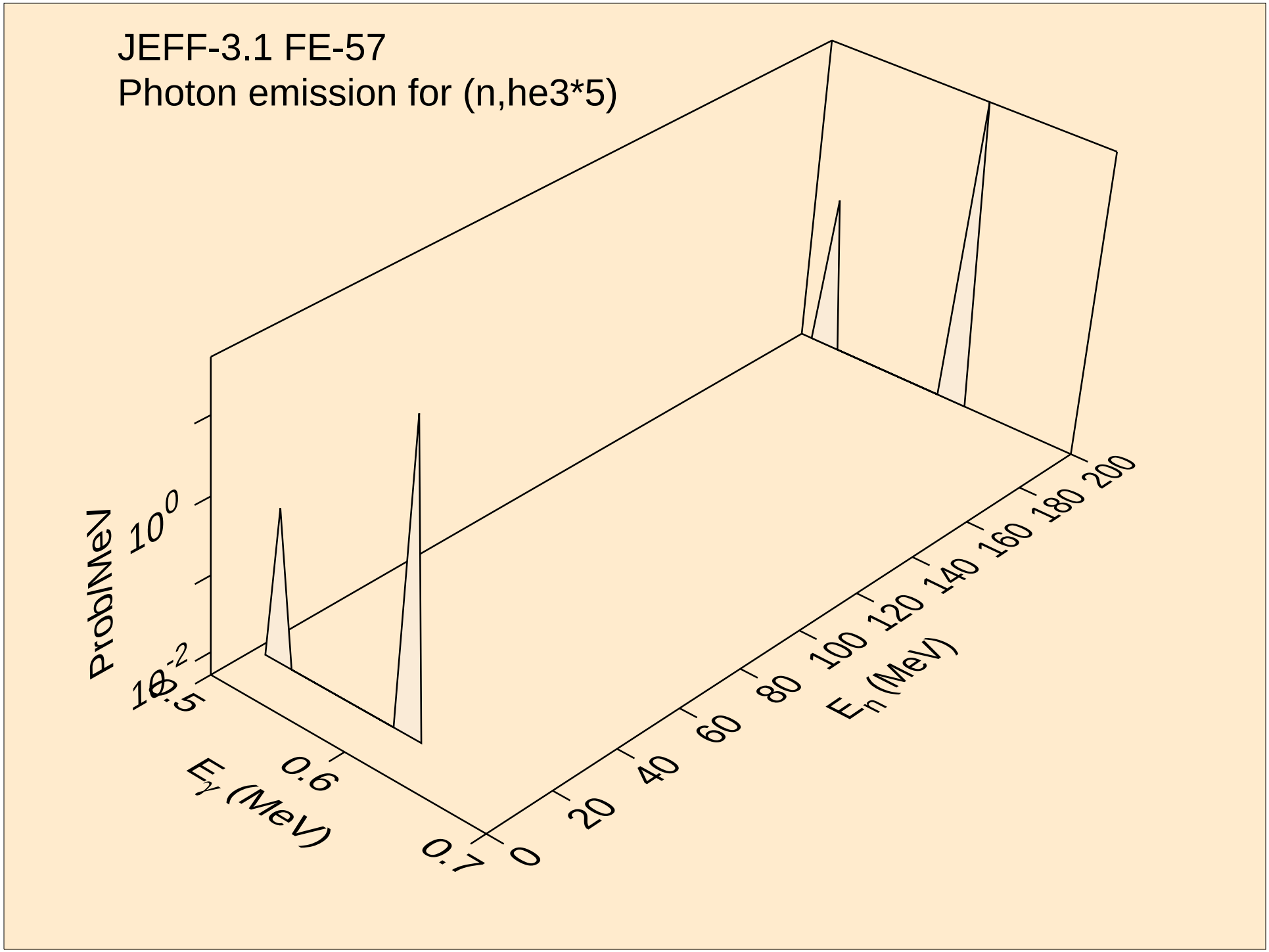

JEFF-3.1 FE-57
Photon emission for (n,t*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
5
10
E_γ (MeV)
10
12
14
16
18
20
E_n (MeV)

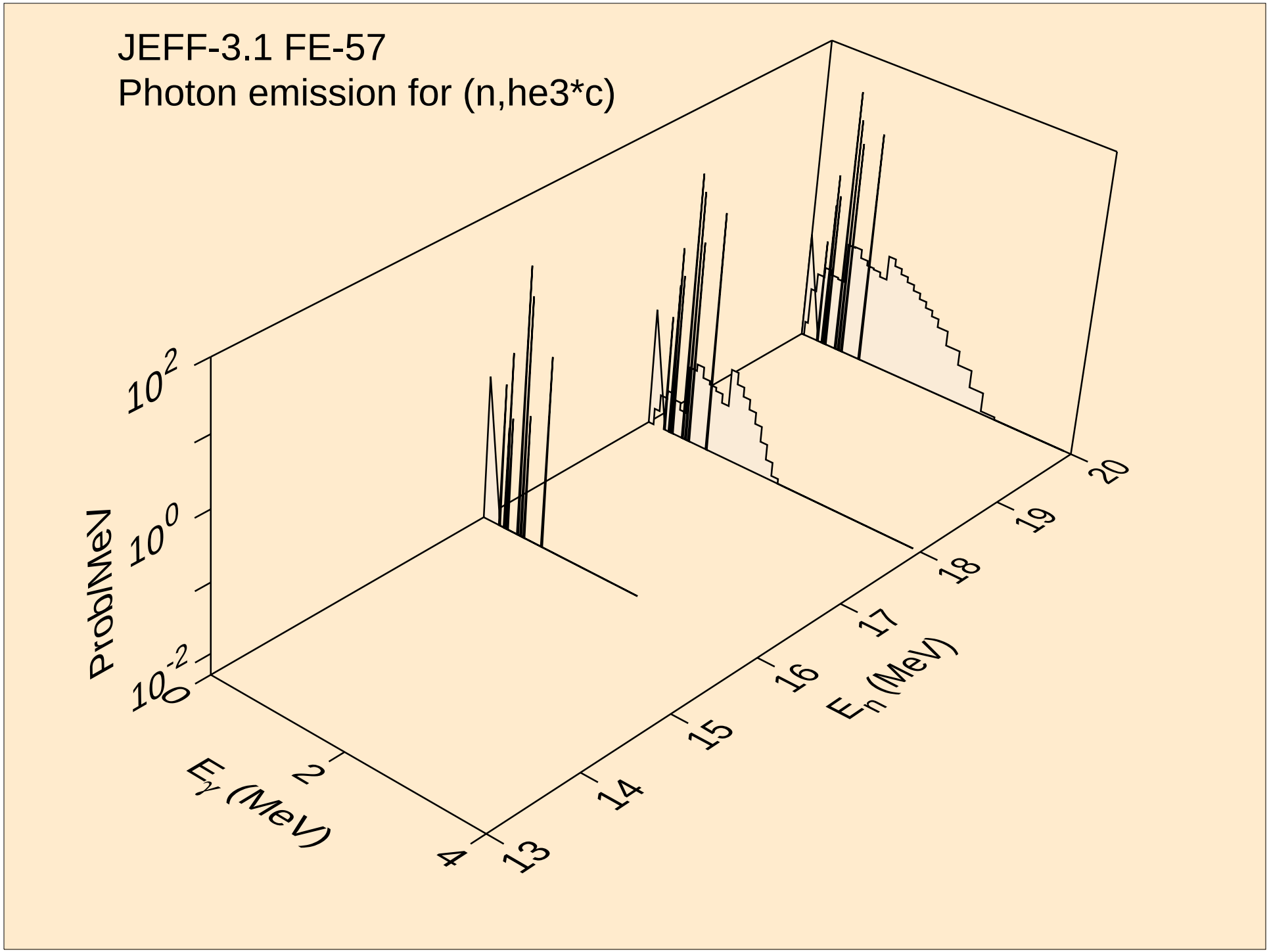

JEFF-3.1 FE-57
Photon emission for (n,he3*1)
Prob/MeV
10^2
10^0
200
250
300
E_γ (MeV)
*10 -3
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

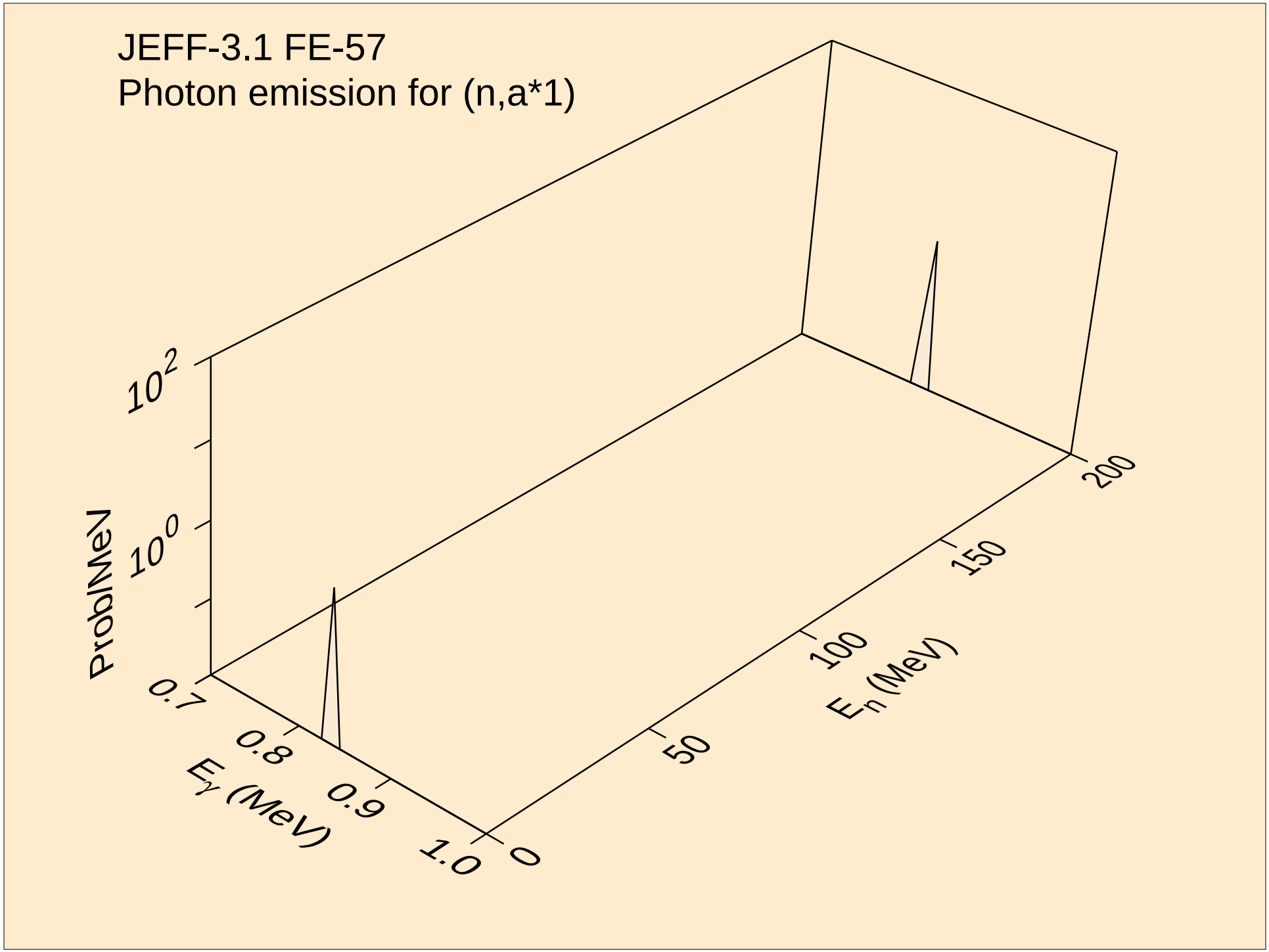

JEFF-3.1 FE-57
Photon emission for (n,he3*2)
Prob/MeV
10^2
10^0
0.4
0.5
0.6
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

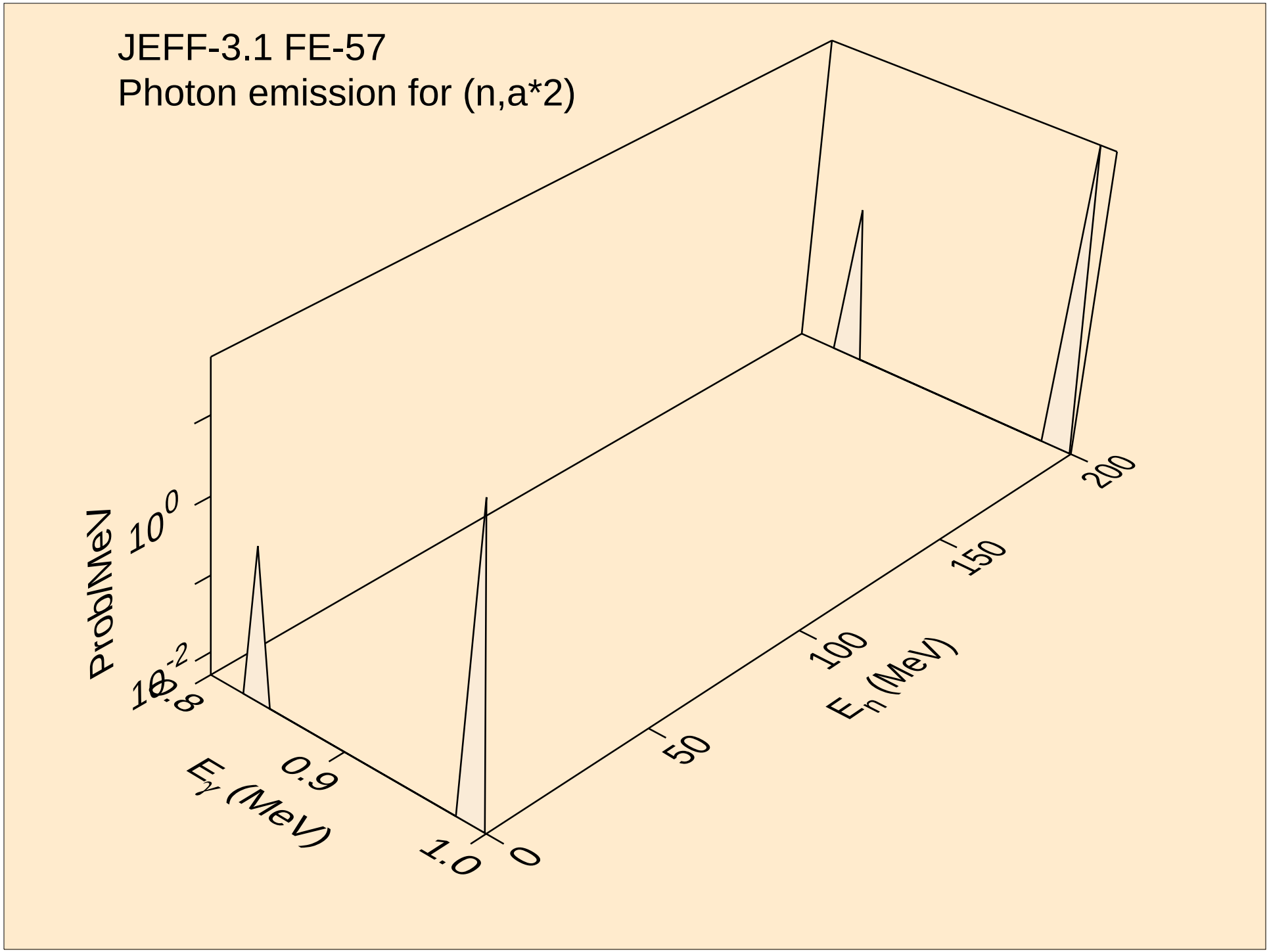

JEFF-3.1 FE-57
Photon emission for (n,he3*3)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.2
0.4
0.6
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

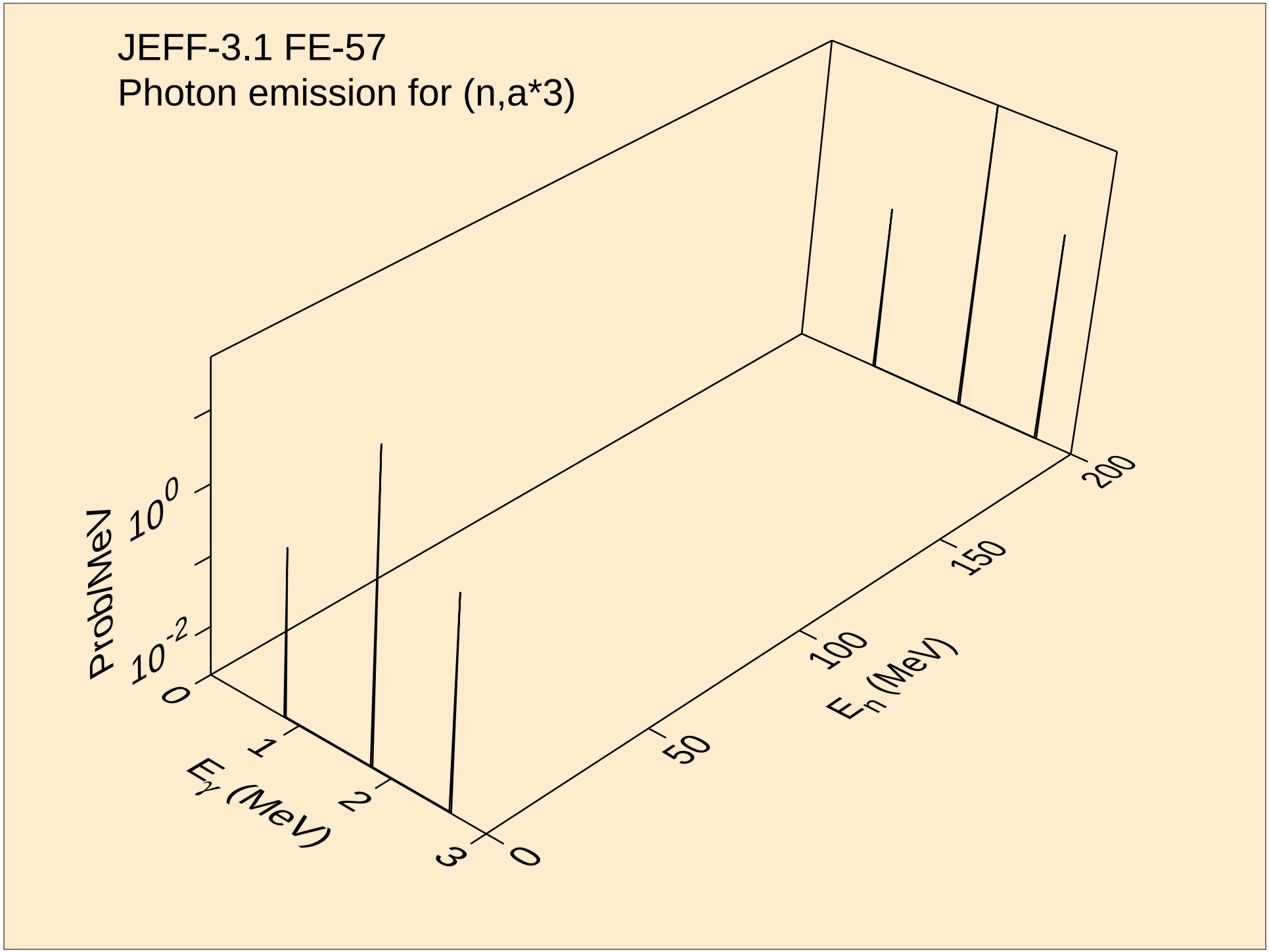

JEFF-3.1 FE-57
Photon emission for (n,he3*4)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

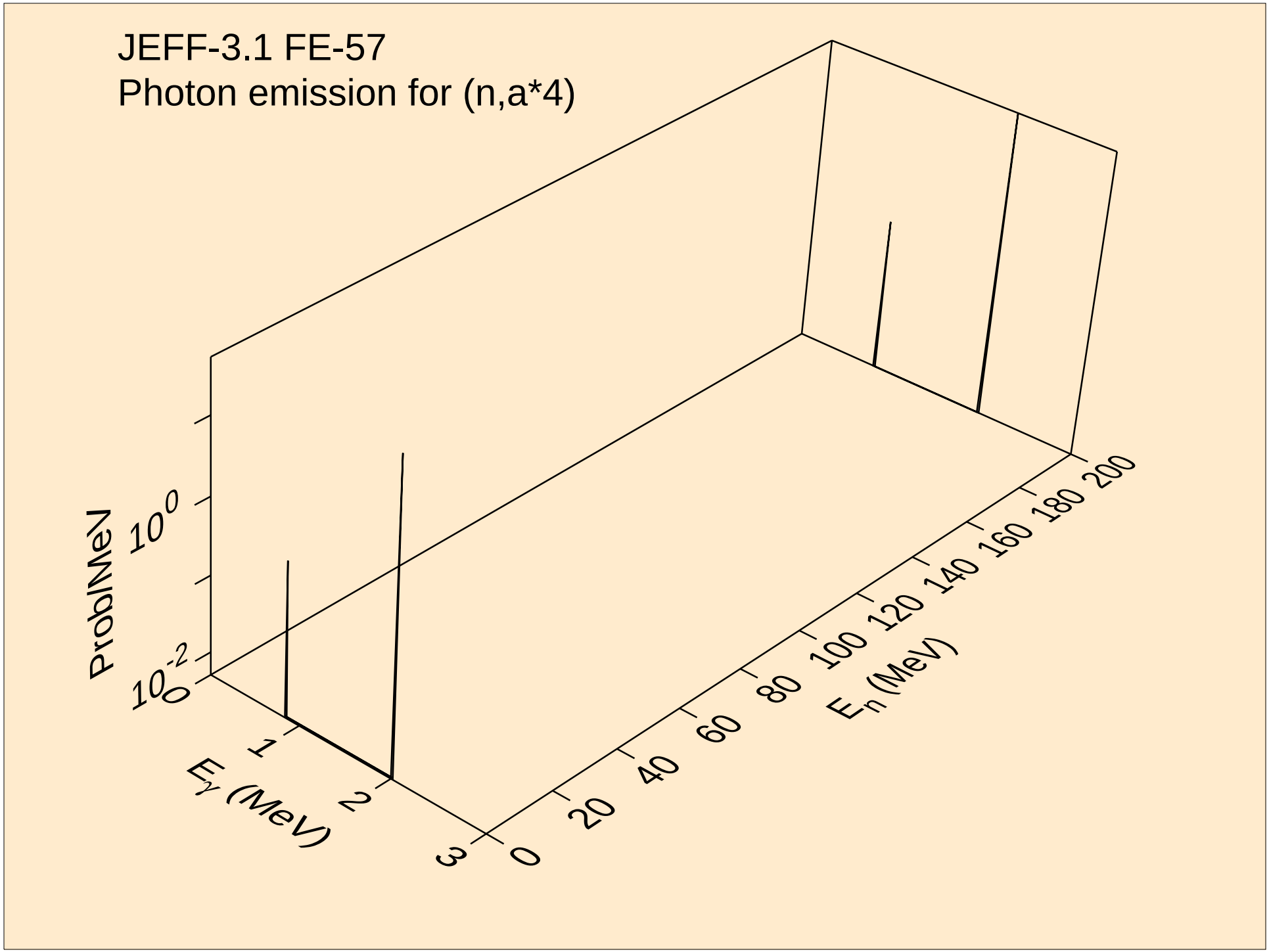

JEFF-3.1 FE-57
Photon emission for (n,he3*5)
Prob/MeV
10^{0}
10^{-2}
0.5
0.6
0.7
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

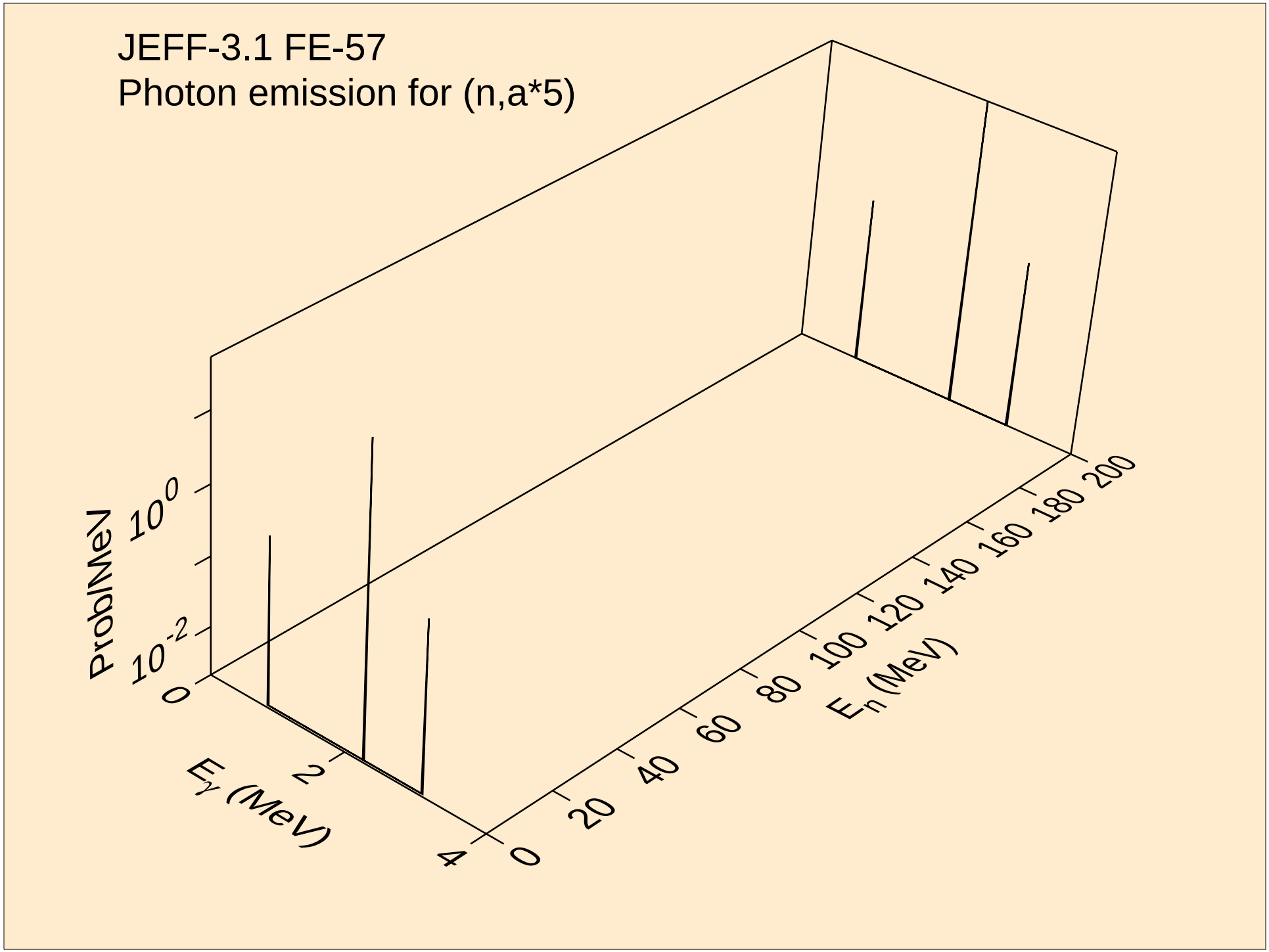

JEFF-3.1 FE-57
Photon emission for (n,he3*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
13
14
15
16
17
18
19
20
E_n (MeV)

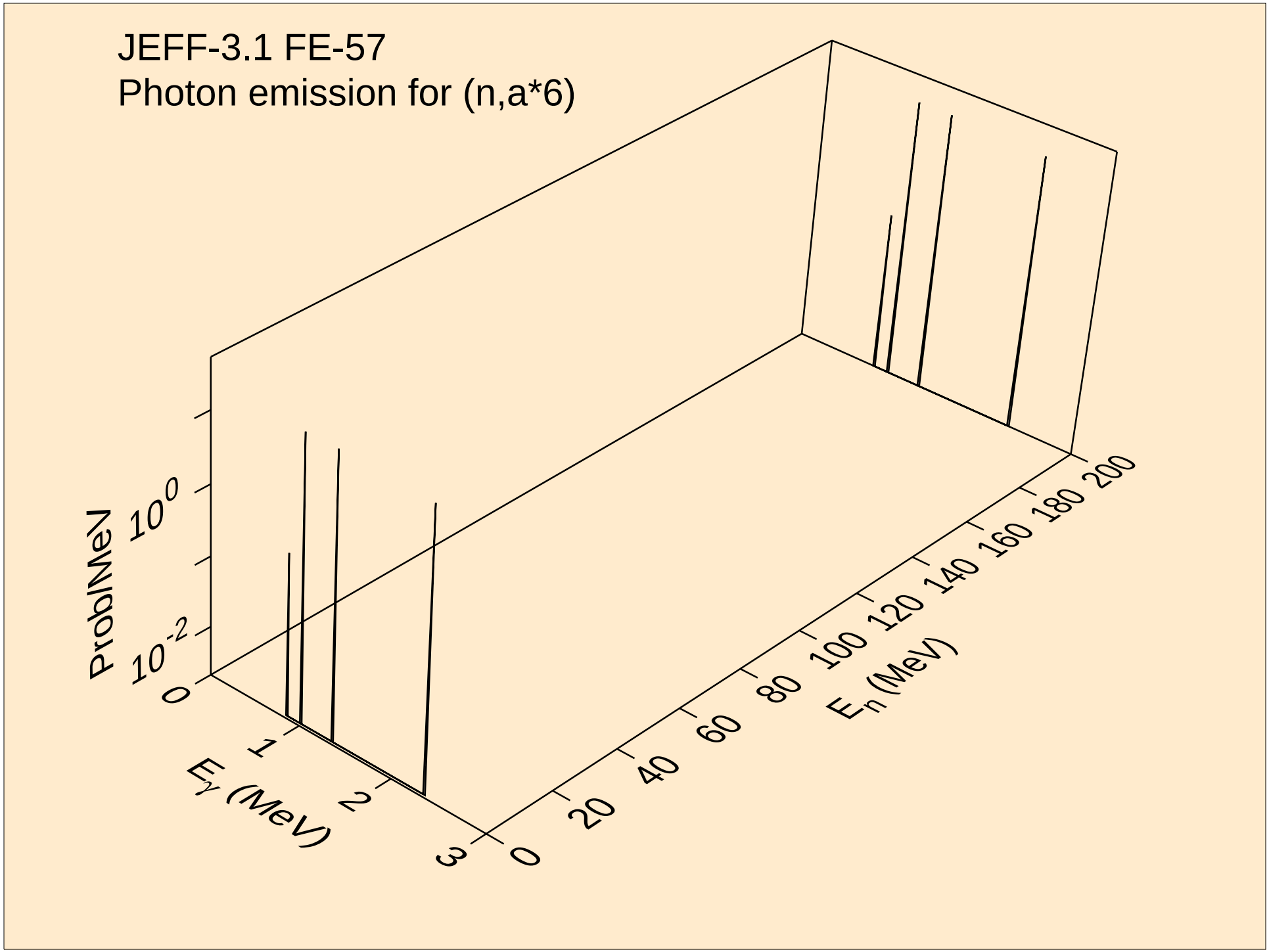

JEFF-3.1 FE-57
Photon emission for (n,a*1)
Prob/MeV
10^2
10^0
0.7
0.8
0.9
1.0
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

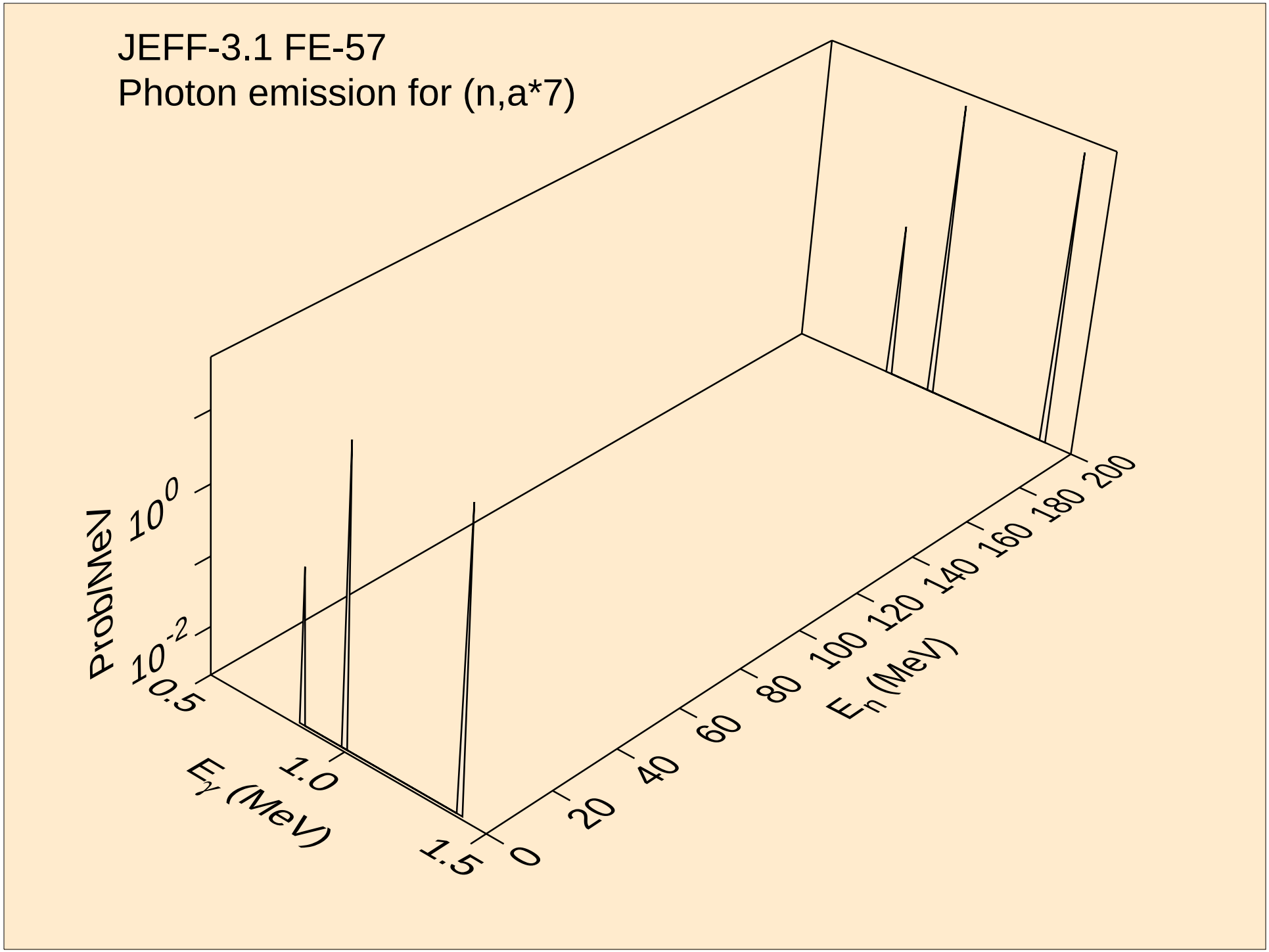

JEFF-3.1 FE-57
Photon emission for (n,a*2)
Prob/MeV
10^0
10^-2
0.8
0.9
1.0
Eγ (MeV)
0
50
100
150
200
En (MeV)

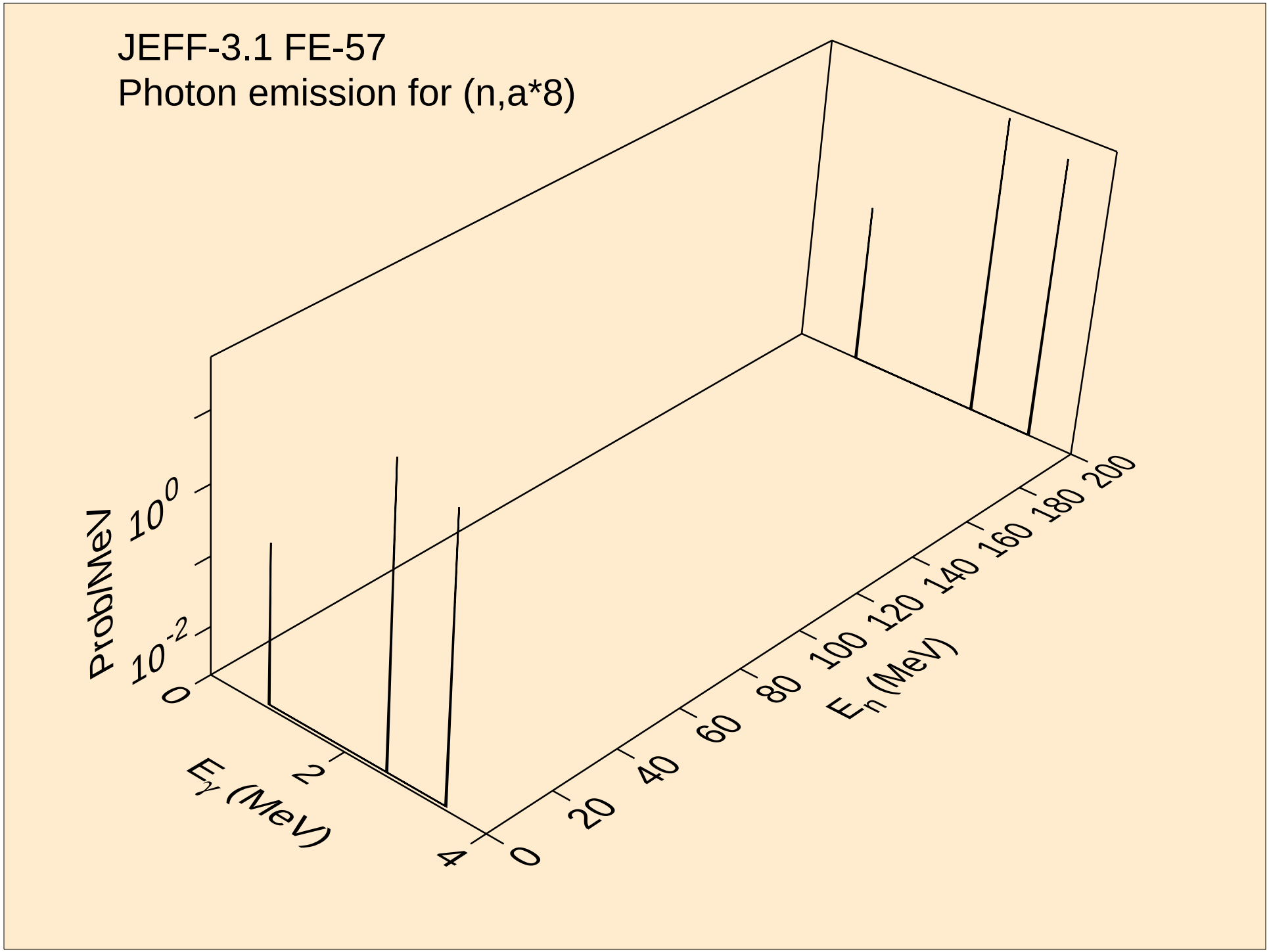

JEFF-3.1 FE-57
Photon emission for (n,a*3)
Prob/MeV
10^0
10^-2
0
1
2
3
Eγ (MeV)
0
50
100
150
200
En (MeV)

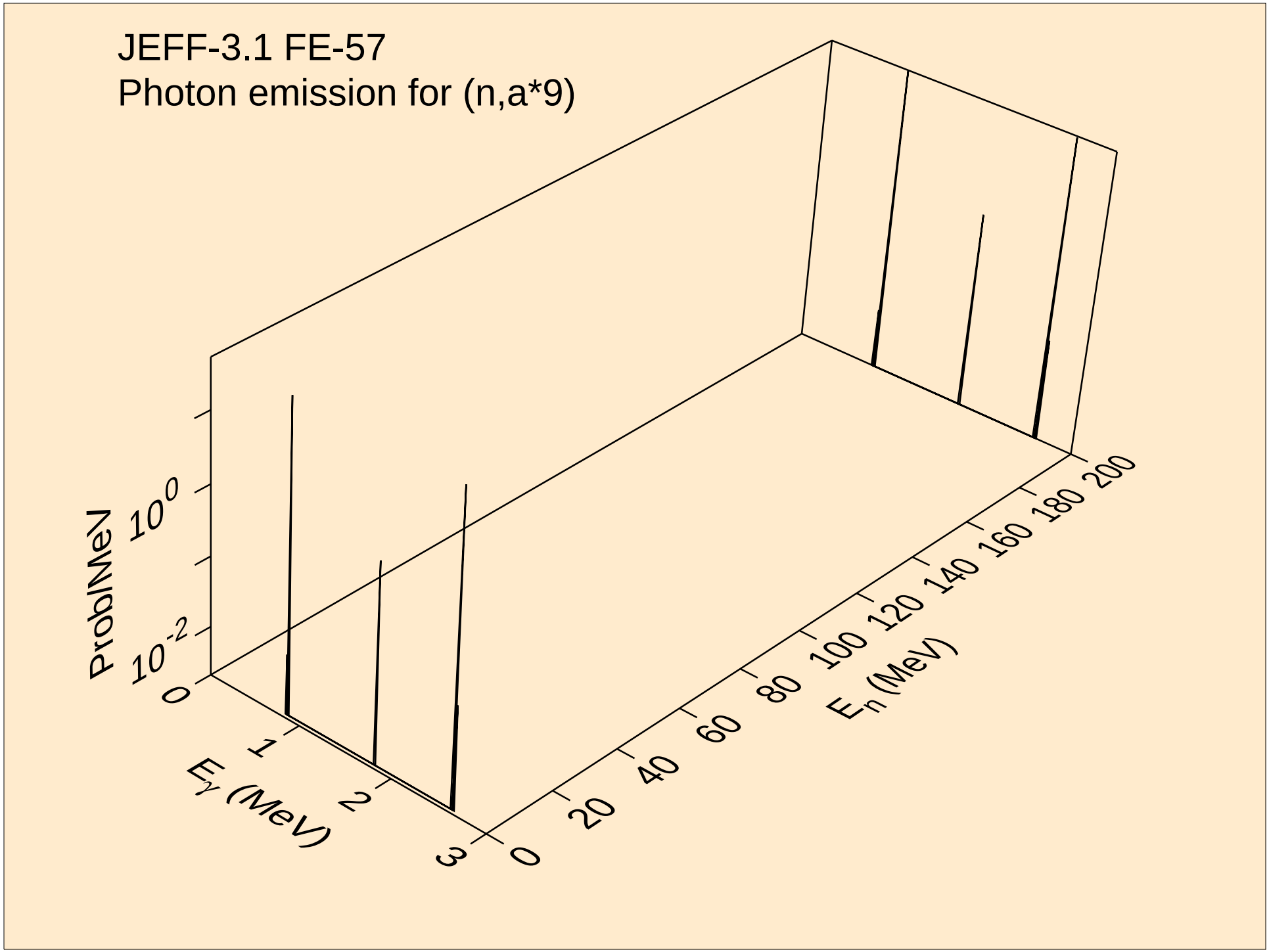

JEFF-3.1 FE-57
Photon emission for (n,a*4)
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

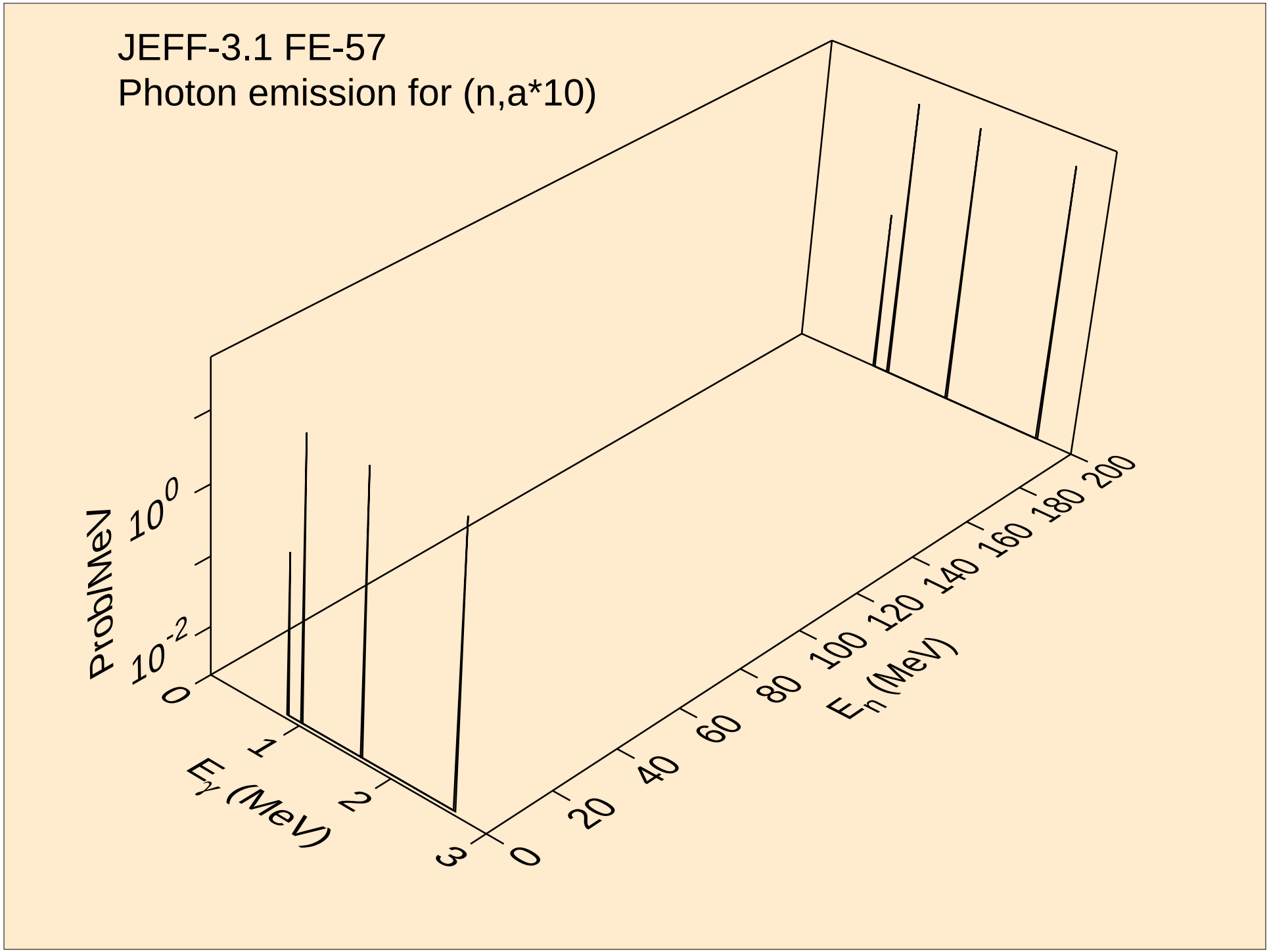

JEFF-3.1 FE-57
Photon emission for (n,a*5)
Prob/MeV
10^0
10^-2
0
2
4
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

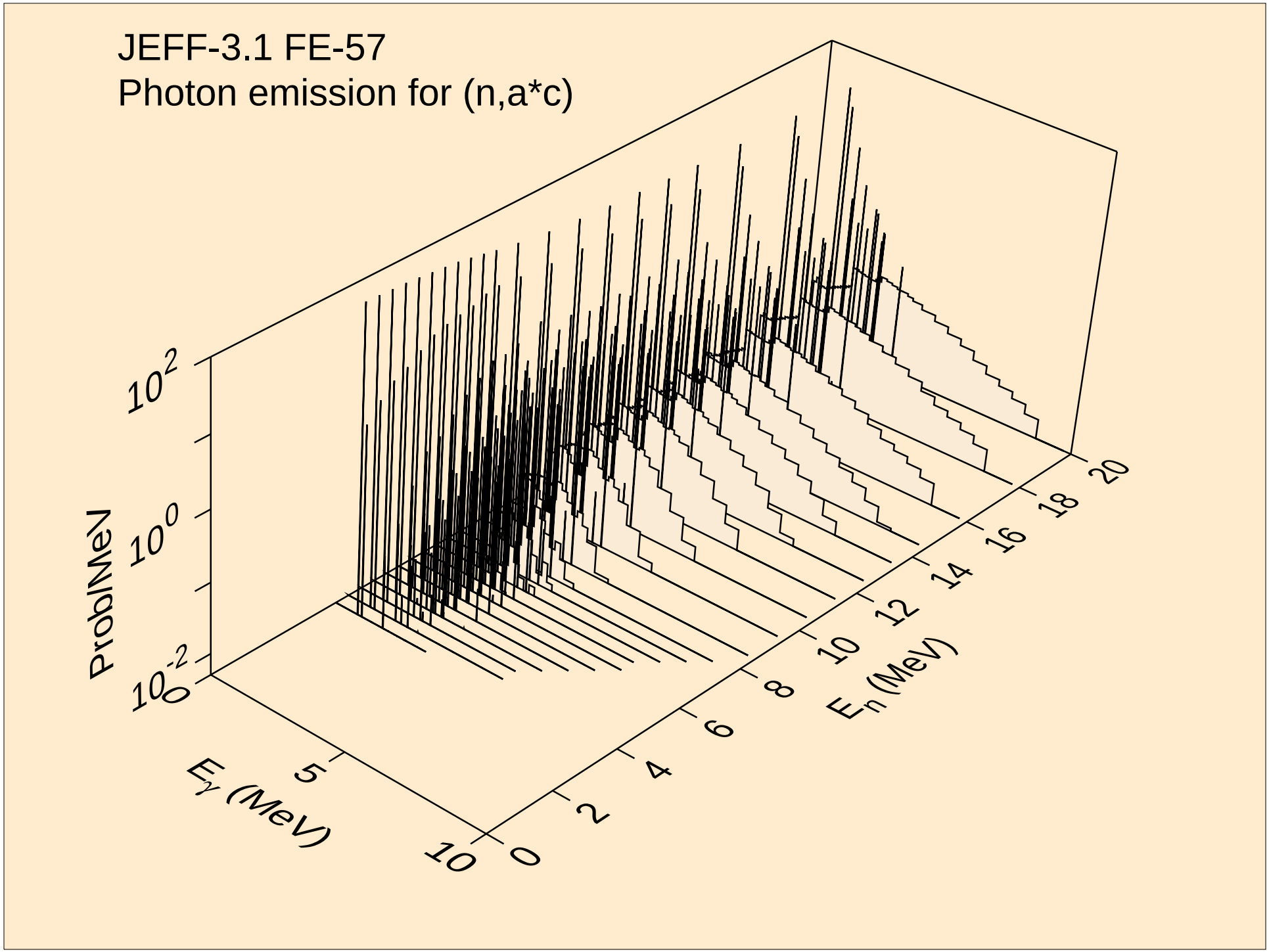

JEFF-3.1 FE-57
Photon emission for (n,a*6)
Prob/MeV
10^0
10^-2
0
1
2
3
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

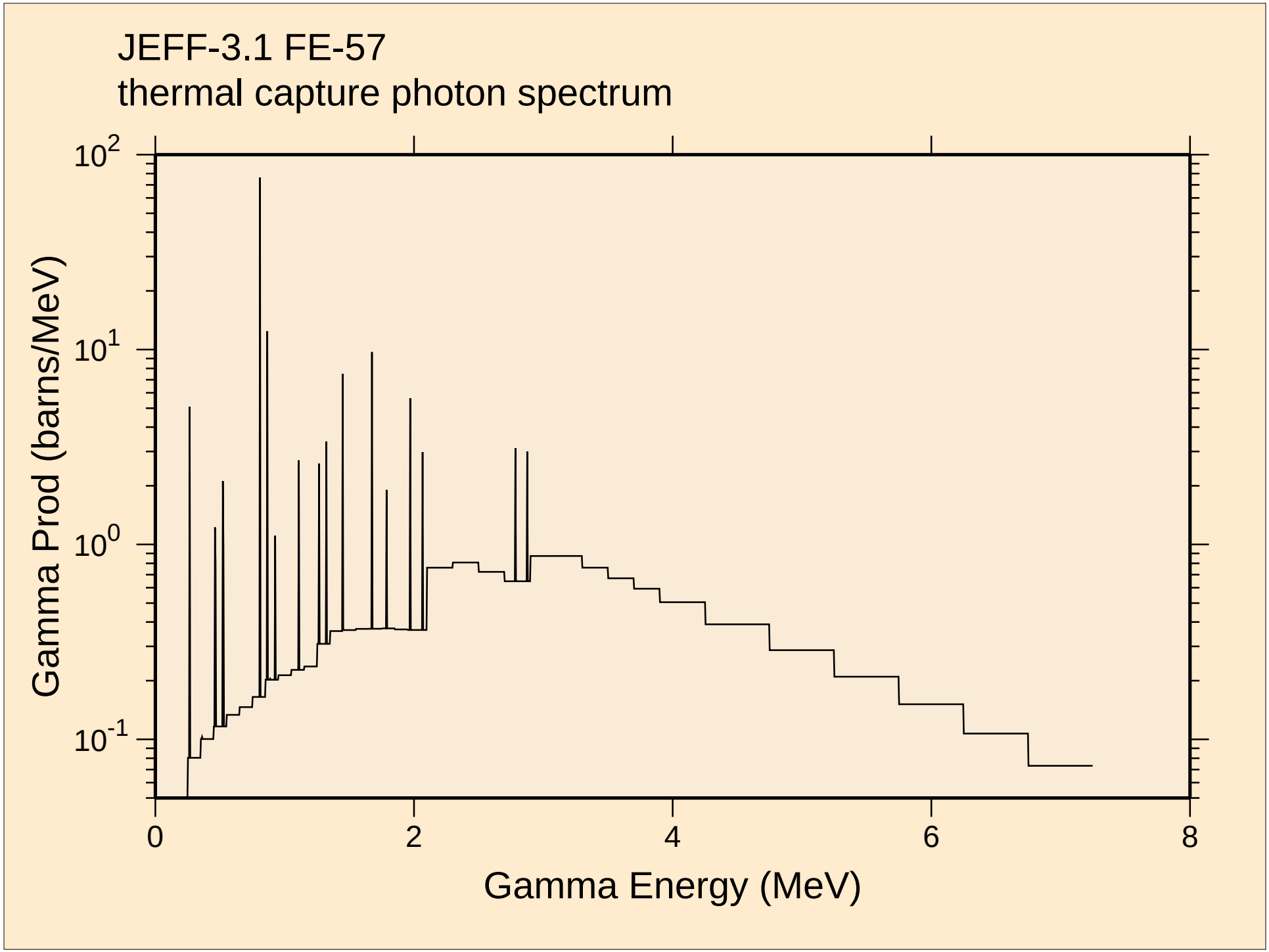

JEFF-3.1 FE-57
Photon emission for (n,a*7)
Prob/MeV
10^0
10^-2
0.5
1.0
1.5
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

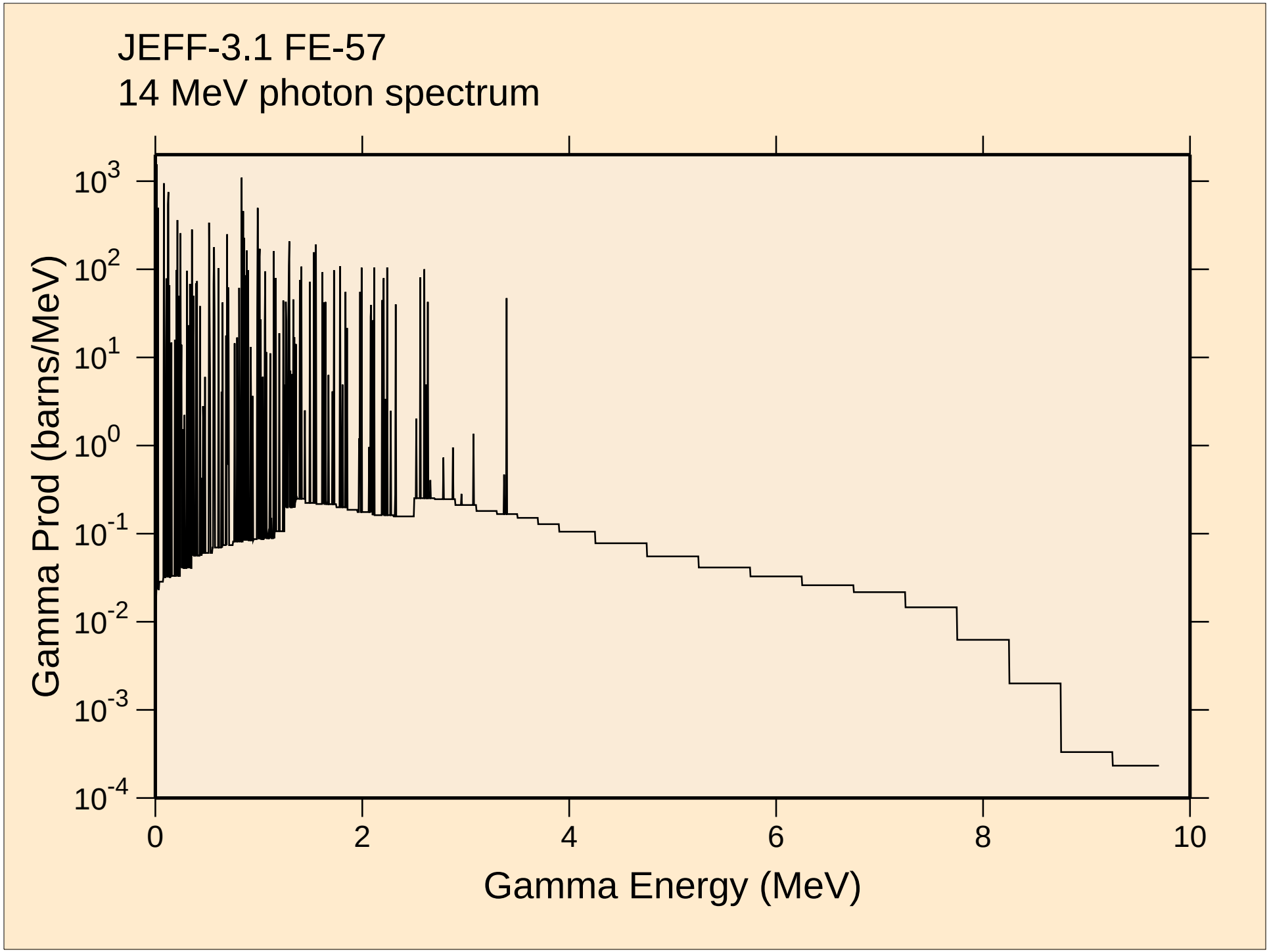

JEFF-3.1 FE-57
Photon emission for (n,a*8)
Prob/MeV
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

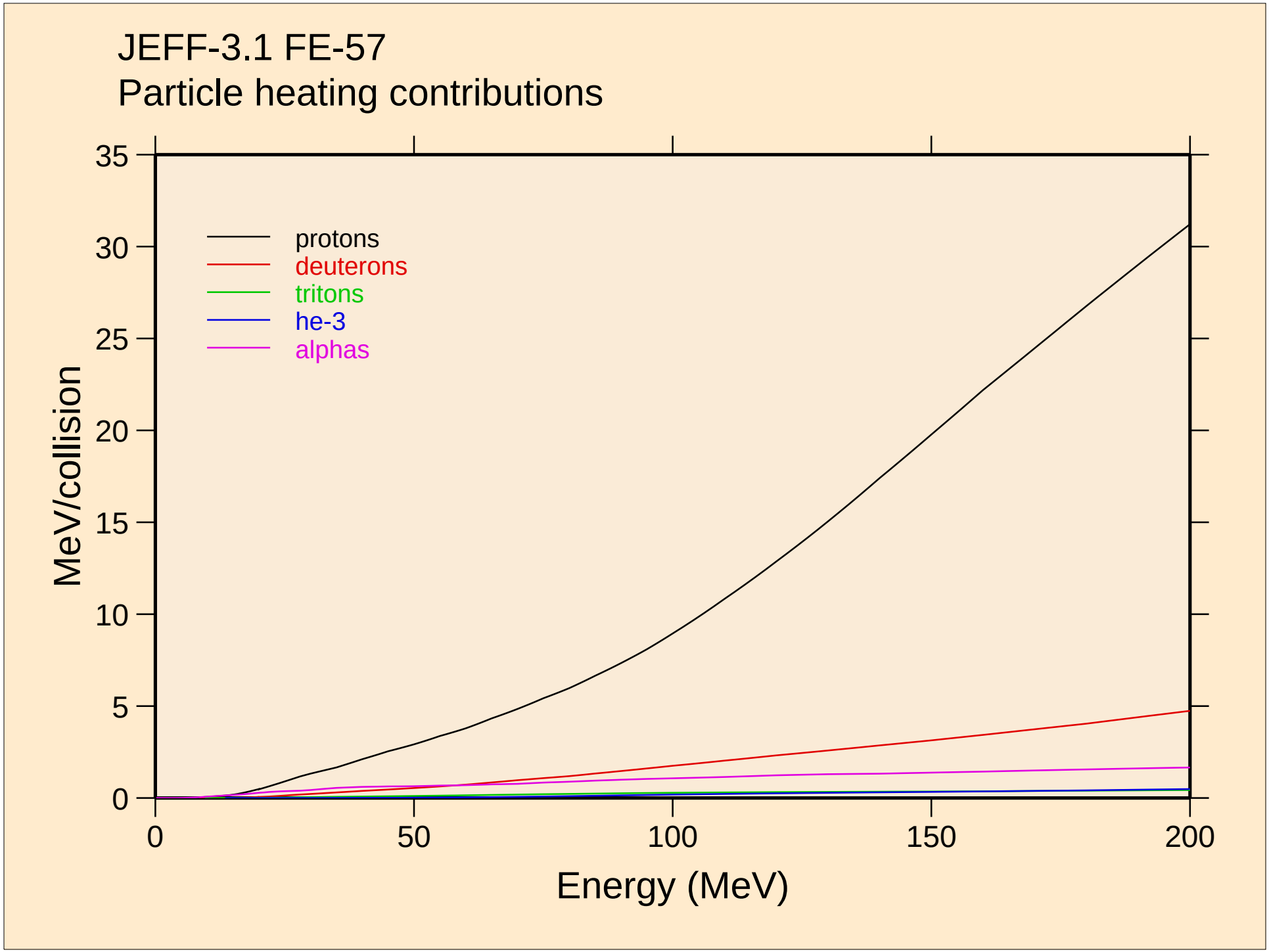

JEFF-3.1 FE-57
Photon emission for (n,a*9)
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

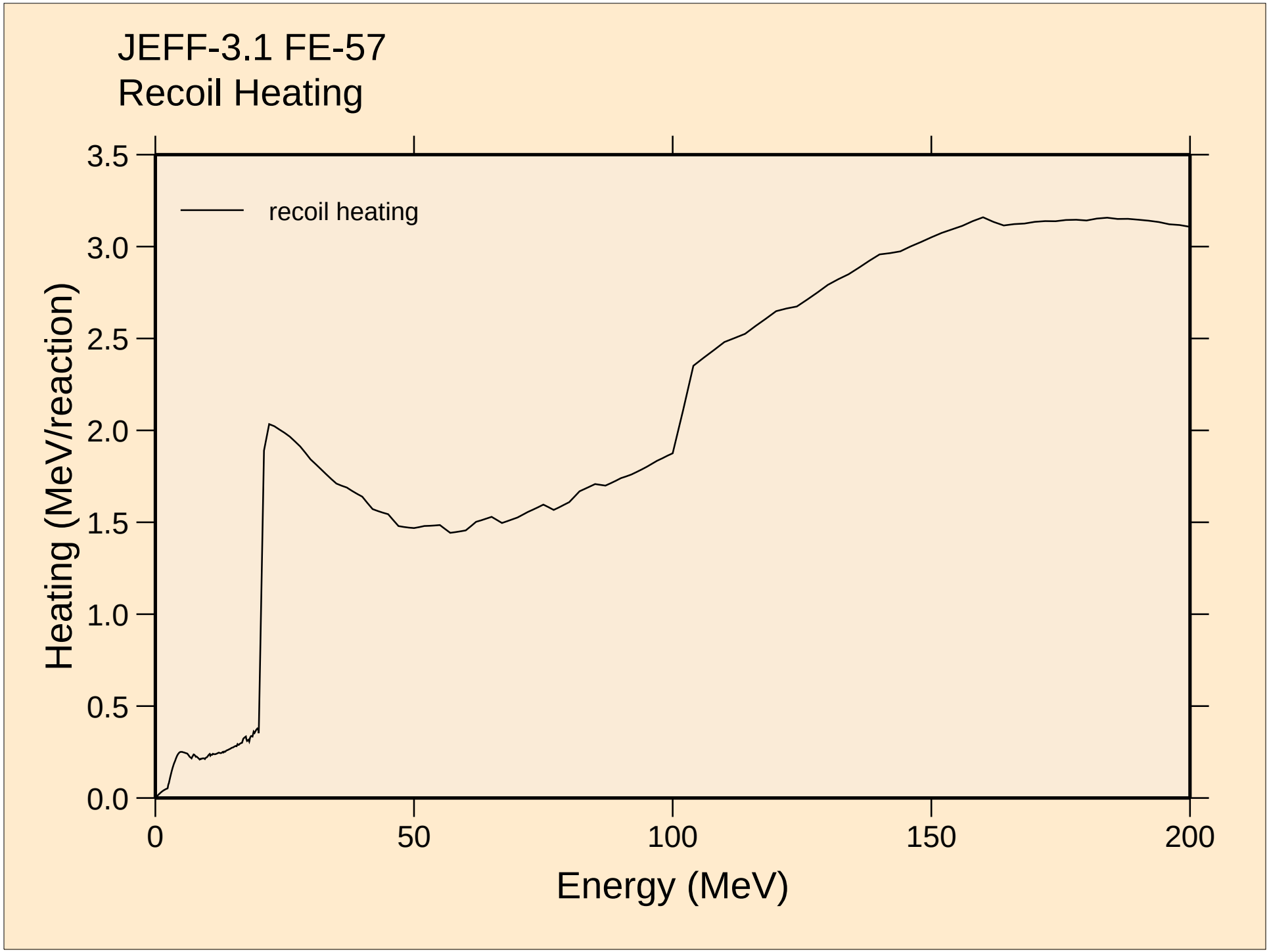

JEFF-3.1 FE-57
Photon emission for (n,a*10)
Prob/MeV
10^0
10^-2
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

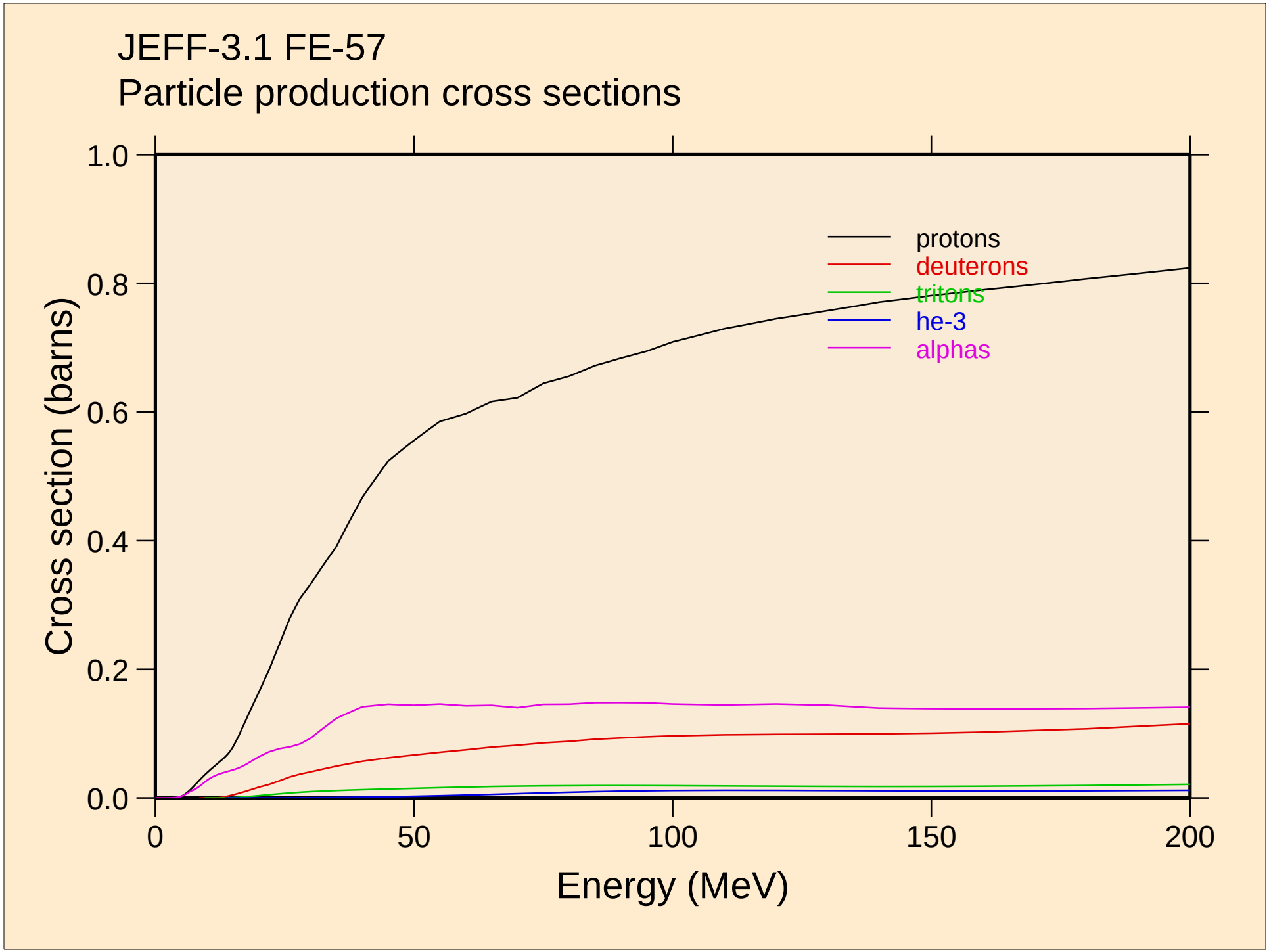

JEFF-3.1 FE-57
Photon emission for (n,a*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
5
10
E_n (MeV)
0
2
4
6
8
10
12
14
16
18
20

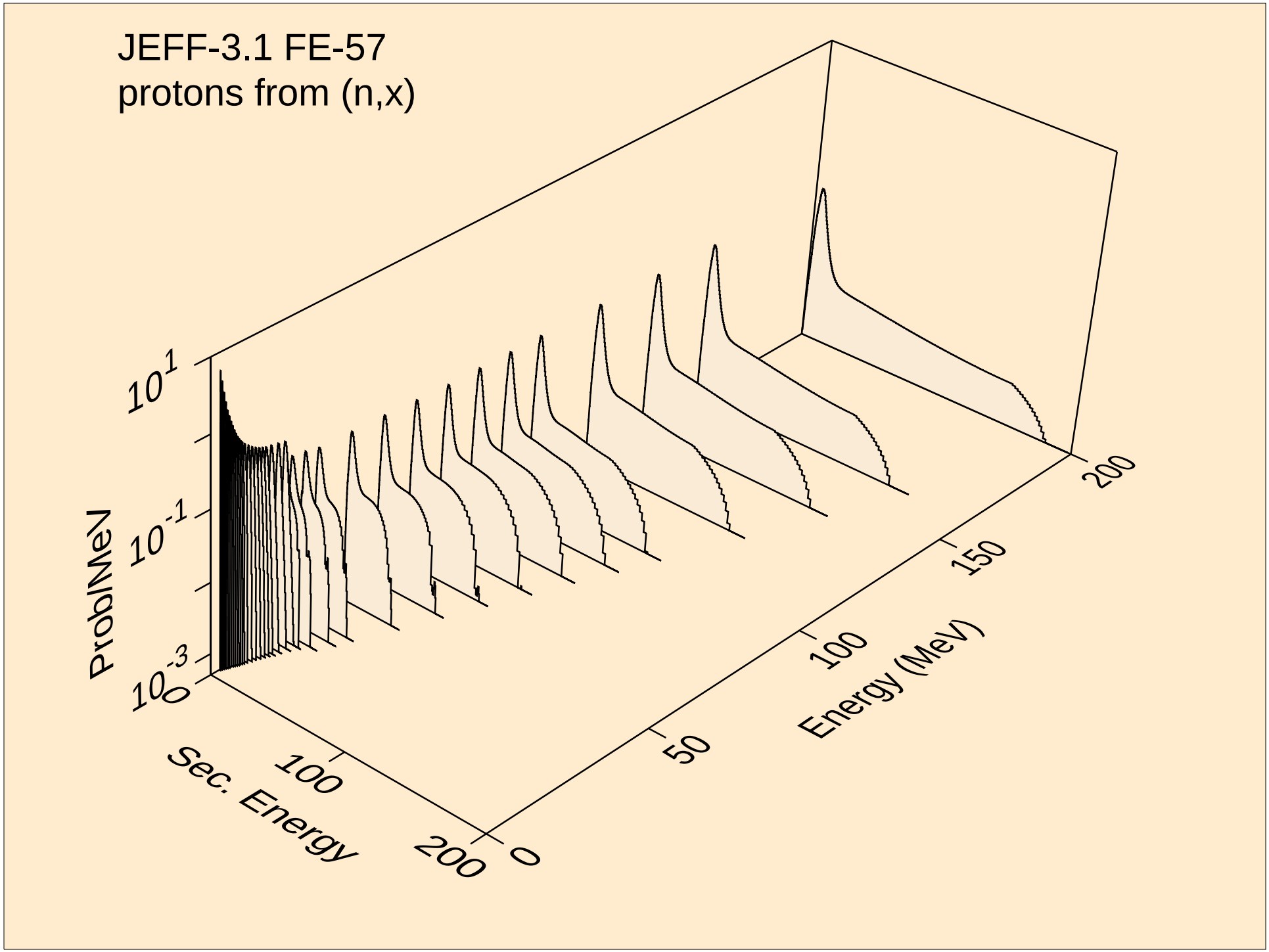

JEFF-3.1 FE-57
thermal capture photon spectrum
Gamma Prod (barns/MeV)
10^2
10^1
10^0
10^{-1}
0
2
4
6
8
Gamma Energy (MeV)

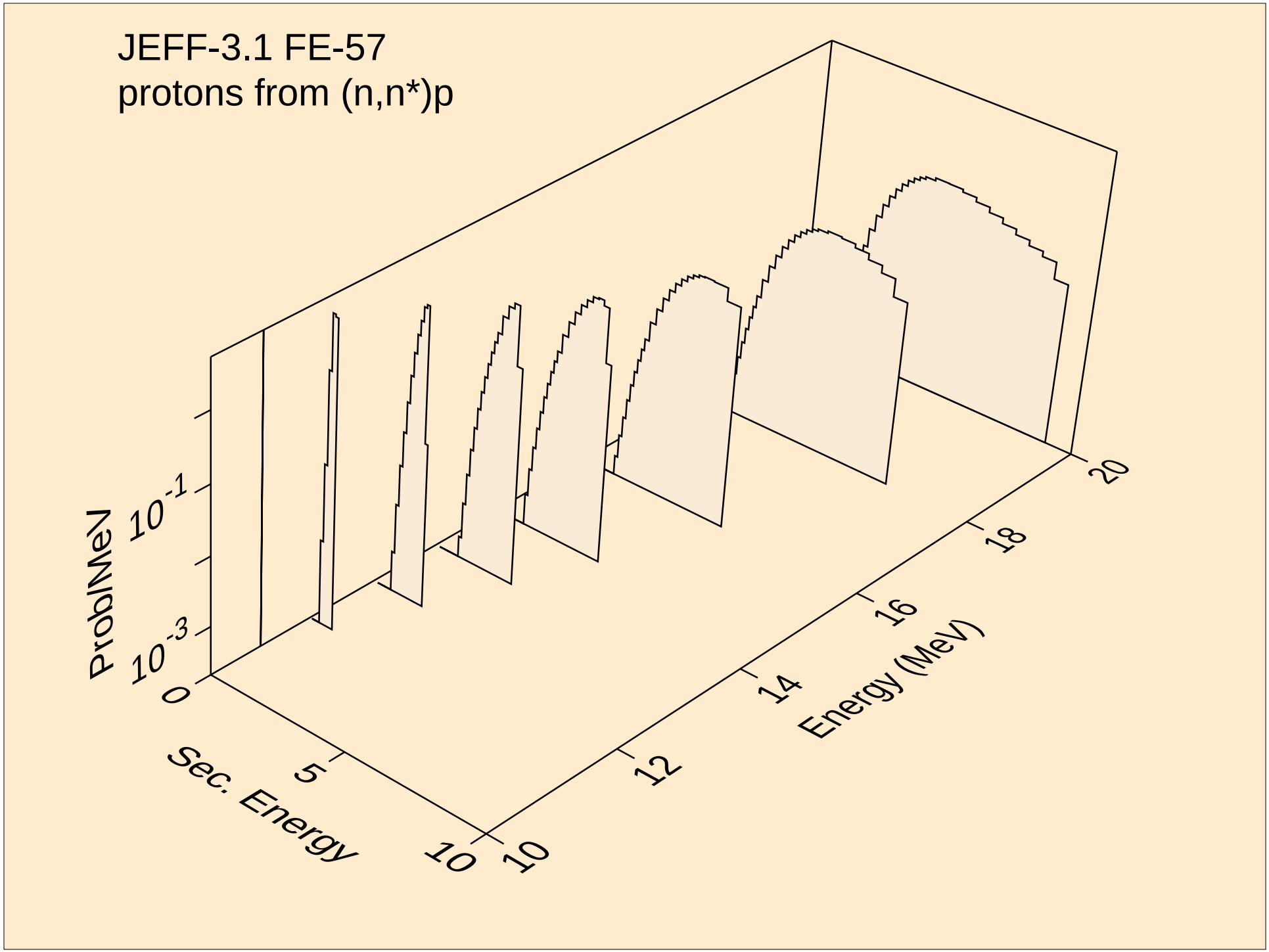

JEFF-3.1 FE-57
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0
2
4
6
8
10
Gamma Energy (MeV)

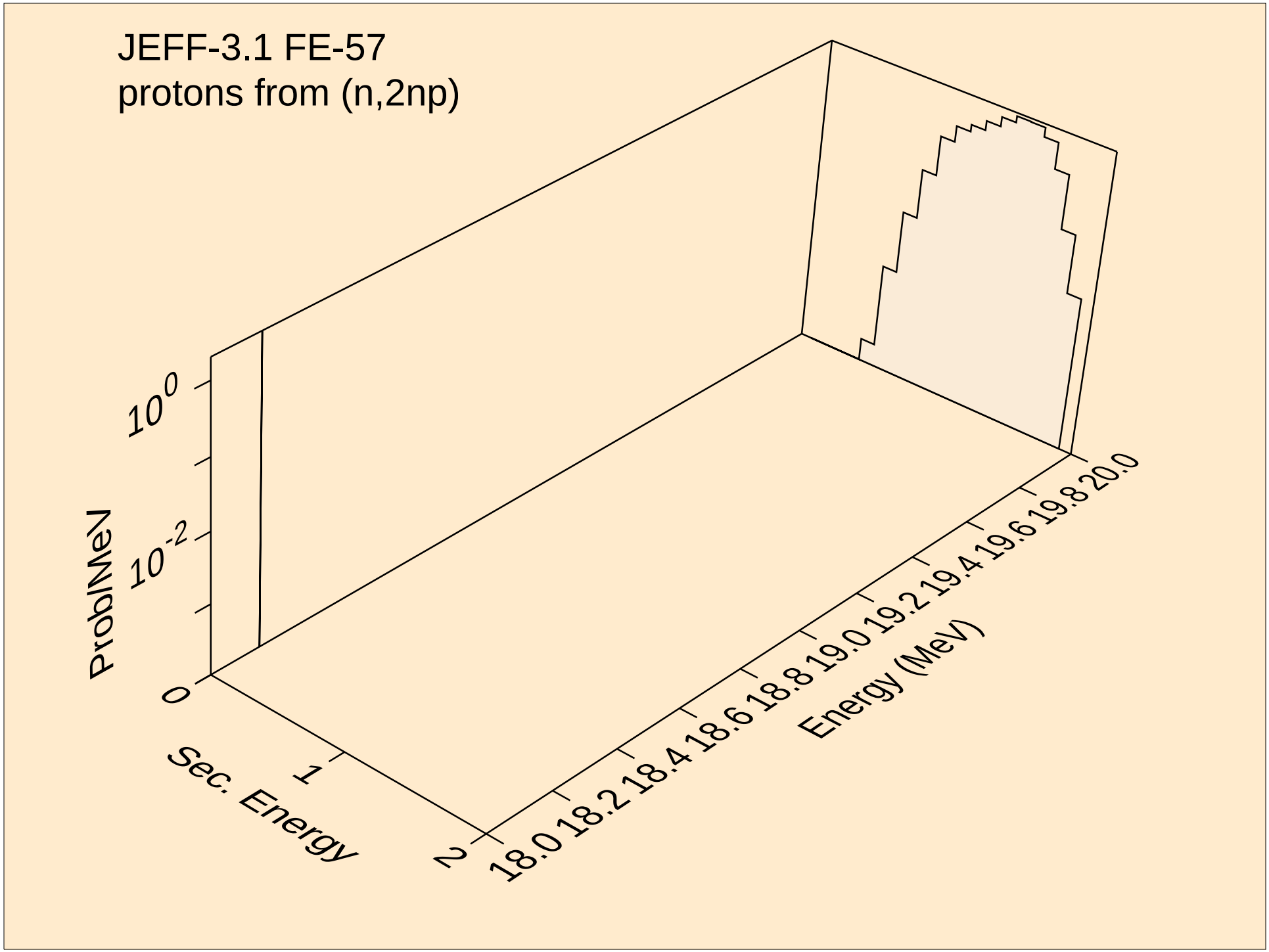

JEFF-3.1 FE-57
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
5
10
15
20
25
30
35
0
50
100
150
200

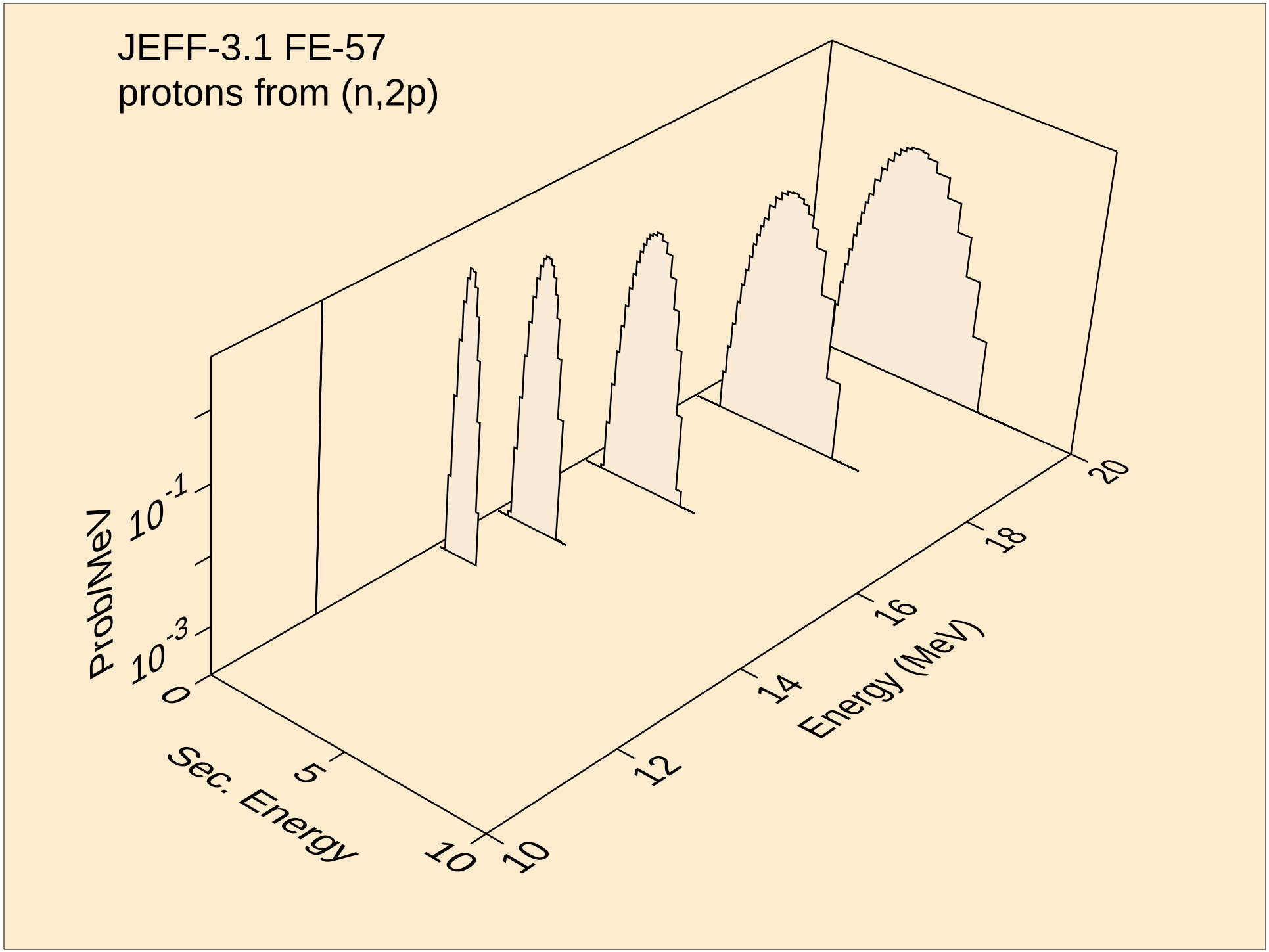

JEFF-3.1 FE-57
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
50
100
150
200

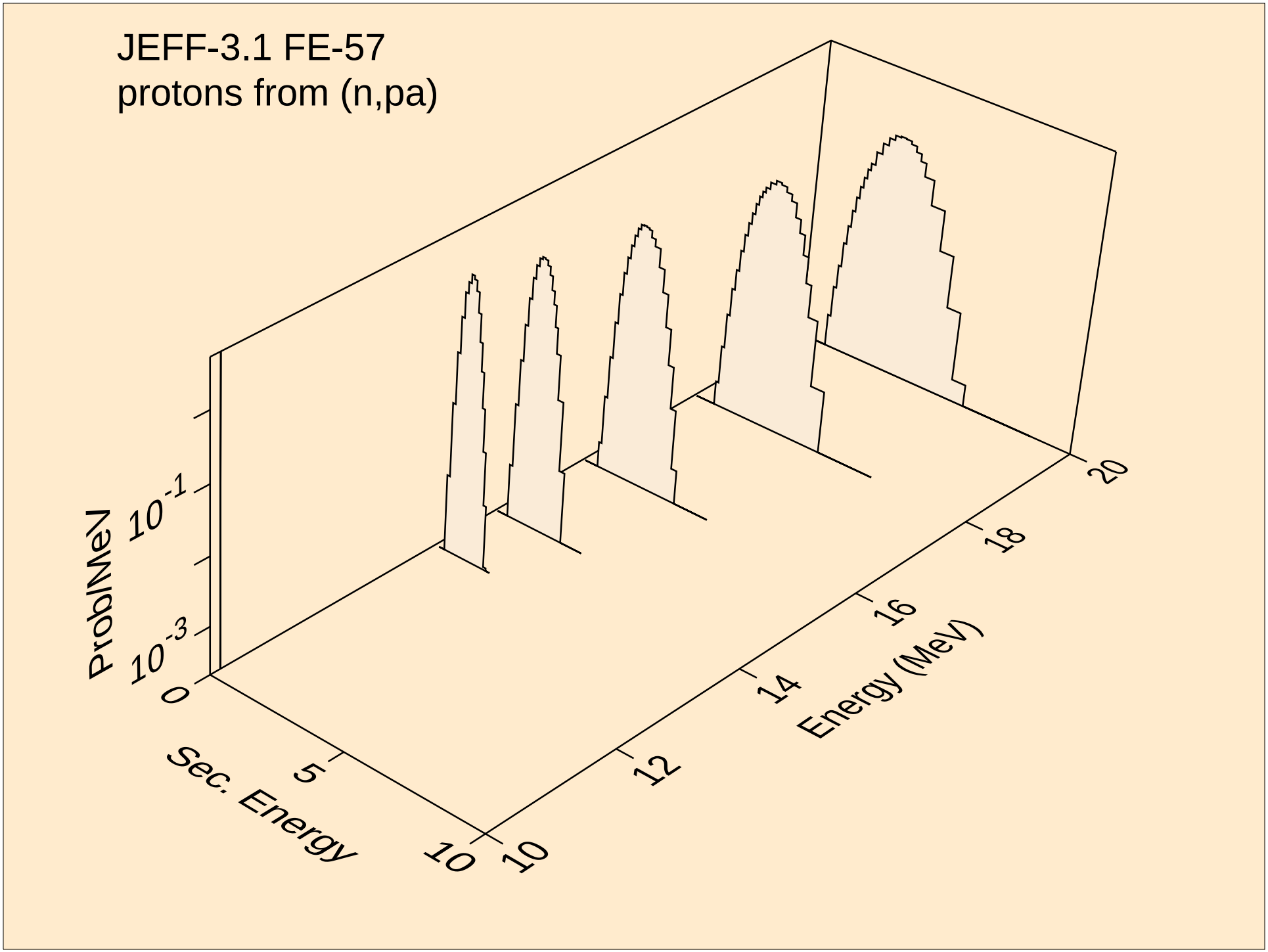

JEFF-3.1 FE-57
Particle production cross sections
Cross section (barns)
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
Energy (MeV)
protons
deuterons
tritons
he-3
alphas

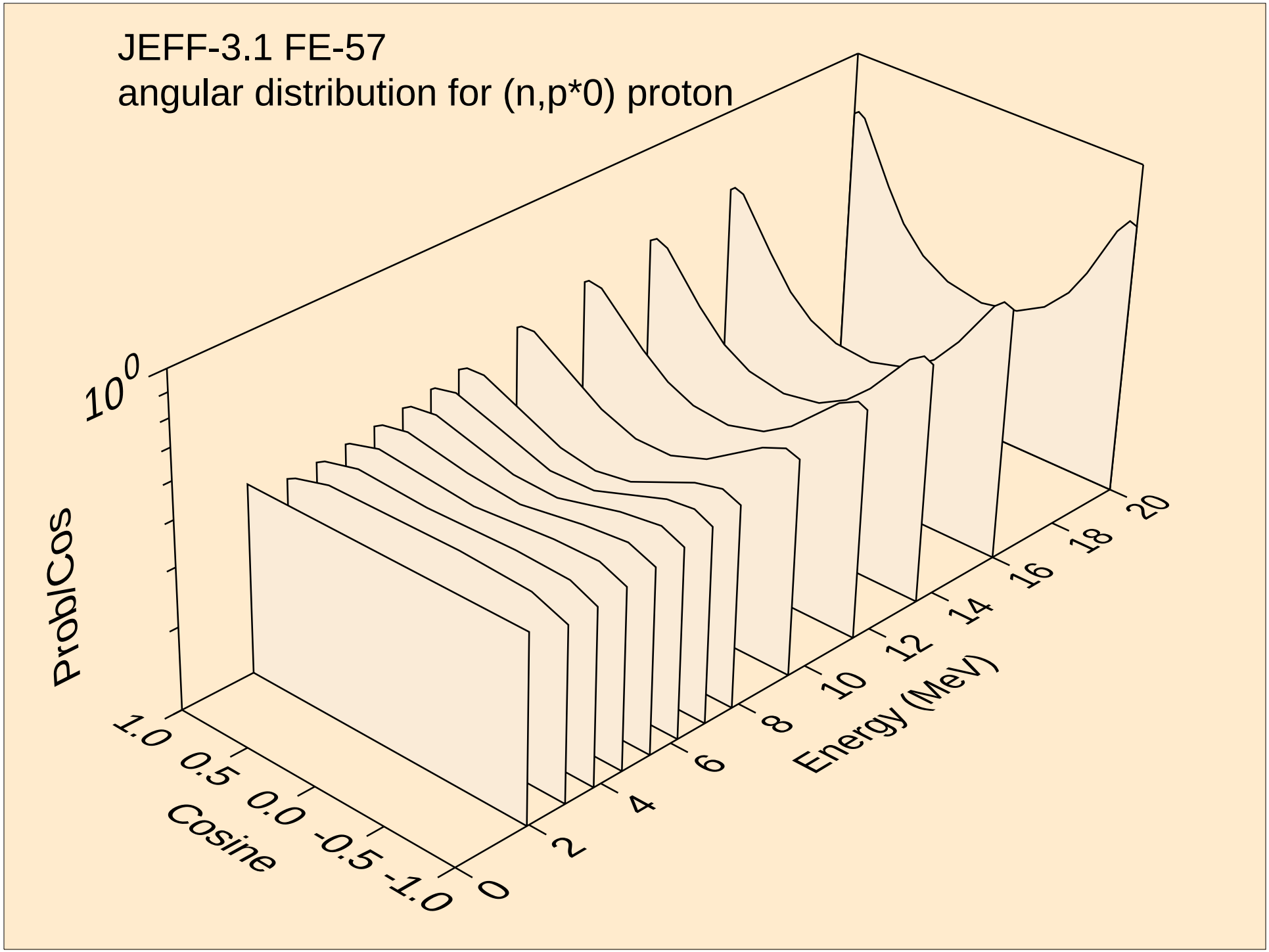

JEFF-3.1 FE-57
protons from (n,x)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
100
200
Sec. Energy
50
100
150
200
Energy (MeV)

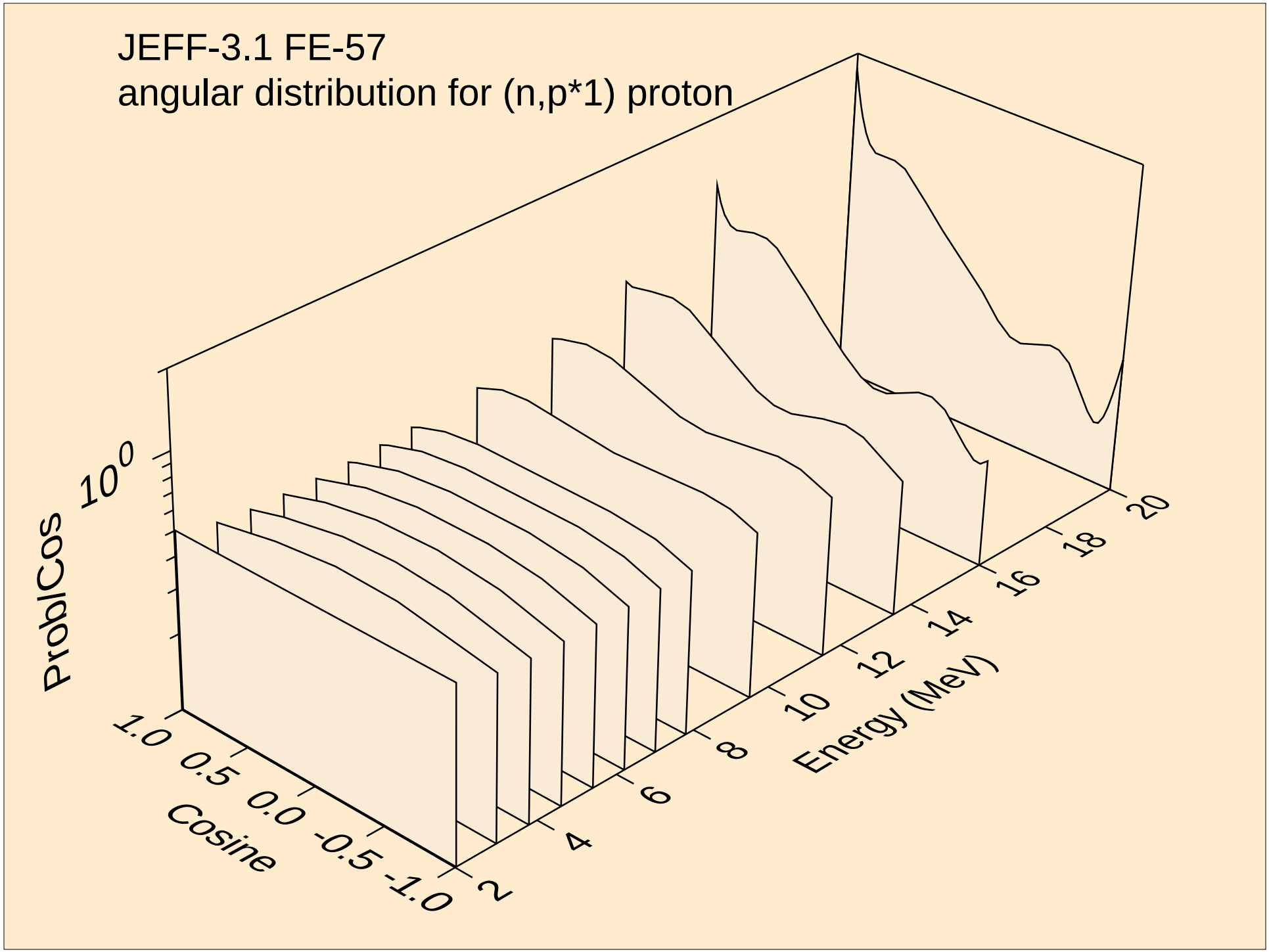

JEFF-3.1 FE-57
protons from (n,n*)p
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
10
12
14
16
18
20
Energy (MeV)

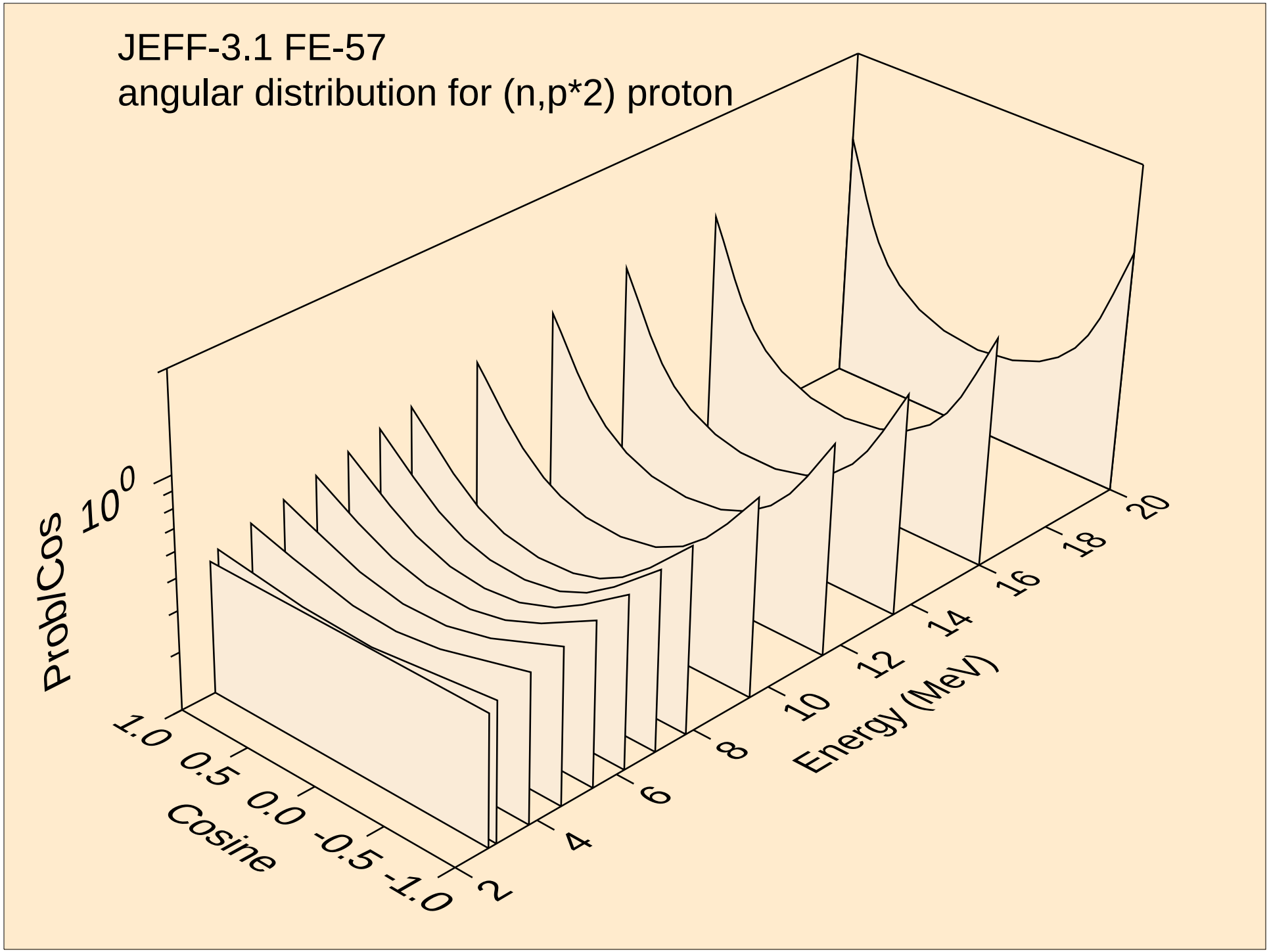

JEFF-3.1 FE-57
protons from (n,2np)
Prob/MeV
10^{0}
10^{-2}
0
Sec. Energy
1
2
18.0 18.2 18.4 18.6 18.8 19.0 19.2 19.4 19.6 19.8 20.0
Energy (MeV)

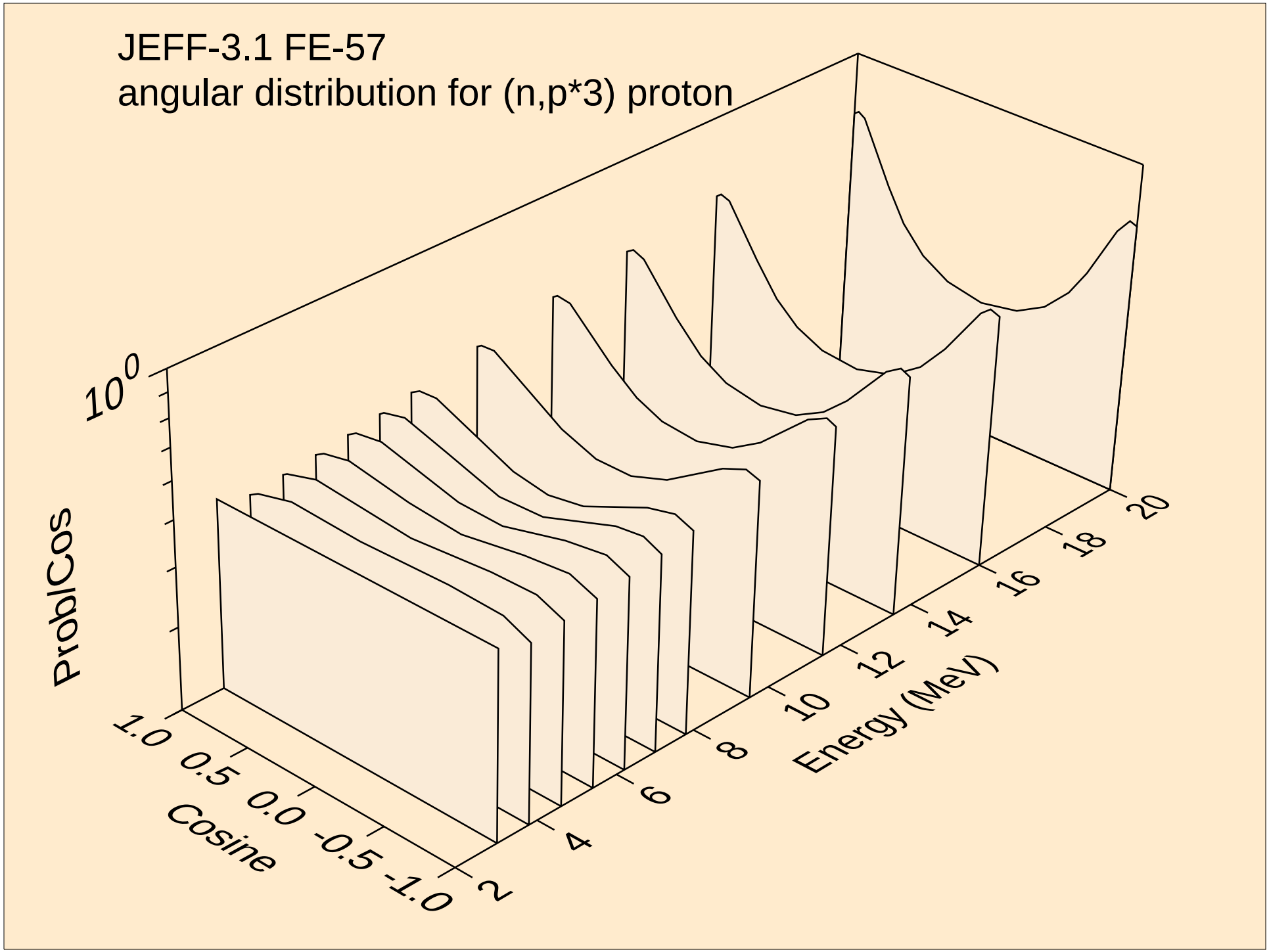

JEFF-3.1 FE-57
protons from (n,2p)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
5
10
10
12
14
16
18
20
Energy (MeV)

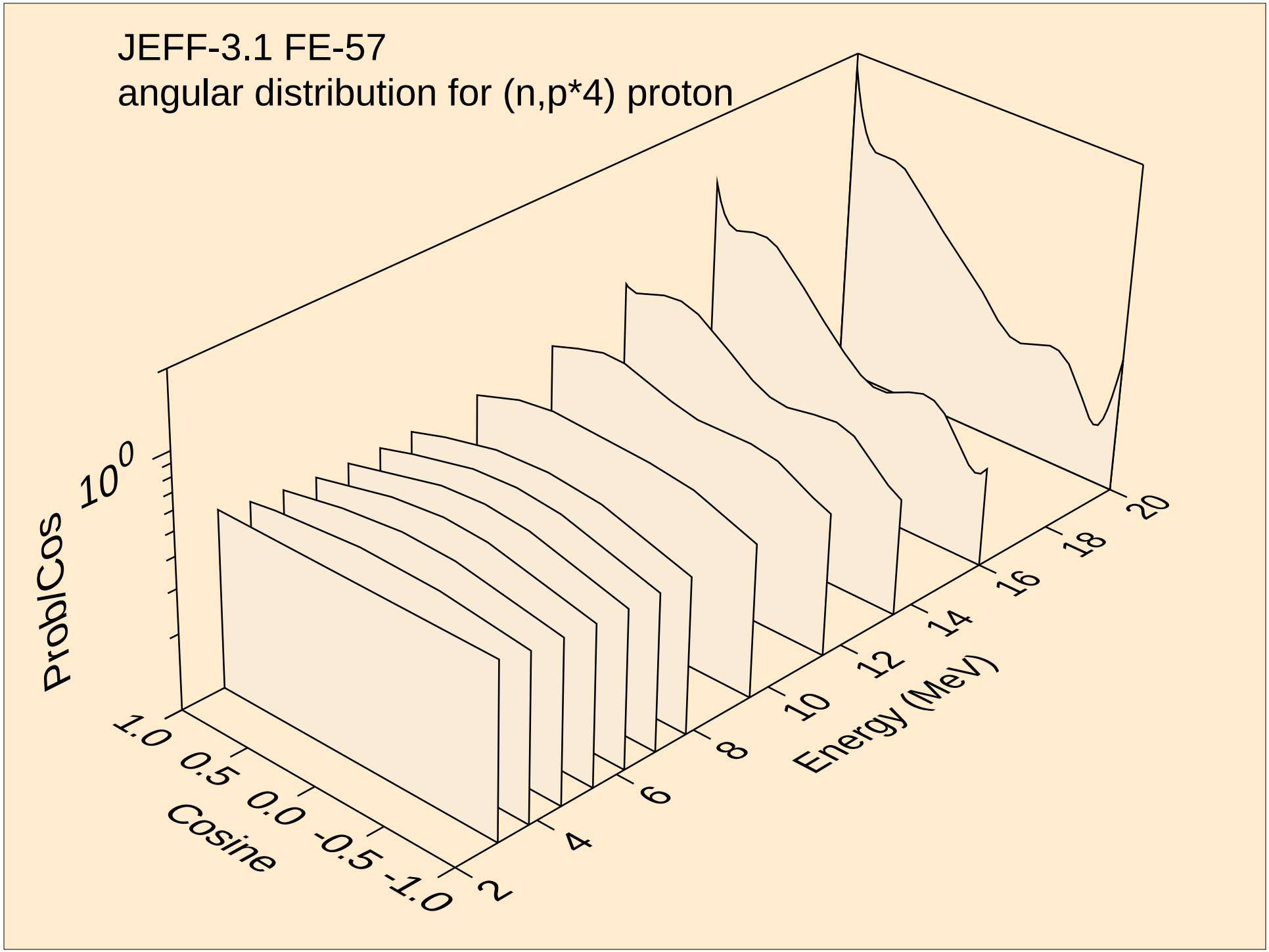

JEFF-3.1 FE-57
protons from (n,pa)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
5
10
10
12
14
16
18
20
Energy (MeV)

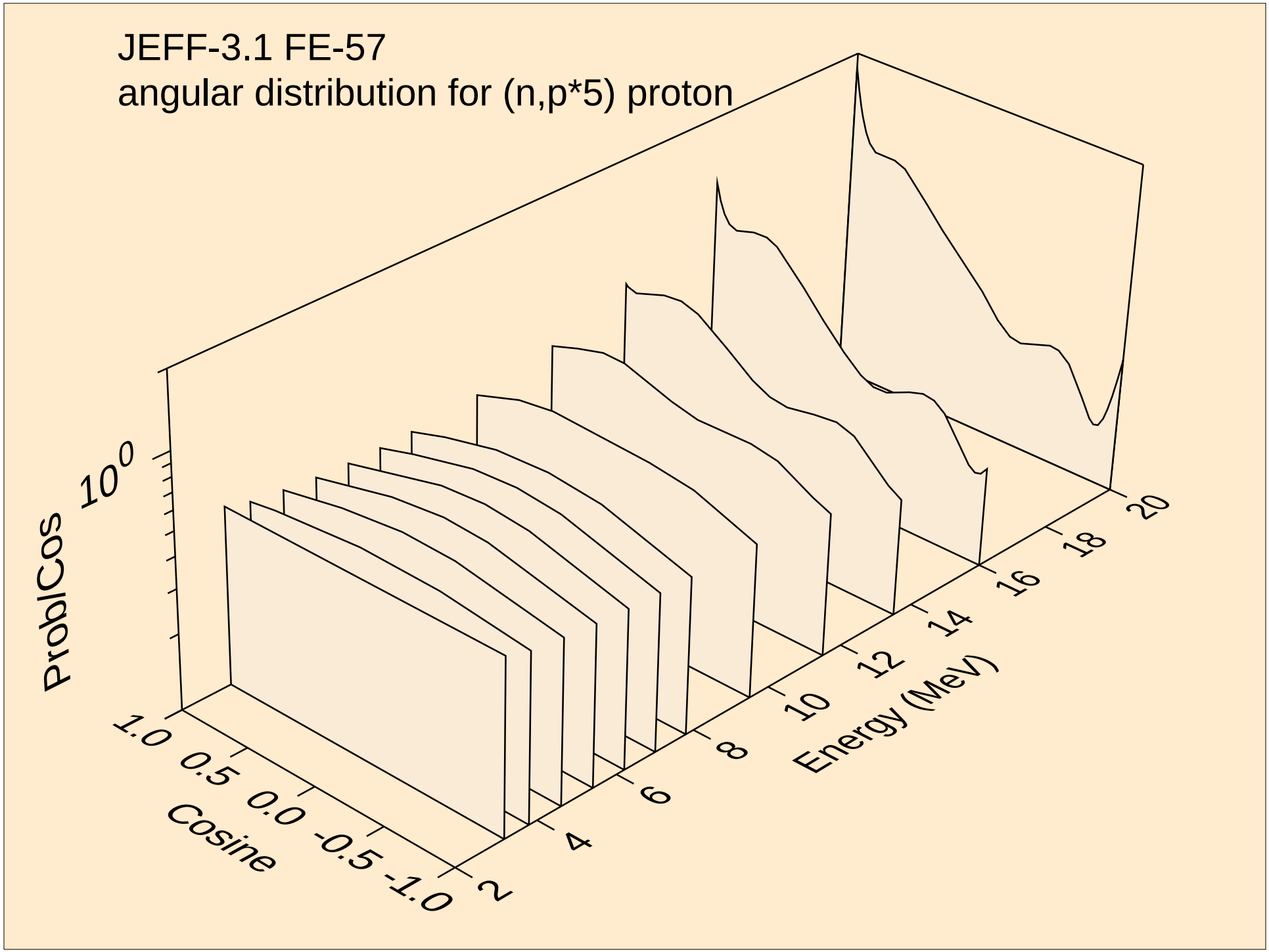

JEFF-3.1 FE-57
angular distribution for (n,p*0) proton
ProbICos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

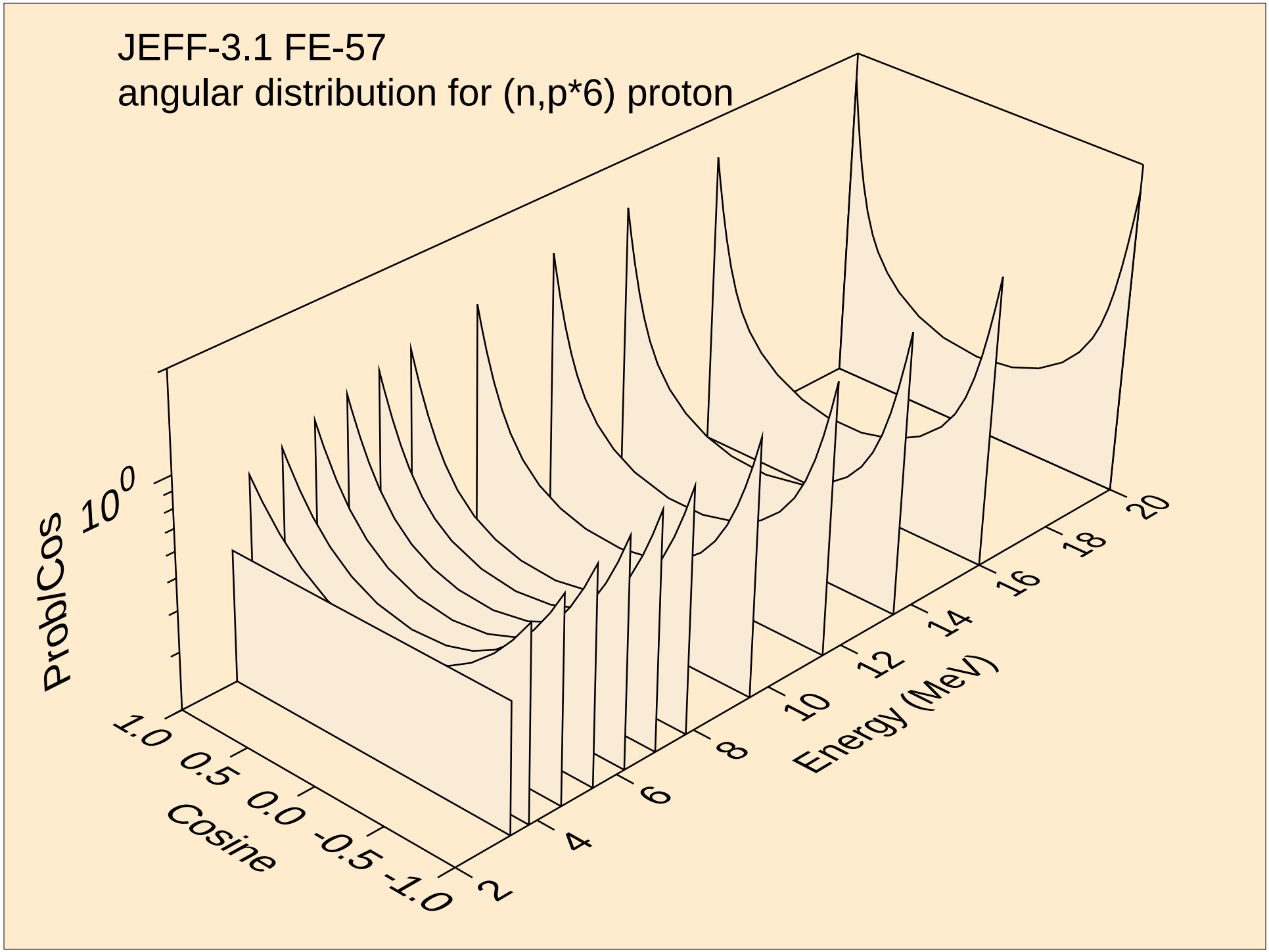

JEFF-3.1 FE-57
angular distribution for (n,p*1) proton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

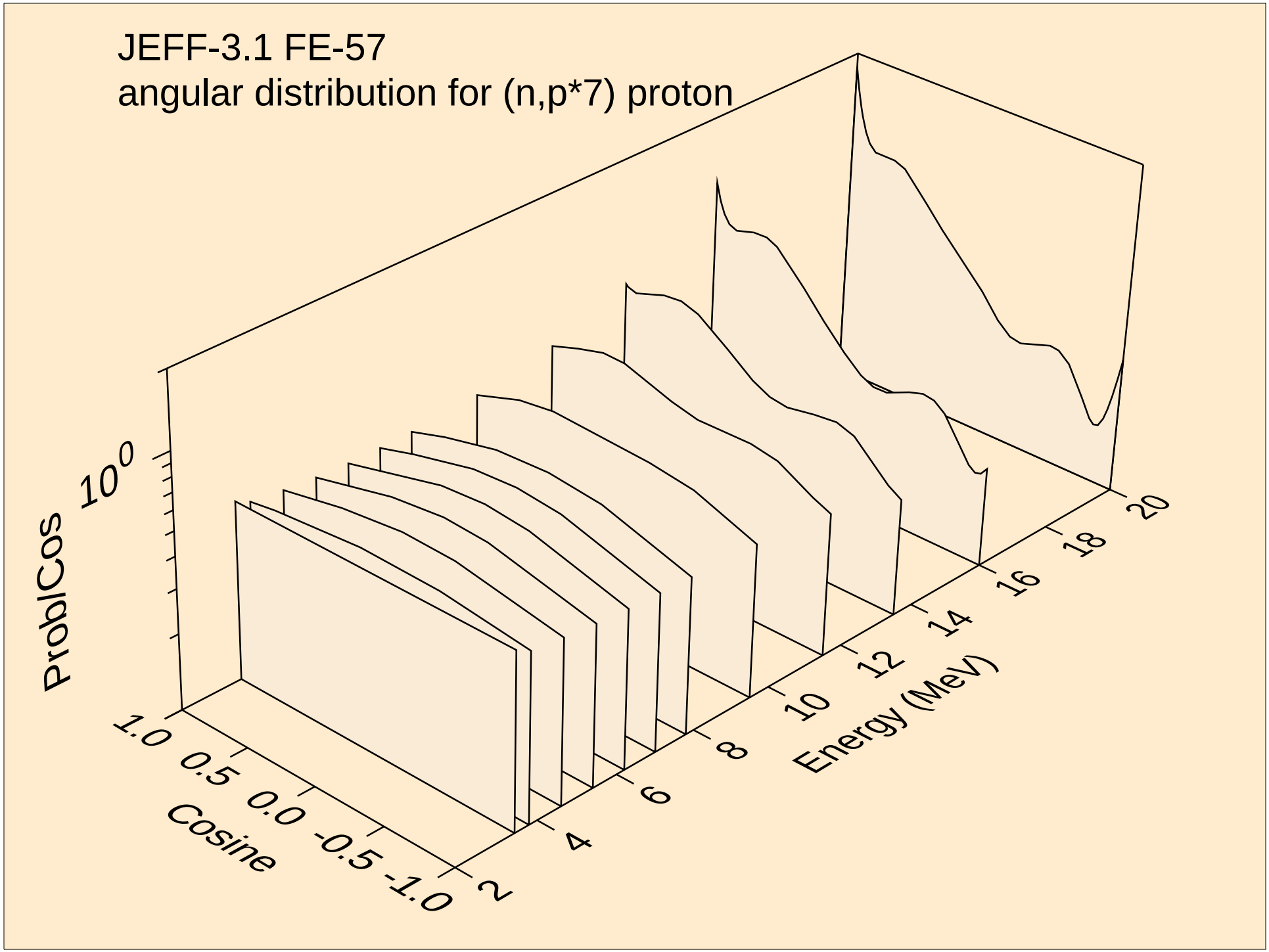

JEFF-3.1 FE-57
angular distribution for (n,p*2) proton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

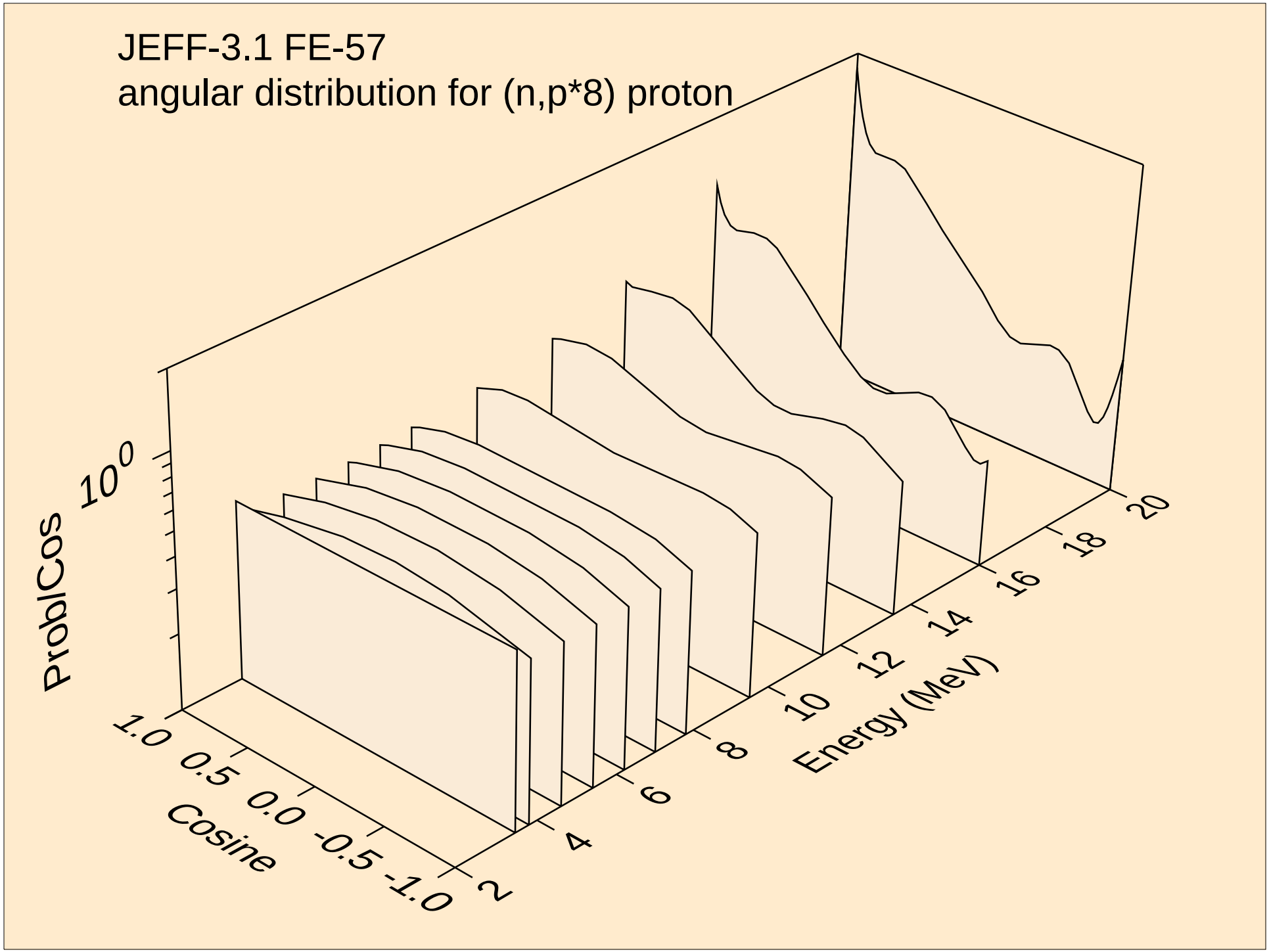

JEFF-3.1 FE-57
angular distribution for (n,p*3) proton
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

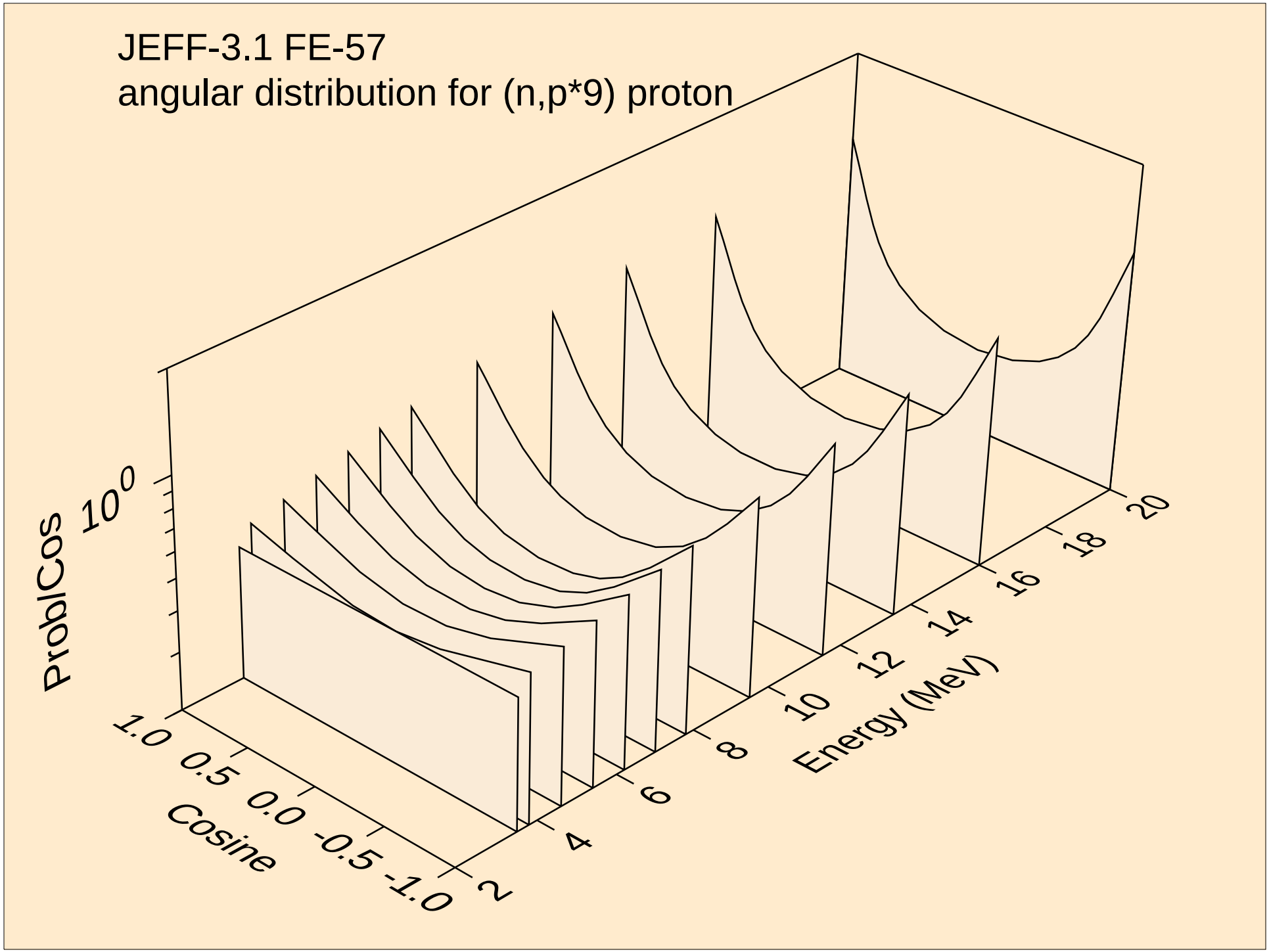

JEFF-3.1 FE-57
angular distribution for (n,p*4) proton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

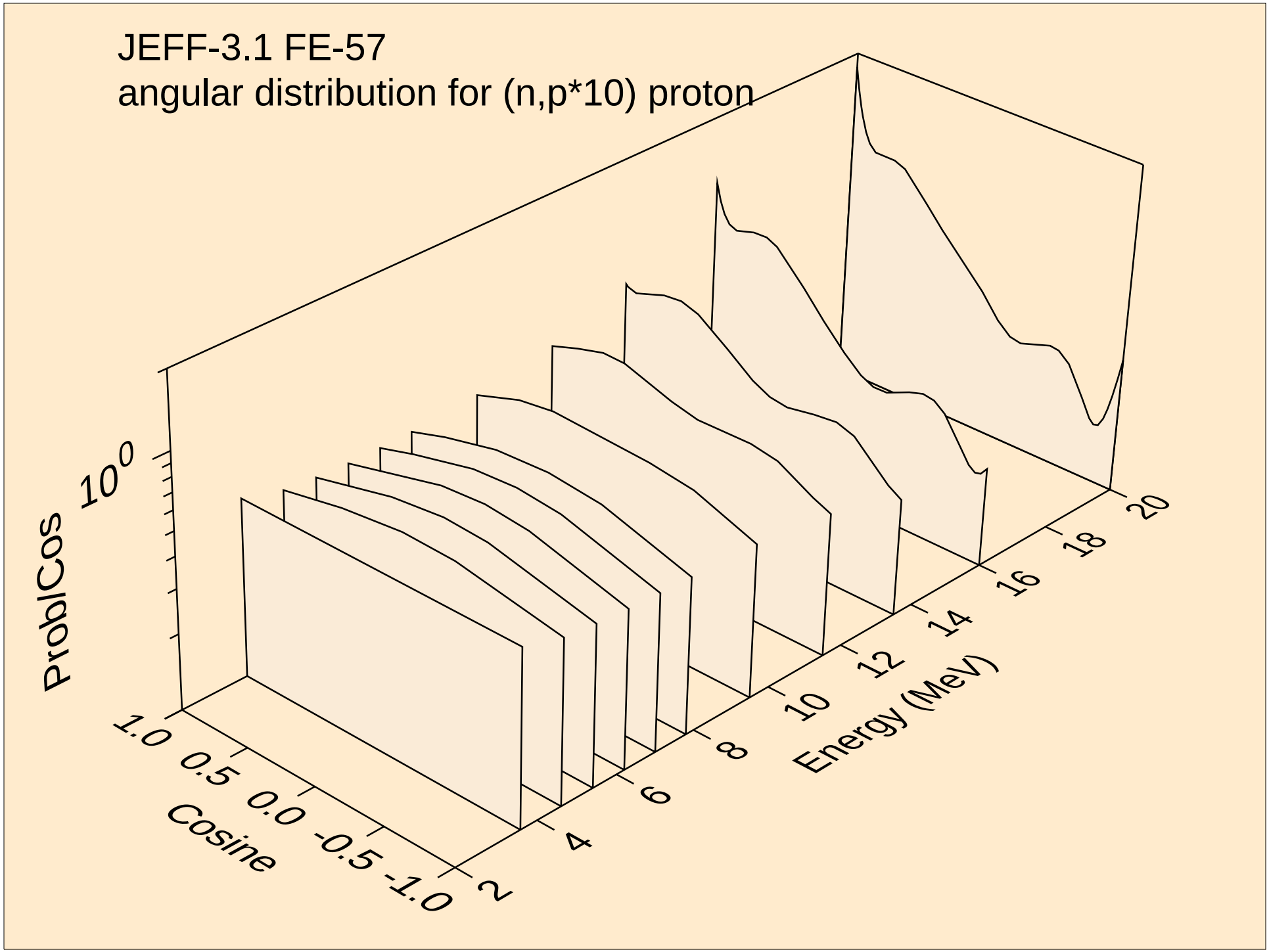

JEFF-3.1 FE-57
angular distribution for (n,p*5) proton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

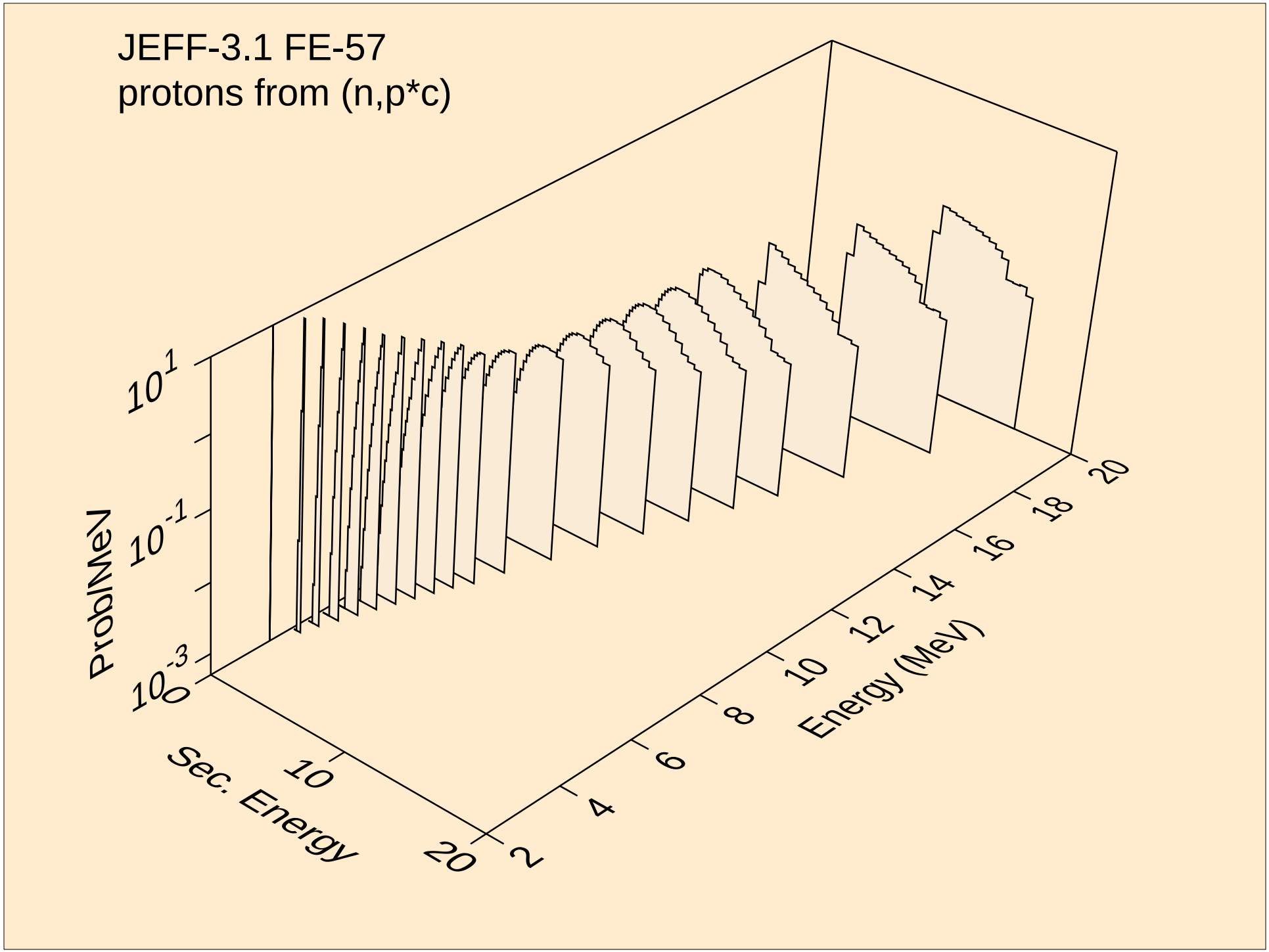

JEFF-3.1 FE-57
angular distribution for (n,p*6) proton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

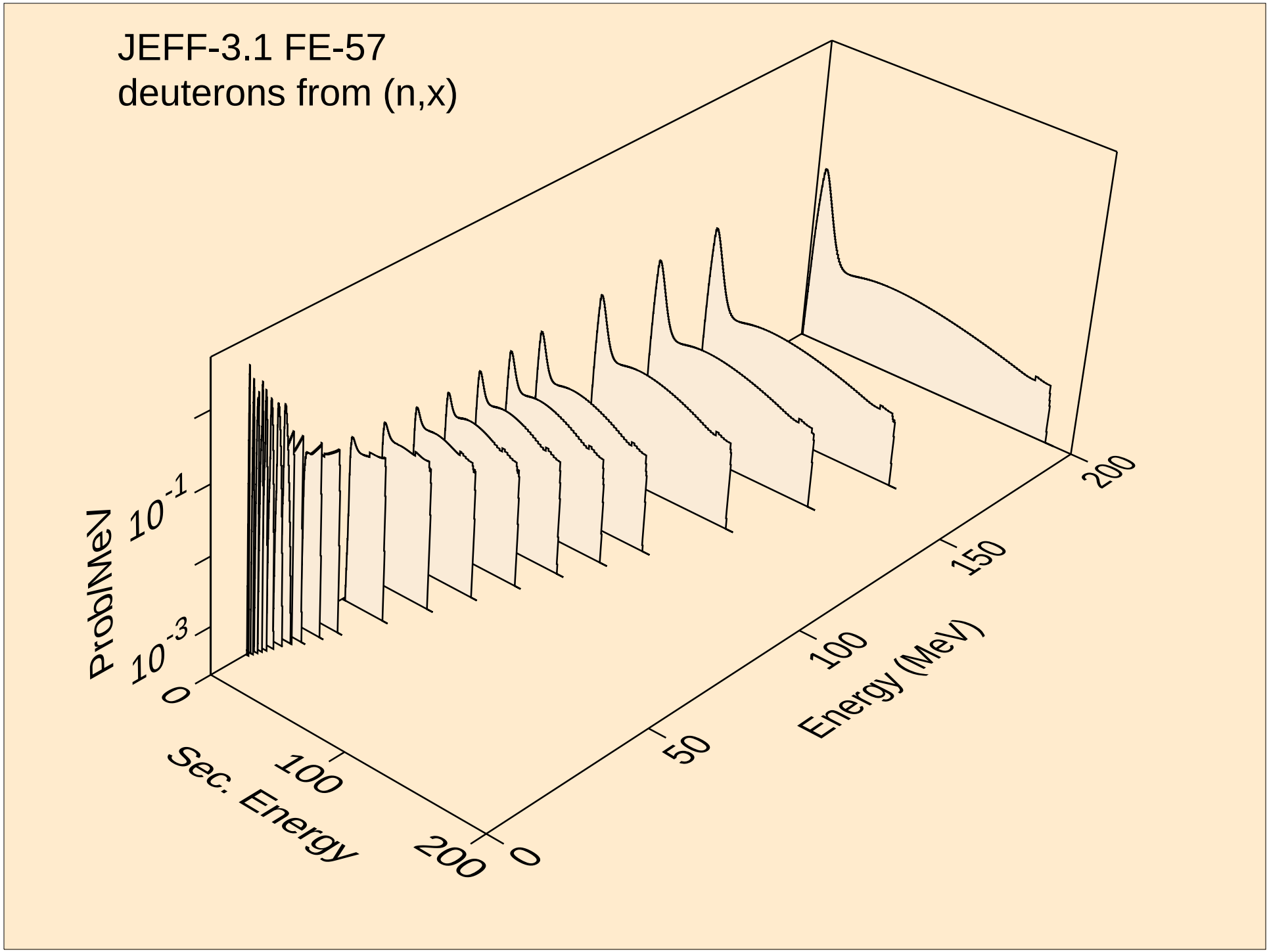

JEFF-3.1 FE-57
angular distribution for (n,p*7) proton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

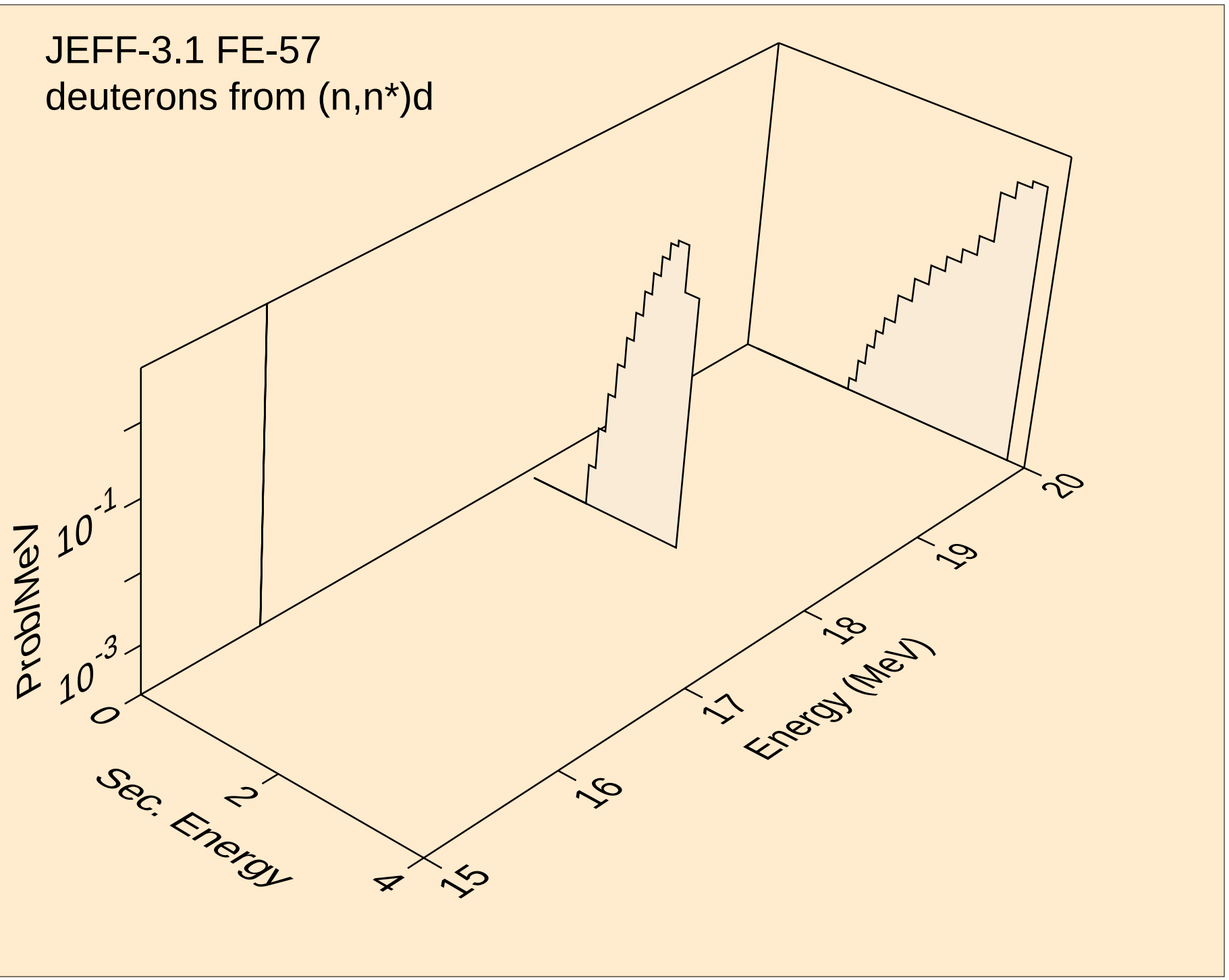

JEFF-3.1 FE-57
angular distribution for (n,p*8) proton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

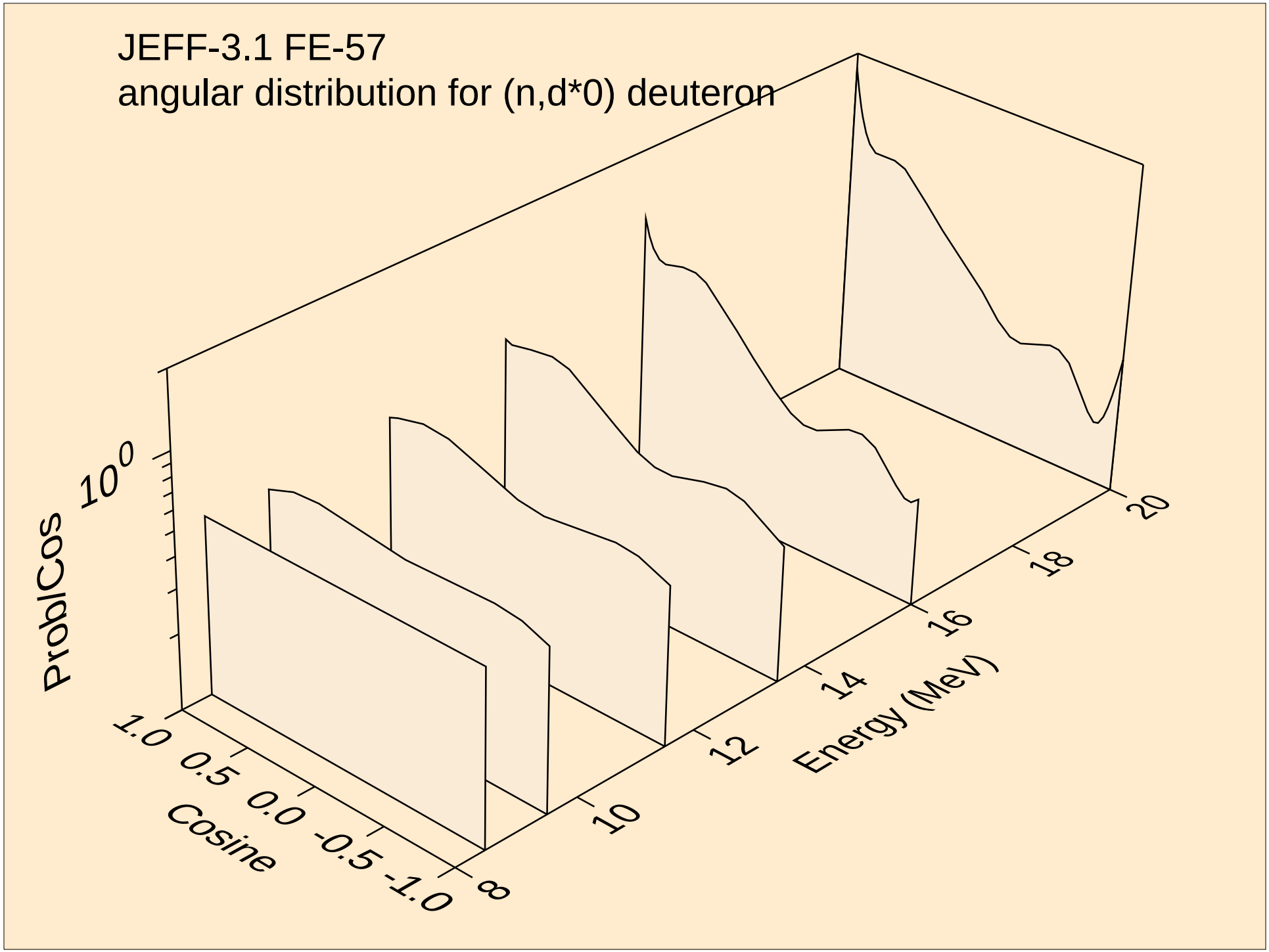

JEFF-3.1 FE-57
angular distribution for (n,p*9) proton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

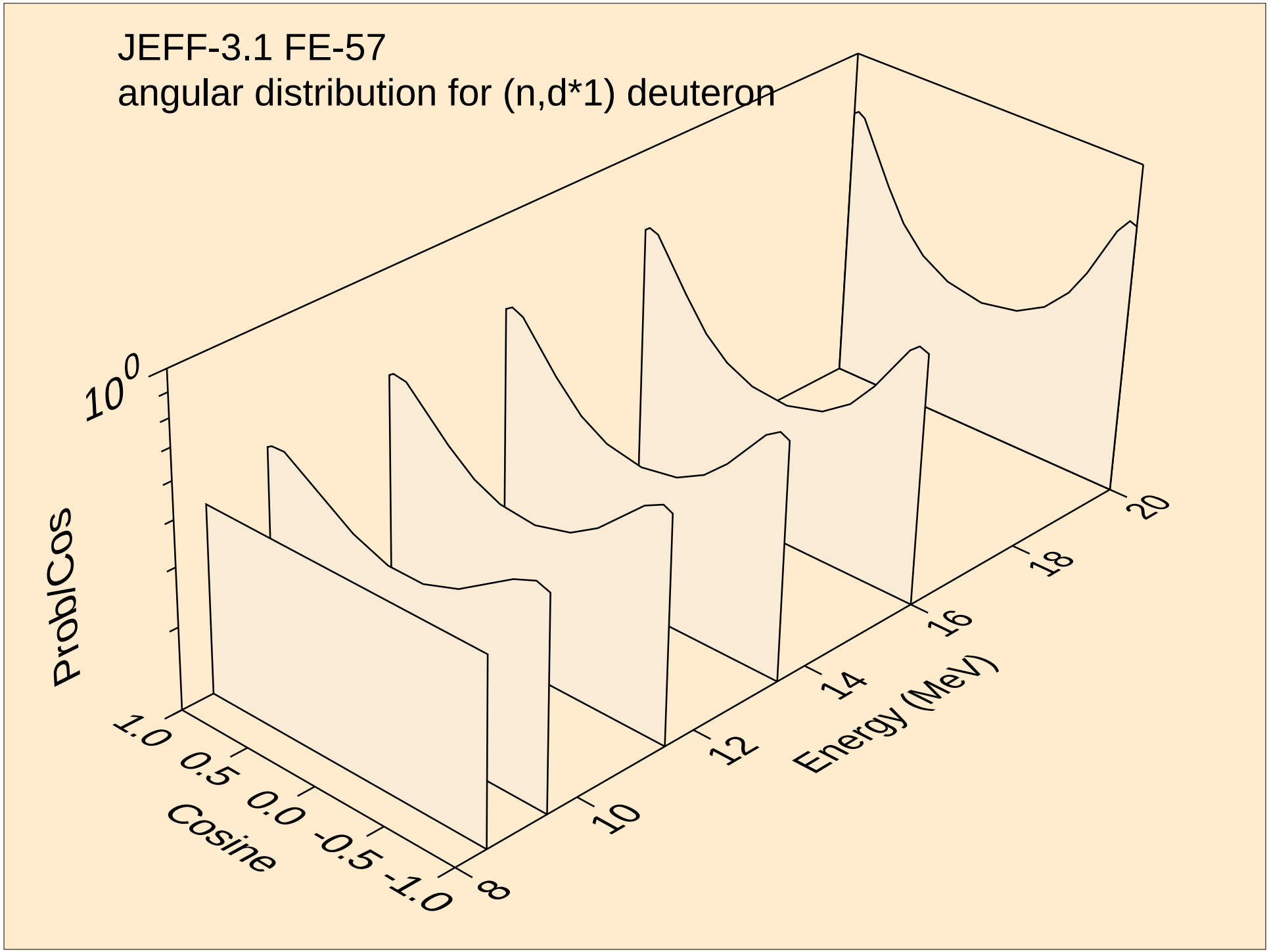

JEFF-3.1 FE-57
angular distribution for (n,p*10) proton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

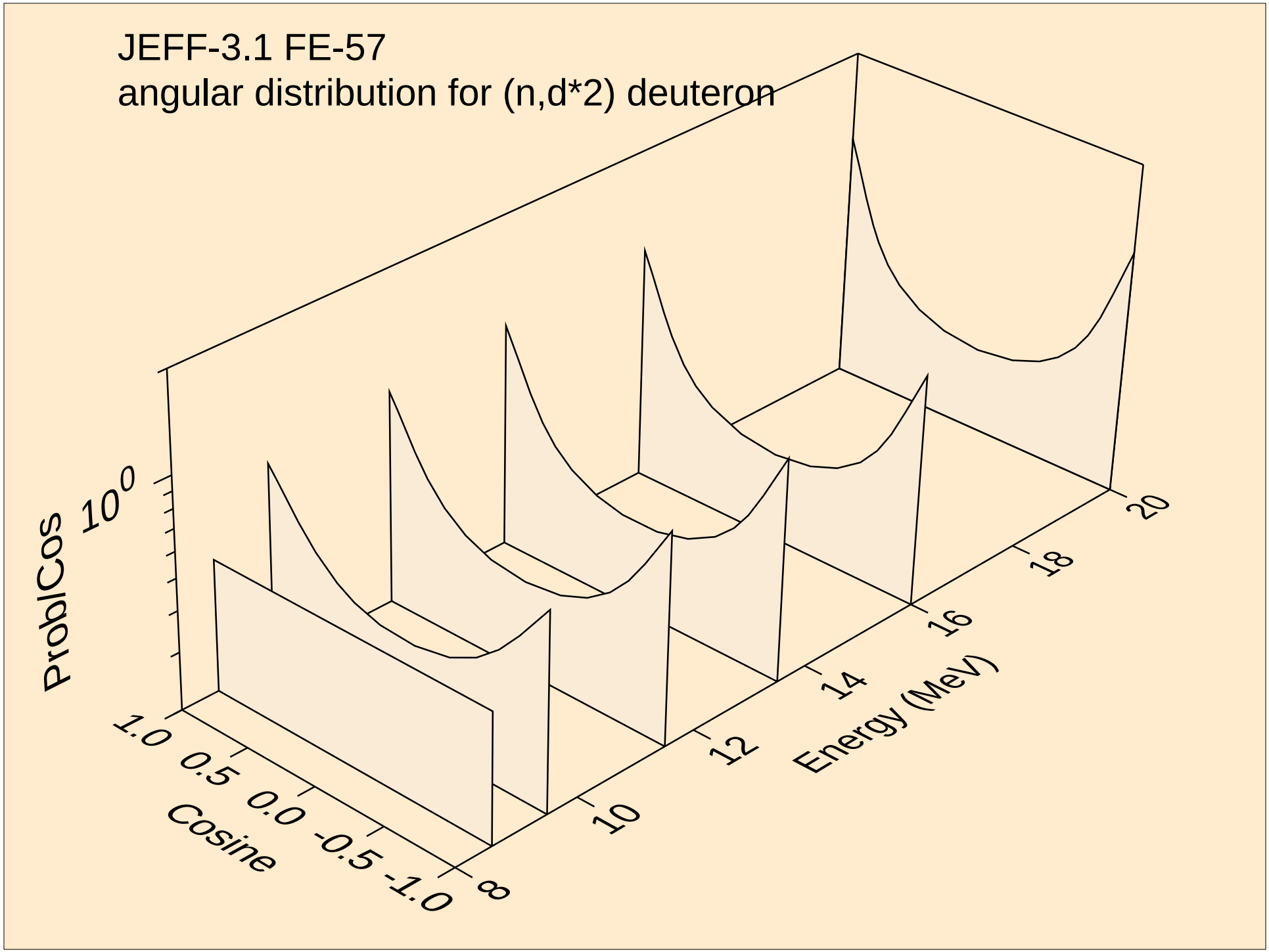

JEFF-3.1 FE-57
protons from (n,p*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
10
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

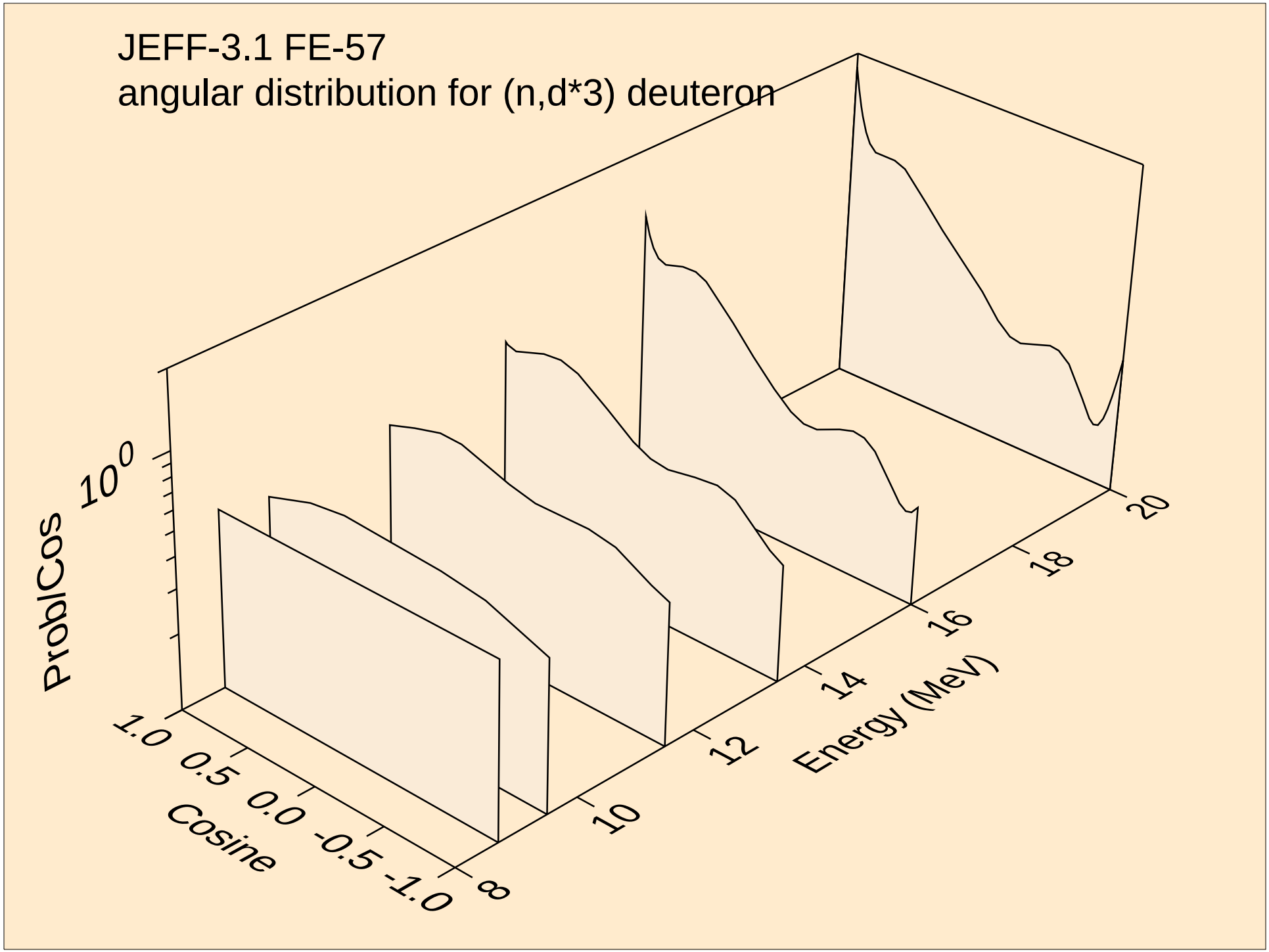

JEFF-3.1 FE-57
deuterons from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

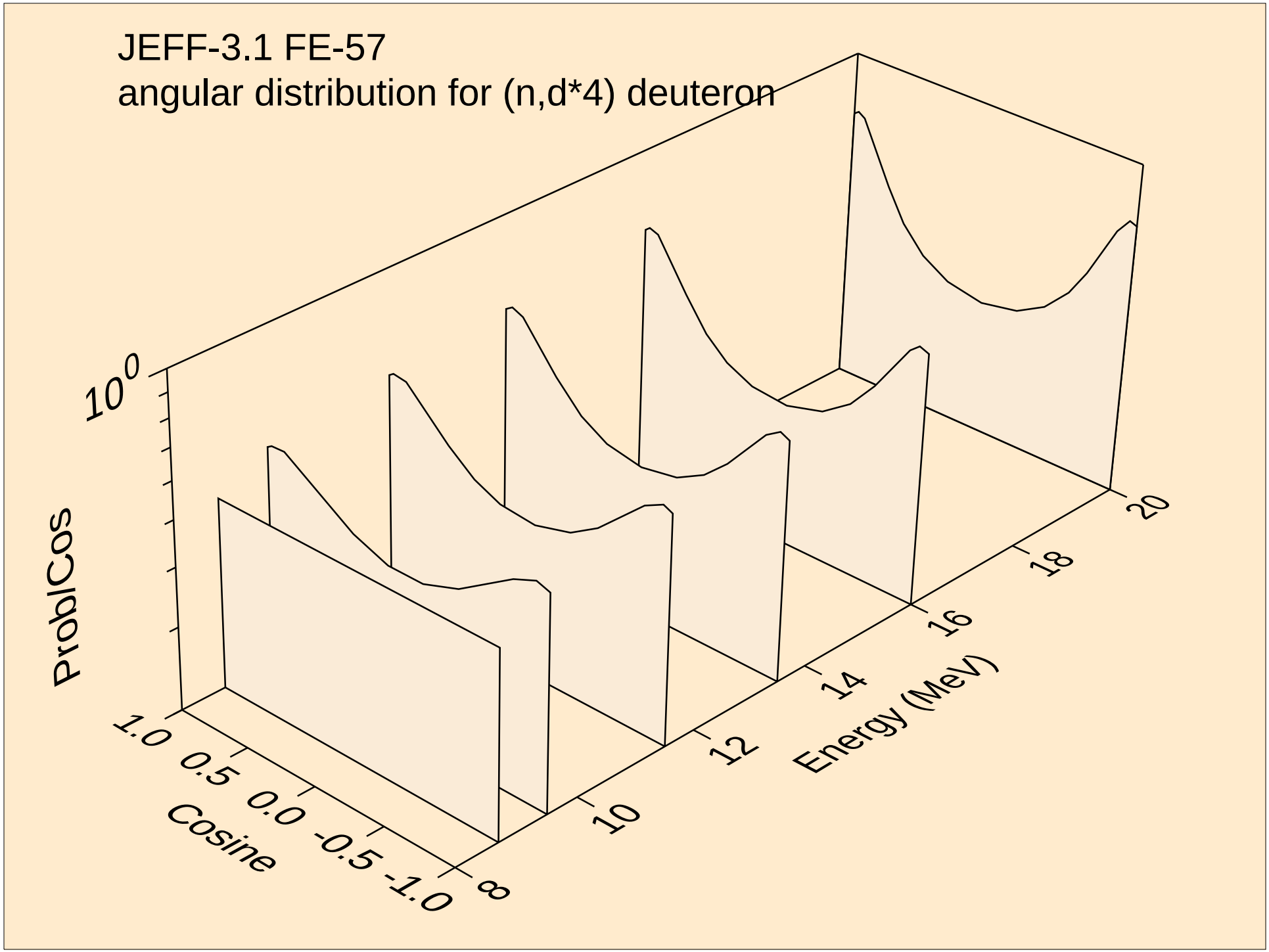

JEFF-3.1 FE-57
deuterons from (n,n*)d
Prob/MeV
10-1
10-3
0
Sec. Energy
2
4
15
16
17
18
19
20
Energy (MeV)

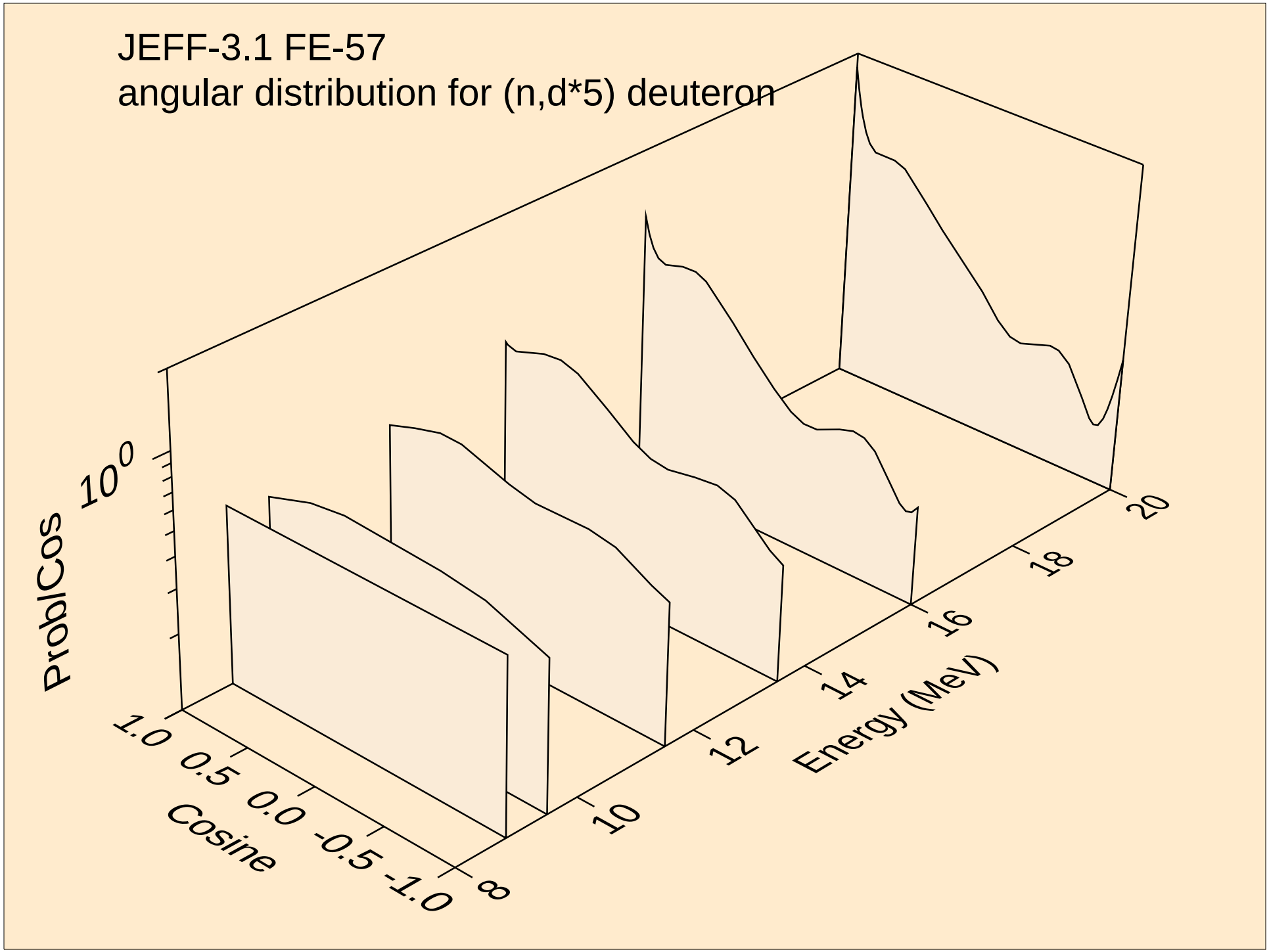

JEFF-3.1 FE-57
angular distribution for (n,d*0) deuteron
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

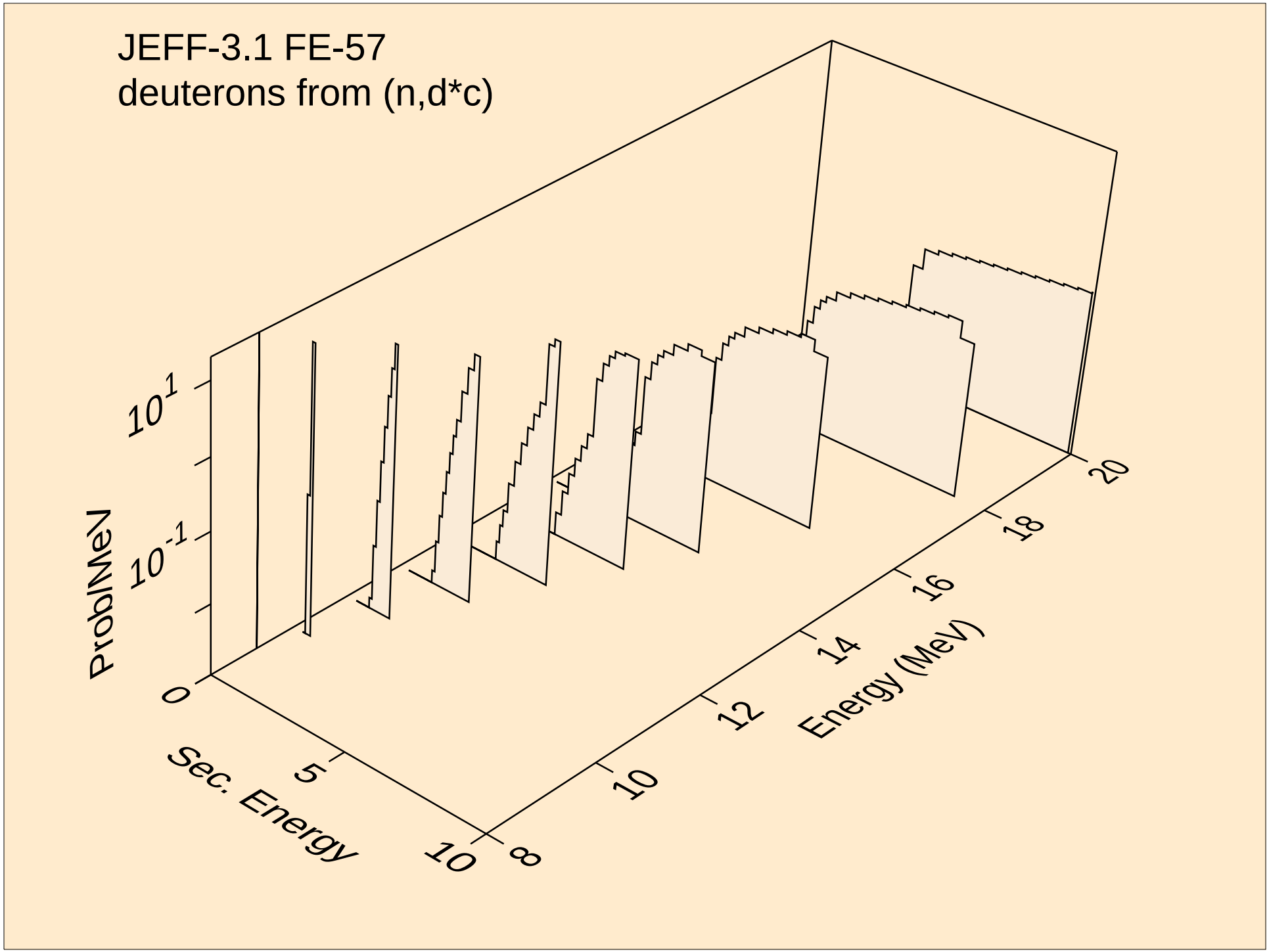

JEFF-3.1 FE-57
angular distribution for (n,d*1) deuteron
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

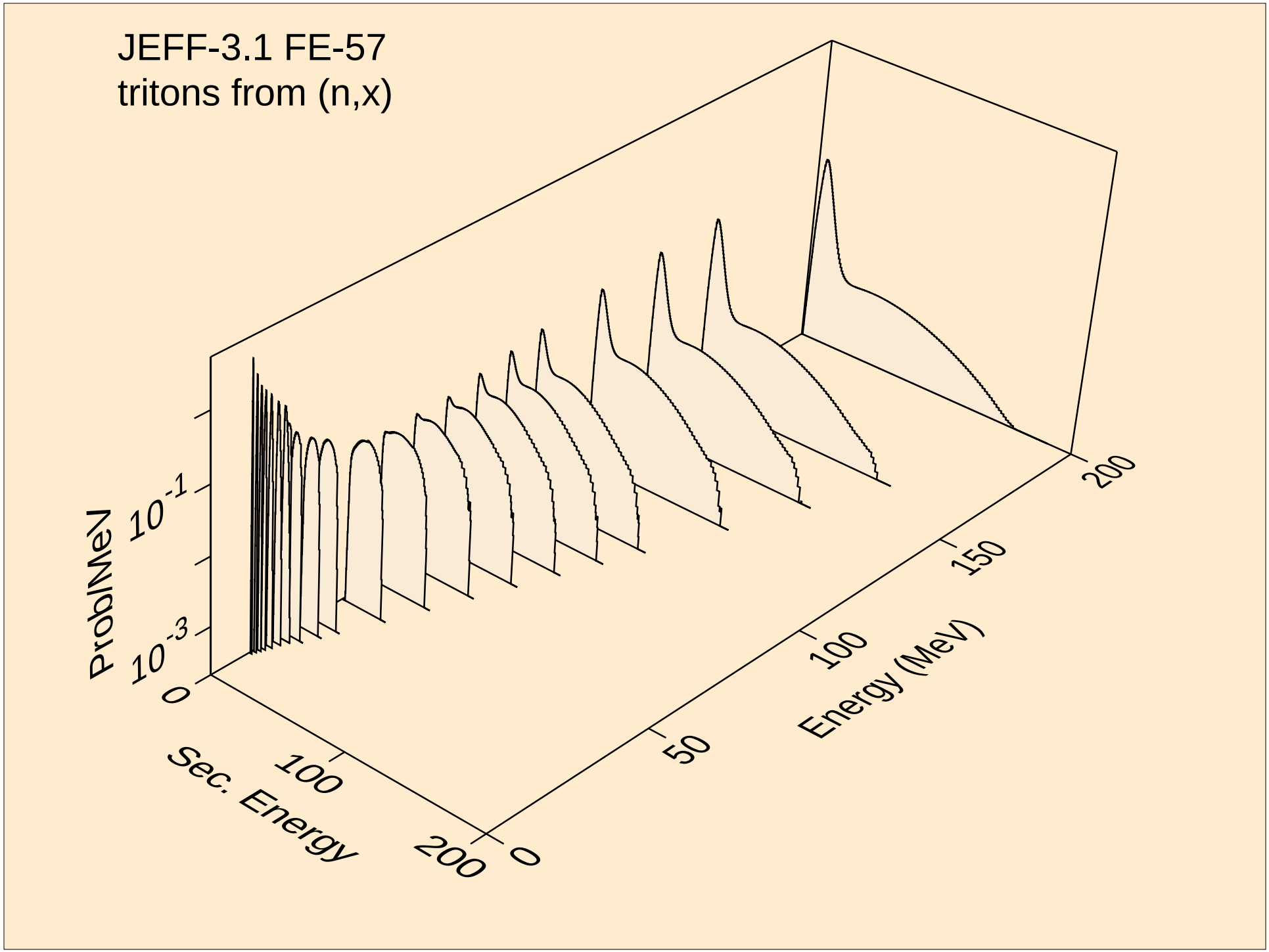

JEFF-3.1 FE-57
angular distribution for (n,d*2) deuteron
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

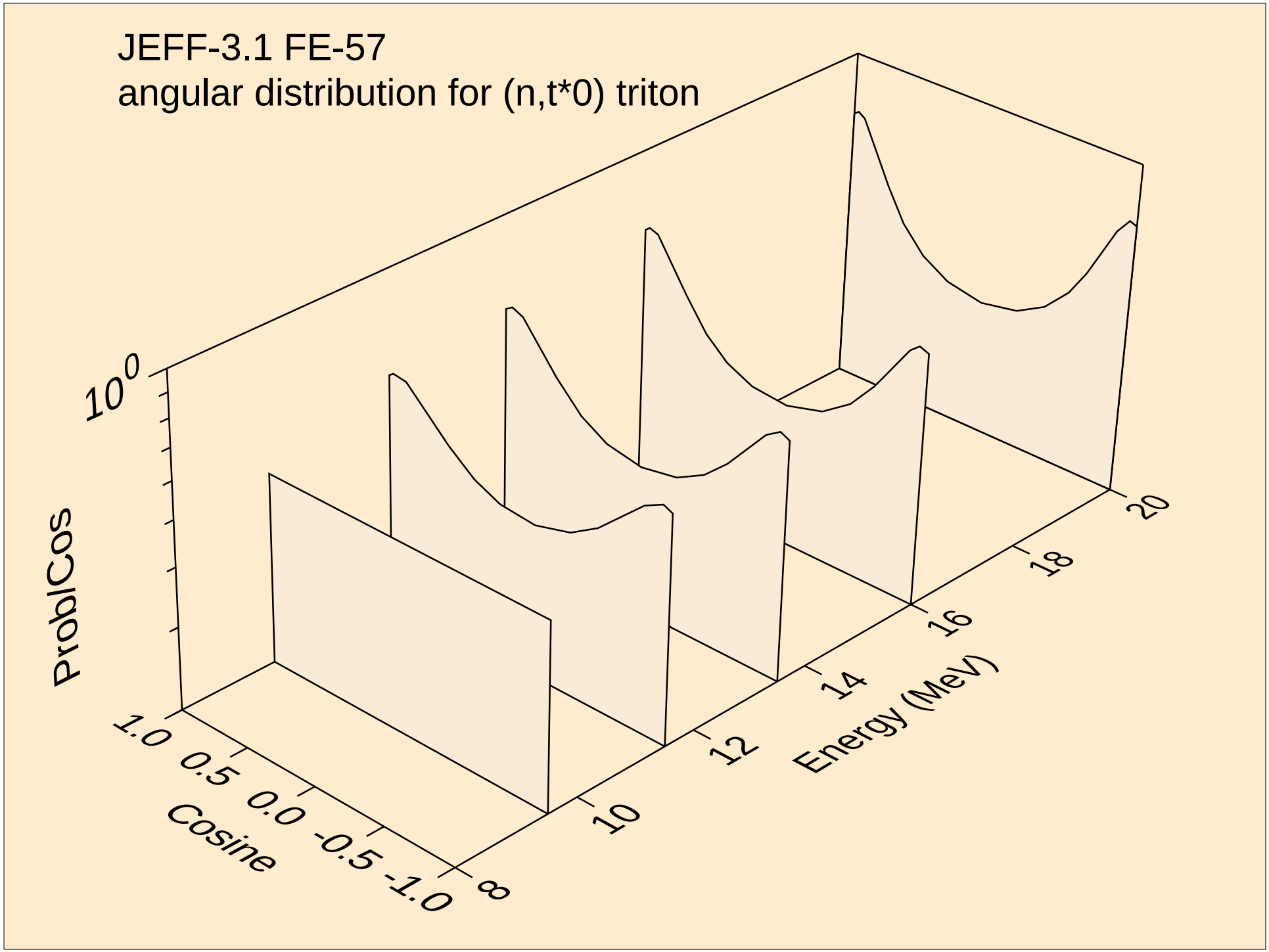

JEFF-3.1 FE-57
angular distribution for (n,d*3) deuteron
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

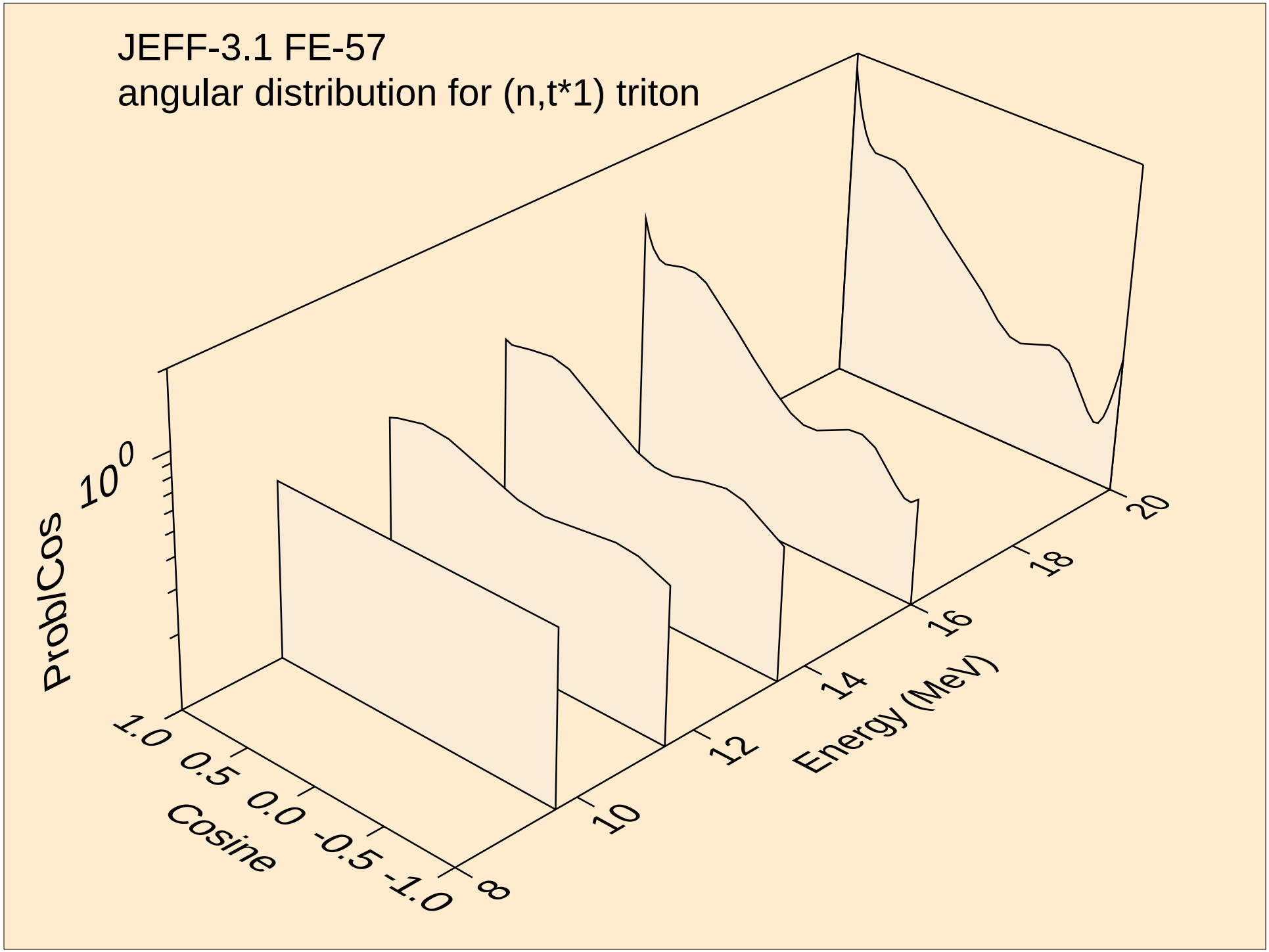

JEFF-3.1 FE-57
angular distribution for (n,d*4) deuteron
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

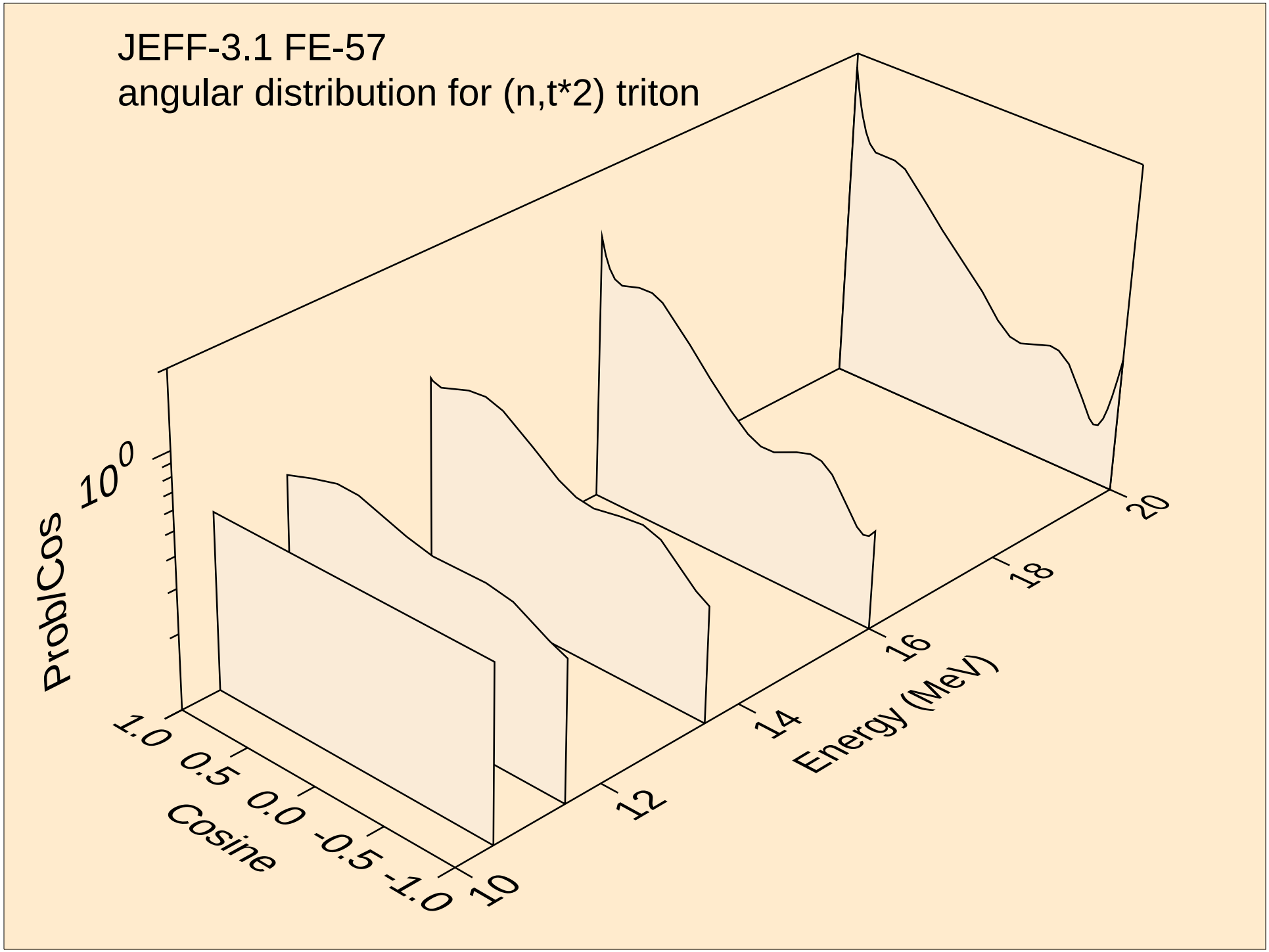

JEFF-3.1 FE-57
angular distribution for (n,d*5) deuteron
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

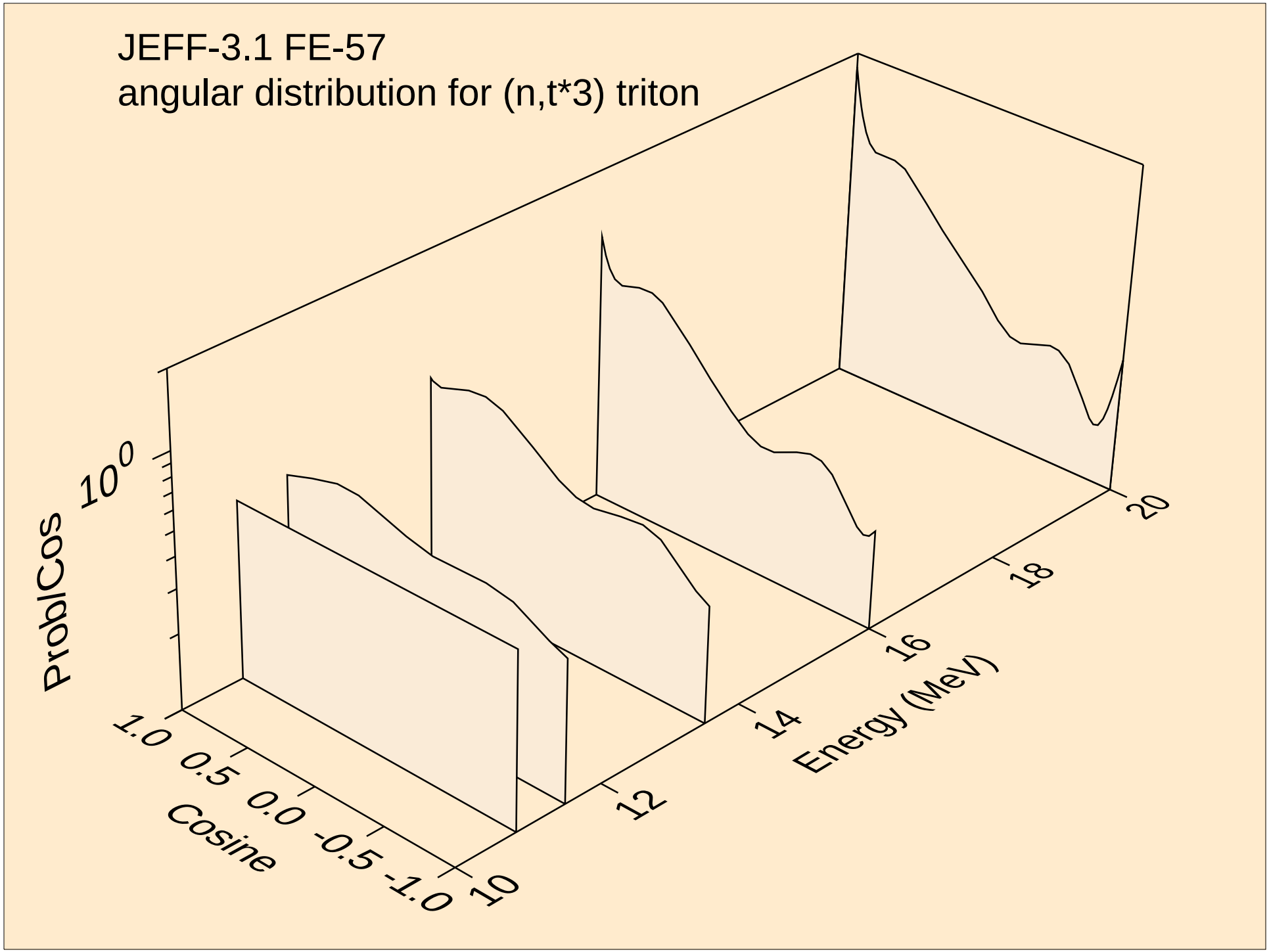

JEFF-3.1 FE-57
deuterons from (n,d*c)
Prob/MeV
10^{1}
10^{-1}
0
5
10
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

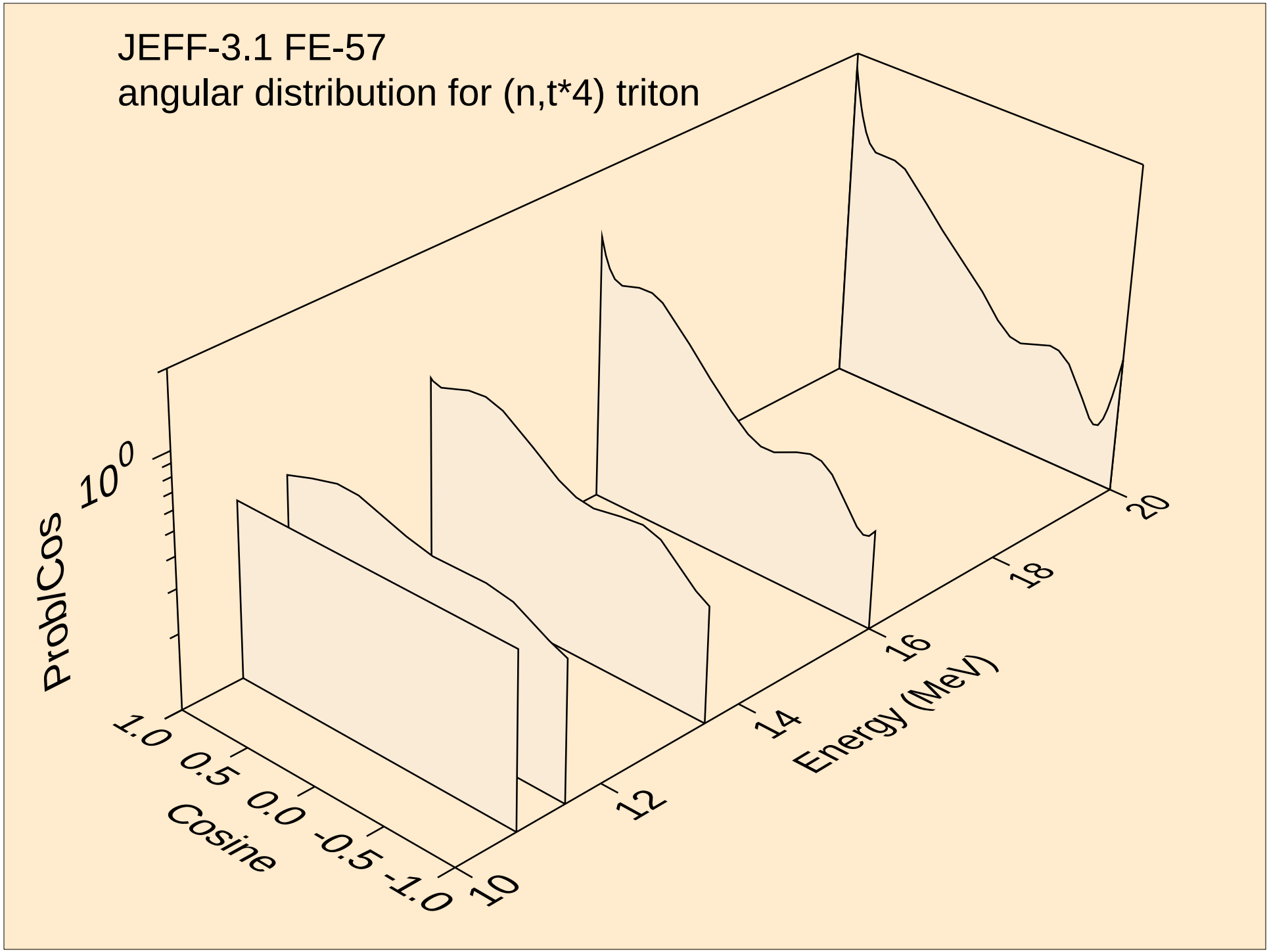

JEFF-3.1 FE-57
tritons from (n,x)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

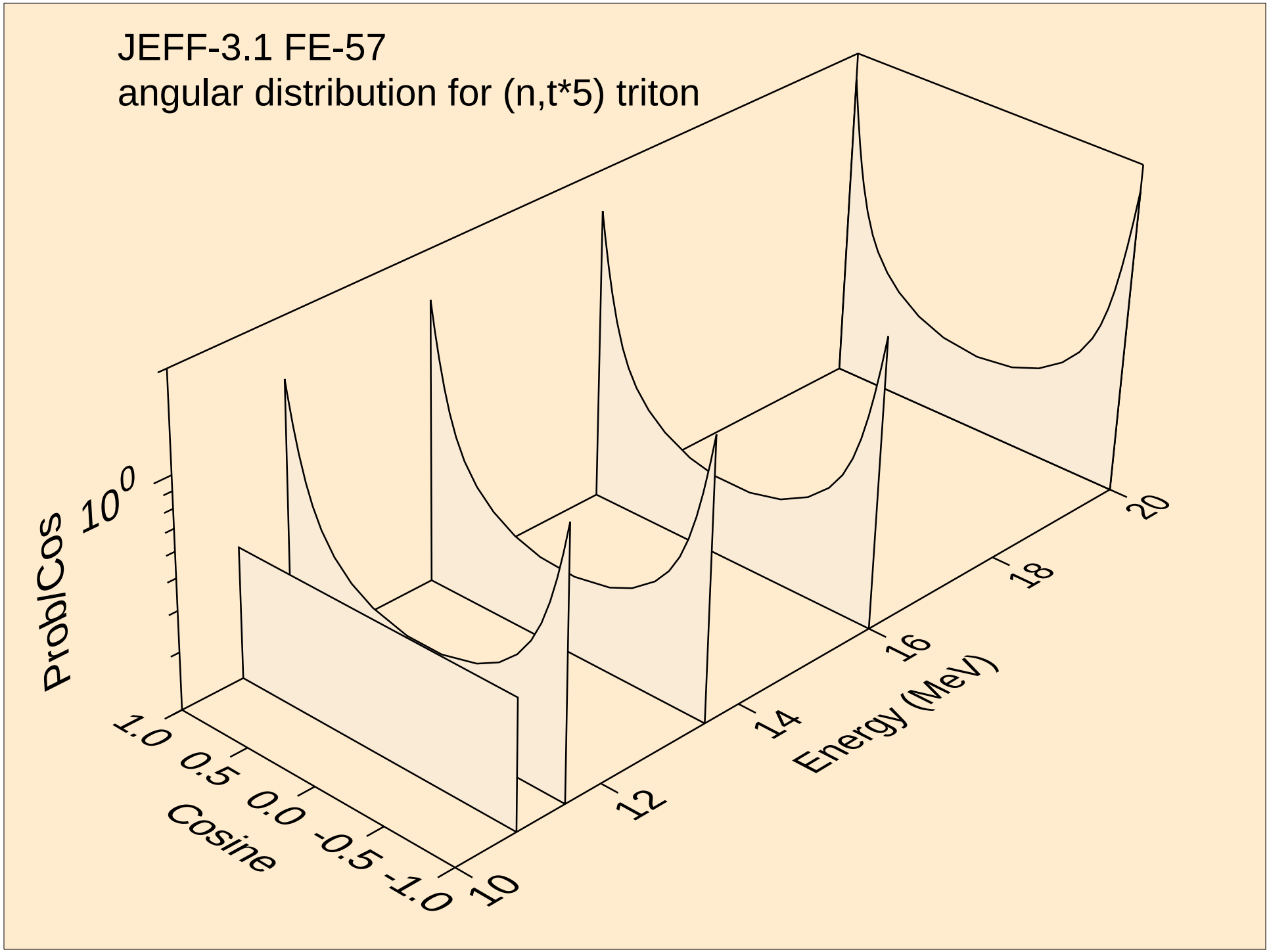

JEFF-3.1 FE-57
angular distribution for (n,t*0) triton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

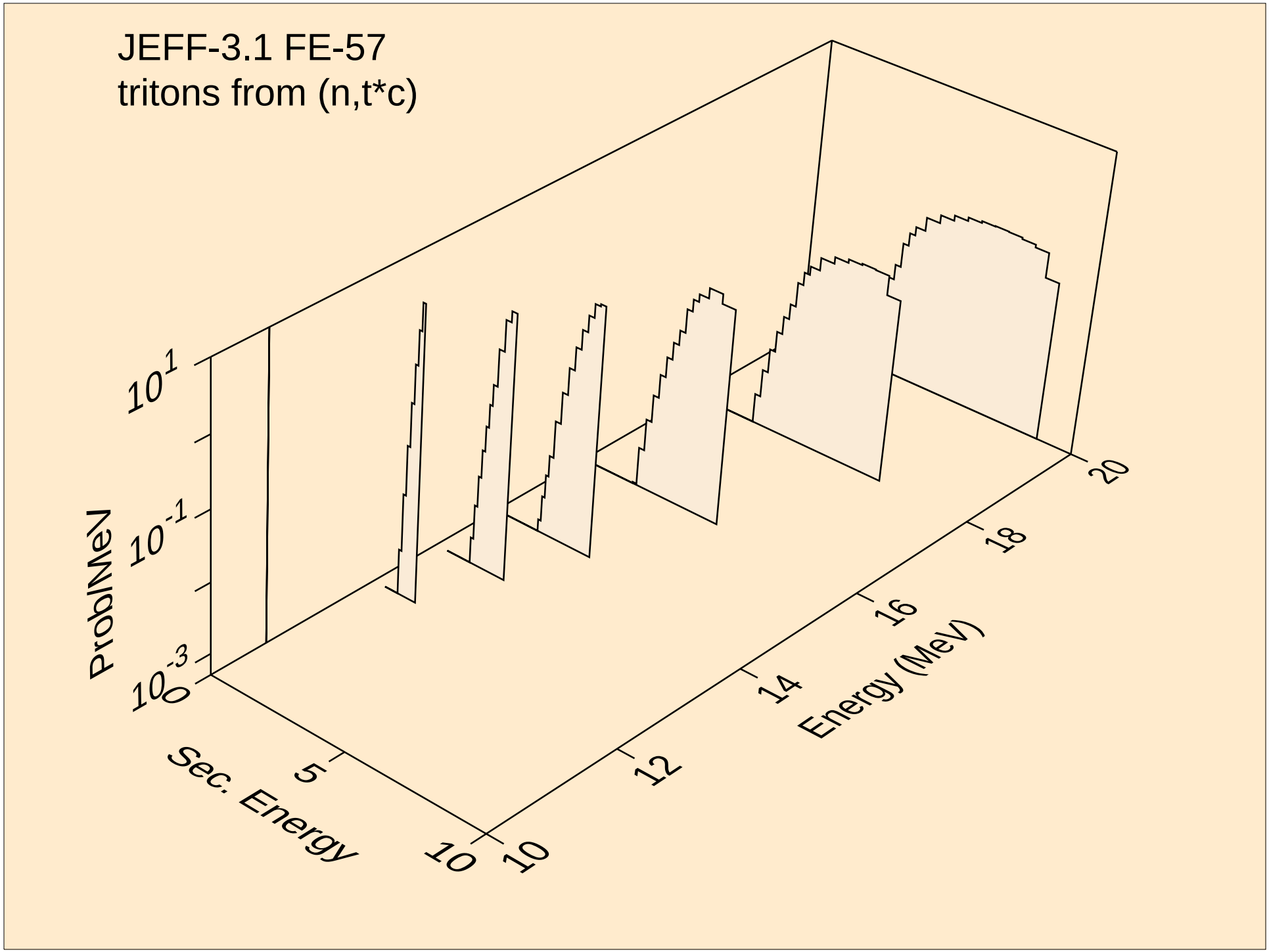

JEFF-3.1 FE-57
angular distribution for (n,t*1) triton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

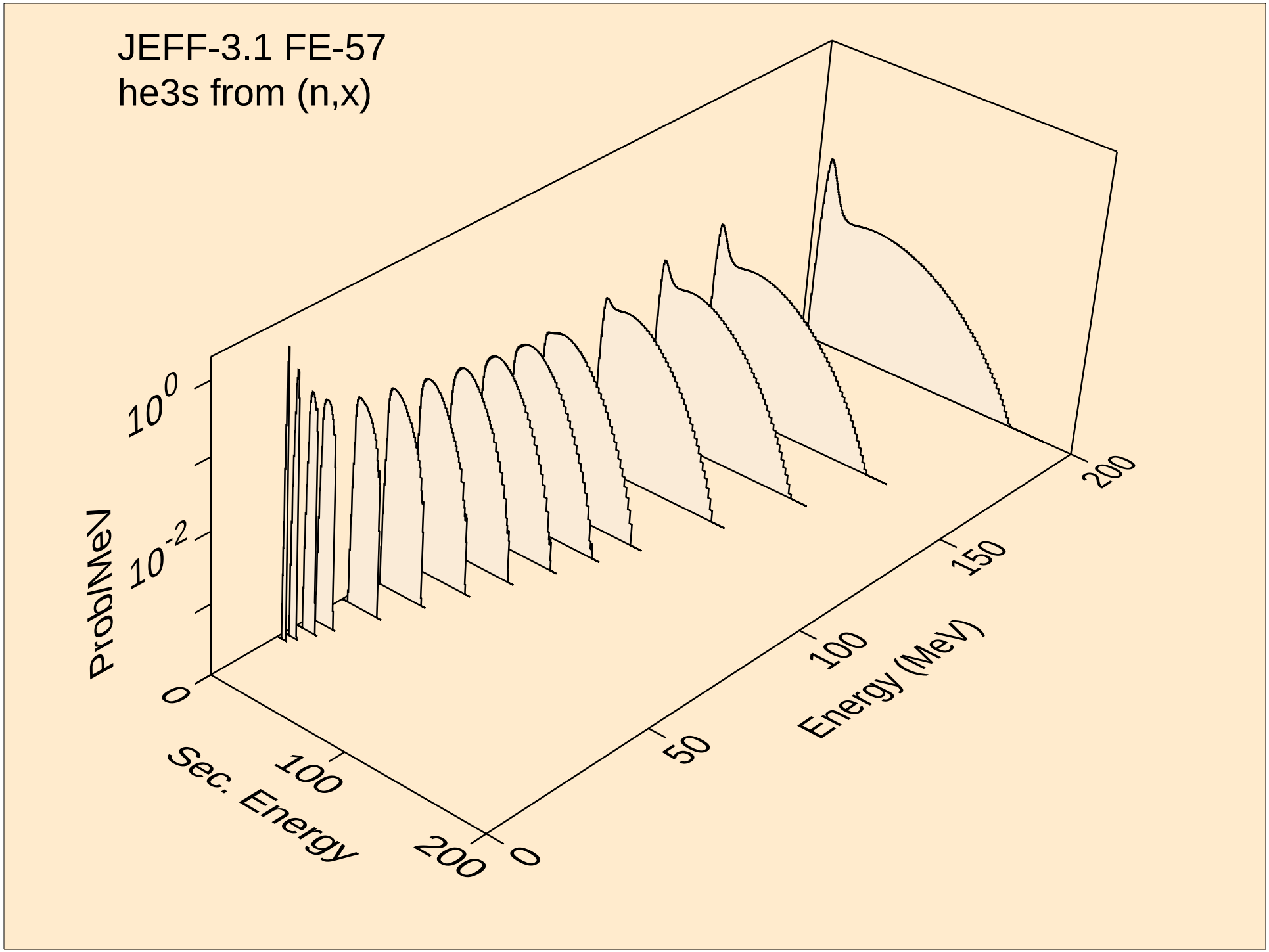

JEFF-3.1 FE-57
angular distribution for (n,t*2) triton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
10
12
14
16
18
20
Energy (MeV)

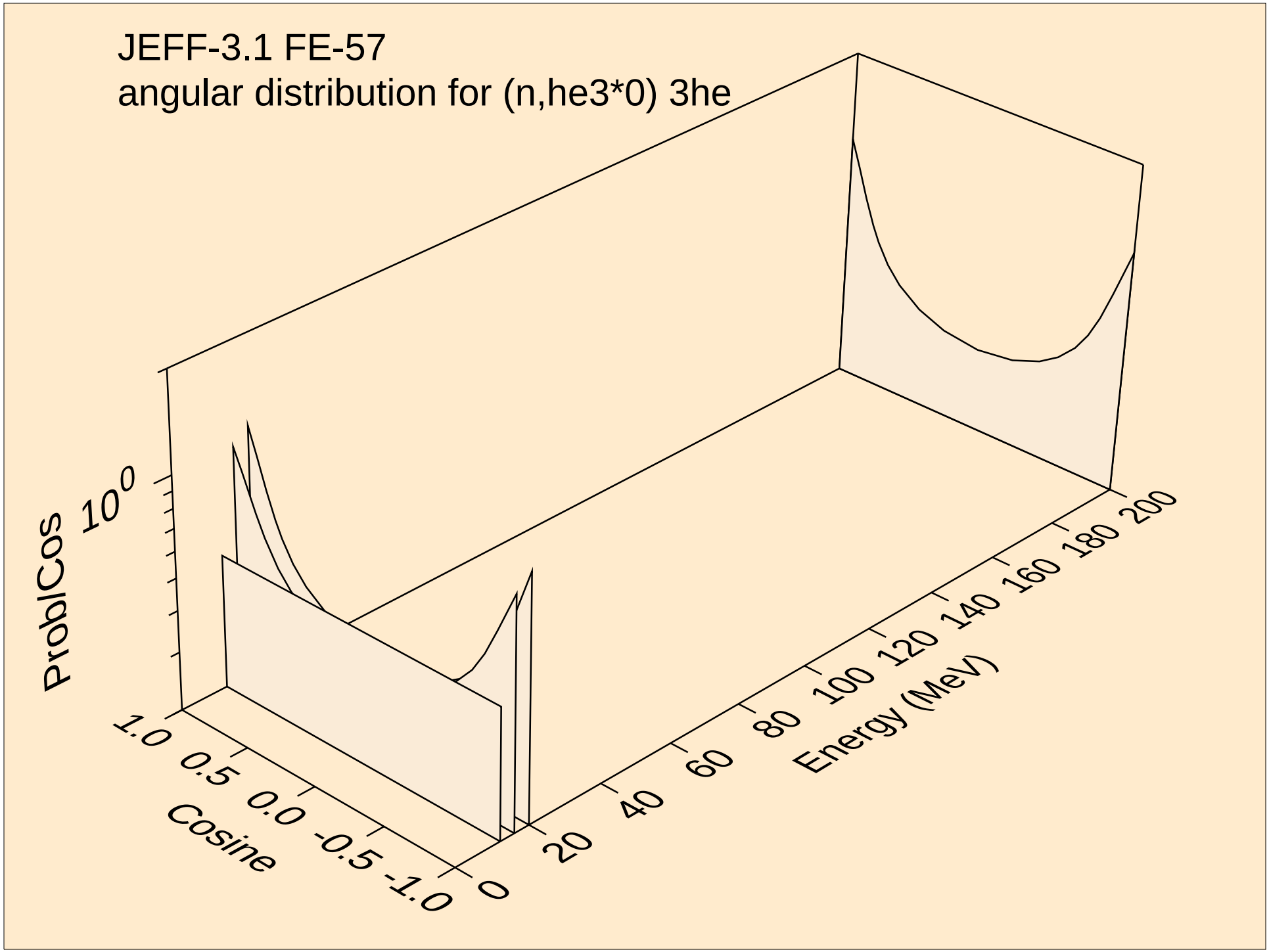

JEFF-3.1 FE-57
angular distribution for (n,t*3) triton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
10
12
14
16
18
20
Energy (MeV)

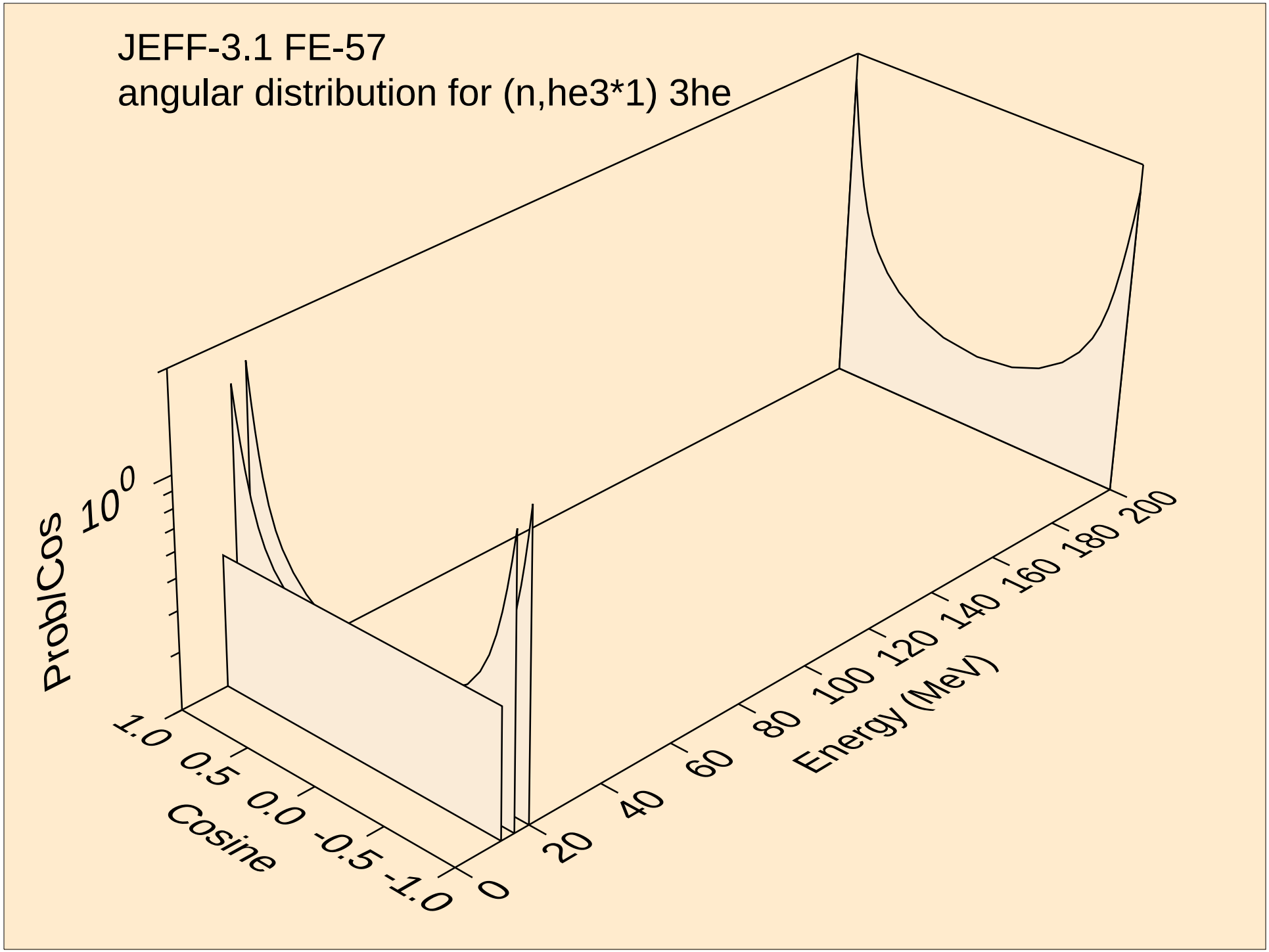

JEFF-3.1 FE-57
angular distribution for (n,t*4) triton
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
10
12
14
16
18
20
Energy (MeV)

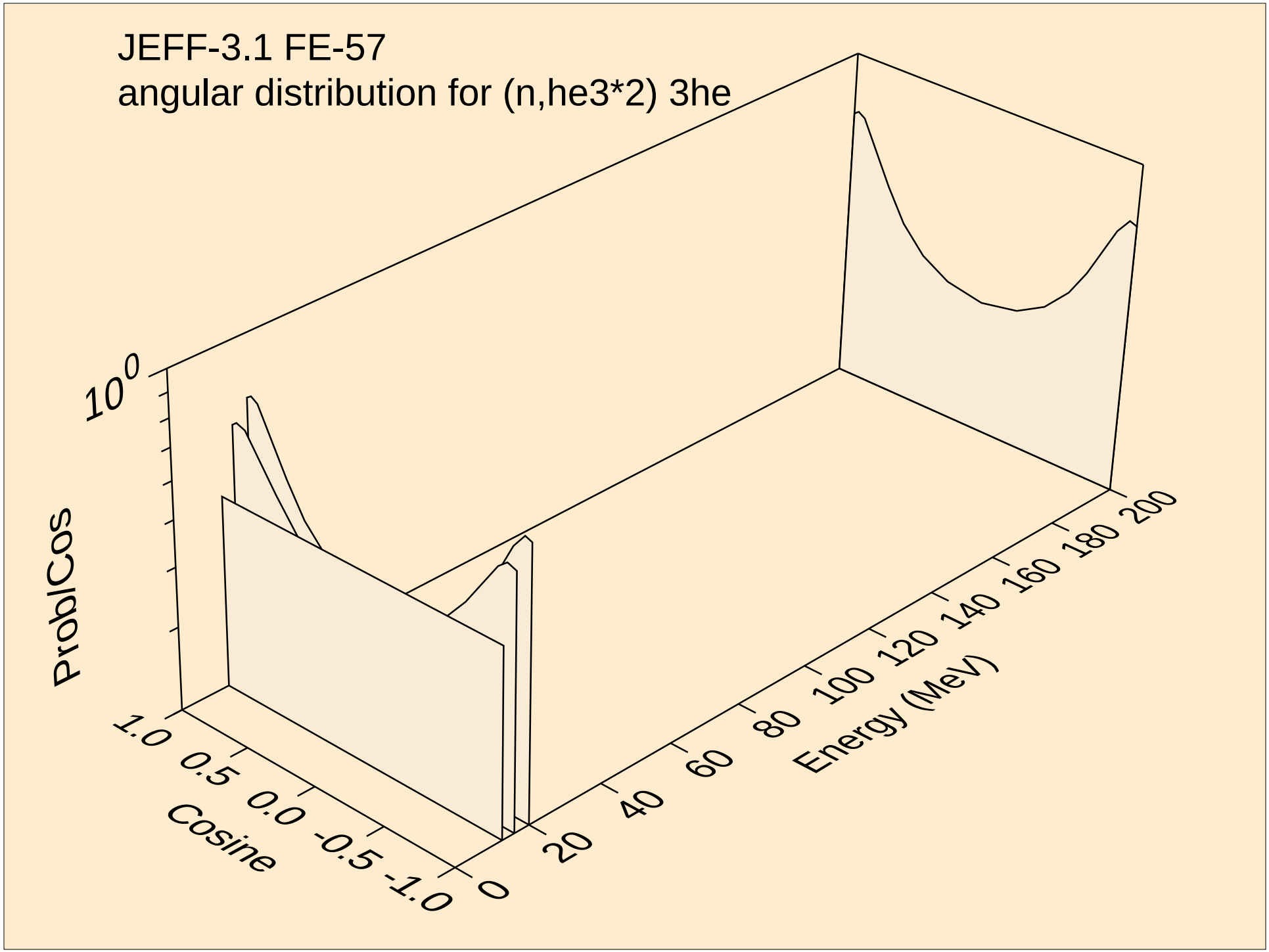

JEFF-3.1 FE-57
angular distribution for (n,t*5) triton
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
10
12
14
16
18
20
Energy (MeV)

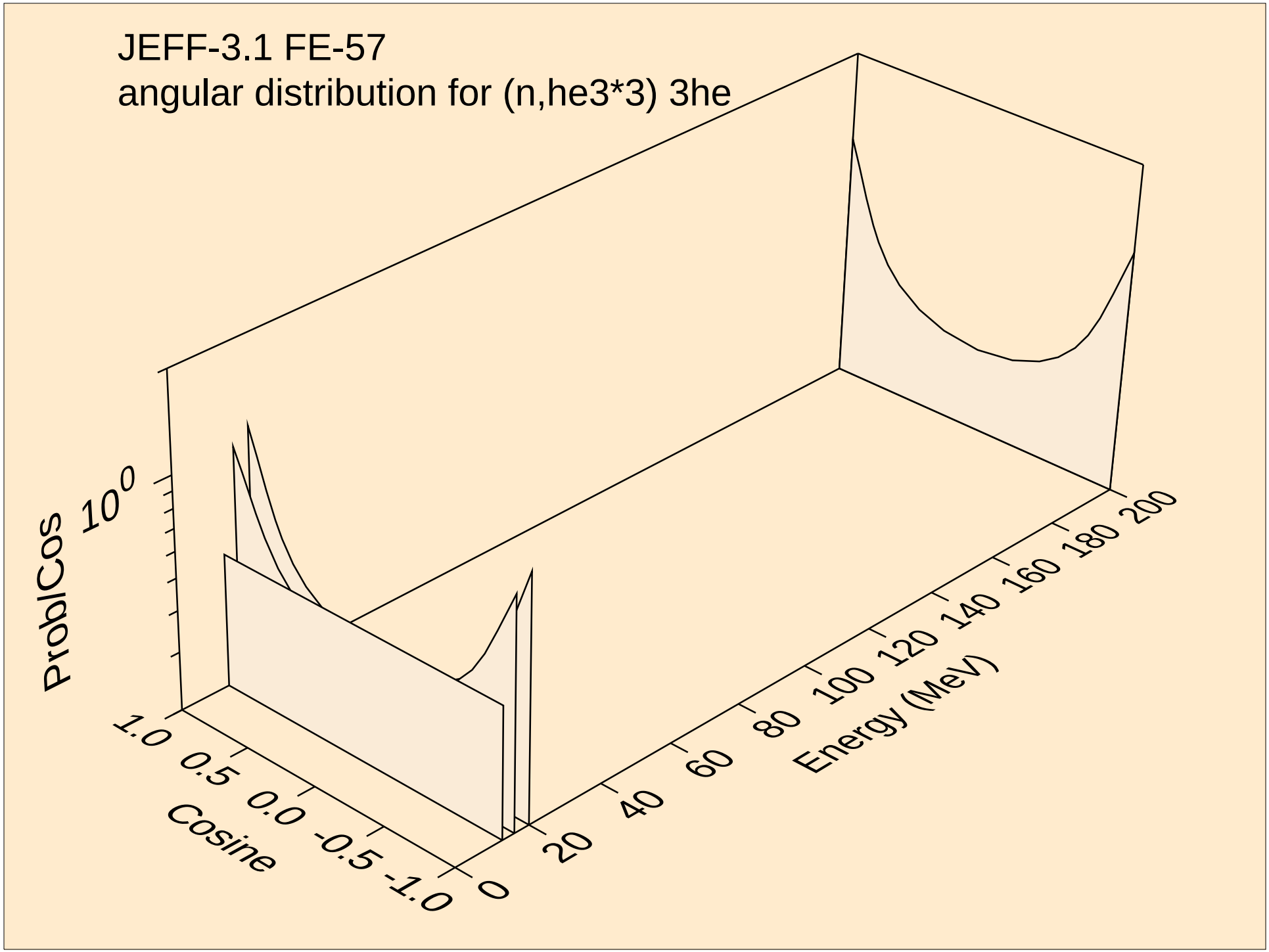

JEFF-3.1 FE-57
tritons from (n,t*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
5
10
Sec. Energy
10
12
14
16
18
20
Energy (MeV)

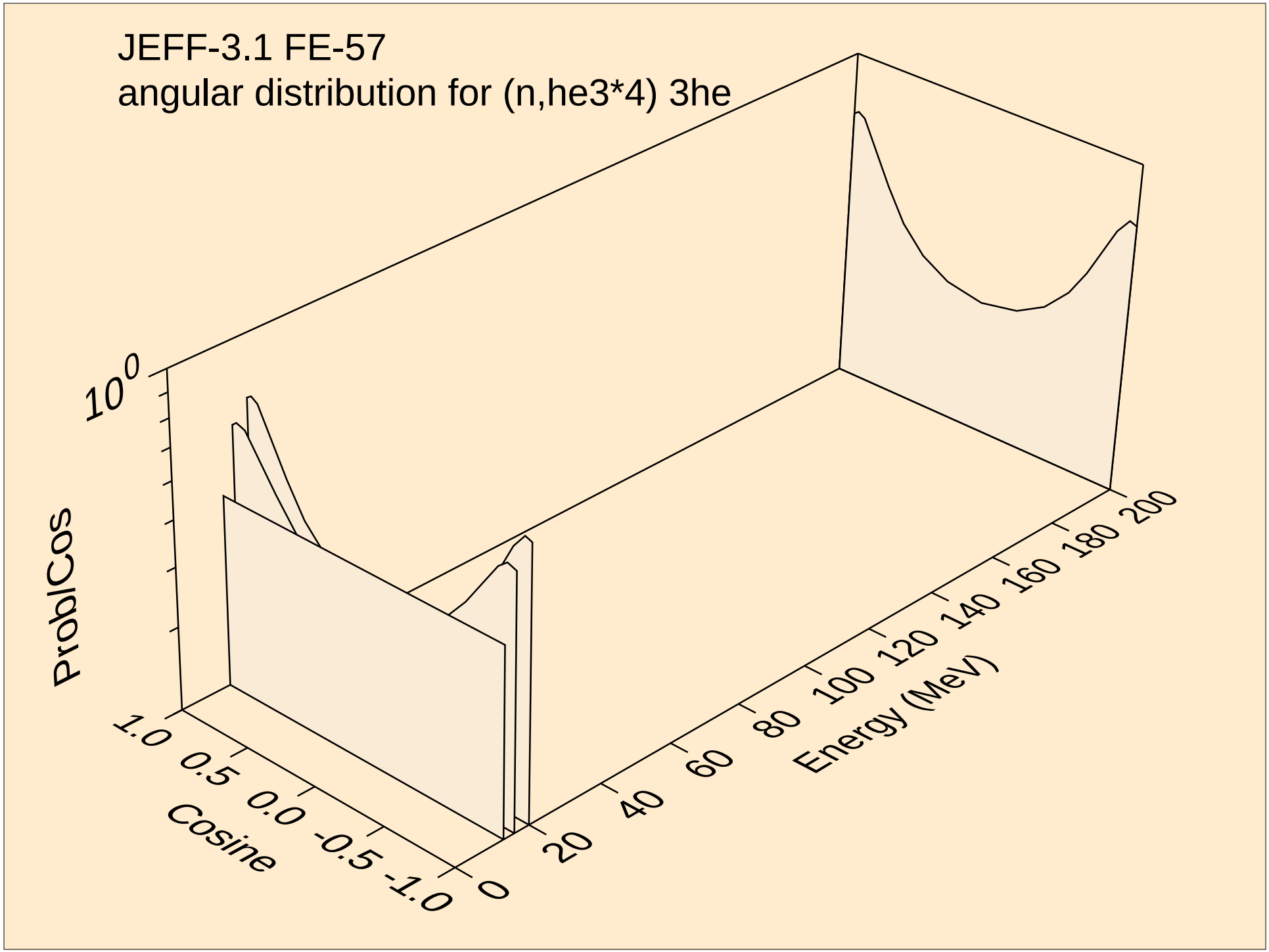

JEFF-3.1 FE-57
he3s from (n,x)
Prob/MeV
10^{0}
10^{-2}
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

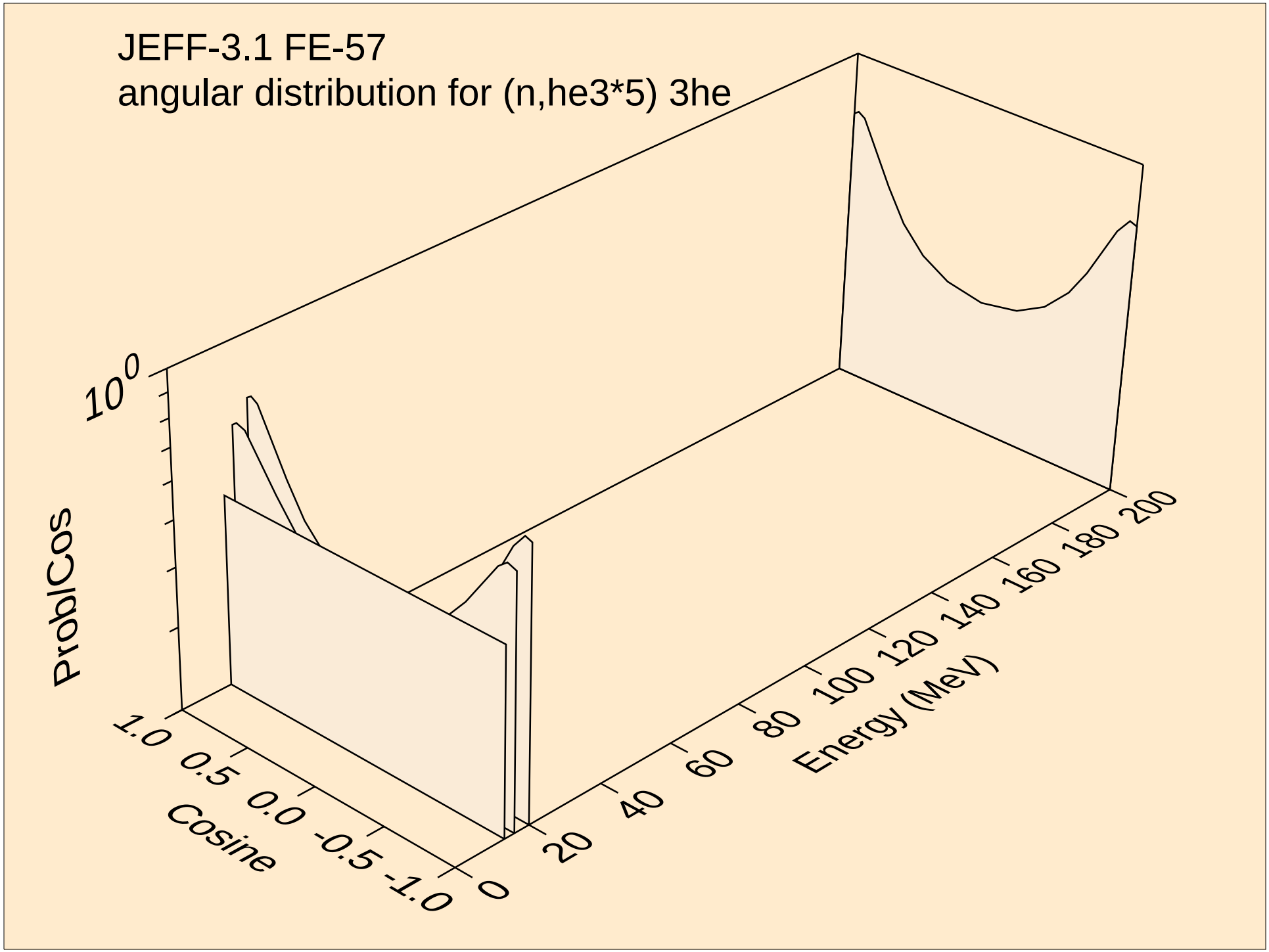

JEFF-3.1 FE-57
angular distribution for (n,he3*0) 3he
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

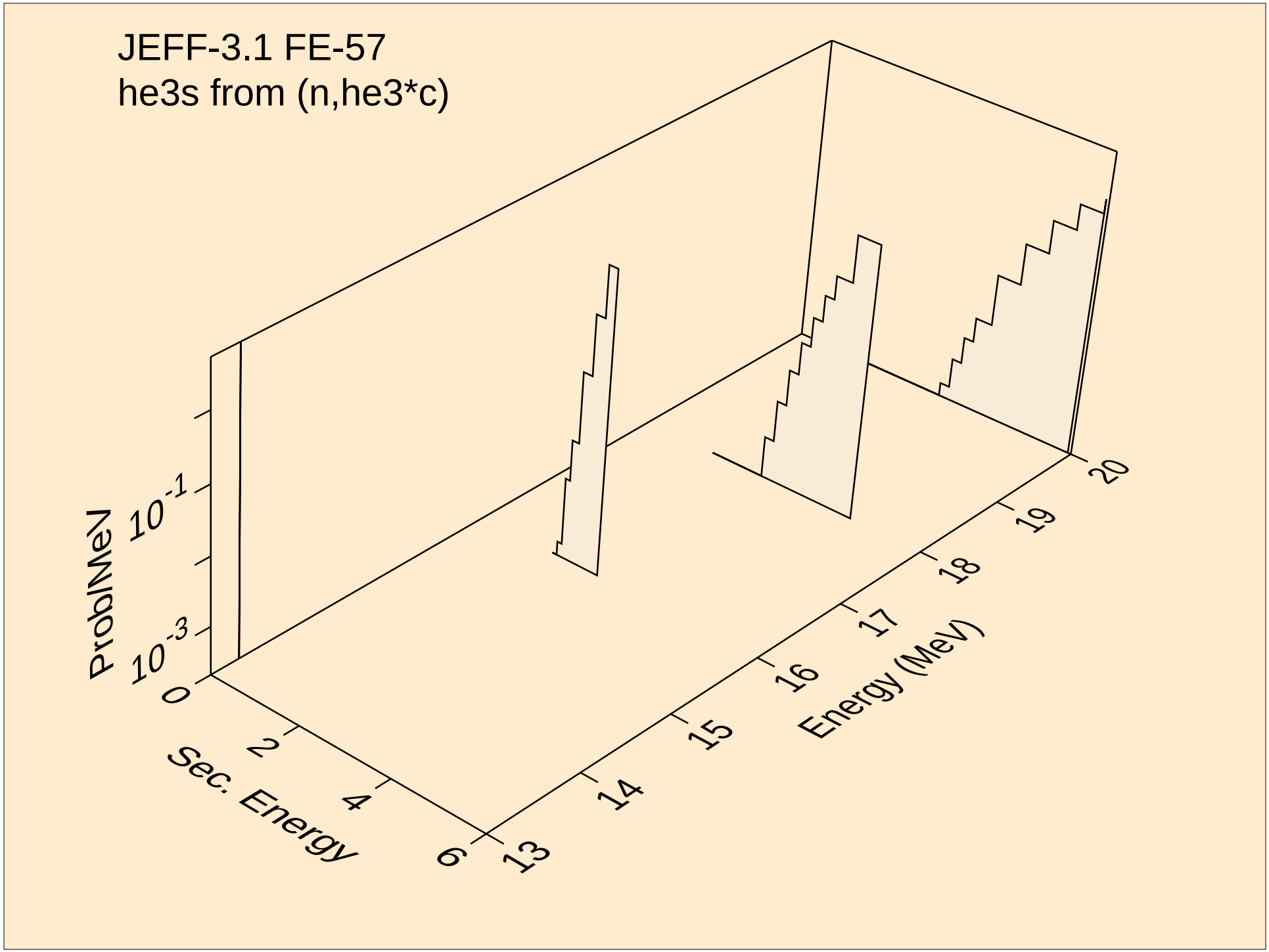

JEFF-3.1 FE-57
angular distribution for (n,he3*1) 3he
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

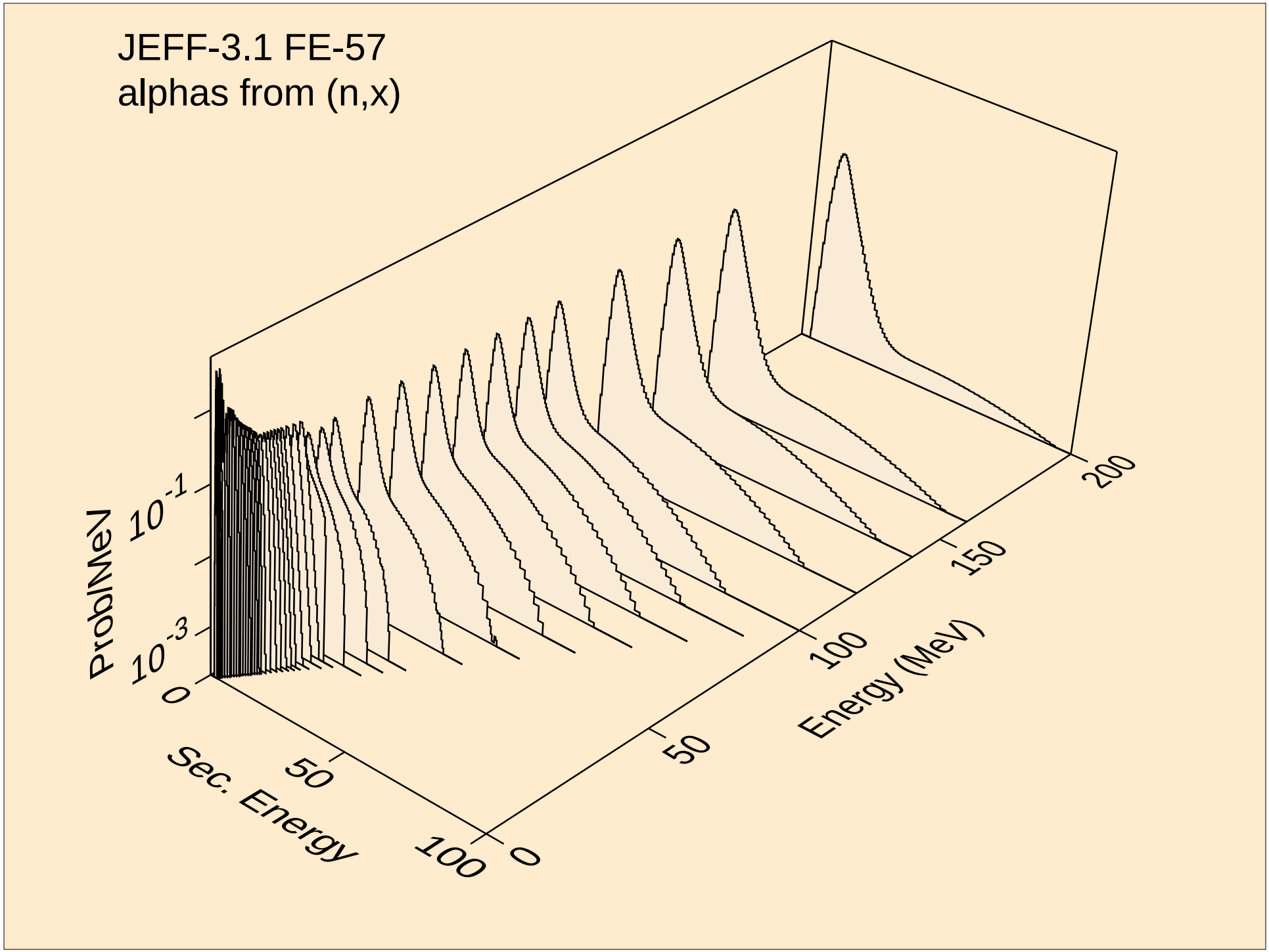

JEFF-3.1 FE-57
angular distribution for (n,he3*2) 3he
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

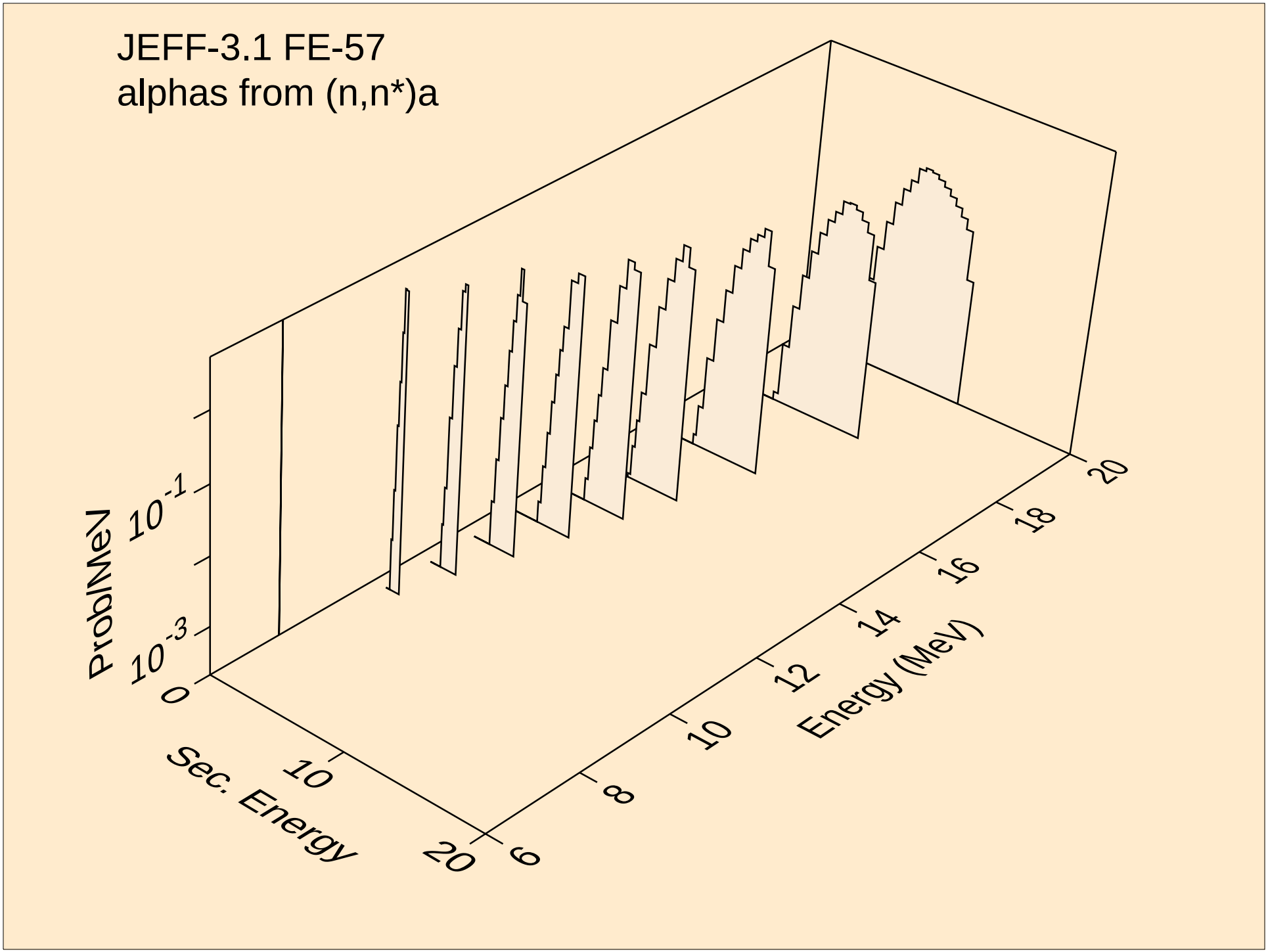

JEFF-3.1 FE-57
angular distribution for (n,he3*3) 3he
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

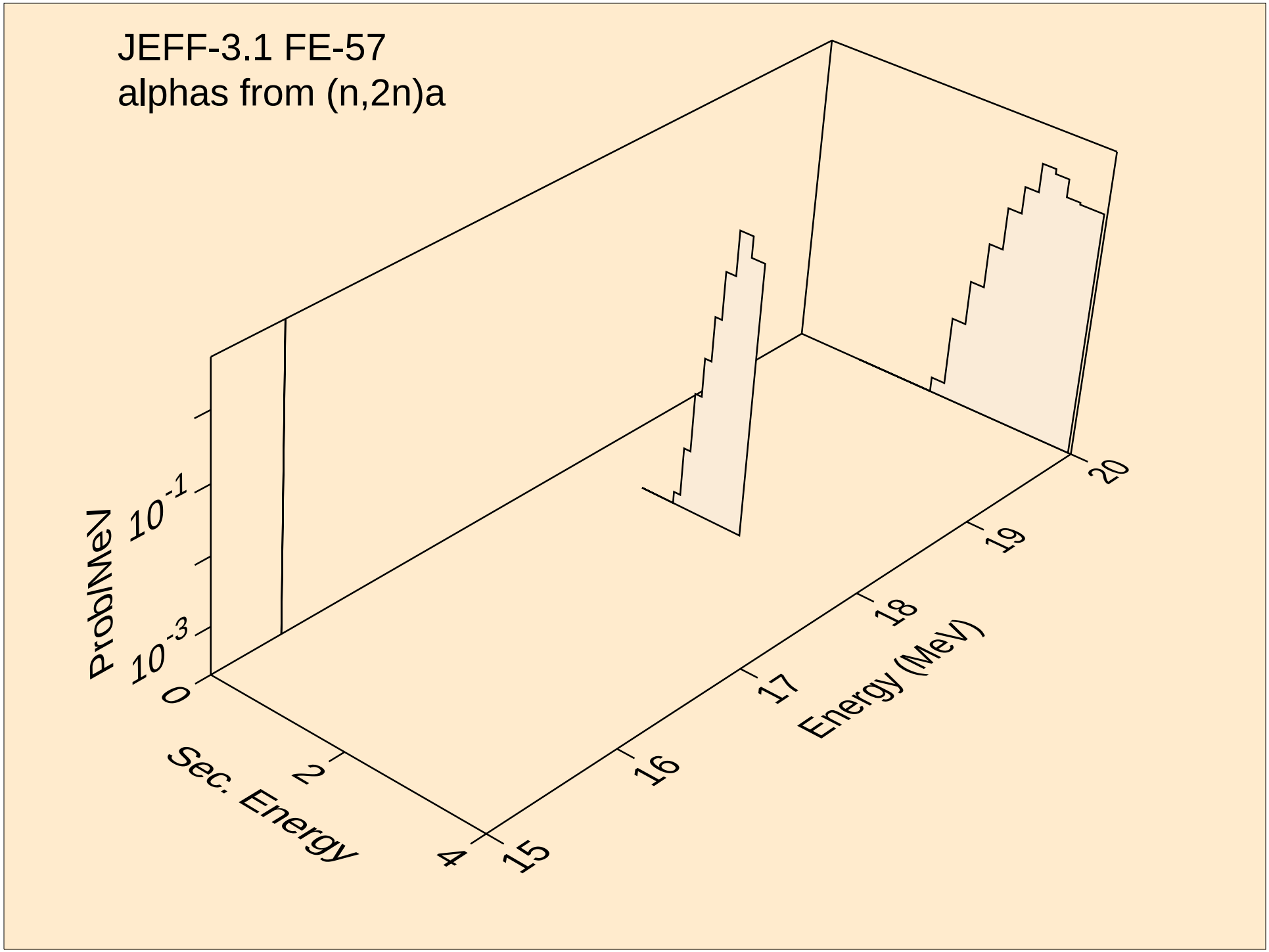

JEFF-3.1 FE-57
angular distribution for (n,he3*4) 3he
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

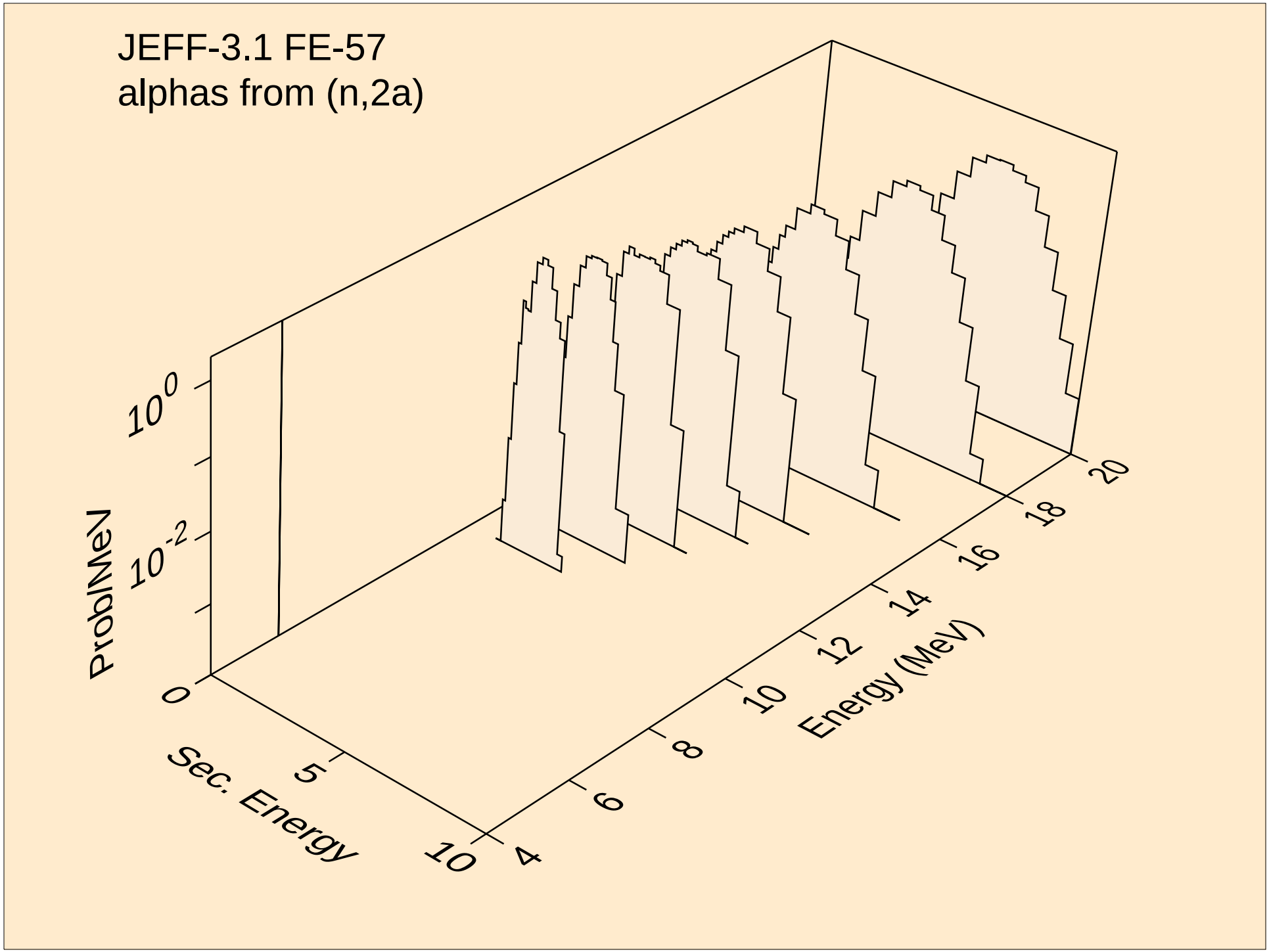

JEFF-3.1 FE-57
angular distribution for (n,he3*5) 3he
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

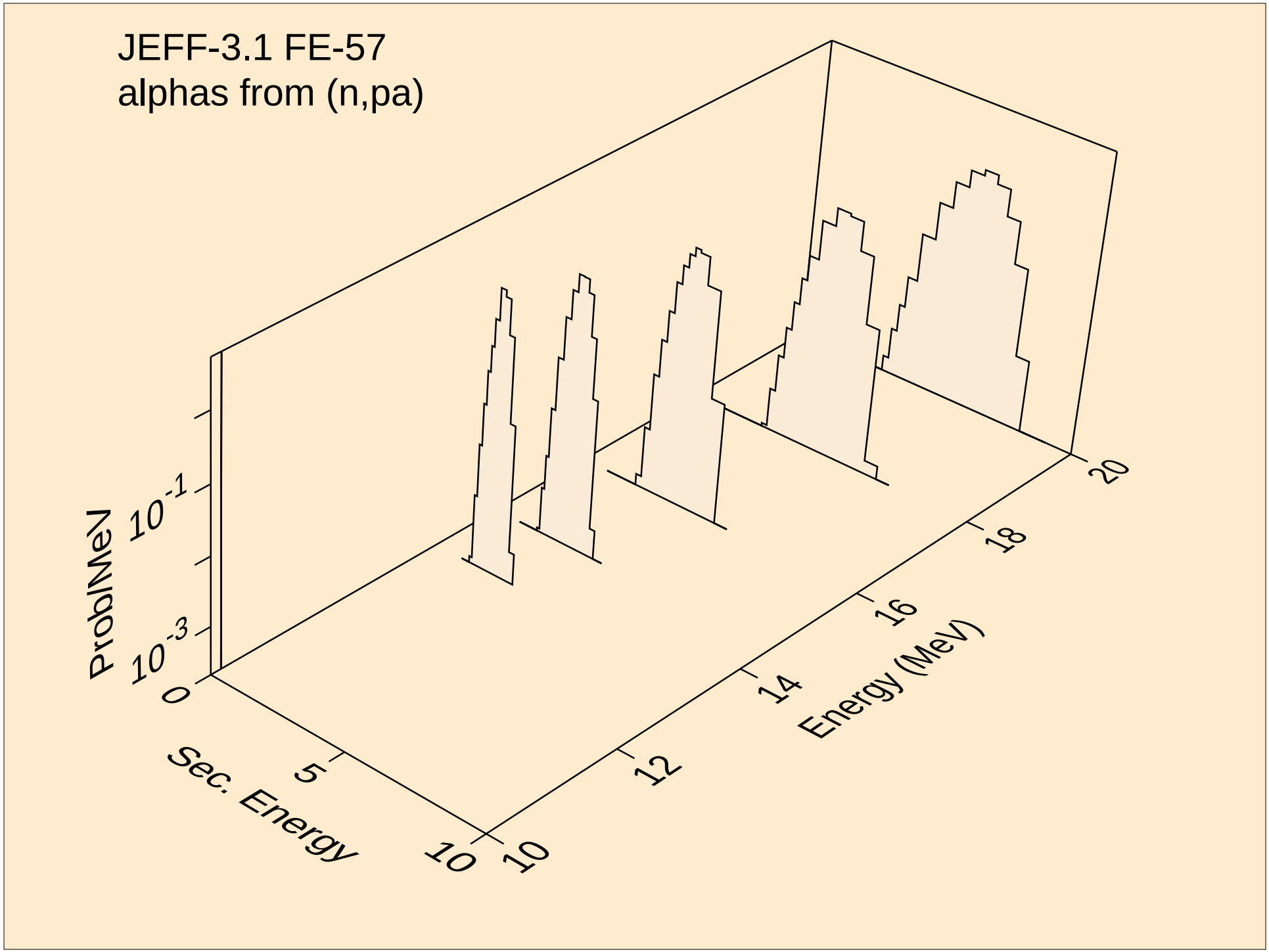

JEFF-3.1 FE-57
he3s from (n,he3*c)
Prob/MeV
10-1
10-3
0
2
4
6
Sec. Energy
13
14
15
16
17
18
19
20
Energy (MeV)

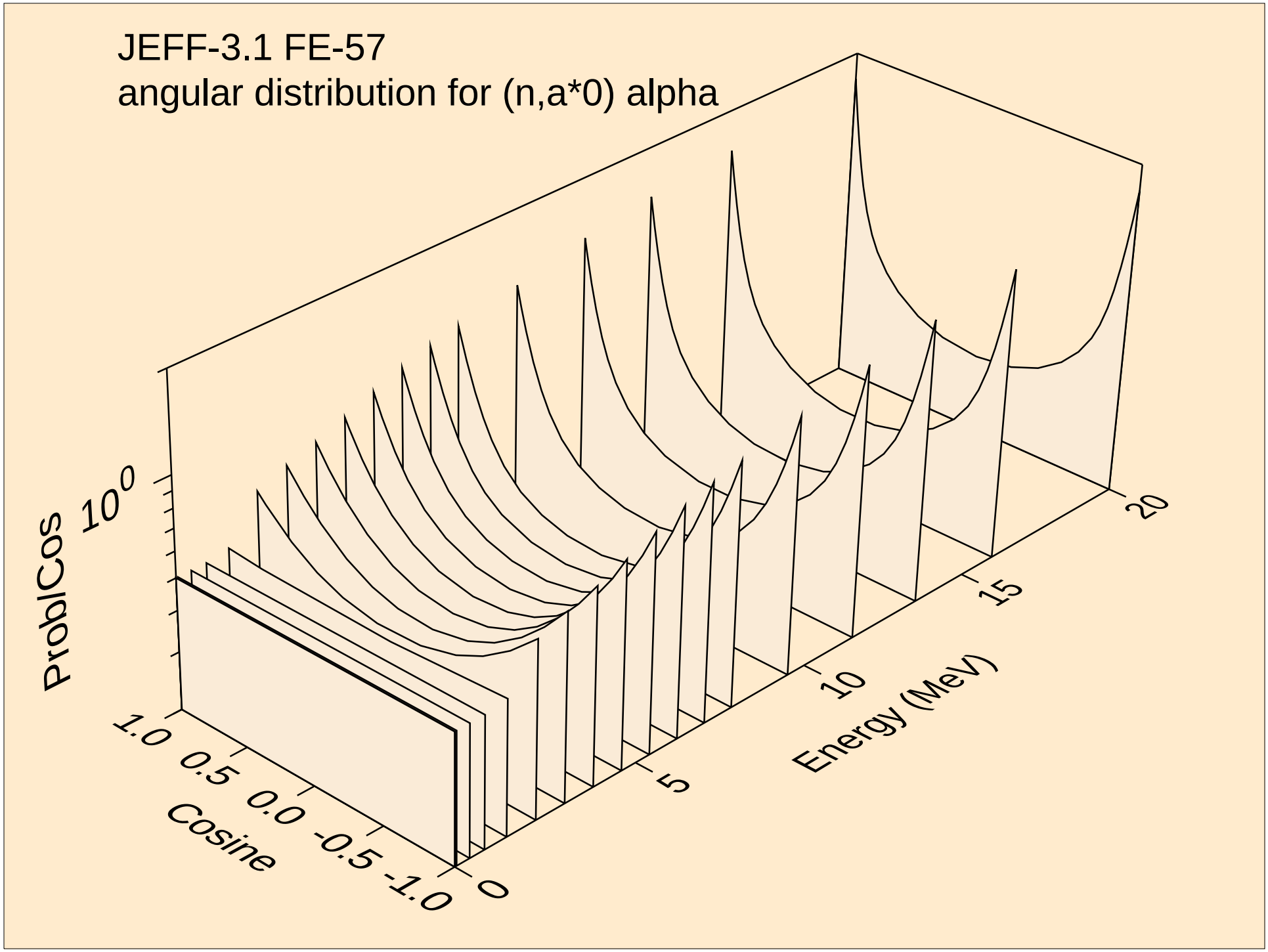

JEFF-3.1 FE-57
alphas from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
50
100
0
50
100
150
200
Energy (MeV)

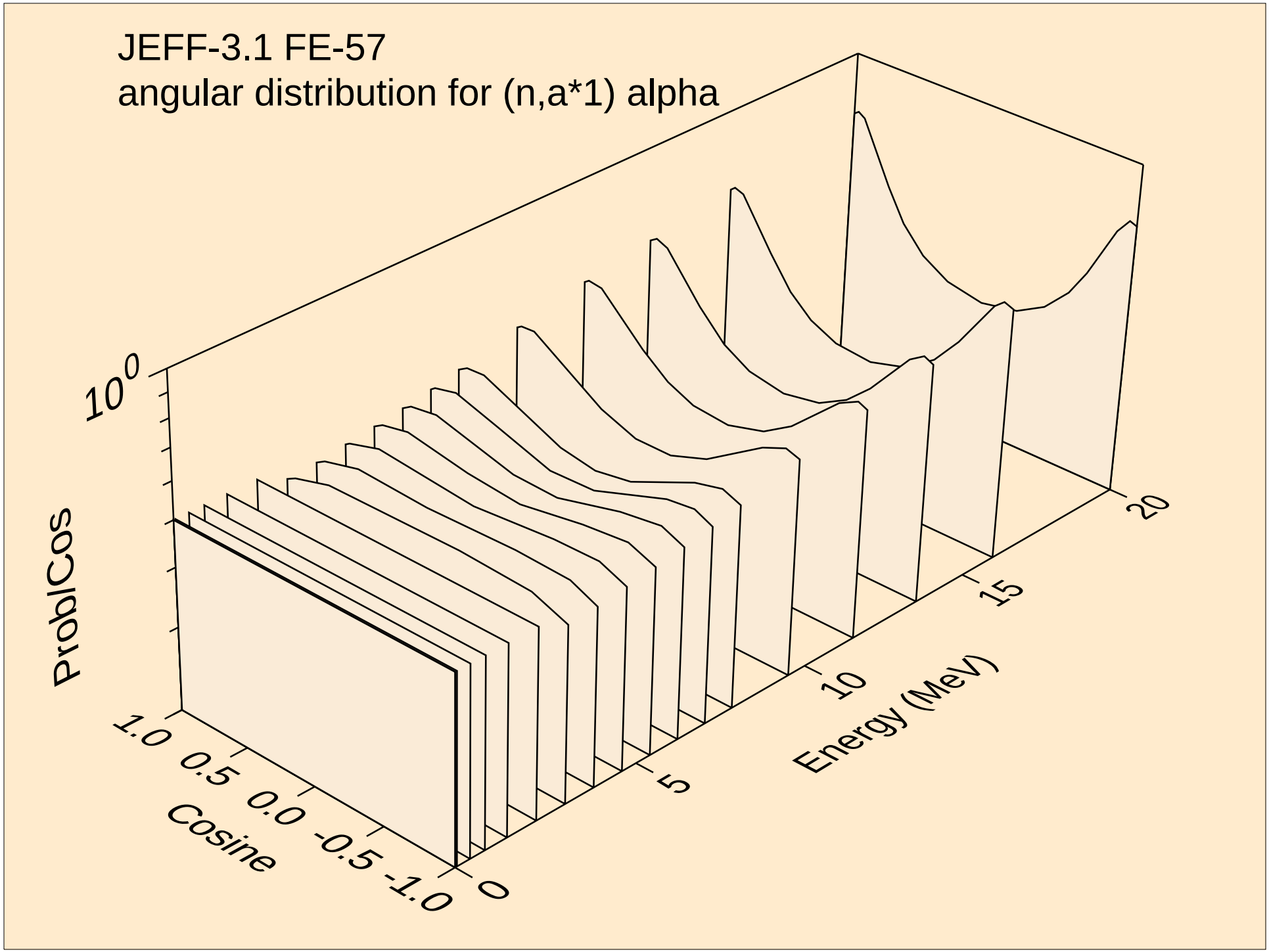

JEFF-3.1 FE-57
alphas from (n,n*)a
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
6
8
10
12
14
16
18
20
Energy (MeV)

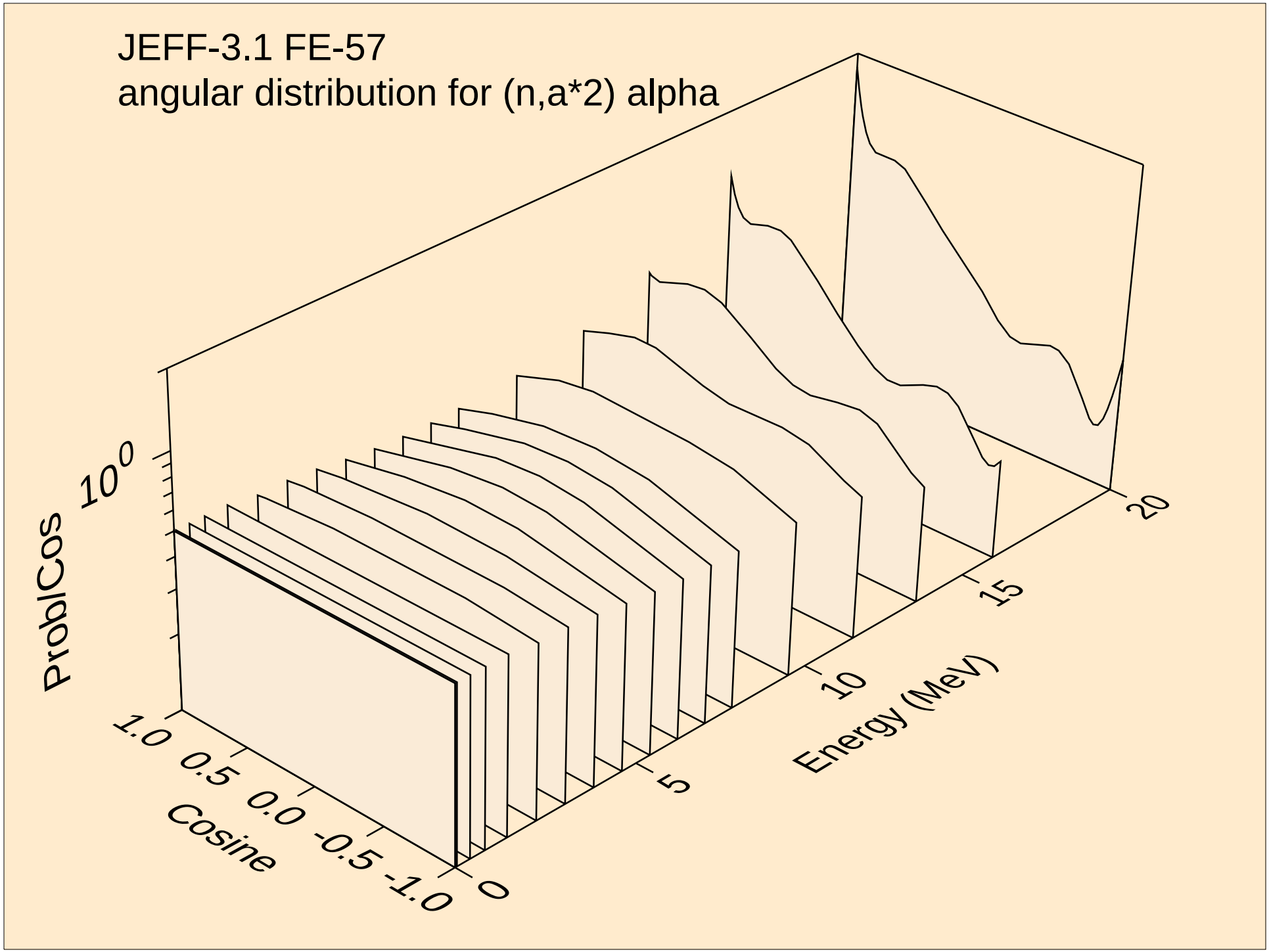

JEFF-3.1 FE-57
alphas from (n,2n)a
Prob/MeV
10-1
10-3
0
Sec. Energy
2
4
15
16
17
18
19
20
Energy (MeV)

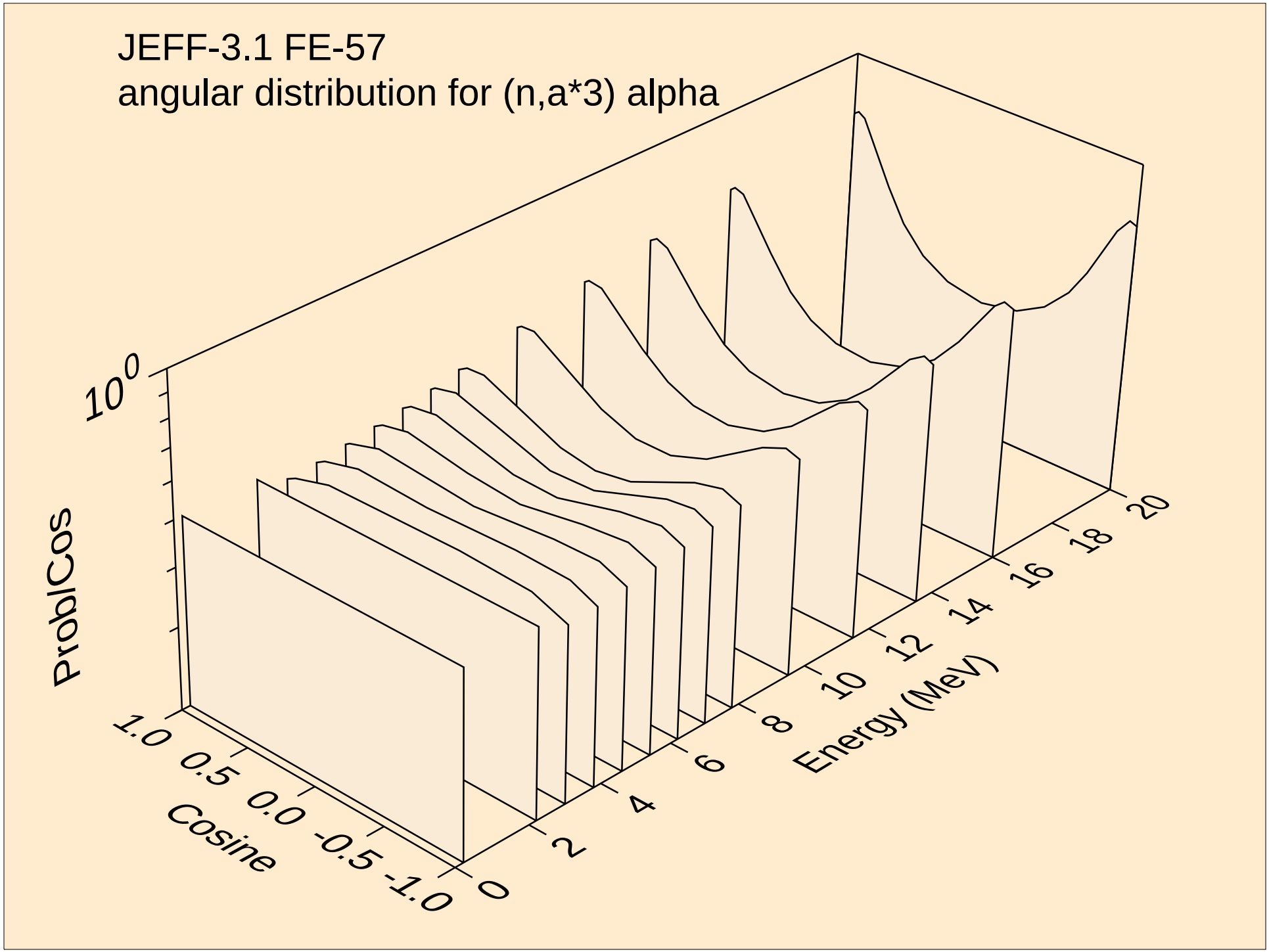

JEFF-3.1 FE-57
alphas from (n,2a)
Prob/MeV
10^{0}
10^{-2}
0
Sec. Energy
5
10
Energy (MeV)
4
6
8
10
12
14
16
18
20

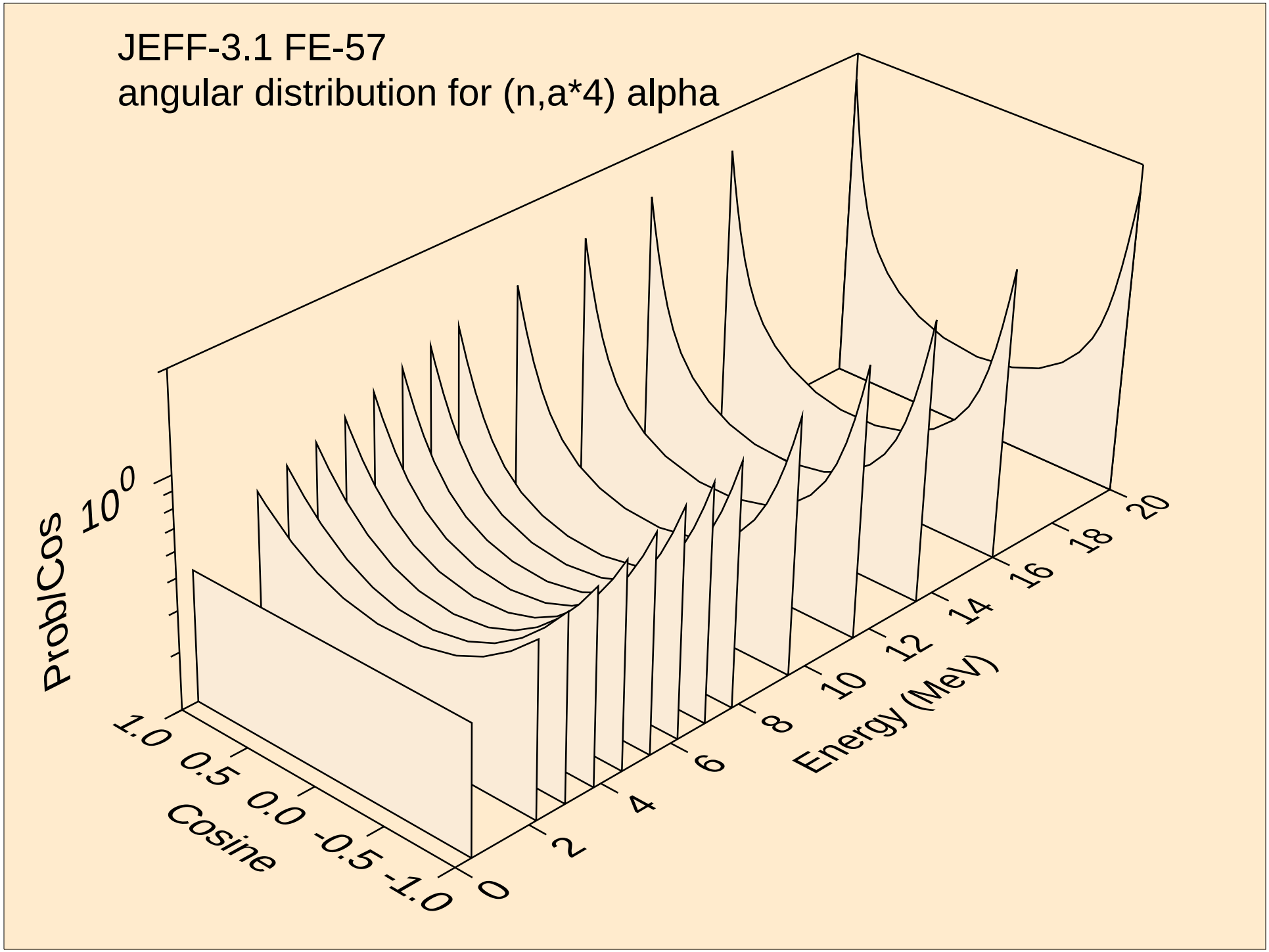

JEFF-3.1 FE-57
alphas from (n,pa)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
5
10
10
12
14
16
18
20
Energy (MeV)

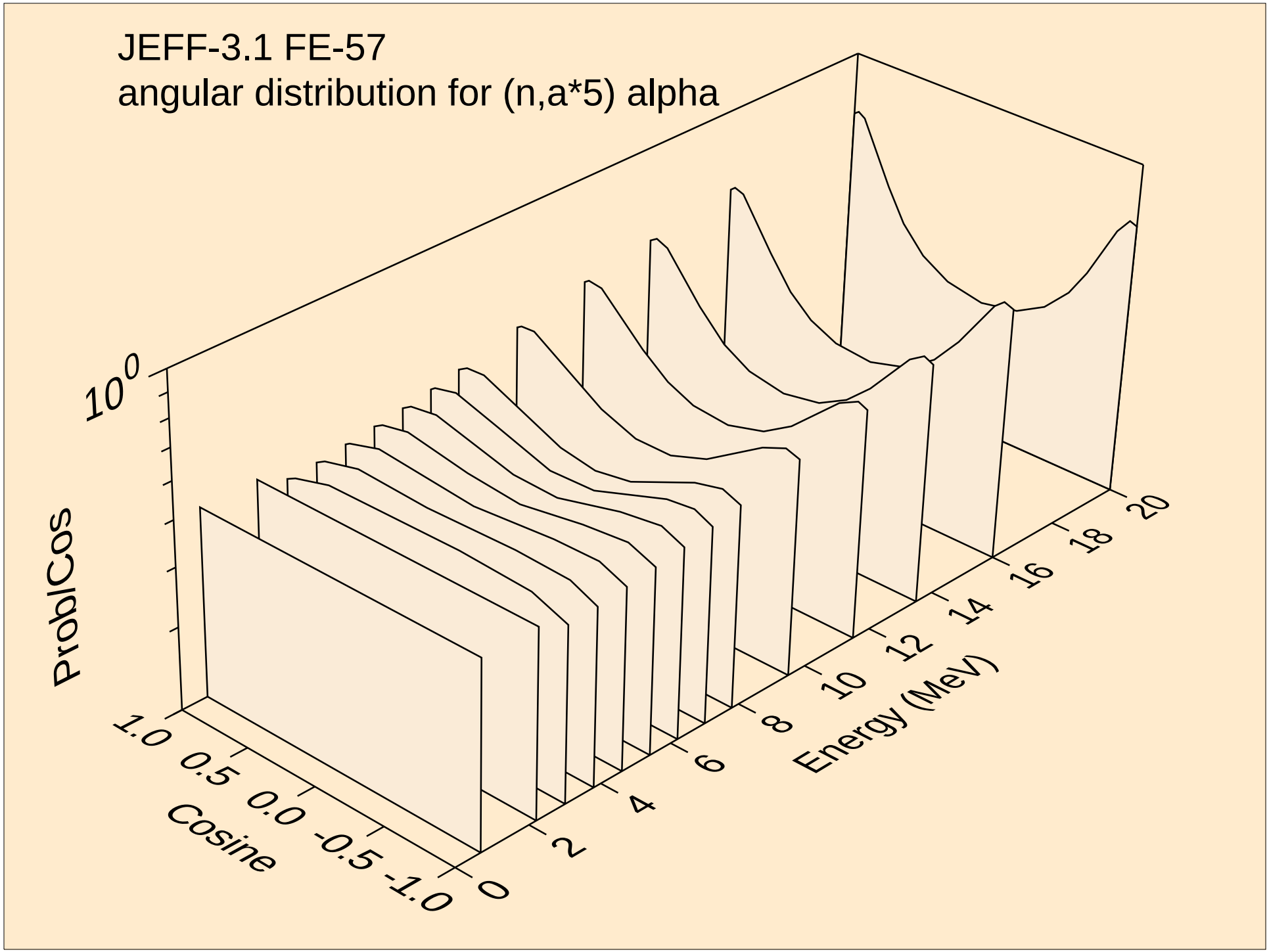

JEFF-3.1 FE-57
angular distribution for (n,a*0) alpha
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

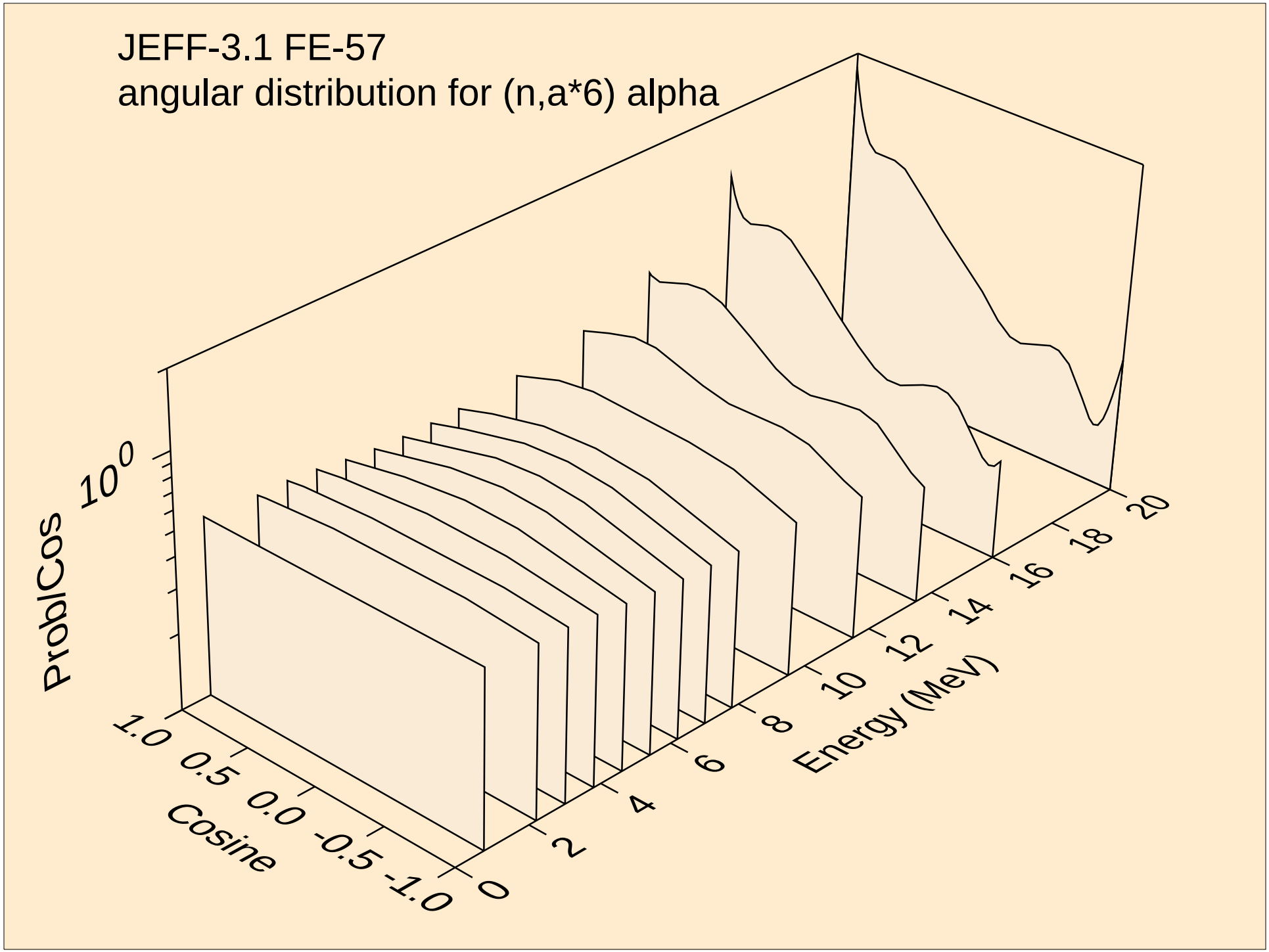

JEFF-3.1 FE-57
angular distribution for (n,a*1) alpha
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

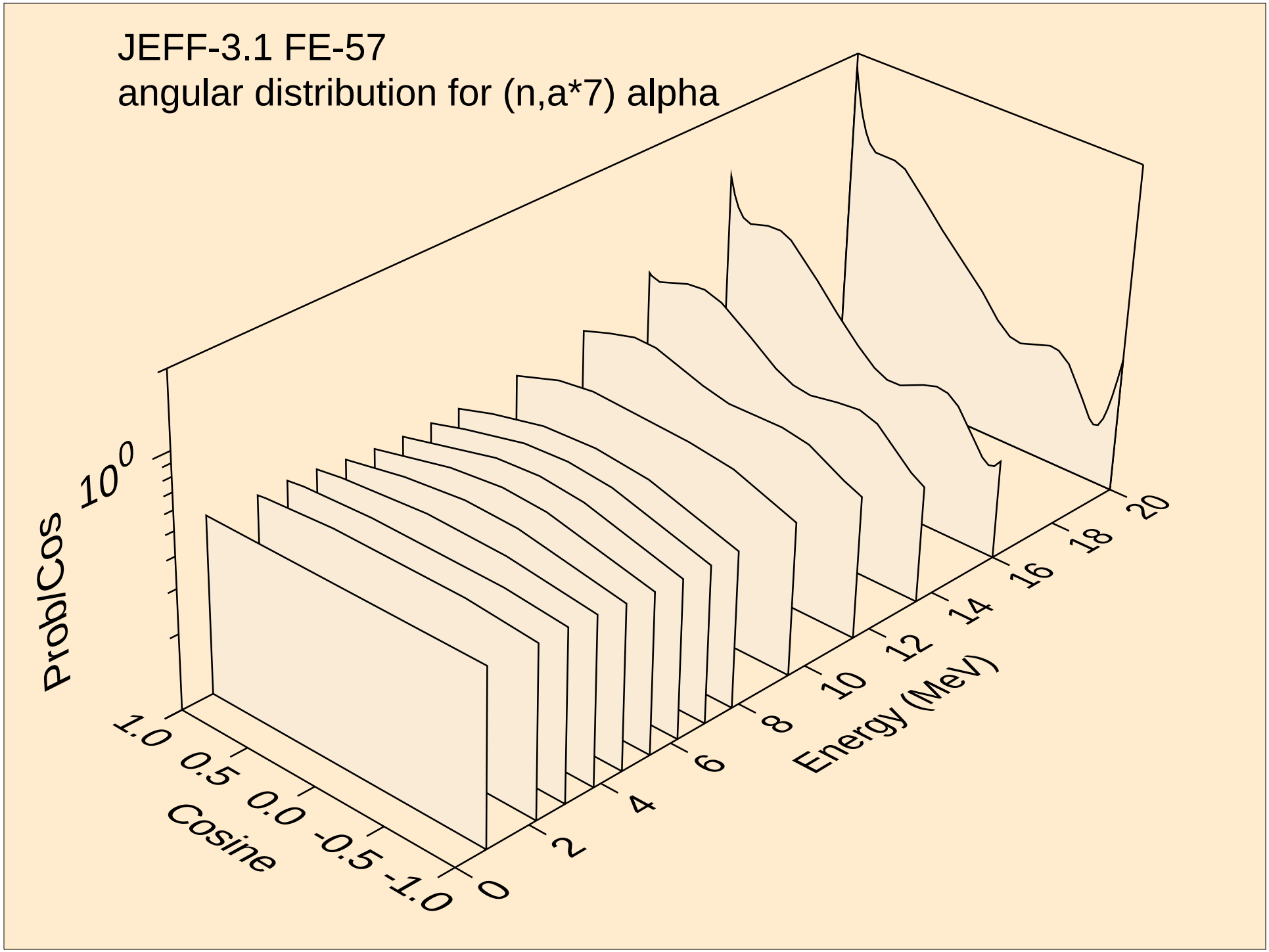

JEFF-3.1 FE-57
angular distribution for (n,a*2) alpha
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

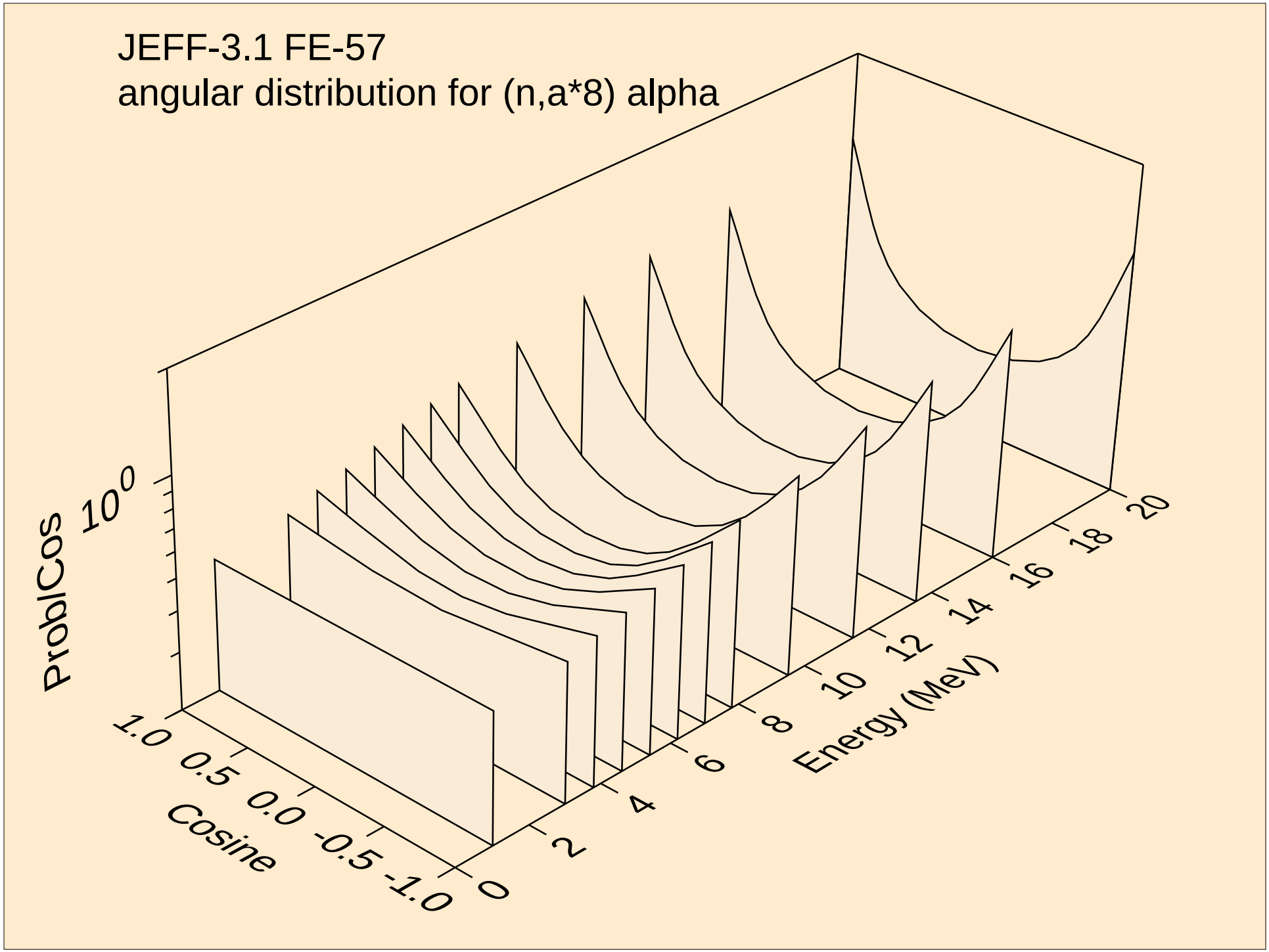

JEFF-3.1 FE-57
angular distribution for (n,a*3) alpha
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

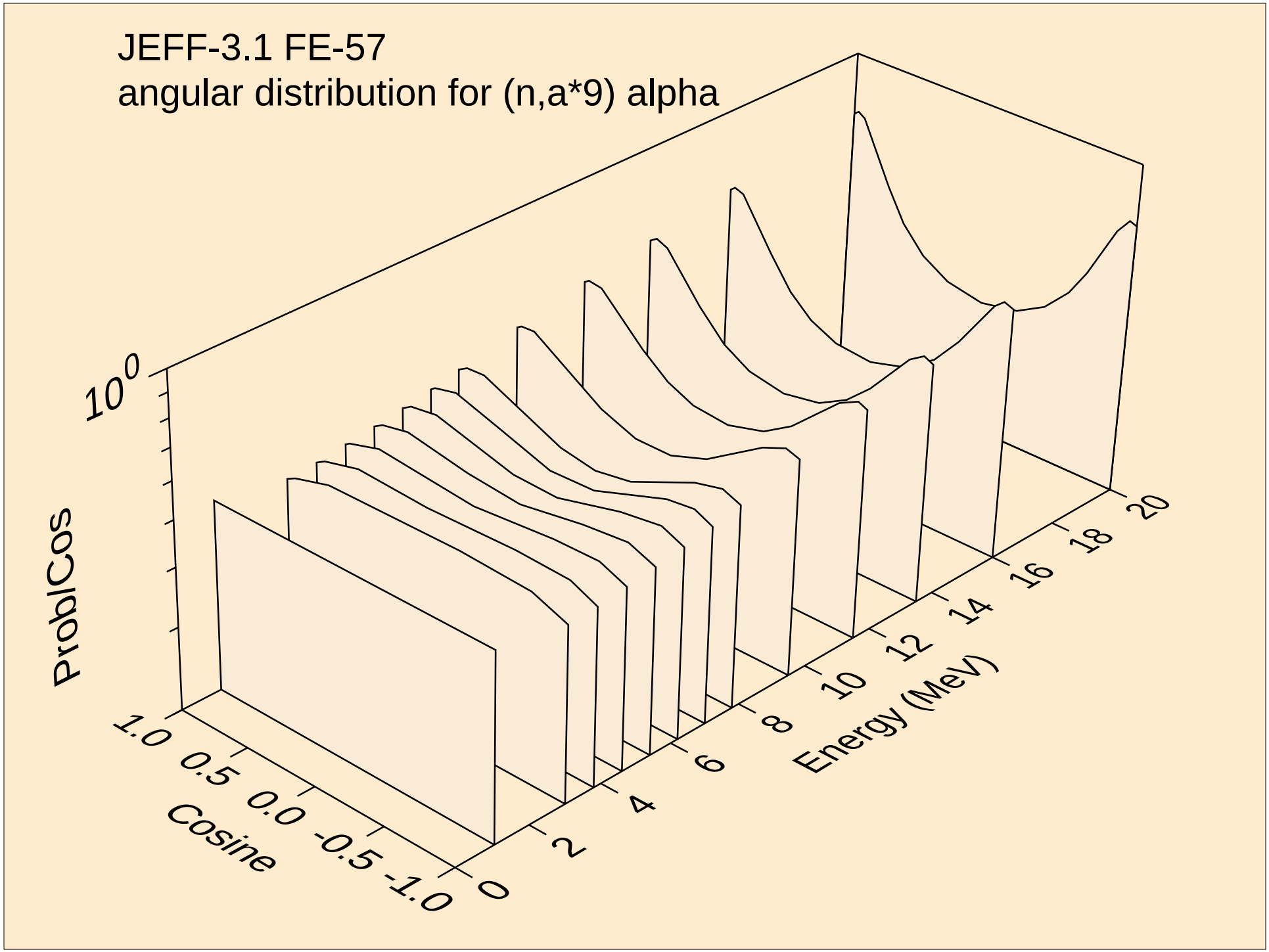

JEFF-3.1 FE-57
angular distribution for (n,a*4) alpha
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

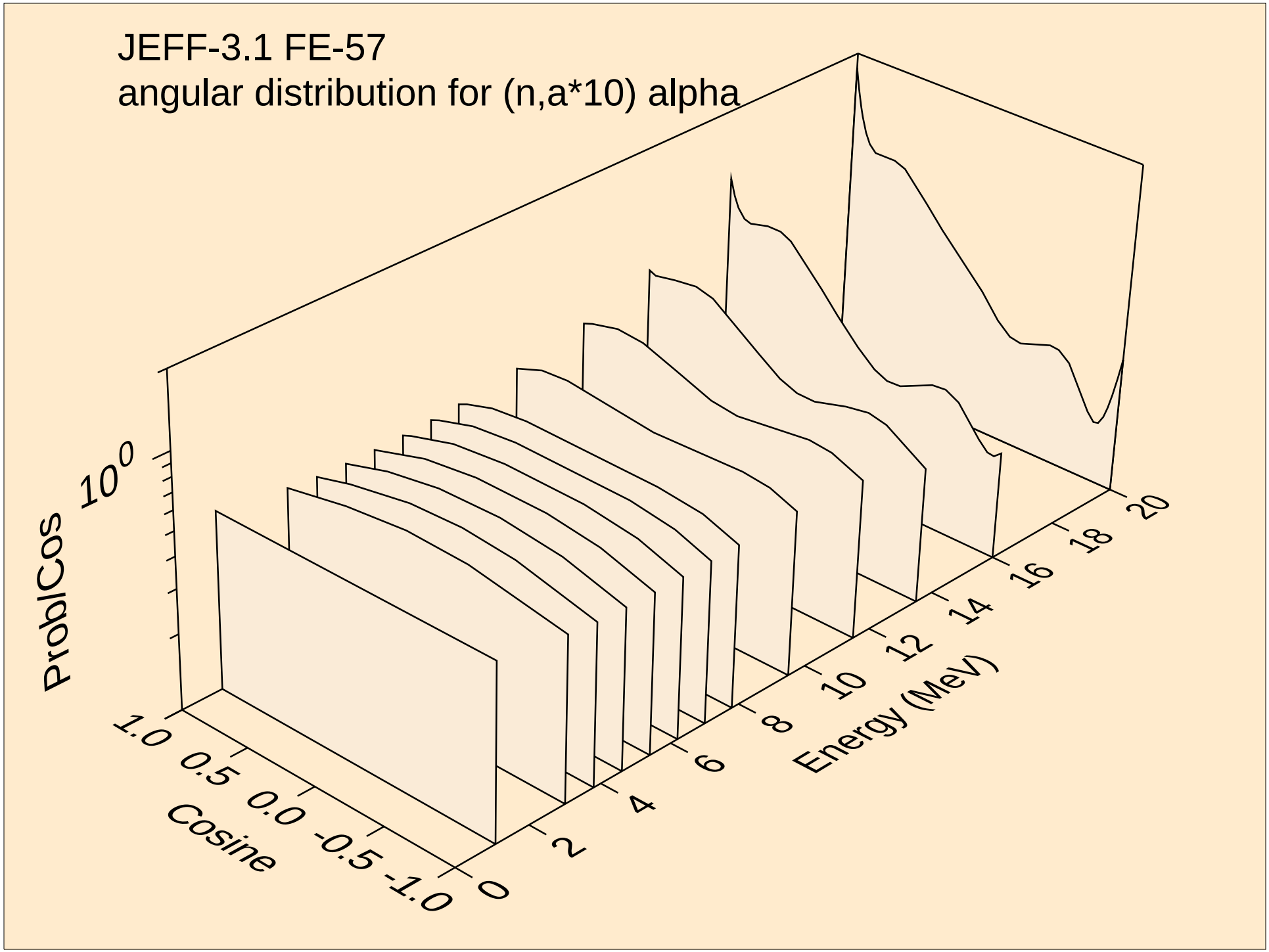

JEFF-3.1 FE-57
angular distribution for (n,a*5) alpha
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

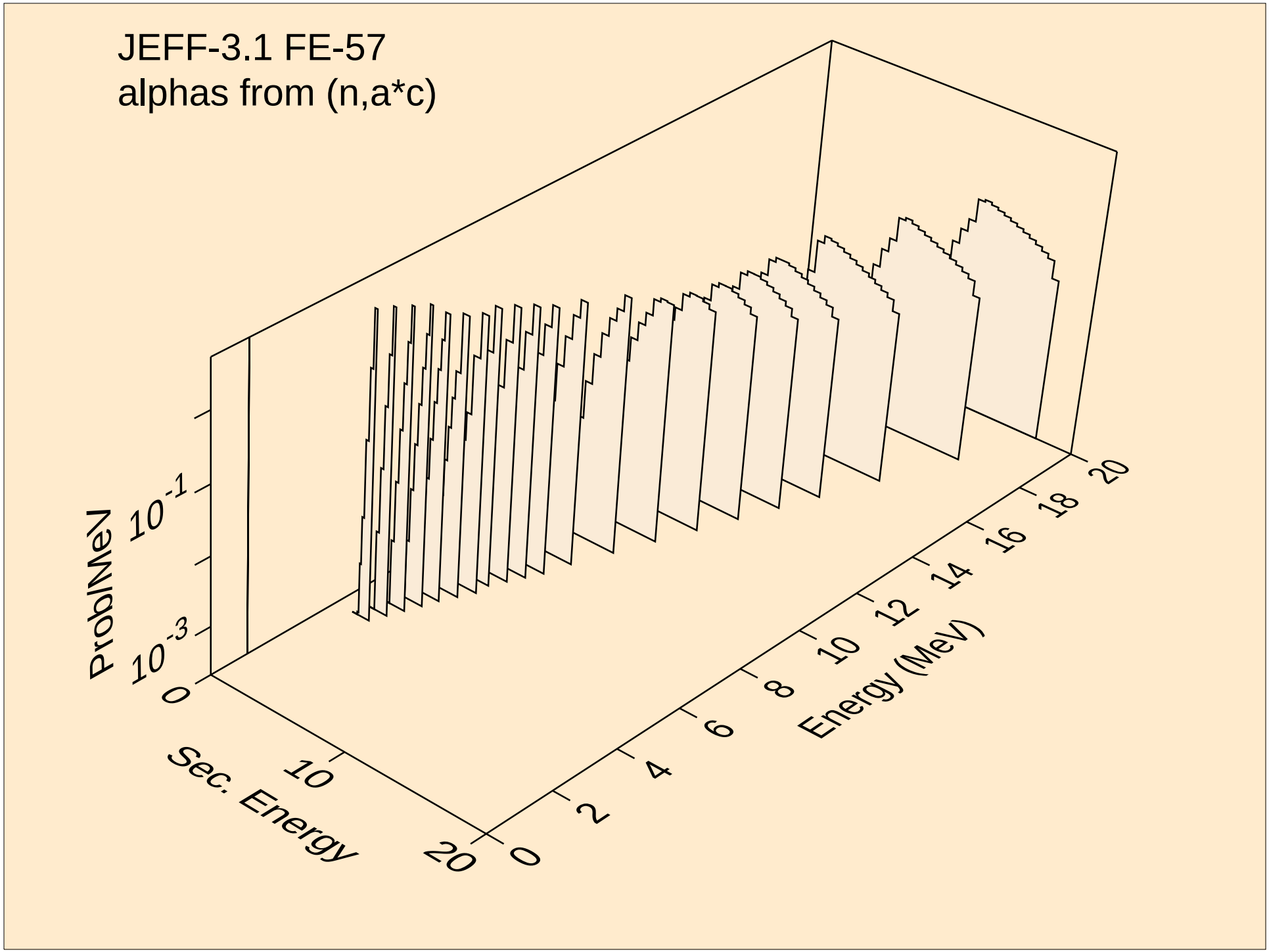

JEFF-3.1 FE-57
angular distribution for (n,a*6) alpha
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JEFF-3.1 FE-57
angular distribution for (n,a*7) alpha
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JEFF-3.1 FE-57
angular distribution for (n,a*8) alpha
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JEFF-3.1 FE-57
angular distribution for (n,a*9) alpha
ProbICos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20


JEFF-3.1 FE-57
angular distribution for (n,a*10) alpha
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


JEFF-3.1 FE-57
alphas from (n,a*c)
Prob/MeV
10^-1
10^-3
0
Sec. Energy
10
20
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)