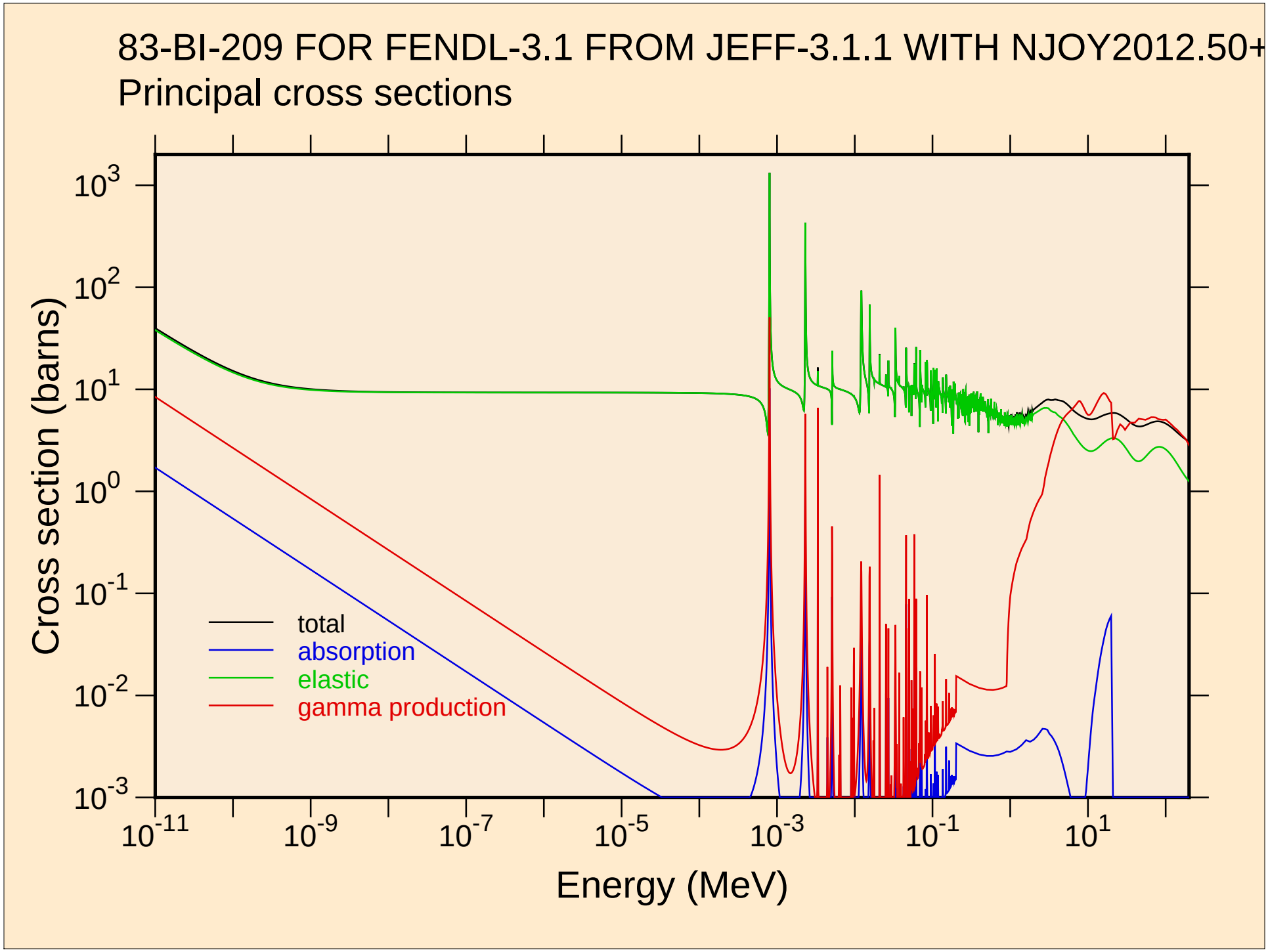
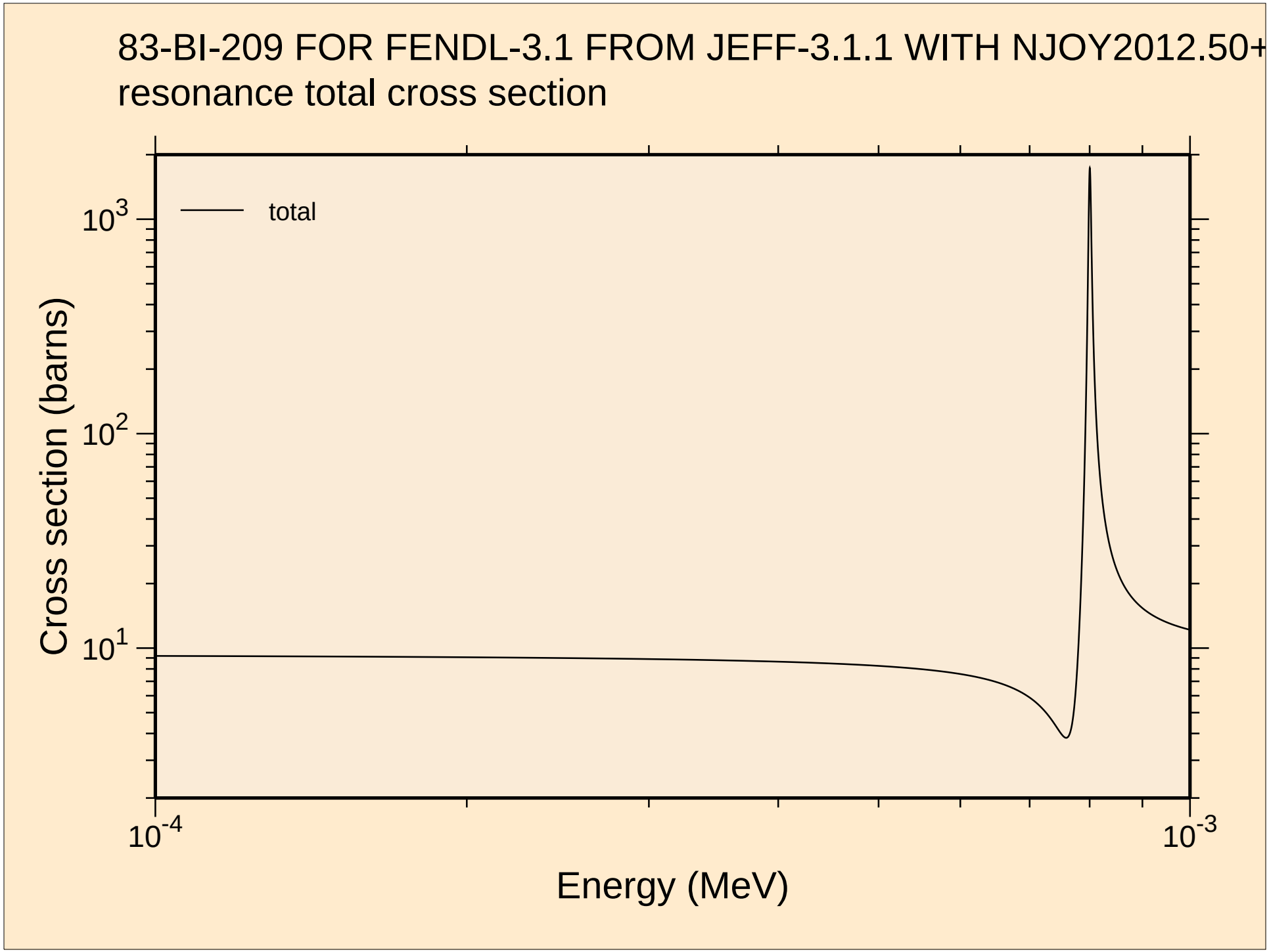
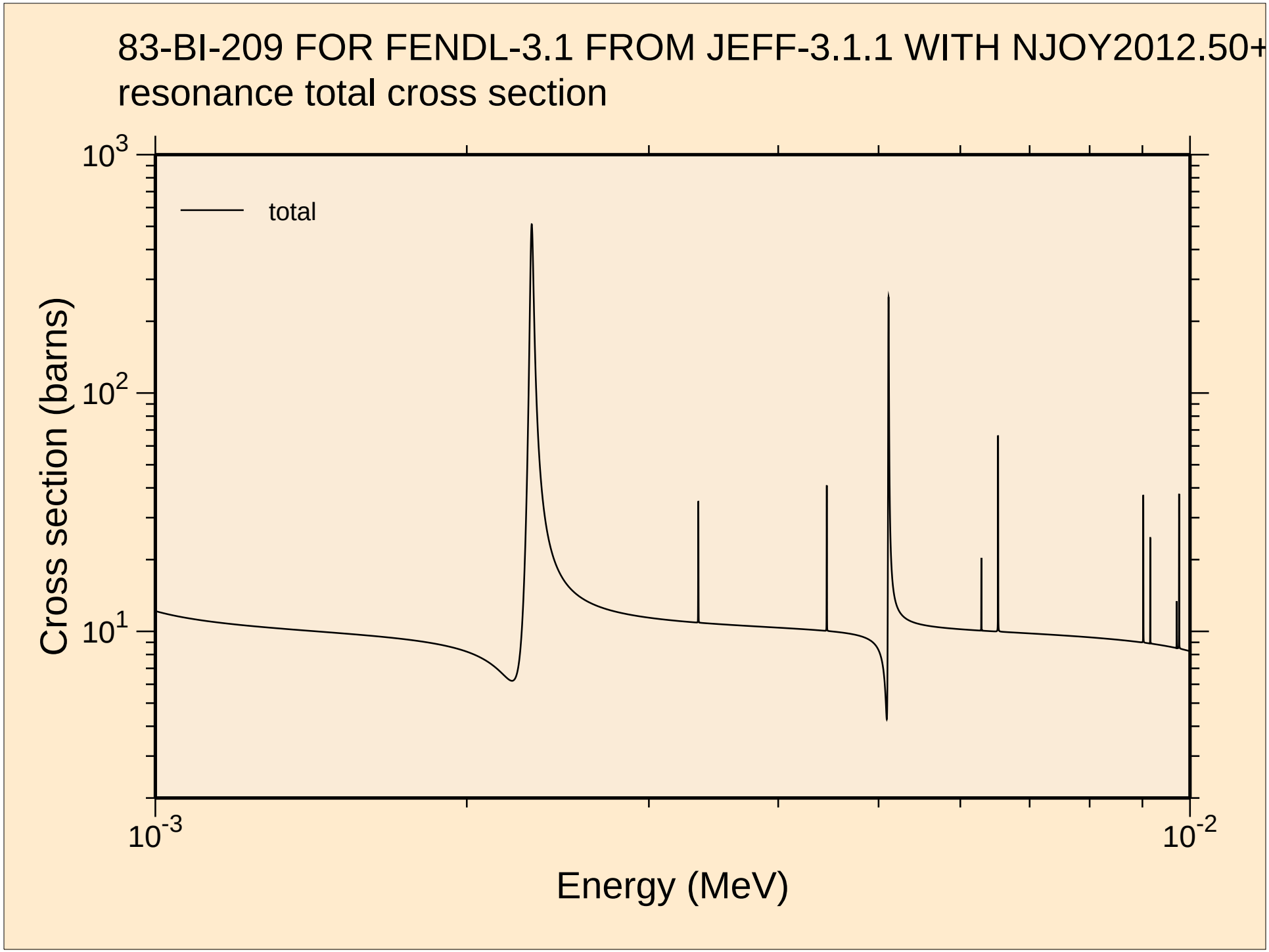
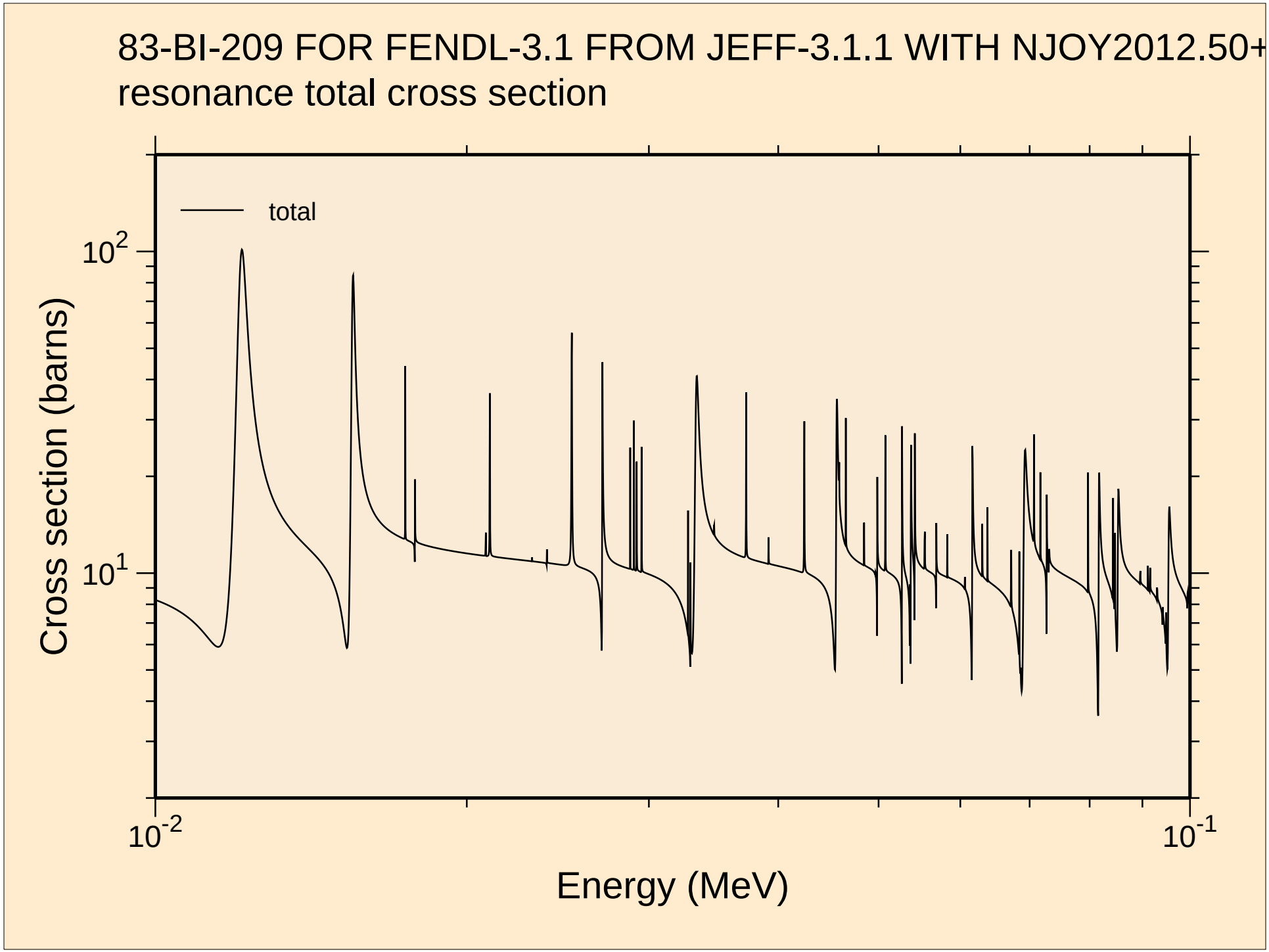
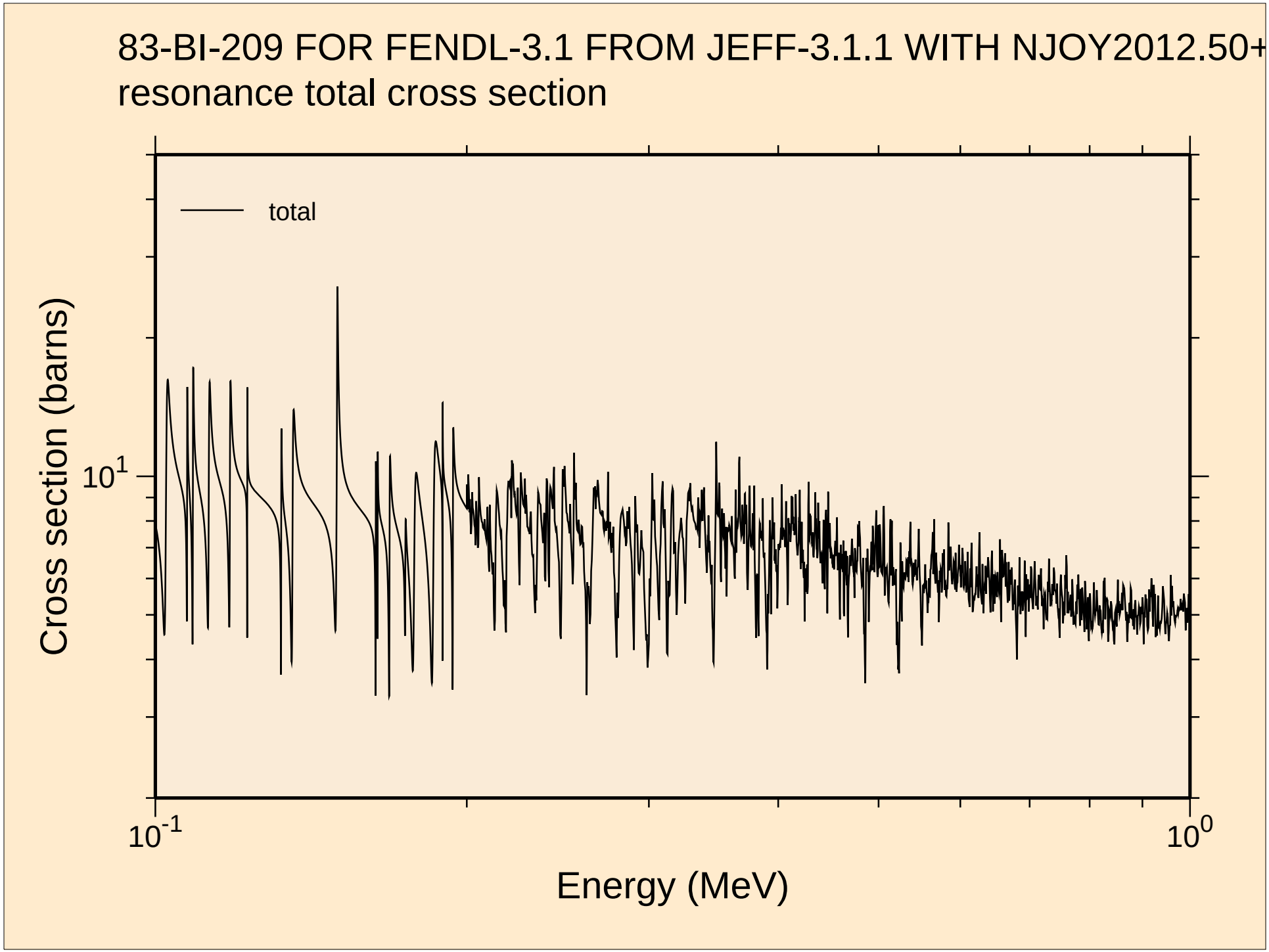
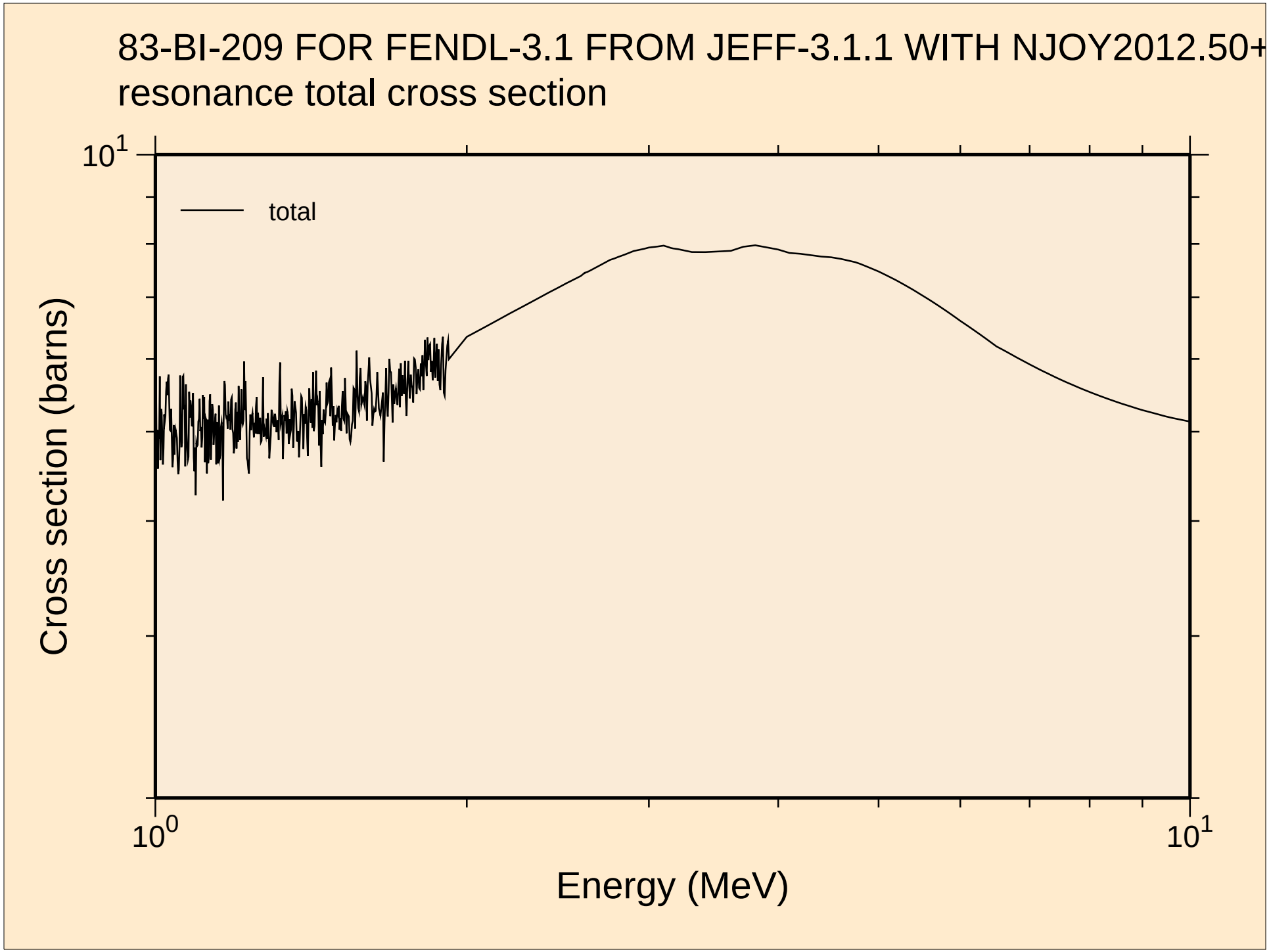

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance total cross section
total
Cross section (barns)
10^3
10^2
10^1
10^-4
10^-3
Energy (MeV)

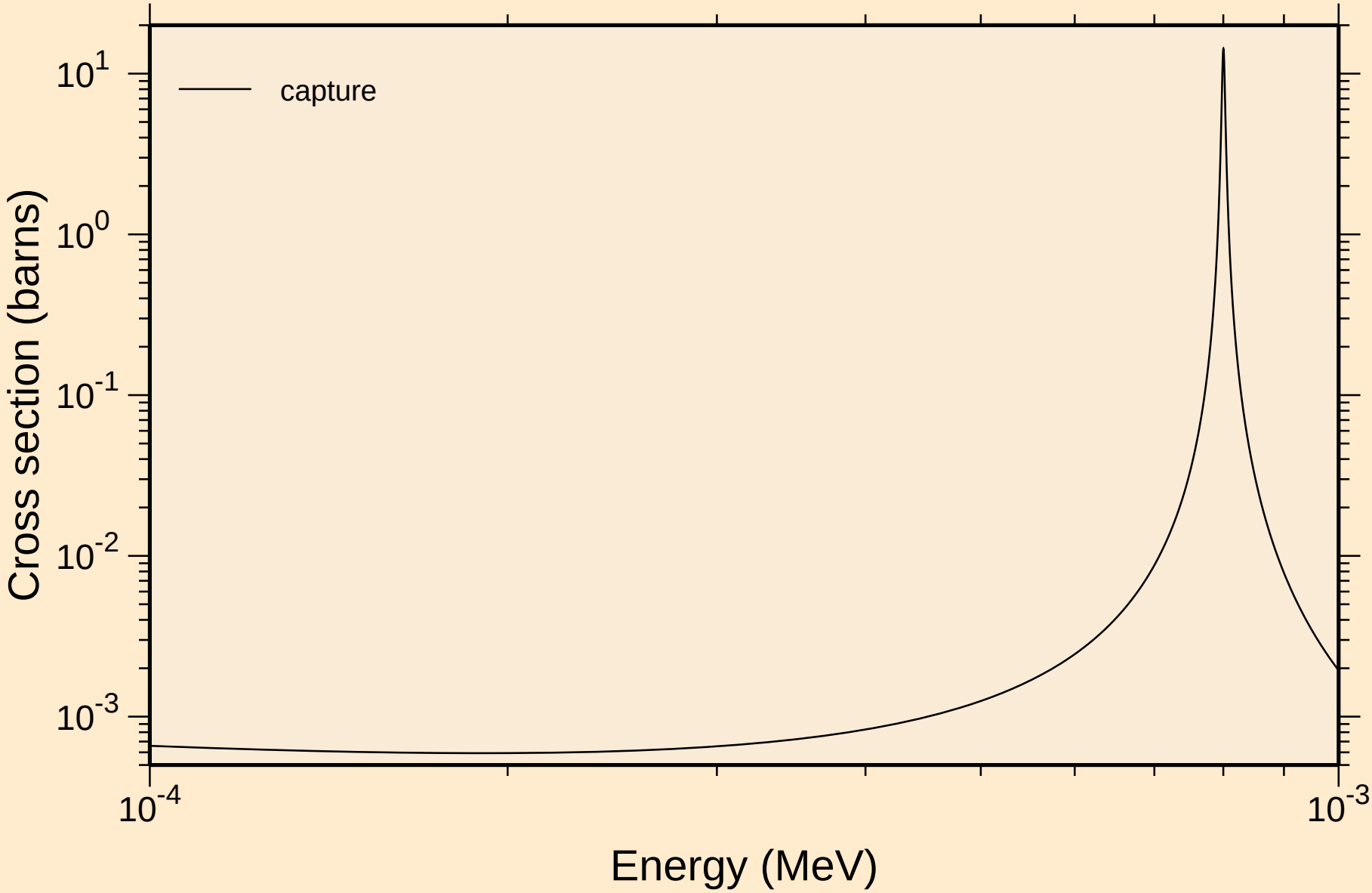

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance total cross section
total
Cross section (barns)
10^3
10^2
10^1
10^-3
10^-2
Energy (MeV)

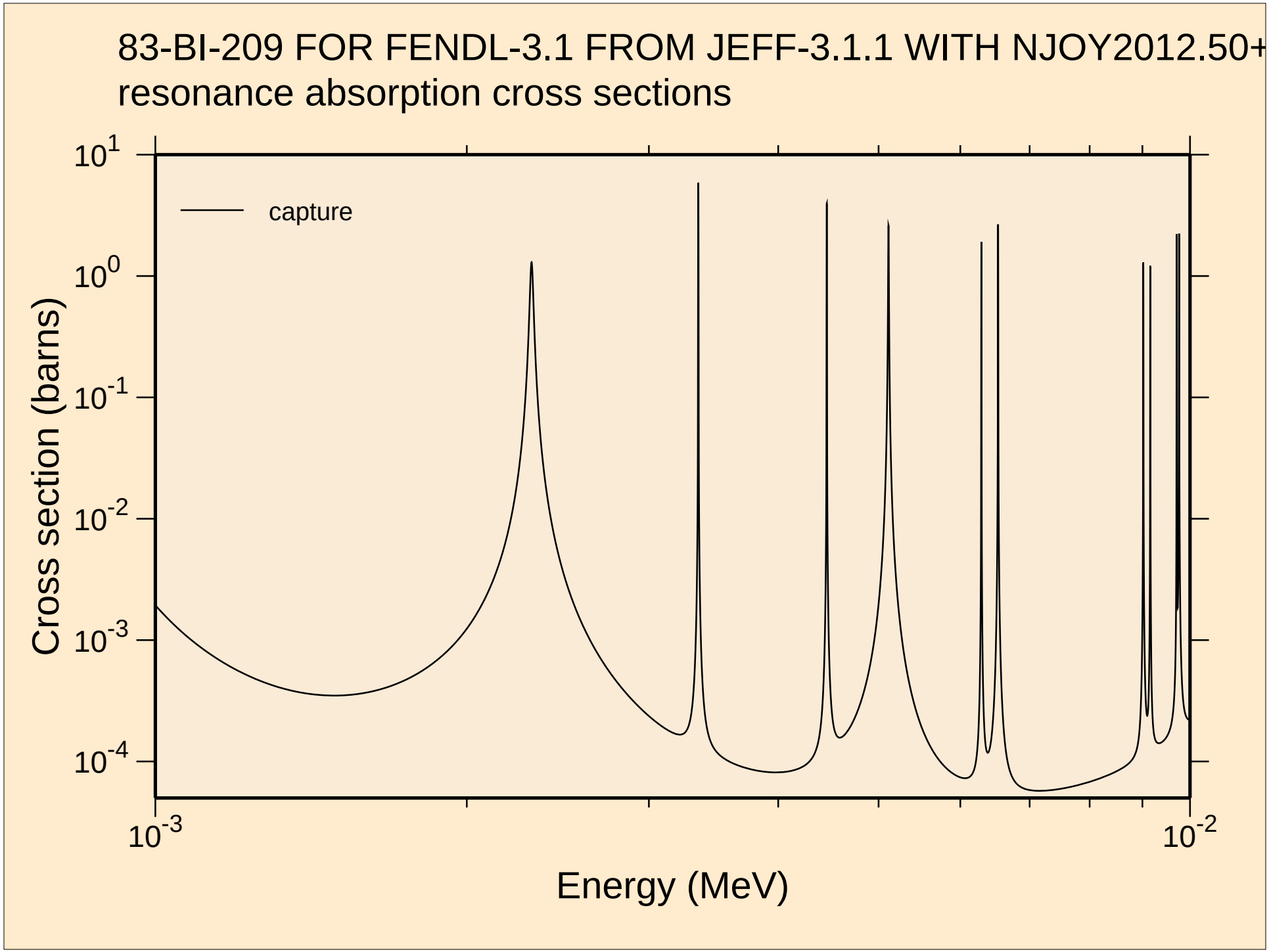

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^-2
10^-1
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance total cross section
total
Cross section (barns)
10^1
10^-1
10^0
Energy (MeV)

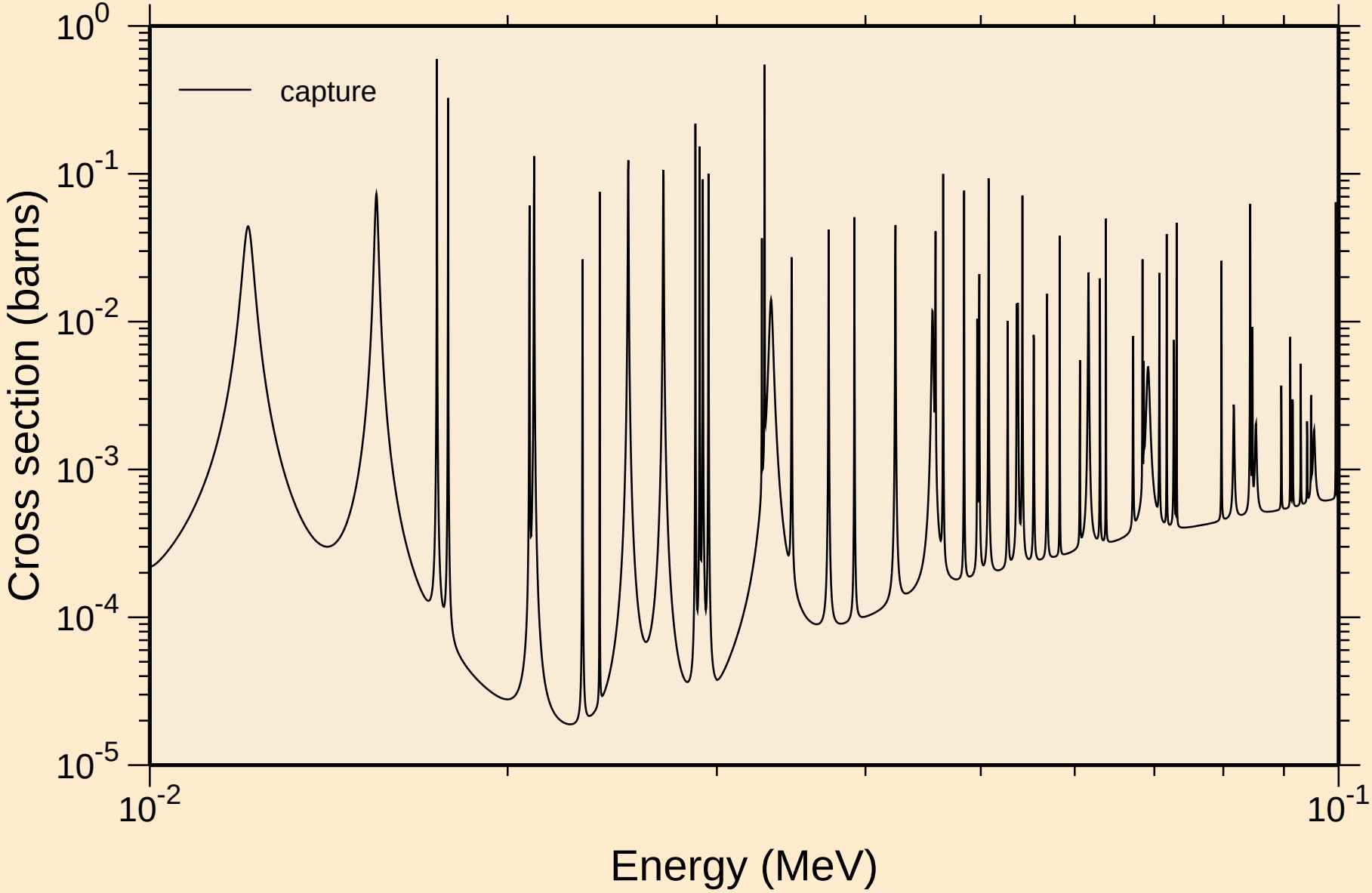

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance total cross section
10^1
total
Cross section (barns)
10^0
10^1
Energy (MeV)

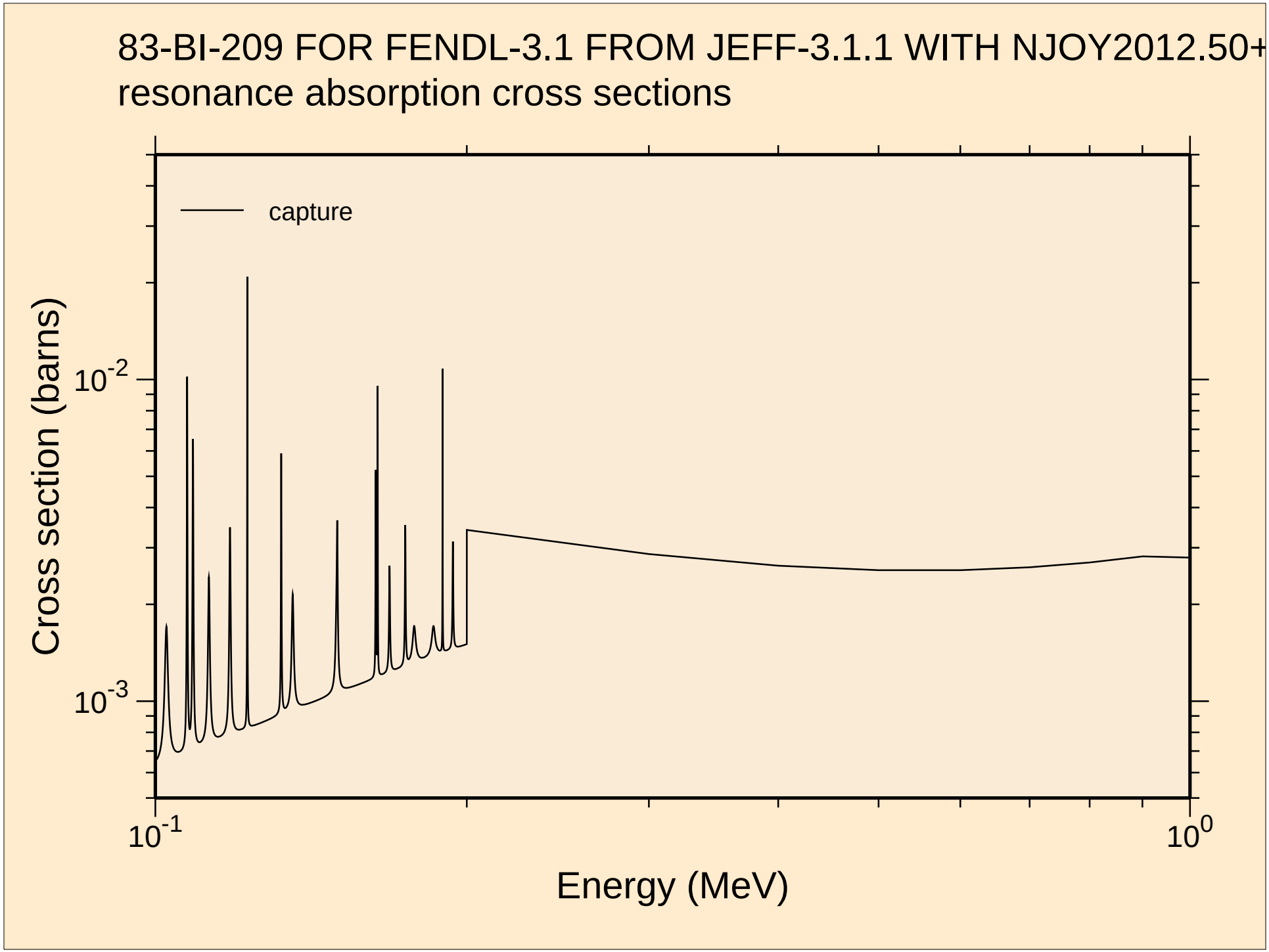
83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance absorption cross sections

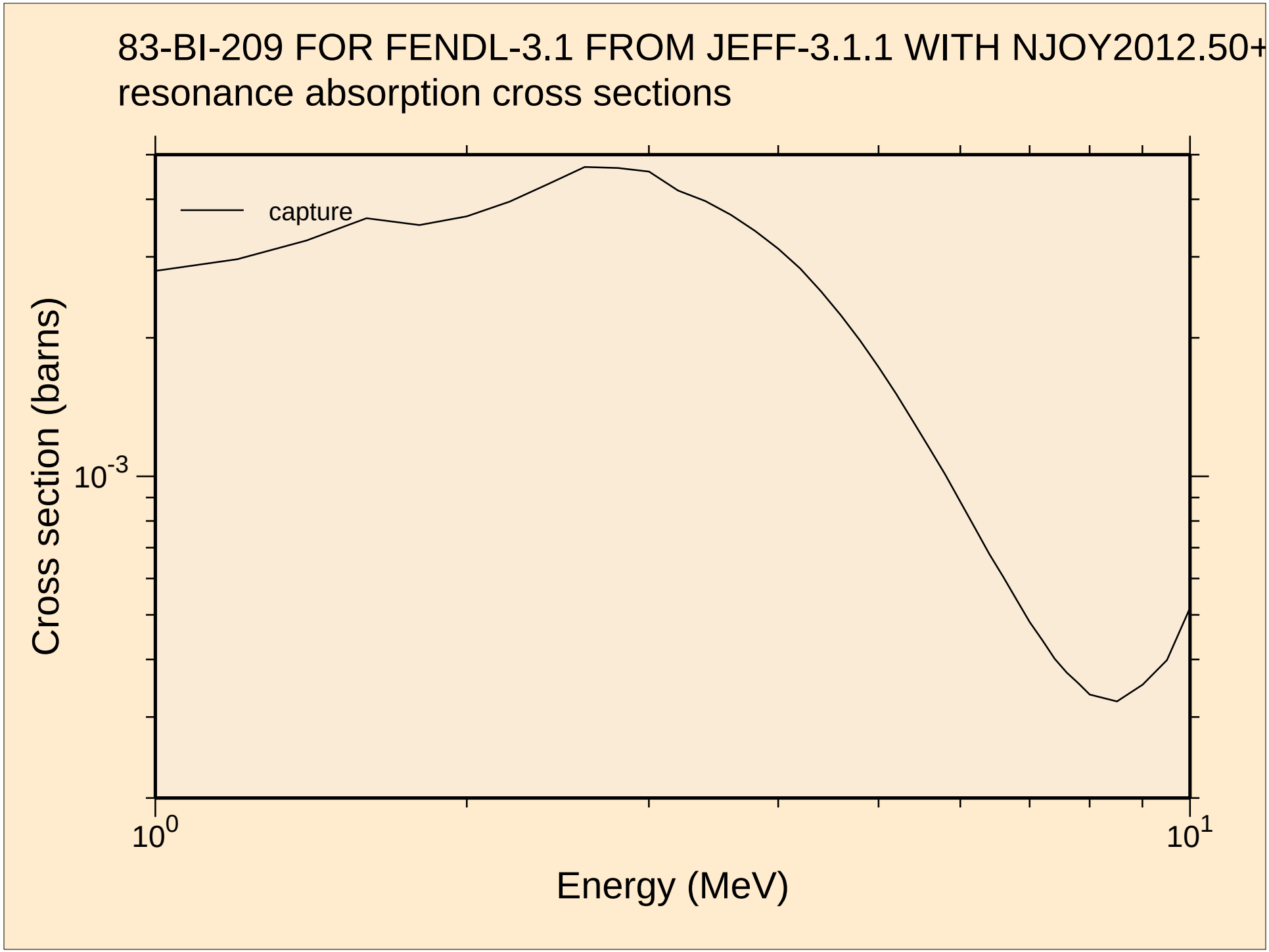


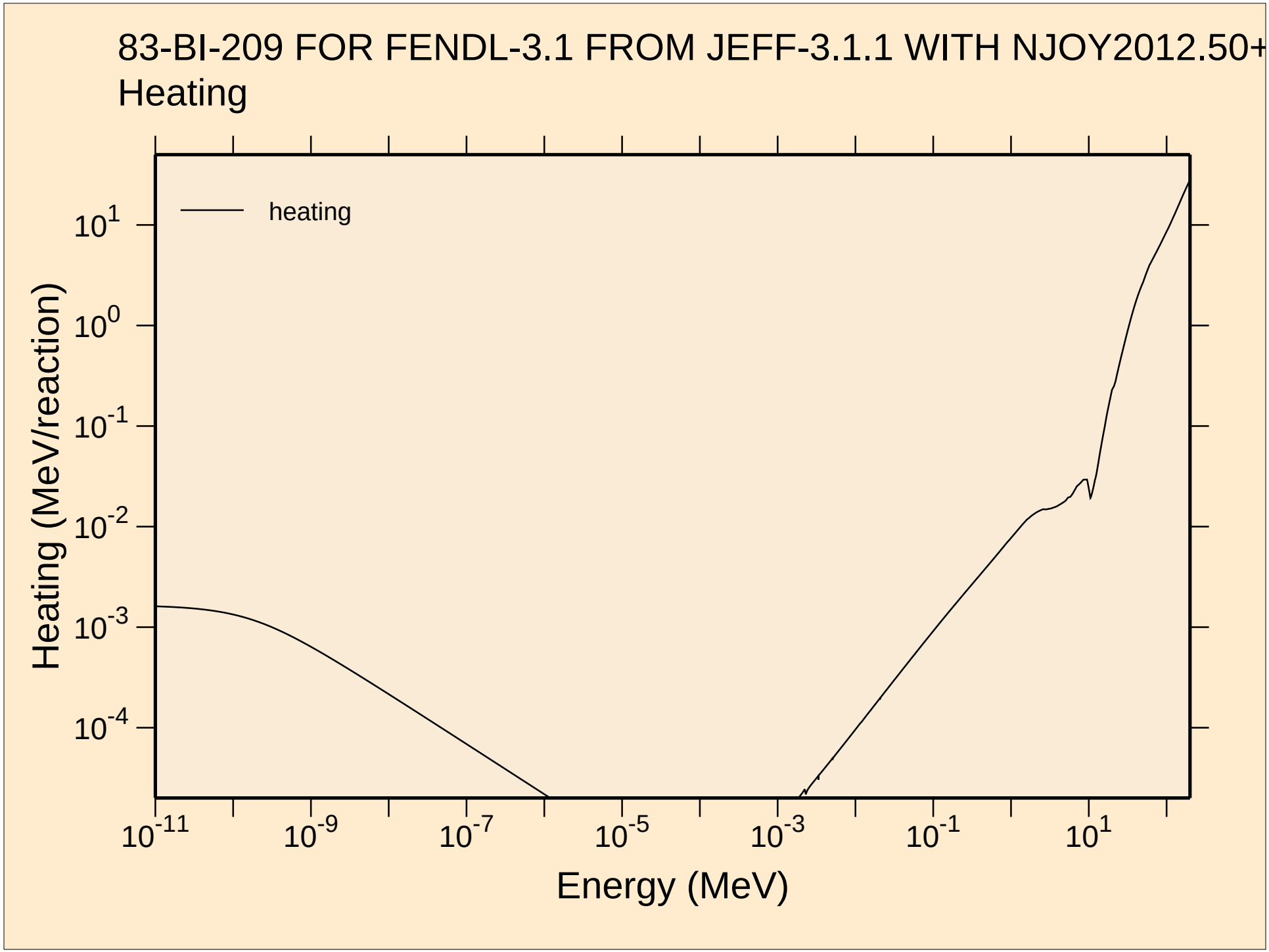

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-3
10^-2
Energy (MeV)

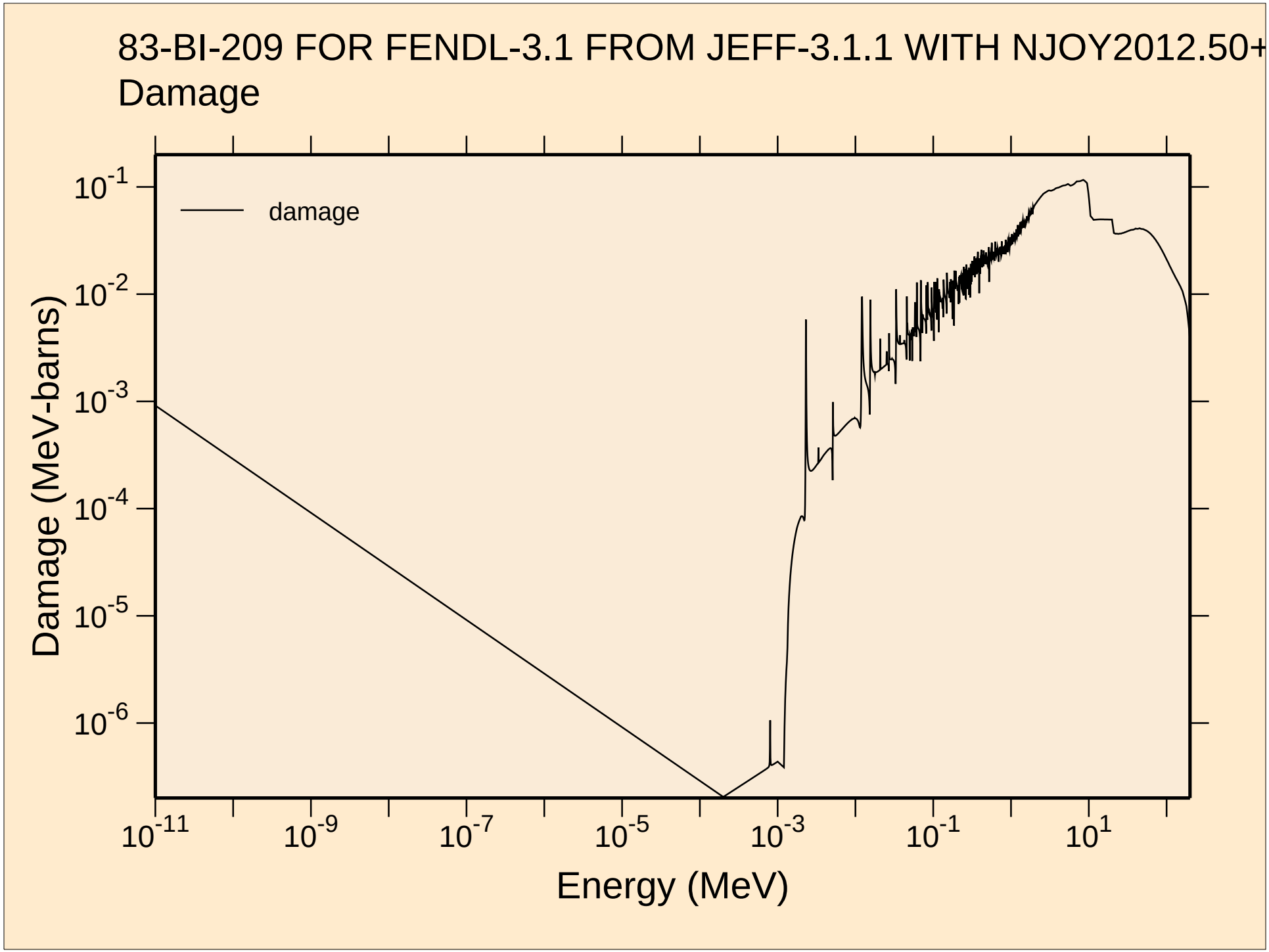
83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance absorption cross sections

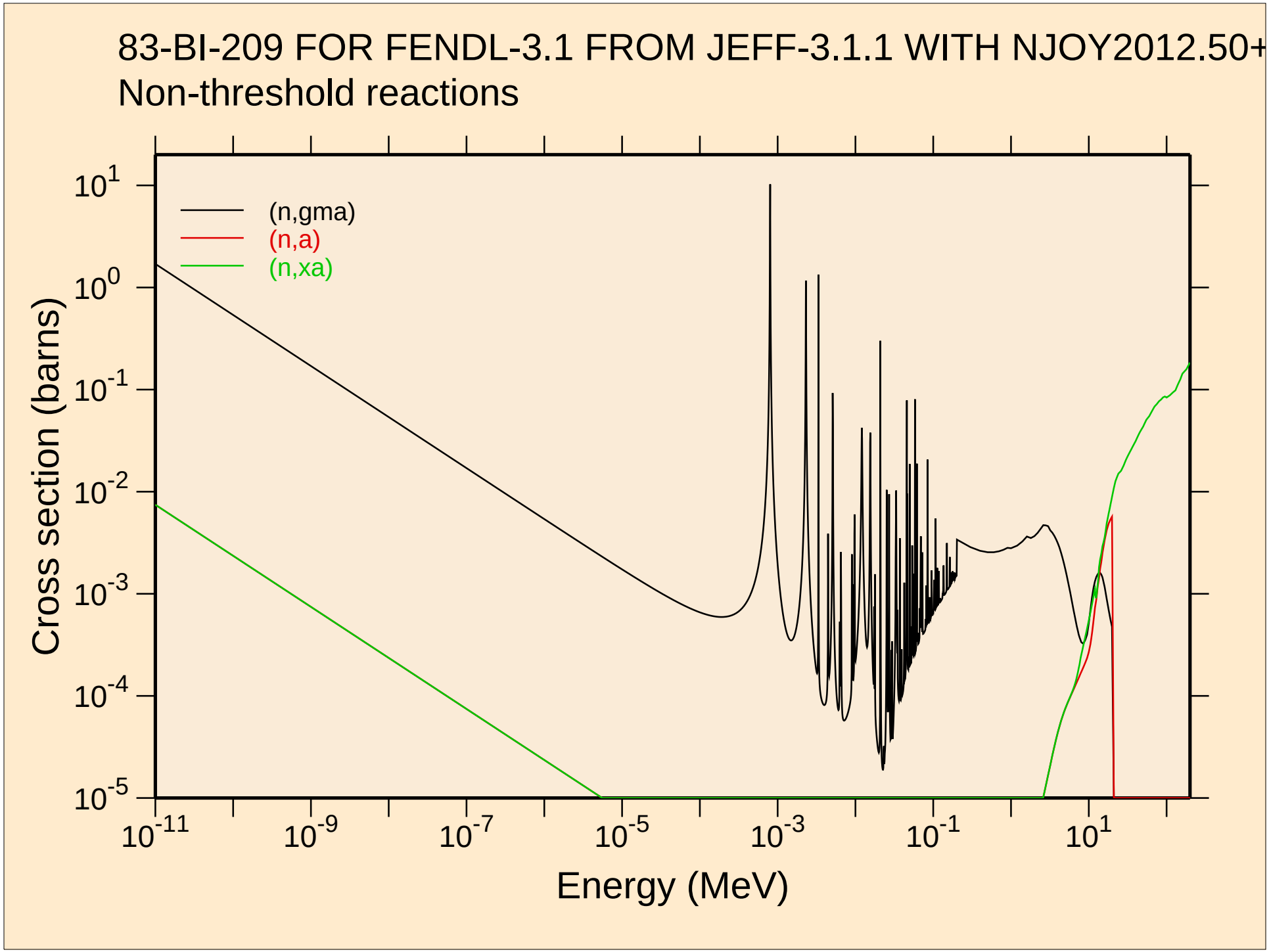


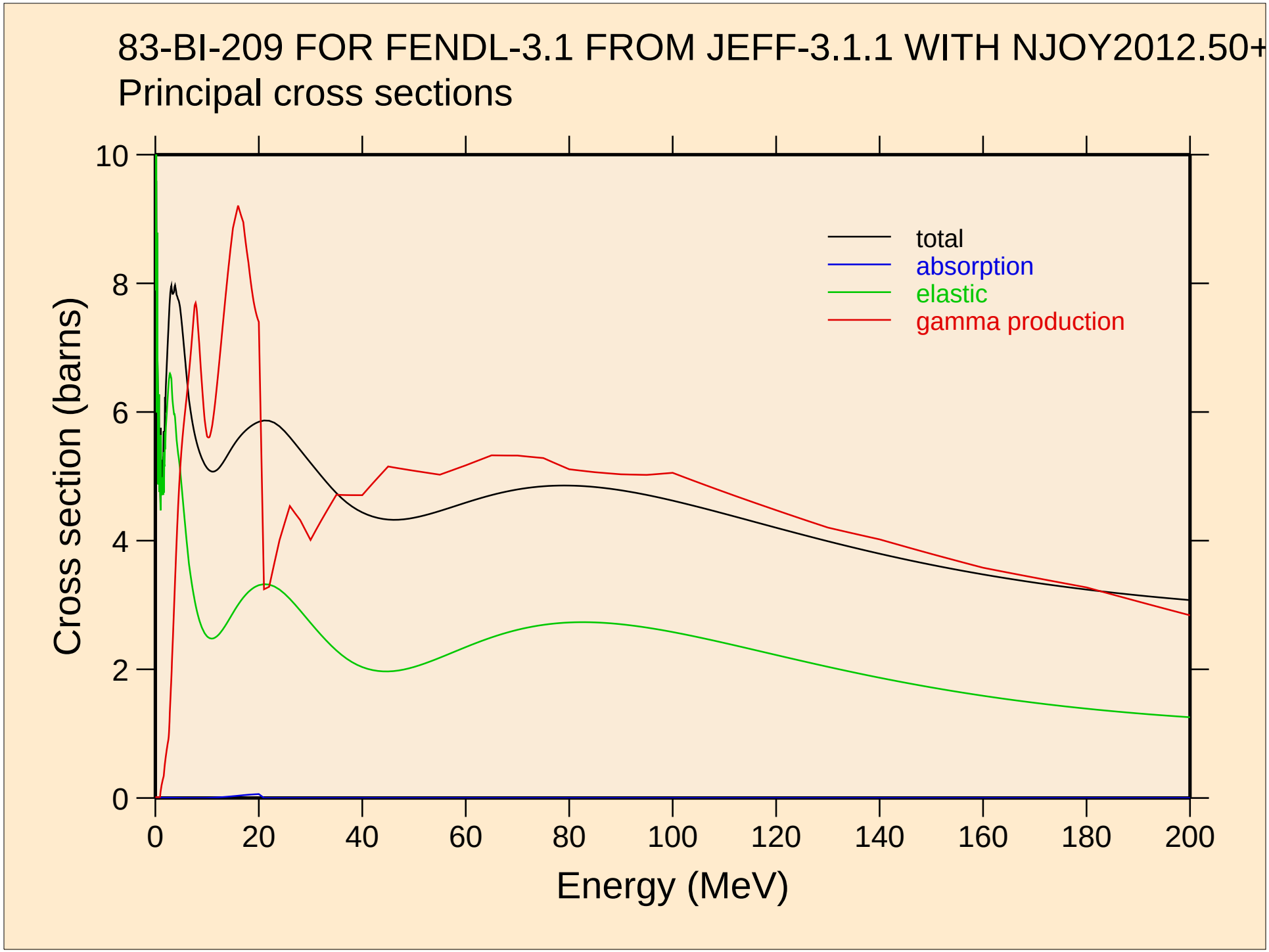

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance absorption cross sections
capture
Cross section (barns)
10-2
10-3
10-1
100
Energy (MeV)

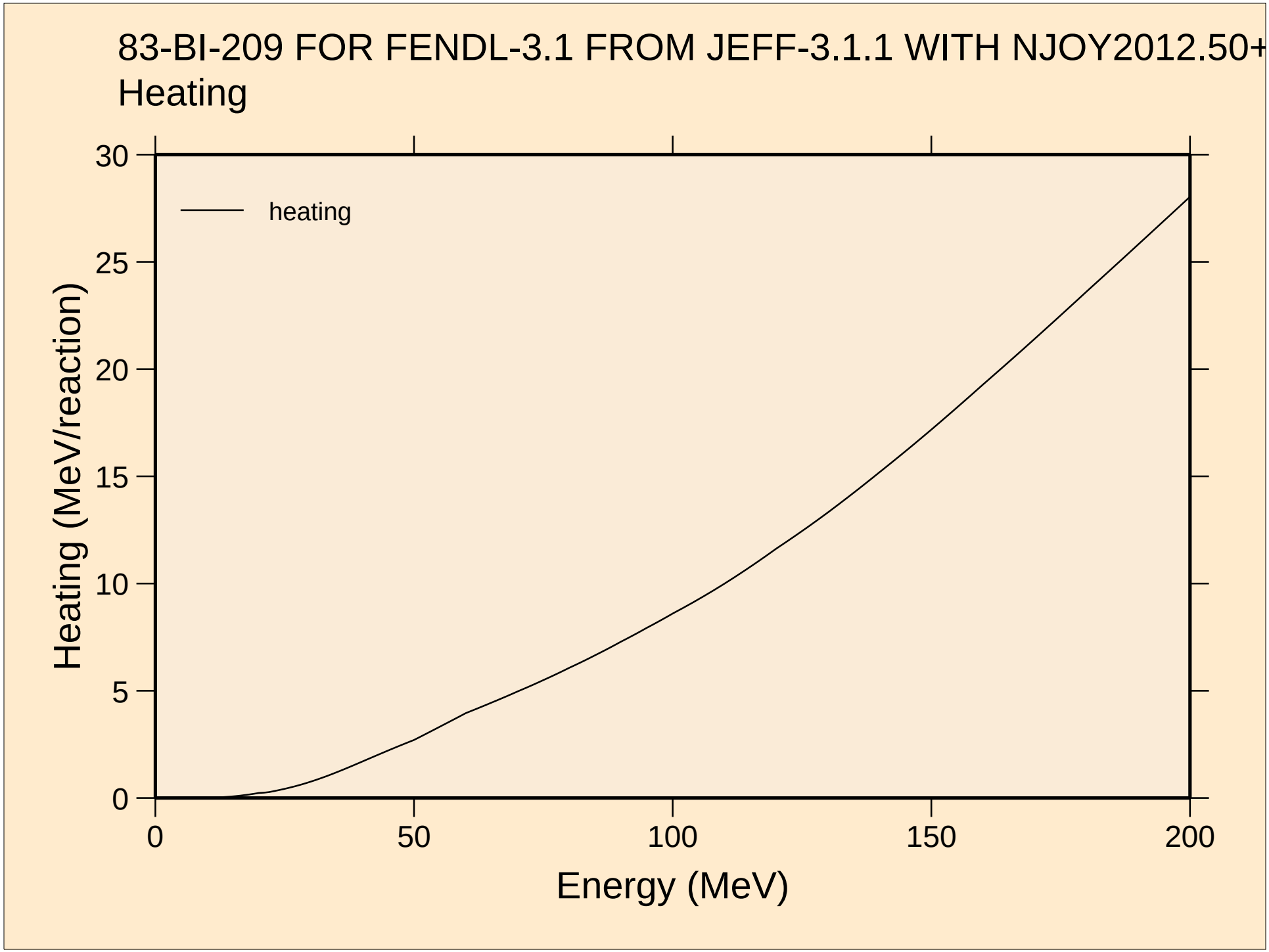

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
resonance absorption cross sections
capture
Cross section (barns)
10-3
100
101
Energy (MeV)

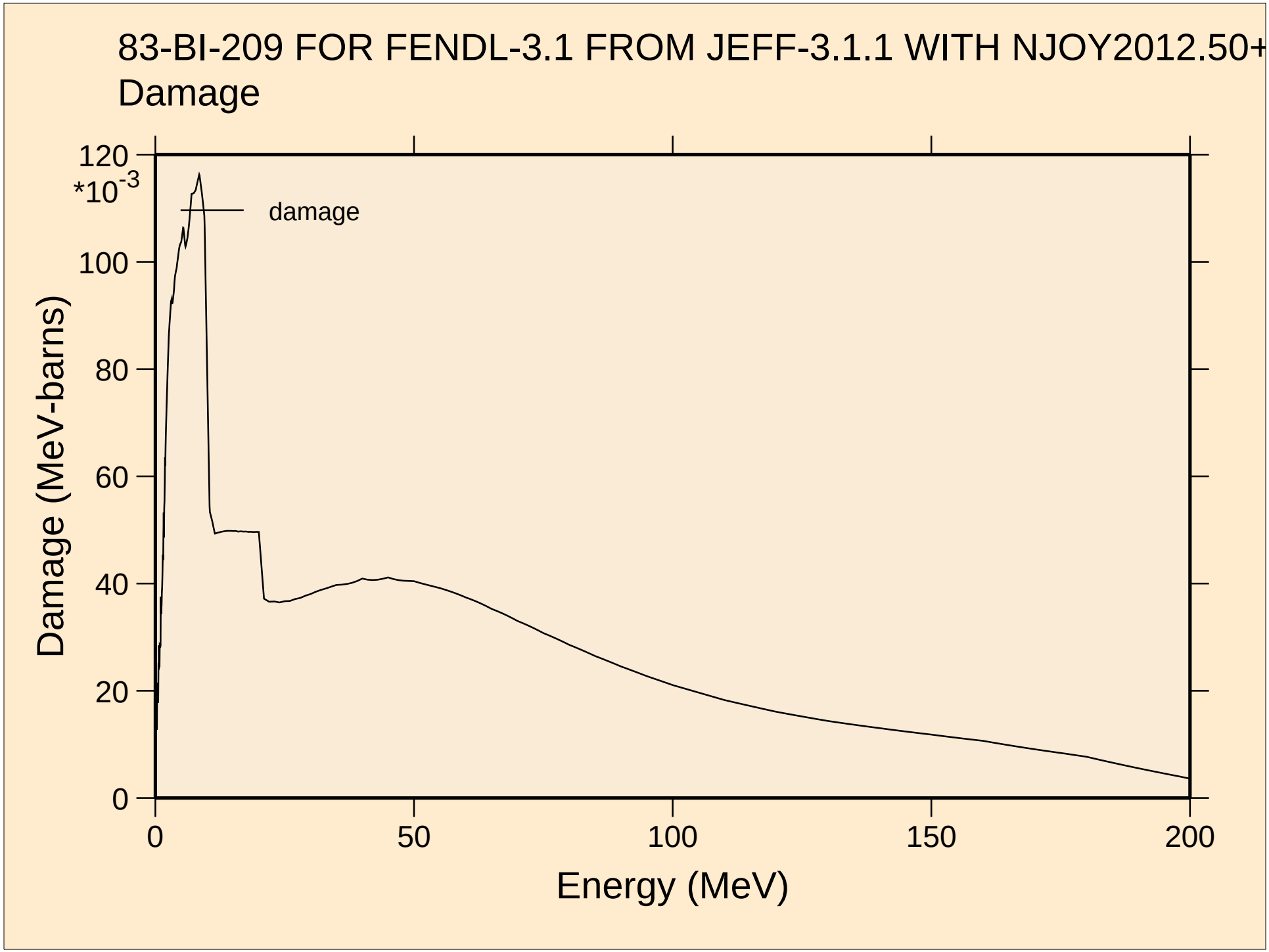

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Heating
heating
Heating (MeV/reaction)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

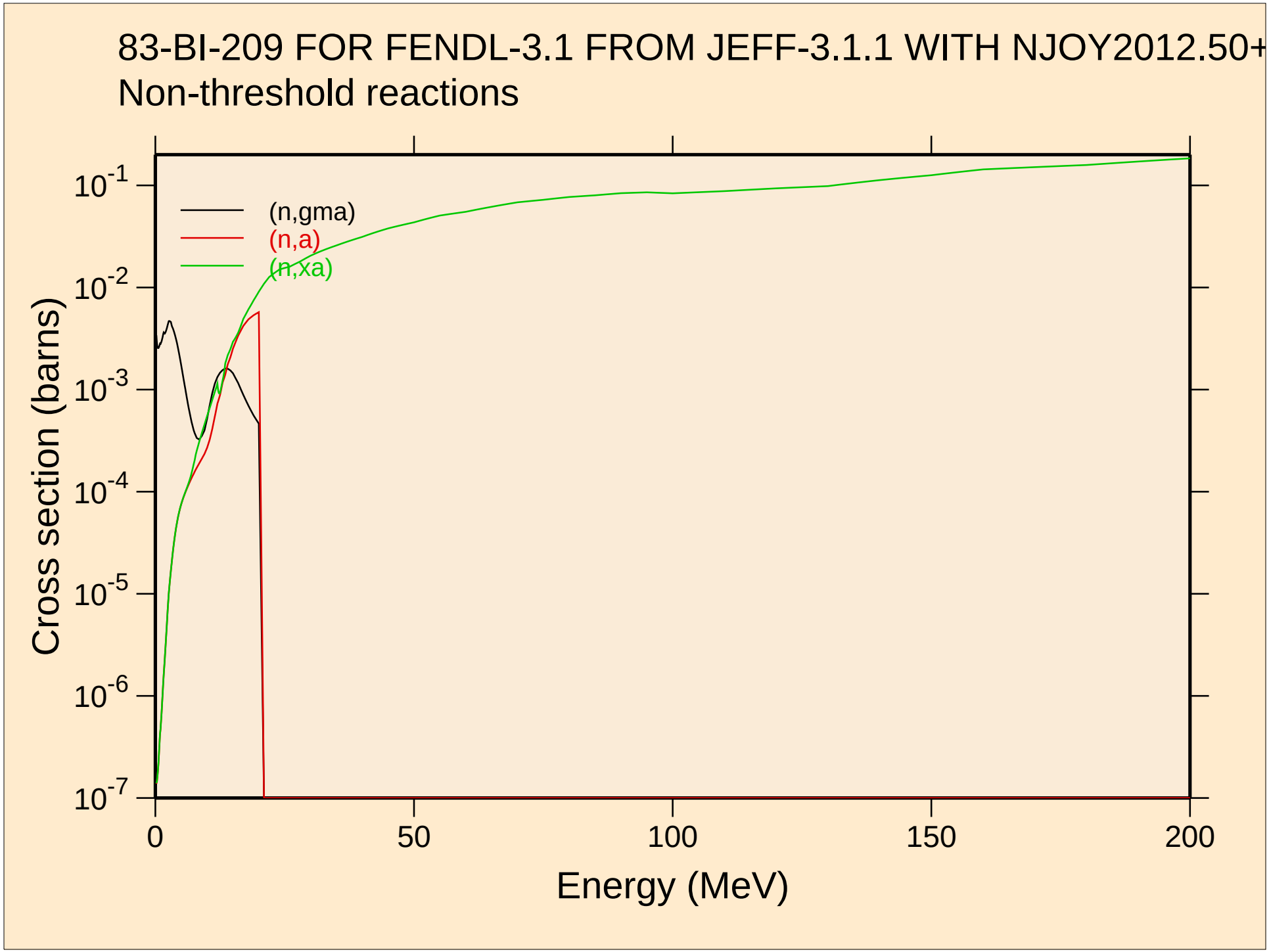

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Damage
damage
Damage (MeV-barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-11
10-9
10-7
10-5
10-3
10-1
101
Energy (MeV)

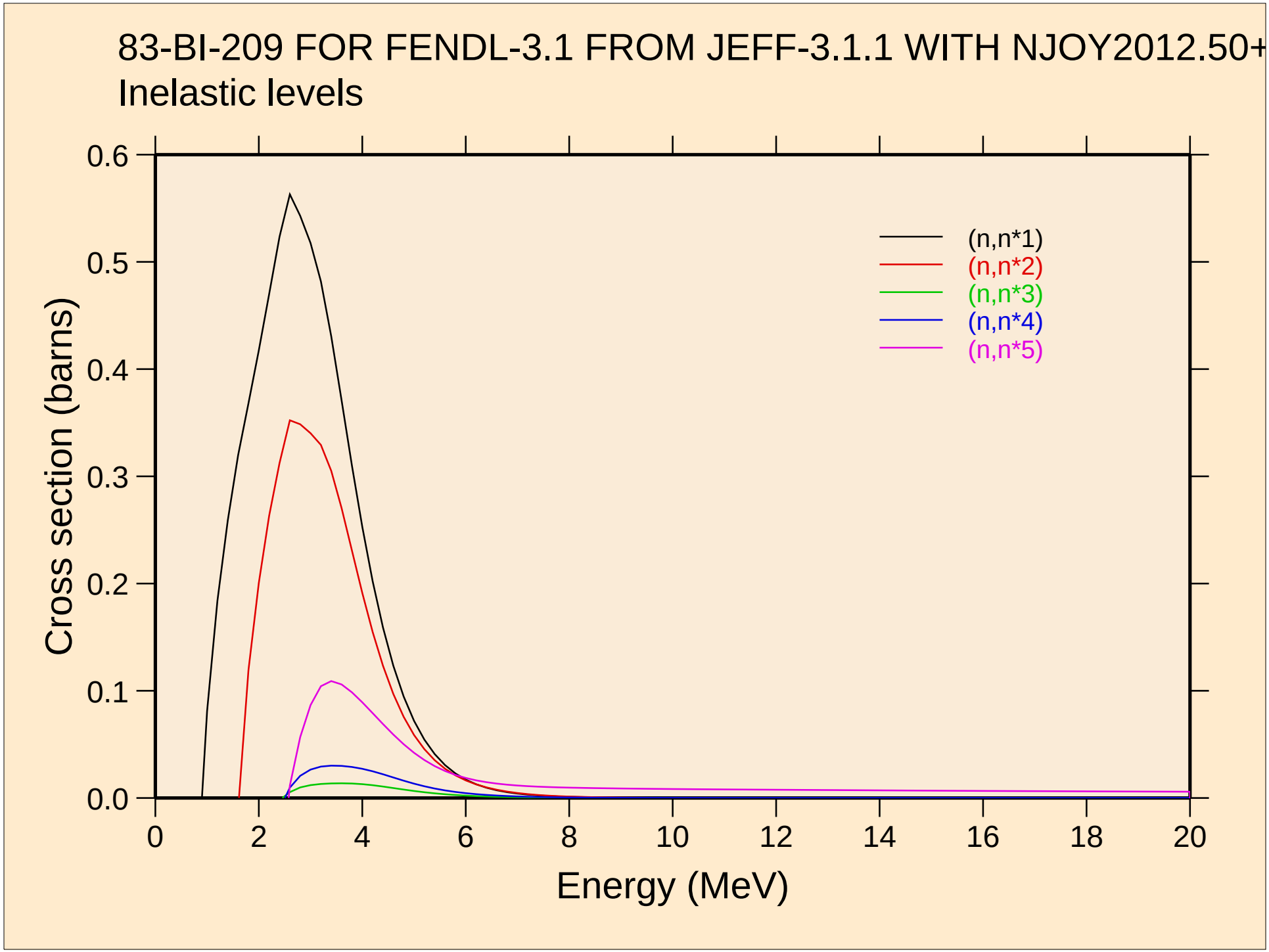

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Non-threshold reactions
(n,gma)
(n,a)
(n,xa)
Cross section (barns)
Energy (MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1

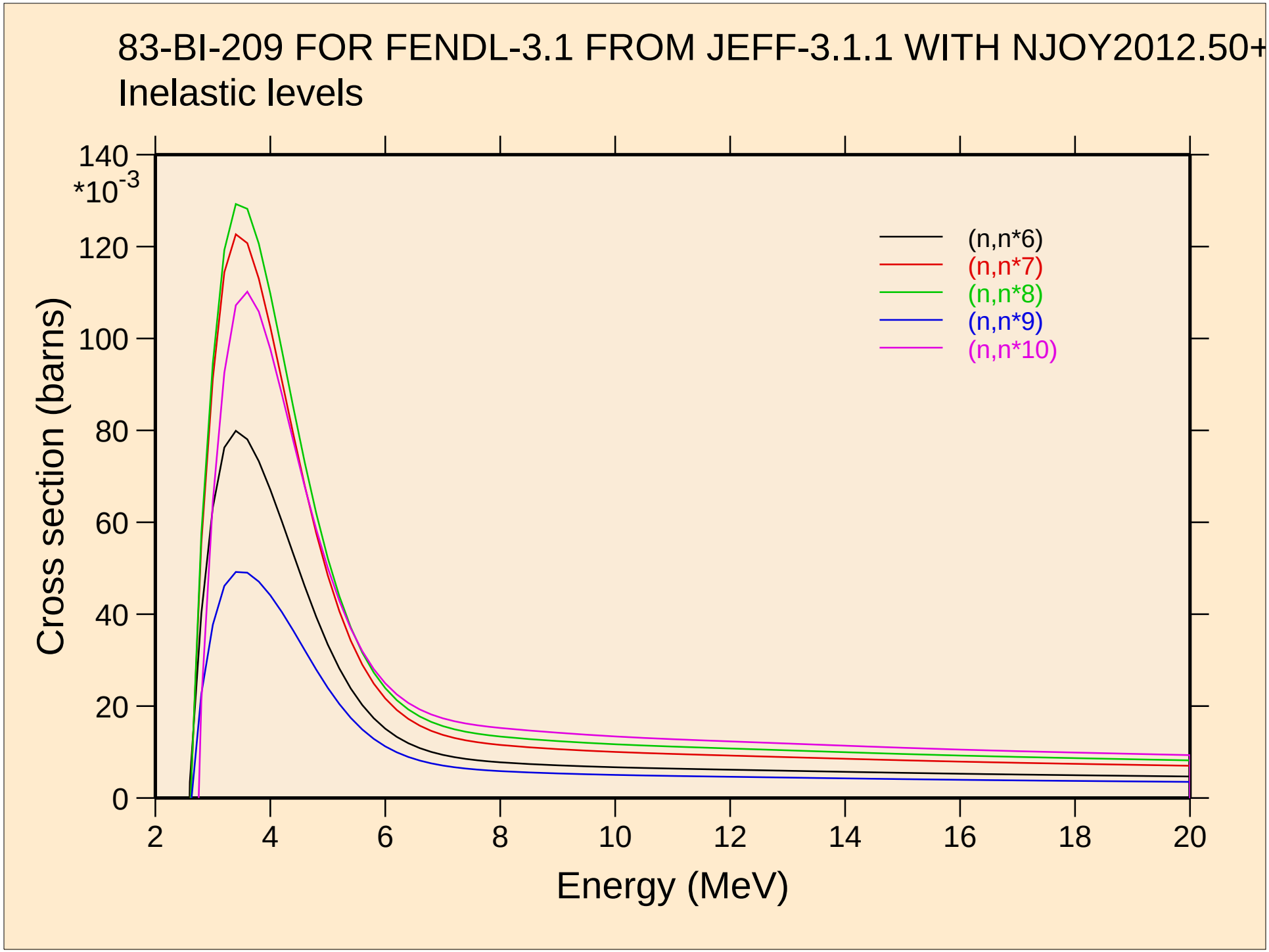

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
0
2
4
6
8
10
0
20
40
60
80
100
120
140
160
180
200

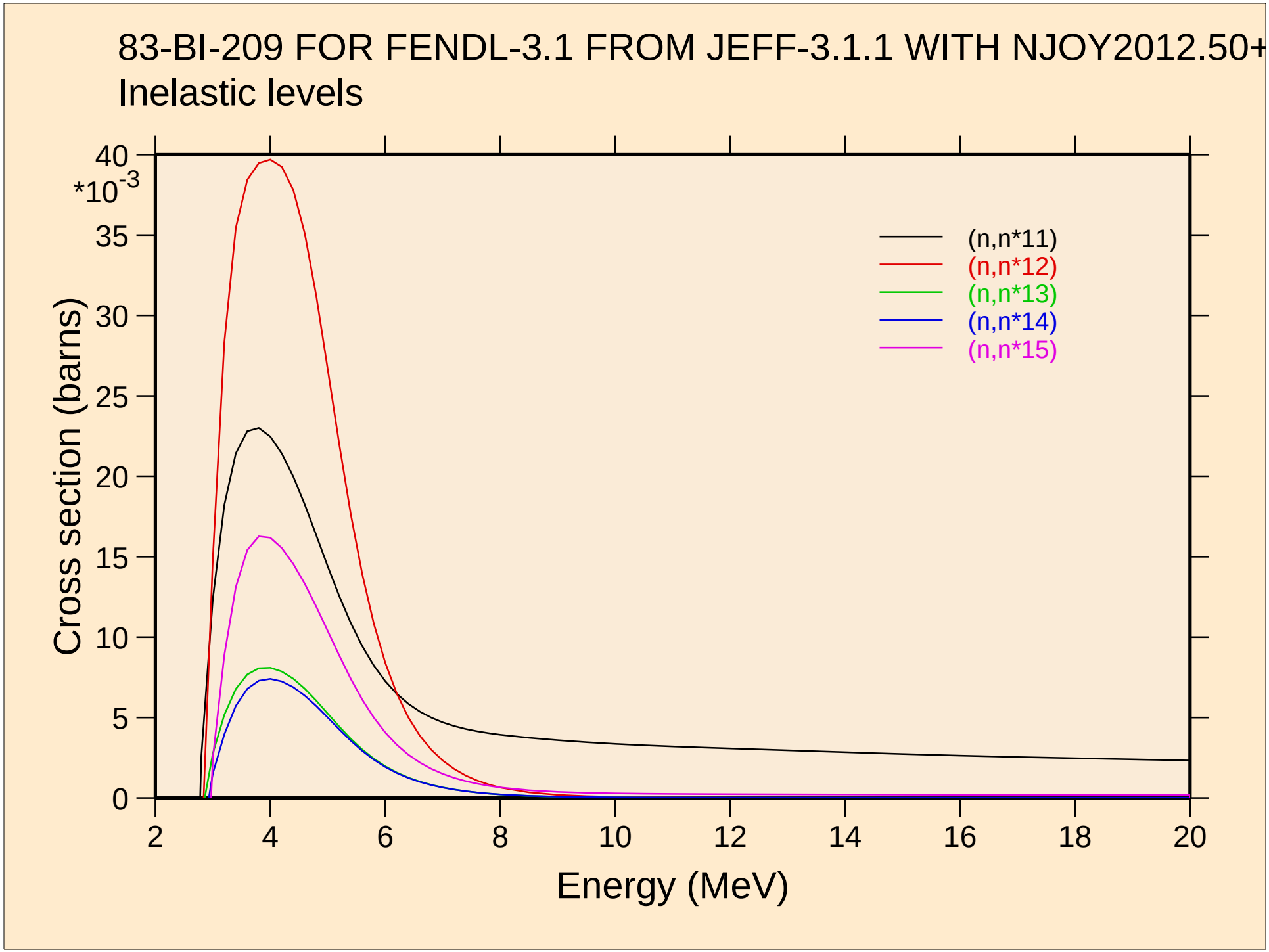

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
5
10
15
20
25
30
0
50
100
150
200

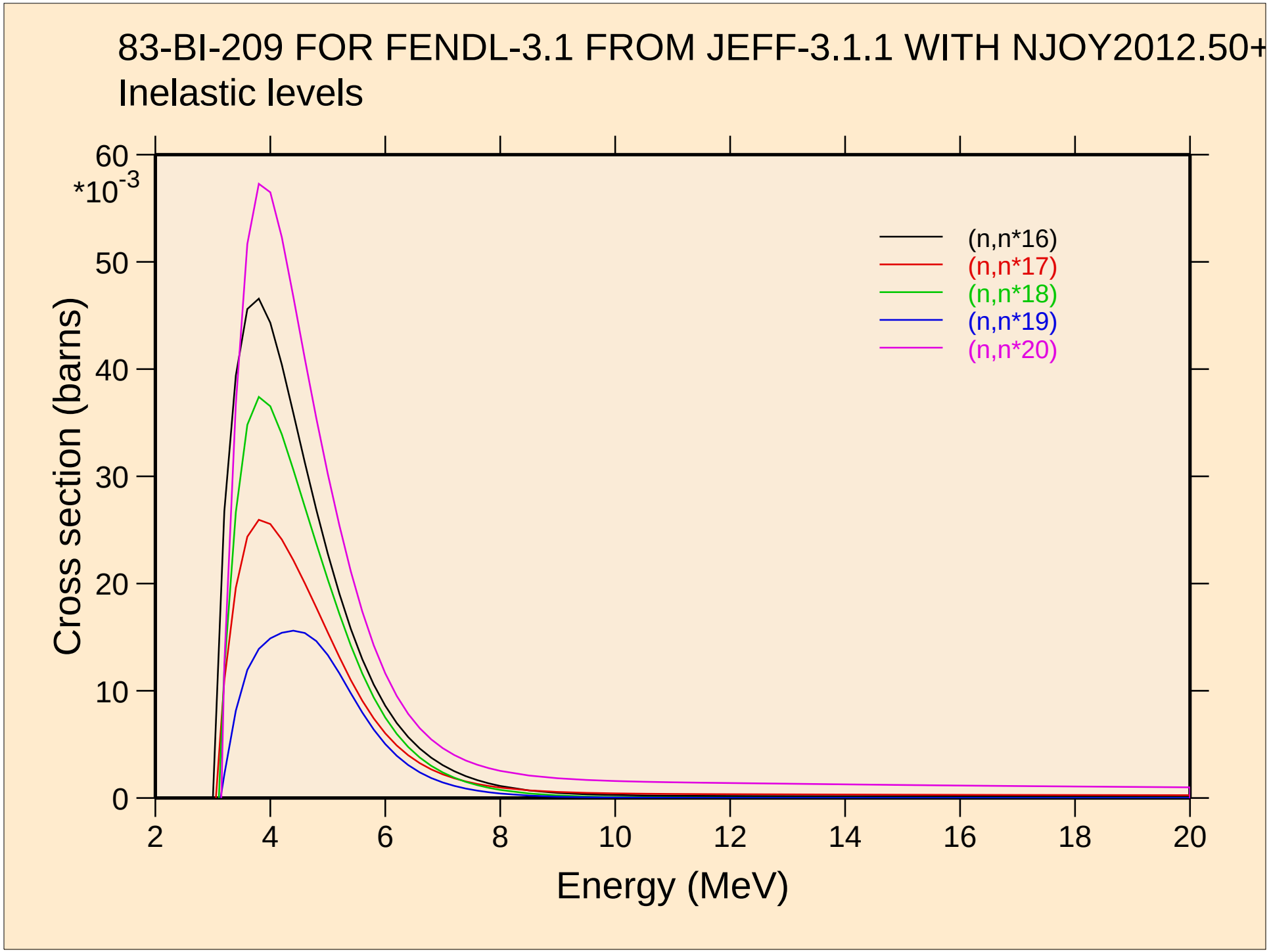

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Damage
120
*10-3
100
80
60
40
20
0
damage
Damage (MeV-barns)
0
50
100
150
200
Energy (MeV)

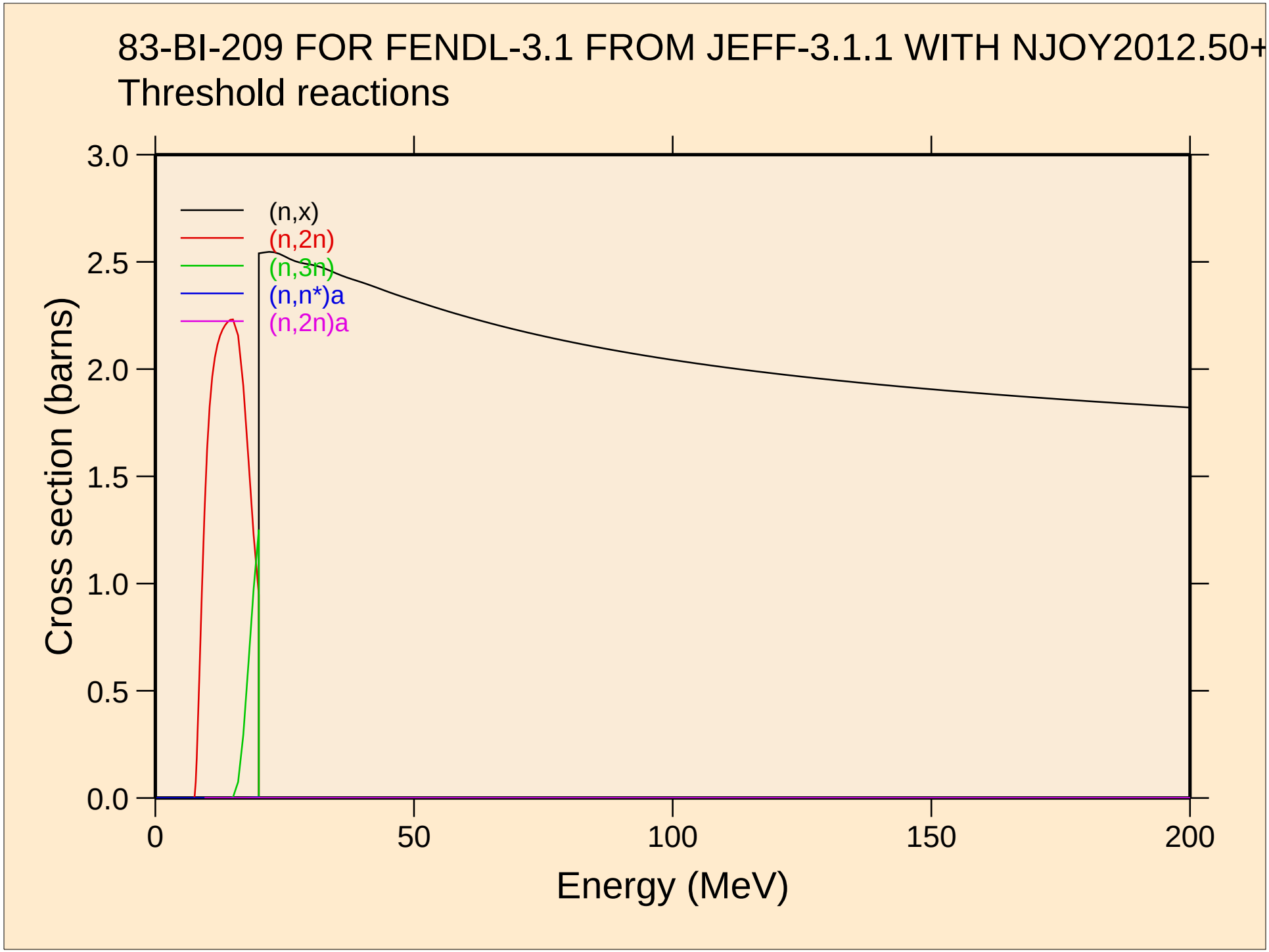

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Non-threshold reactions
(n,gma)
(n,a)
(n,xa)
Cross section (barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-7
0
50
100
150
200
Energy (MeV)

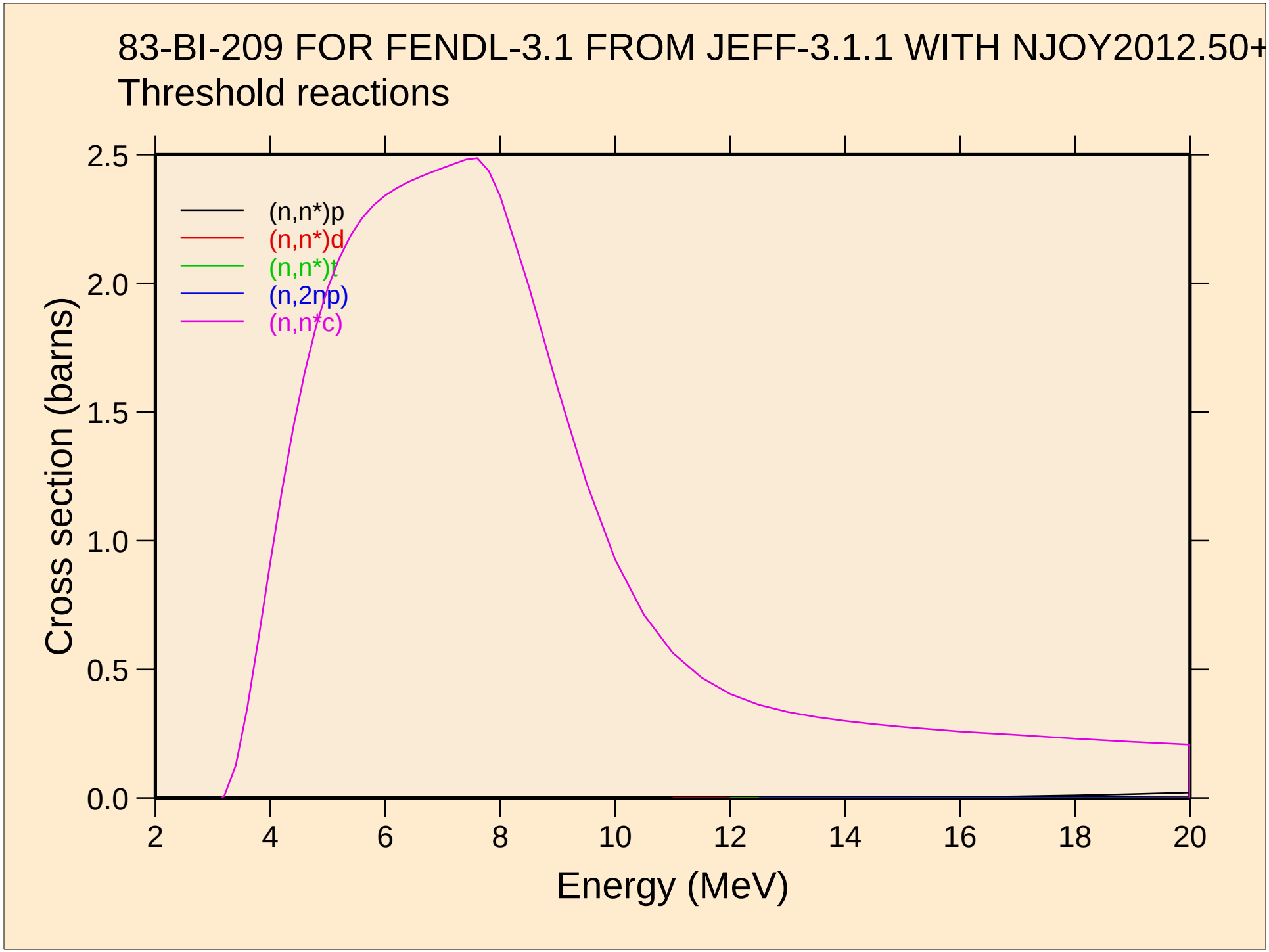

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Inelastic levels
Cross section (barns)
Energy (MeV)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
2
4
6
8
10
12
14
16
18
20
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

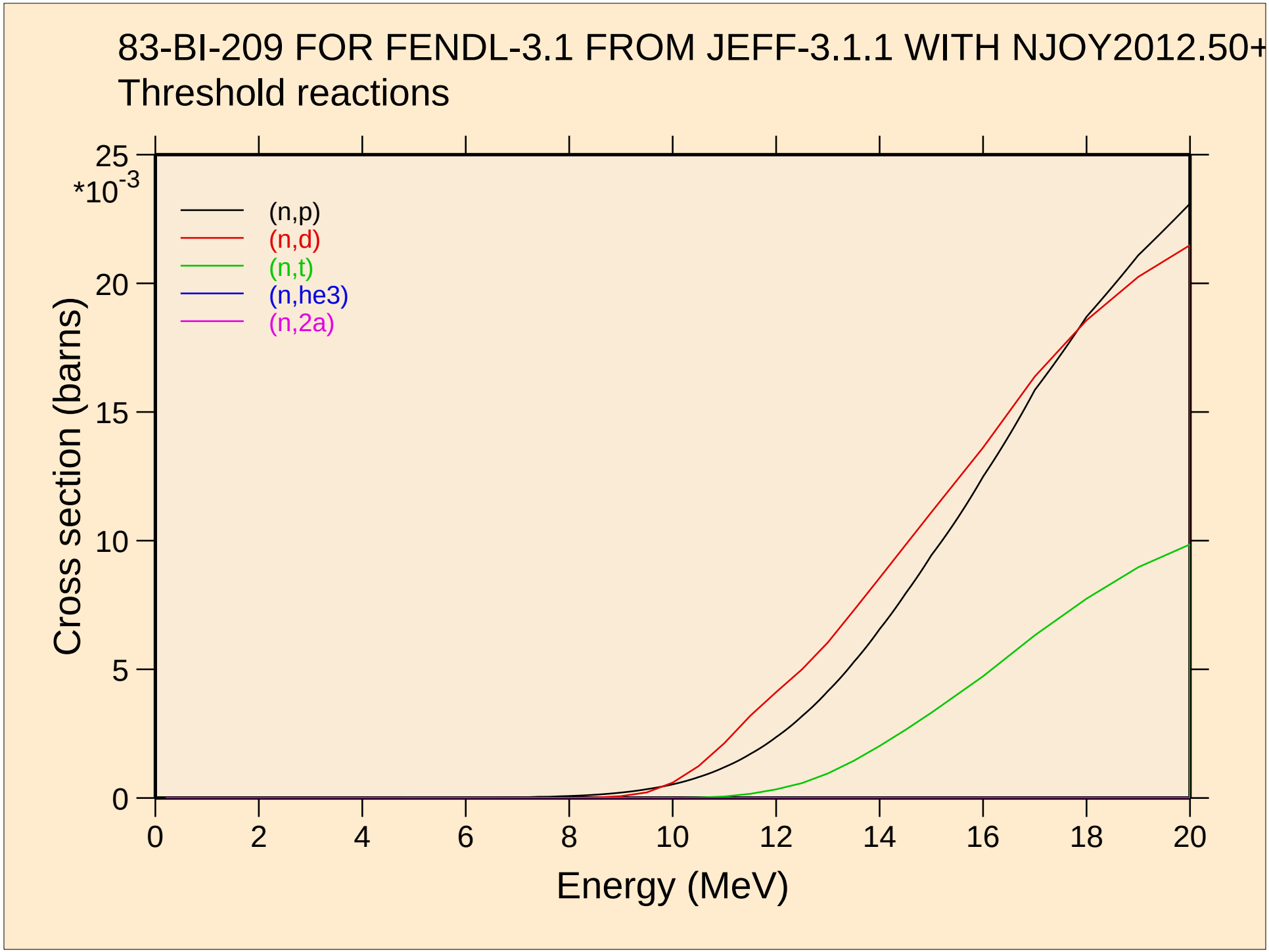

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Inelastic levels
Cross section (barns)
*10-3
140
120
100
80
60
40
20
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

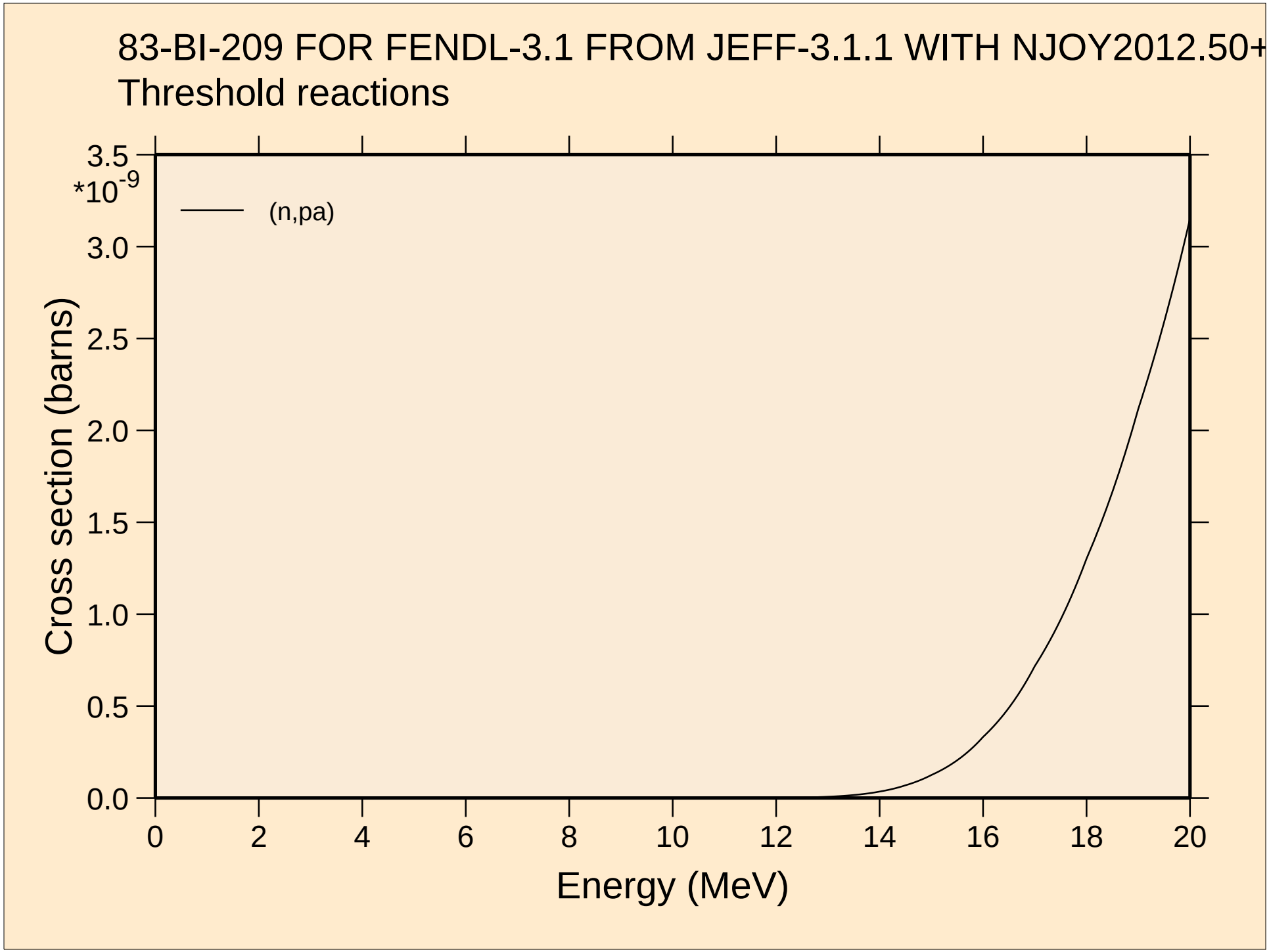

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Inelastic levels
Cross section (barns)
*10-3
40
35
30
25
20
15
10
5
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

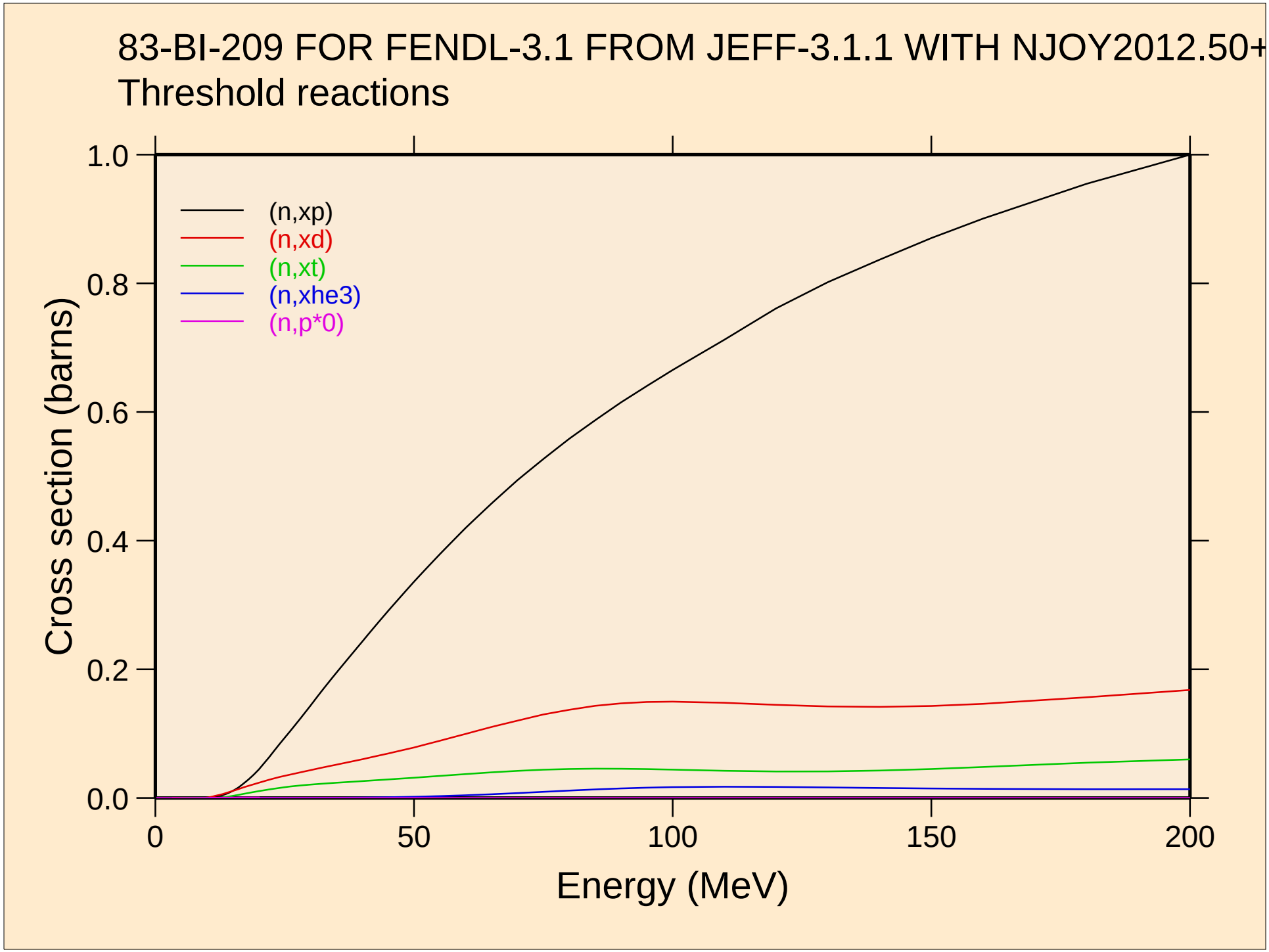

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Inelastic levels
Cross section (barns)
*10-3
60
50
40
30
20
10
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

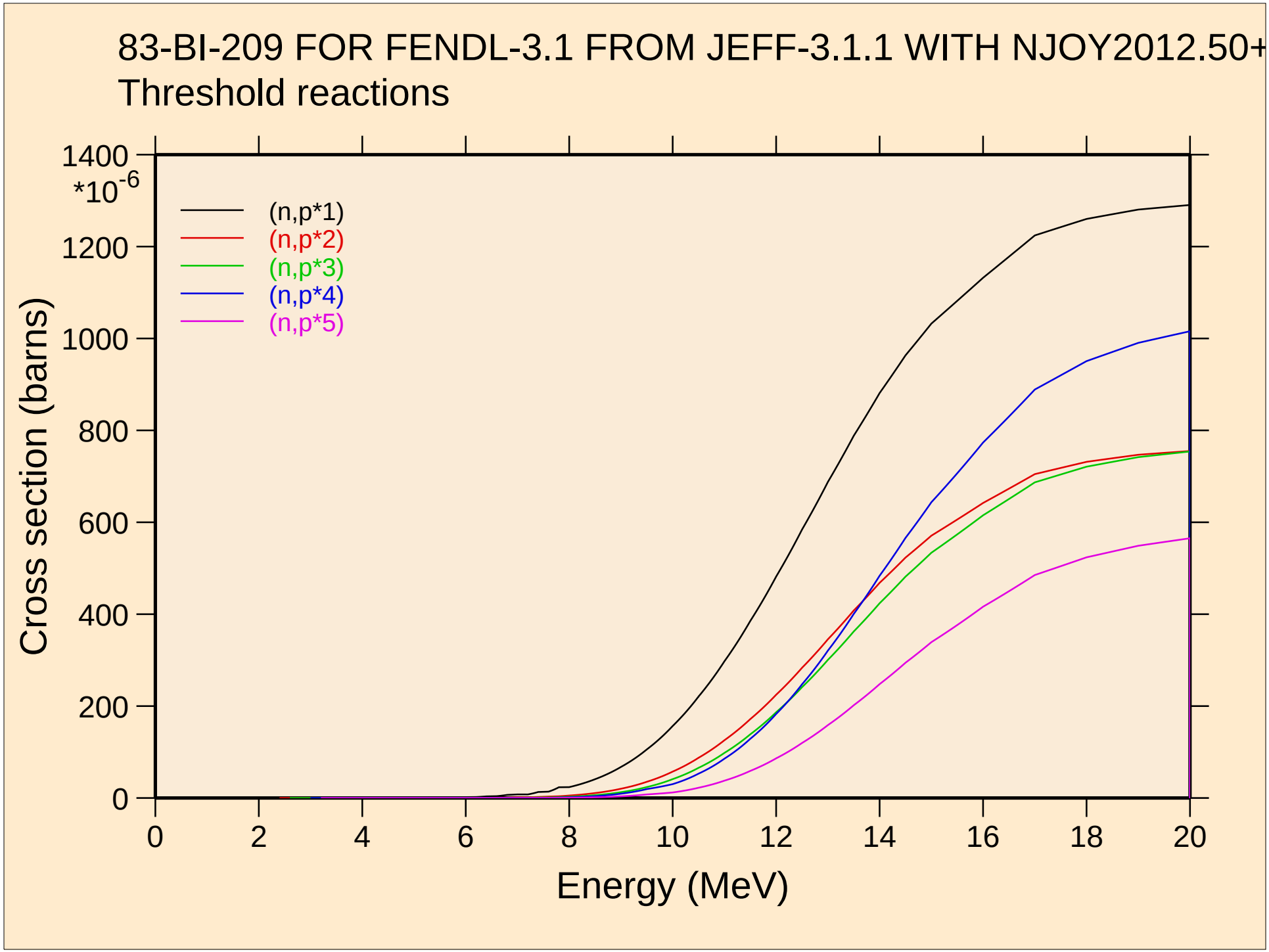

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
Cross section (barns)
Energy (MeV)
(n,x)
(n,2n)
(n,3n)
(n,n*)a
(n,2n)a
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
50
100
150
200

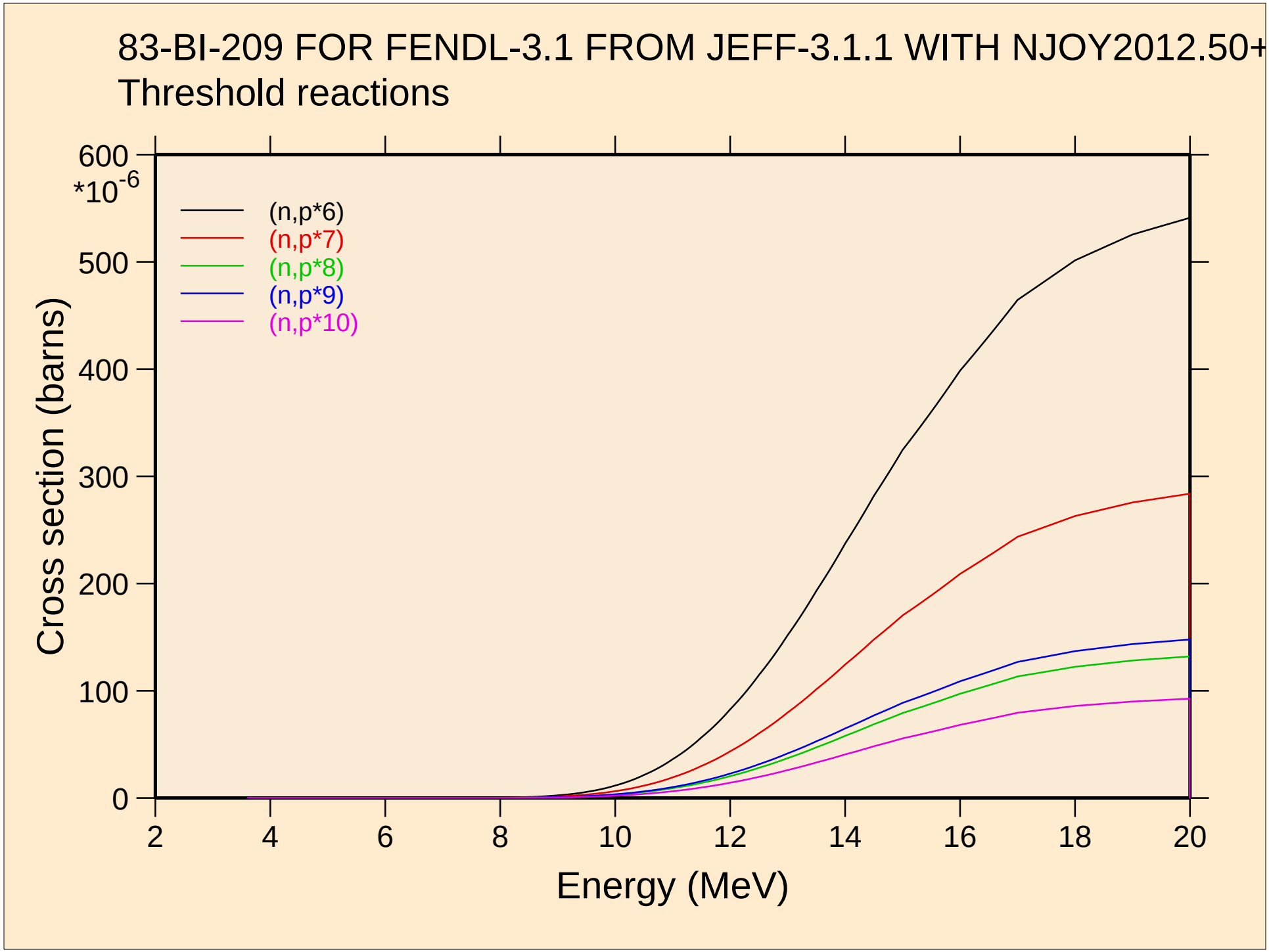

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
(n,n*)p
(n,n*)d
(n,n*)t
(n,2np)
(n,n*c)
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
2
4
6
8
10
12
14
16
18
20

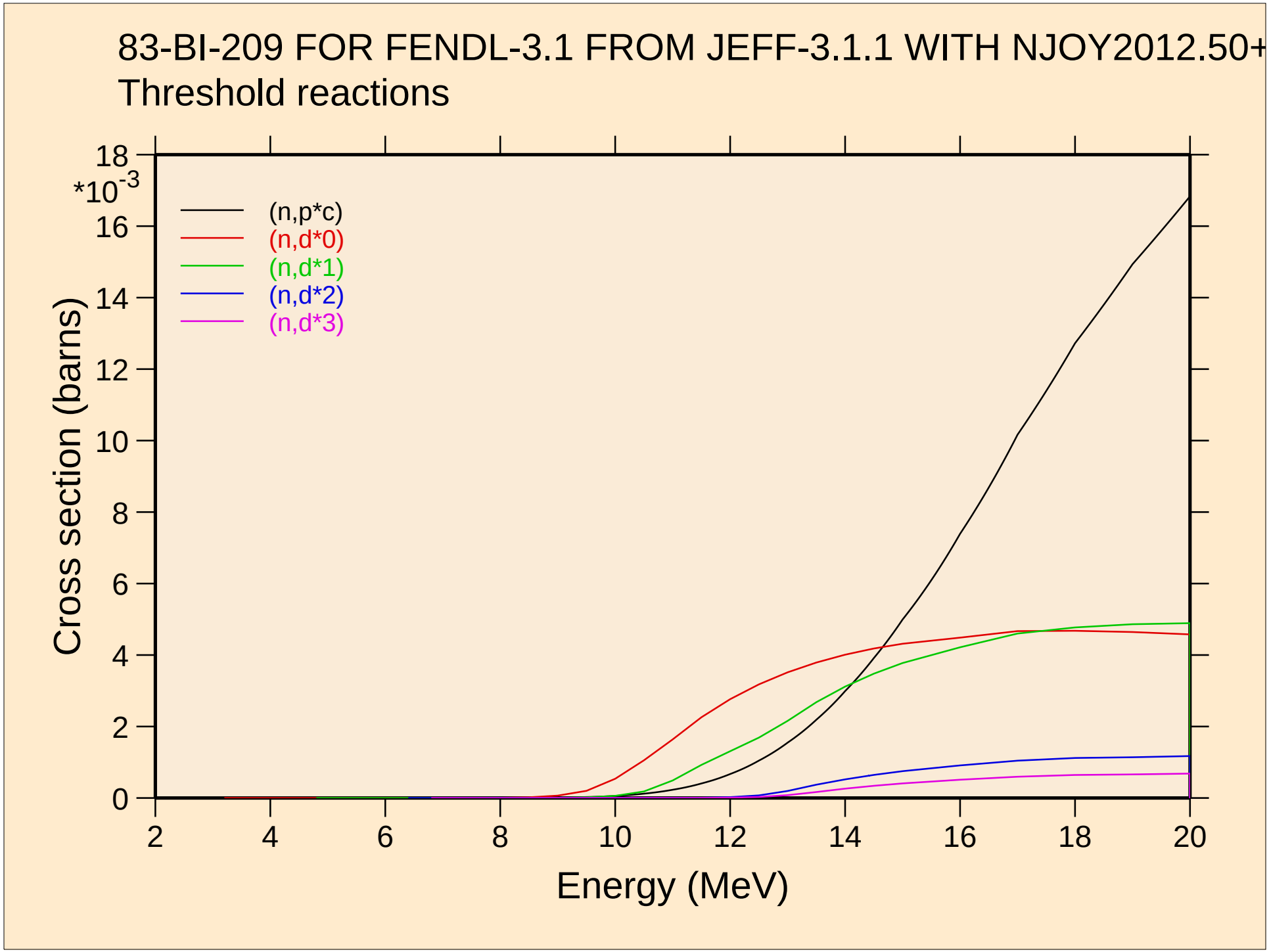

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
*10-3
Cross section (barns)
Energy (MeV)
(n,p)
(n,d)
(n,t)
(n,he3)
(n,2a)
0
5
10
15
20
25
0
2
4
6
8
10
12
14
16
18
20

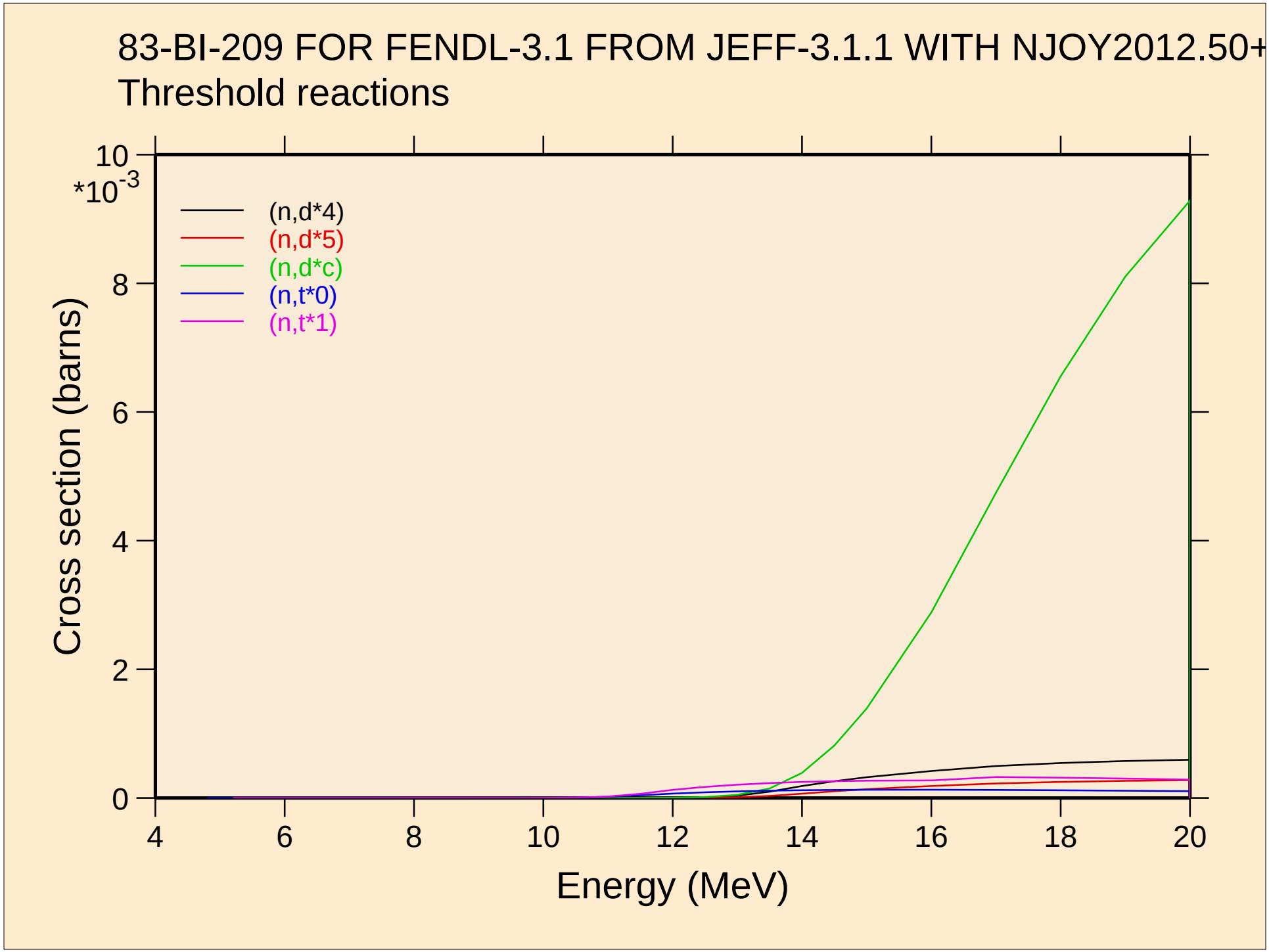

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
3.5
*10-9
3.0
2.5
2.0
1.5
1.0
0.5
0.0
(n,pa)
Cross section (barns)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

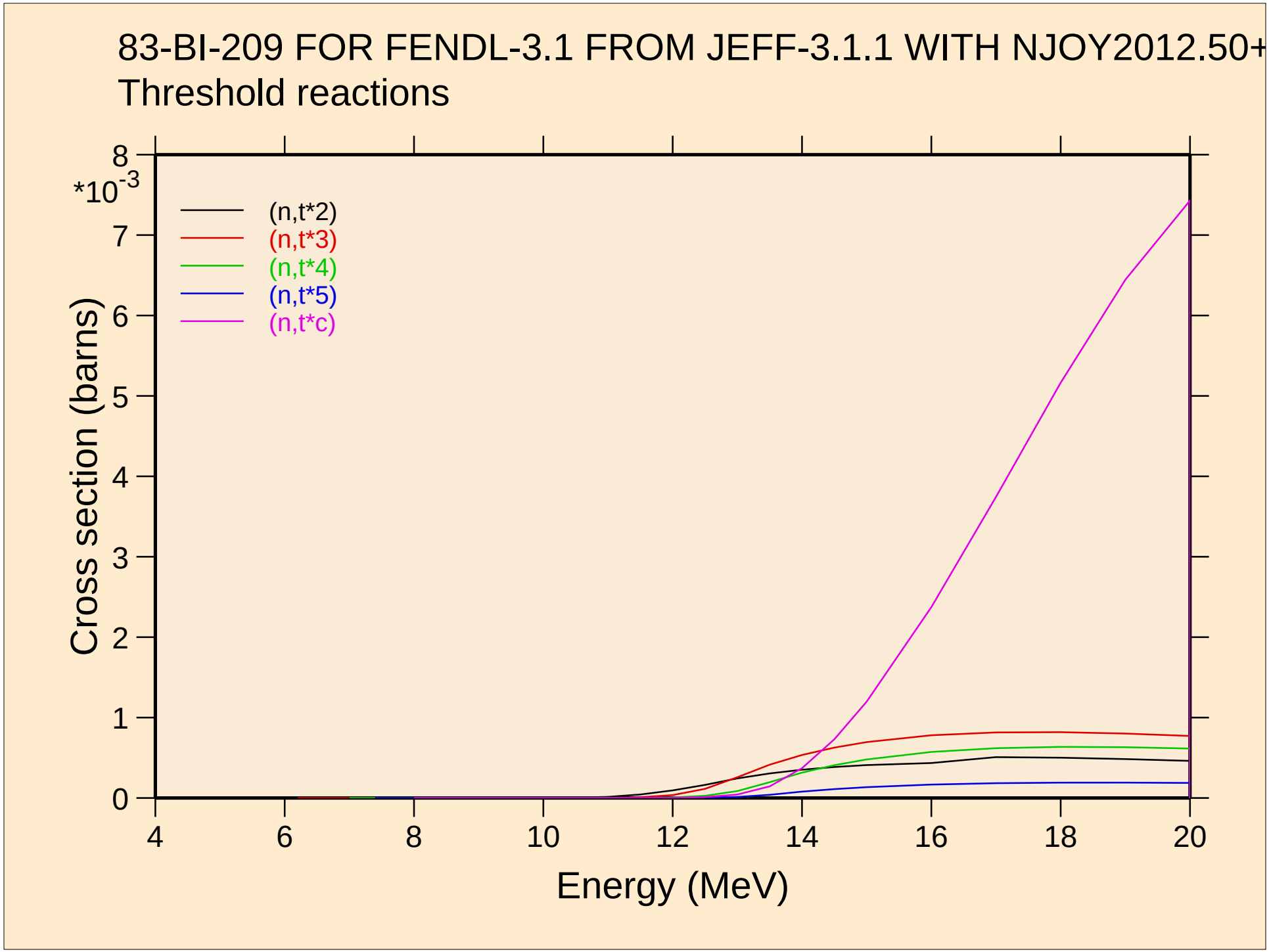

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,p*0)
Cross section (barns)
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
Energy (MeV)

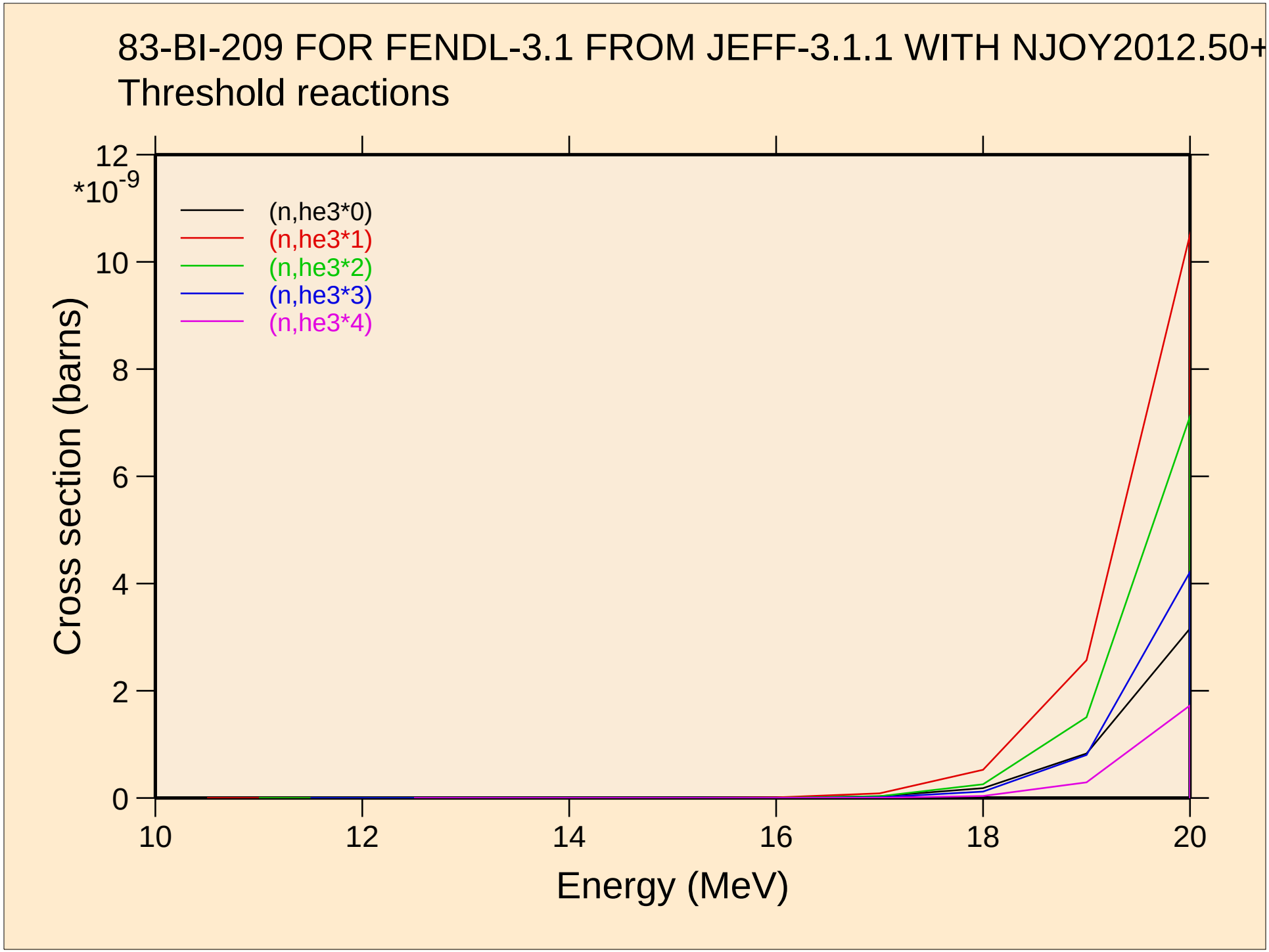

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
1400
*10-6
1200
1000
800
600
400
200
0
Cross section (barns)
(n,p*1)
(n,p*2)
(n,p*3)
(n,p*4)
(n,p*5)
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

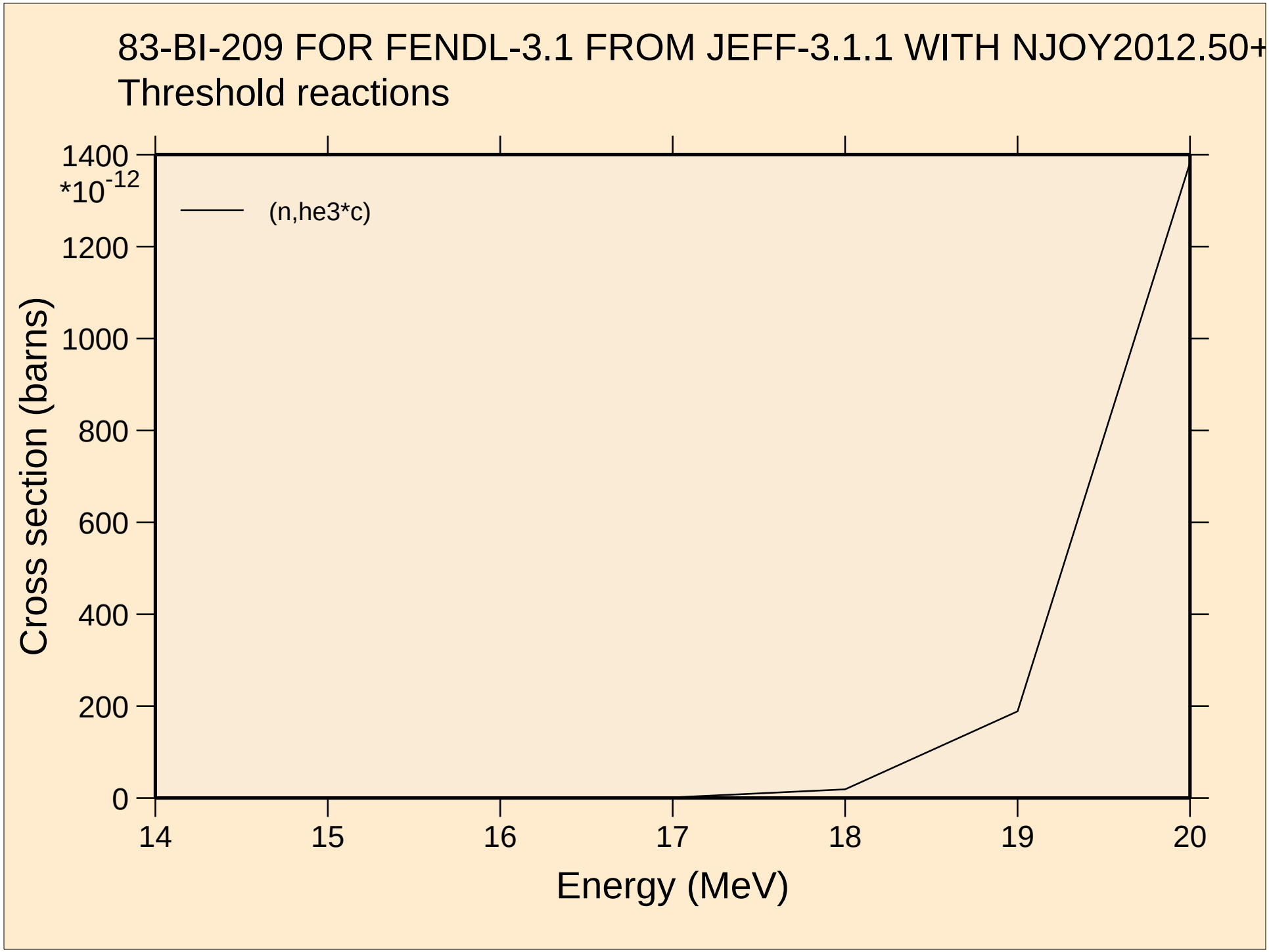

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
600
*10-6
500
400
300
200
100
0
Cross section (barns)
(n,p*6)
(n,p*7)
(n,p*8)
(n,p*9)
(n,p*10)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

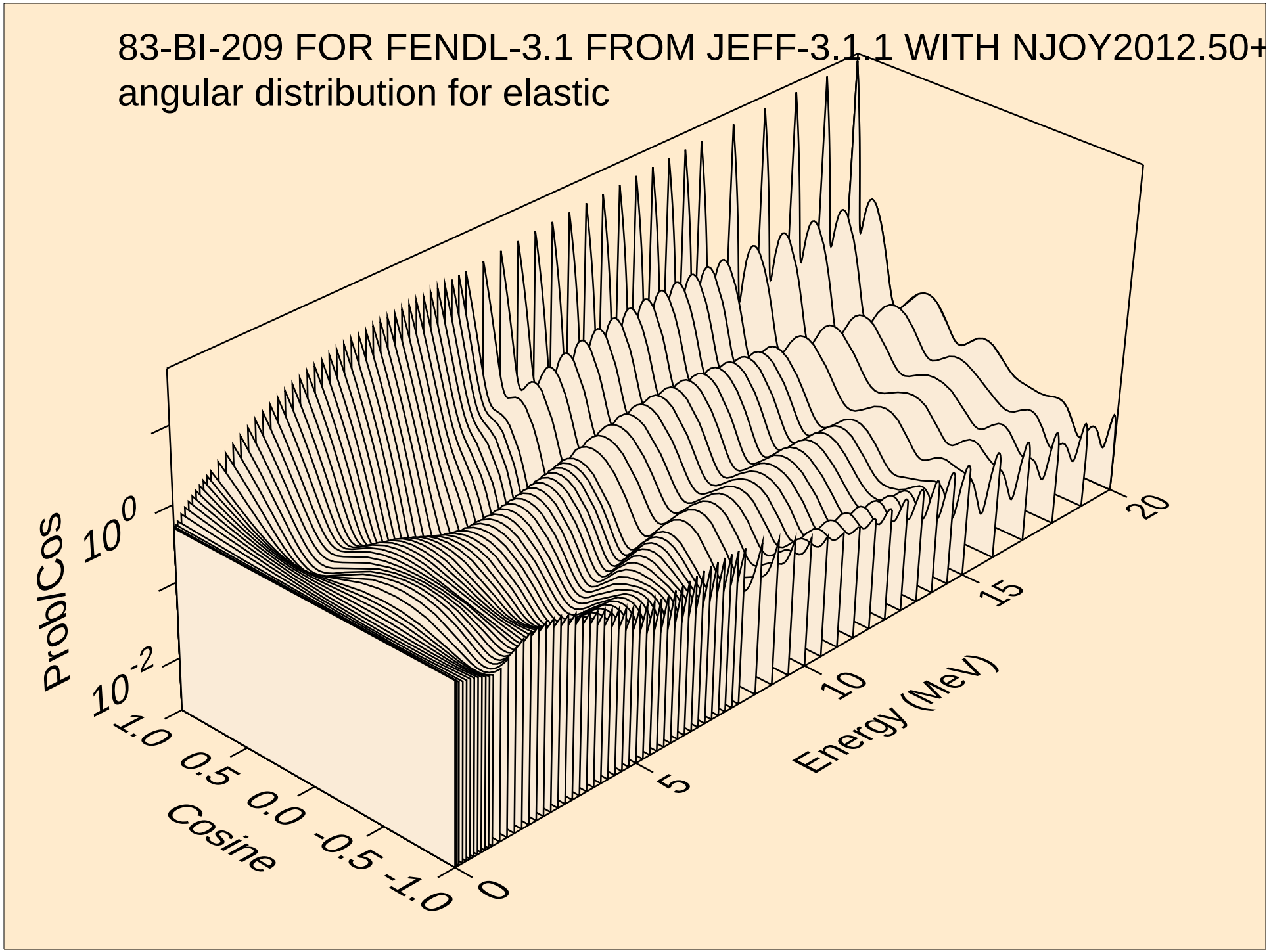

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
*10-3
Cross section (barns)
Energy (MeV)
(n,p*c)
(n,d*0)
(n,d*1)
(n,d*2)
(n,d*3)
0
2
4
6
8
10
12
14
16
18
20

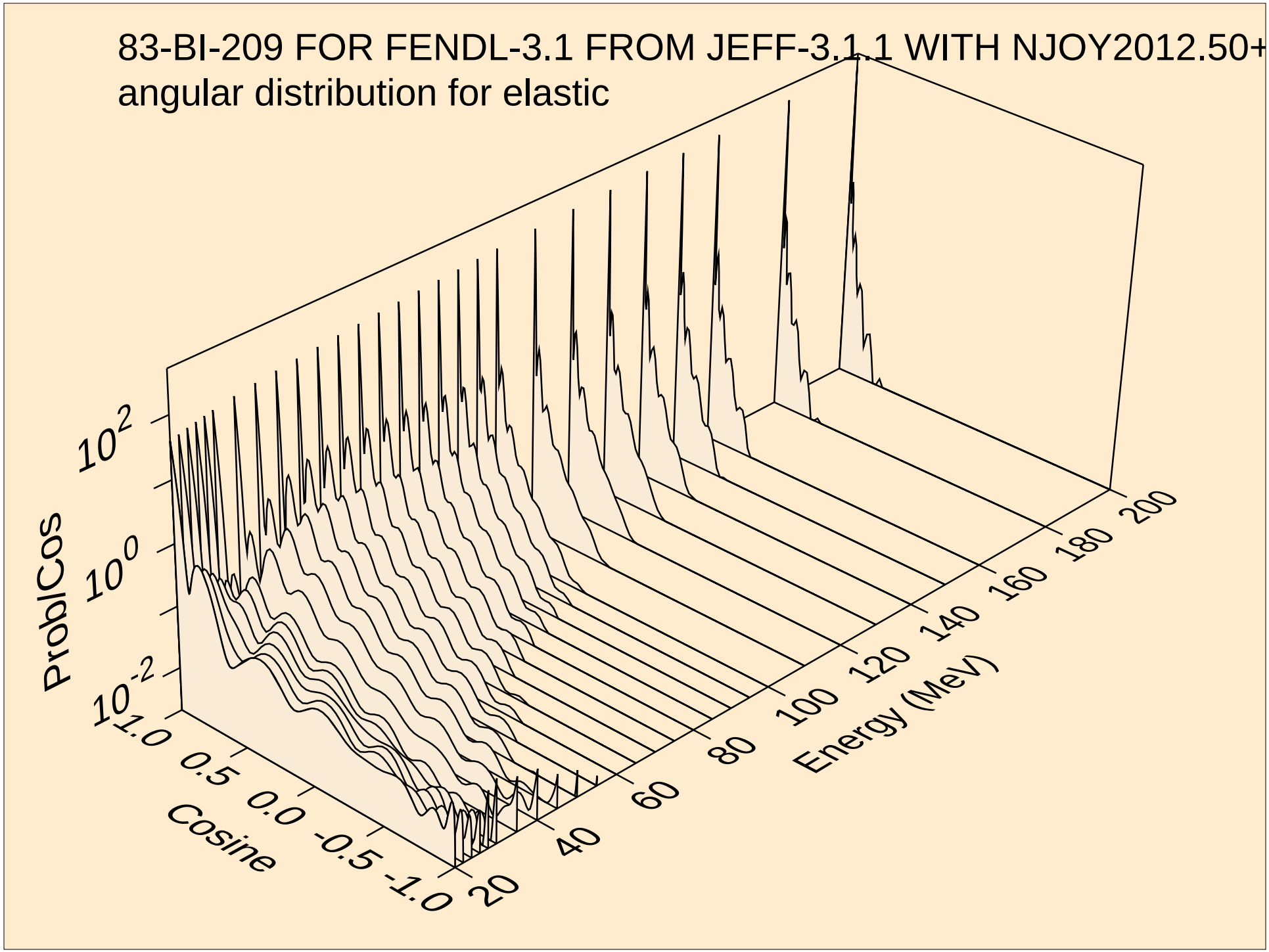

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
10
*10-3
8
6
4
2
0
Cross section (barns)
(n,d*4)
(n,d*5)
(n,d*c)
(n,t*0)
(n,t*1)
4
6
8
10
12
14
16
18
20
Energy (MeV)

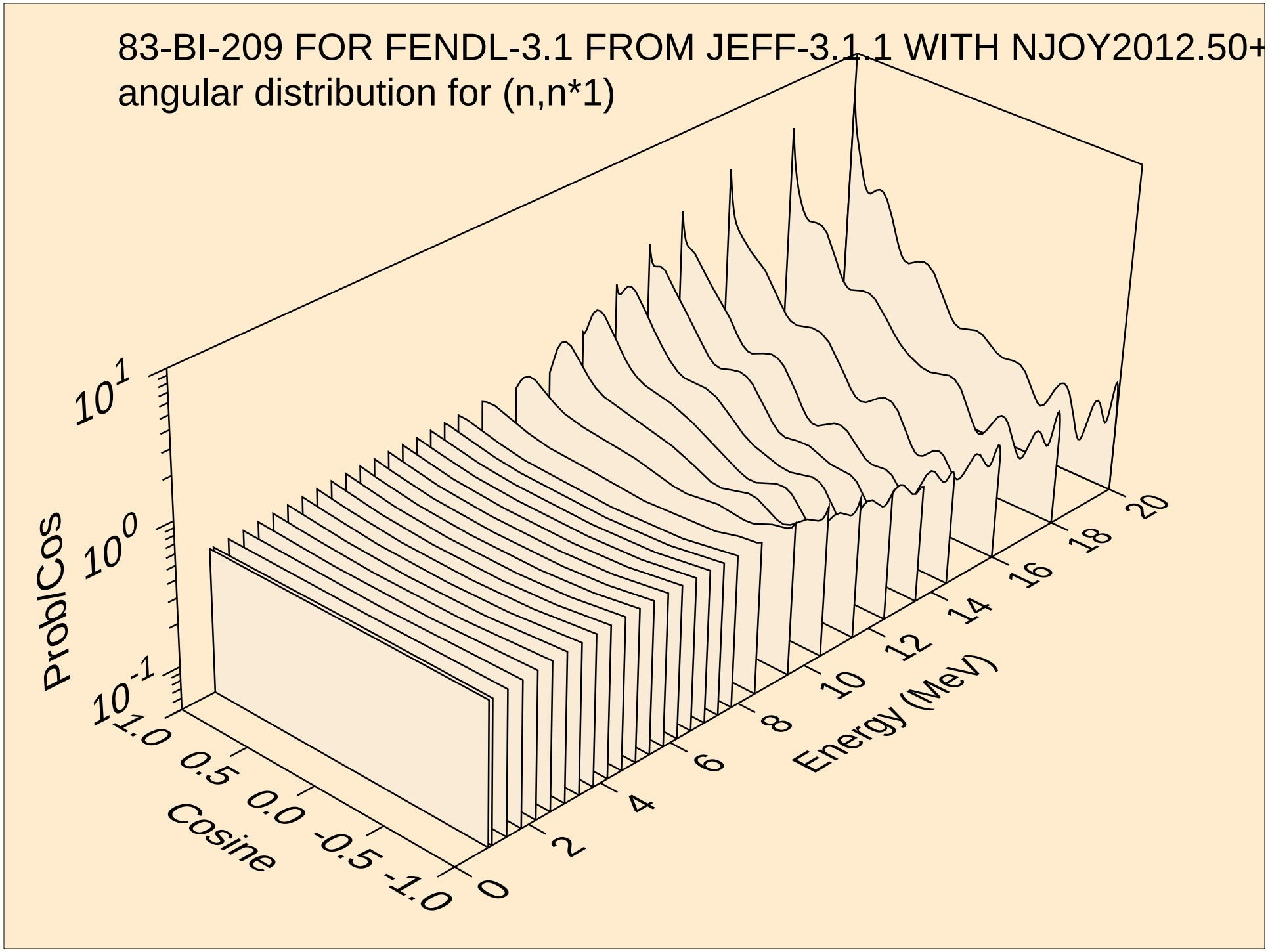

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
*10-3
Cross section (barns)
Energy (MeV)
(n,t*2)
(n,t*3)
(n,t*4)
(n,t*5)
(n,t*c)
0
1
2
3
4
5
6
7
8
4
6
8
10
12
14
16
18
20

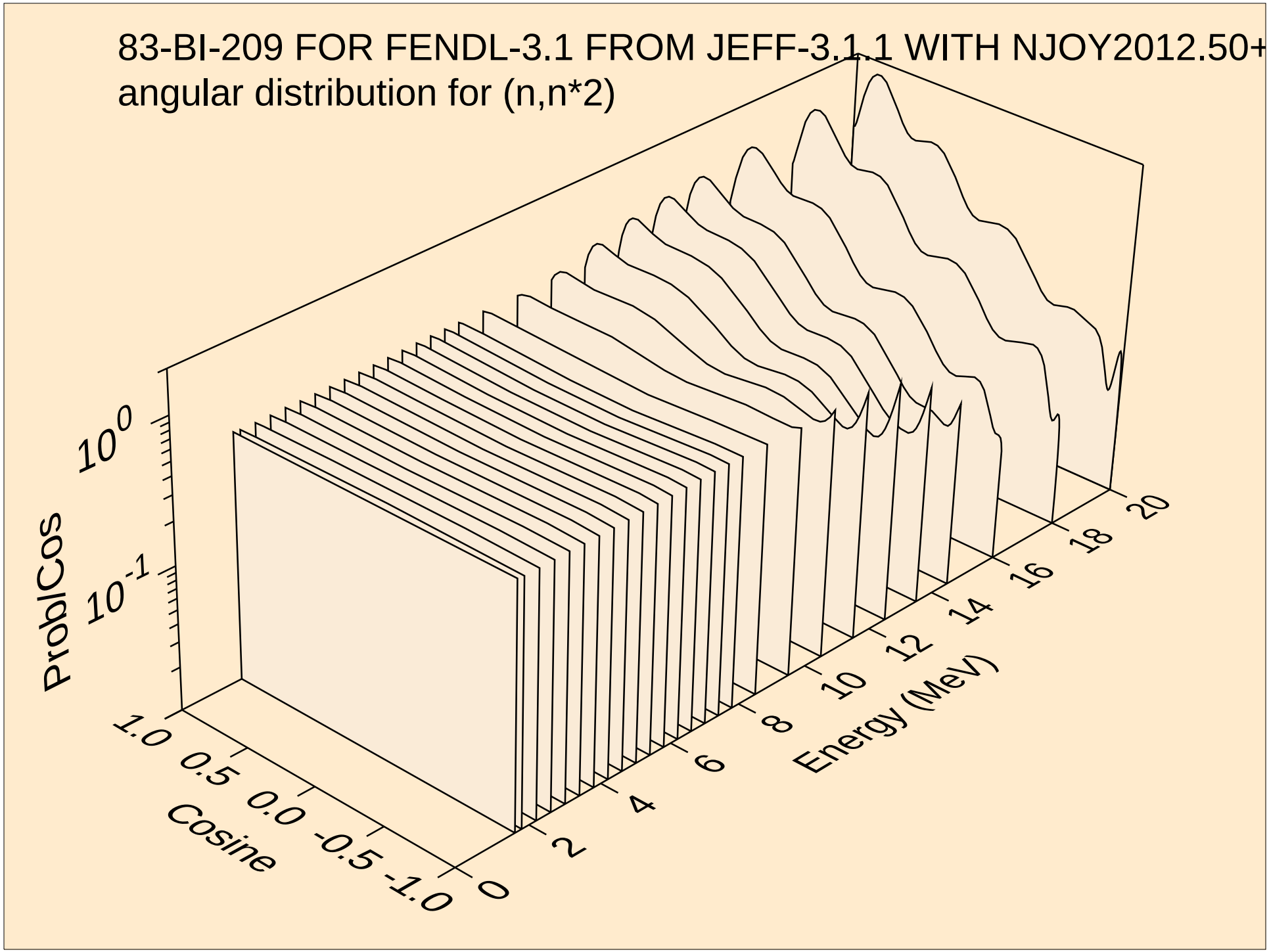

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
*10-9
12
10
8
6
4
2
0
Cross section (barns)
(n,he3*0)
(n,he3*1)
(n,he3*2)
(n,he3*3)
(n,he3*4)
10
12
14
16
18
20
Energy (MeV)

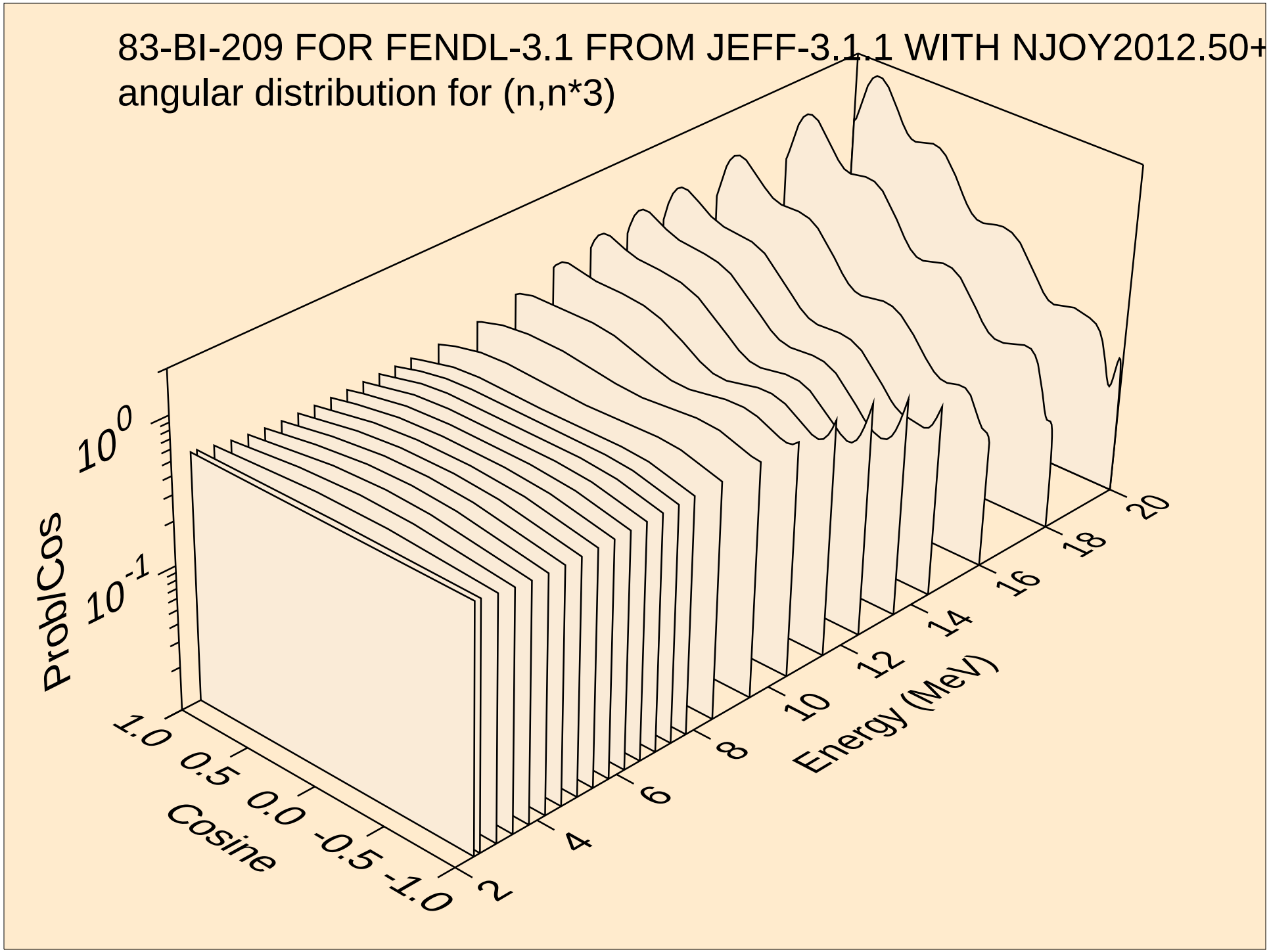

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Threshold reactions
1400
*10-12
1200
1000
800
600
400
200
0
(n,he3*c)
Cross section (barns)
14
15
16
17
18
19
20
Energy (MeV)

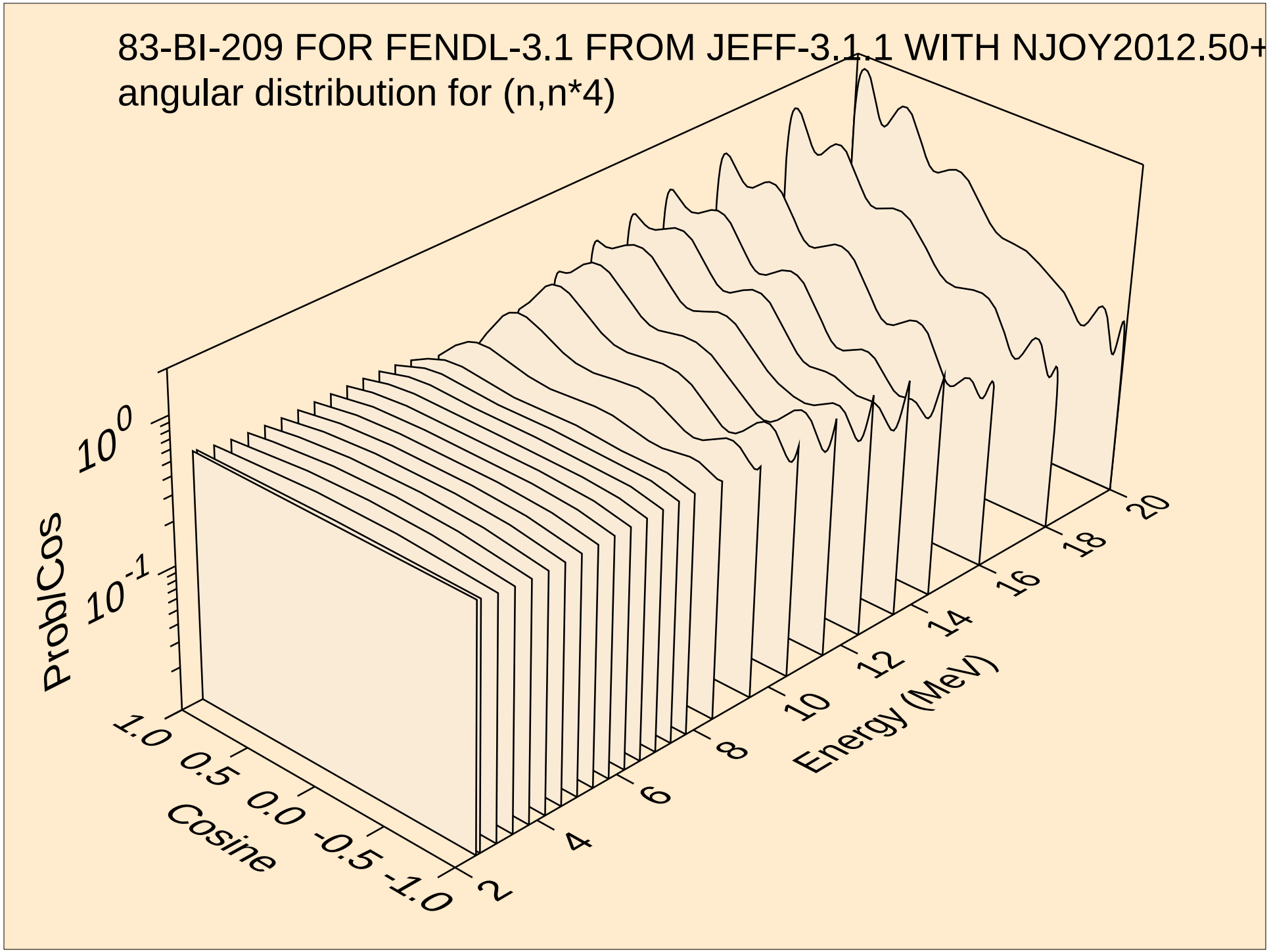

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for elastic
ProbICos
10^{0}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

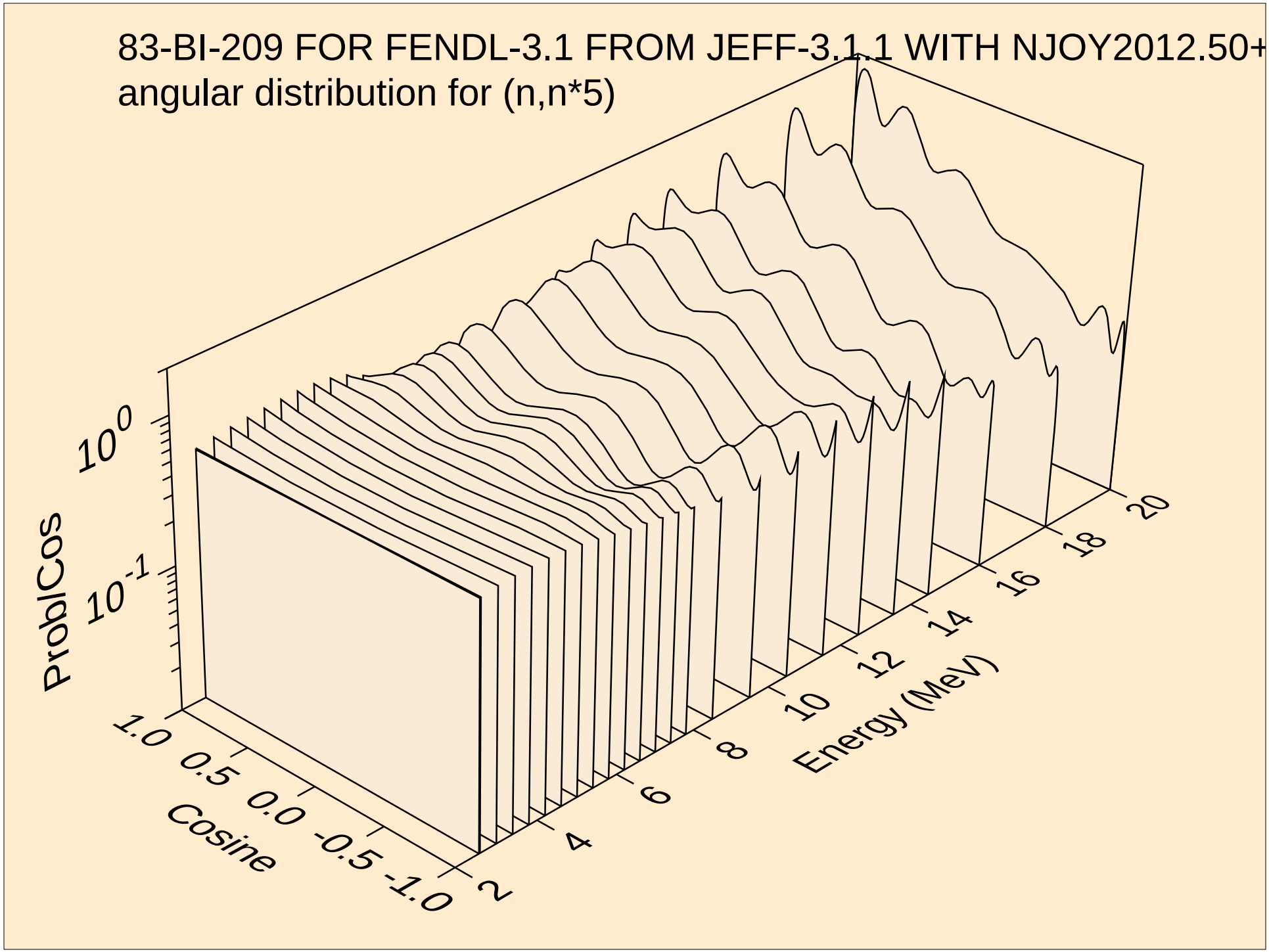

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for elastic
ProblCos
10^{2}
10^{0}
10^{-2}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
20
40
60
80
100
120
140
160
180
200

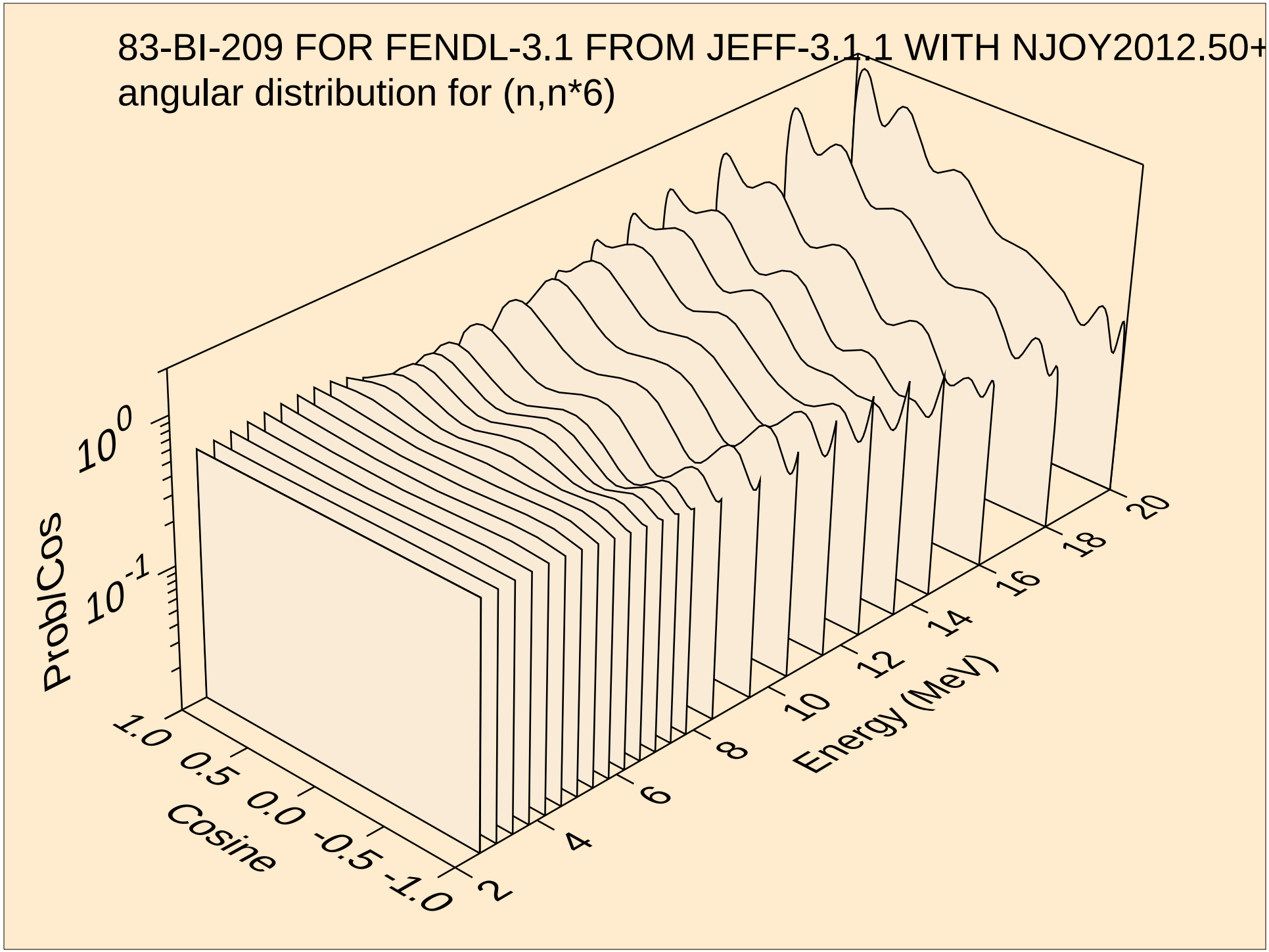

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*1)
ProblCos
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

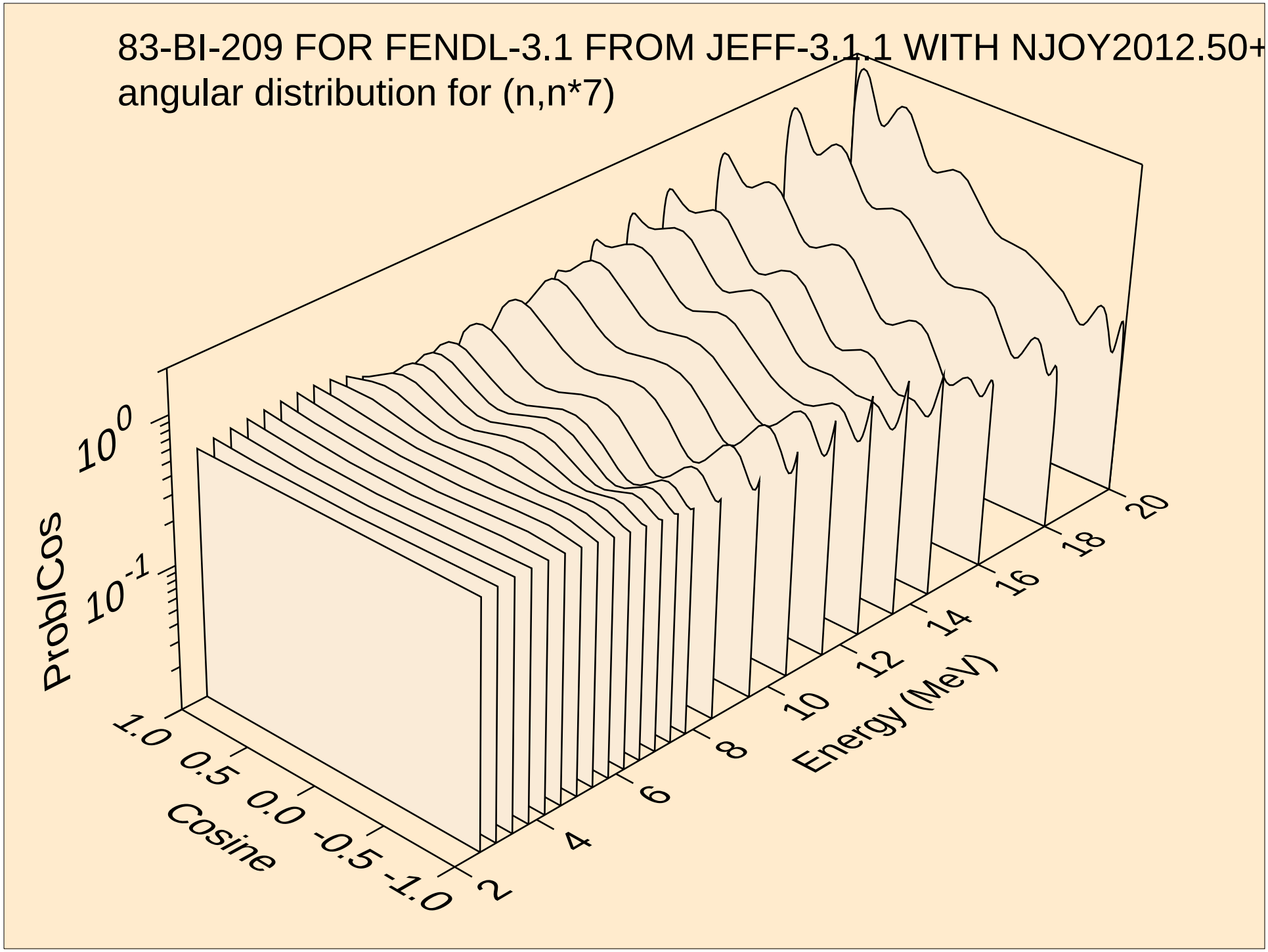

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*2)
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

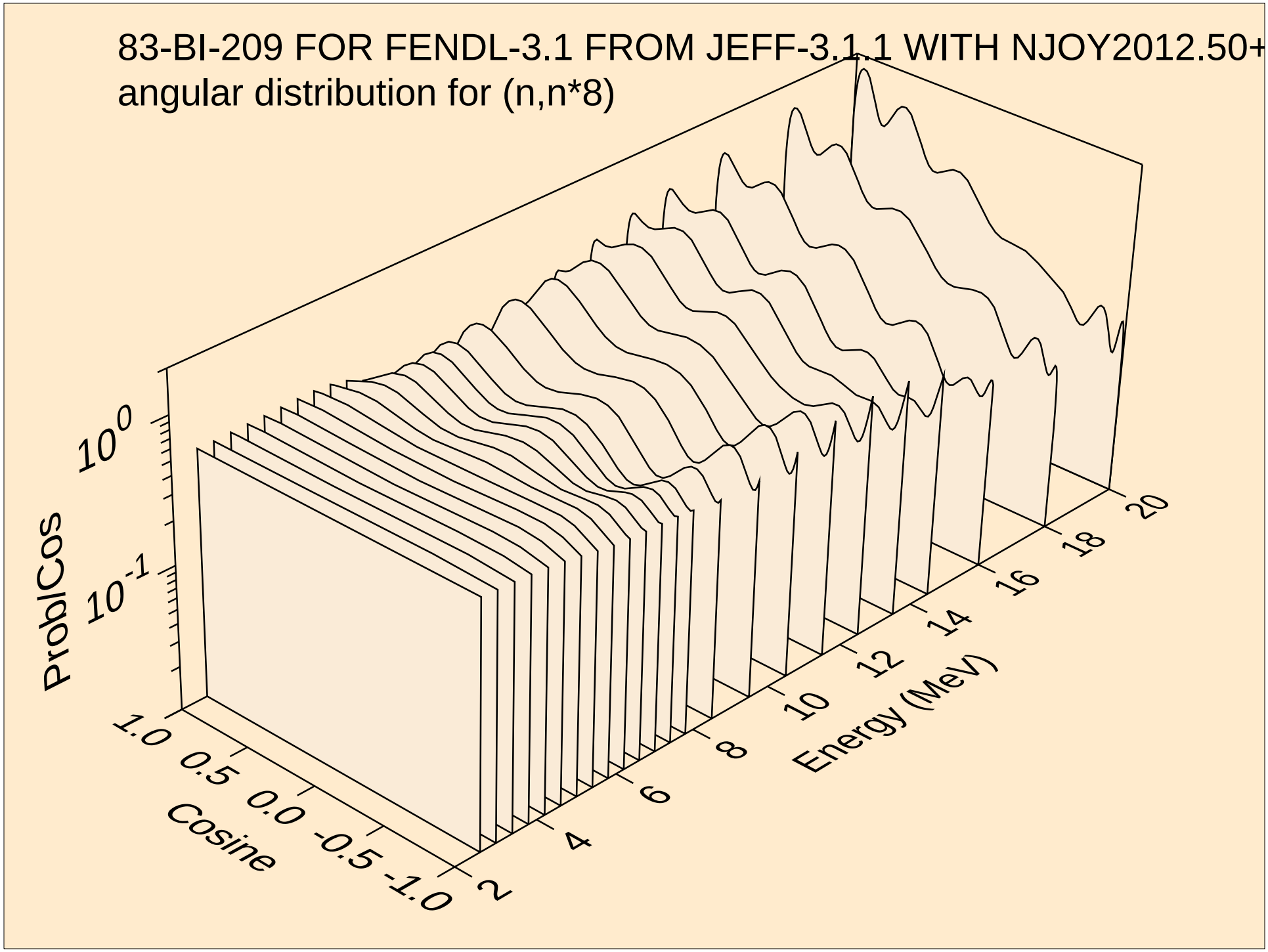

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*3)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

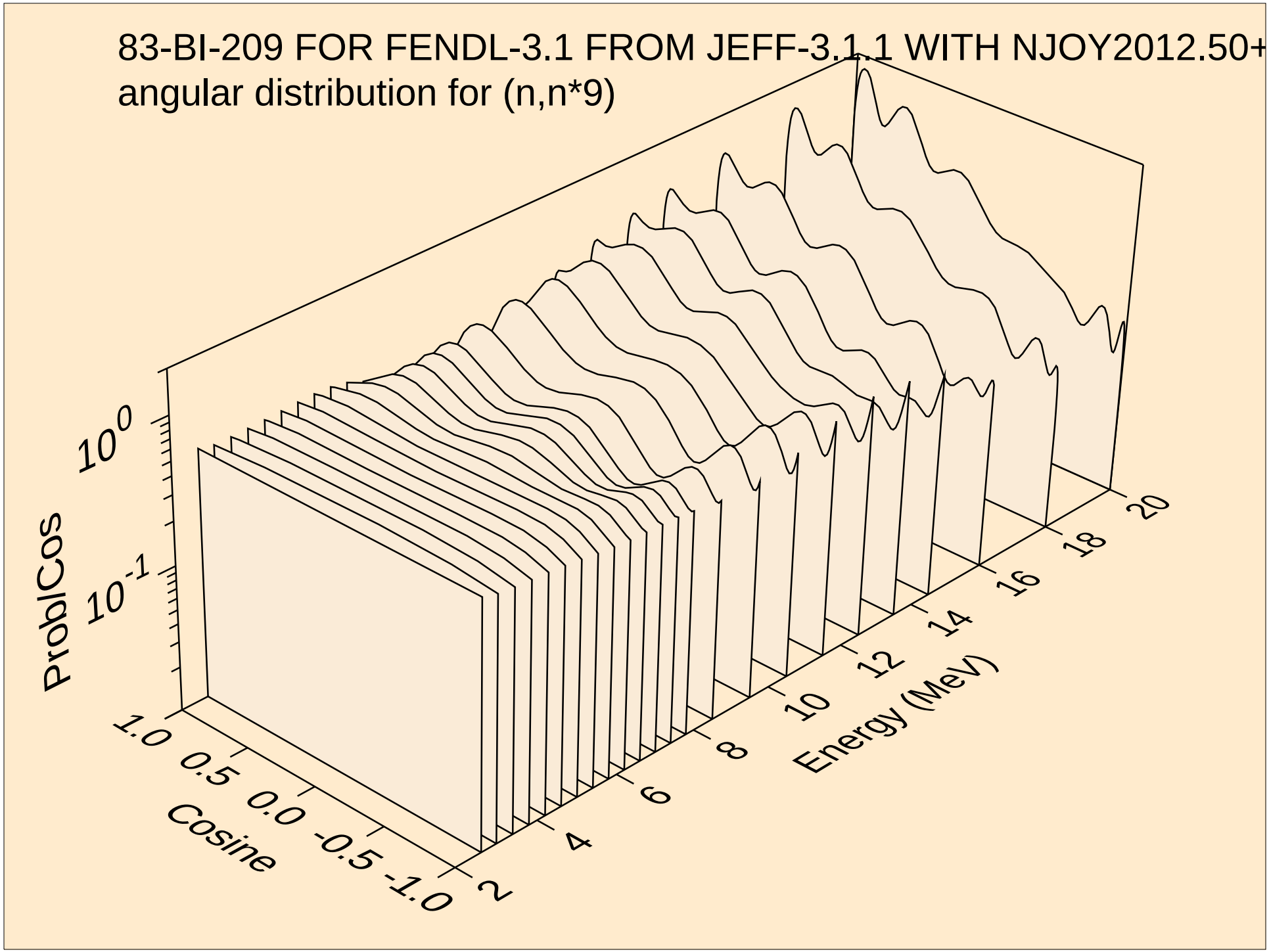

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*4)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

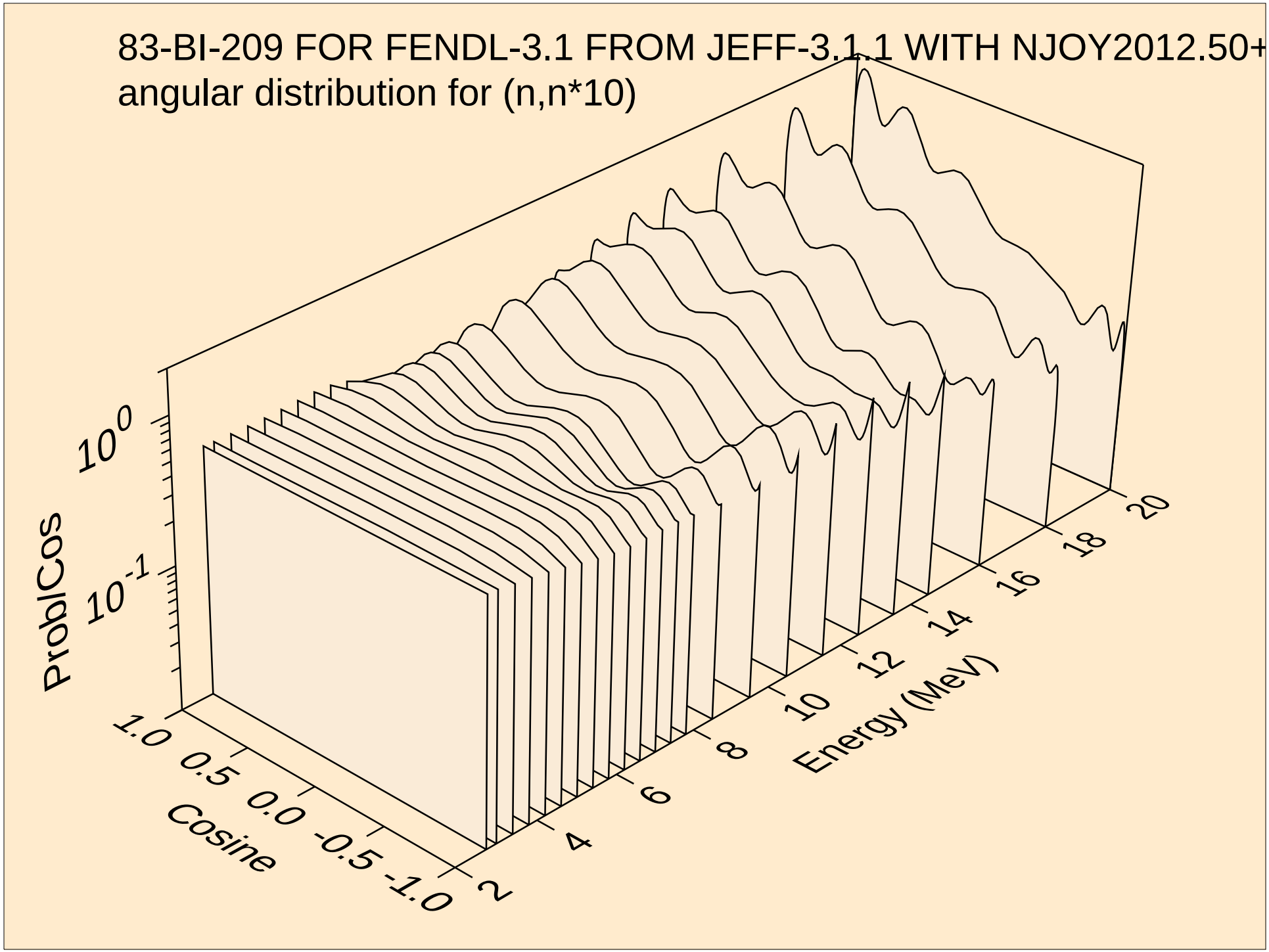

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*5)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

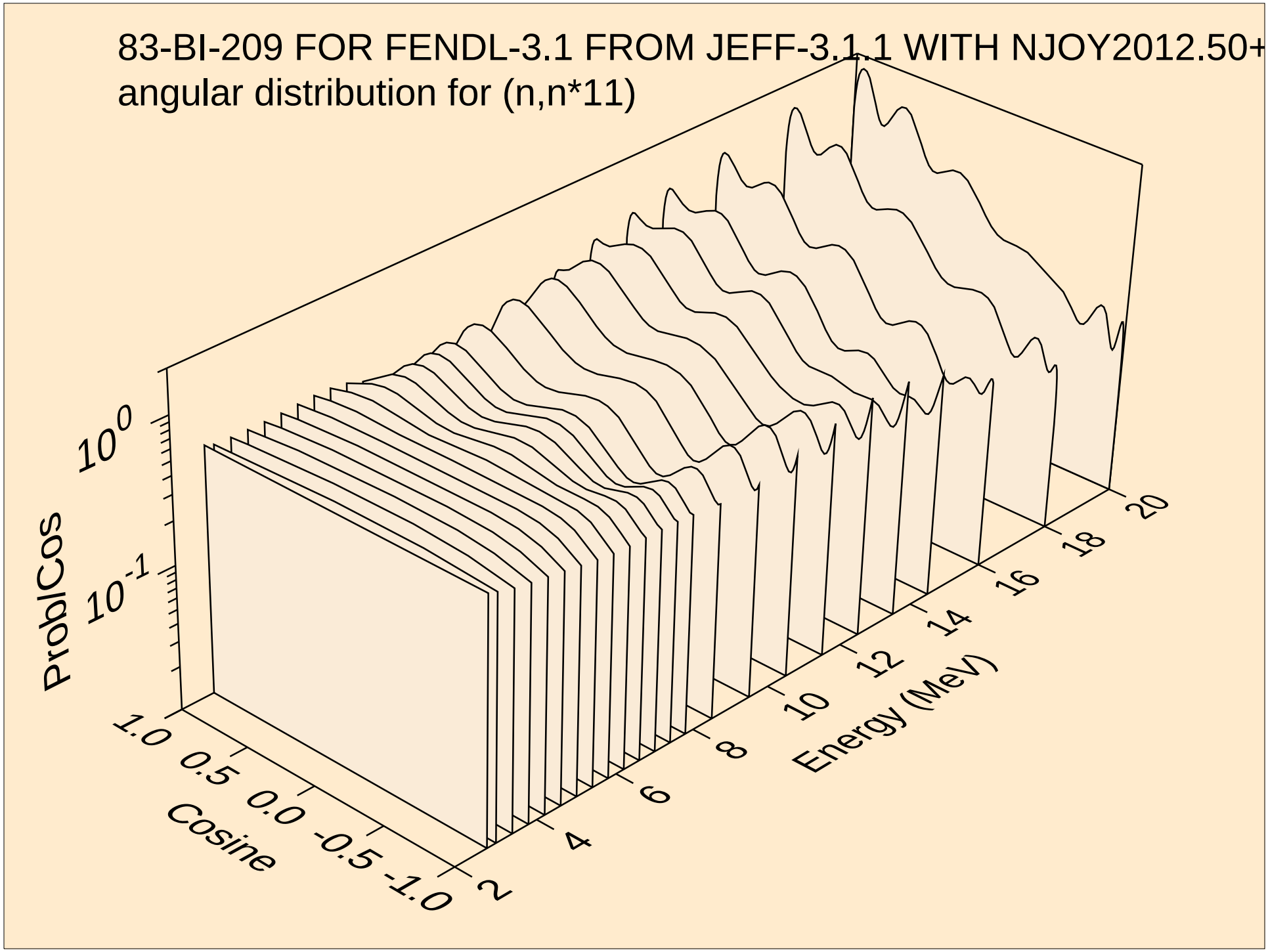

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*6)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

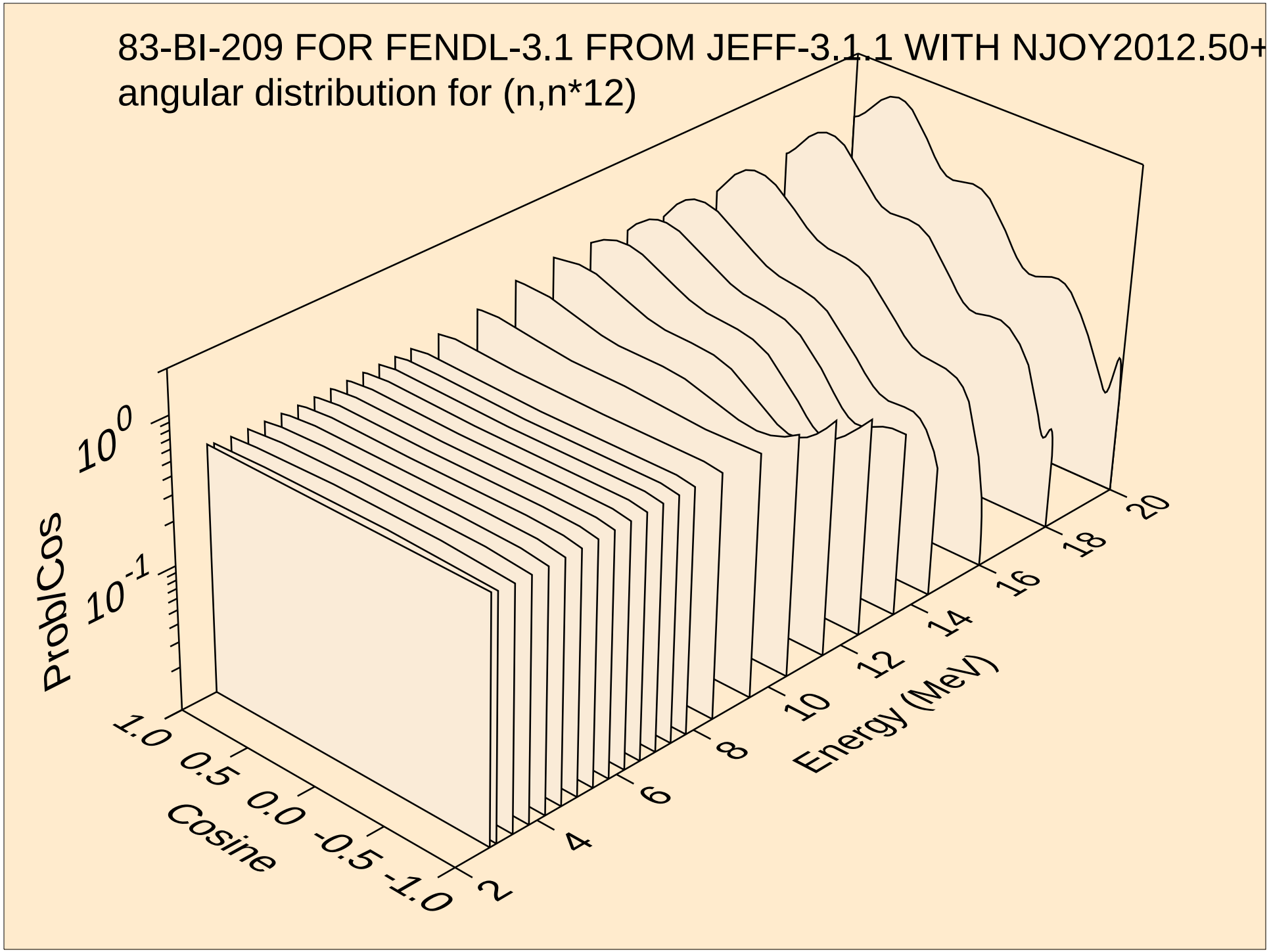

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*7)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

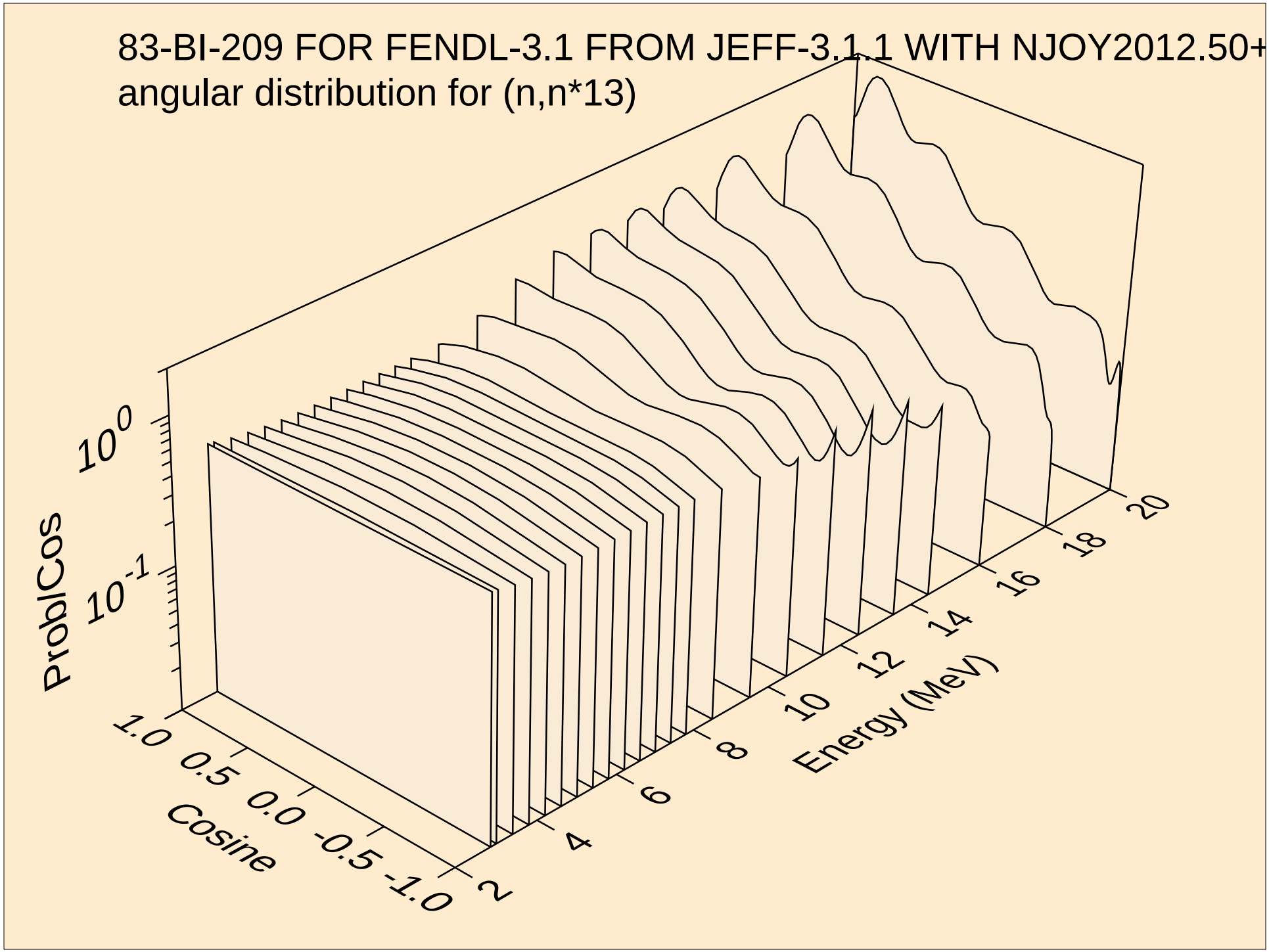

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*8)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

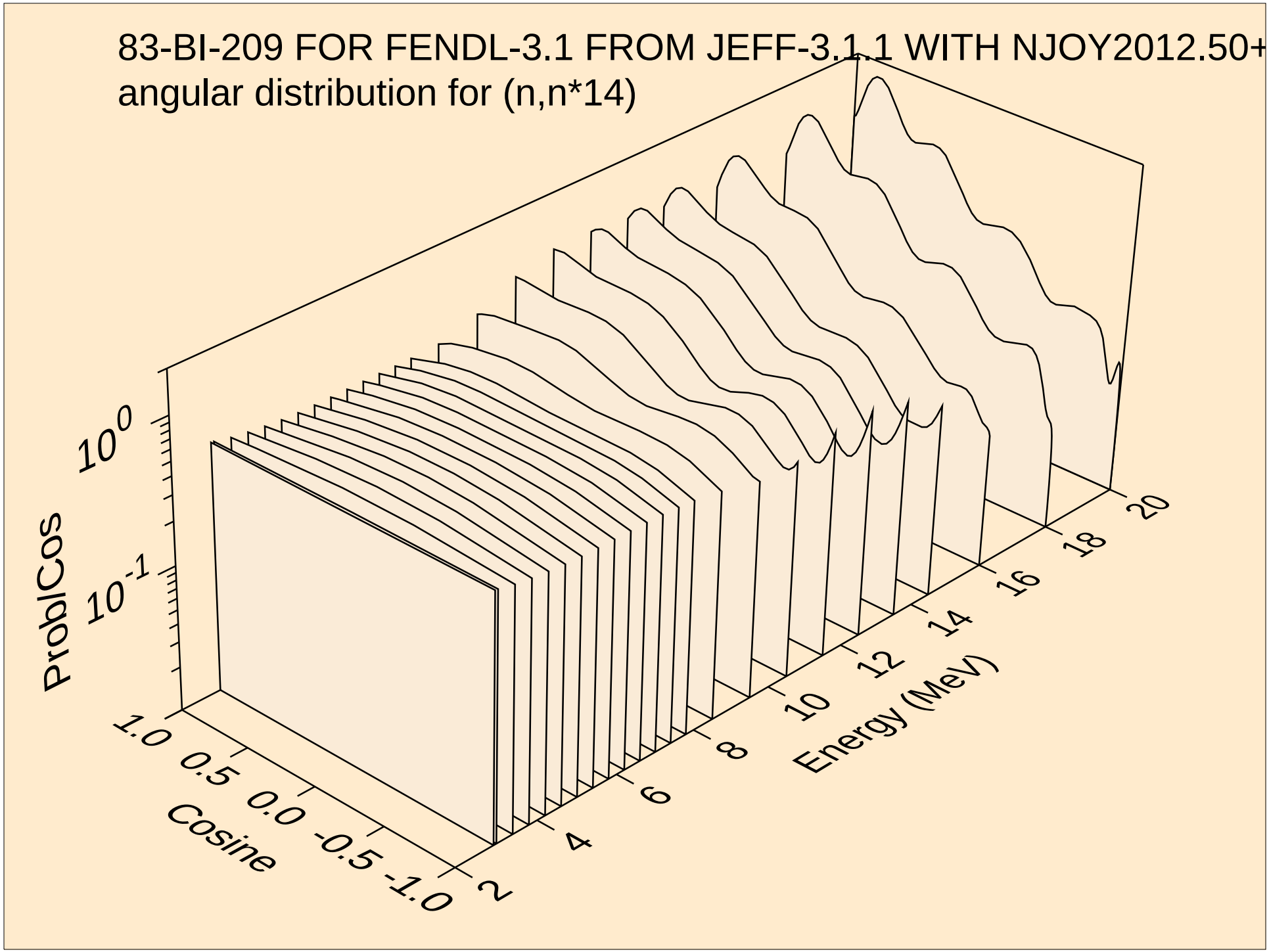

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*9)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

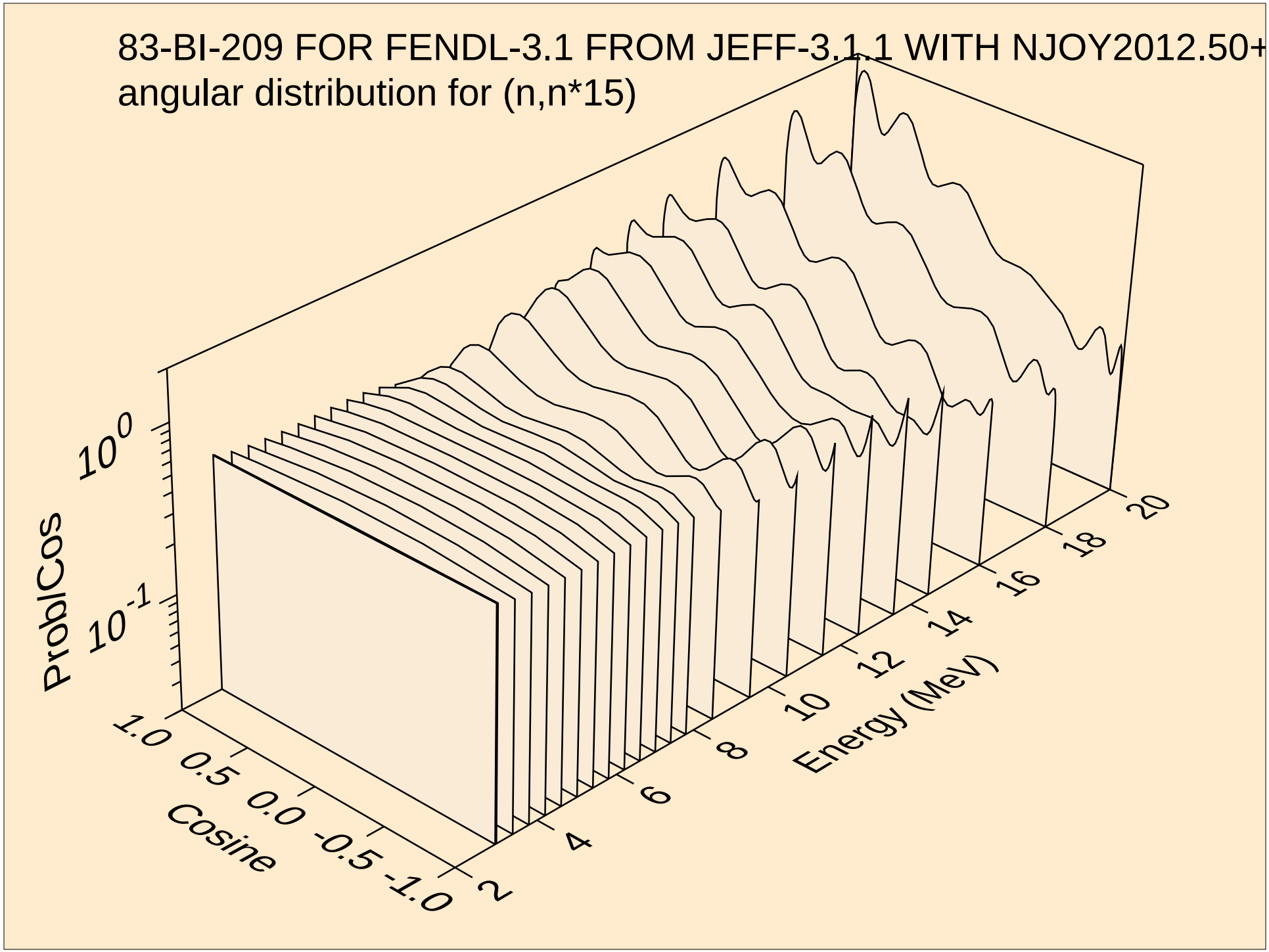

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*10)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

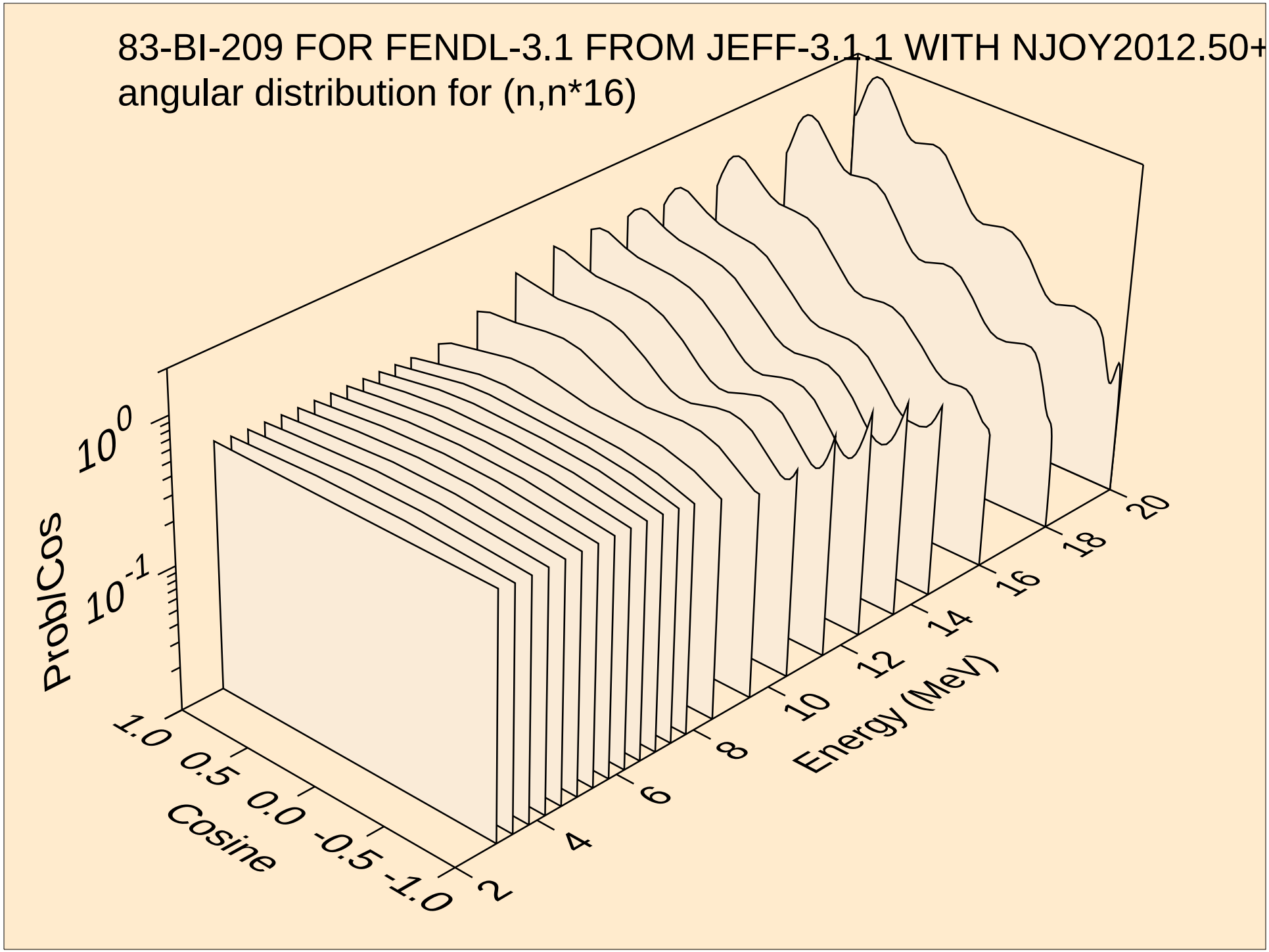

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*11)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

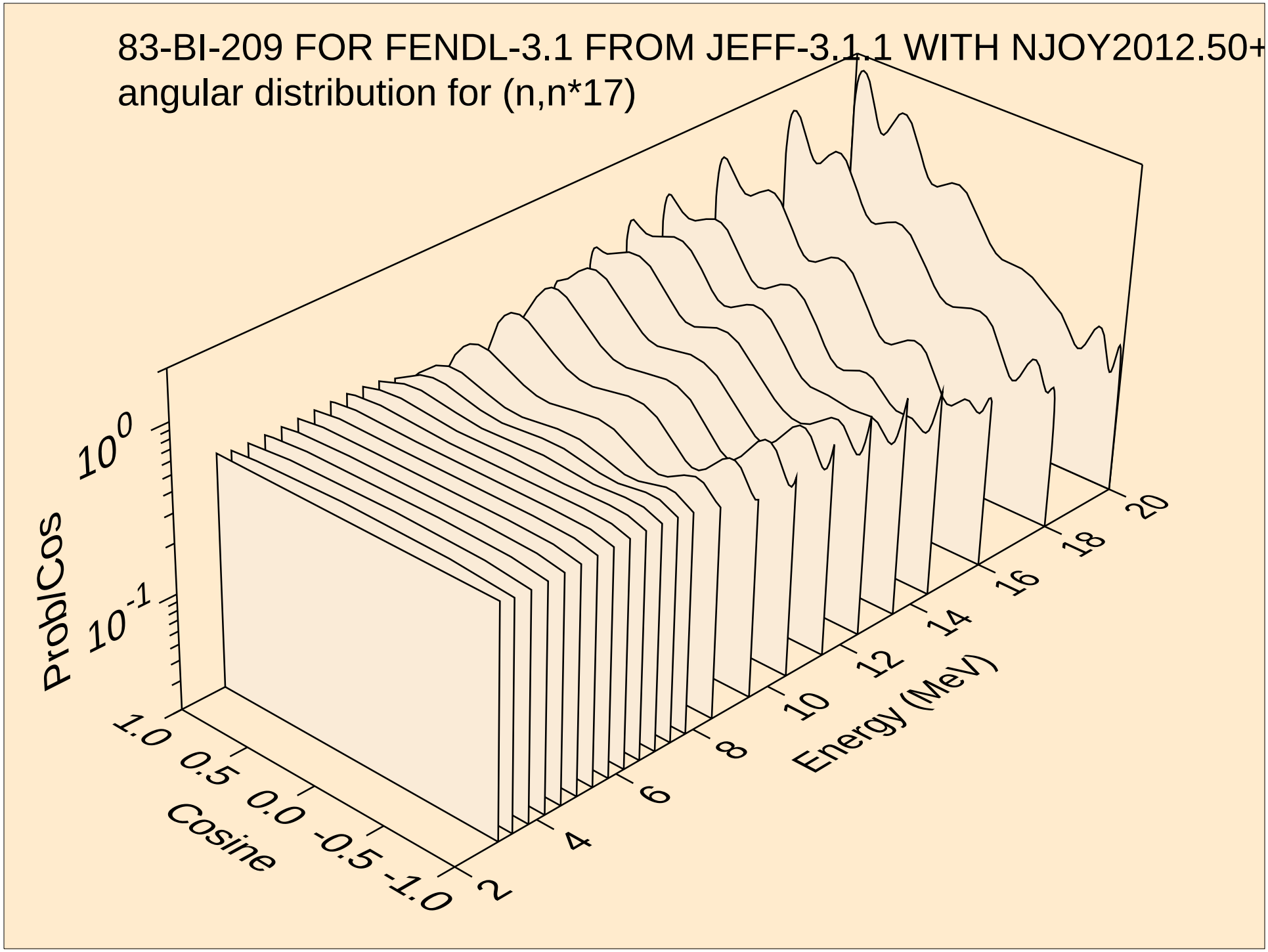

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*12)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

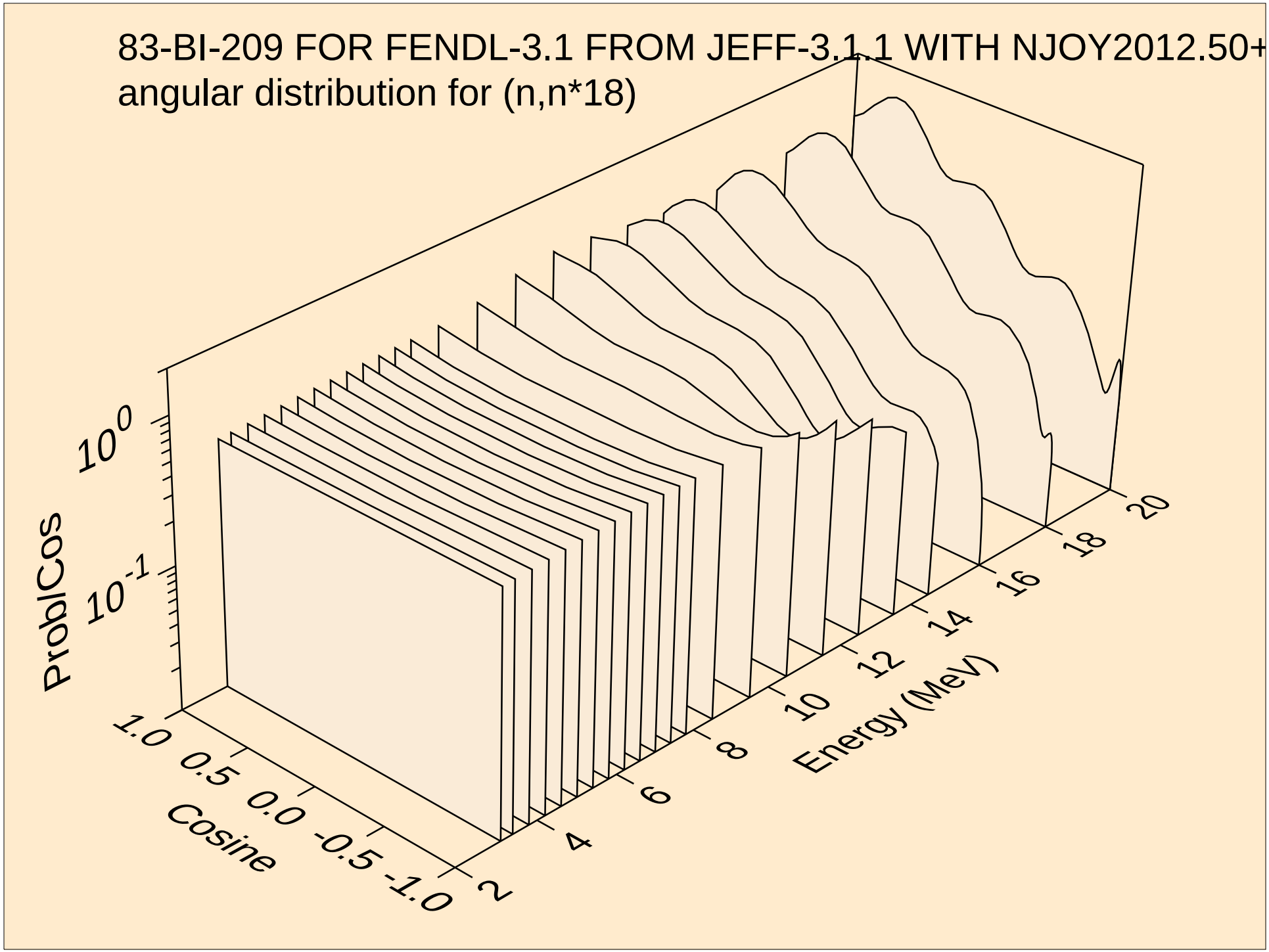

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*13)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

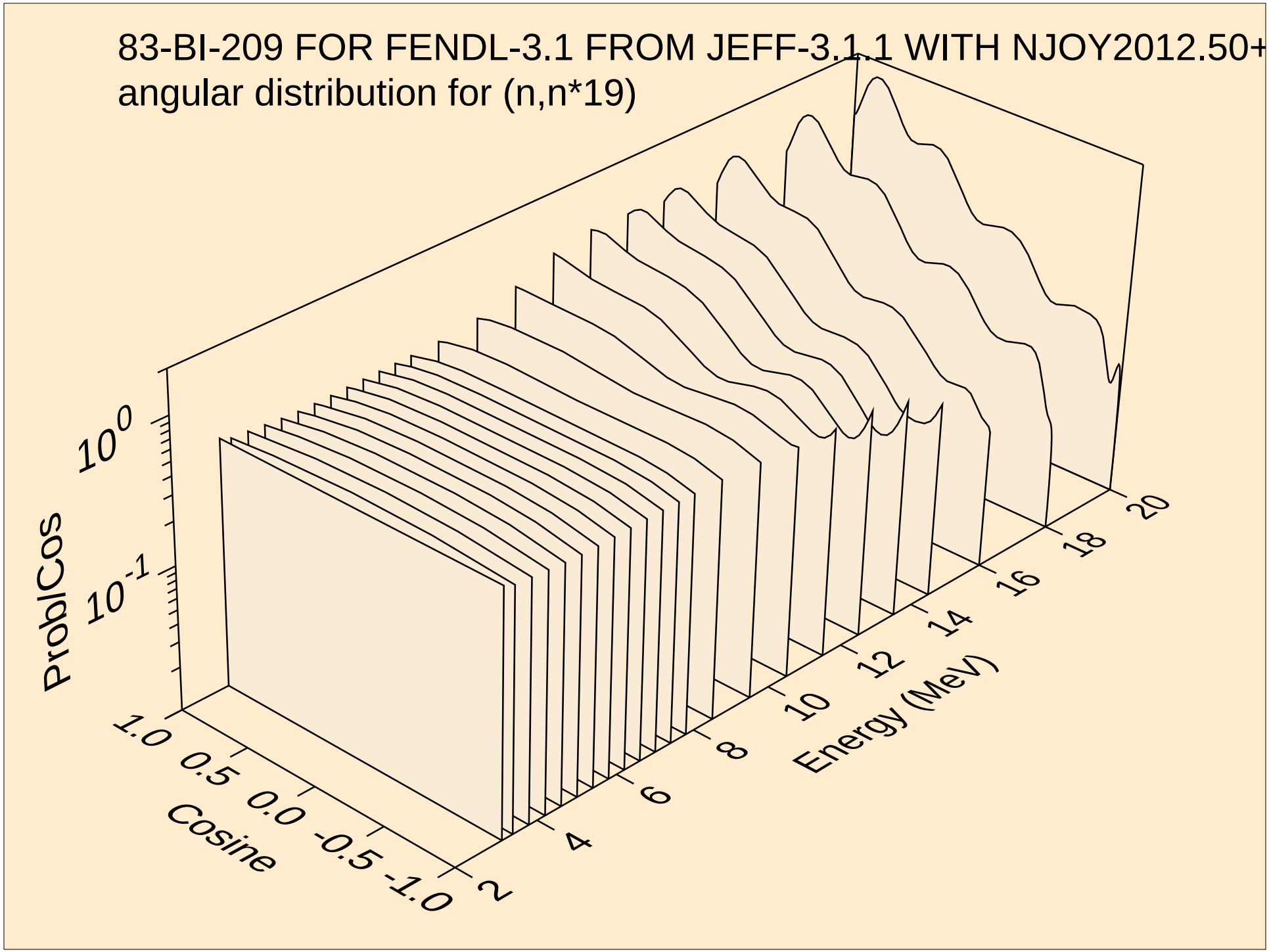

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*14)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

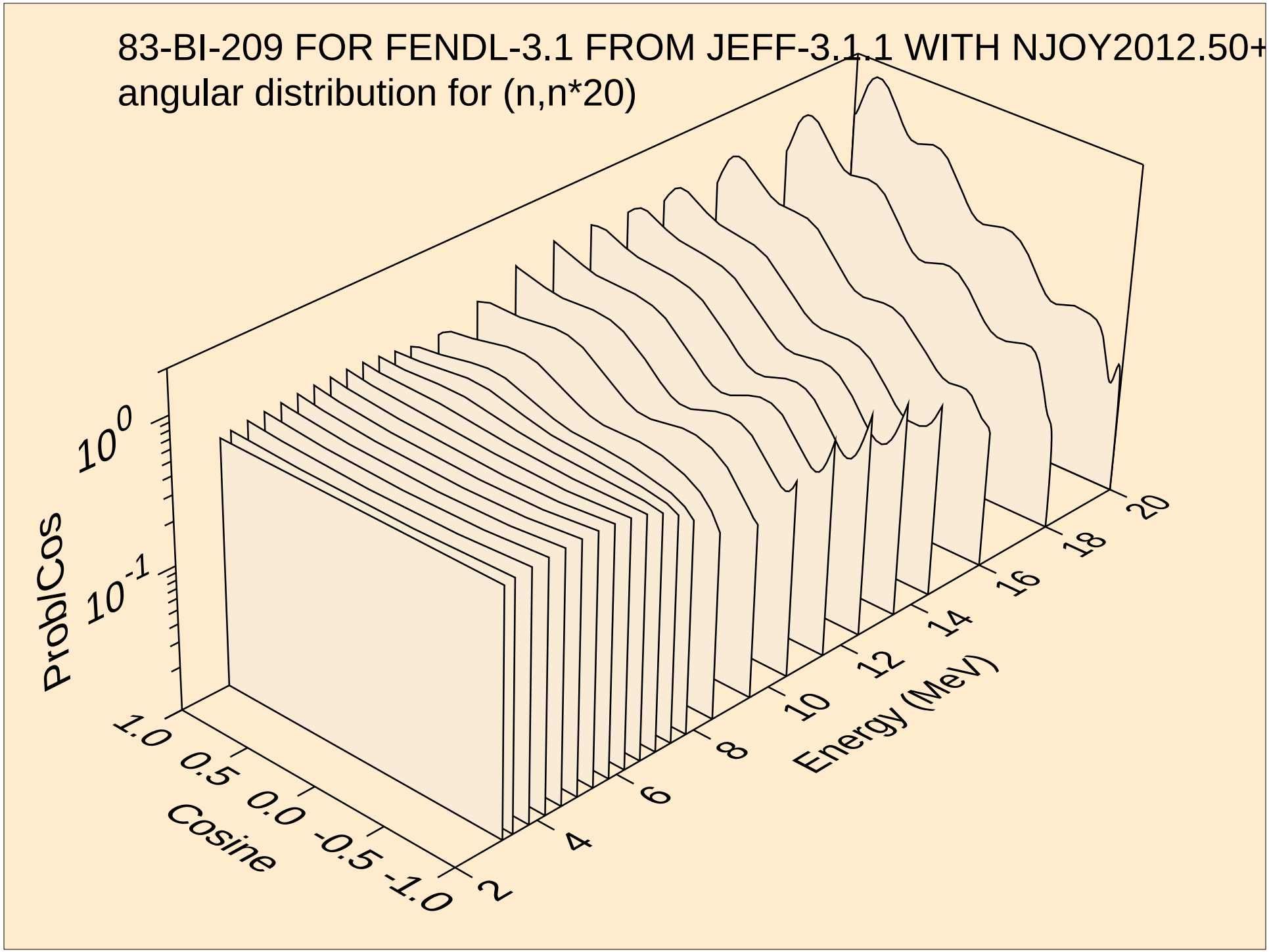

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*15)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

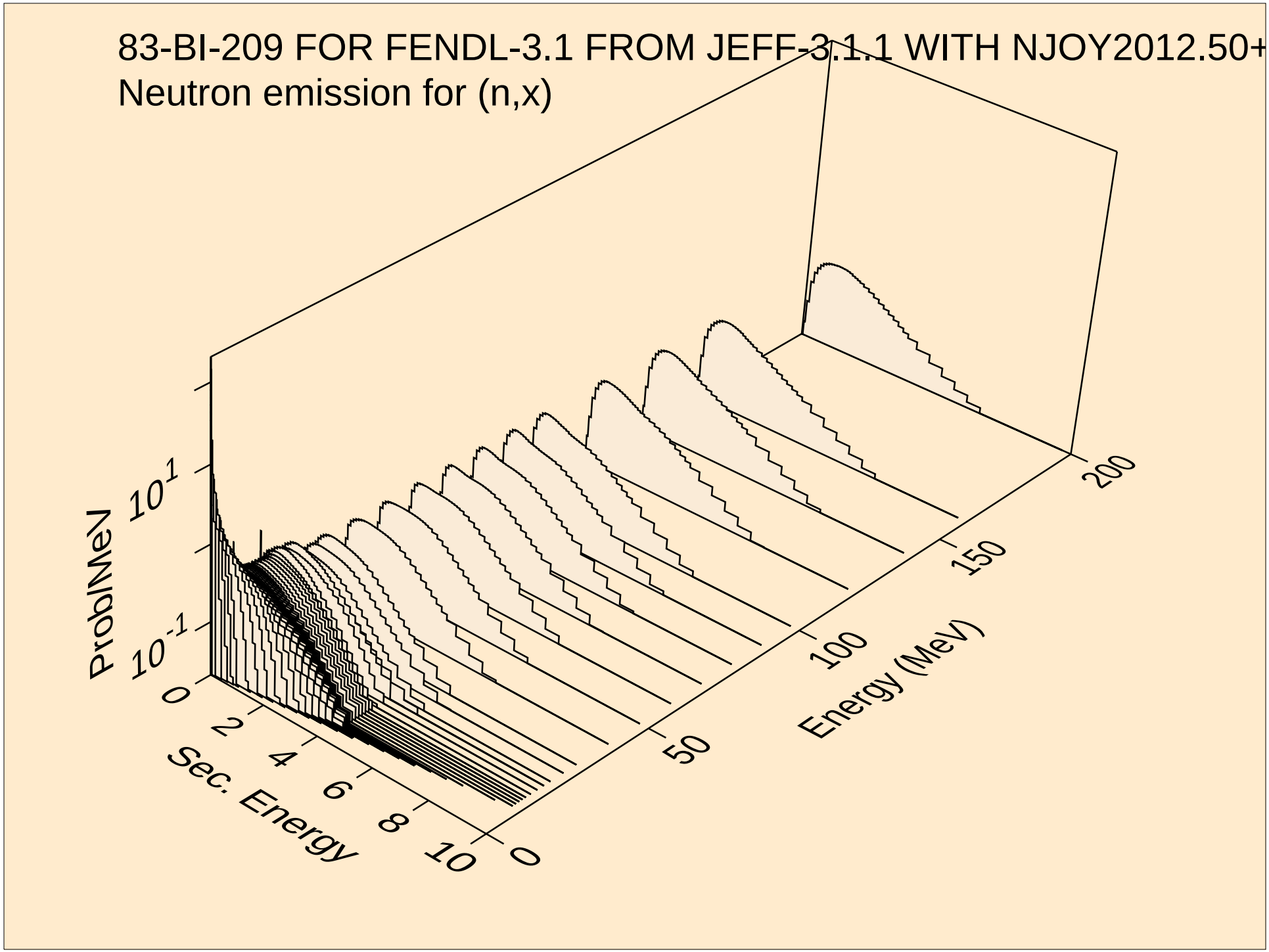

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*16)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

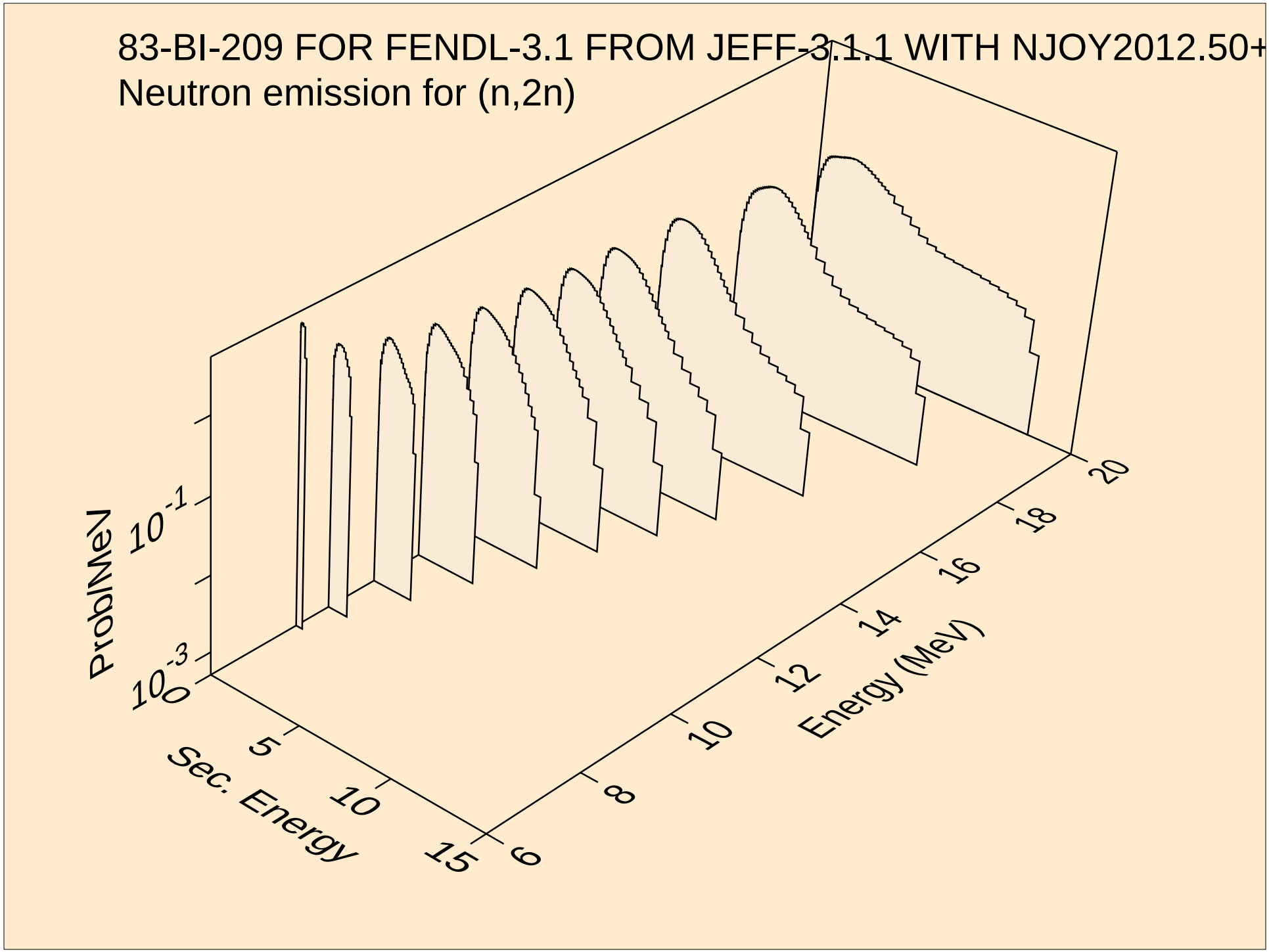

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*17)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

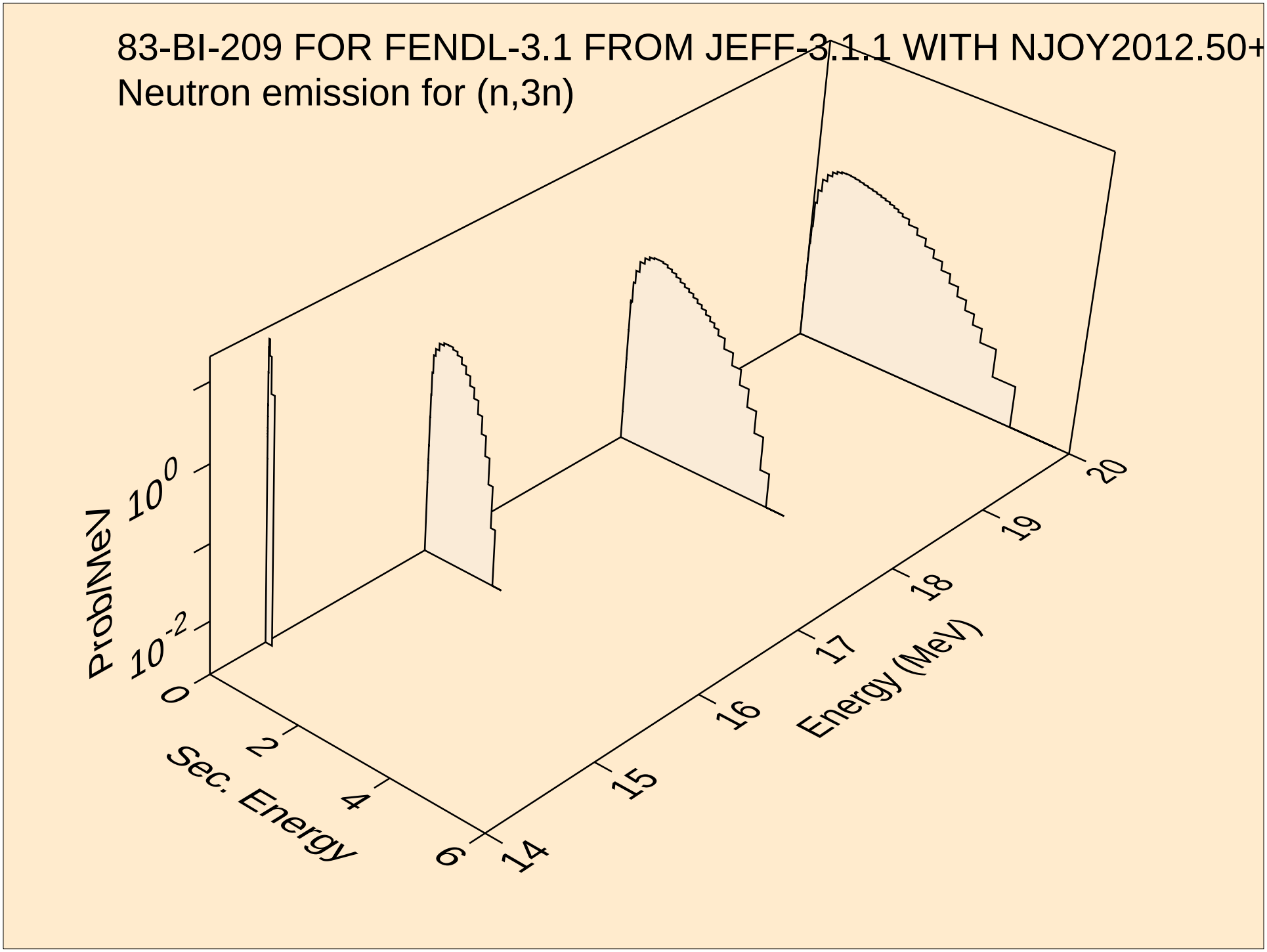

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*18)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

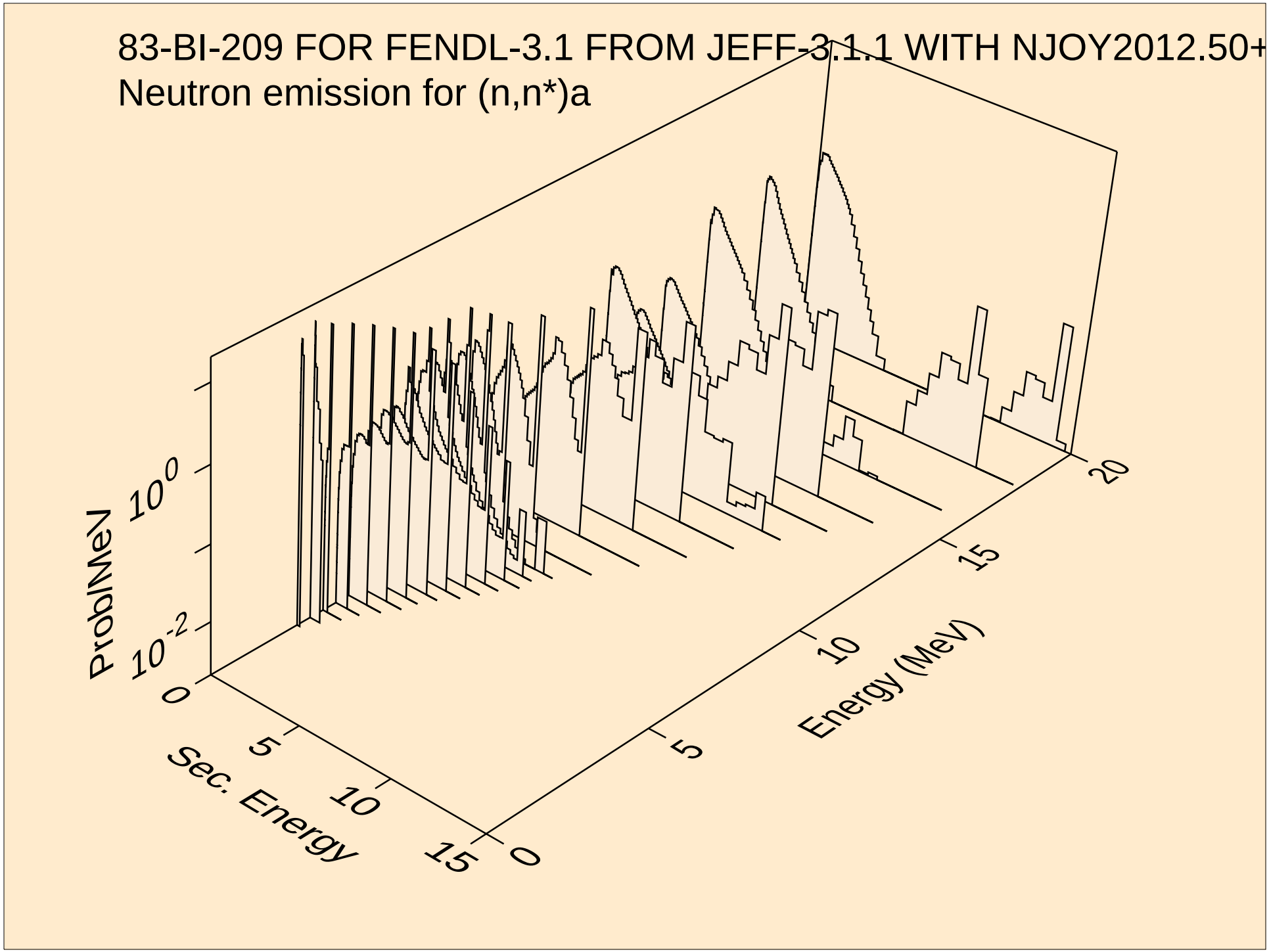

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*19)
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

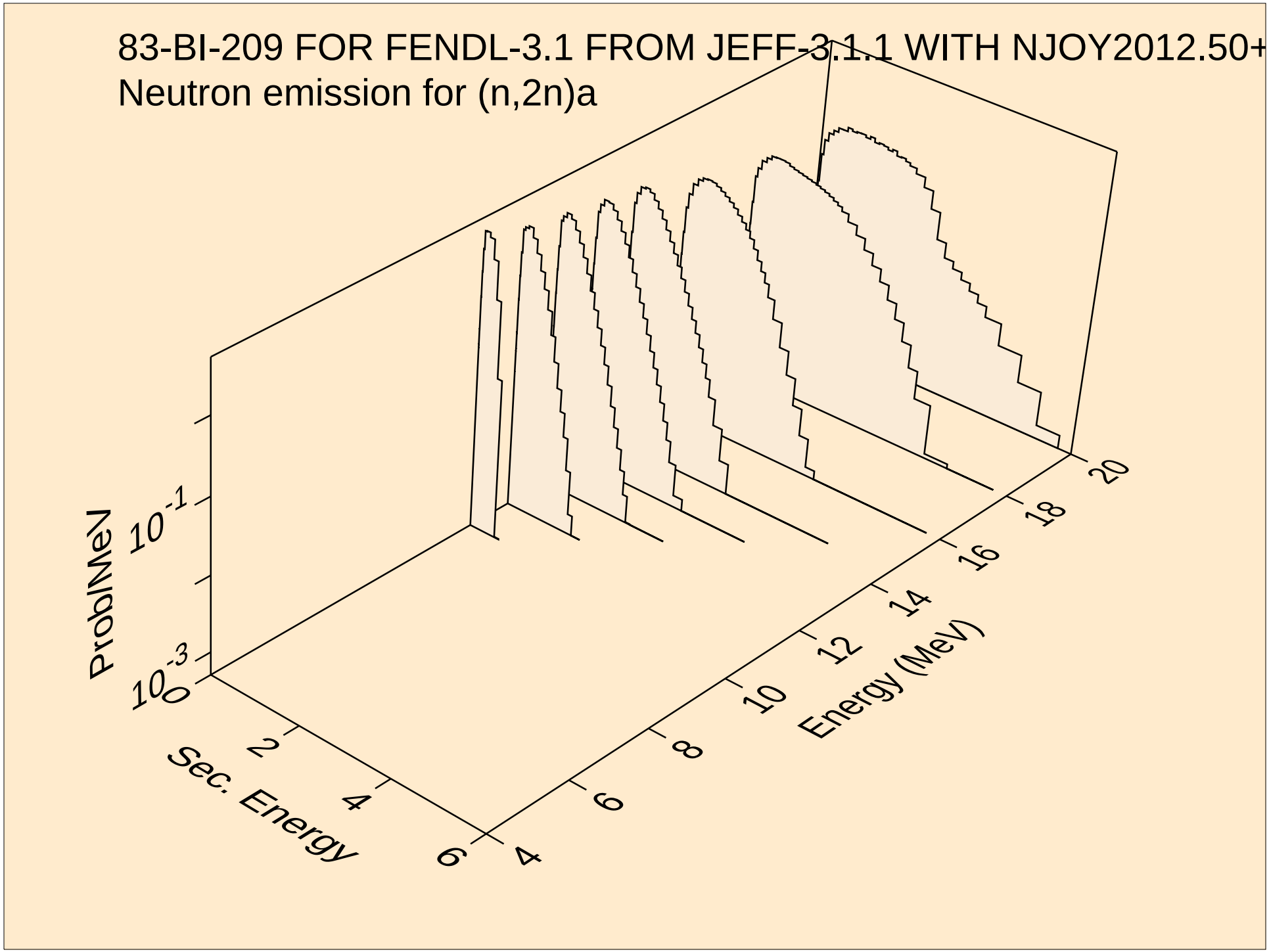

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,n*20)
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

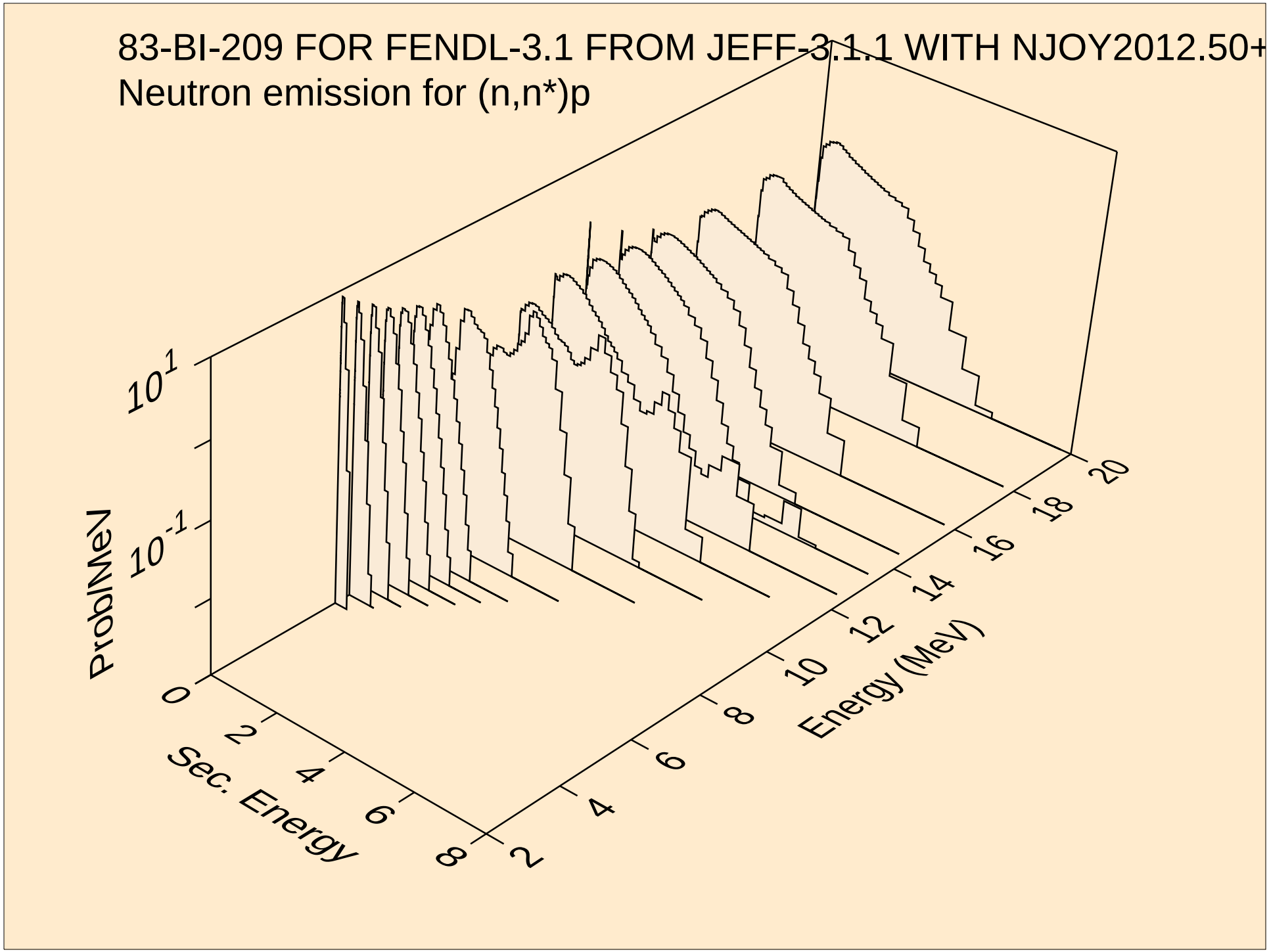

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,x)
Prob/MeV
10^1
10^-1
0
2
4
6
8
10
Sec. Energy
0
50
100
150
200
Energy (MeV)

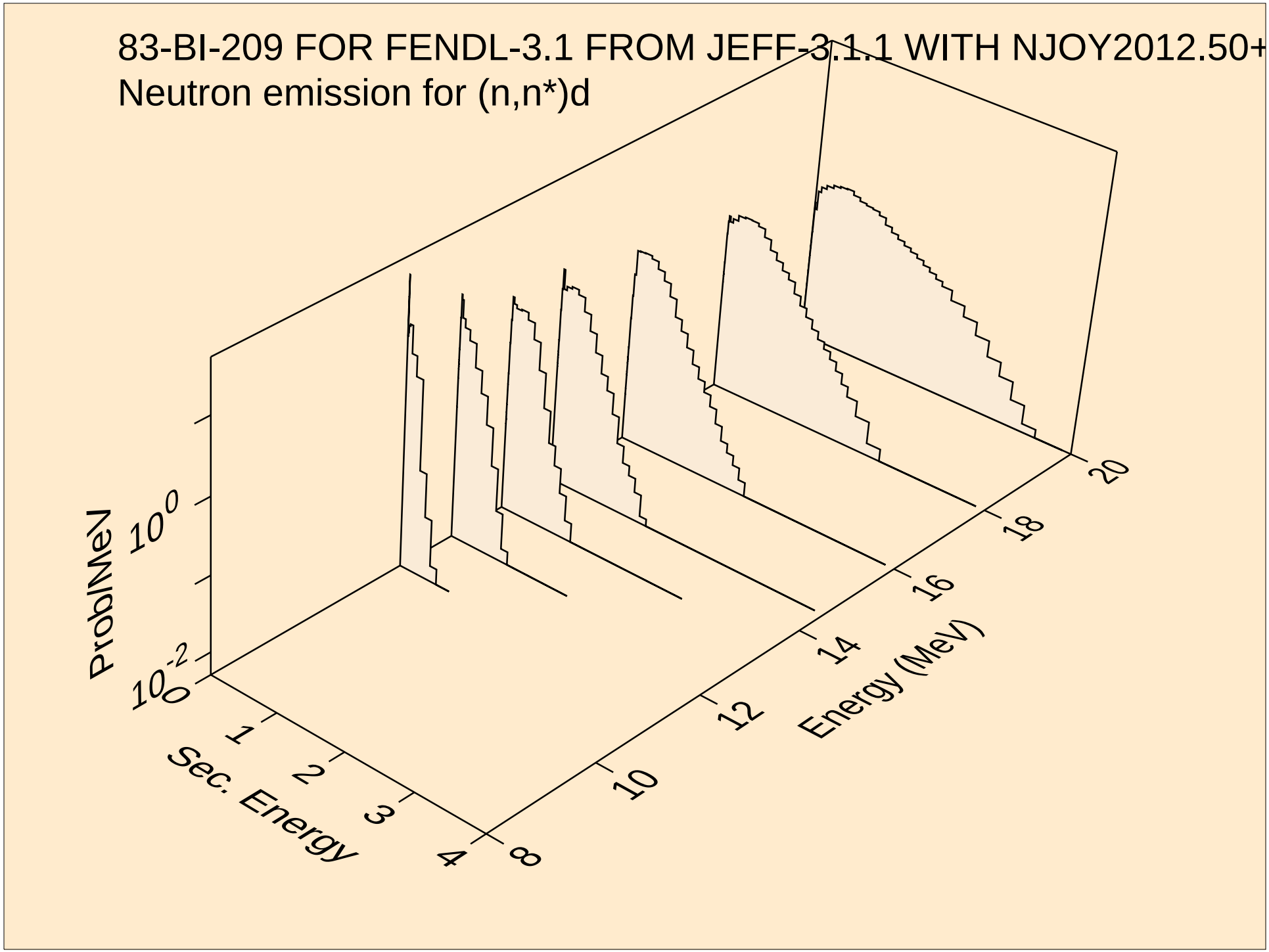

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,2n)
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

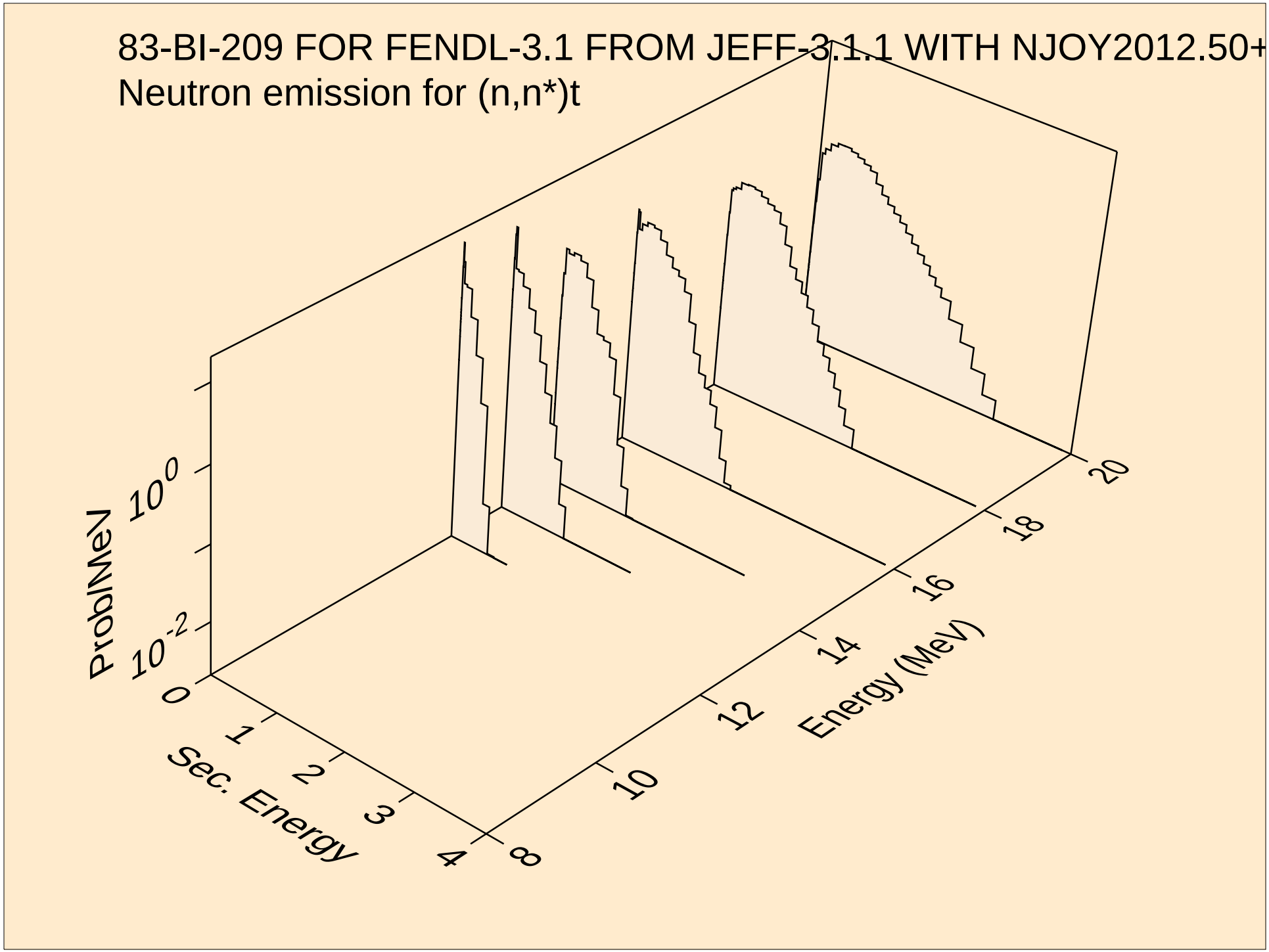

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,3n)
Prob/MeV
10^0
10^-2
0
2
4
6
Sec. Energy
14
15
16
17
18
19
20
Energy (MeV)

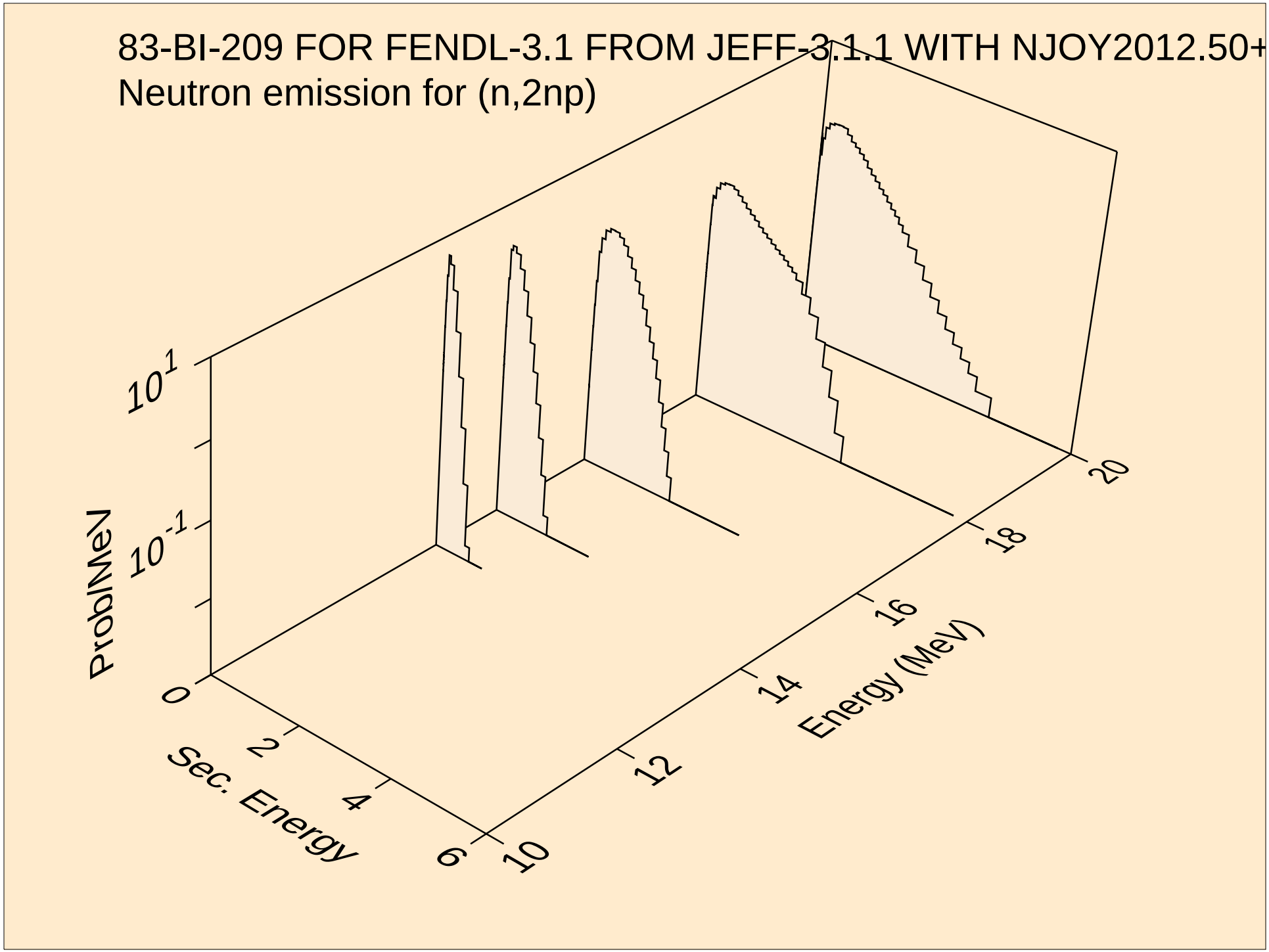

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,n*)a
Prob/MeV
10^0
10^-2
0
5
10
15
Sec. Energy
0
5
10
15
20
Energy (MeV)

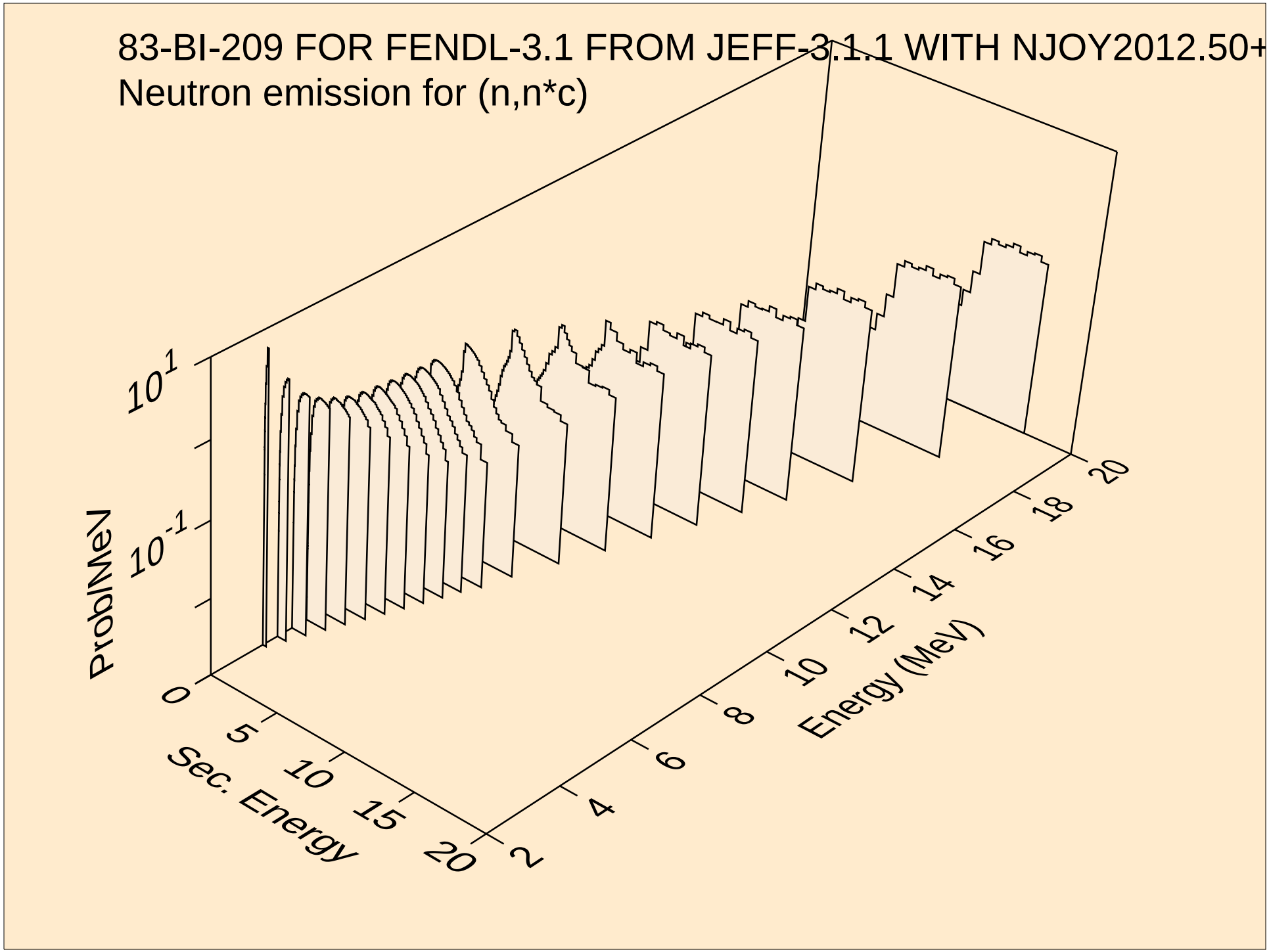

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,2n)a
Prob/MeV
10-1
10-3
0
2
4
6
Sec. Energy
4
6
8
10
12
14
16
18
20
Energy (MeV)

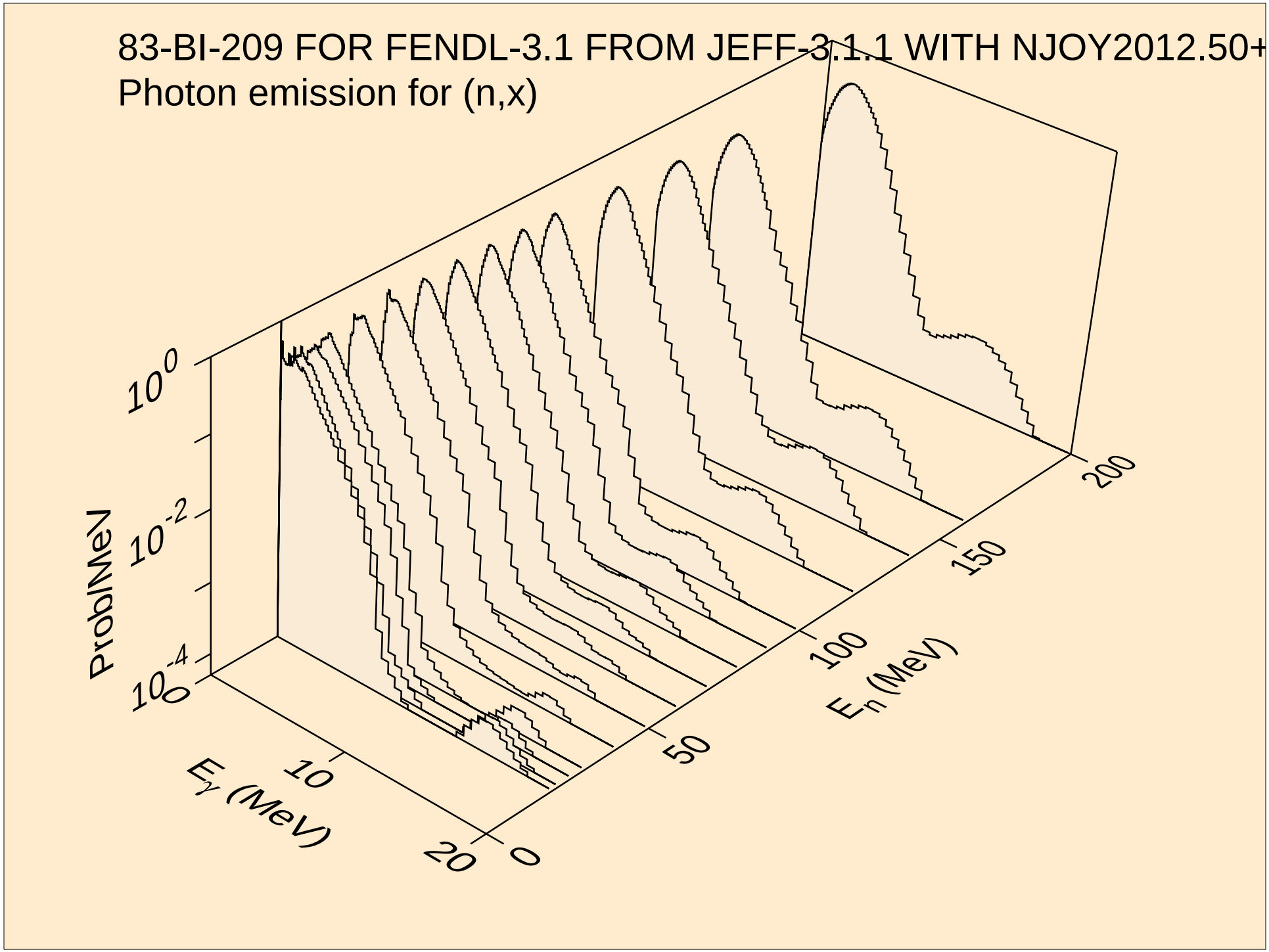

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,n*)p
Prob/MeV
10^1
10^-1
0
2
4
6
8
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

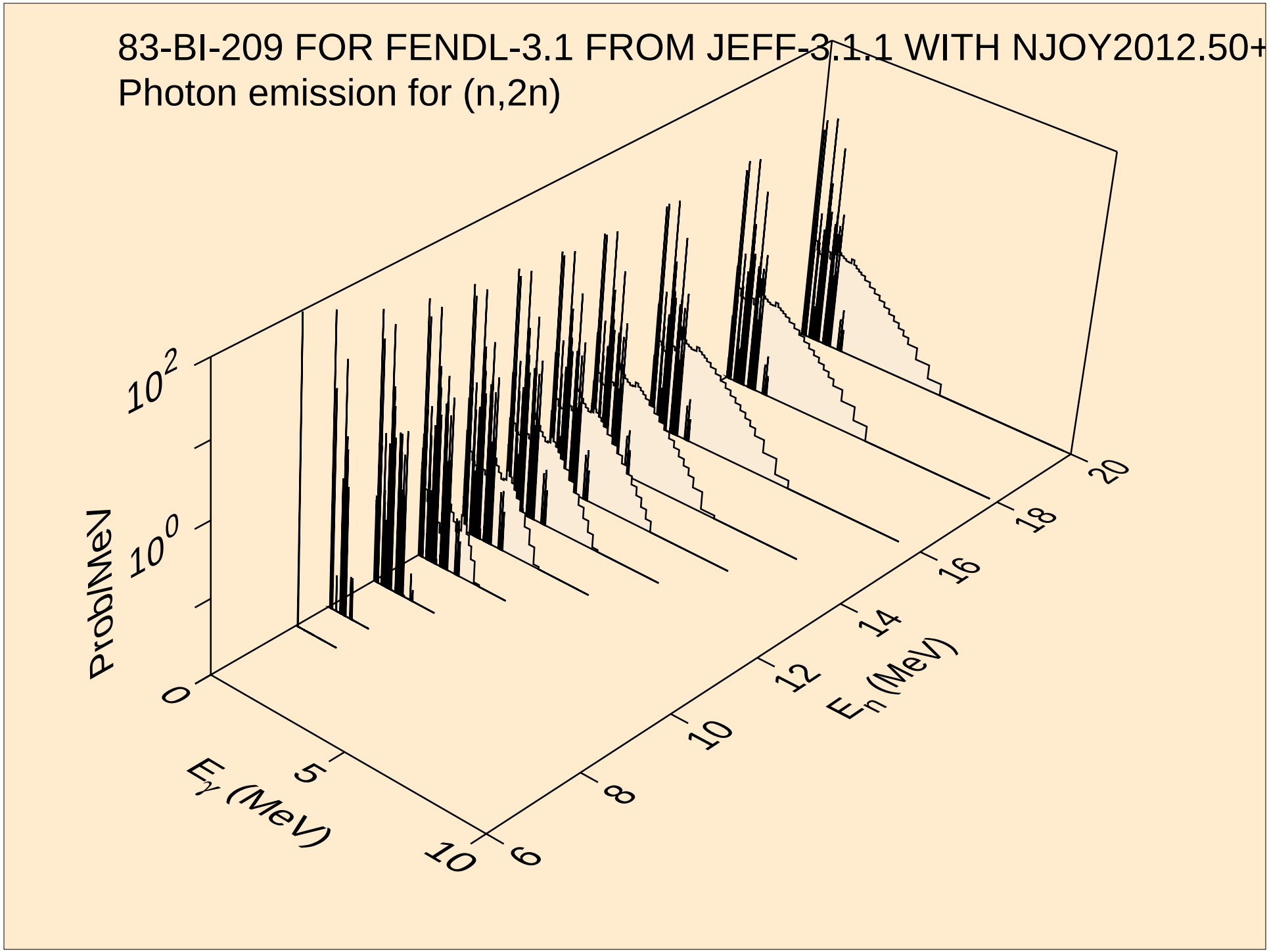

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,n*)d
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
4
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

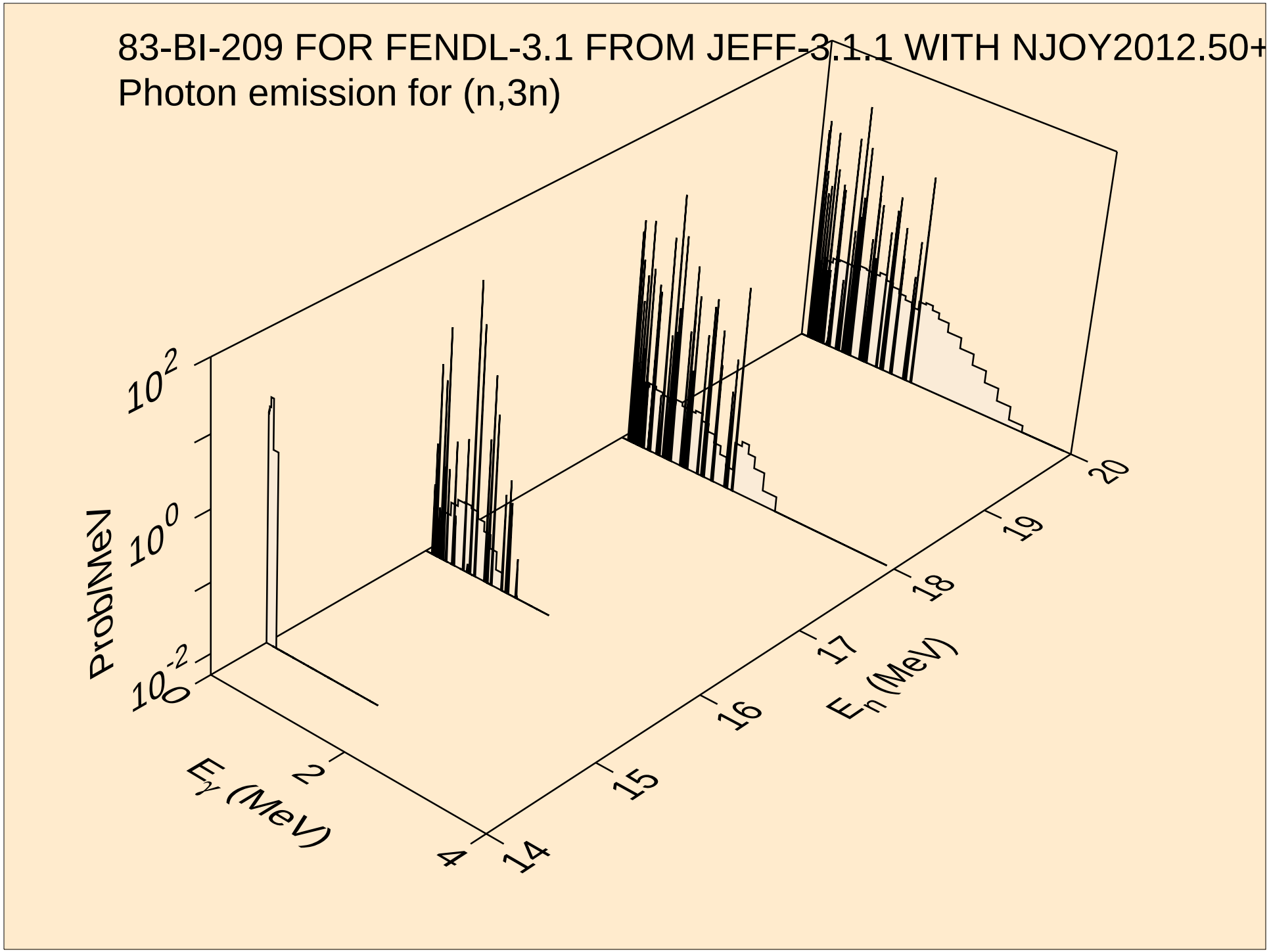

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,n*)t
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
4
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

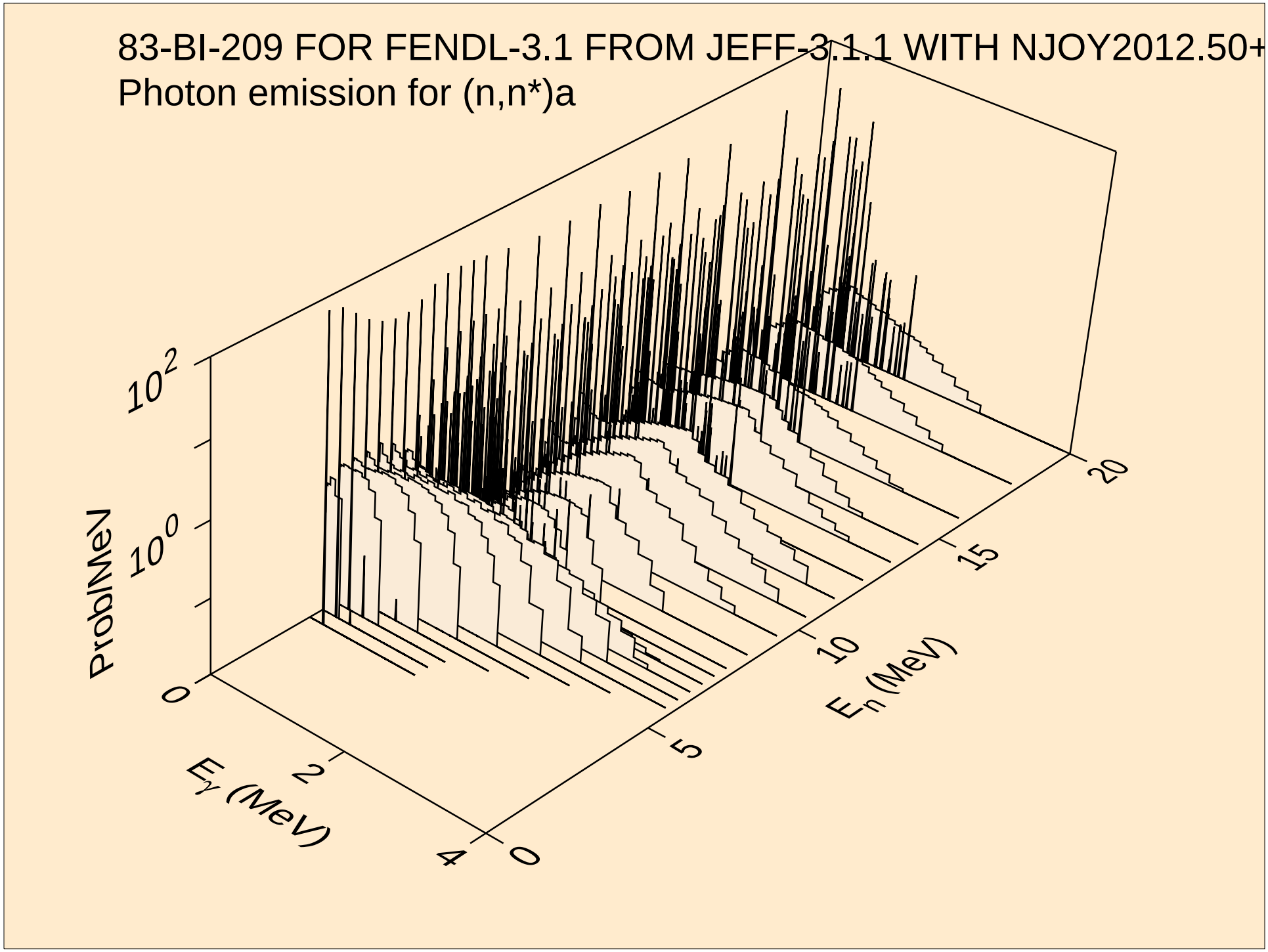

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,2np)
Prob/MeV
10^1
10^-1
0
2
4
6
10
12
14
16
18
20
Sec. Energy
Energy (MeV)

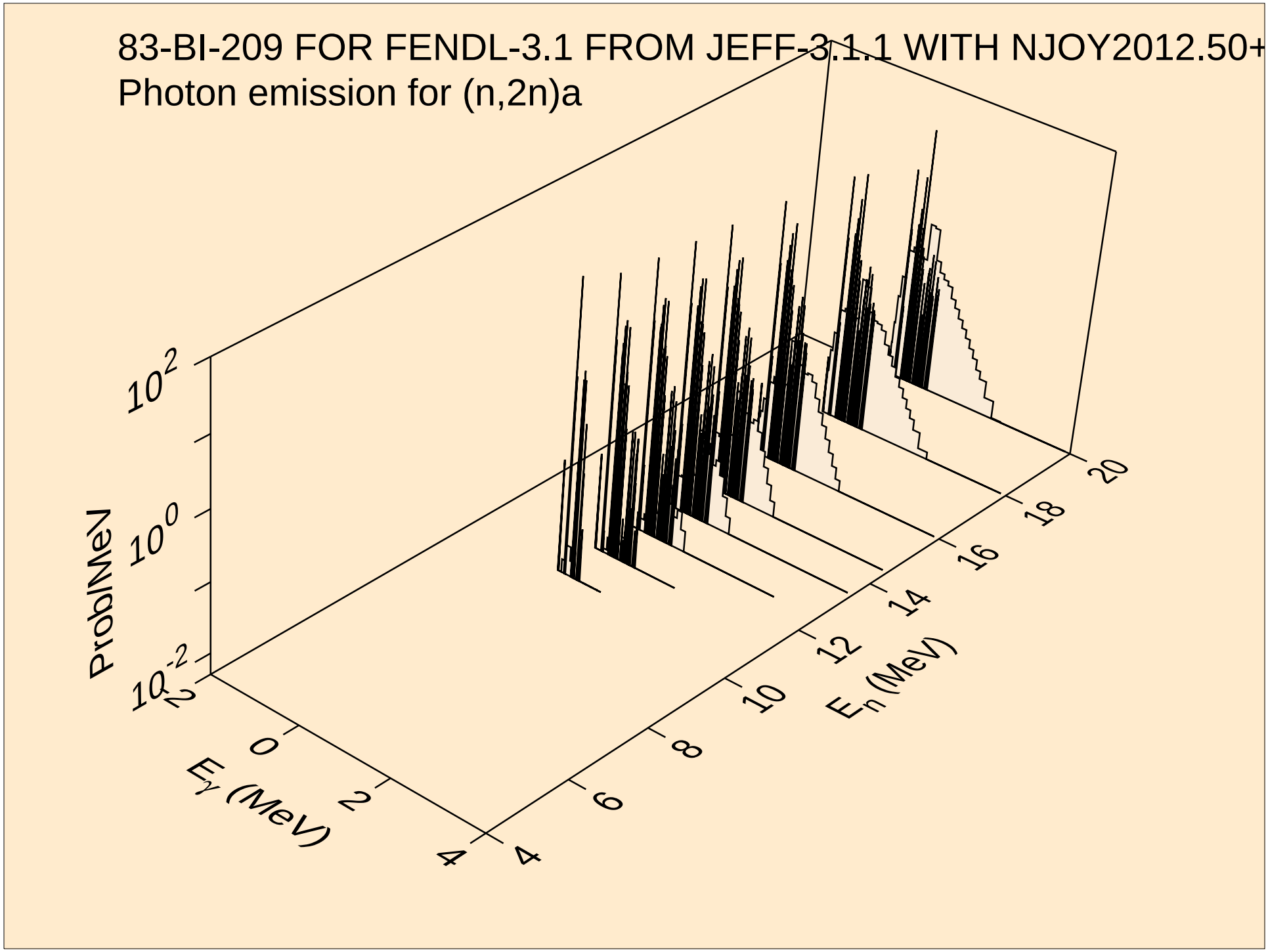

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Neutron emission for (n,n*c)
Prob/MeV
10^1
10^-1
0
5
10
15
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

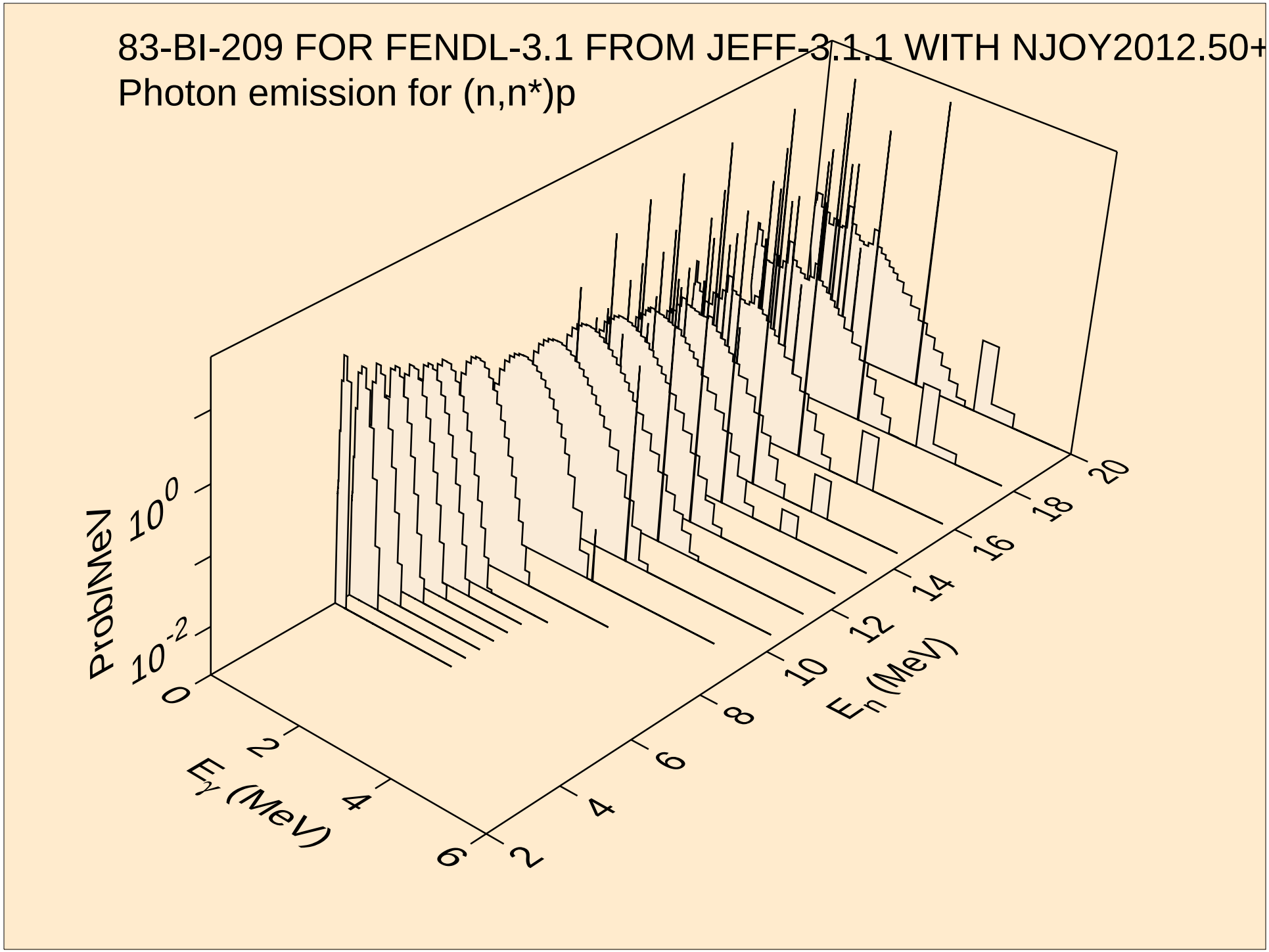

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,x)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
E_γ (MeV)
0
10
20
E_n (MeV)
0
50
100
150
200

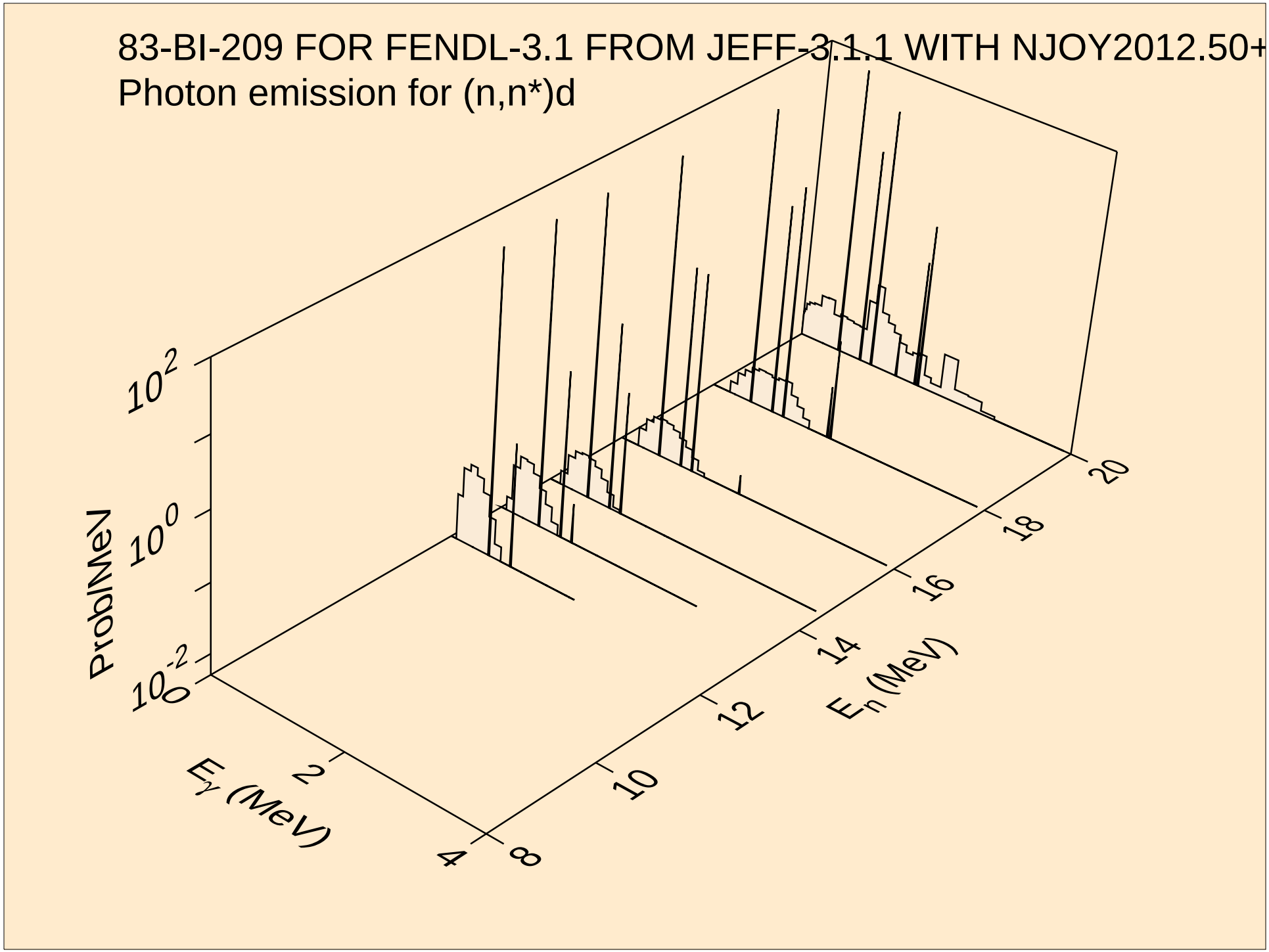

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,2n)
Prob/MeV
10^2
10^0
0
5
10
E_γ (MeV)
6
8
10
12
14
16
18
20
E_n (MeV)

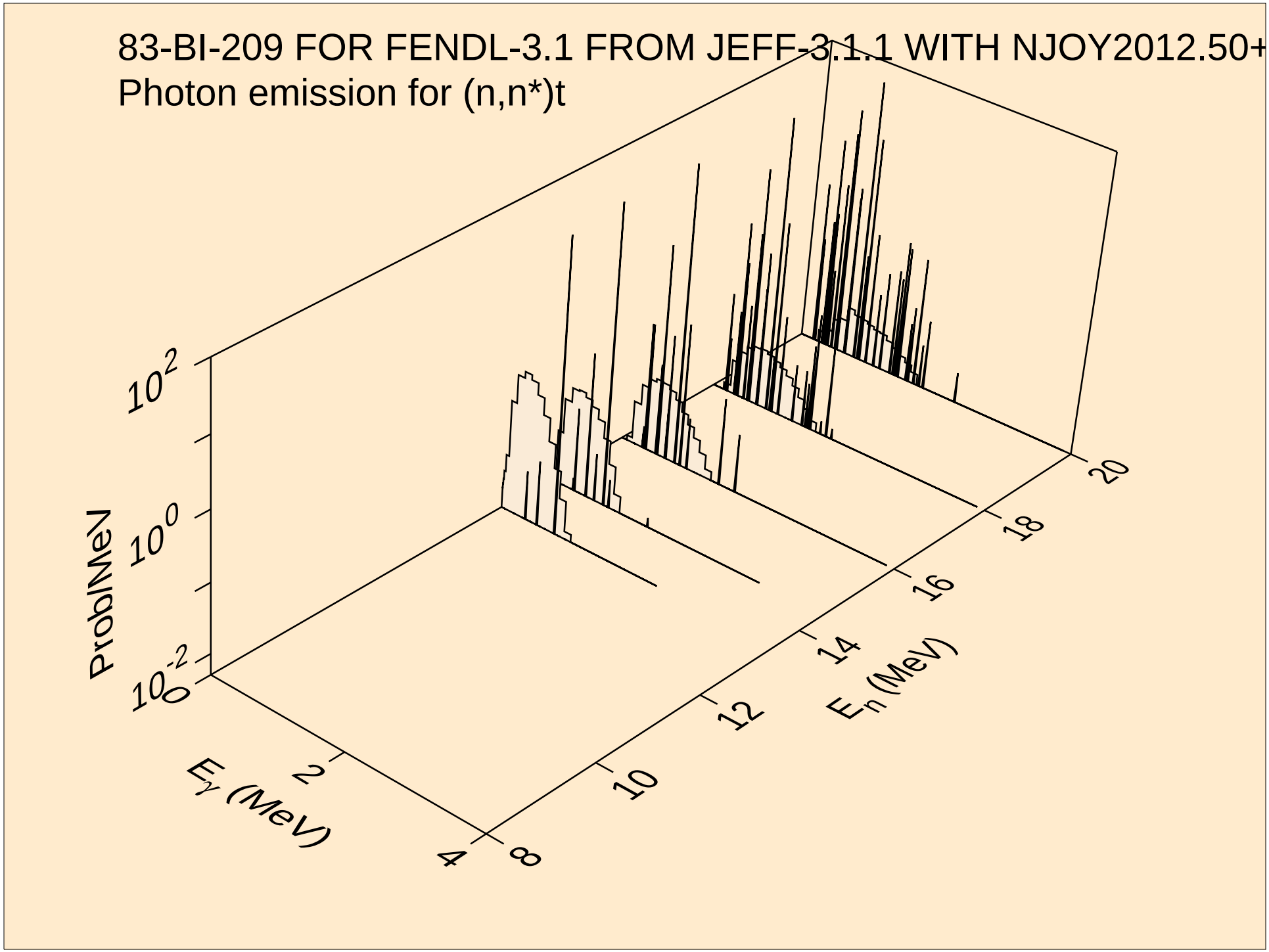

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,3n)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
E_n (MeV)
14
15
16
17
18
19
20

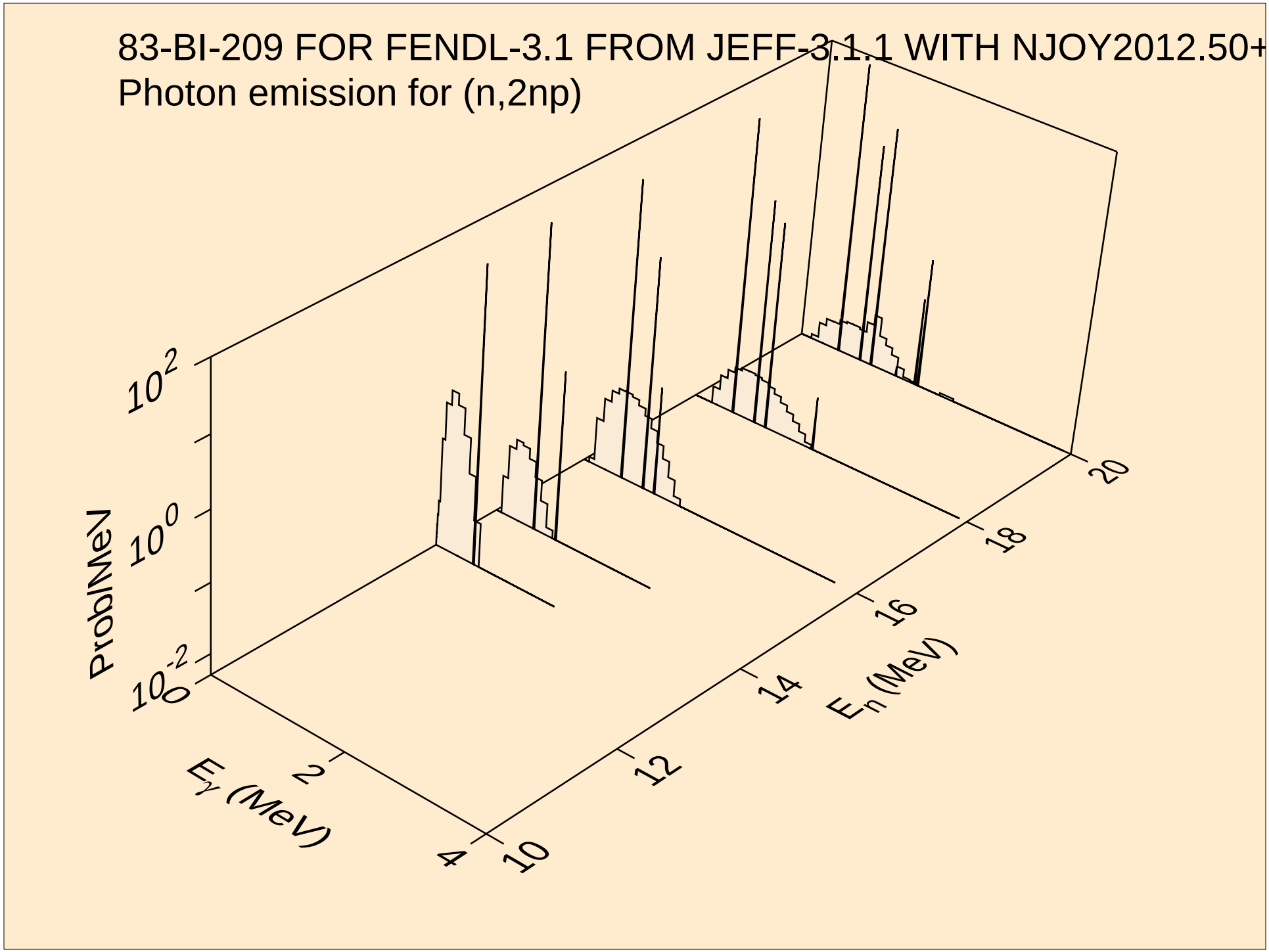

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*)a
Prob/MeV
10^2
10^0
0
2
4
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

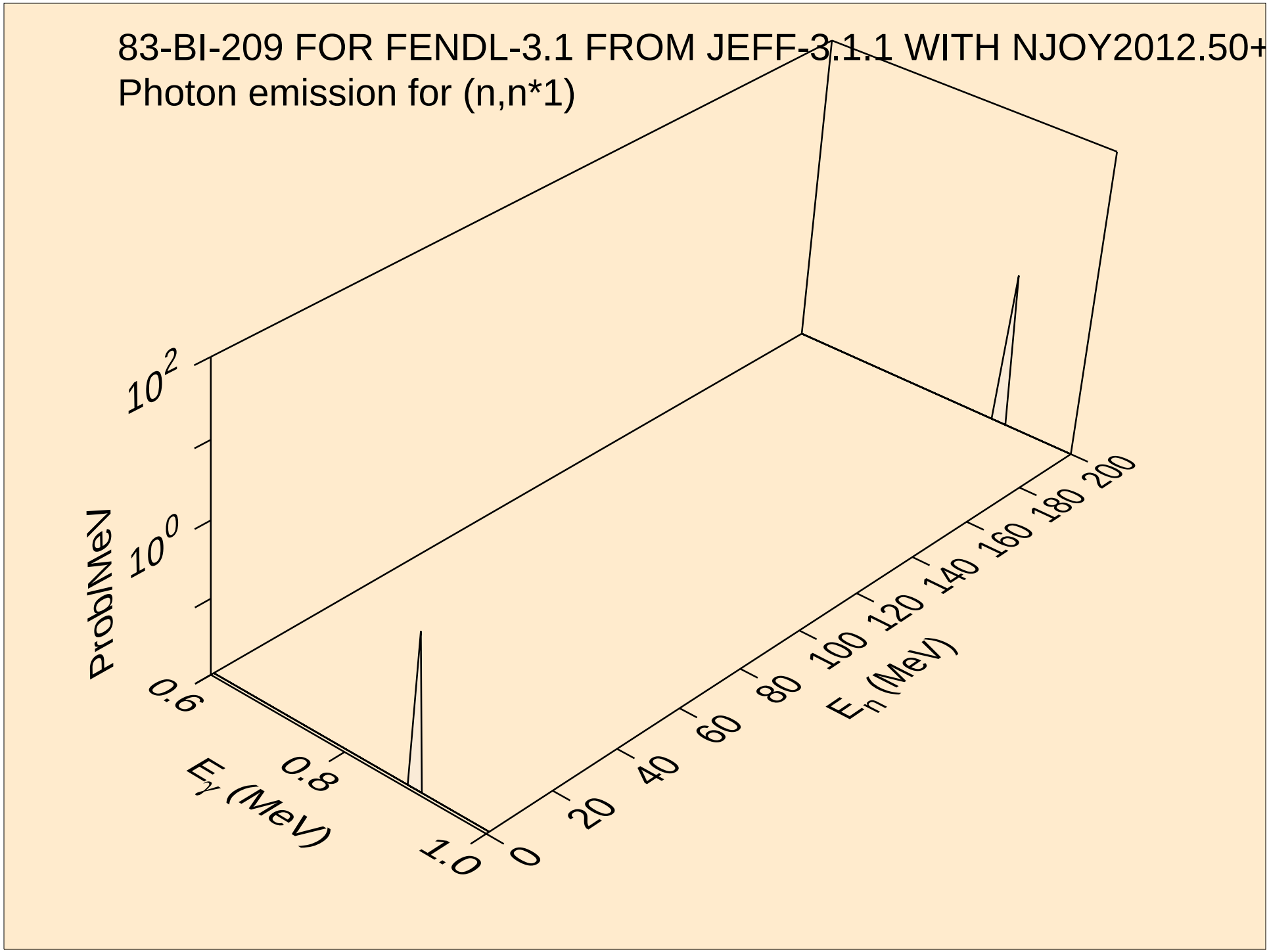

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,2n)a
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
E_n (MeV)
4
6
8
10
12
14
16
18
20

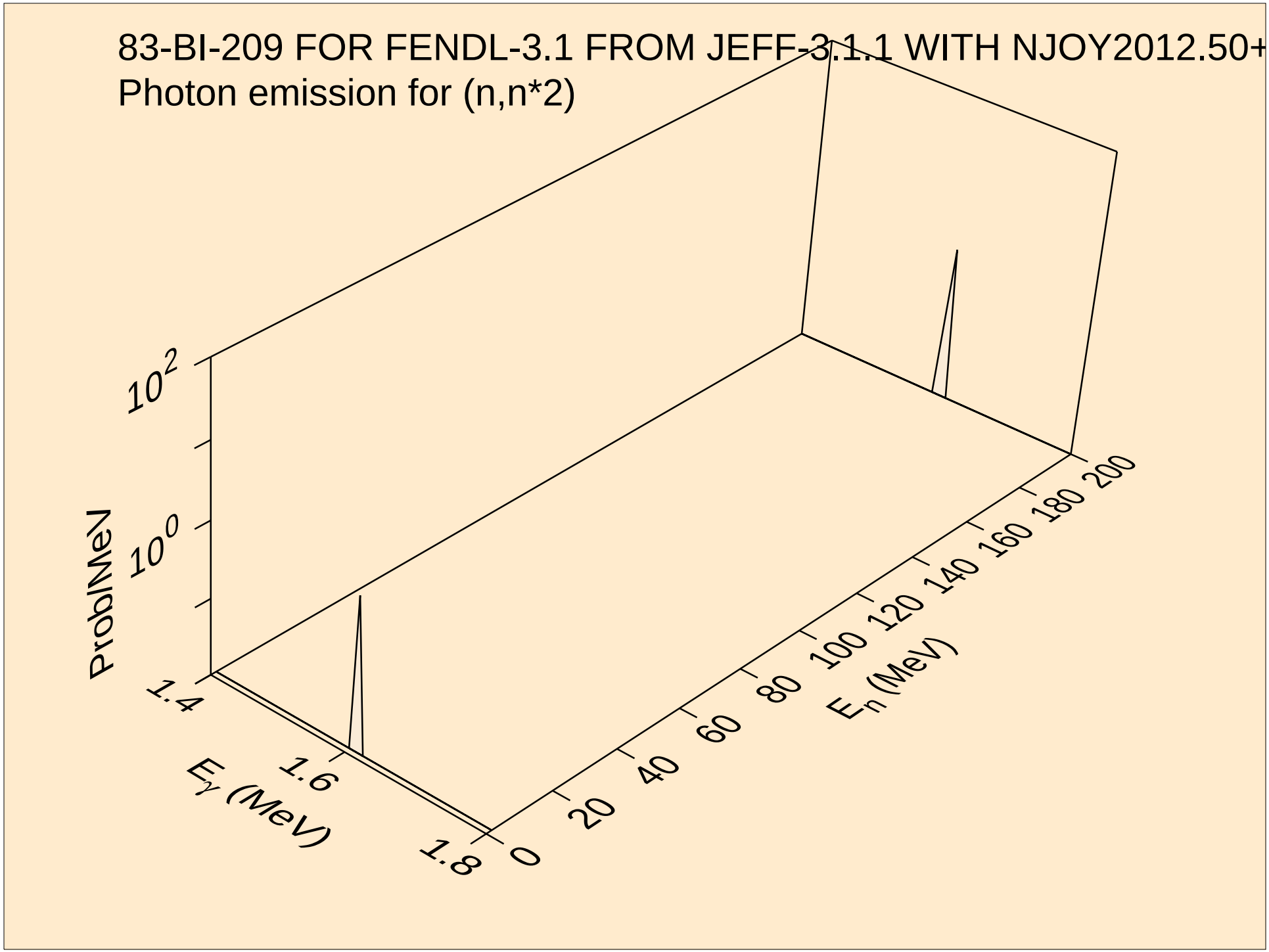

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*)p
Prob/MeV
10^0
10^-2
0
2
4
6
E_γ (MeV)
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

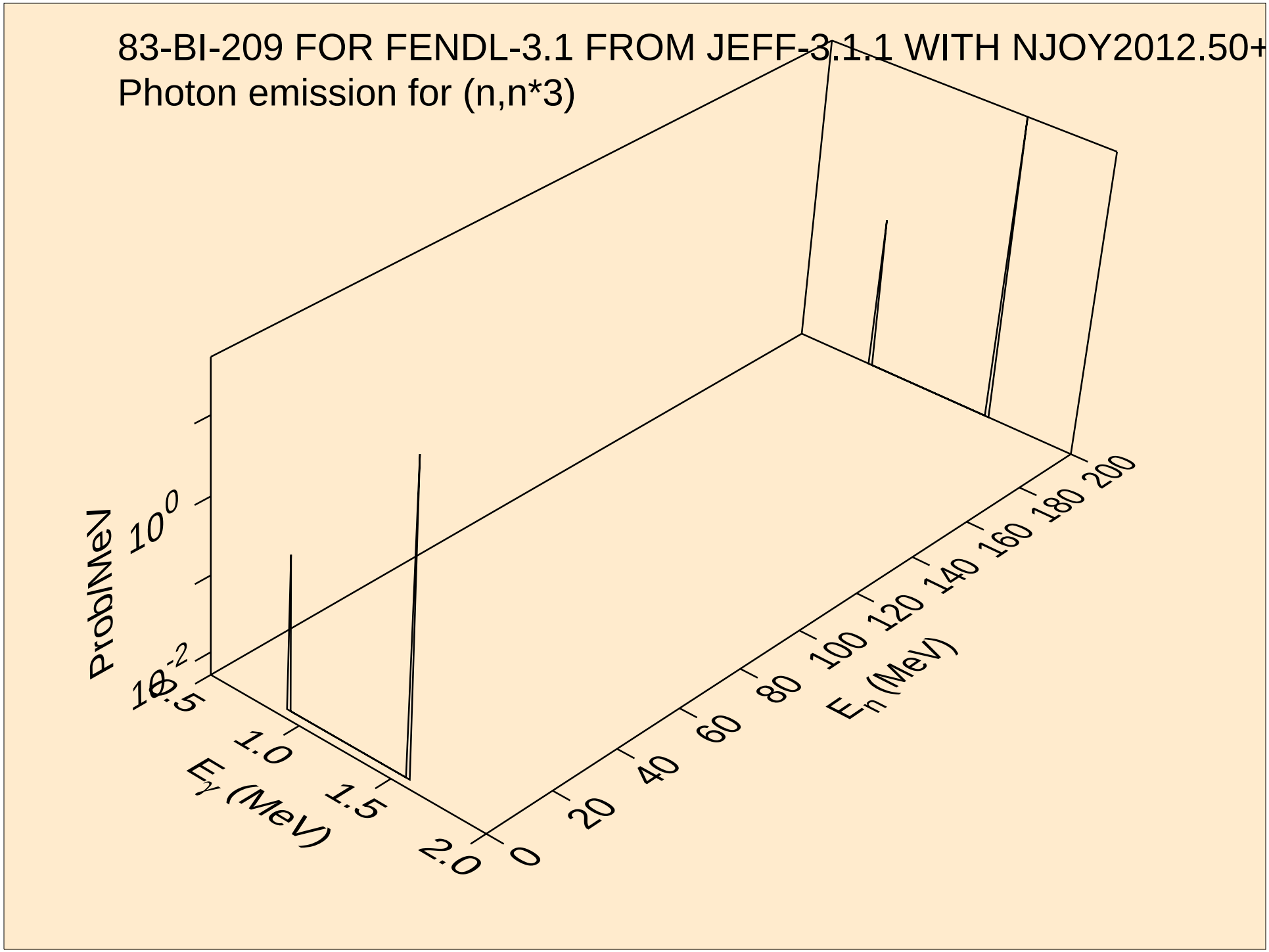

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*)d
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
8
10
12
14
16
18
20
E_n (MeV)

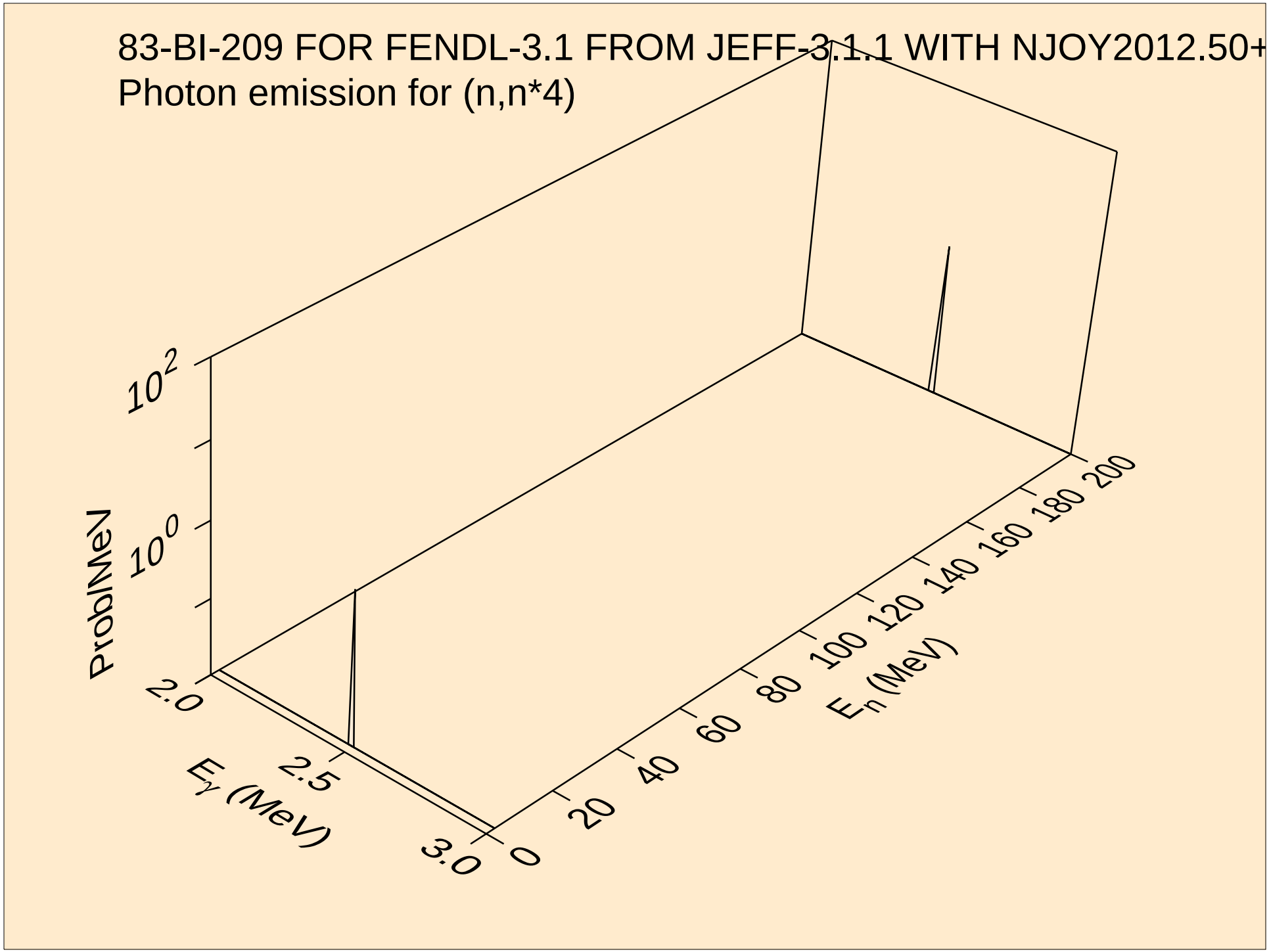

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*)t
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
8
10
12
14
16
18
20
E_n (MeV)

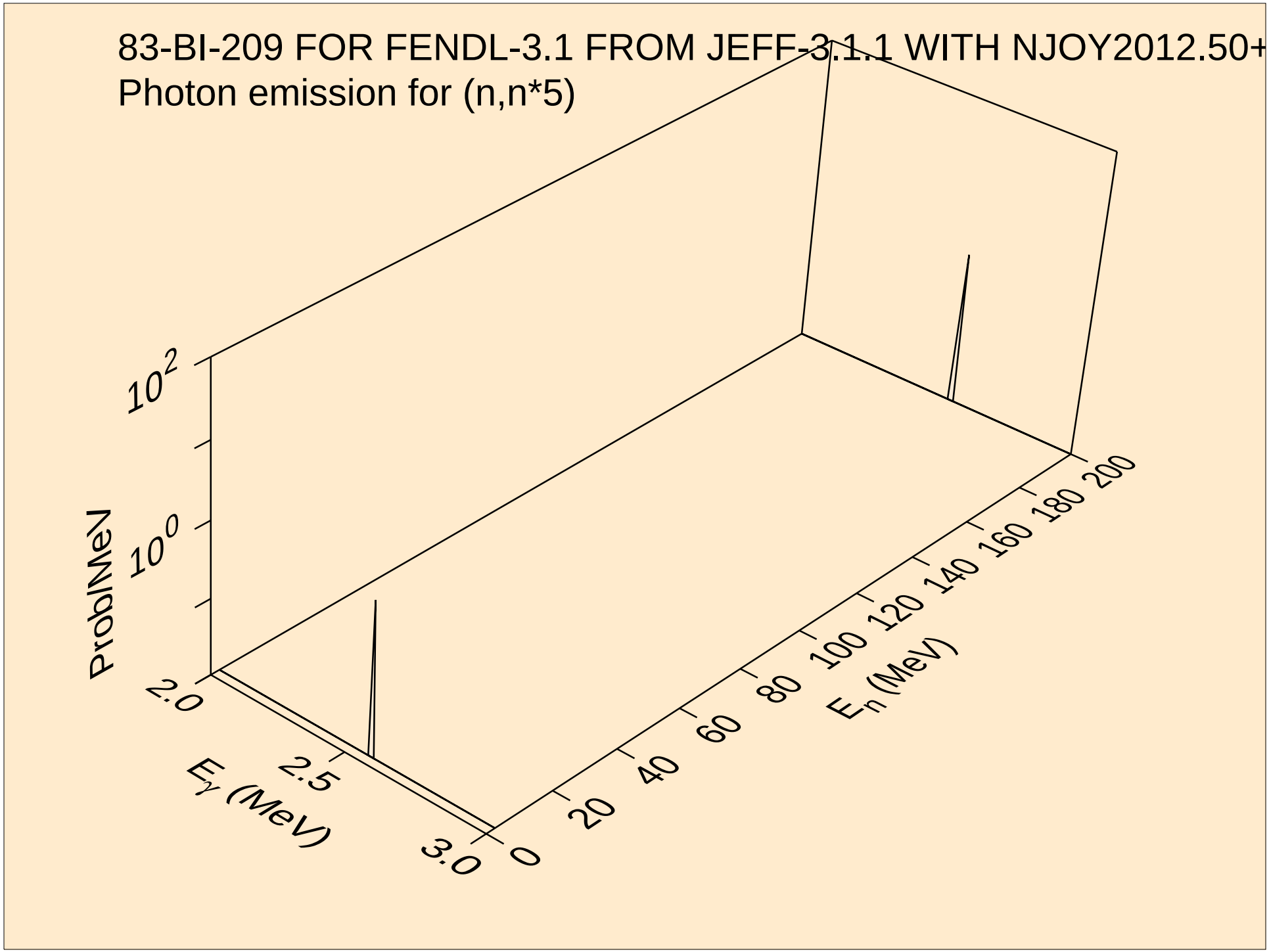

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,2np)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
10
12
14
16
18
20
E_n (MeV)

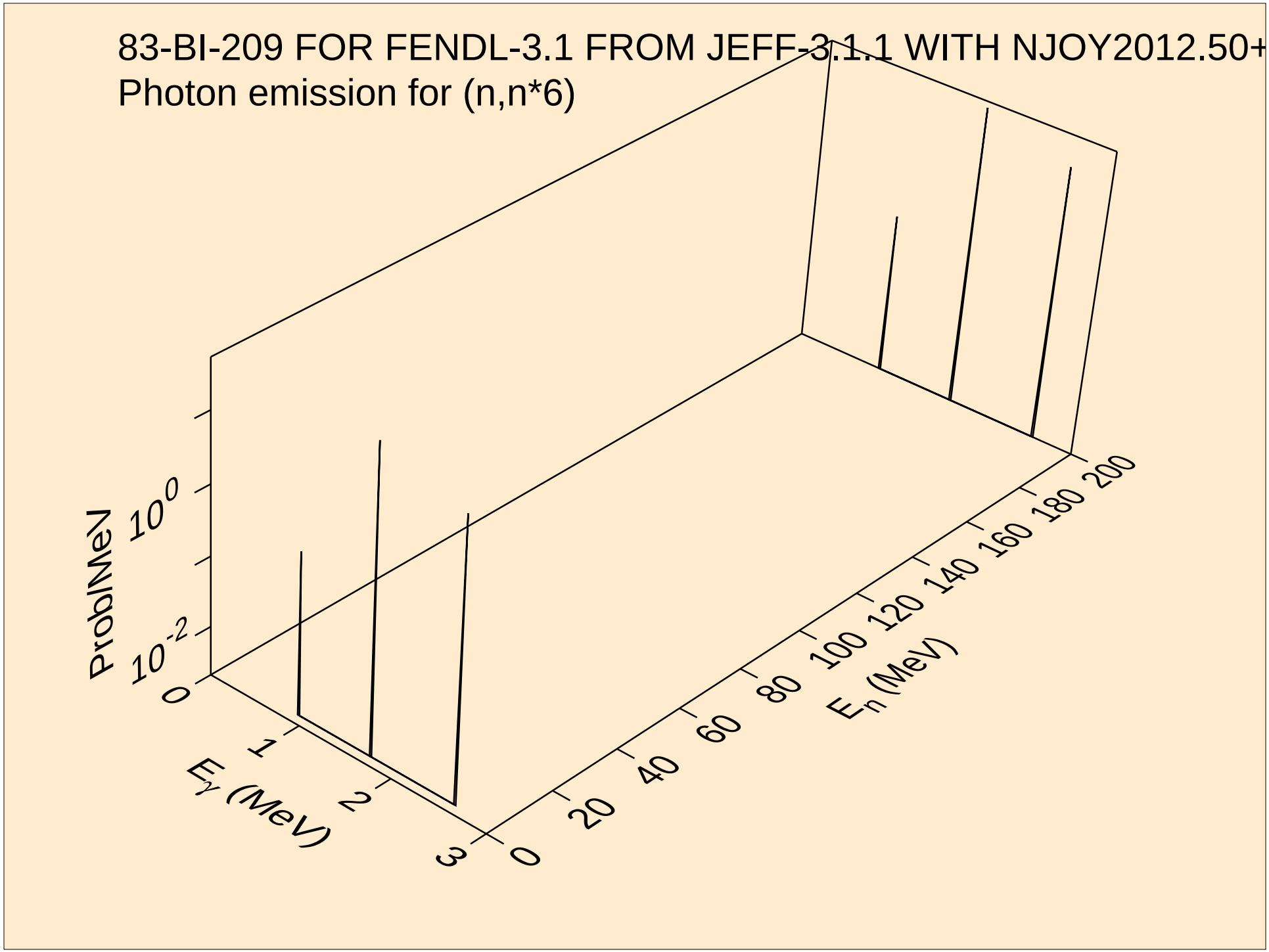

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*1)
Prob/MeV
10^2
10^0
0.6
0.8
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

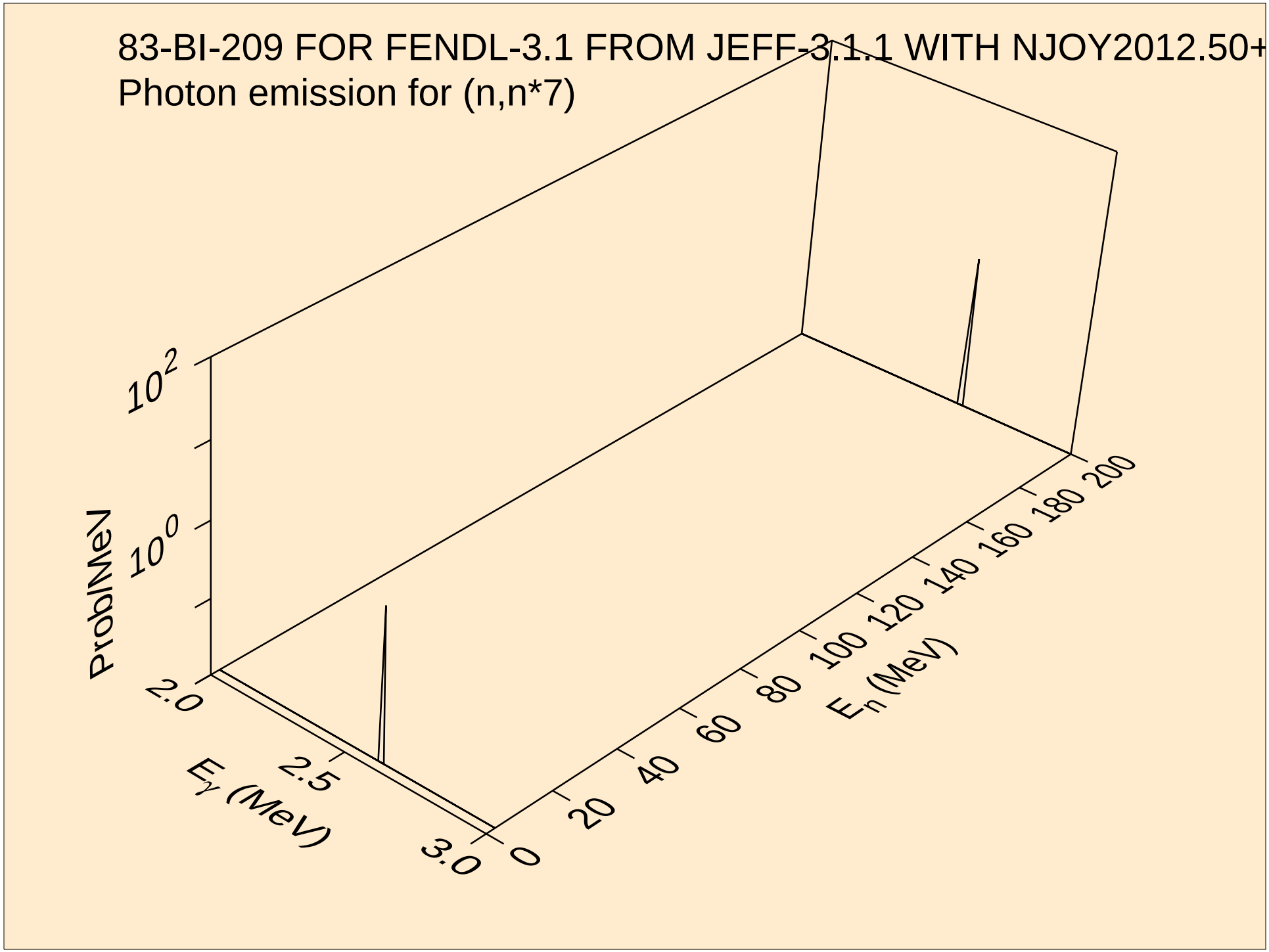

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*2)
Prob/MeV
10^2
10^0
1.4
1.6
1.8
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

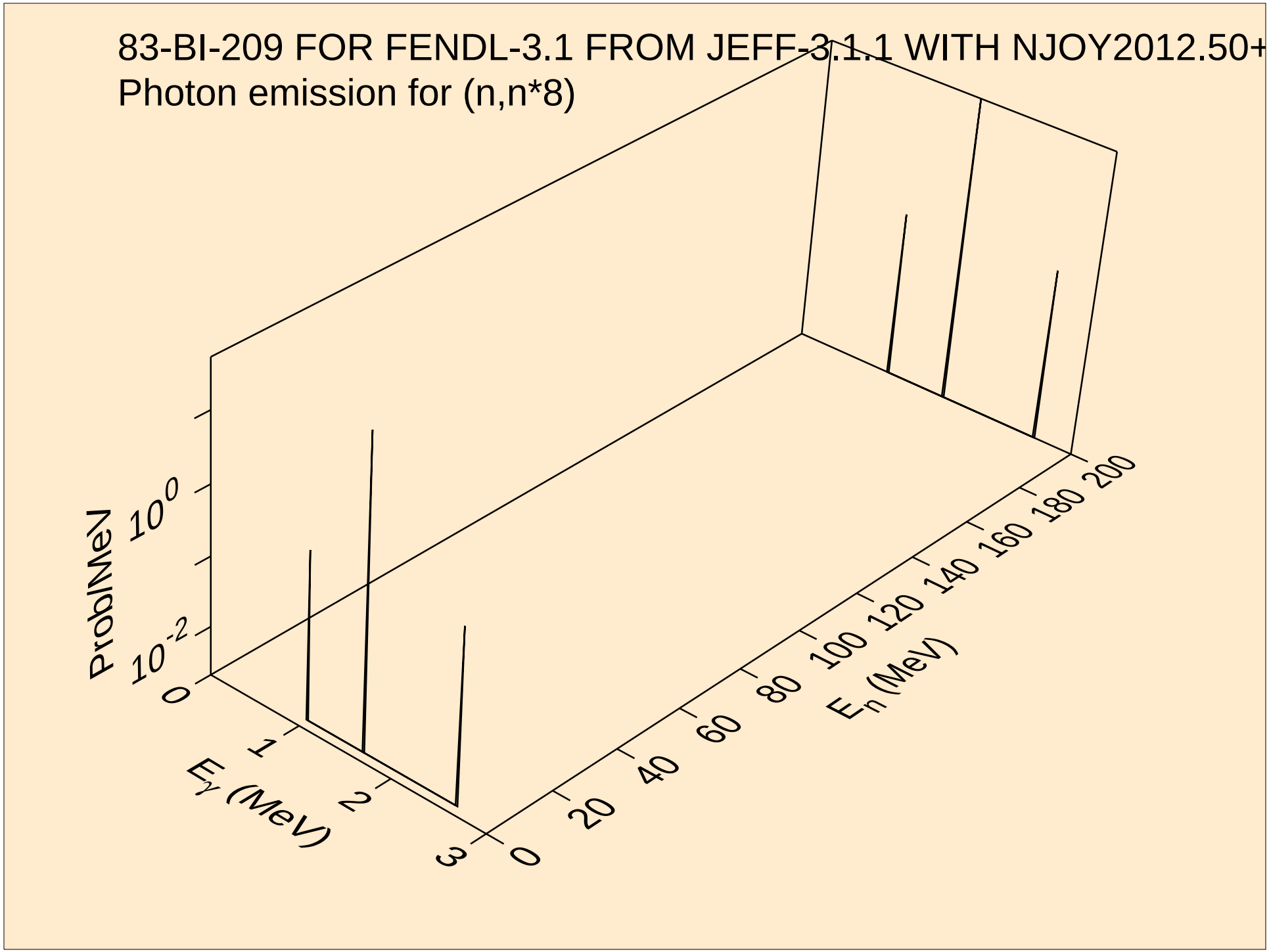

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*3)
Prob/MeV
10^{0}
10^{-2}
0.5
1.0
1.5
2.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

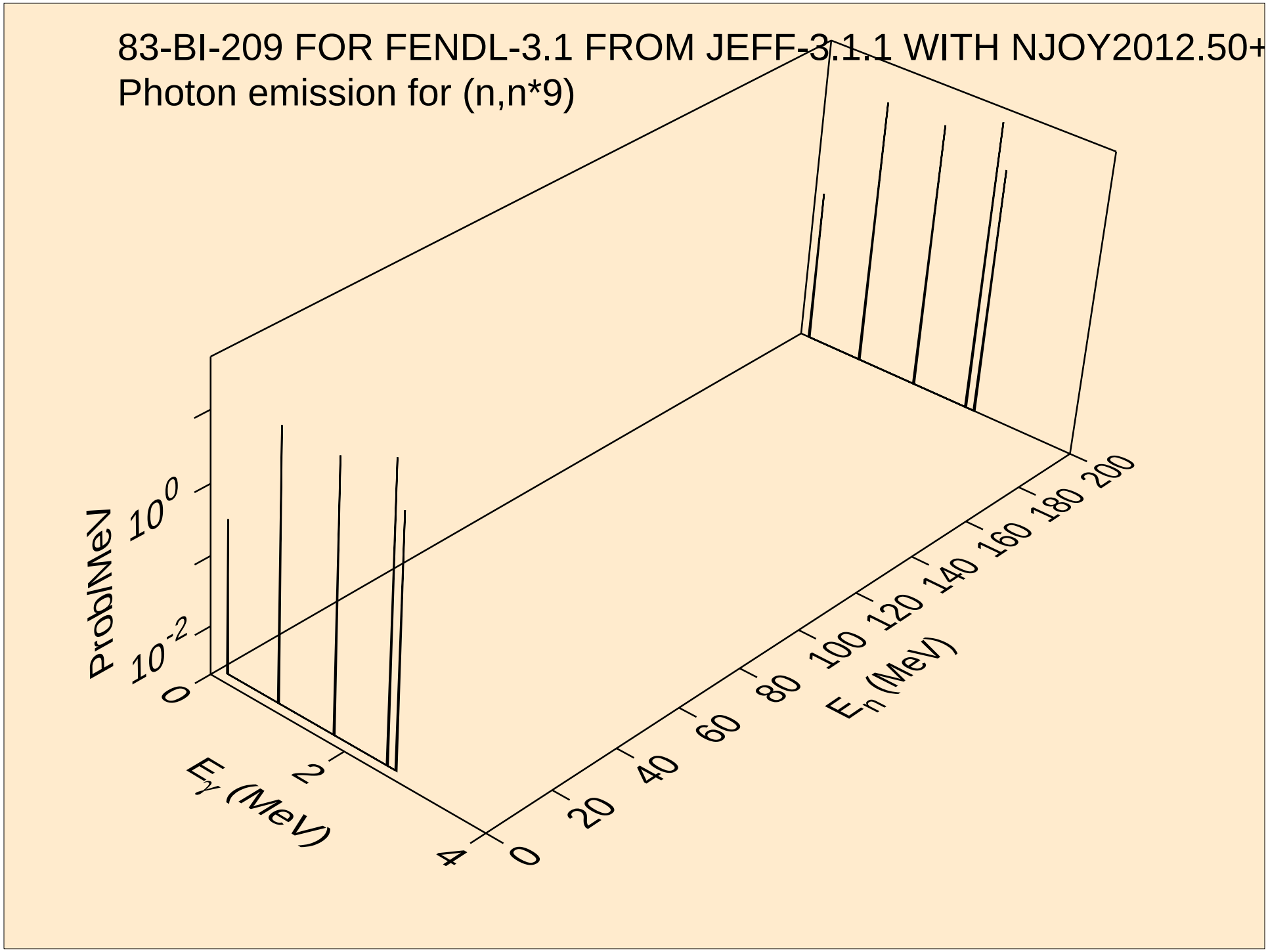

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*4)
Prob/MeV
10^2
10^0
2.0
2.5
3.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

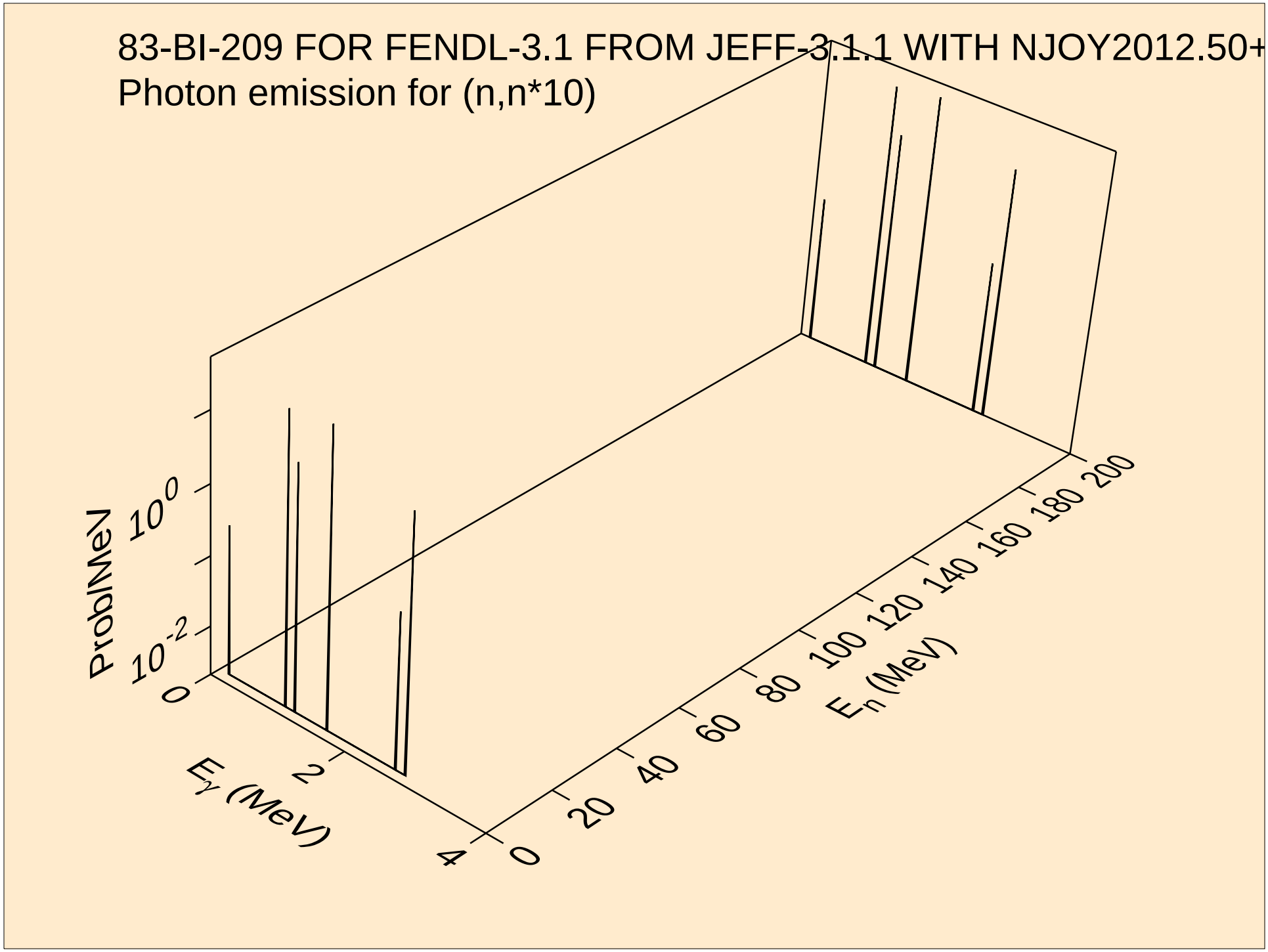

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*5)
Prob/MeV
10^2
10^0
2.0
2.5
3.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

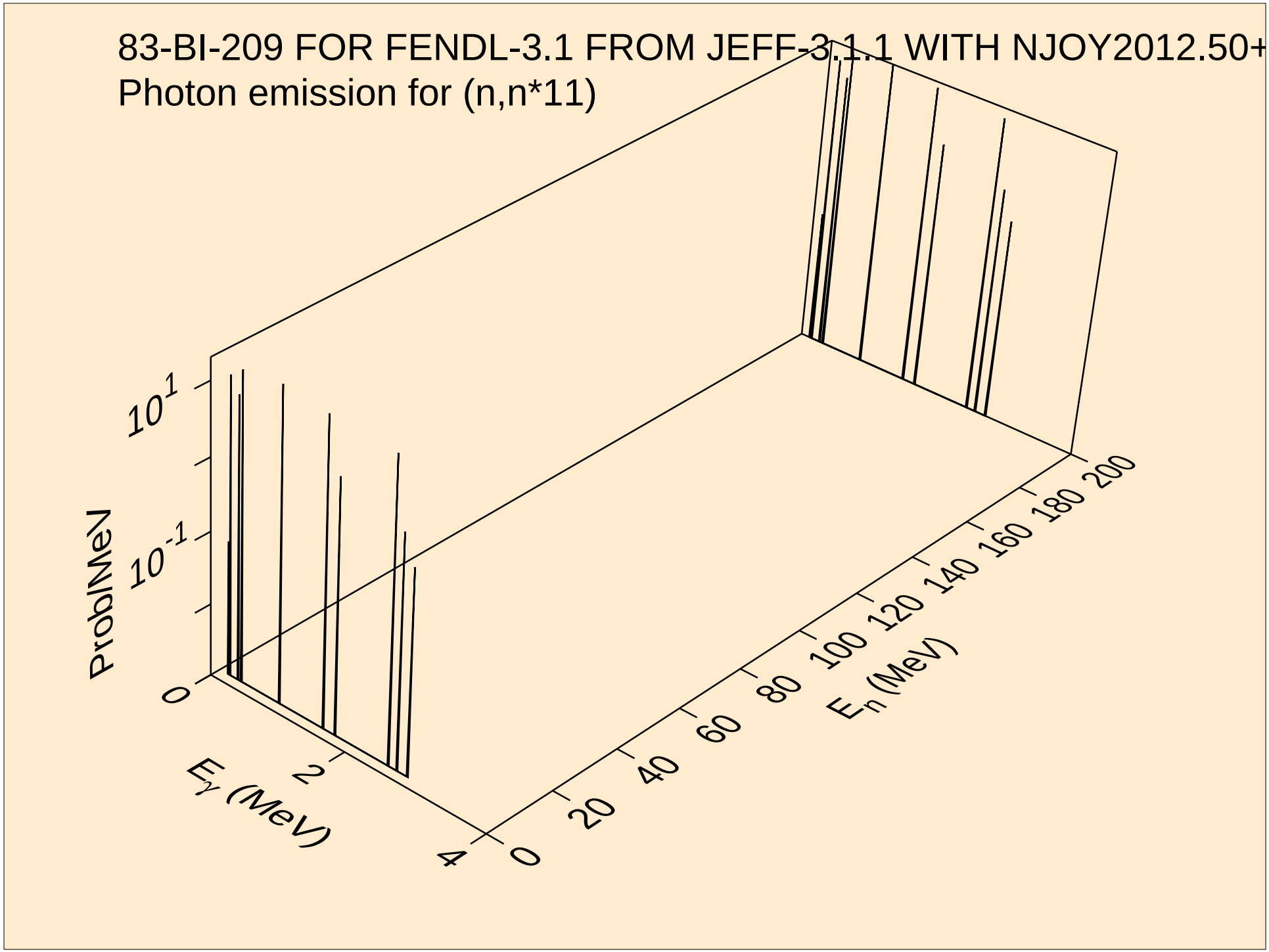

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*6)
Prob/MeV
10^0
10^-2
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

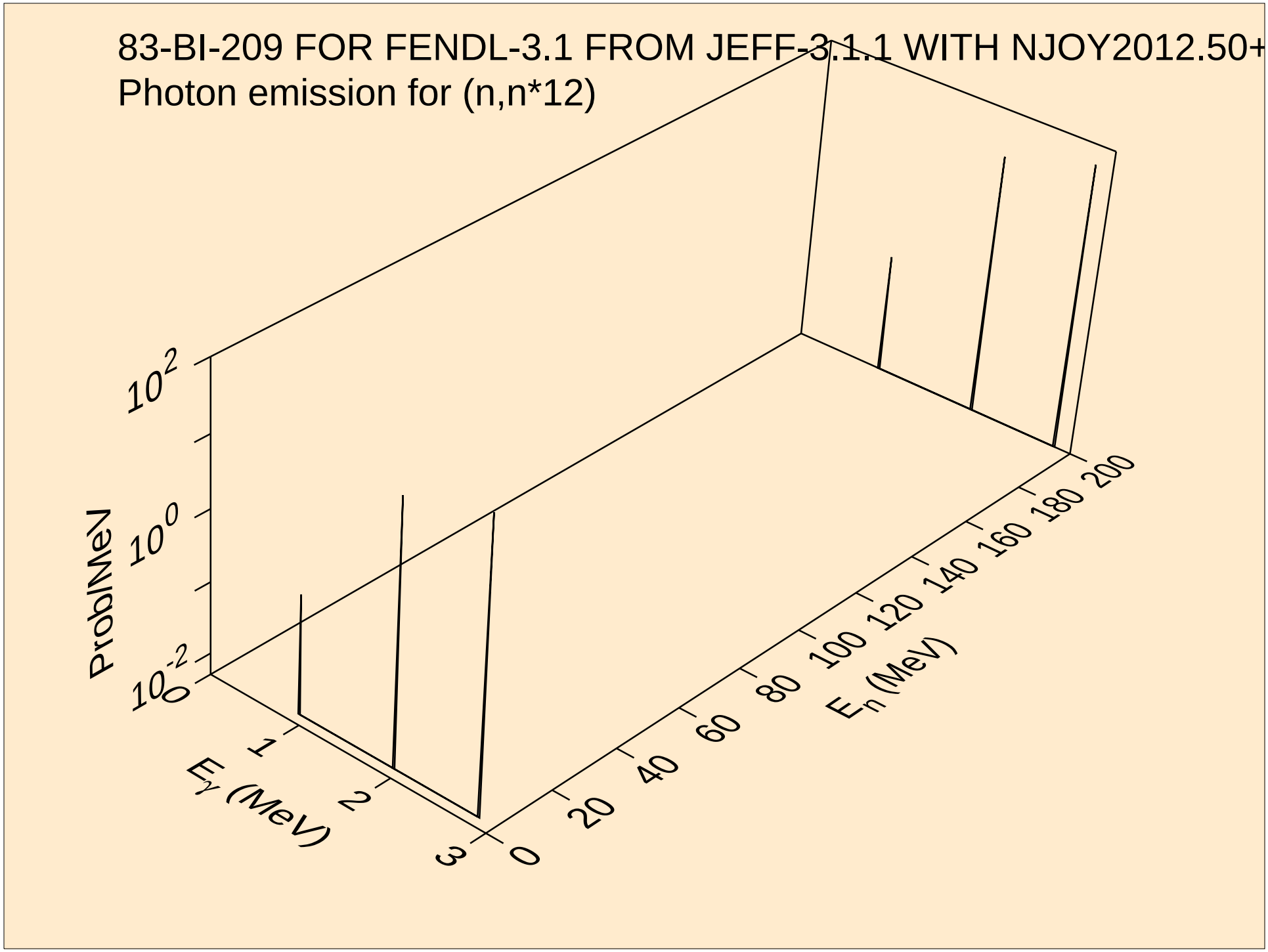

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*7)
Prob/MeV
10^2
10^0
2.0
2.5
3.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

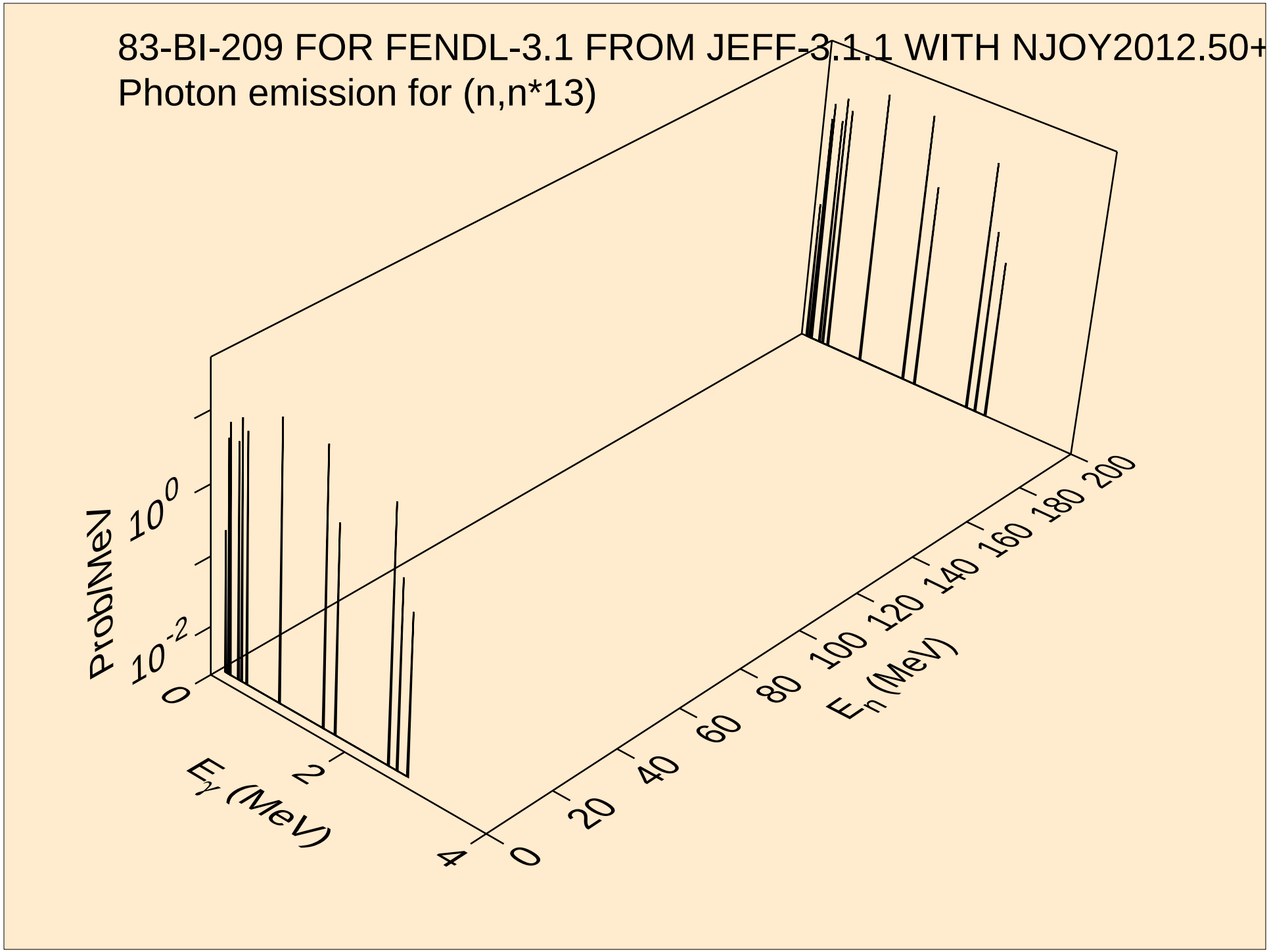

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*8)
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

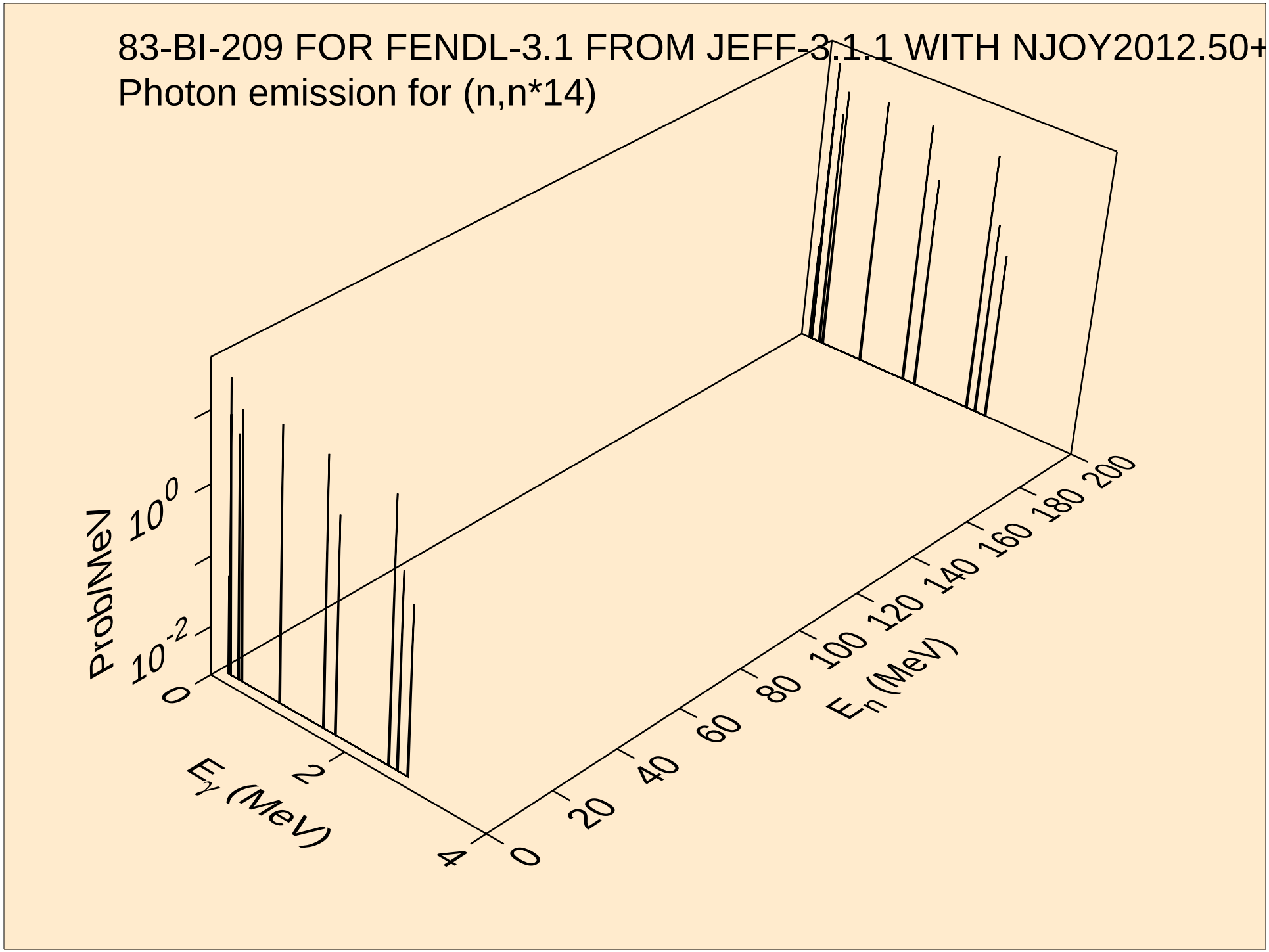

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*9)
Prob/MeV
10^0
10^-2
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

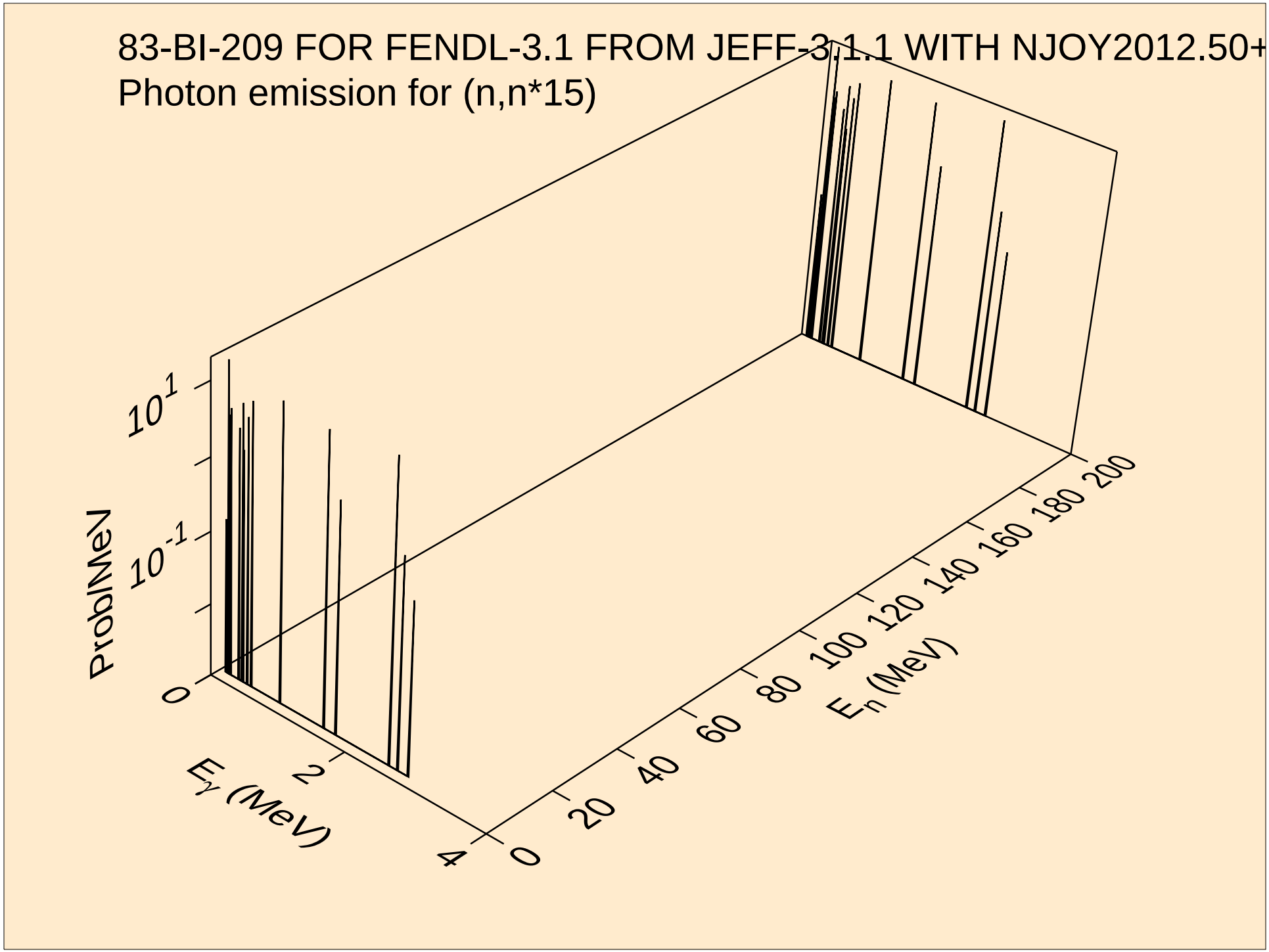

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*10)
Prob/MeV
10^0
10^-2
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

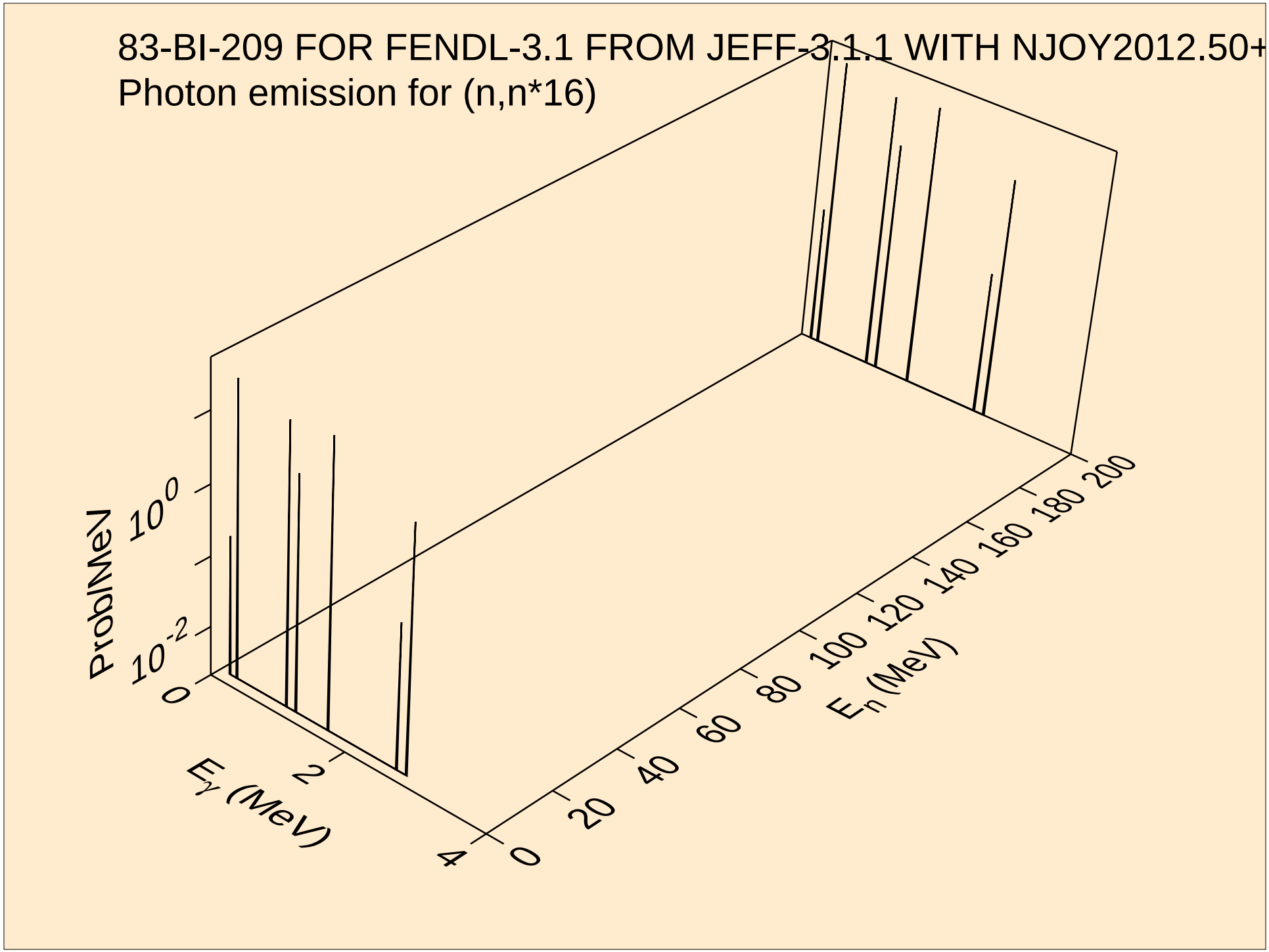

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*11)
Prob/MeV
10^{1}
10^{-1}
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

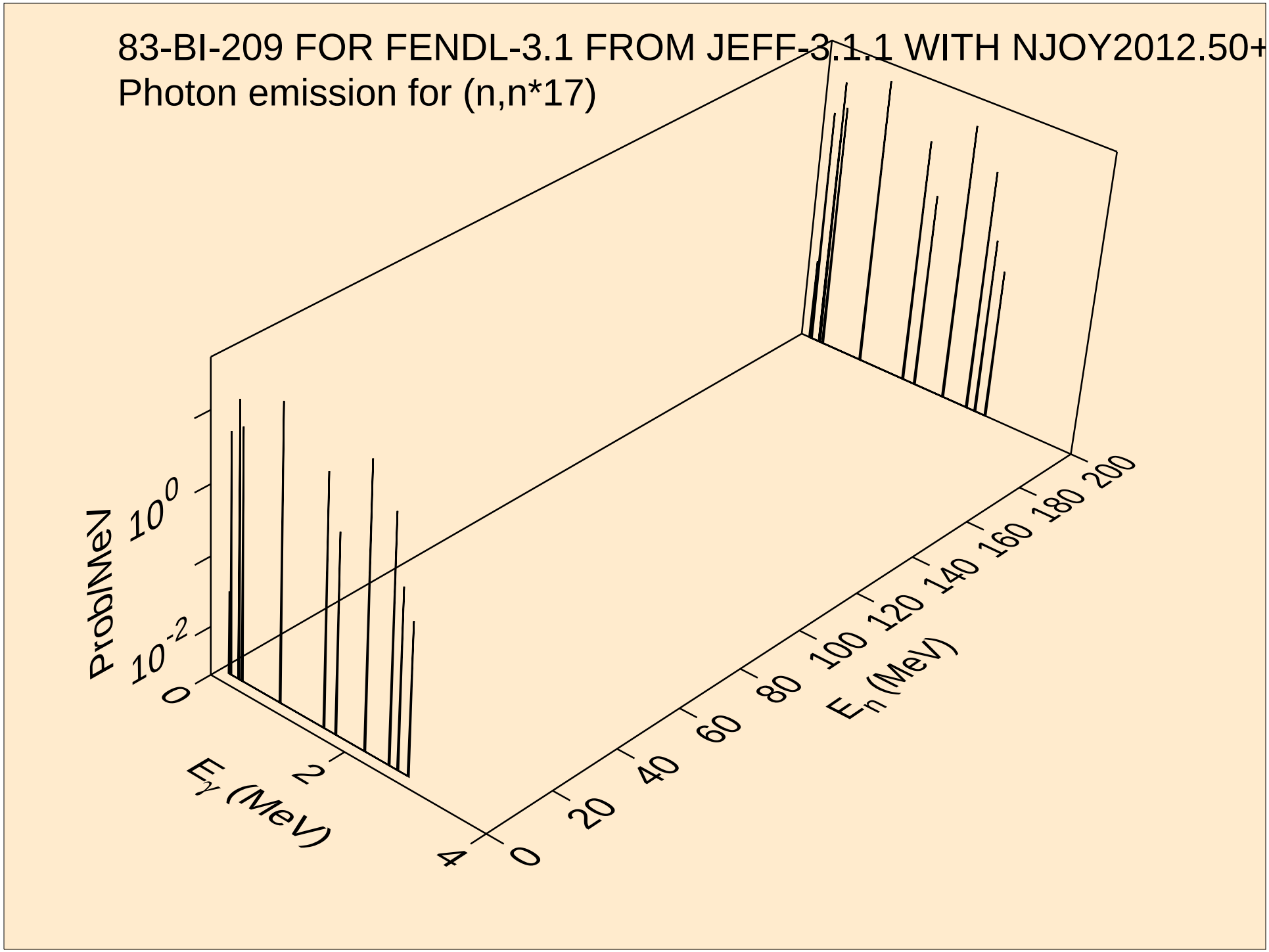

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*12)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
1
2
3
E_n (MeV)
0
20
40
60
80
100
120
140
160
180
200

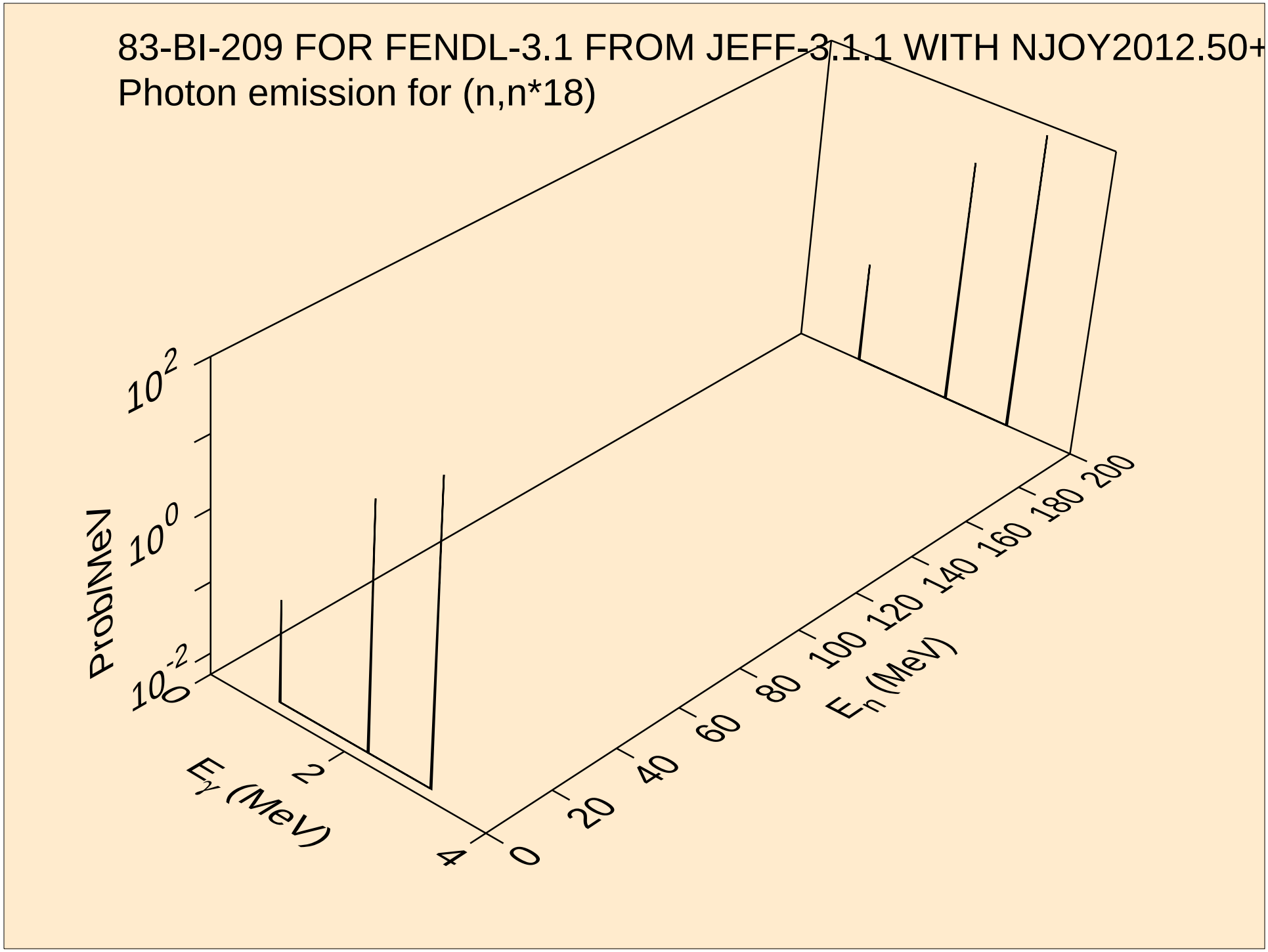

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*13)
Prob/MeV
10^0
10^-2
0
2
4
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

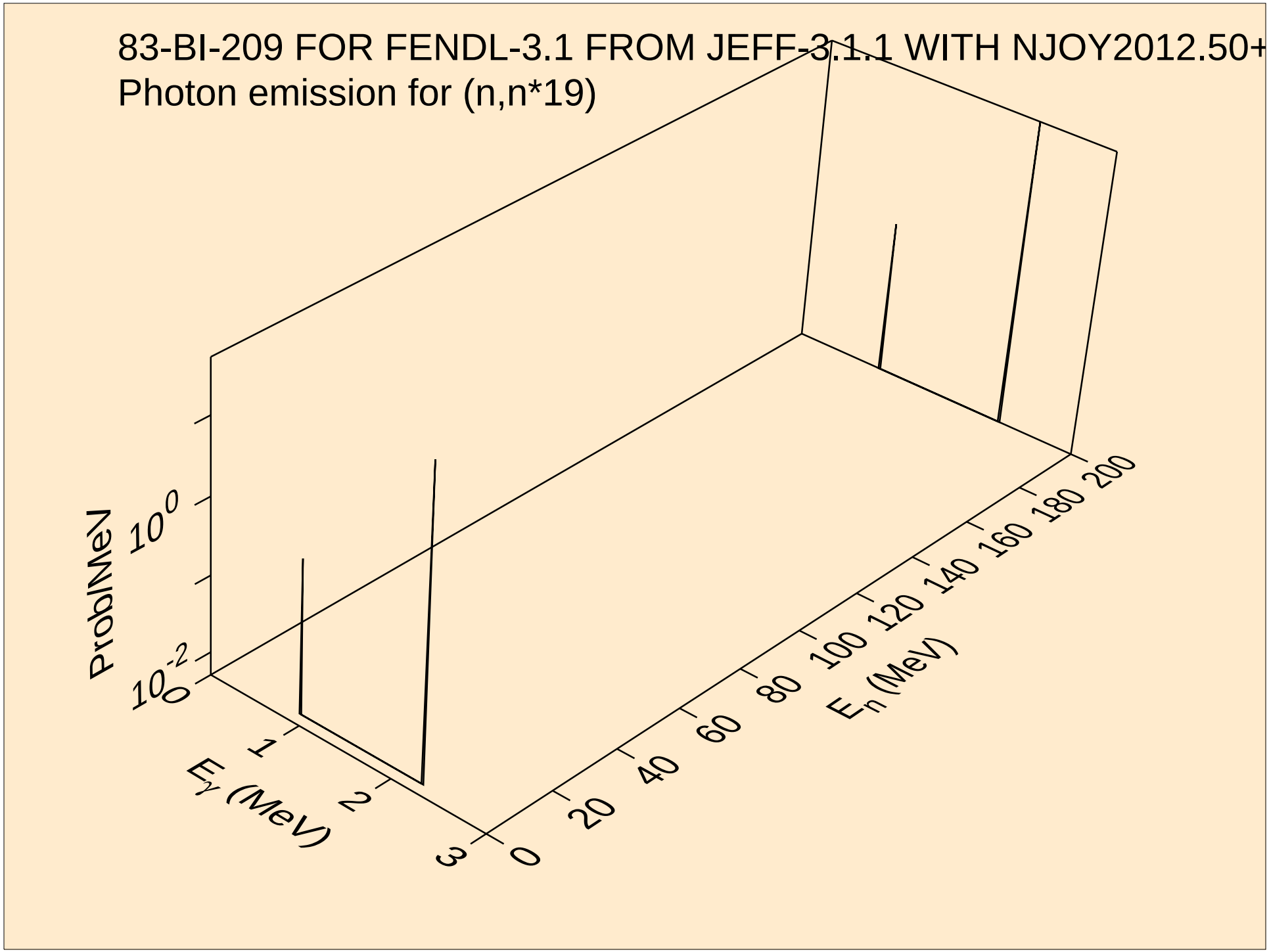

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*14)
Prob/MeV
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

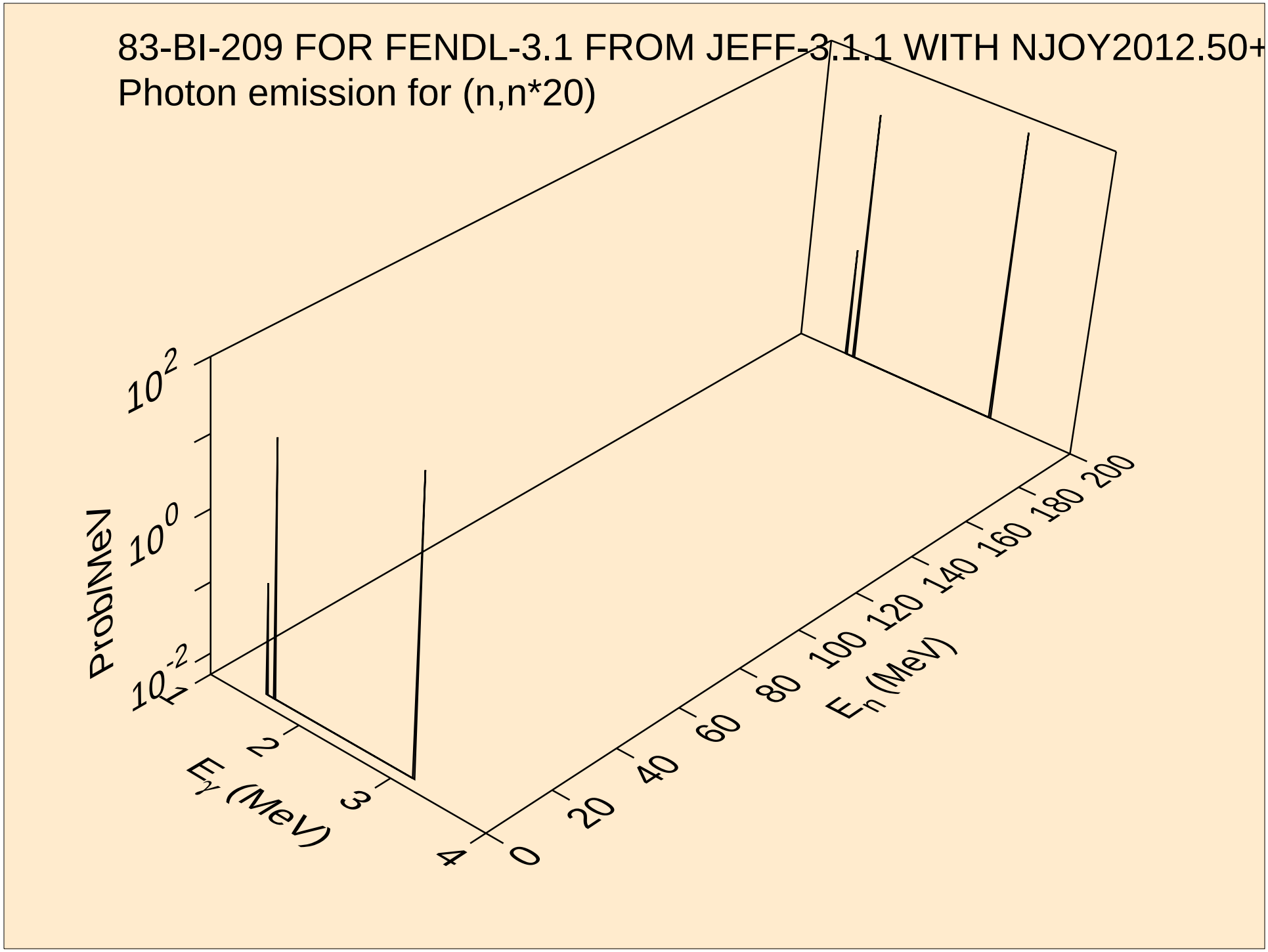

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*15)
Prob/MeV
10^{1}
10^{-1}
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

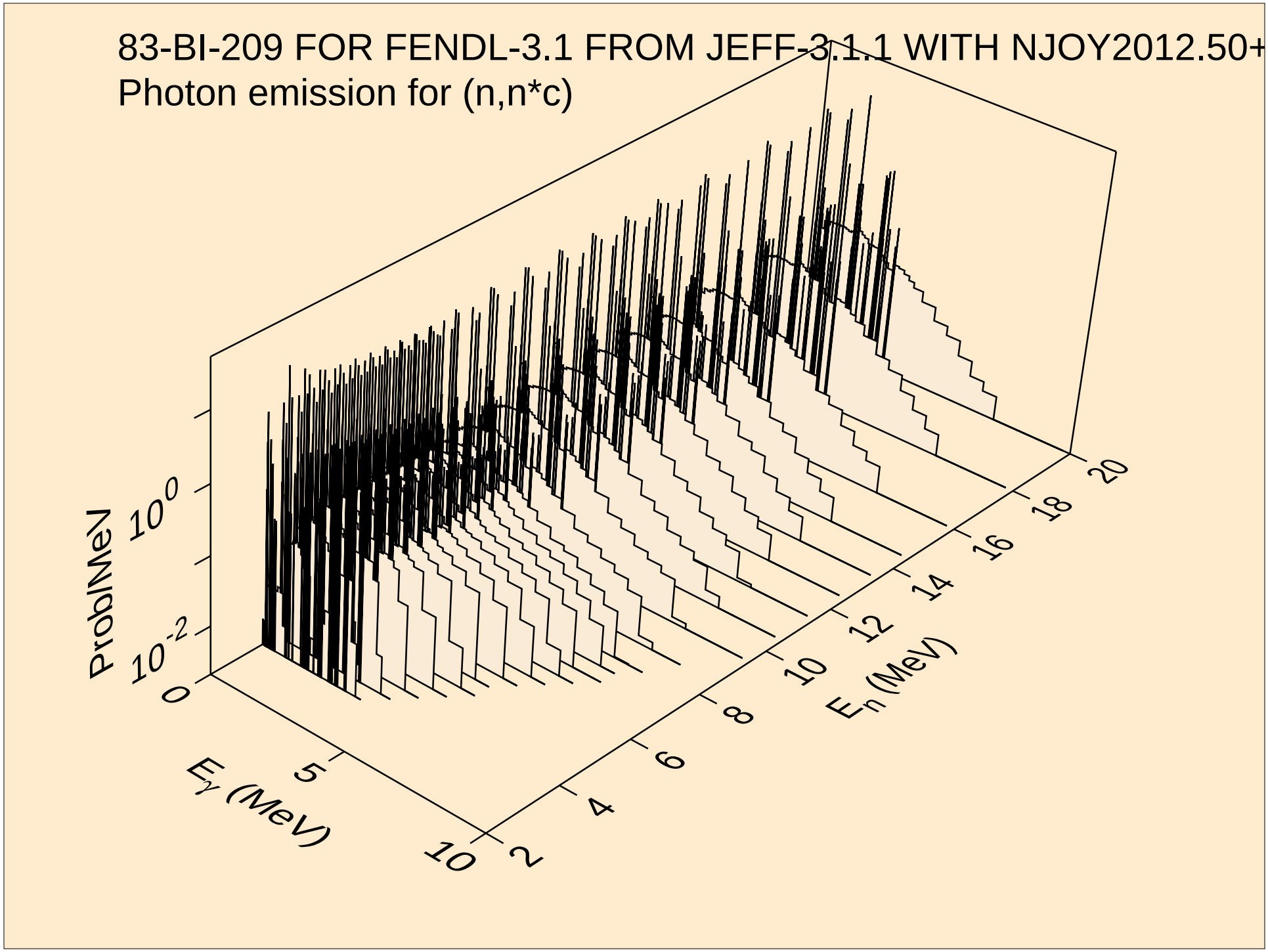

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*16)
Prob/MeV
10^0
10^-2
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

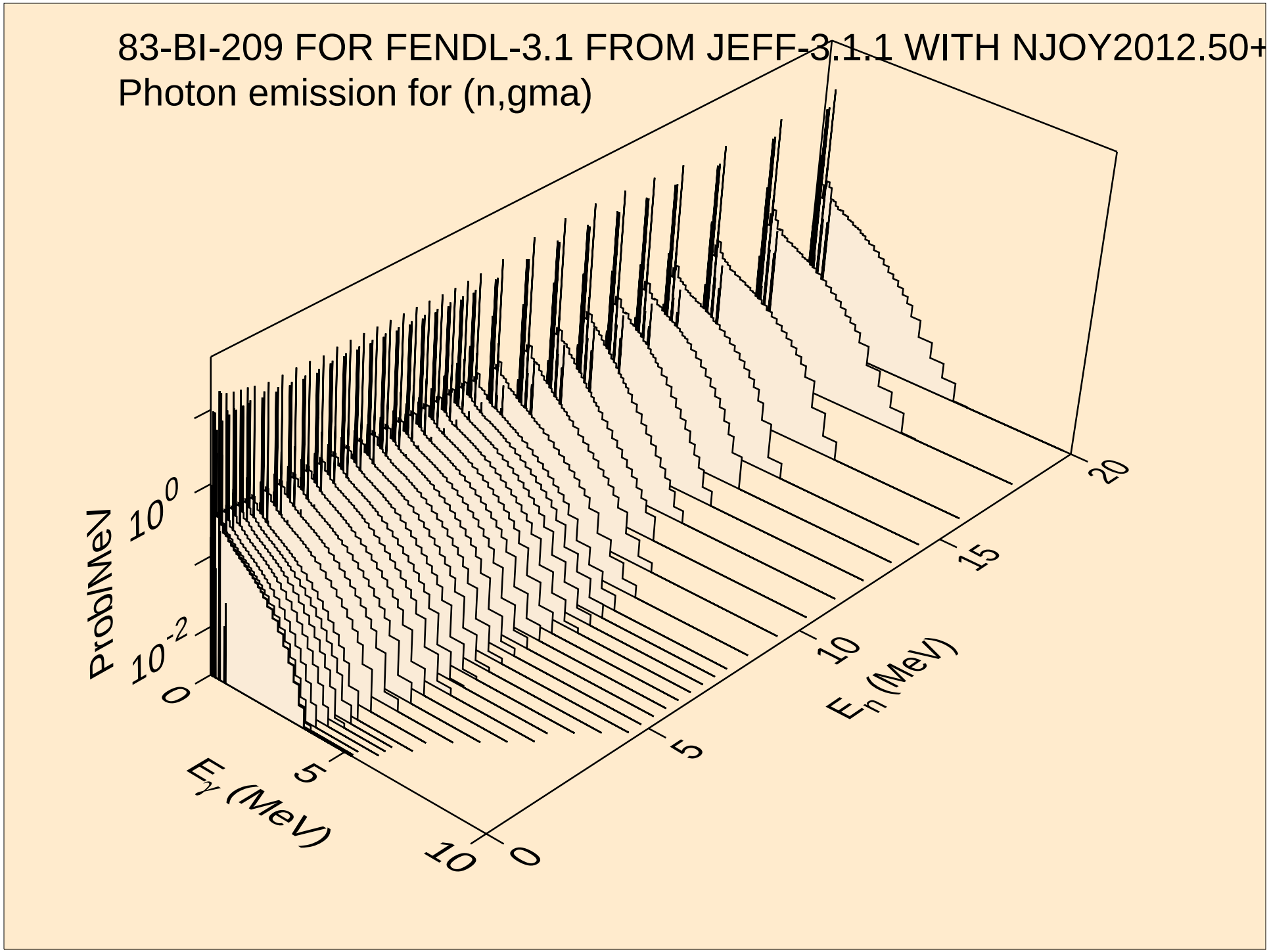

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*17)
Prob/MeV
10^0
10^-2
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

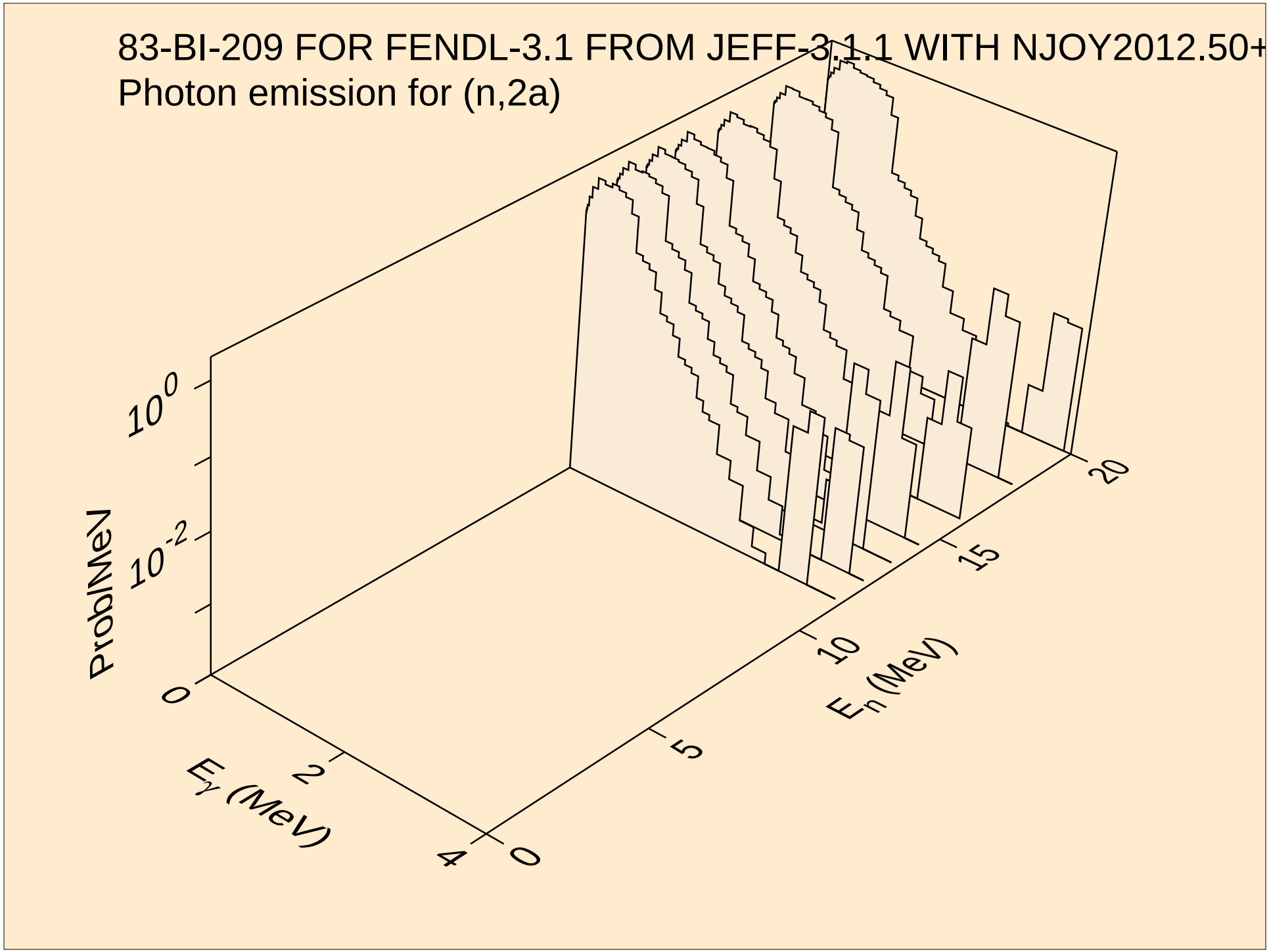

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*18)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
E_n (MeV)
0
20
40
60
80
100
120
140
160
180
200

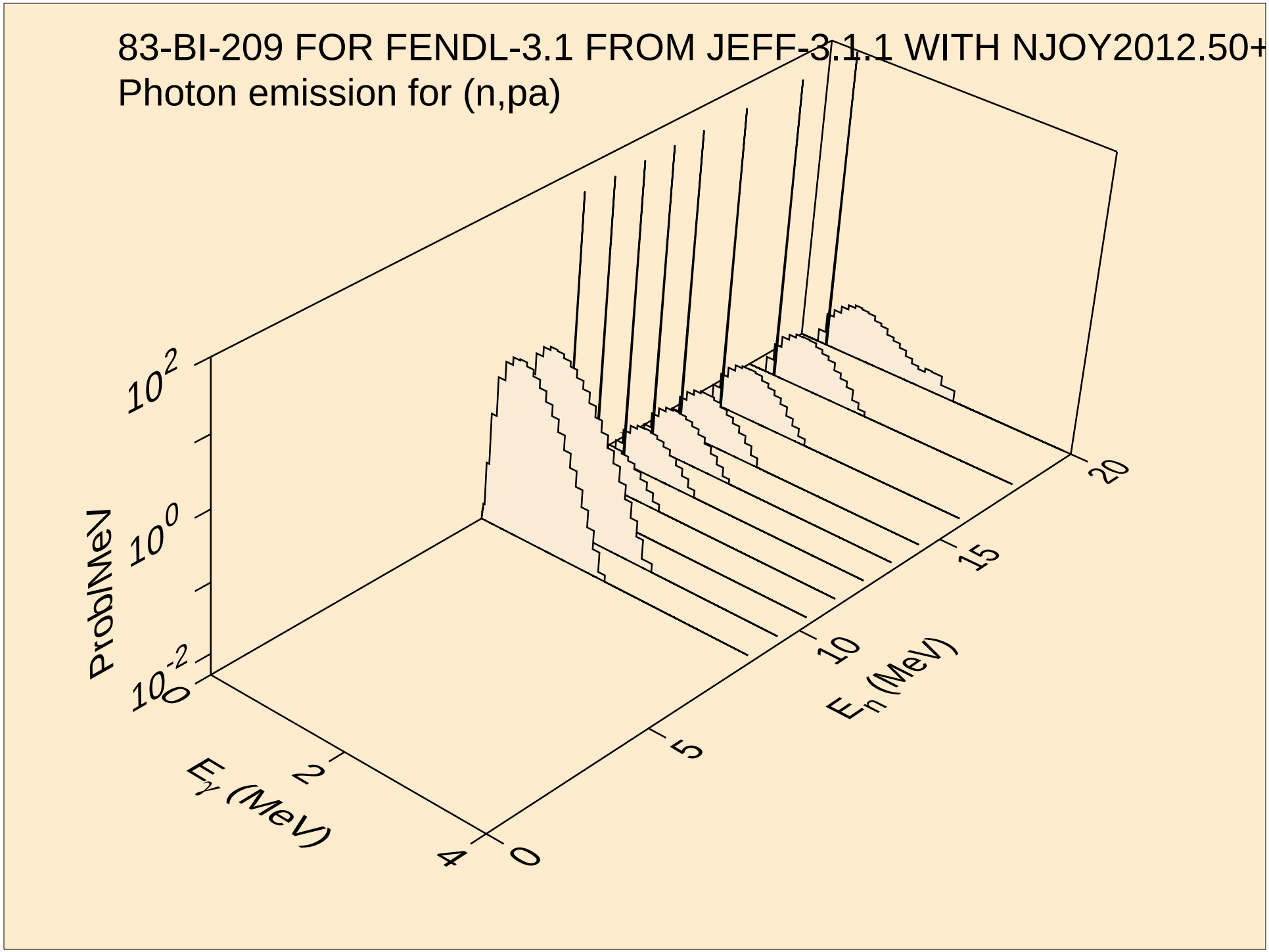

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*19)
Prob/MeV
10^{0}
10^{-2}
0
1
2
3
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

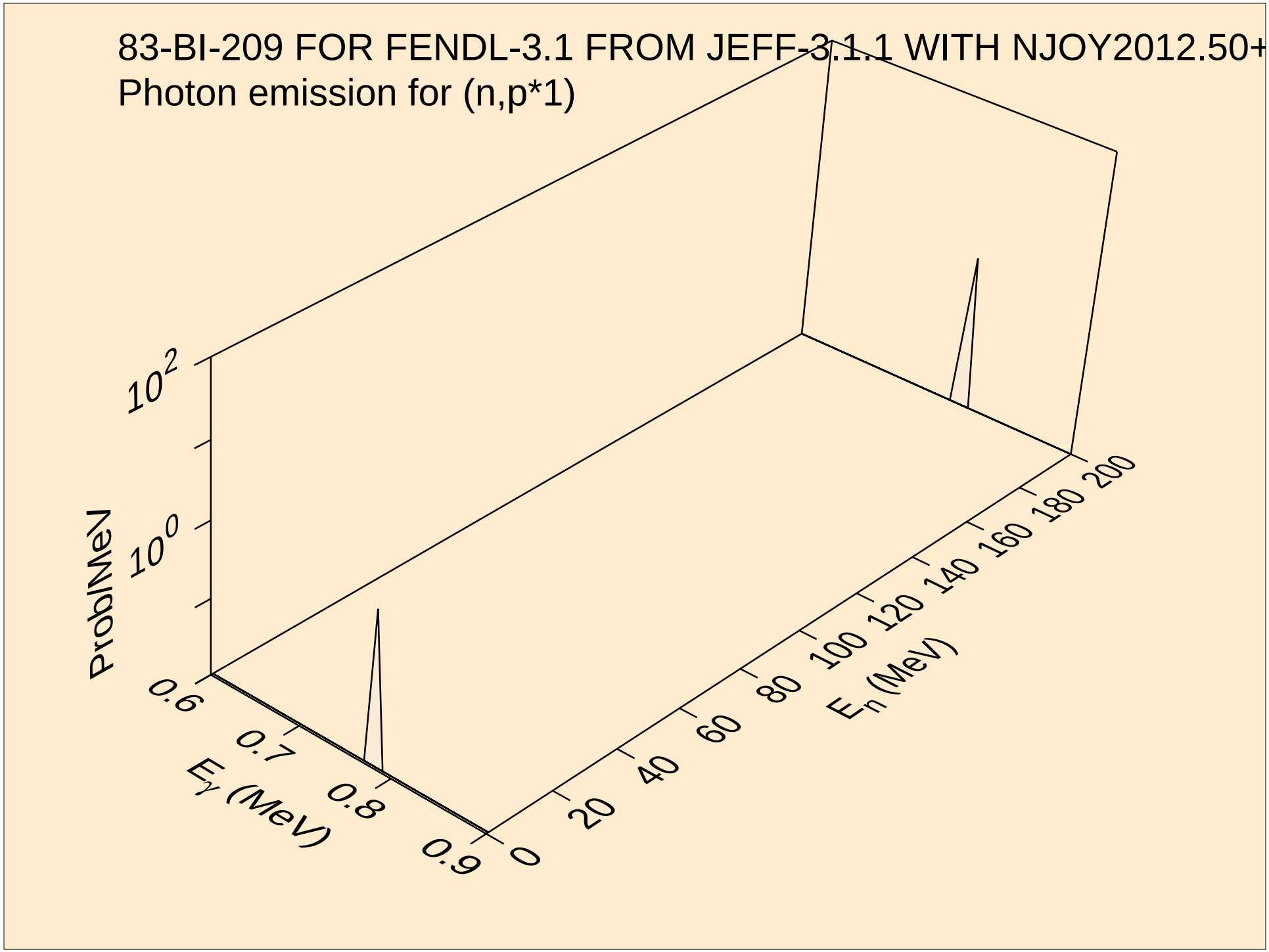

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*20)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
3
4
E_n (MeV)
0
20
40
60
80
100
120
140
160
180
200

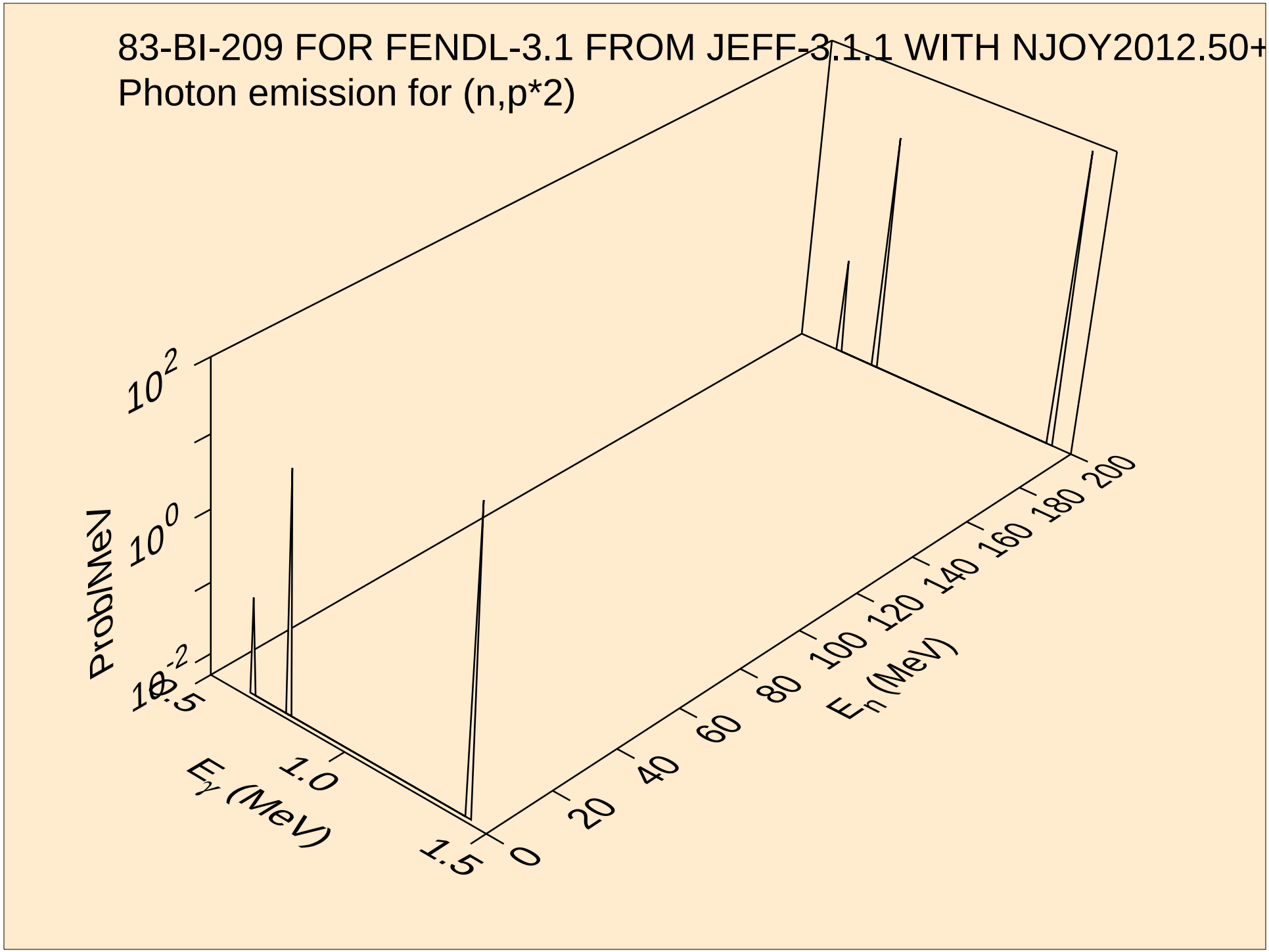

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,n*c)
Prob/MeV
10^{0}
10^{-2}
0
E_γ (MeV)
5
10
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

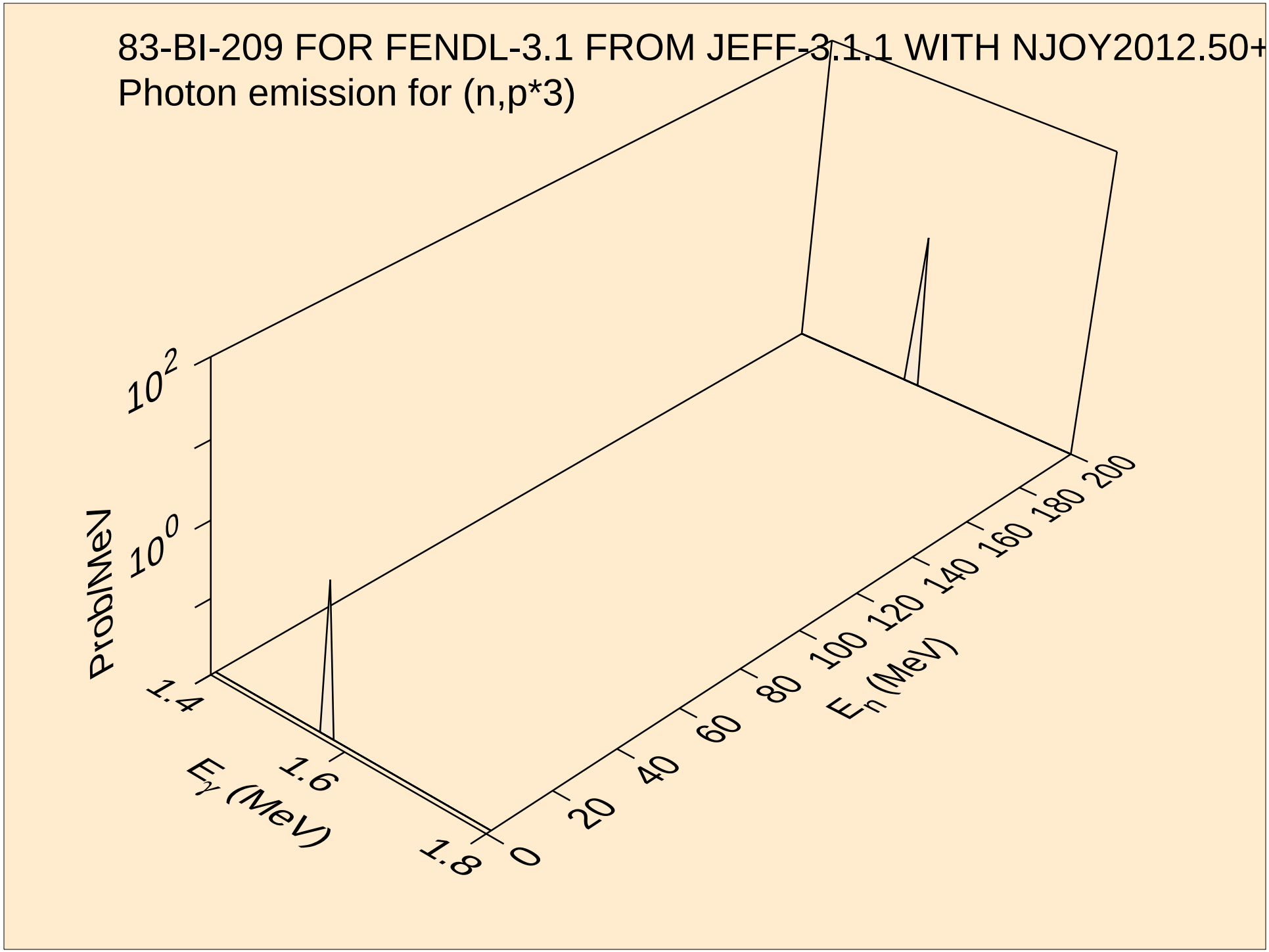

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,gma)
Prob/MeV
10^0
10^-2
0
5
10
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

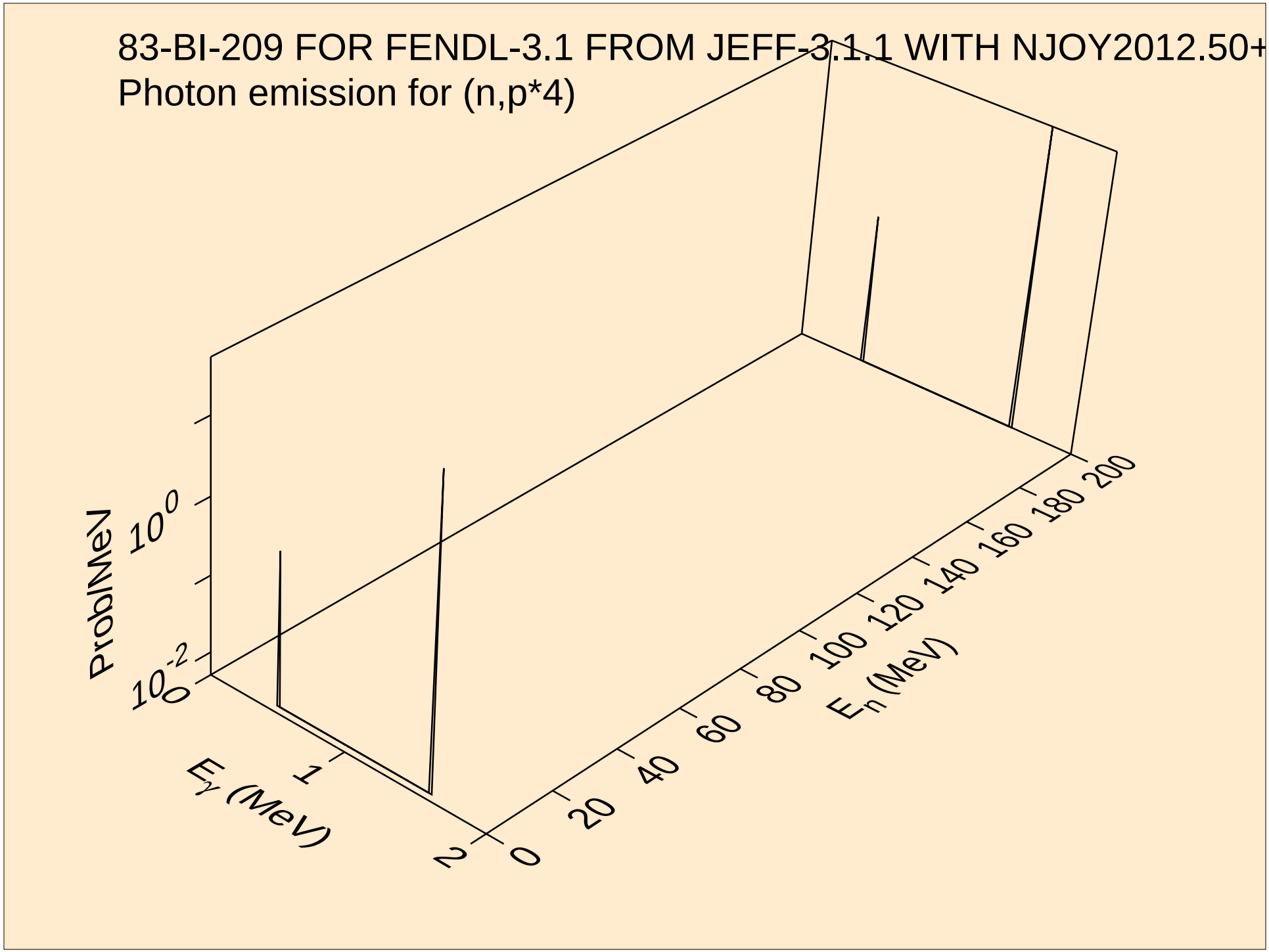

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,2a)
Prob/MeV
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

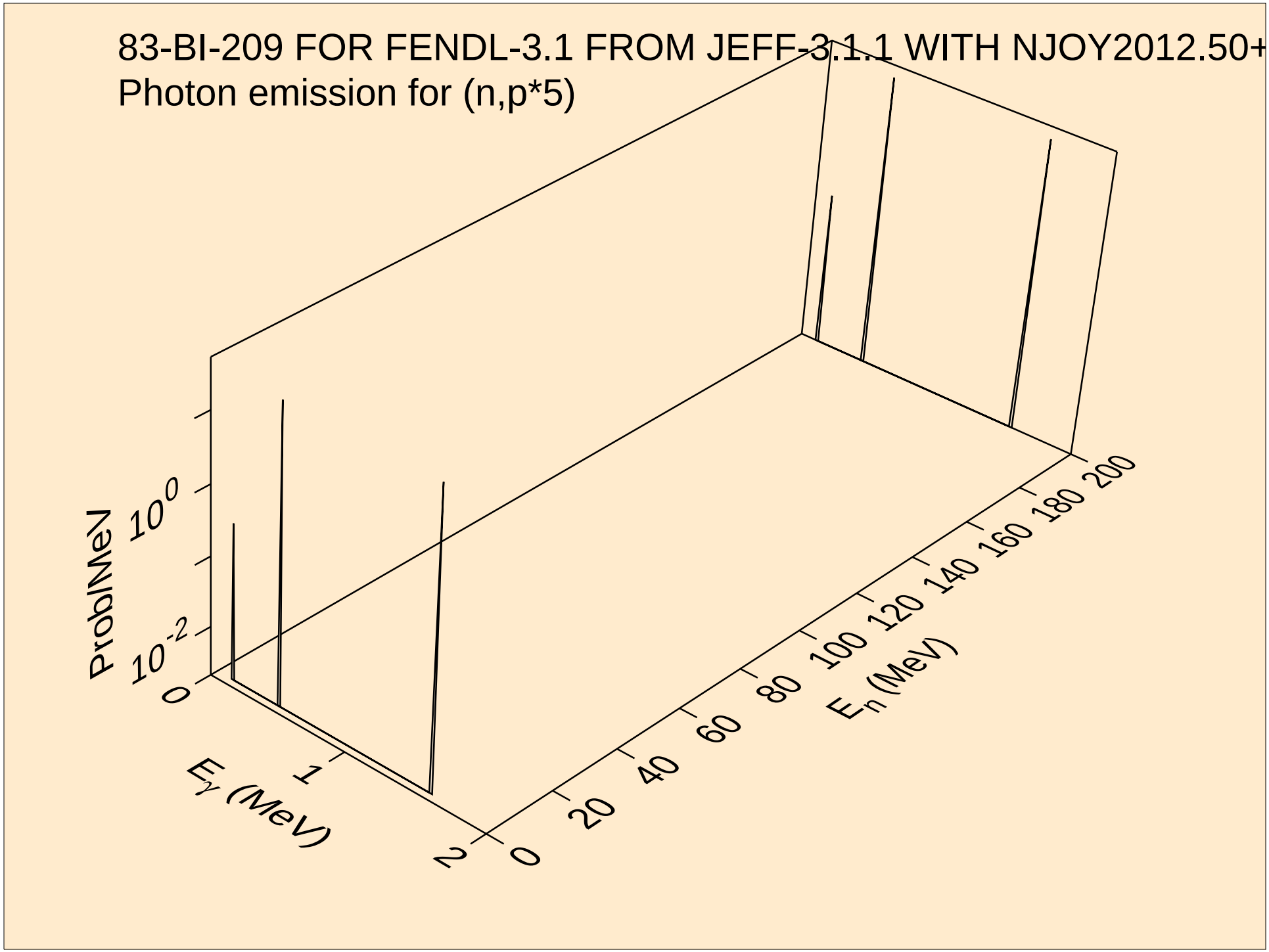

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,pa)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
E_n (MeV)
0
5
10
15
20

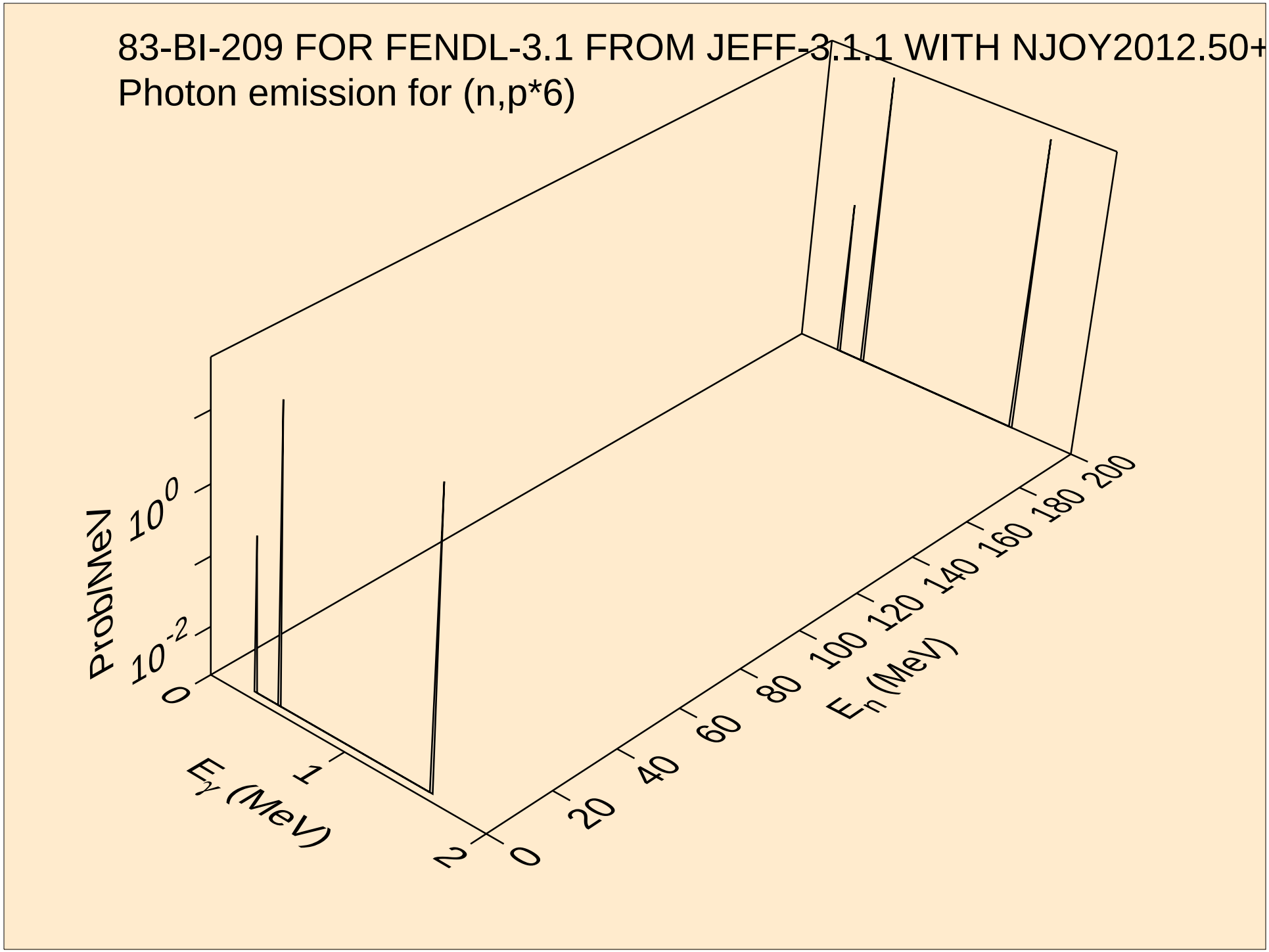

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*1)
Prob/MeV
10^2
10^0
0.6
0.7
0.8
0.9
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

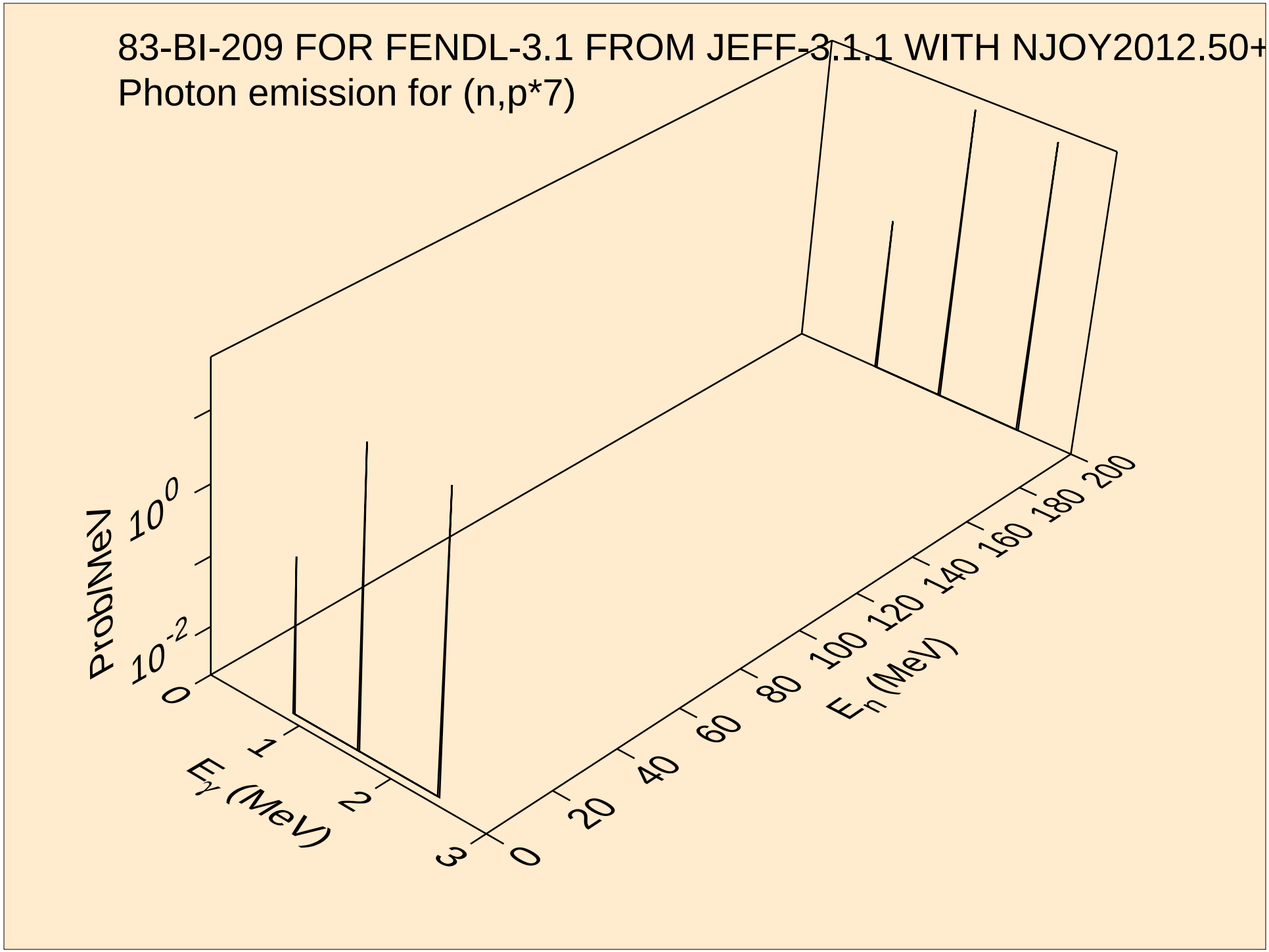

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*2)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.5
1.0
1.5
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

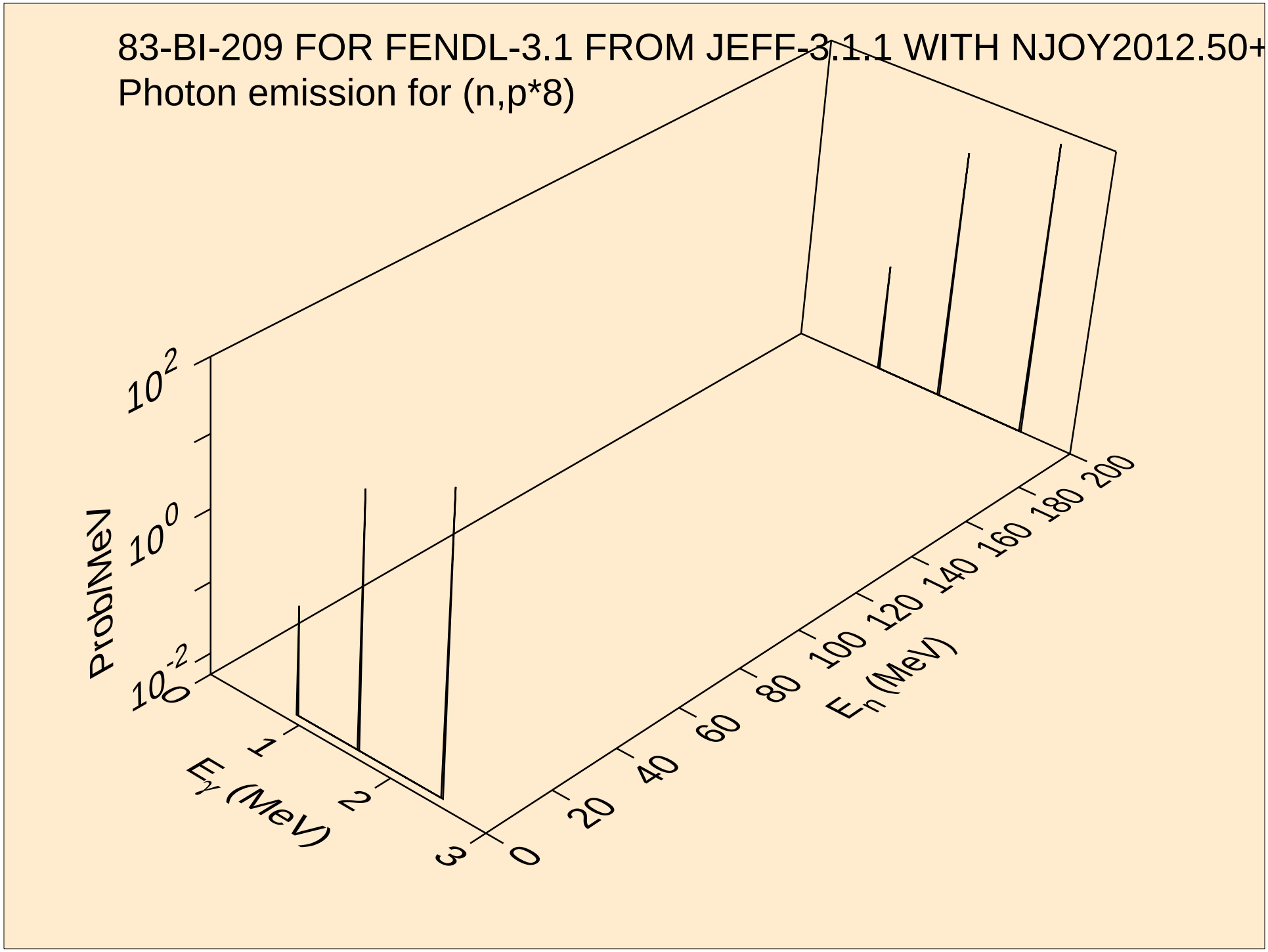

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*3)
Prob/MeV
10^2
10^0
1.4
1.6
1.8
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

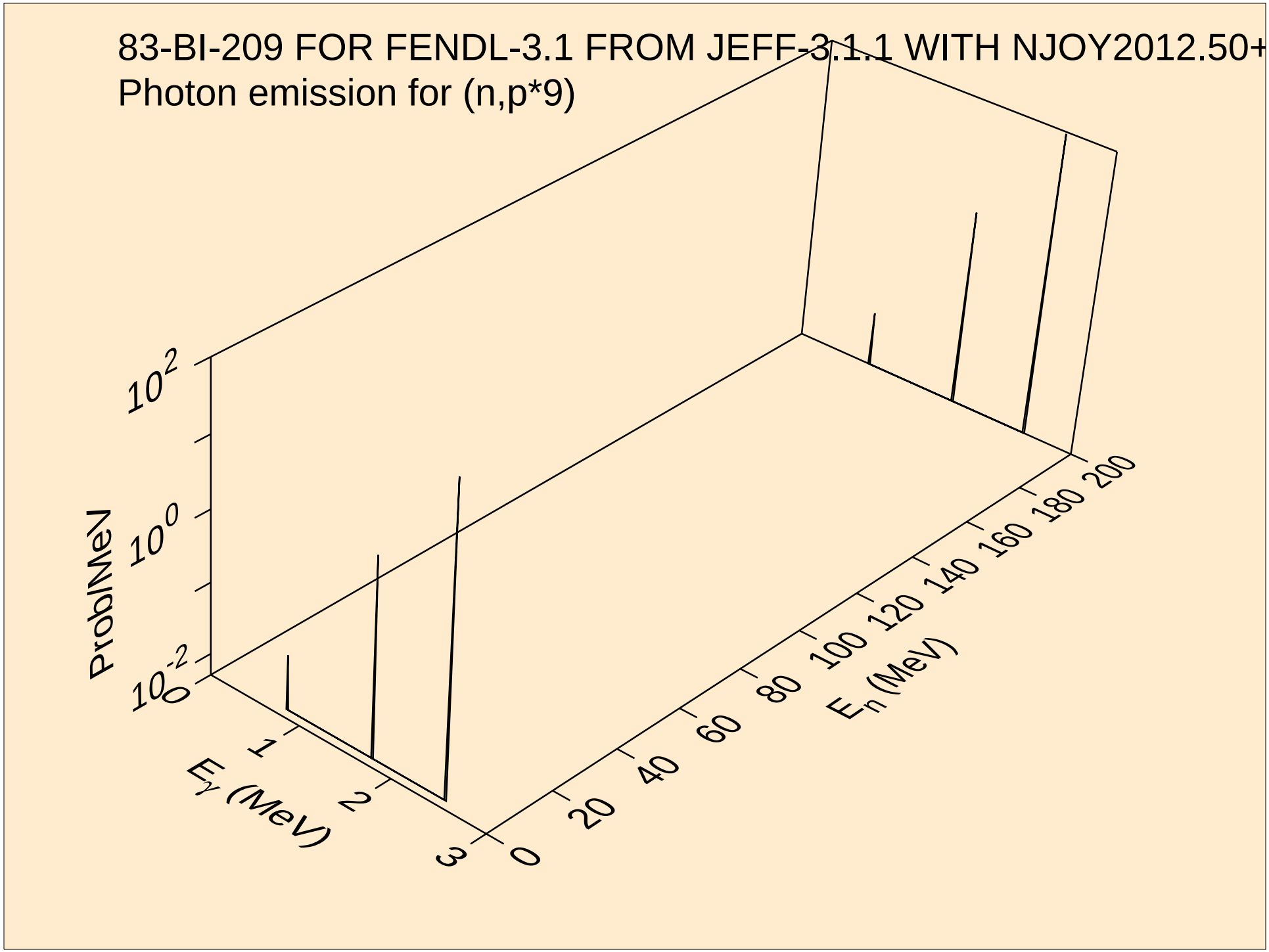

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*4)
Prob/MeV
10^{0}
10^{-2}
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

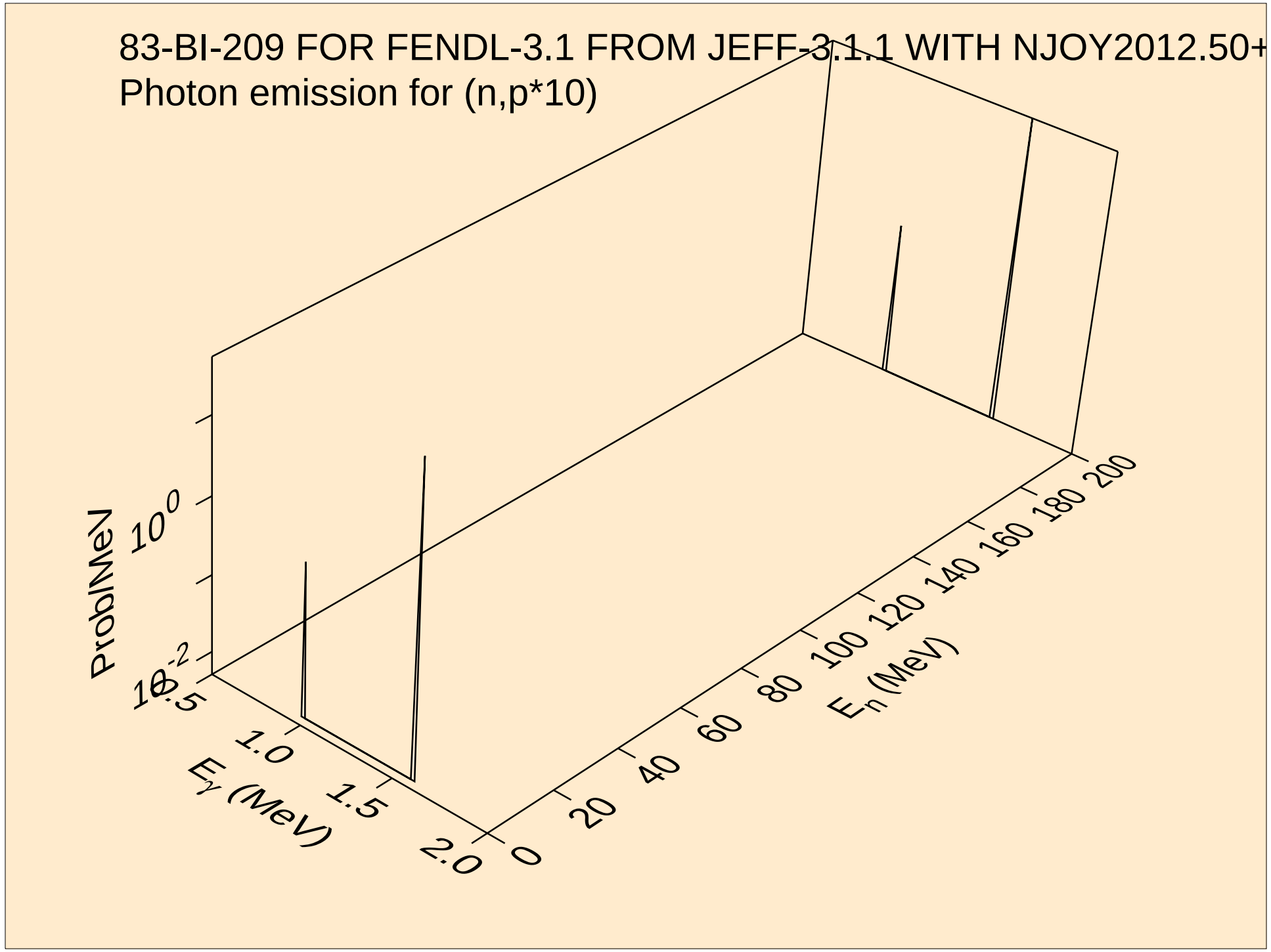

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*5)
Prob/MeV
10^0
10^-2
0
1
2
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

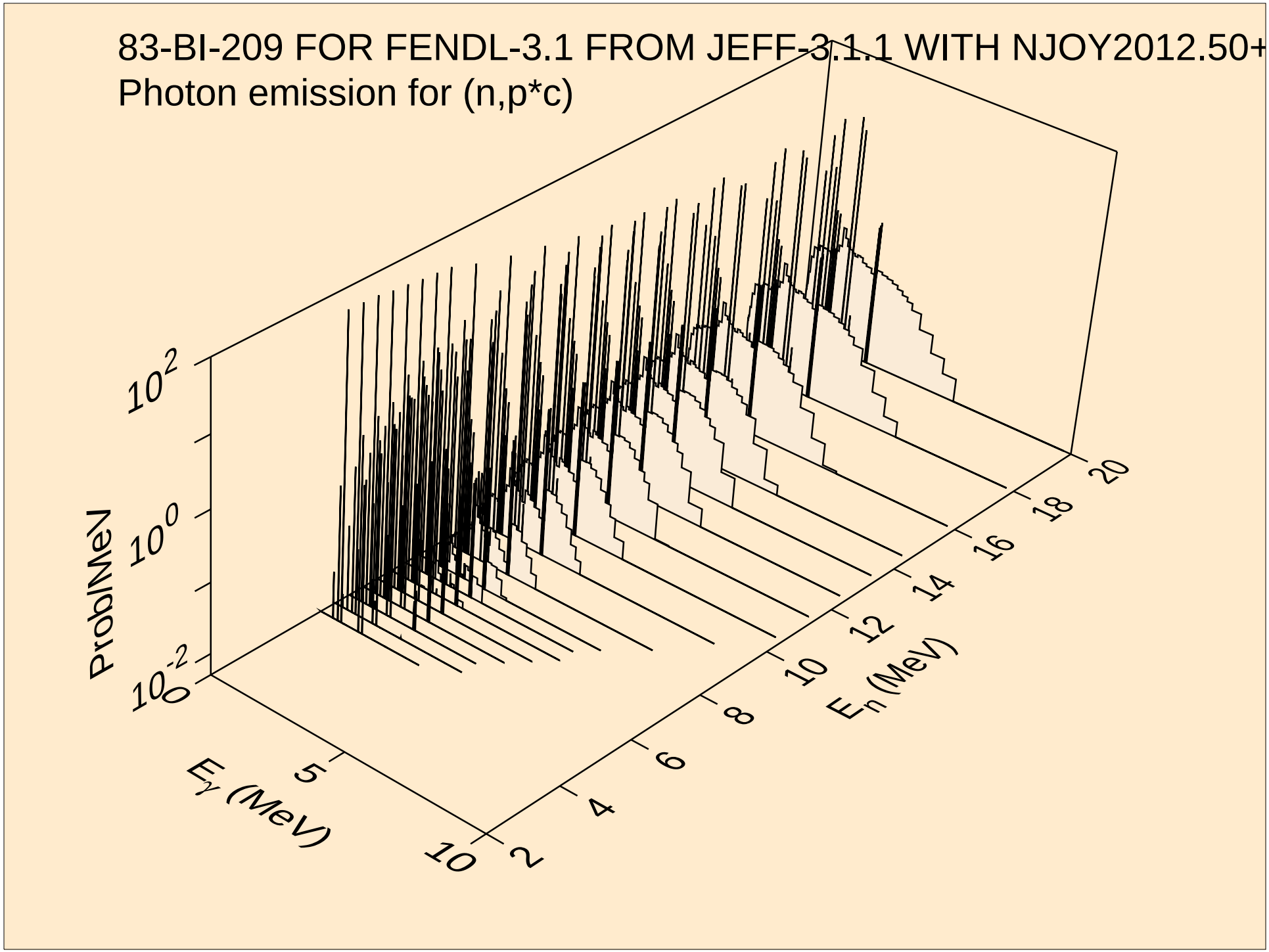

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*6)
Prob/MeV
10^0
10^-2
0
1
2
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

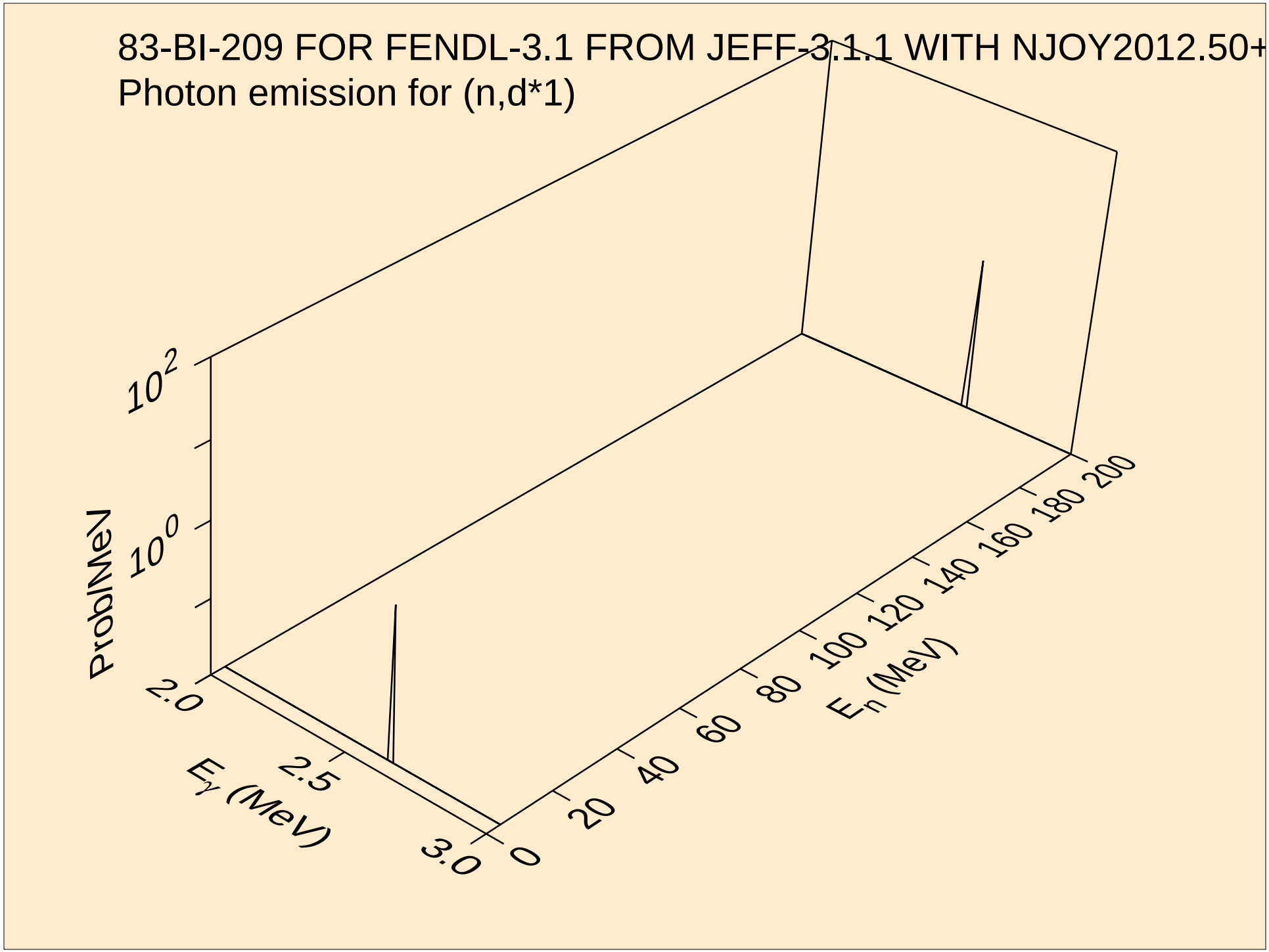

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*7)
Prob/MeV
10^0
10^-2
0
1
2
3
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

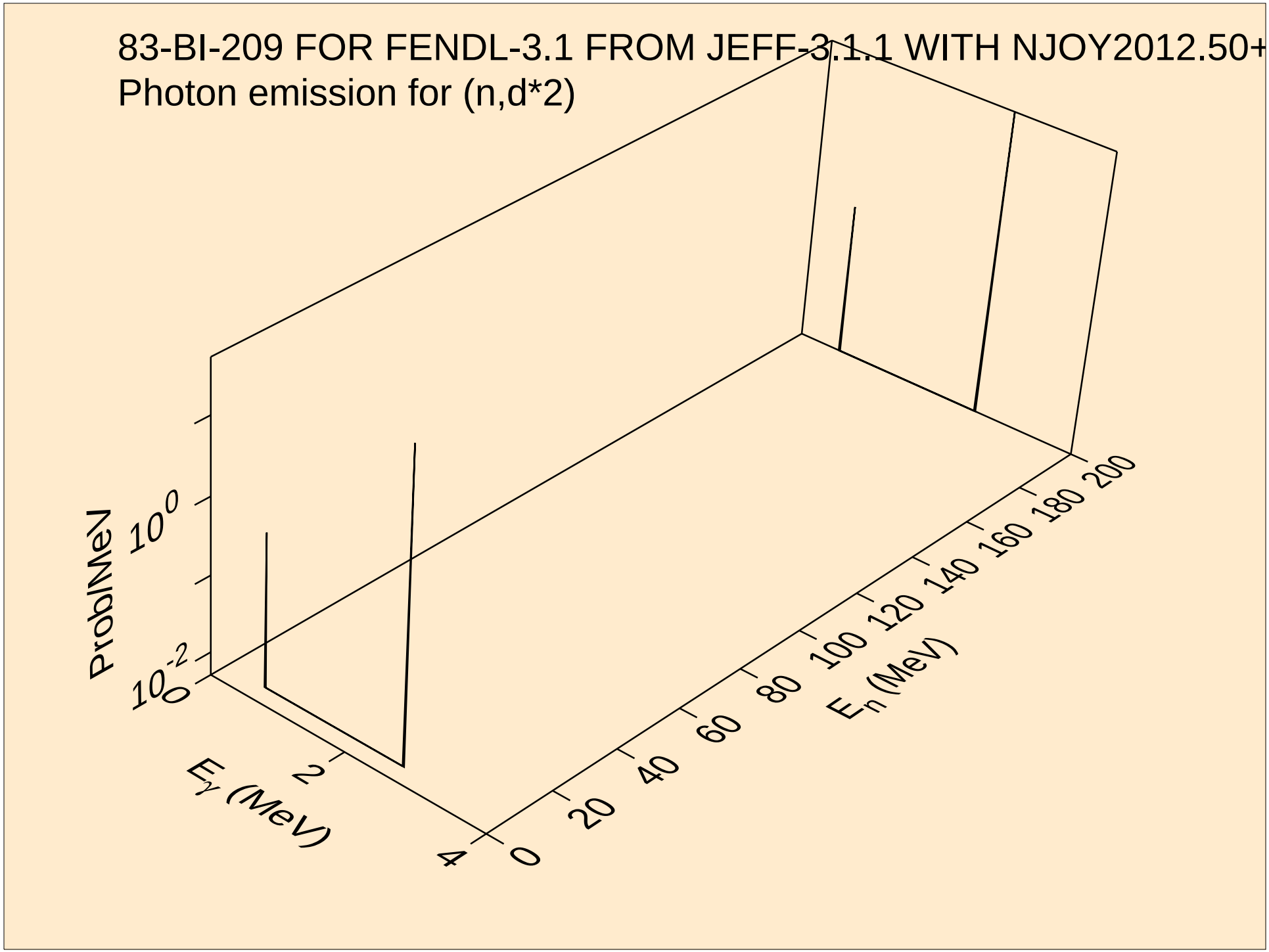

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*8)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
1
2
3
E_n (MeV)
0
20
40
60
80
100
120
140
160
180
200

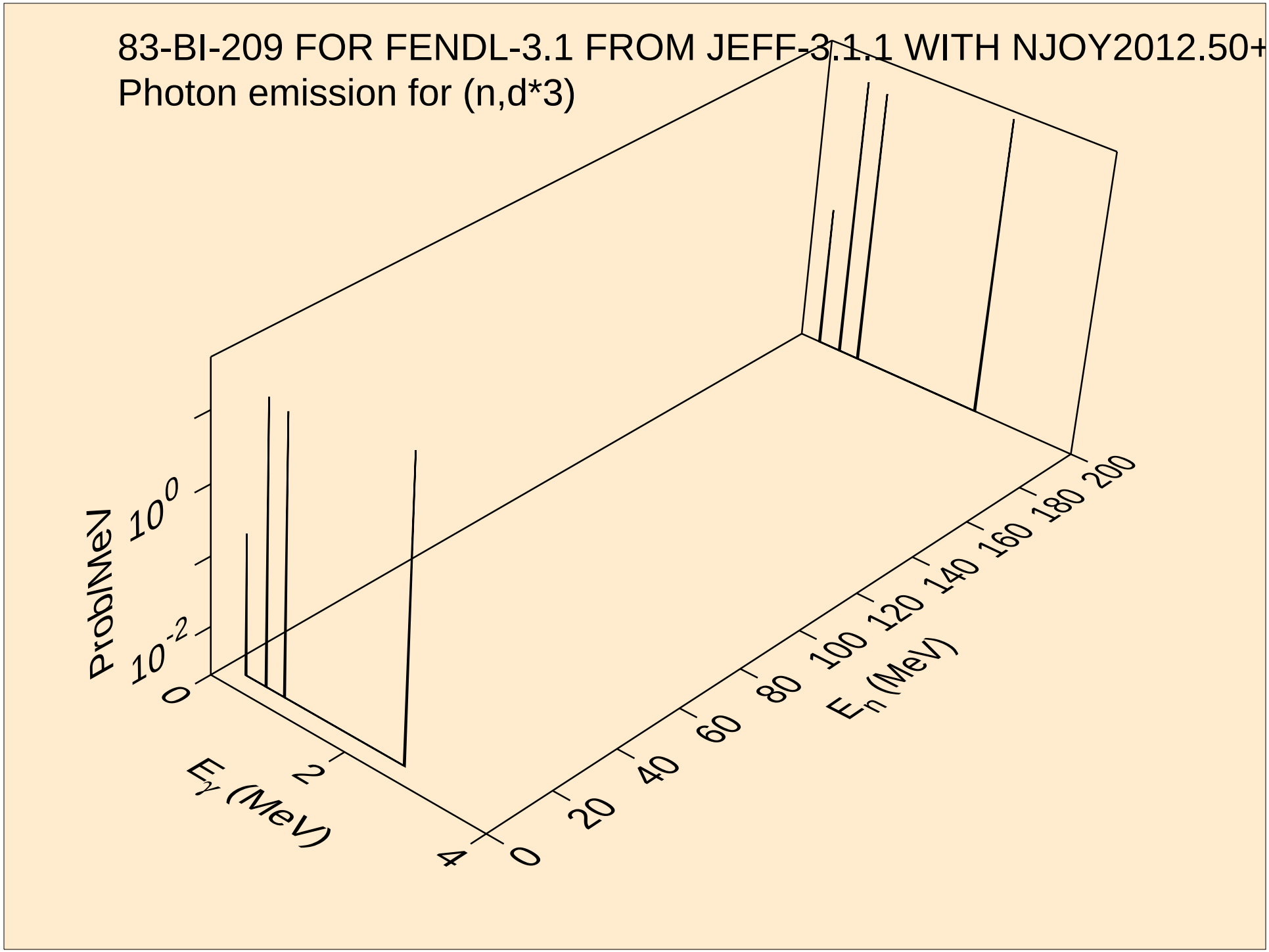

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*9)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
1
2
3
E_n (MeV)
0
20
40
60
80
100
120
140
160
180
200

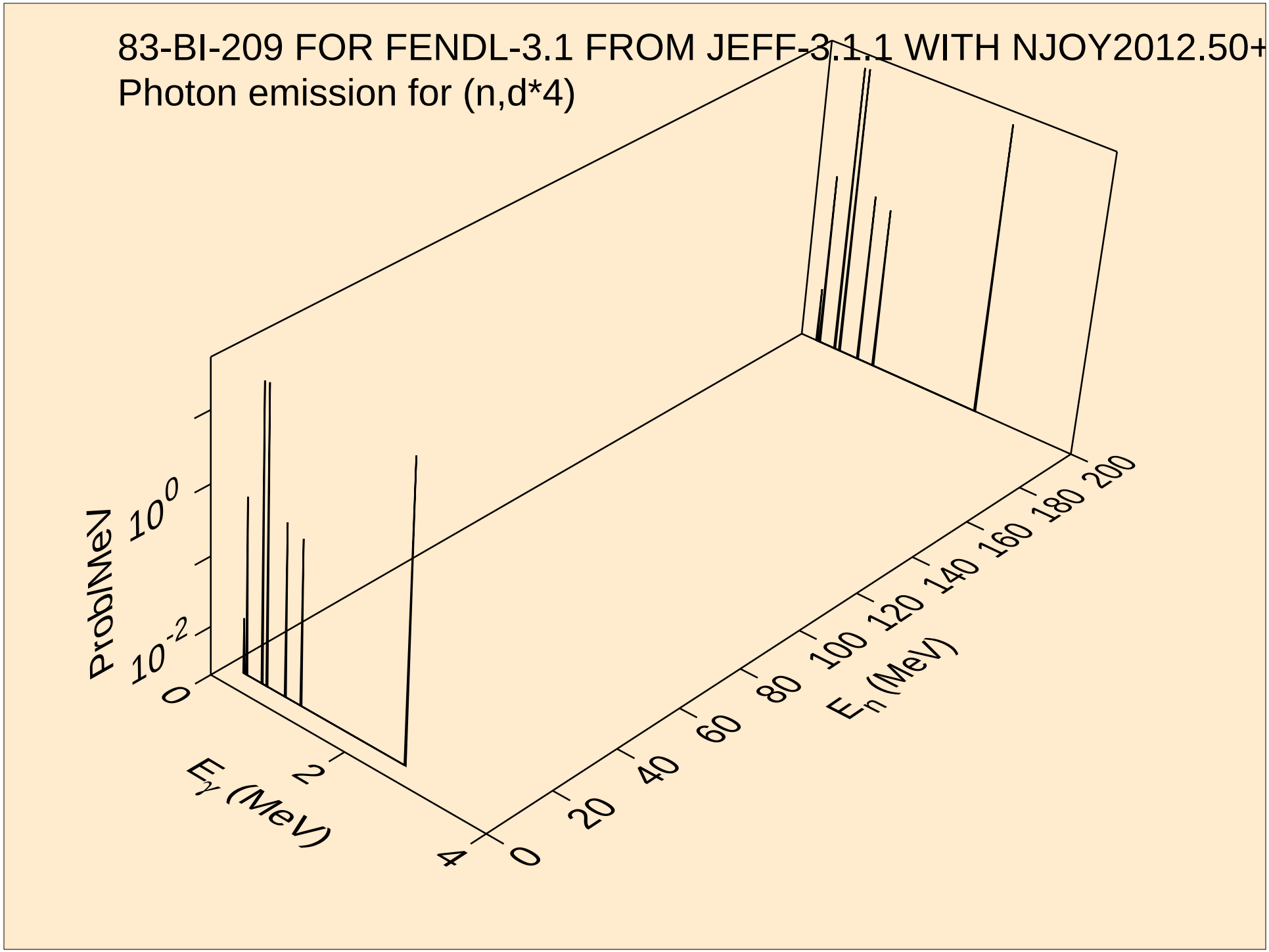

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*10)
Prob/MeV
10^{0}
10^{-2}
0.5
1.0
1.5
2.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

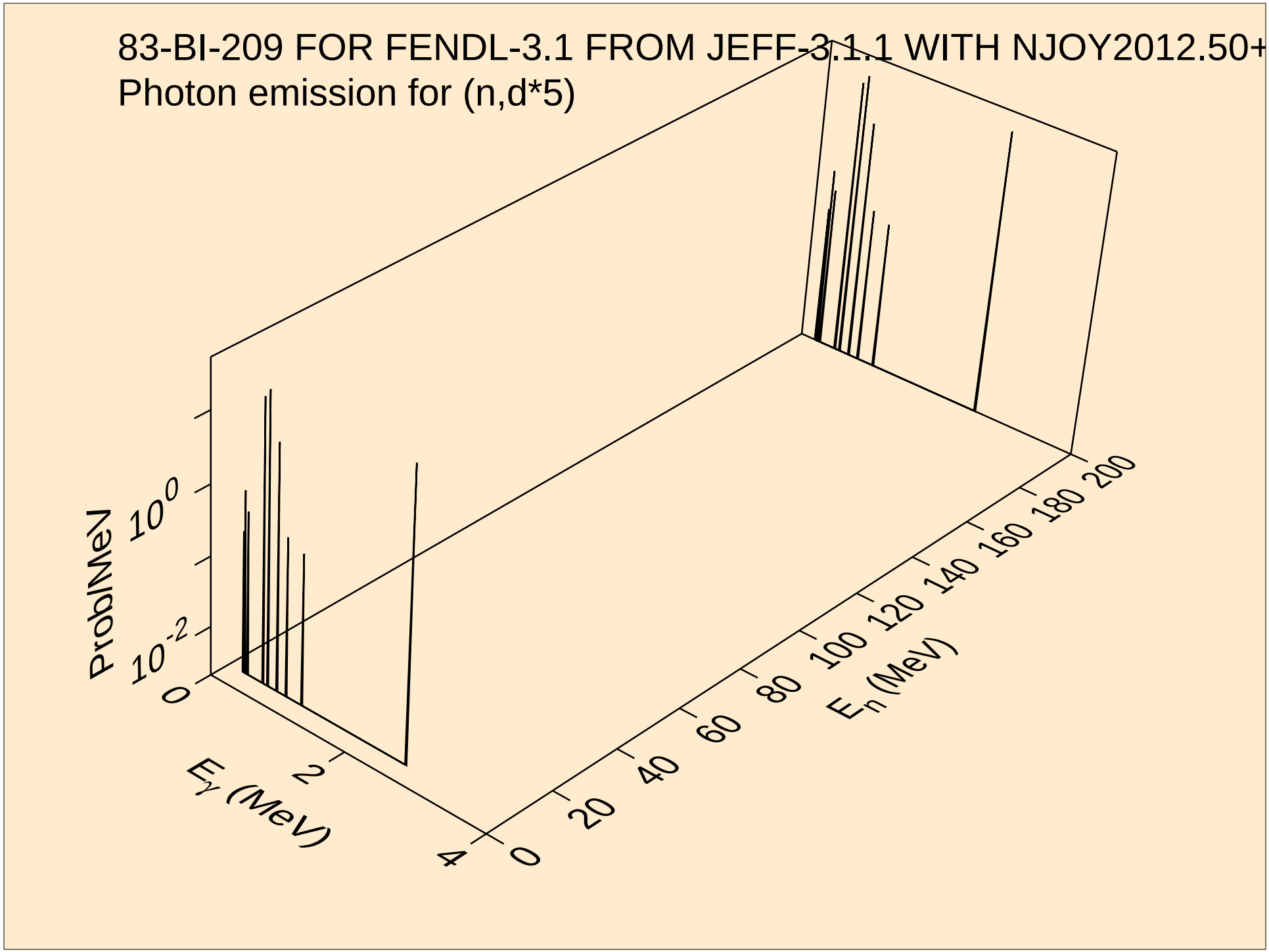

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,p*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
5
10
E_n (MeV)
2
4
6
8
10
12
14
16
18
20

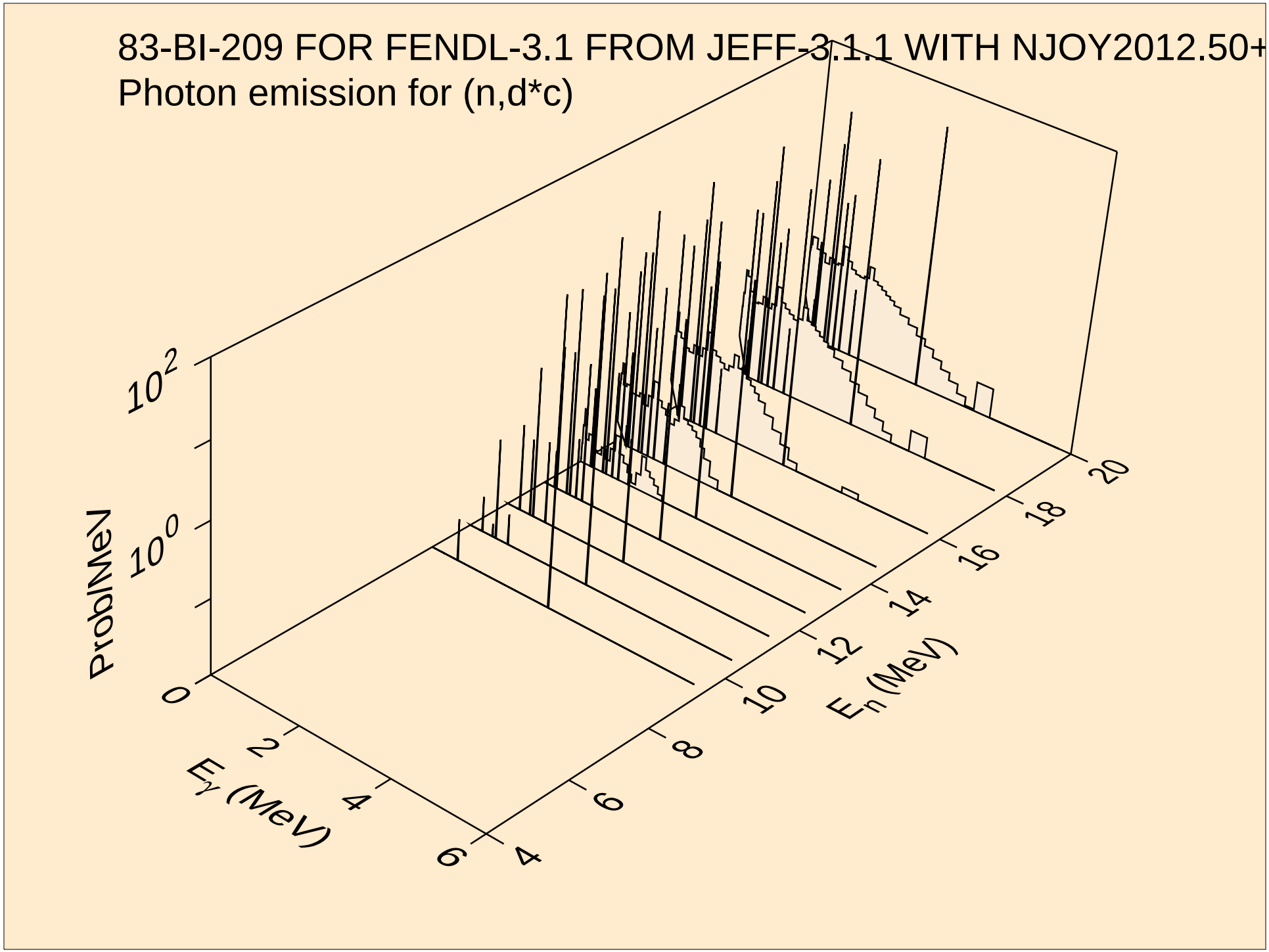

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*1)
Prob/MeV
10^2
10^0
2.0
2.5
3.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

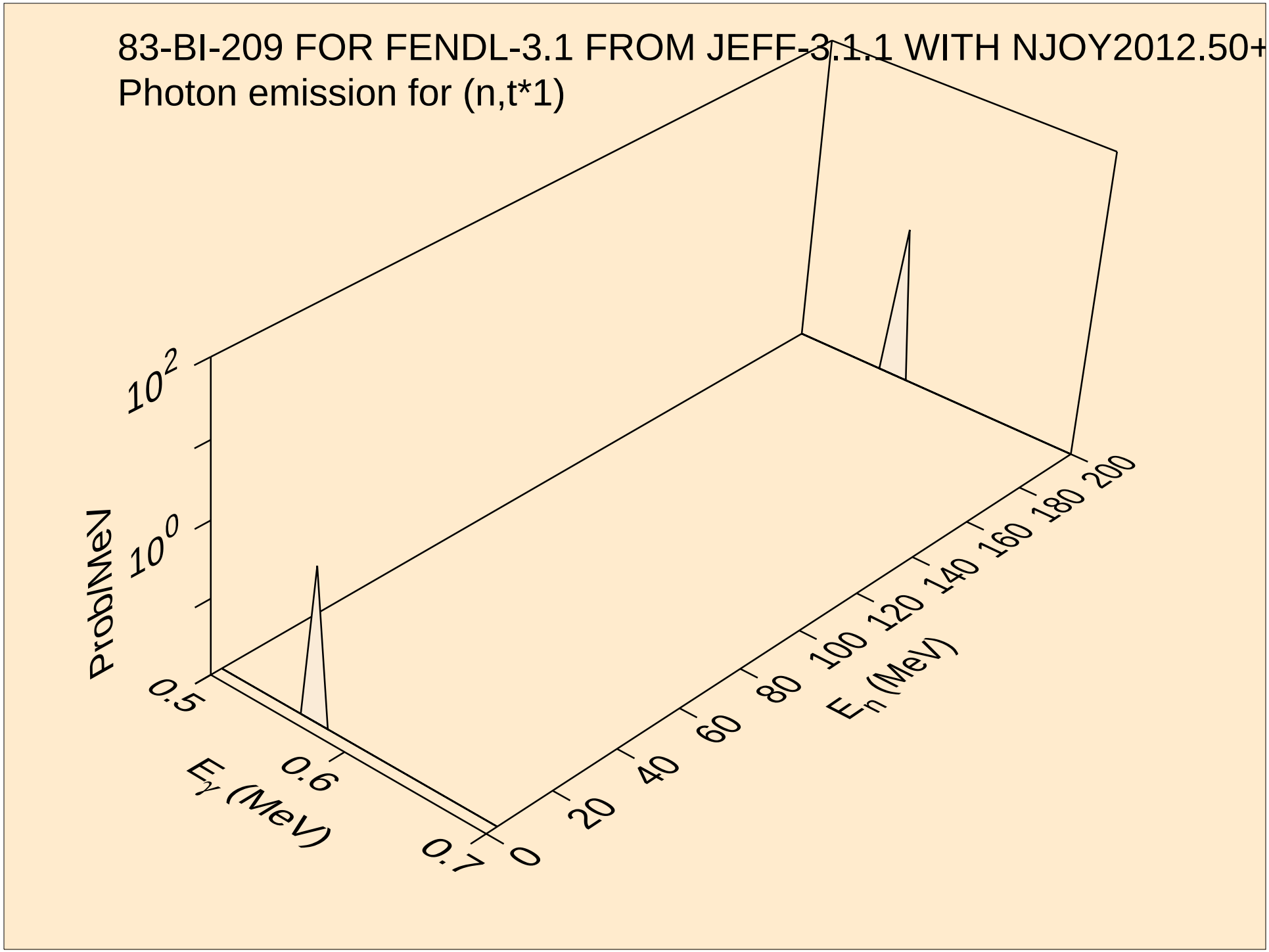

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*2)
Prob/MeV
10^{0}
10^{-2}
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

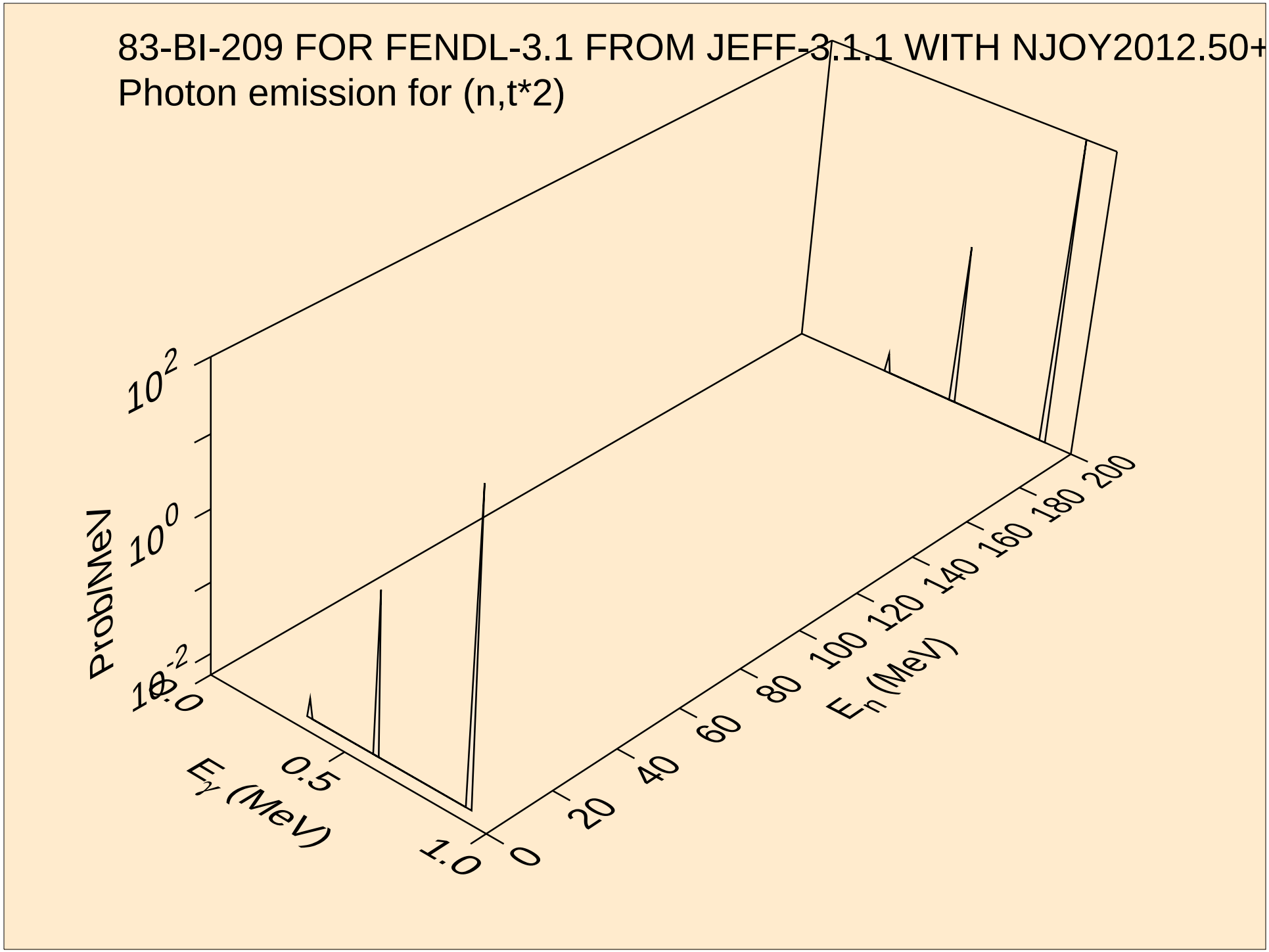

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*3)
Prob/MeV
10^0
10^-2
0
2
4
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

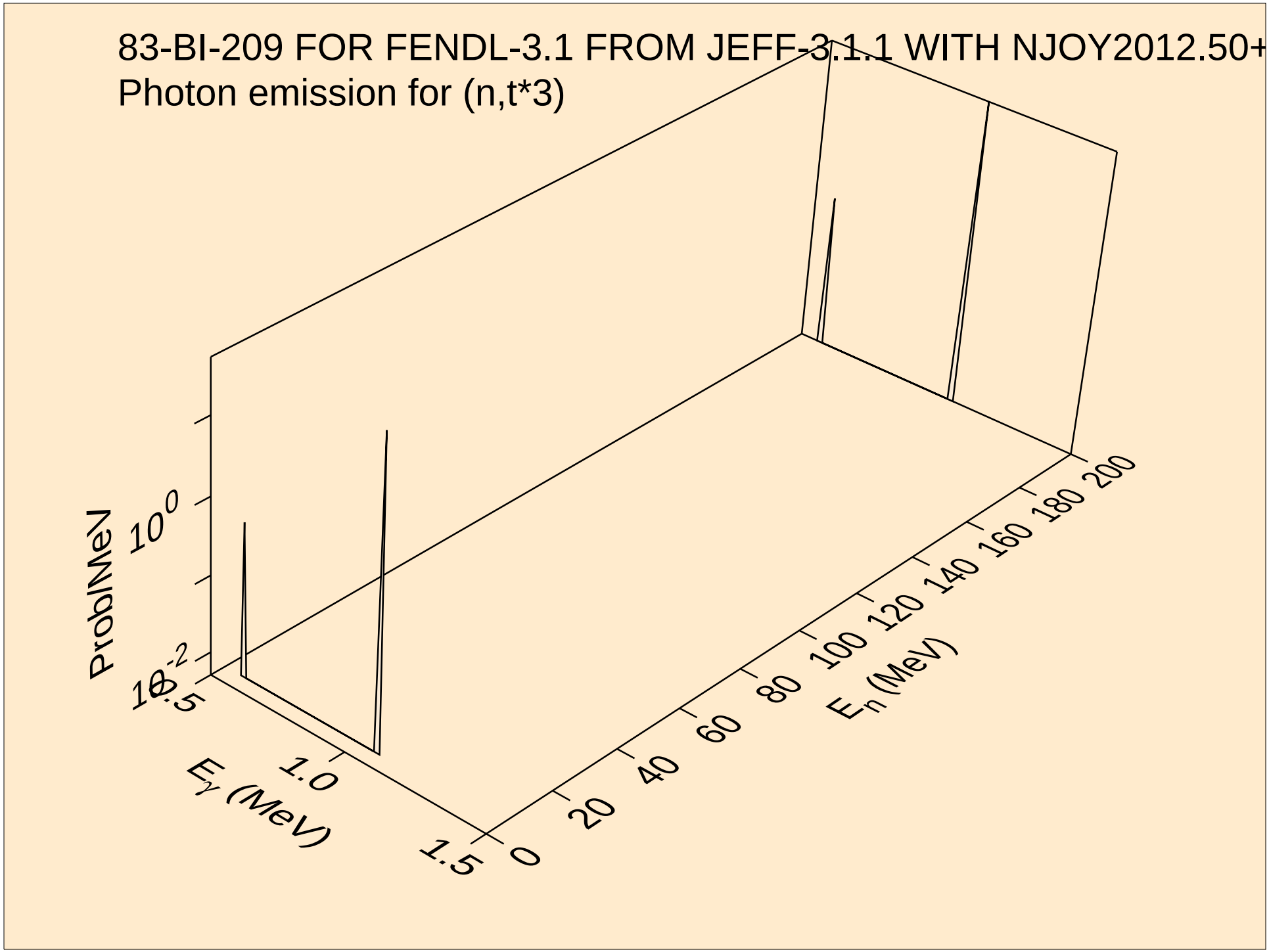

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*4)
Prob/MeV
10^0
10^-2
0
2
4
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

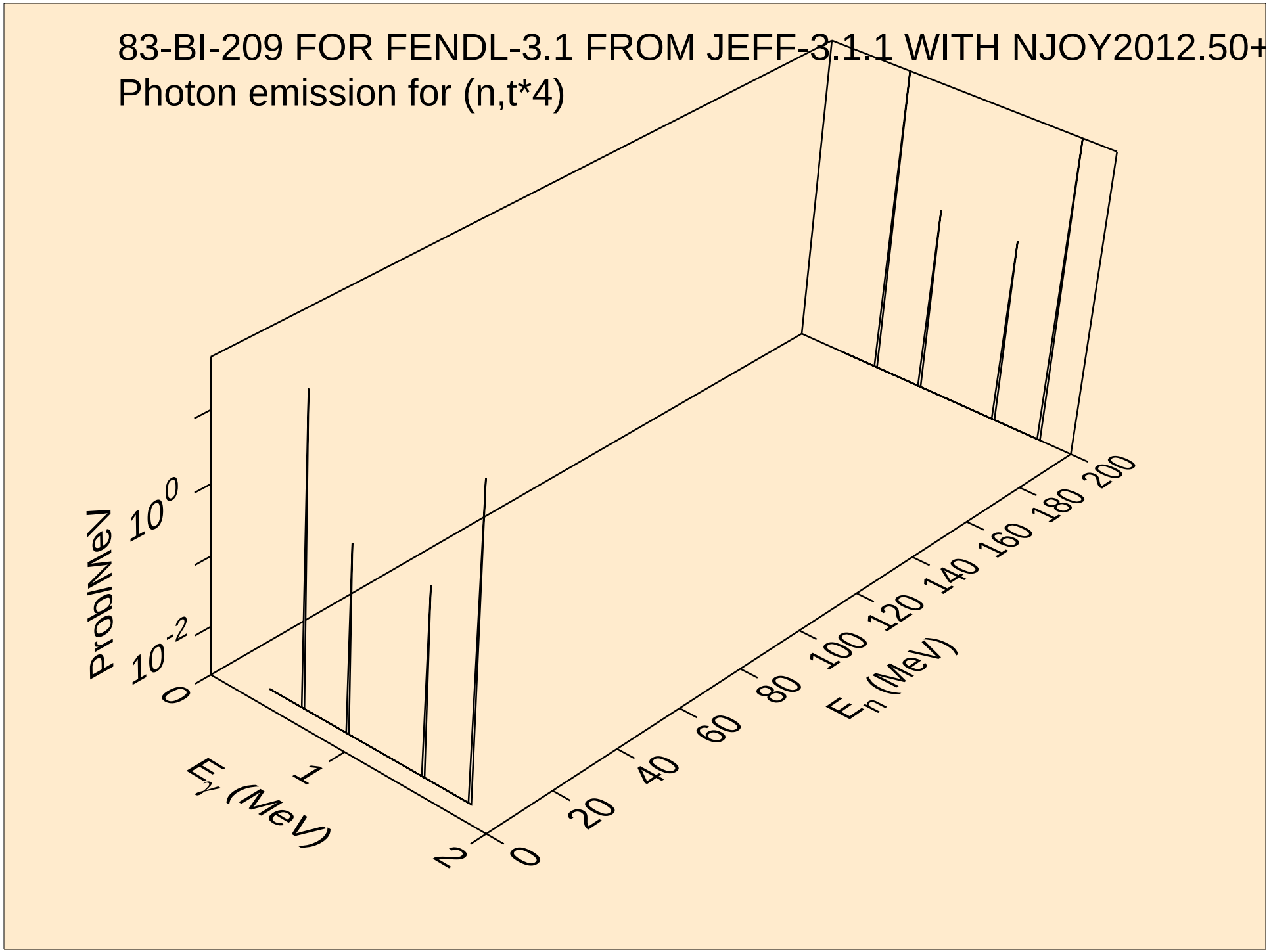

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*5)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
2
4
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

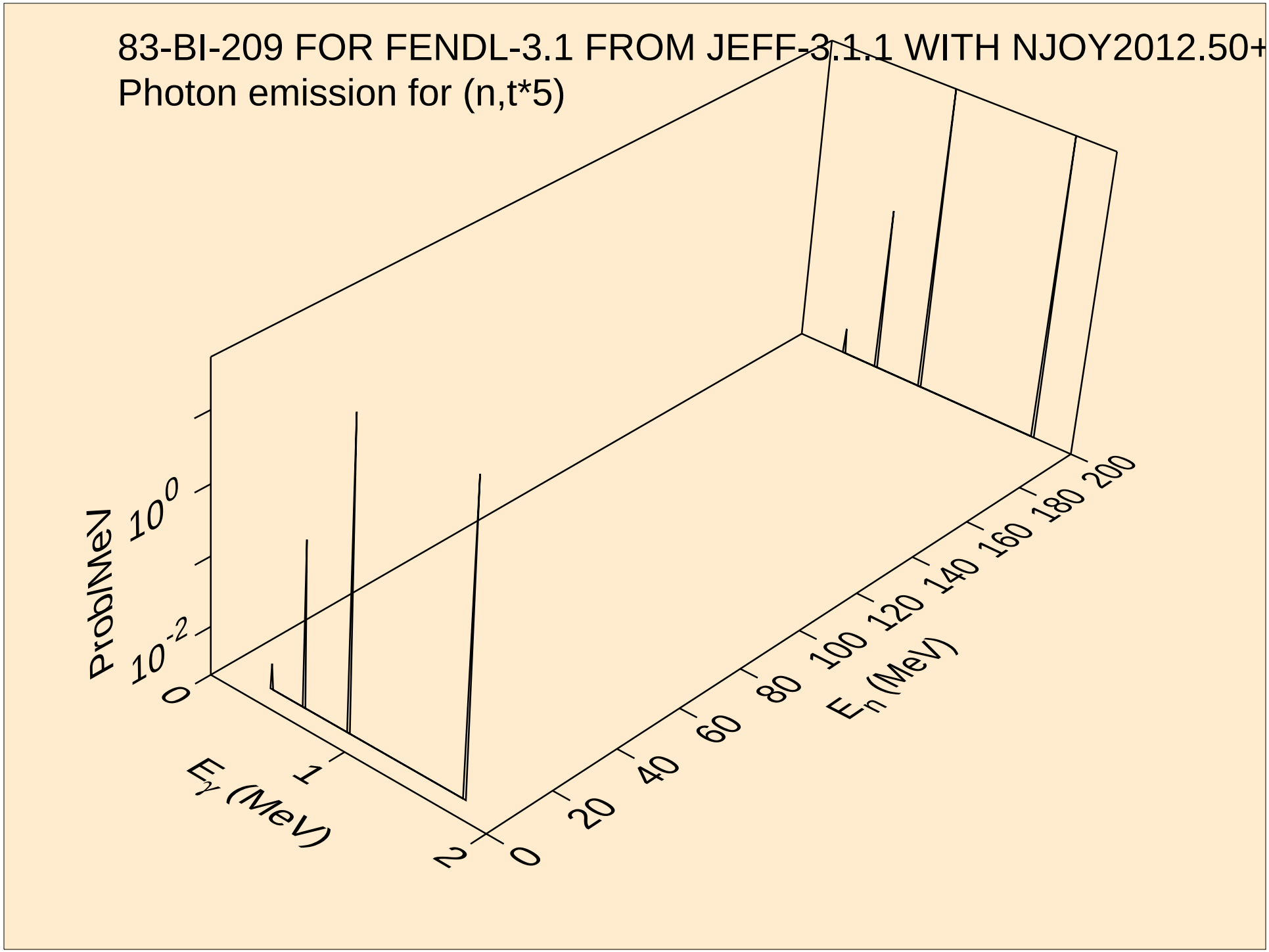

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,d*c)
Prob/MeV
10^2
10^0
0
2
4
6
E_γ (MeV)
4
6
8
10
12
14
16
18
20
E_n (MeV)

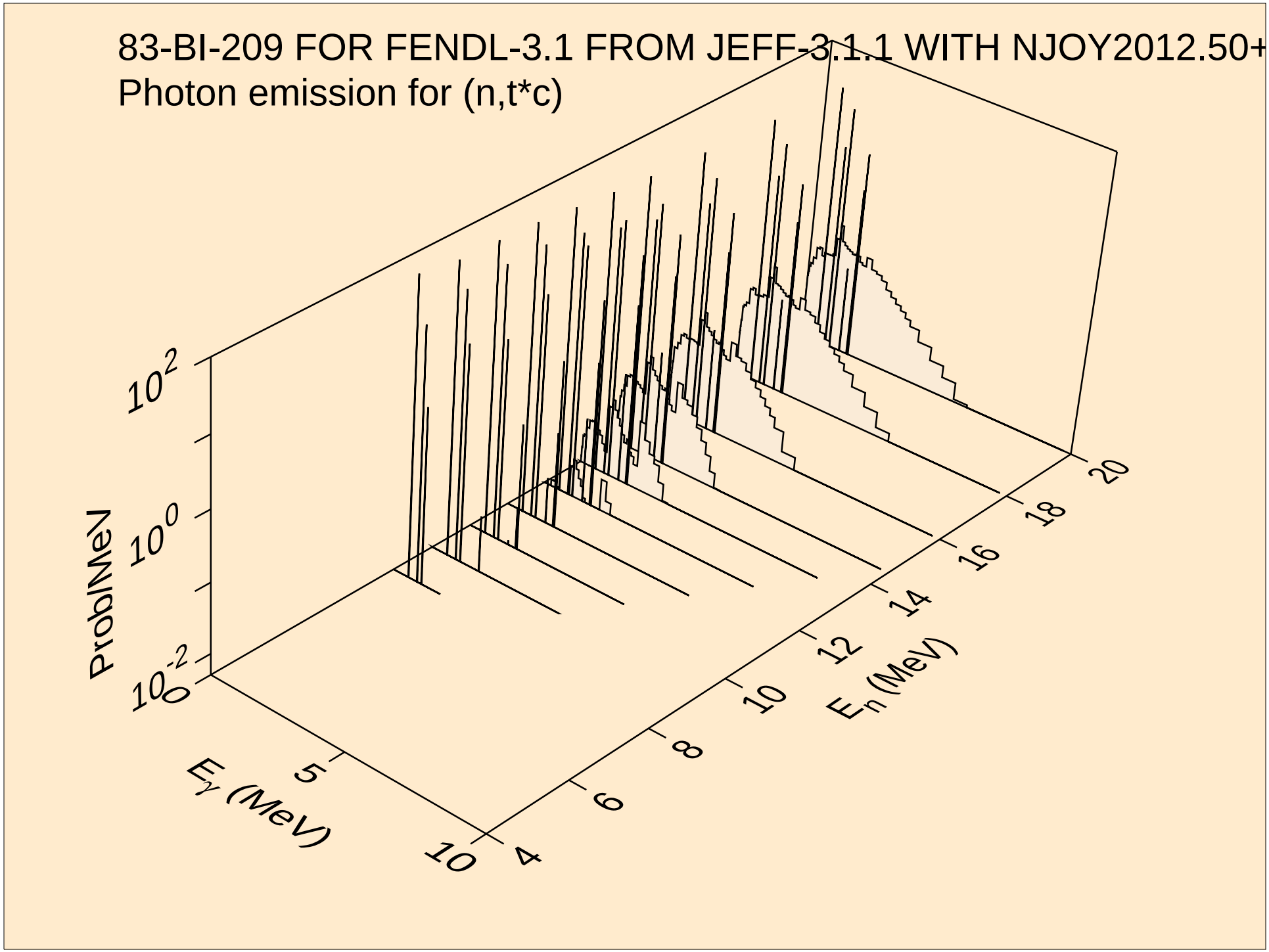

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*1)
Prob/MeV
10^2
10^0
0.5
0.6
0.7
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

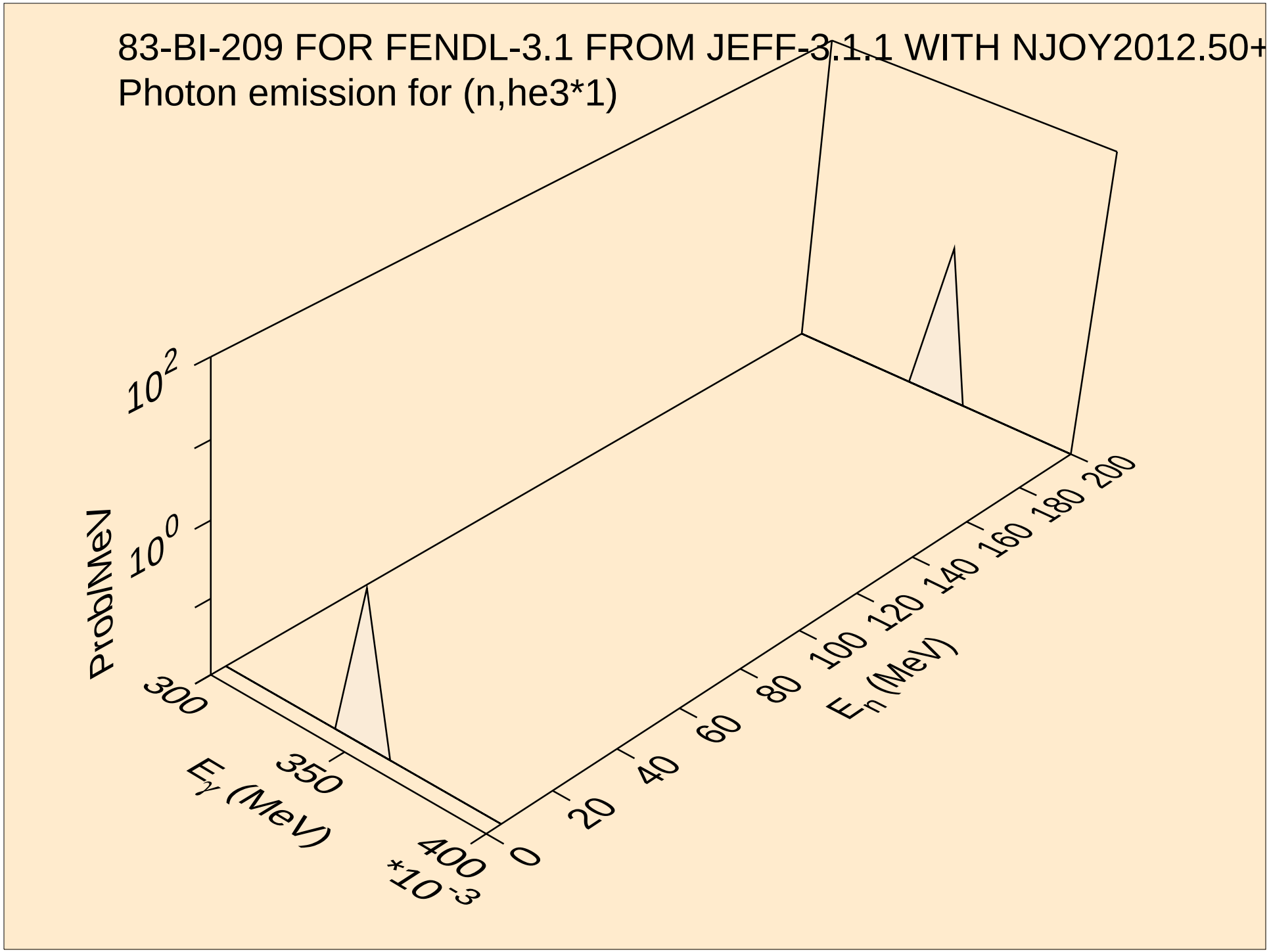

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*2)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.0
0.5
1.0
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

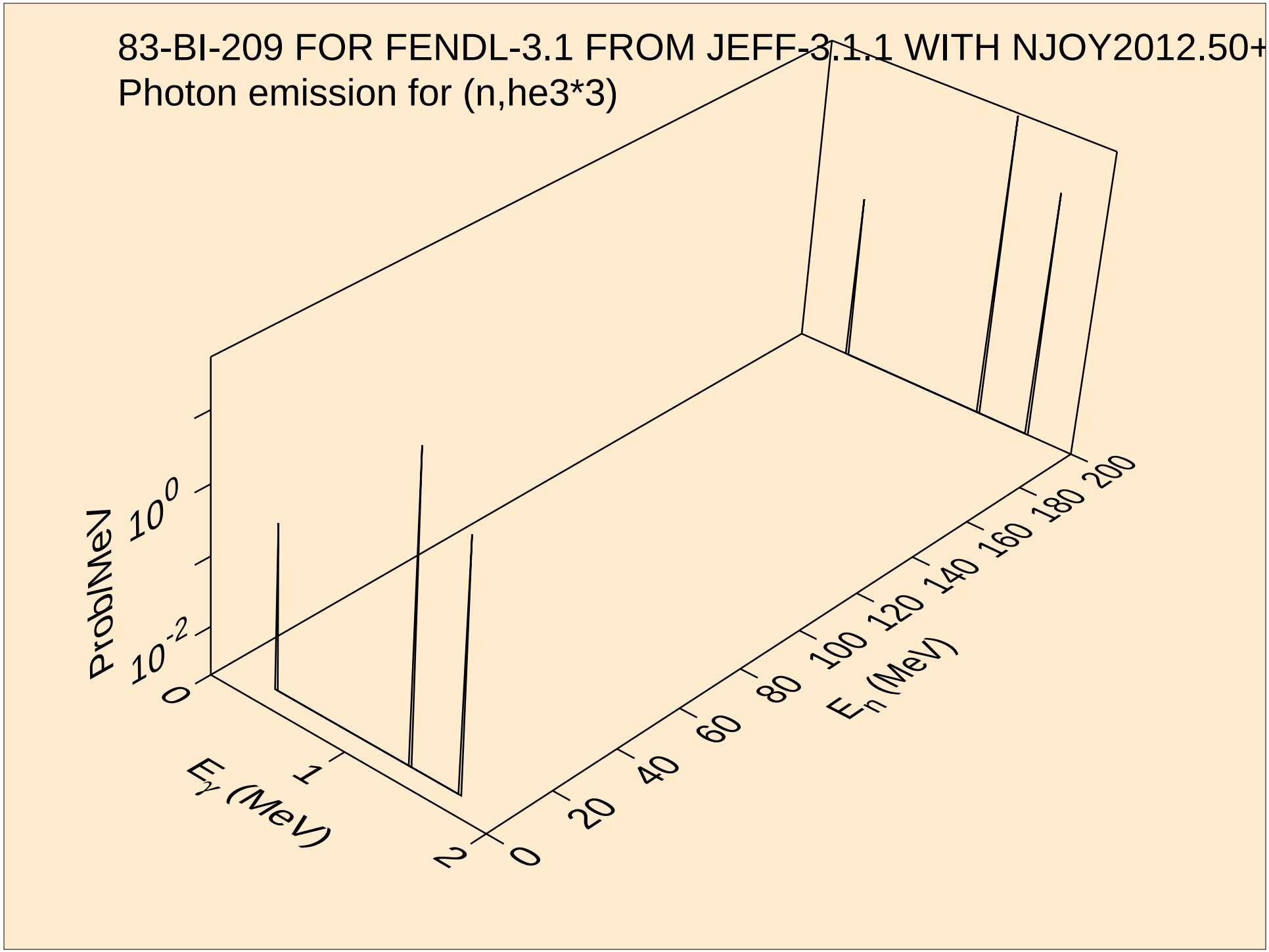

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*3)
Prob/MeV
10^{0}
10^{-2}
0.5
1.0
1.5
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

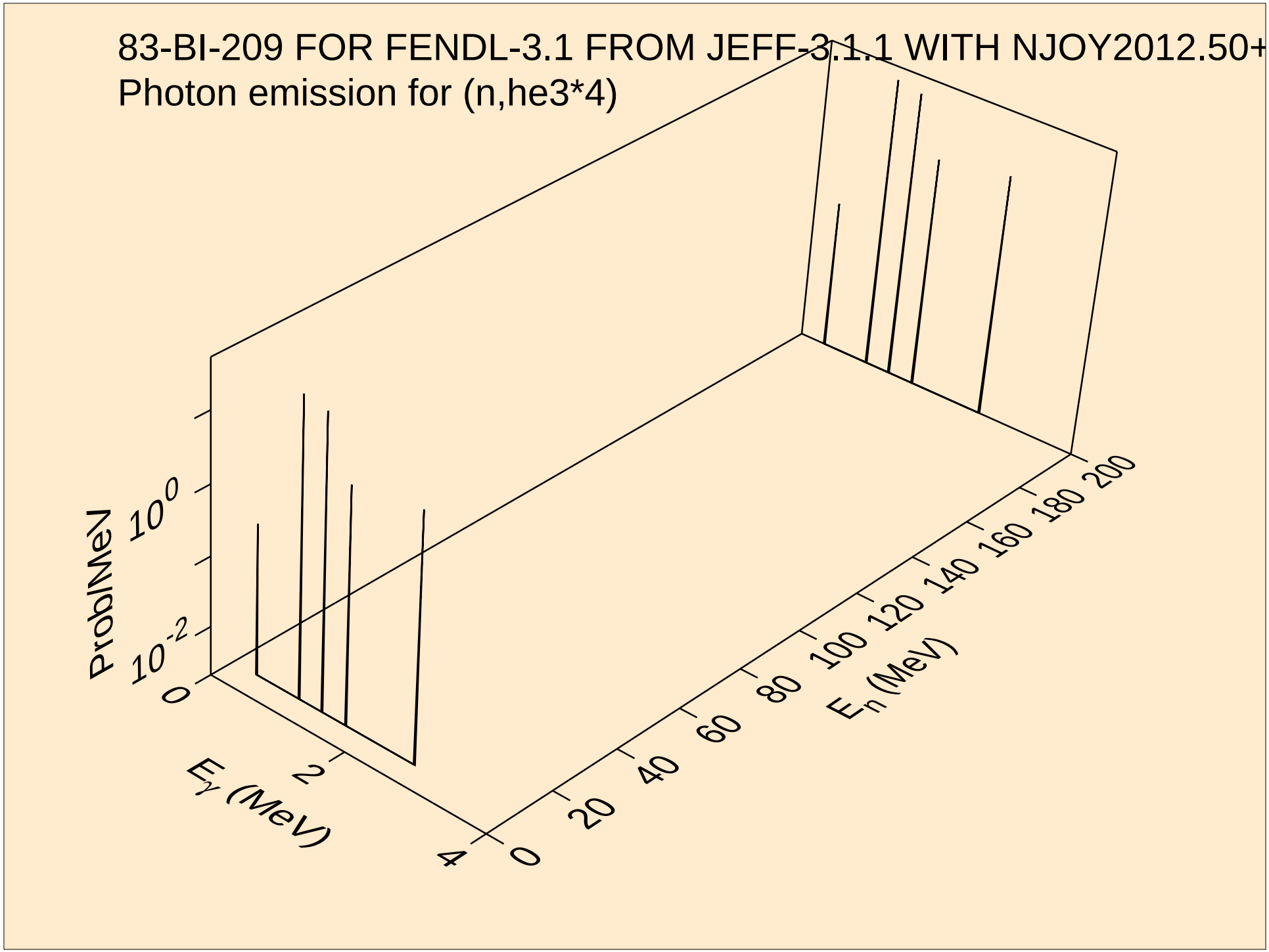

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*4)
Prob/MeV
10^0
10^-2
0
E_γ (MeV)
1
2
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

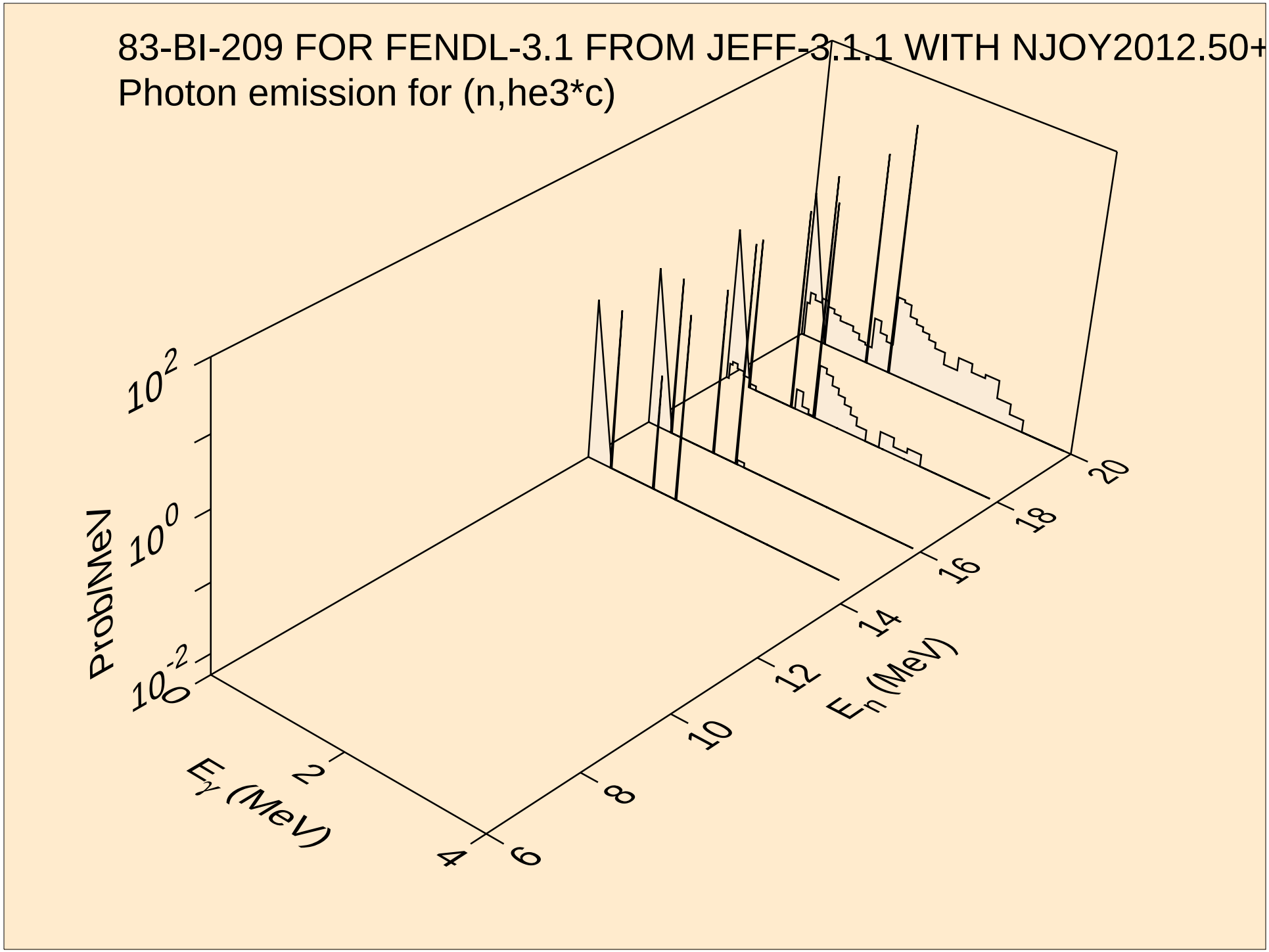

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*5)
Prob/MeV
10^0
10^-2
0
1
2
E_γ (MeV)
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

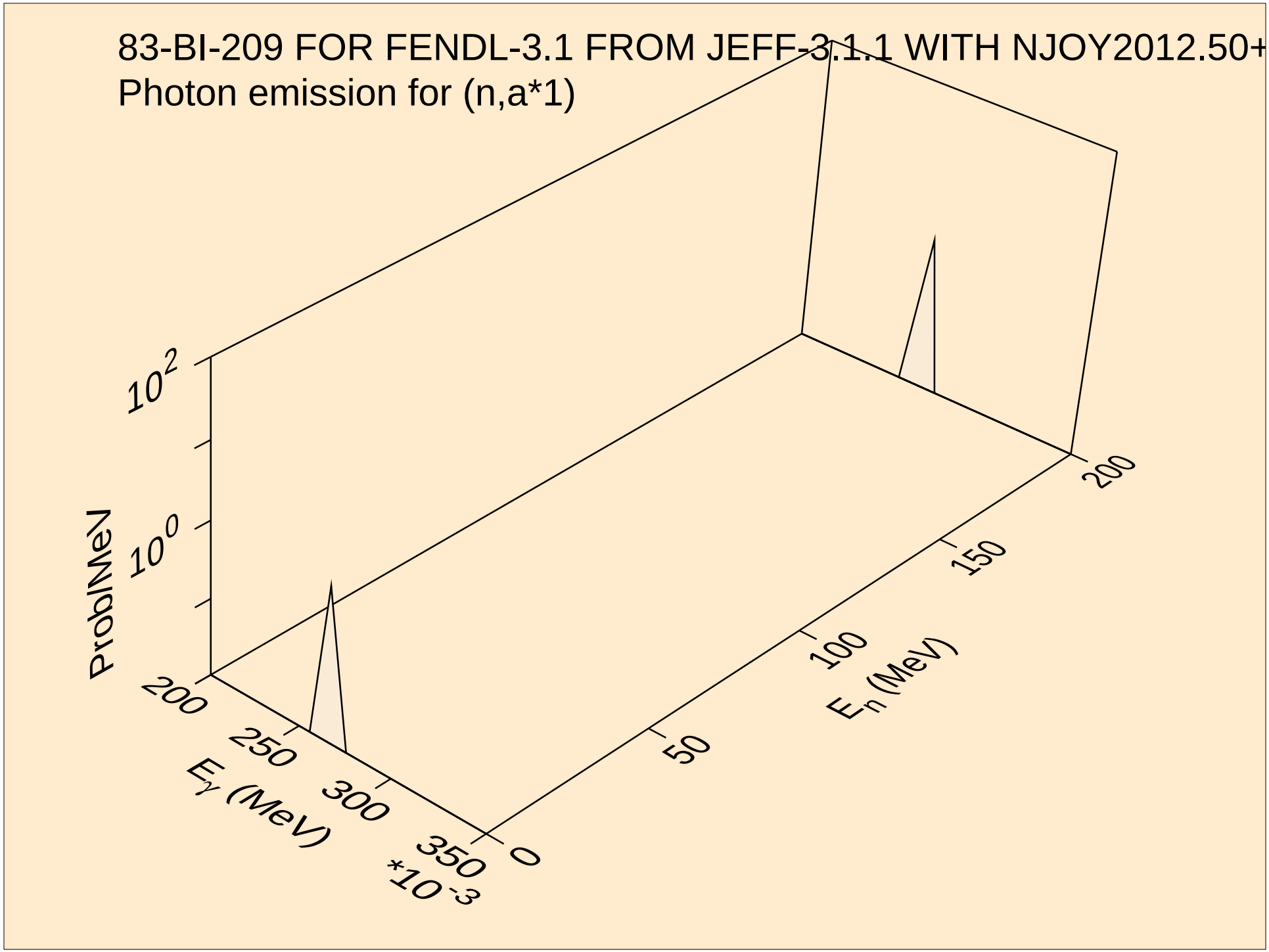

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,t*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
5
10
E_n (MeV)
4
6
8
10
12
14
16
18
20

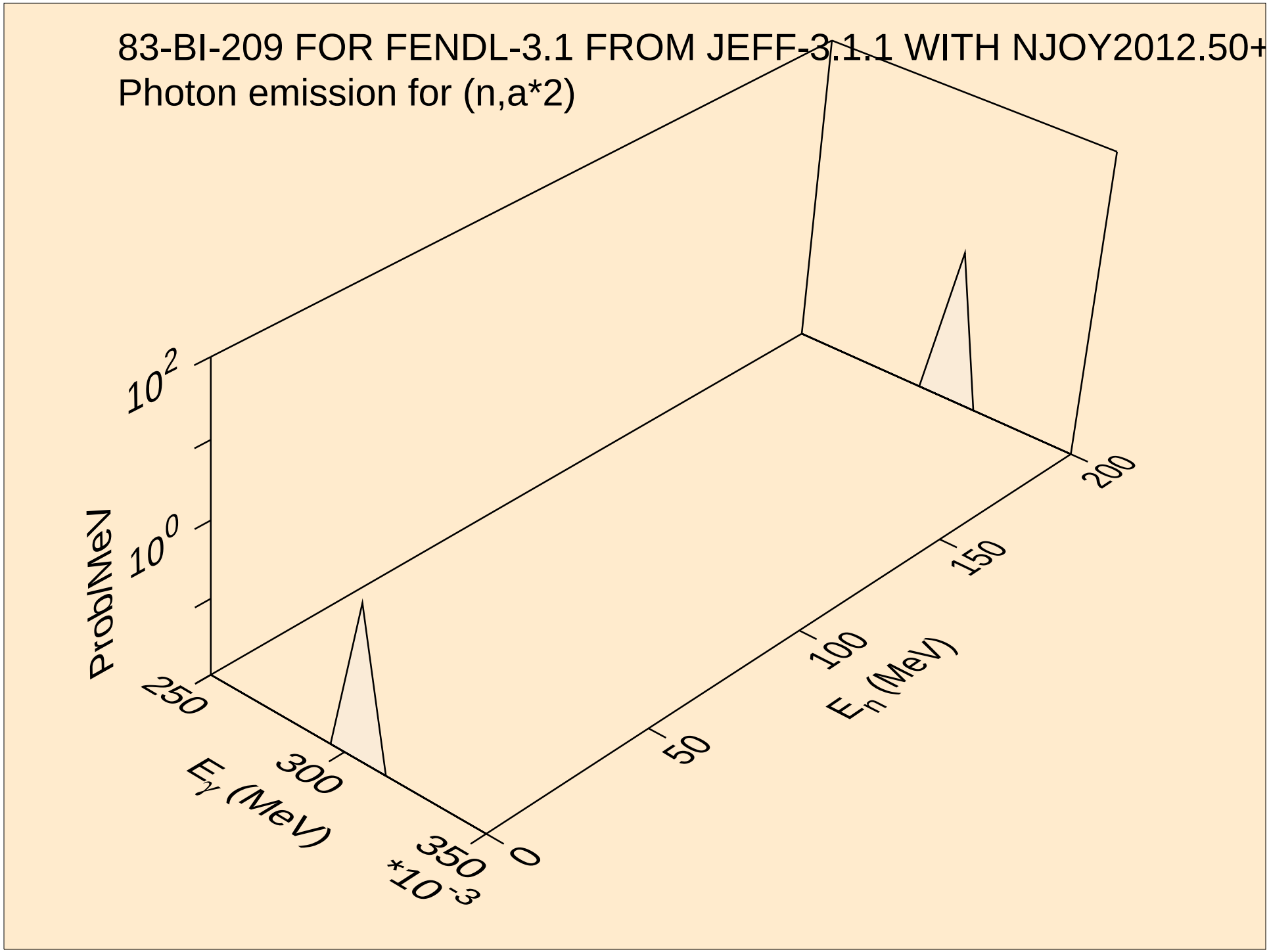

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,he3*1)
Prob/MeV
10^2
10^0
300
350
400
E_γ (MeV)
*10 -3
0
20
40
60
80
100
120
140
160
180
200
E_n (MeV)

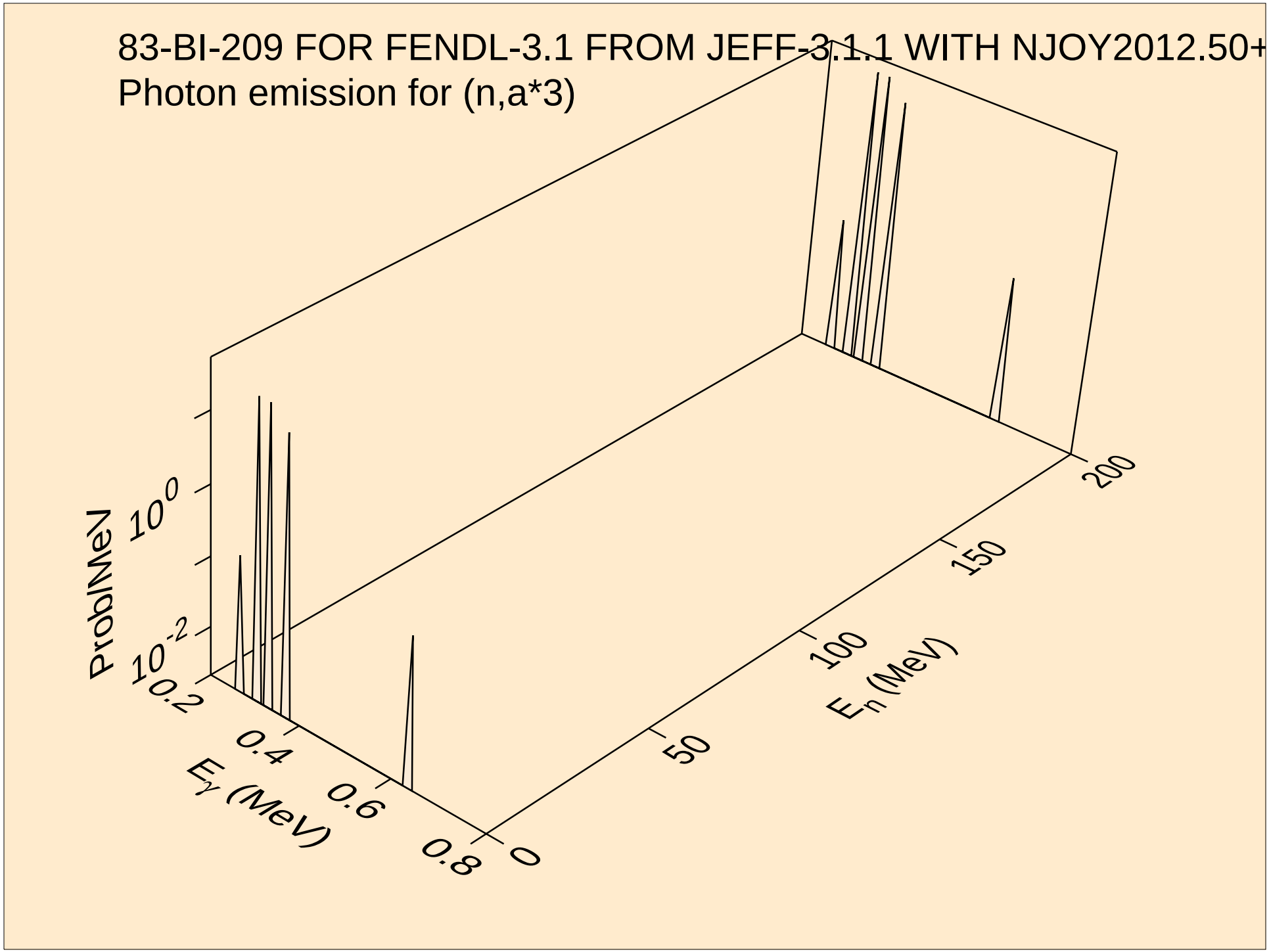

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,he3*3)
Prob/MeV
10^0
10^-2
0
1
2
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

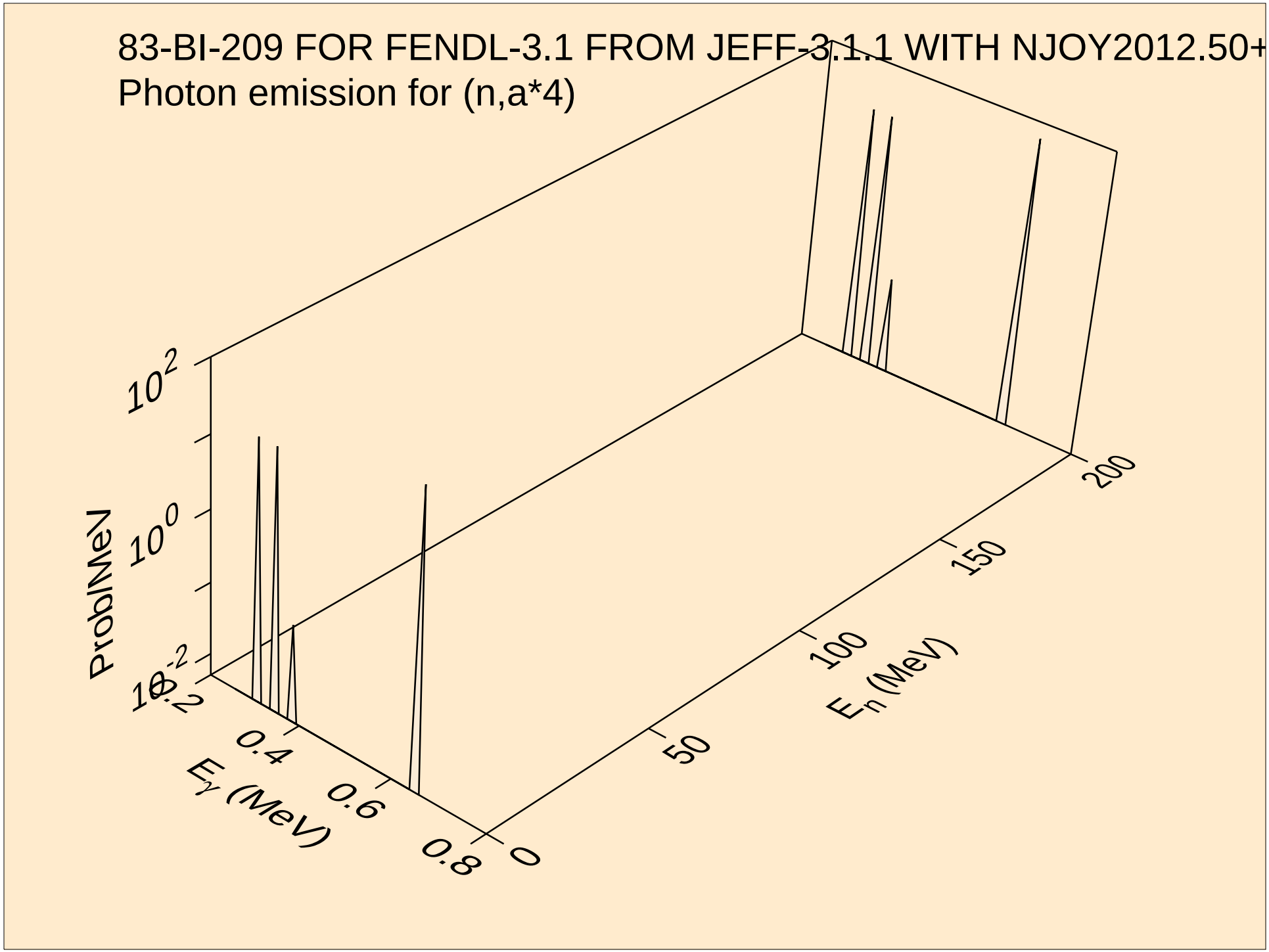

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,he3*4)
Prob/MeV
10^0
10^-2
0
2
4
Eγ (MeV)
0
20
40
60
80
100
120
140
160
180
200
En (MeV)

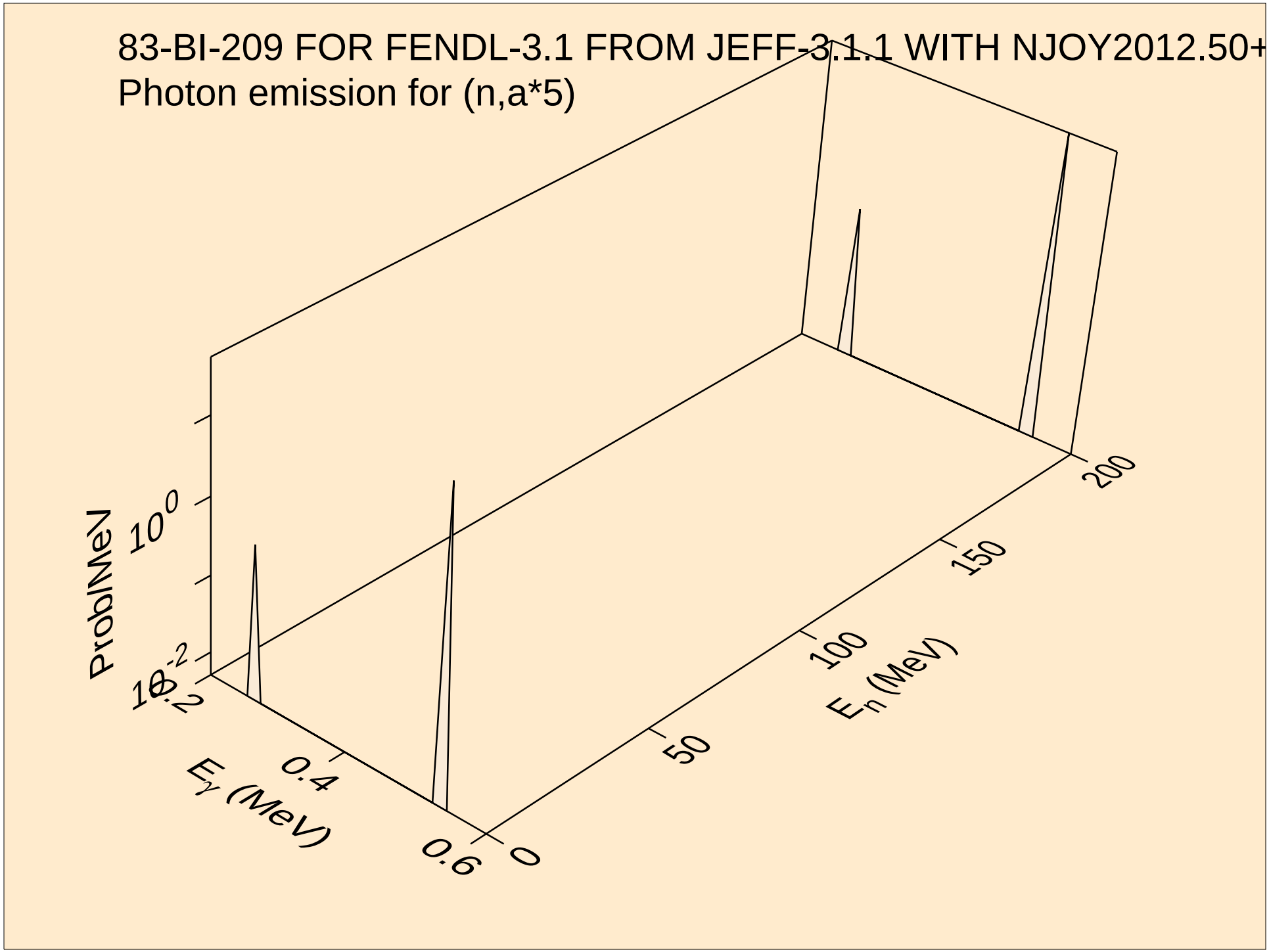

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,he3*c)
Prob/MeV
10^{2}
10^{0}
10^{-2}
E_γ (MeV)
0
2
4
6
8
10
12
14
16
18
20
E_n (MeV)

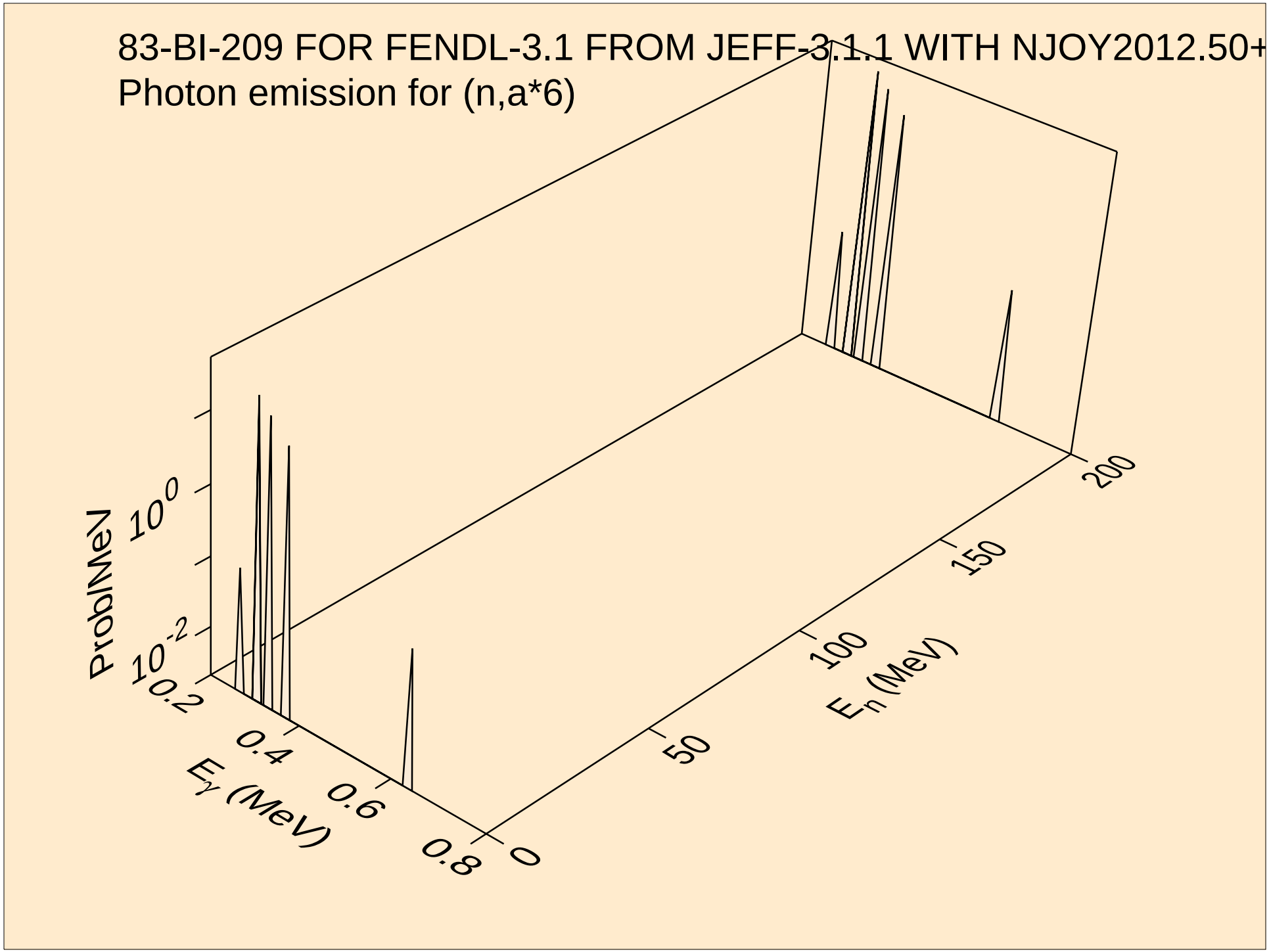

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*1)
Prob/MeV
10^2
10^0
200
250
300
350
E_γ (MeV)
*10 -3
0
50
100
150
200
E_n (MeV)

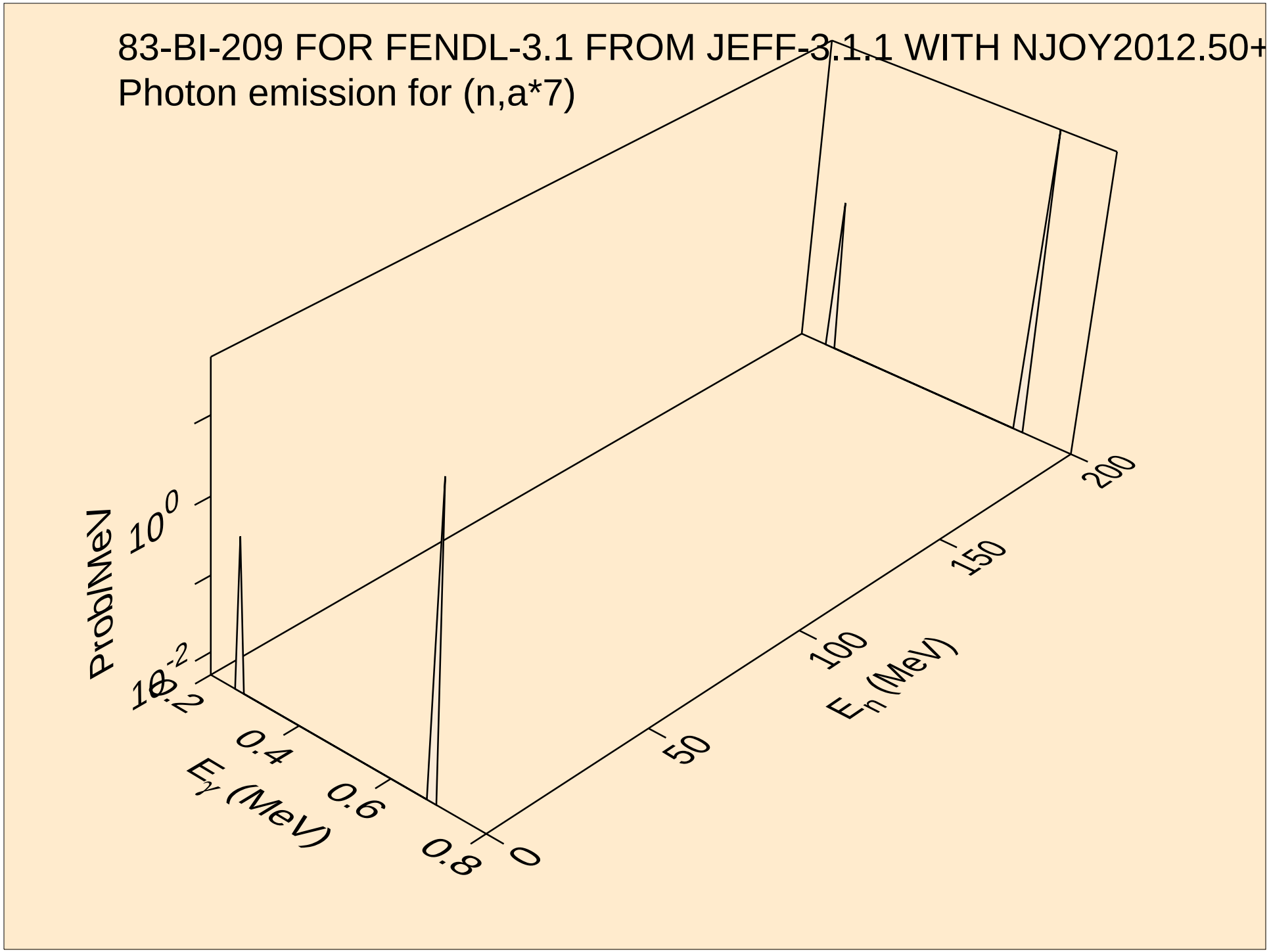

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*2)
Prob/MeV
10^2
10^0
250
300
350
E_γ (MeV)
*10 -3
0
50
100
150
200
E_n (MeV)

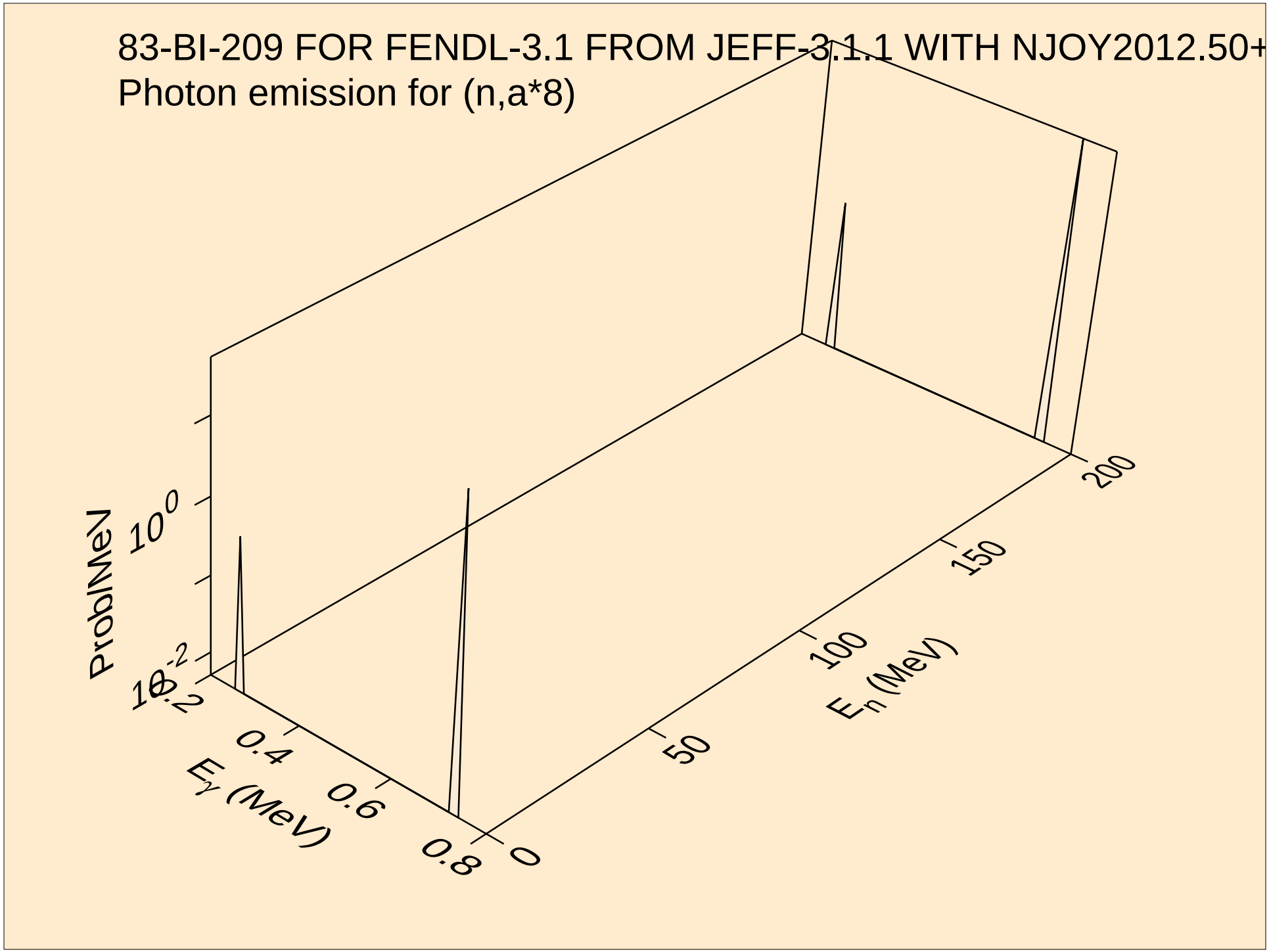

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*3)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
0.8
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

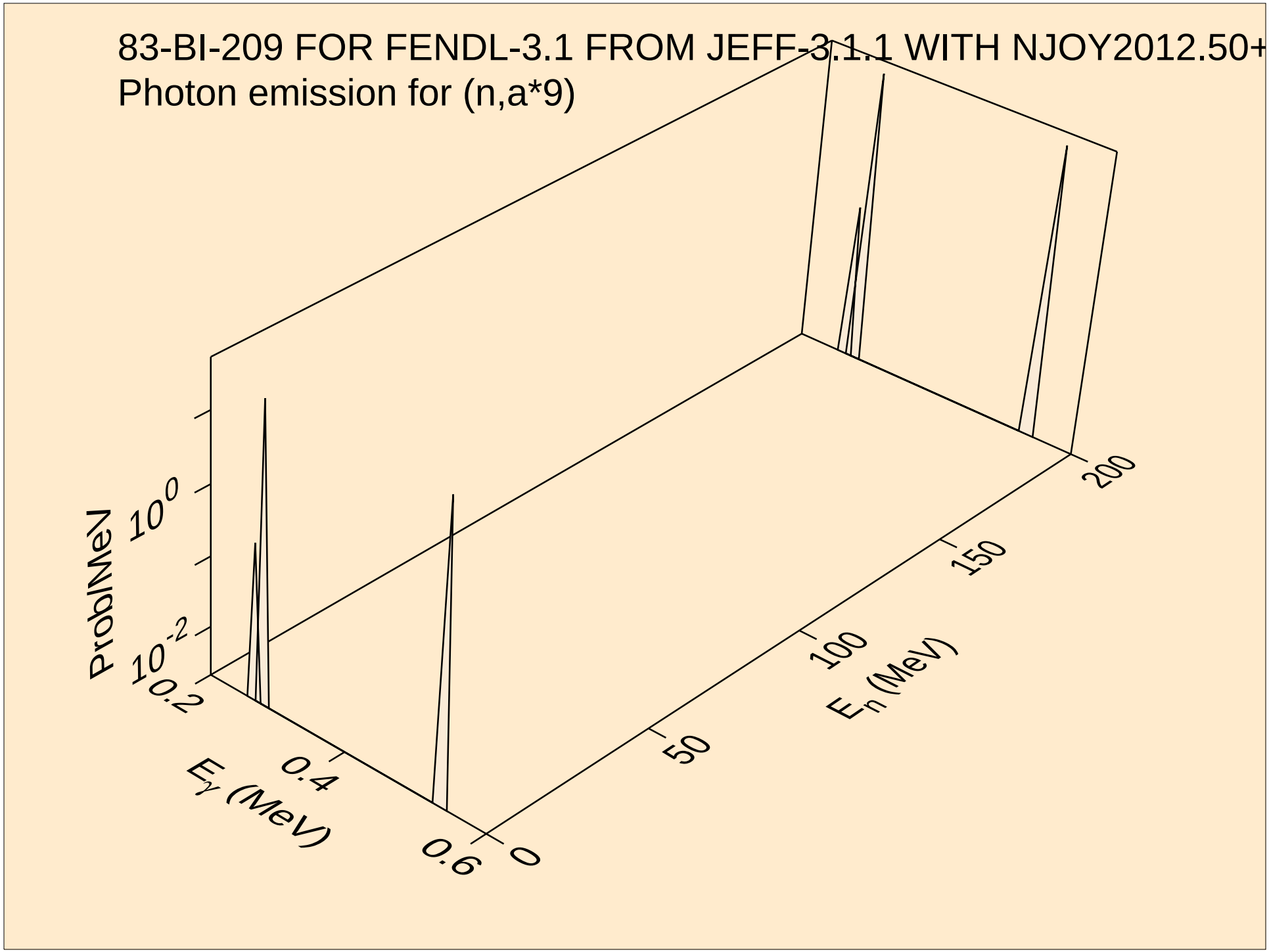

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*4)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0.2
0.4
0.6
0.8
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

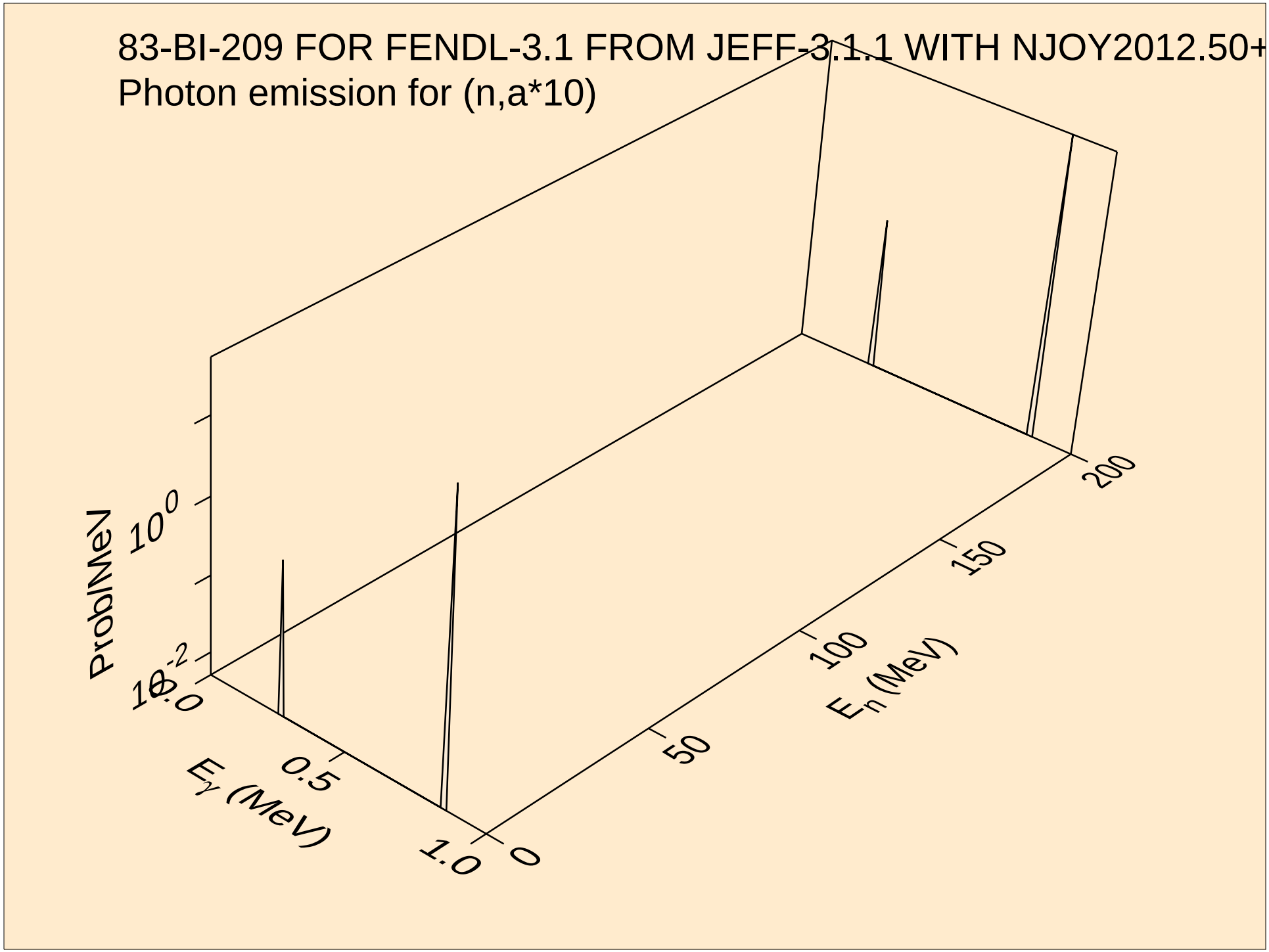

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*5)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

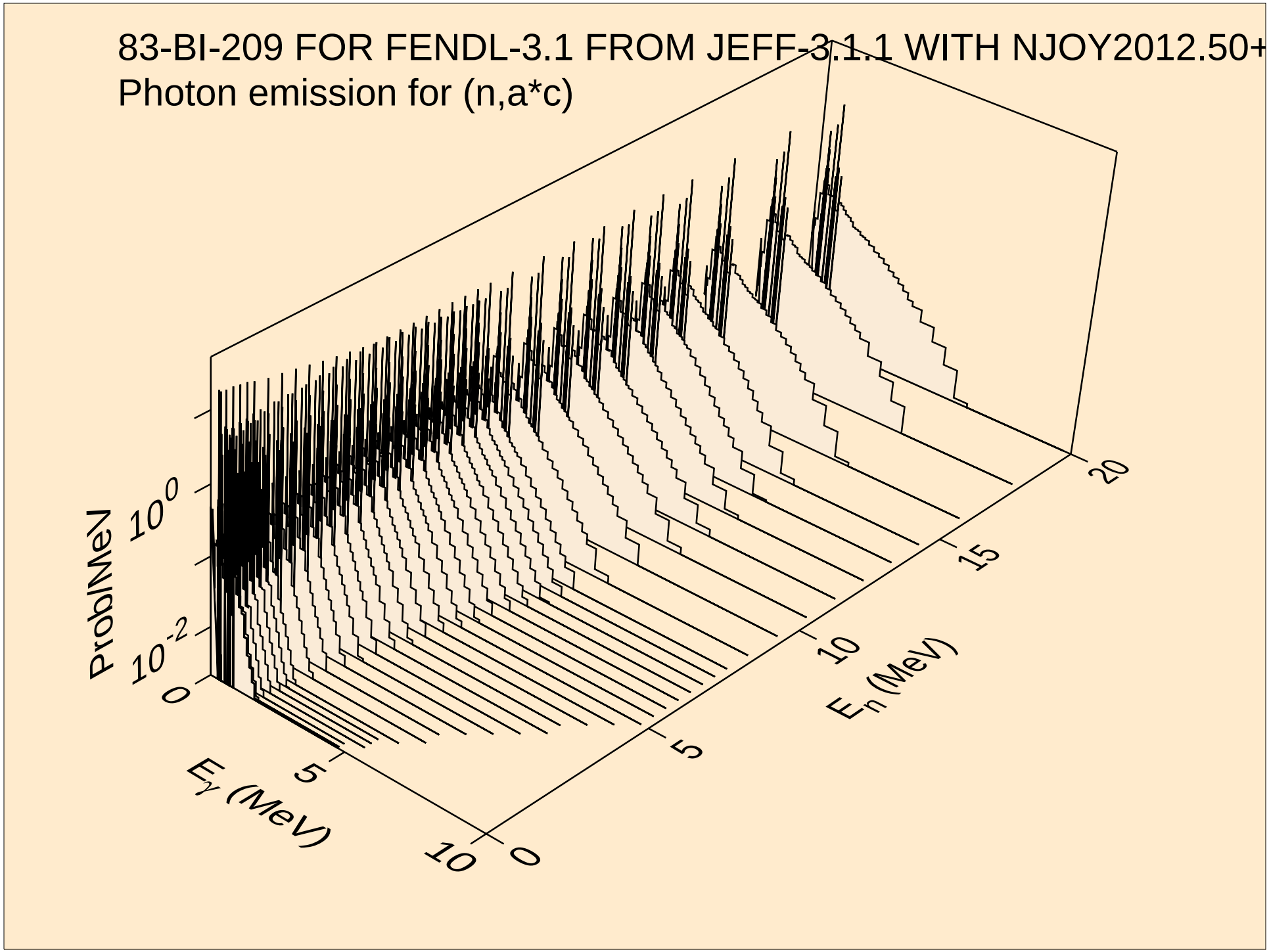

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*6)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
0.8
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

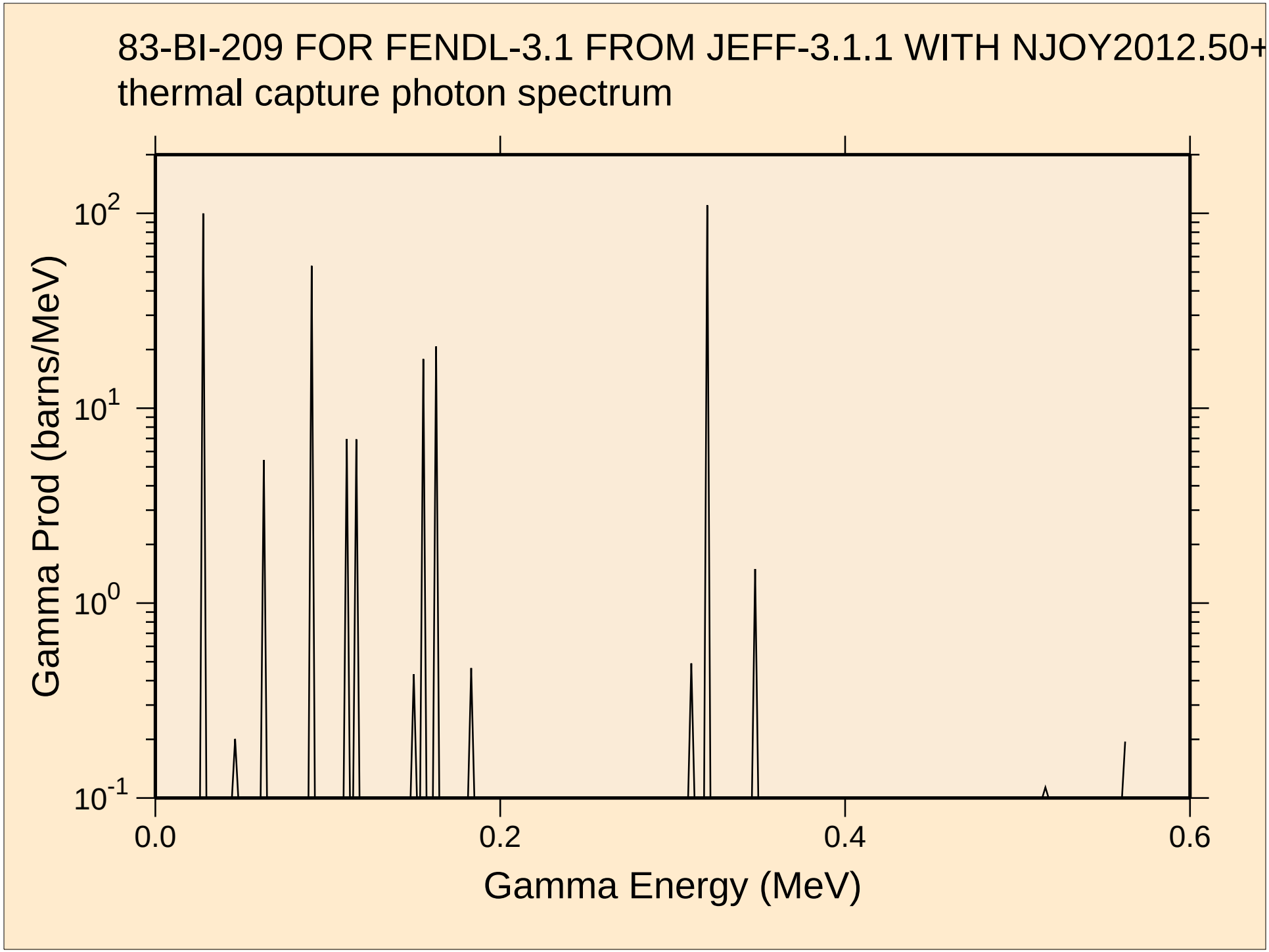

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*7)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
0.8
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

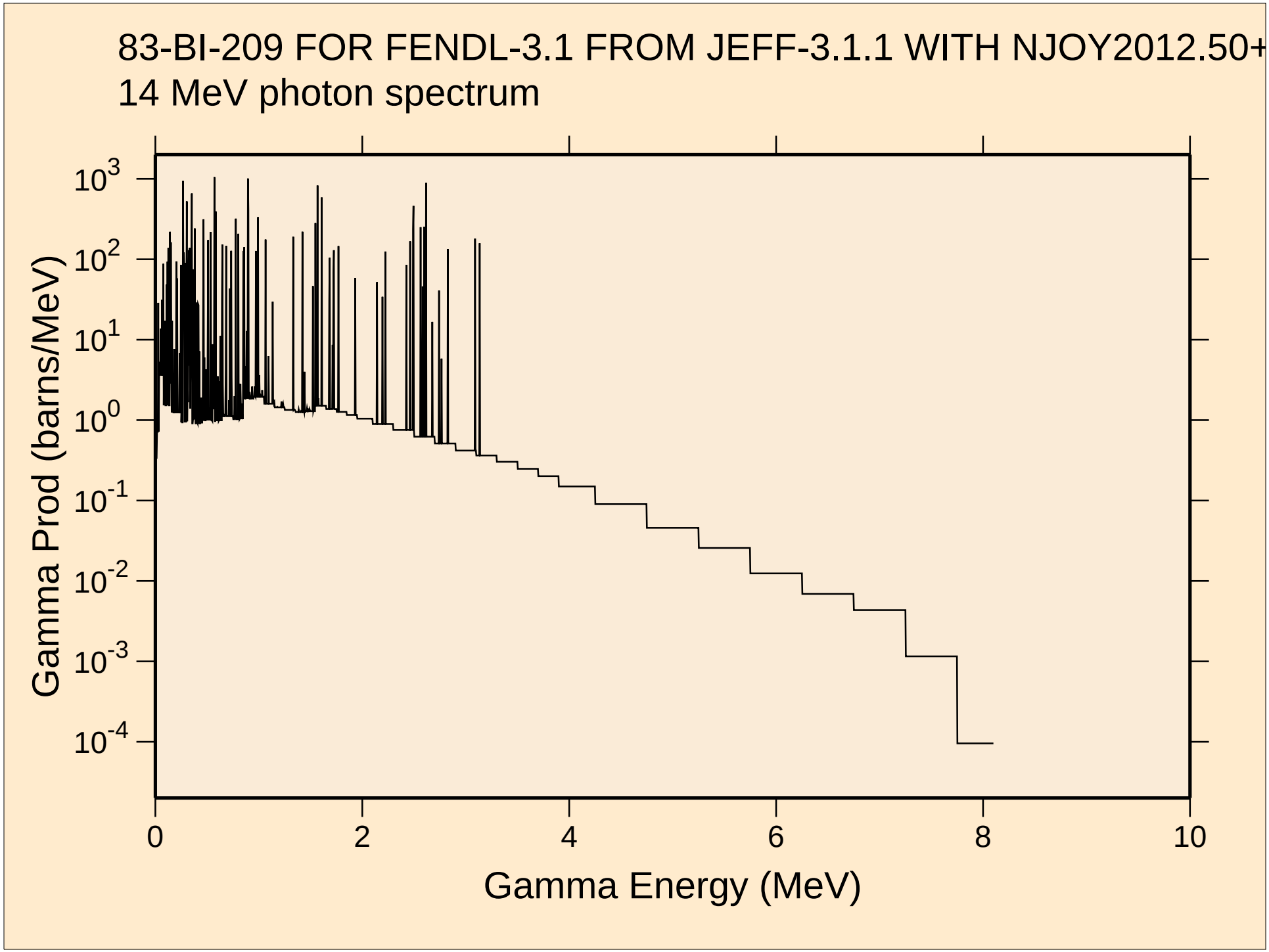

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*8)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
0.8
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

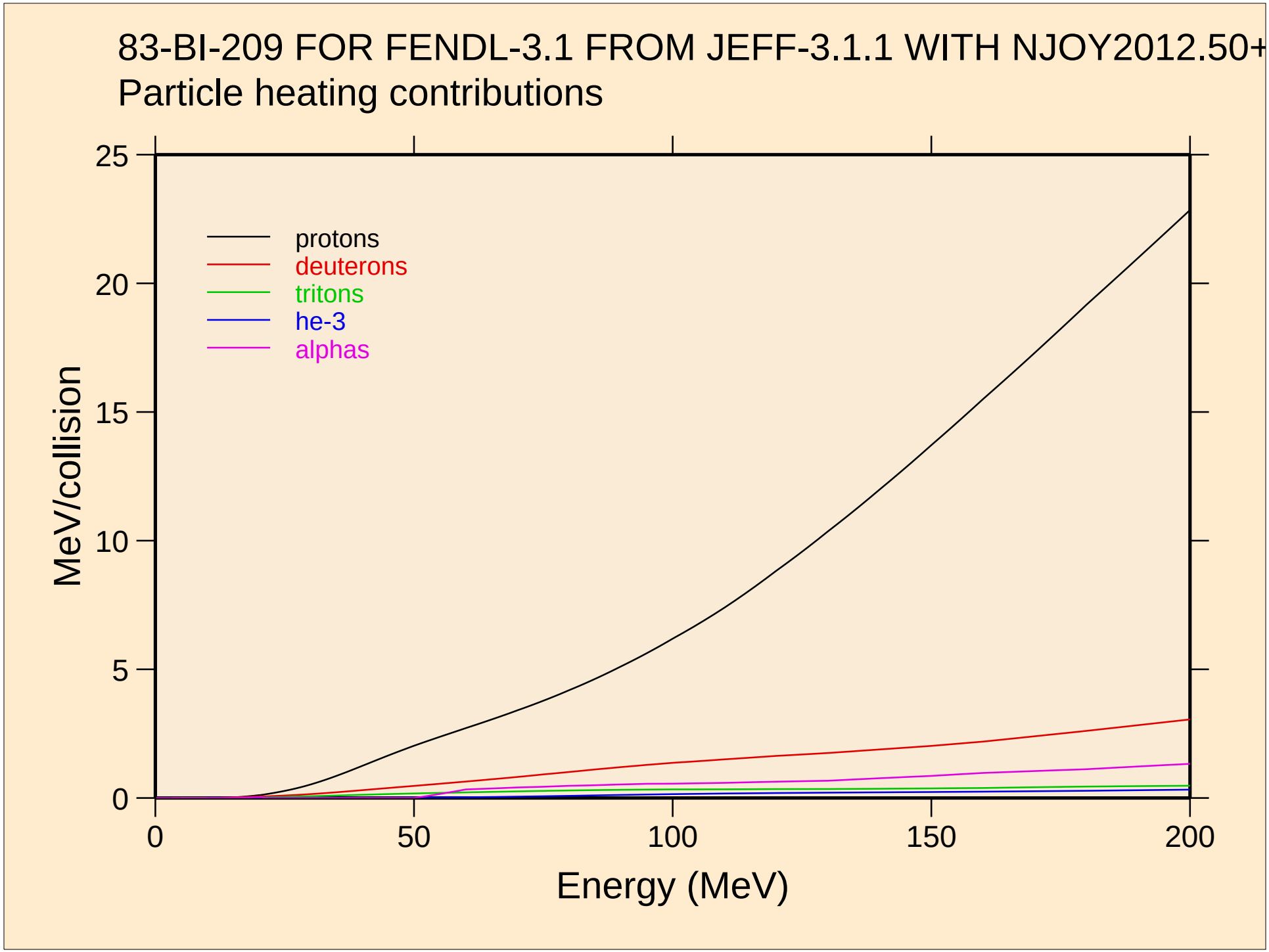

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*9)
Prob/MeV
10^0
10^-2
0.2
0.4
0.6
Eγ (MeV)
0
50
100
150
200
En (MeV)

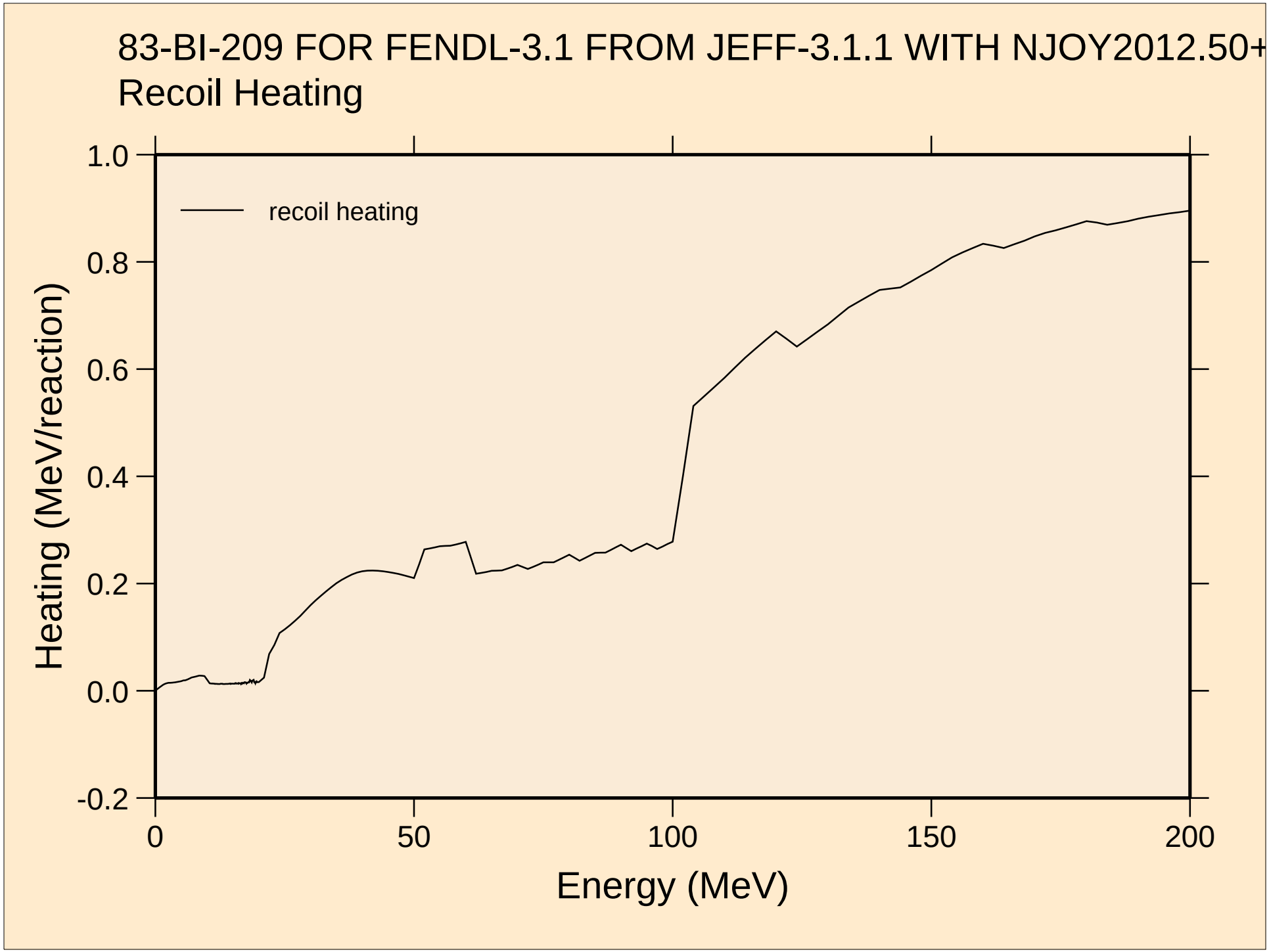

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*10)
Prob/MeV
10^0
10^-2
0.0
0.5
1.0
E_γ (MeV)
0
50
100
150
200
E_n (MeV)

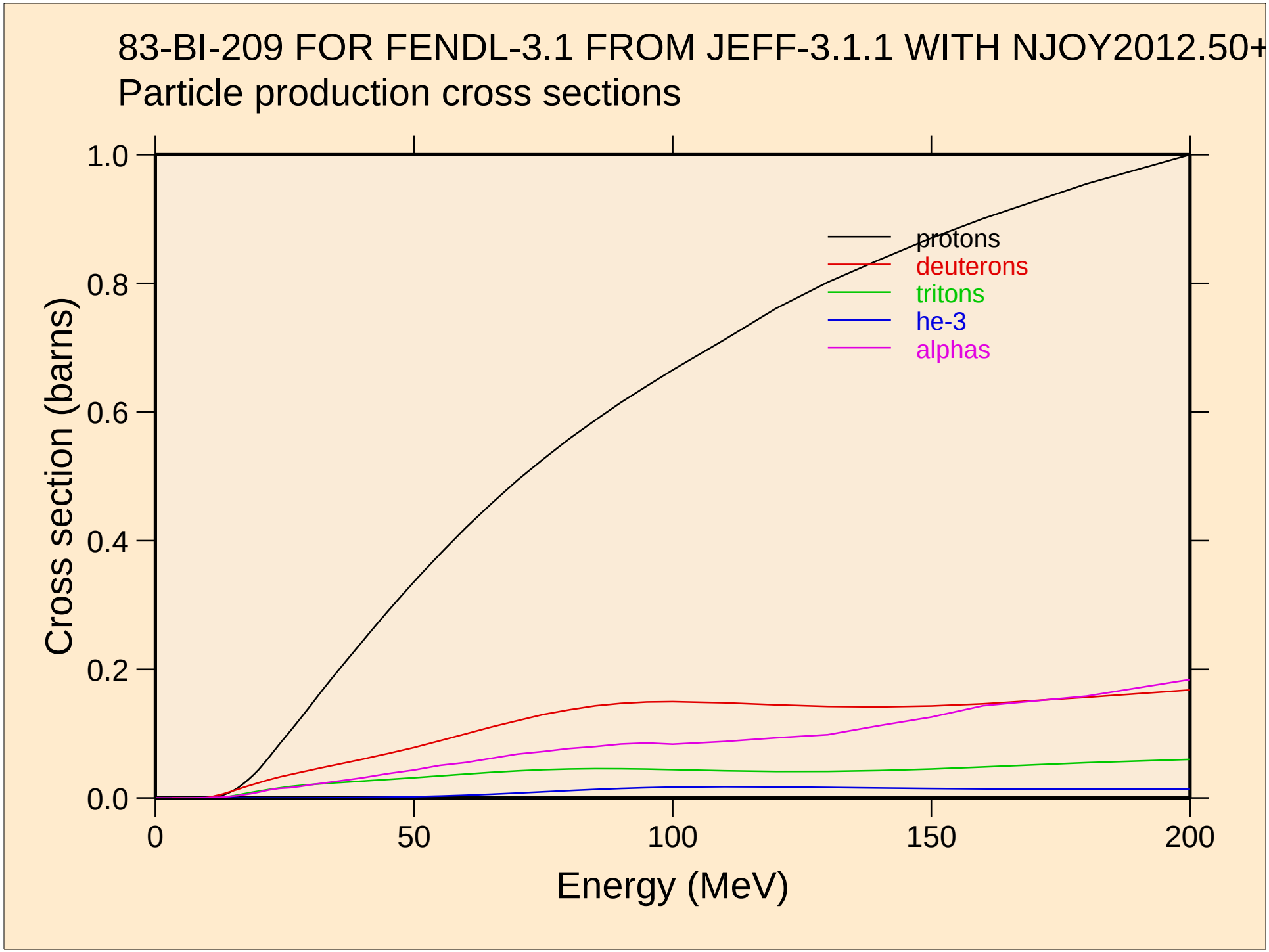

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Photon emission for (n,a*c)
Prob/MeV
10^0
10^-2
0
5
10
E_γ (MeV)
0
5
10
15
20
E_n (MeV)

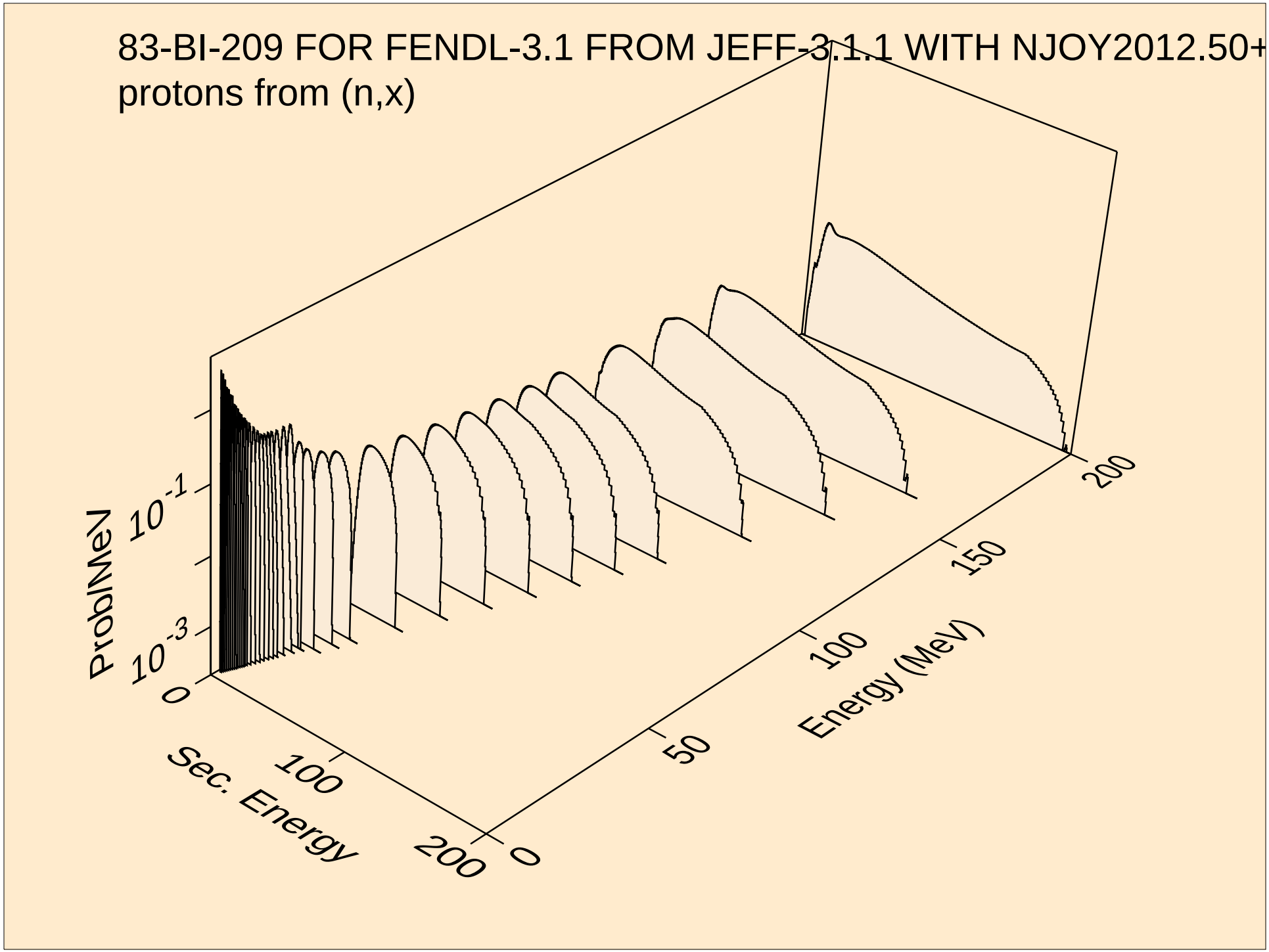

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
thermal capture photon spectrum
Gamma Prod (barns/MeV)
10^2
10^1
10^0
10^-1
0.0
0.2
0.4
0.6
Gamma Energy (MeV)

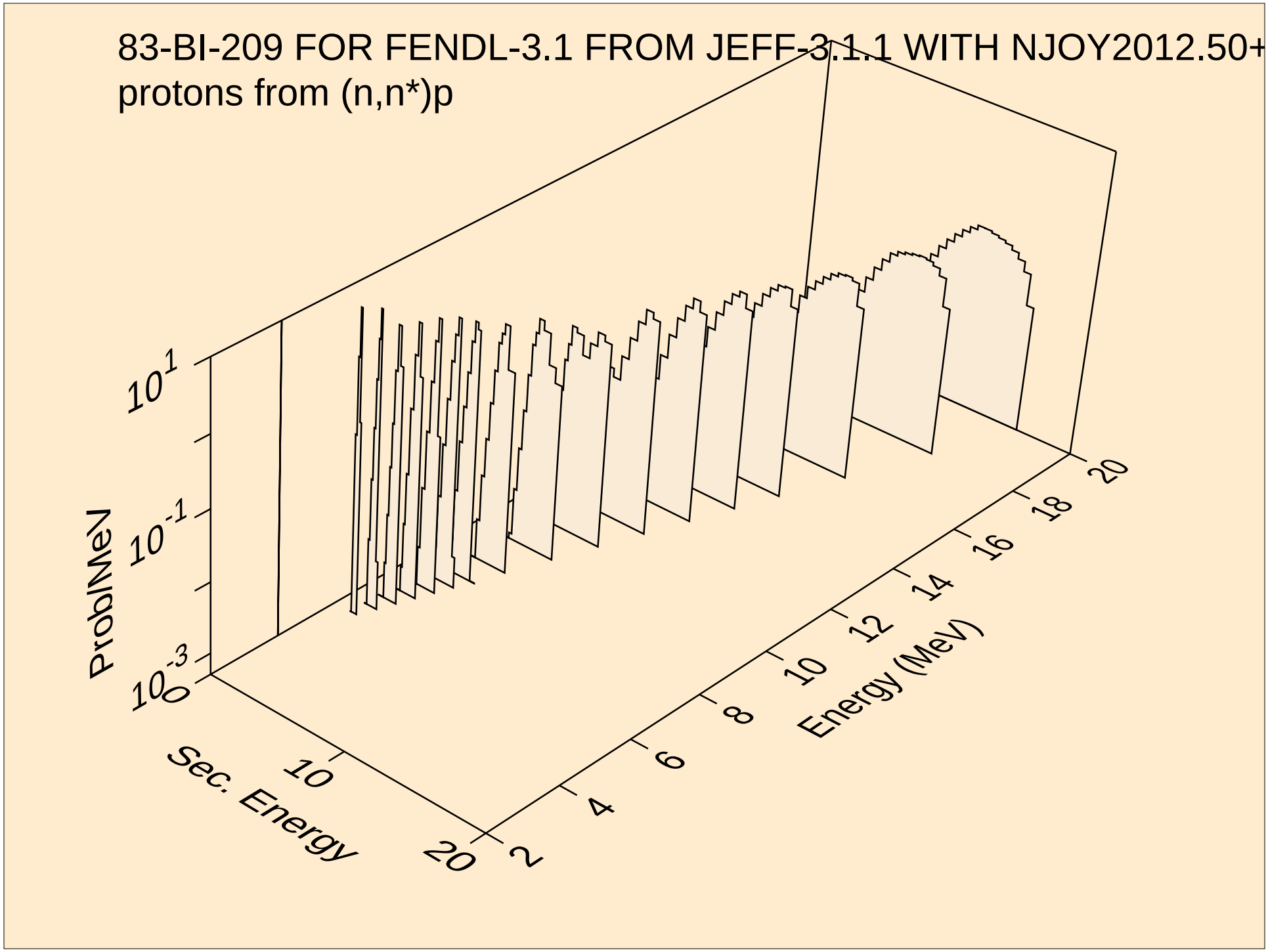

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0
2
4
6
8
10
Gamma Energy (MeV)

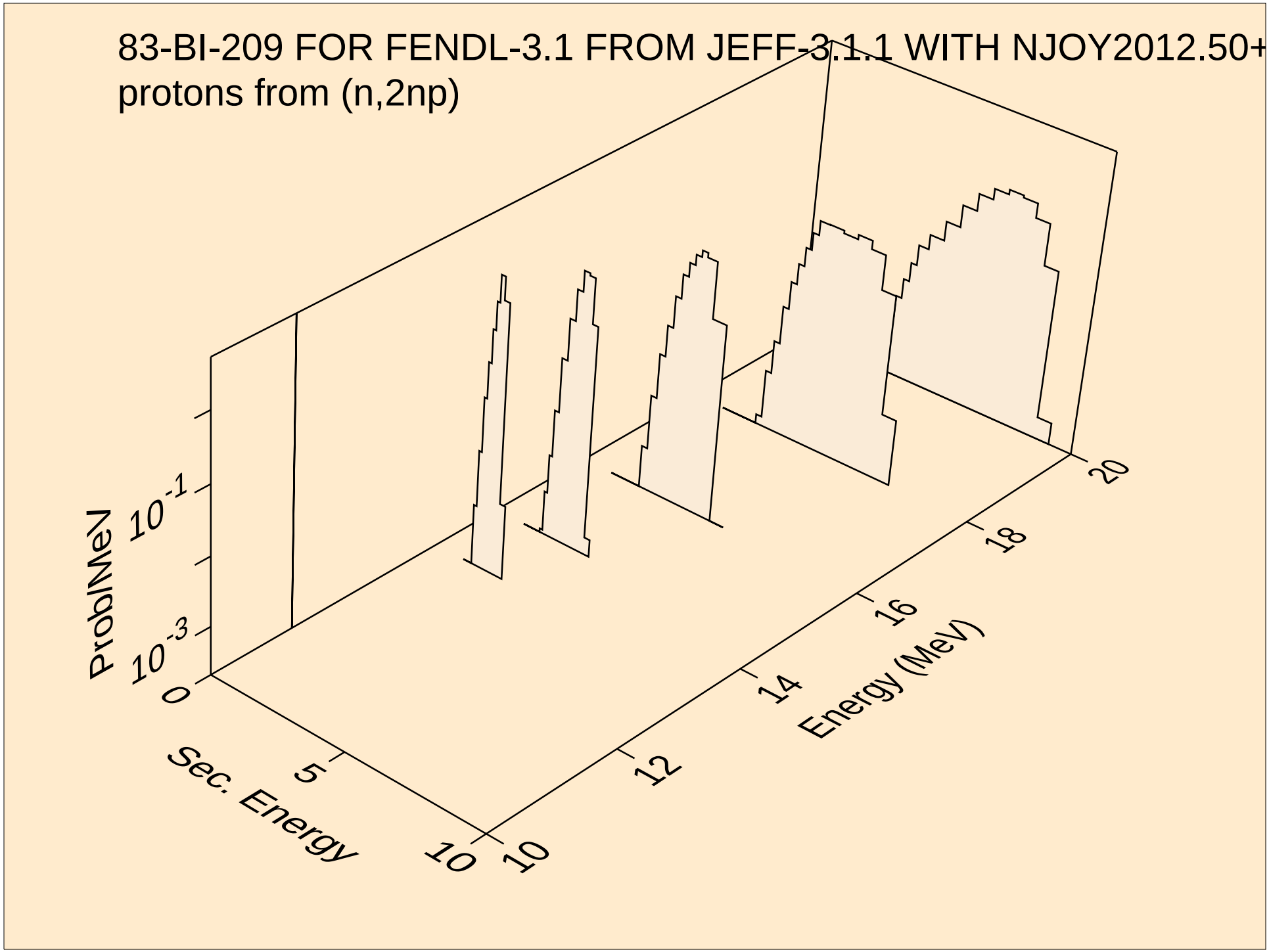

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
5
10
15
20
25
0
50
100
150
200

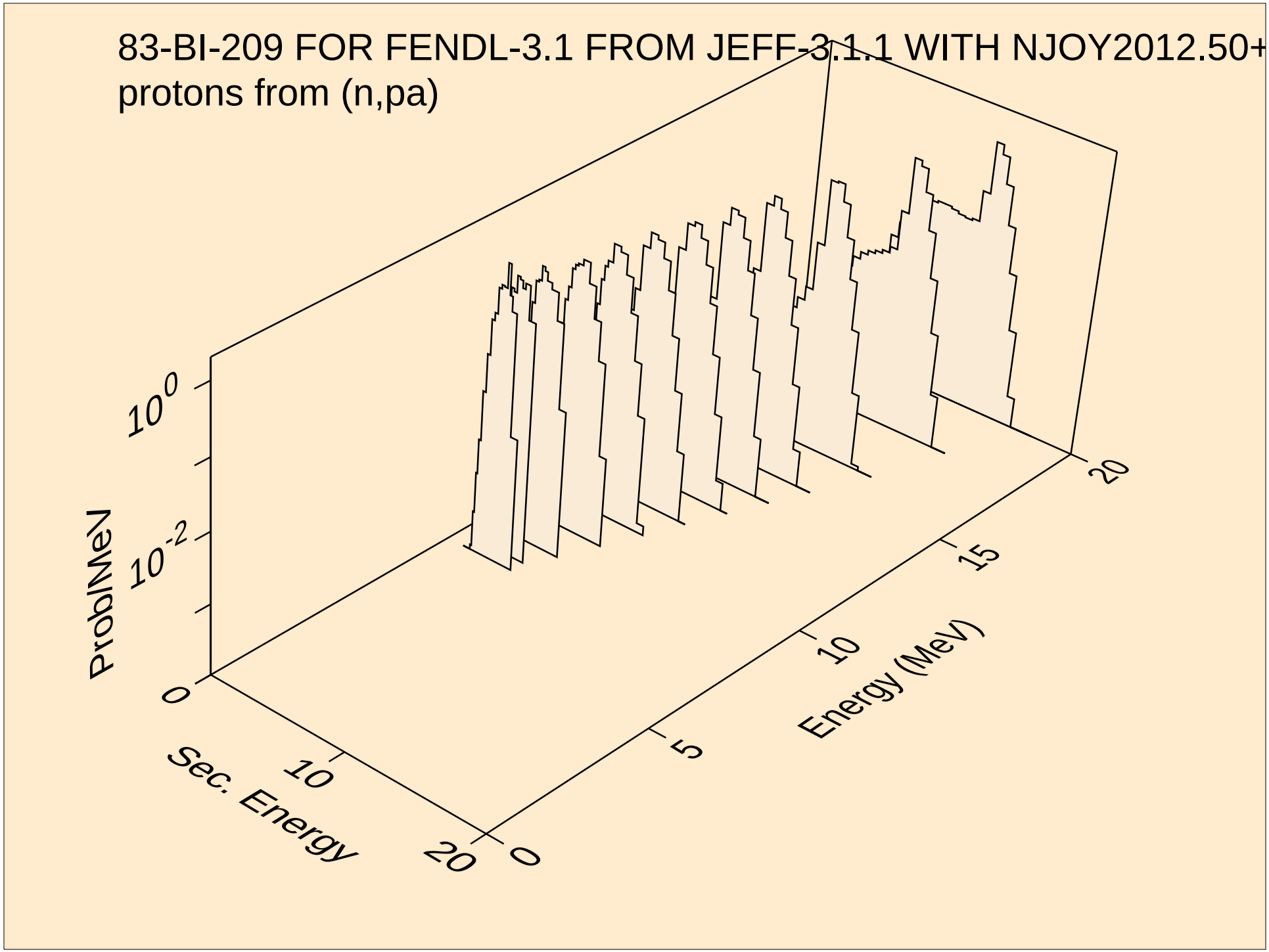

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0
50
100
150
200

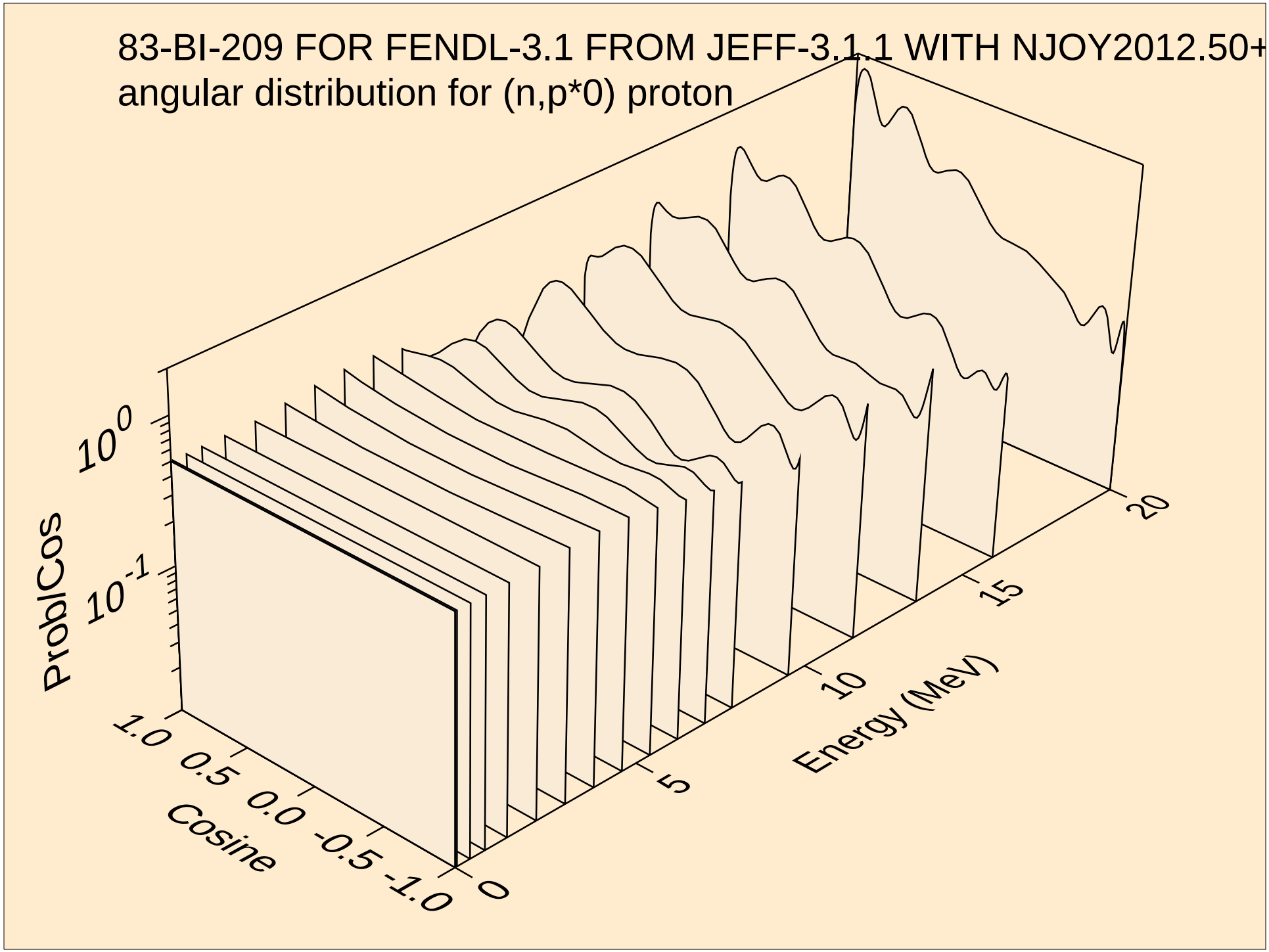

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
Particle production cross sections
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
protons
deuterons
tritons
he-3
alphas

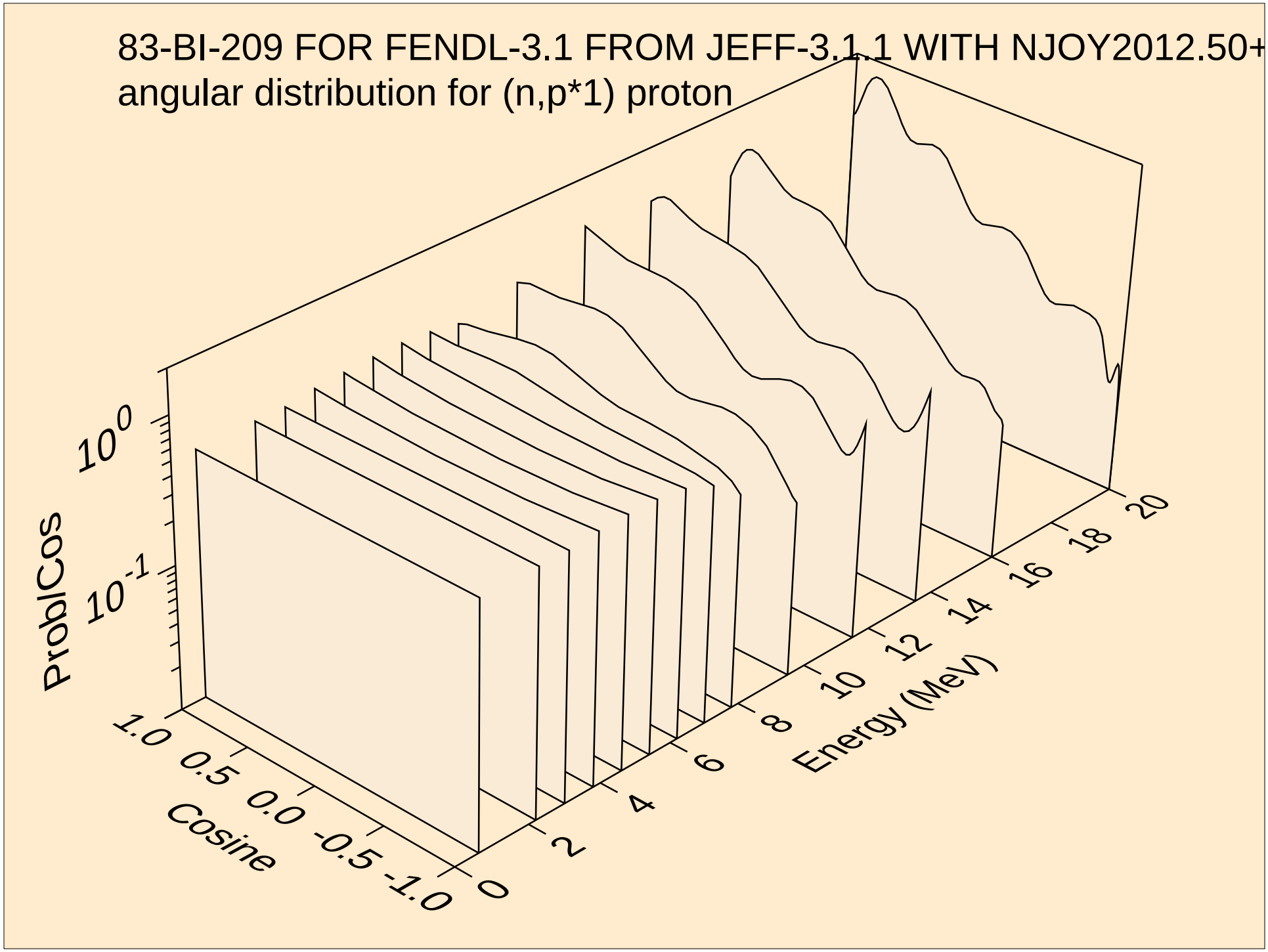

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
protons from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

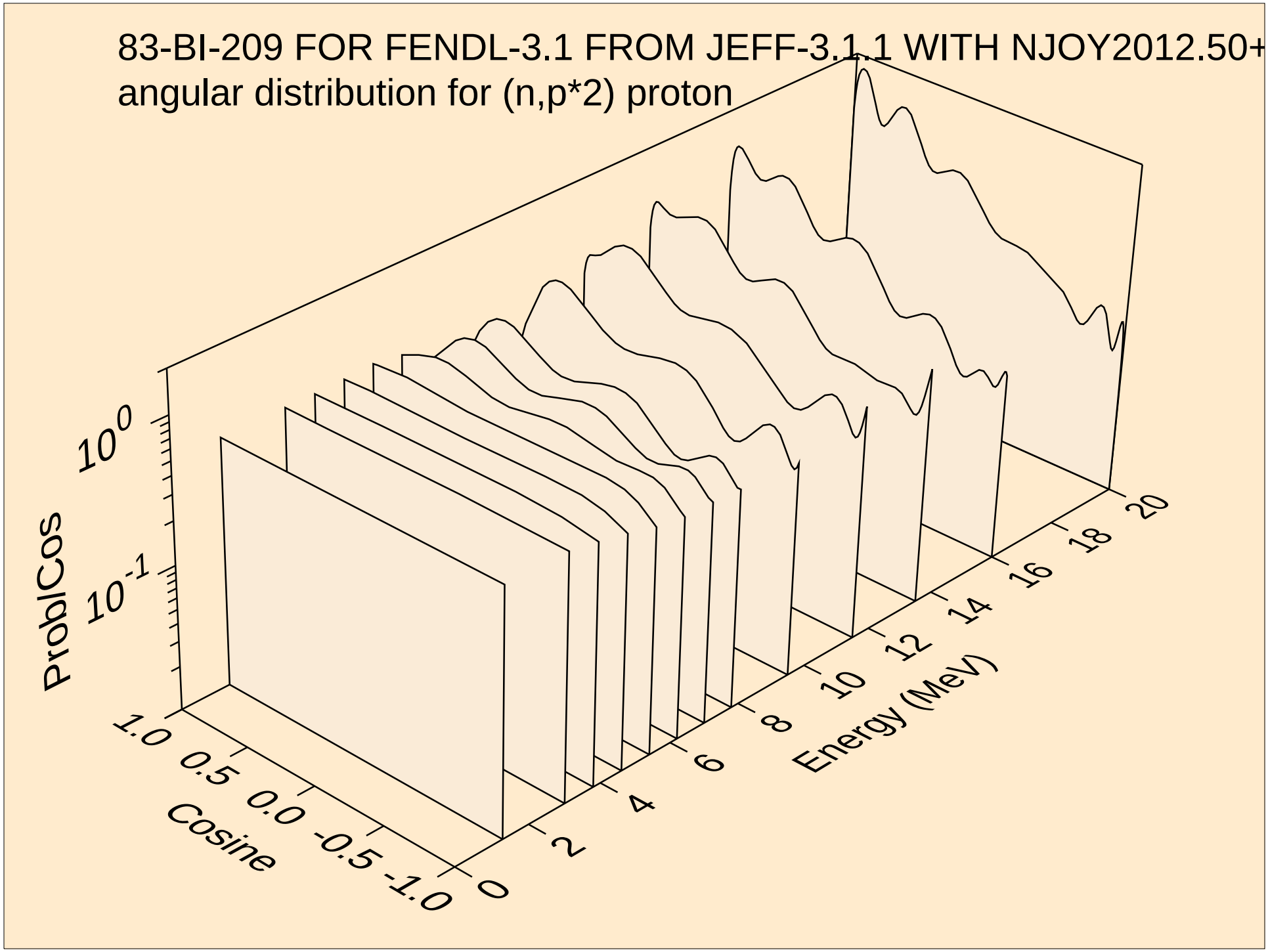

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
protons from (n,n*)p
Prob/MeV
10^1
10^-1
10^-3
0
Sec. Energy
10
20
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

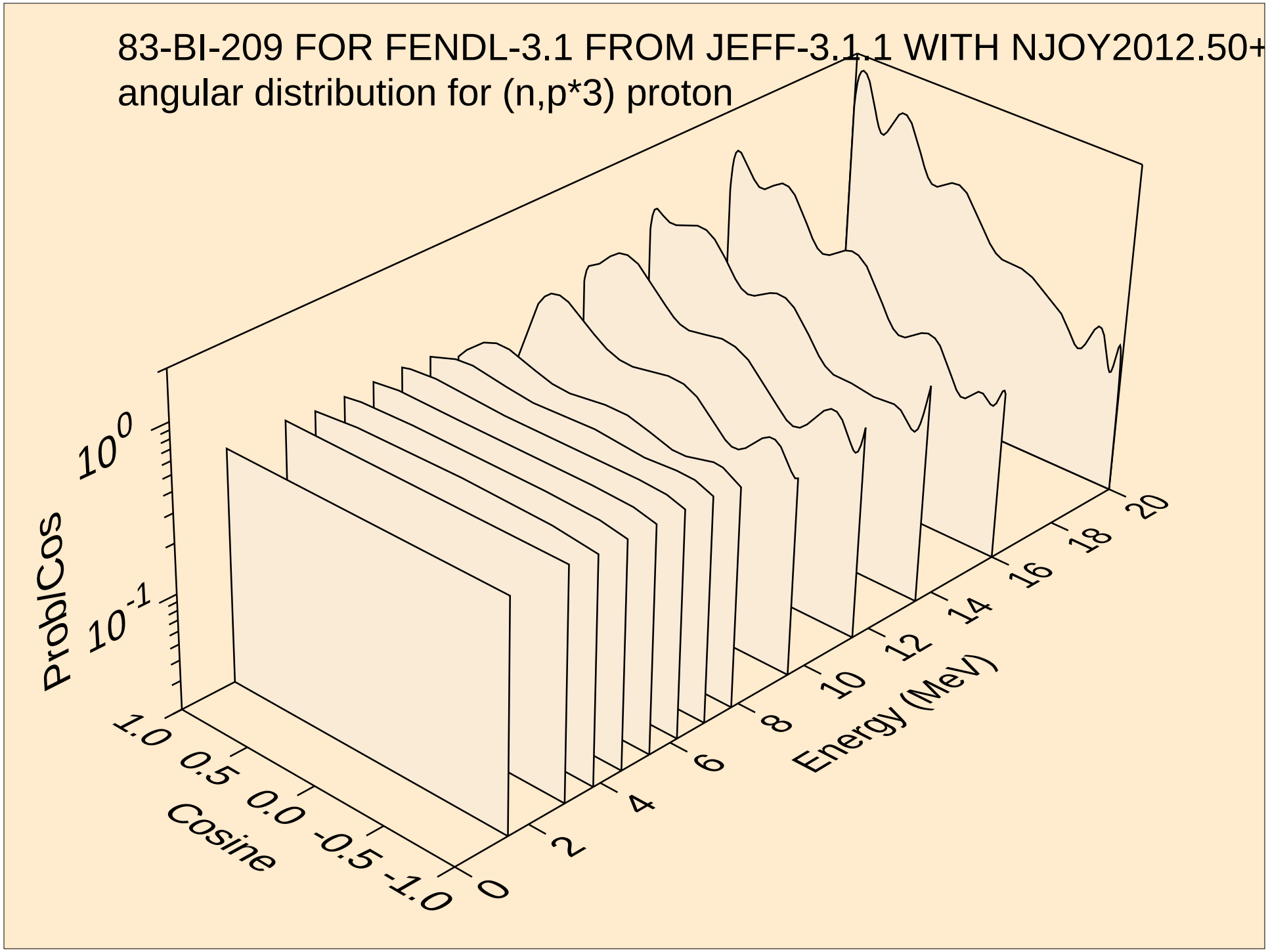

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
protons from (n,2np)
Prob/MeV
10-1
10-3
0
Sec. Energy
5
10
10
12
14
16
18
20
Energy (MeV)

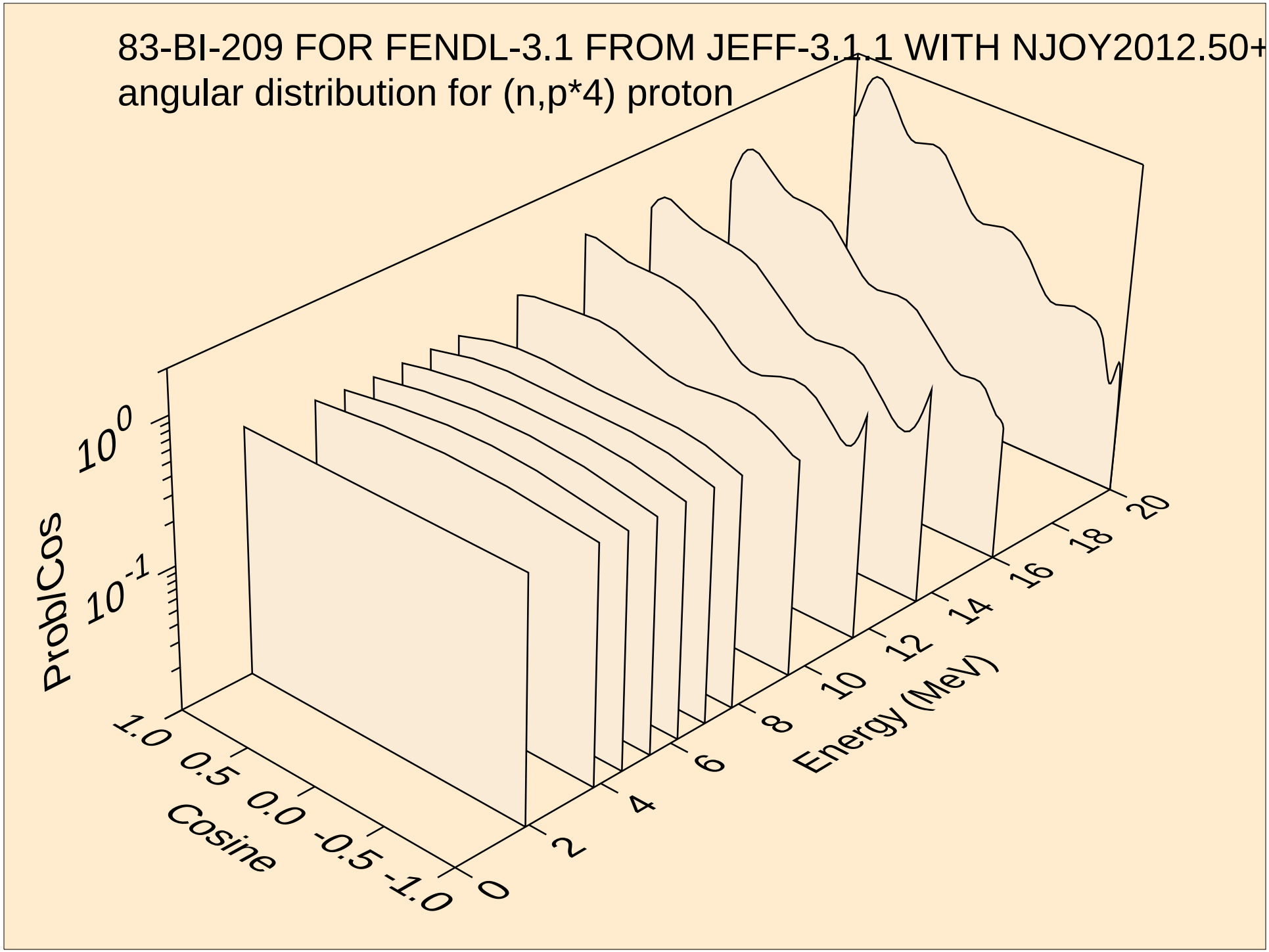

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
protons from (n,pa)
Prob/MeV
10^0
10^-2
0
Sec. Energy
10
20
0
5
10
15
20
Energy (MeV)

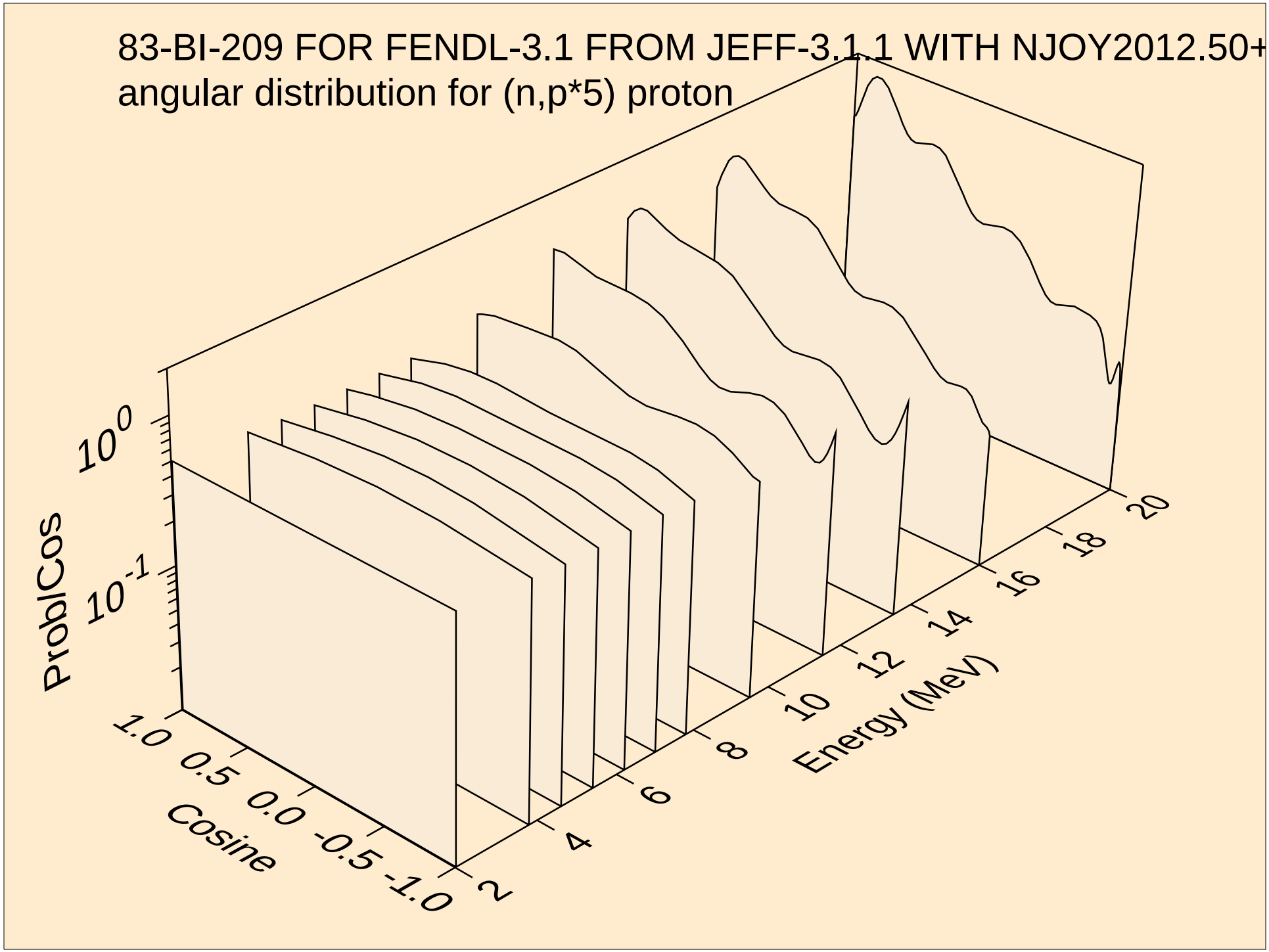

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*0) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

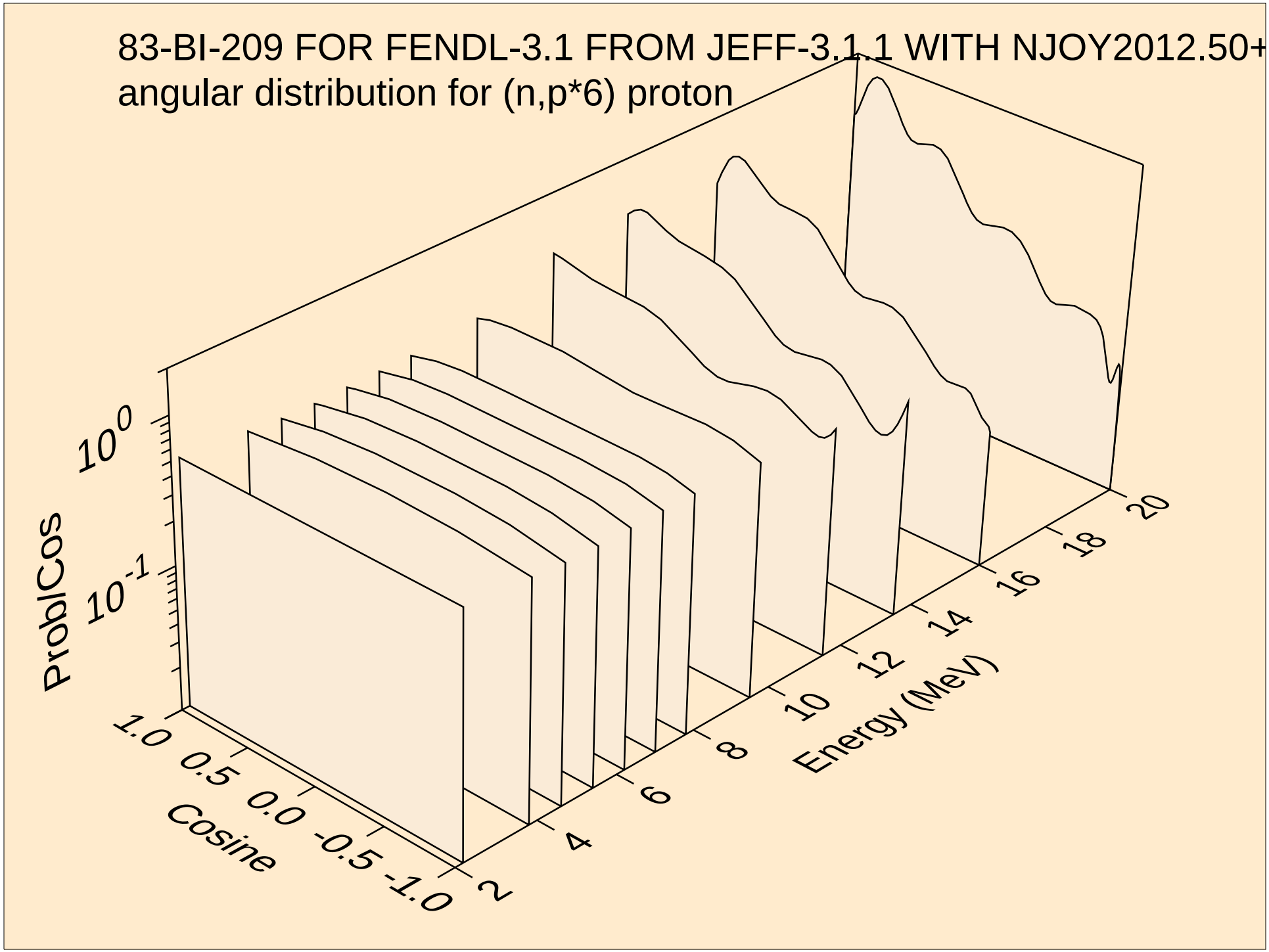

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*1) proton
ProblCos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

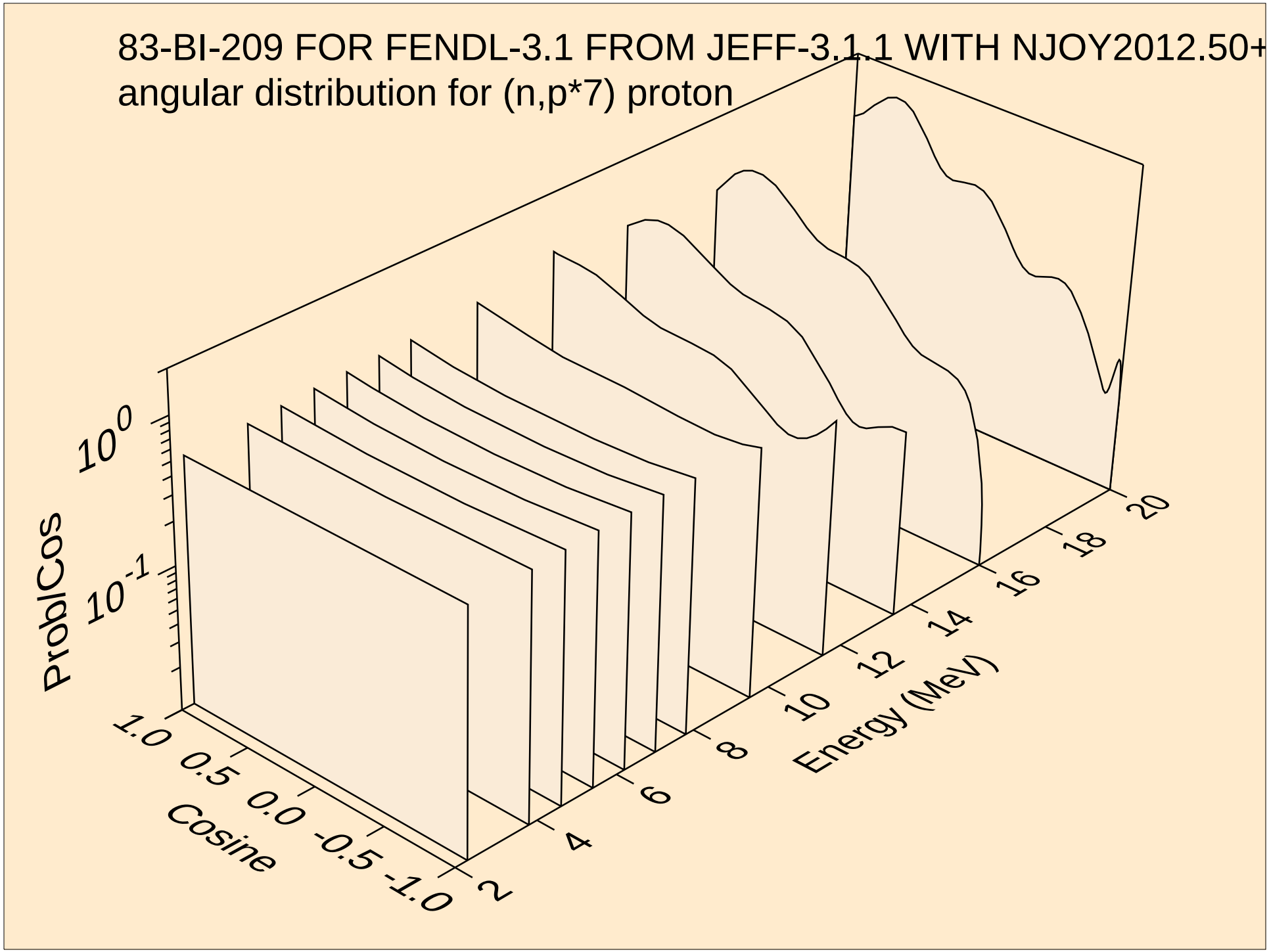

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*2) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

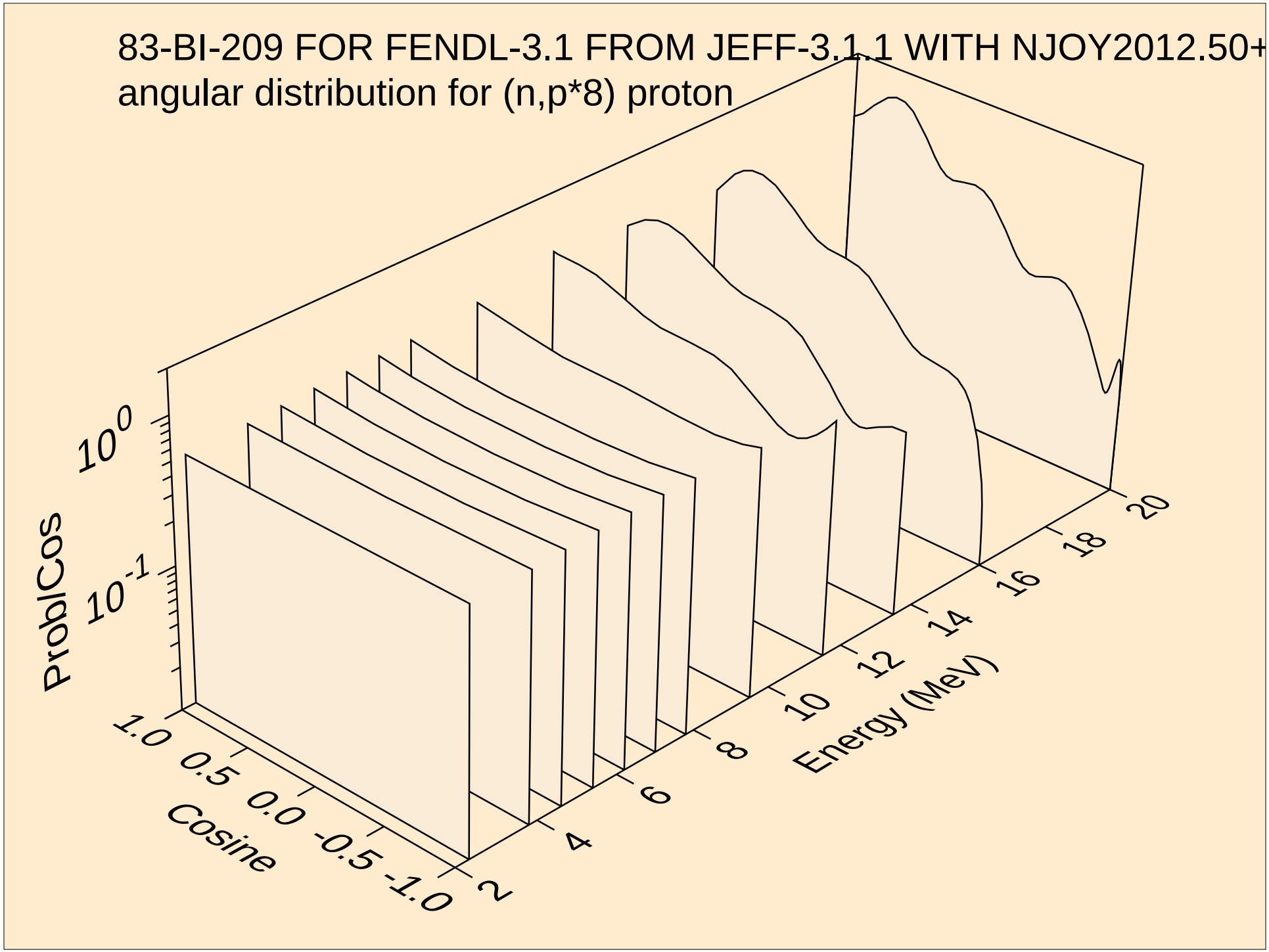

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*3) proton
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

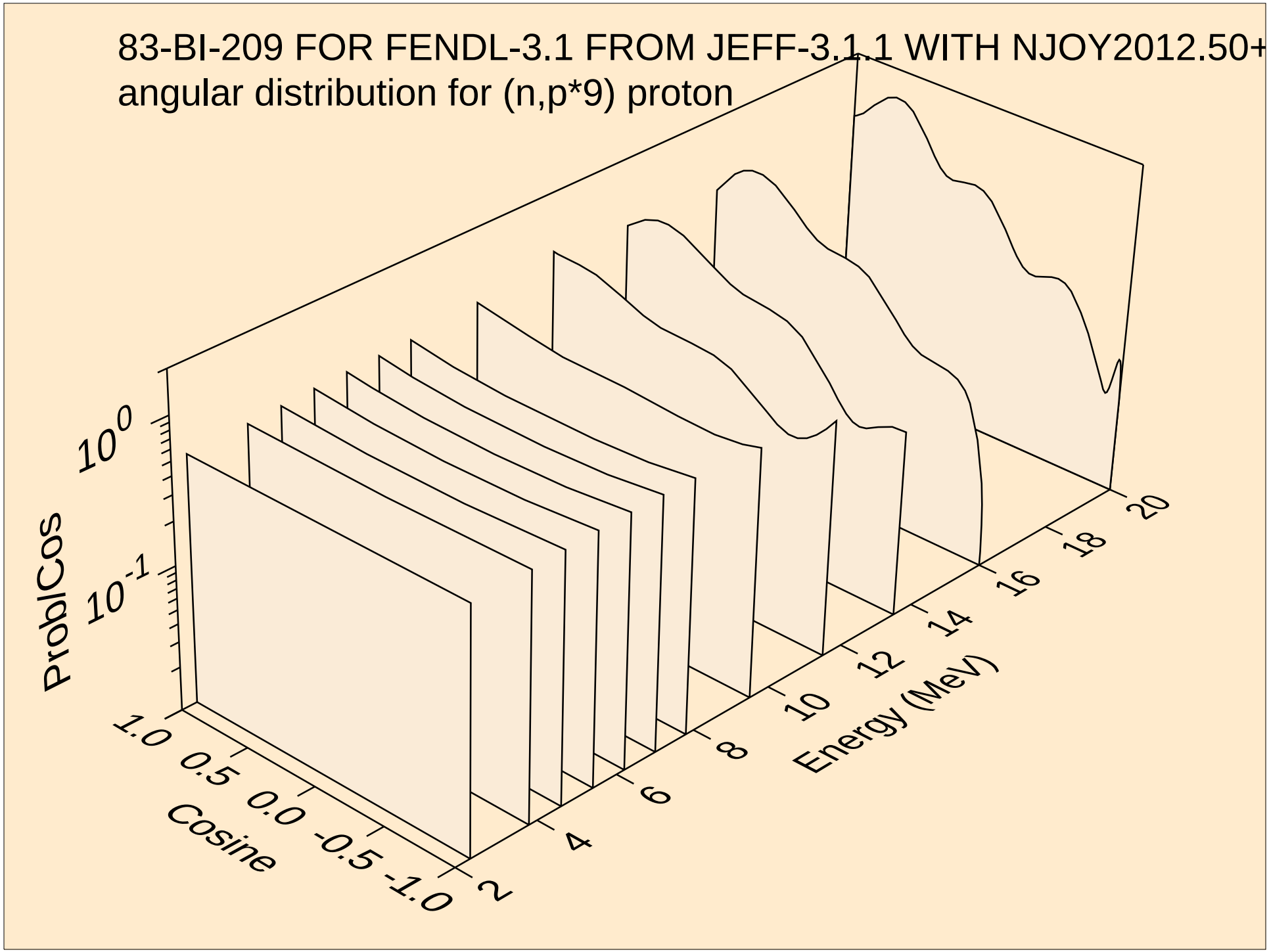

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*4) proton
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

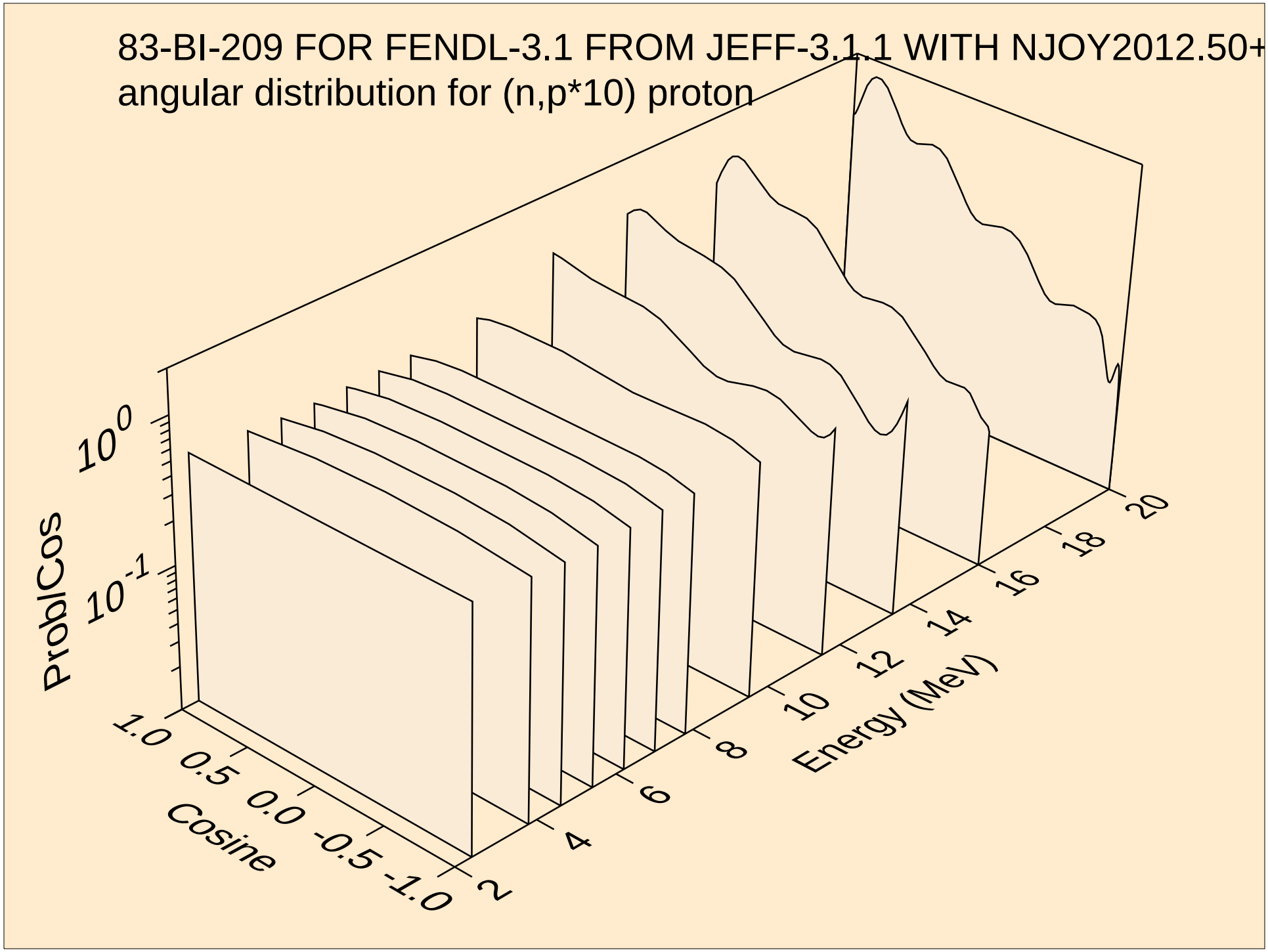

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*5) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

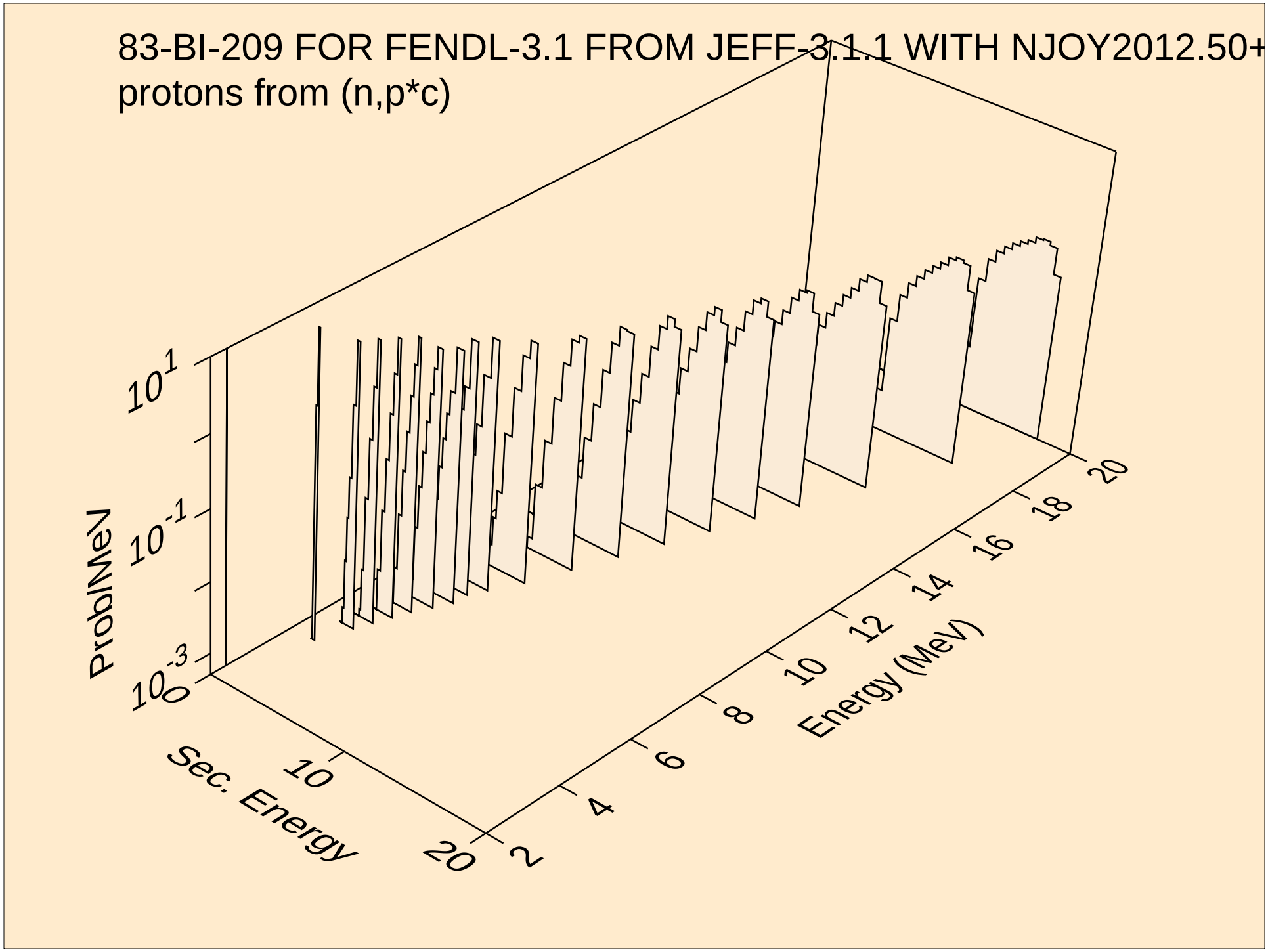

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*6) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

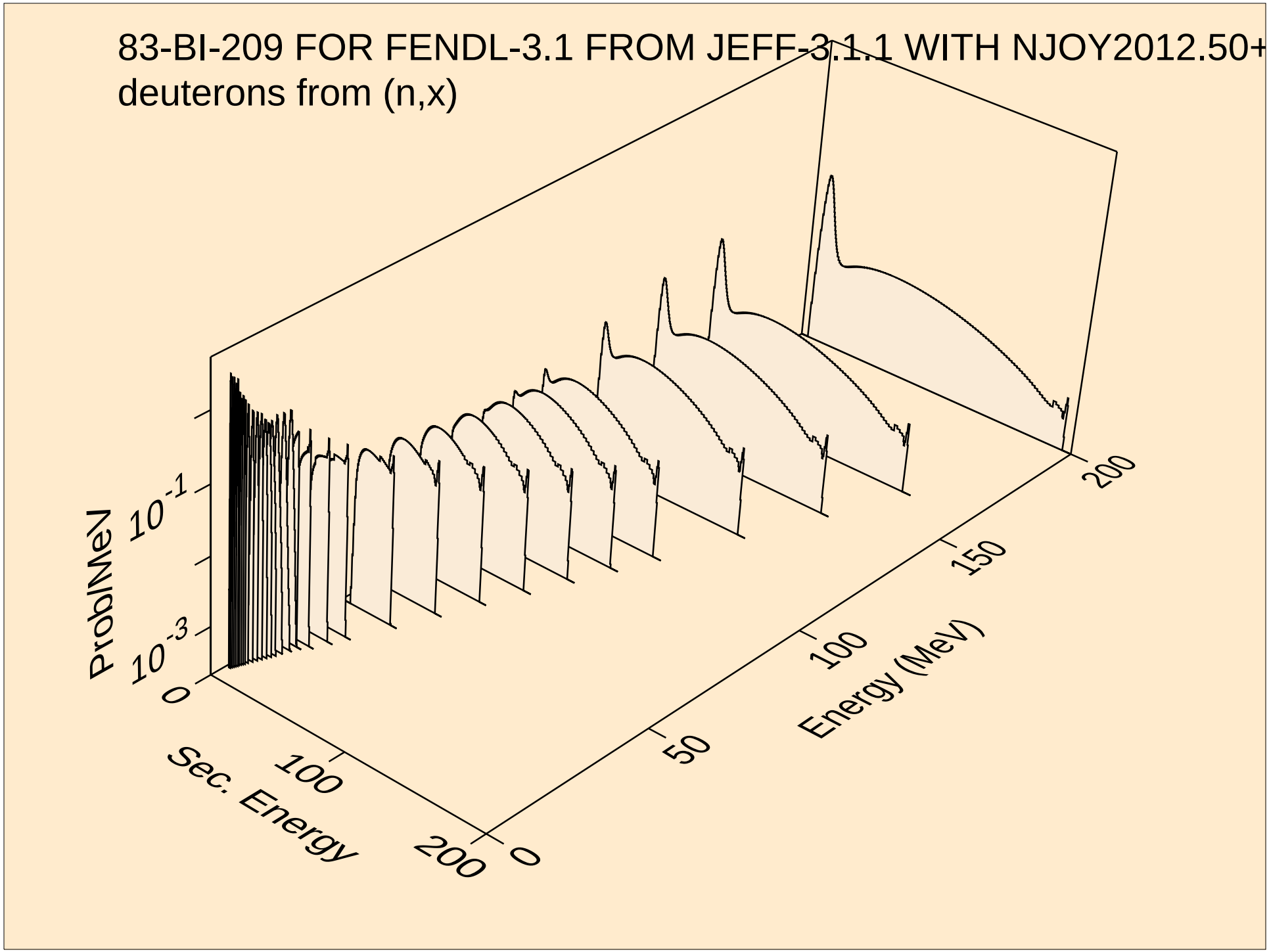

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*7) proton
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

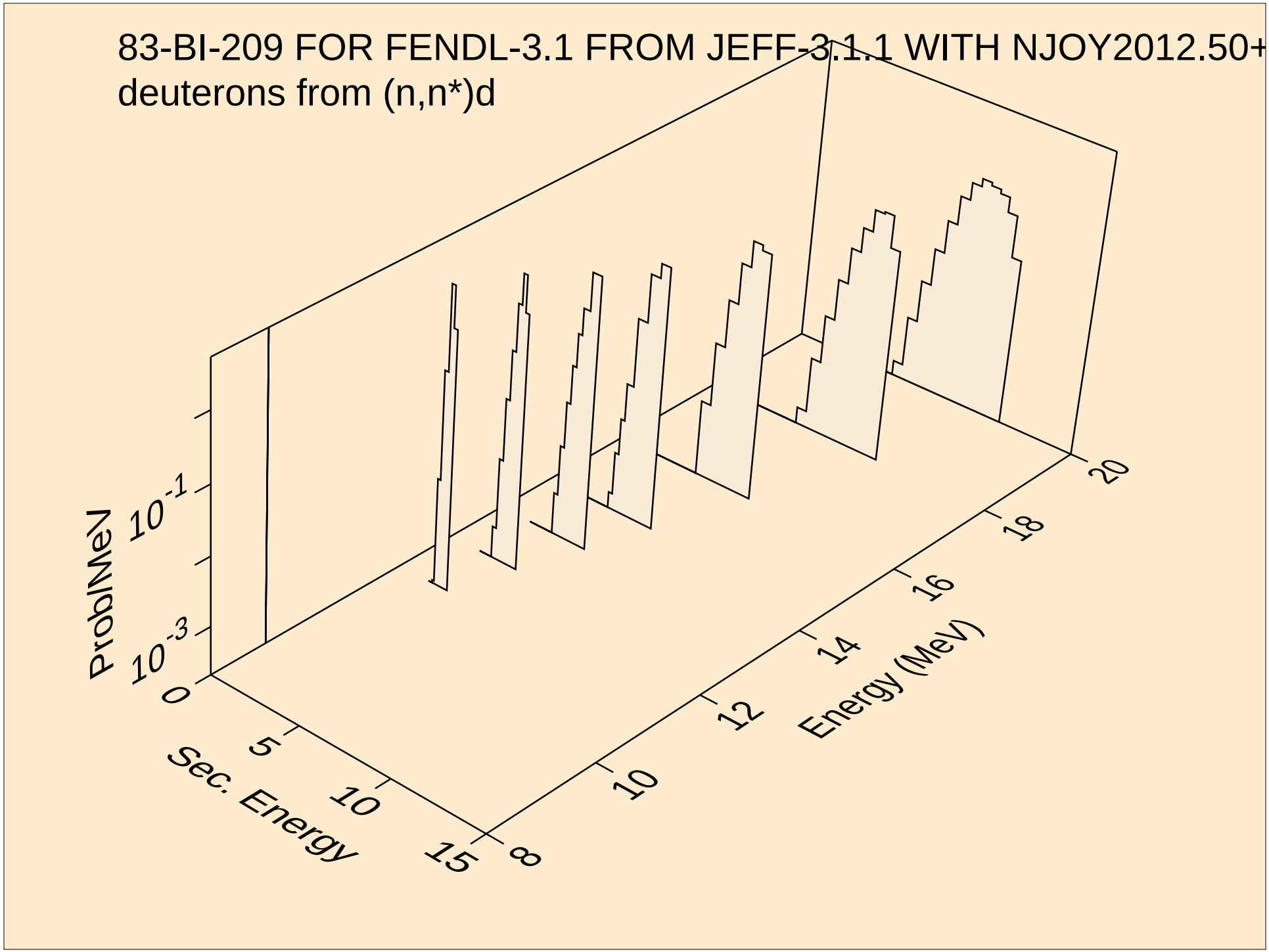

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*8) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

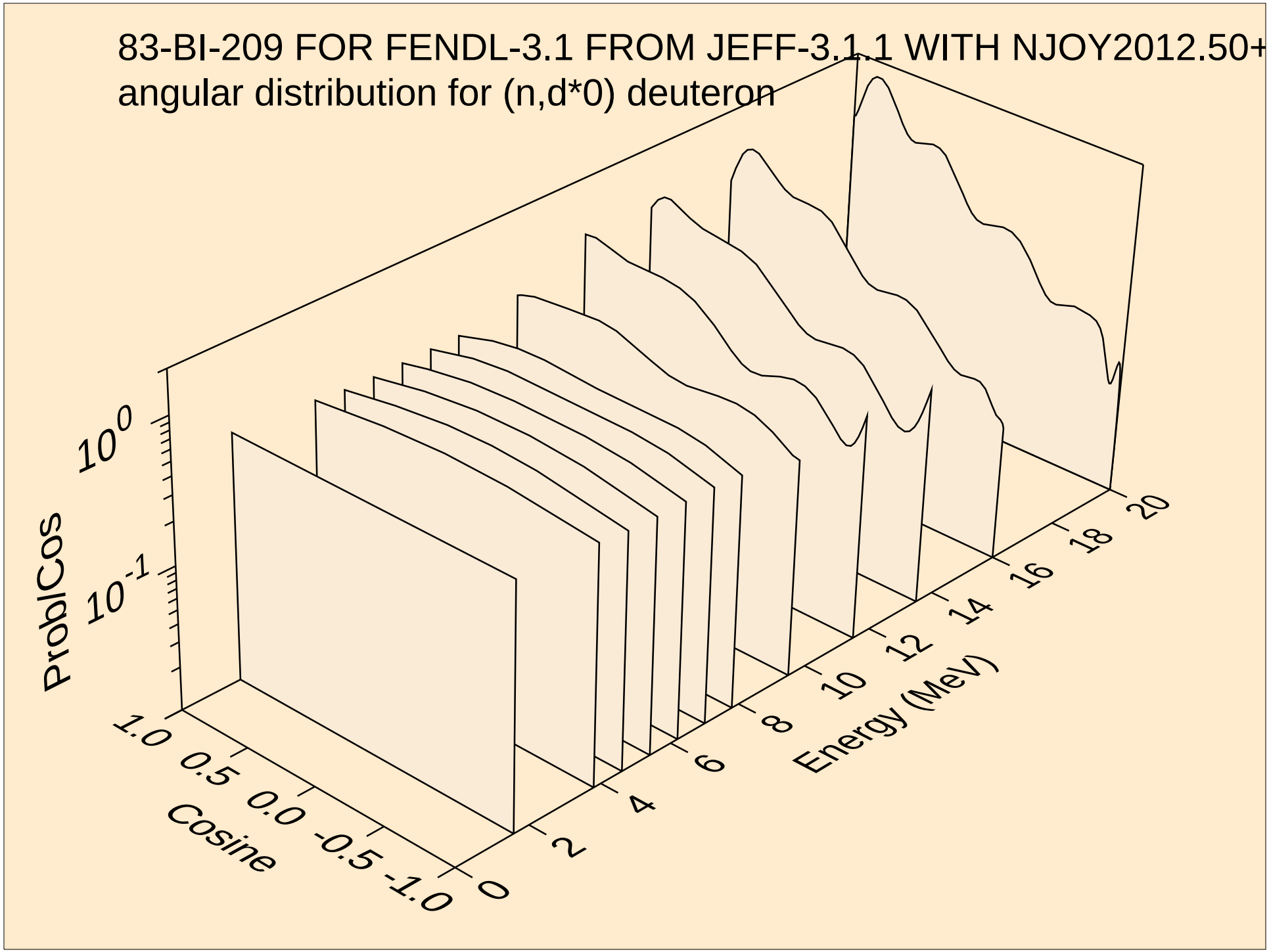

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*9) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

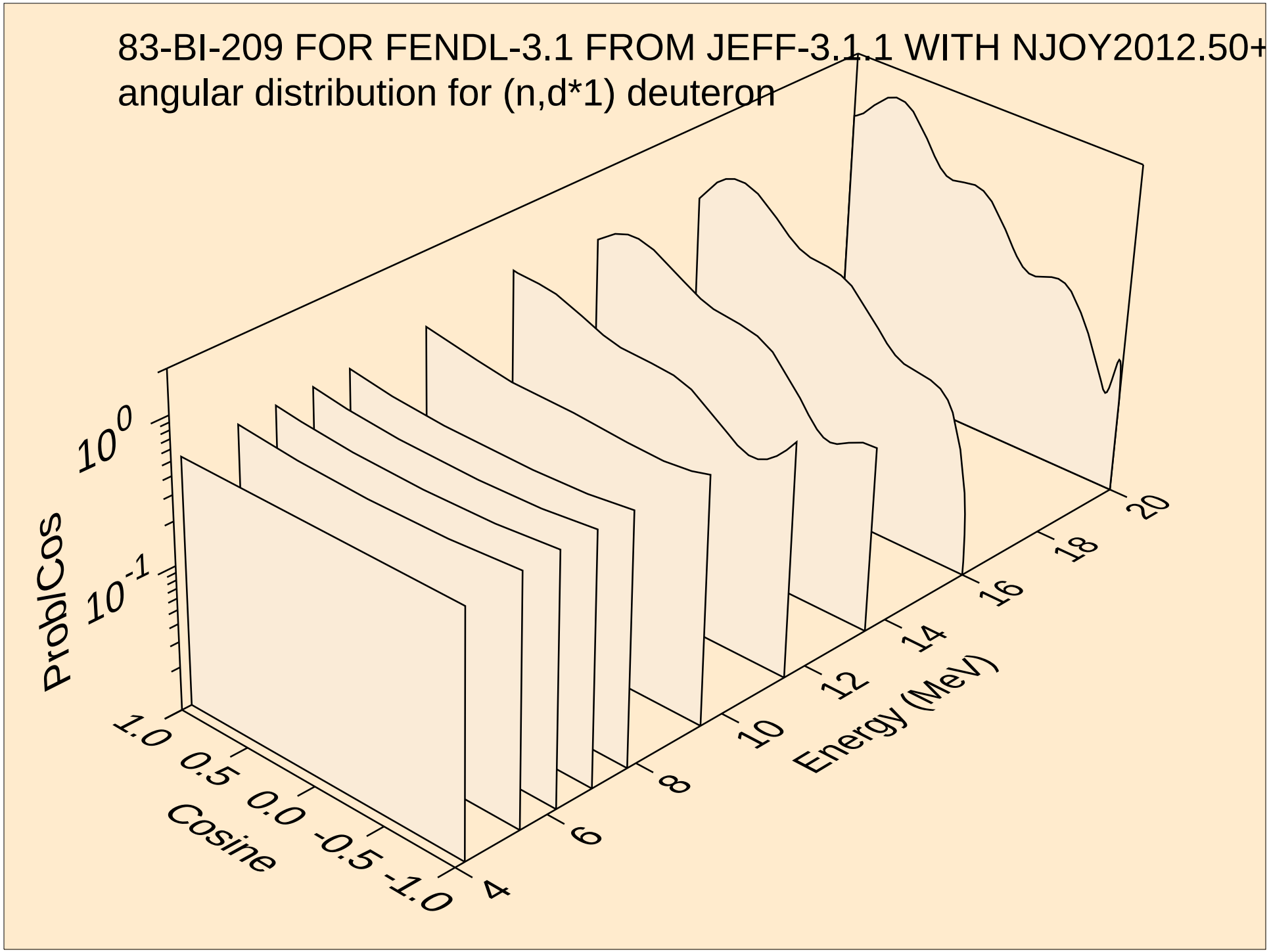

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,p*10) proton
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

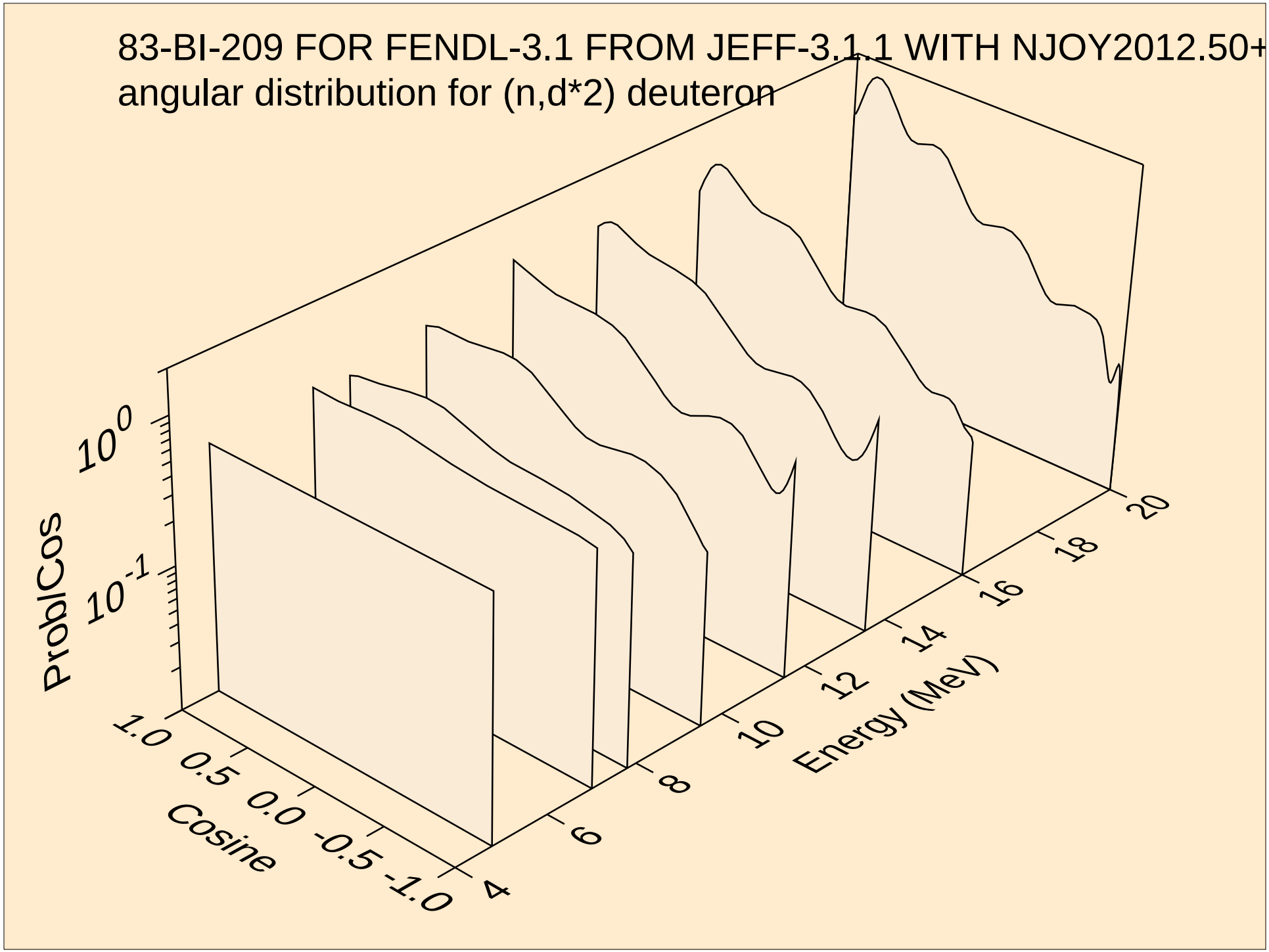

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
protons from (n,p*c)
Prob/MeV
10^1
10^-1
10^-3
0
Sec. Energy
10
20
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

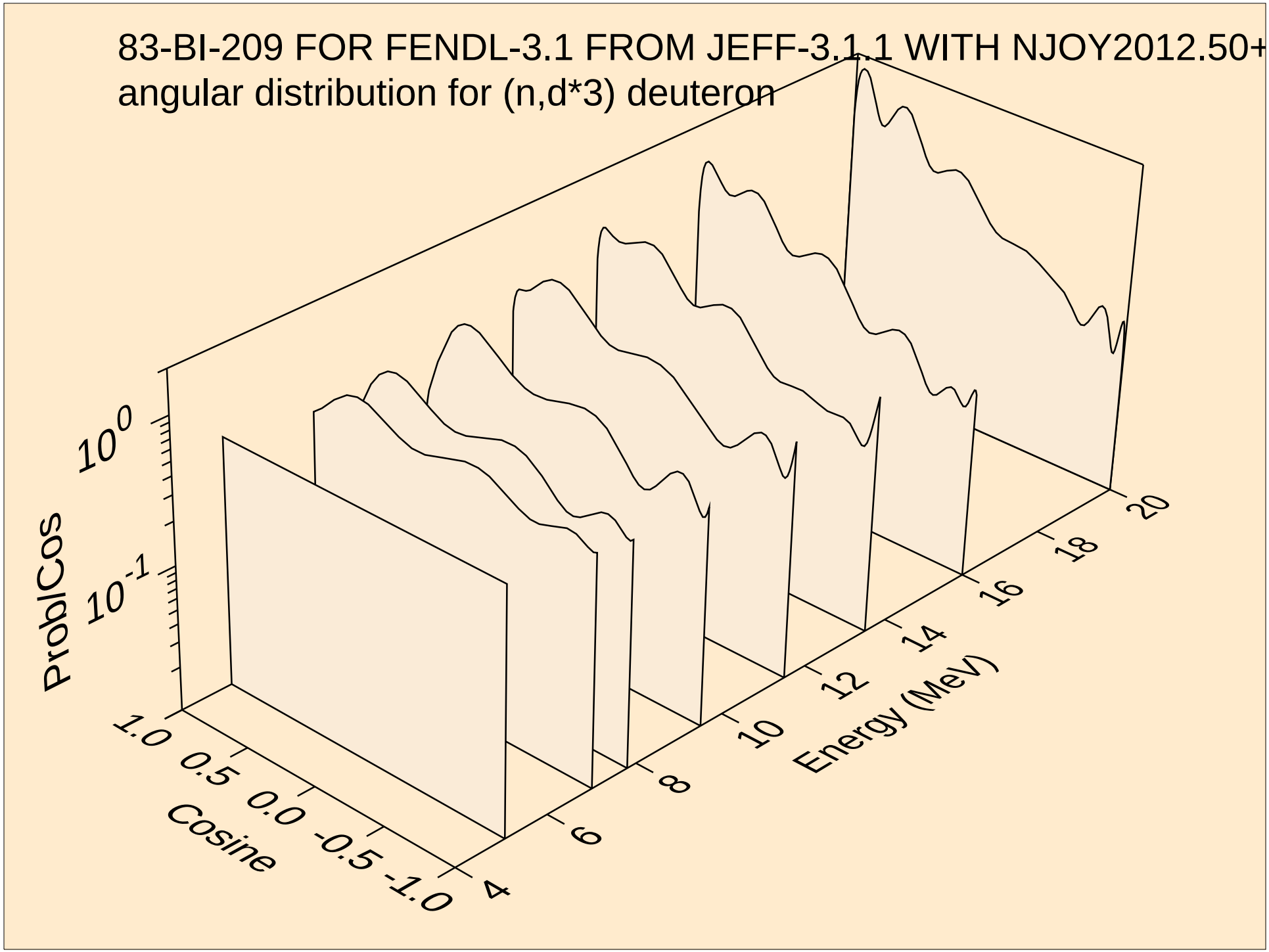

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
deuterons from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

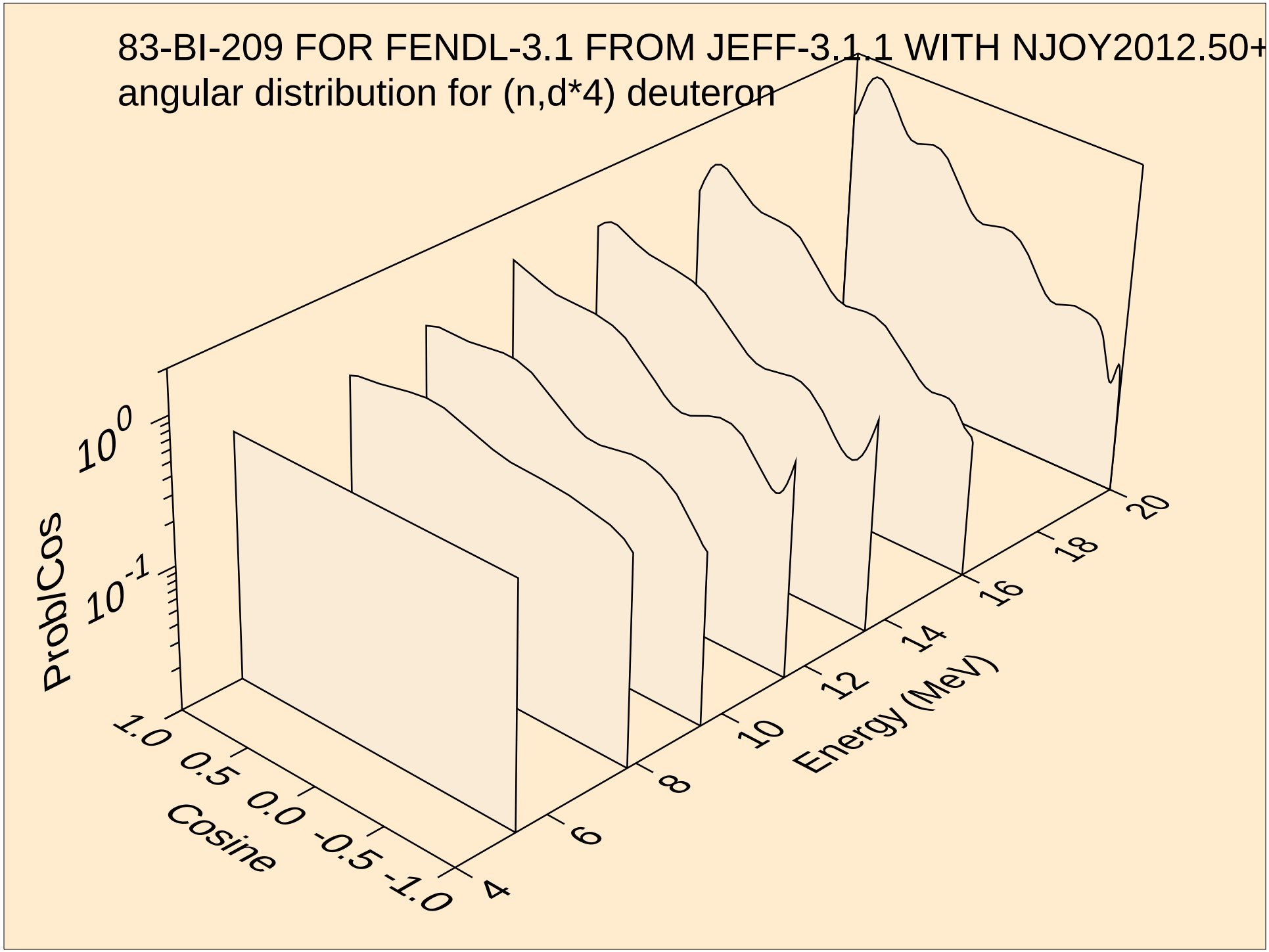

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
deuterons from (n,n*)d
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

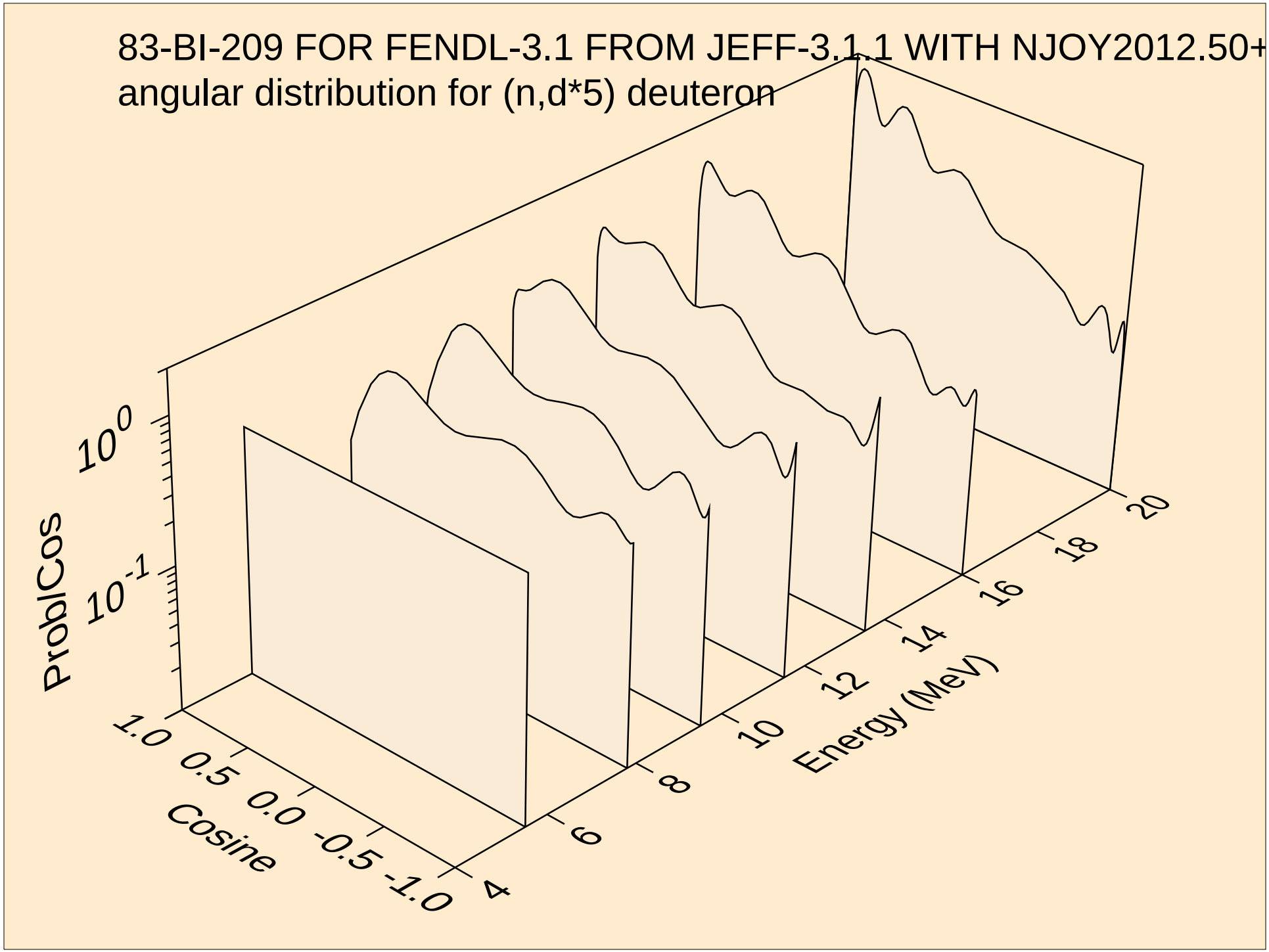

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*0) deuteron
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20

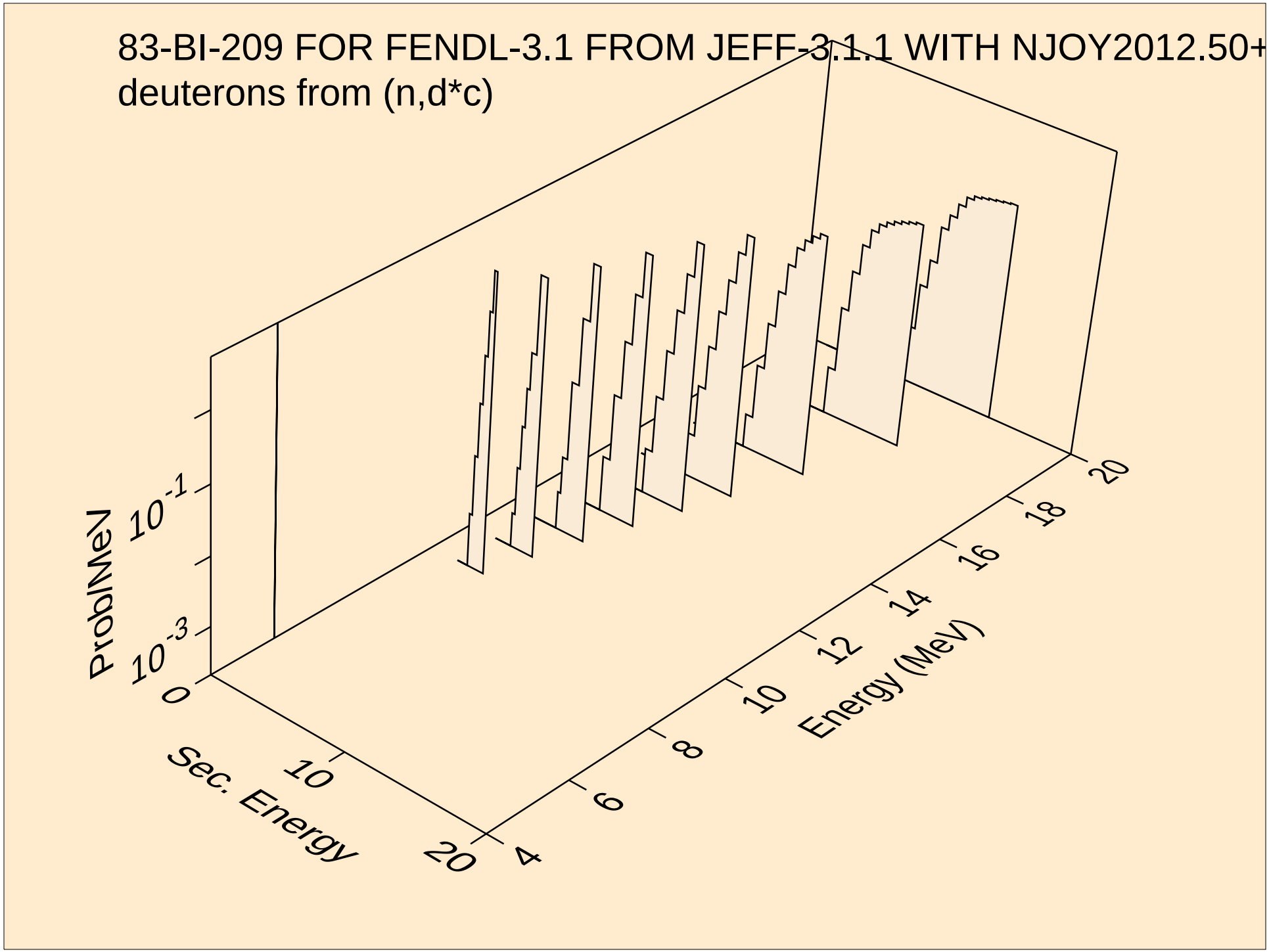

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*1) deuteron
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

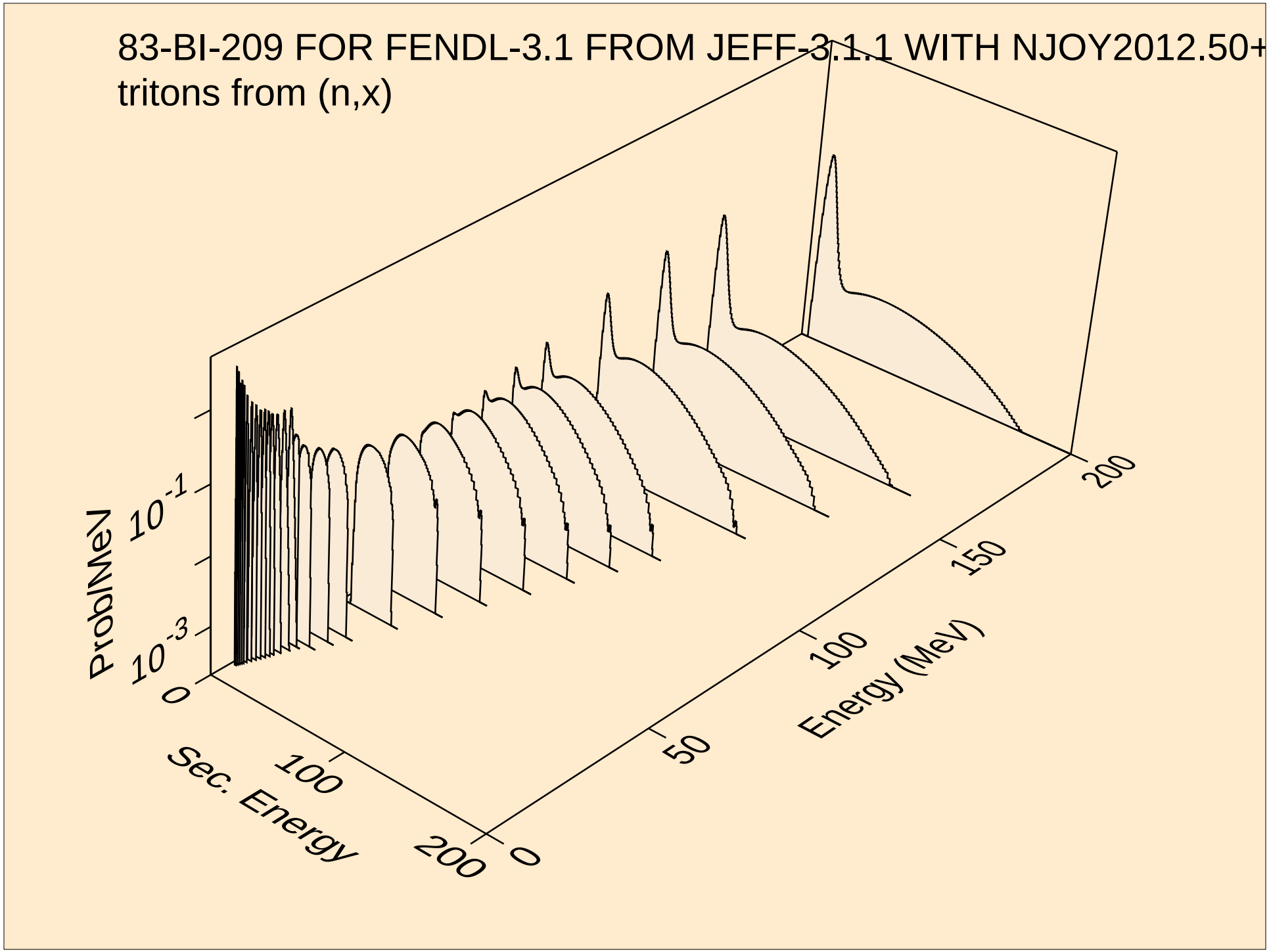

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*2) deuteron
ProbCos
10^{0}
10^{-1}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
4
6
8
10
12
14
16
18
20

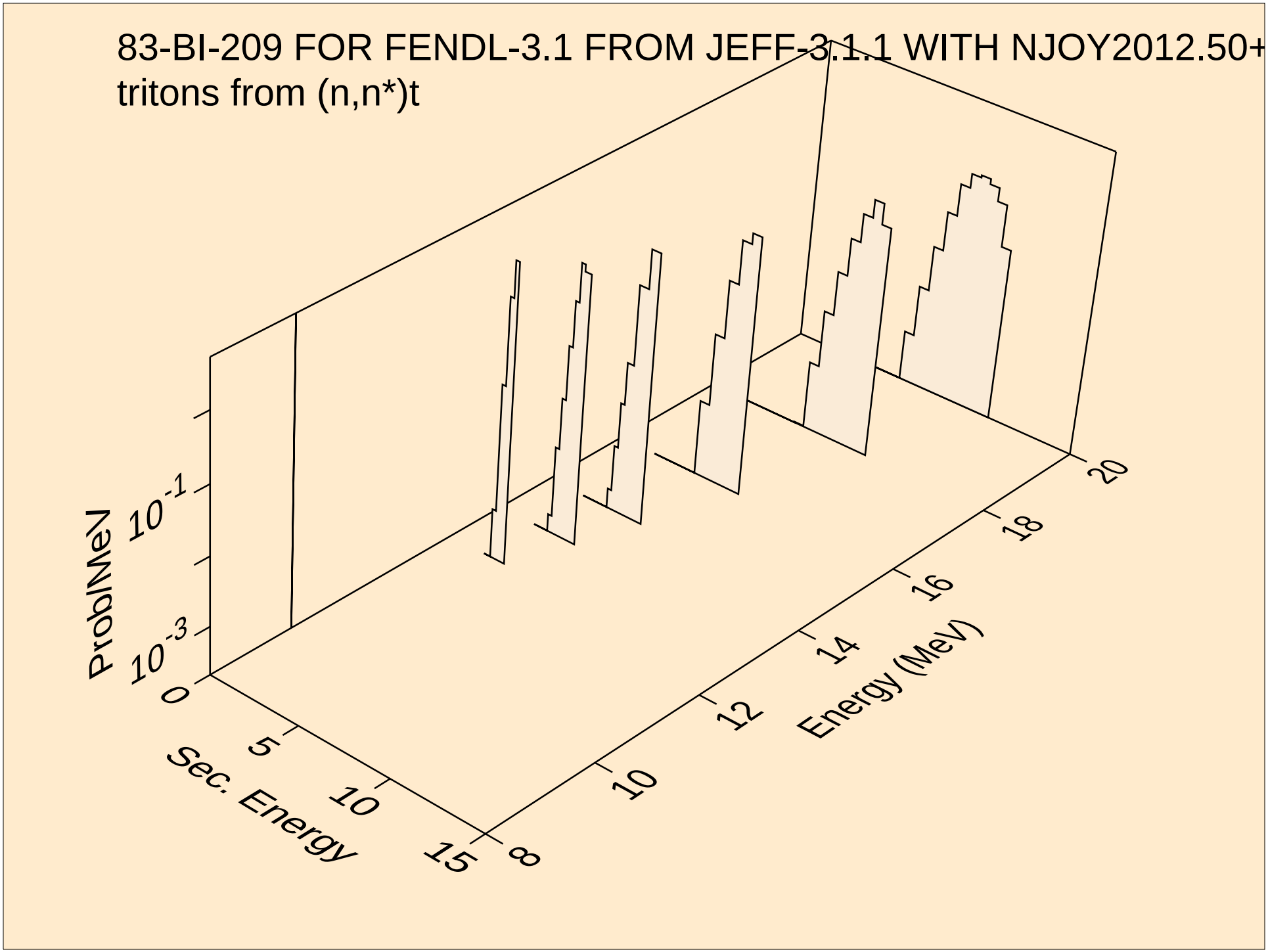

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*3) deuteron
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

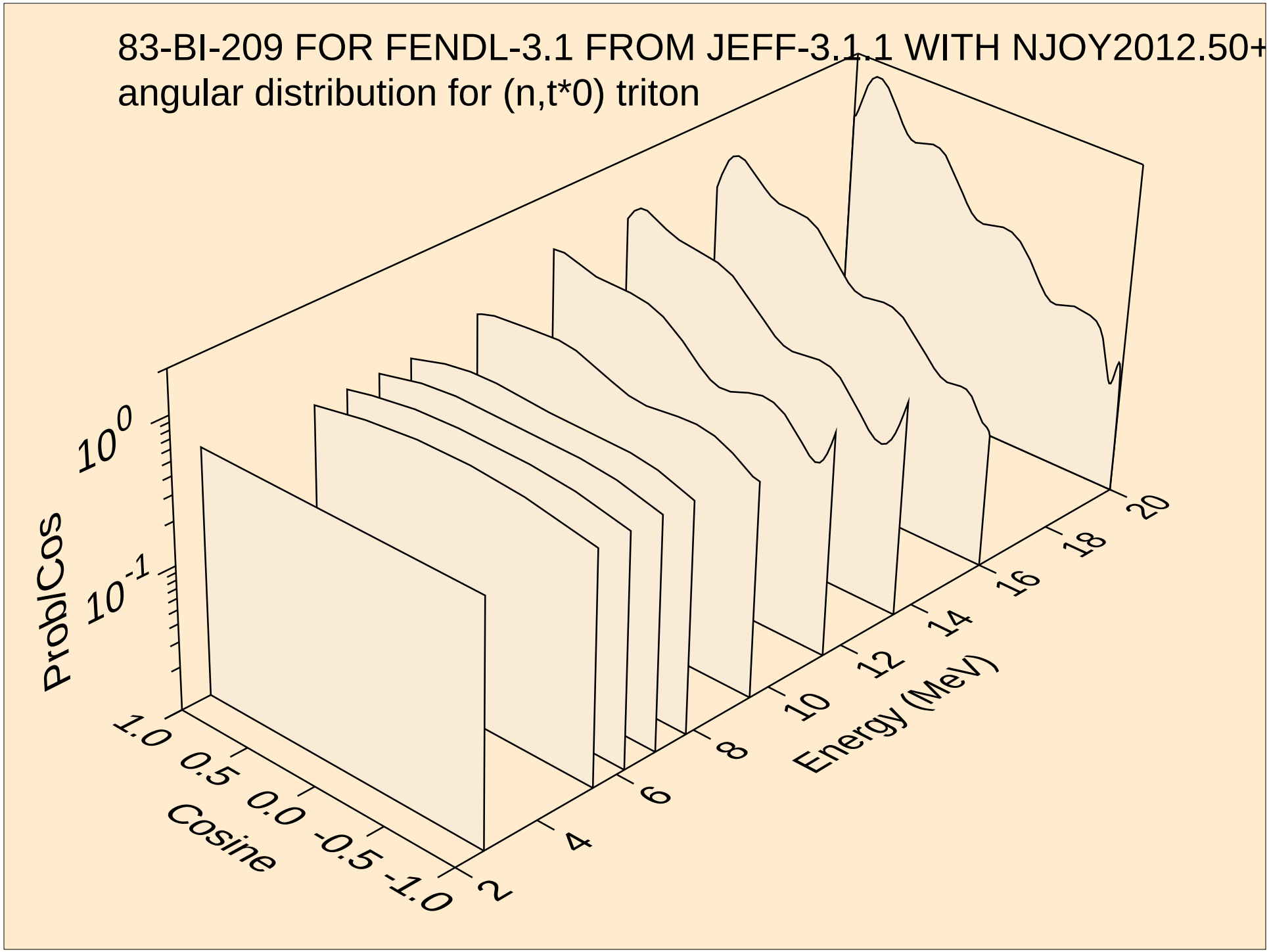

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*4) deuteron
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

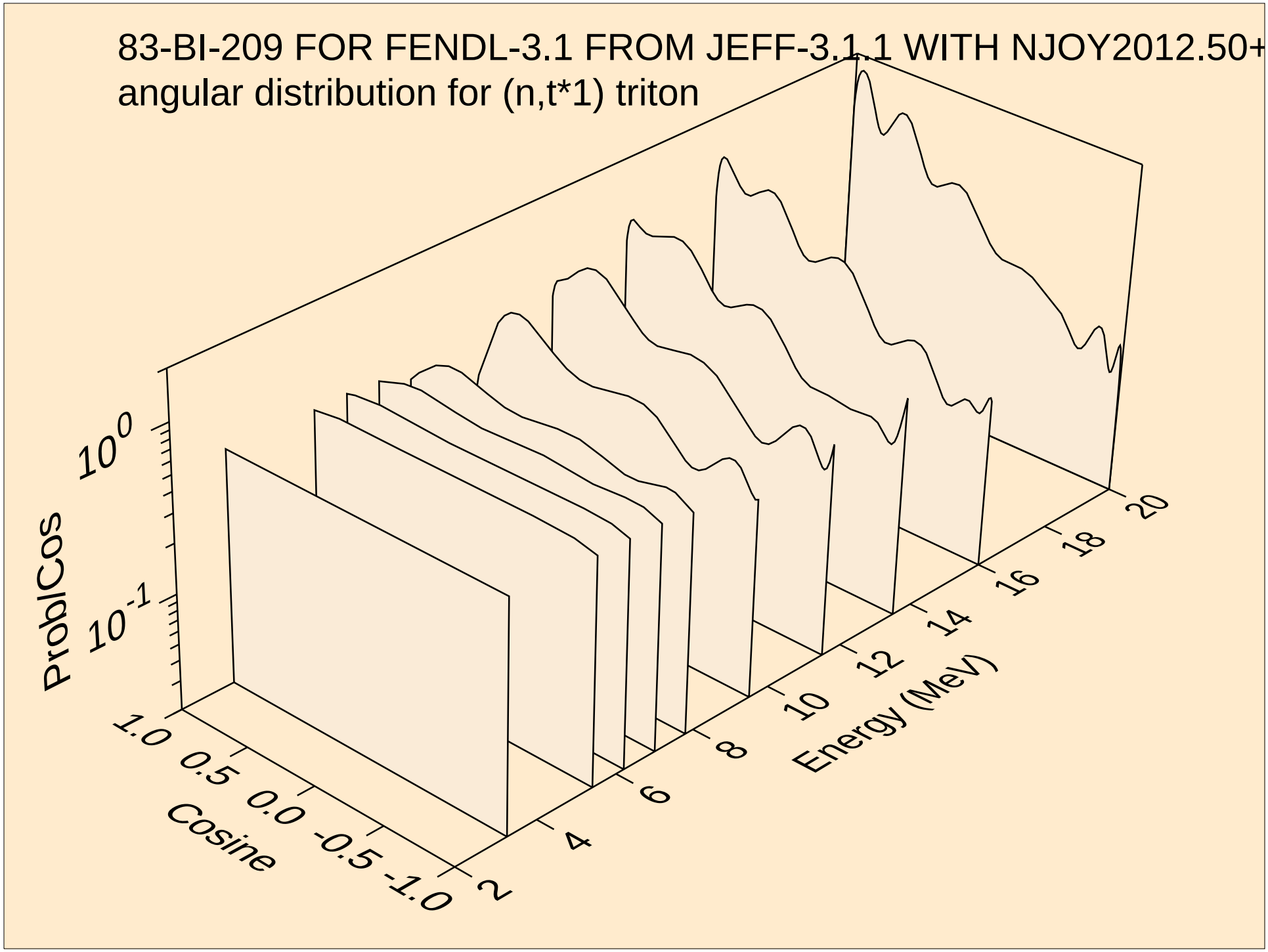

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,d*5) deuteron
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

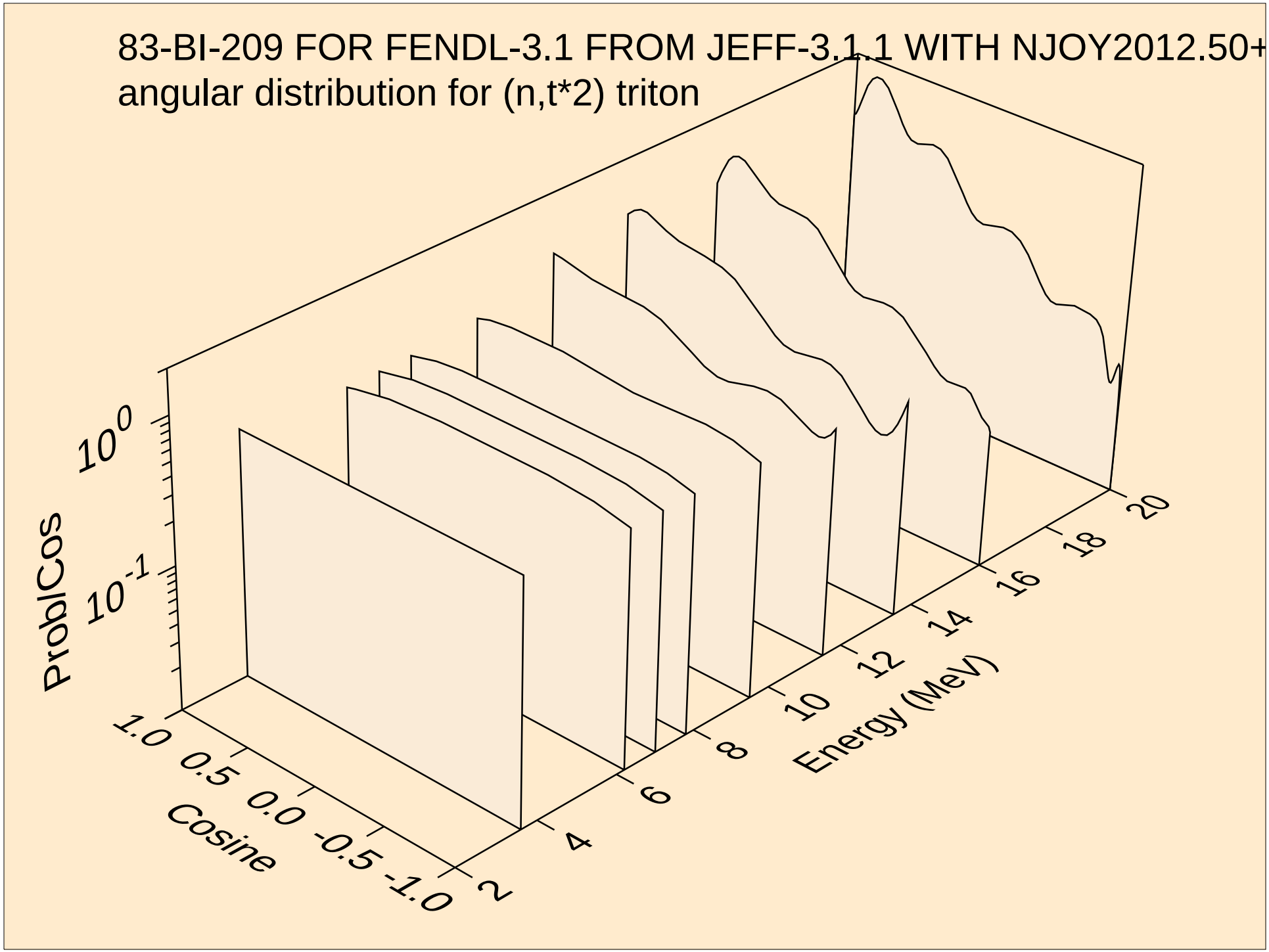

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
deuterons from (n,d*c)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
4
6
8
10
12
14
16
18
20
Energy (MeV)

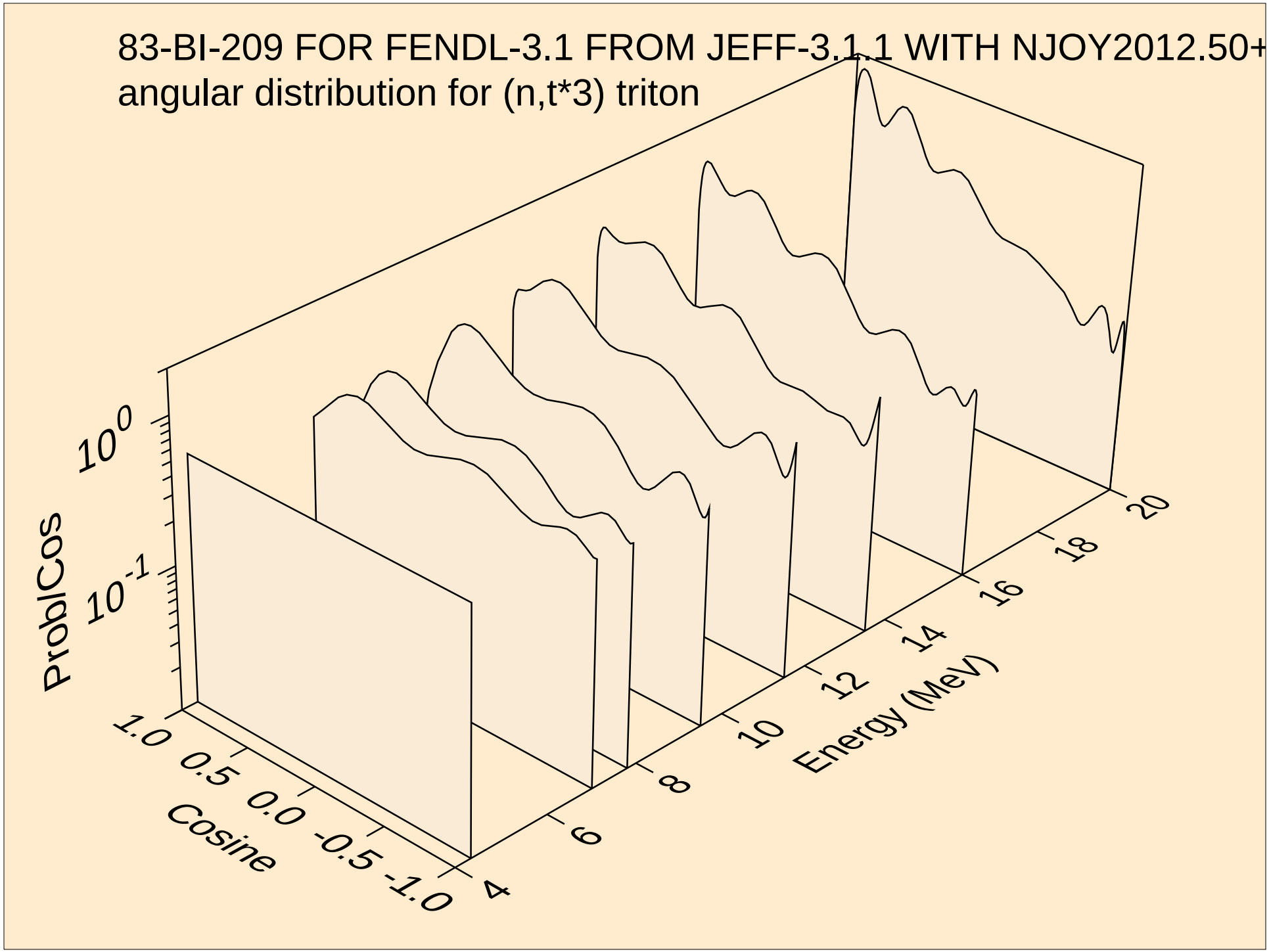

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
tritons from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

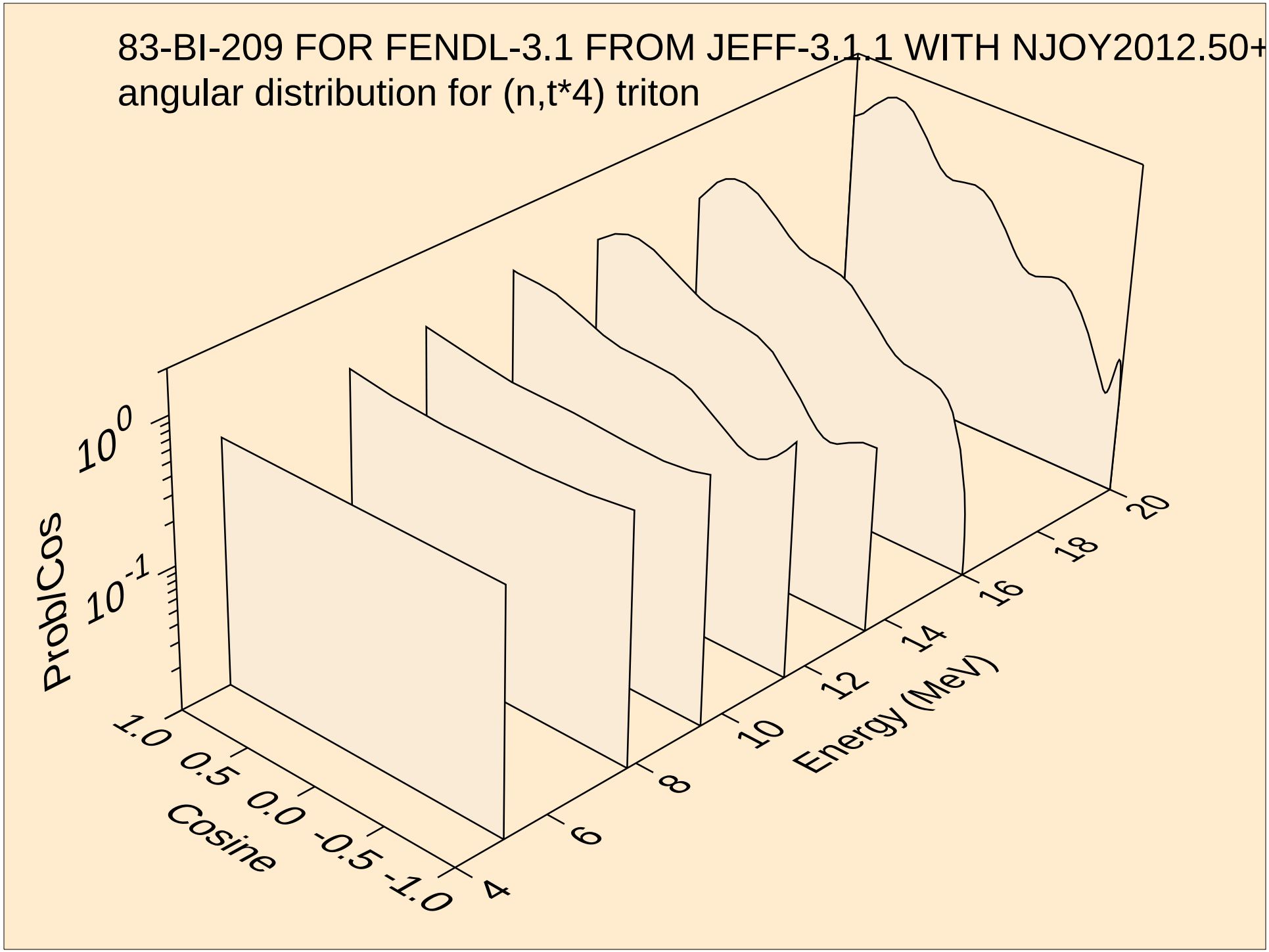

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
tritons from (n,n*)t
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

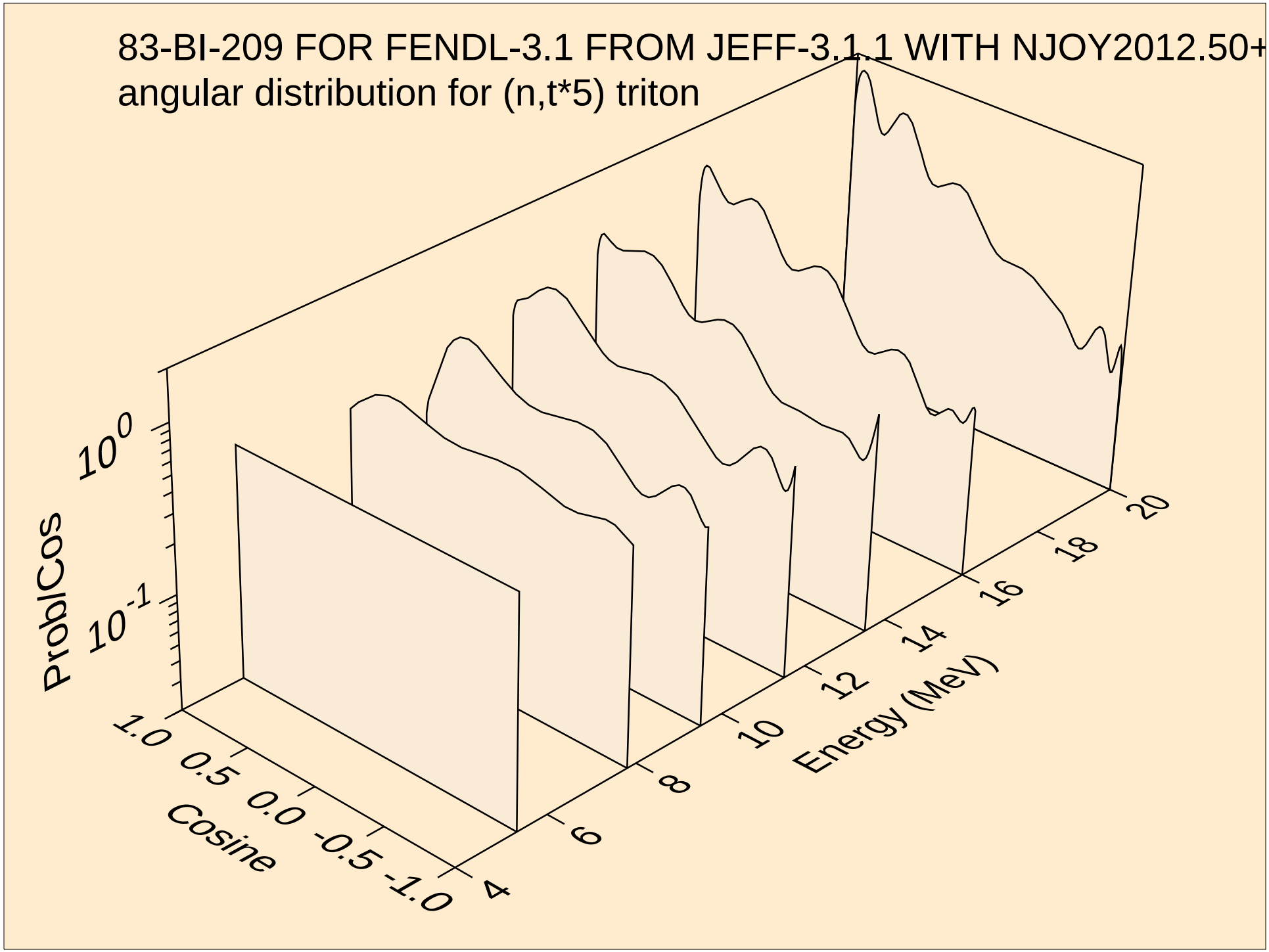

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*0) triton
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

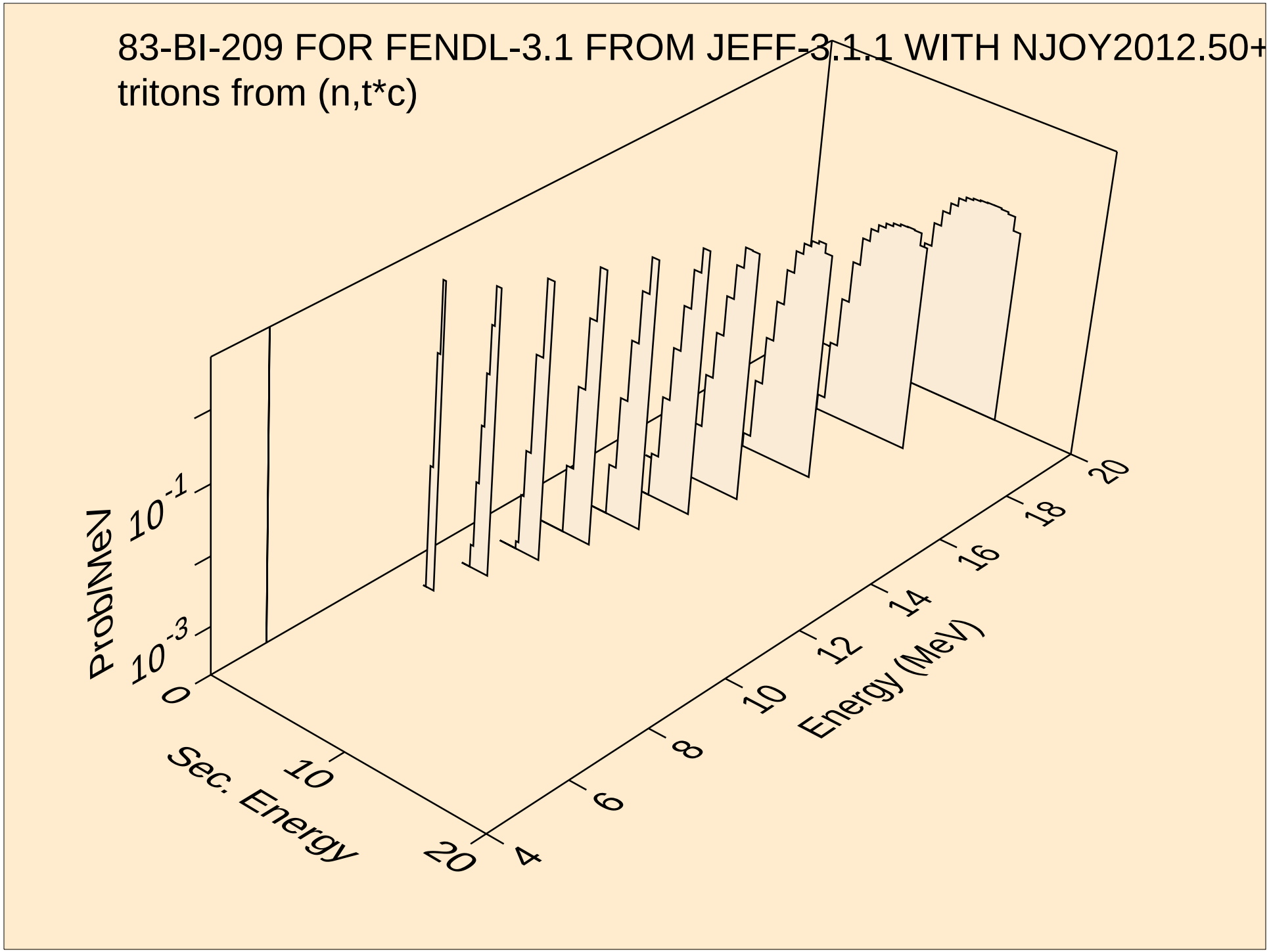

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*1) triton
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

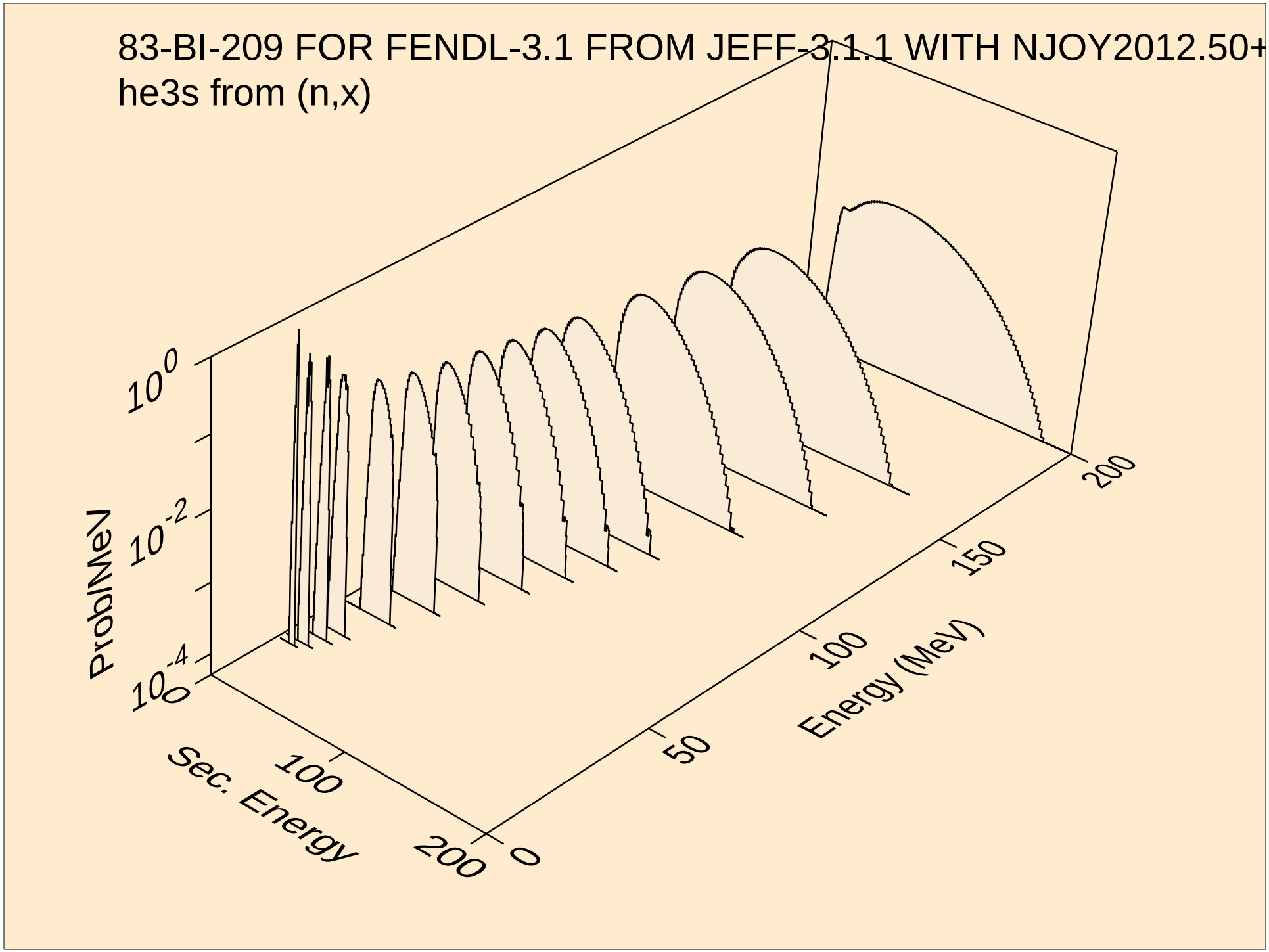

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*2) triton
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

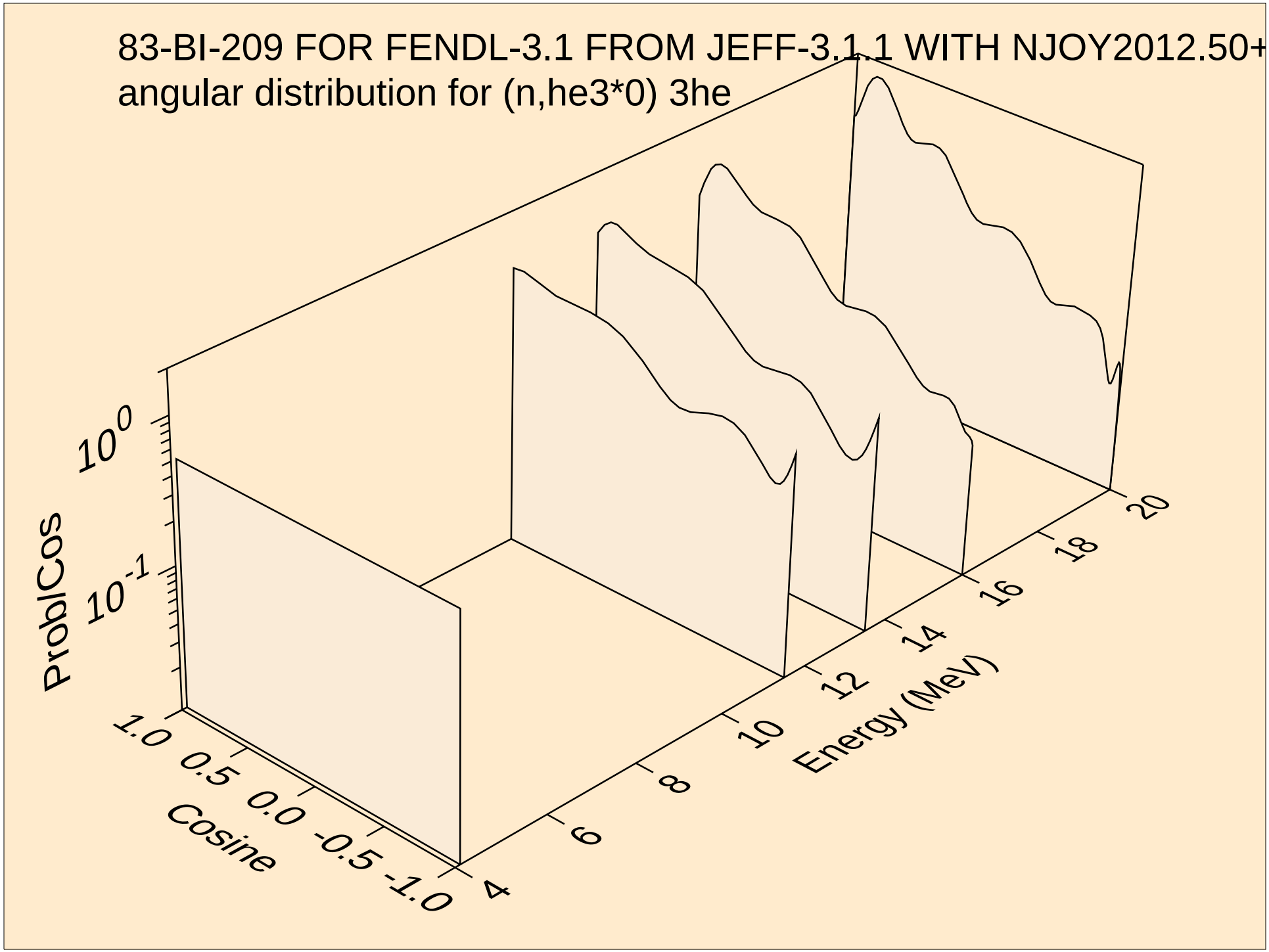

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*3) triton
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

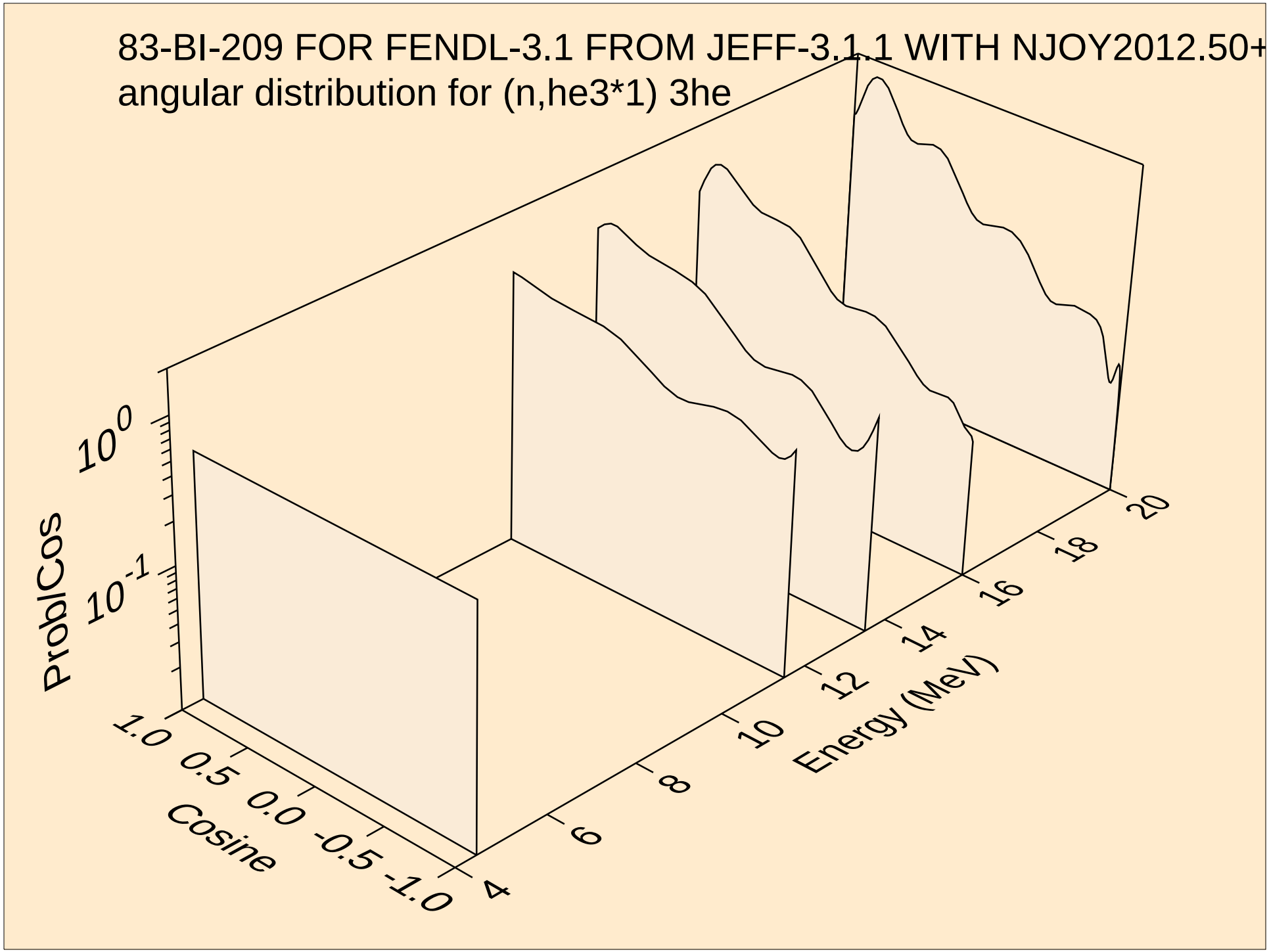

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*4) triton
ProblCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

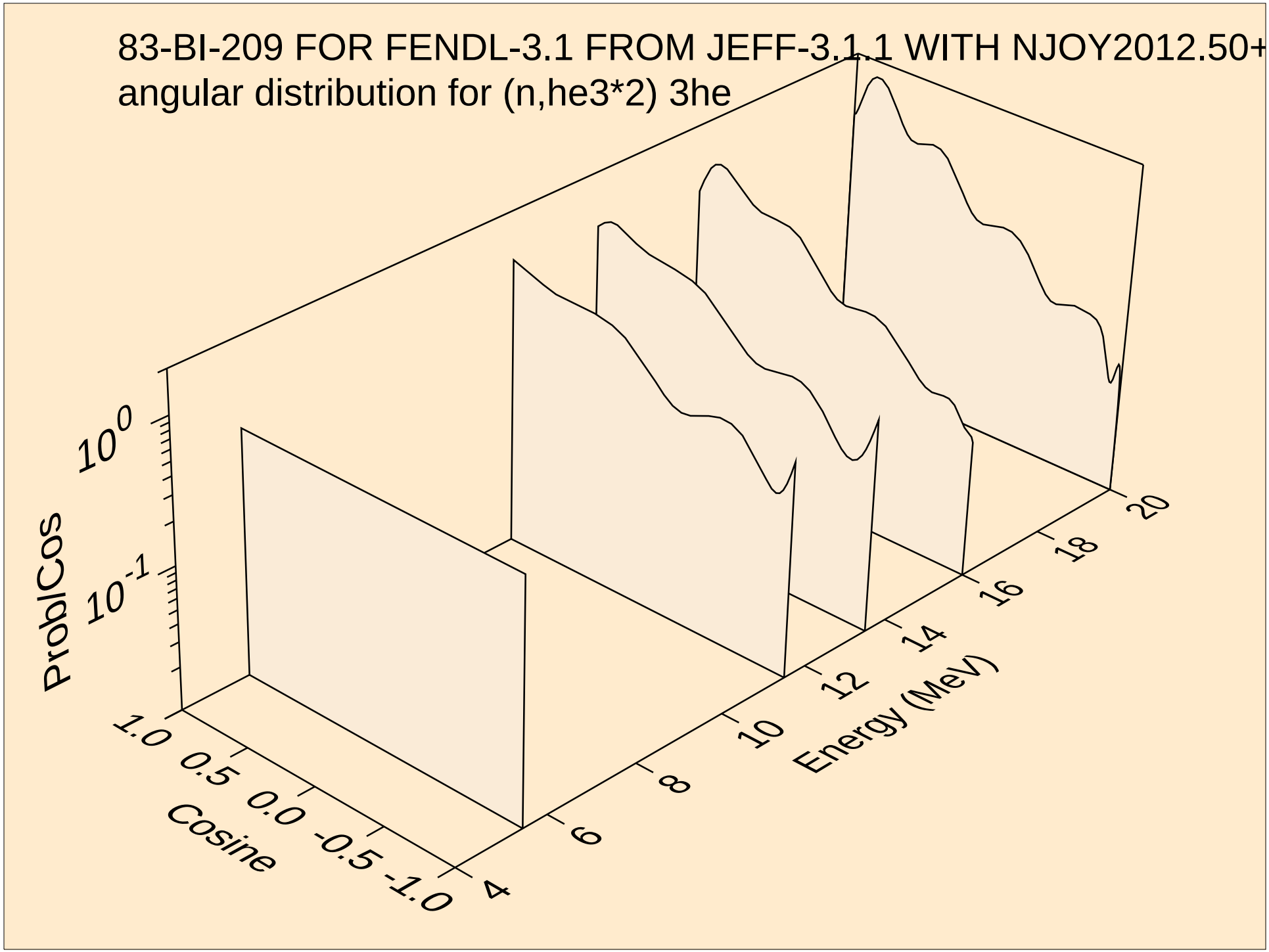

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,t*5) triton
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

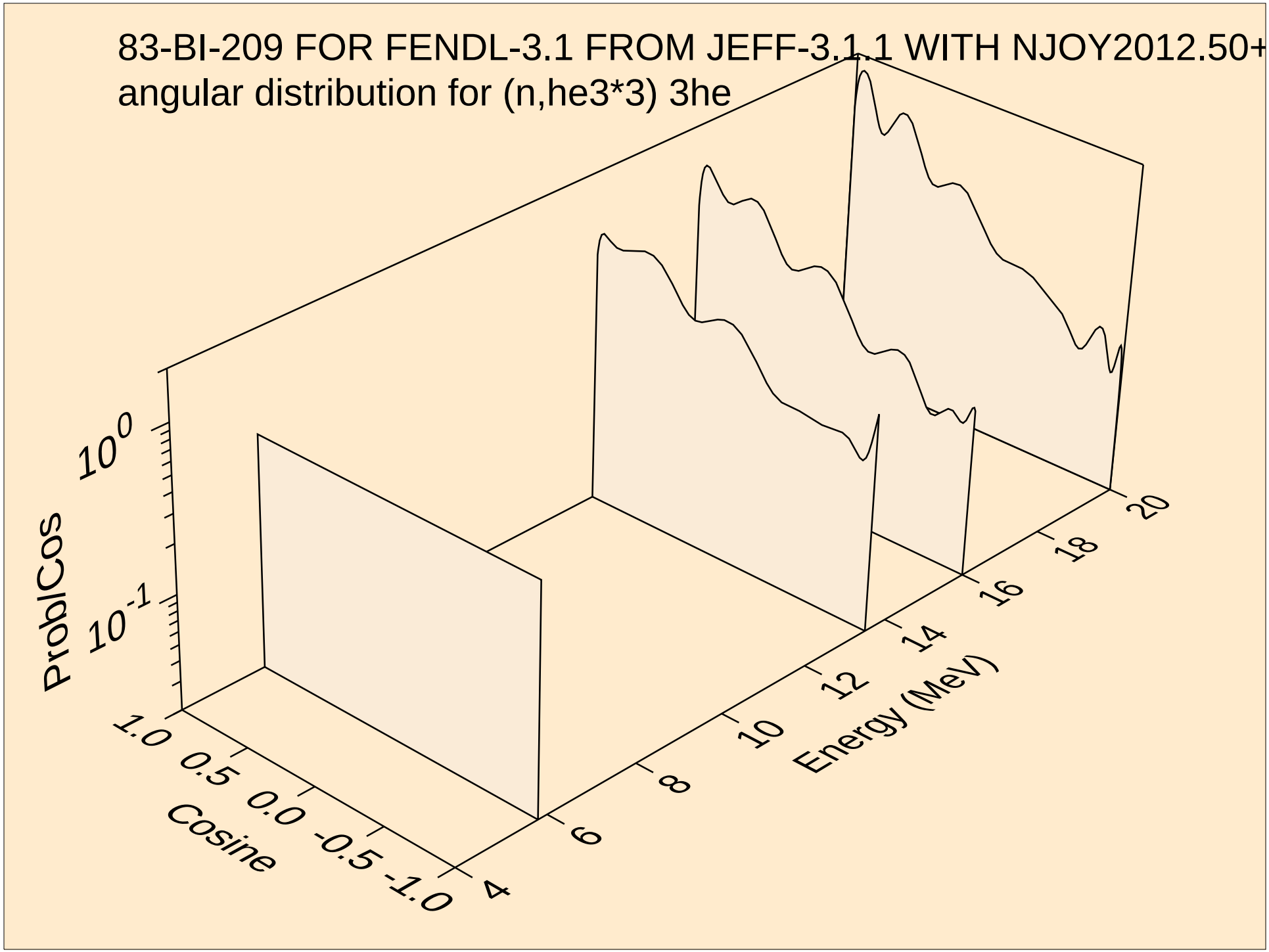

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
tritons from (n,t*c)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
4
6
8
10
12
14
16
18
20
Energy (MeV)

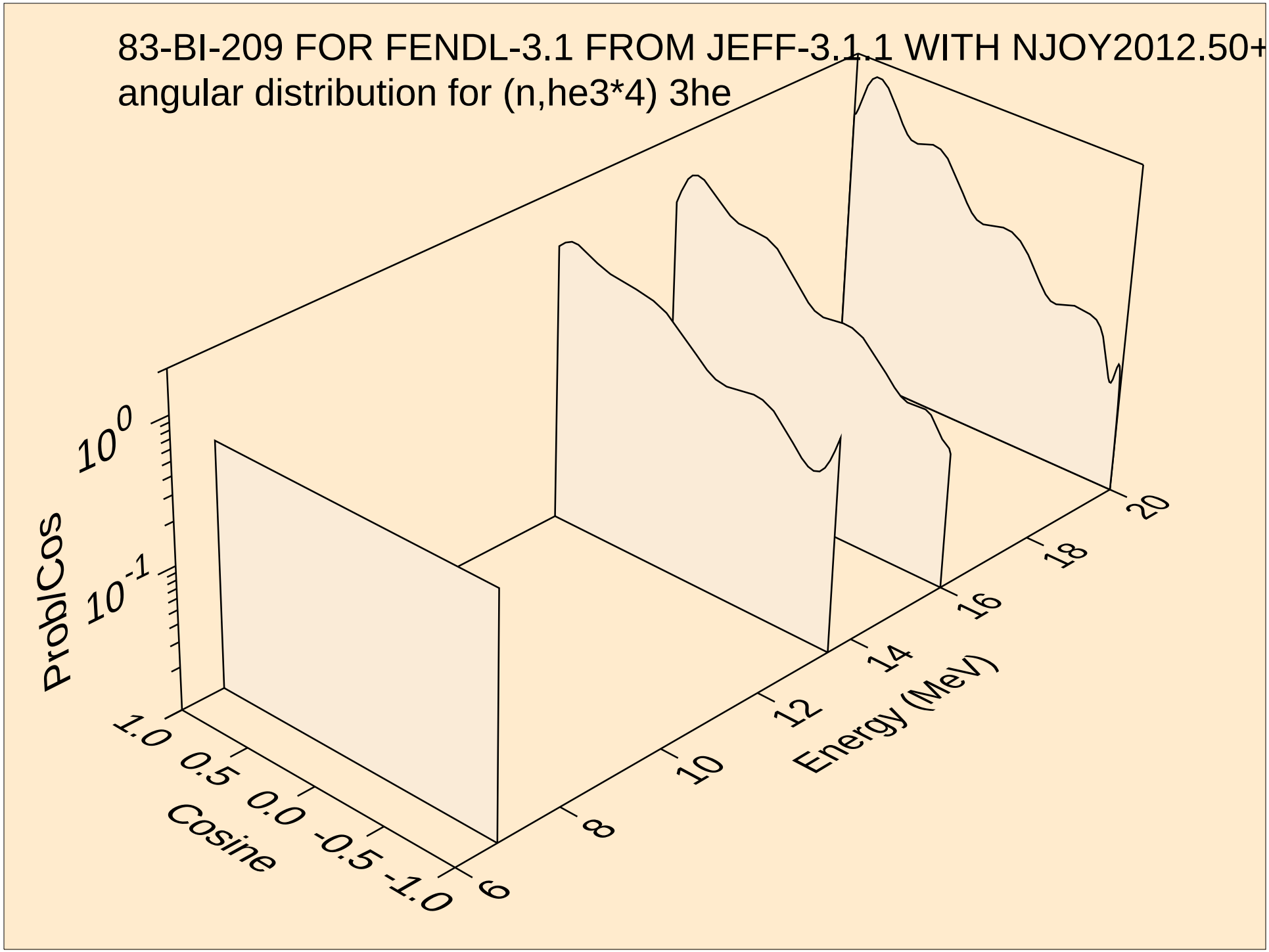

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
he3s from (n,x)
Prob/MeV
10^0
10^-2
10^-4
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

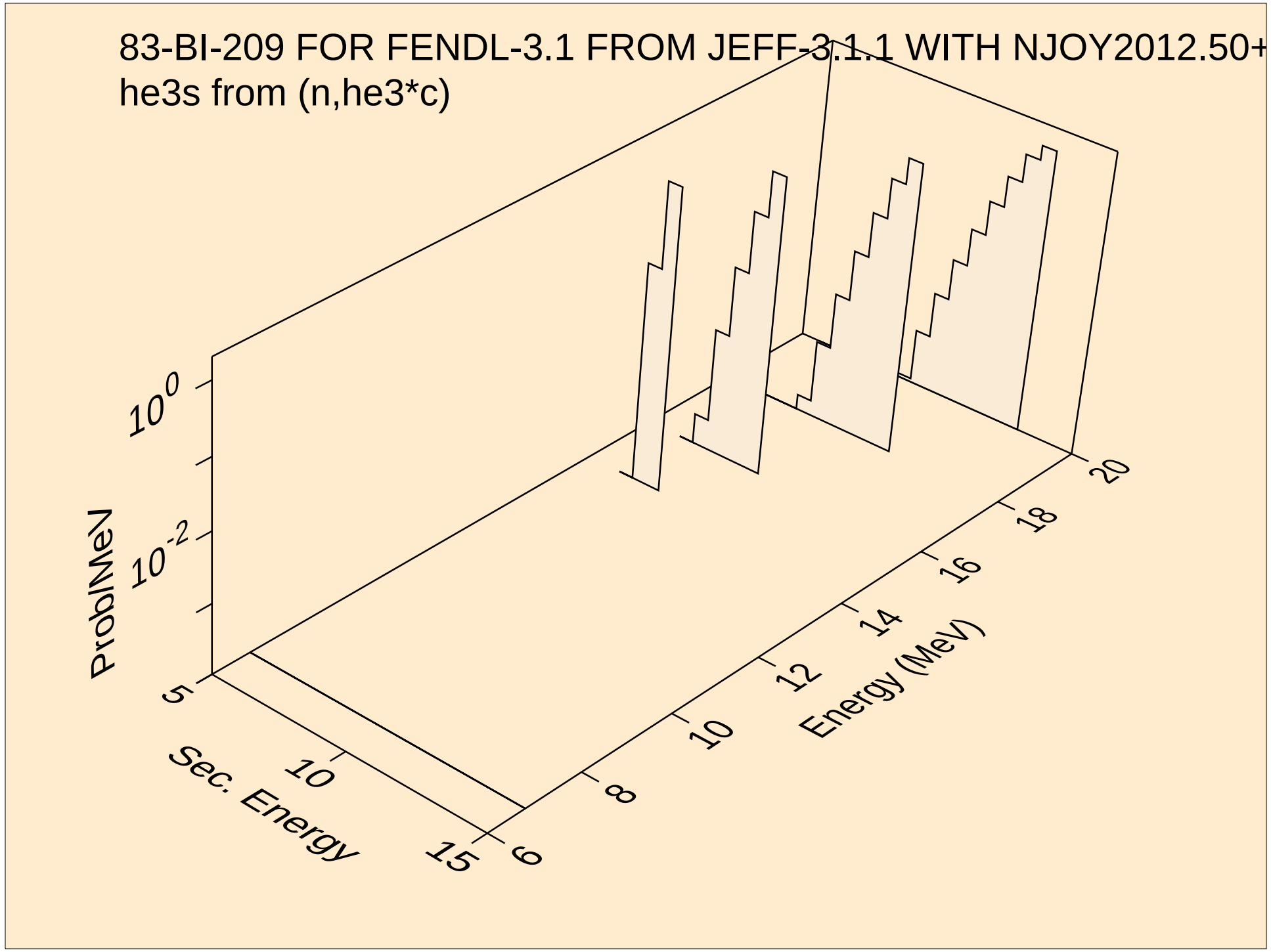

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,he3*0) 3he
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

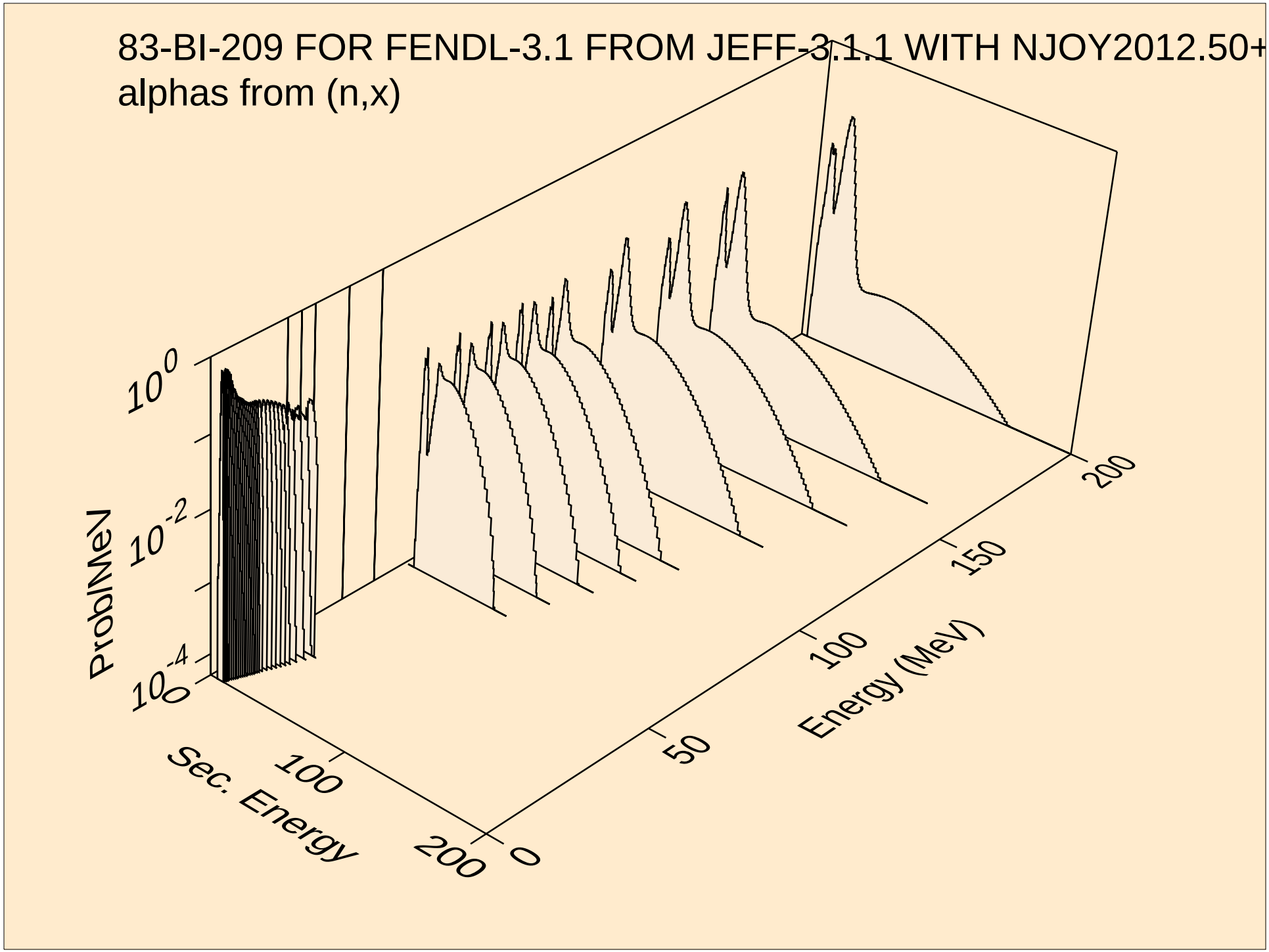

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,he3*1) 3he
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

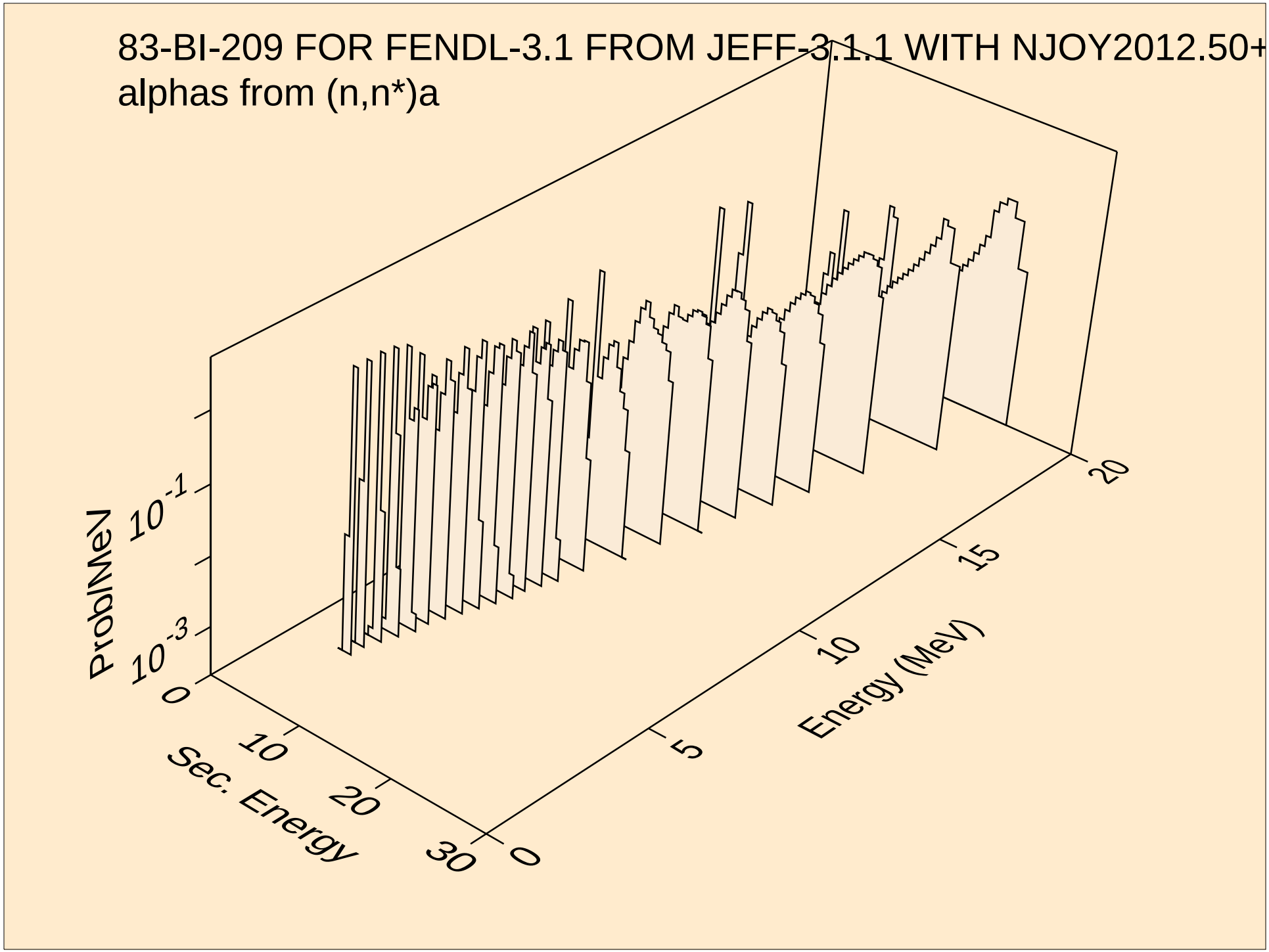

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,he3*2) 3he
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

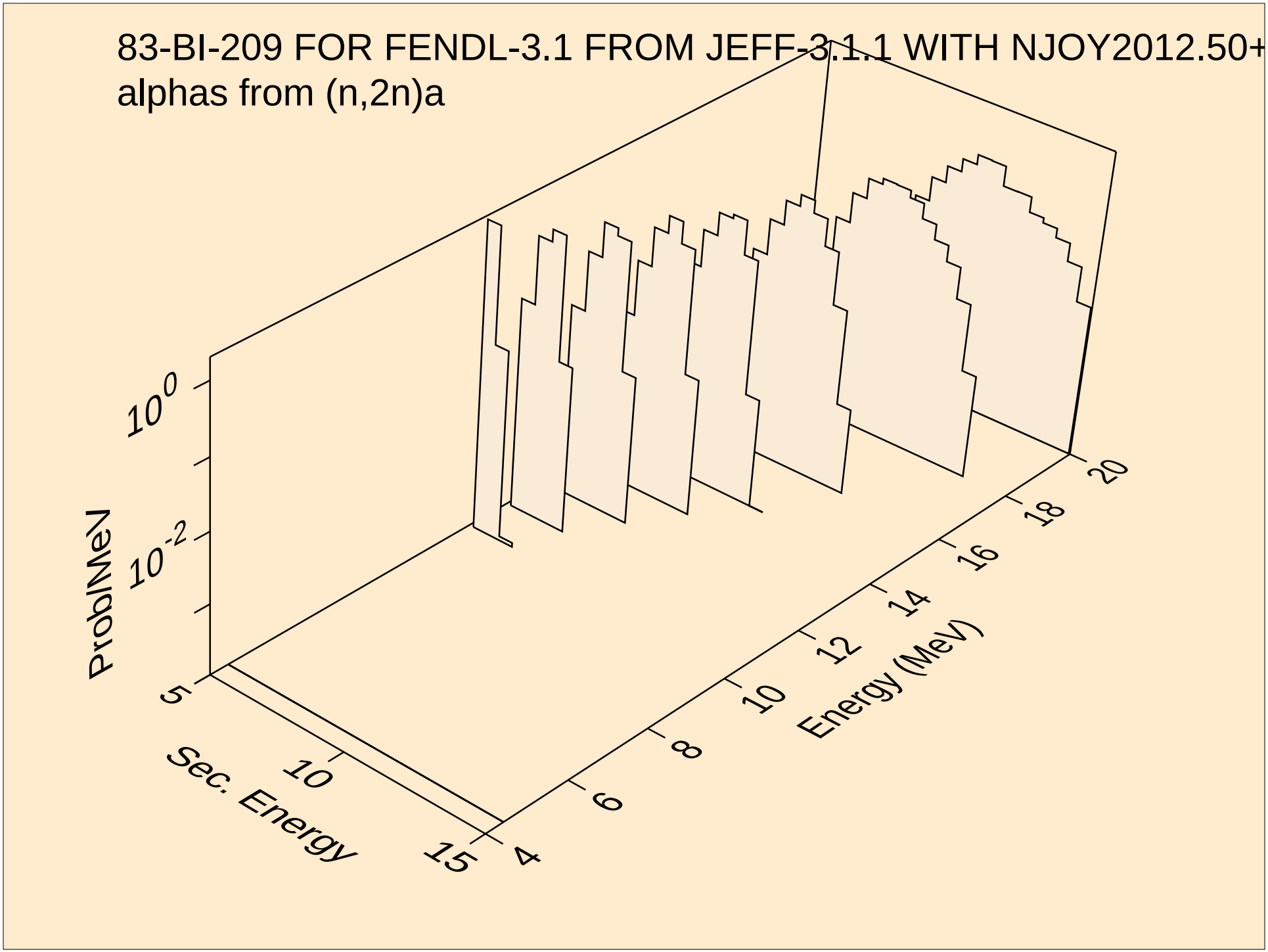

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,he3*3) 3he
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

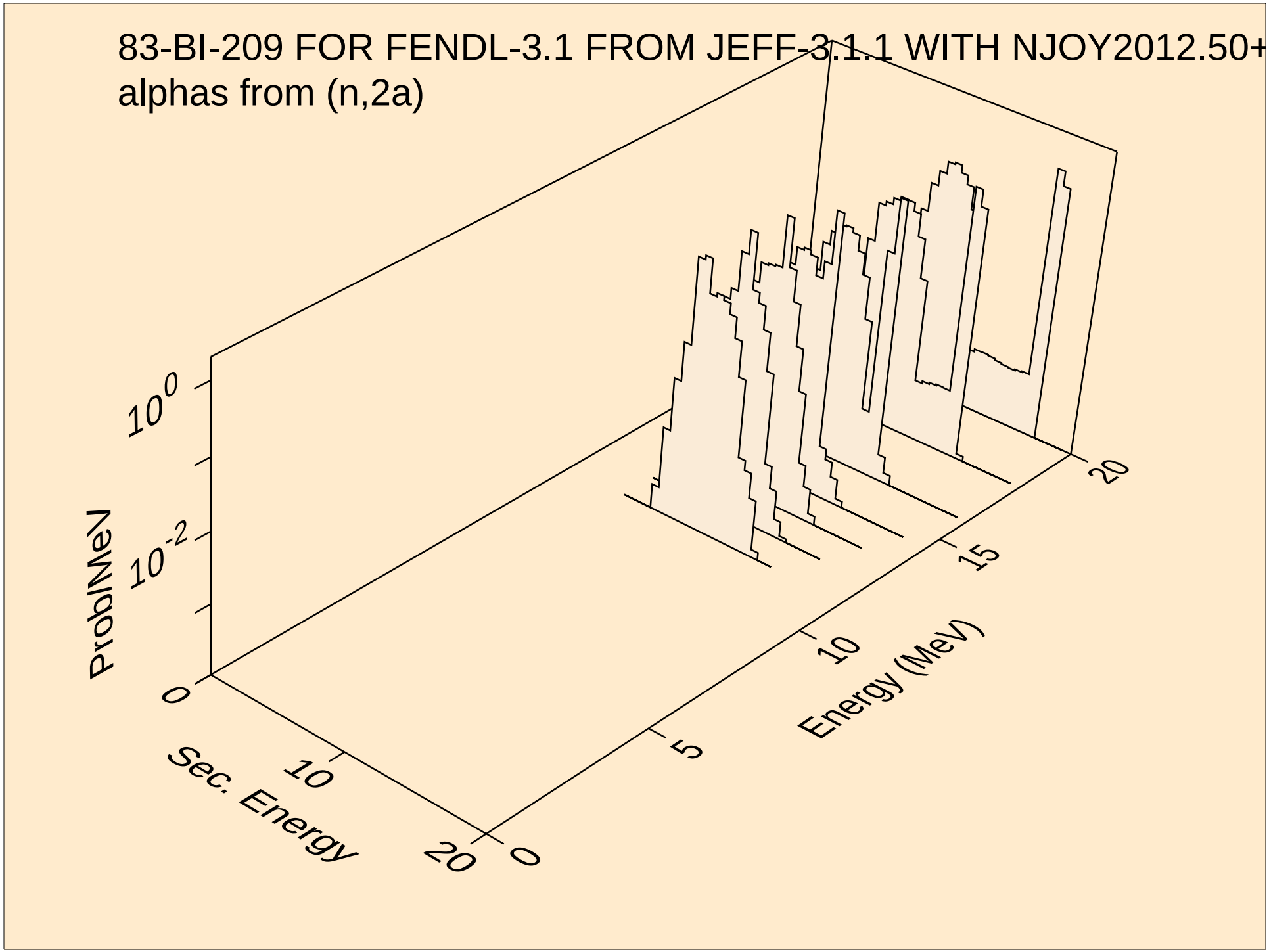

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,he3*4) 3he
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
6
8
10
12
14
16
18
20
Energy (MeV)

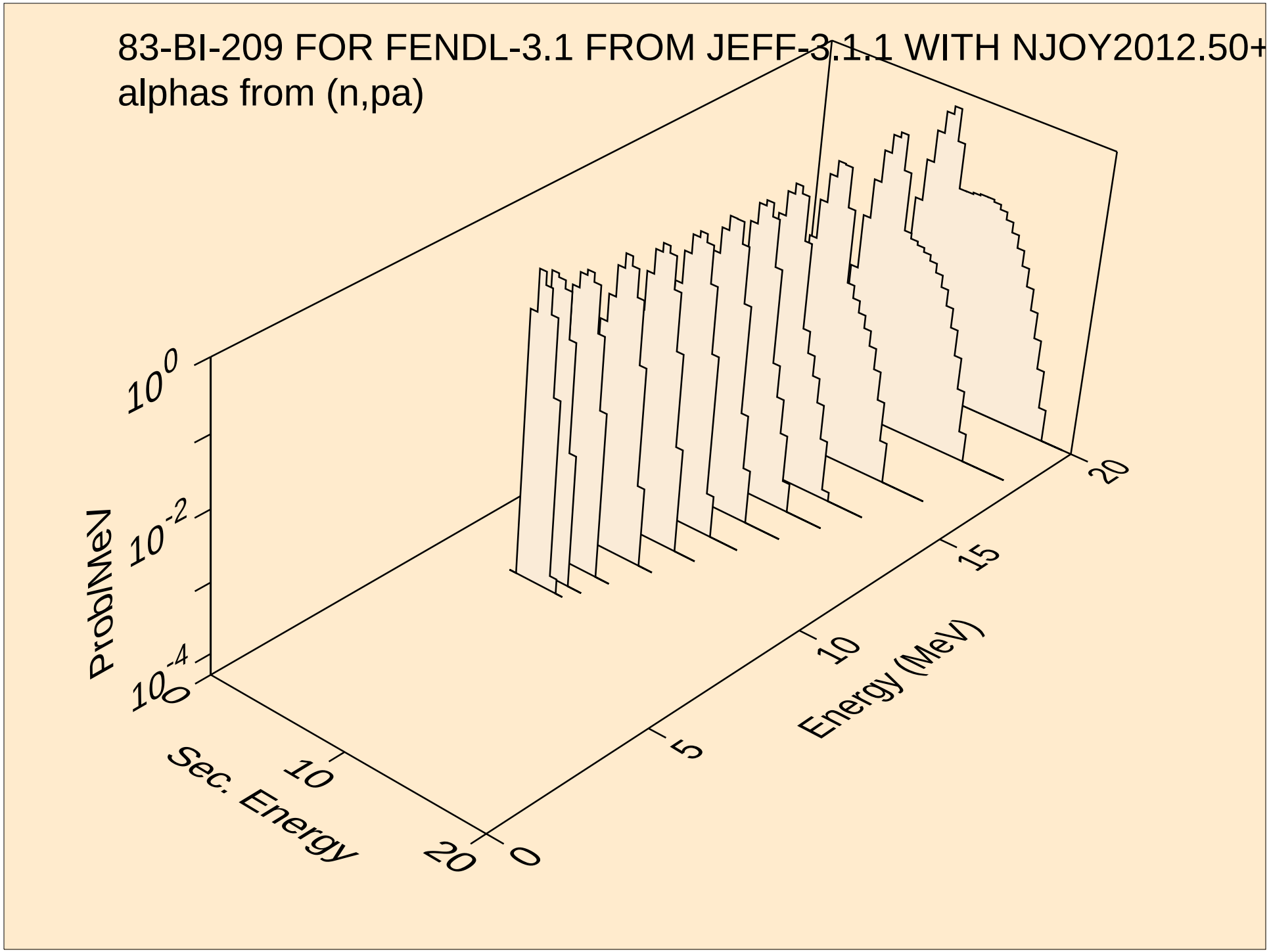

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
he3s from (n,he3*c)
Prob/MeV
10^{0}
10^{-2}
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

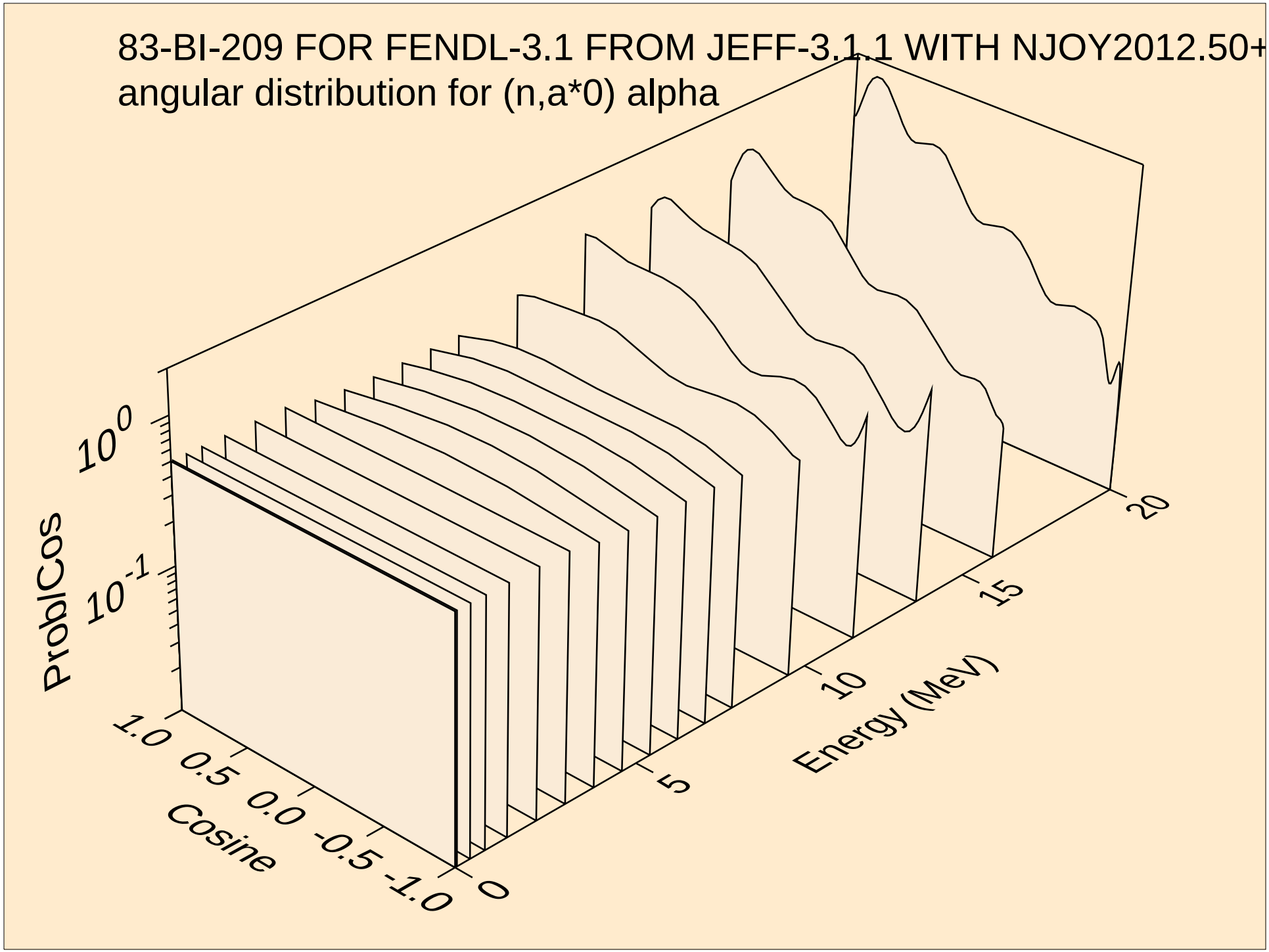

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,x)
Prob/MeV
10^0
10^-2
10^-4
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

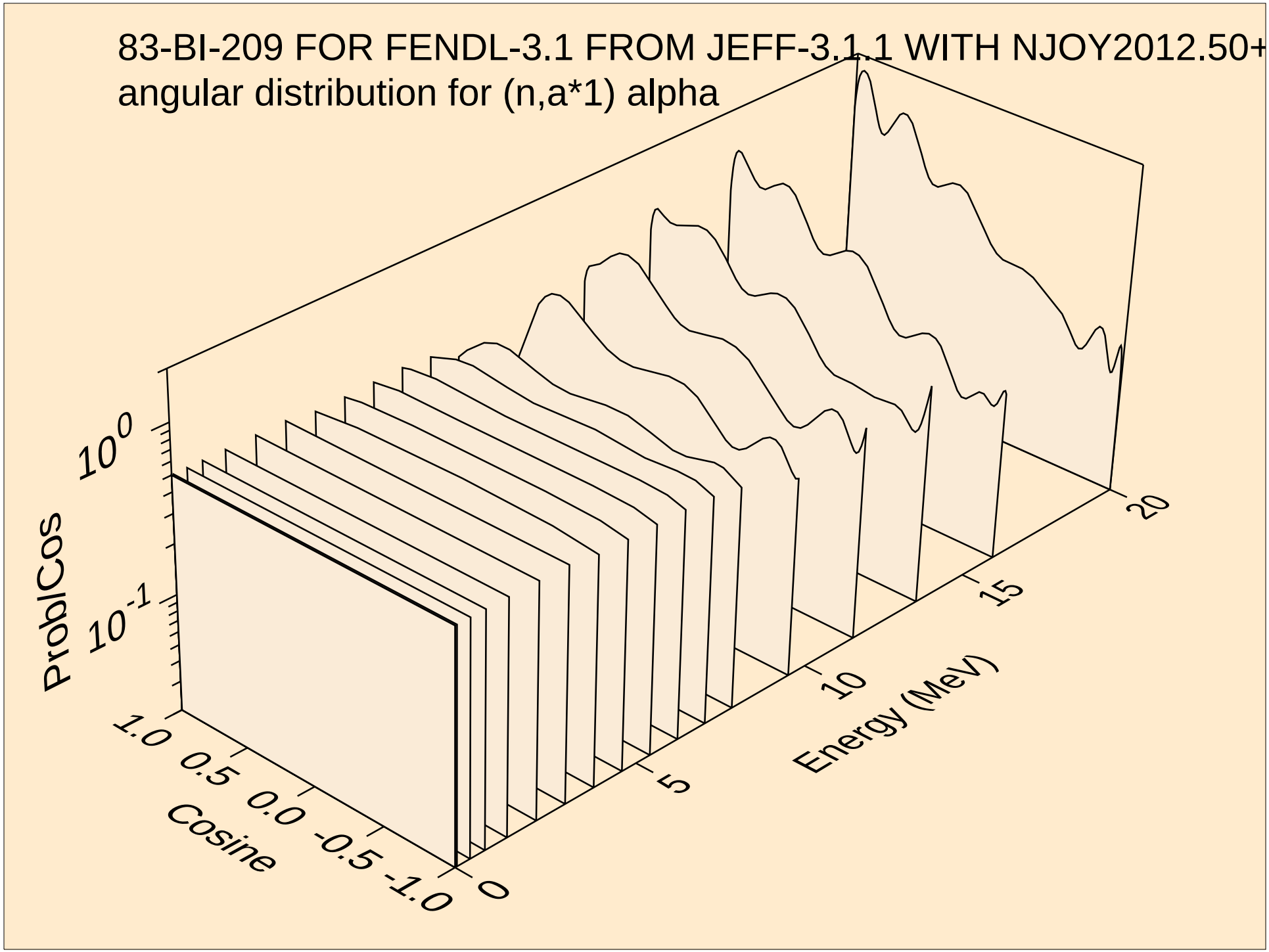

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,n*)a
Prob/MeV
10-1
10-3
0
10
20
30
Sec. Energy
0
5
10
15
20
Energy (MeV)

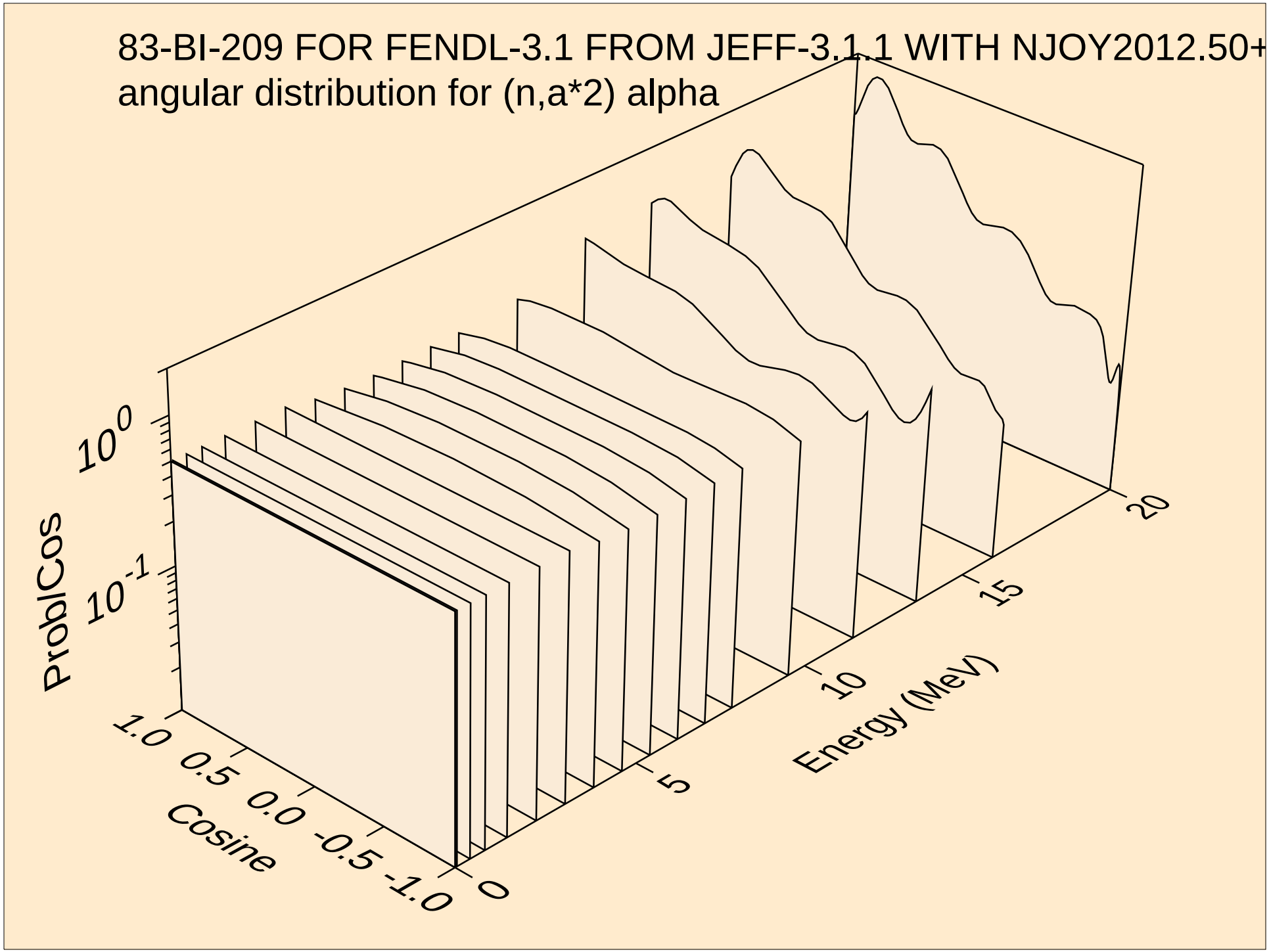

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,2n)a
Prob/MeV
10^0
10^-2
5
10
15
Sec. Energy
4
6
8
10
12
14
16
18
20
Energy (MeV)

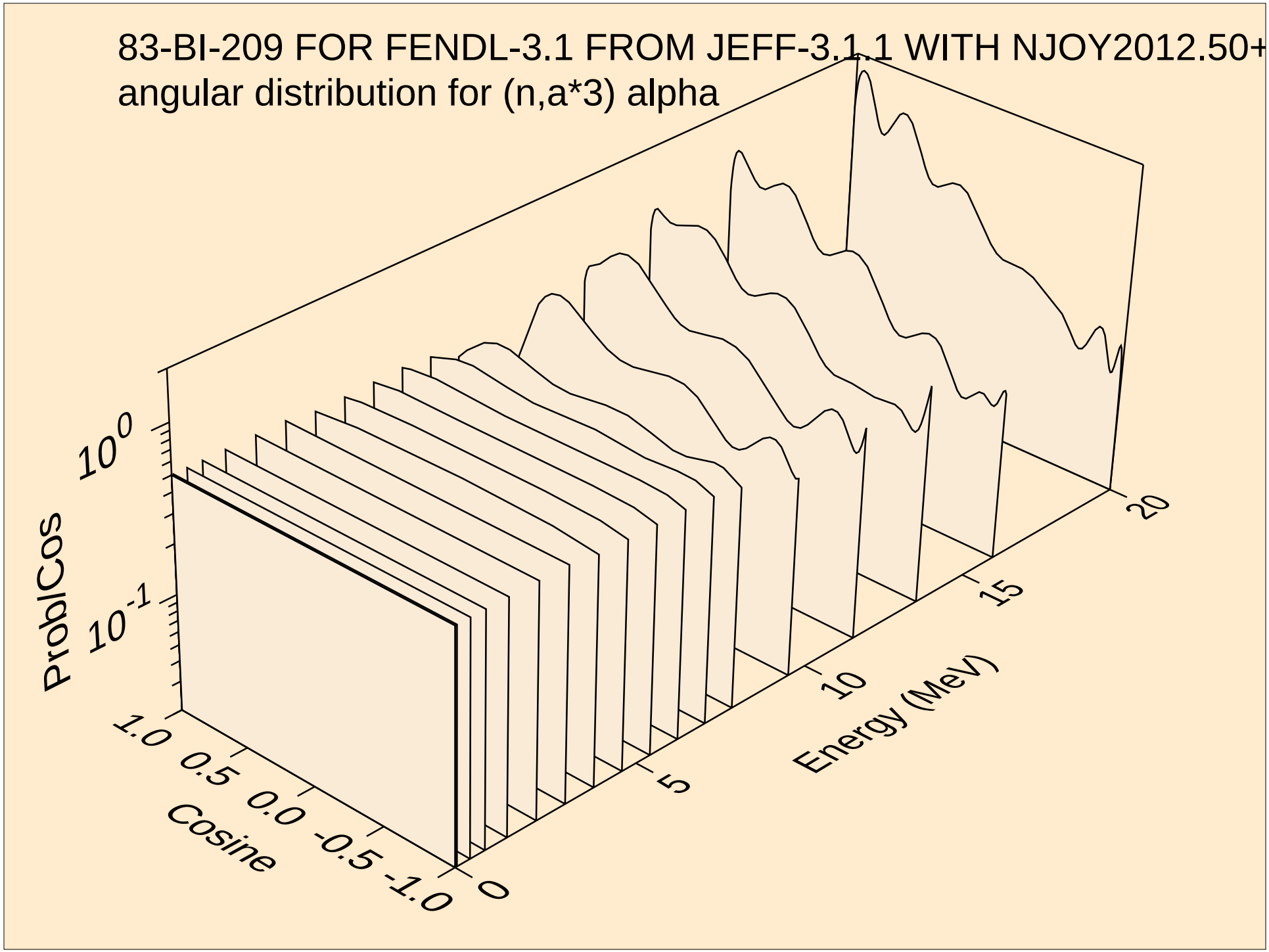

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,2a)
Prob/MeV
10^0
10^-2
0
Sec. Energy
10
20
0
5
10
15
20
Energy (MeV)

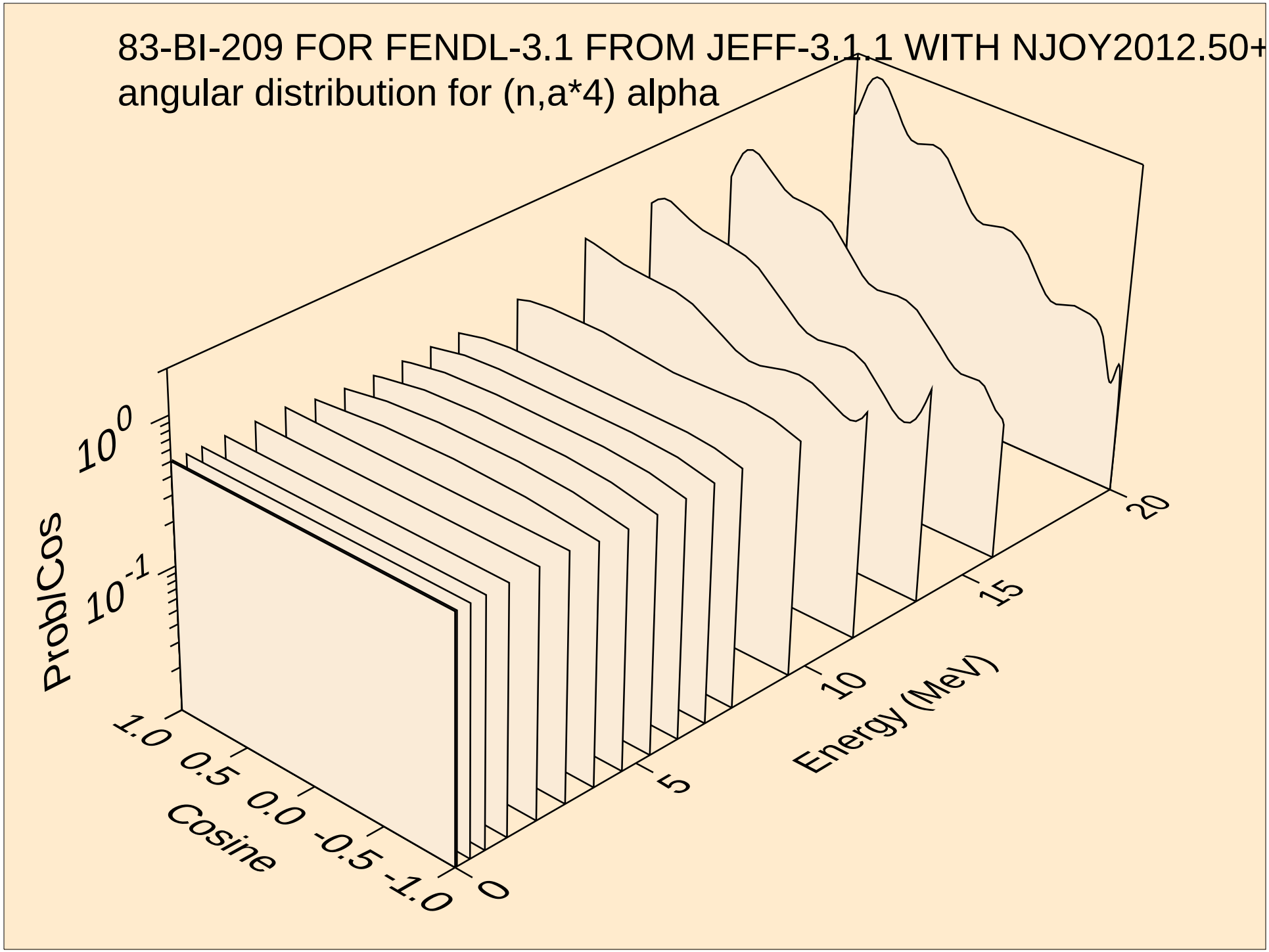

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,pa)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
0
10
20
Sec. Energy
0
5
10
15
20
Energy (MeV)

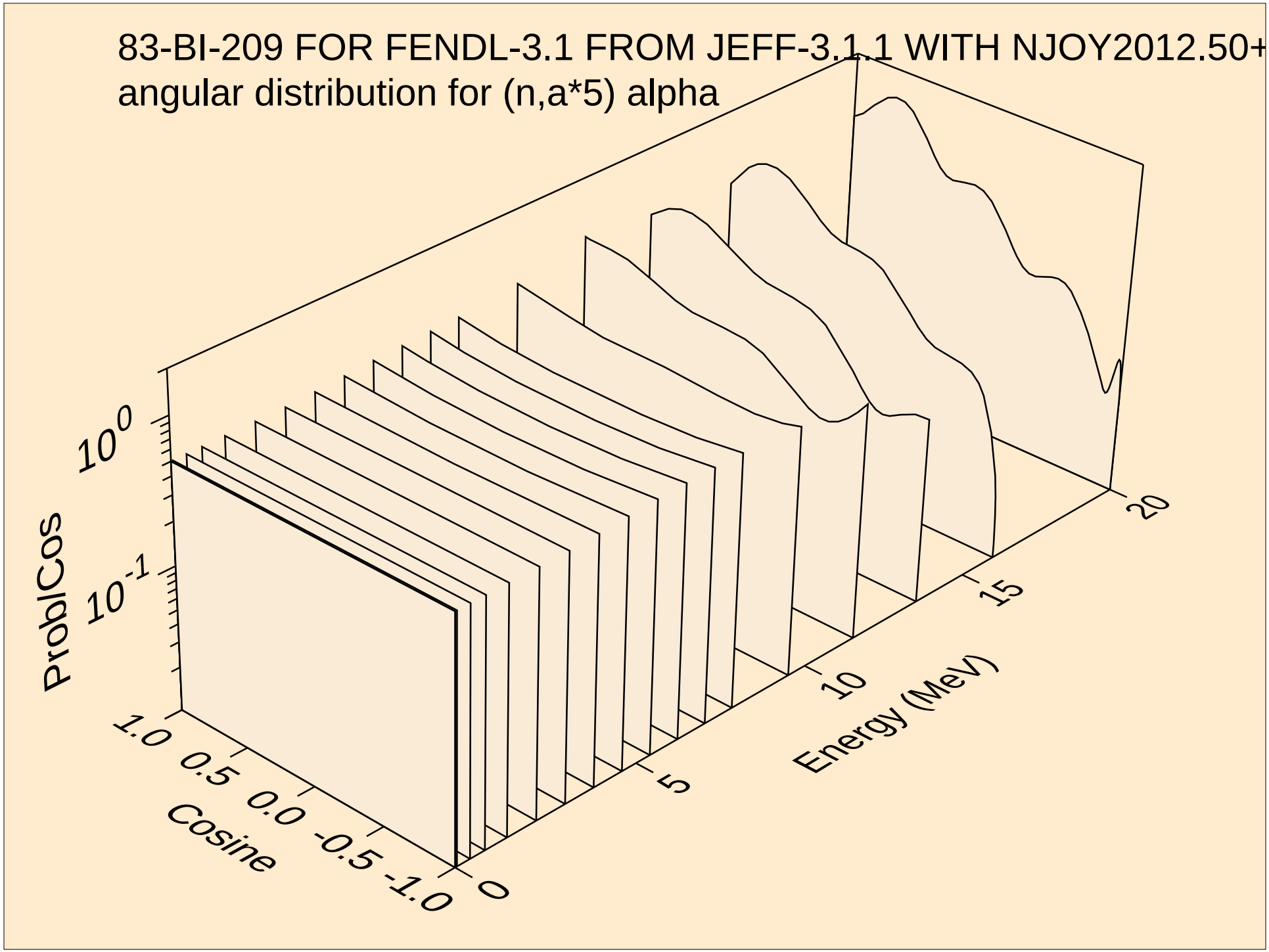

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*0) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

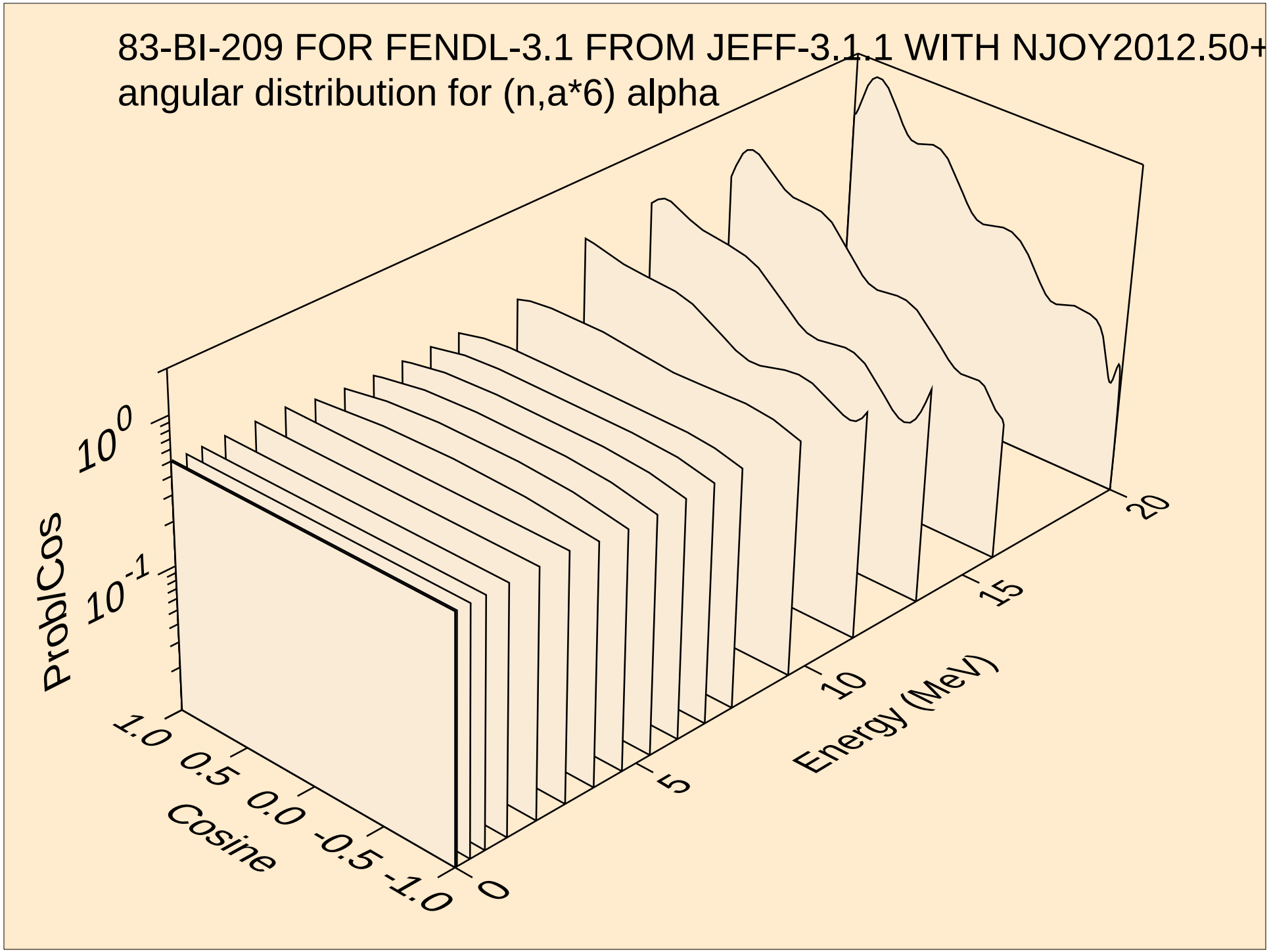

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*1) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

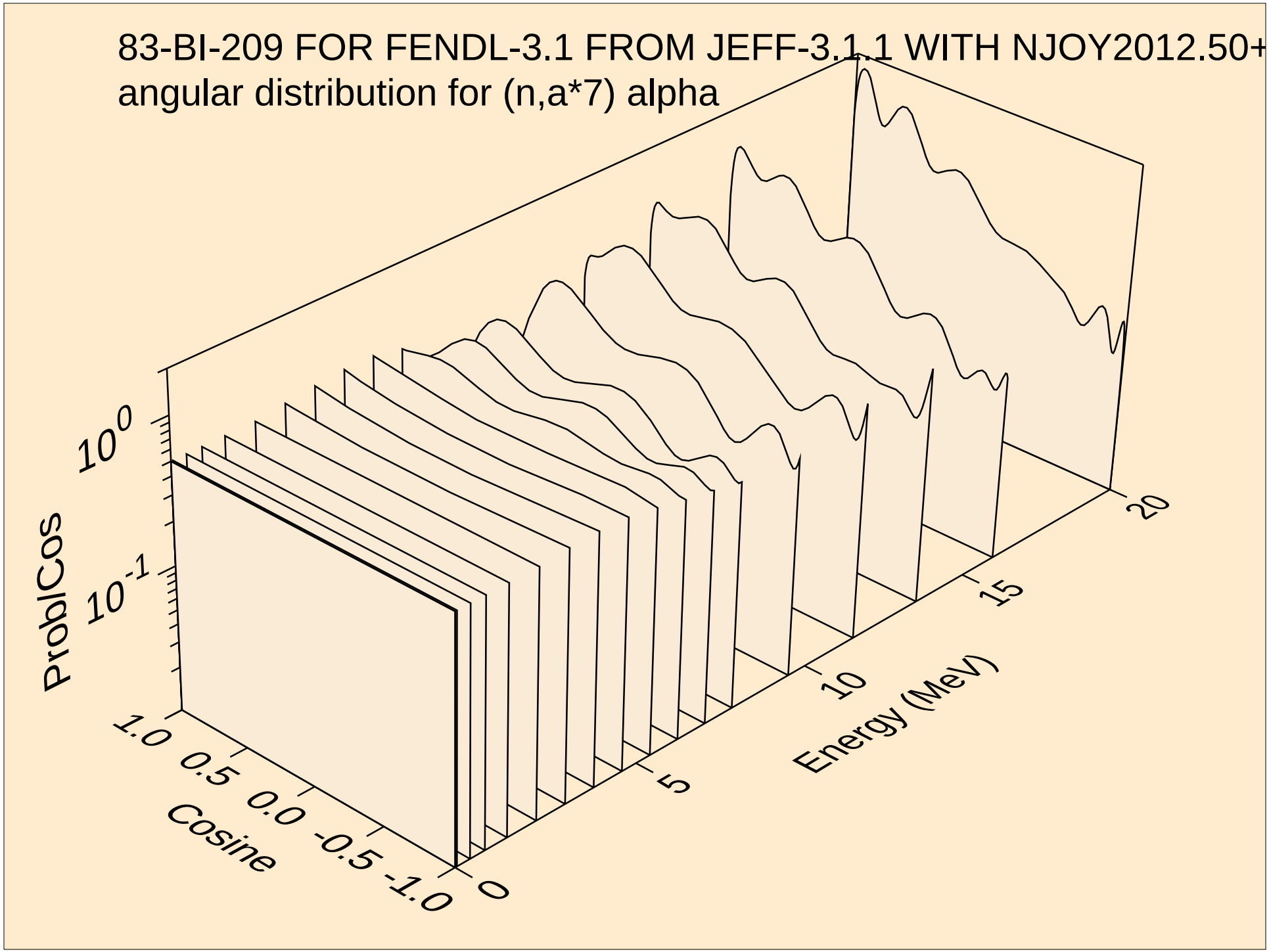

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*2) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

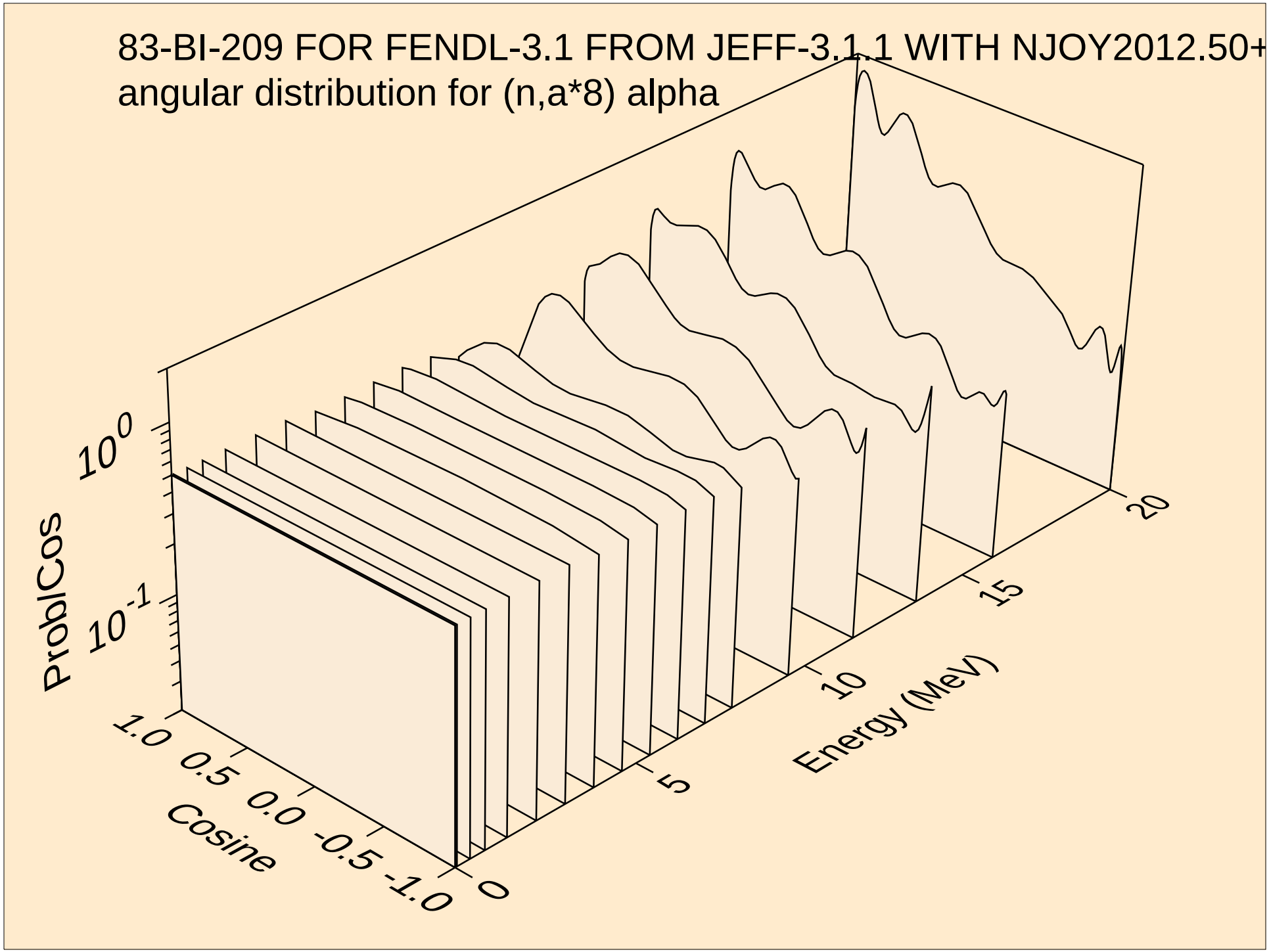

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*3) alpha
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

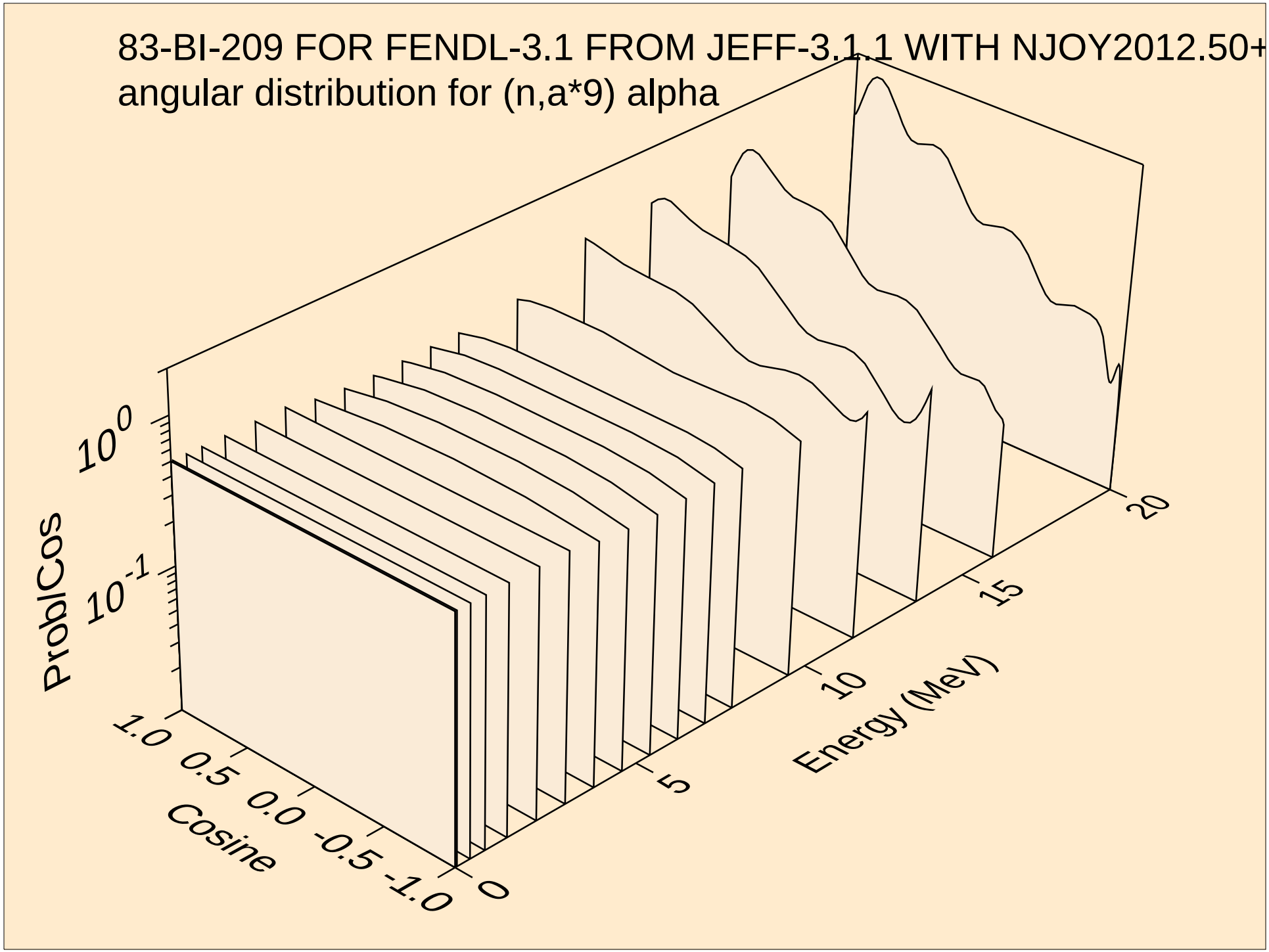

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*4) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

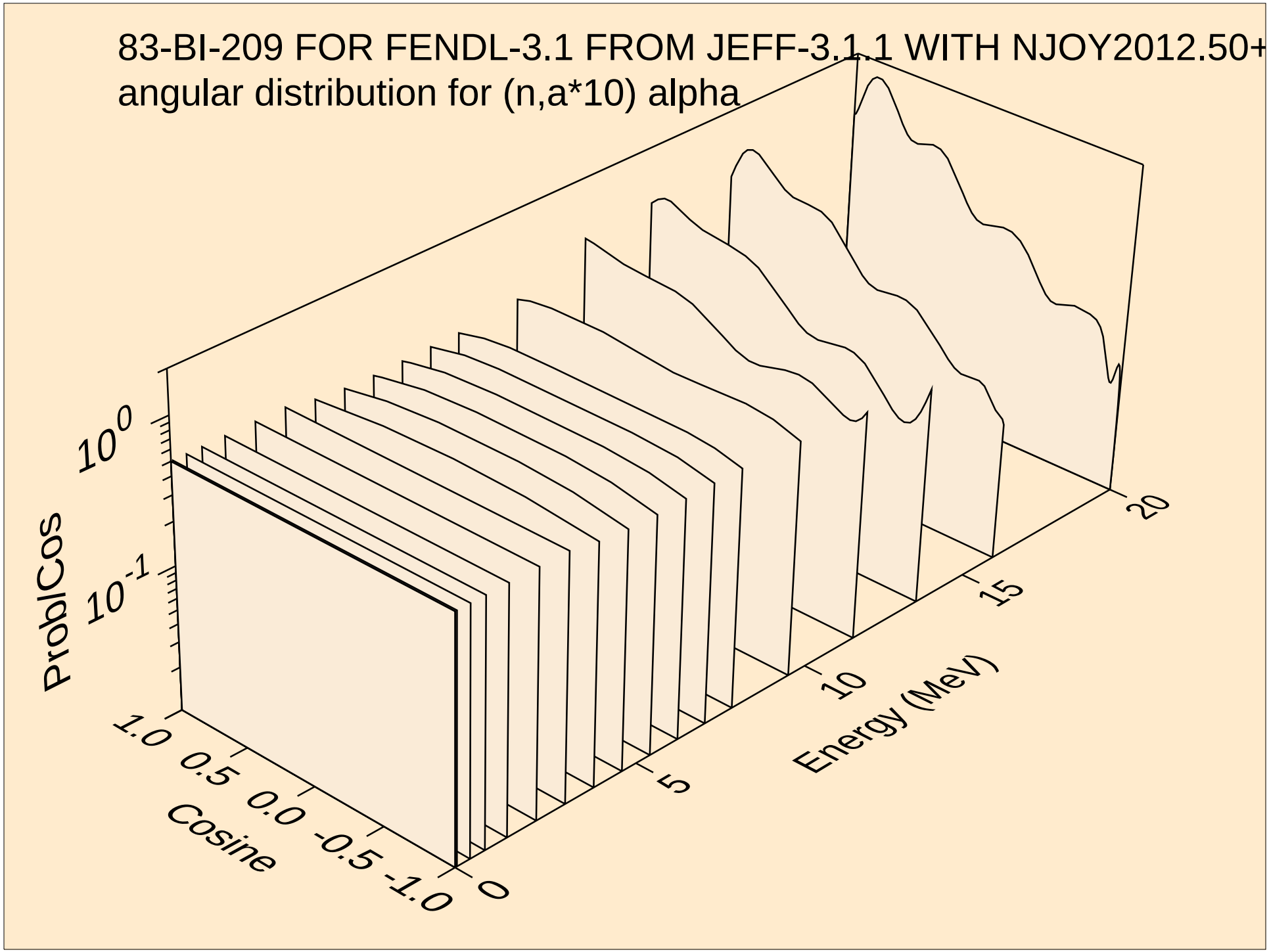

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*5) alpha
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

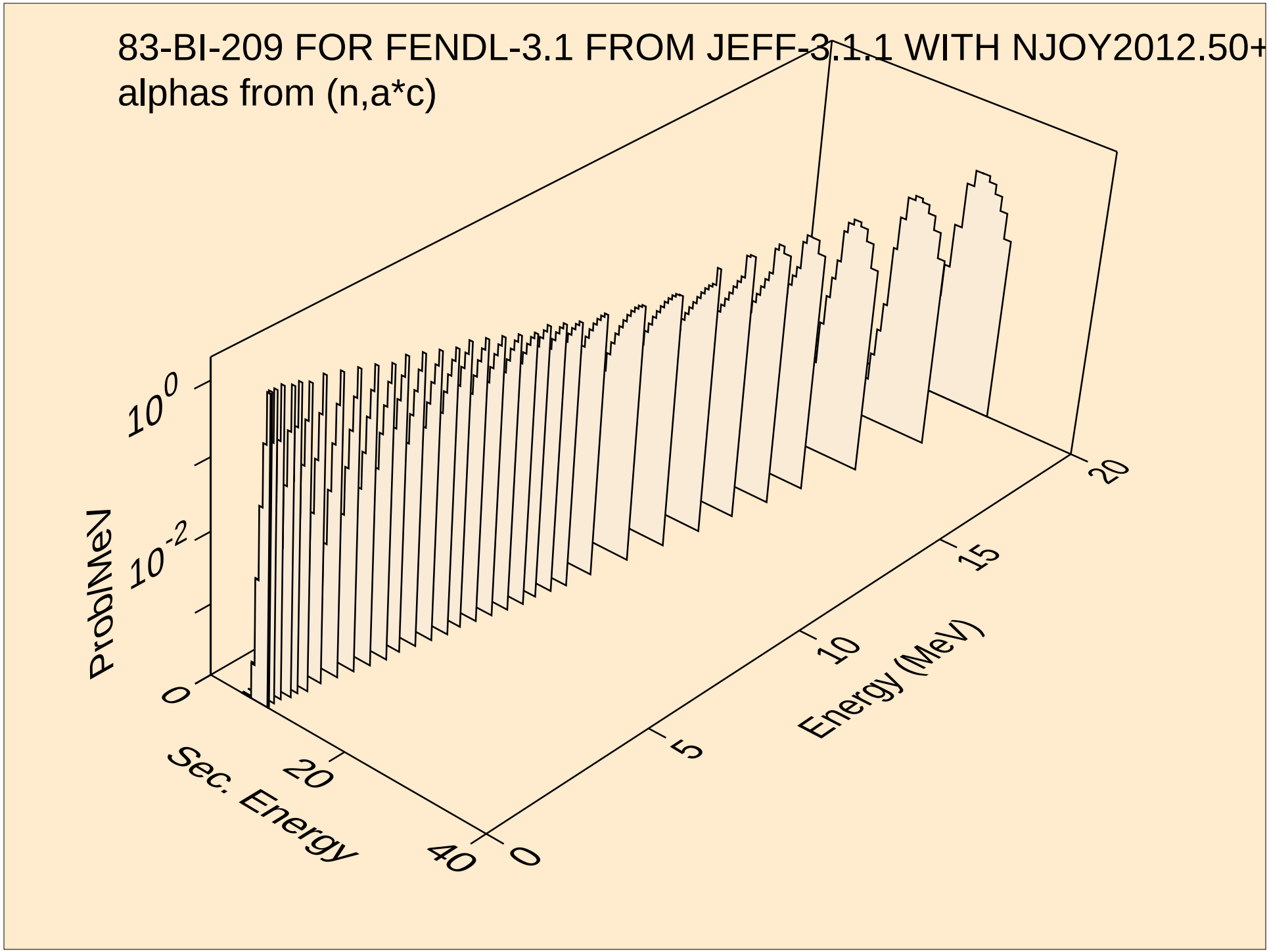

83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*6) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*7) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*8) alpha
ProbCos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*9) alpha
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
angular distribution for (n,a*10) alpha
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)


83-BI-209 FOR FENDL-3.1 FROM JEFF-3.1.1 WITH NJOY2012.50+
alphas from (n,a*c)
Prob/MeV
10^0
10^-2
0
Sec. Energy
20
40
0
5
10
15
20
Energy (MeV)