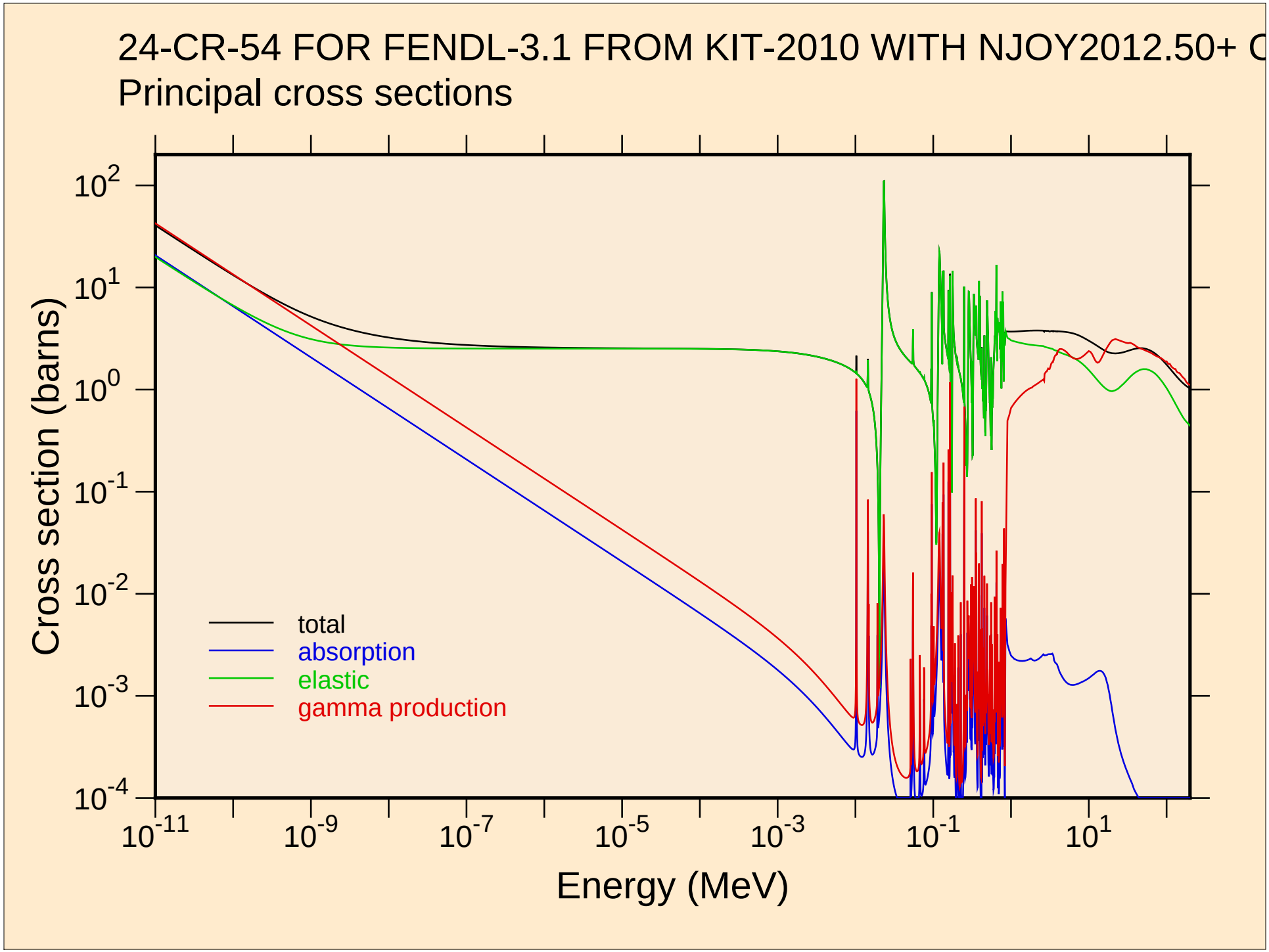
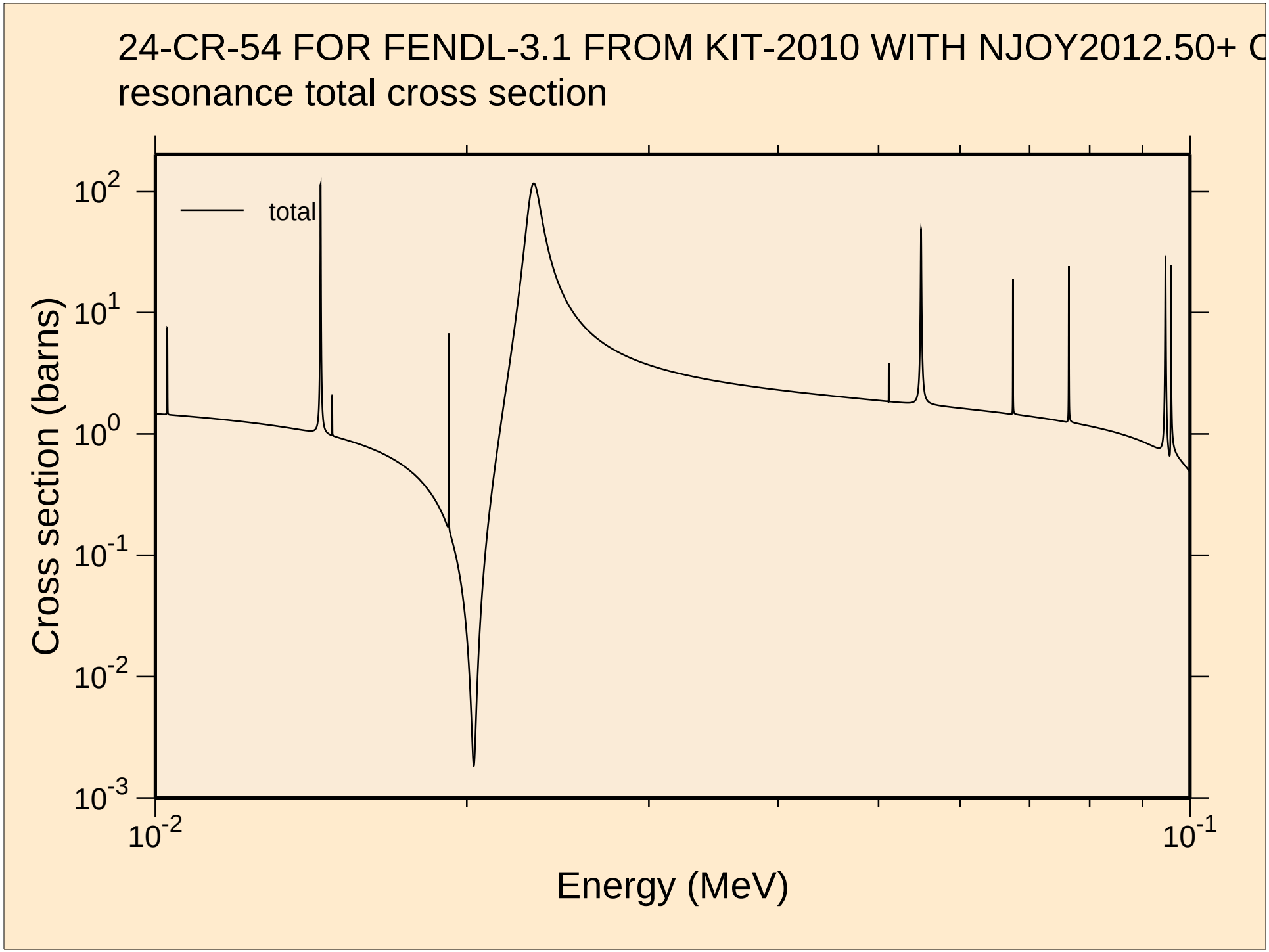
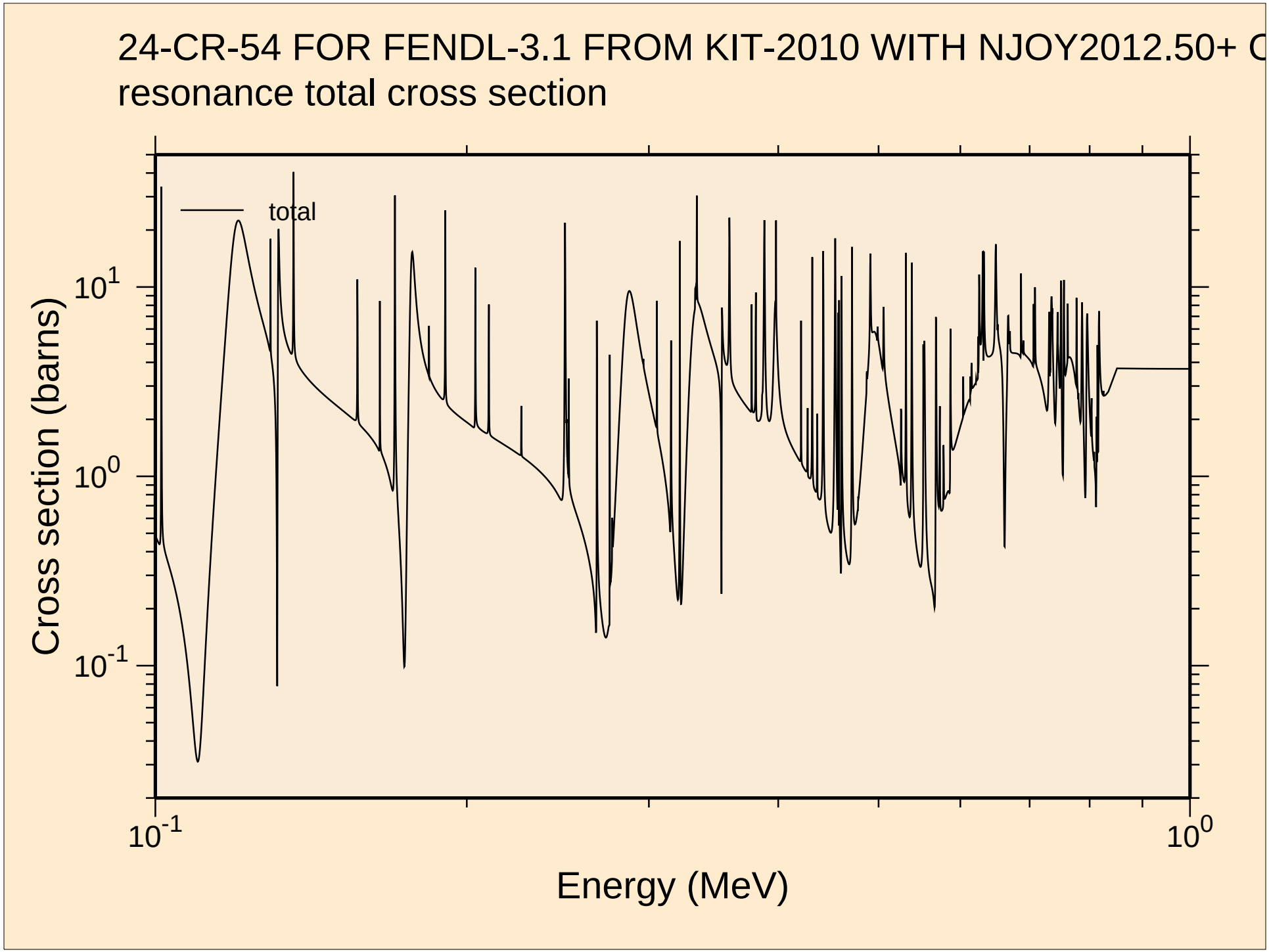
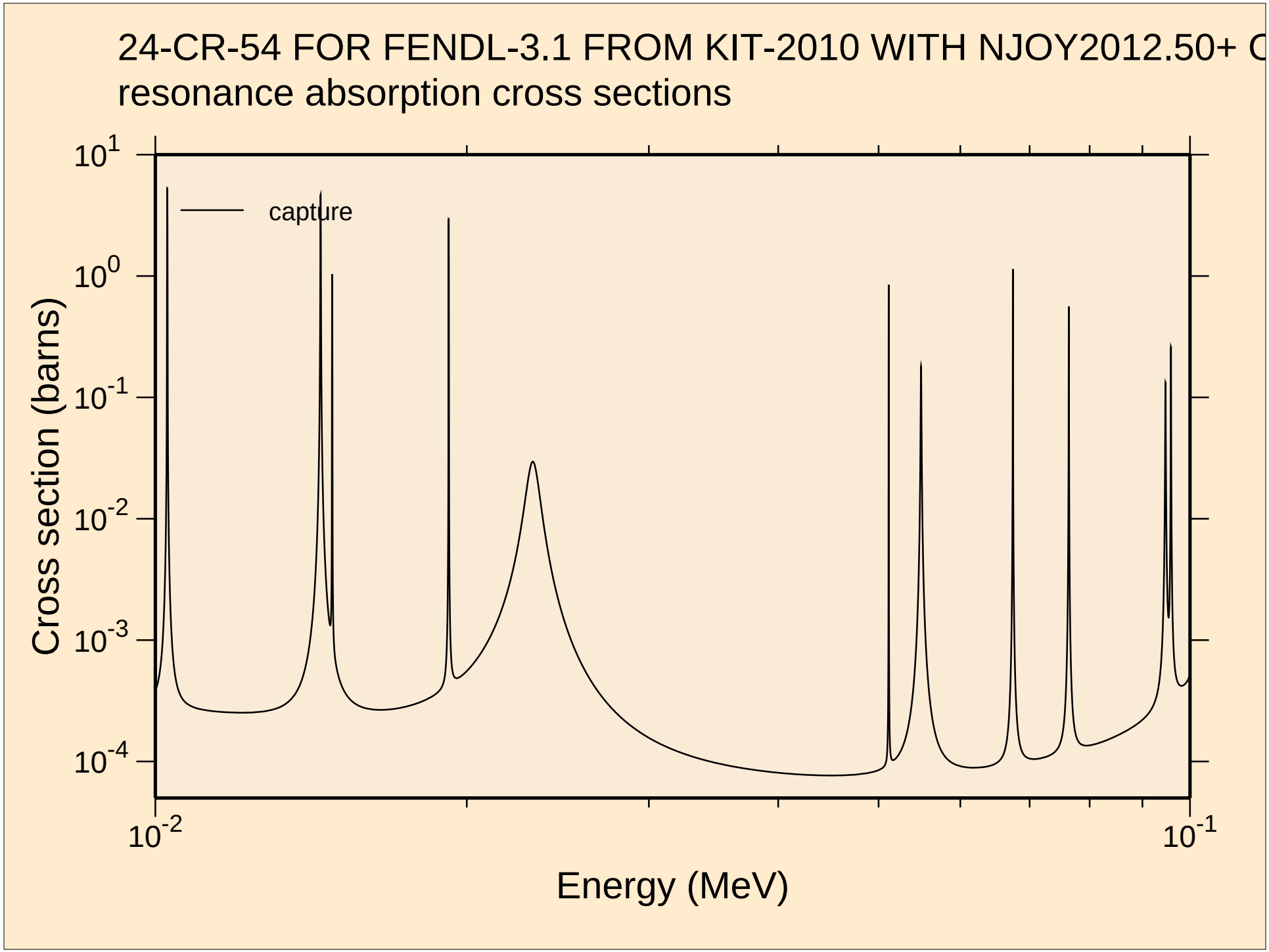
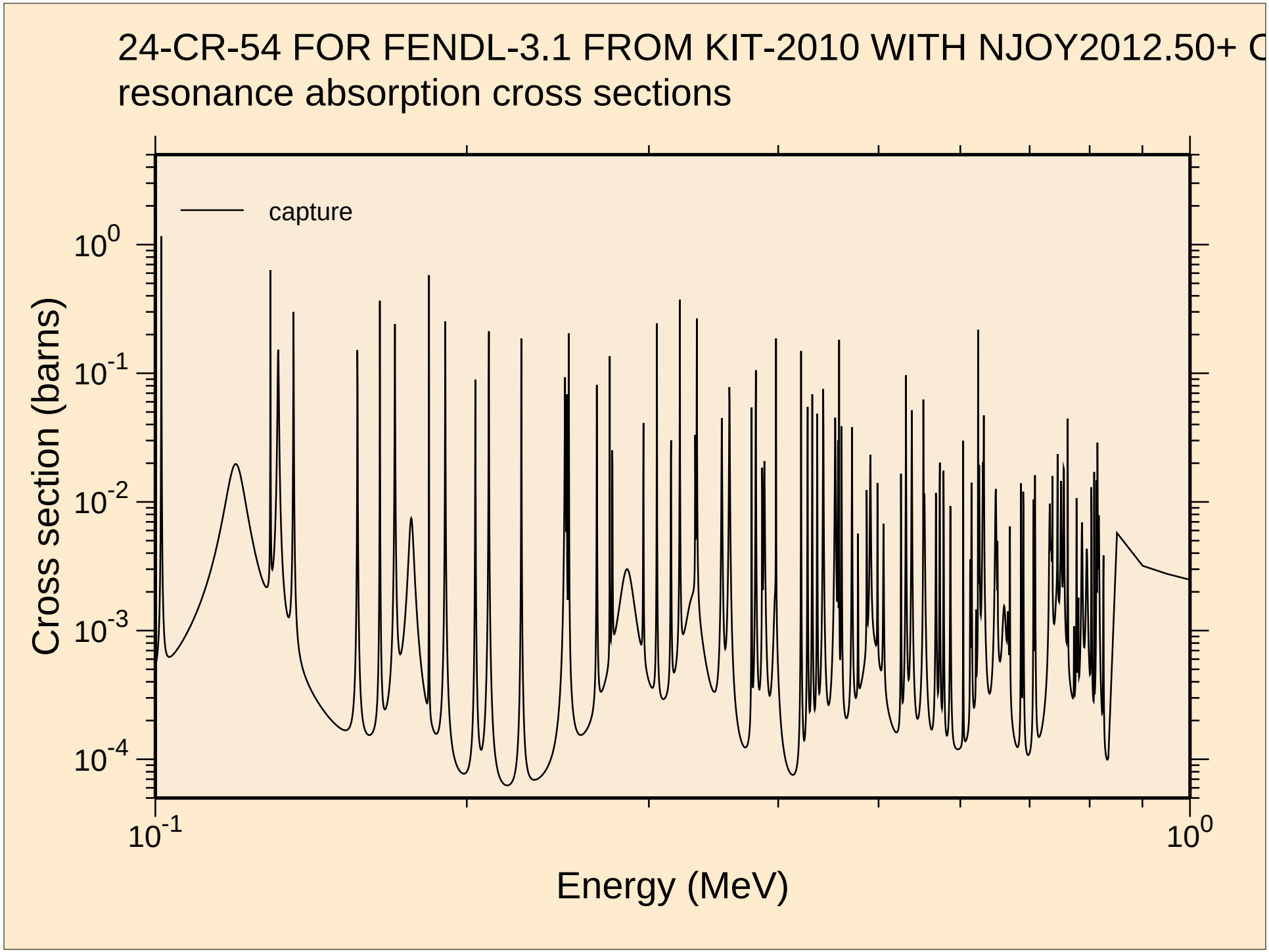
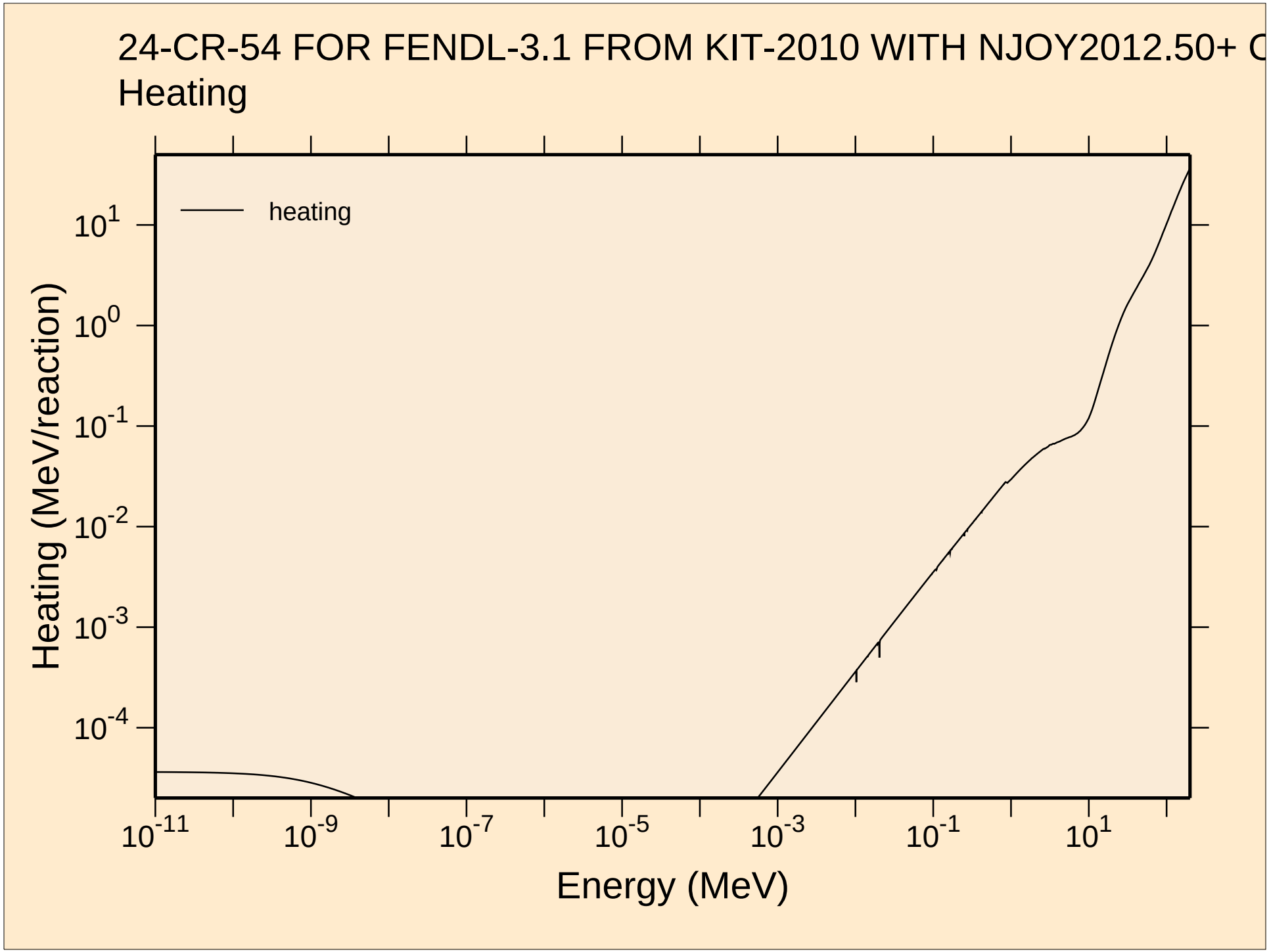

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production

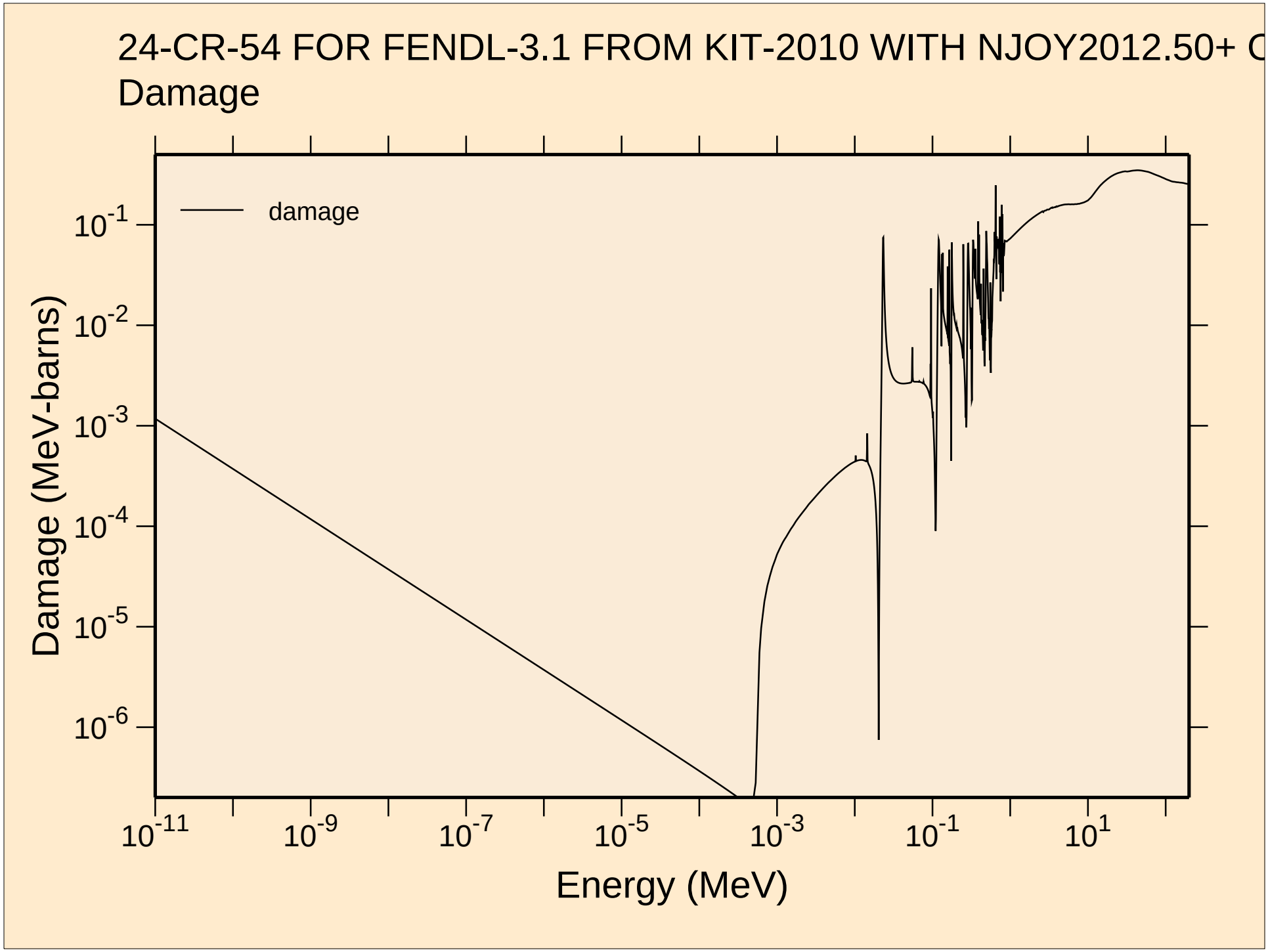

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-2
10^-1
Energy (MeV)

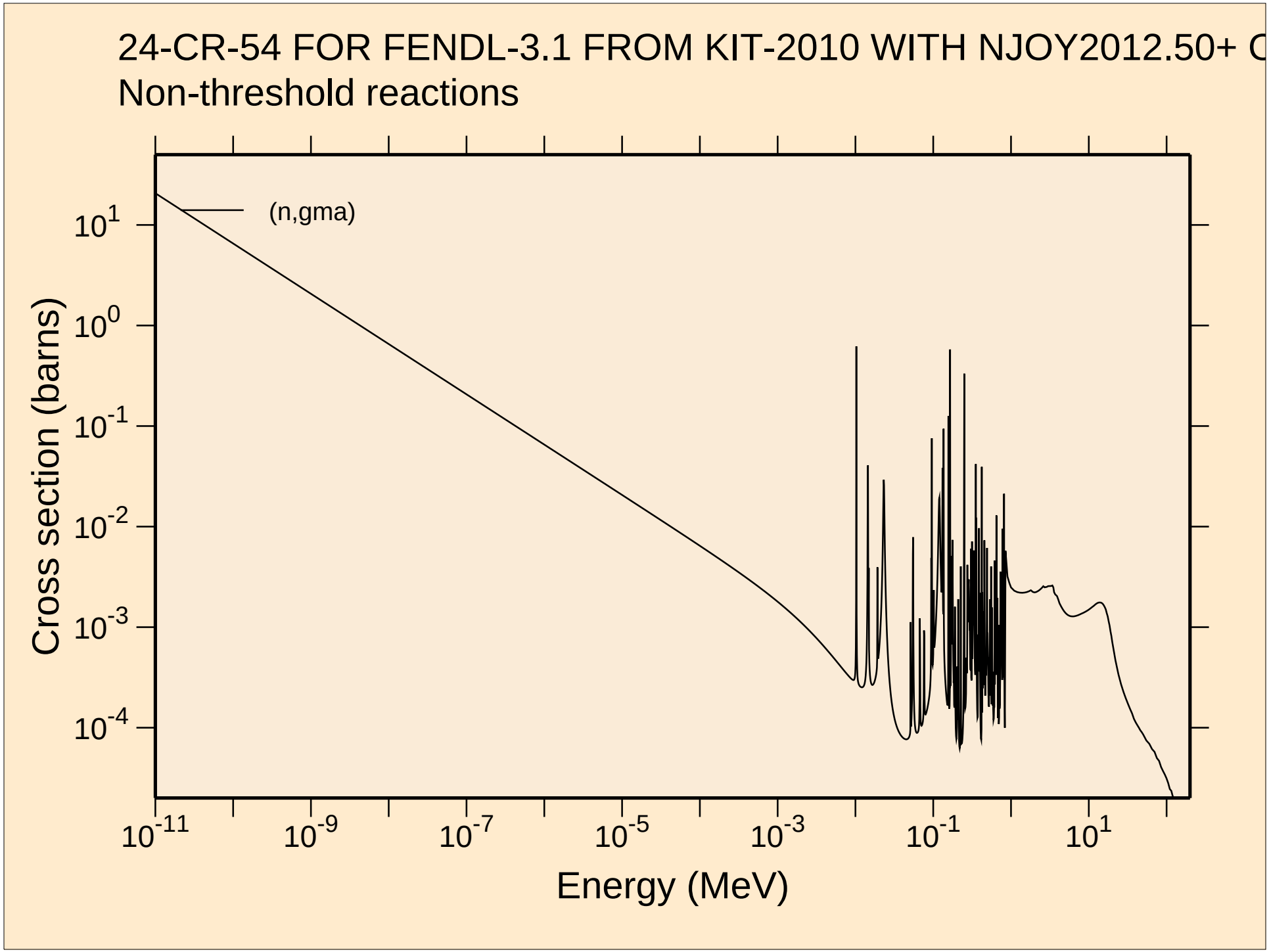

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
resonance total cross section
total
Cross section (barns)
10^1
10^0
10^-1
10^-1
10^0
Energy (MeV)

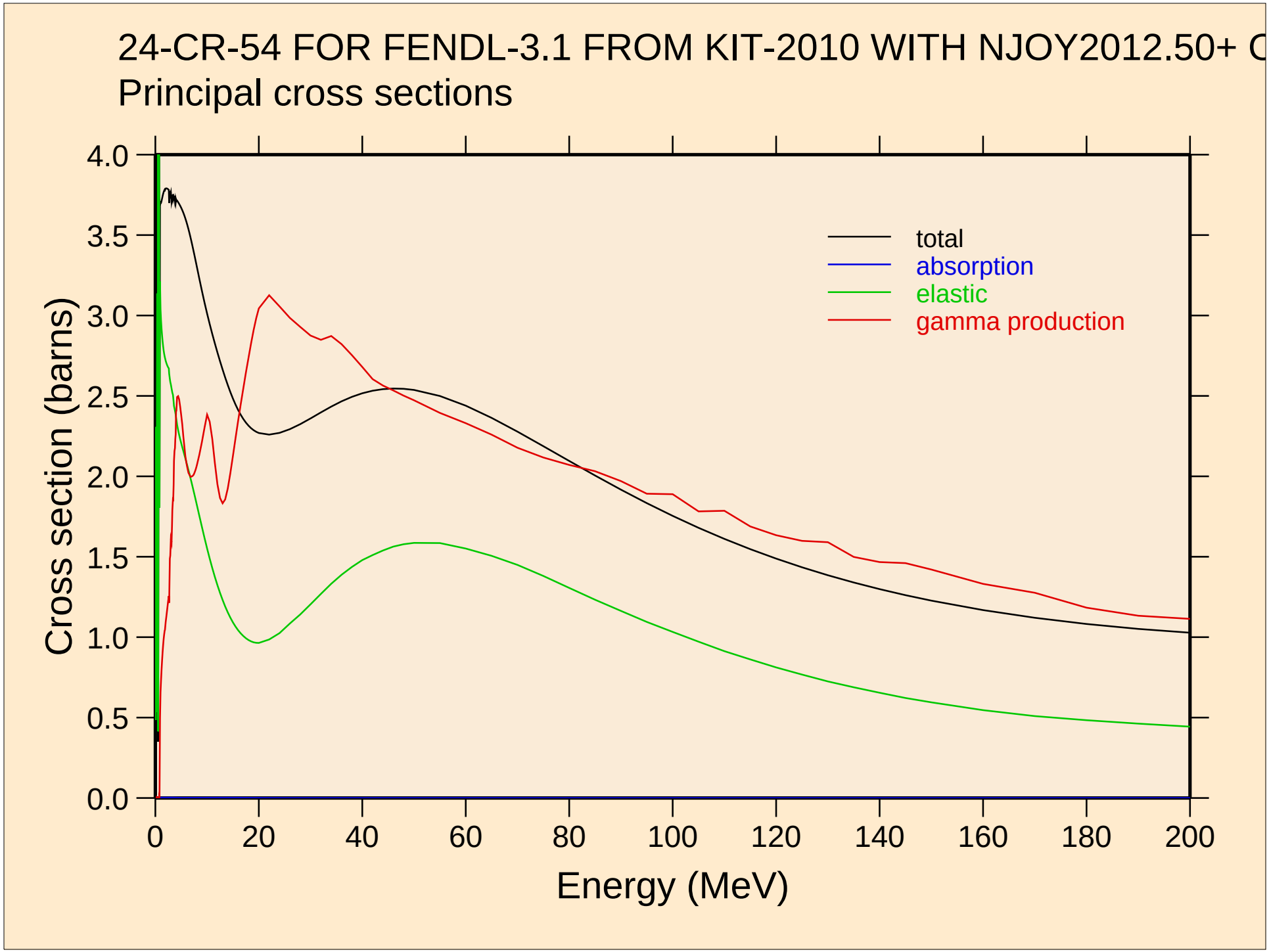

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-2
10^-1
Energy (MeV)

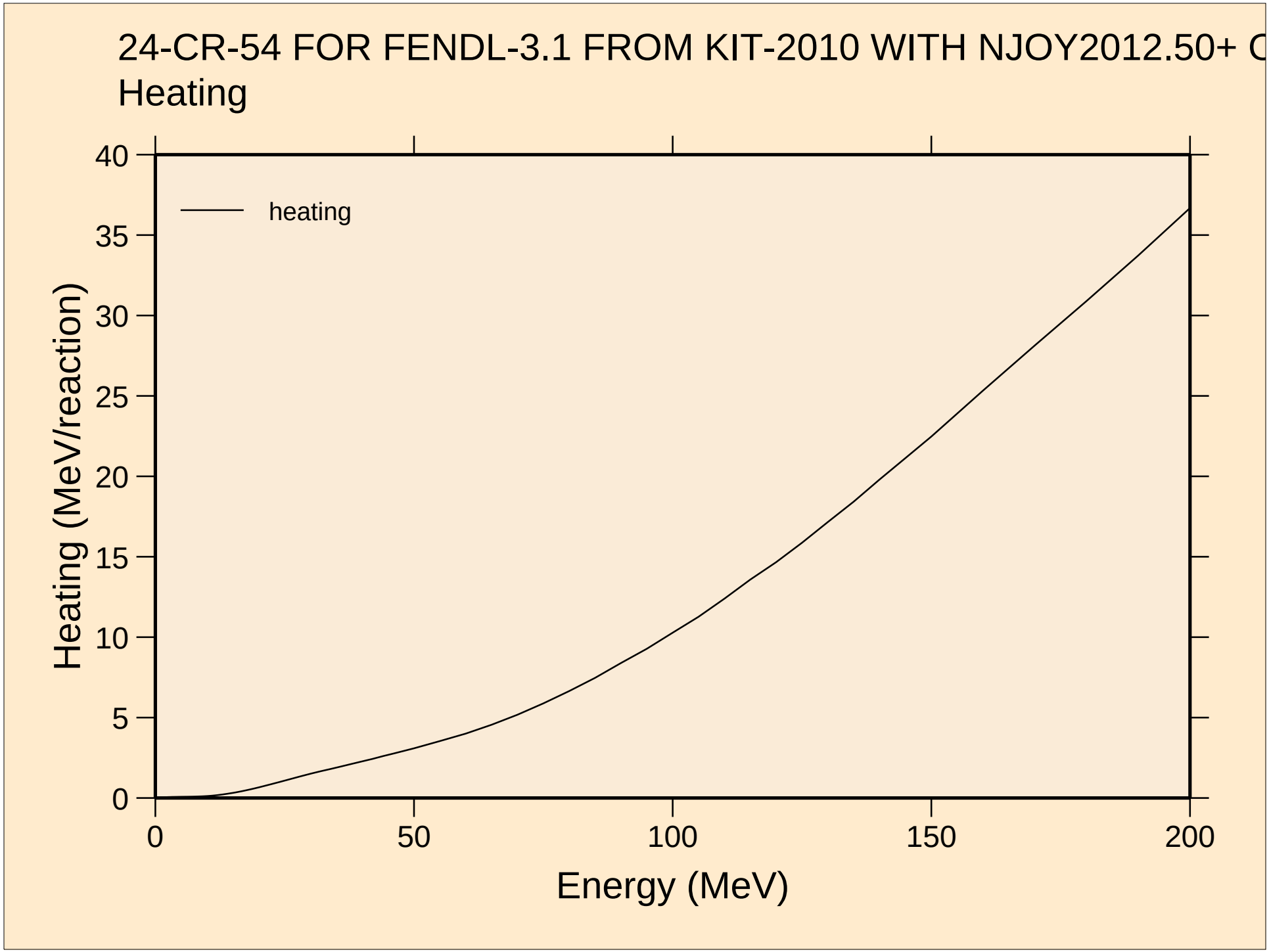

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10^0
10^-1
10^-2
10^-3
10^-4
10^-1
10^0
Energy (MeV)

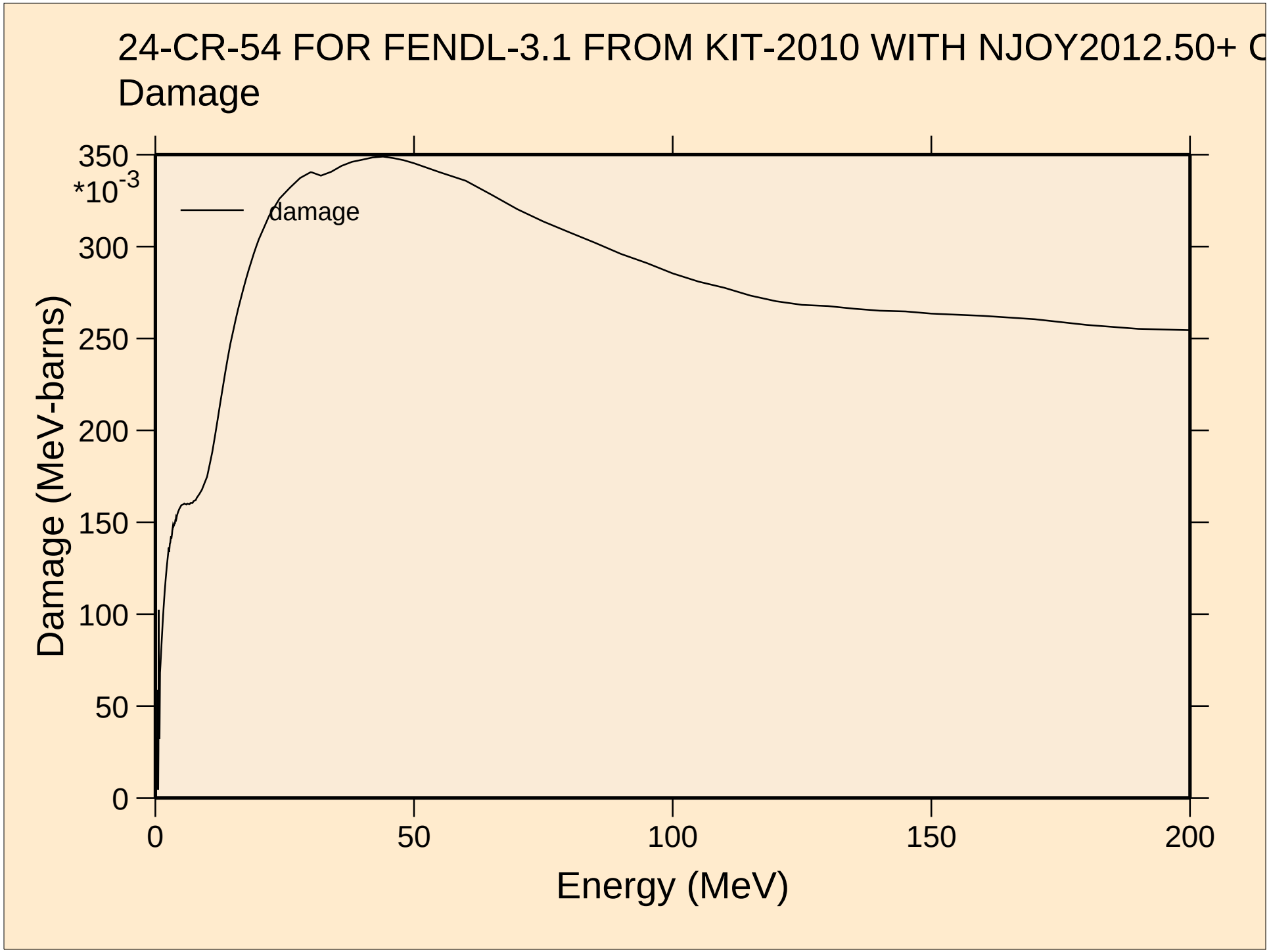

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Heating
heating
Heating (MeV/reaction)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

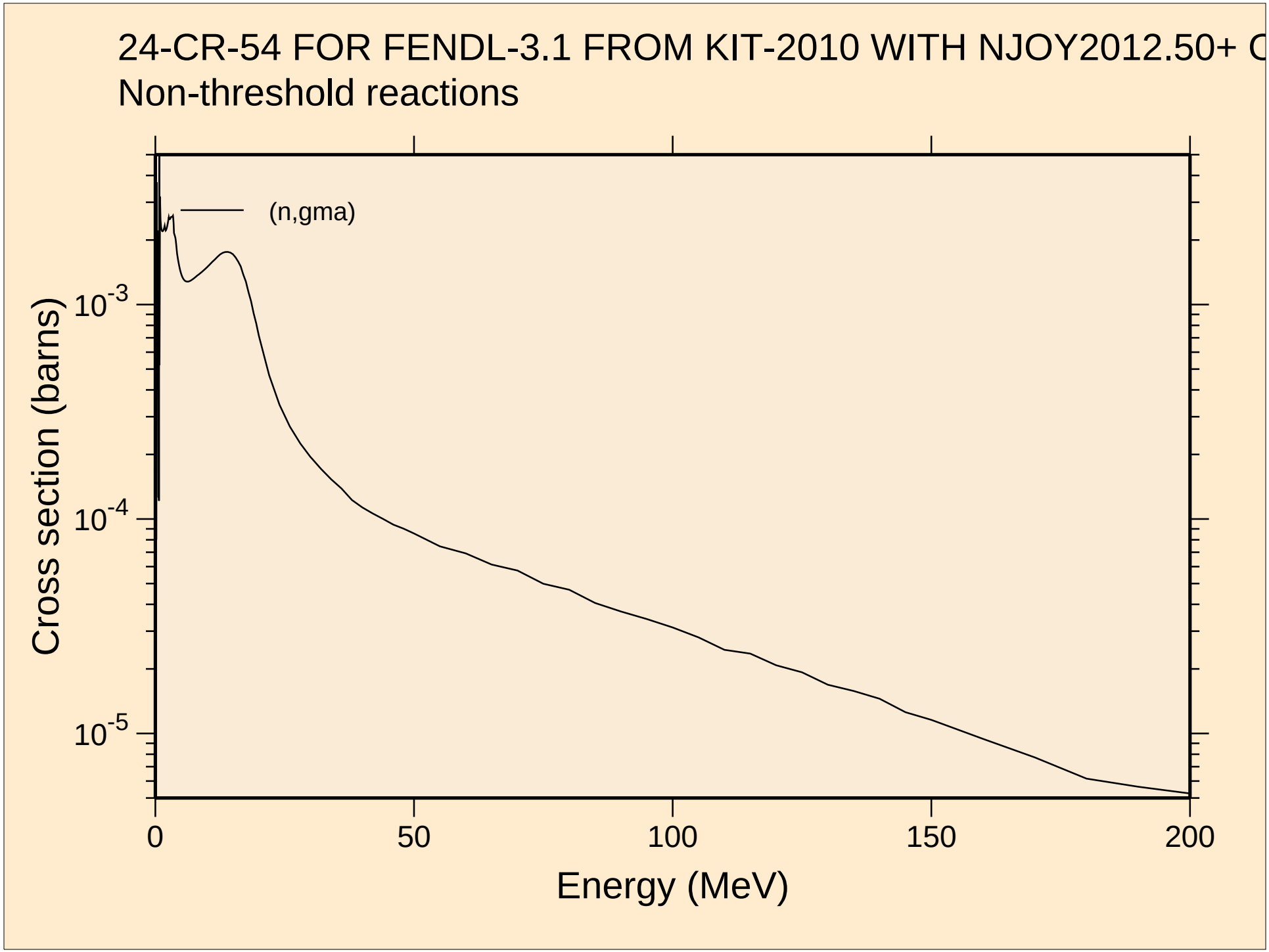

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Damage
damage
Damage (MeV-barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-11
10-9
10-7
10-5
10-3
10-1
101
Energy (MeV)

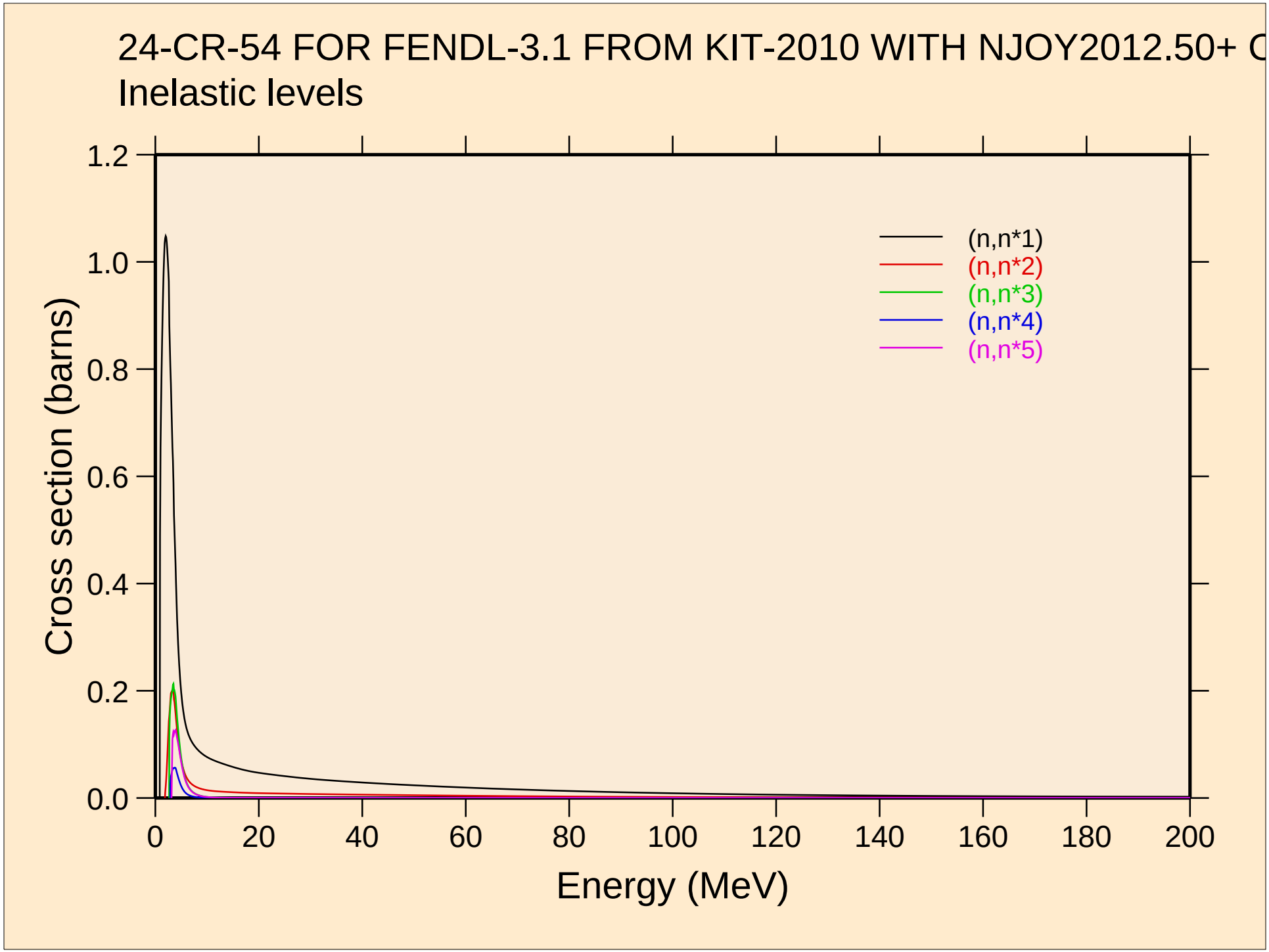

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Non-threshold reactions
(n,gma)
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

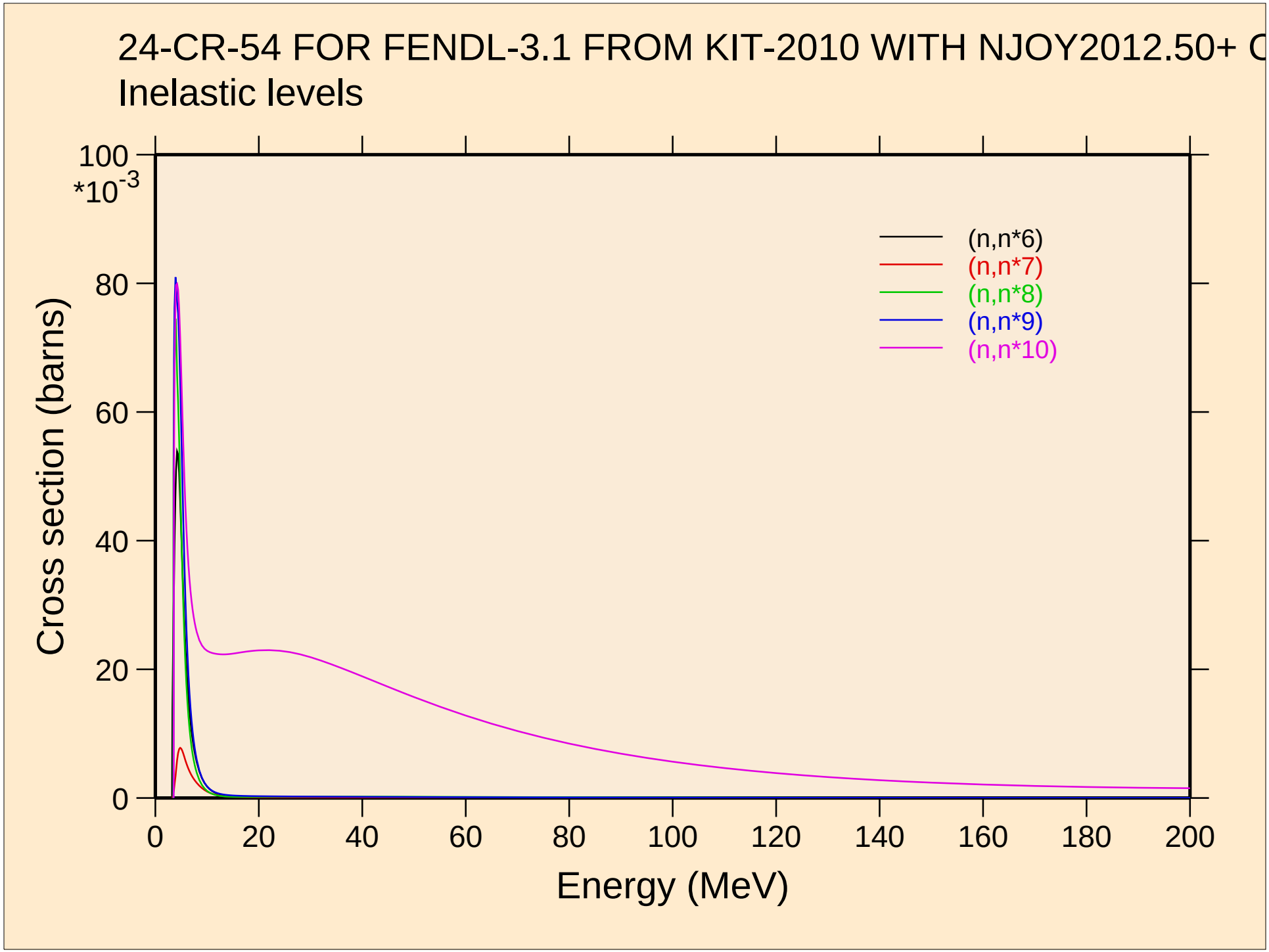

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
20
40
60
80
100
120
140
160
180
200

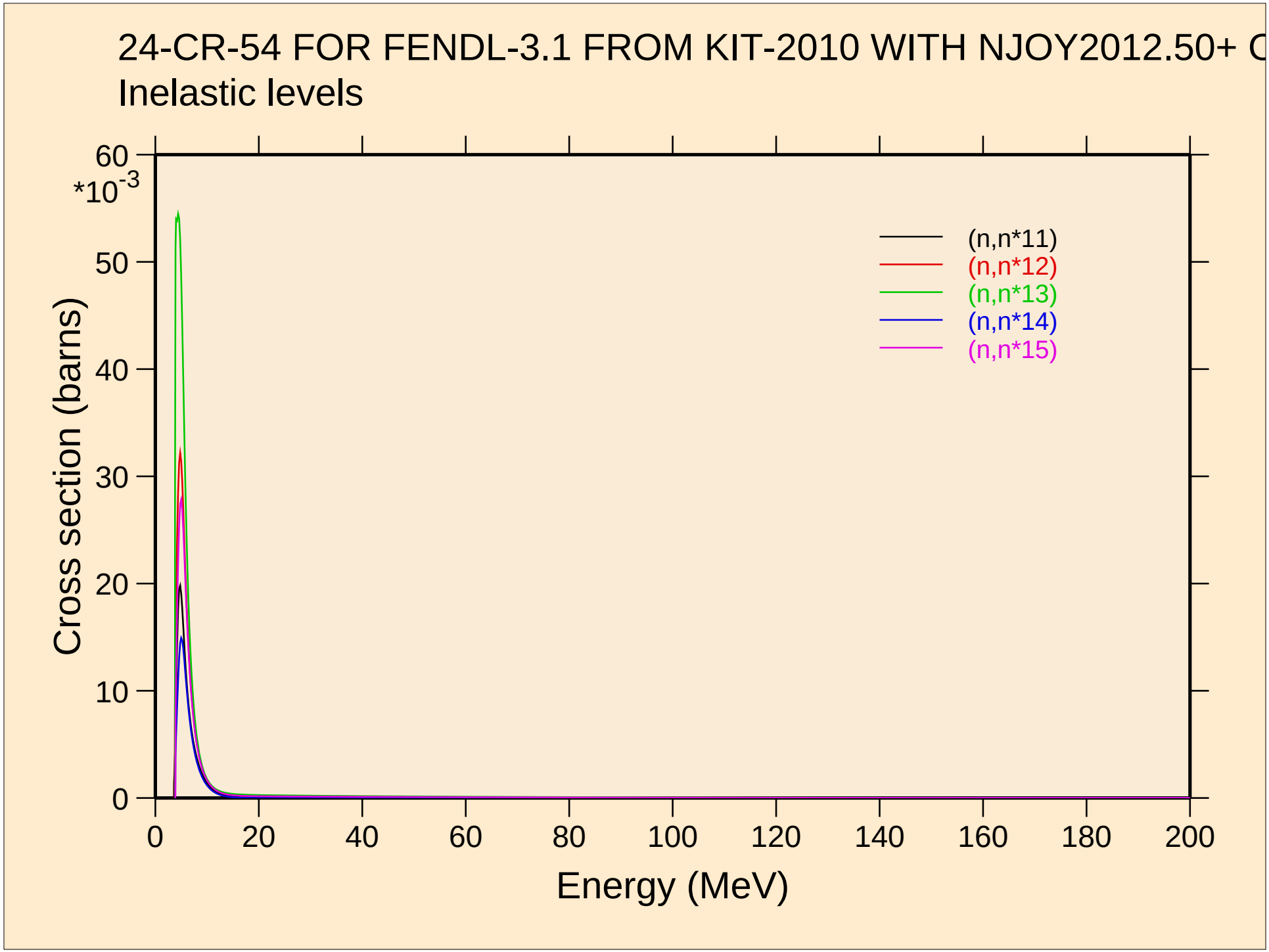

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
5
10
15
20
25
30
35
40
0
50
100
150
200

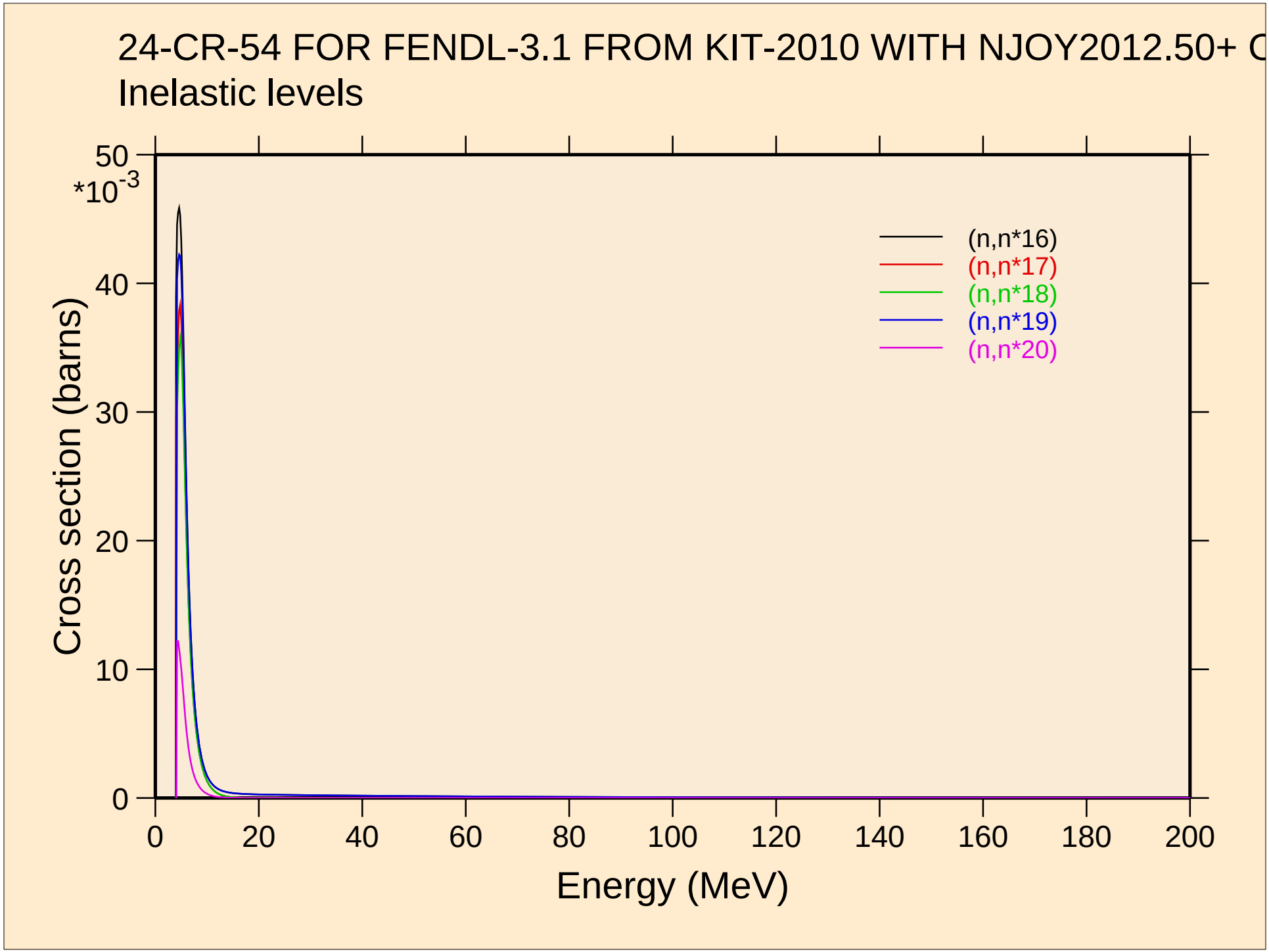

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Damage
350
*10-3
300
250
200
150
100
50
0
damage
Damage (MeV-barns)
0
50
100
150
200
Energy (MeV)

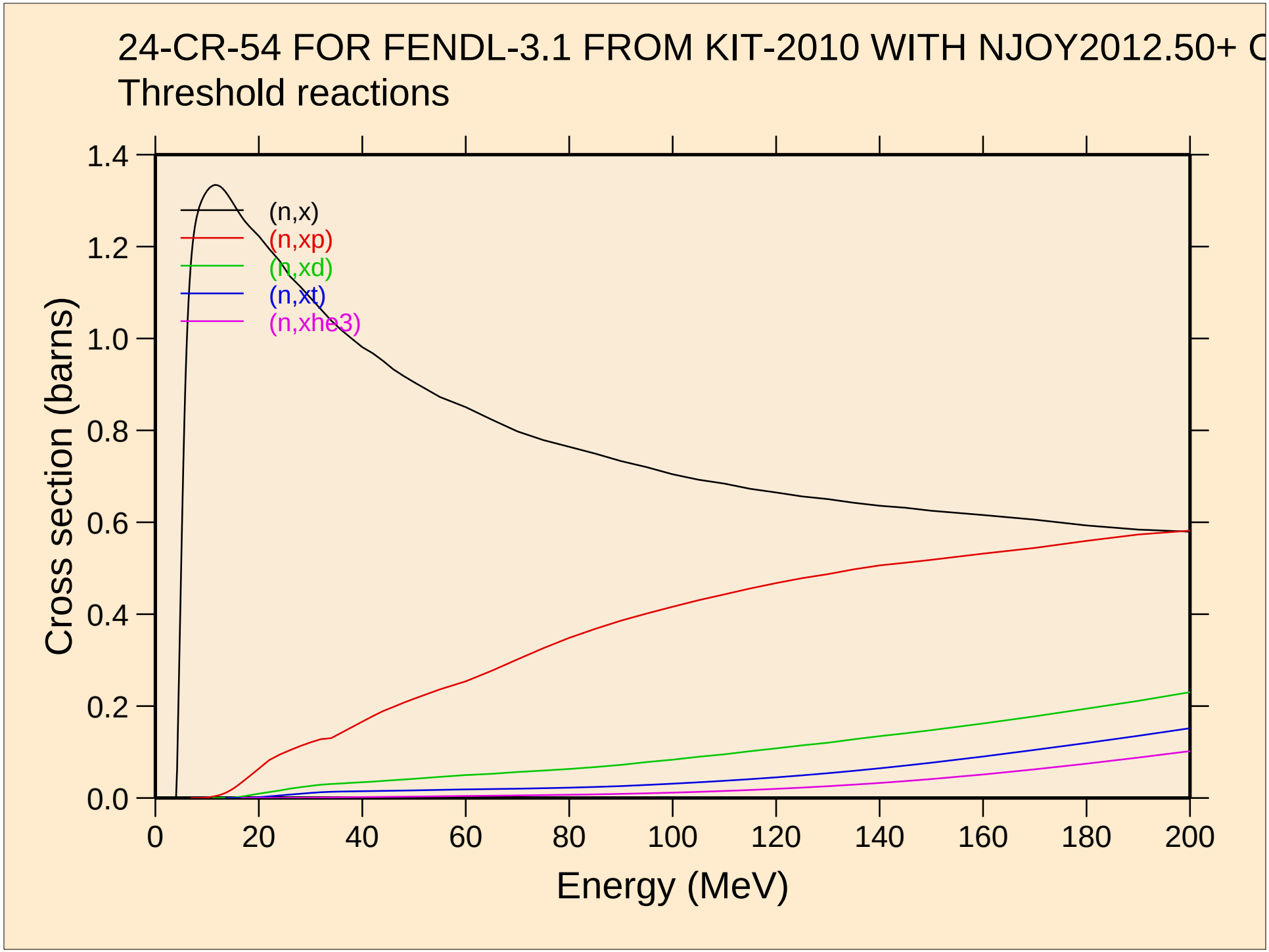

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Non-threshold reactions
(n,gma)
Cross section (barns)
10-3
10-4
10-5
0
50
100
150
200
Energy (MeV)

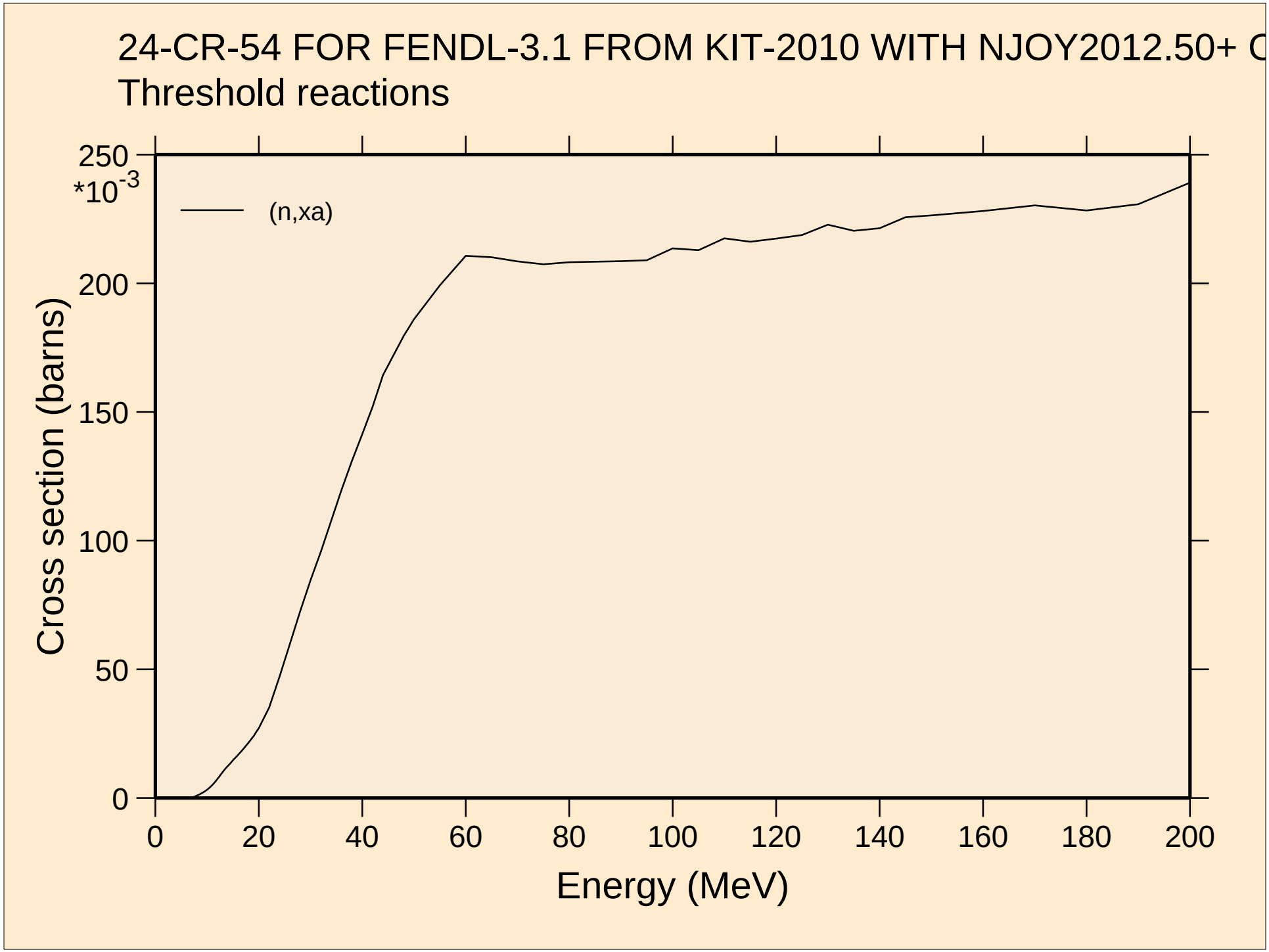

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
20
40
60
80
100
120
140
160
180
200
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

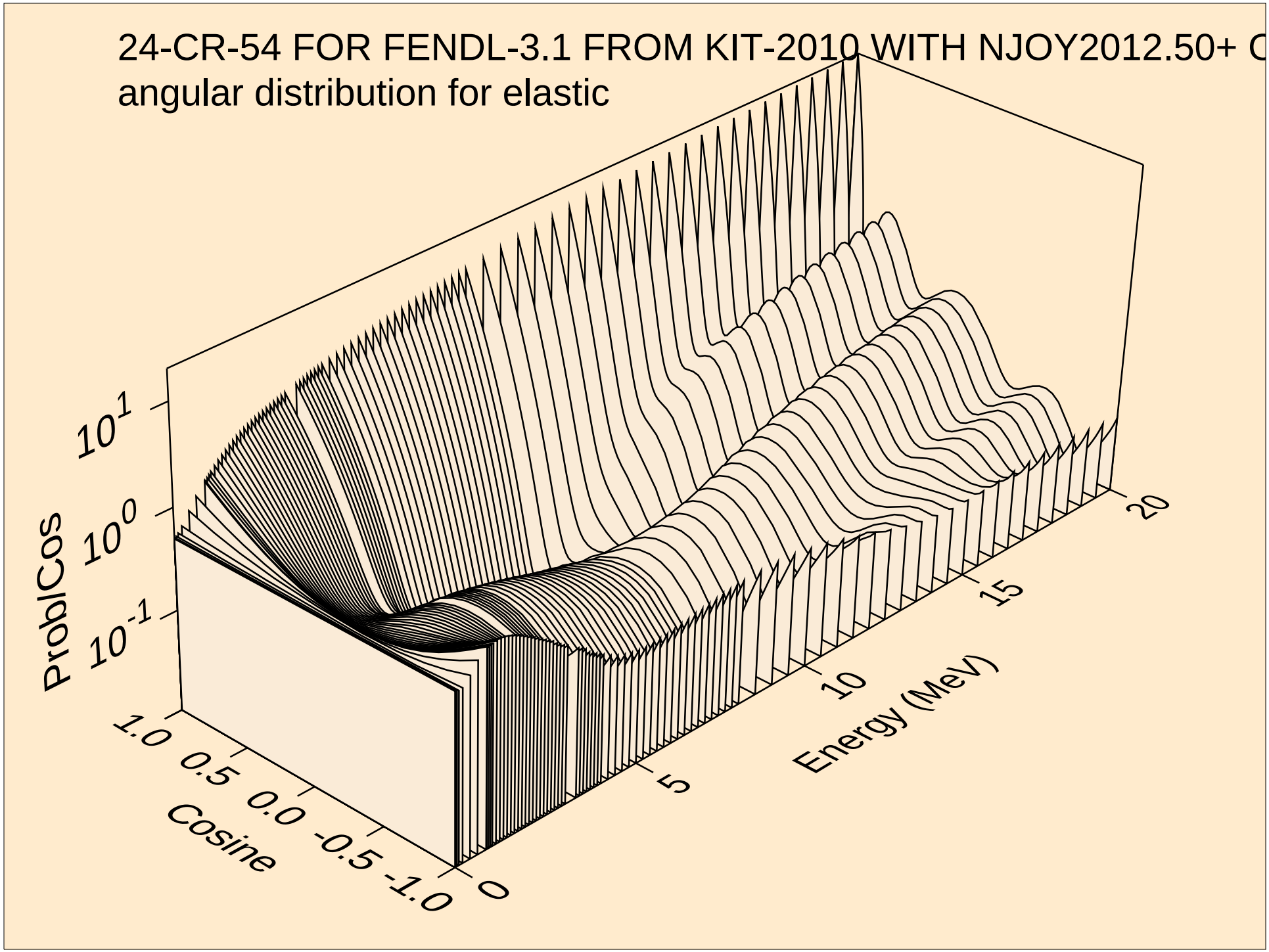

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Inelastic levels
100
*10-3
80
60
40
20
0
Cross section (barns)
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

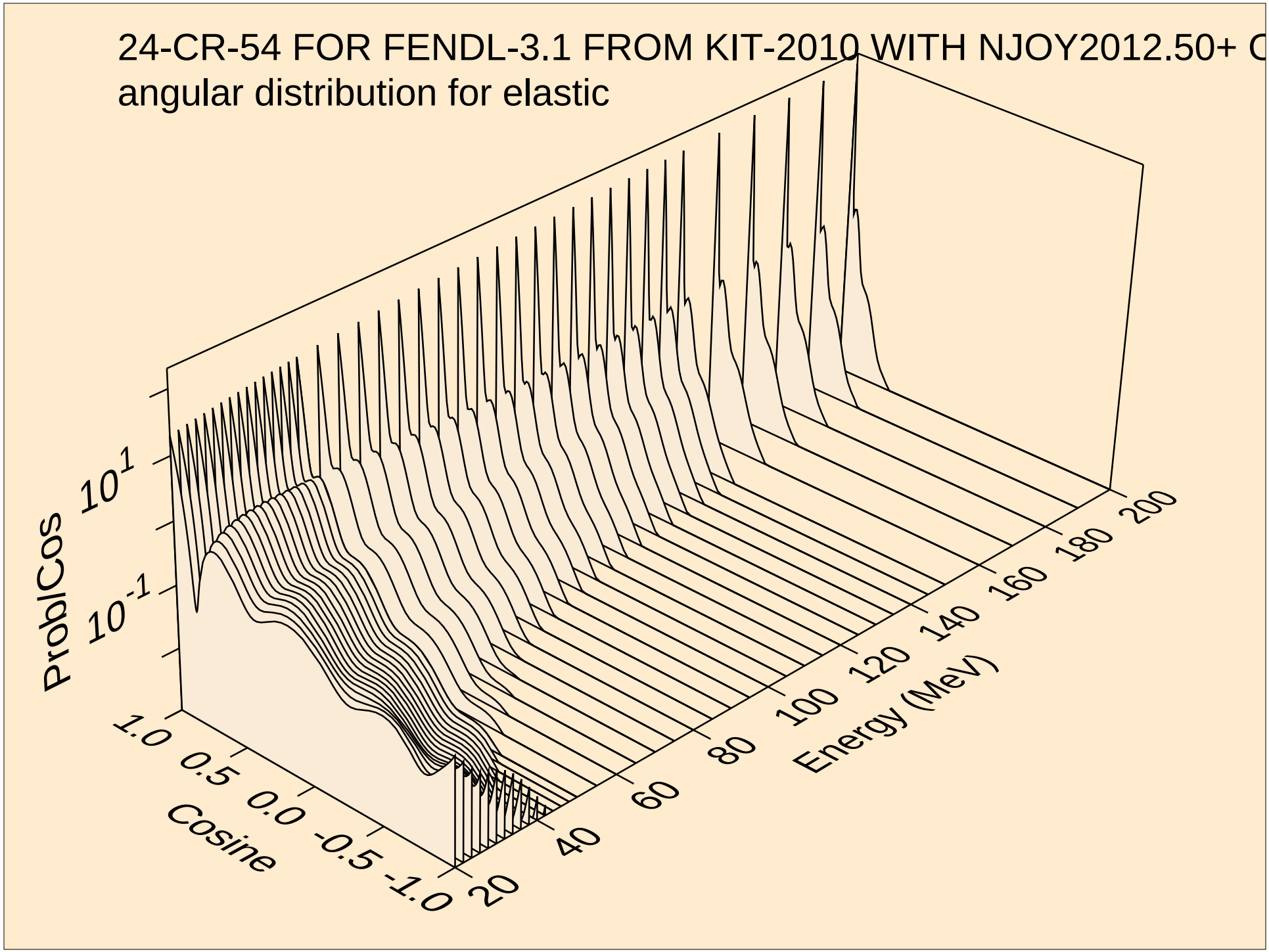

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

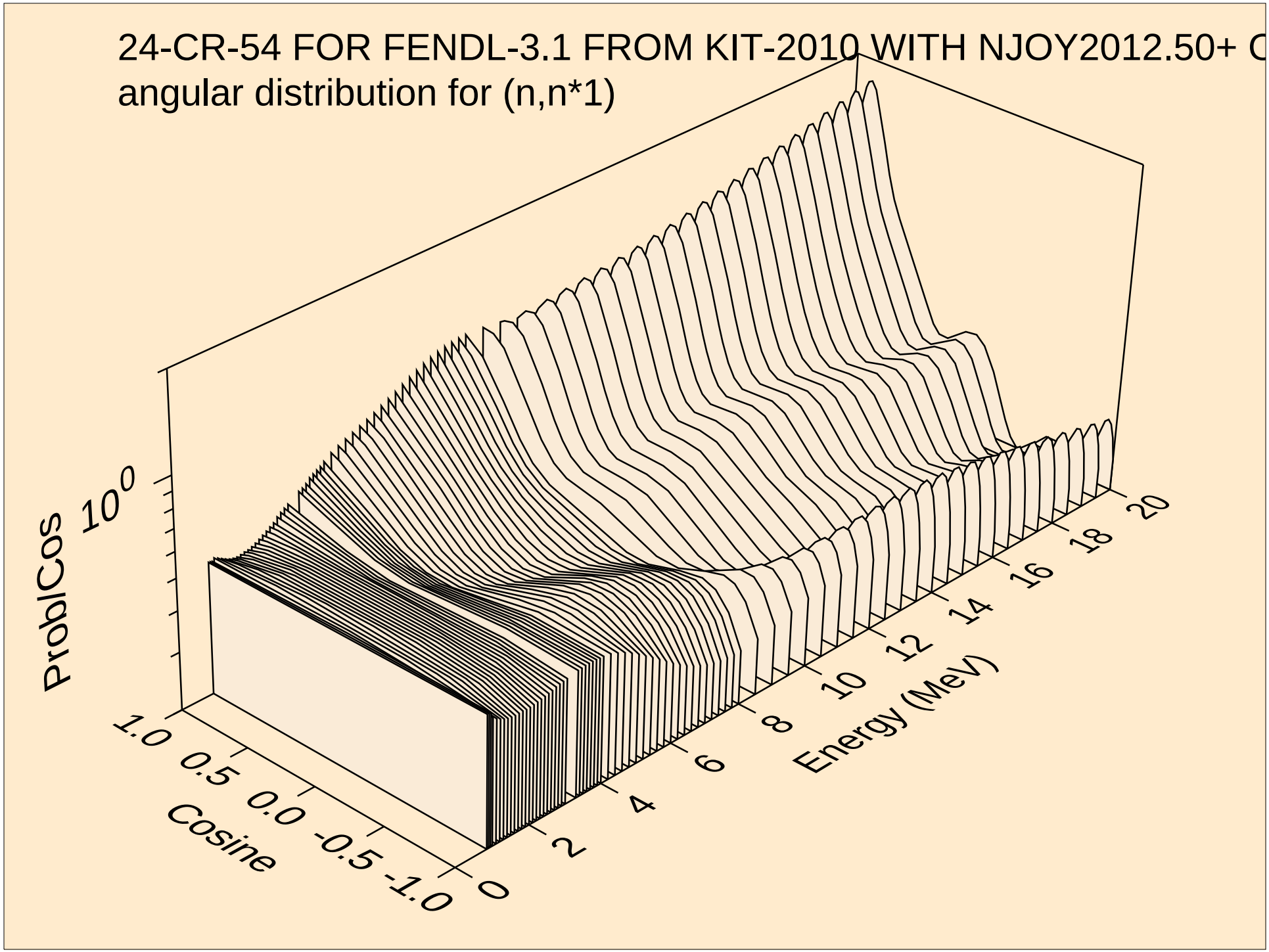

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
50
40
30
20
10
0
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

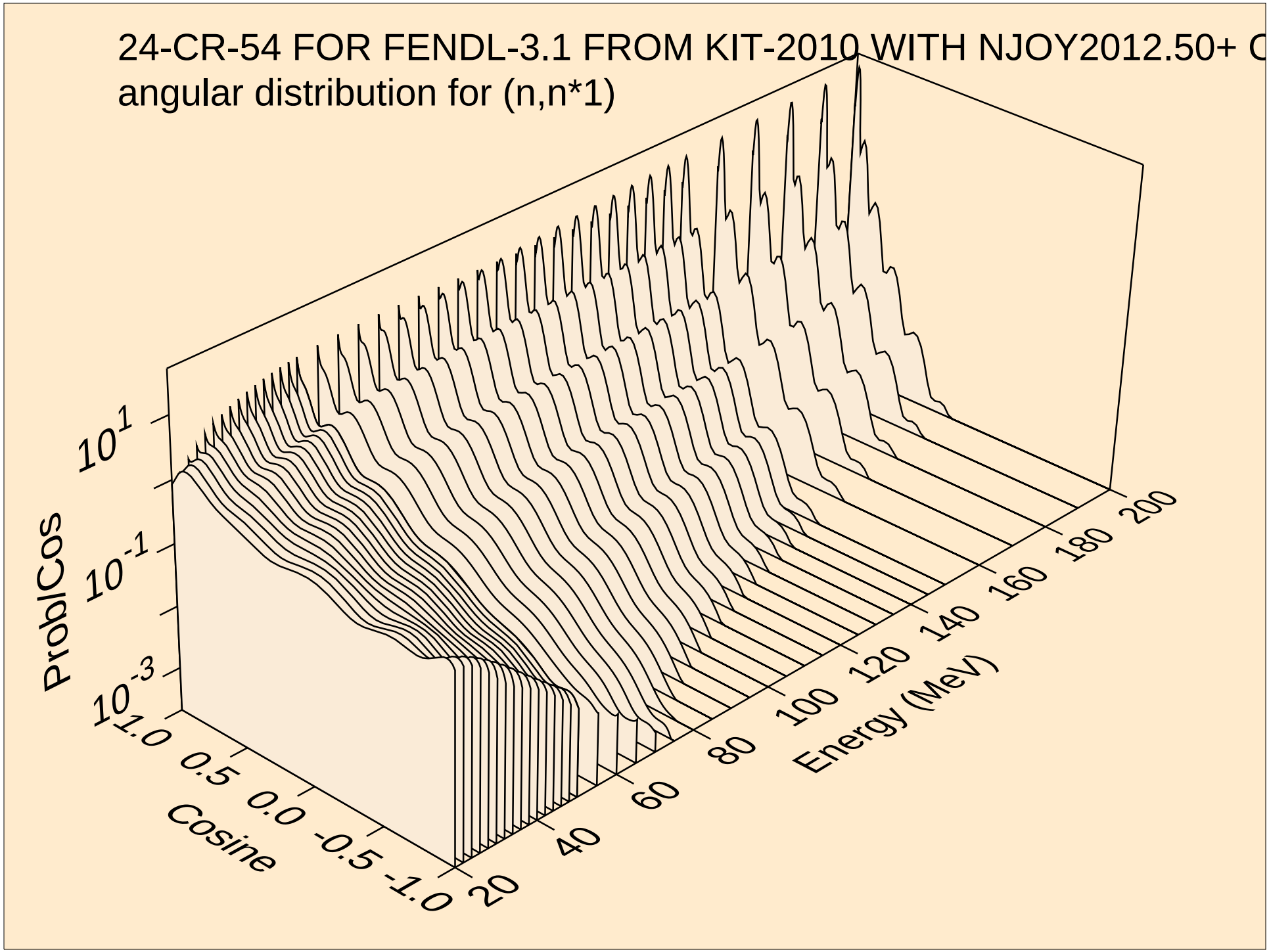

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Threshold reactions
(n,x)
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0
20
40
60
80
100
120
140
160
180
200

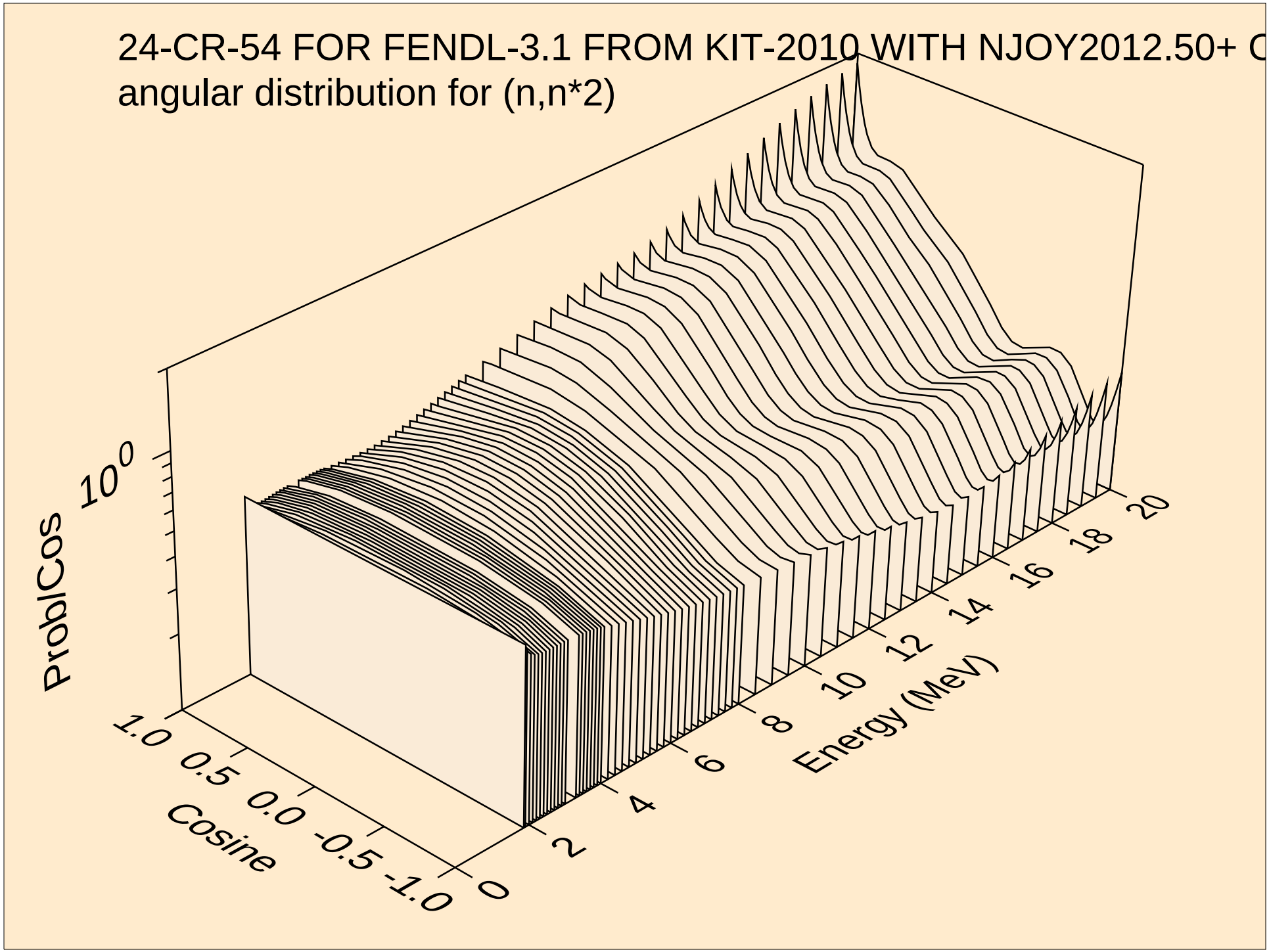

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Threshold reactions
250
*10-3
200
150
100
50
0
(n,xa)
Cross section (barns)
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

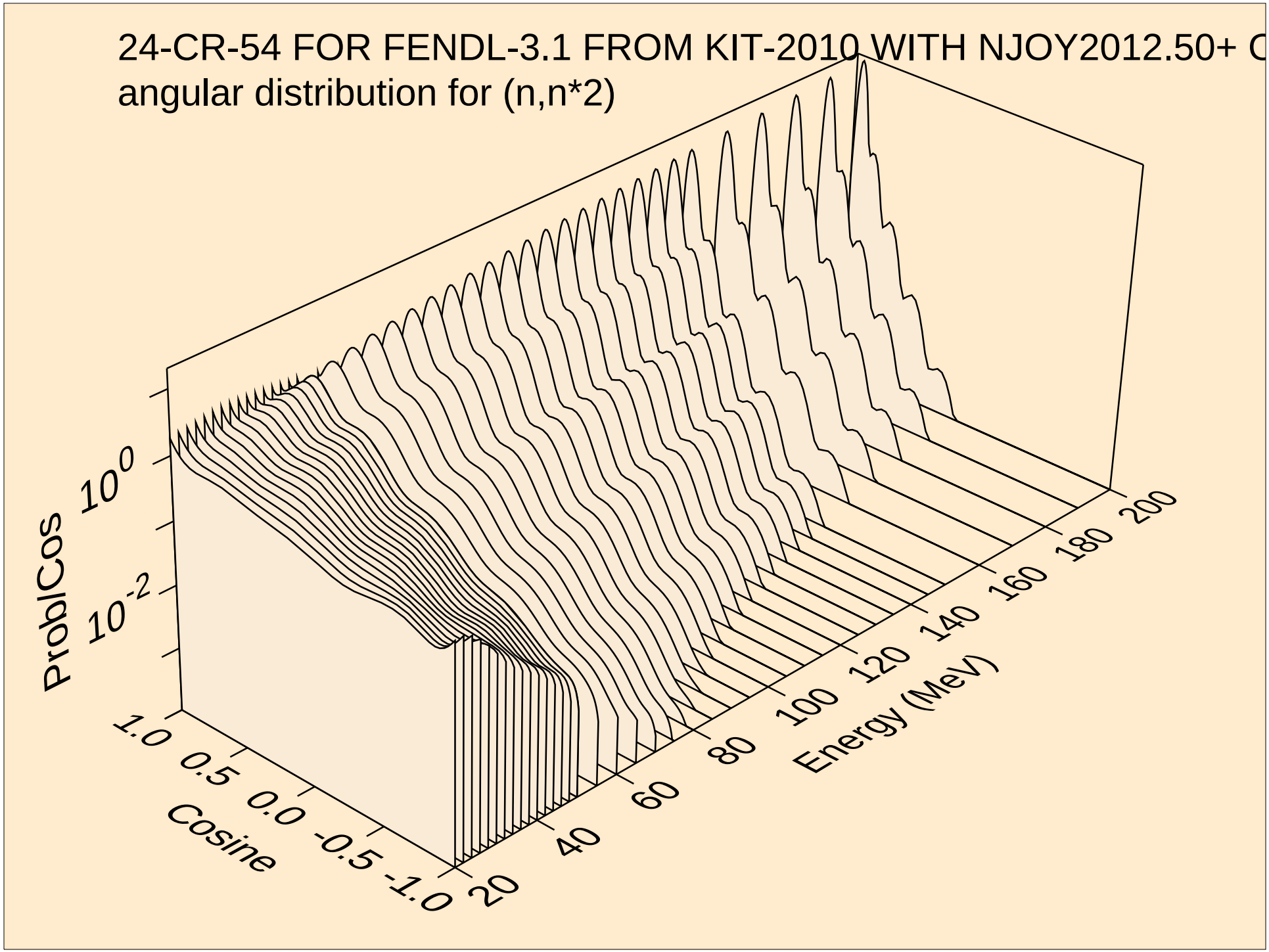

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for elastic
ProbICos
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

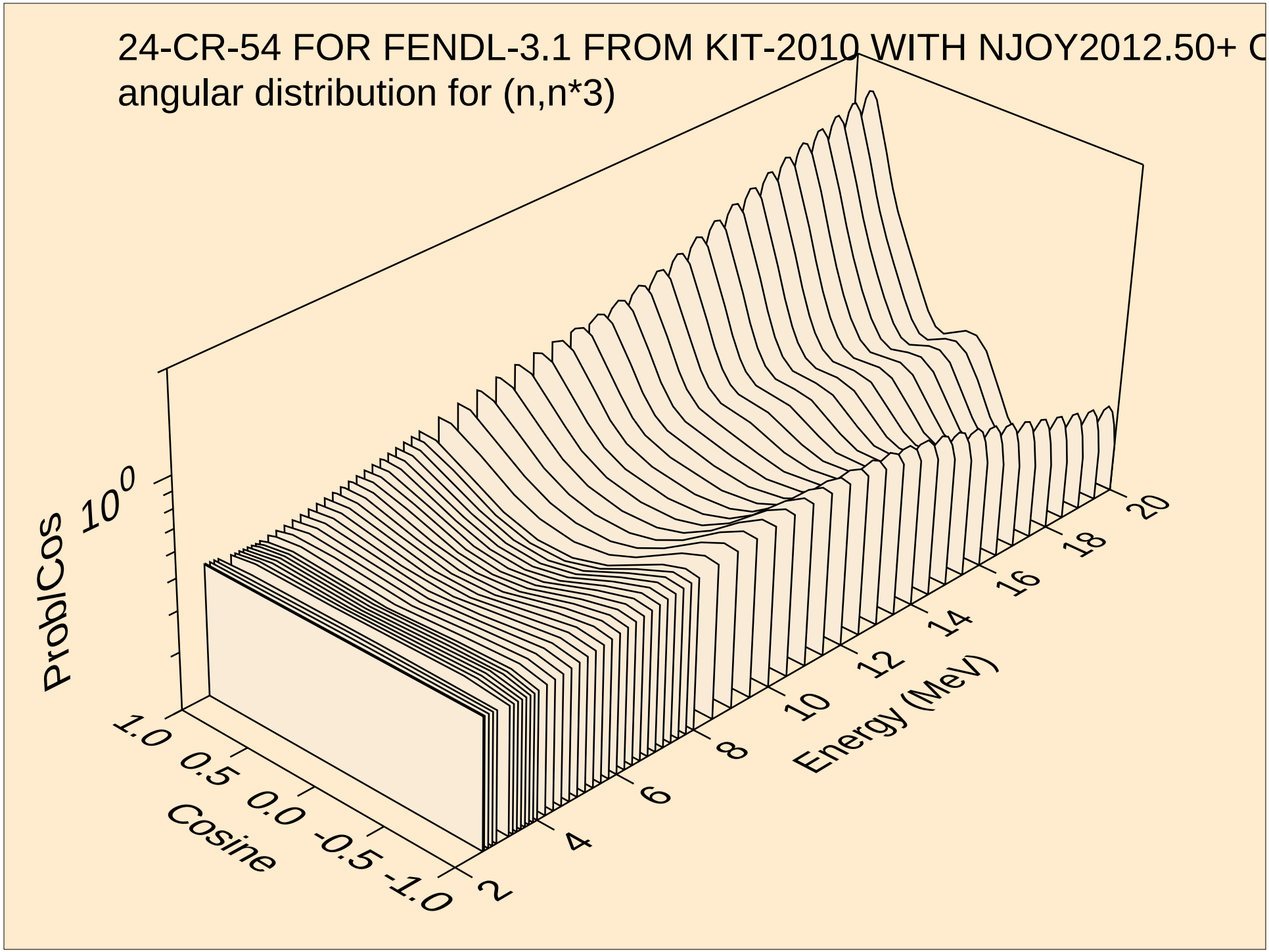

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for elastic
ProbICos
10^1
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

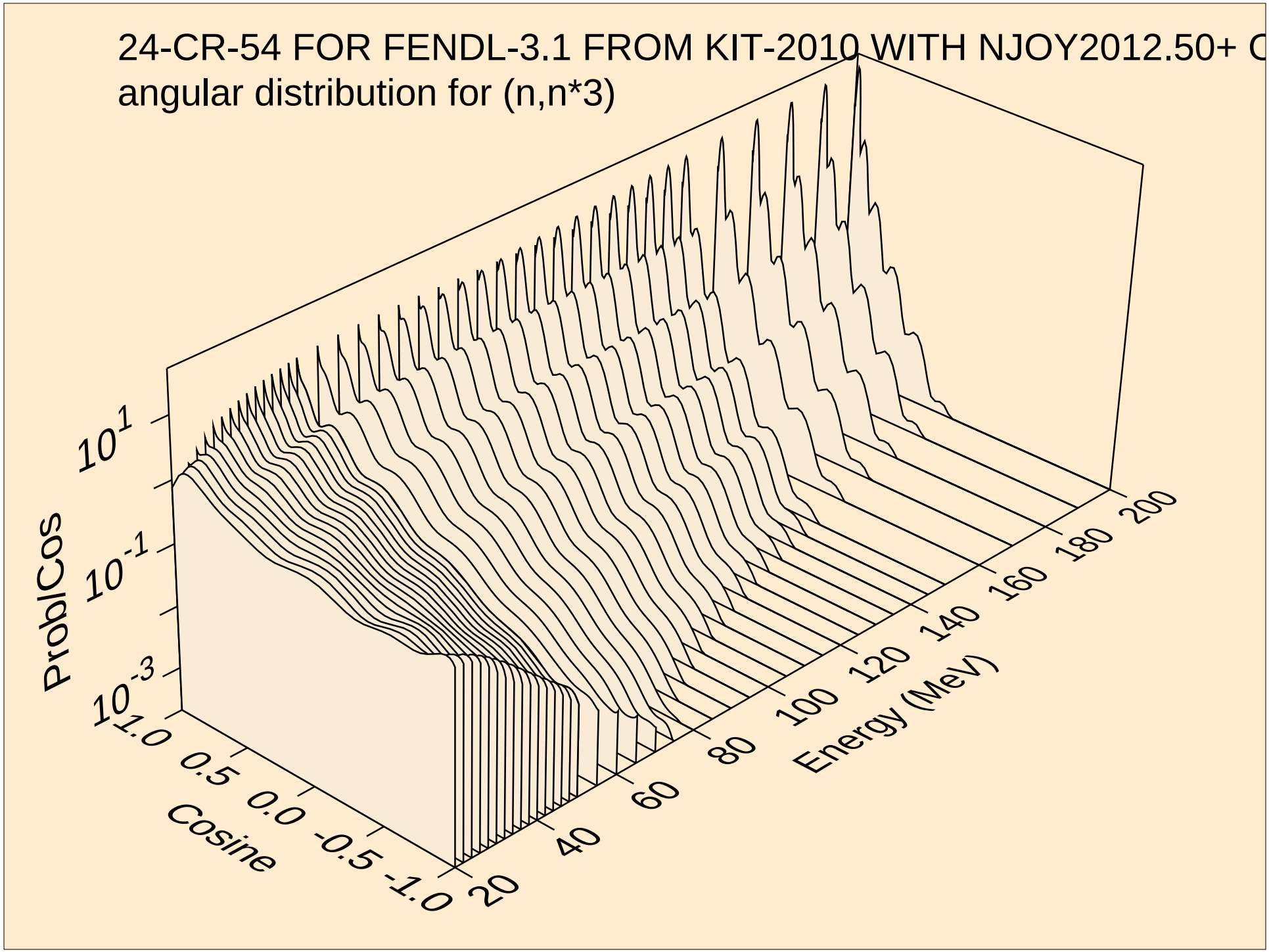

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*1)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

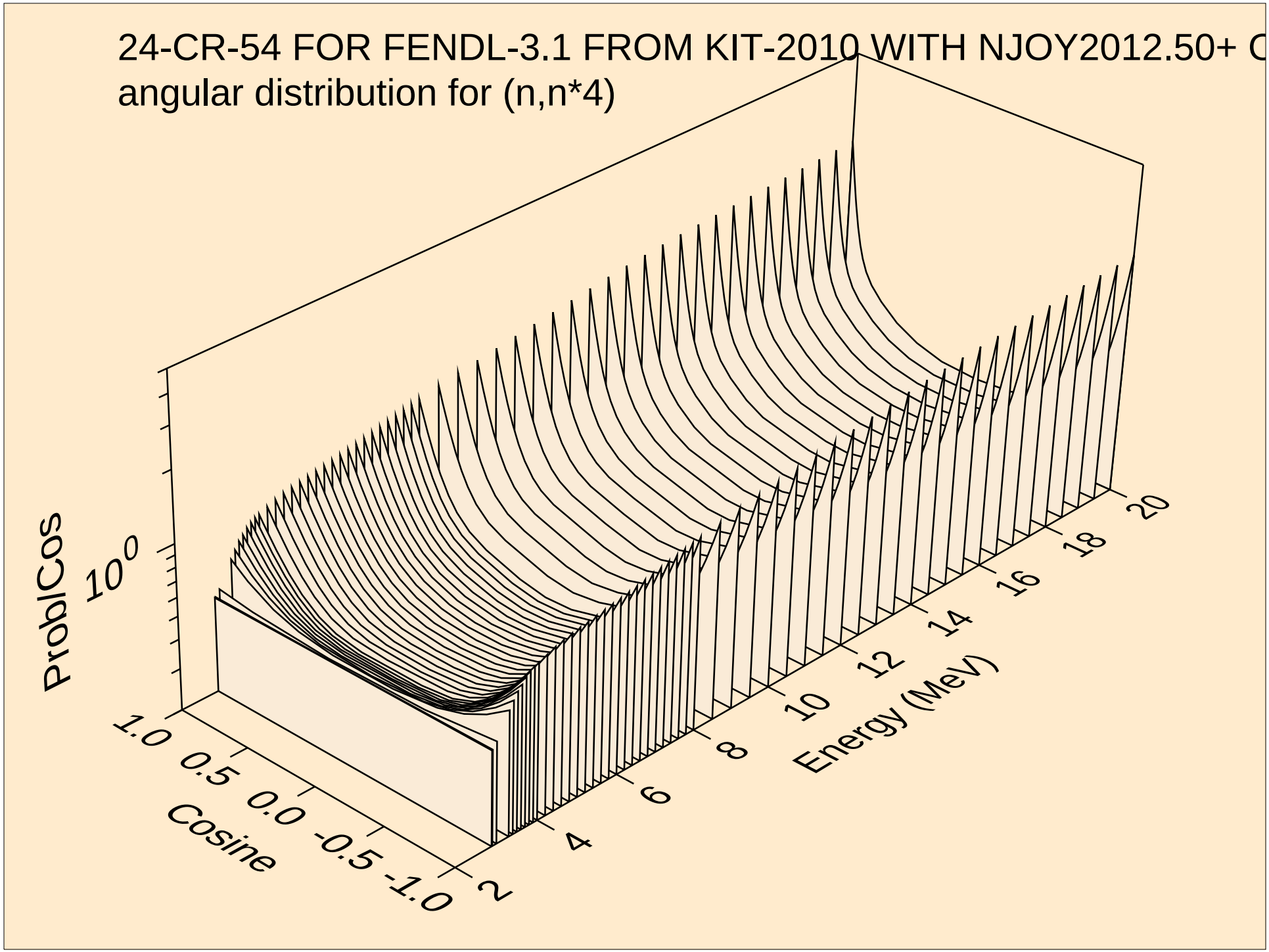

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*1)
ProbICos
10^1
10^-1
10^-3
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
20
40
60
80
100
120
140
160
180
200

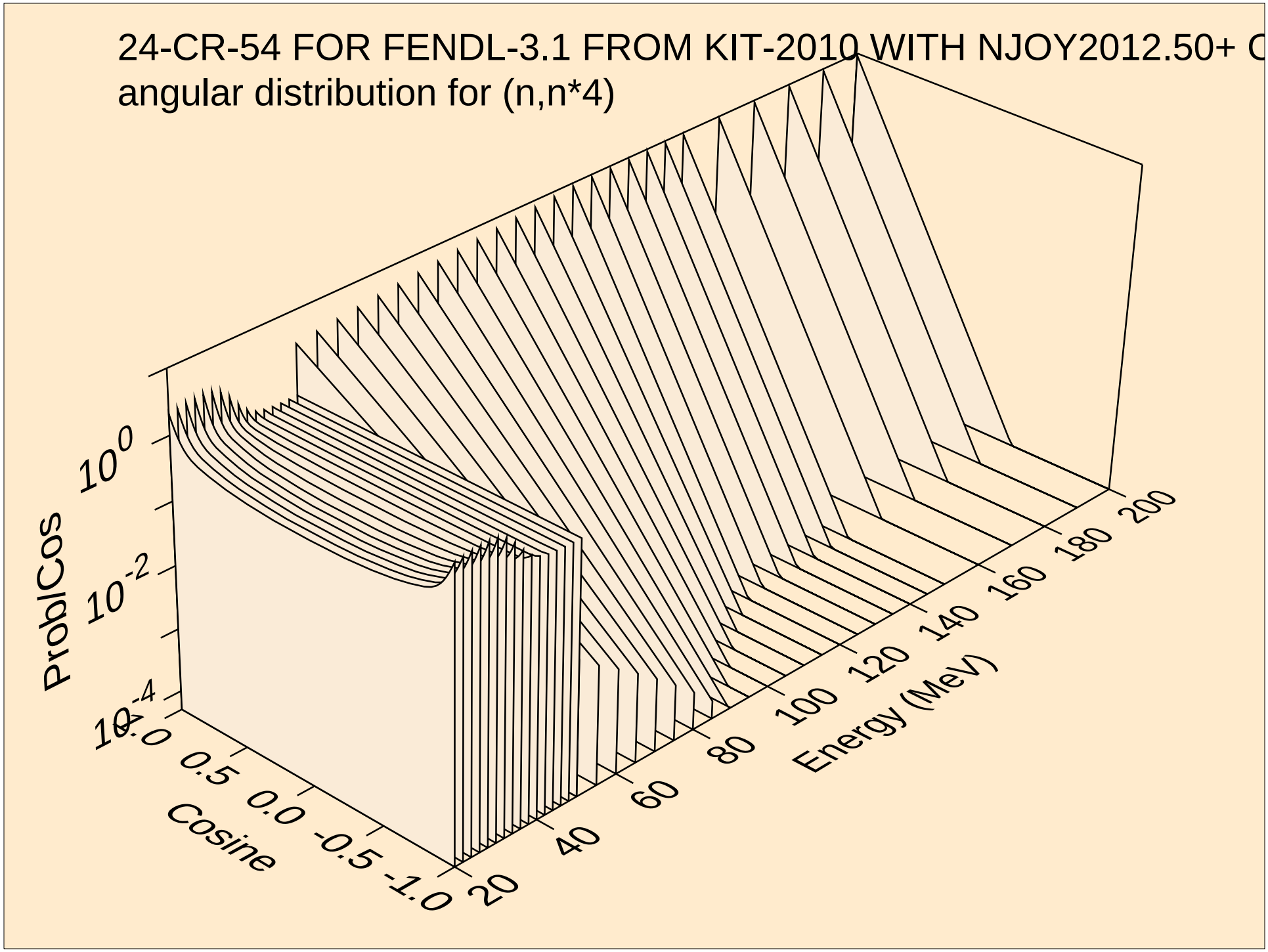

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*2)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

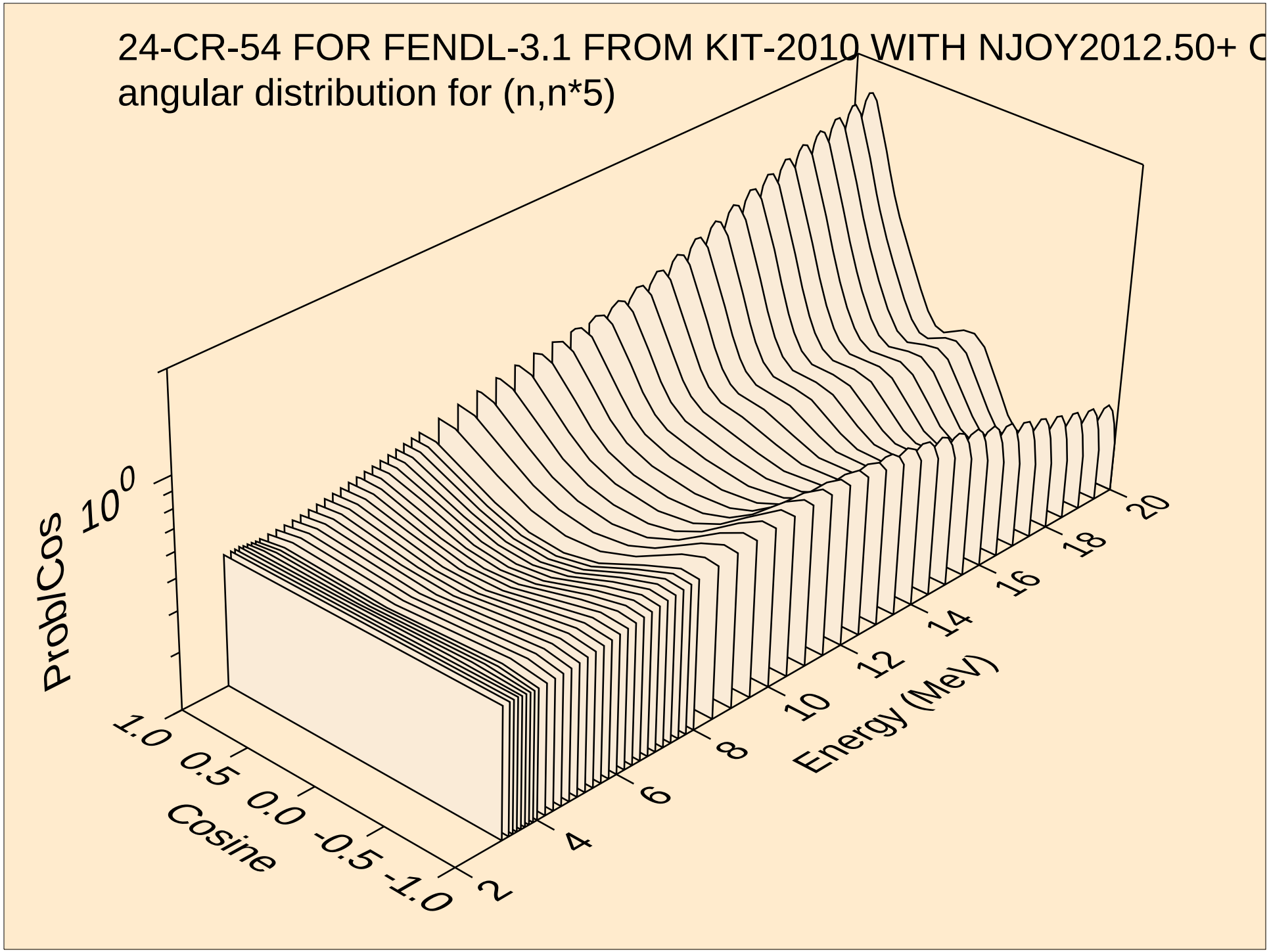

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*2)
ProbICos
10^0
10^-2
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

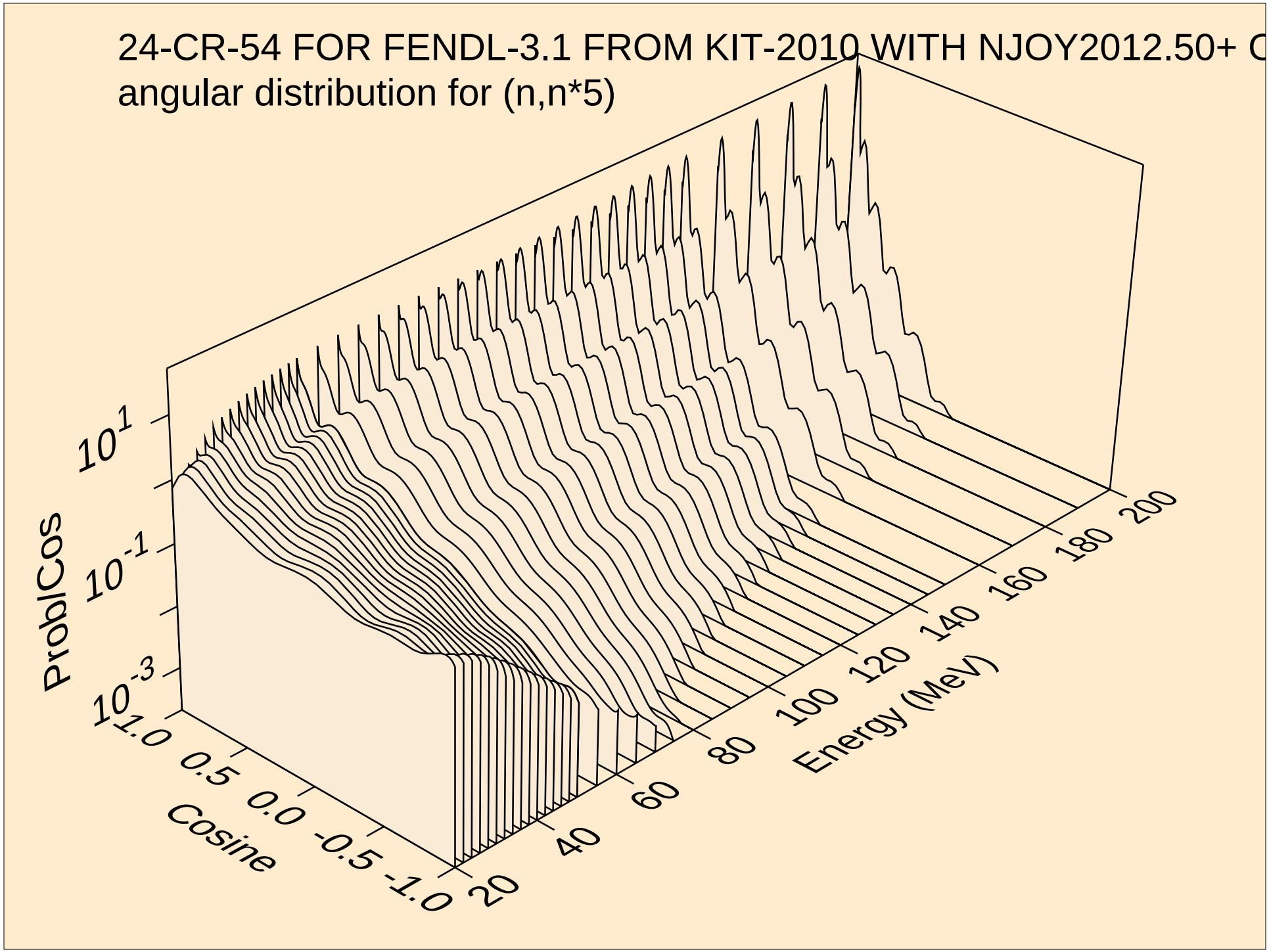

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*3)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

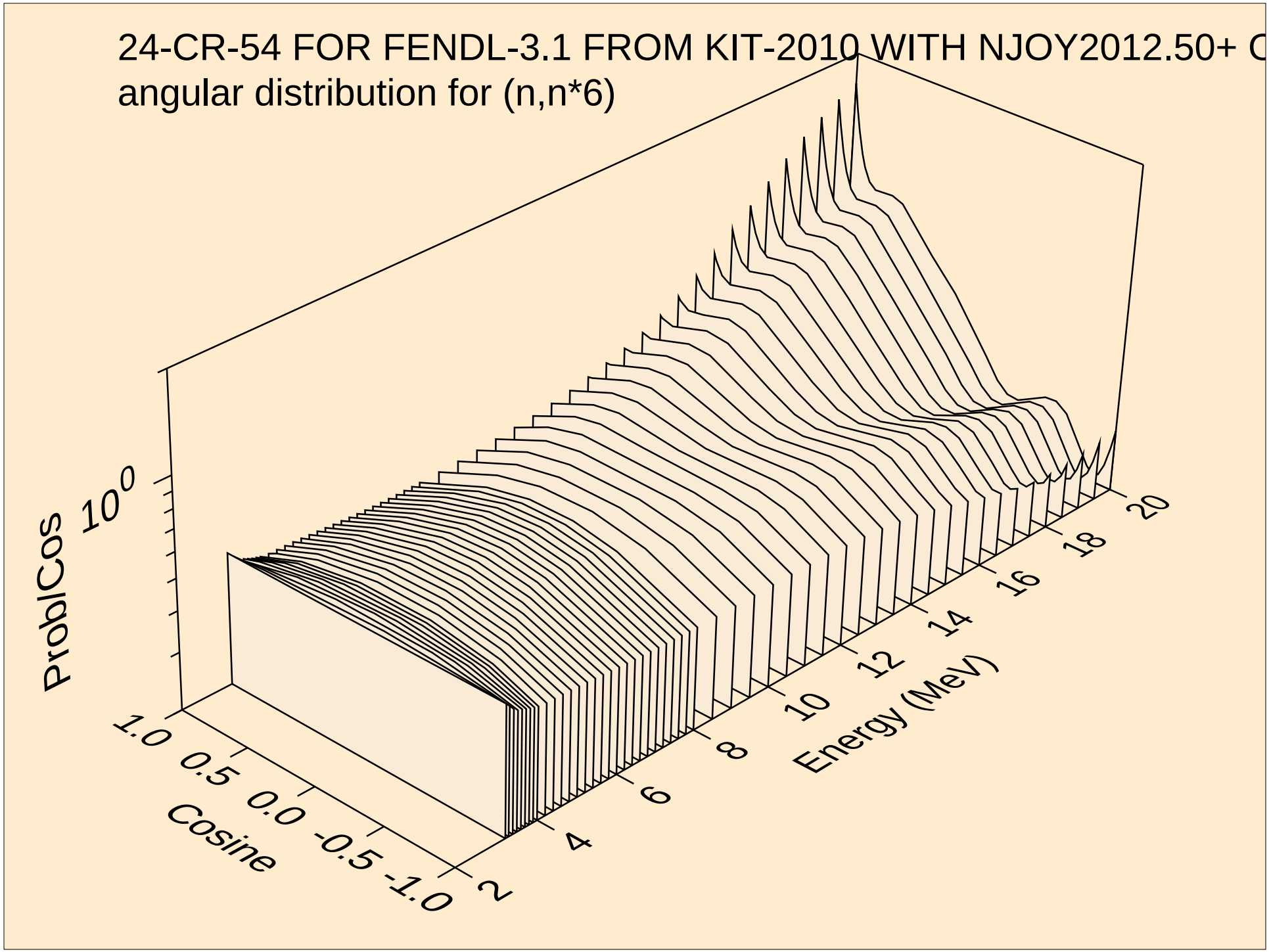

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*3)
ProblCos
10^{1}
10^{-1}
10^{-3}
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

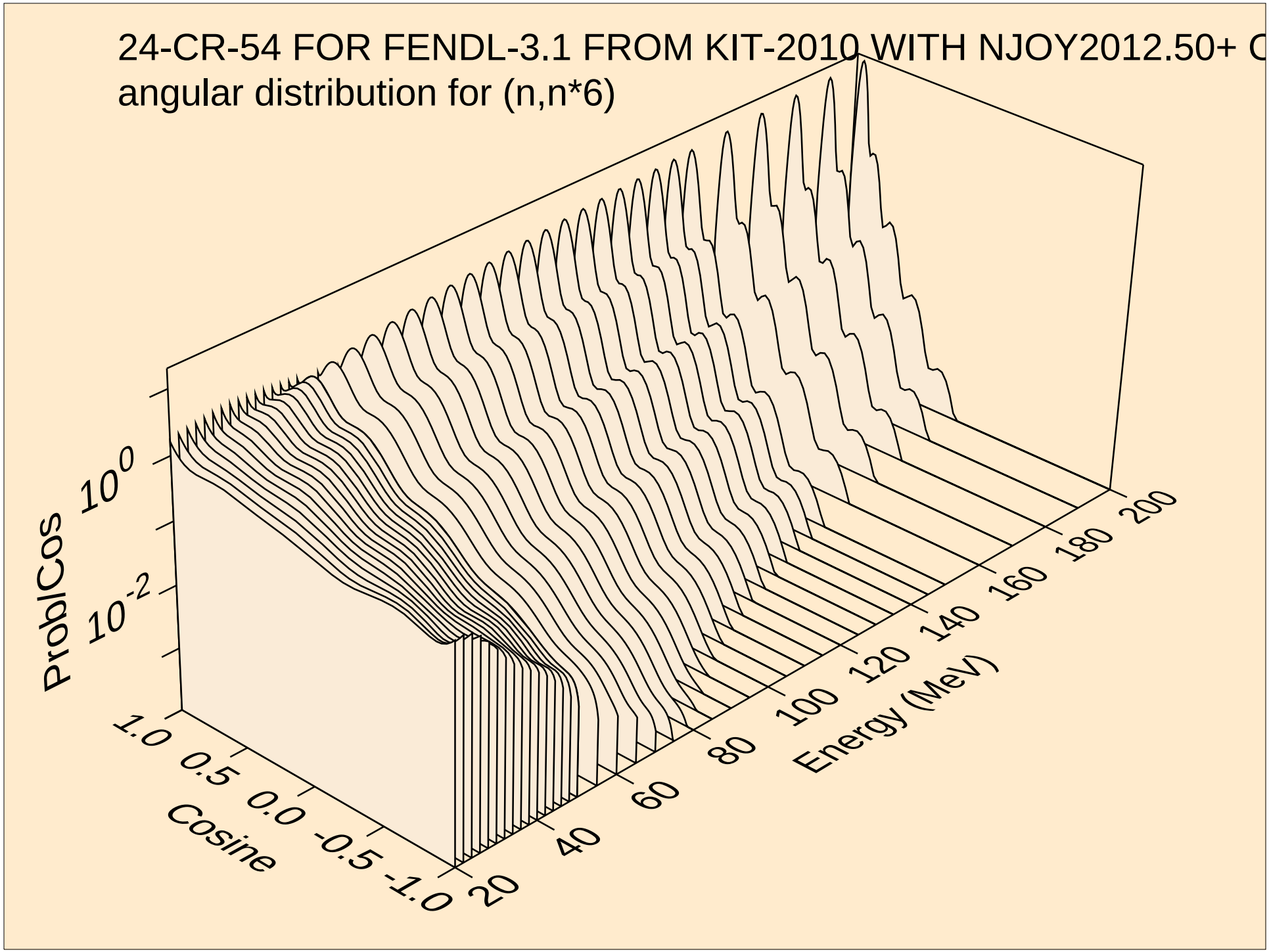

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*4)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

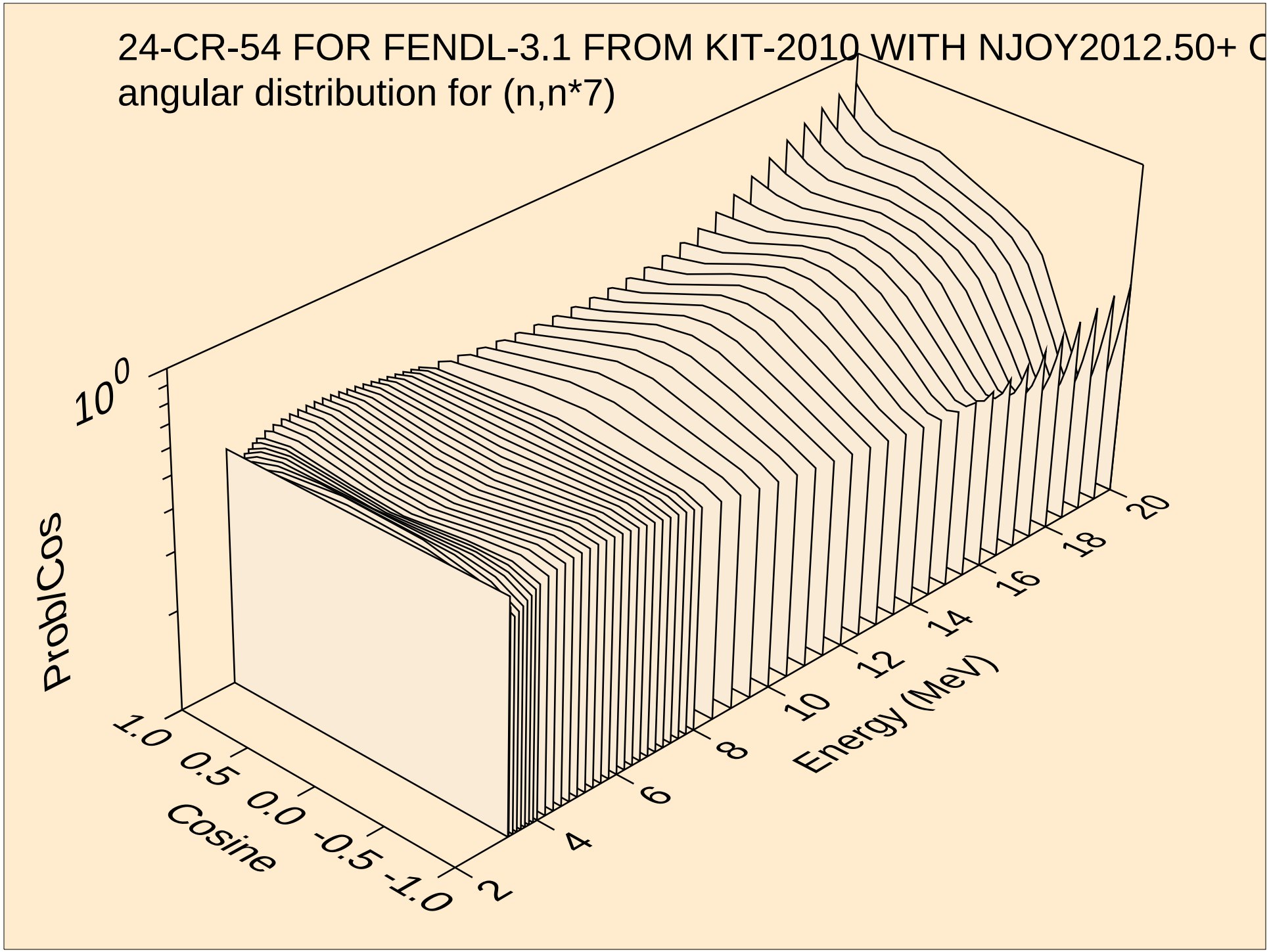

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*4)
ProbICos
10^0
10^-2
10^-4
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

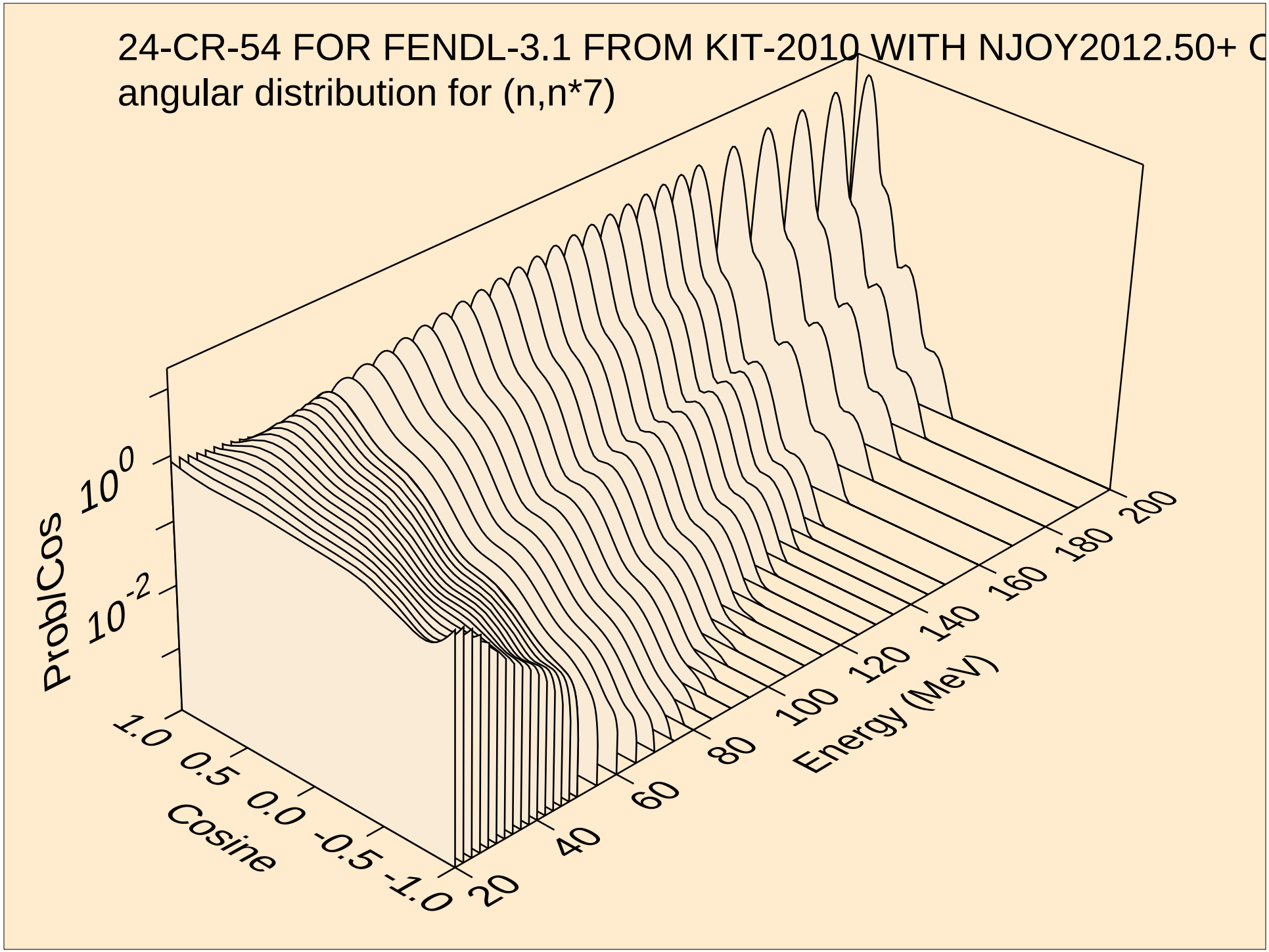

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*5)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

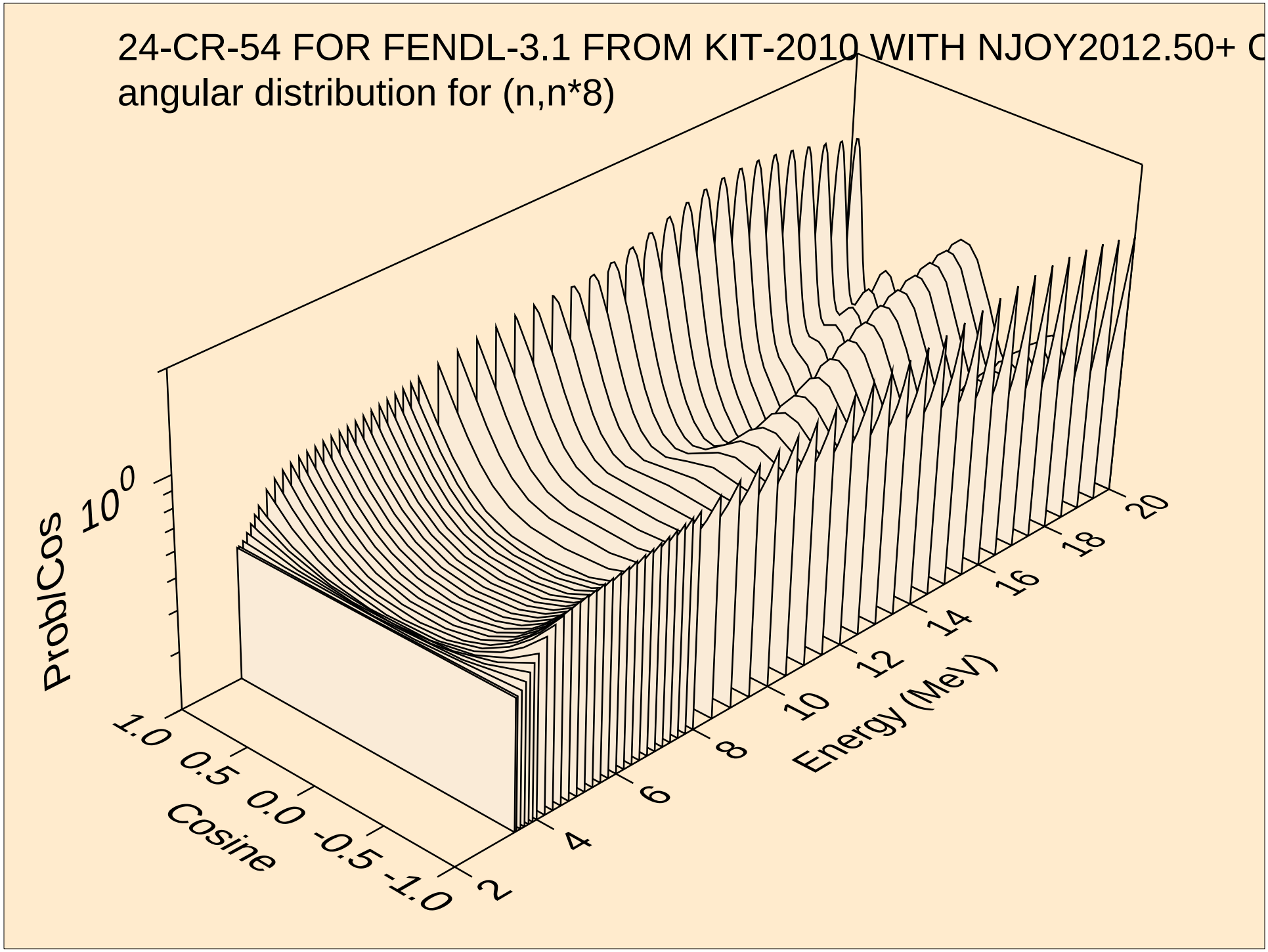

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*5)
ProbICos
10^1
10^-1
10^-3
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

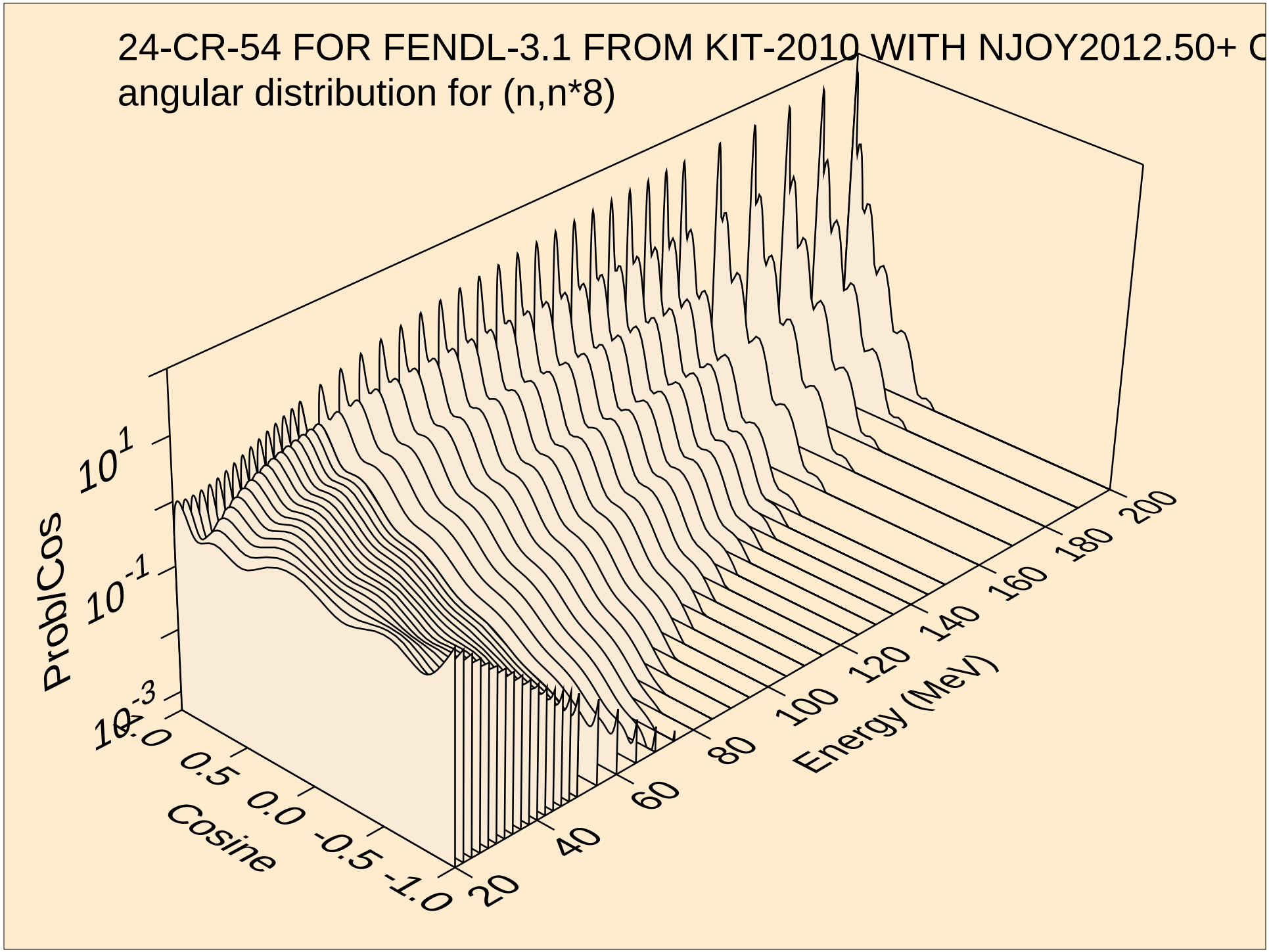

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*6)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

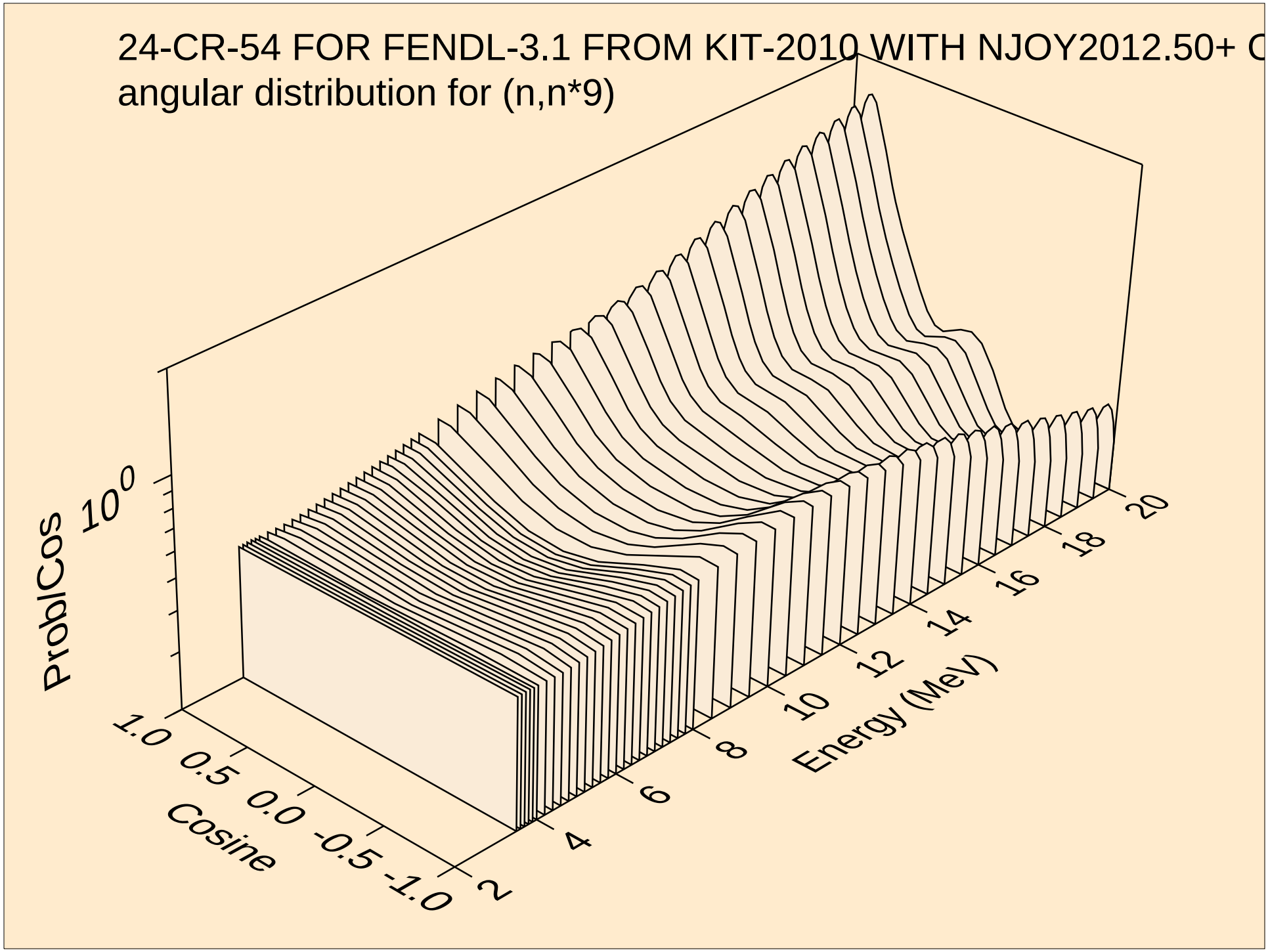

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*6)
ProbICos
10^0
10^-2
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

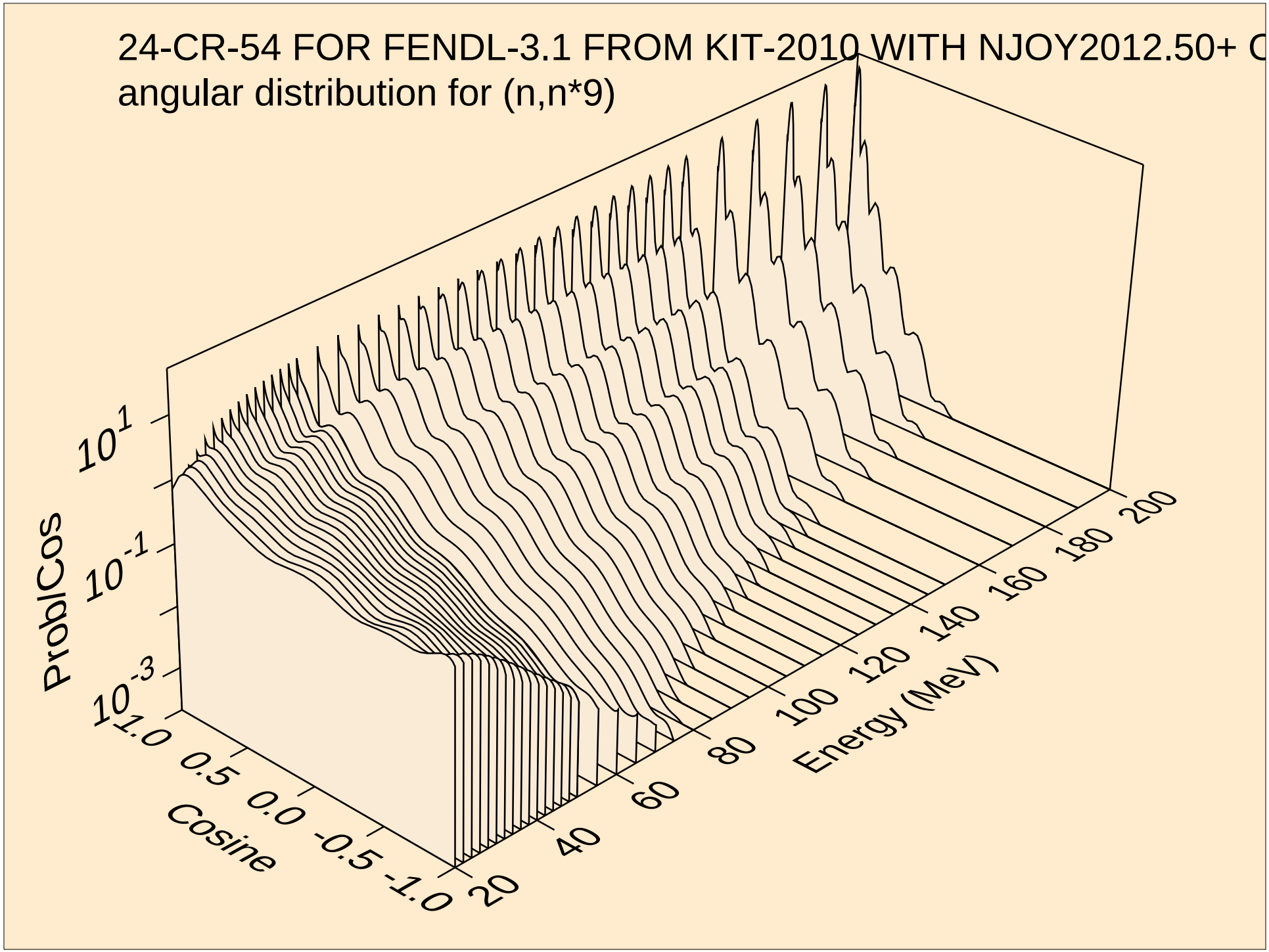

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*7)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

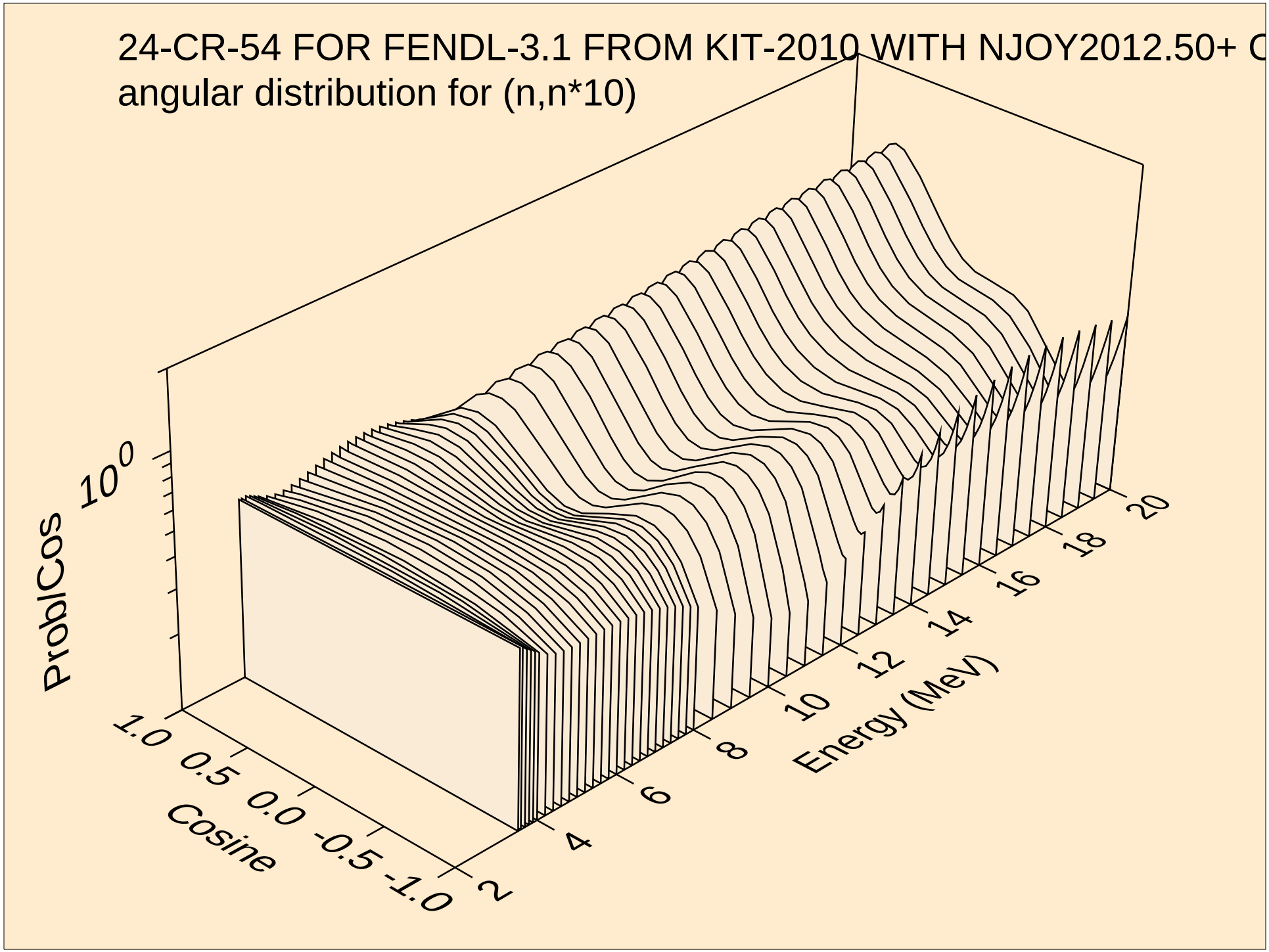

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*7)
ProbICos
10^0
10^-2
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

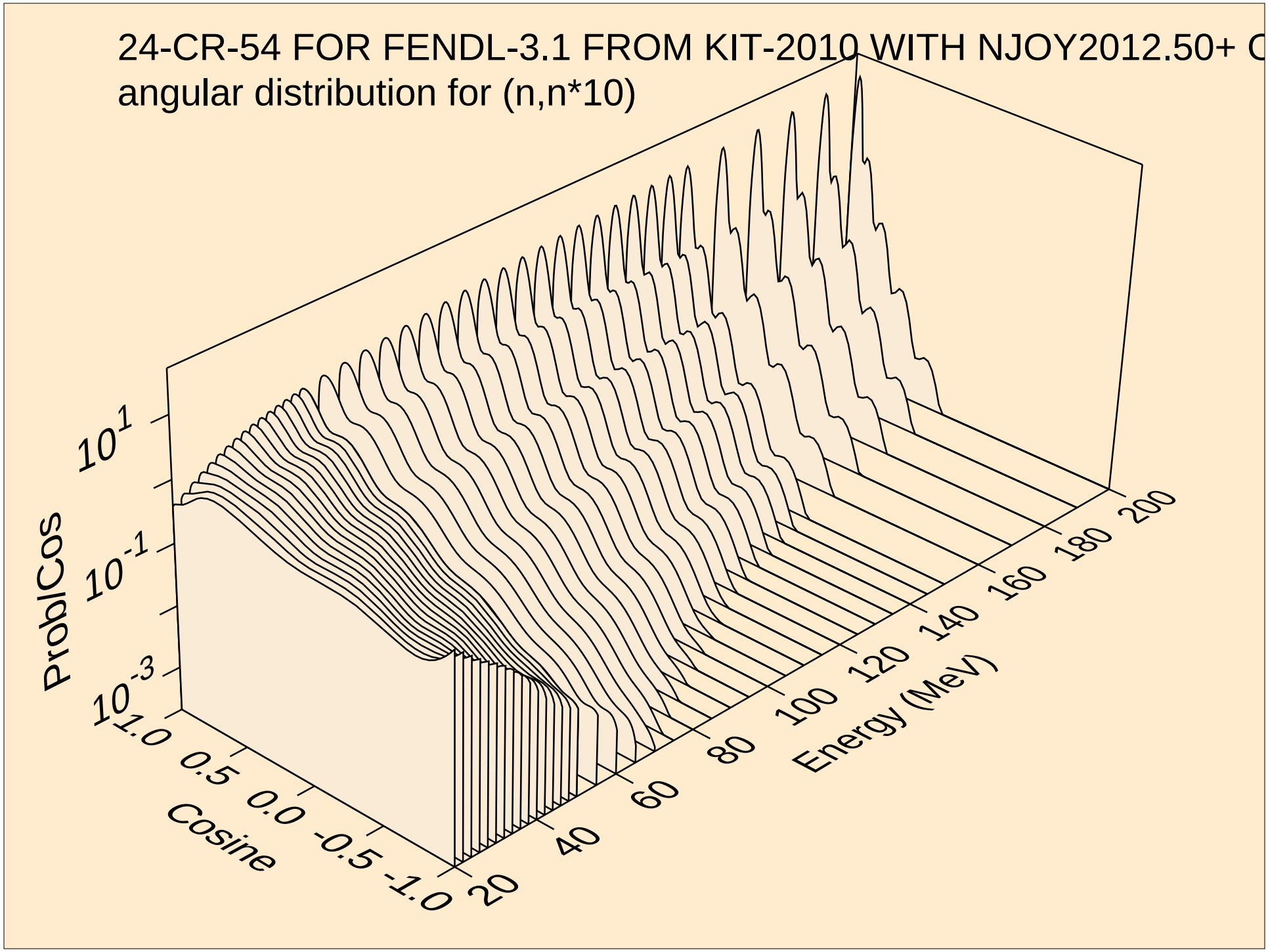

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*8)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

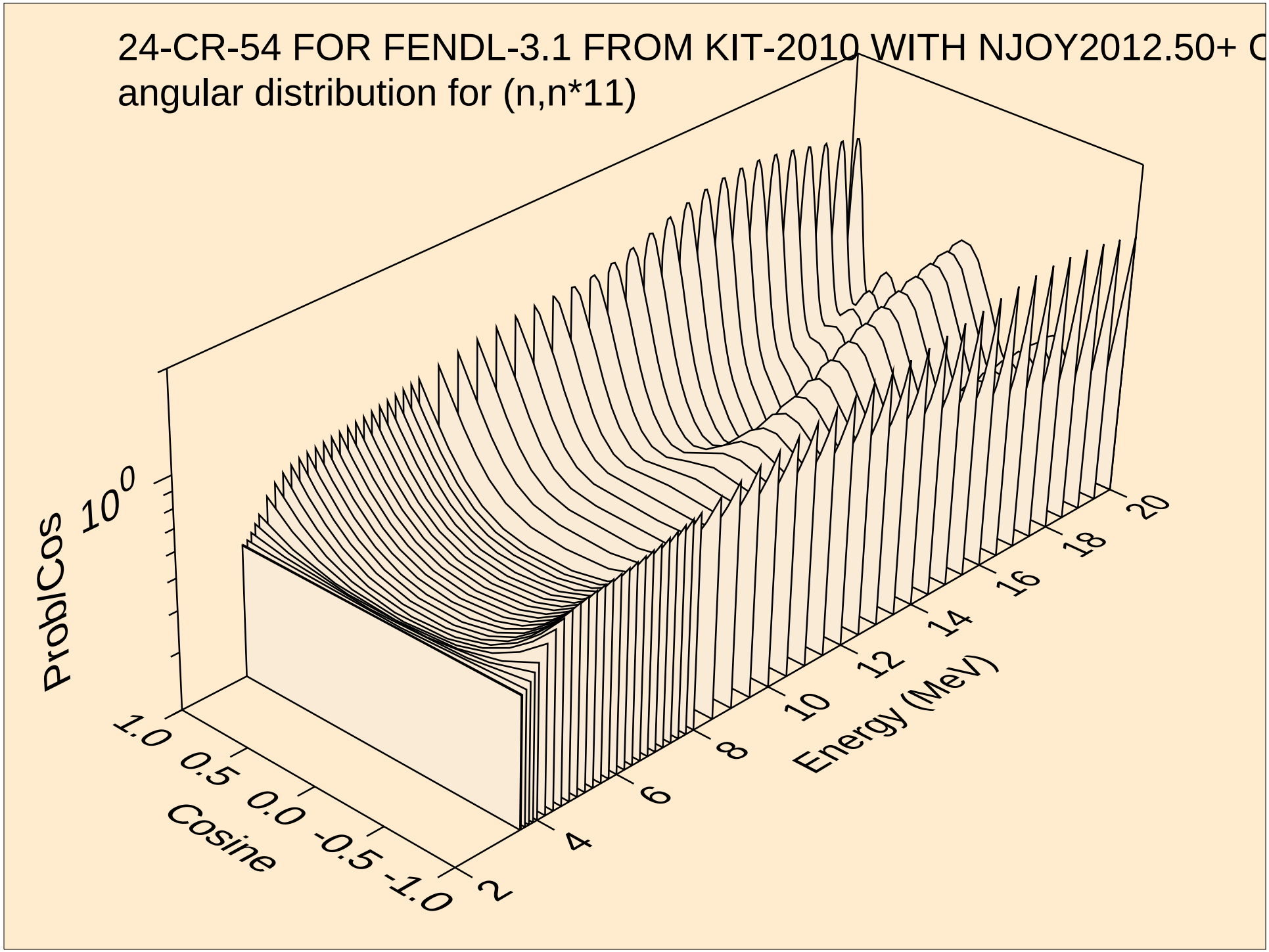

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*8)
Prob\Cos
10^1
10^-1
10^-3
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

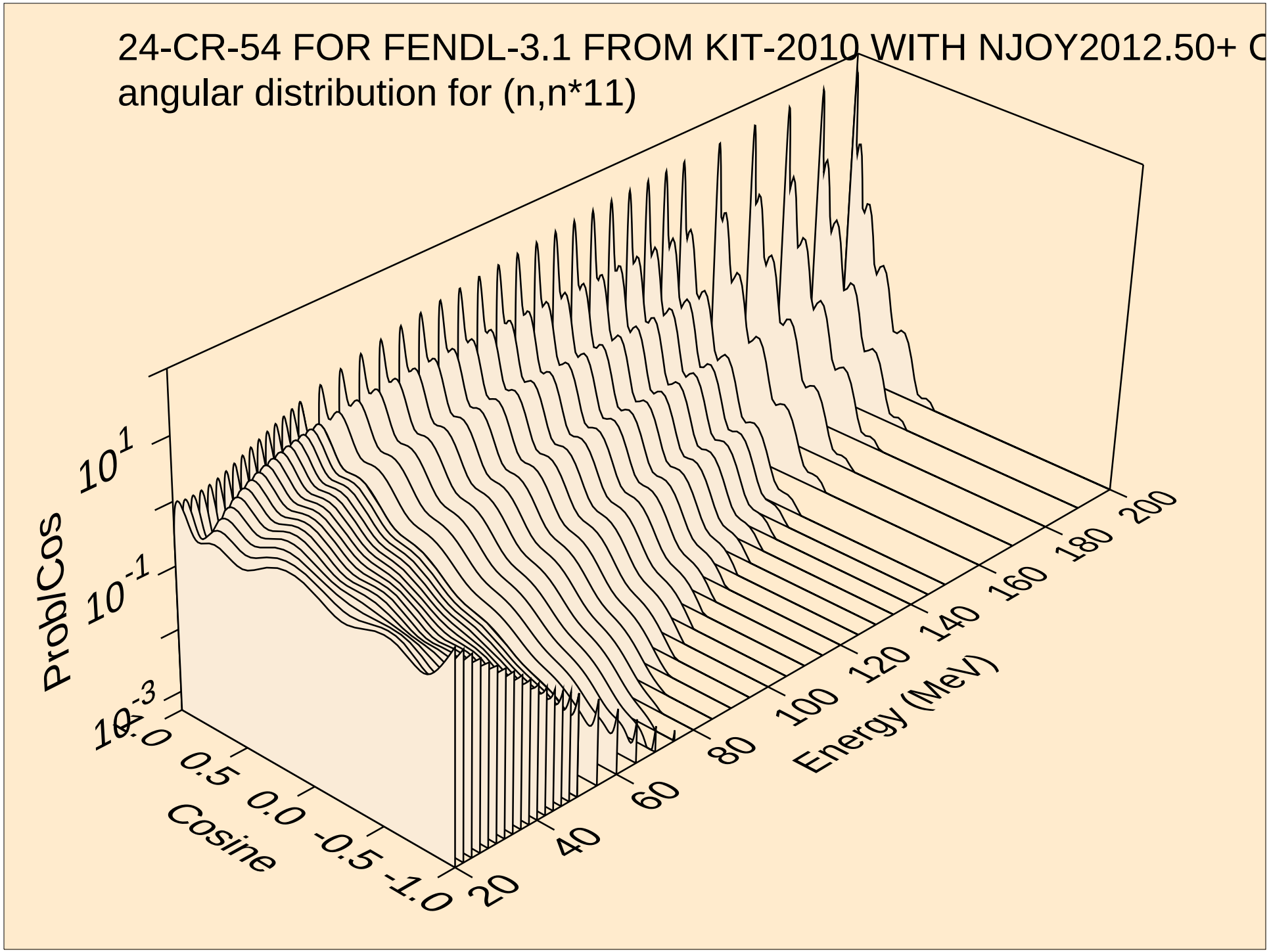

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*9)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

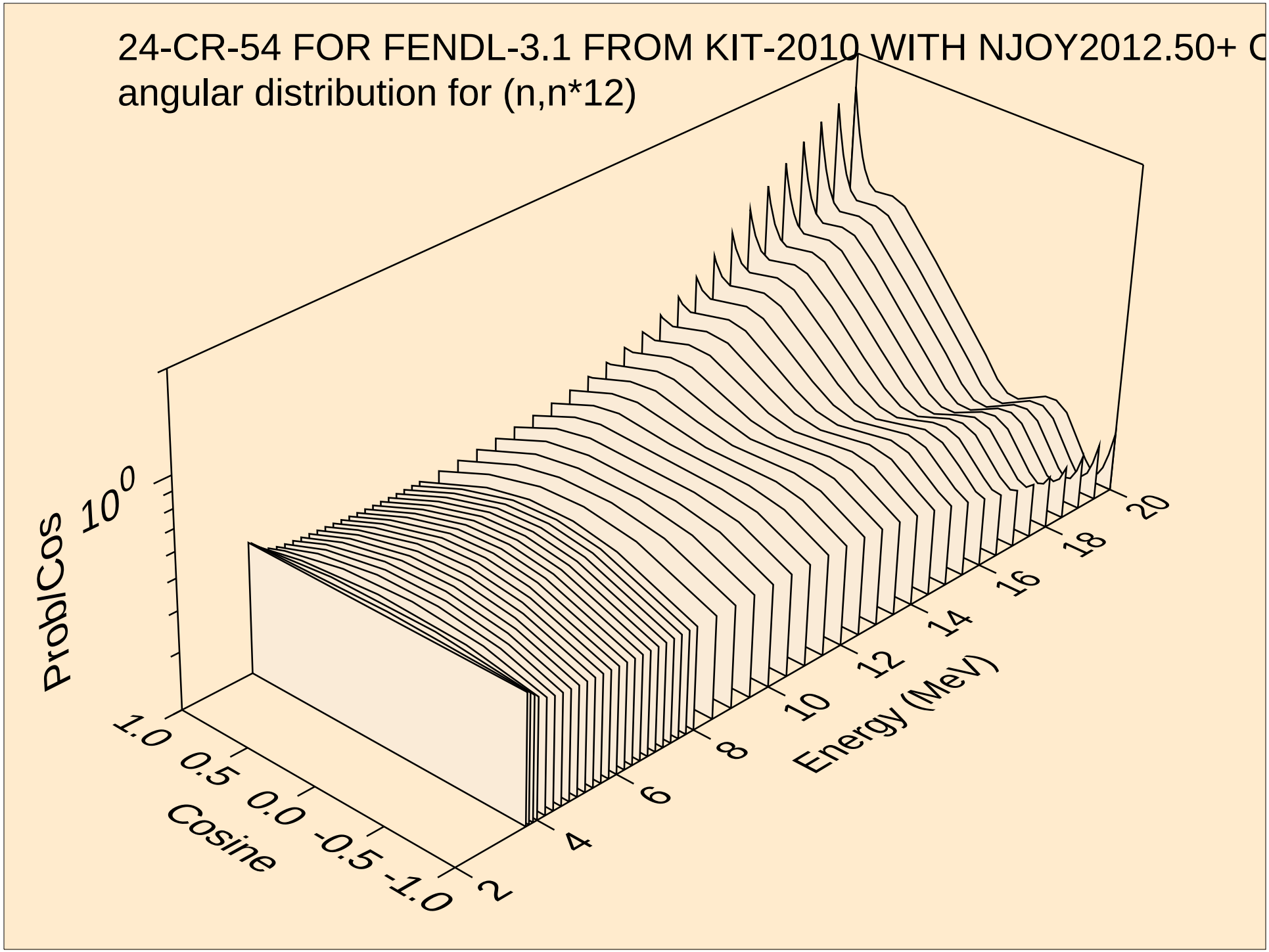

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*9)
ProblCos
10^{1}
10^{-1}
10^{-3}
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

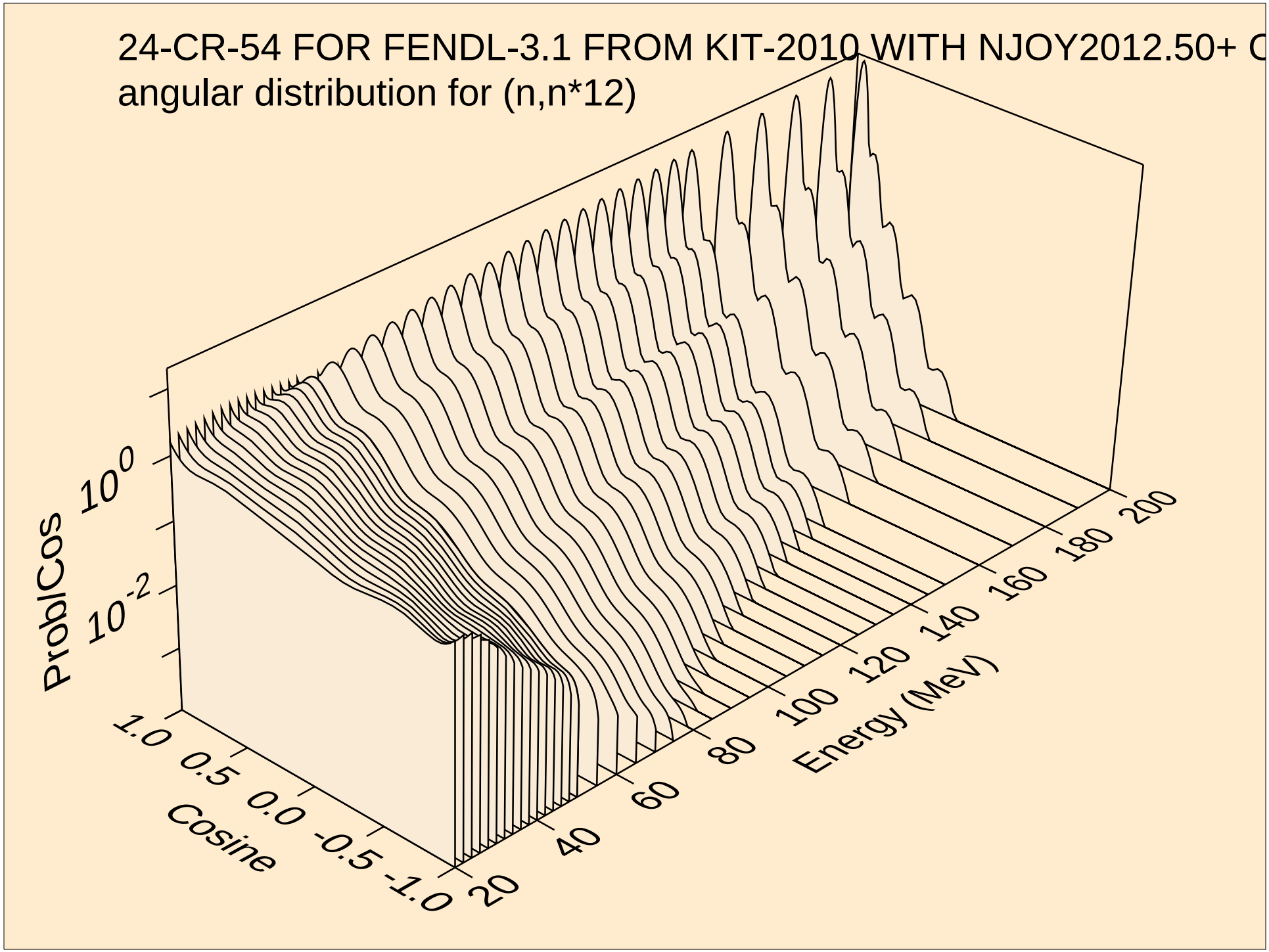

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*10)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

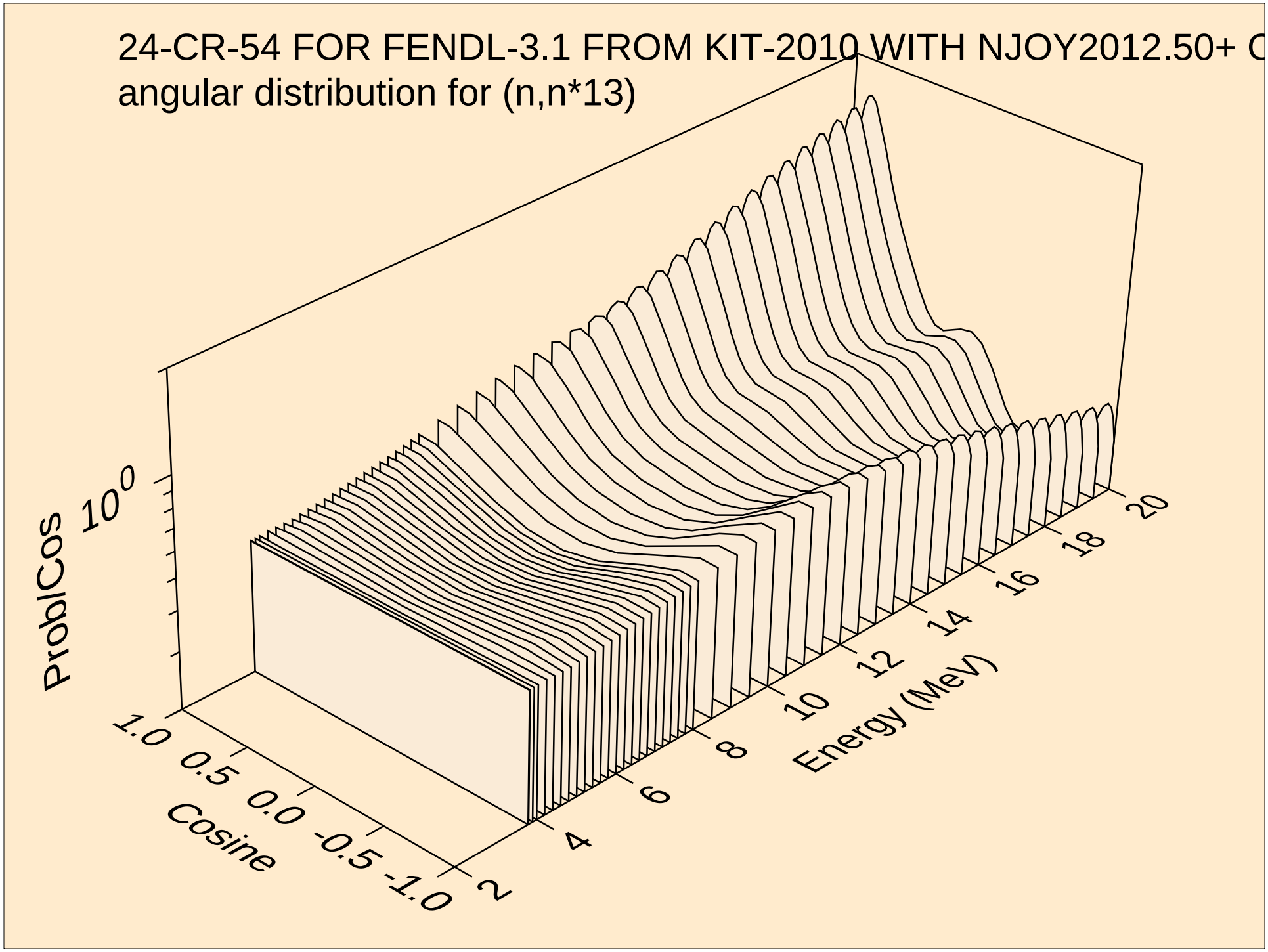

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*10)
ProblCos
10^1
10^-1
10^-3
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

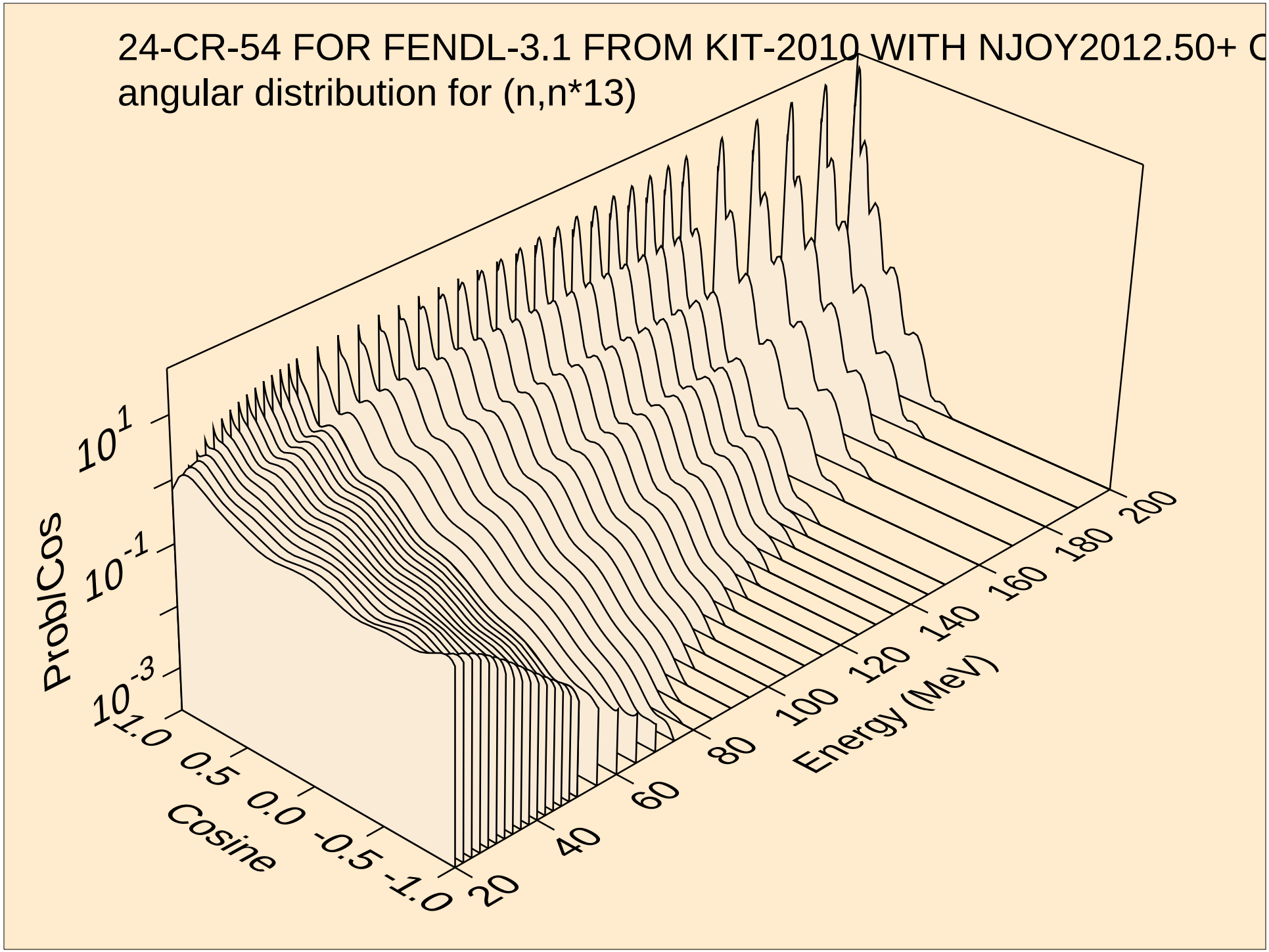

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*11)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

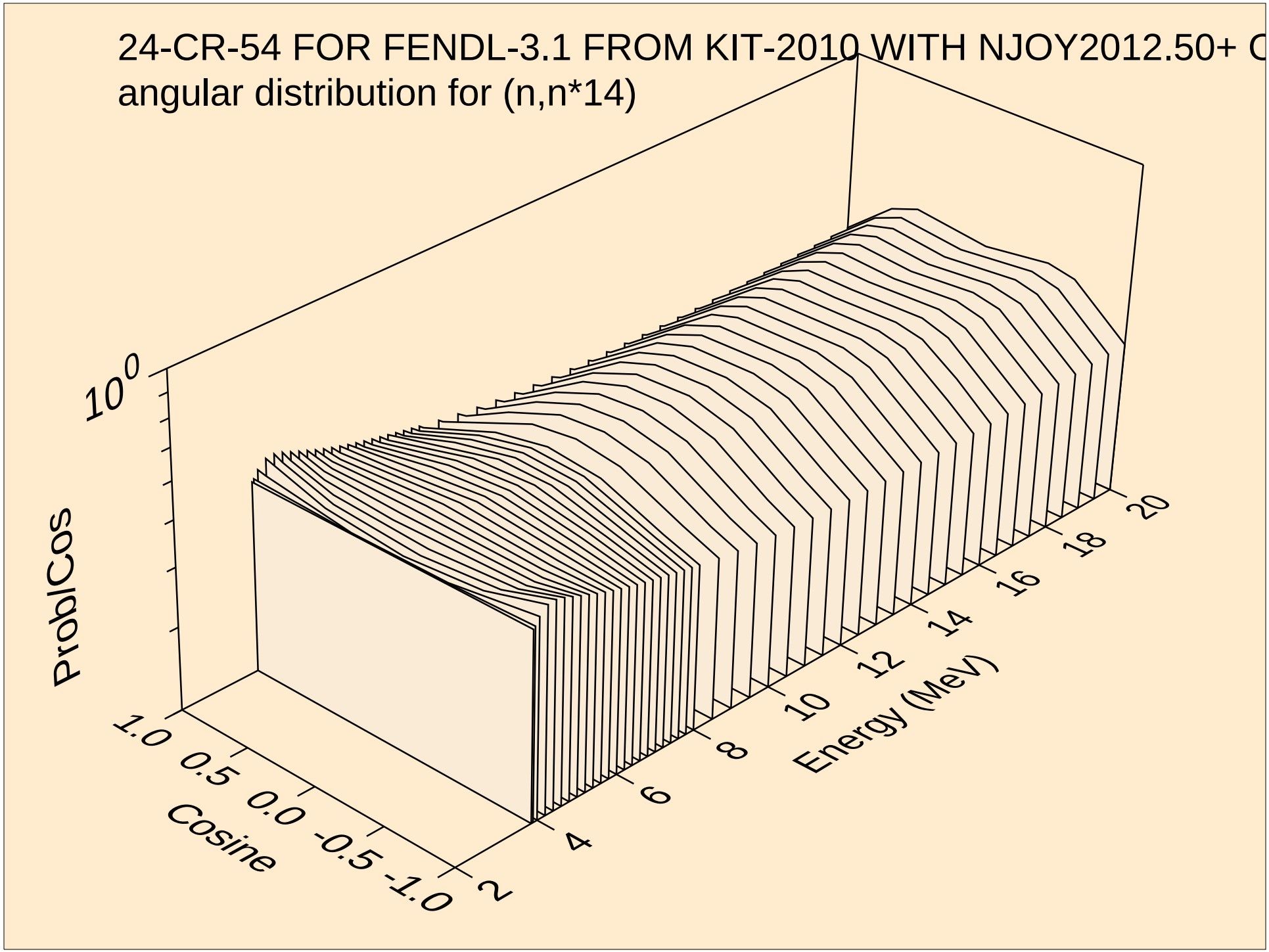

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*11)
Prob\Cos
10^1
10^-1
10^-3
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

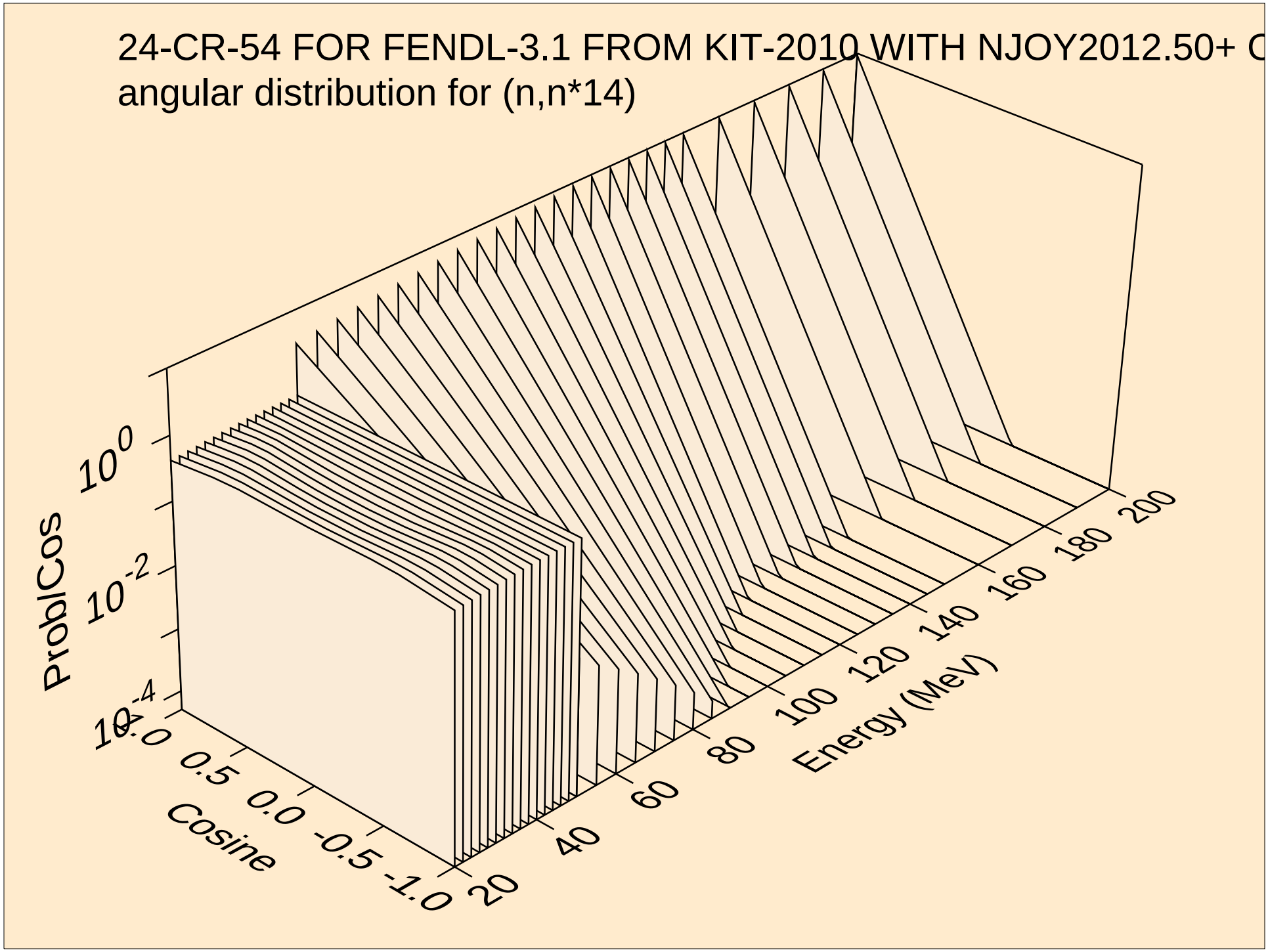

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*12)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

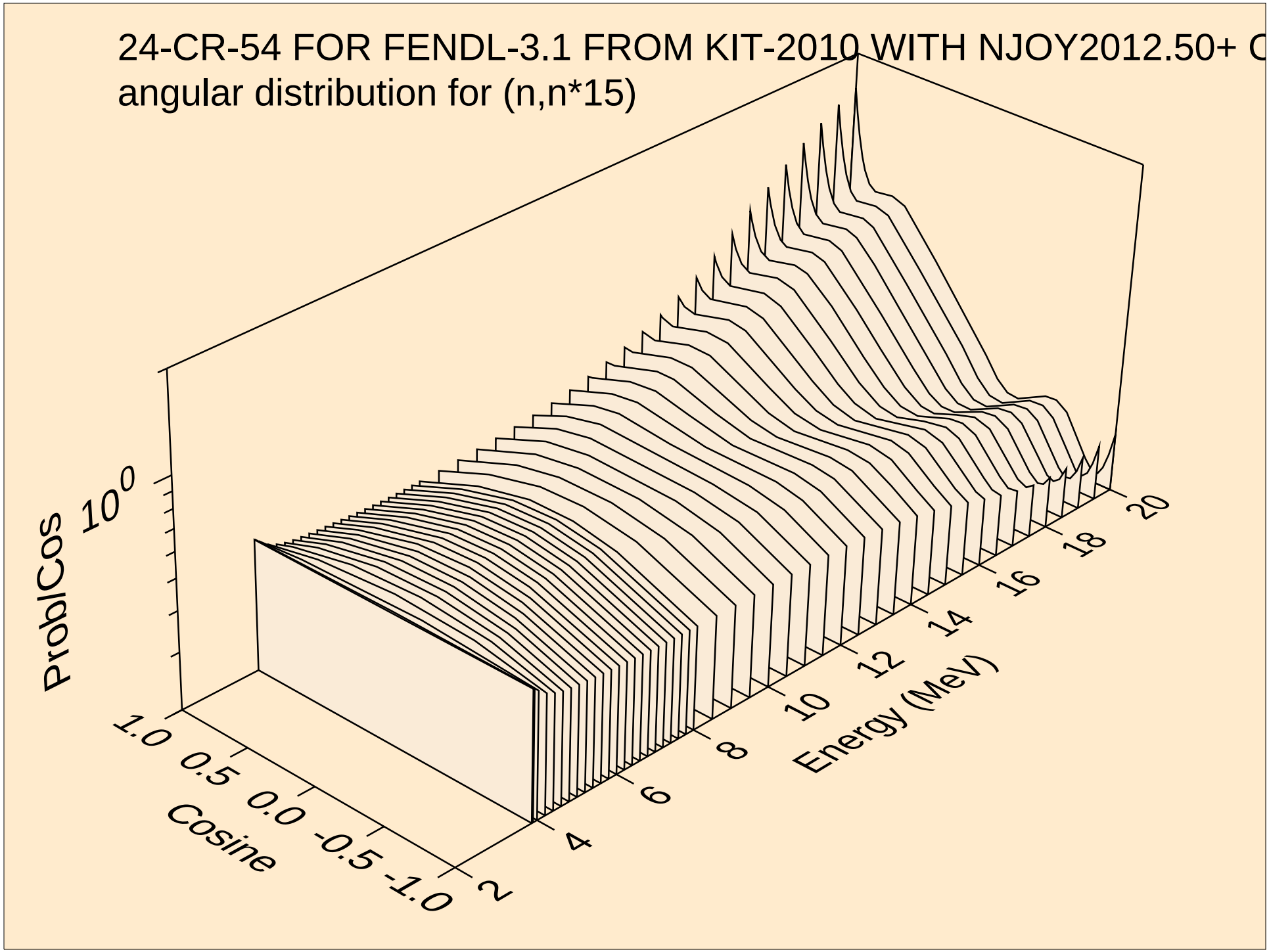

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*12)
ProbICos
10^0
10^-2
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

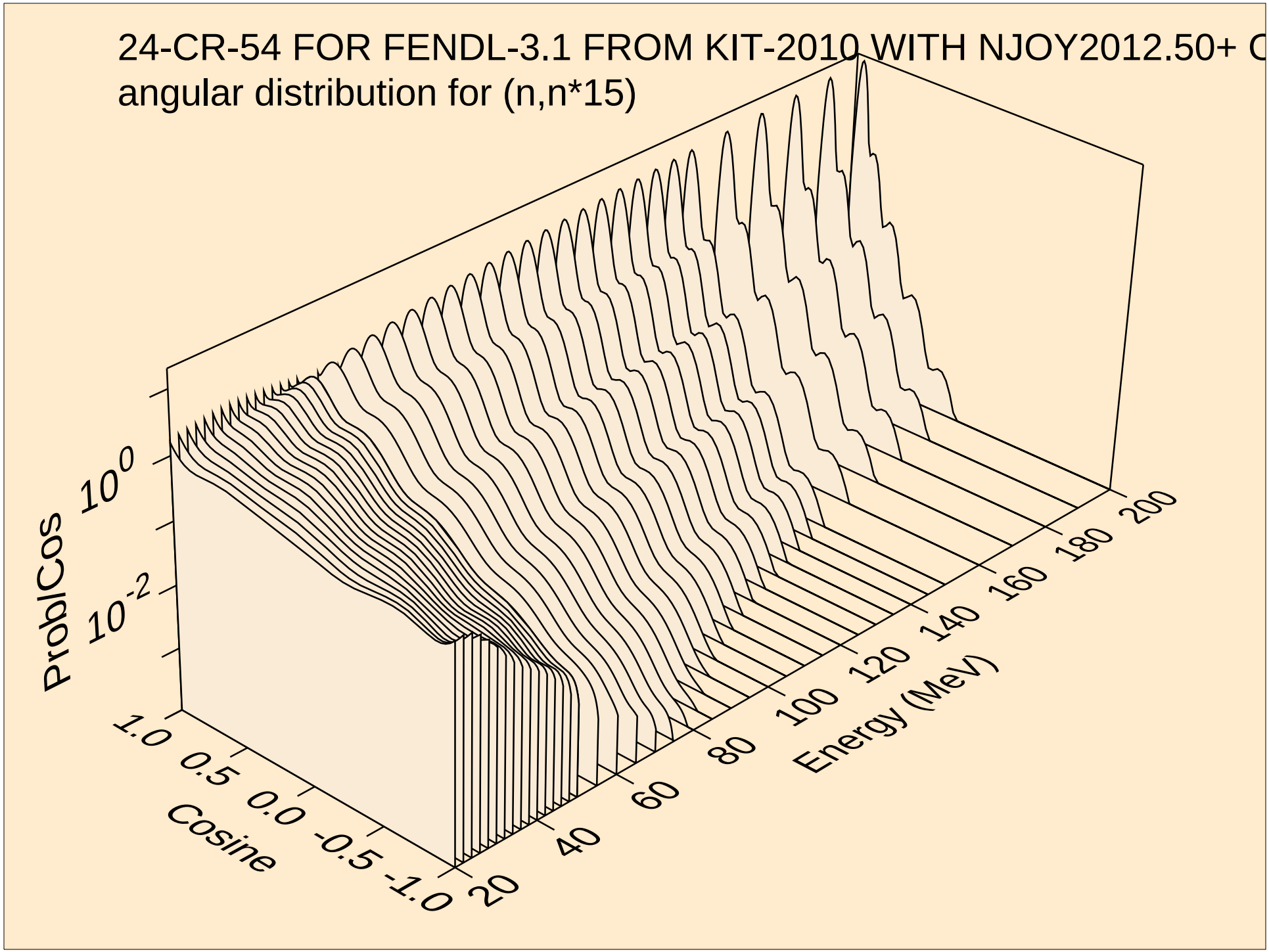

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*13)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

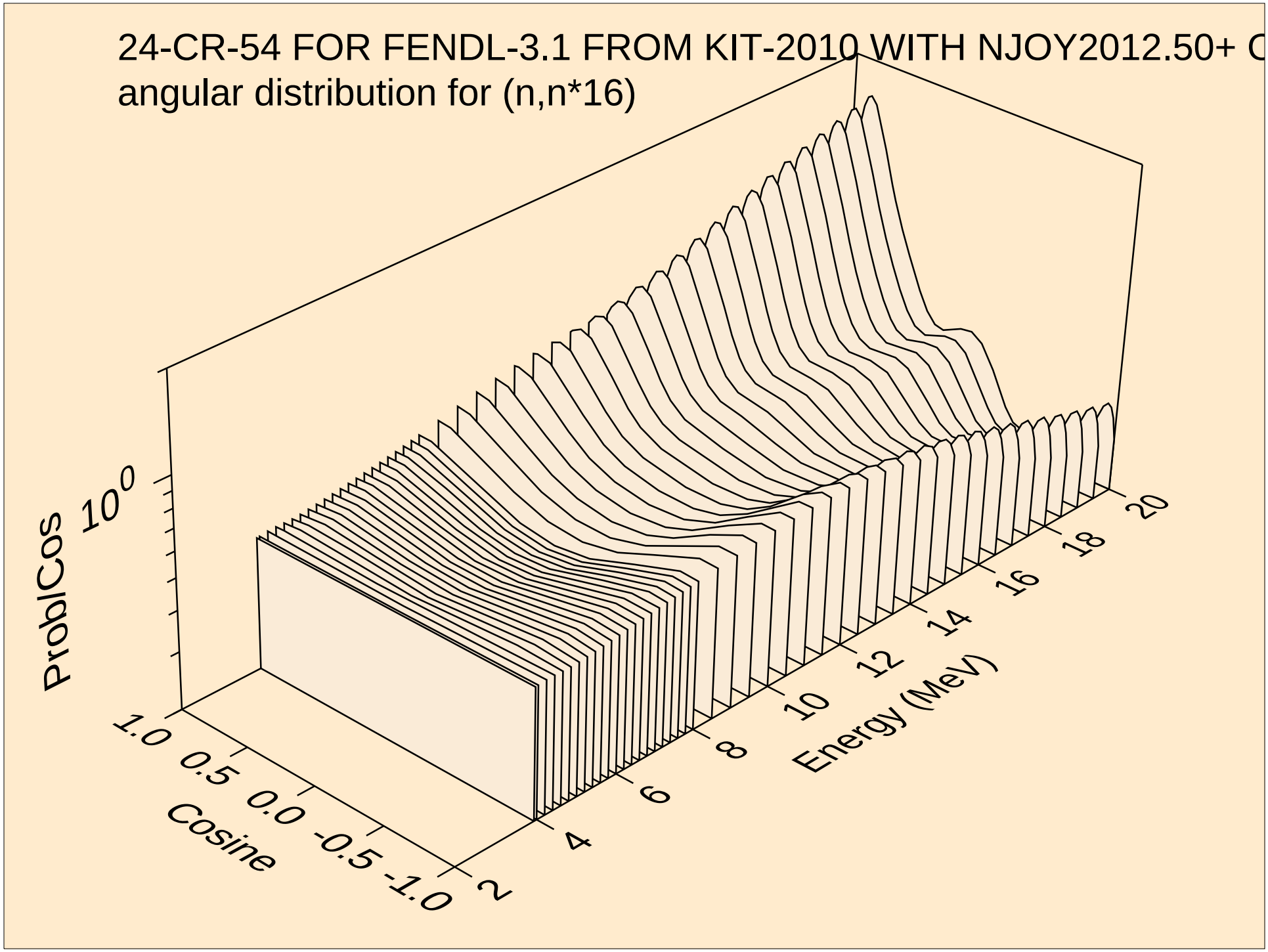

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*13)
ProblCos
10^1
10^-1
10^-3
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

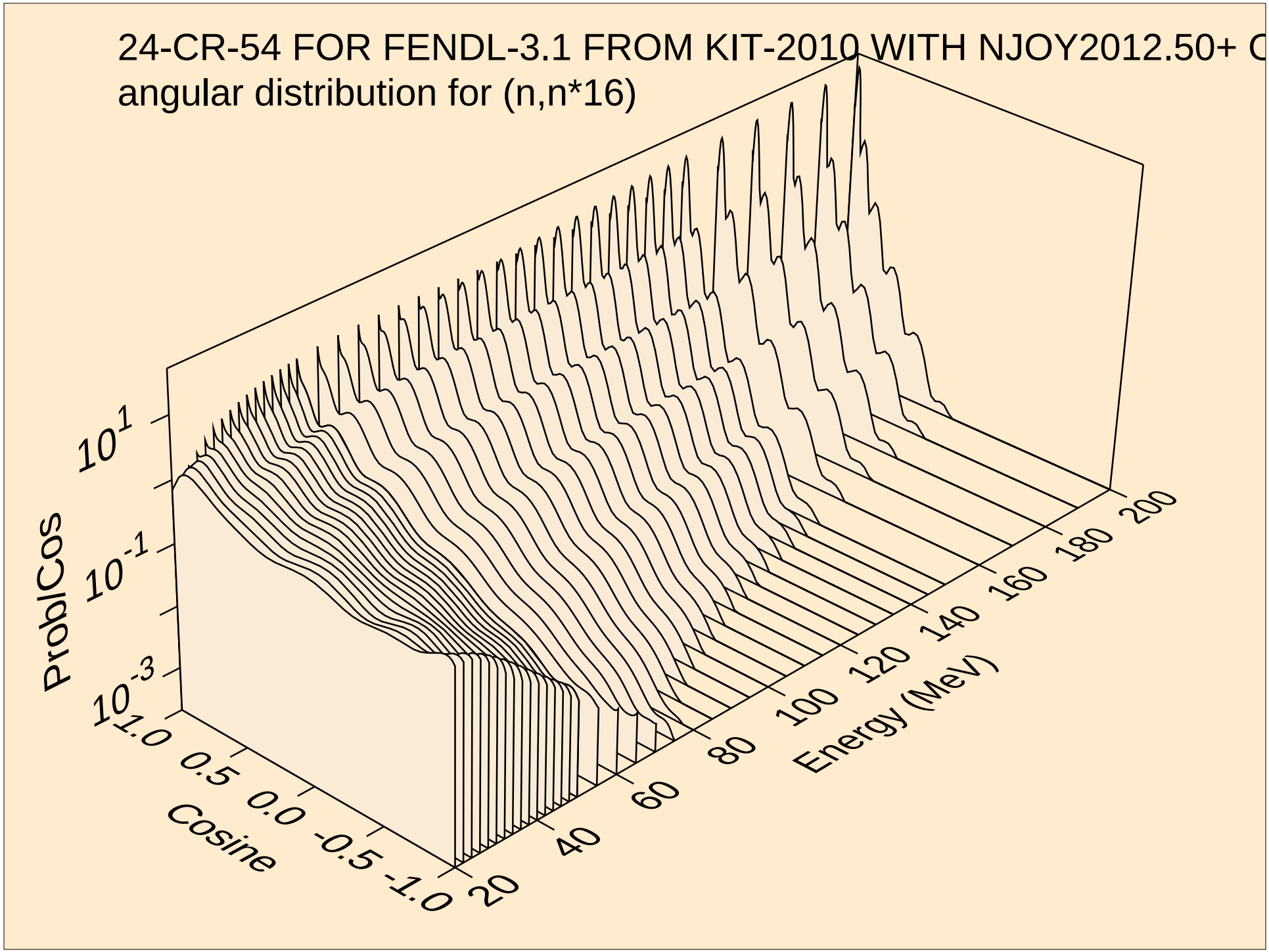

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*14)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

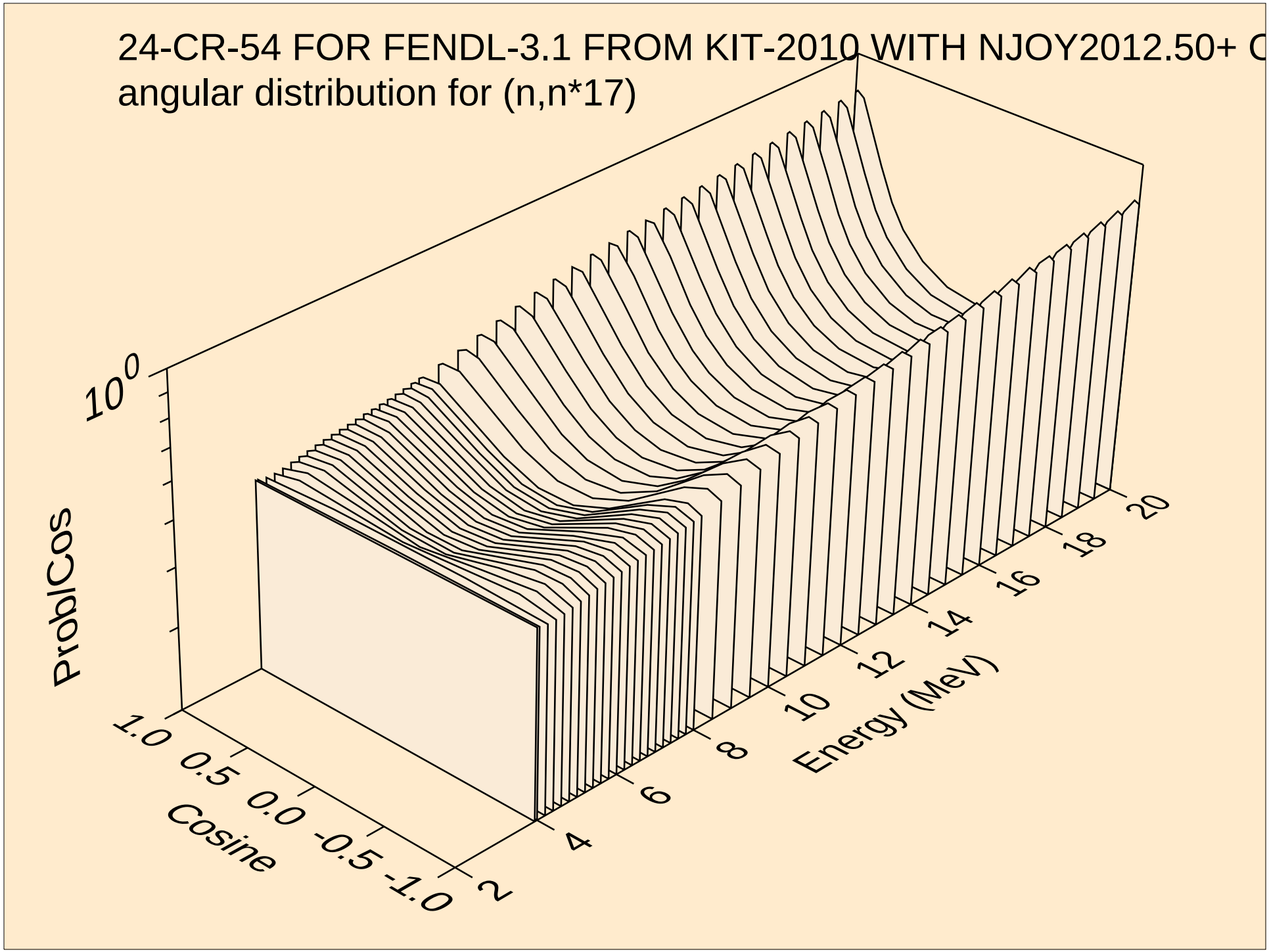

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*14)
ProbCos
10^0
10^-2
10^-4
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

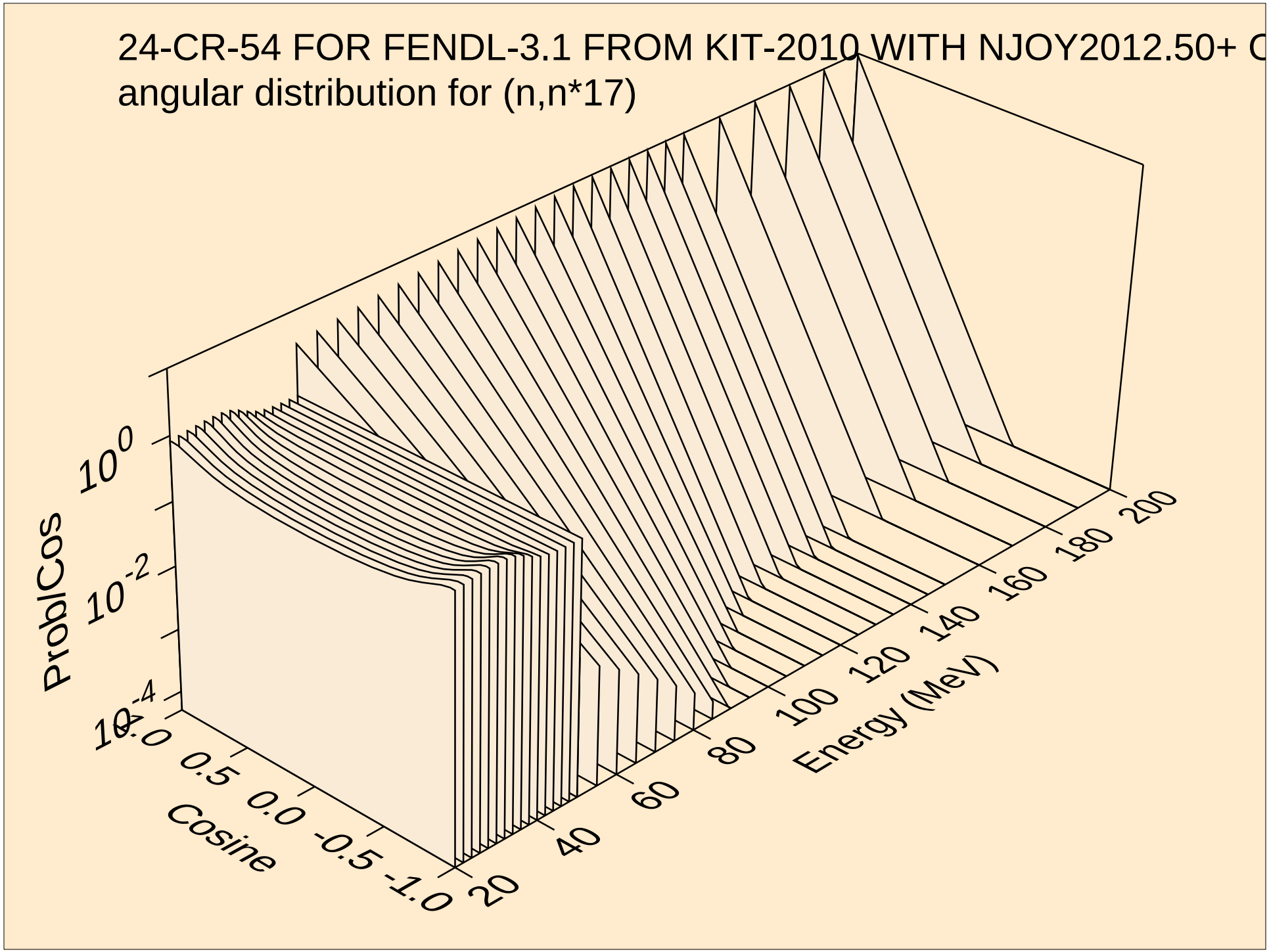

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*15)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

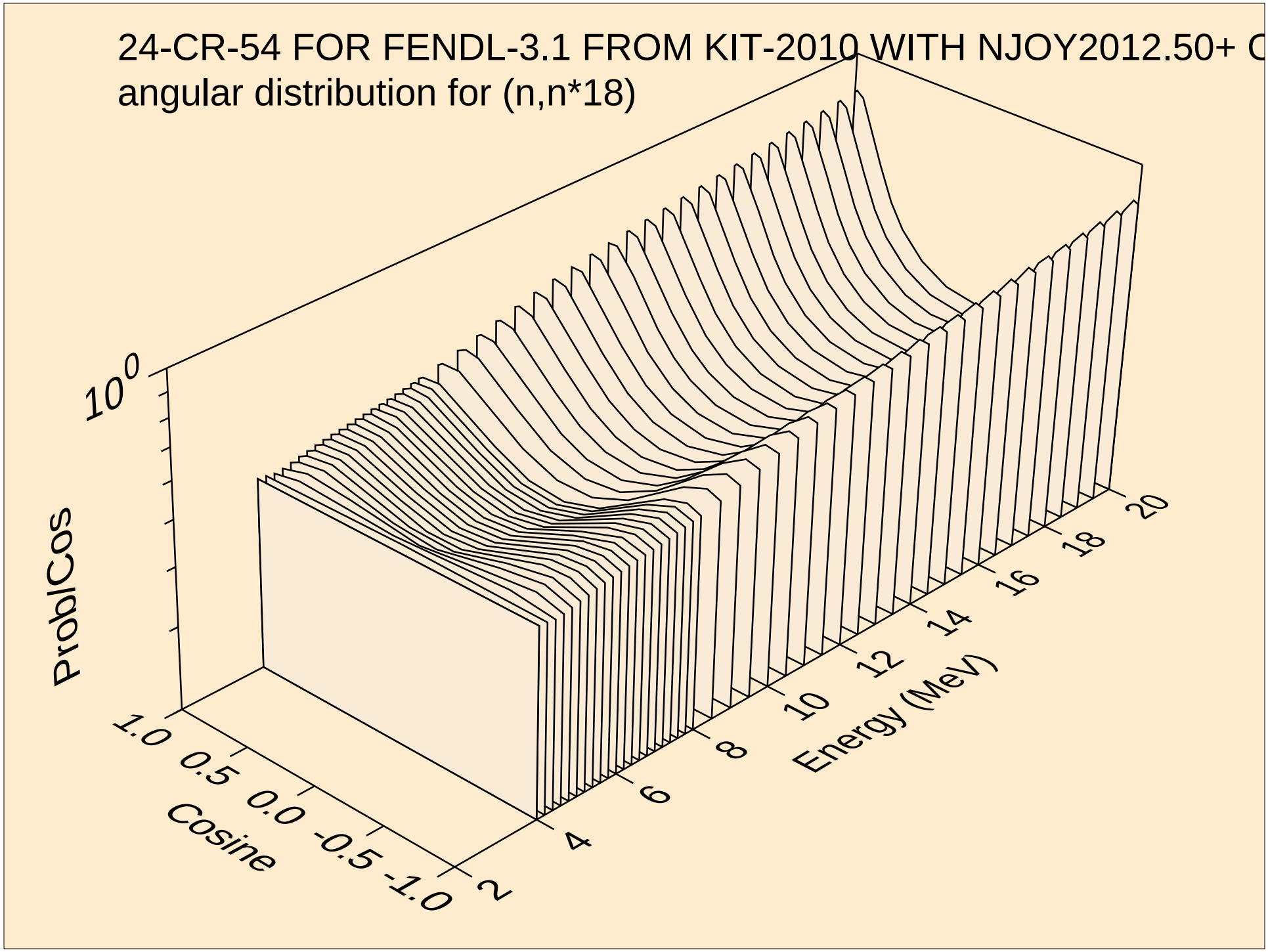

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*15)
ProbICos
10^0
10^-2
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

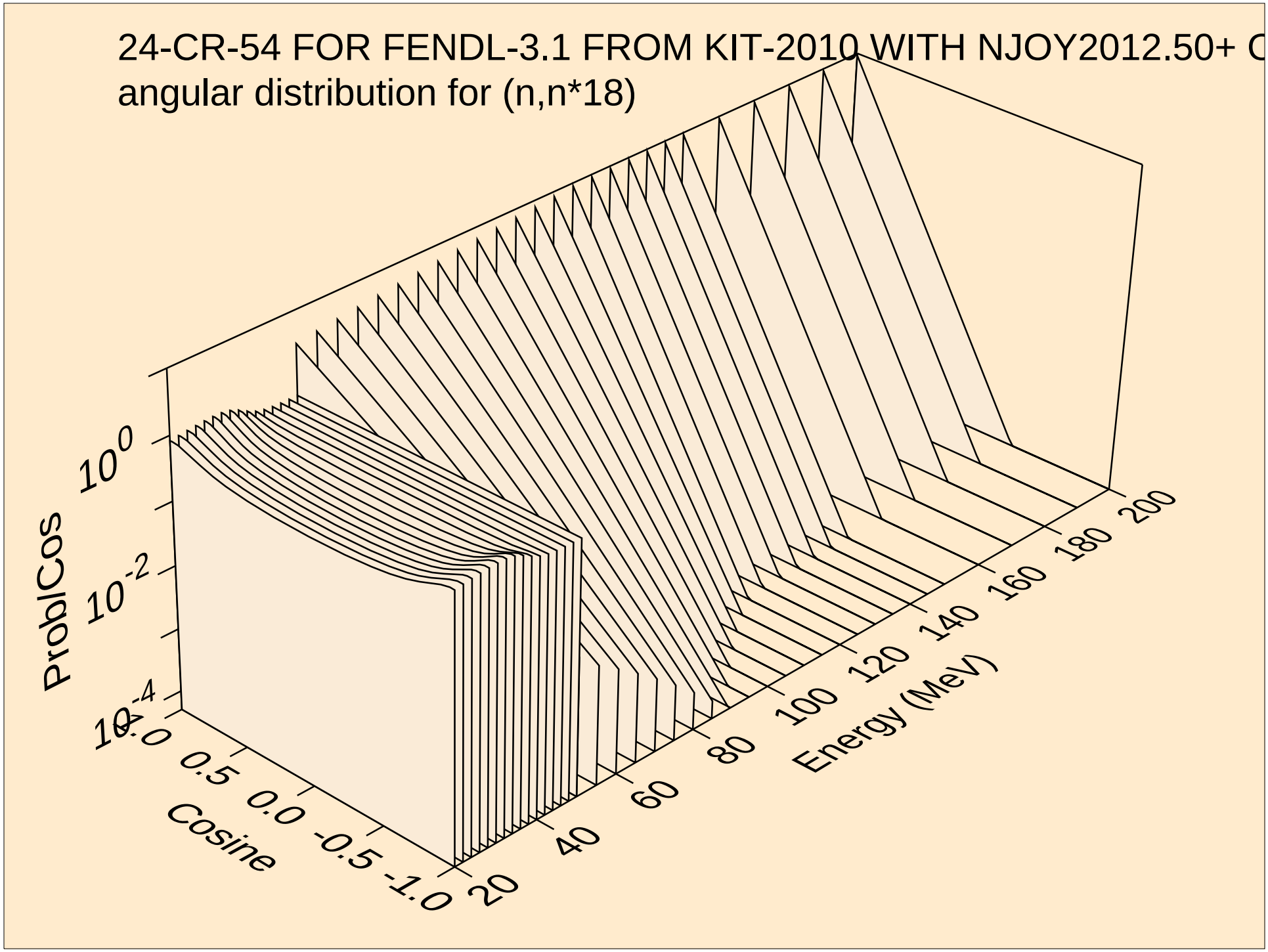

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*16)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

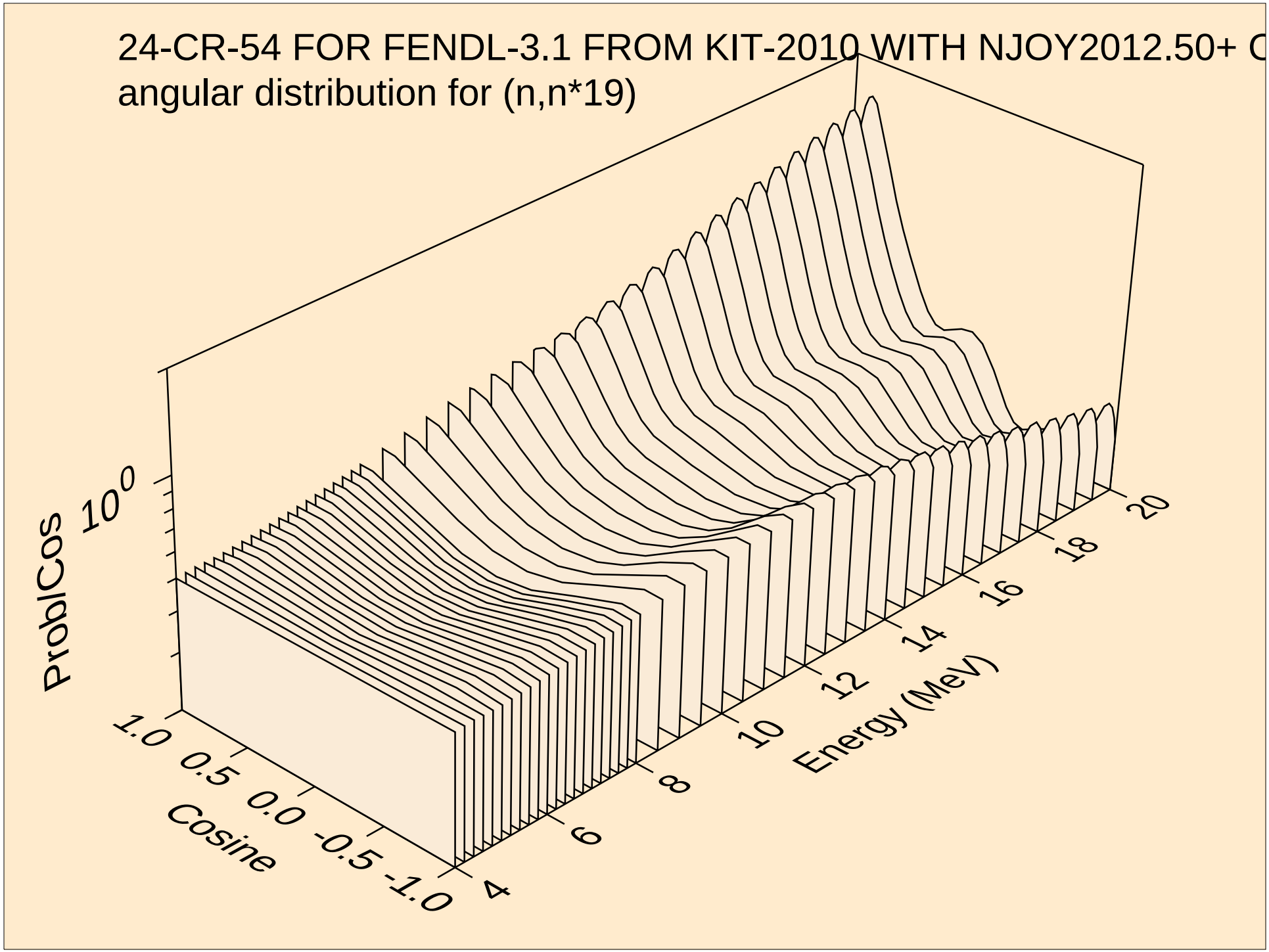

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*16)
ProblCos
10^{1}
10^{-1}
10^{-3}
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
20
40
60
80
100
120
140
160
180
200

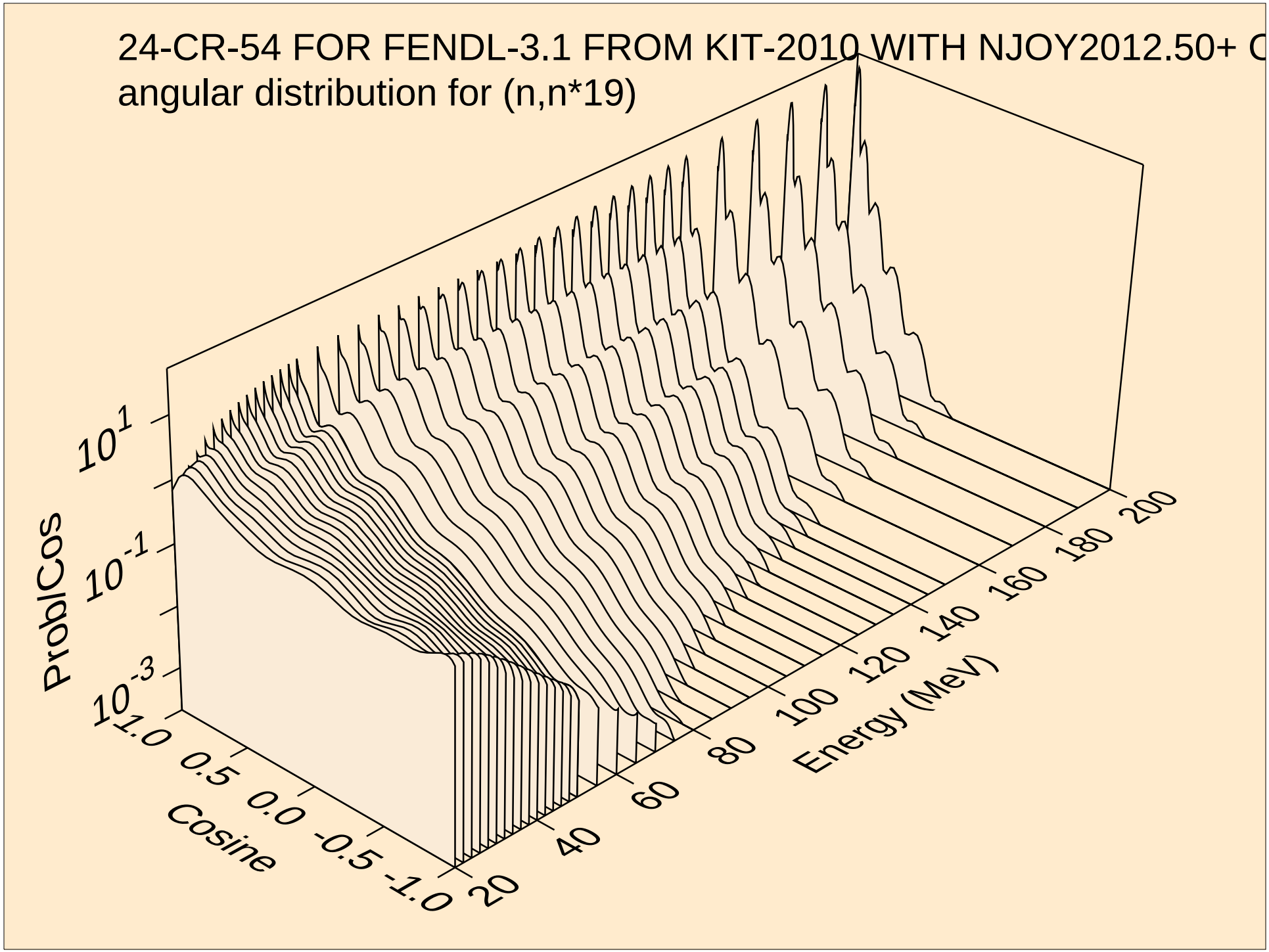

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*17)
ProbICos
10^0
Cosine
1.0
0.5
0.0
-0.5
-1.0
Energy (MeV)
2
4
6
8
10
12
14
16
18
20

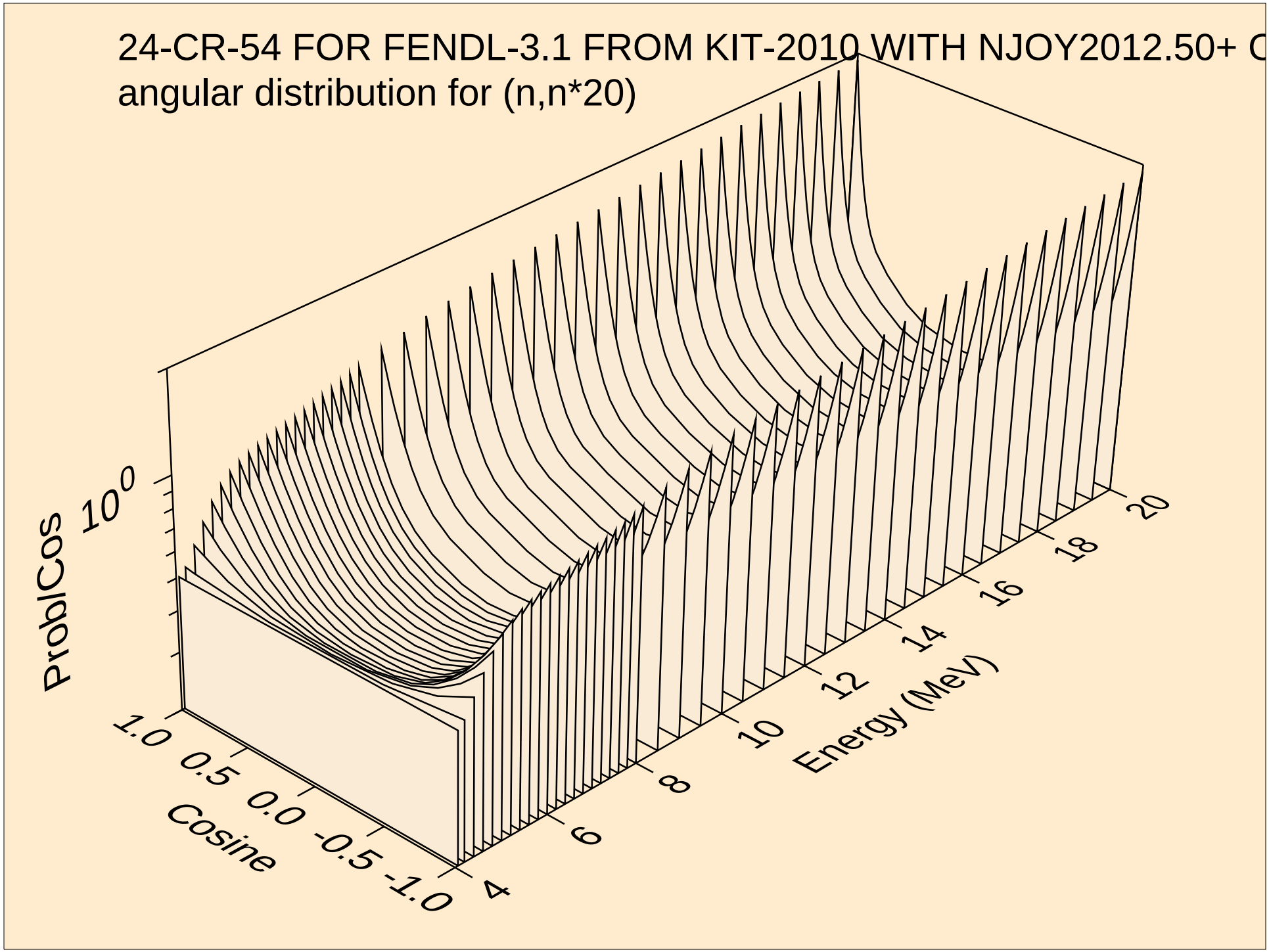

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*17)
ProbICos
10^0
10^-2
10^-4
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

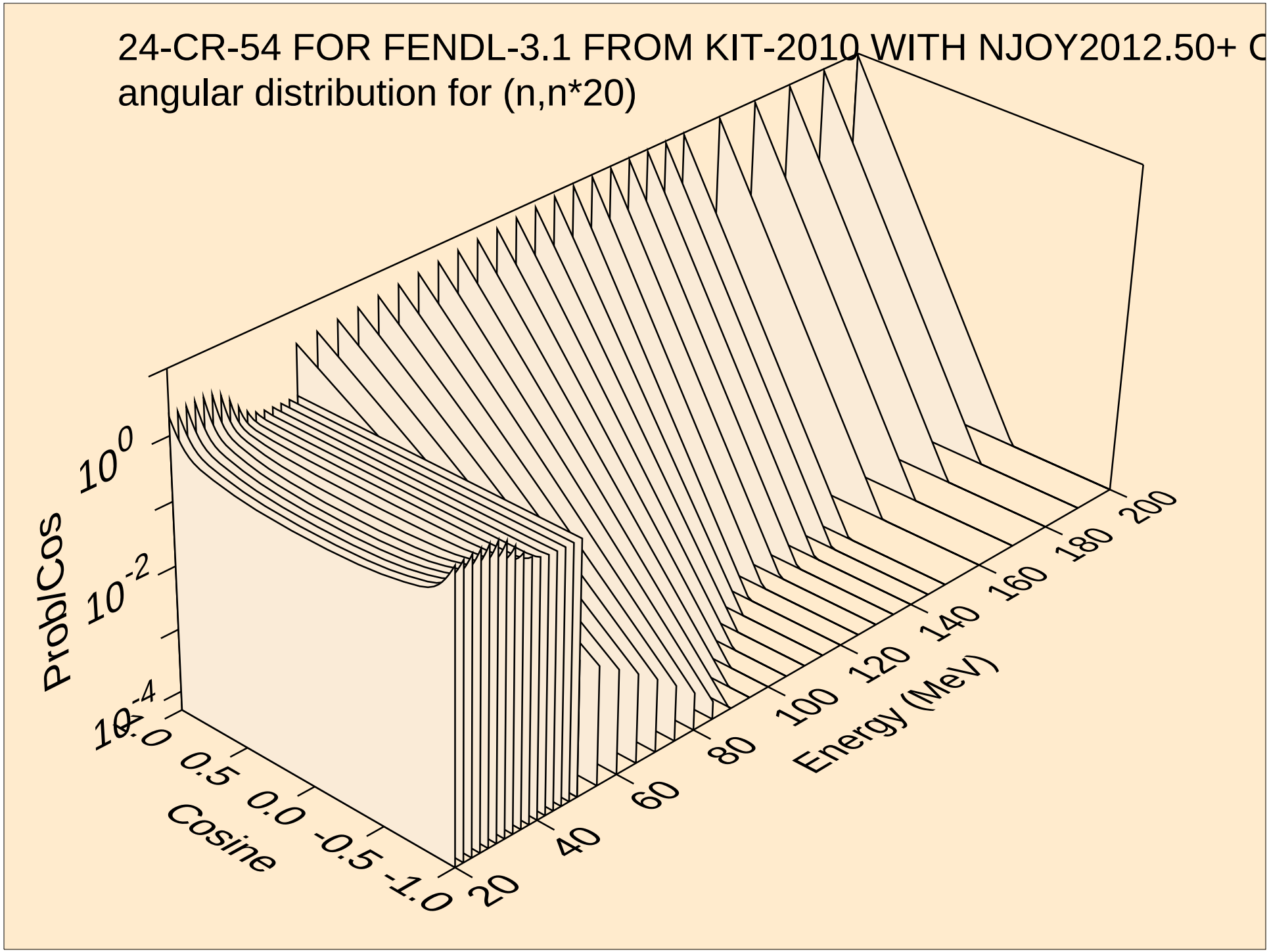

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*18)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

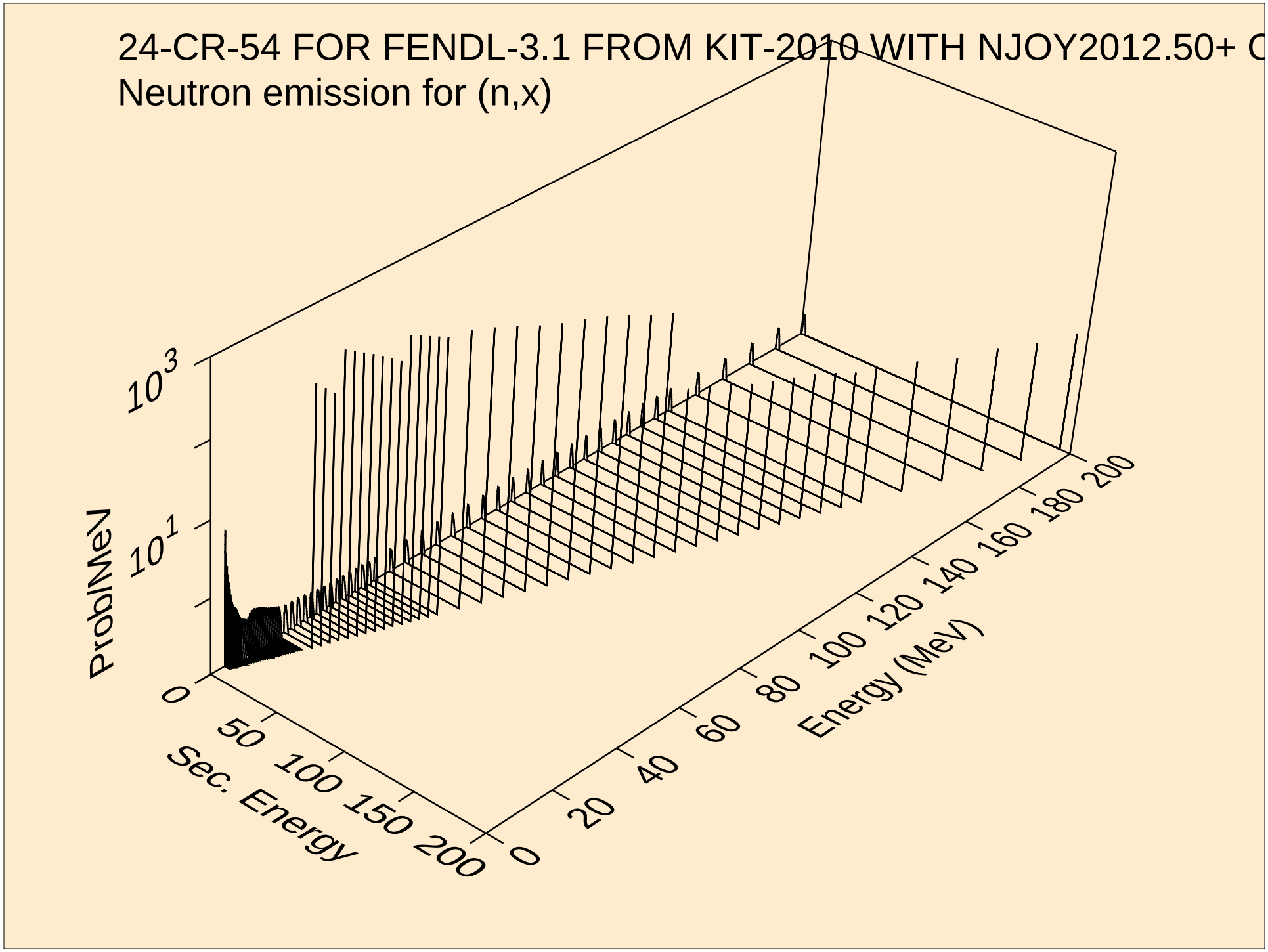

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*18)
ProbICos
10^0
10^-2
10^-4
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

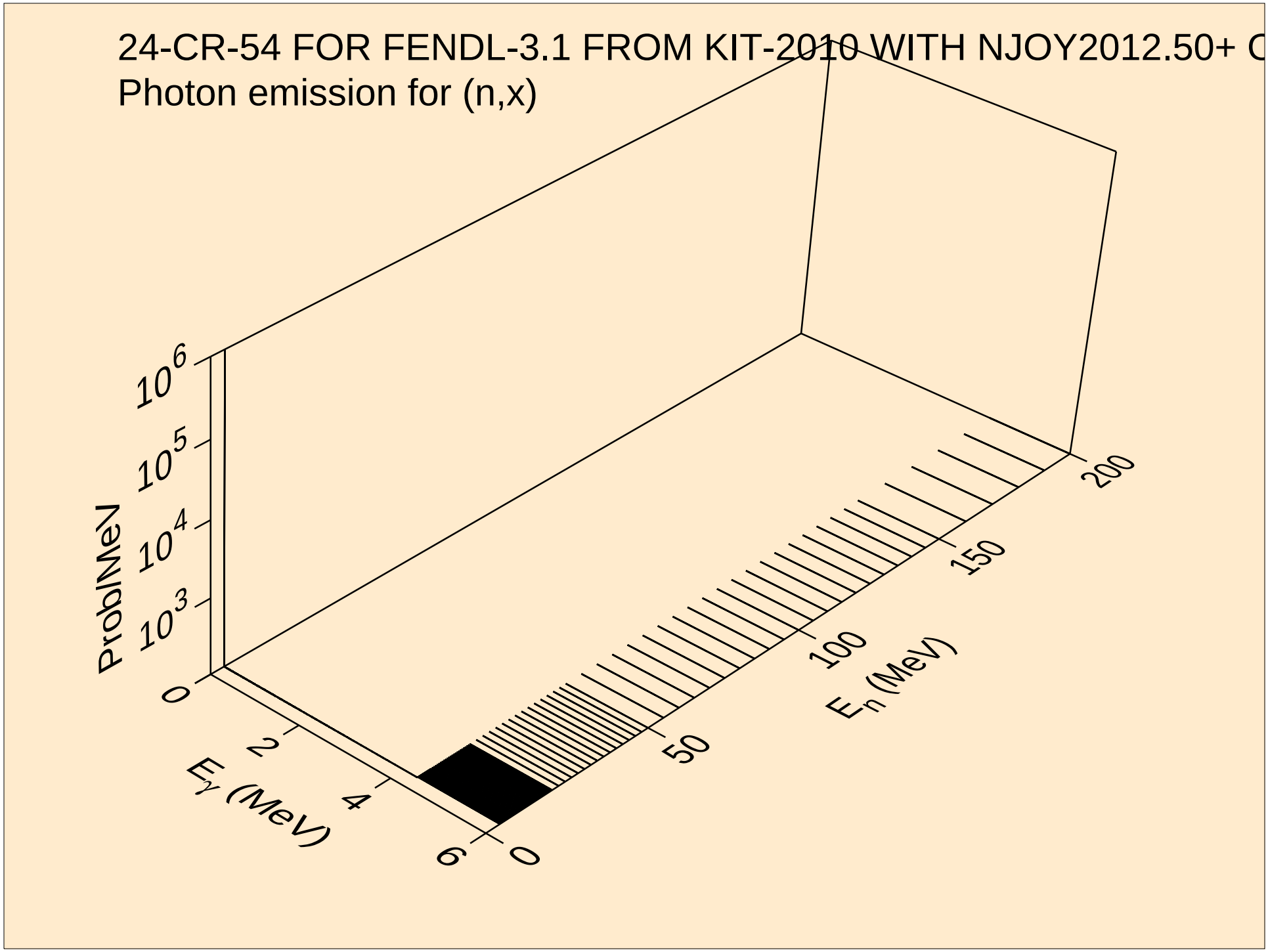

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*19)
ProbICos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

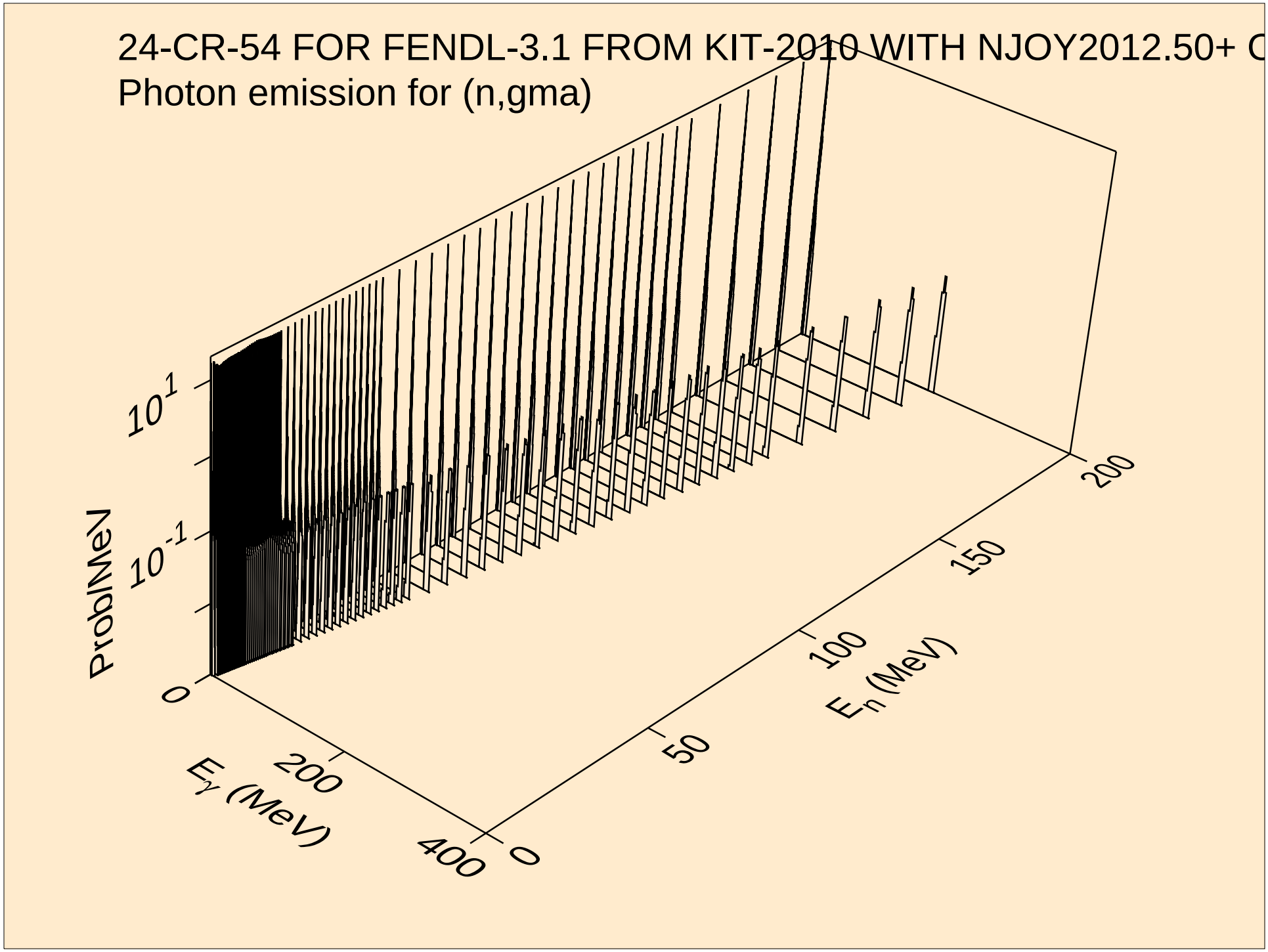

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*19)
ProblCos
10^{1}
10^{-1}
10^{-3}
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

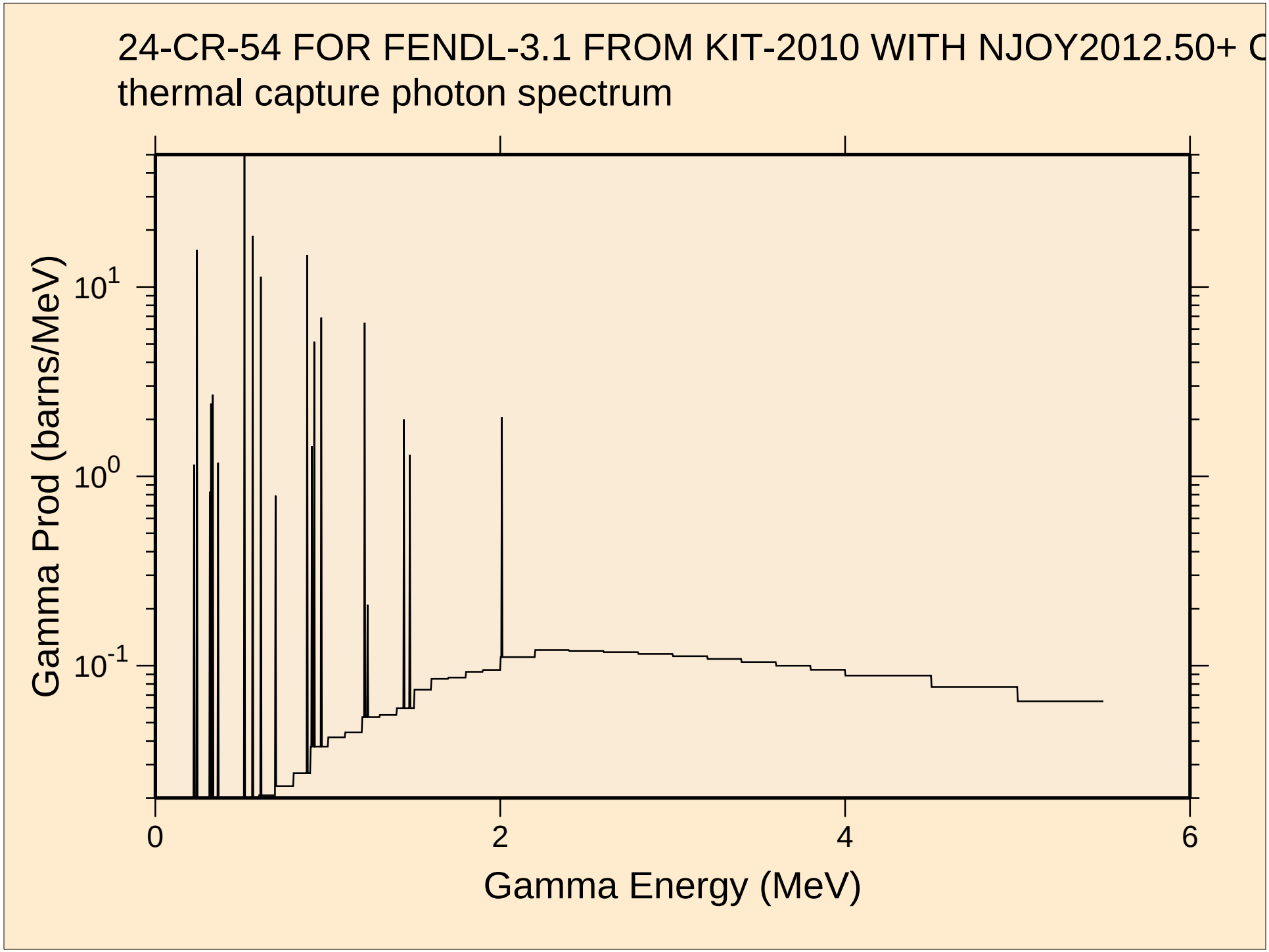

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*20)
ProblCos
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

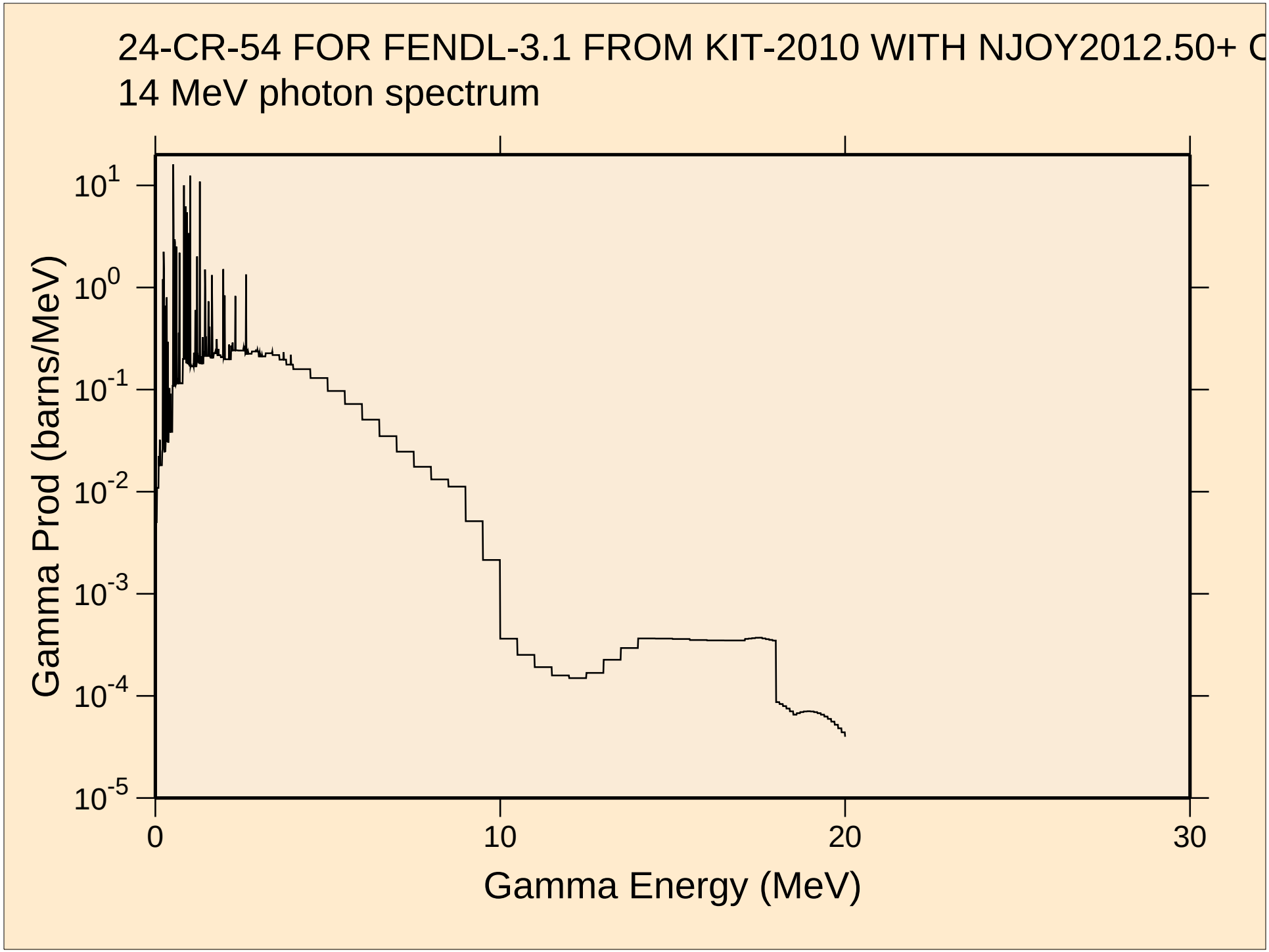

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
angular distribution for (n,n*20)
Prob|Cos
10^0
10^-2
10^-4
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

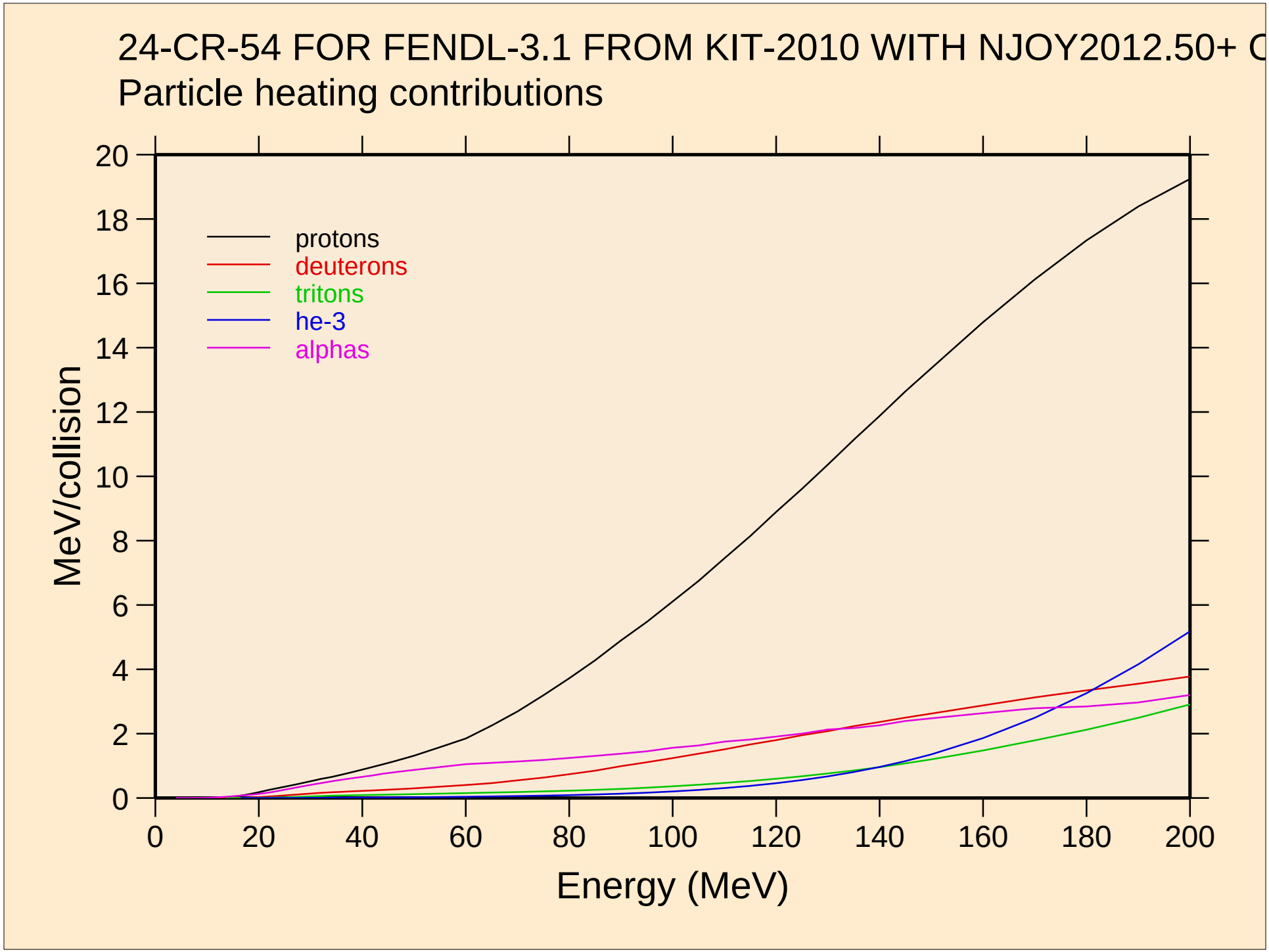

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Neutron emission for (n,x)
Prob/MeV
10^3
10^1
0
50
100
150
200
Sec. Energy
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

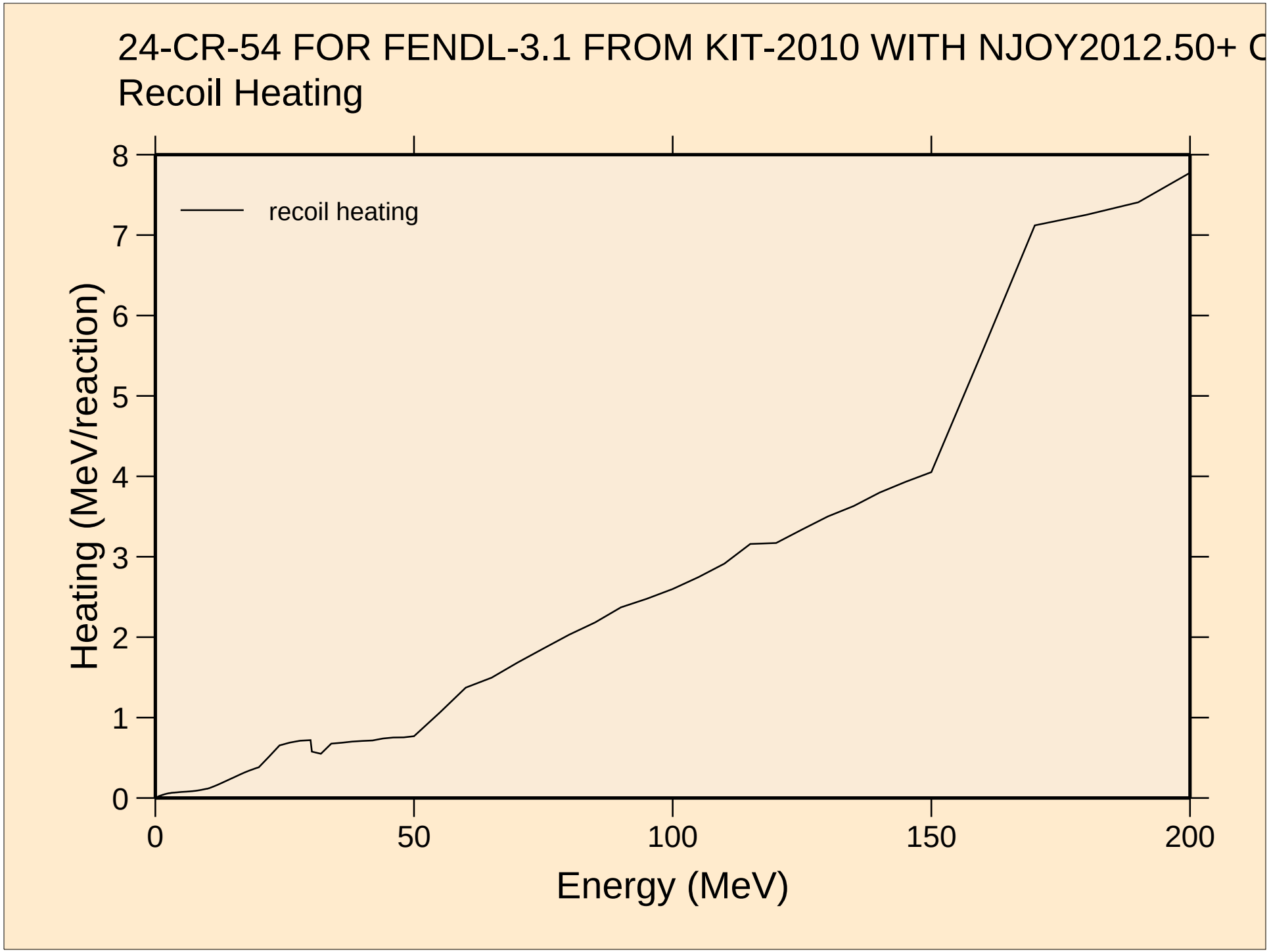

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Photon emission for (n,x)
Prob/MeV
10^6
10^5
10^4
10^3
0
E_γ (MeV)
2
4
6
0
50
100
150
200
E_n (MeV)

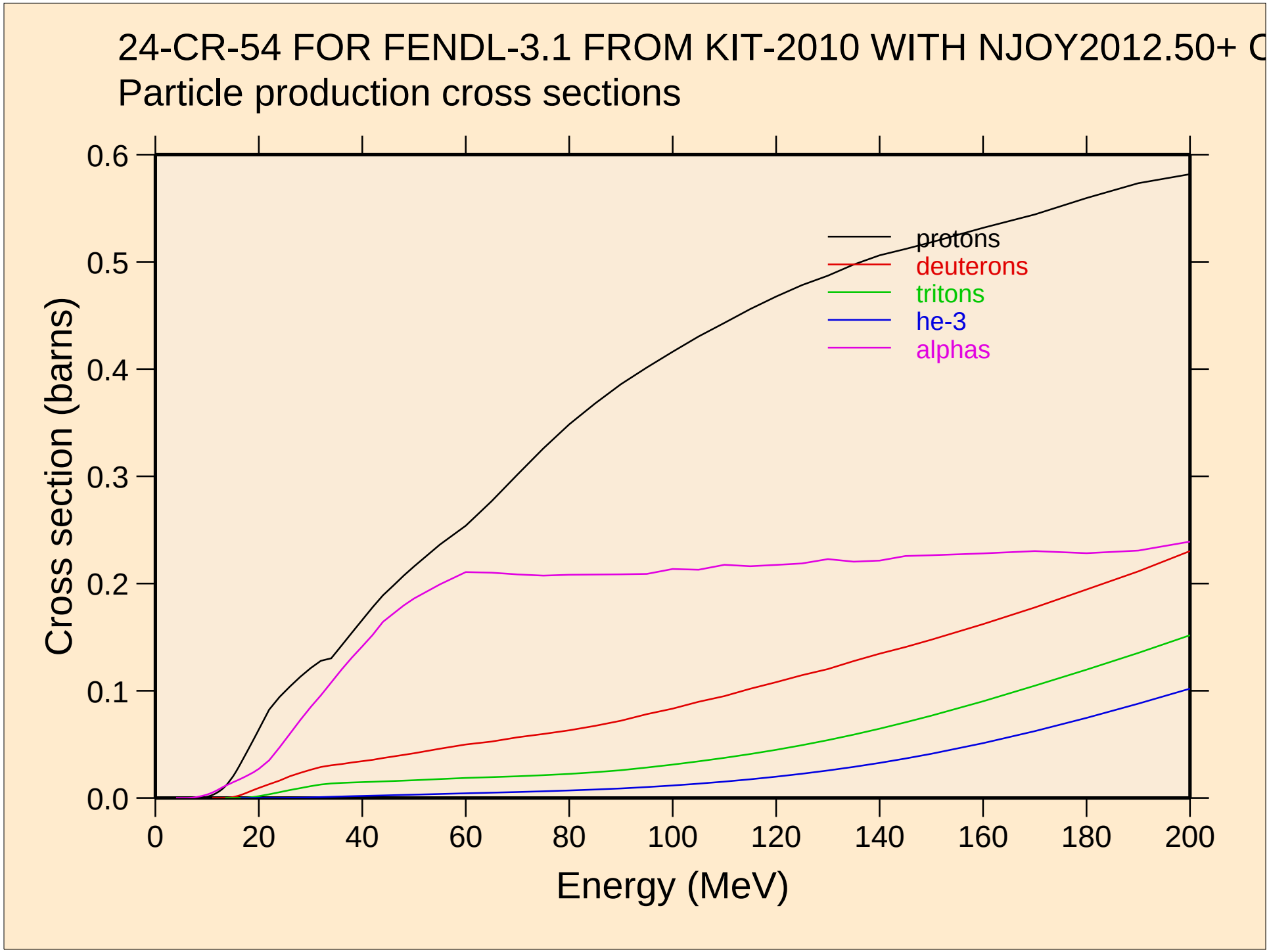

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Photon emission for (n,gma)
Prob/MeV
10^1
10^-1
0
200
400
Eγ (MeV)
0
50
100
150
200
En (MeV)

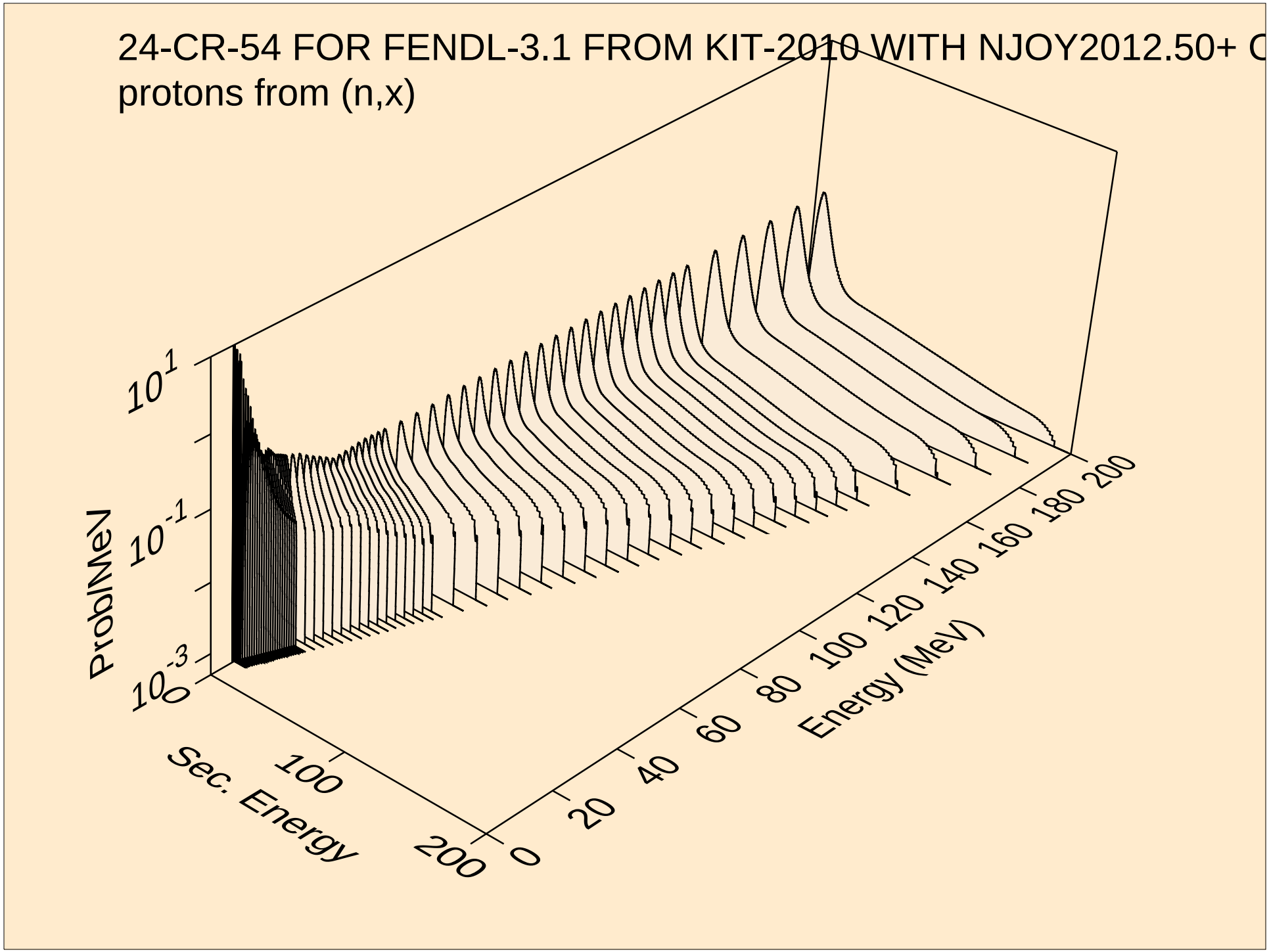

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
thermal capture photon spectrum
Gamma Prod (barns/MeV)
10^1
10^0
10^-1
0
2
4
6
Gamma Energy (MeV)

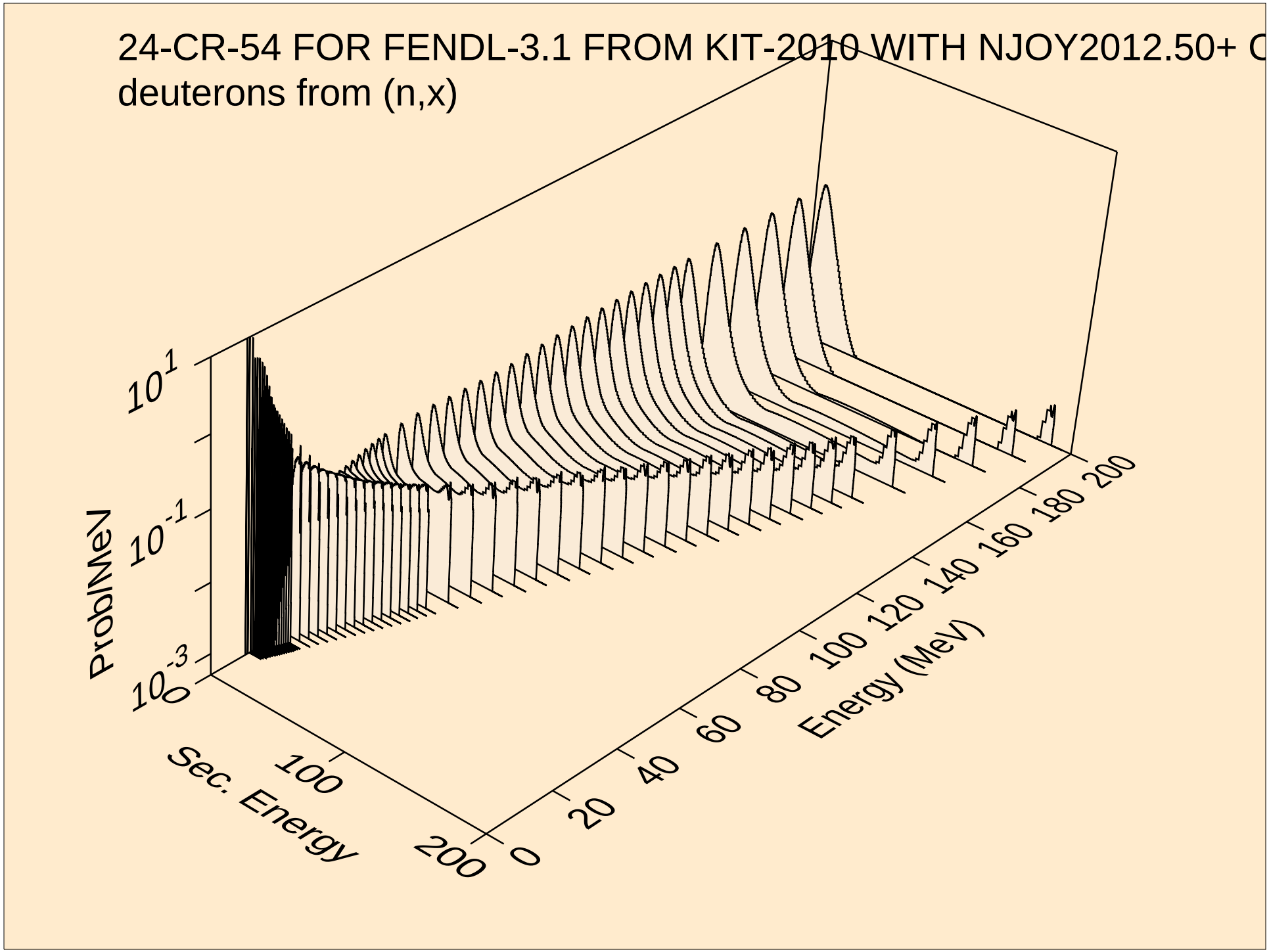

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
0
10
20
30
Gamma Energy (MeV)

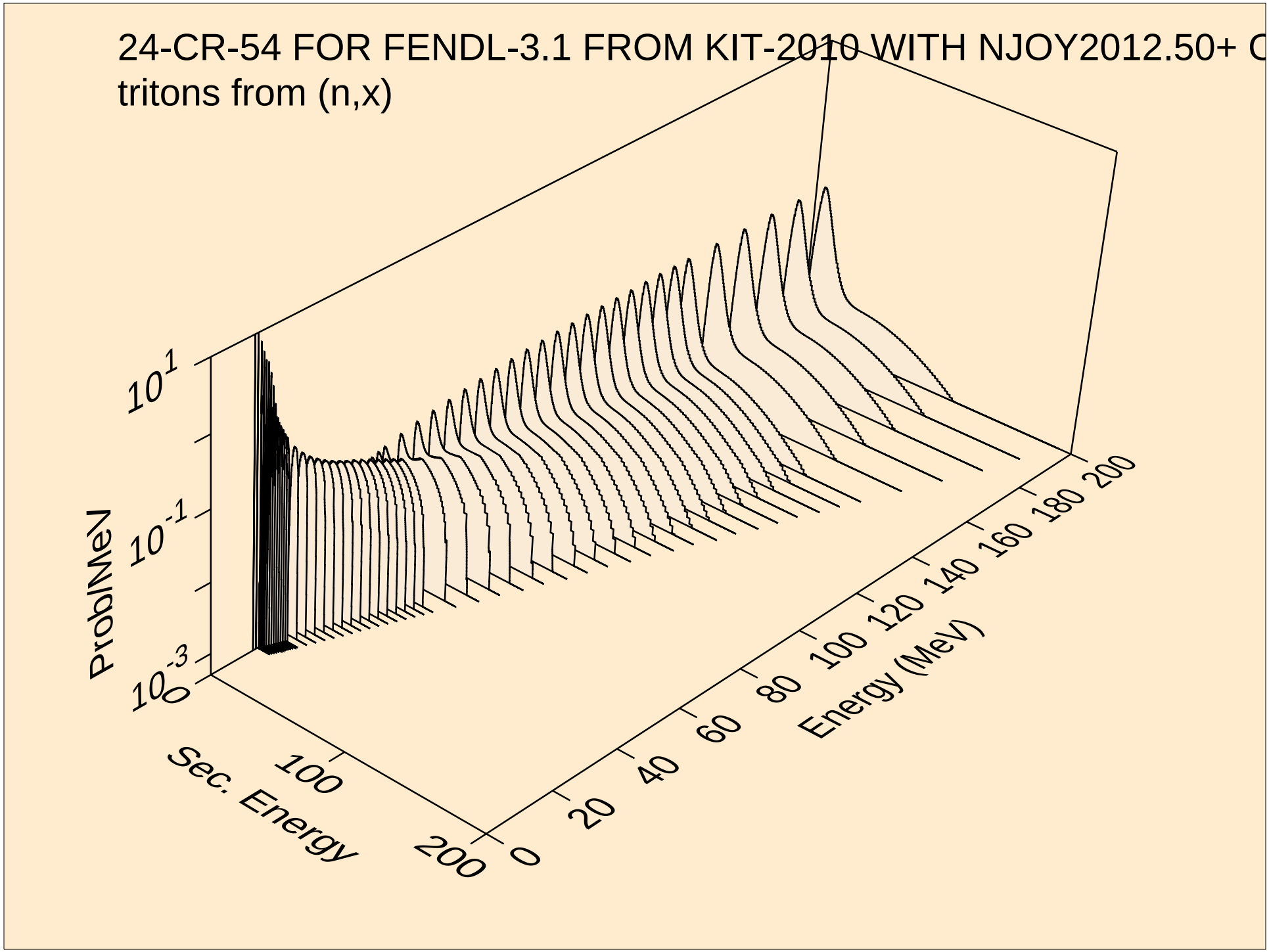

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20
0
20
40
60
80
100
120
140
160
180
200

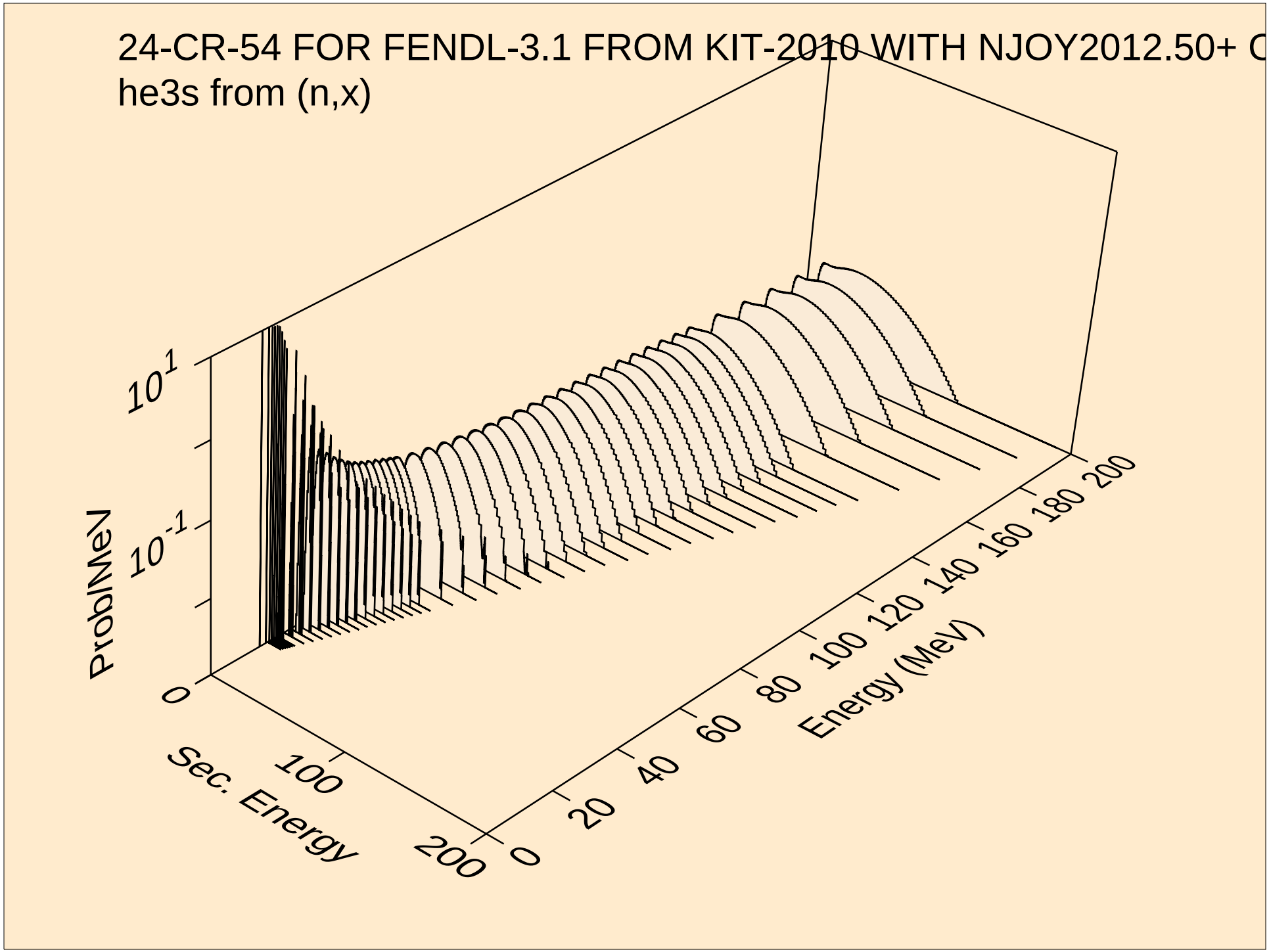

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
0
1
2
3
4
5
6
7
8
0
50
100
150
200

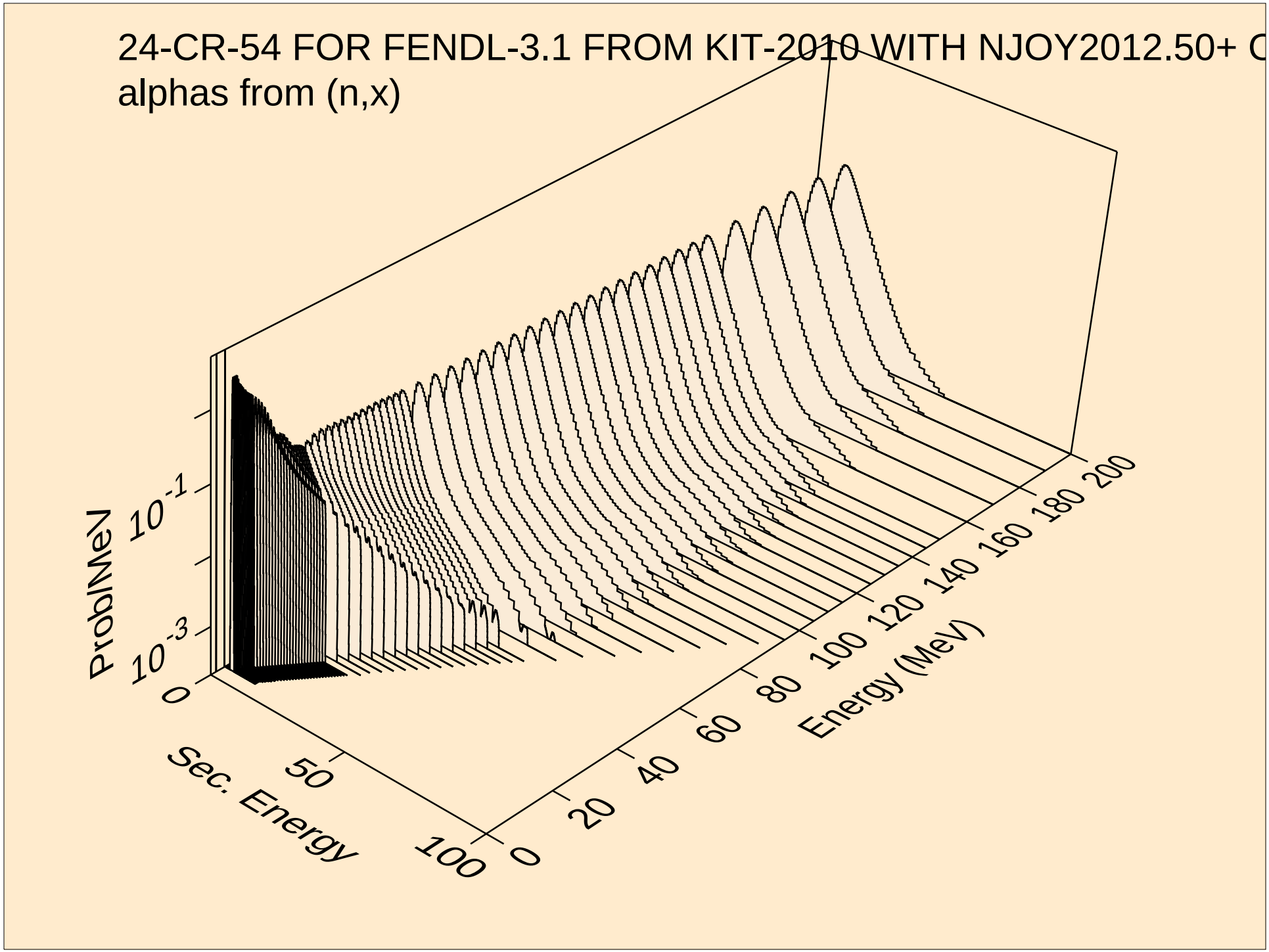

24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
Particle production cross sections
Cross section (barns)
Energy (MeV)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
20
40
60
80
100
120
140
160
180
200
protons
deuterons
tritons
he-3
alphas


24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
protons from (n,x)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)


24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
deuterons from (n,x)
Prob/MeV
10^1
10^-1
10^-3
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)


24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
tritons from (n,x)
Prob/MeV
10^1
10^-1
10^-3
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)


24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
he3s from (n,x)
Prob/MeV
10^{1}
10^{-1}
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)


24-CR-54 FOR FENDL-3.1 FROM KIT-2010 WITH NJOY2012.50+ C
alphas from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
50
100
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)