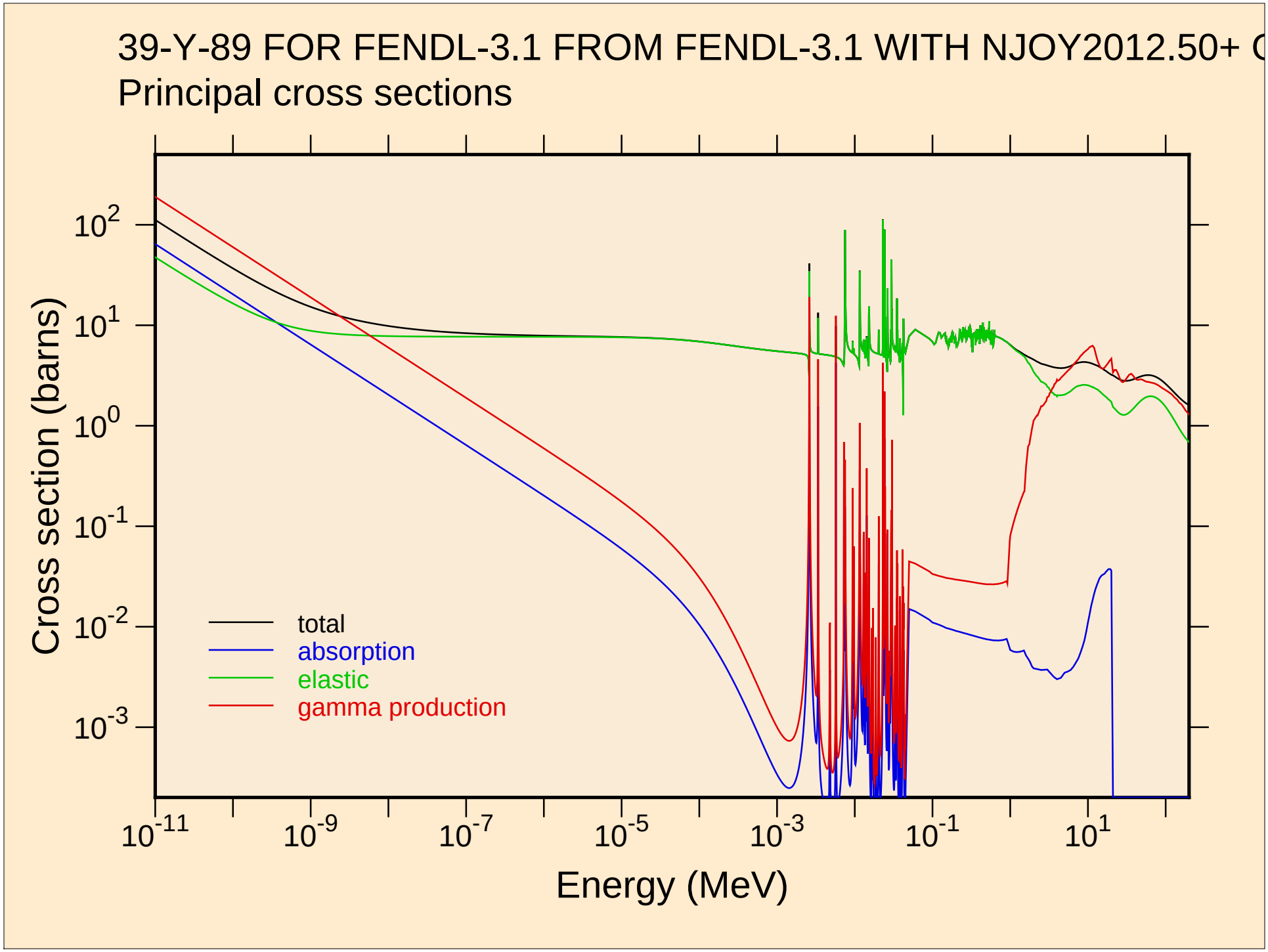
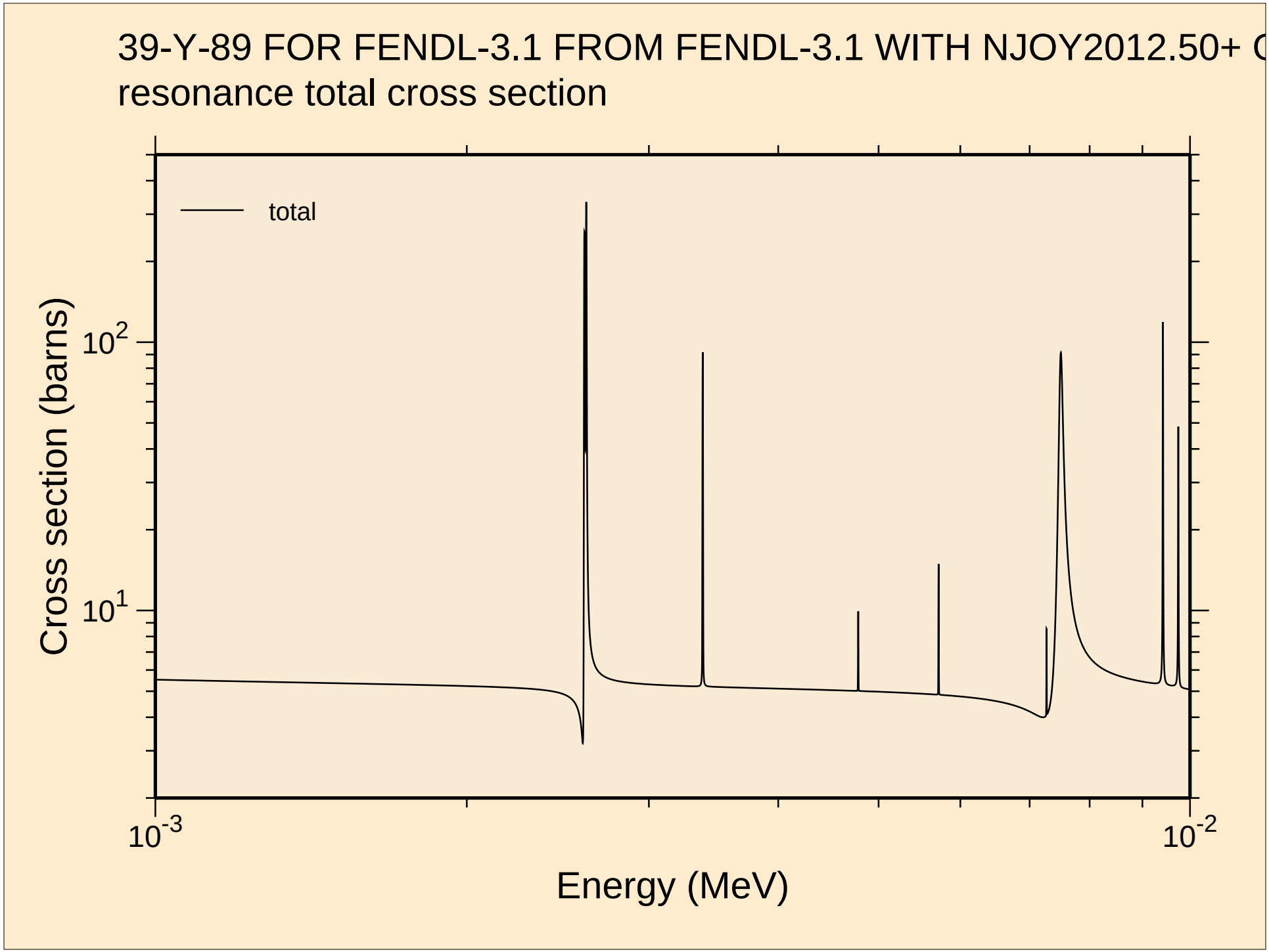
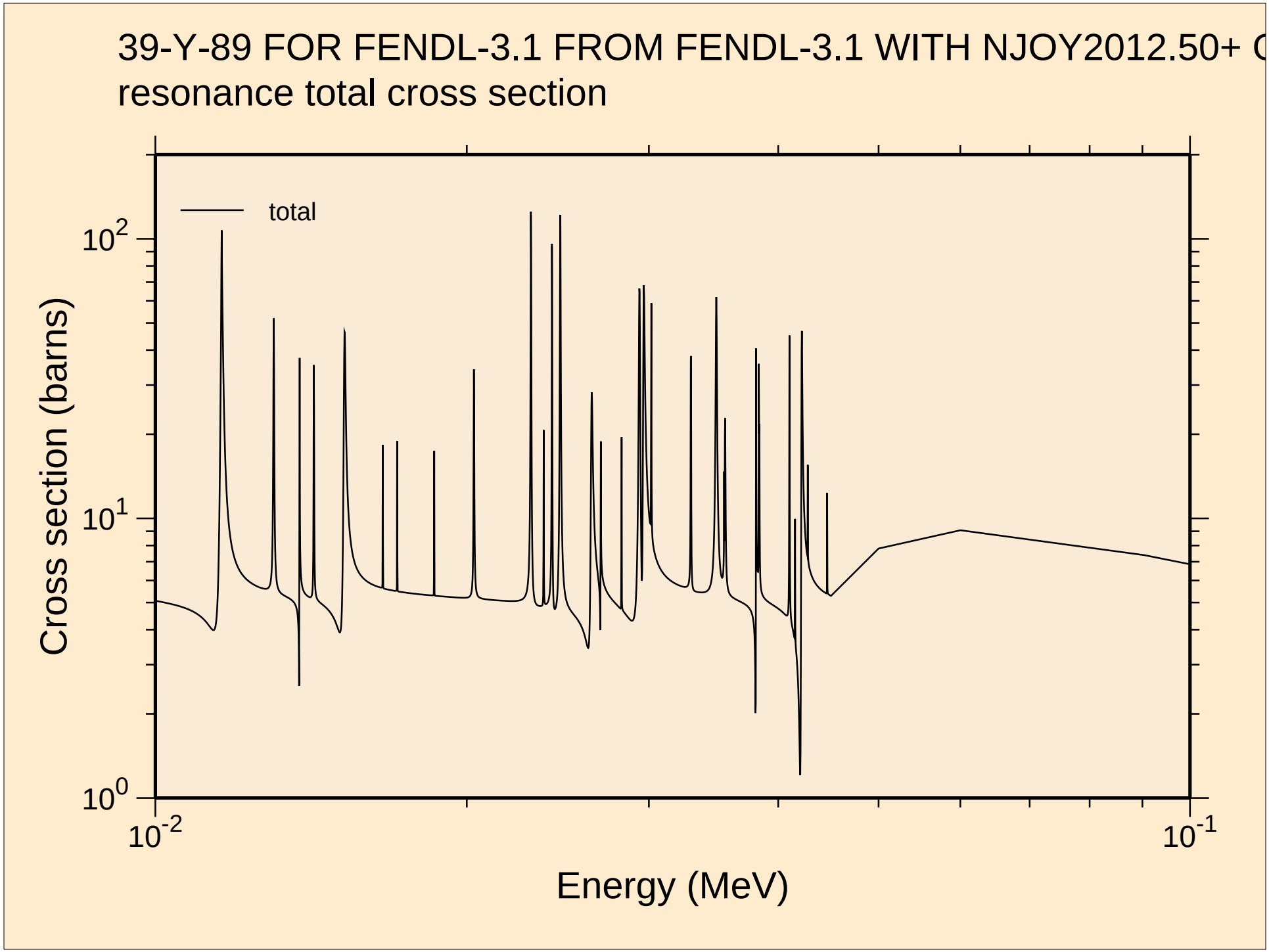
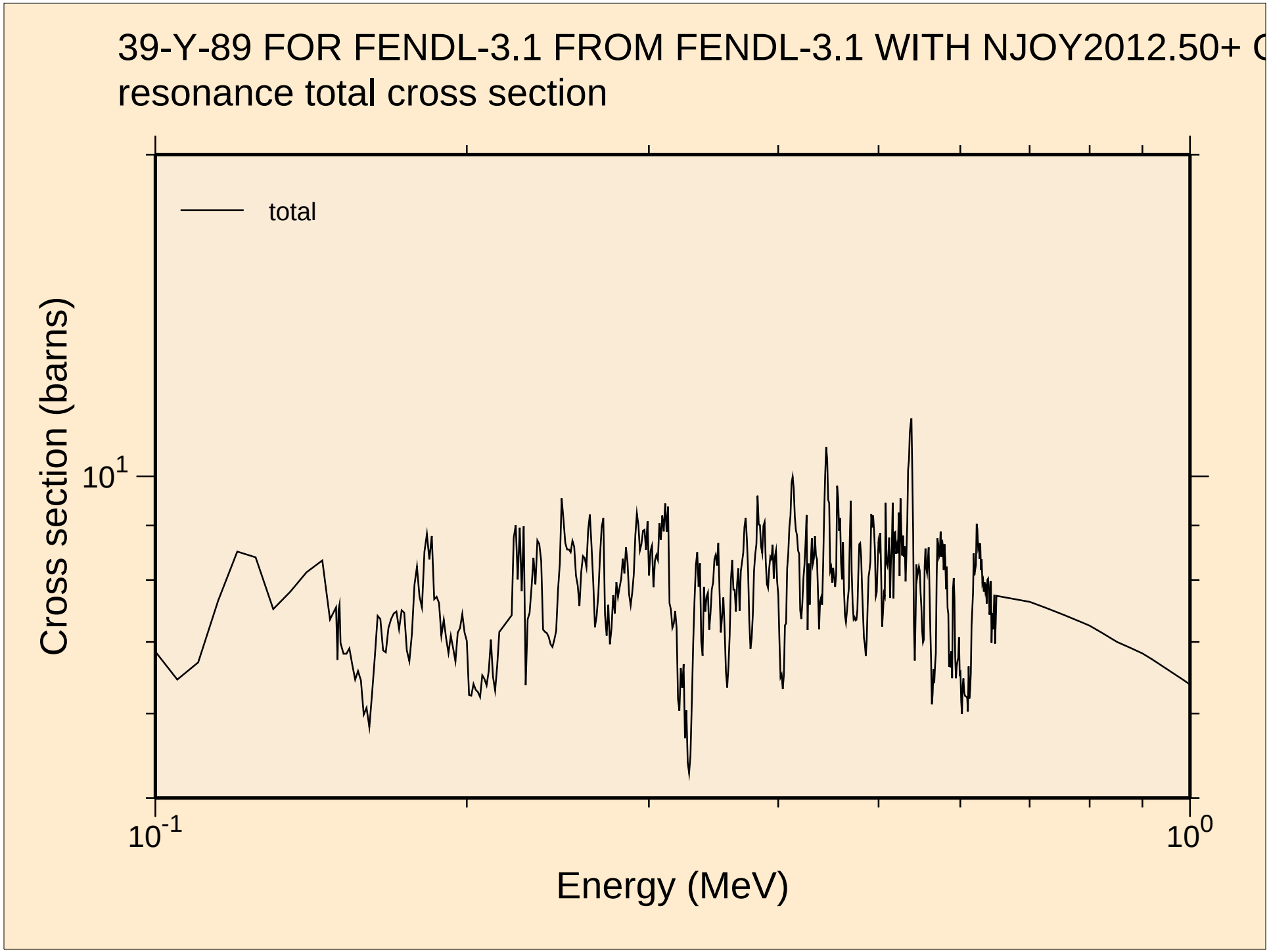
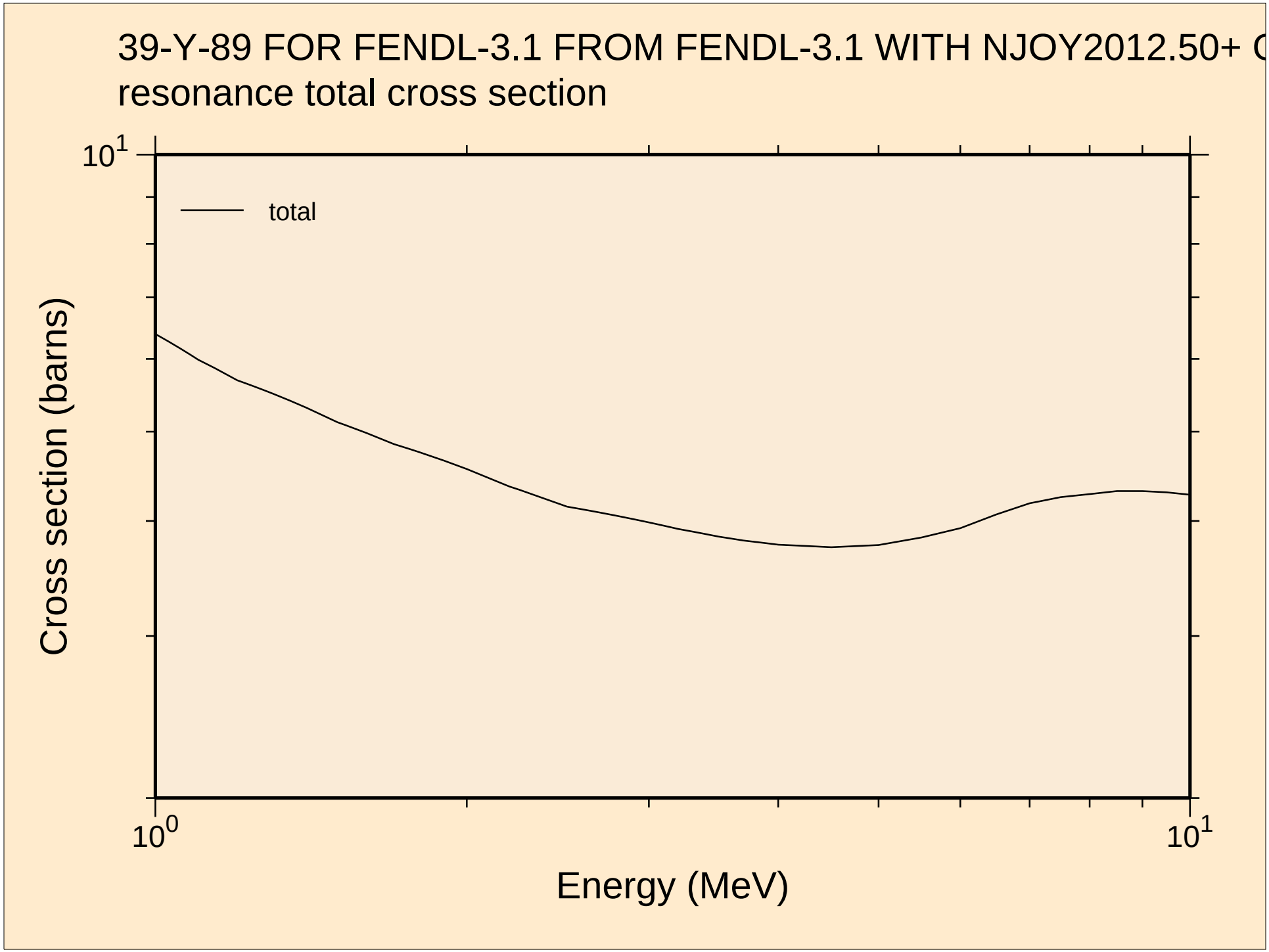
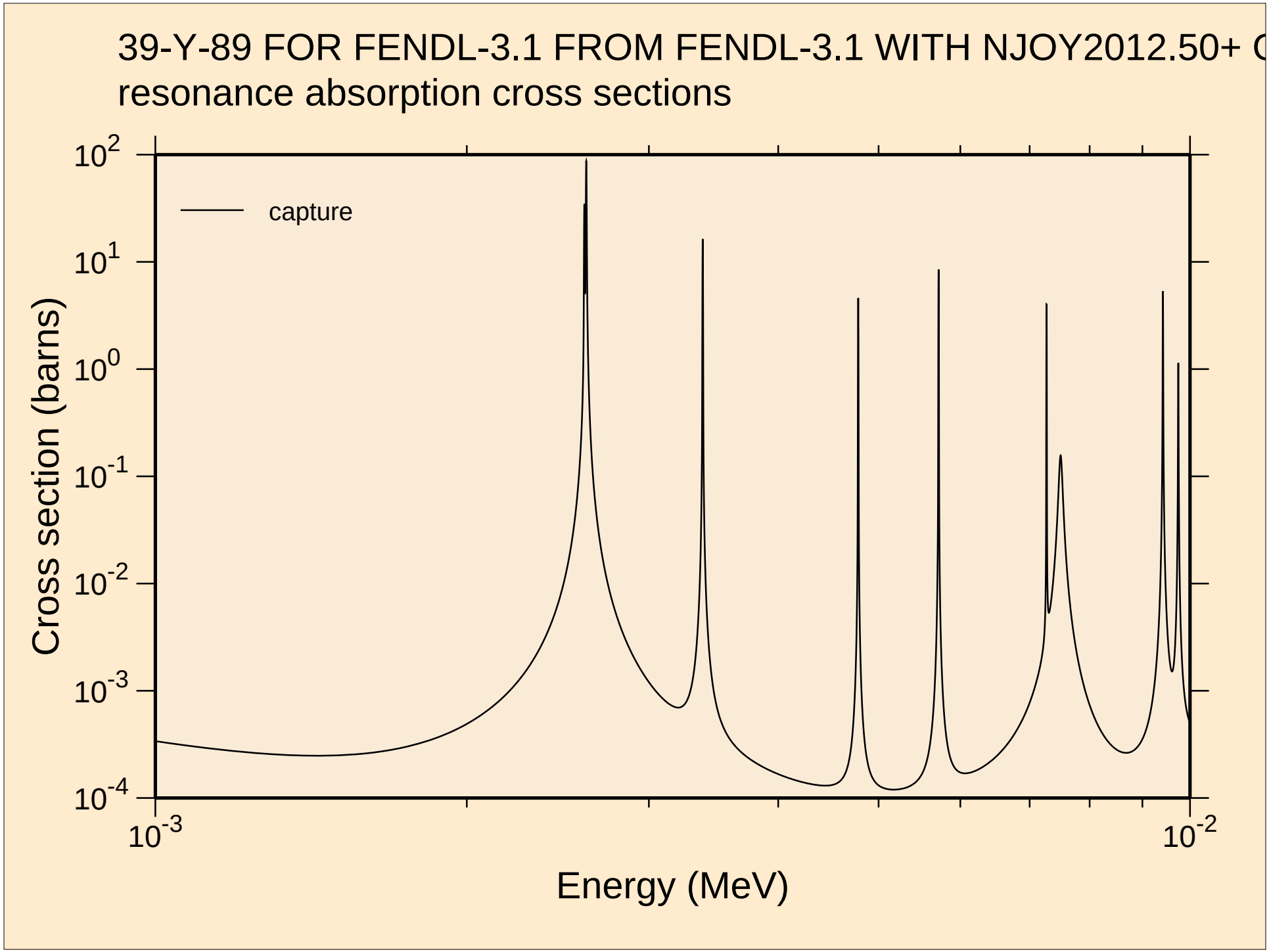

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Principal cross sections
Cross section (barns)
10^2
10^1
10^0
10^-1
10^-2
10^-3
total
absorption
elastic
gamma production
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

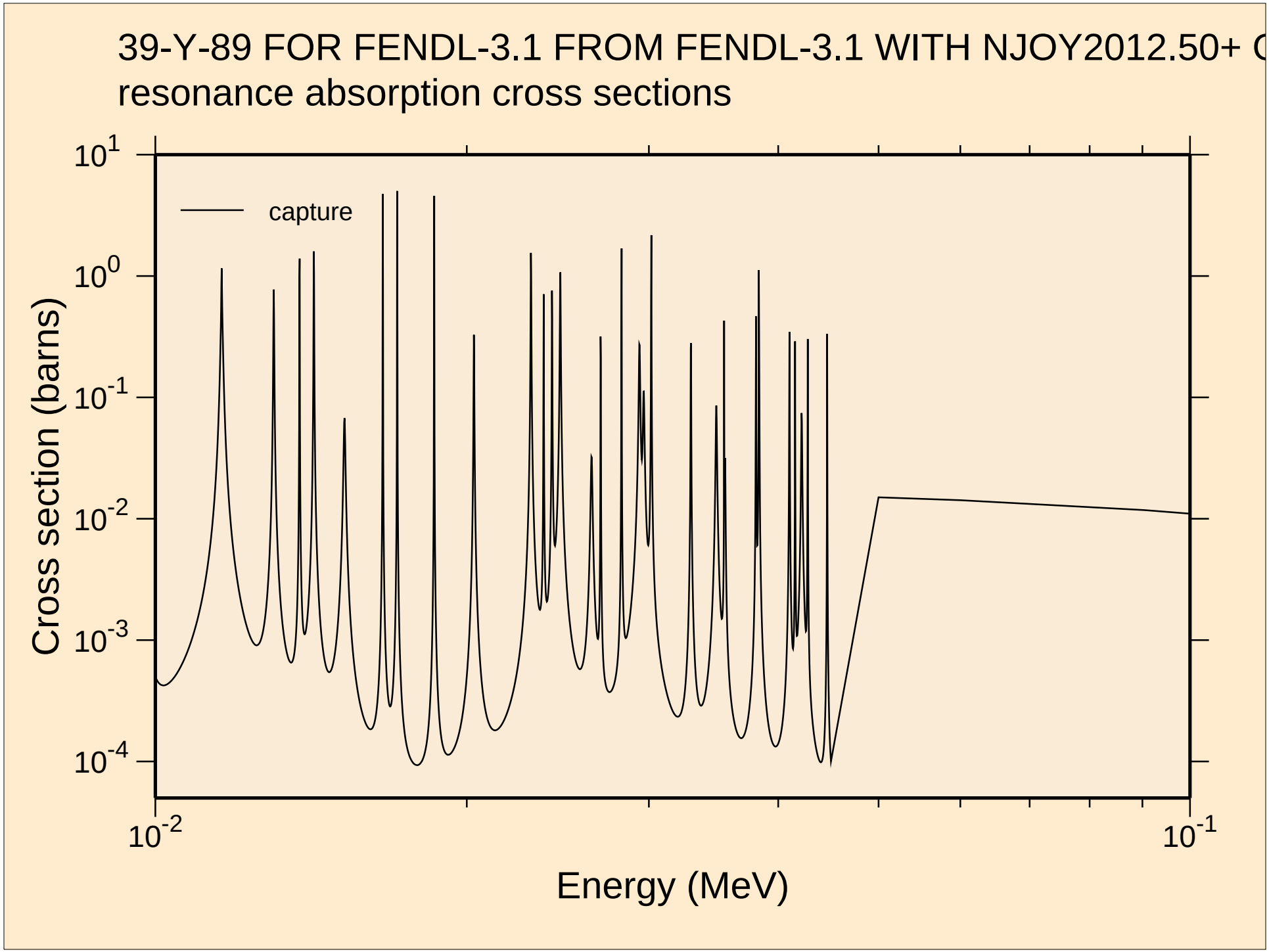

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^-3
10^-2
Energy (MeV)

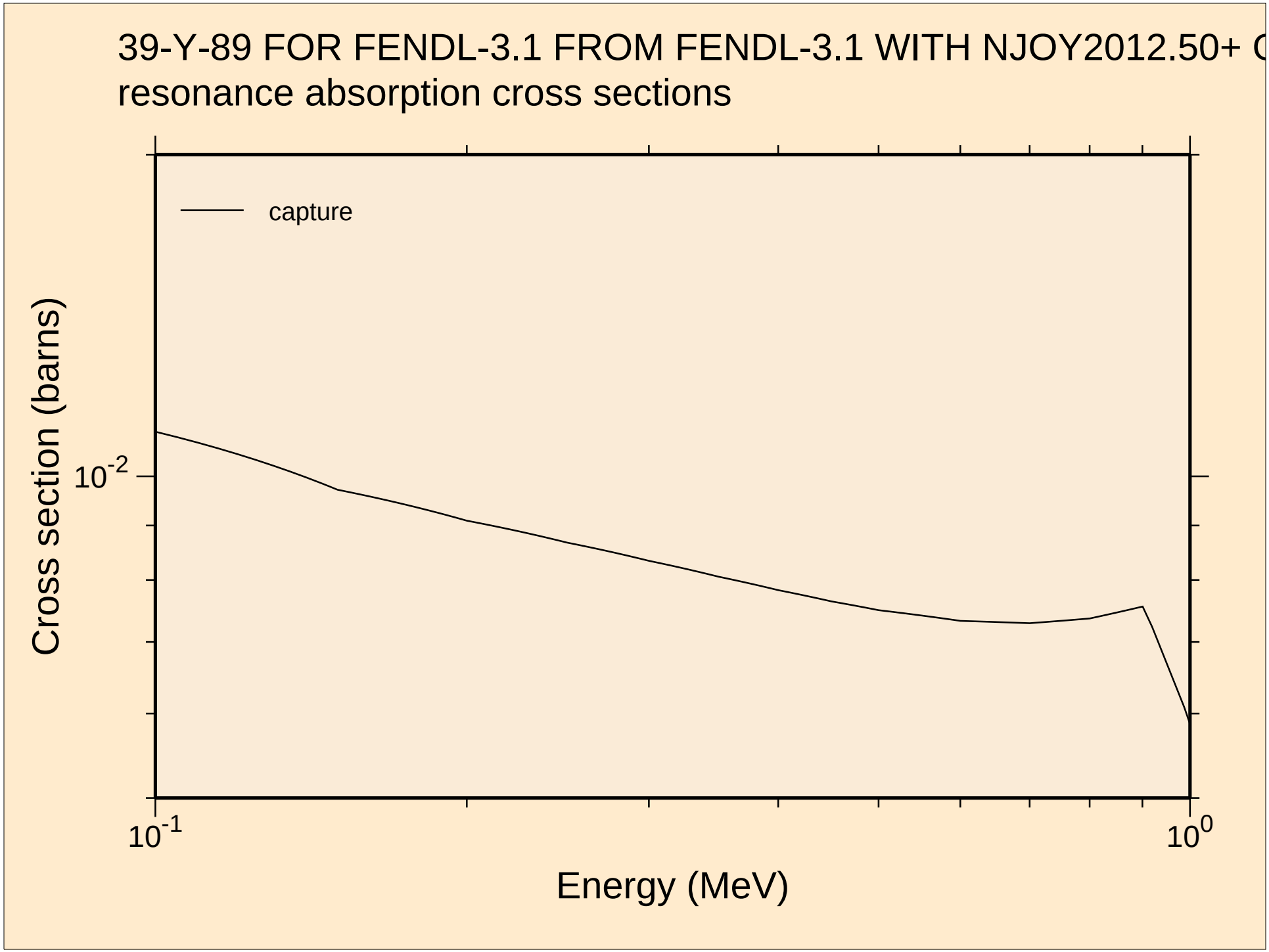

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^-2
10^-1
Energy (MeV)

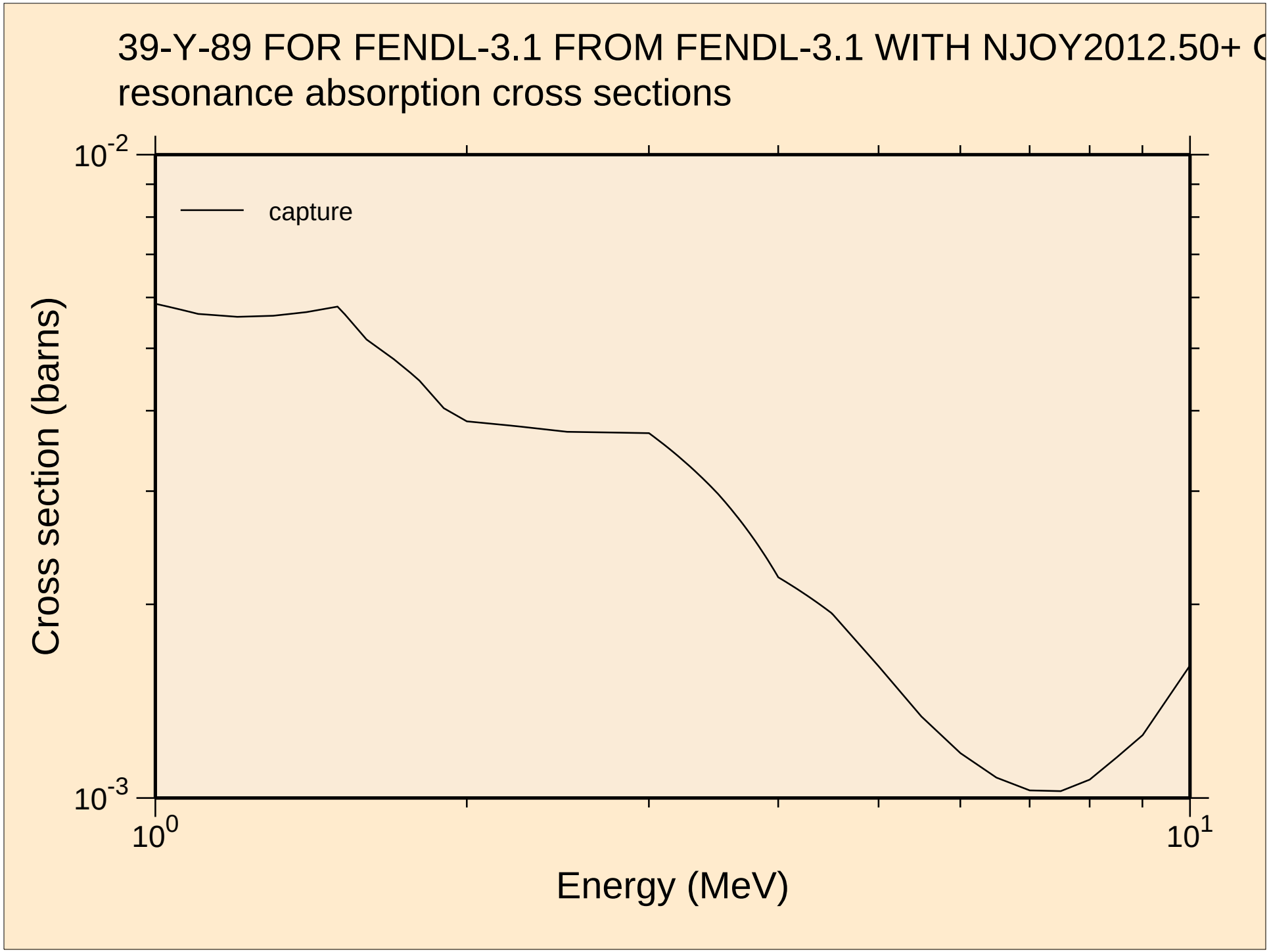

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance total cross section
total
Cross section (barns)
10^1
10^-1
10^0
Energy (MeV)

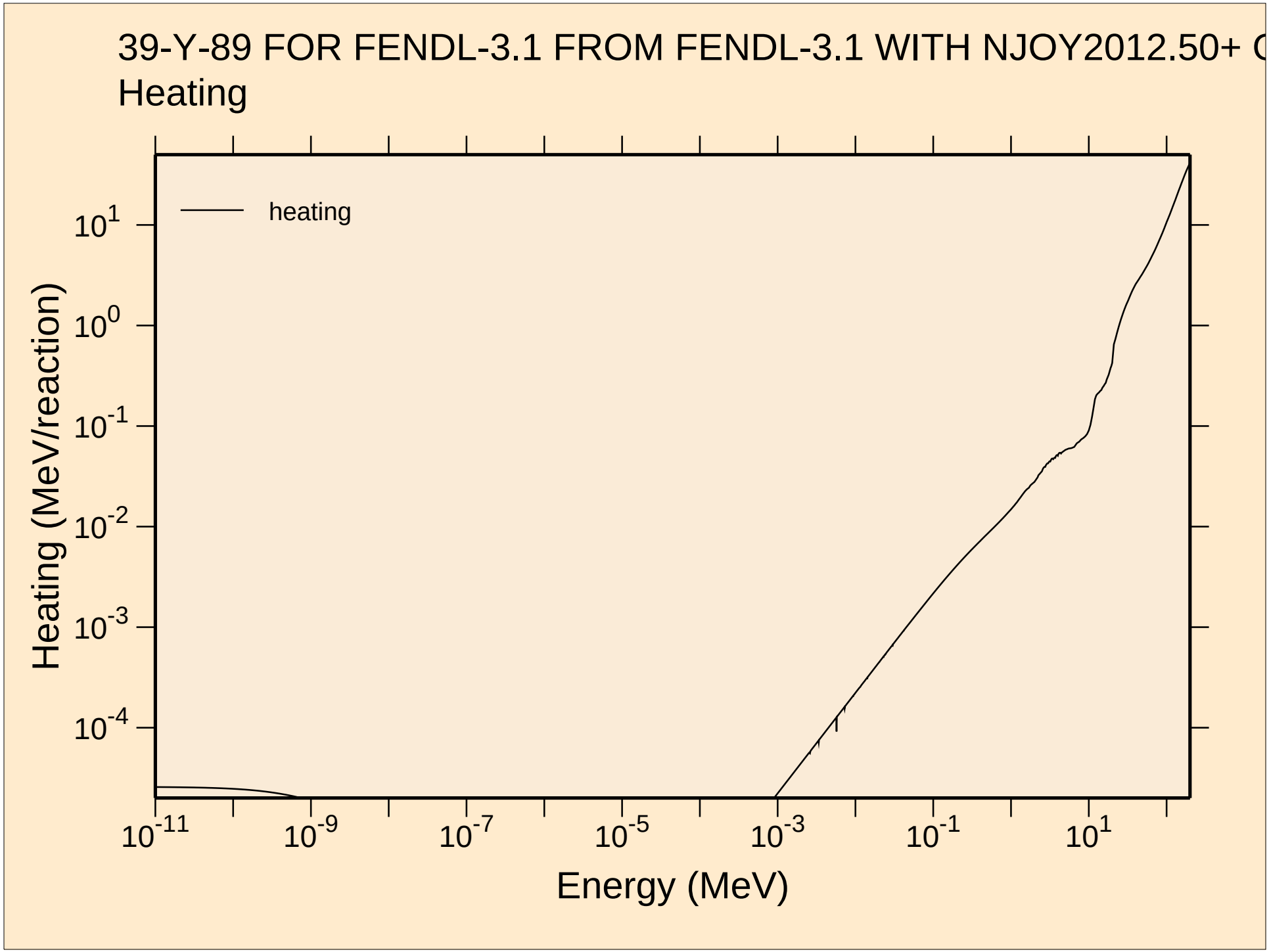

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance total cross section
$10^1$
total
Cross section (barns)
$10^0$
$10^1$
Energy (MeV)

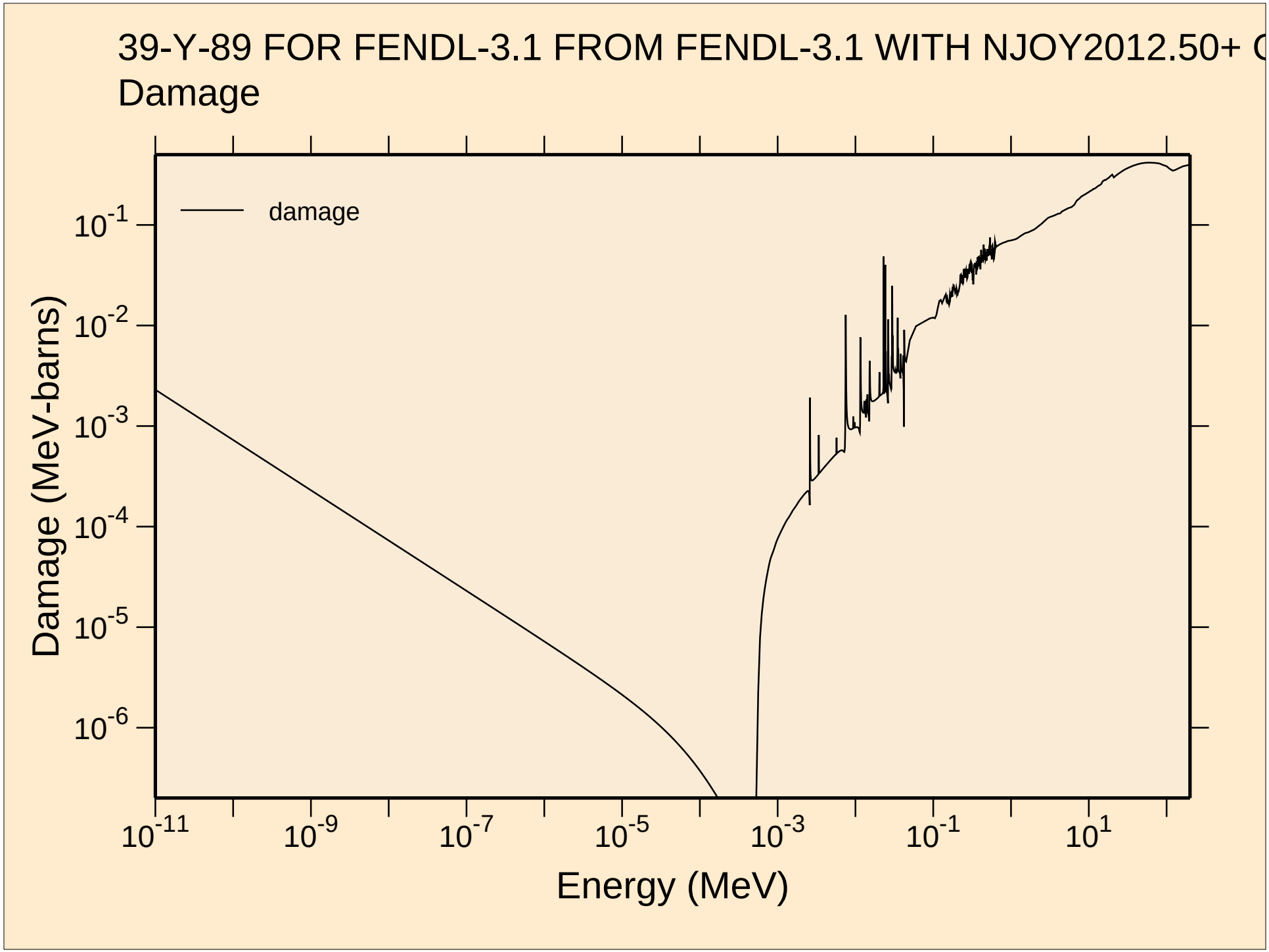

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-3
10^-2
Energy (MeV)

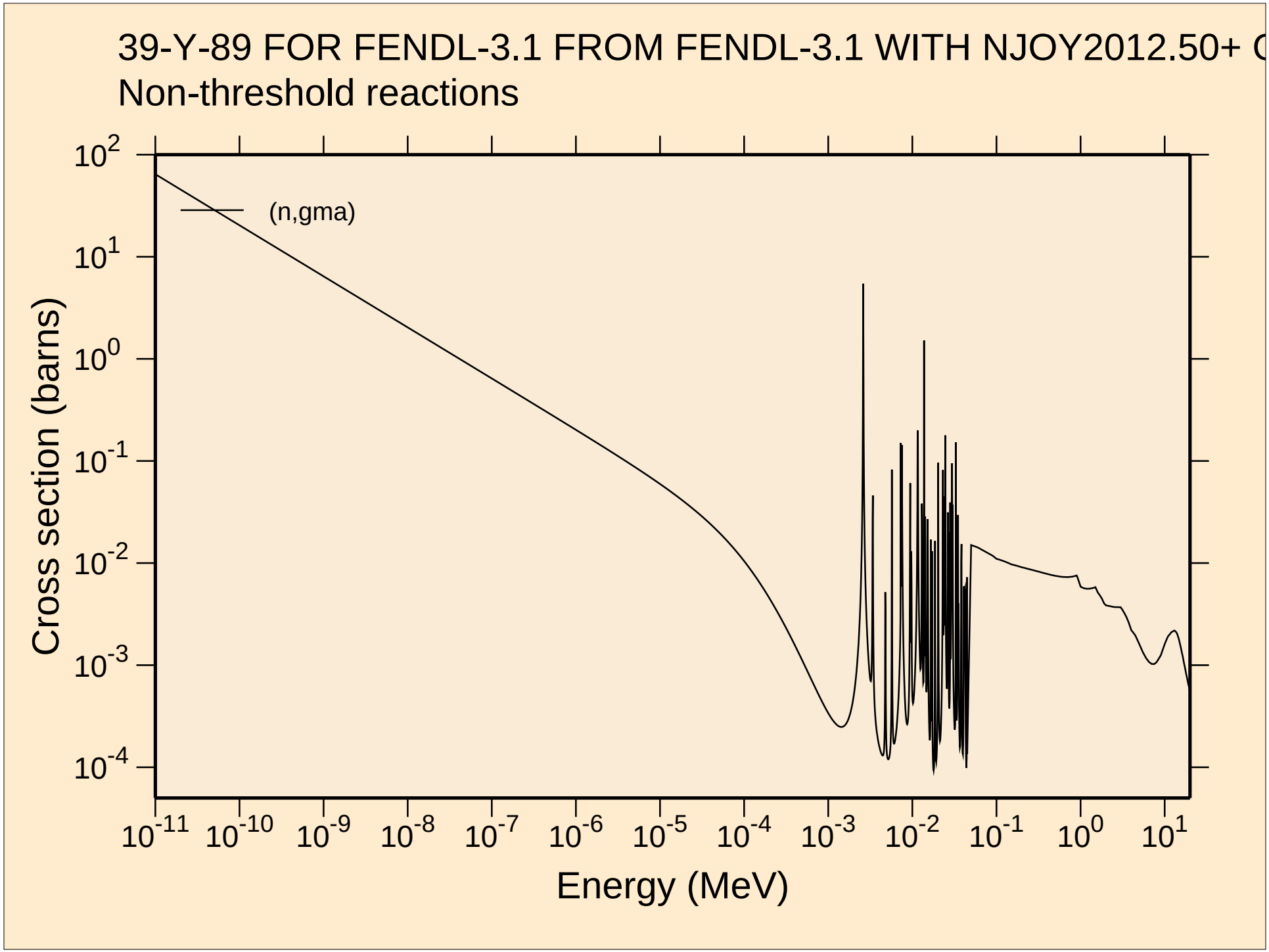

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-2
10^-1
Energy (MeV)

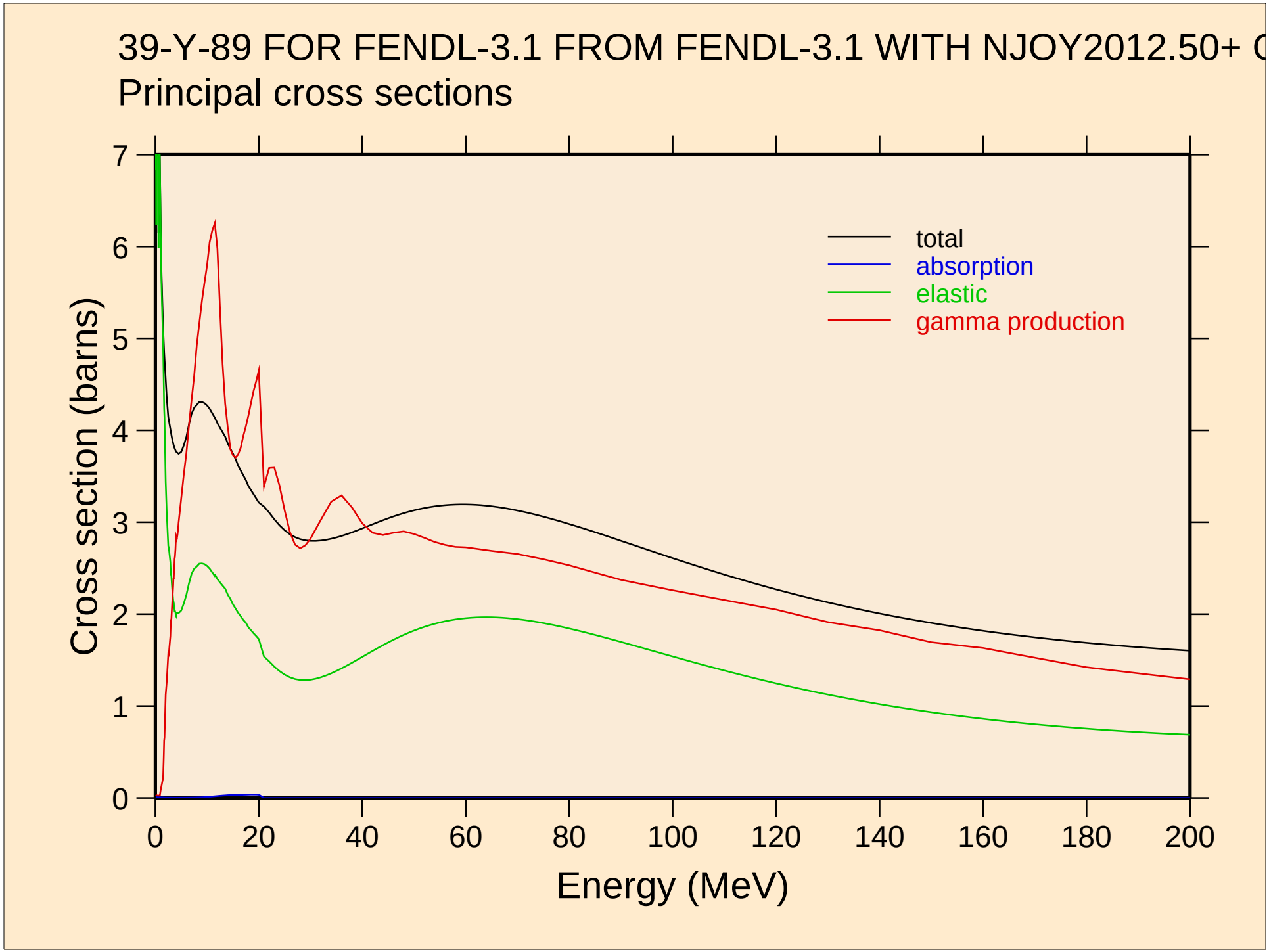

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10-2
10-1
100
Energy (MeV)

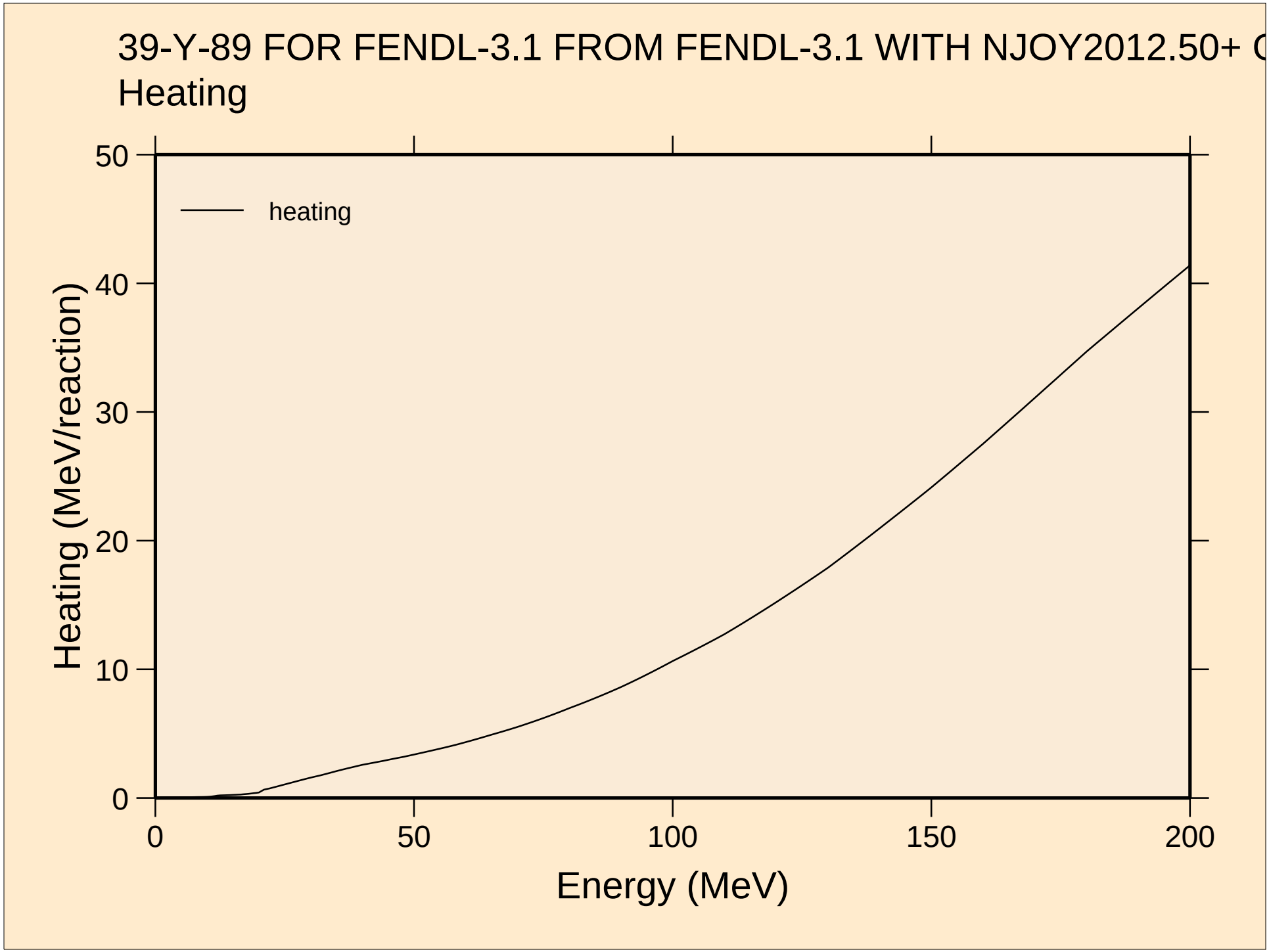

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
resonance absorption cross sections
capture
Cross section (barns)
10-2
10-3
100
101
Energy (MeV)

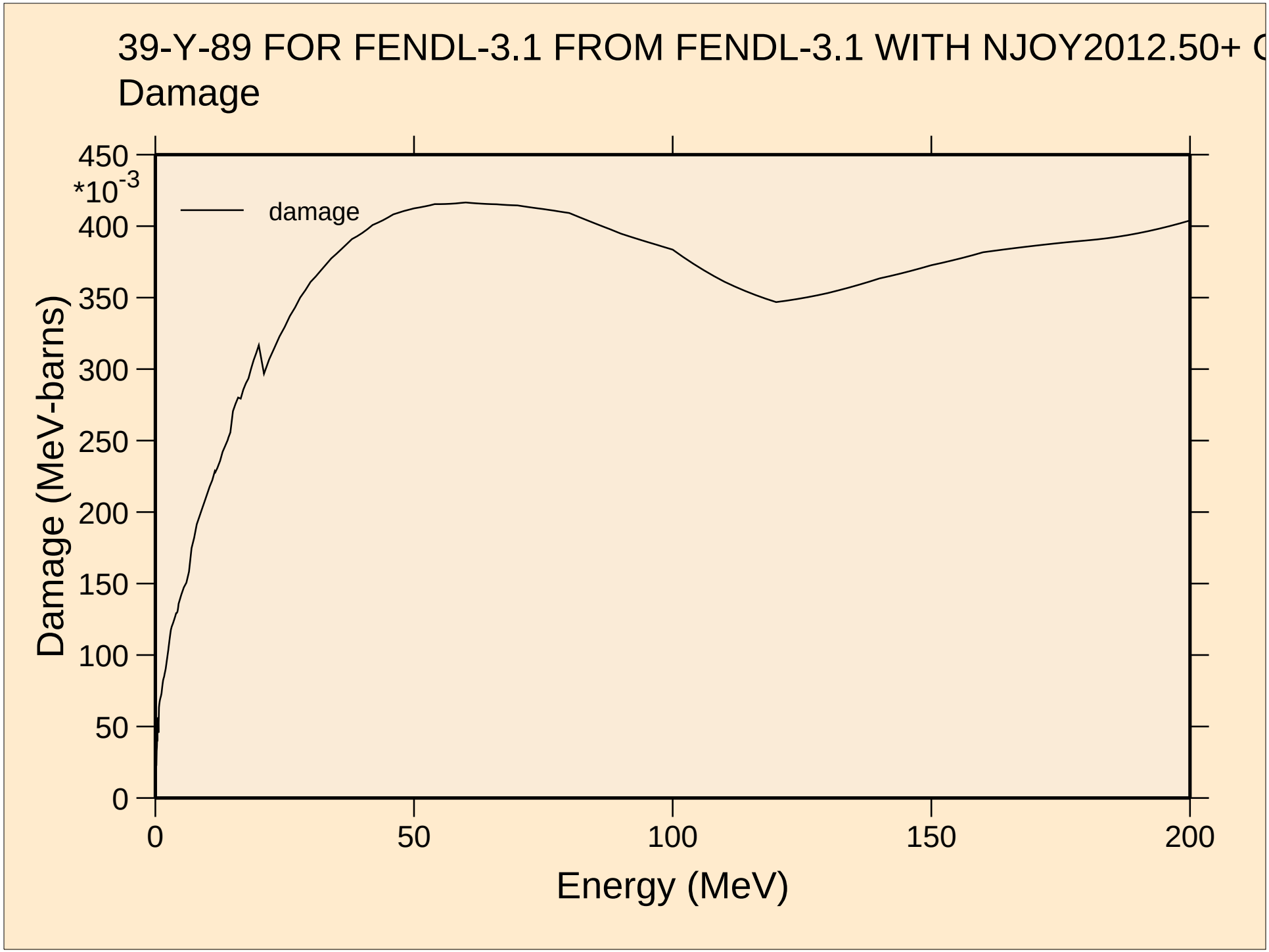

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Heating
heating
Heating (MeV/reaction)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

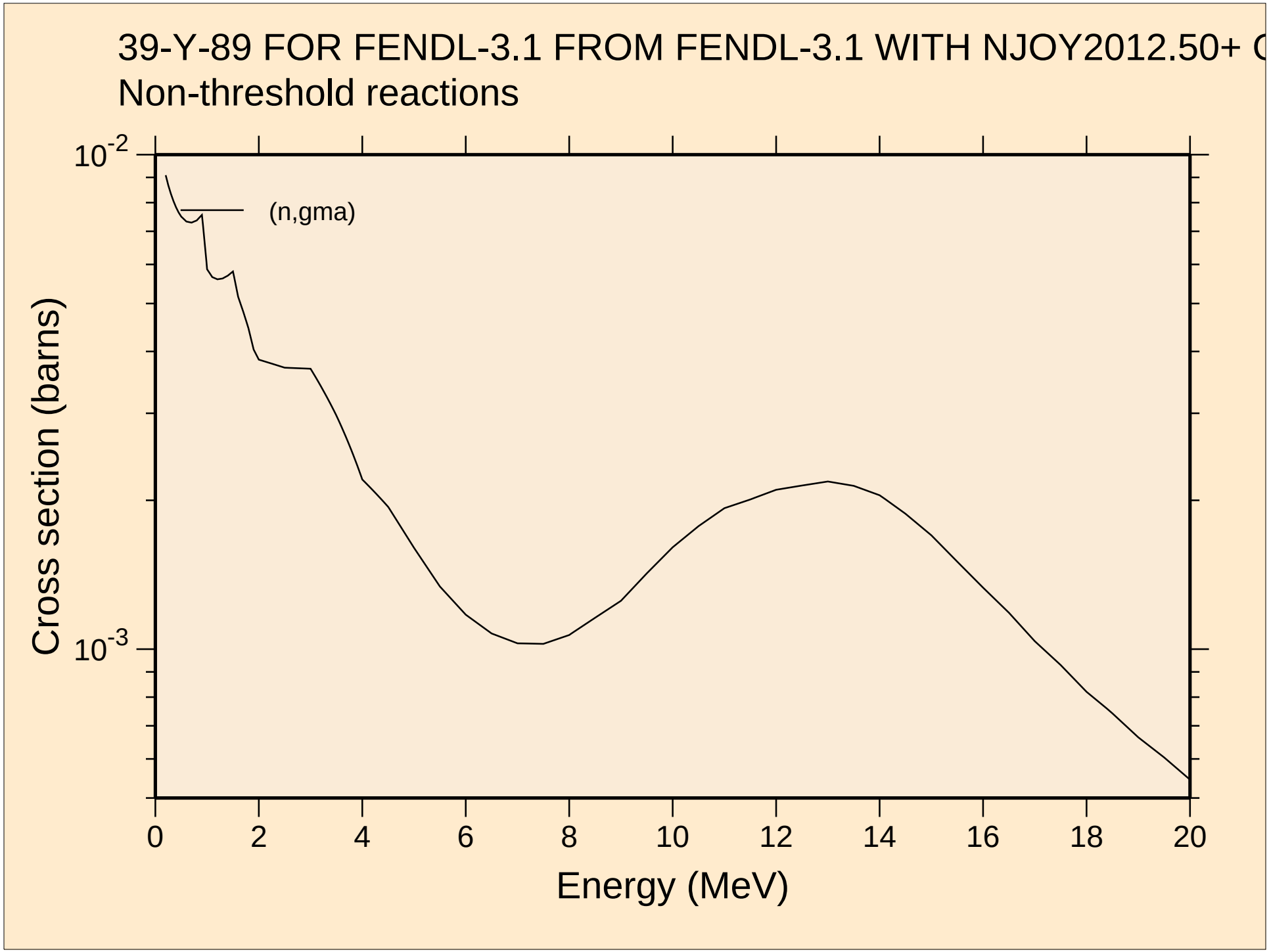

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Damage
damage
Damage (MeV-barns)
10-1
10-2
10-3
10-4
10-5
10-6
10-11
10-9
10-7
10-5
10-3
10-1
101
Energy (MeV)

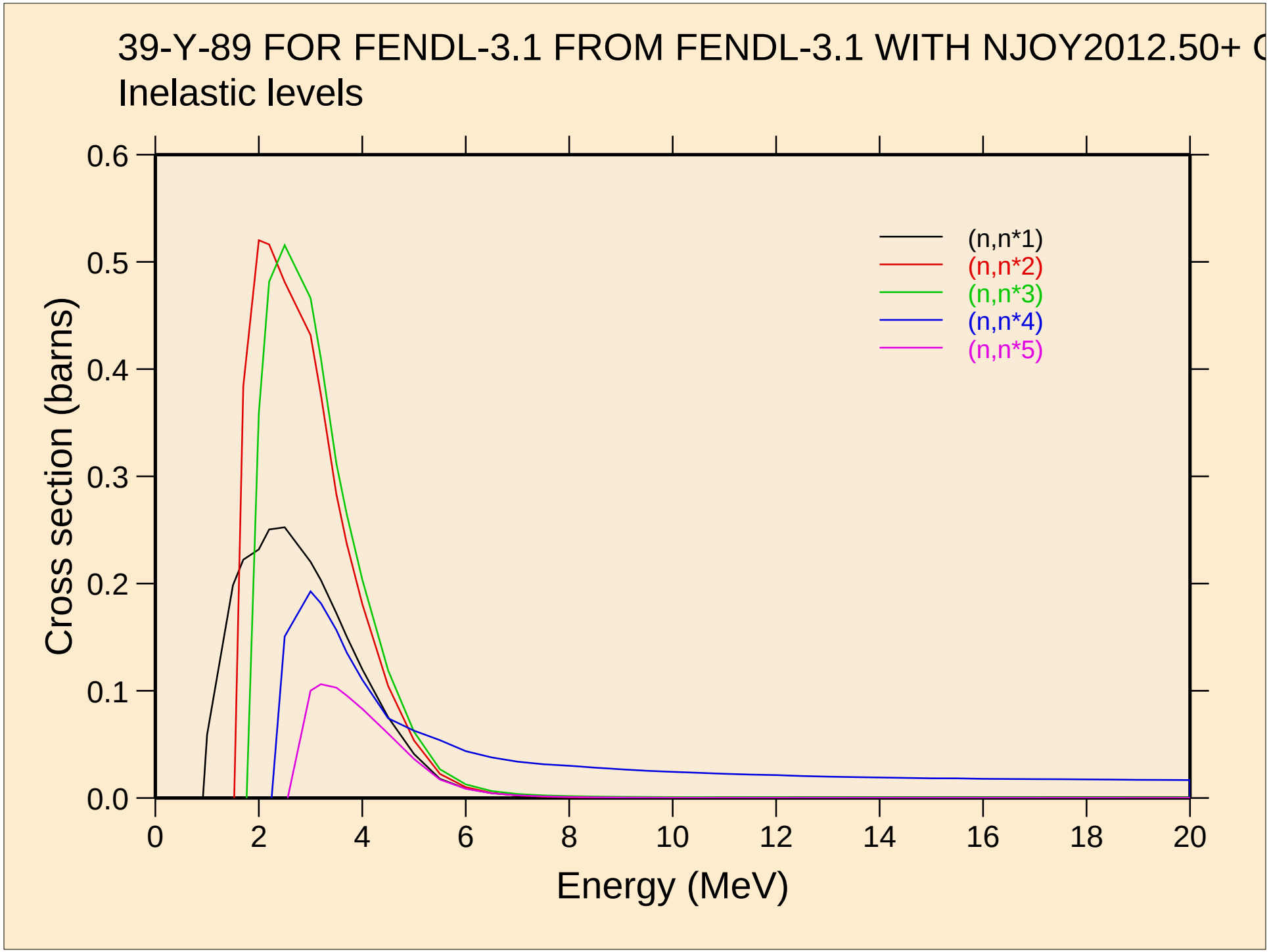

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Non-threshold reactions
(n,gma)
Cross section (barns)
Energy (MeV)
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-10
10^-9
10^-8
10^-7
10^-6
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

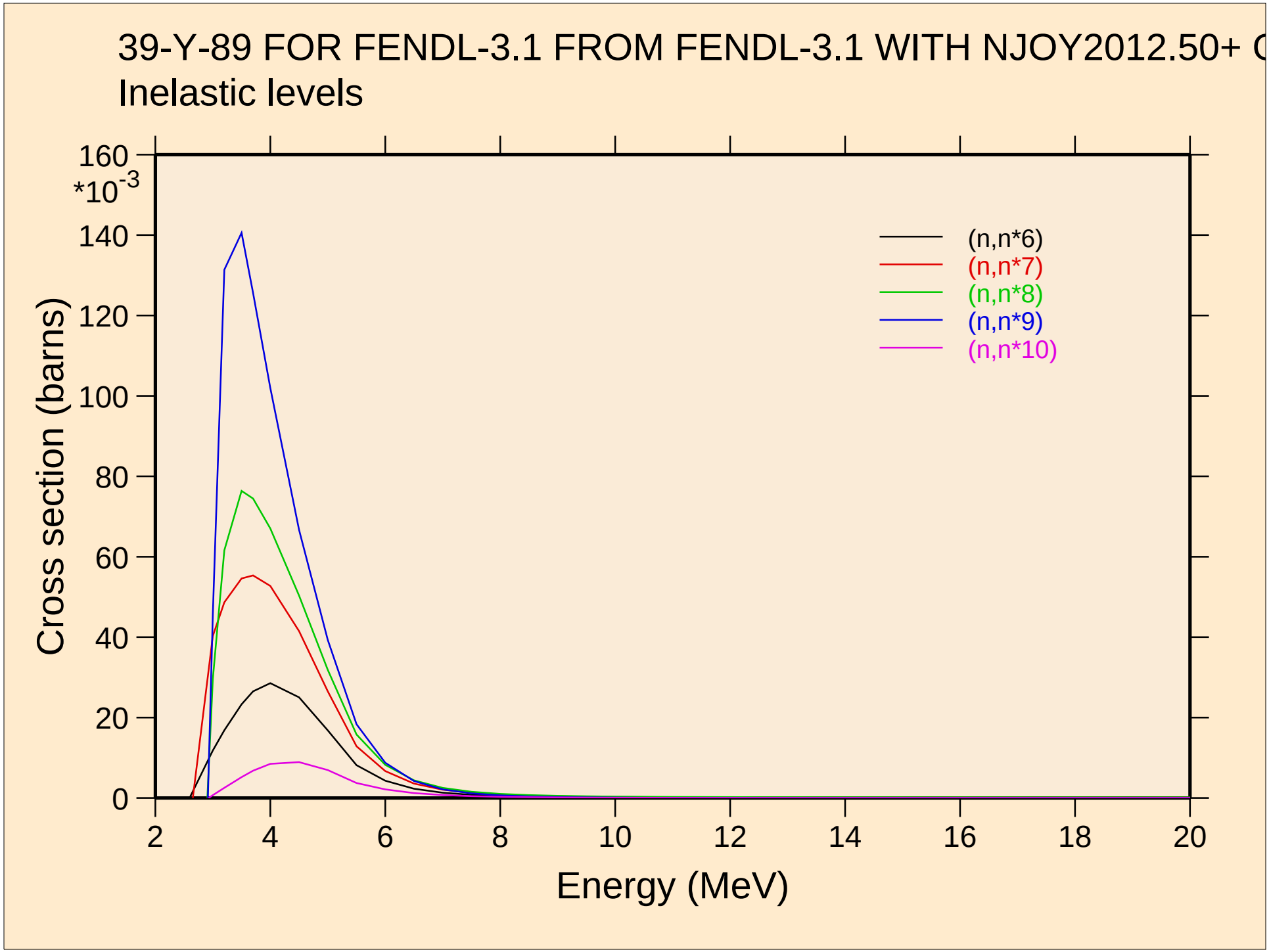

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Principal cross sections
Cross section (barns)
Energy (MeV)
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160
180
200
total
absorption
elastic
gamma production

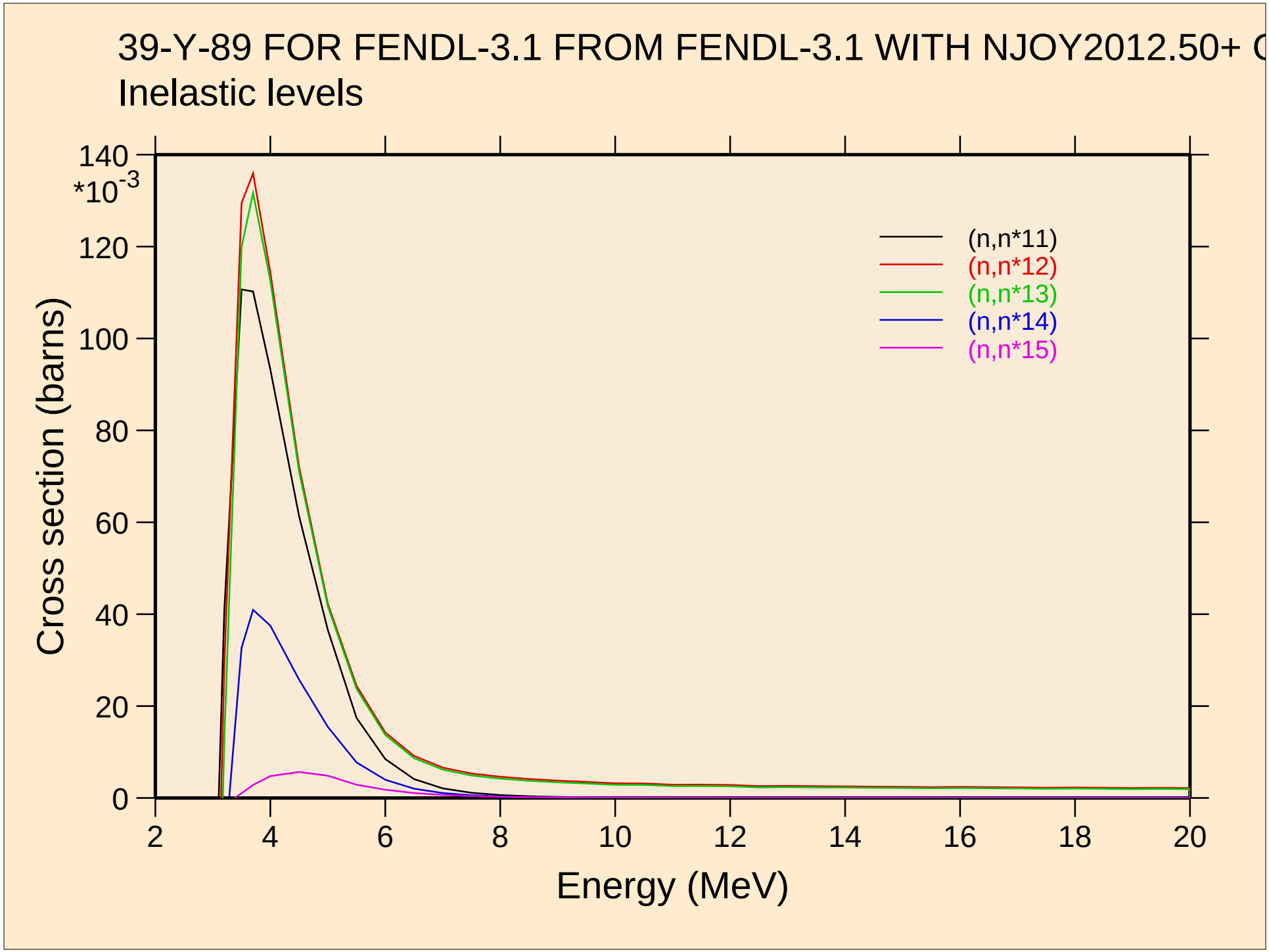

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
10
20
30
40
50
0
50
100
150
200

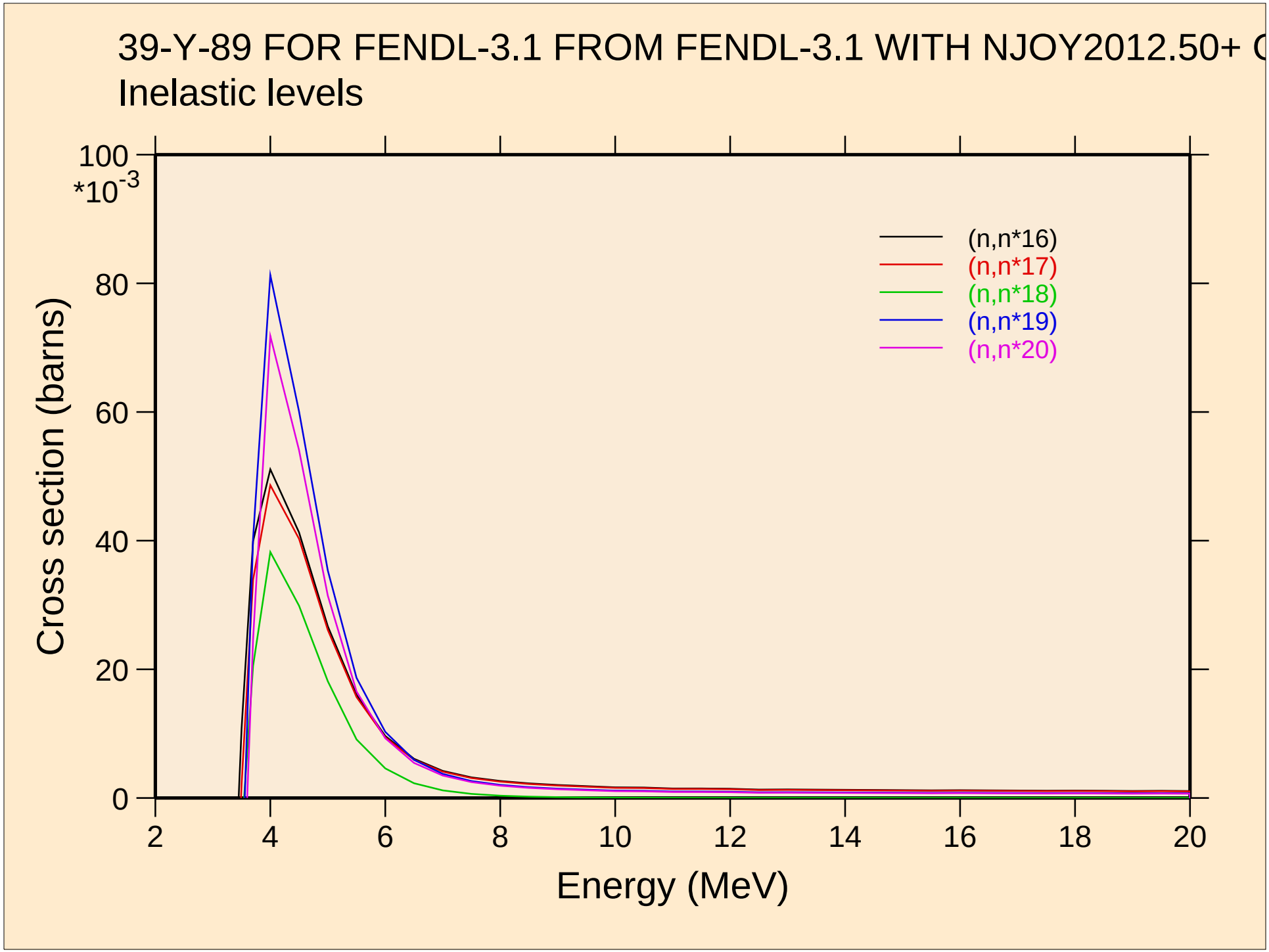

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Damage
*10-3
damage
Damage (MeV-barns)
450
400
350
300
250
200
150
100
50
0
0
50
100
150
200
Energy (MeV)

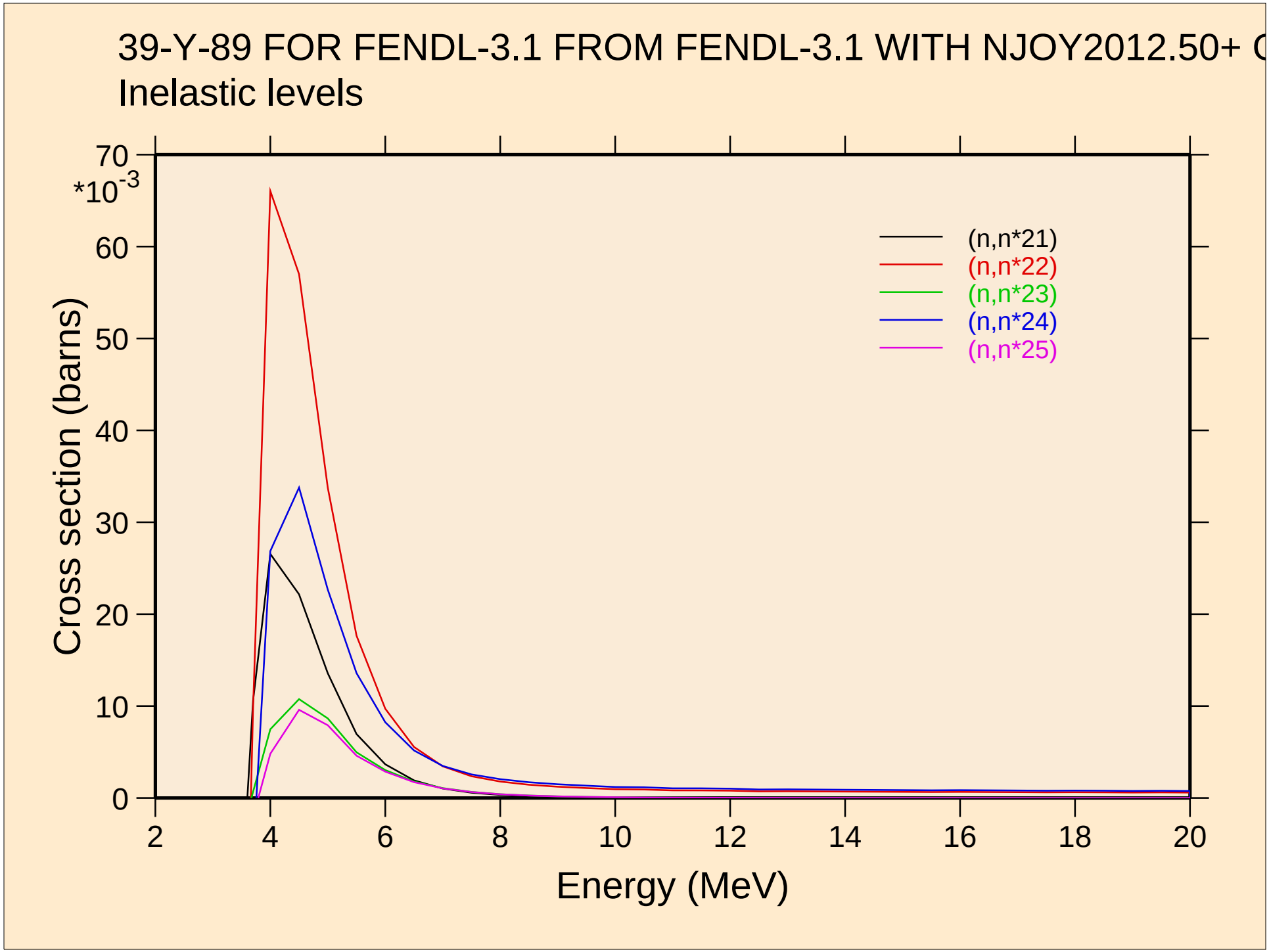

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Non-threshold reactions
(n,gma)
Cross section (barns)
10-2
10-3
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

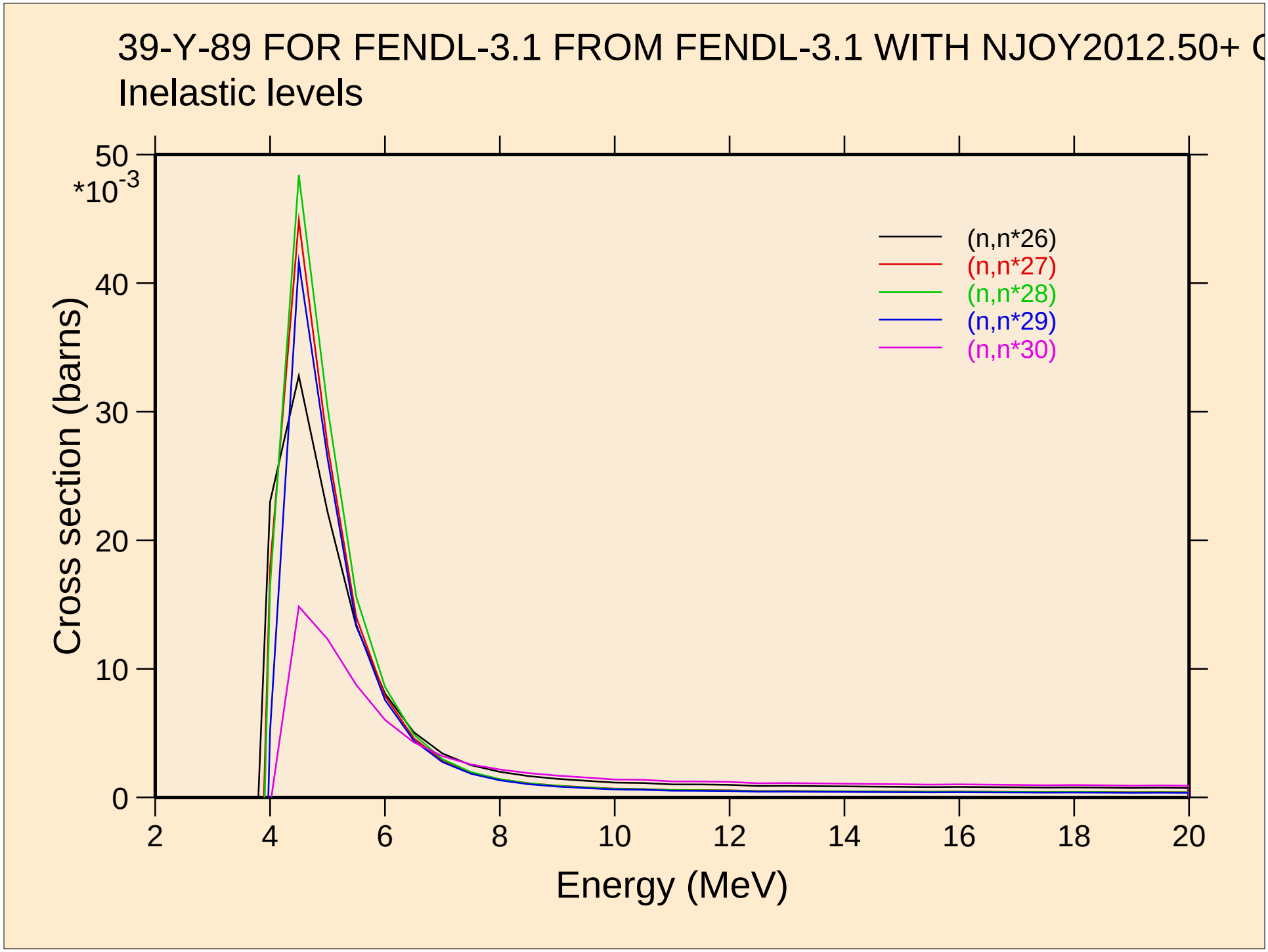

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
Energy (MeV)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
2
4
6
8
10
12
14
16
18
20
(n,n*1)
(n,n*2)
(n,n*3)
(n,n*4)
(n,n*5)

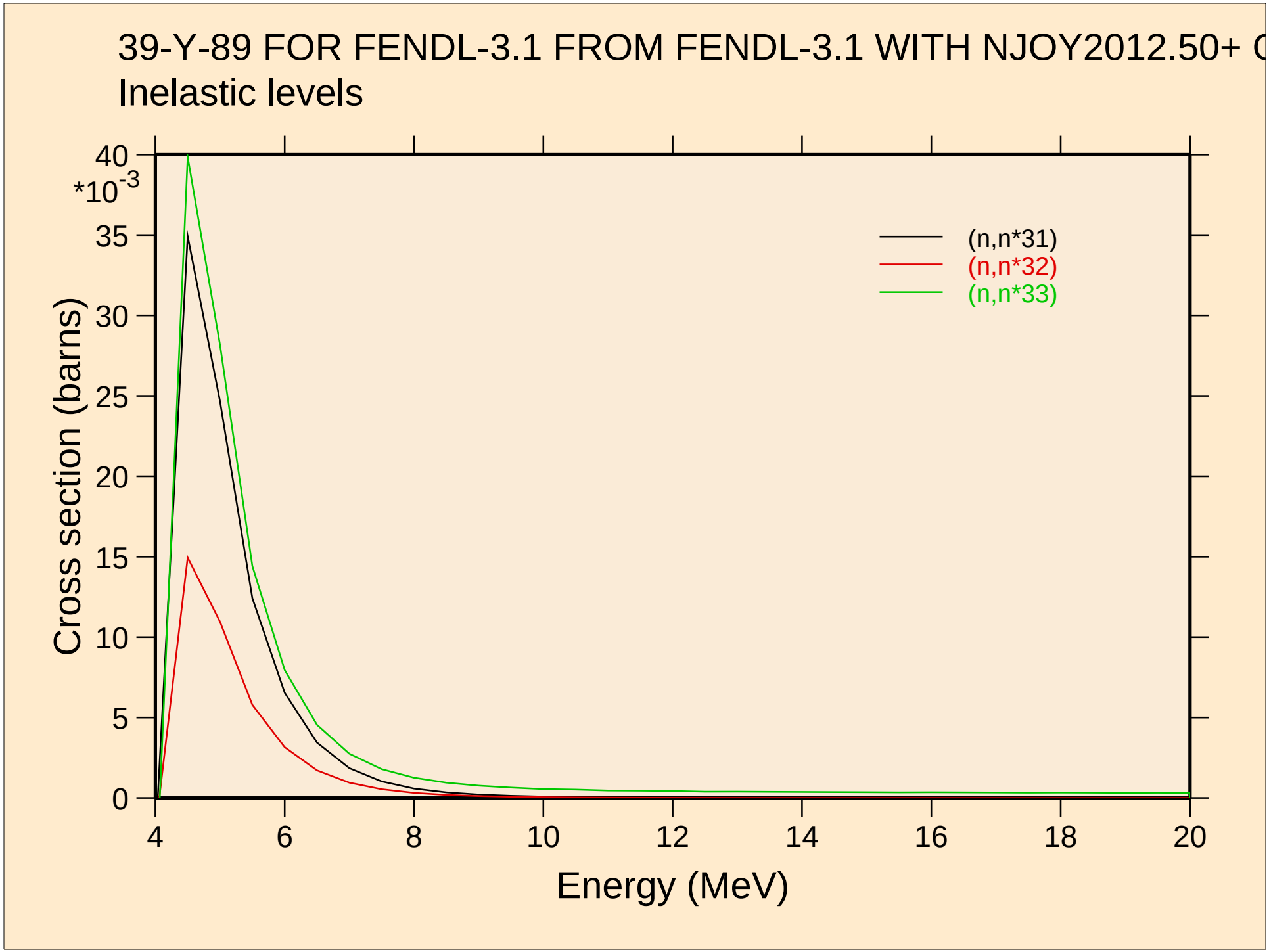

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
160
140
120
100
80
60
40
20
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*6)
(n,n*7)
(n,n*8)
(n,n*9)
(n,n*10)

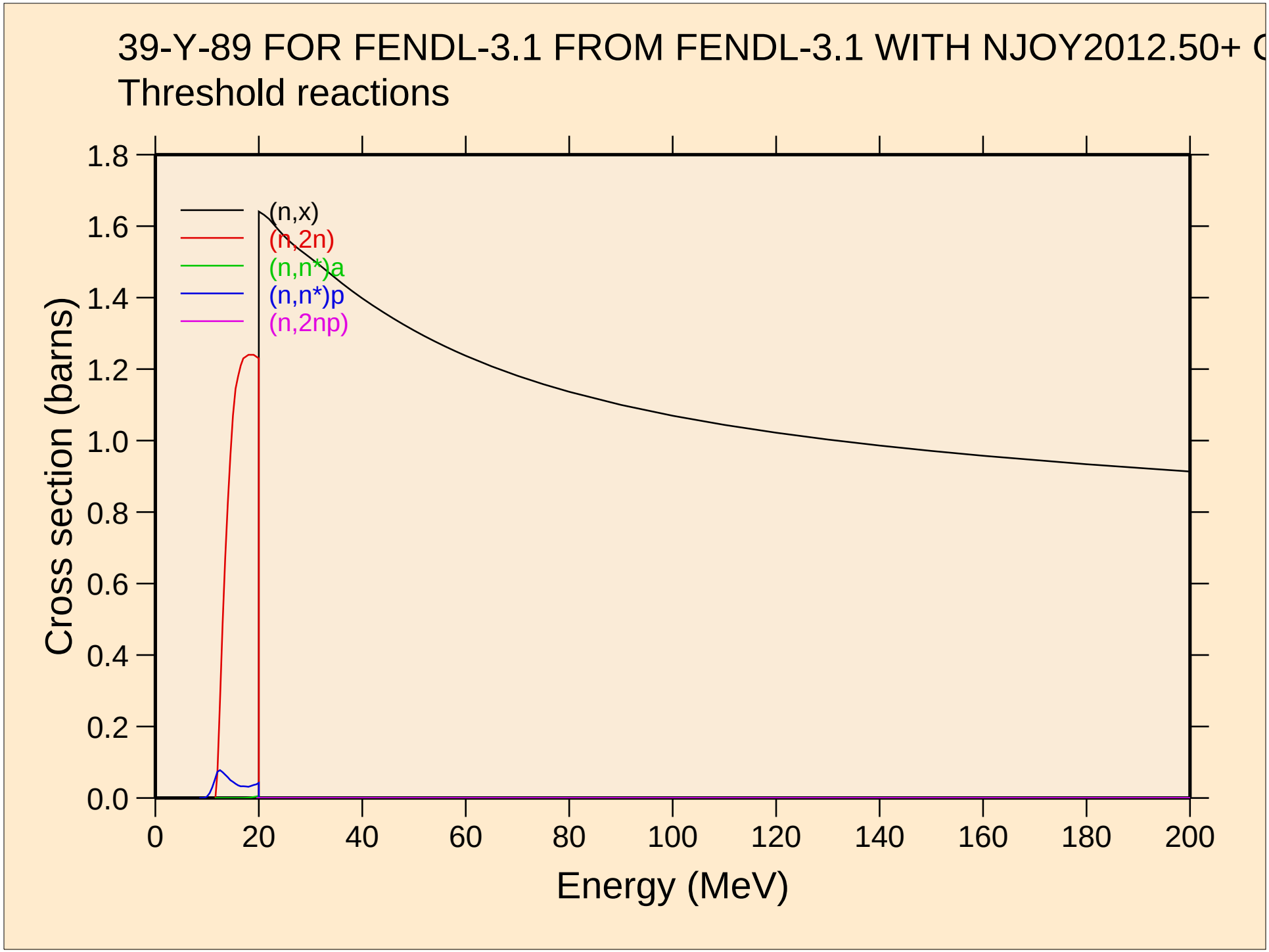

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
140
120
100
80
60
40
20
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*11)
(n,n*12)
(n,n*13)
(n,n*14)
(n,n*15)

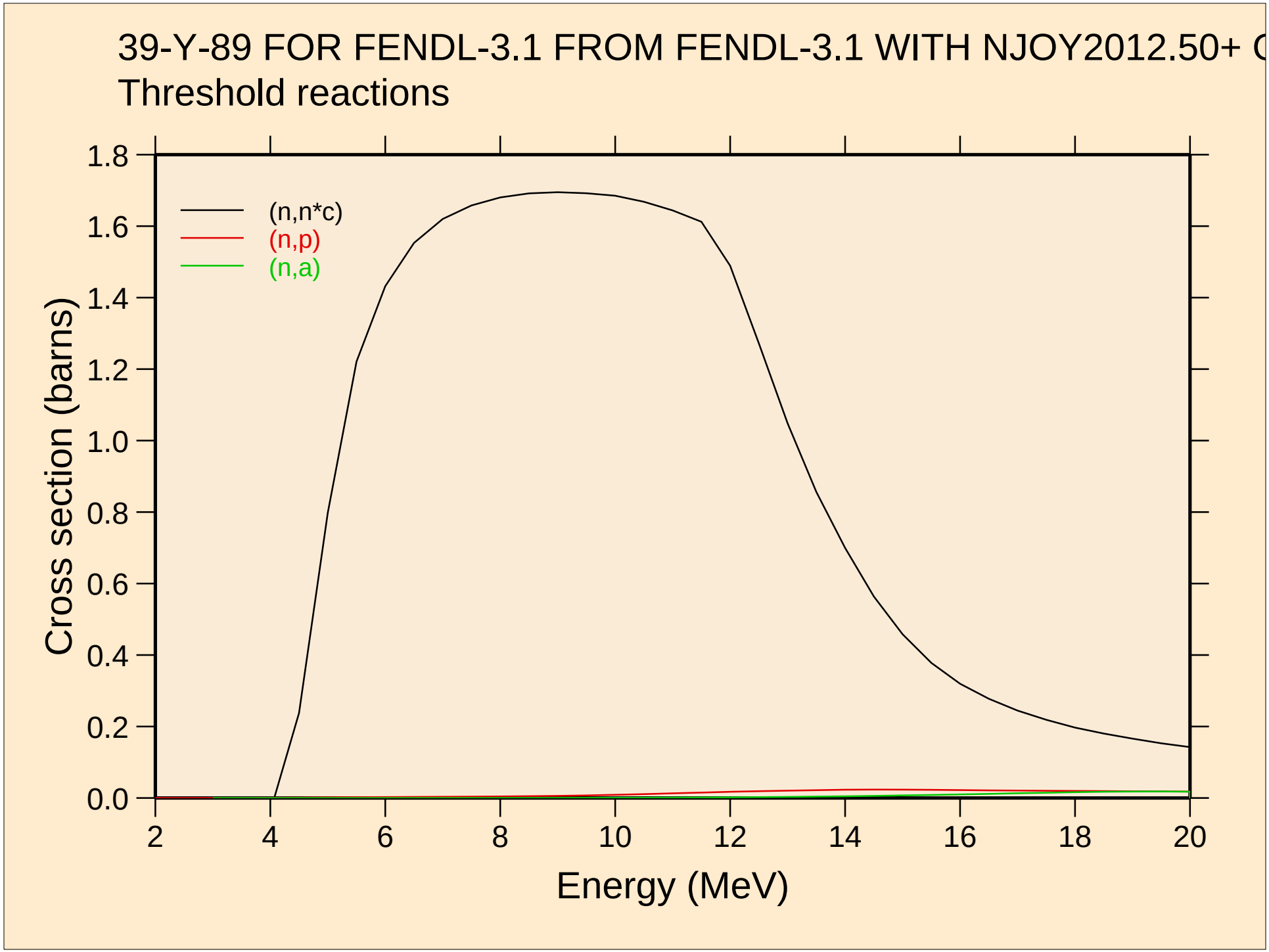

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
100
*10-3
80
60
40
20
0
Cross section (barns)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*16)
(n,n*17)
(n,n*18)
(n,n*19)
(n,n*20)

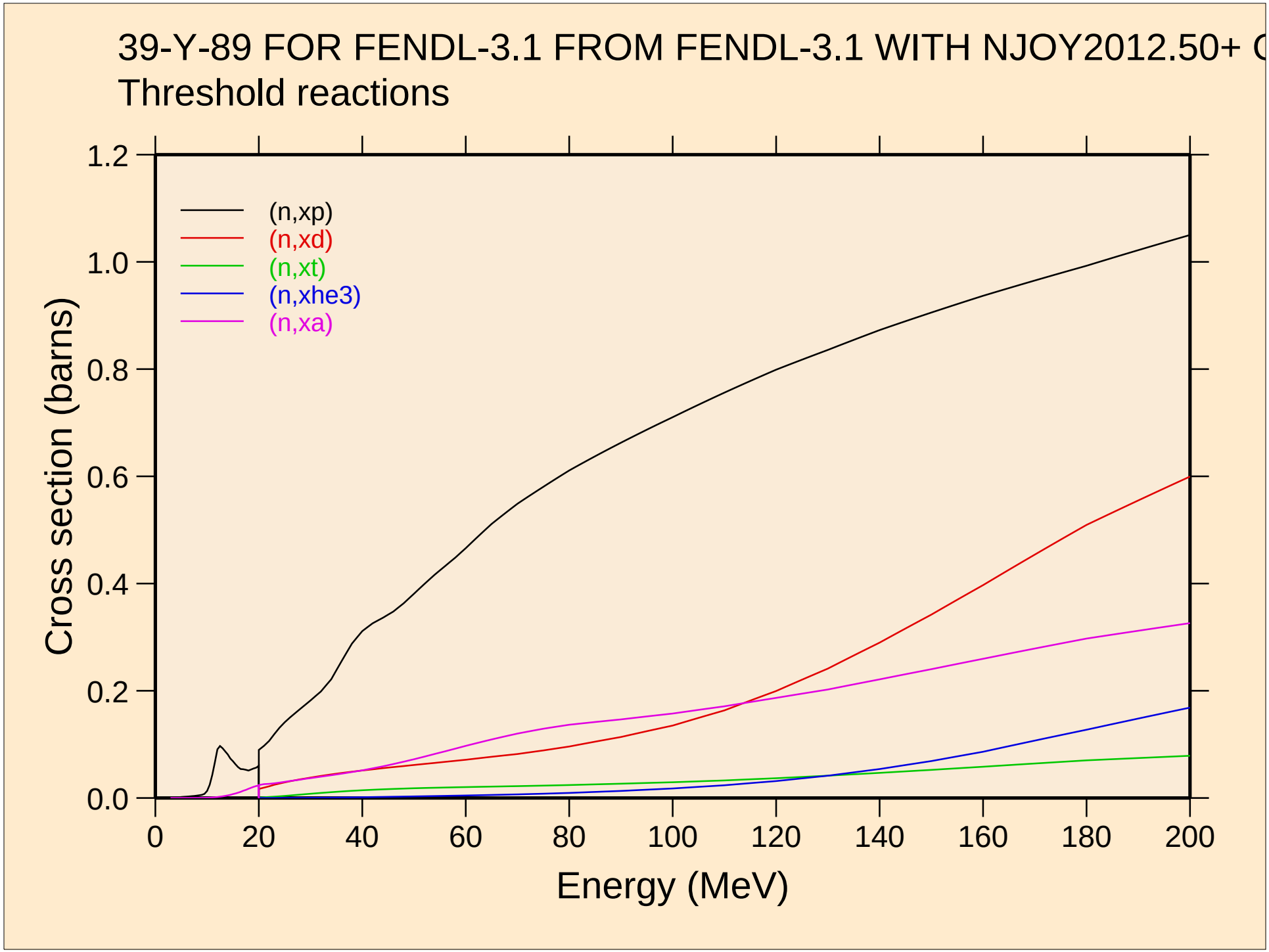

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
70
60
50
40
30
20
10
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*21)
(n,n*22)
(n,n*23)
(n,n*24)
(n,n*25)

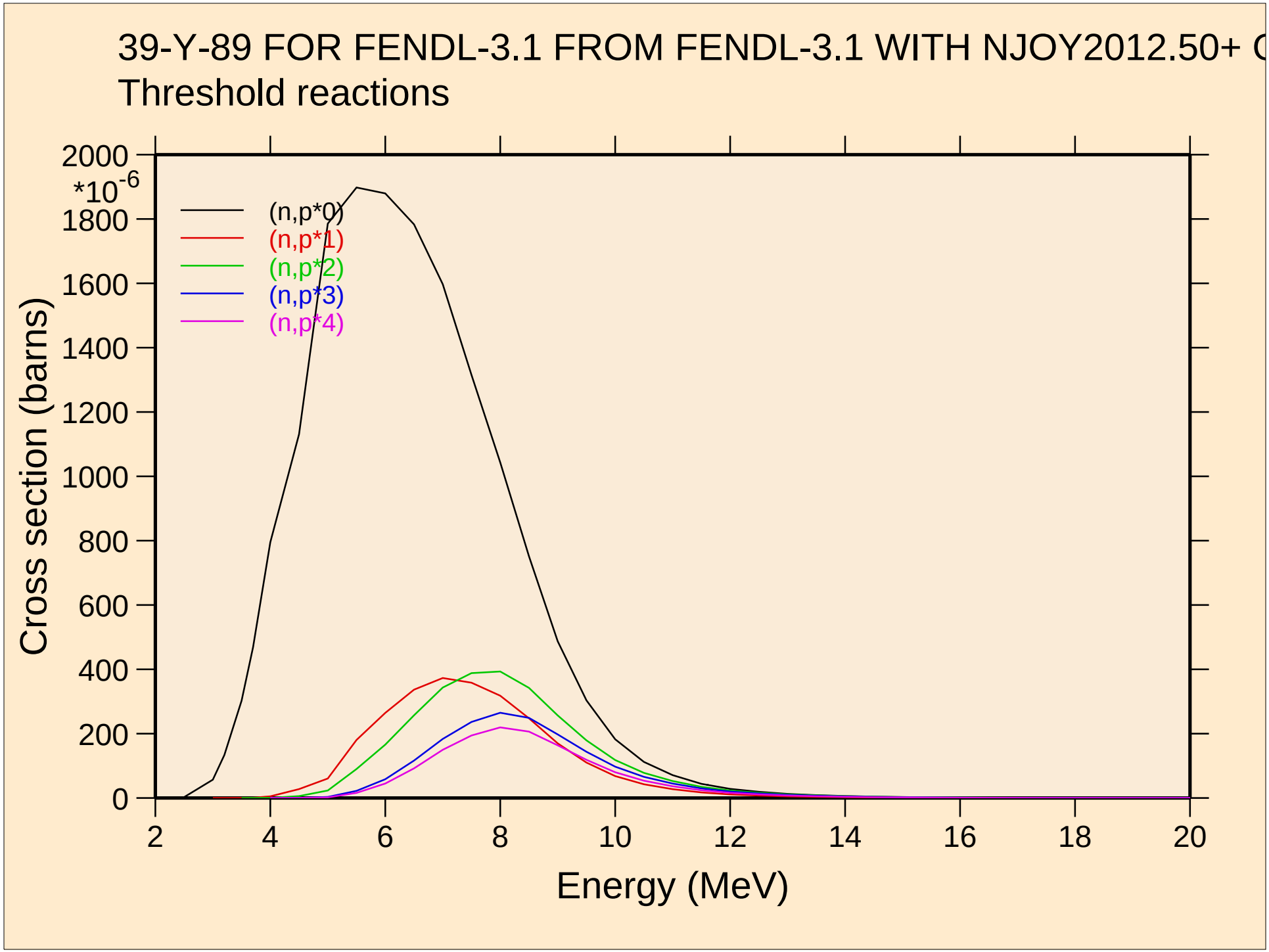

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
50
40
30
20
10
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*26)
(n,n*27)
(n,n*28)
(n,n*29)
(n,n*30)

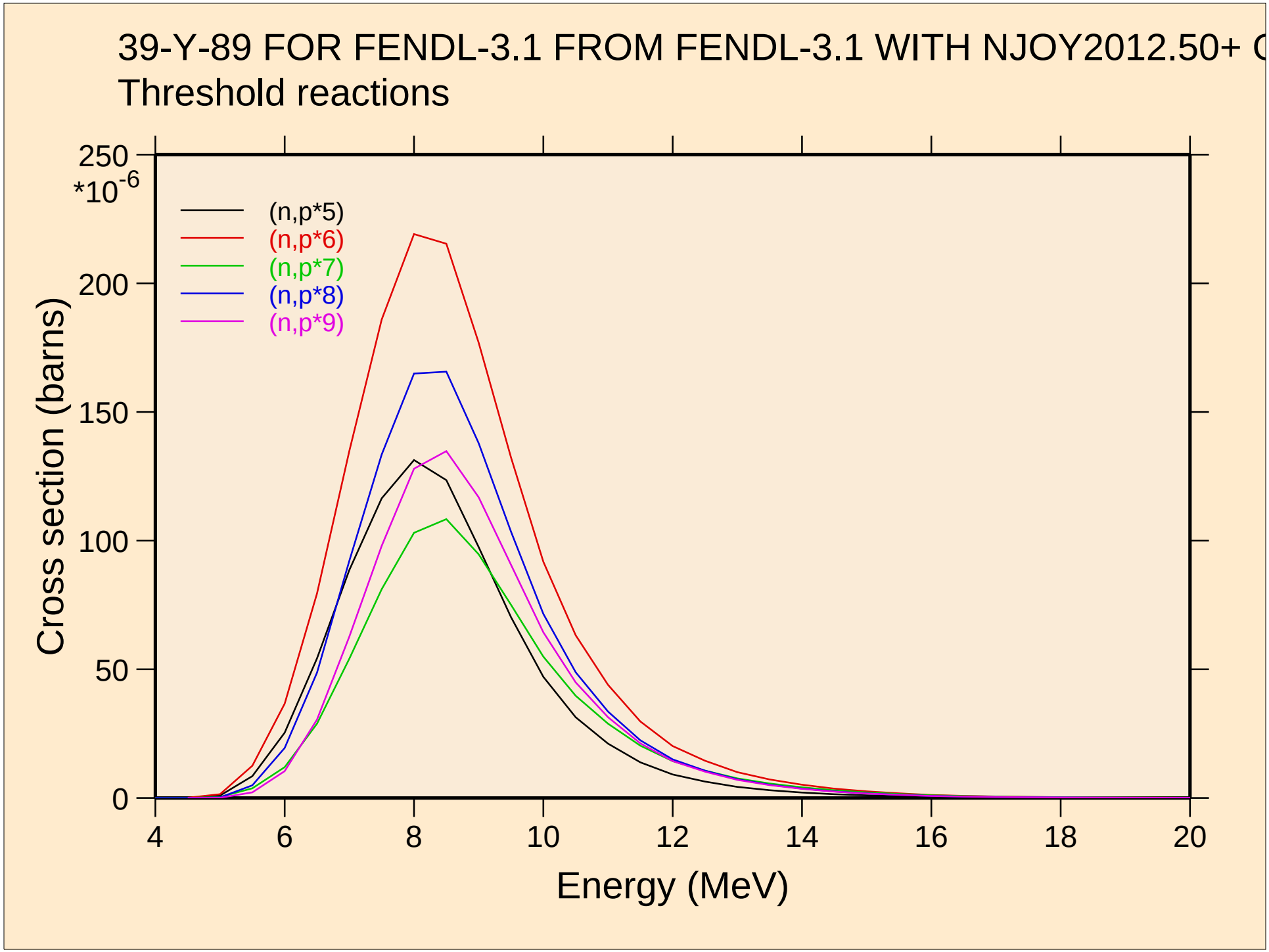

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Inelastic levels
Cross section (barns)
*10-3
40
35
30
25
20
15
10
5
0
4
6
8
10
12
14
16
18
20
Energy (MeV)
(n,n*31)
(n,n*32)
(n,n*33)

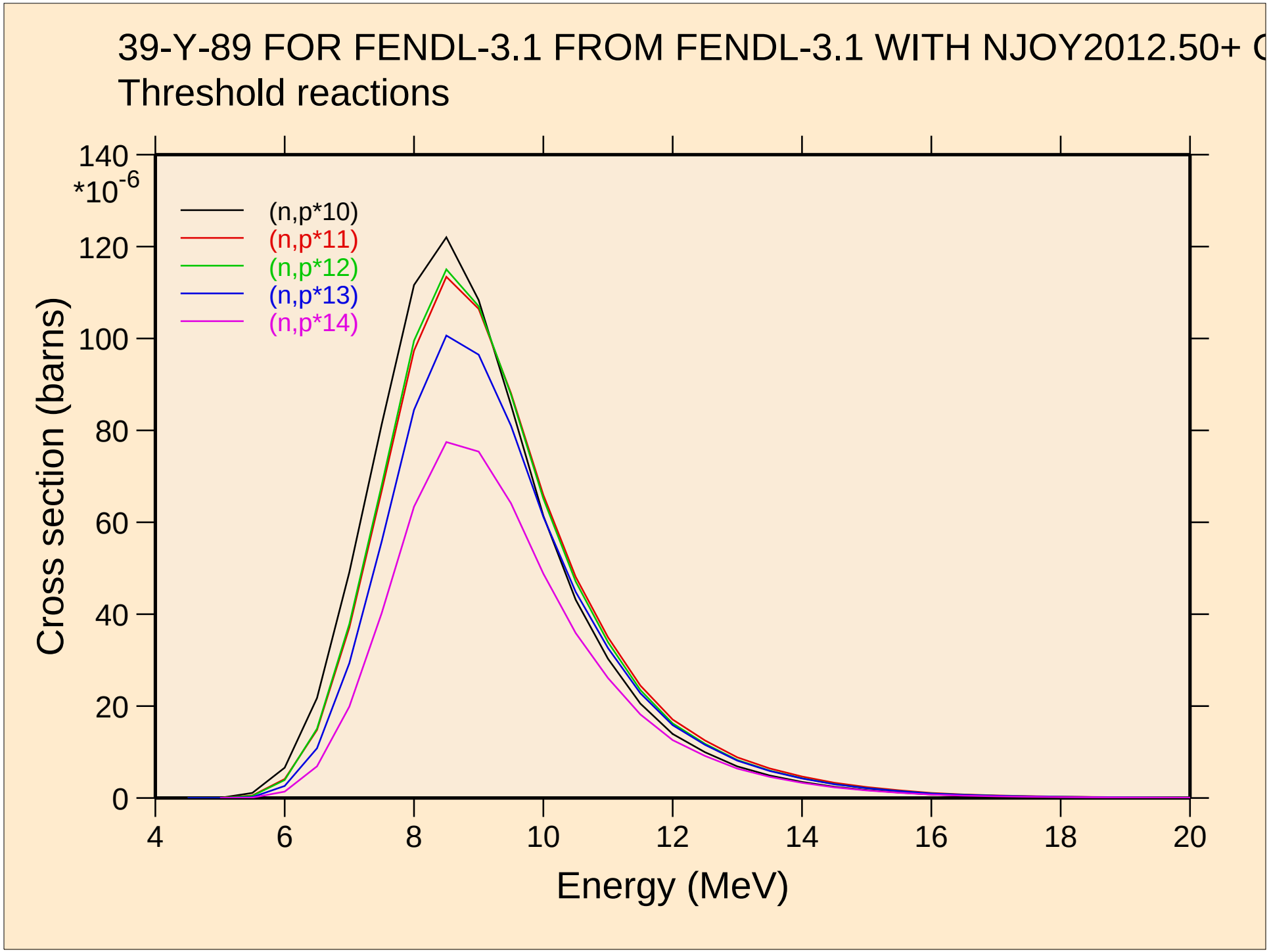

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
Cross section (barns)
Energy (MeV)
(n,x)
(n,2n)
(n,n*)a
(n,n*)p
(n,2np)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
0
20
40
60
80
100
120
140
160
180
200

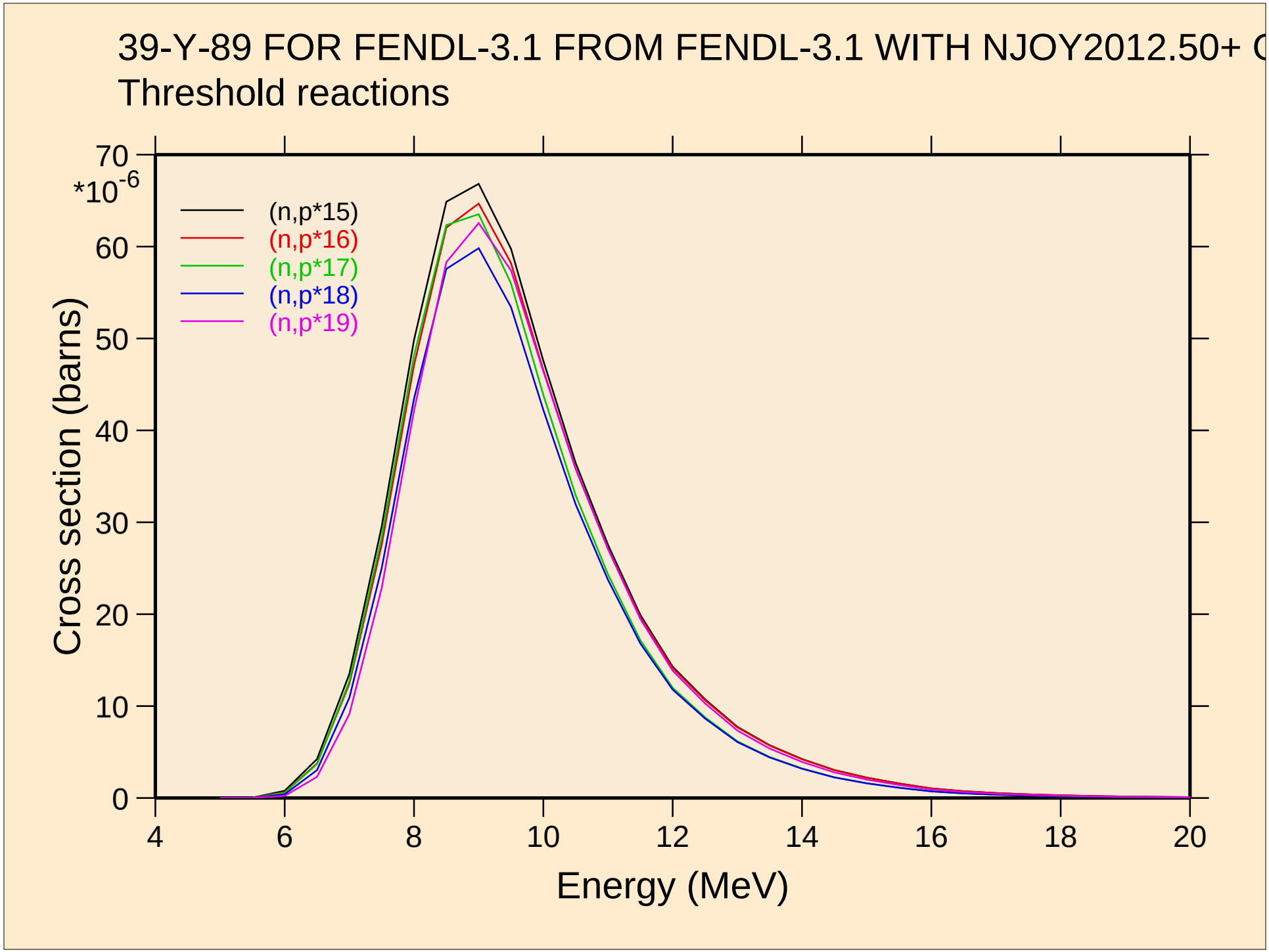

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
(n,n*c)
(n,p)
(n,a)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2
4
6
8
10
12
14
16
18
20

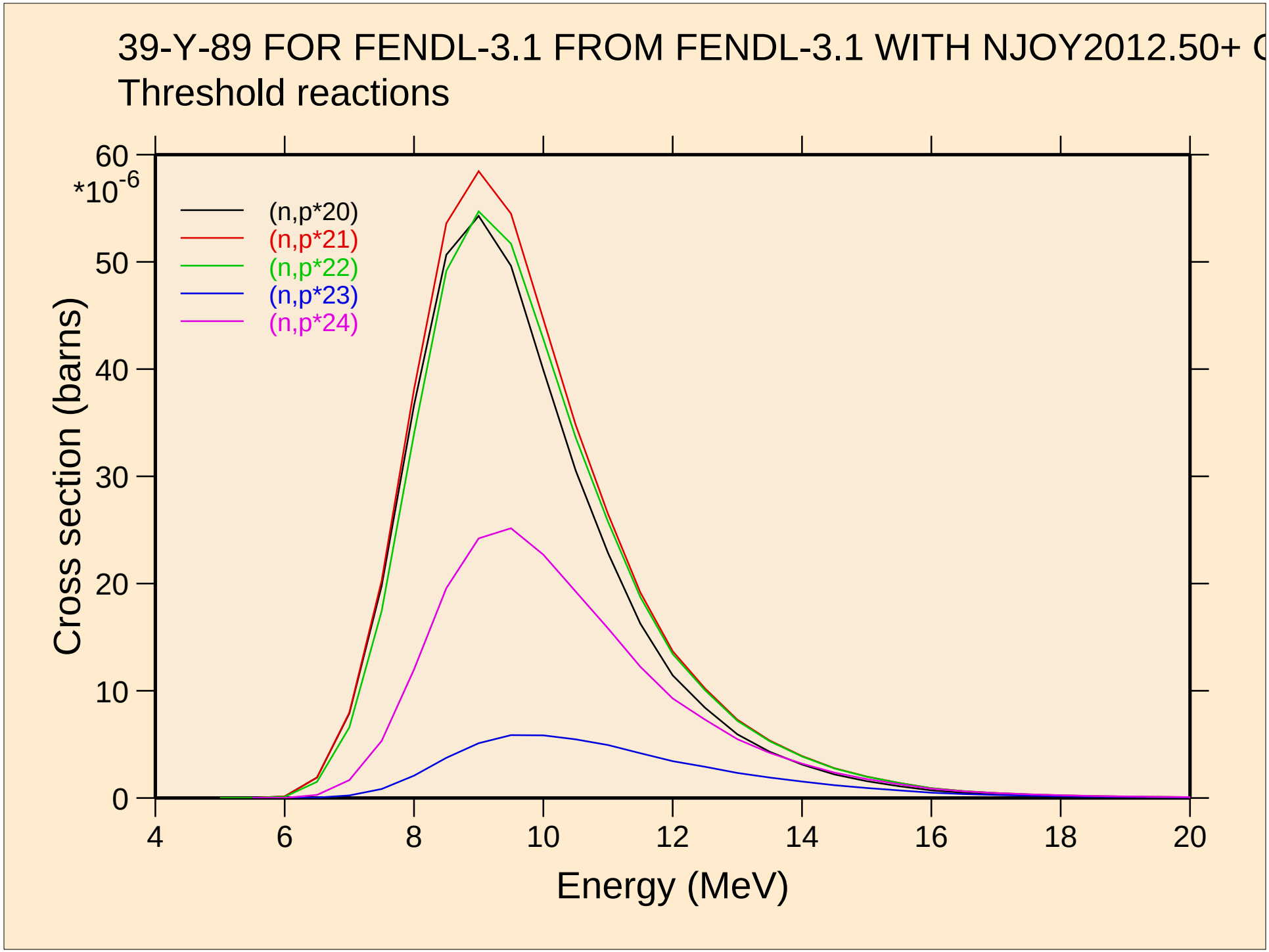

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,xa)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
20
40
60
80
100
120
140
160
180
200

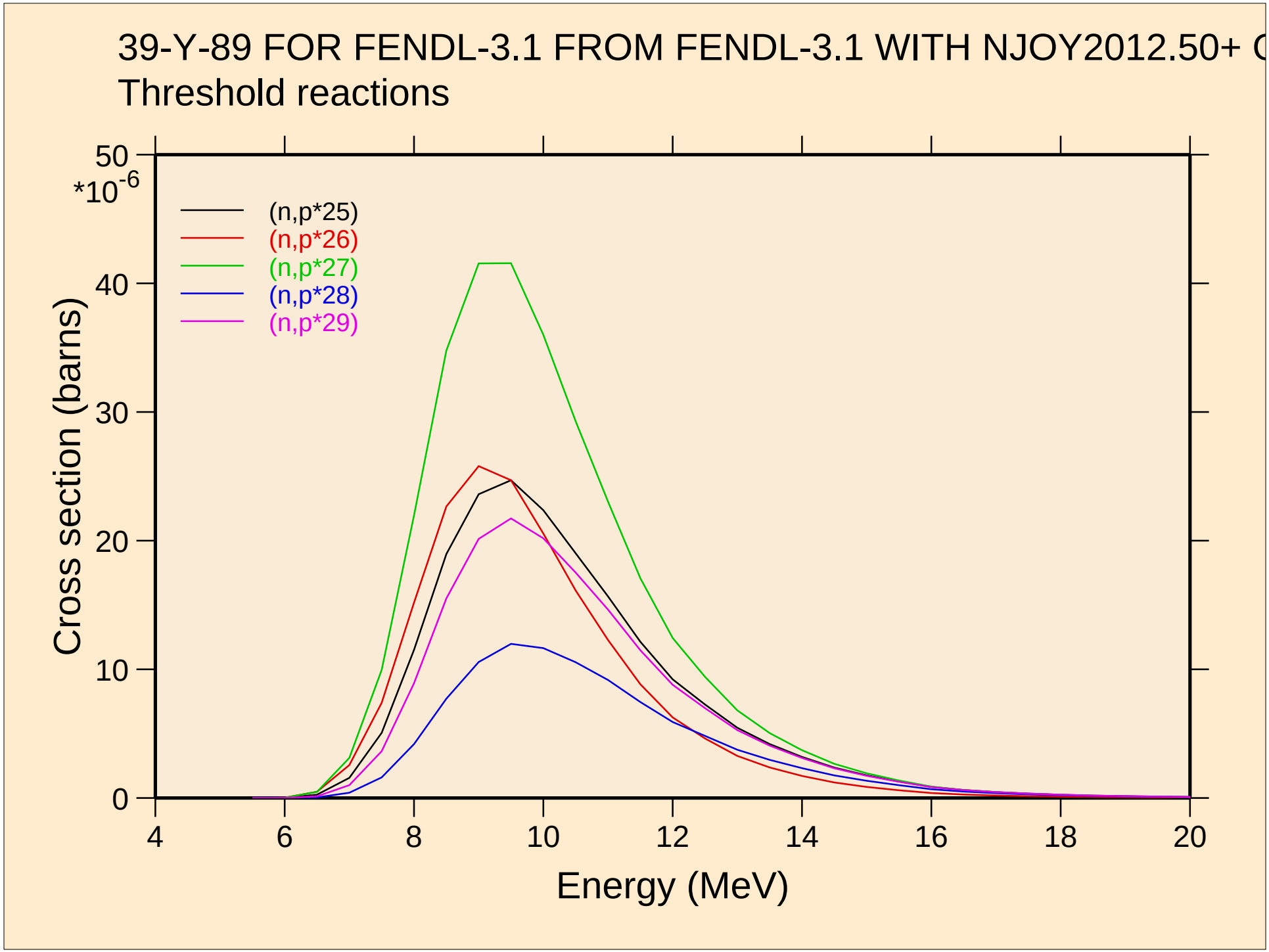

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
Cross section (barns)
*10-6
2000
1800
1600
1400
1200
1000
800
600
400
200
0
(n,p*0)
(n,p*1)
(n,p*2)
(n,p*3)
(n,p*4)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

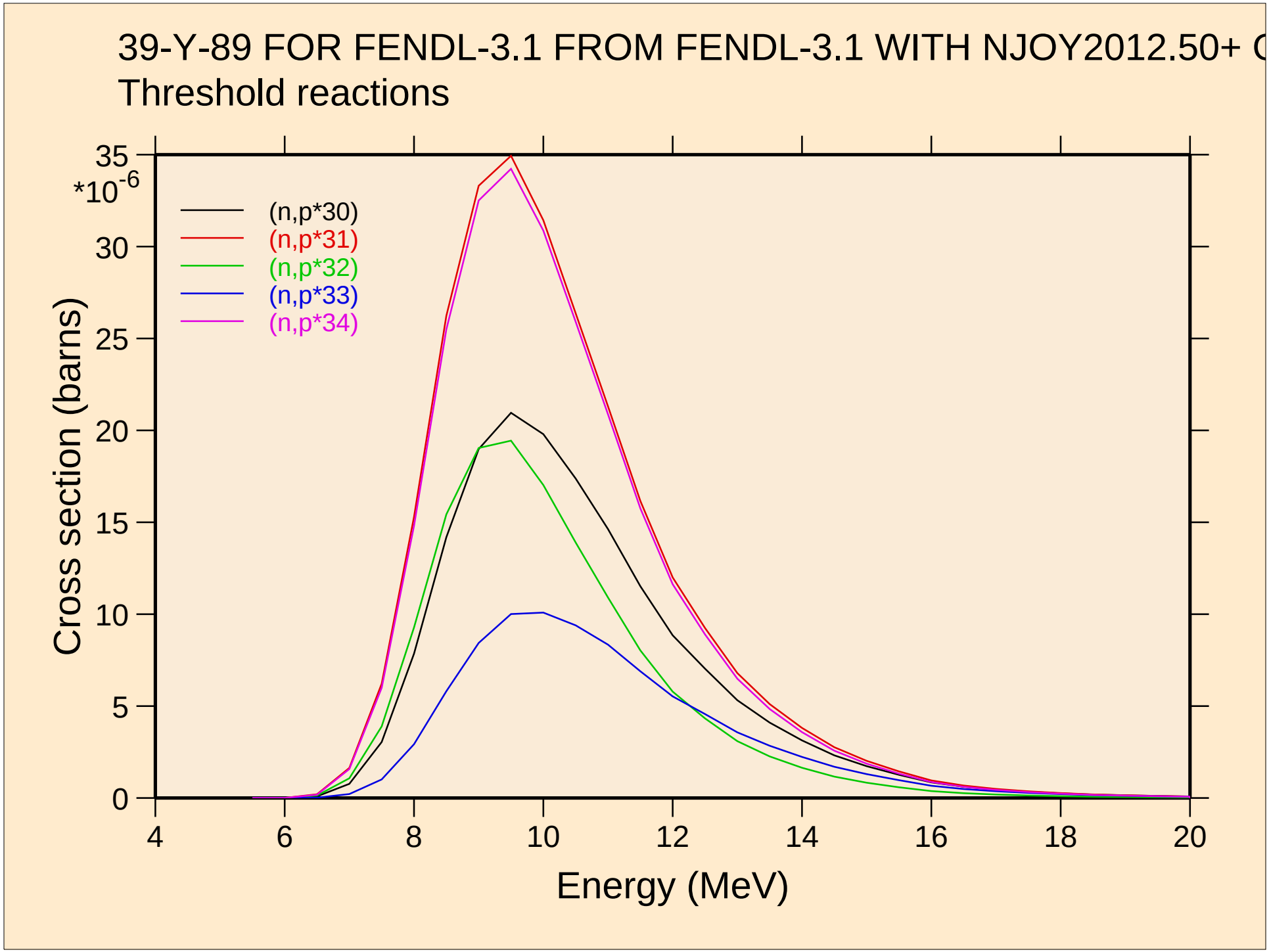

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
250
*10-6
200
150
100
50
0
Cross section (barns)
(n,p*5)
(n,p*6)
(n,p*7)
(n,p*8)
(n,p*9)
4
6
8
10
12
14
16
18
20
Energy (MeV)

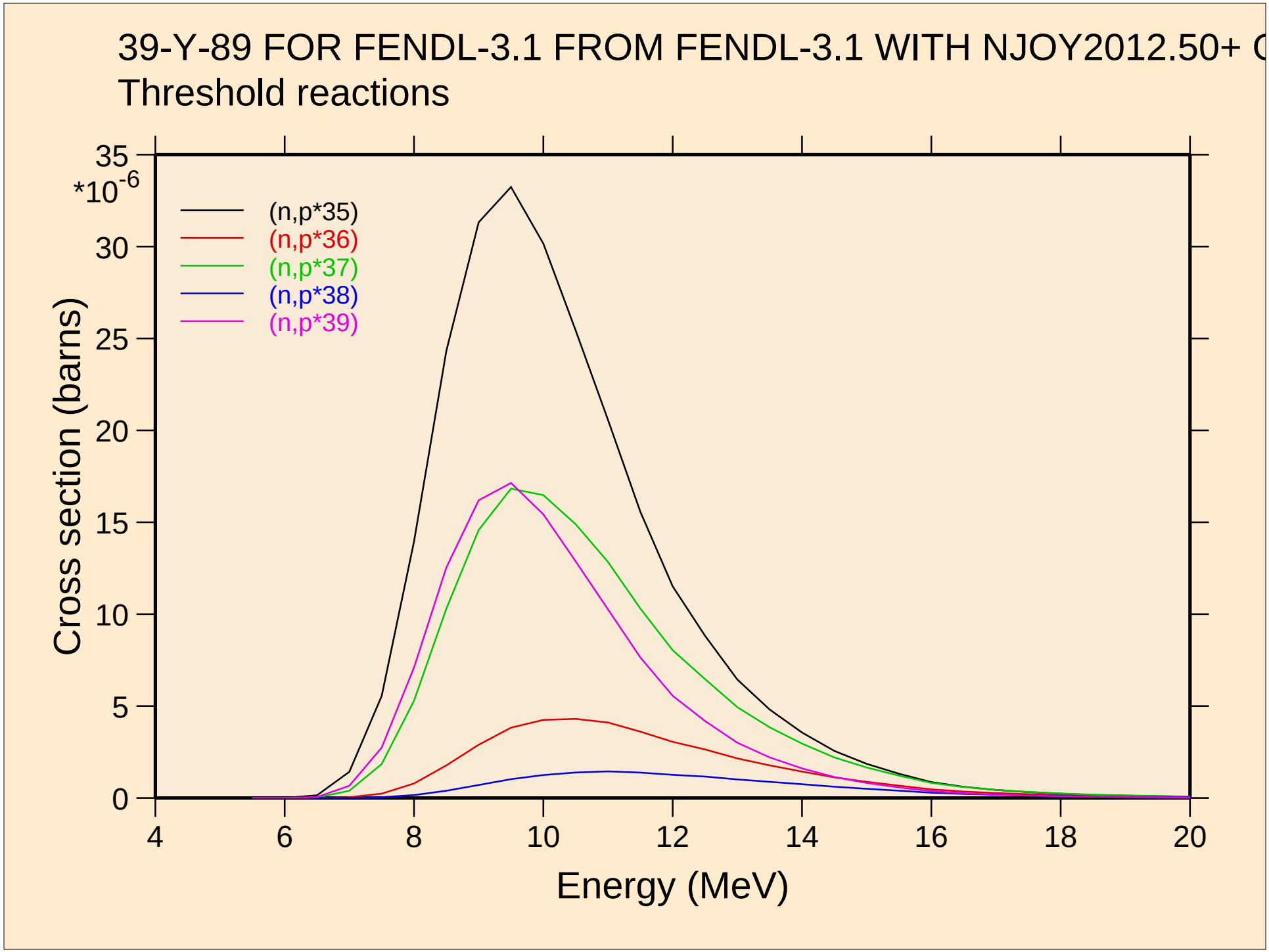

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
140
*10-6
120
100
80
60
40
20
0
Cross section (barns)
(n,p*10)
(n,p*11)
(n,p*12)
(n,p*13)
(n,p*14)
4
6
8
10
12
14
16
18
20
Energy (MeV)

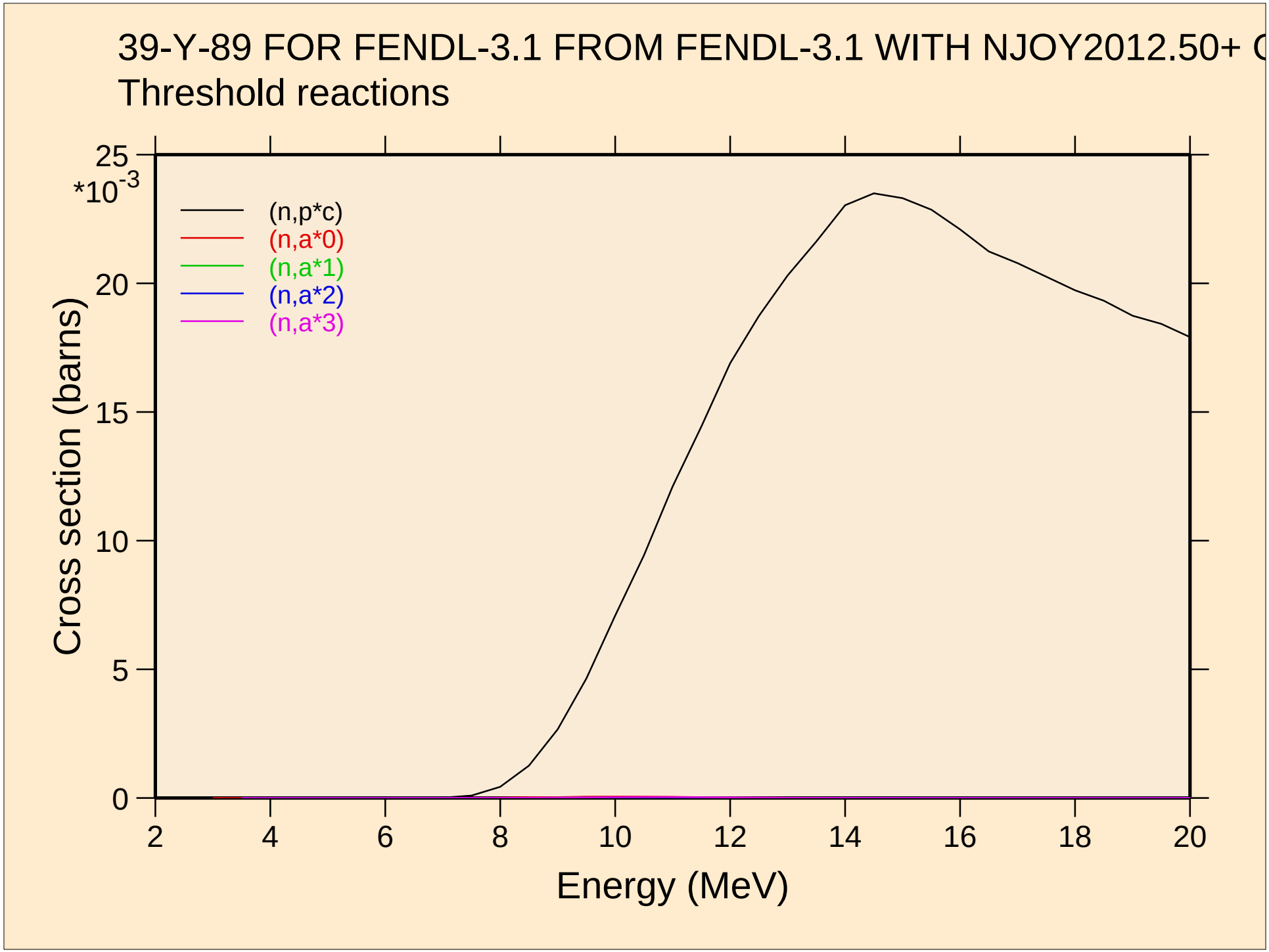

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,p*15)
(n,p*16)
(n,p*17)
(n,p*18)
(n,p*19)
Cross section (barns)
Energy (MeV)
0
10
20
30
40
50
60
70
4
6
8
10
12
14
16
18
20

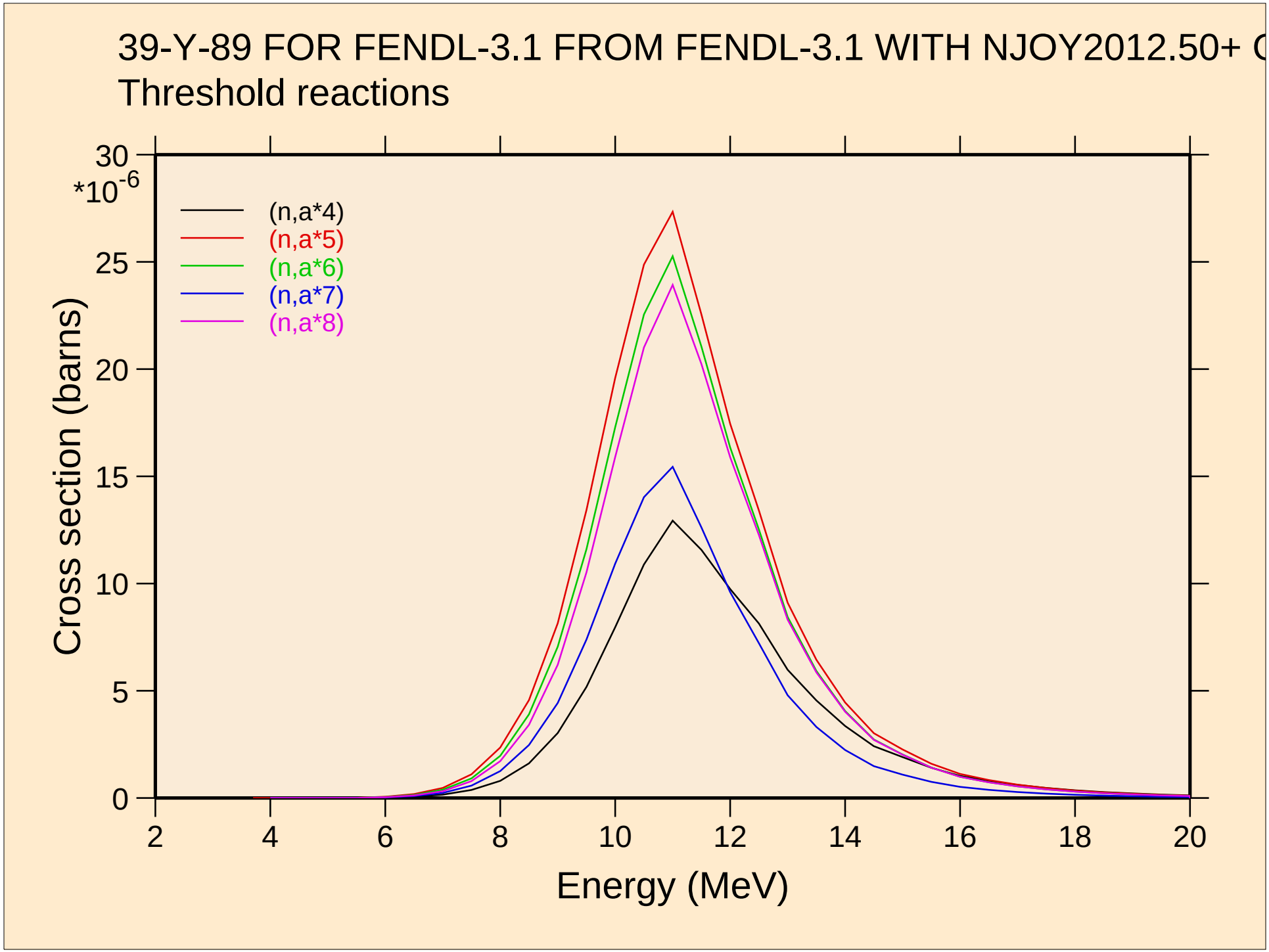

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,p*20)
(n,p*21)
(n,p*22)
(n,p*23)
(n,p*24)
Cross section (barns)
Energy (MeV)
0
10
20
30
40
50
60
4
6
8
10
12
14
16
18
20

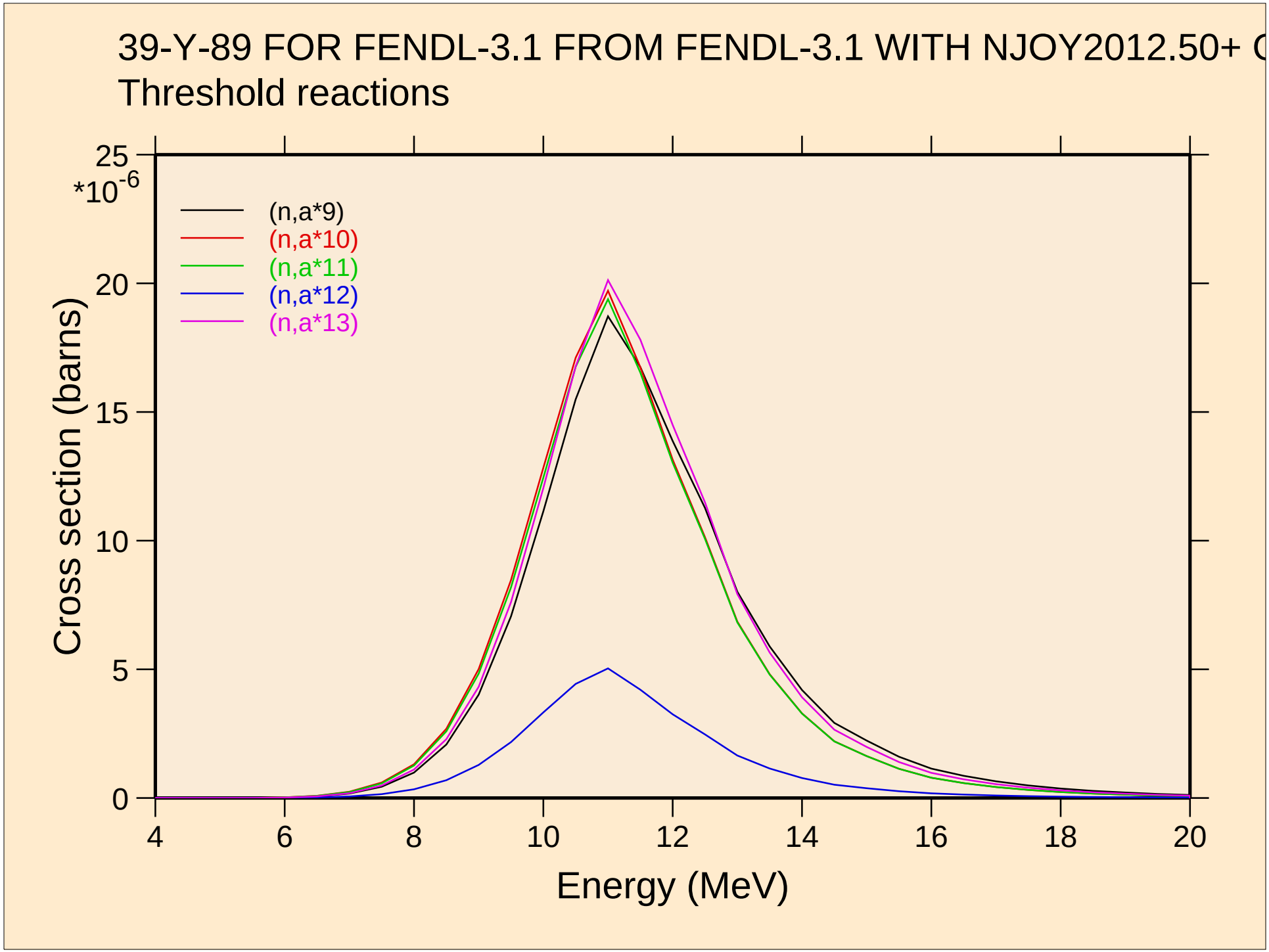

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
50
40
30
20
10
0
(n,p*25)
(n,p*26)
(n,p*27)
(n,p*28)
(n,p*29)
Cross section (barns)
4
6
8
10
12
14
16
18
20
Energy (MeV)

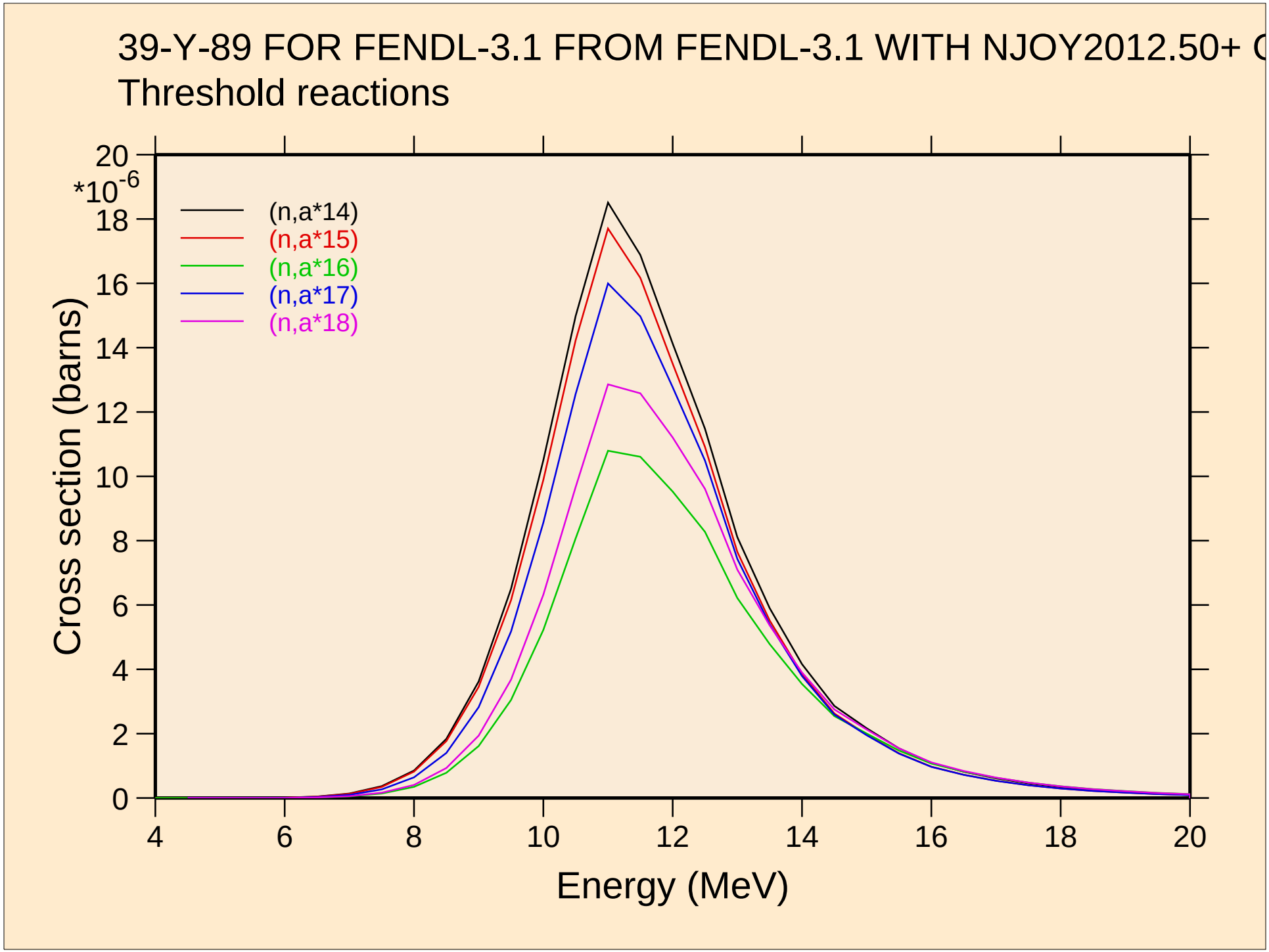

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,p*30)
(n,p*31)
(n,p*32)
(n,p*33)
(n,p*34)
Cross section (barns)
Energy (MeV)
0
5
10
15
20
25
30
35
4
6
8
10
12
14
16
18
20

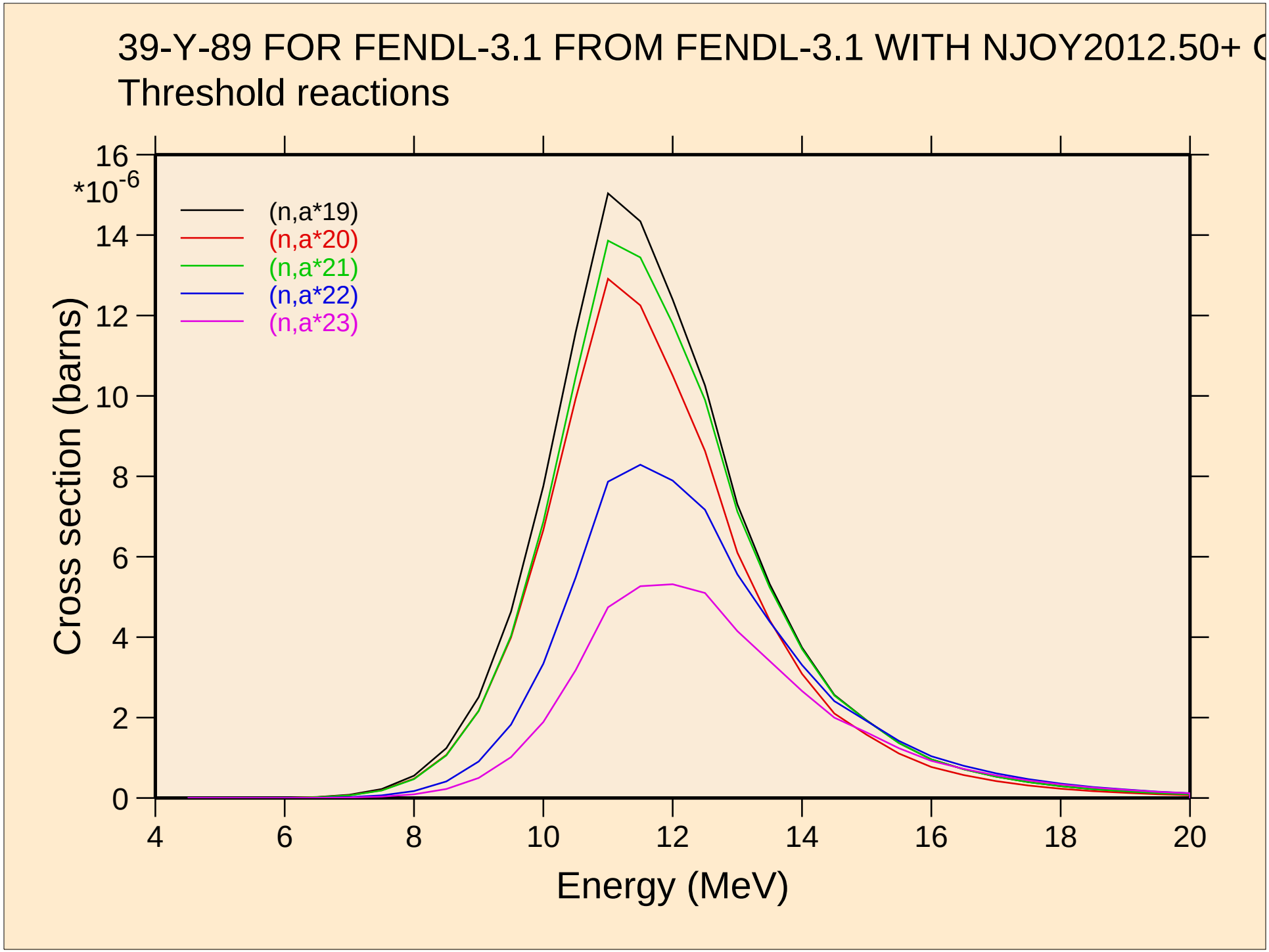

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,p*35)
(n,p*36)
(n,p*37)
(n,p*38)
(n,p*39)
Cross section (barns)
Energy (MeV)
0
5
10
15
20
25
30
35
4
6
8
10
12
14
16
18
20

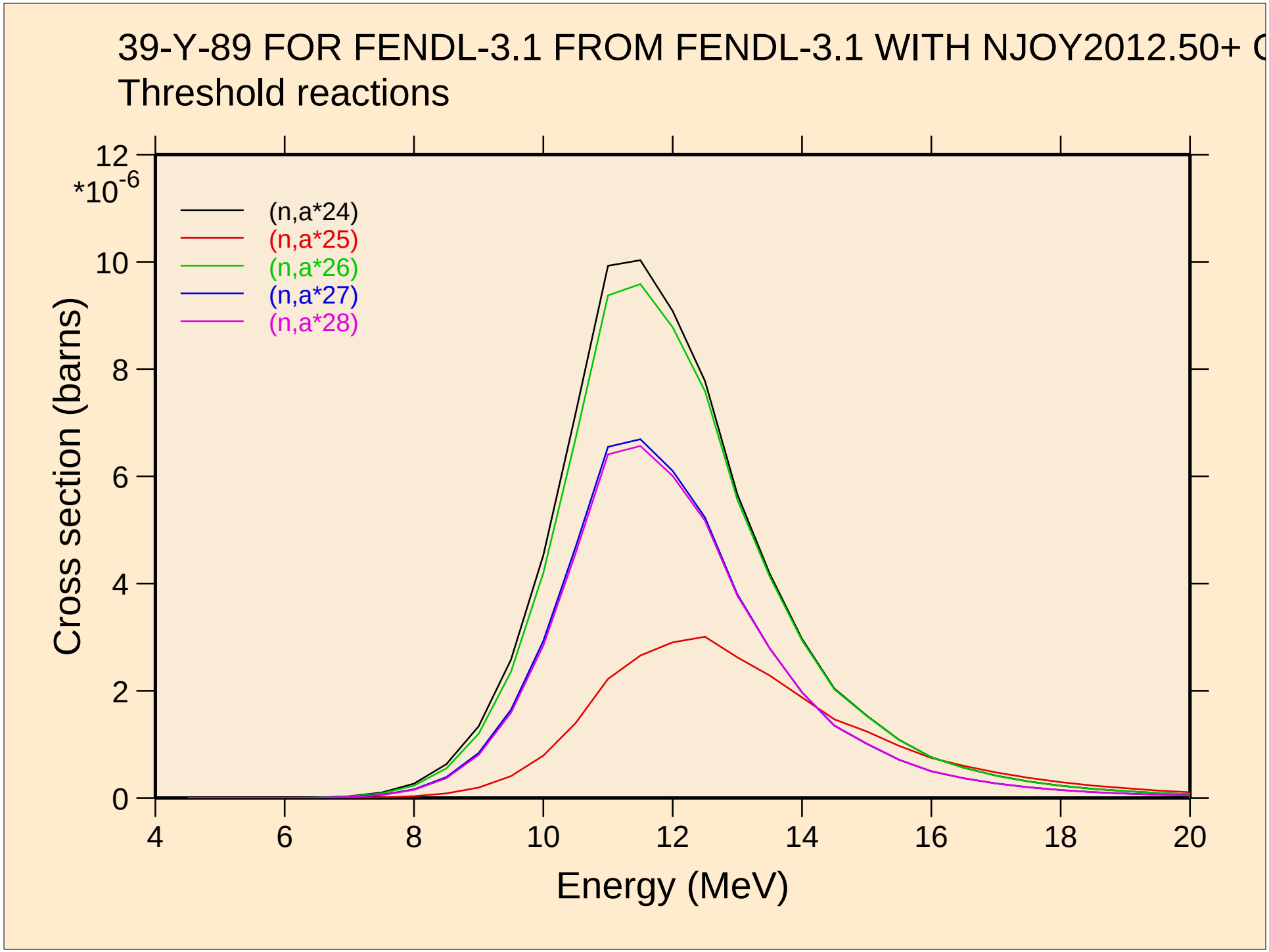

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-3
Cross section (barns)
Energy (MeV)
(n,p*c)
(n,a*0)
(n,a*1)
(n,a*2)
(n,a*3)
0
5
10
15
20
25
2
4
6
8
10
12
14
16
18
20

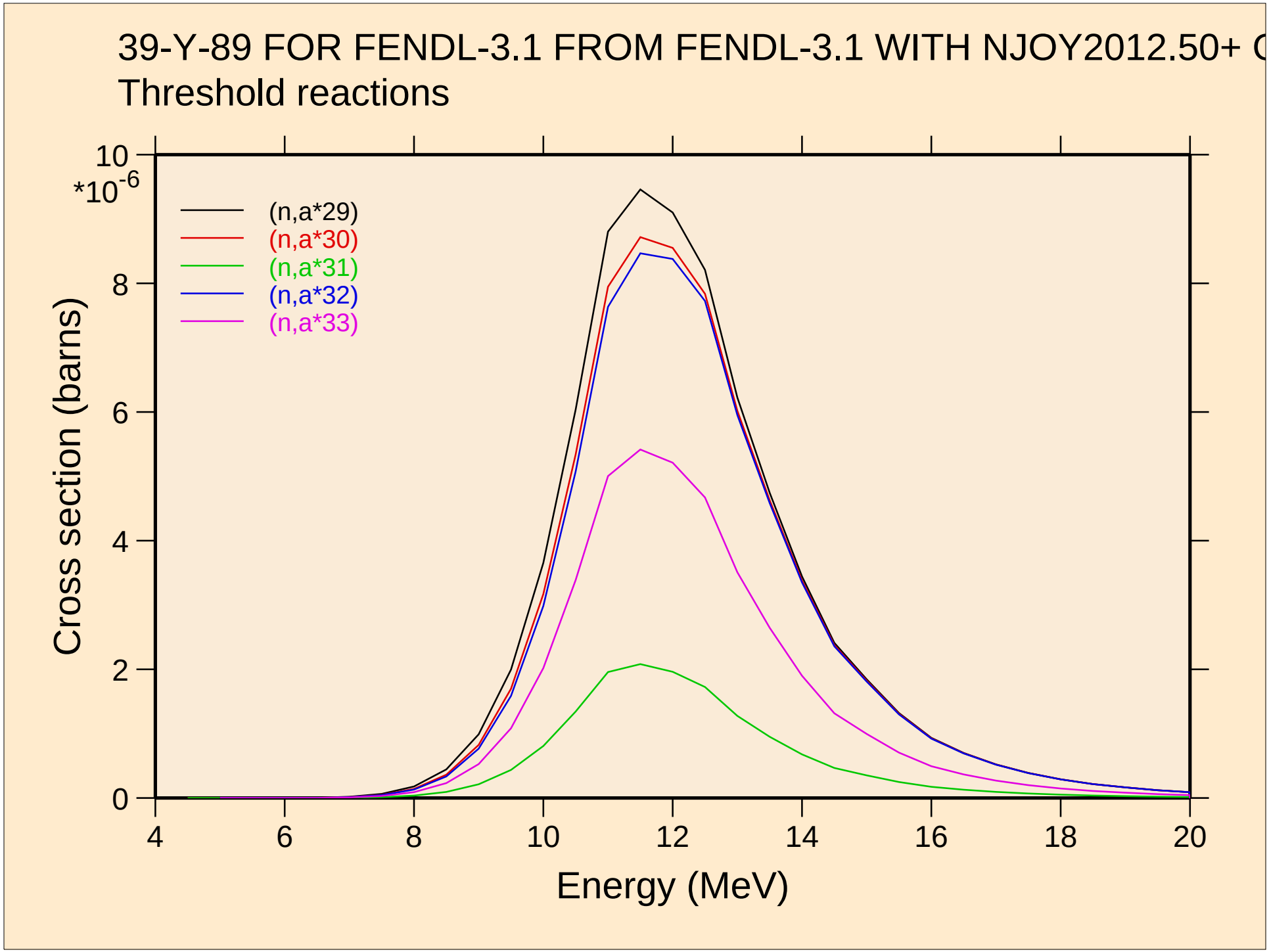

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
30
25
20
15
10
5
0
(n,a*4)
(n,a*5)
(n,a*6)
(n,a*7)
(n,a*8)
Cross section (barns)
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

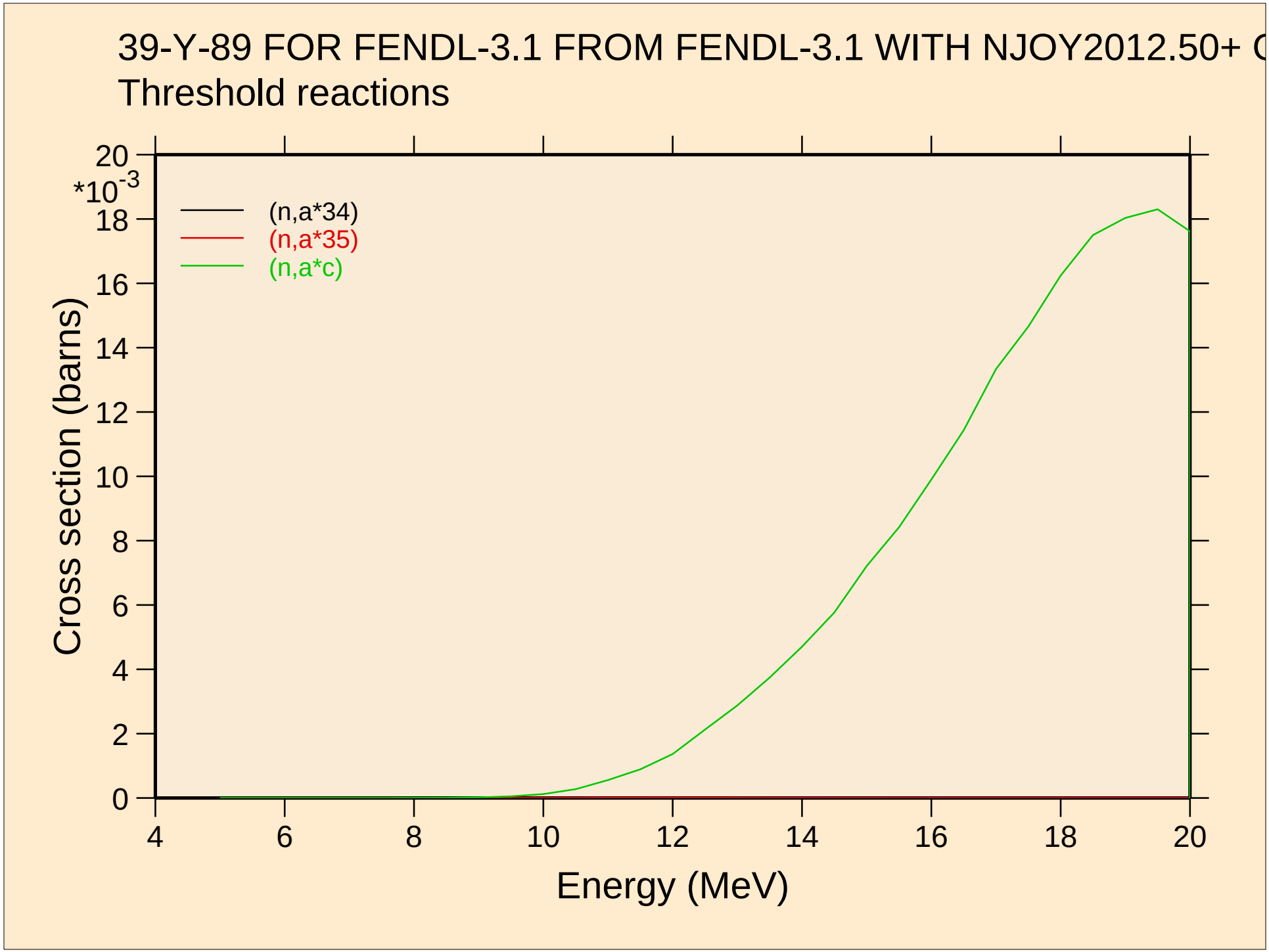

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,a*9)
(n,a*10)
(n,a*11)
(n,a*12)
(n,a*13)
Cross section (barns)
Energy (MeV)
0
5
10
15
20
25
4
6
8
10
12
14
16
18
20

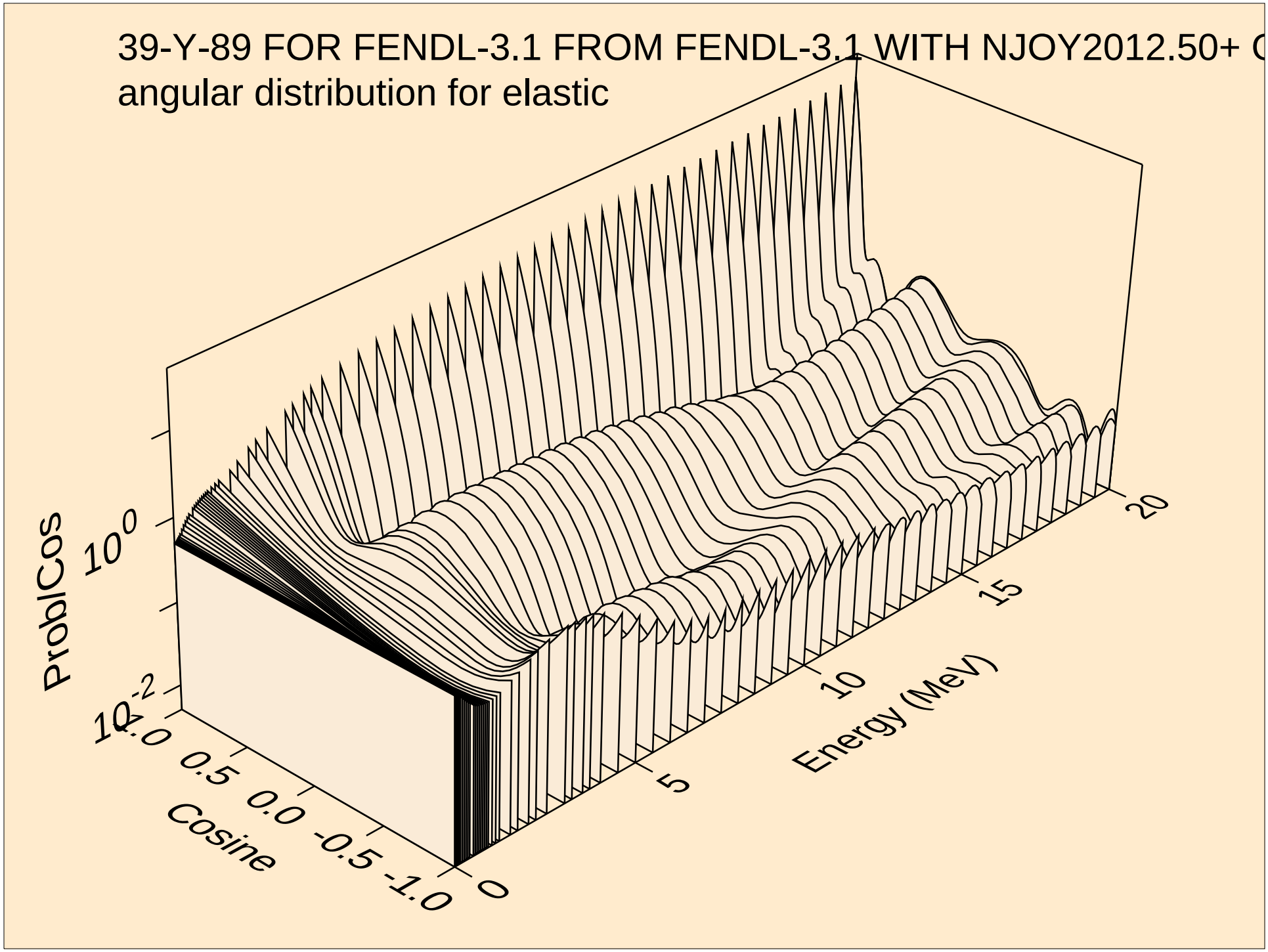

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
Cross section (barns)
Energy (MeV)
(n,a*14)
(n,a*15)
(n,a*16)
(n,a*17)
(n,a*18)
0
2
4
6
8
10
12
14
16
18
20
4
6
8
10
12
14
16
18
20

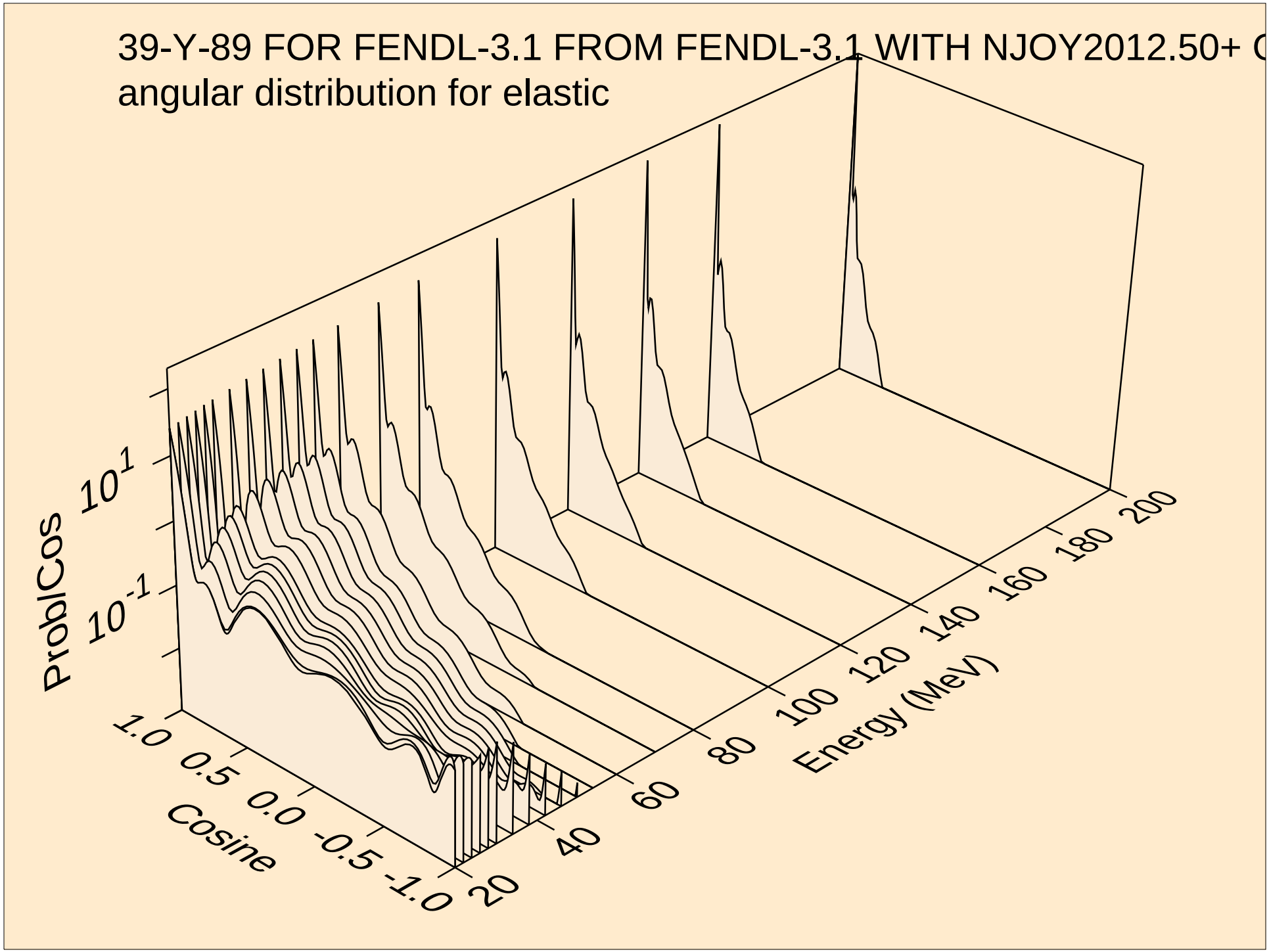

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
(n,a*19)
(n,a*20)
(n,a*21)
(n,a*22)
(n,a*23)
Cross section (barns)
Energy (MeV)
0
2
4
6
8
10
12
14
16
4
6
8
10
12
14
16
18
20

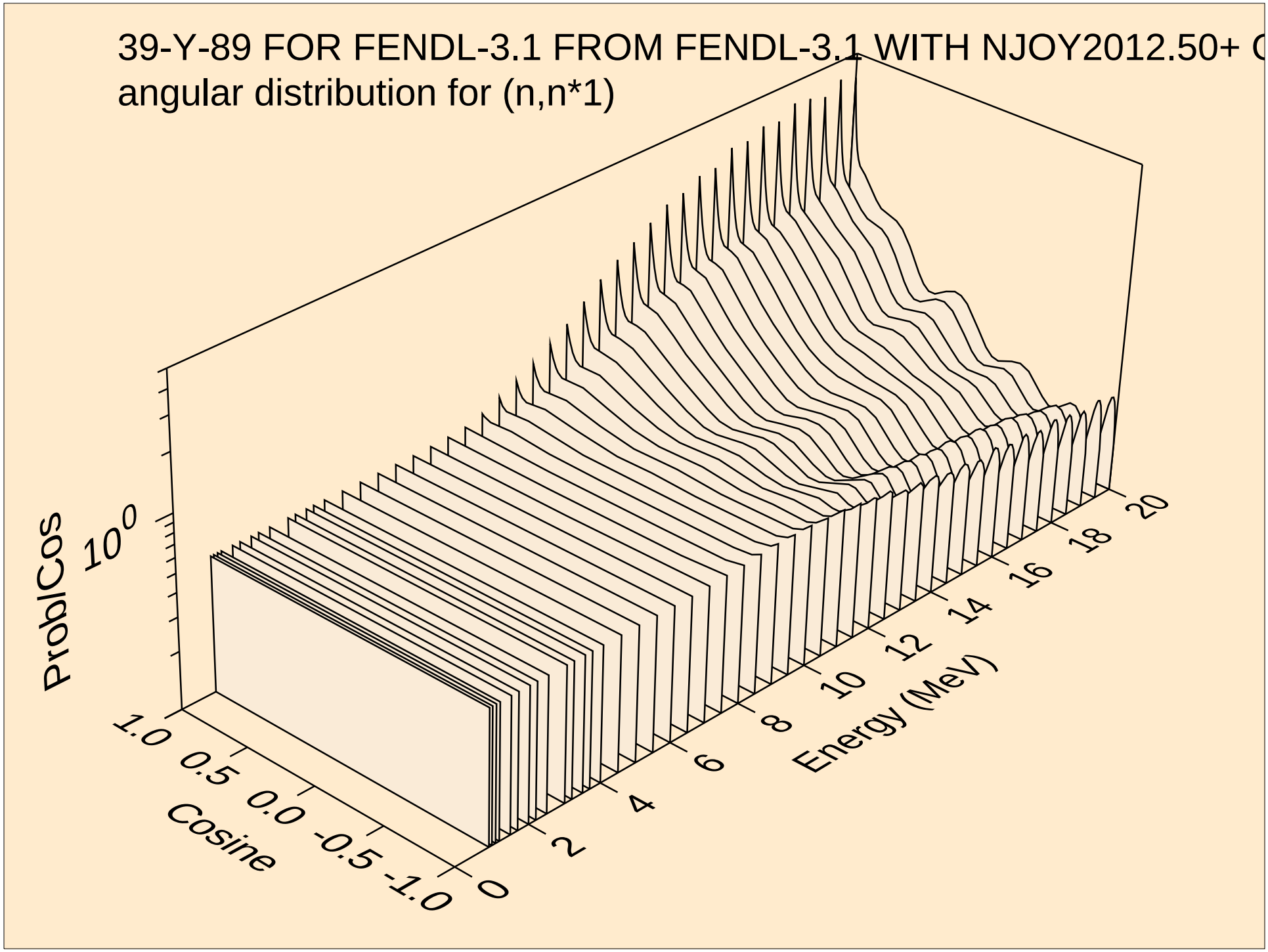

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-6
12
10
8
6
4
2
0
(n,a*24)
(n,a*25)
(n,a*26)
(n,a*27)
(n,a*28)
Cross section (barns)
4
6
8
10
12
14
16
18
20
Energy (MeV)

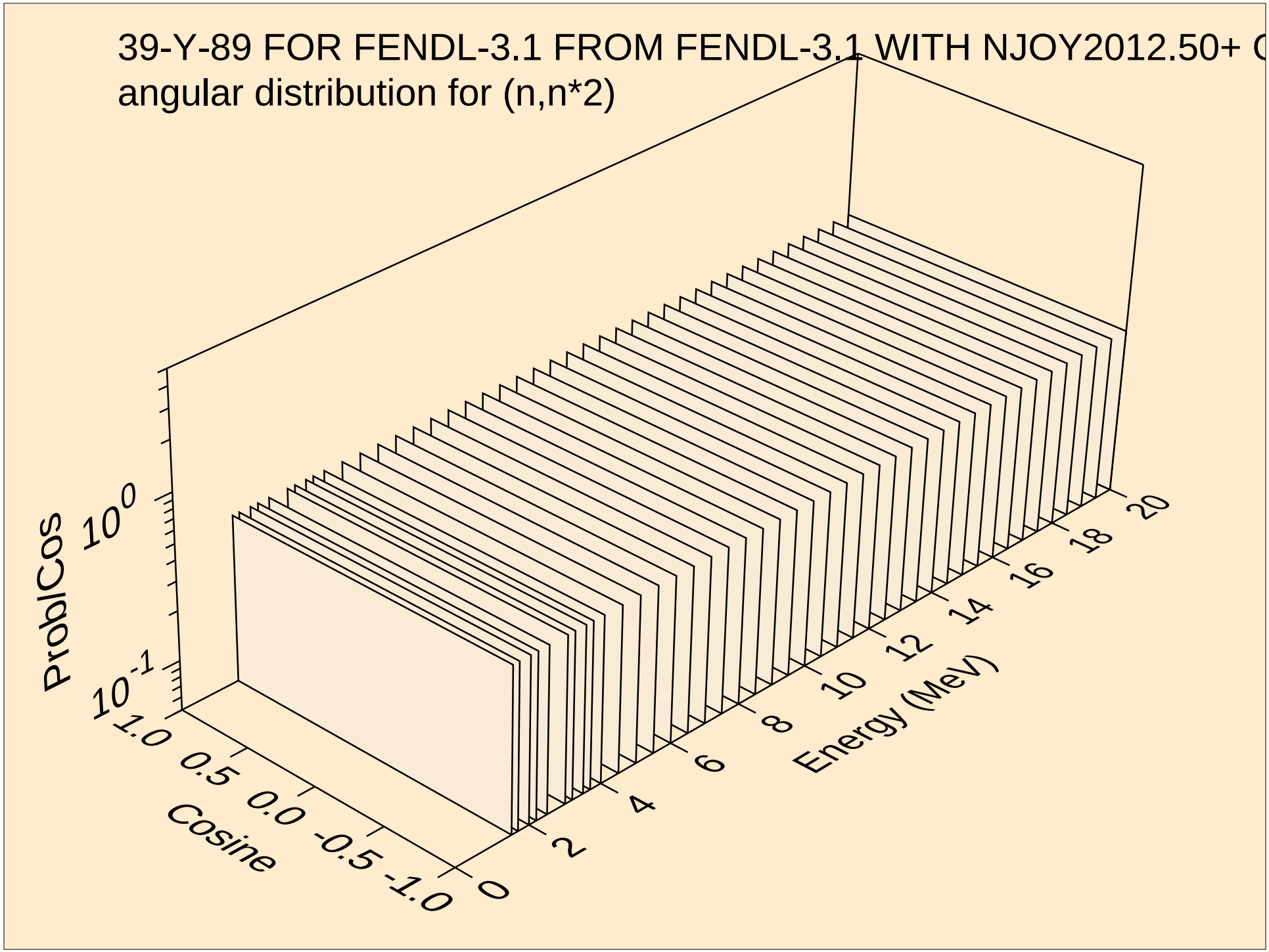

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
10
*10-6
8
6
4
2
0
Cross section (barns)
(n,a*29)
(n,a*30)
(n,a*31)
(n,a*32)
(n,a*33)
4
6
8
10
12
14
16
18
20
Energy (MeV)

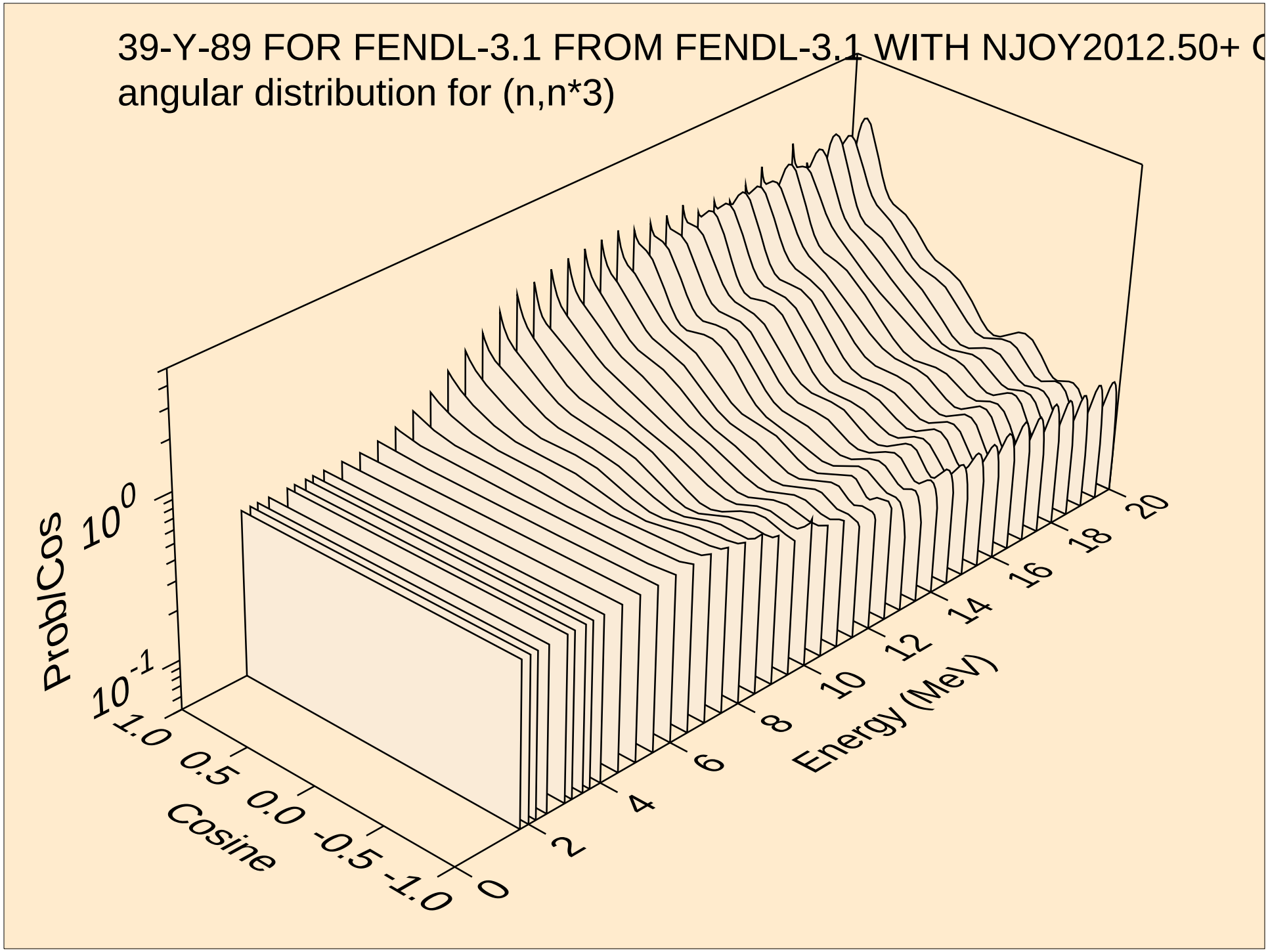

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Threshold reactions
*10-3
(n,a*34)
(n,a*35)
(n,a*c)
Cross section (barns)
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
20
4
6
8
10
12
14
16
18
20

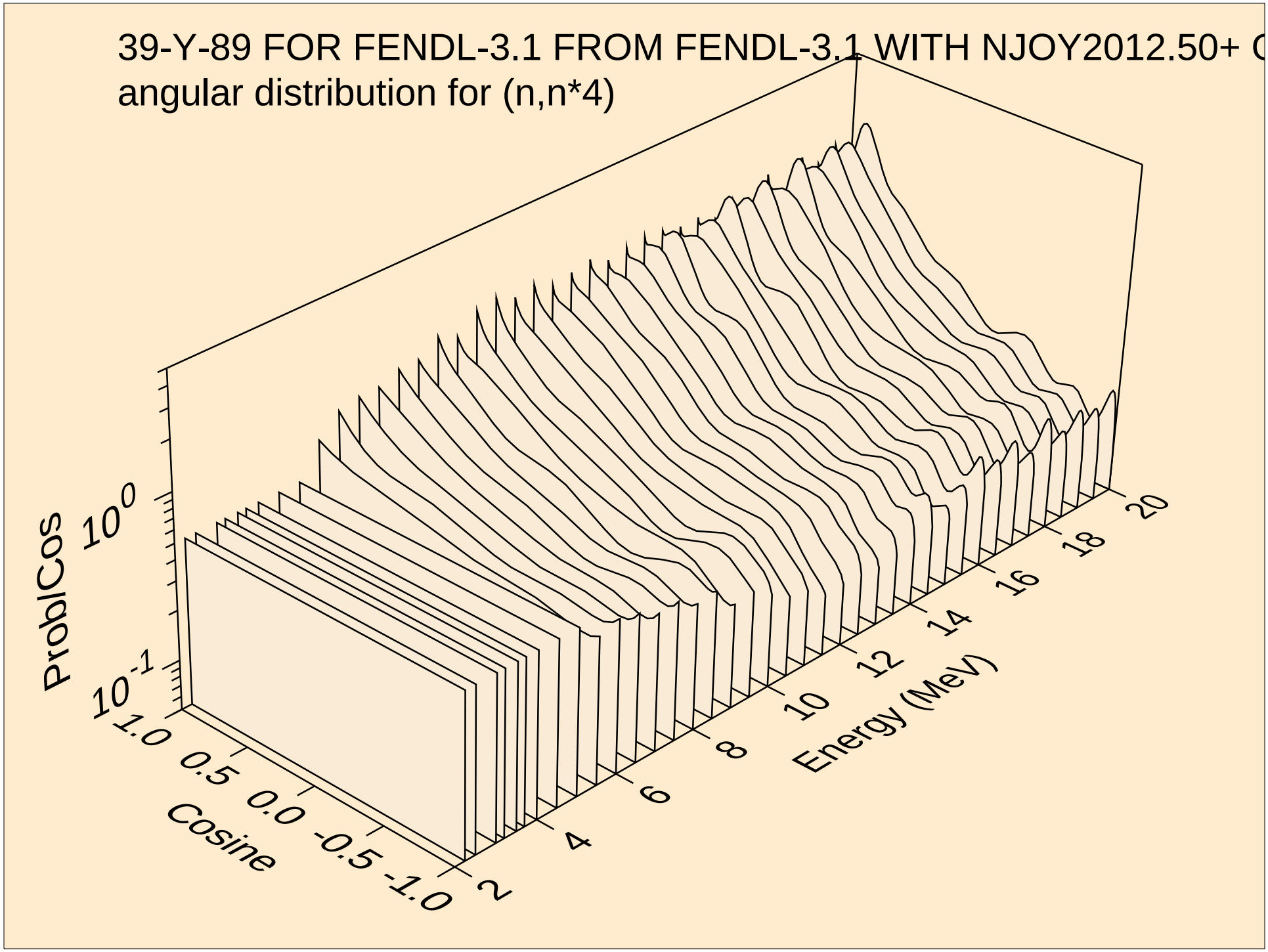

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for elastic
ProblCos
$10^{0}$
$10^{-2}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

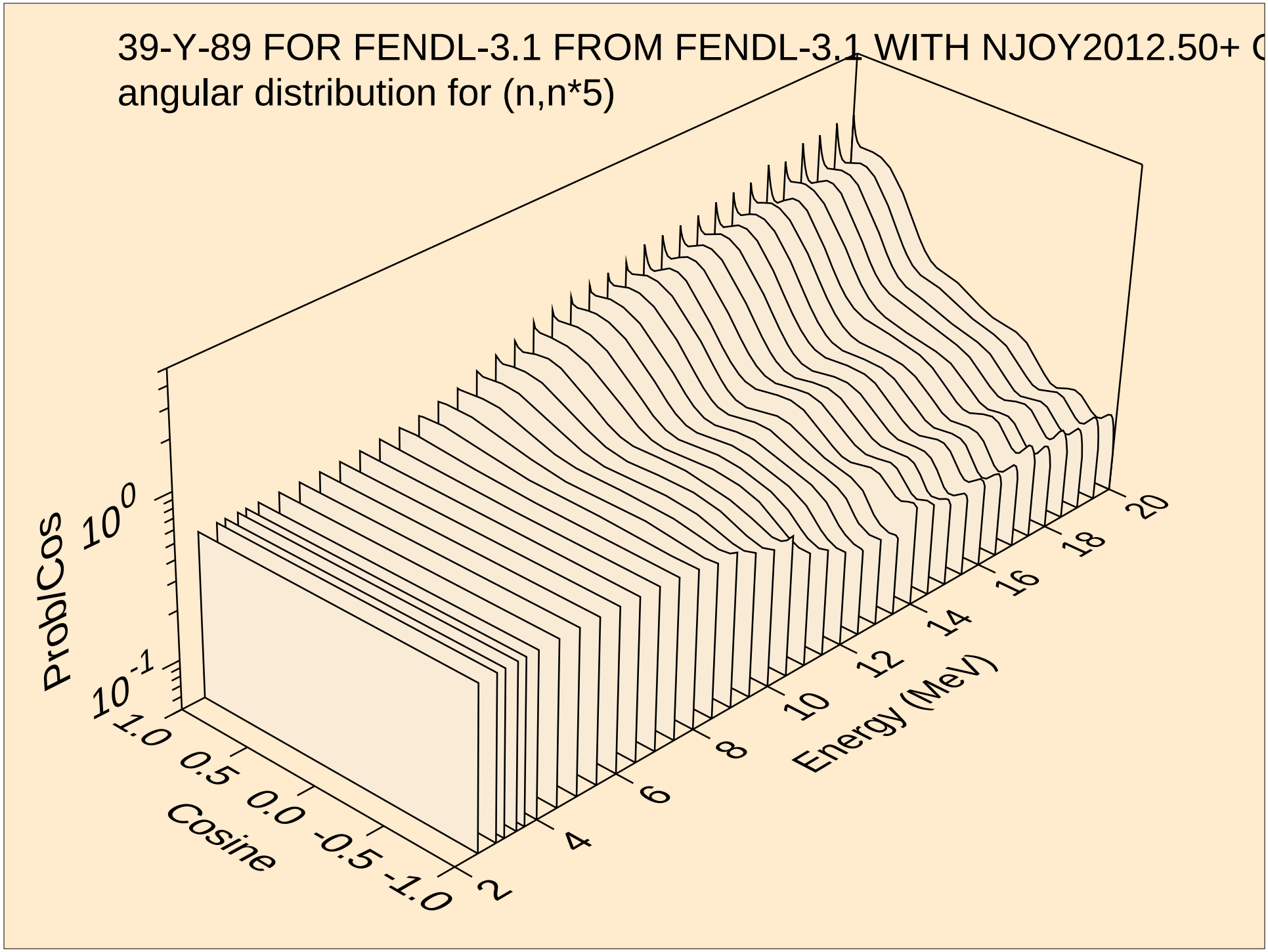

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for elastic
ProbICos
10^1
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

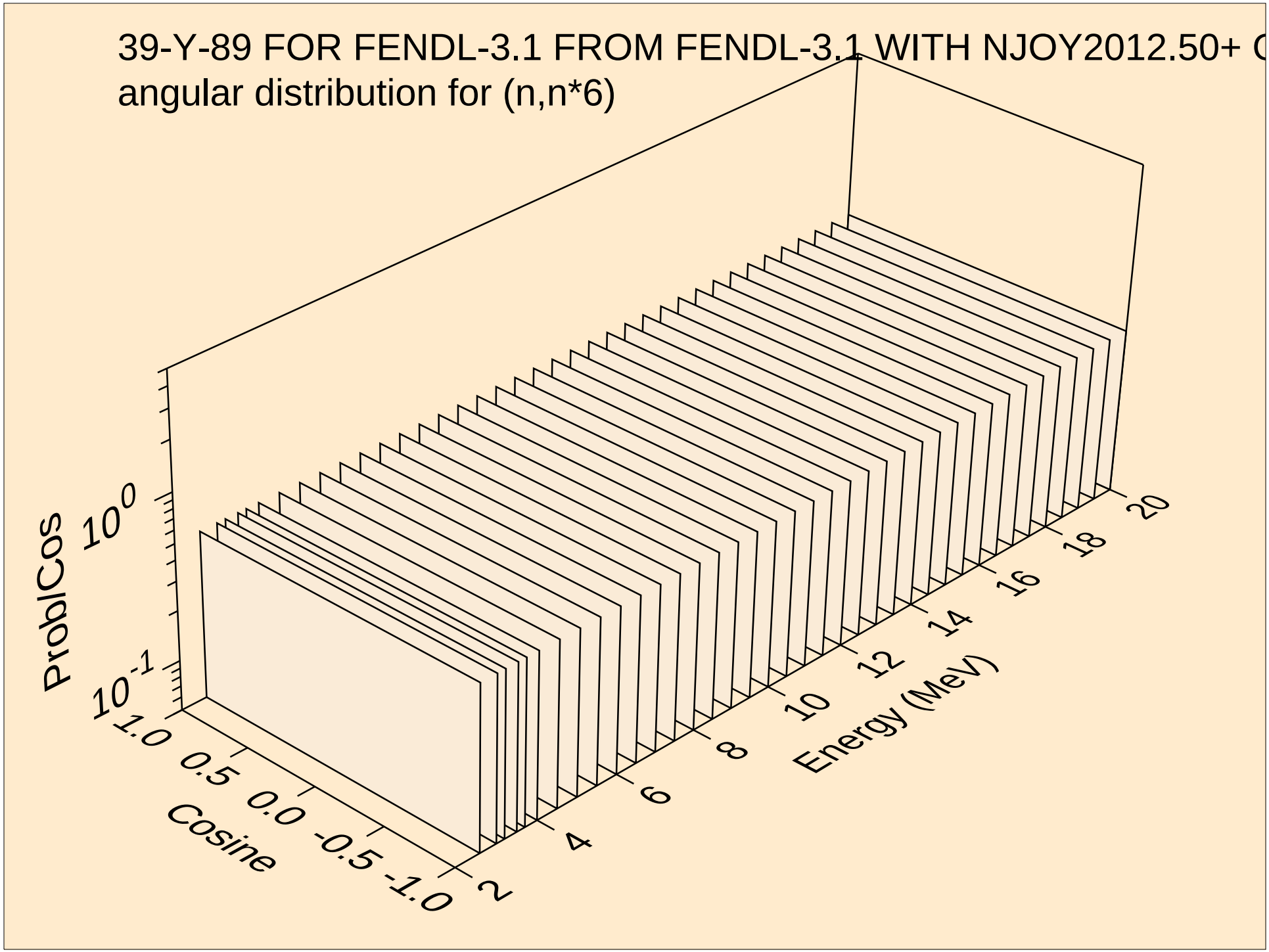

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*1)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

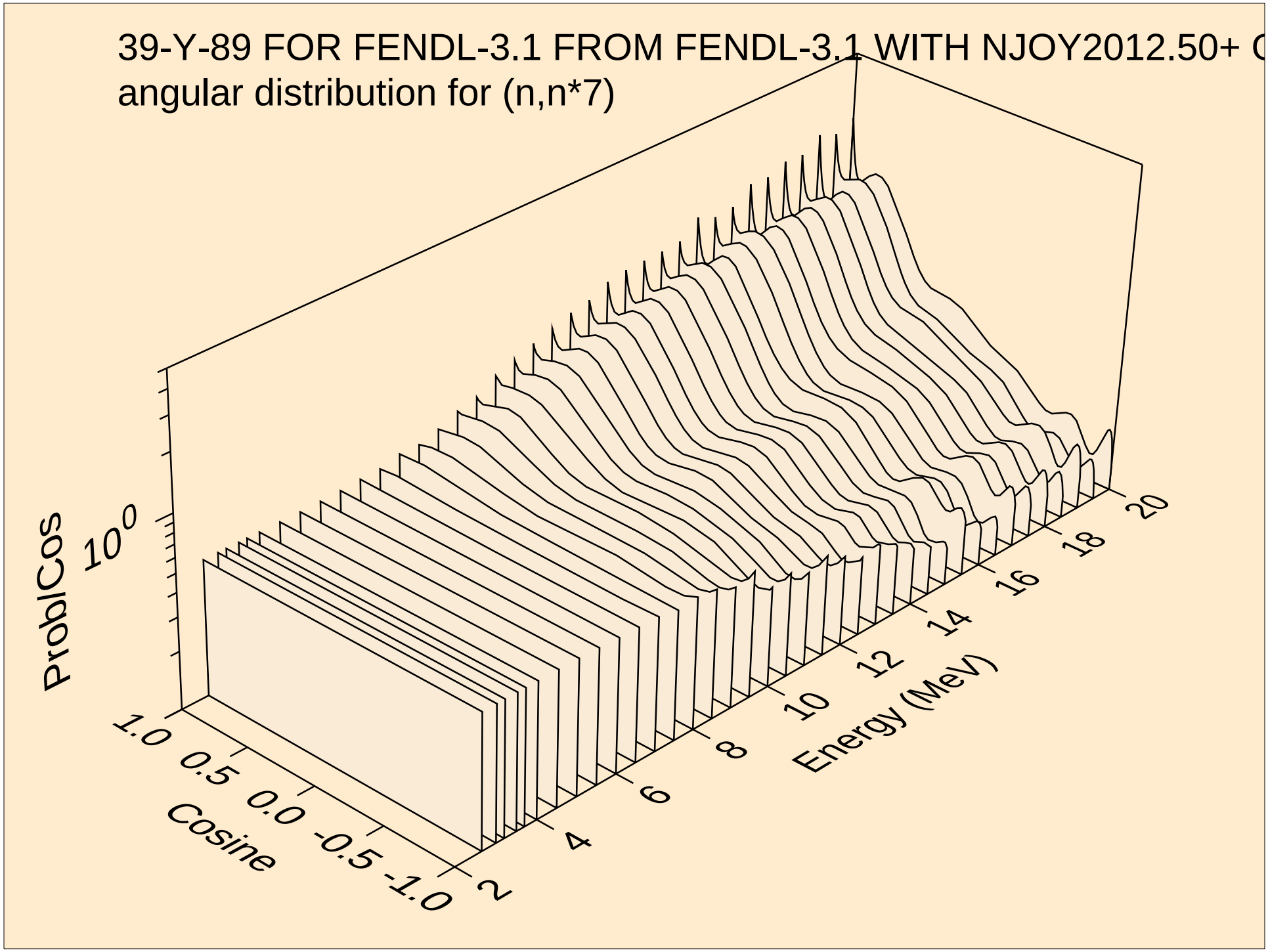

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*2)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

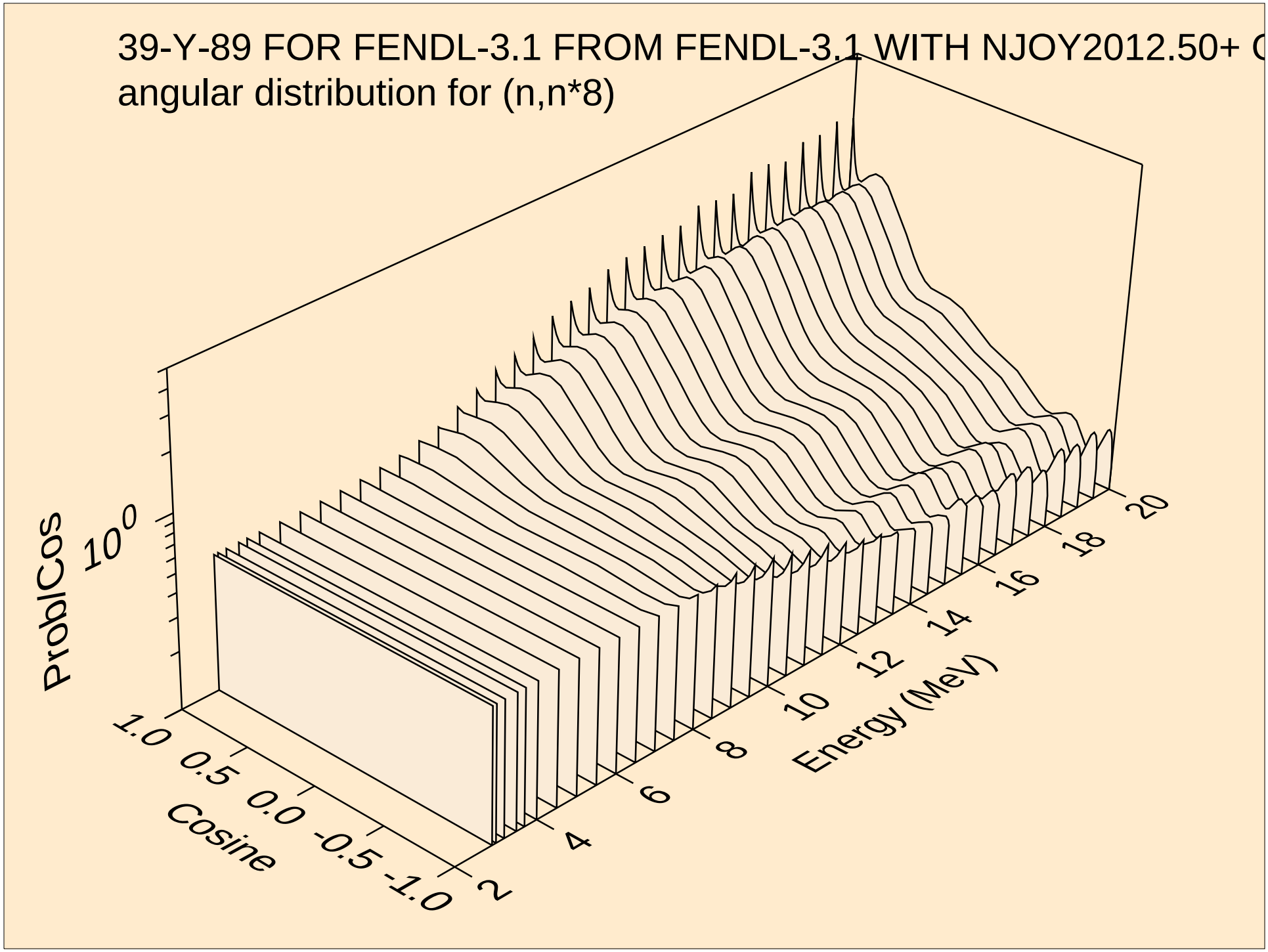

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*3)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

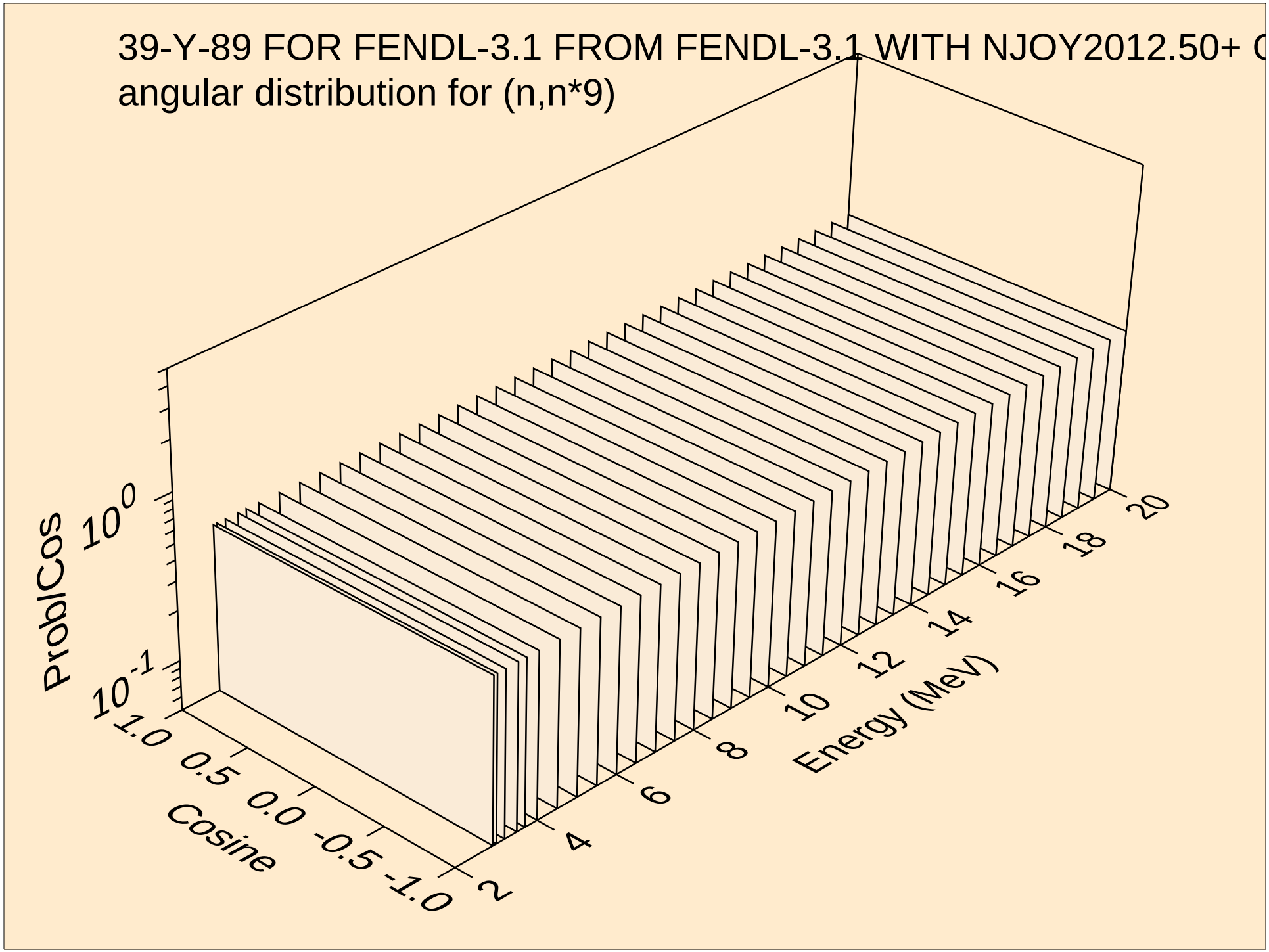

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*4)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

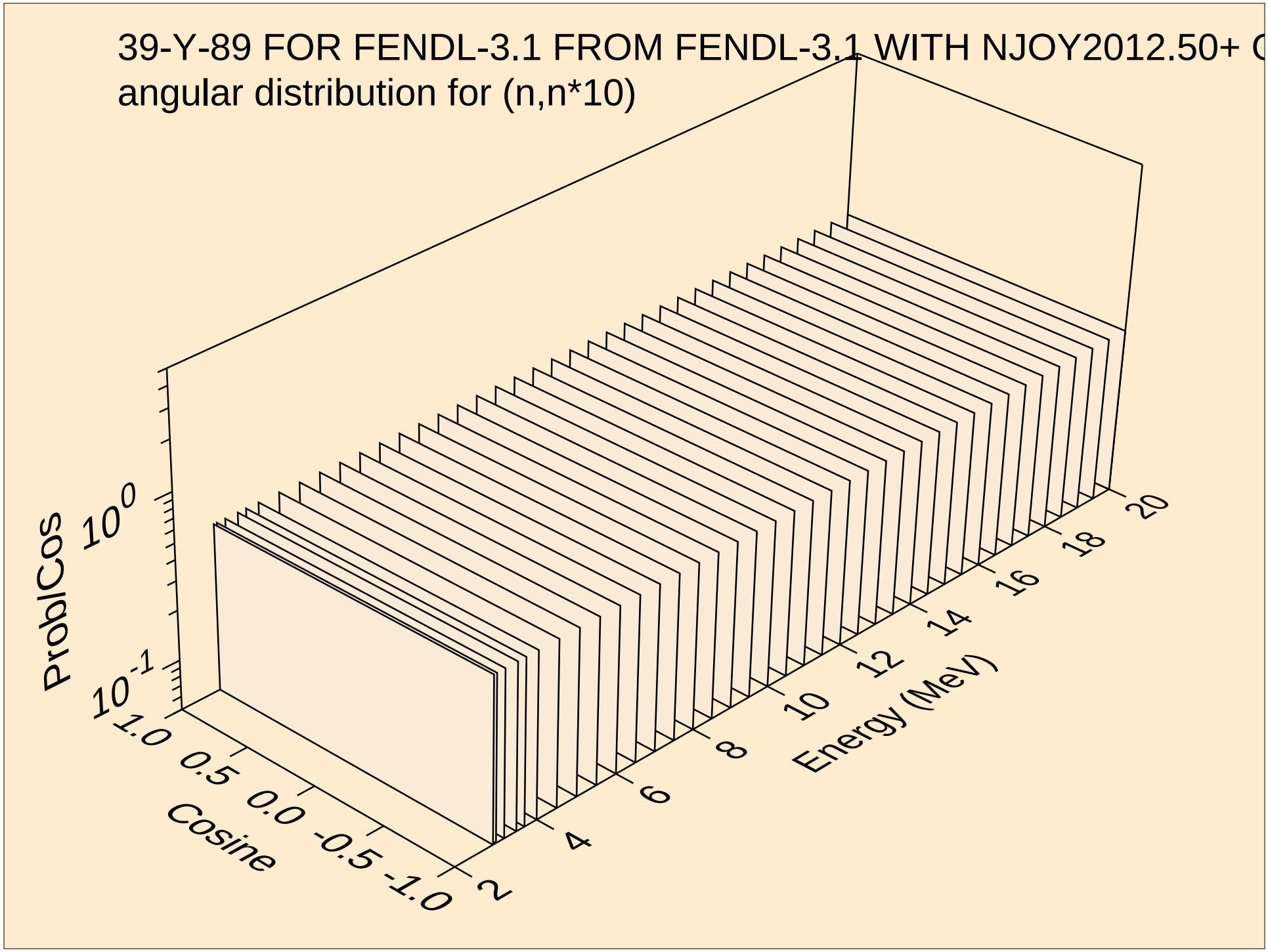

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*5)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

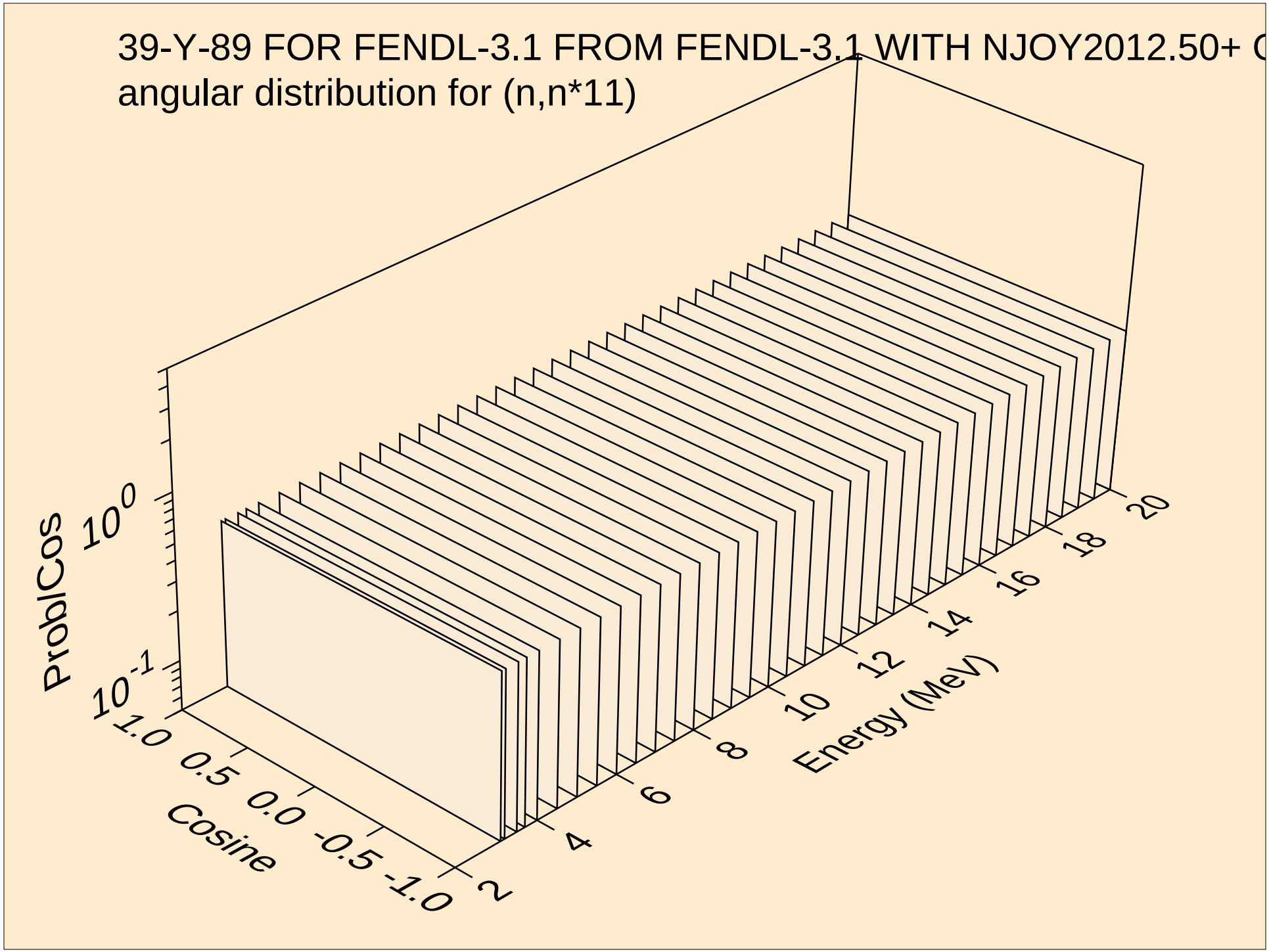

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*6)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

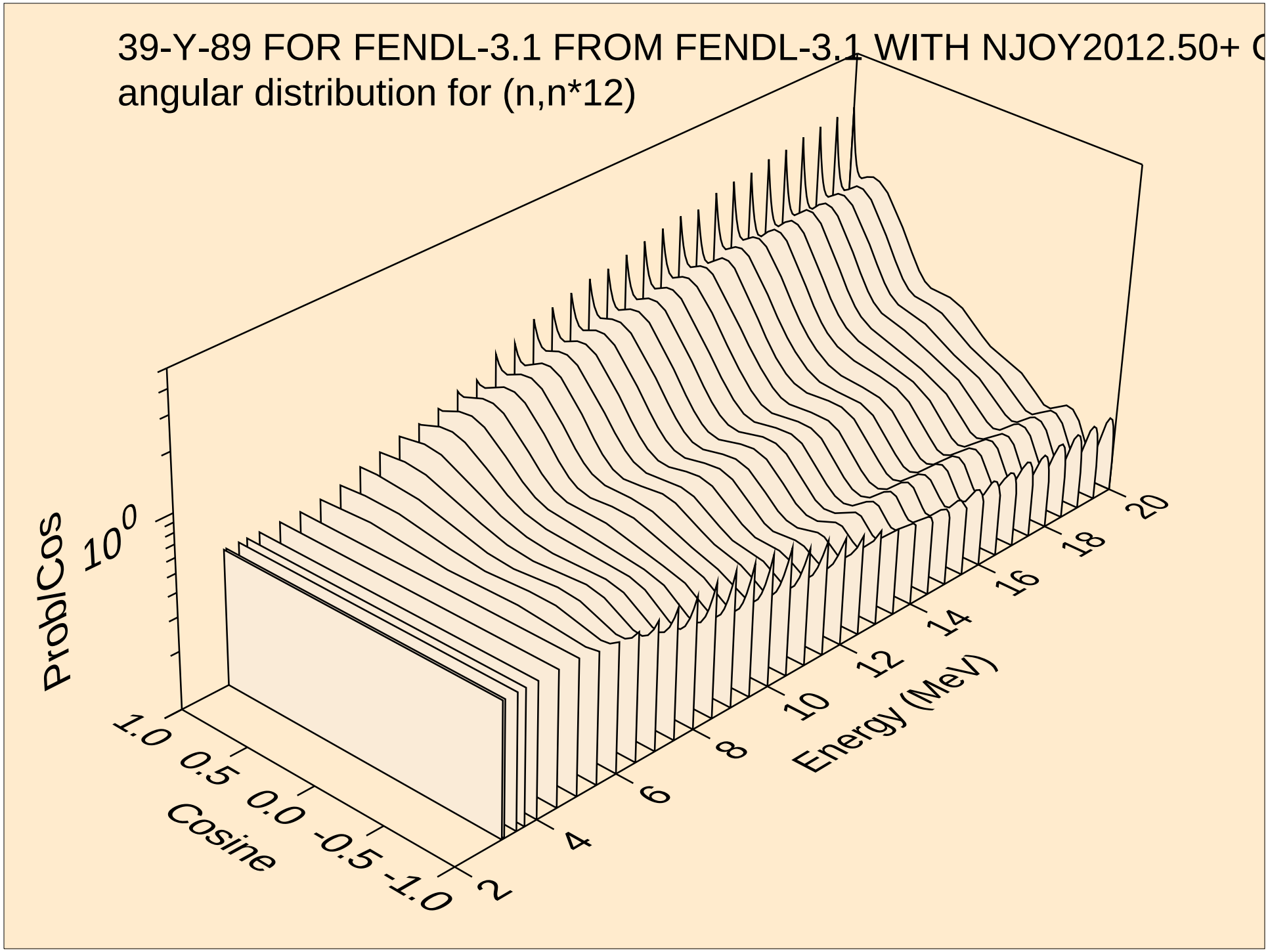

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*7)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

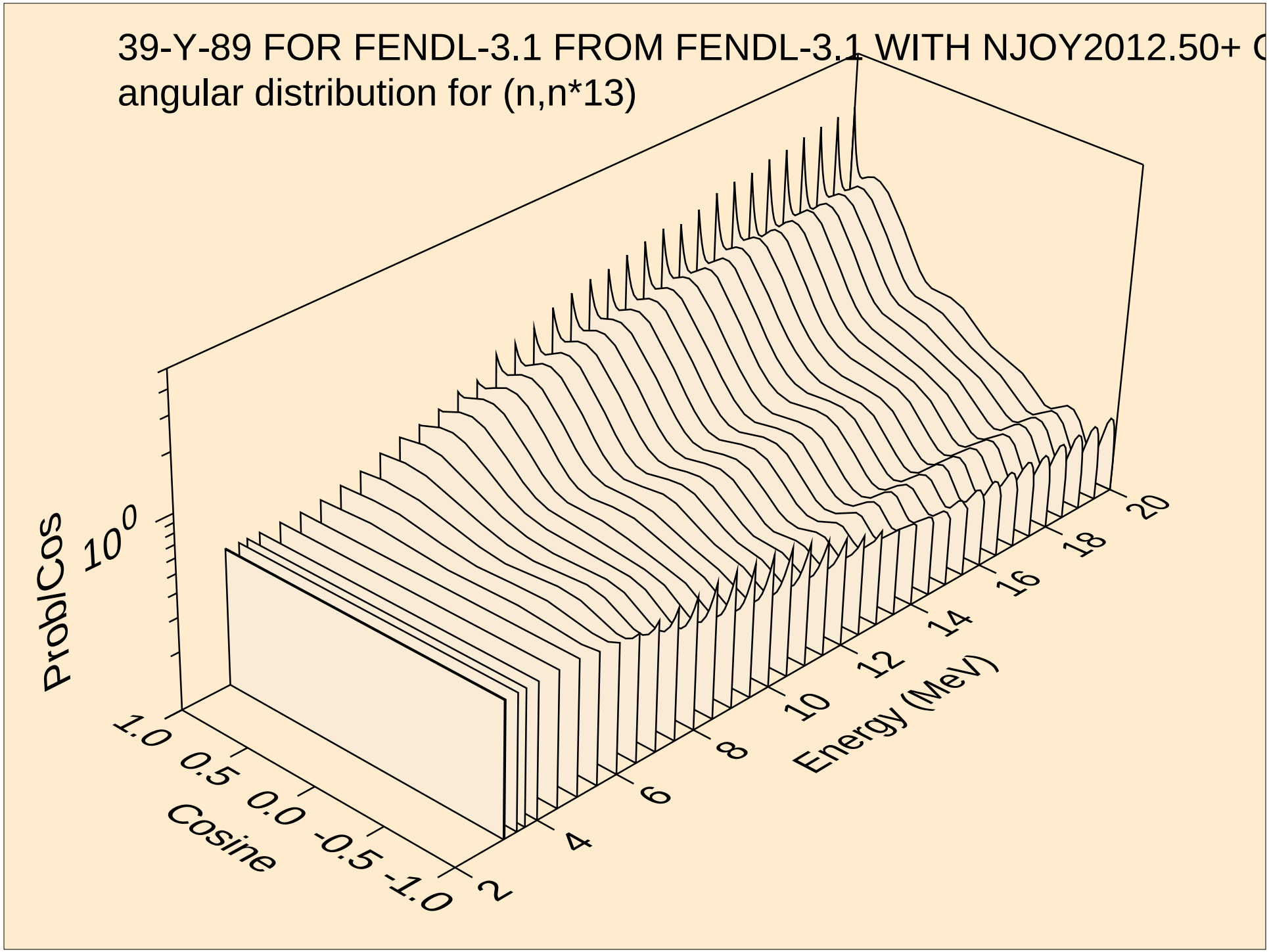

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*8)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

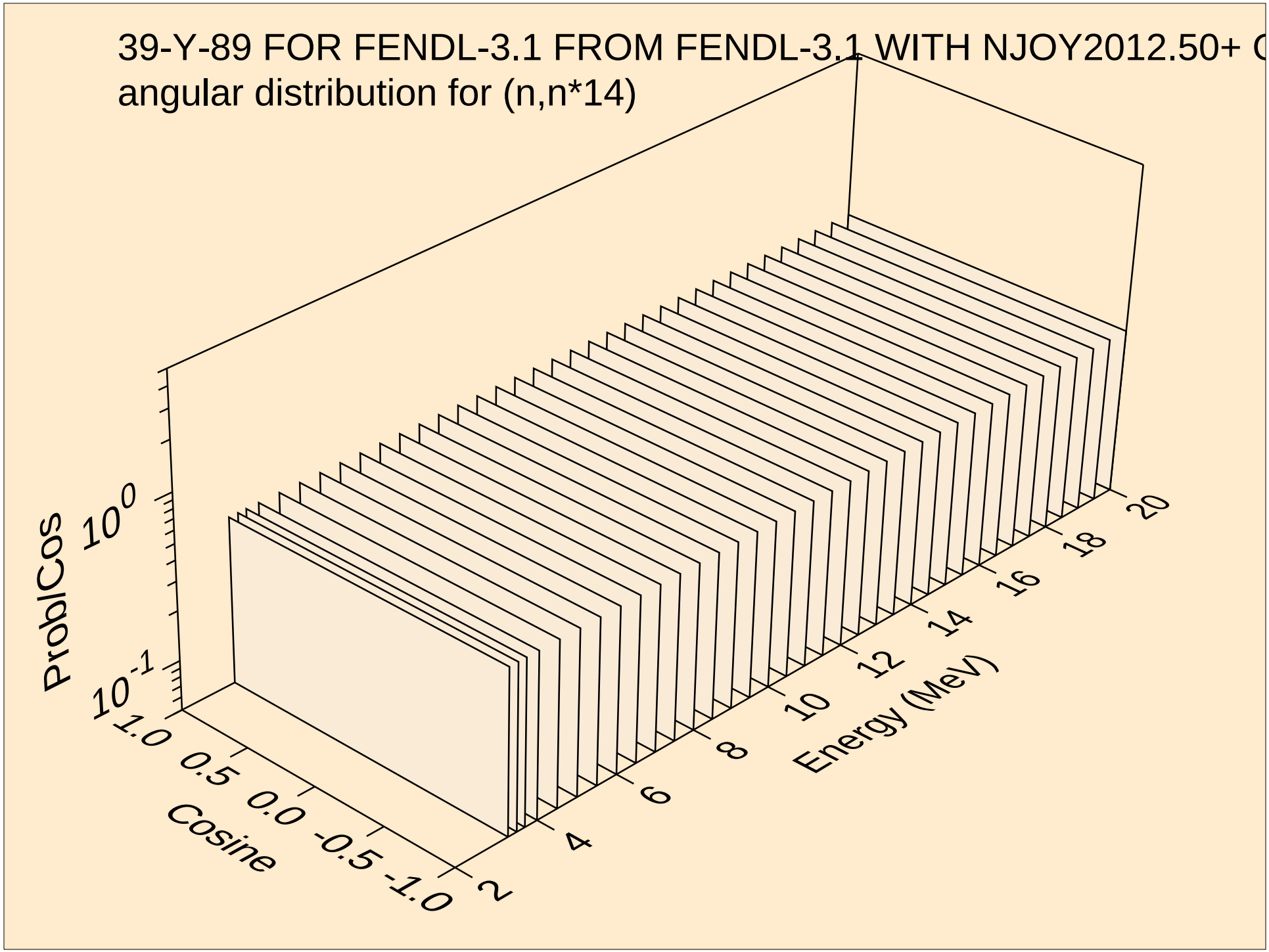

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*9)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

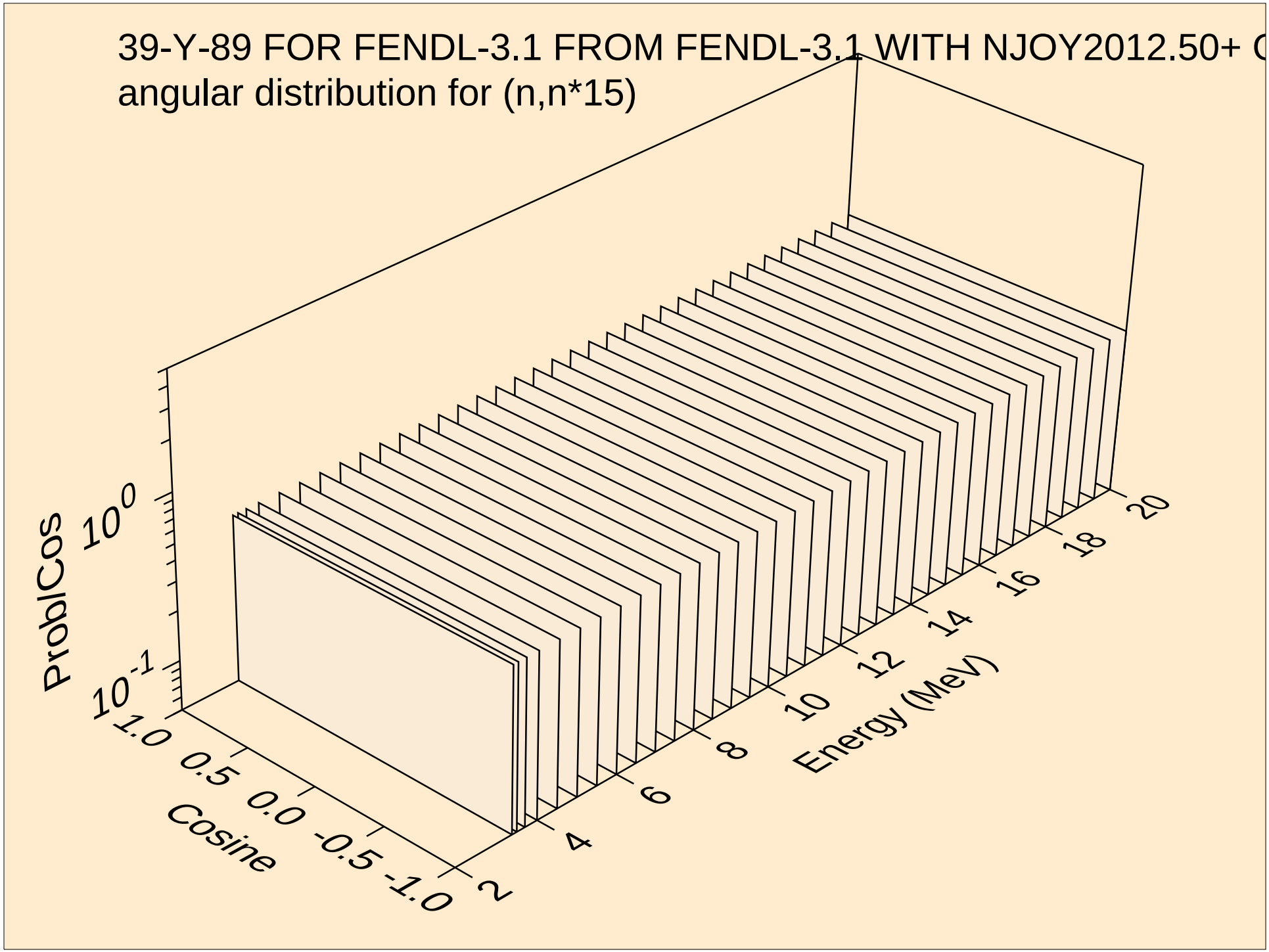

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*10)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

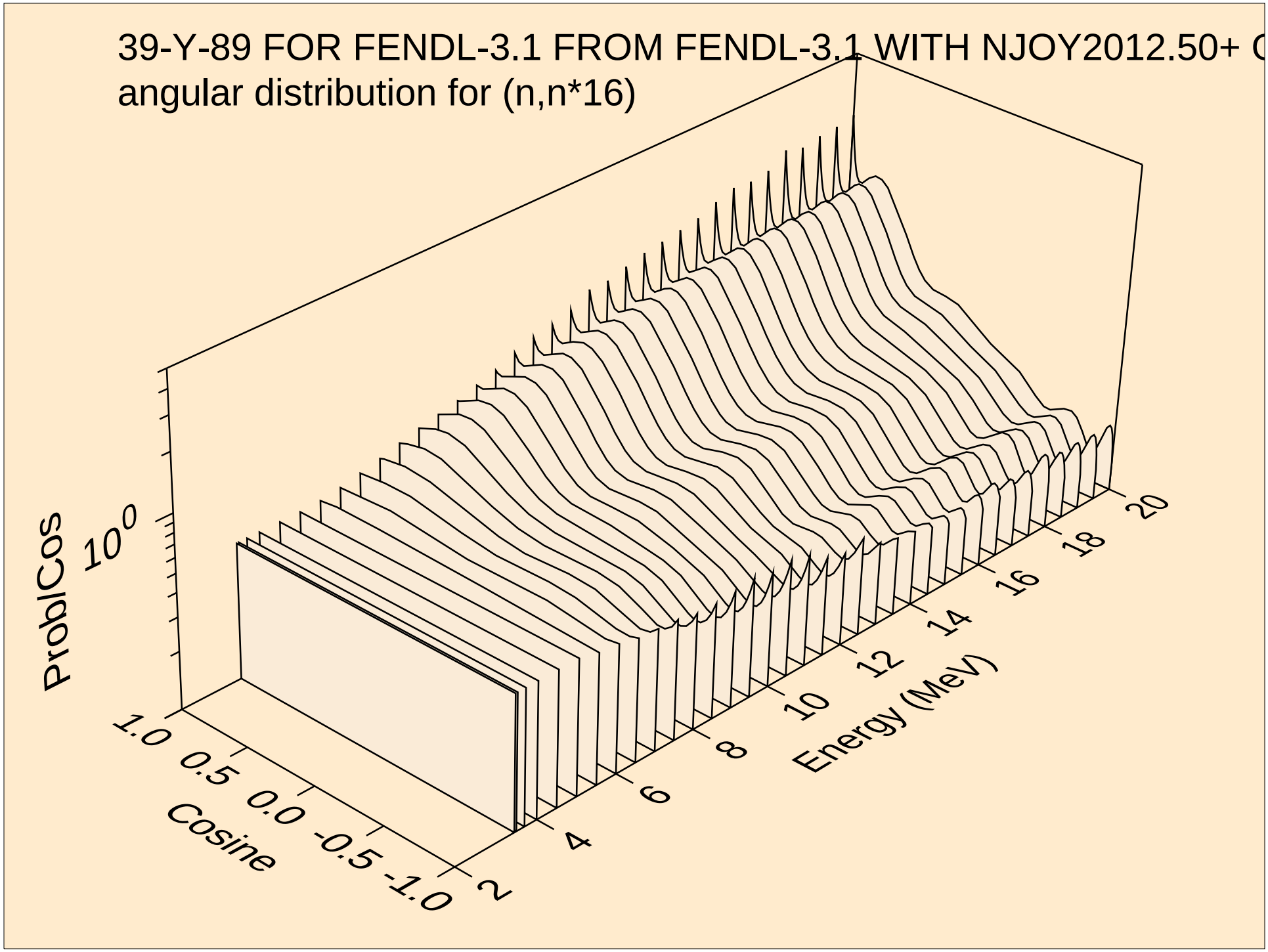

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*11)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

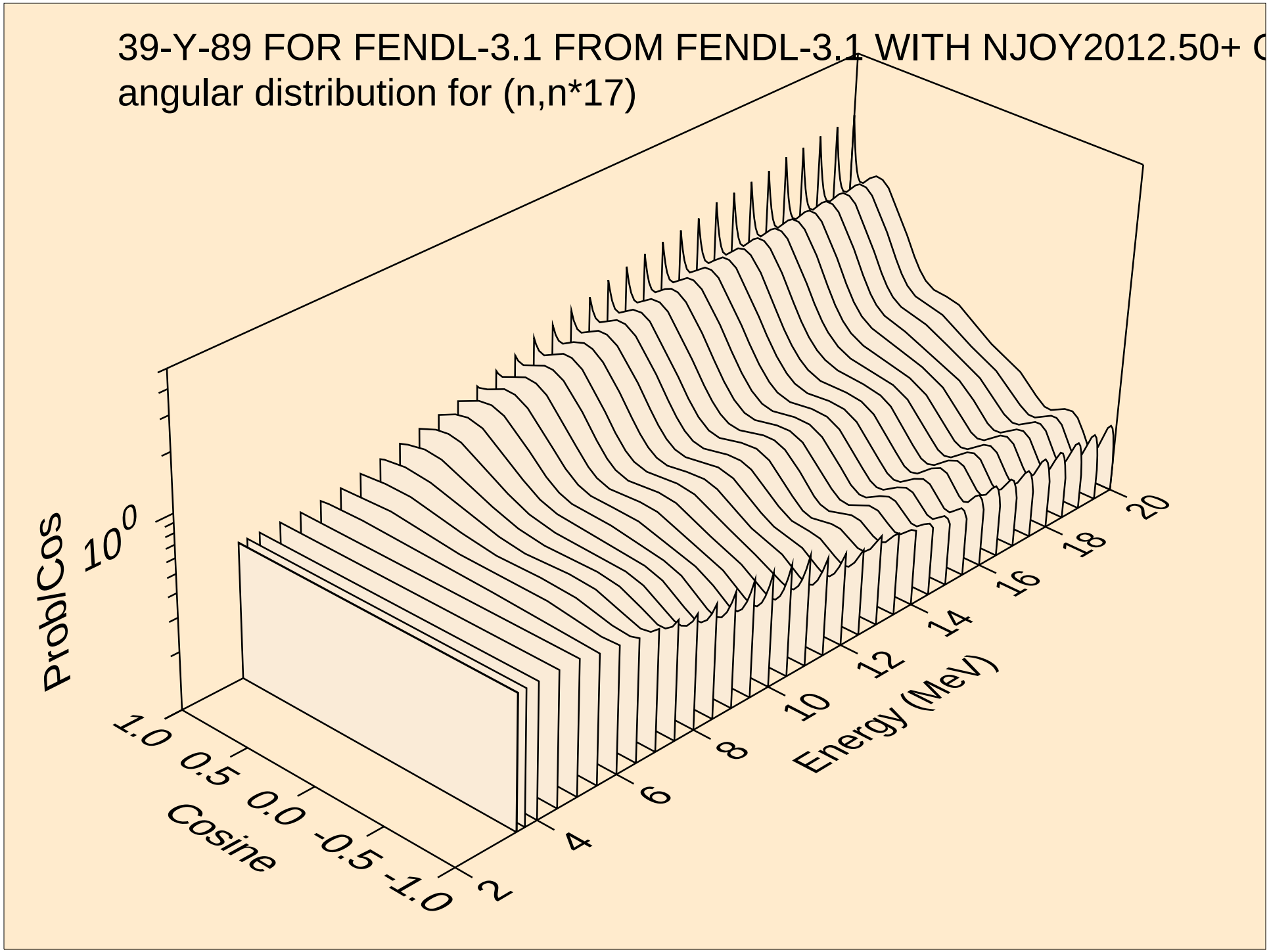

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*12)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

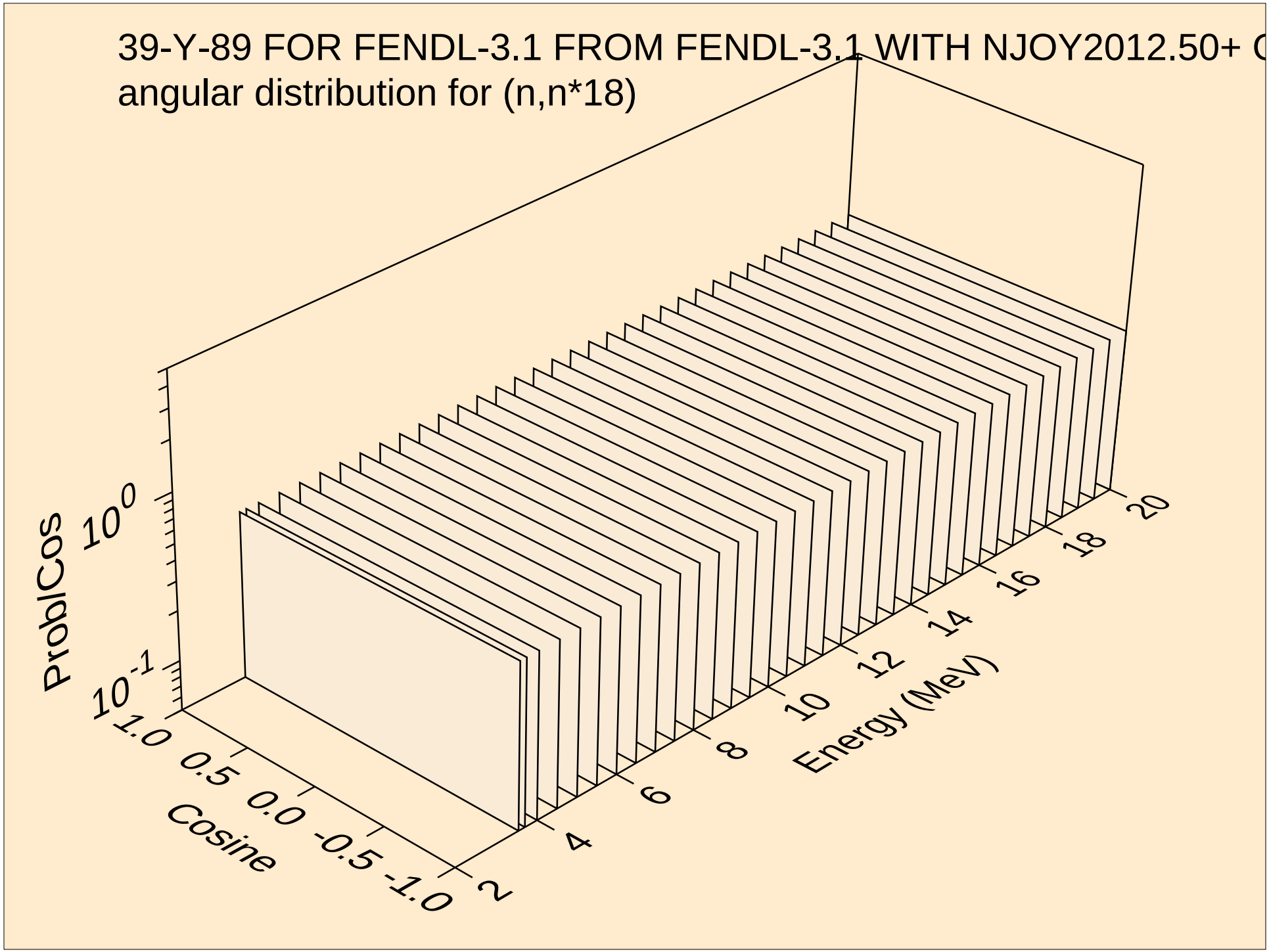

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*13)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

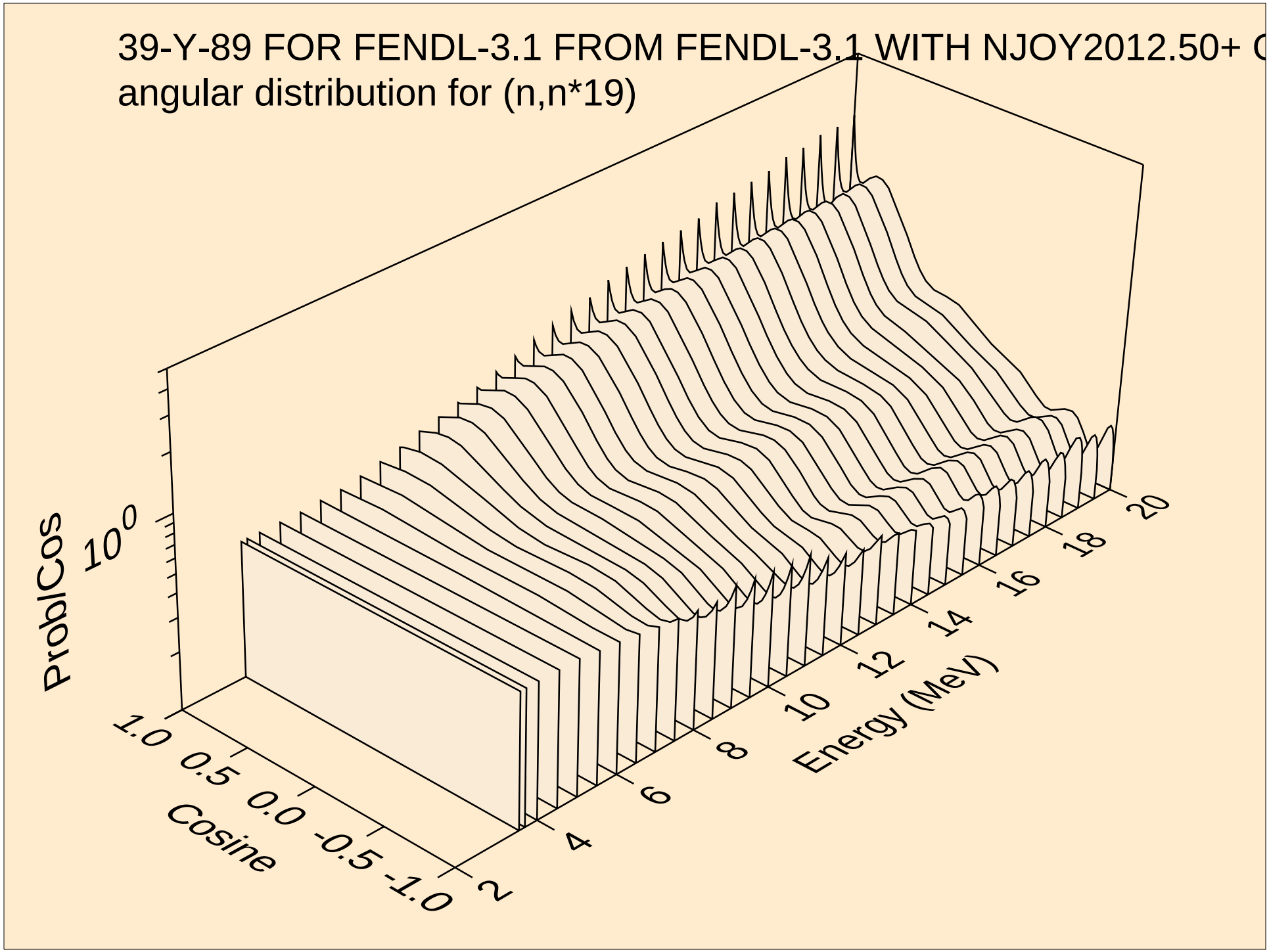

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*14)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

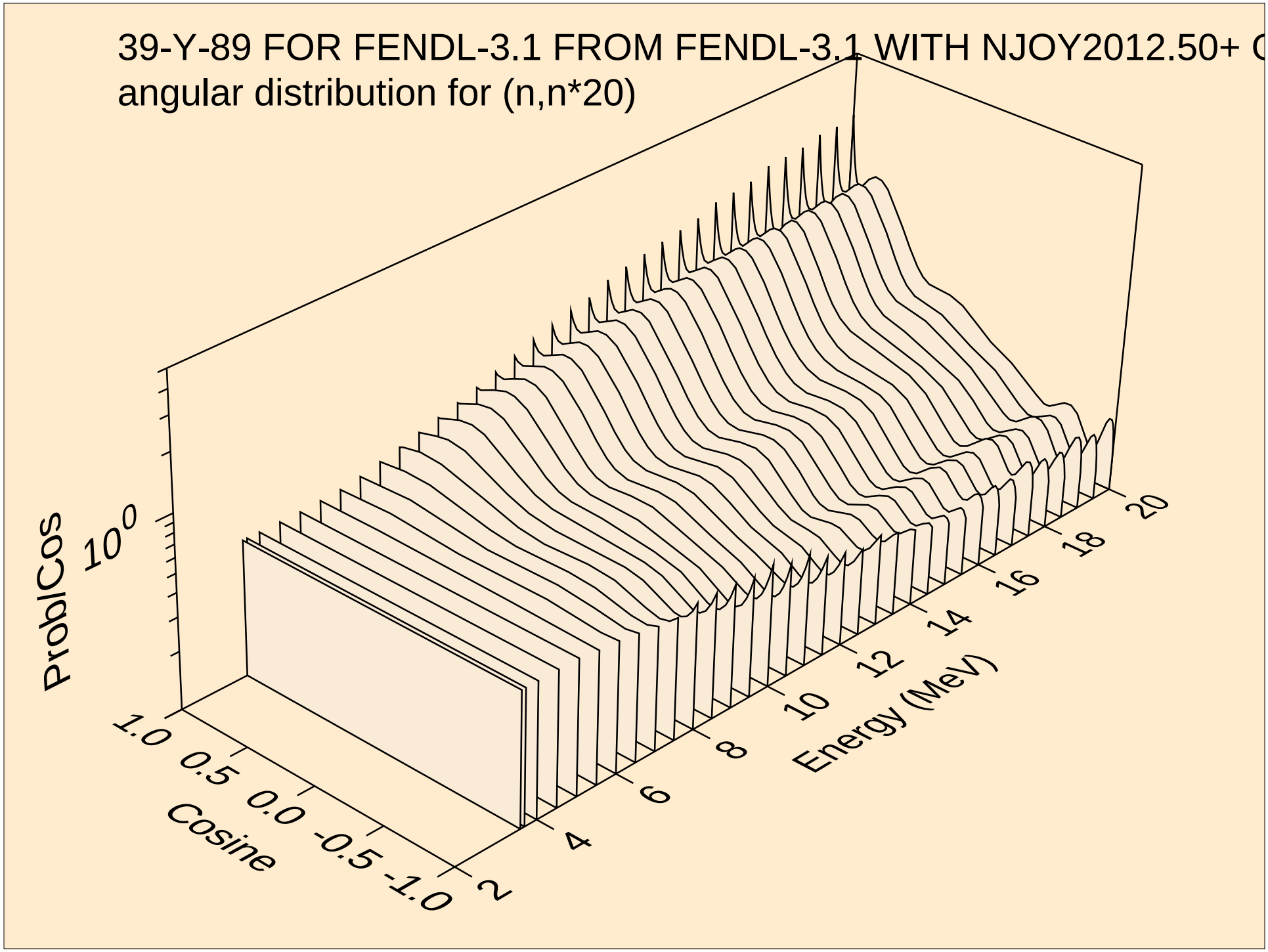

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*15)
Prob\Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

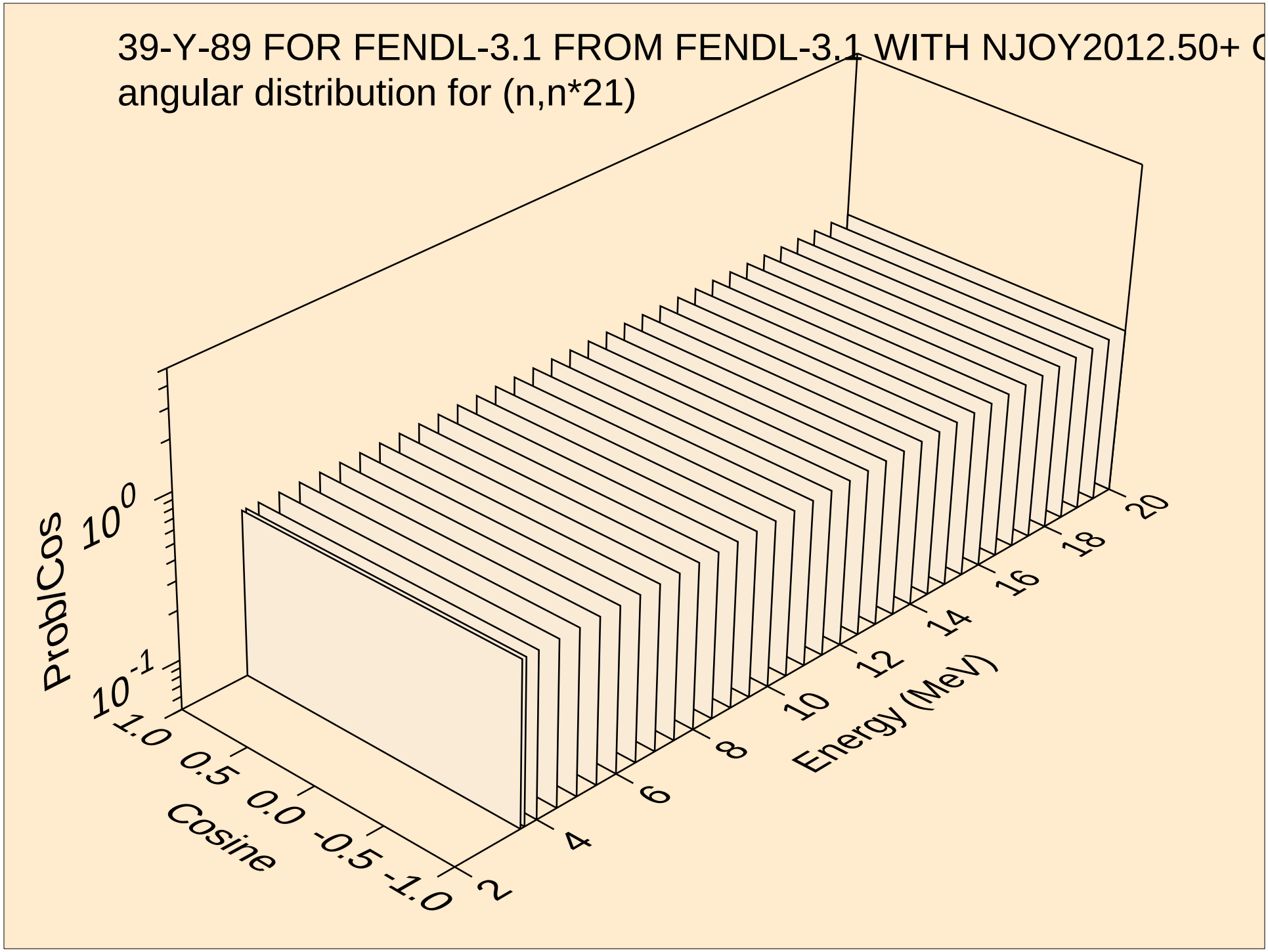

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*16)
ProblCos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

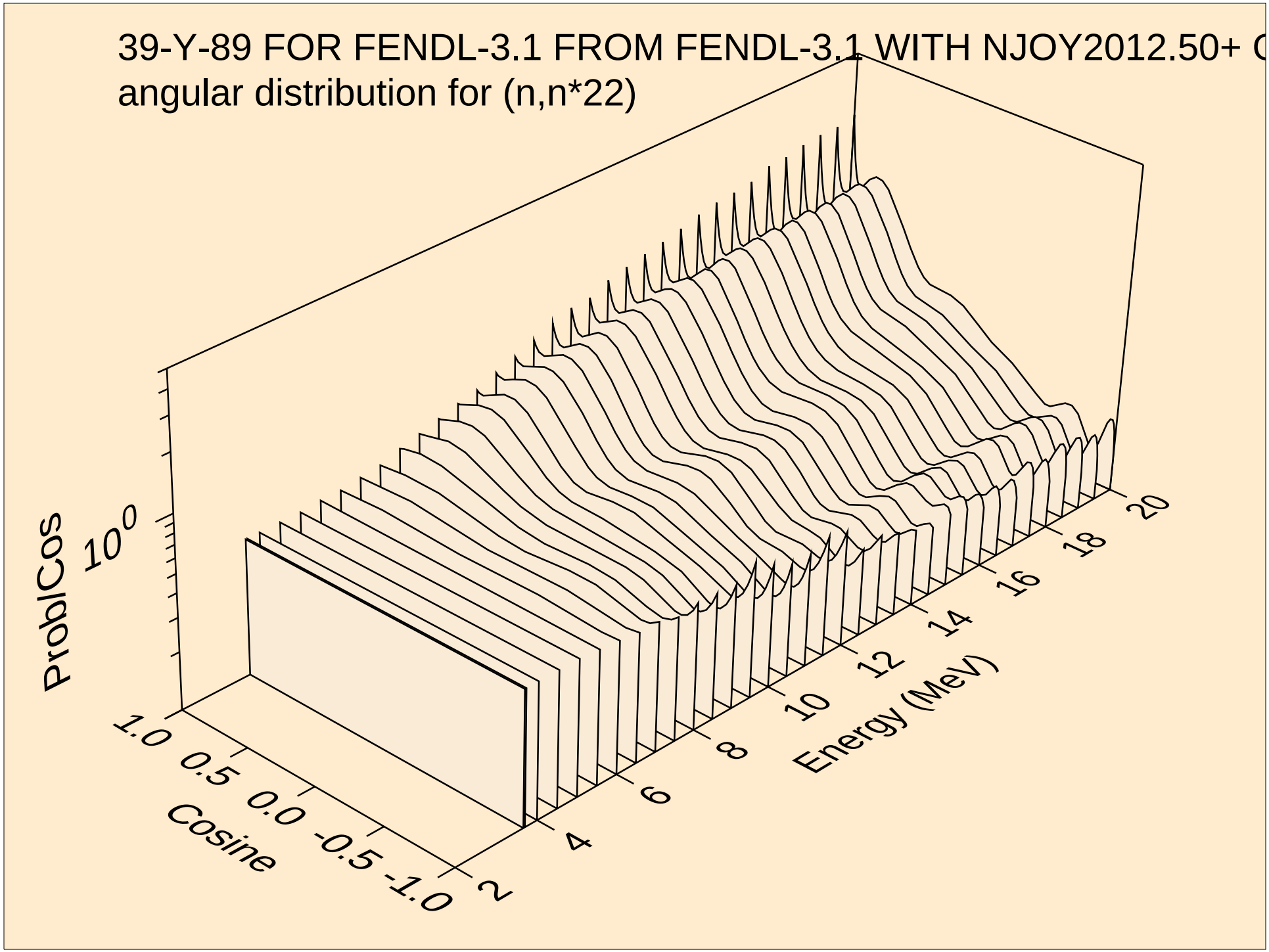

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*17)
ProblCos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

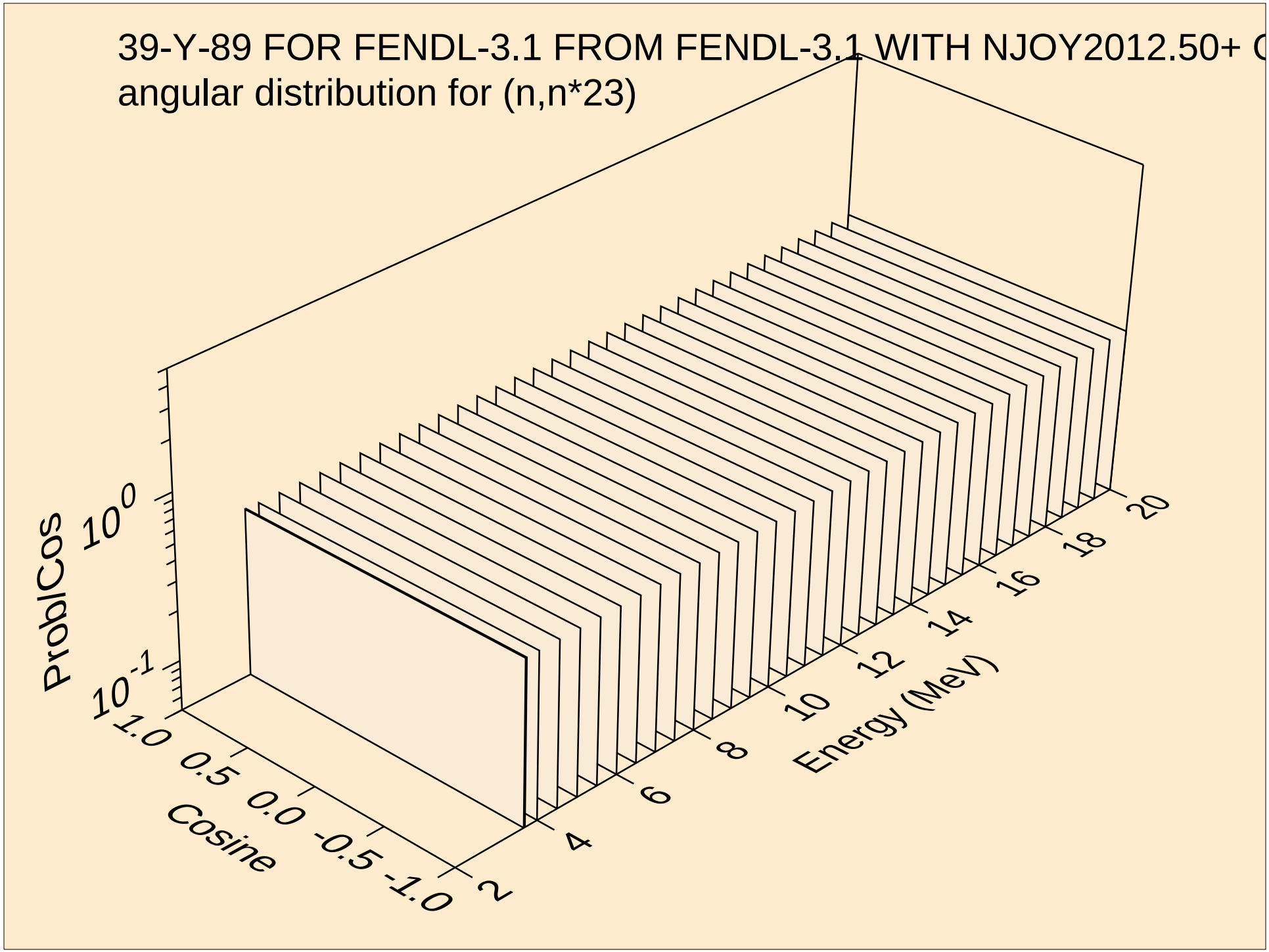

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*18)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

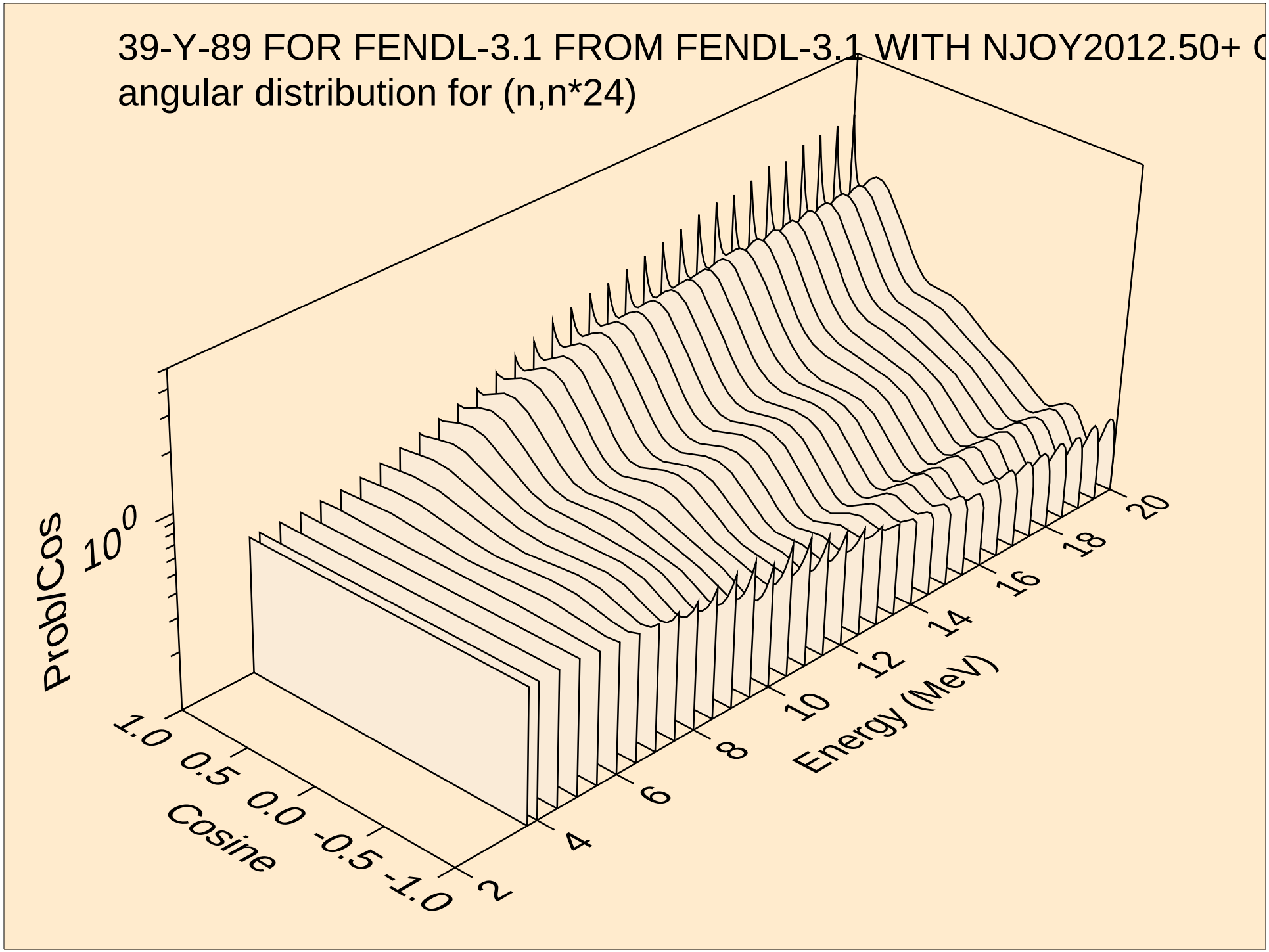

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*19)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

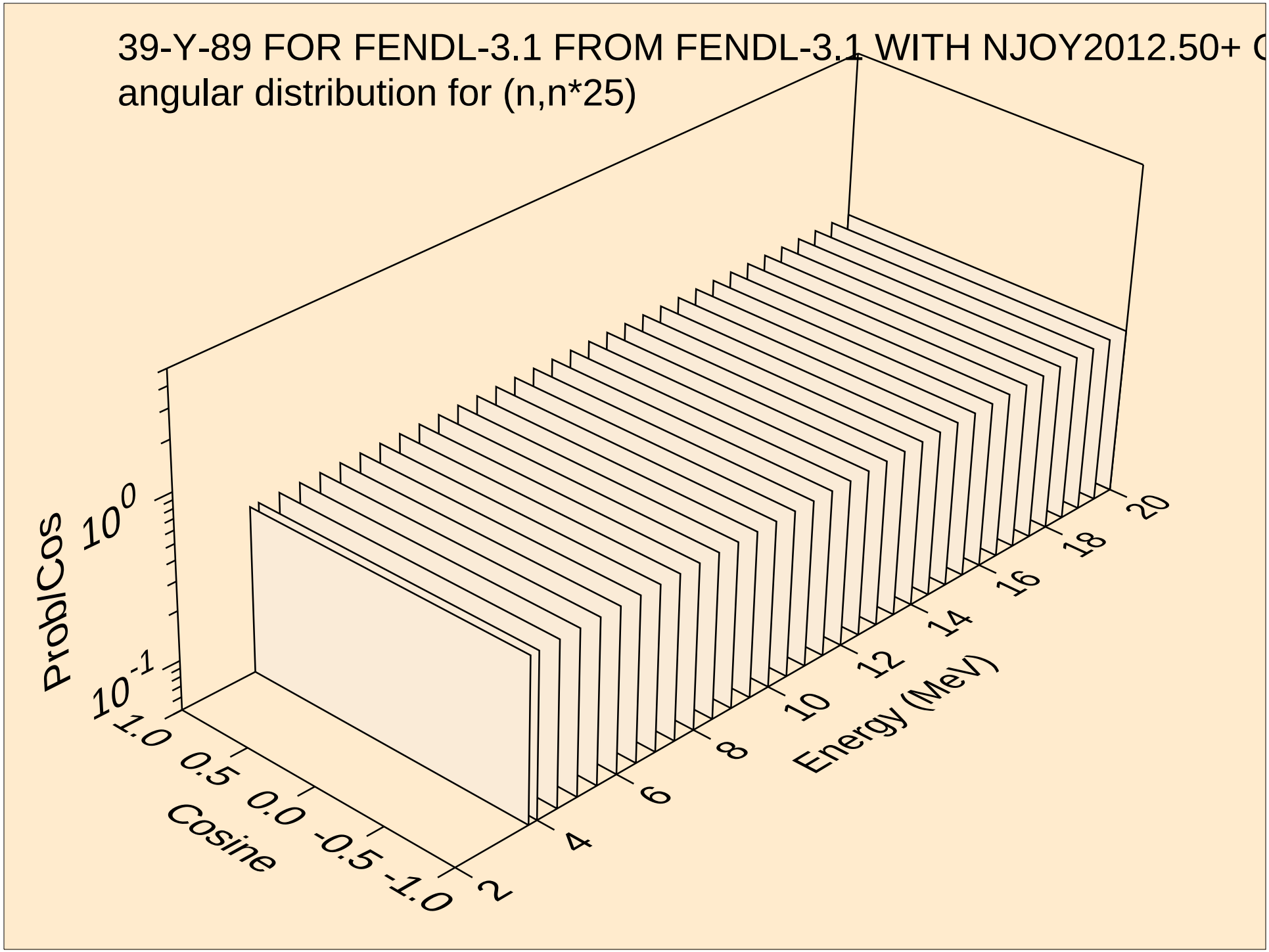

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*20)
ProblCos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

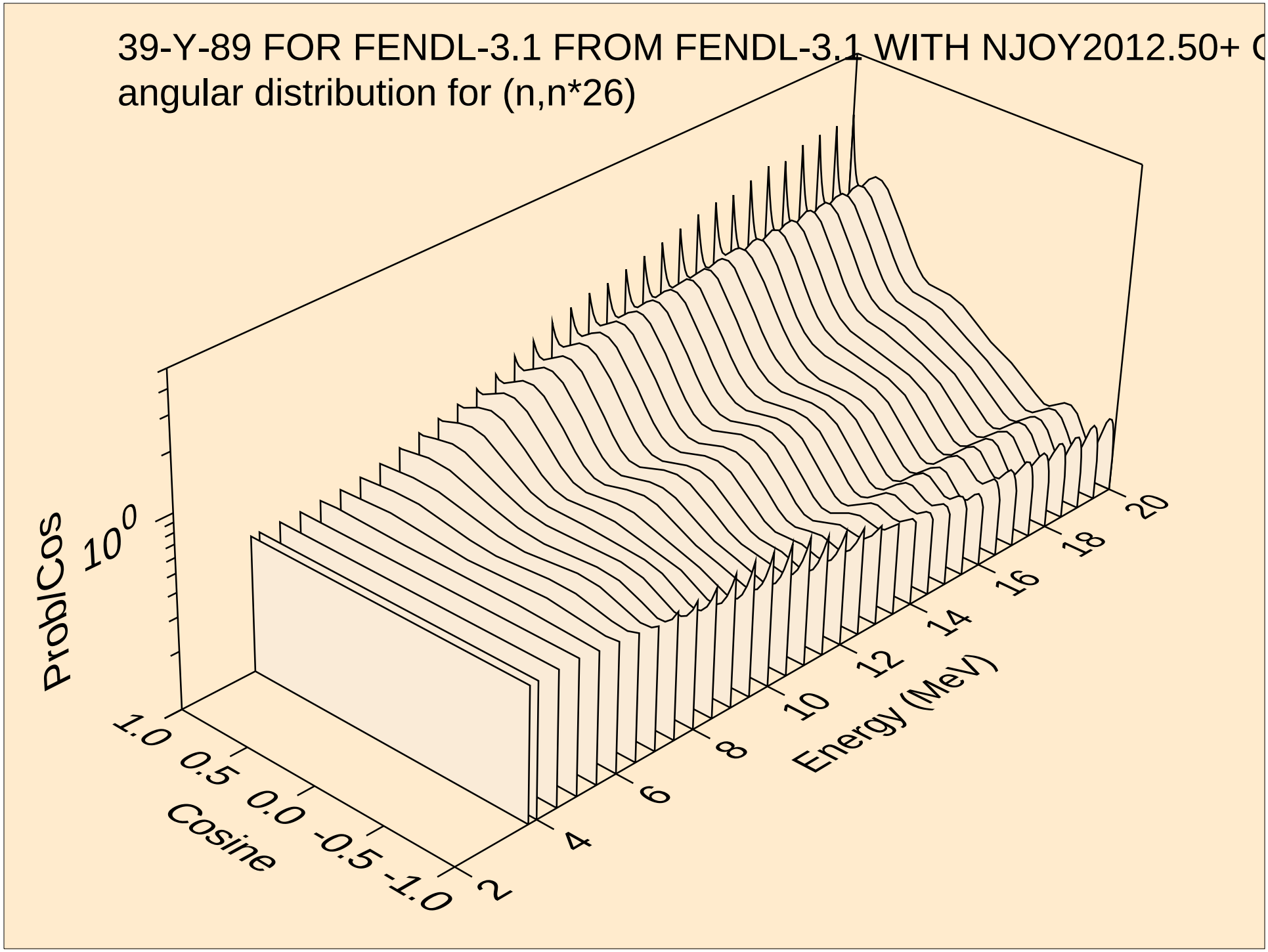

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*21)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

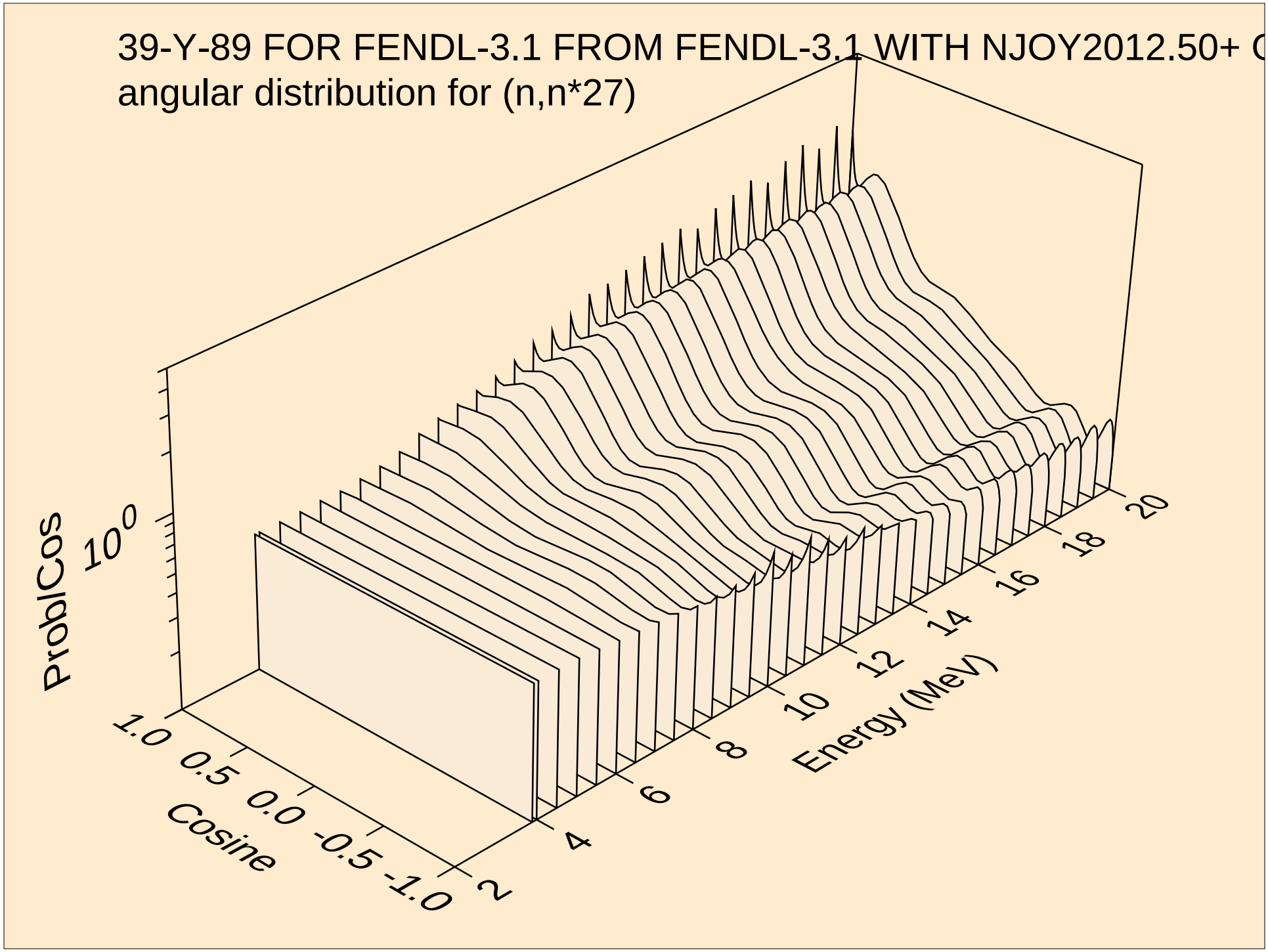

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*22)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

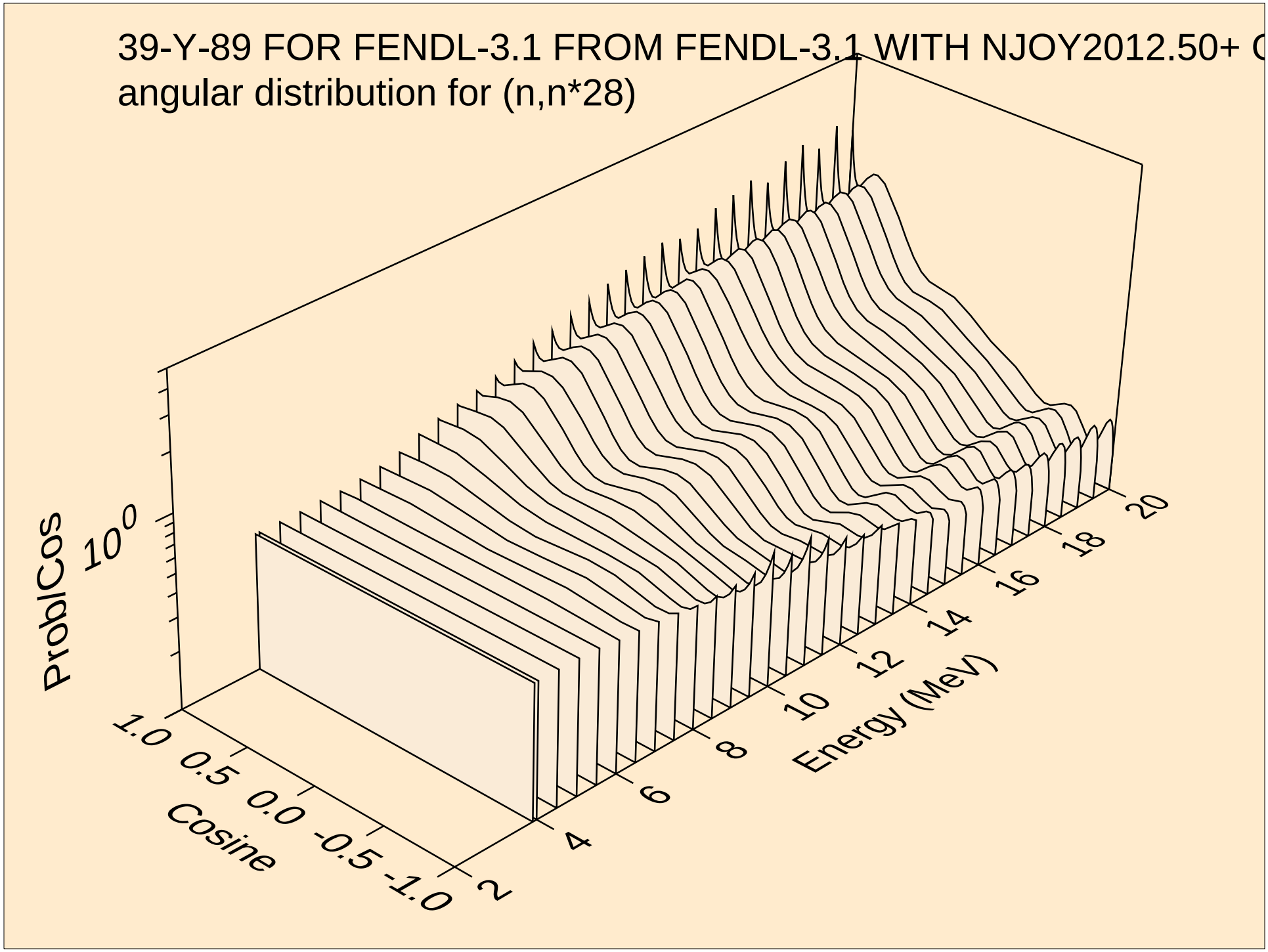

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*23)
Prob|Cos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

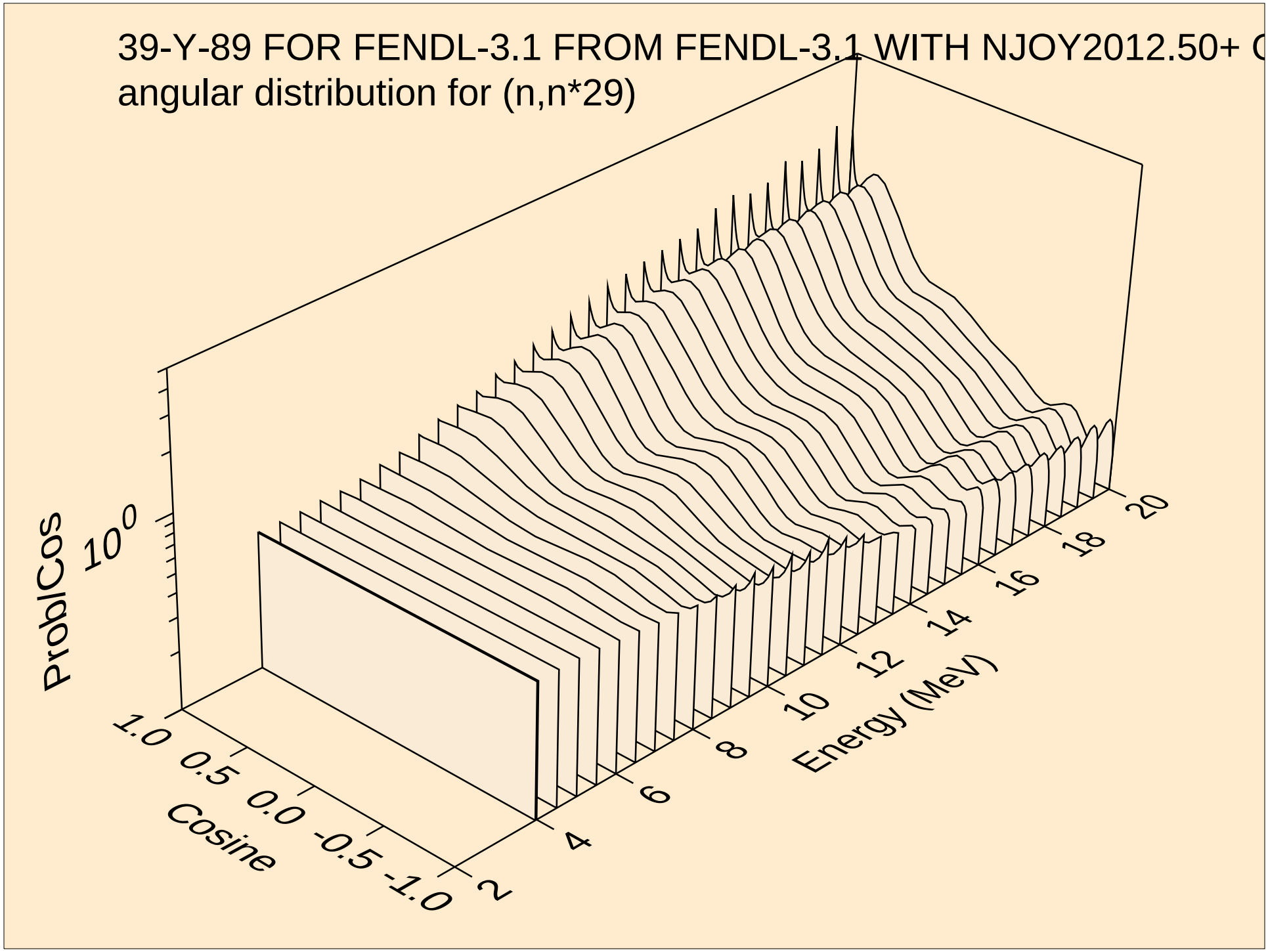

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*24)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

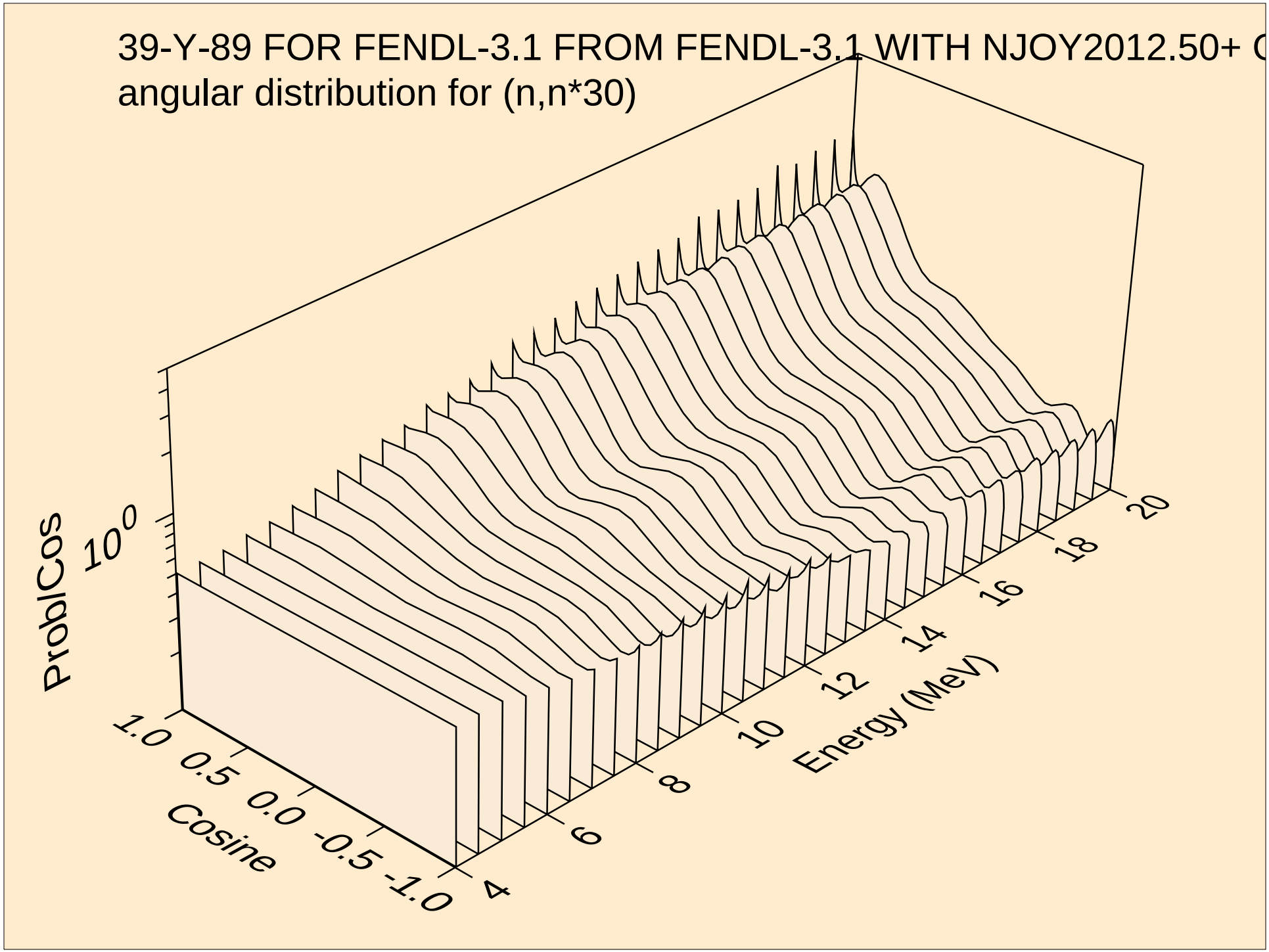

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*25)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

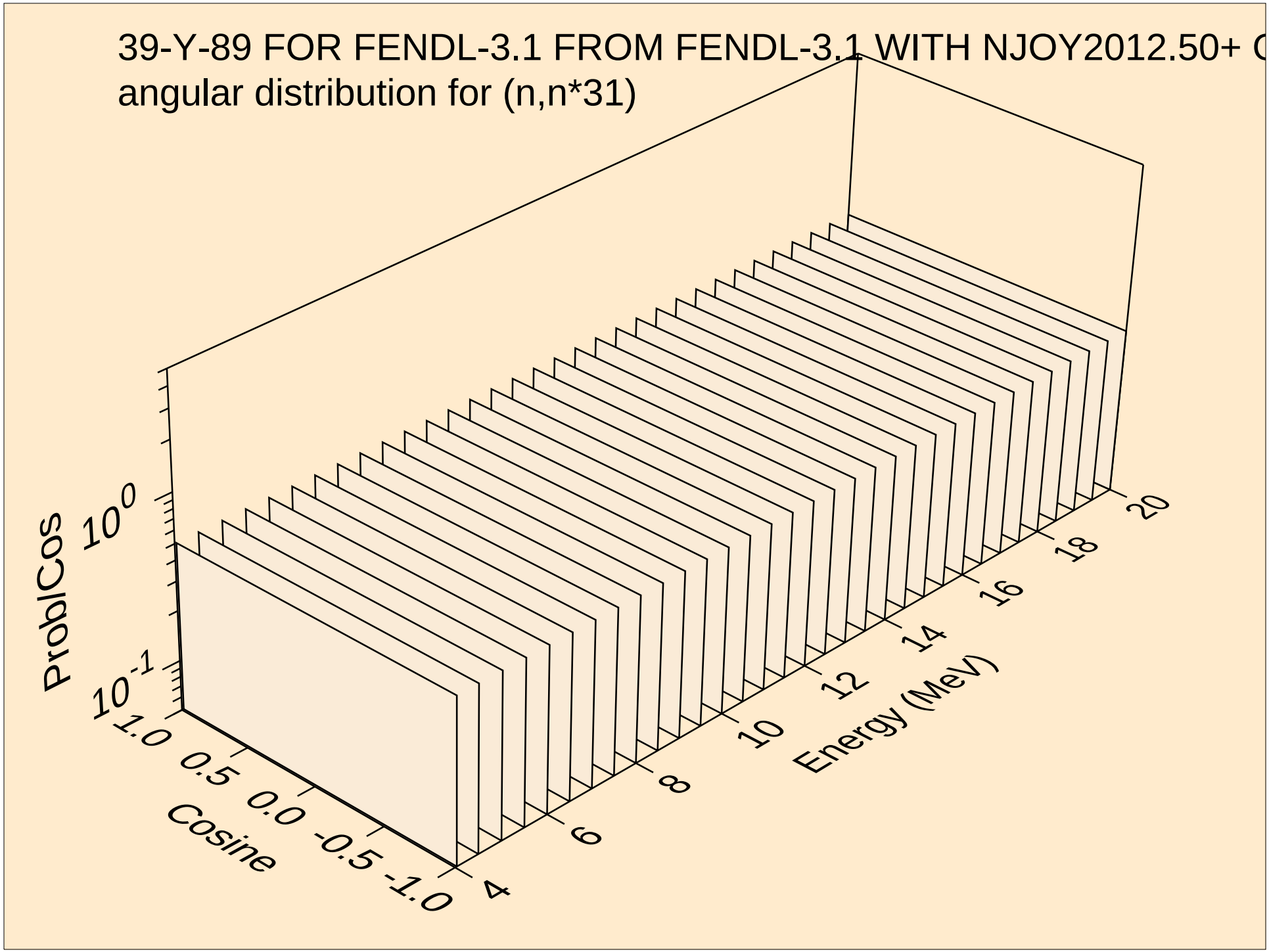

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*26)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

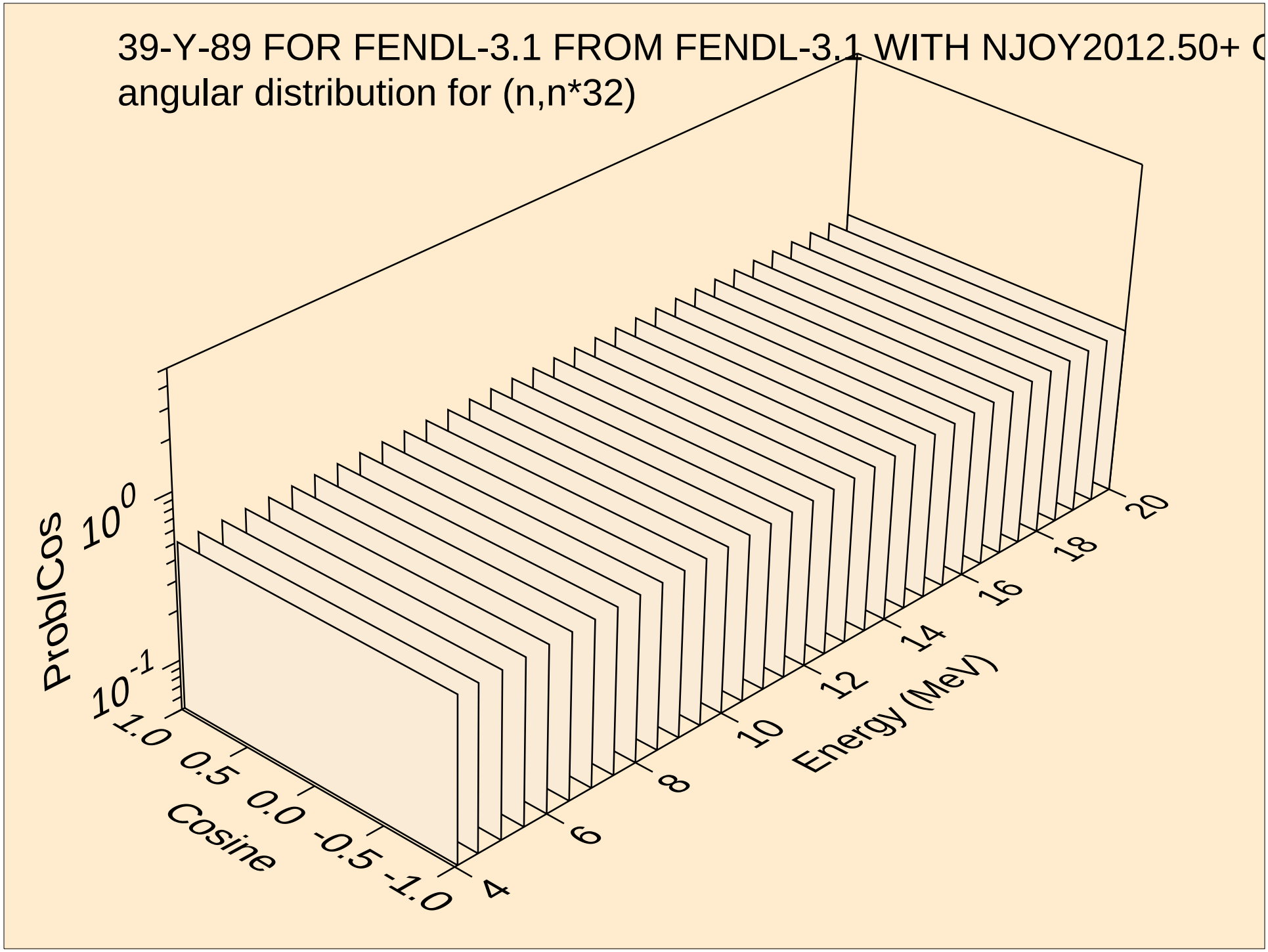

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*27)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

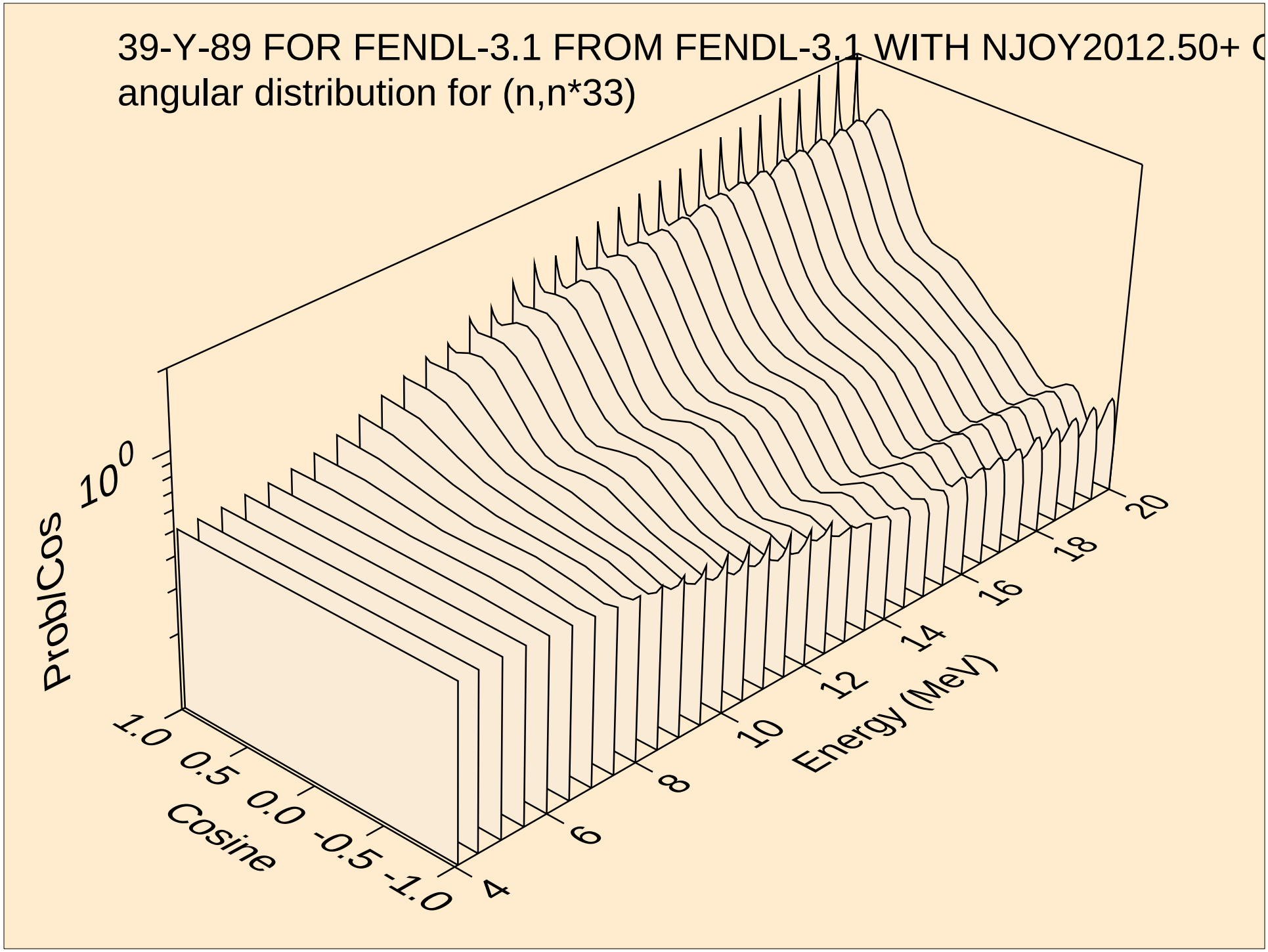

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*28)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

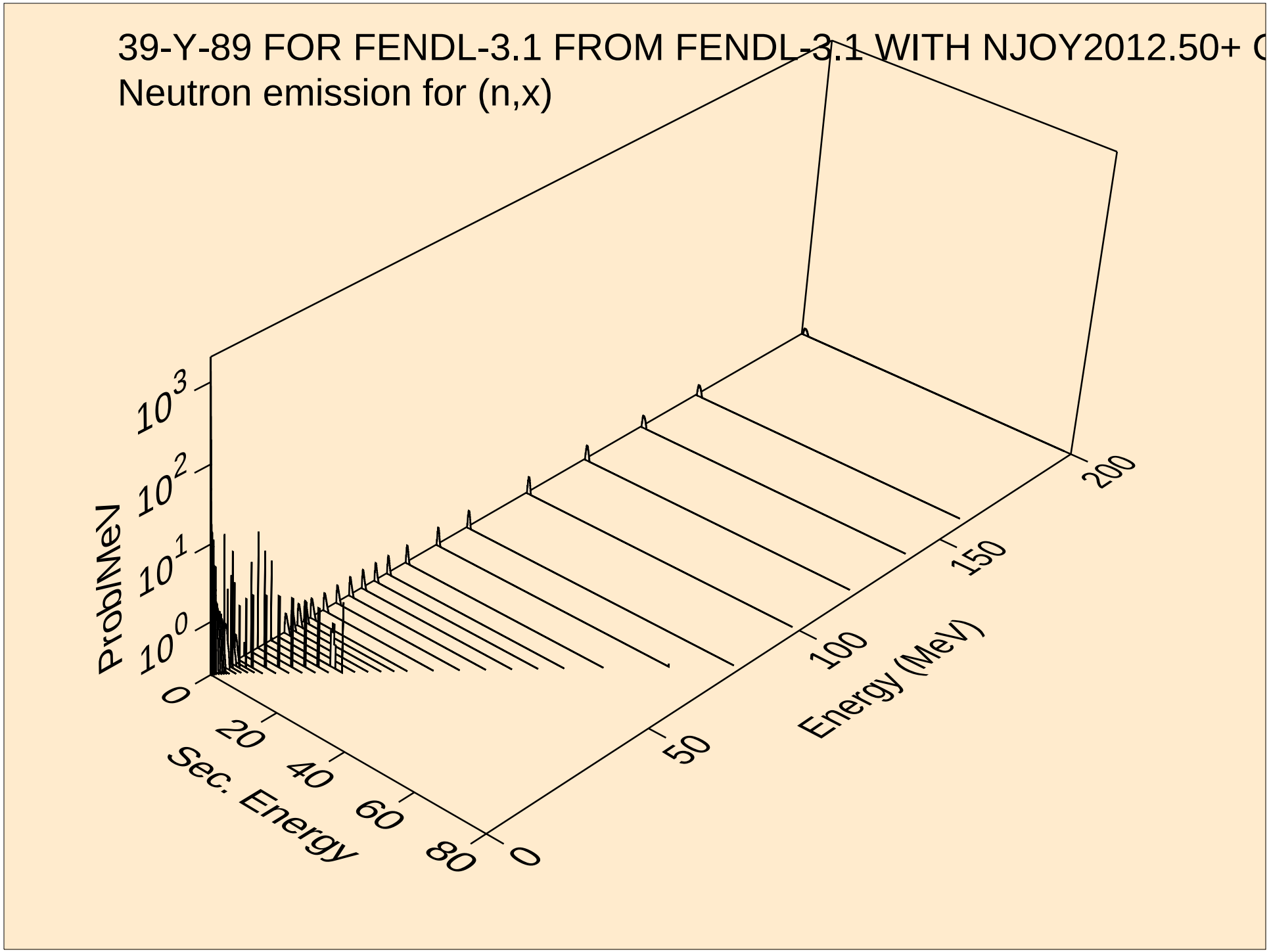

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*29)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

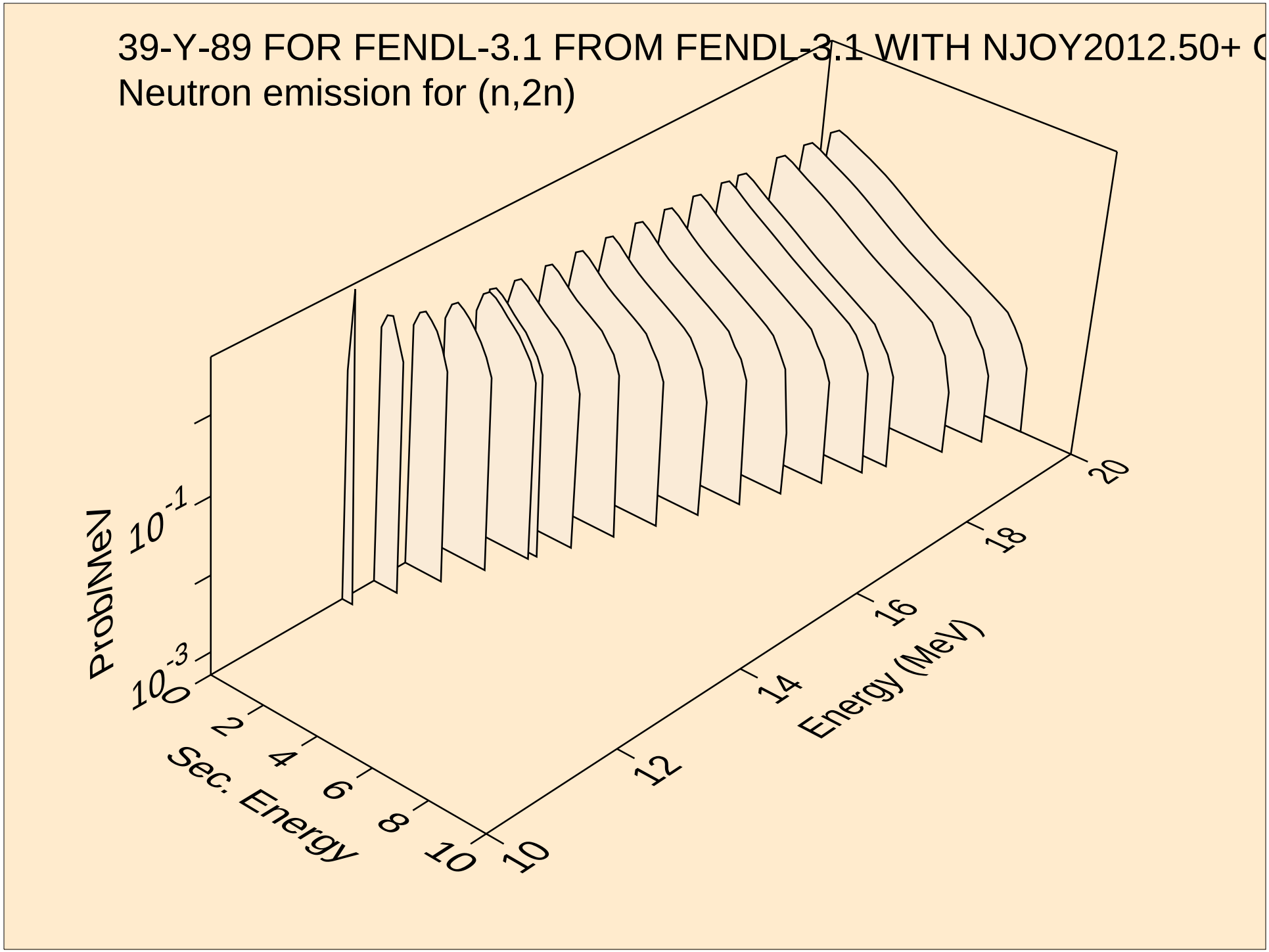

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*30)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

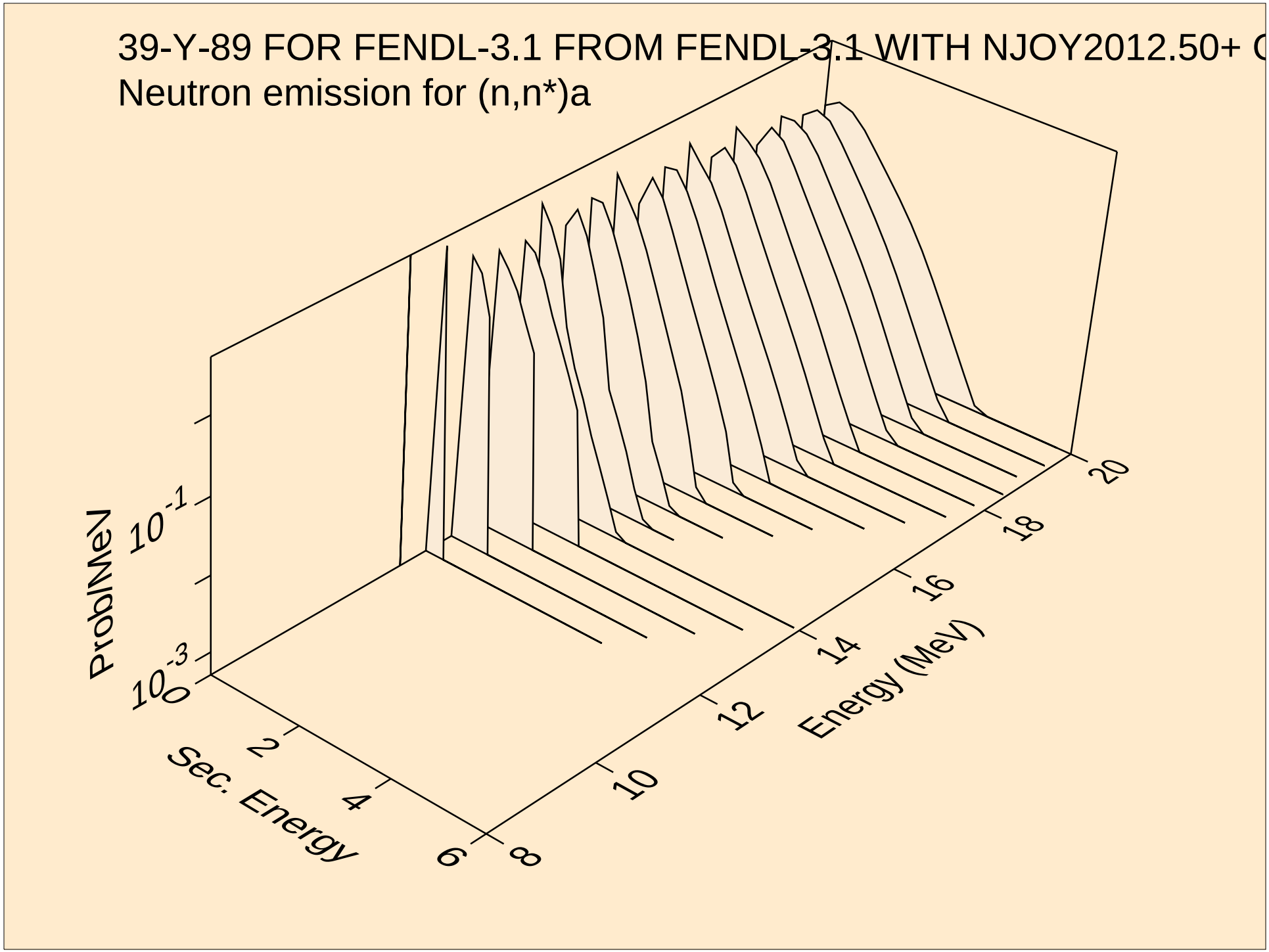

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*31)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

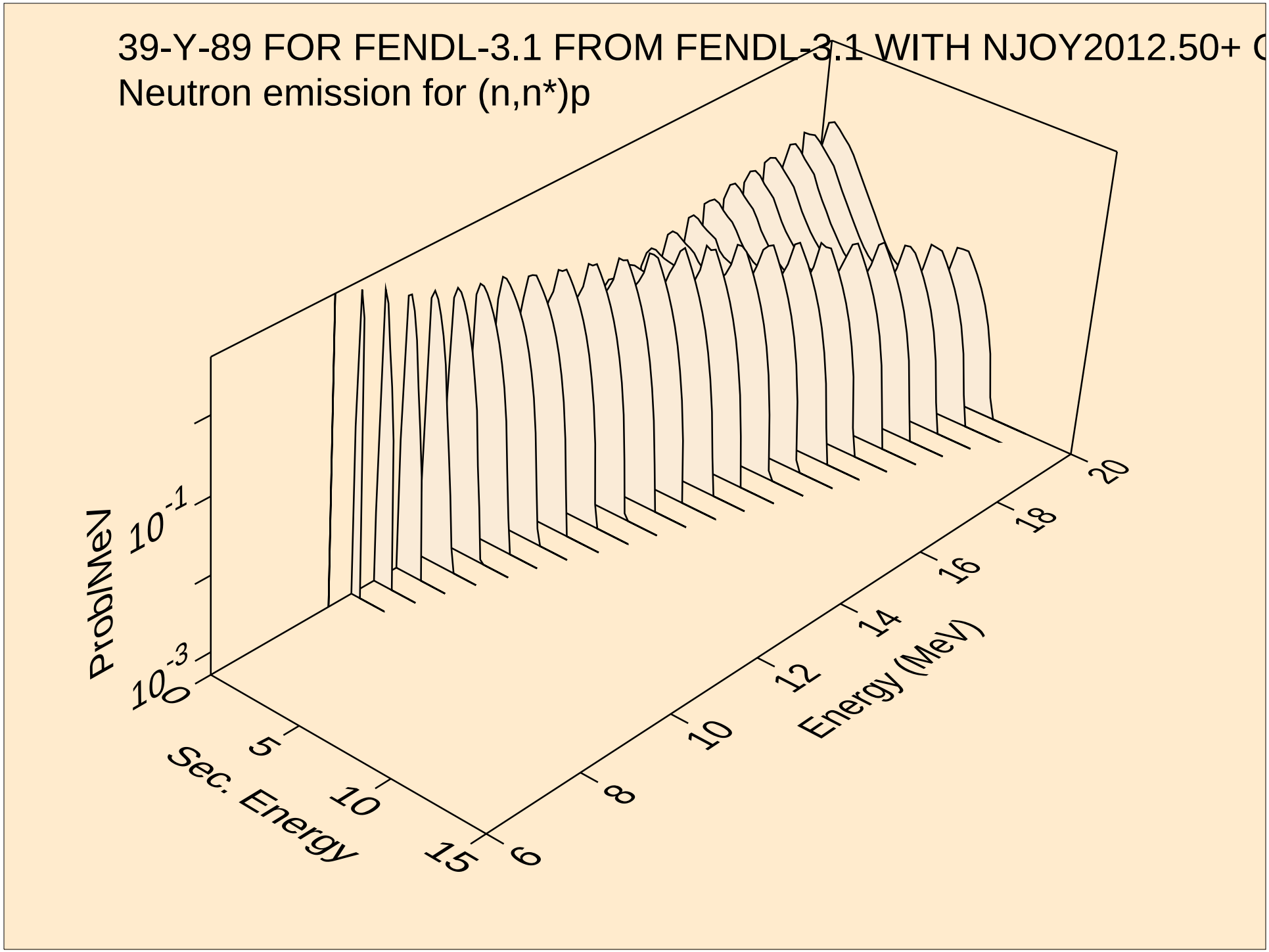

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*32)
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

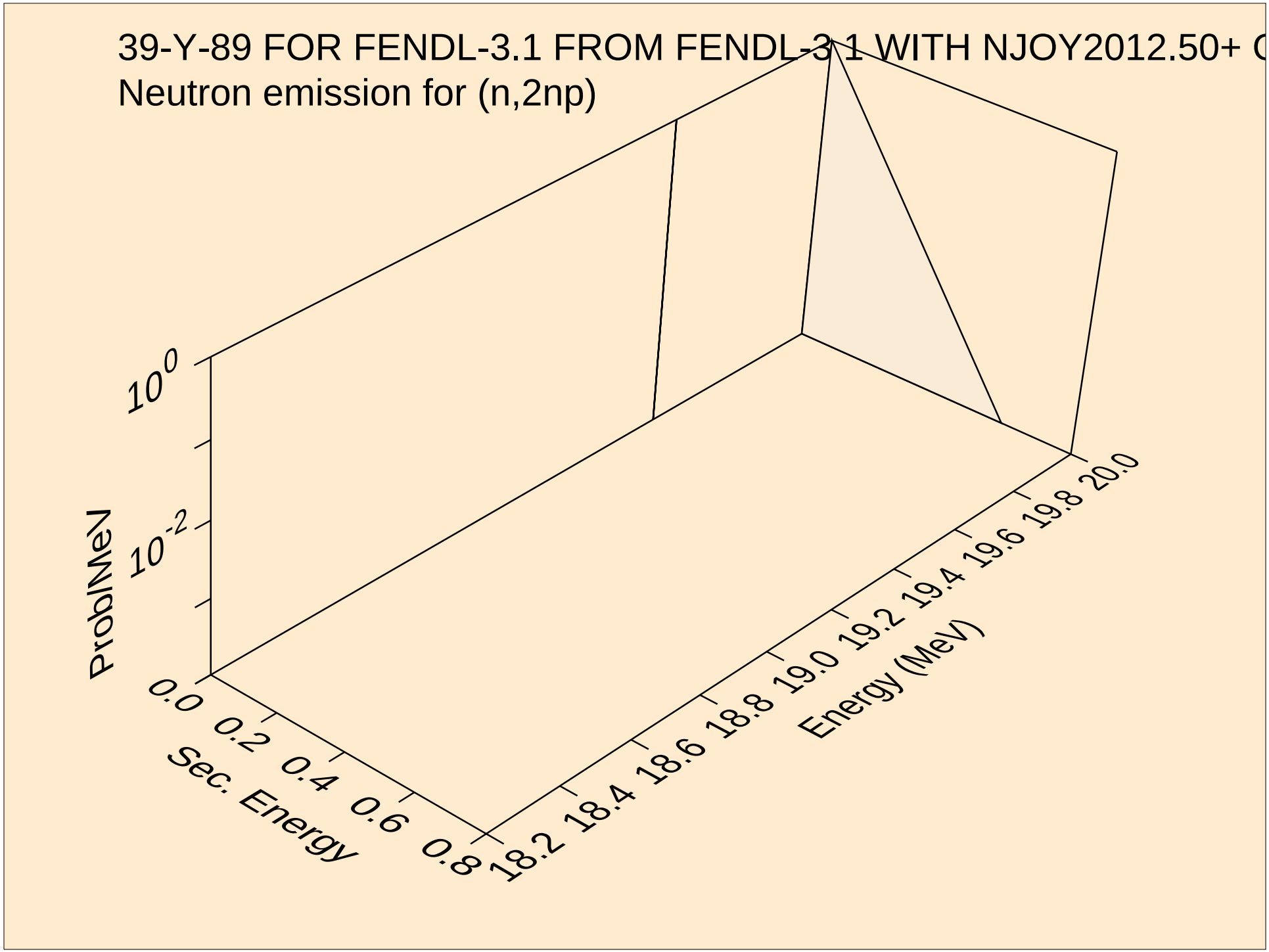

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,n*33)
ProbICos
$10^0$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

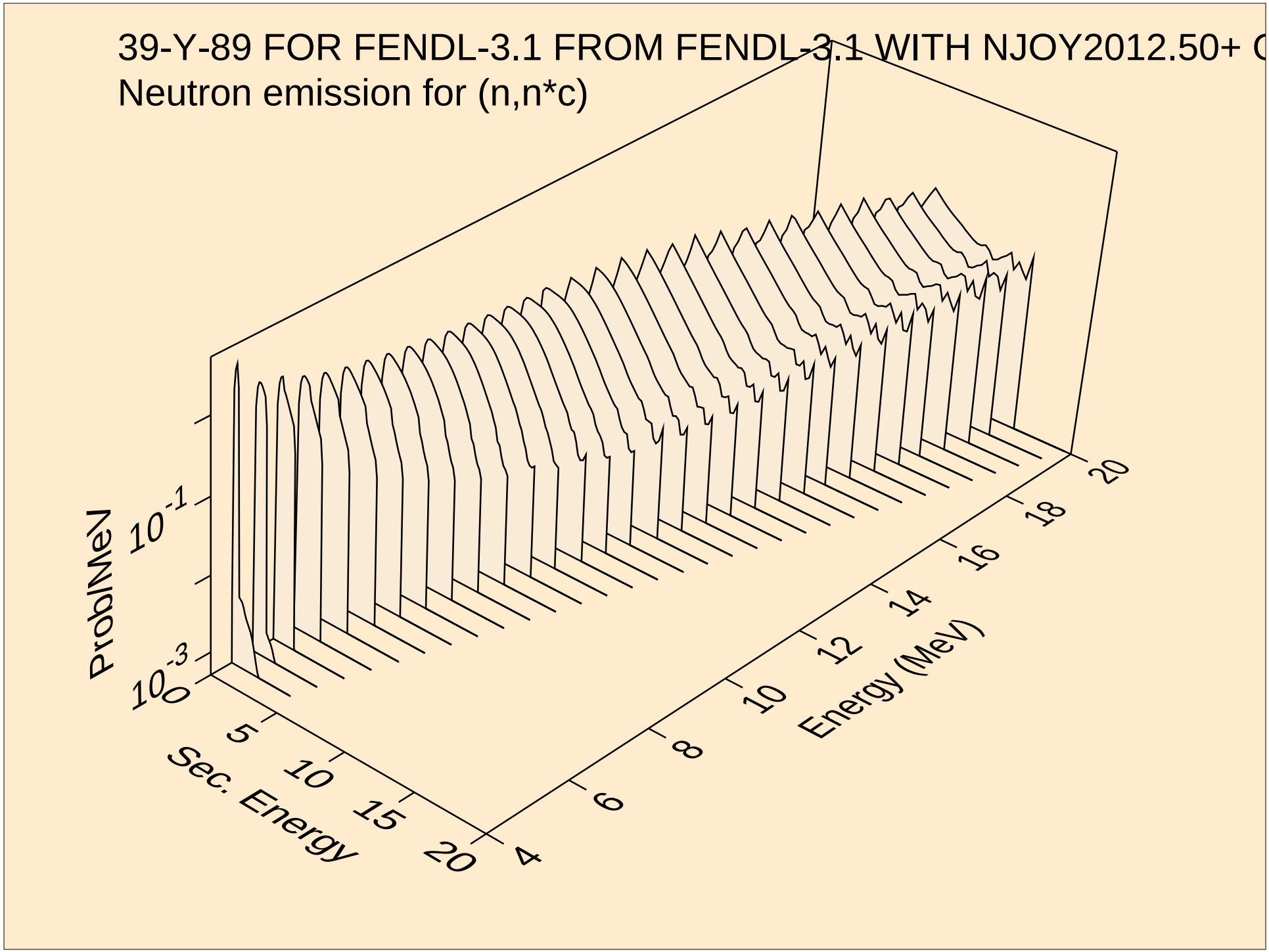

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,x)
Prob/MeV
$10^3$
$10^2$
$10^1$
$10^0$
0
20
40
60
80
Sec. Energy
0
50
100
150
200
Energy (MeV)

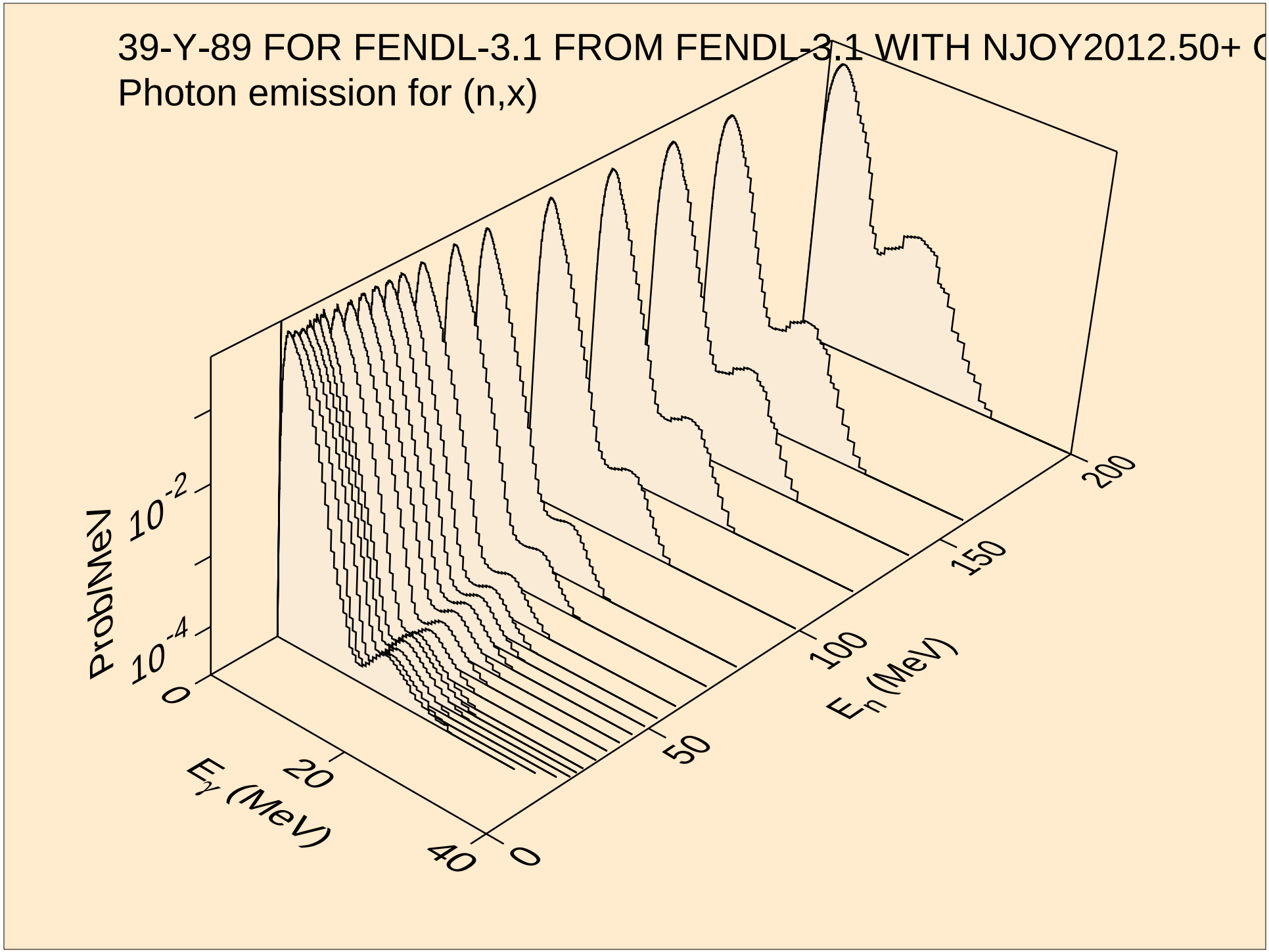

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,2n)
Prob/MeV
10-1
10-3
0
2
4
6
8
10
Sec. Energy
10
12
14
16
18
20
Energy (MeV)

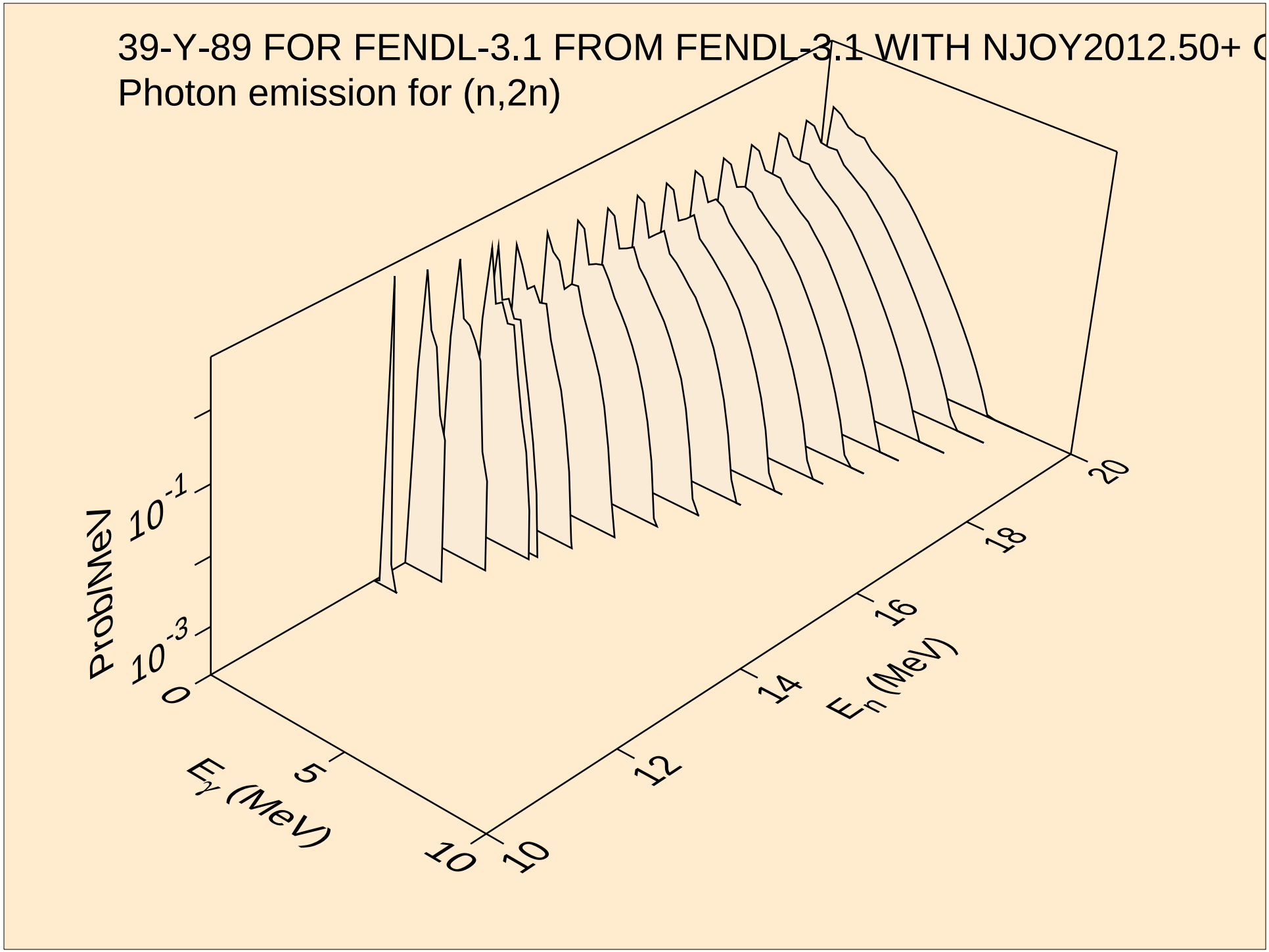

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,n*)a
Prob/MeV
10-1
10-3
0
2
4
6
8
Sec. Energy
10
12
14
16
18
20
Energy (MeV)

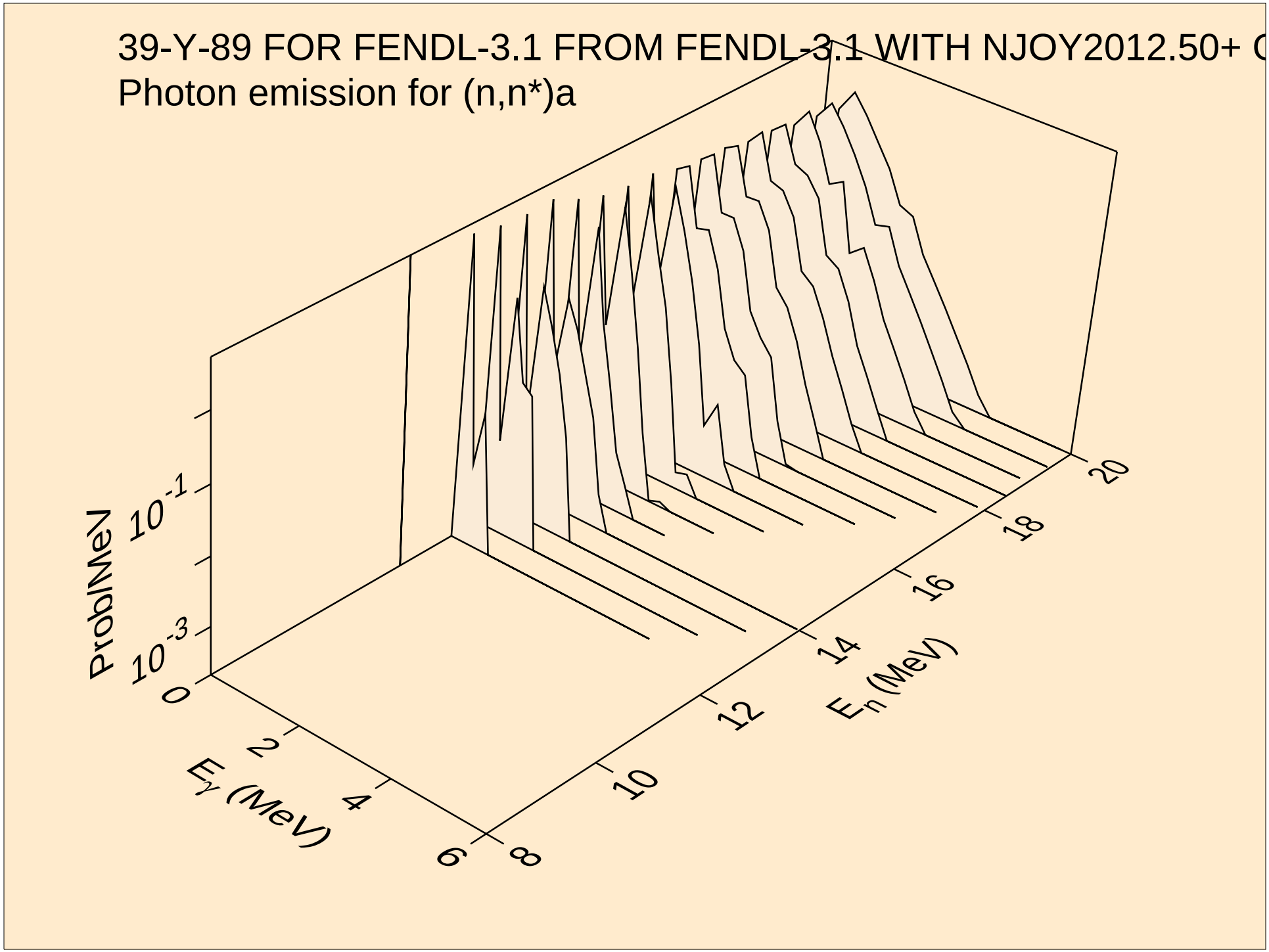

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,n*)p
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
6
8
10
12
14
16
18
20
Energy (MeV)

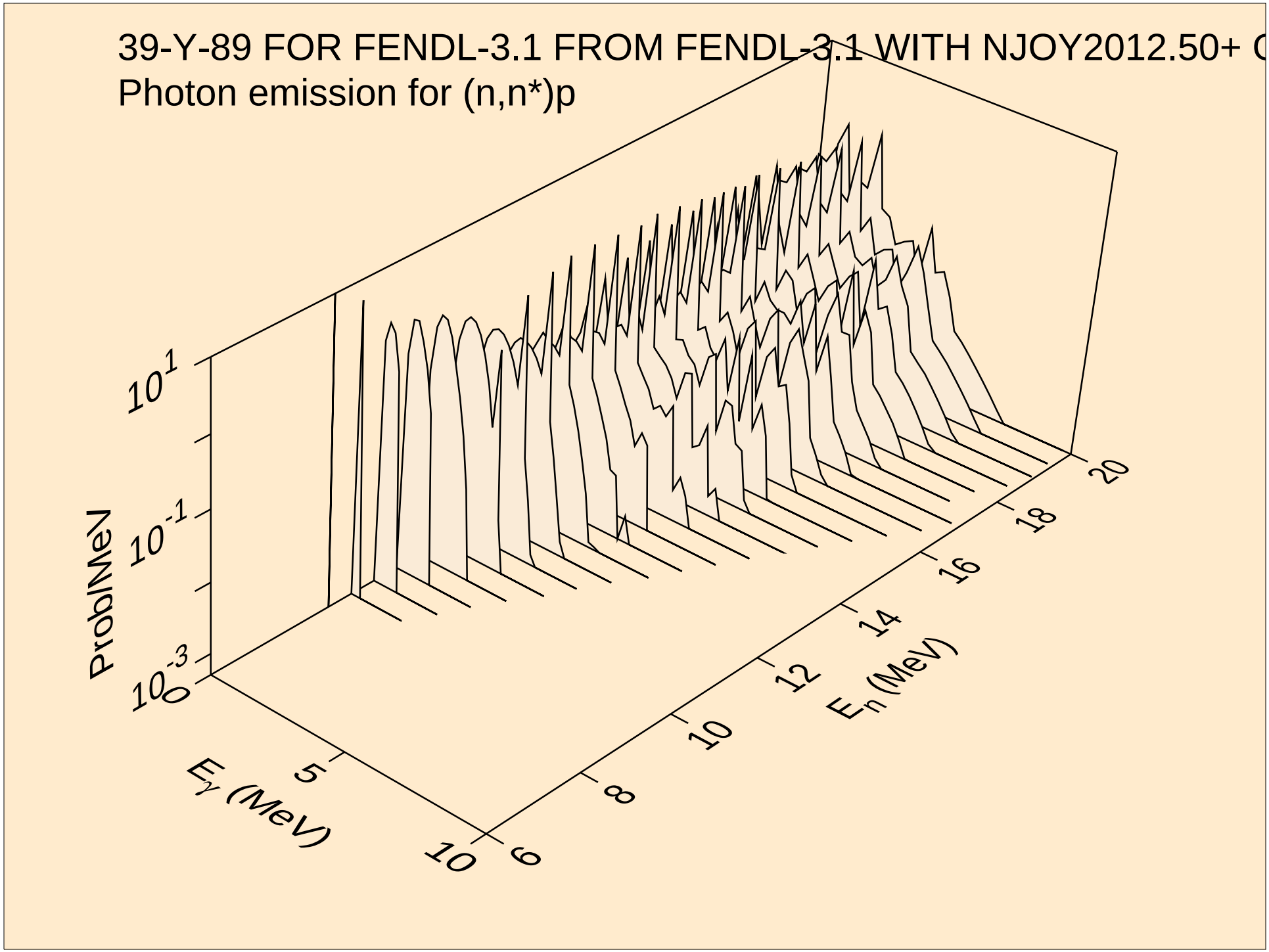

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,2np)
Prob/MeV
$10^{0}$
$10^{-2}$
0.0 0.2 0.4 0.6 0.8
Sec. Energy
18.2 18.4 18.6 18.8 19.0 19.2 19.4 19.6 19.8 20.0
Energy (MeV)

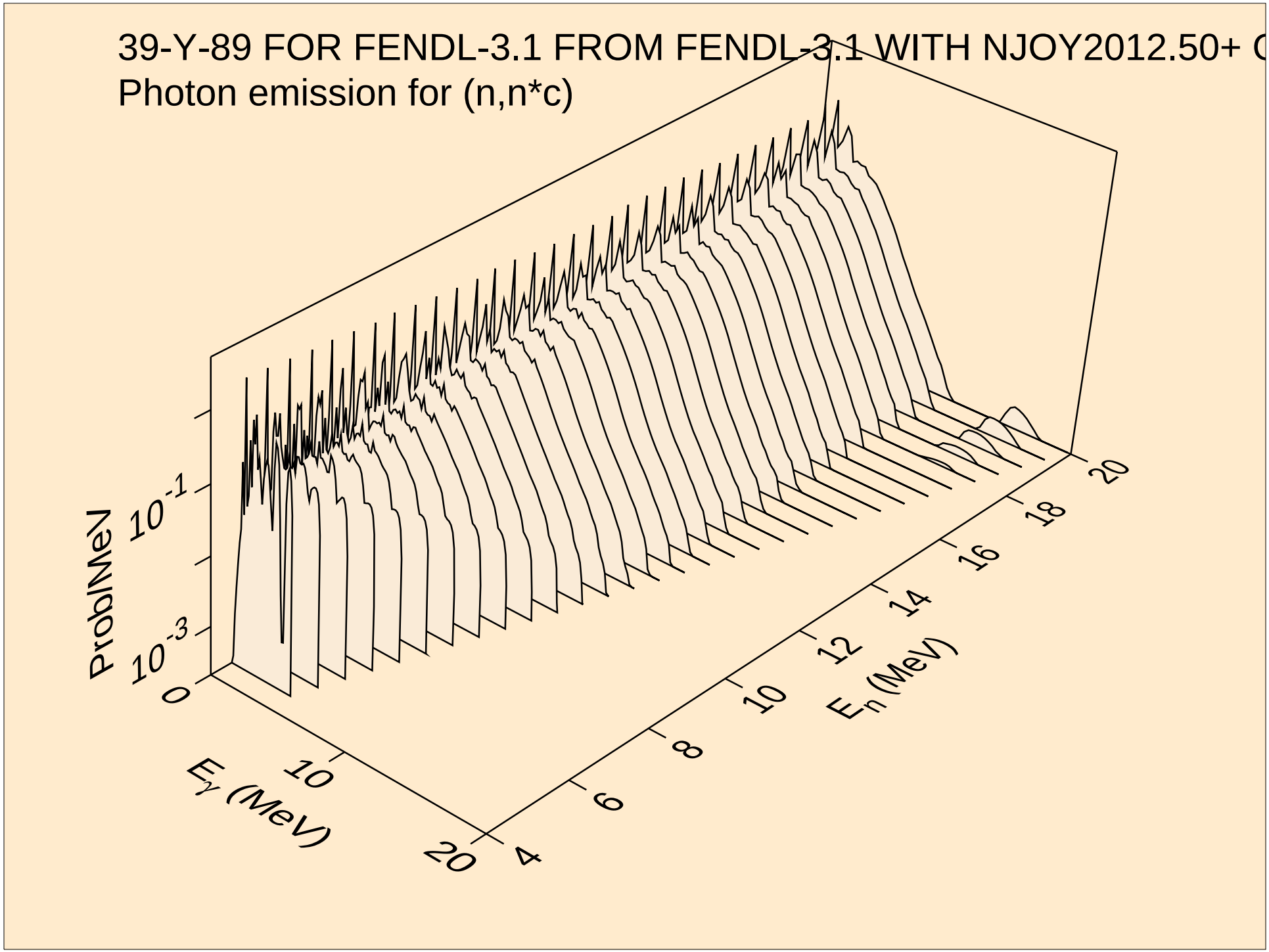

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Neutron emission for (n,n*c)
Prob/MeV
10-1
10-3
0
5
10
15
20
Sec. Energy
4
6
8
10
12
14
16
18
20
Energy (MeV)

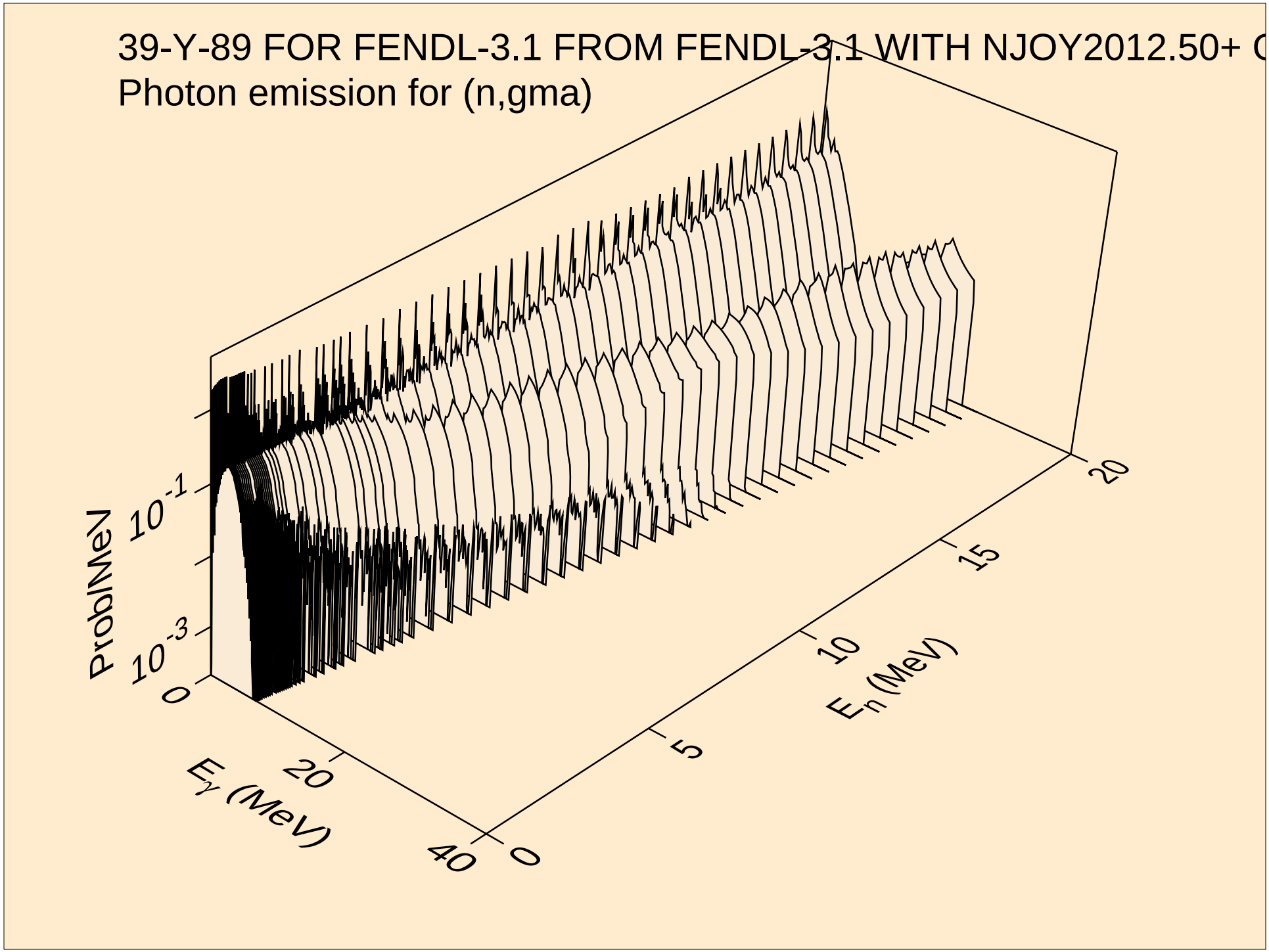

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,x)
Prob/MeV
10-2
10-4
0
20
40
Eγ (MeV)
0
50
100
150
200
En (MeV)

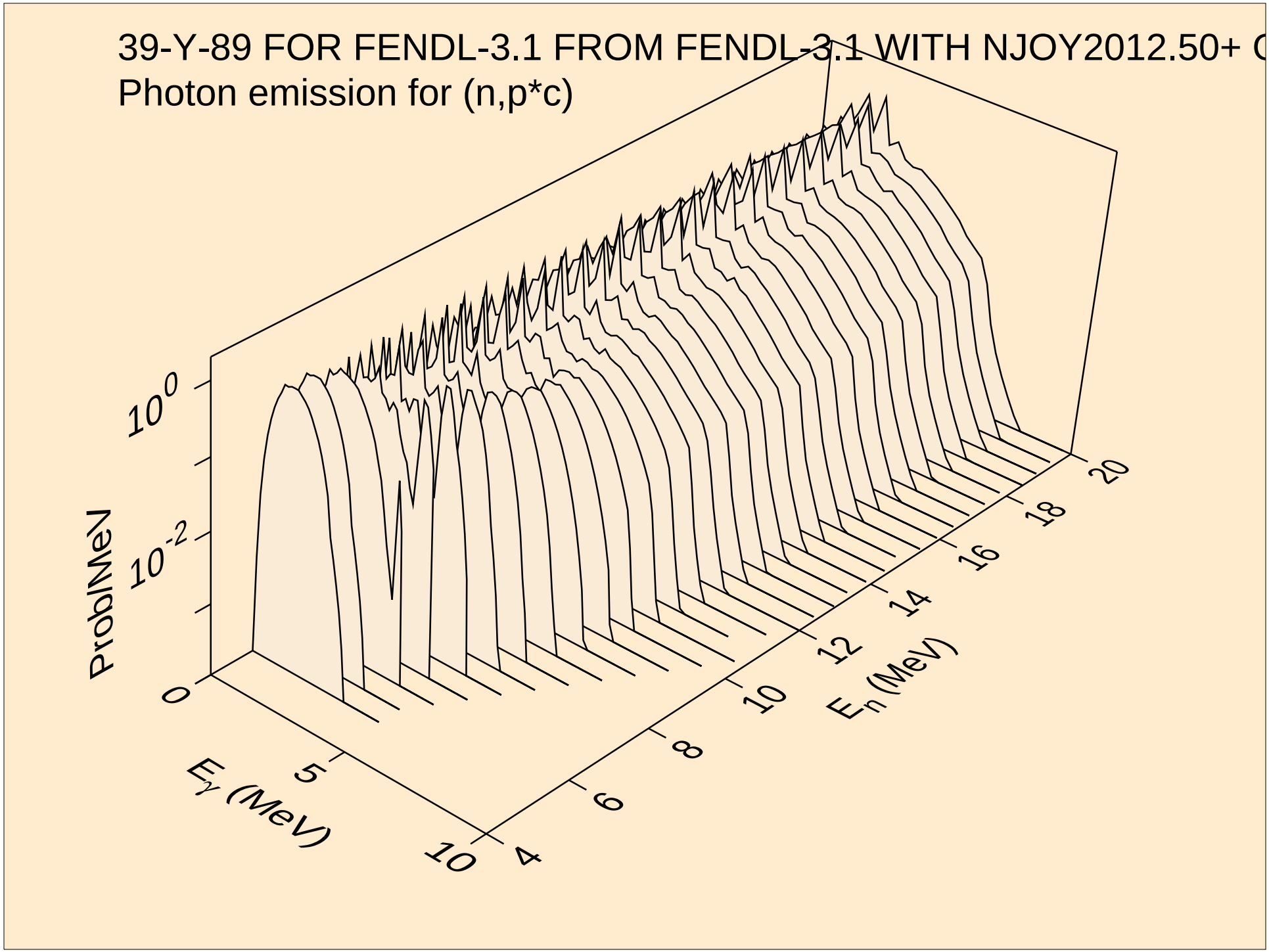

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,2n)
Prob/MeV
10-1
10-3
0
5
10
Eγ (MeV)
10
12
14
16
18
20
En (MeV)

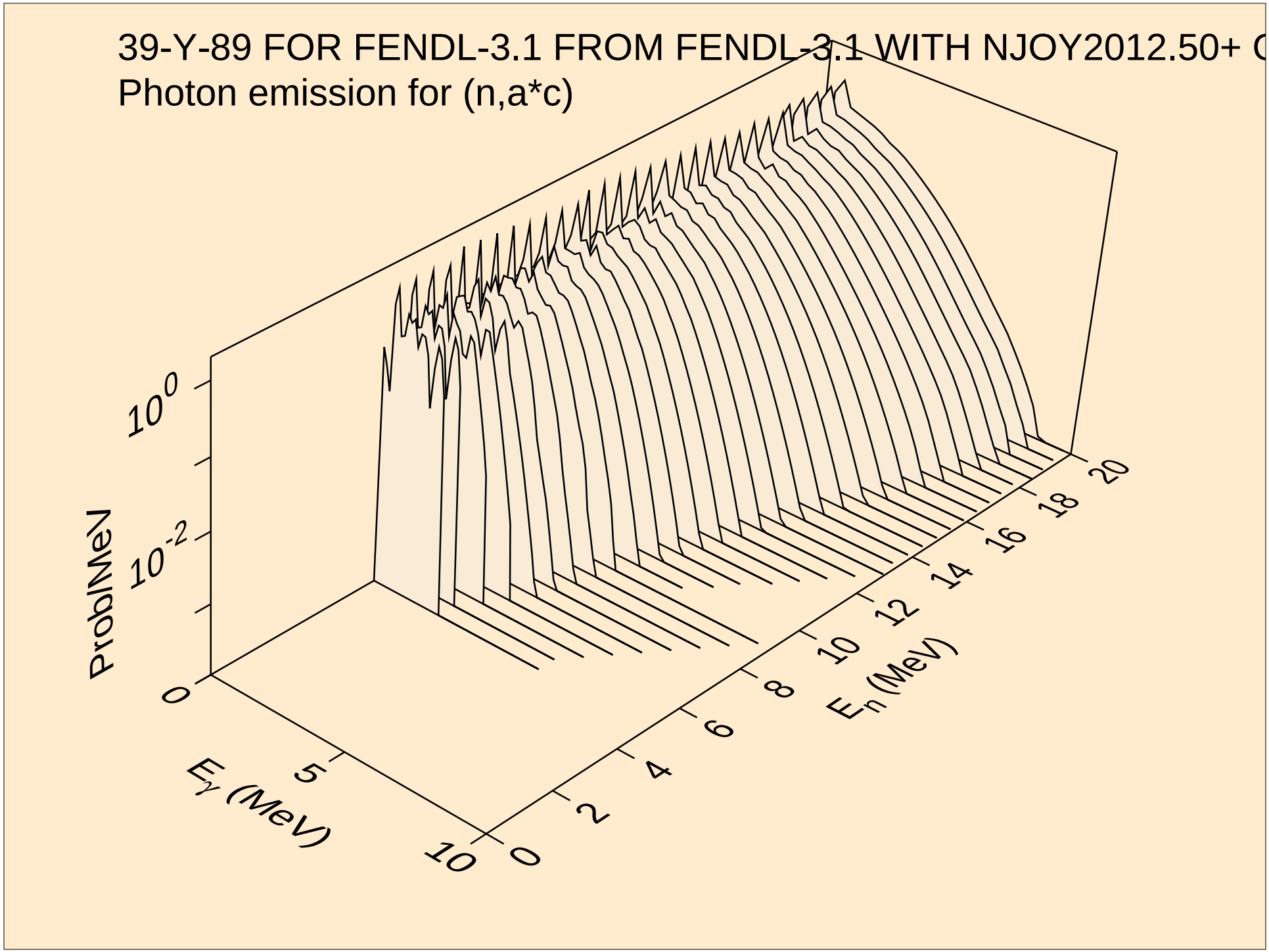

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,n*)a
Prob/MeV
10-1
10-3
0
2
4
6
8
10
12
14
16
18
20
Eγ (MeV)
En (MeV)

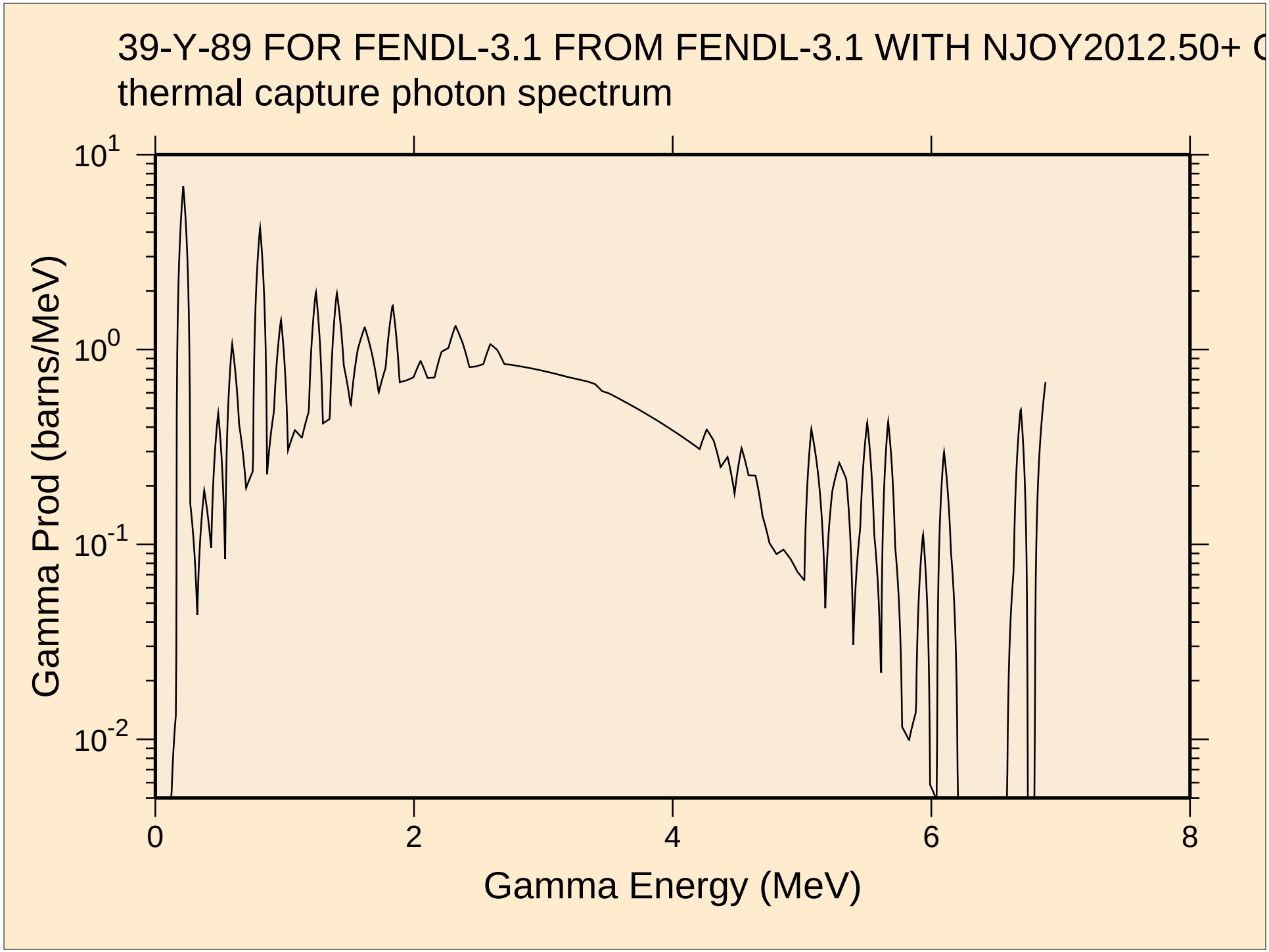

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,n*)p
Prob/MeV
$10^{1}$
$10^{-1}$
$10^{-3}$
0
5
10
$E_\gamma$ (MeV)
6
8
10
12
14
16
18
20
$E_n$ (MeV)

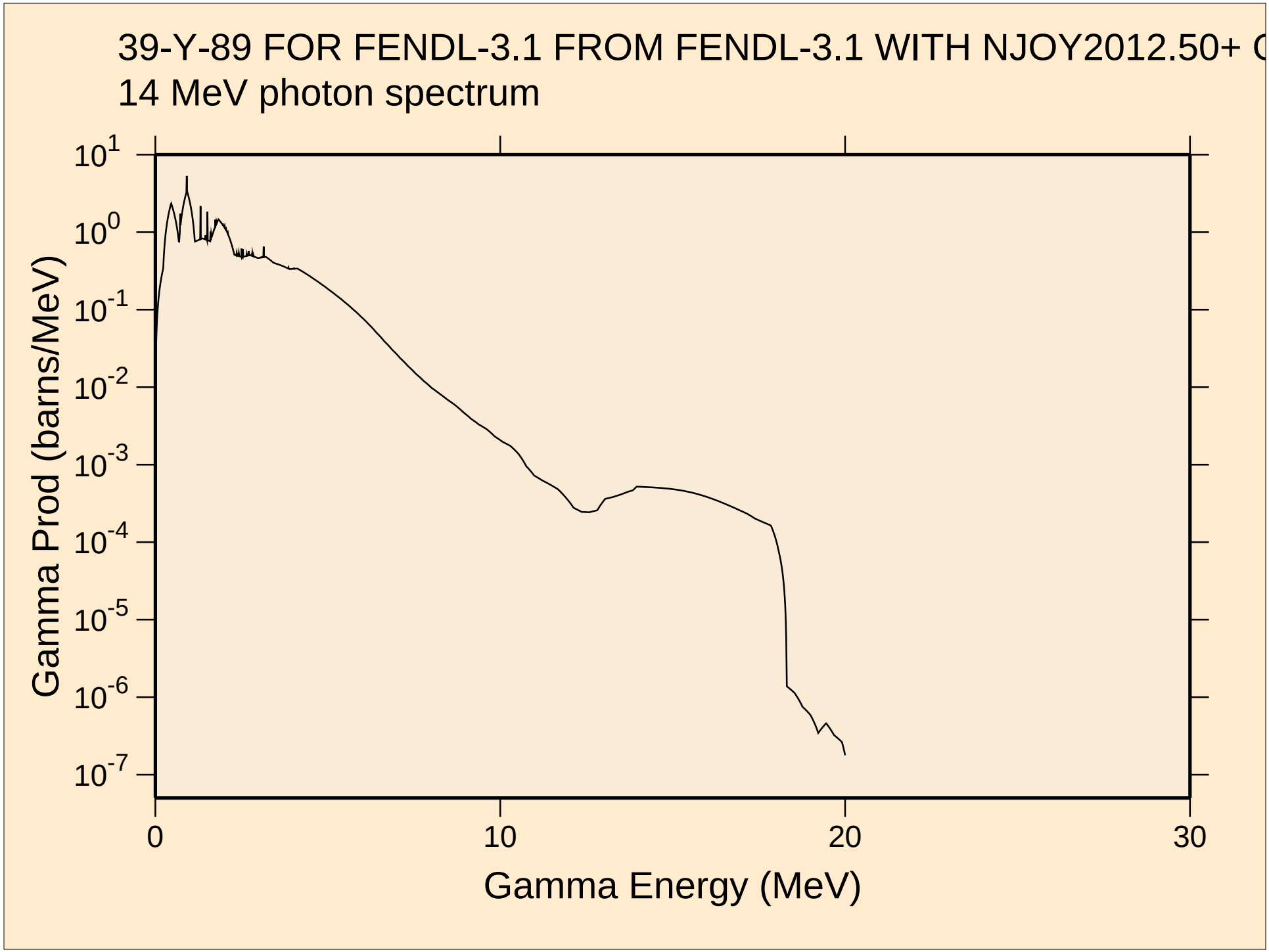

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,n*c)
Prob/MeV
10-1
10-3
0
Eγ (MeV)
10
20
En (MeV)
4
6
8
10
12
14
16
18
20

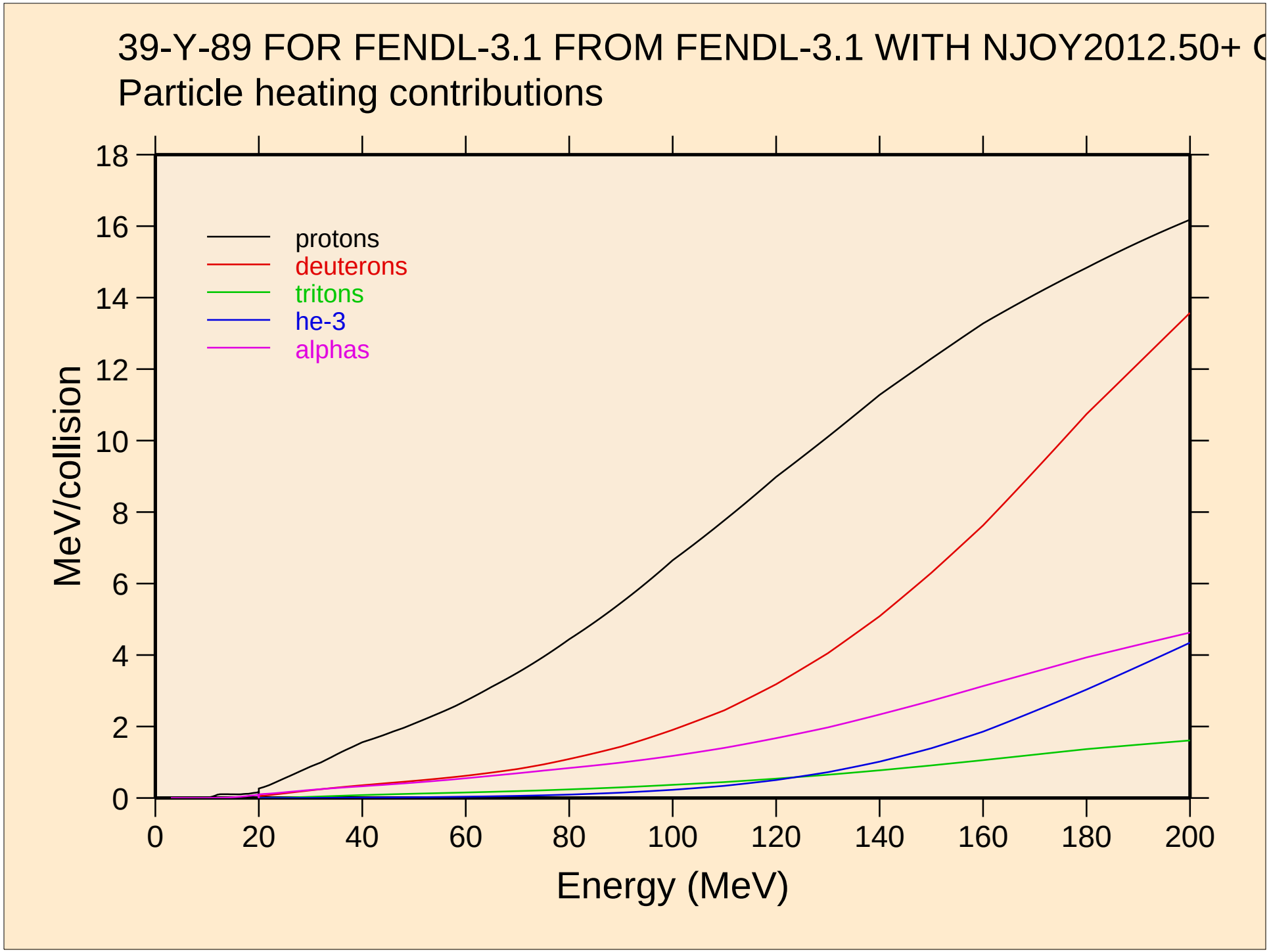

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,gma)
Prob/MeV
10-1
10-3
0
20
40
Eγ (MeV)
0
5
10
15
20
En (MeV)

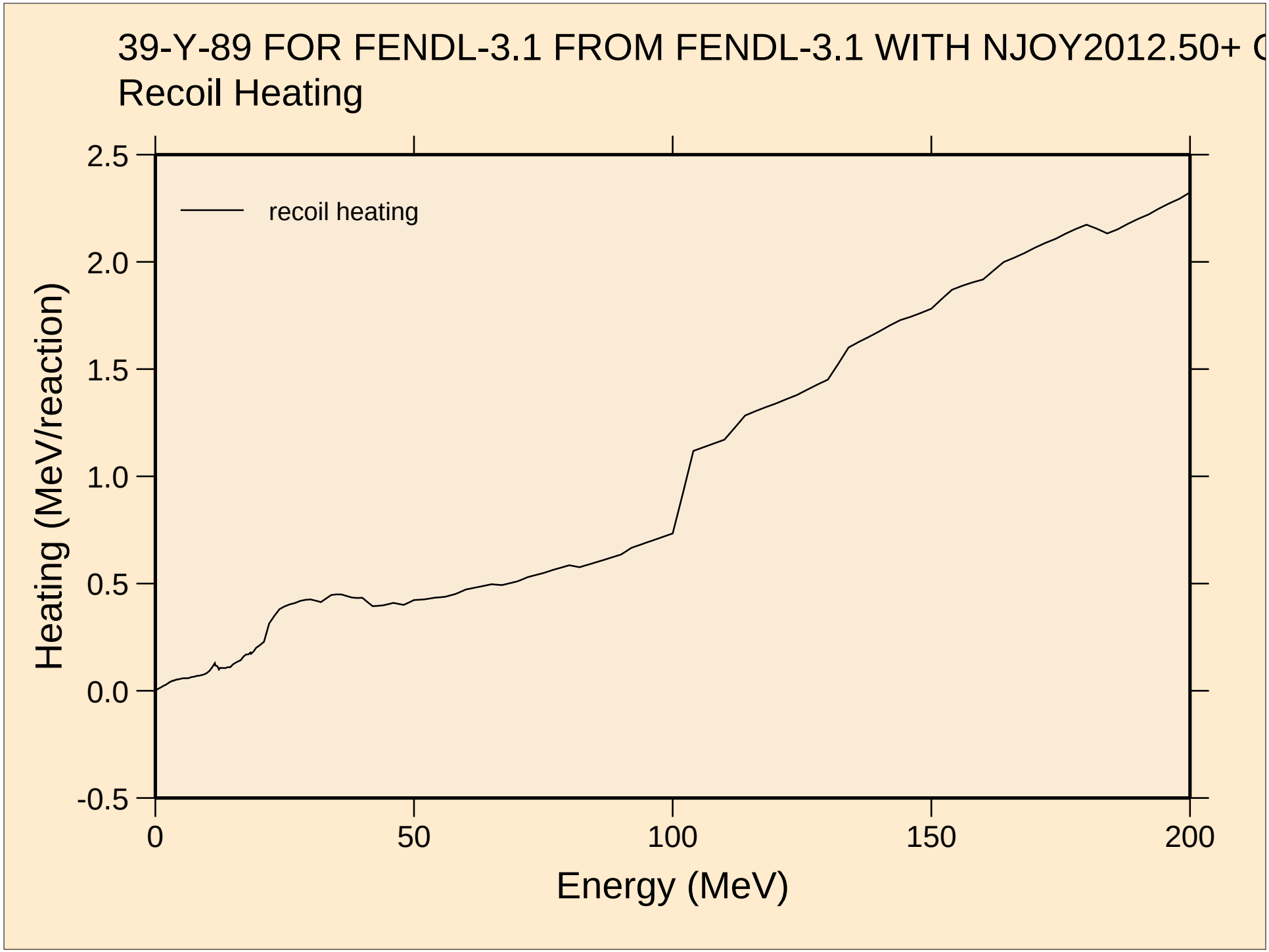

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,p*c)
Prob/MeV
$10^{0}$
$10^{-2}$
0
5
10
$E_\gamma$ (MeV)
4
6
8
10
12
14
16
18
20
$E_n$ (MeV)

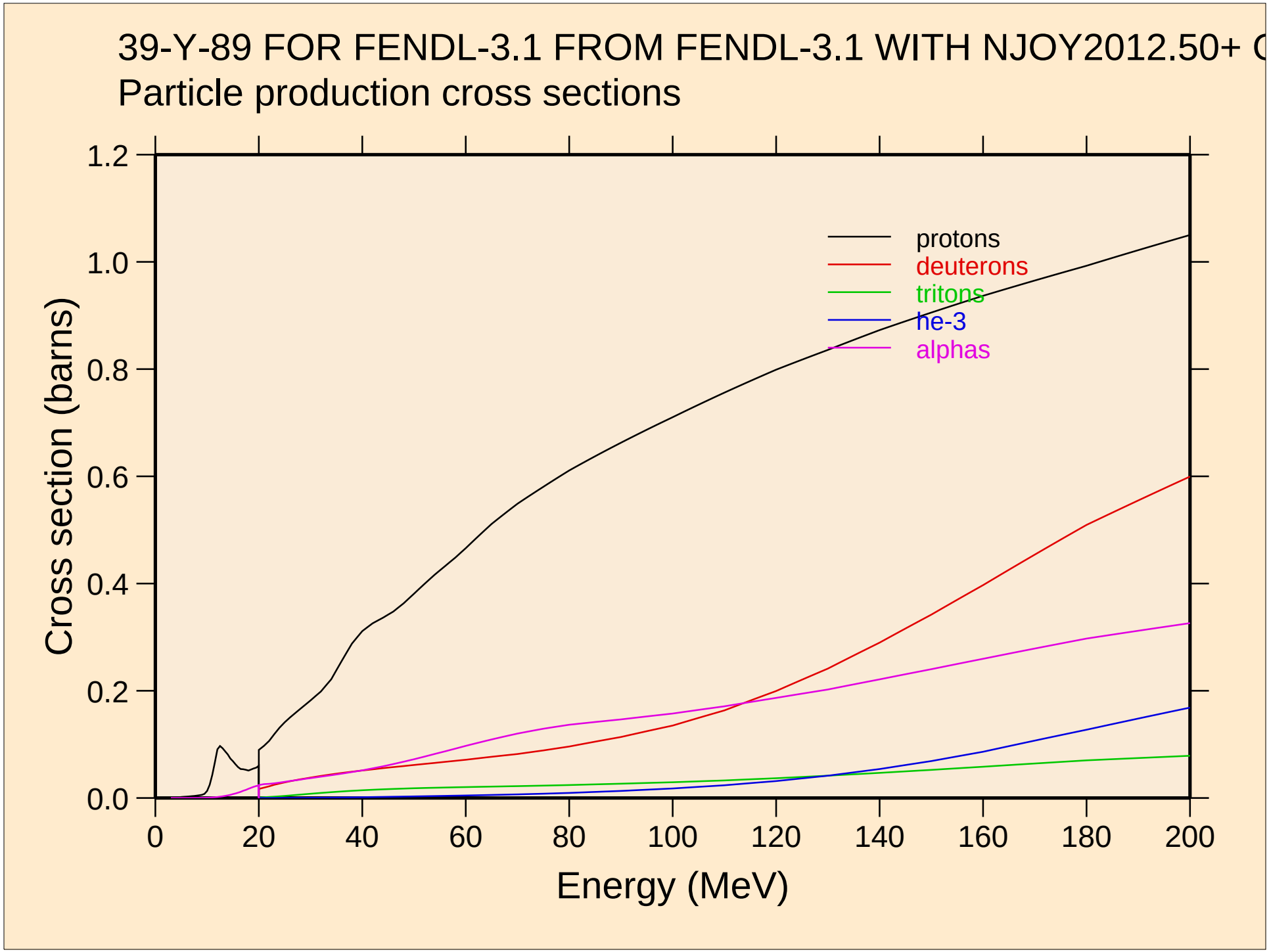

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Photon emission for (n,a*c)
Prob/MeV
$10^{0}$
$10^{-2}$
0
5
10
$E_\gamma$ (MeV)
0
2
4
6
8
10
12
14
16
18
20
$E_n$ (MeV)

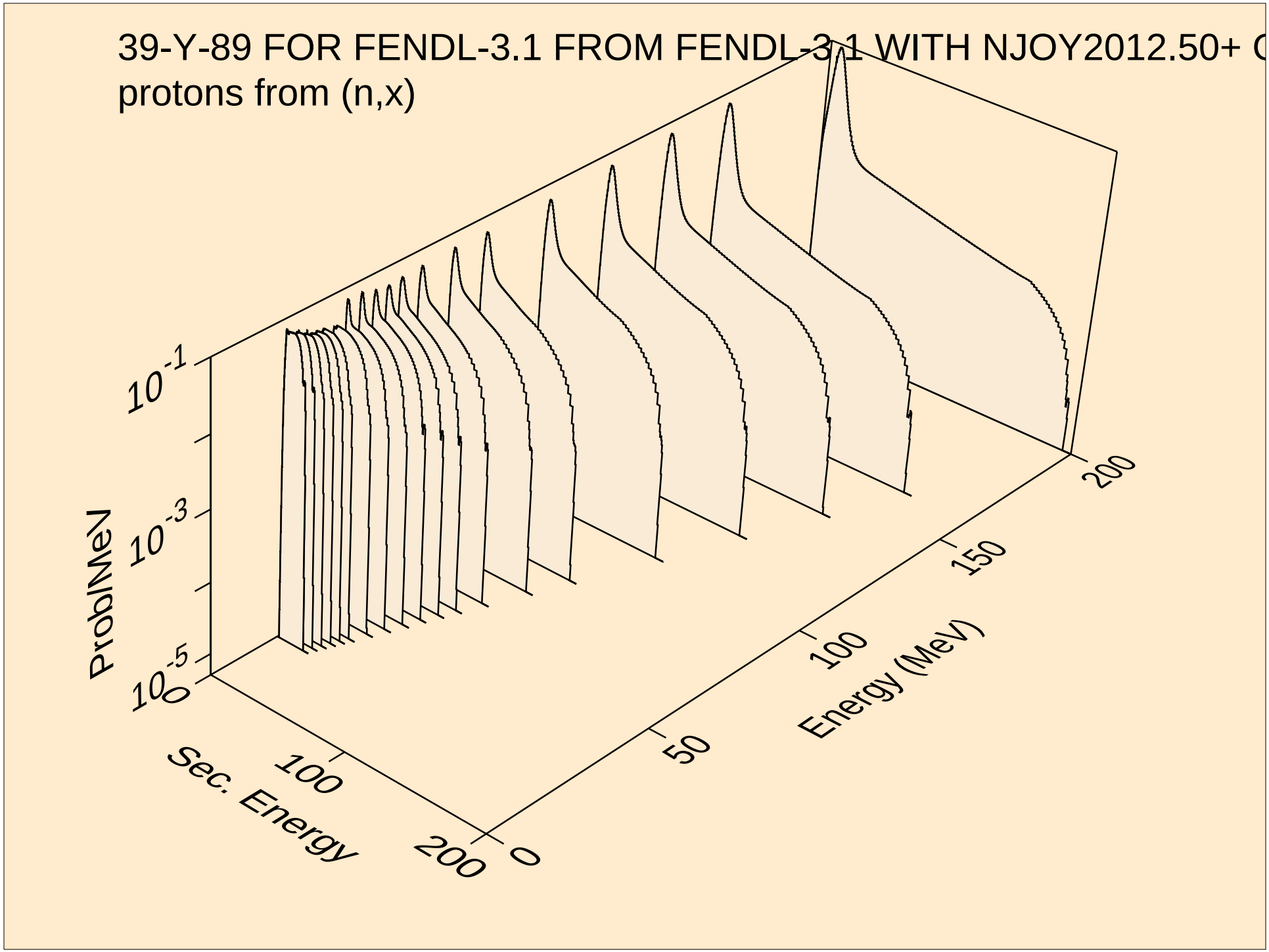

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
thermal capture photon spectrum
Gamma Prod (barns/MeV)
$10^{1}$
$10^{0}$
$10^{-1}$
$10^{-2}$
0
2
4
6
8
Gamma Energy (MeV)

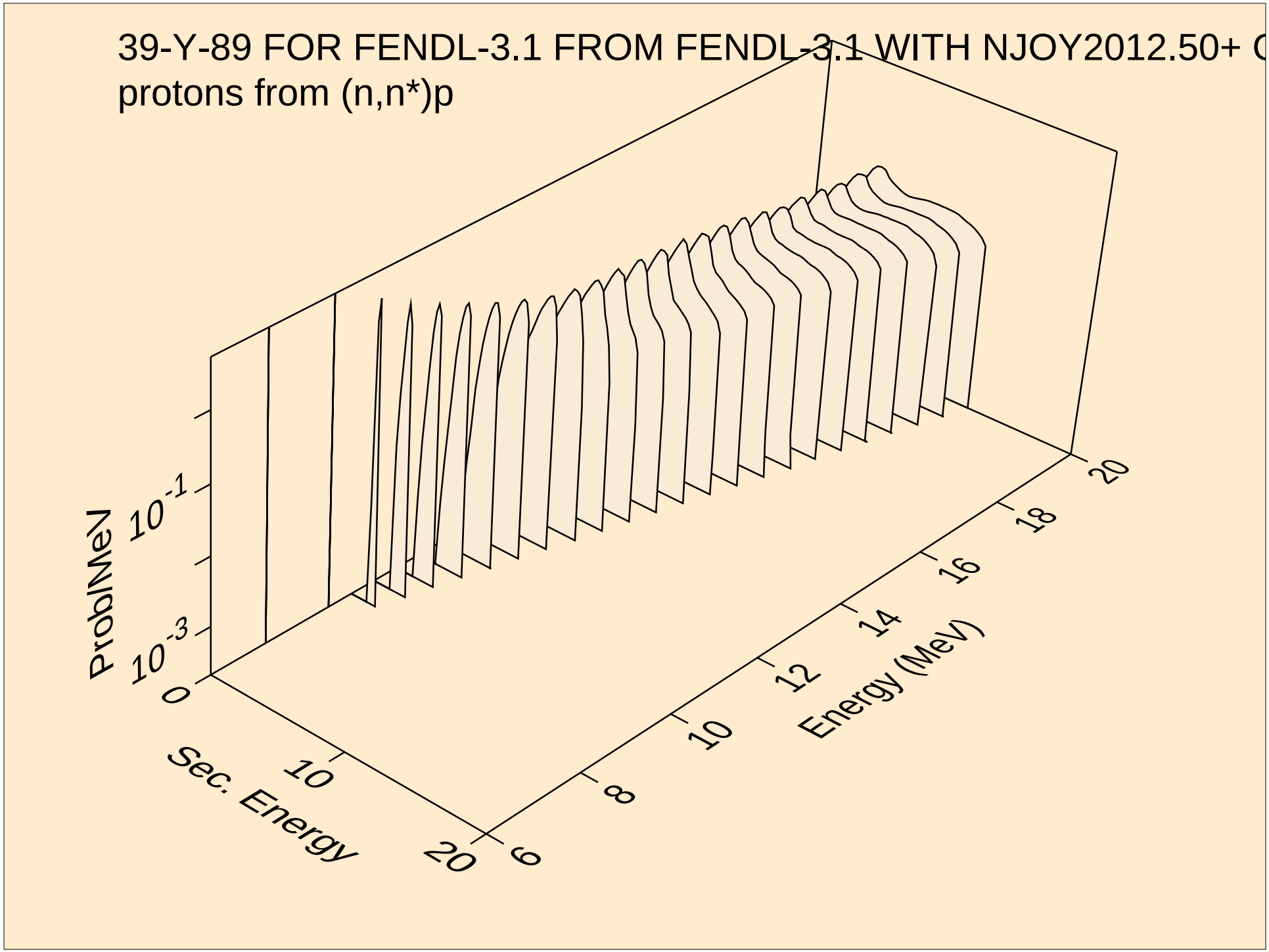

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
14 MeV photon spectrum
Gamma Prod (barns/MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
10
20
30
Gamma Energy (MeV)

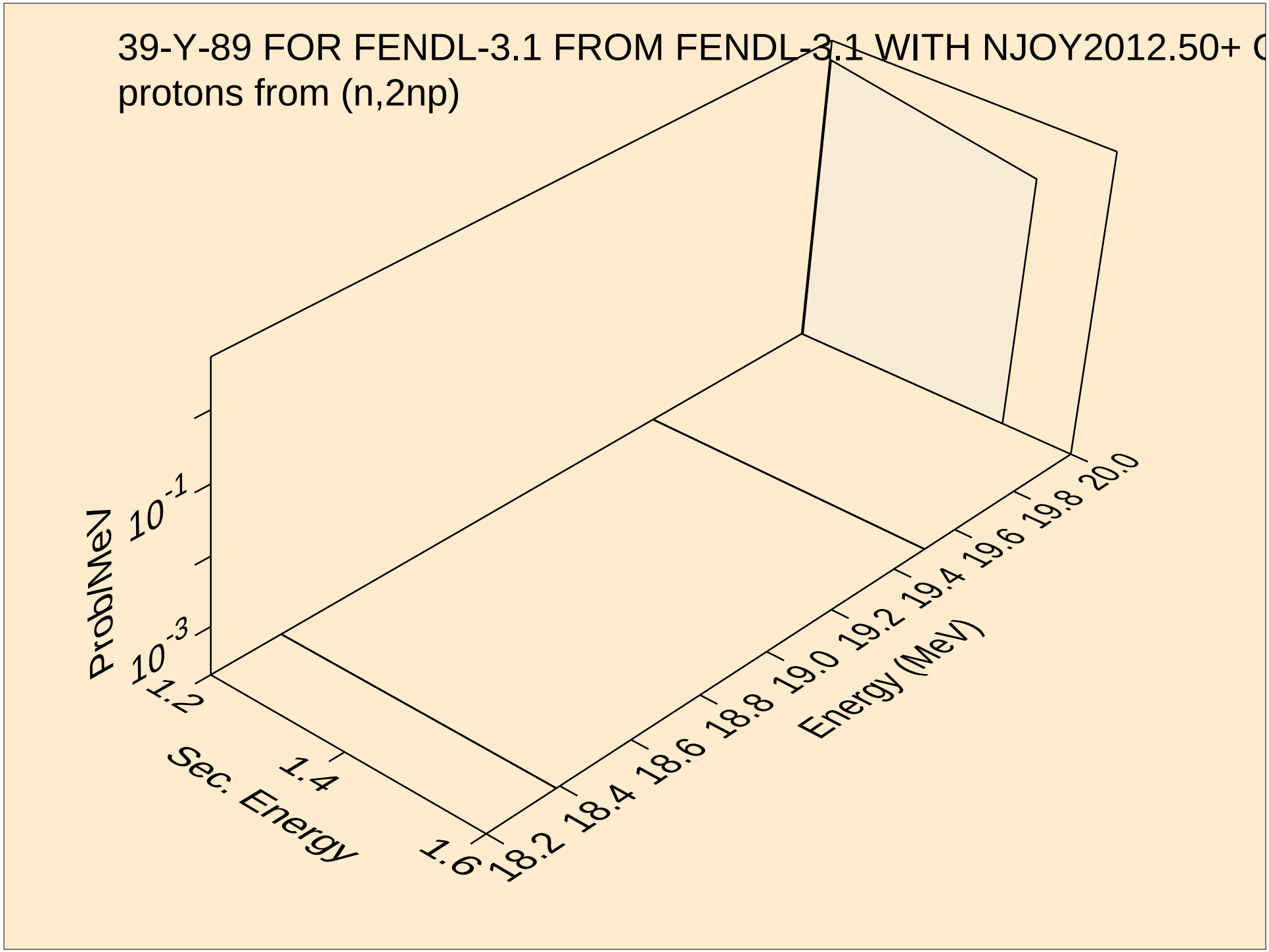

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
2
4
6
8
10
12
14
16
18
0
20
40
60
80
100
120
140
160
180
200

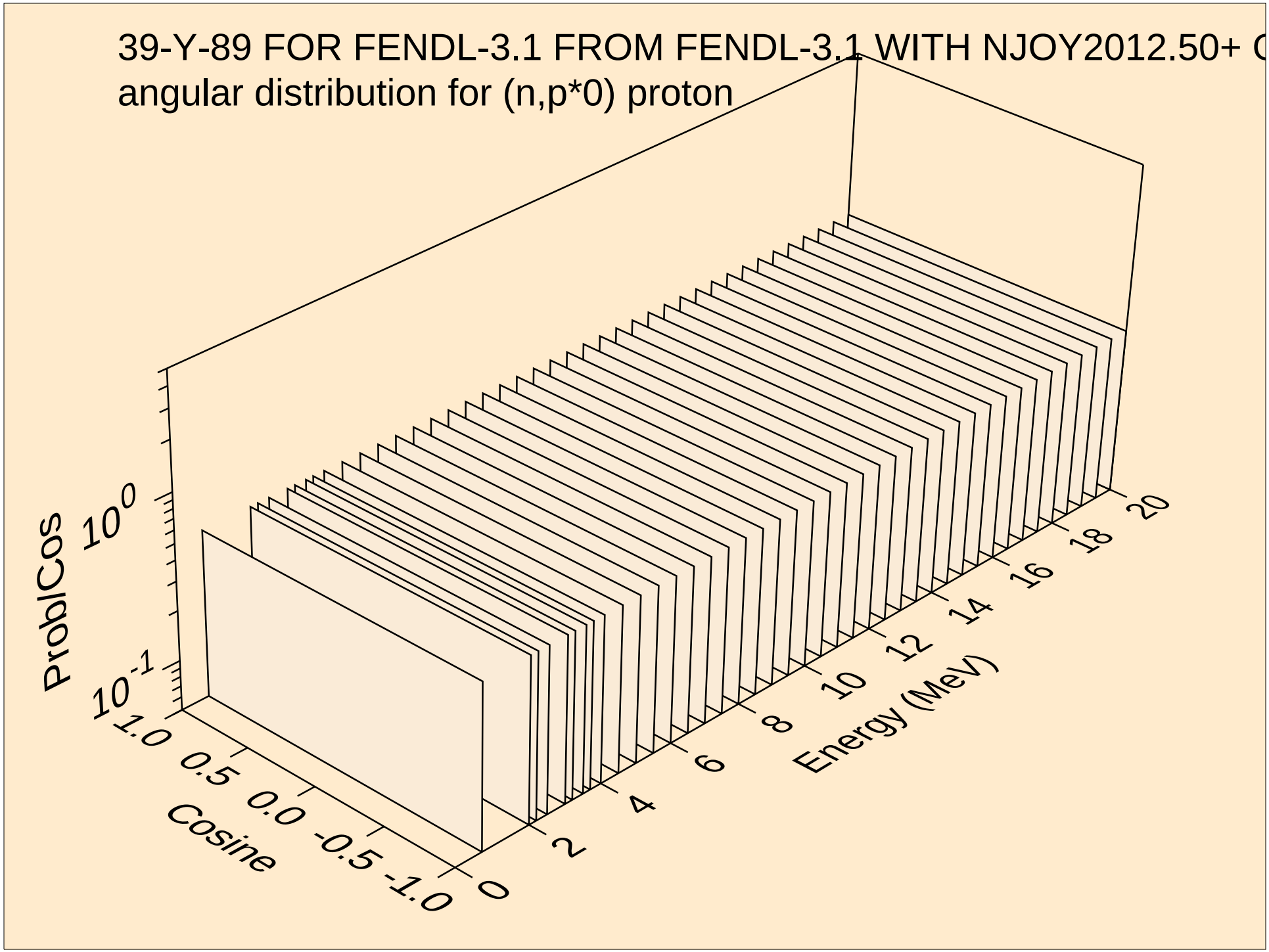

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
0
50
100
150
200

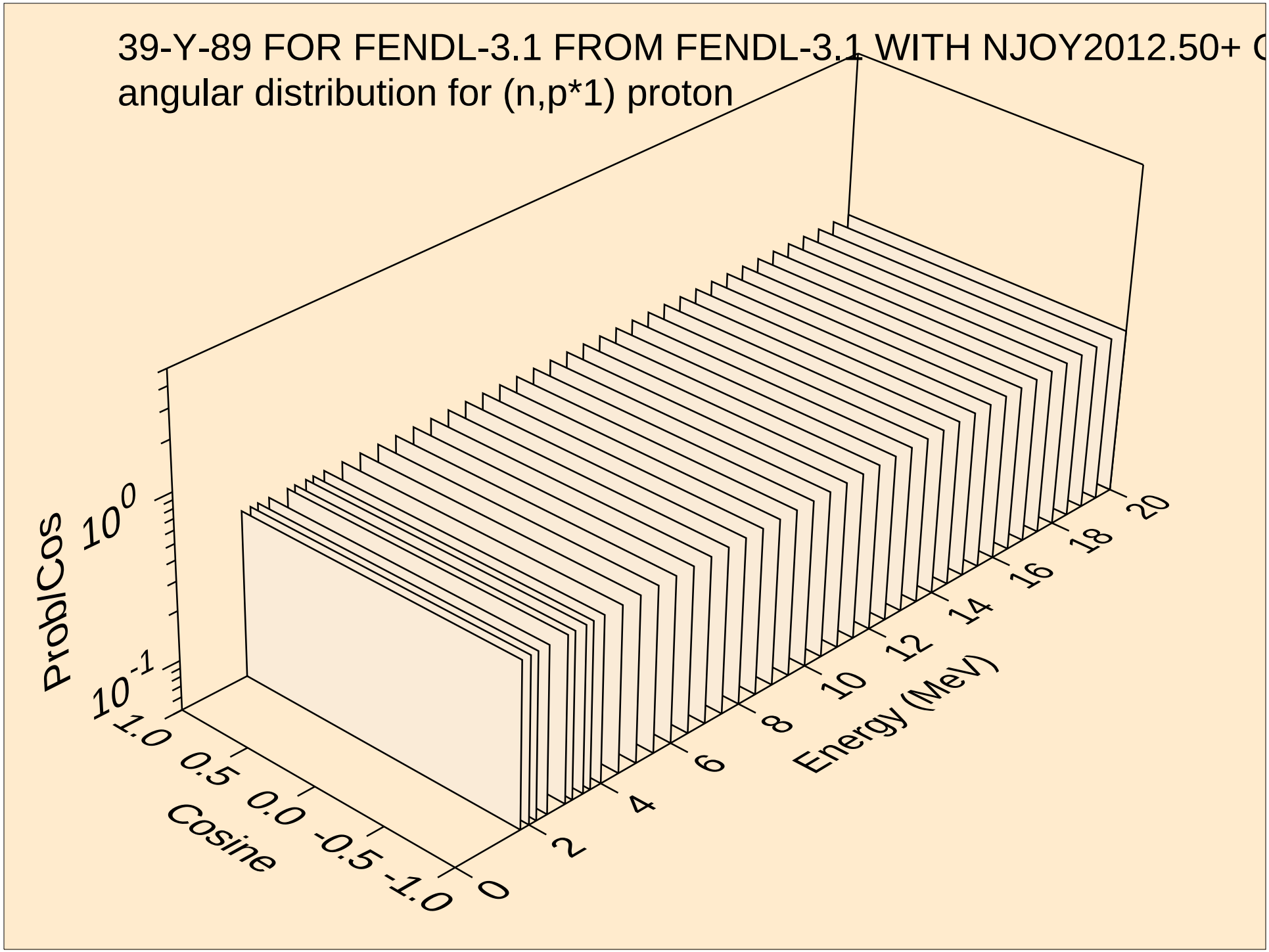

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
Particle production cross sections
Cross section (barns)
Energy (MeV)
protons
deuterons
tritons
he-3
alphas
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
20
40
60
80
100
120
140
160
180
200

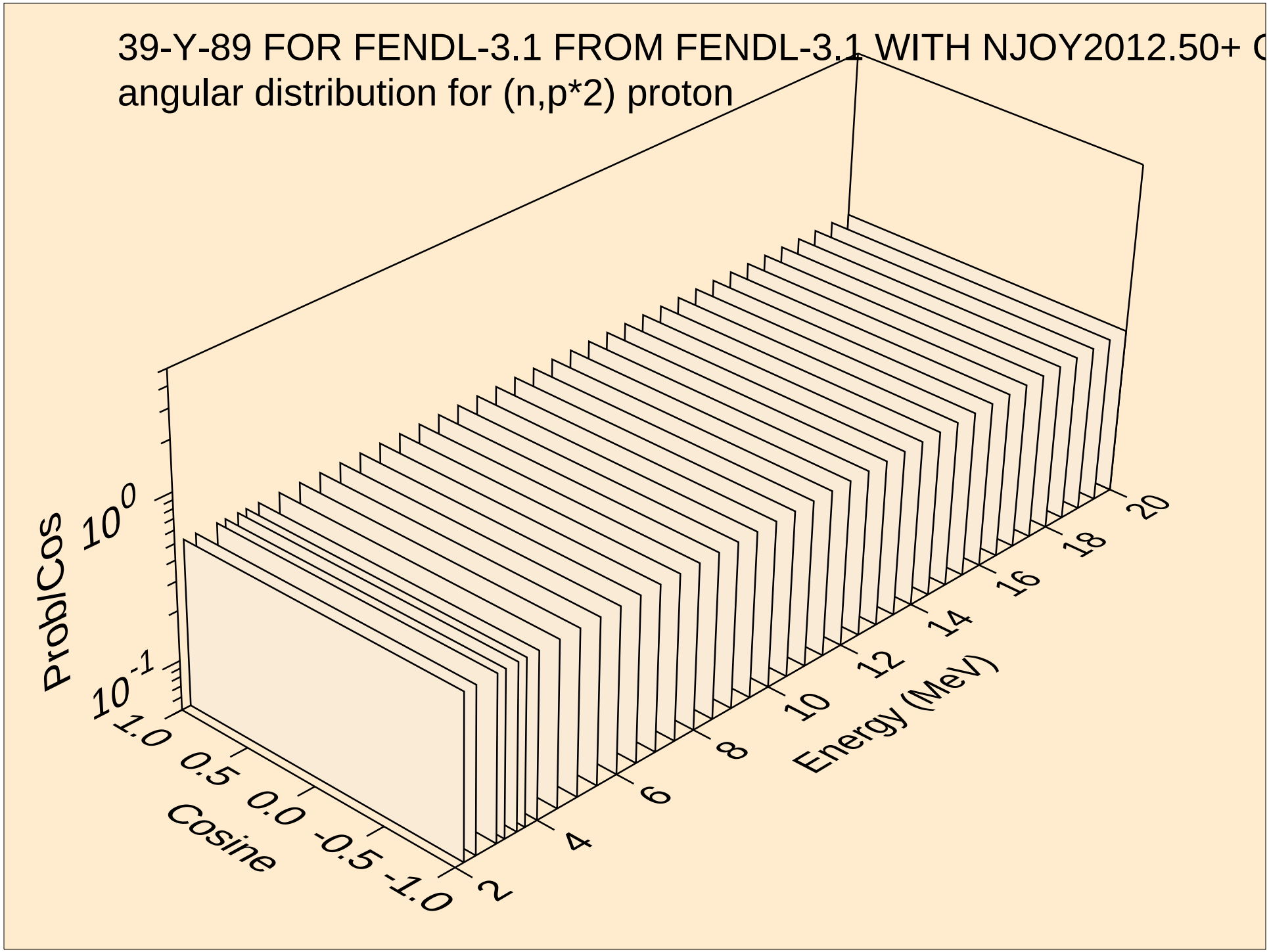

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
protons from (n,x)
Prob/MeV
10-1
10-3
10-5
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

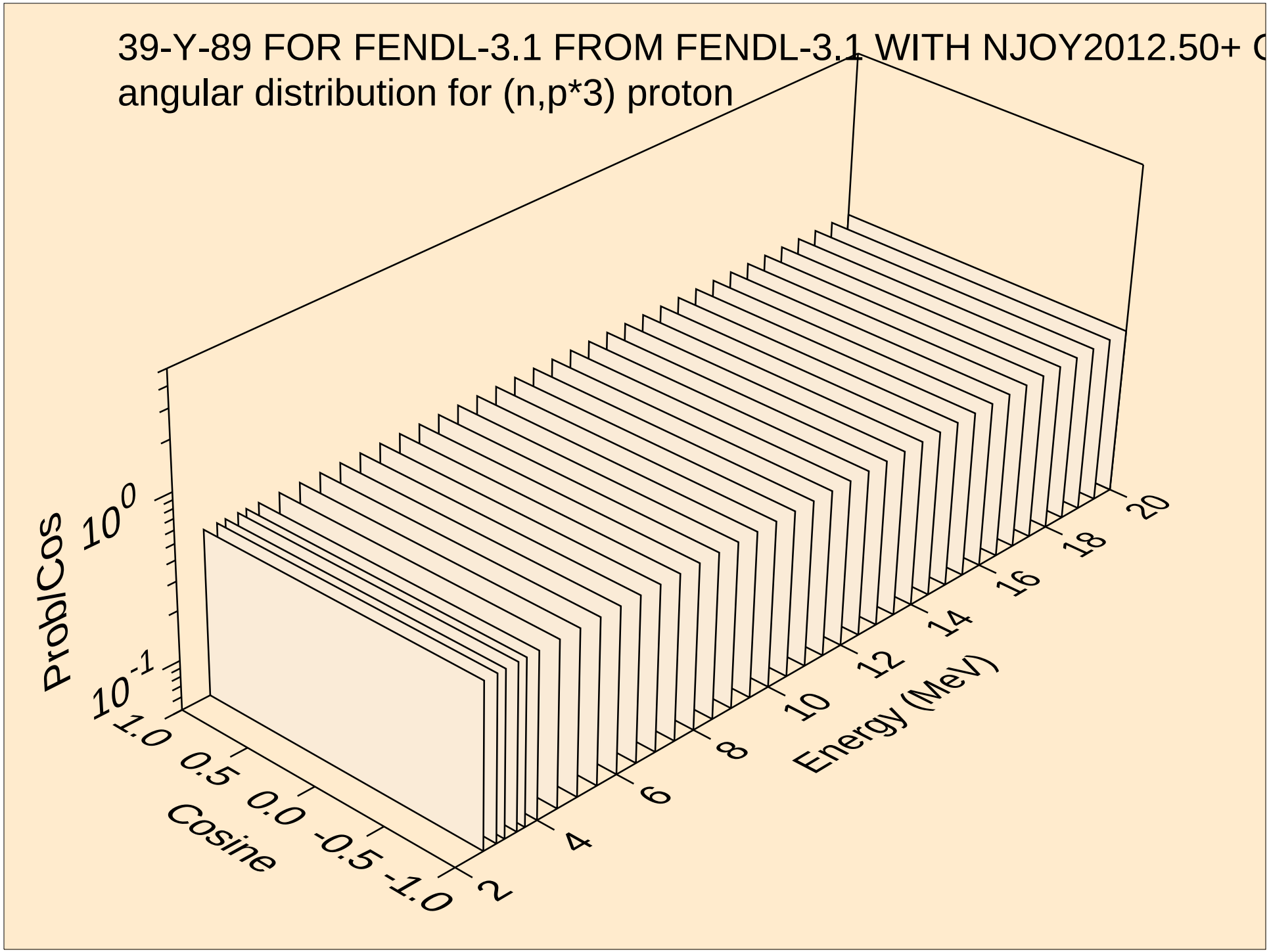

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
protons from (n,n*)p
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
6
8
10
12
14
16
18
20
Energy (MeV)

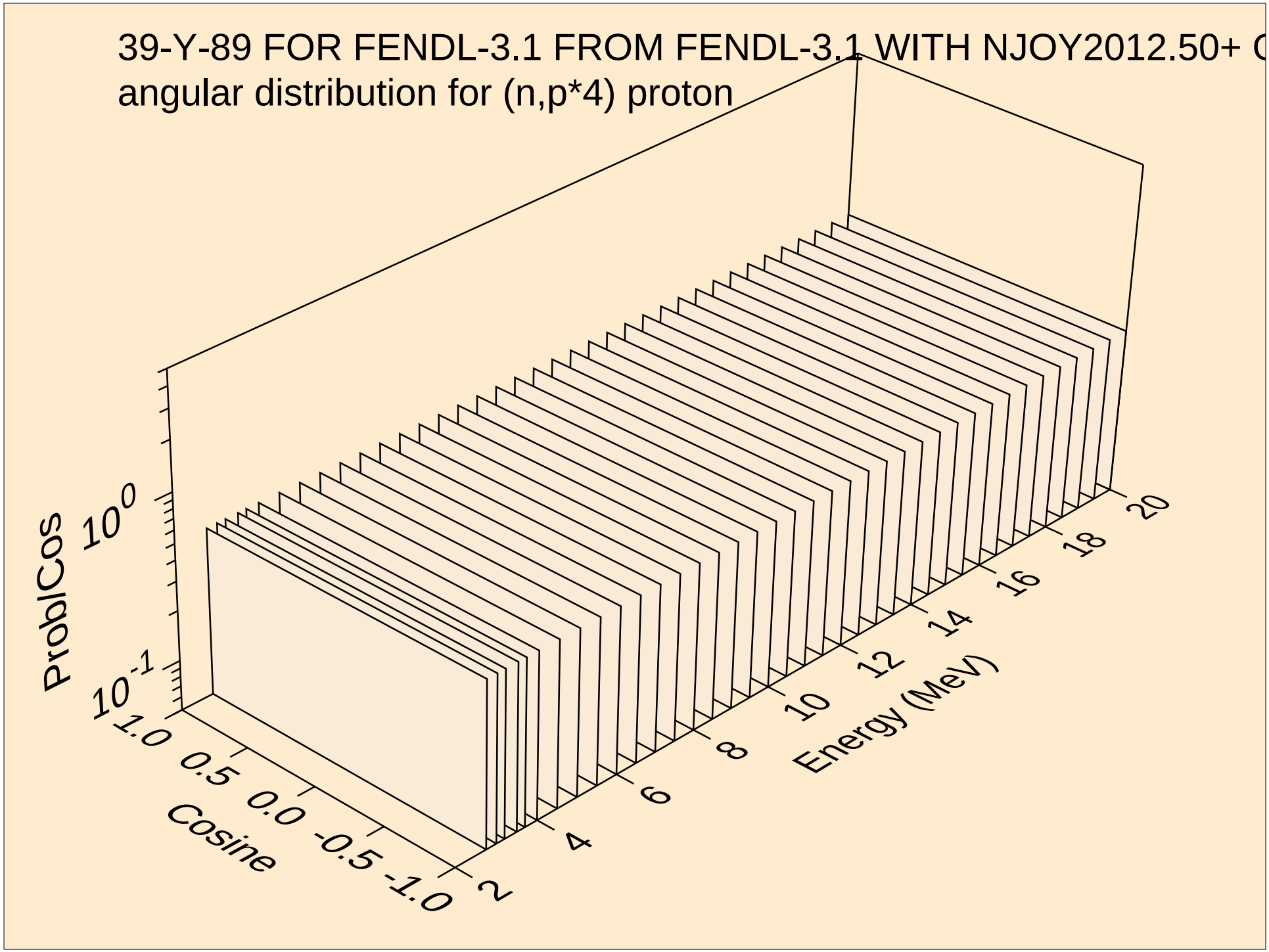

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
protons from (n,2np)
Prob/MeV
10-1
10-3
1.2
1.4
1.6
Sec. Energy
18.2
18.4
18.6
18.8
19.0
19.2
19.4
19.6
19.8
20.0
Energy (MeV)

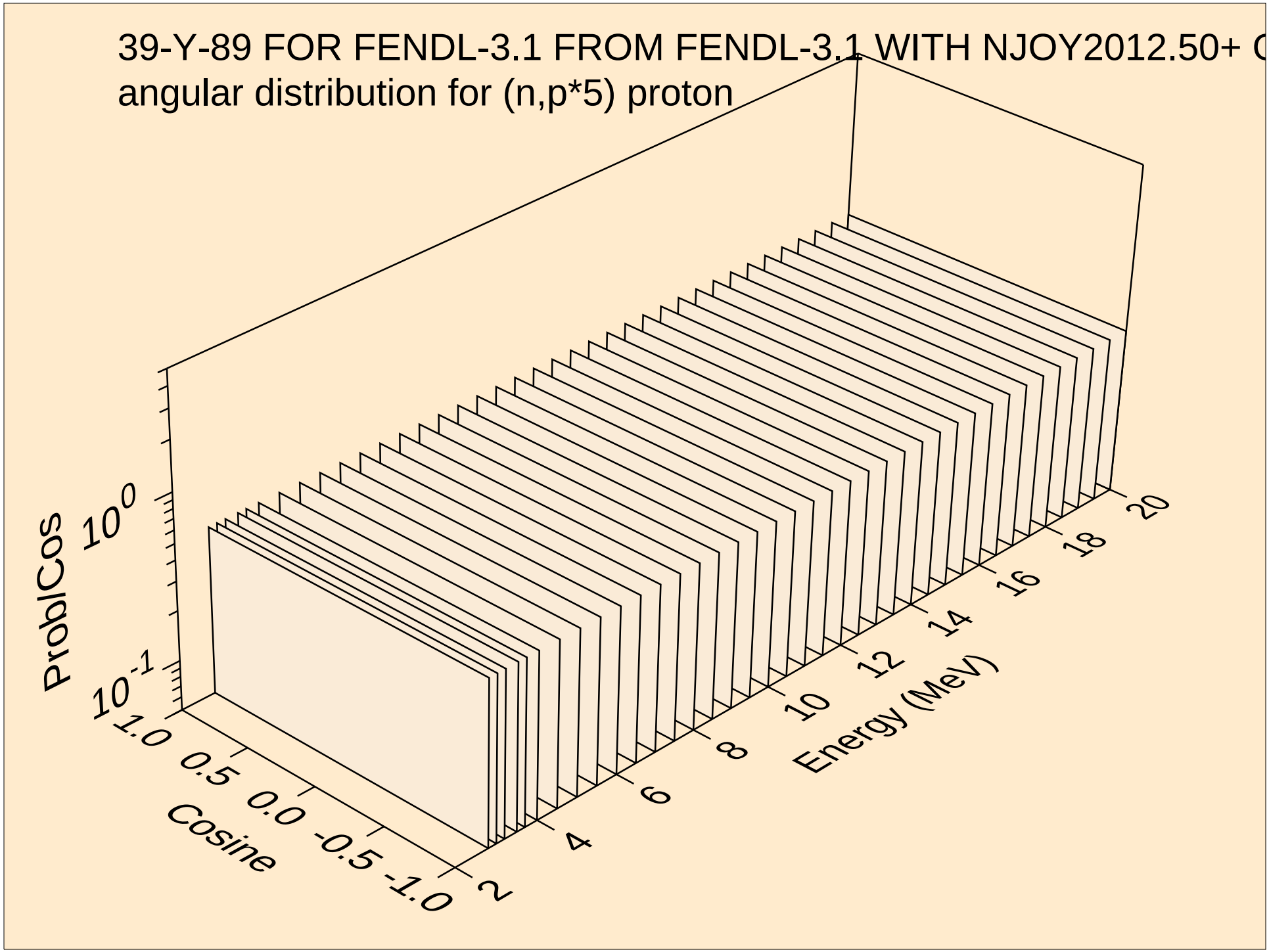

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*0) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

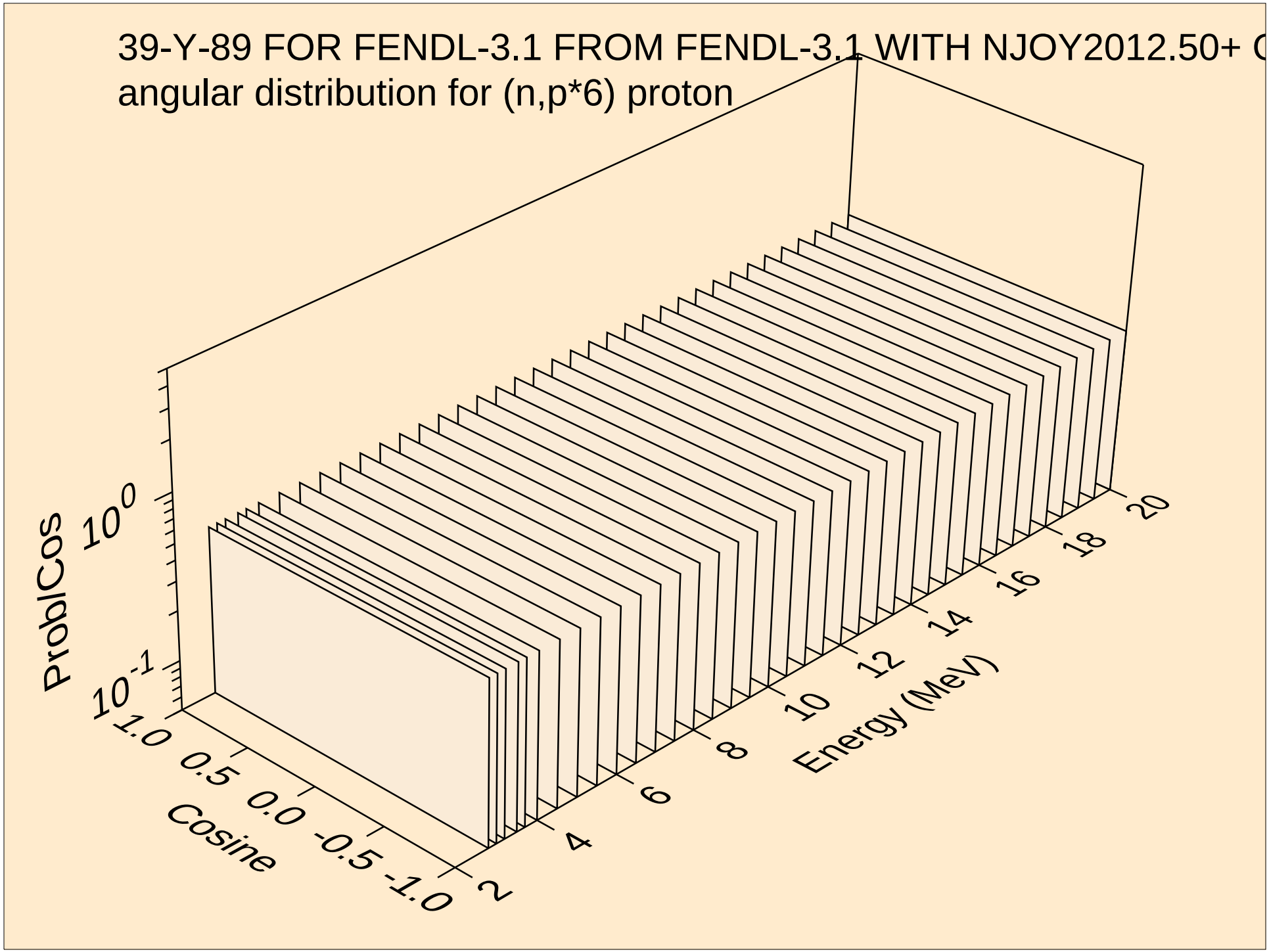

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*1) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

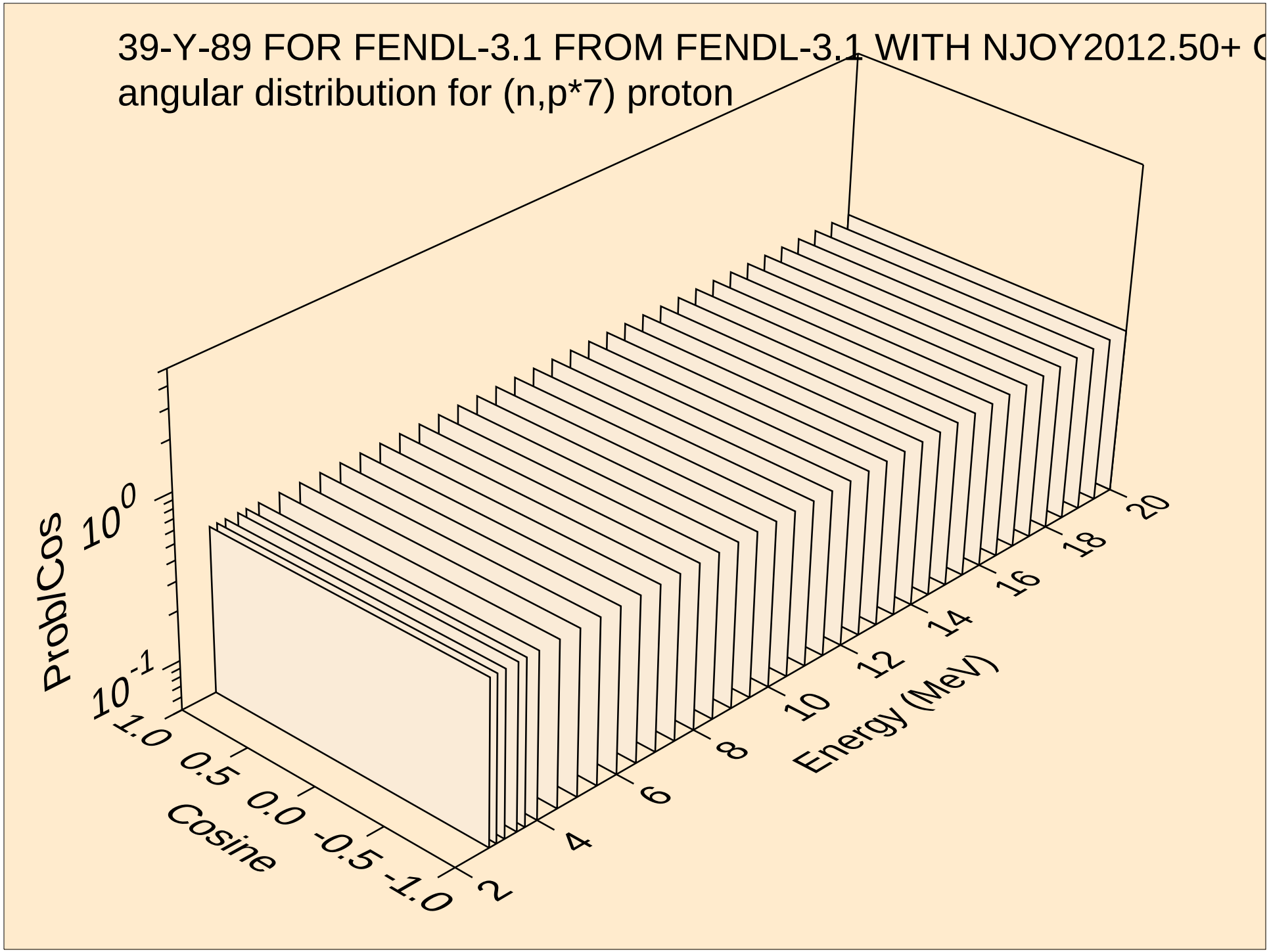

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*2) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

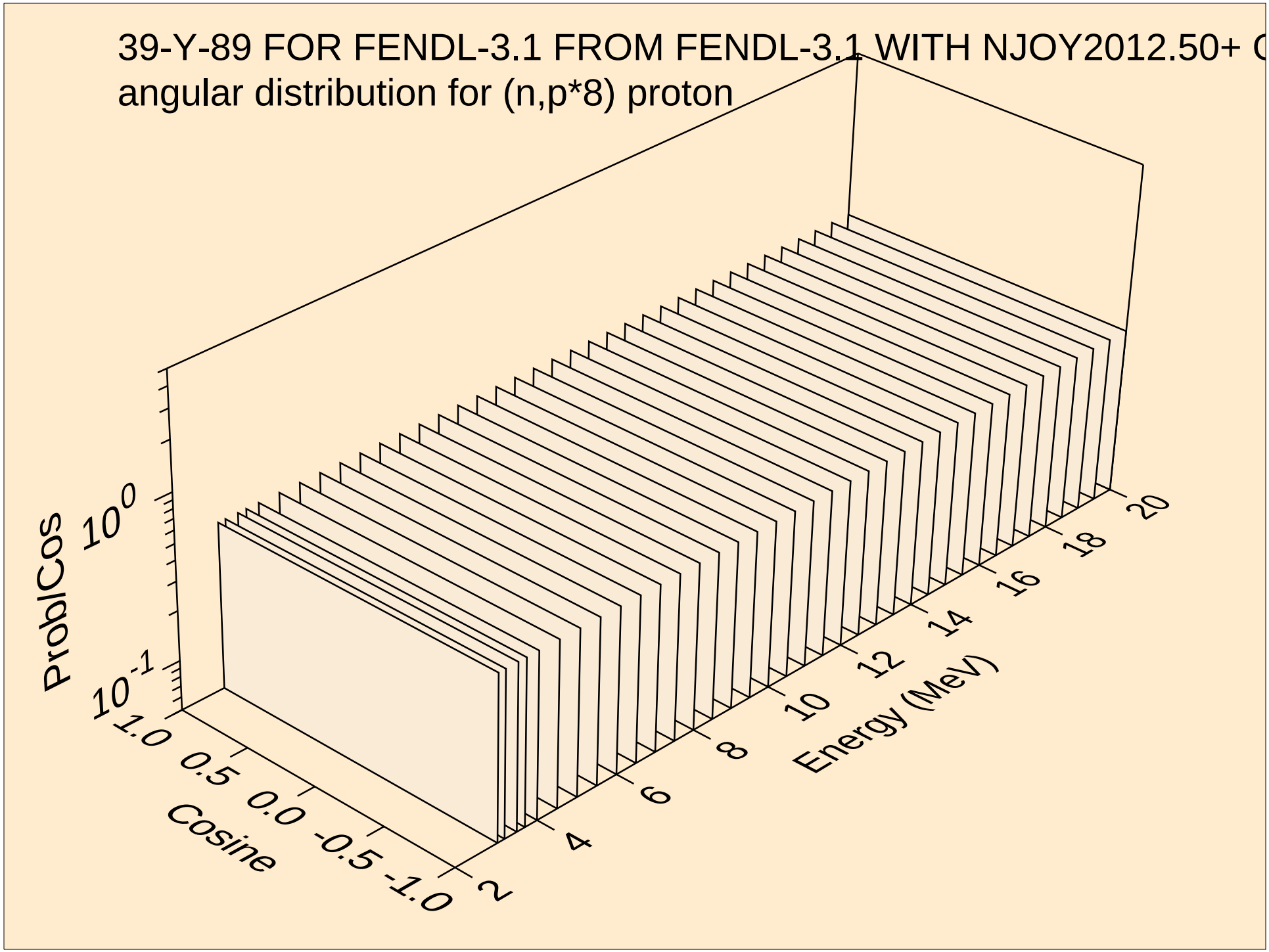

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*3) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

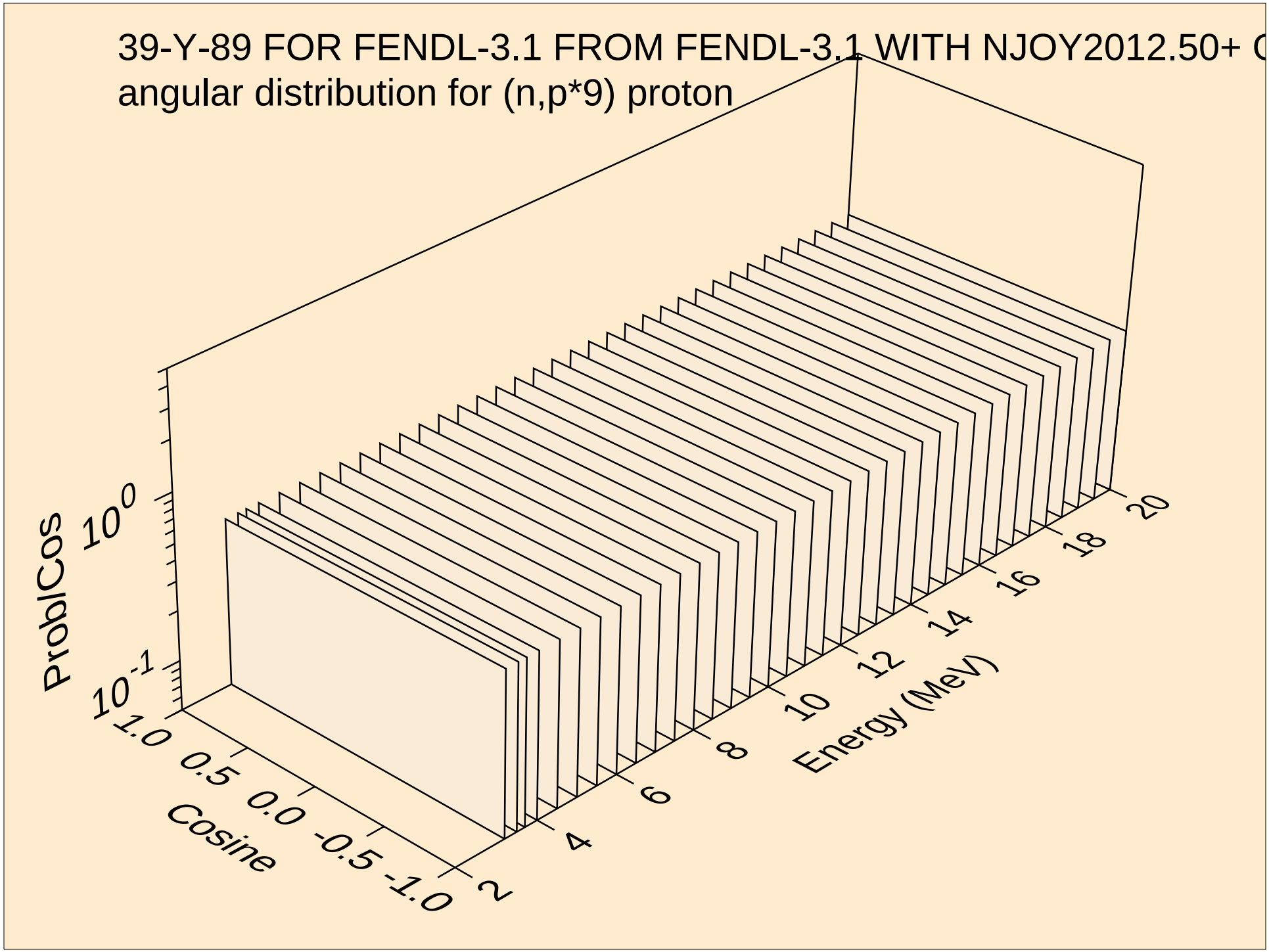

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*4) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

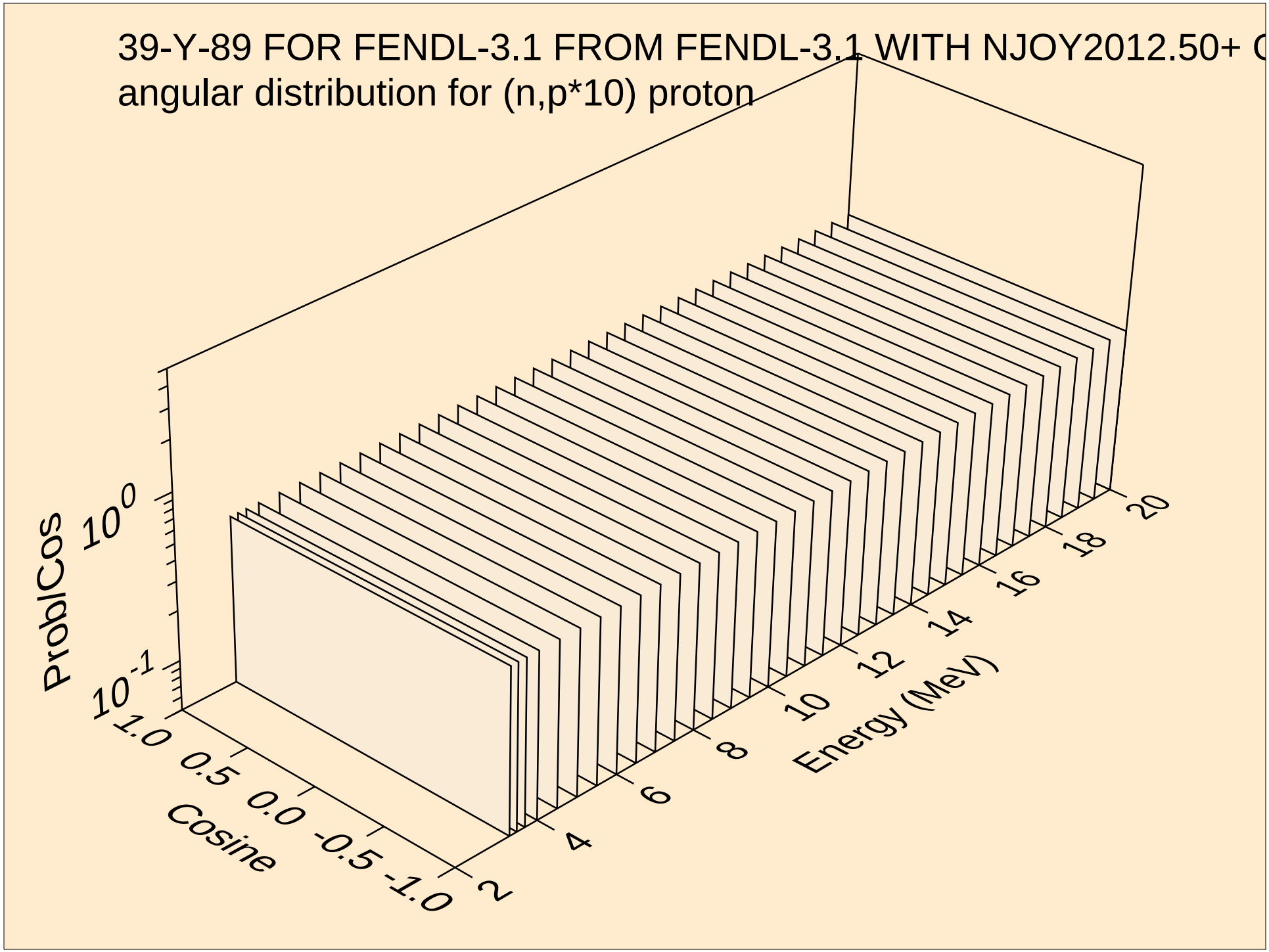

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*5) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

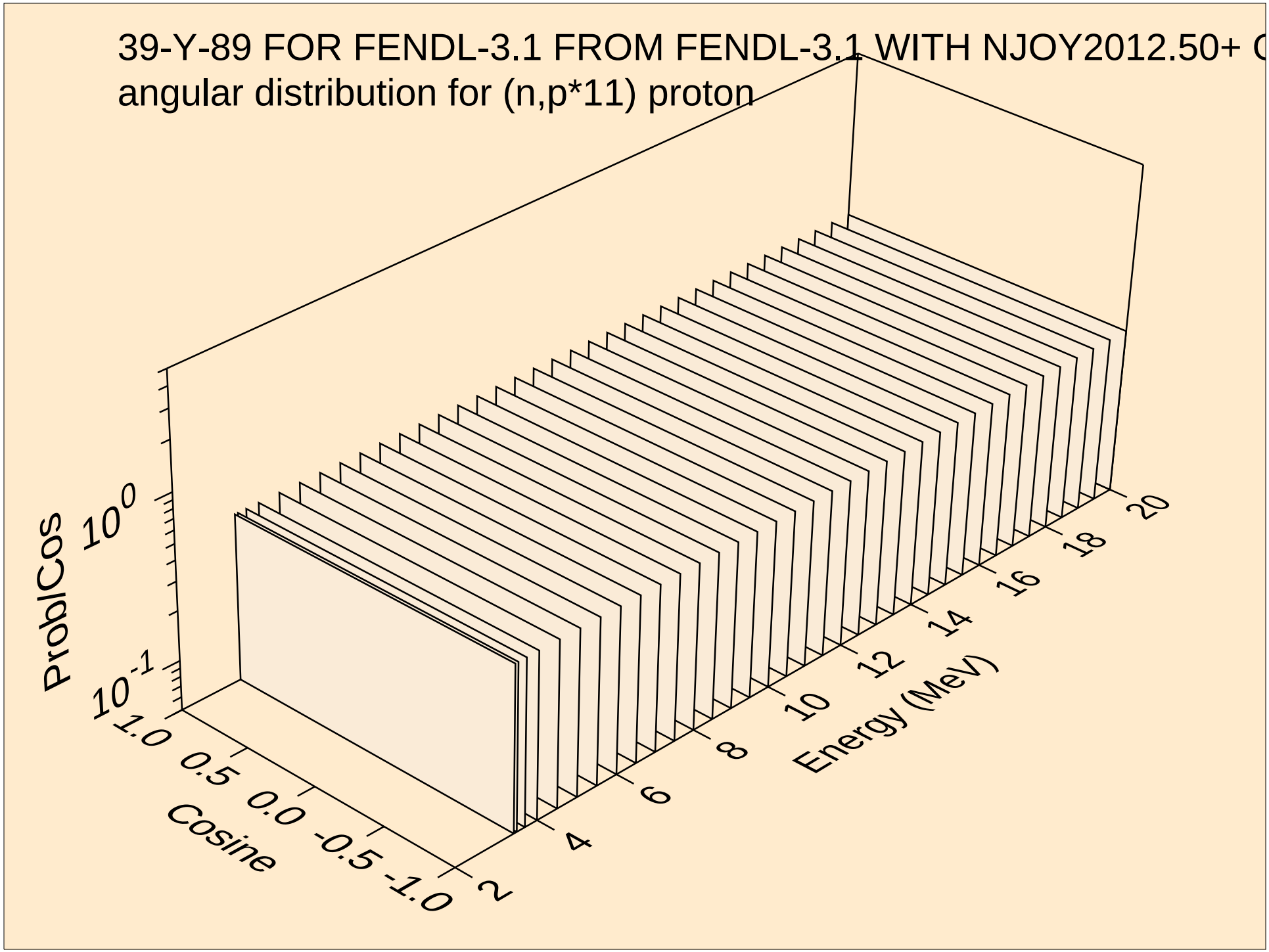

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*6) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

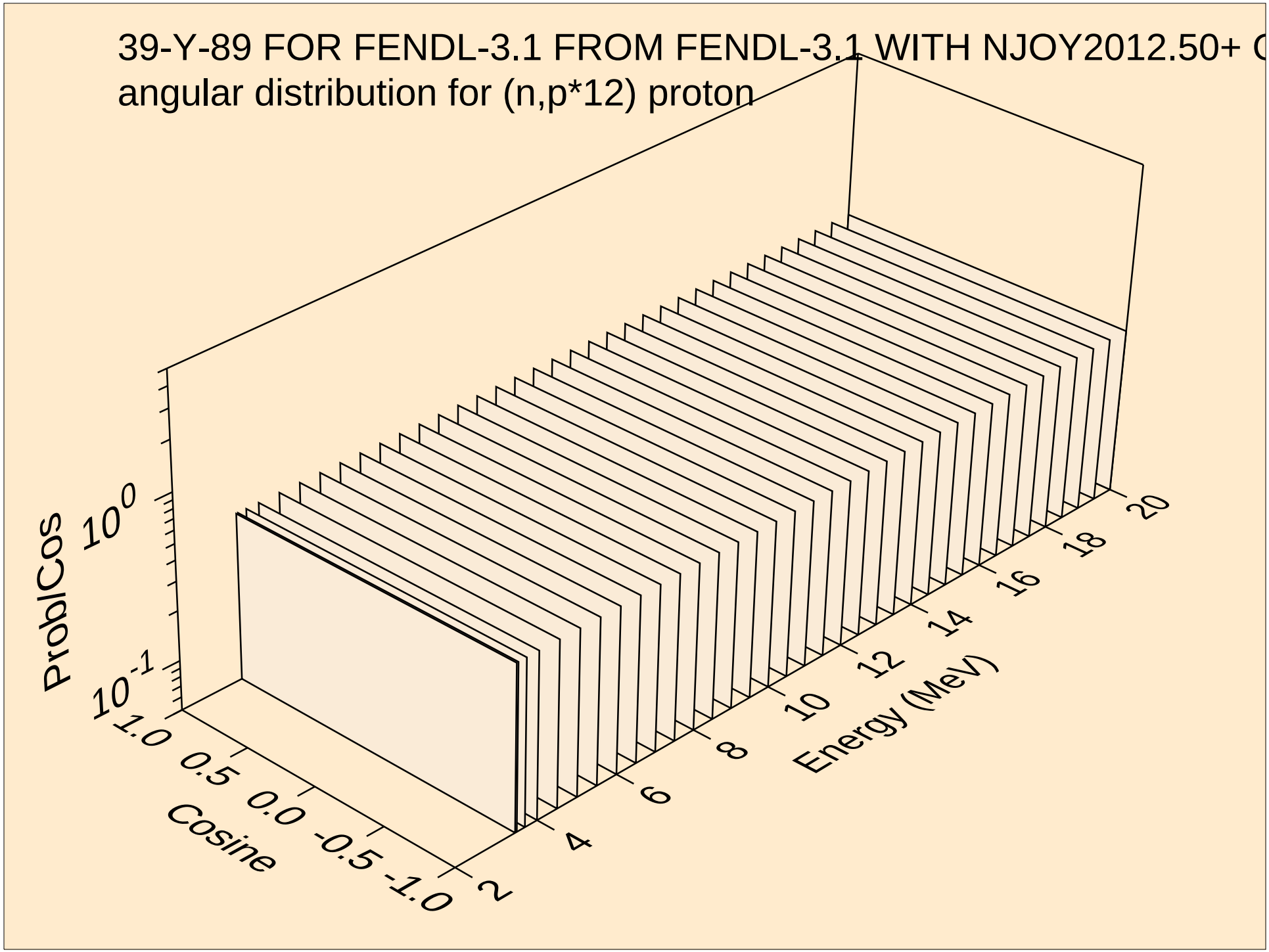

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*7) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

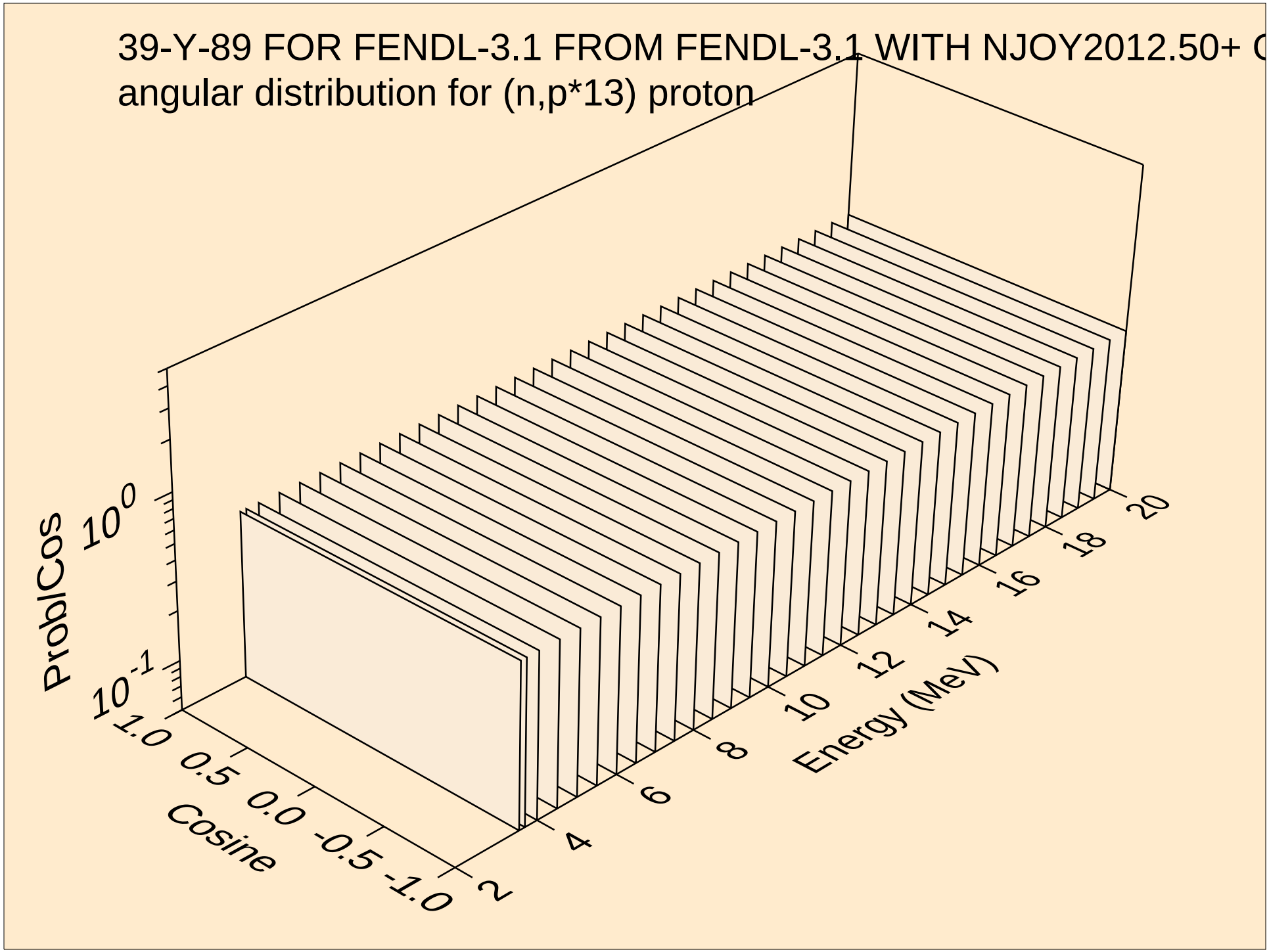

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*8) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

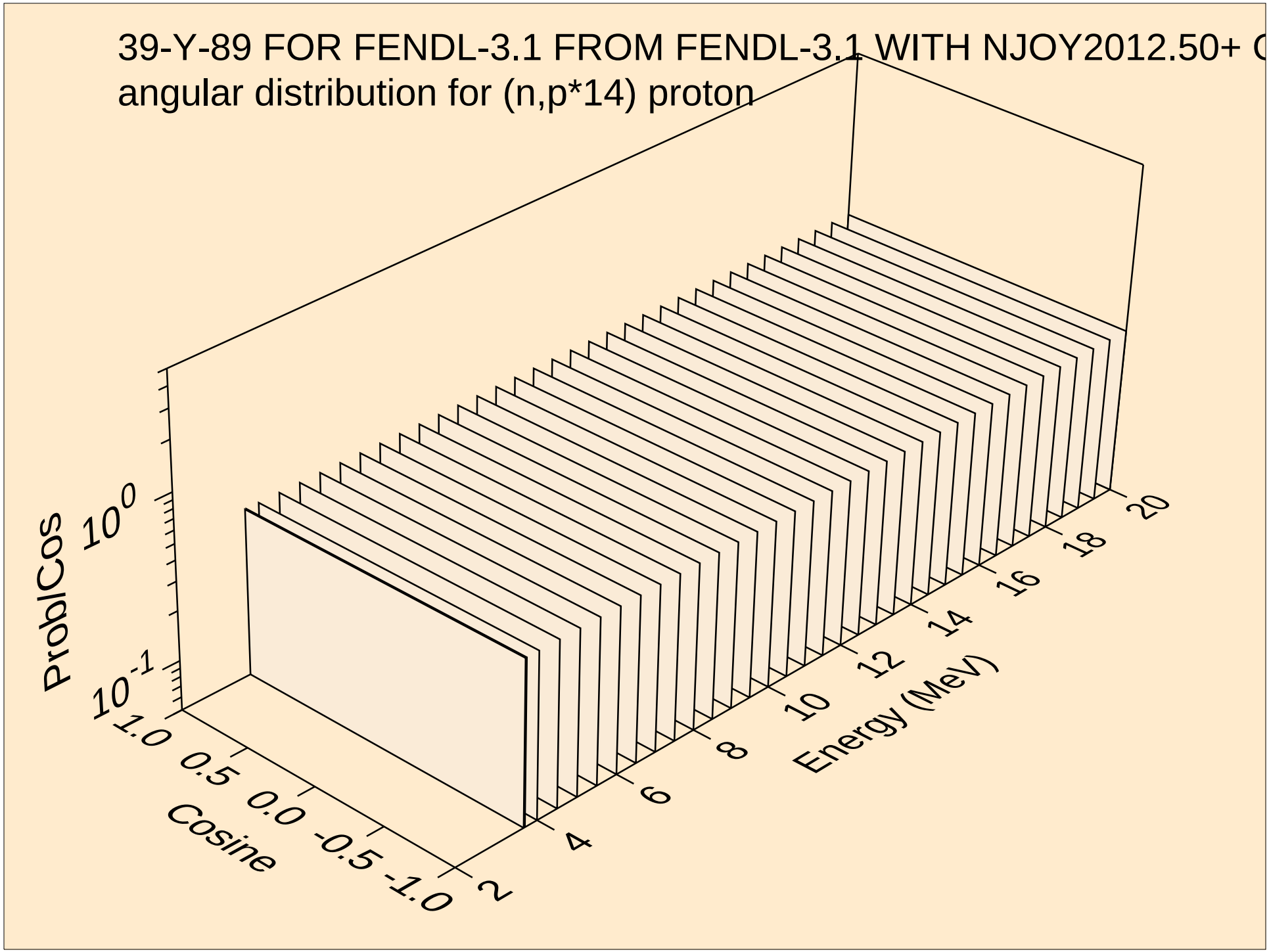

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*9) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

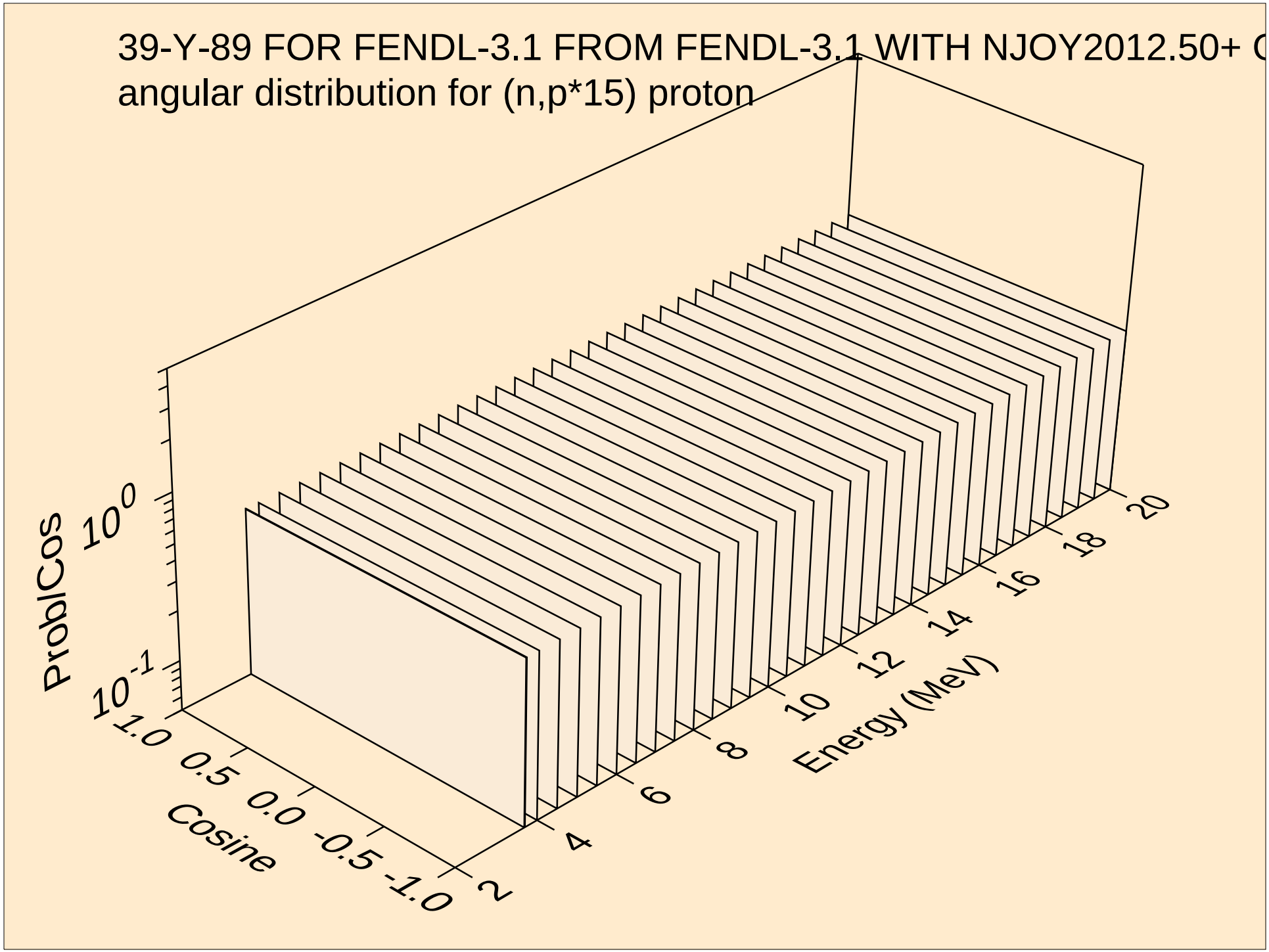

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*10) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

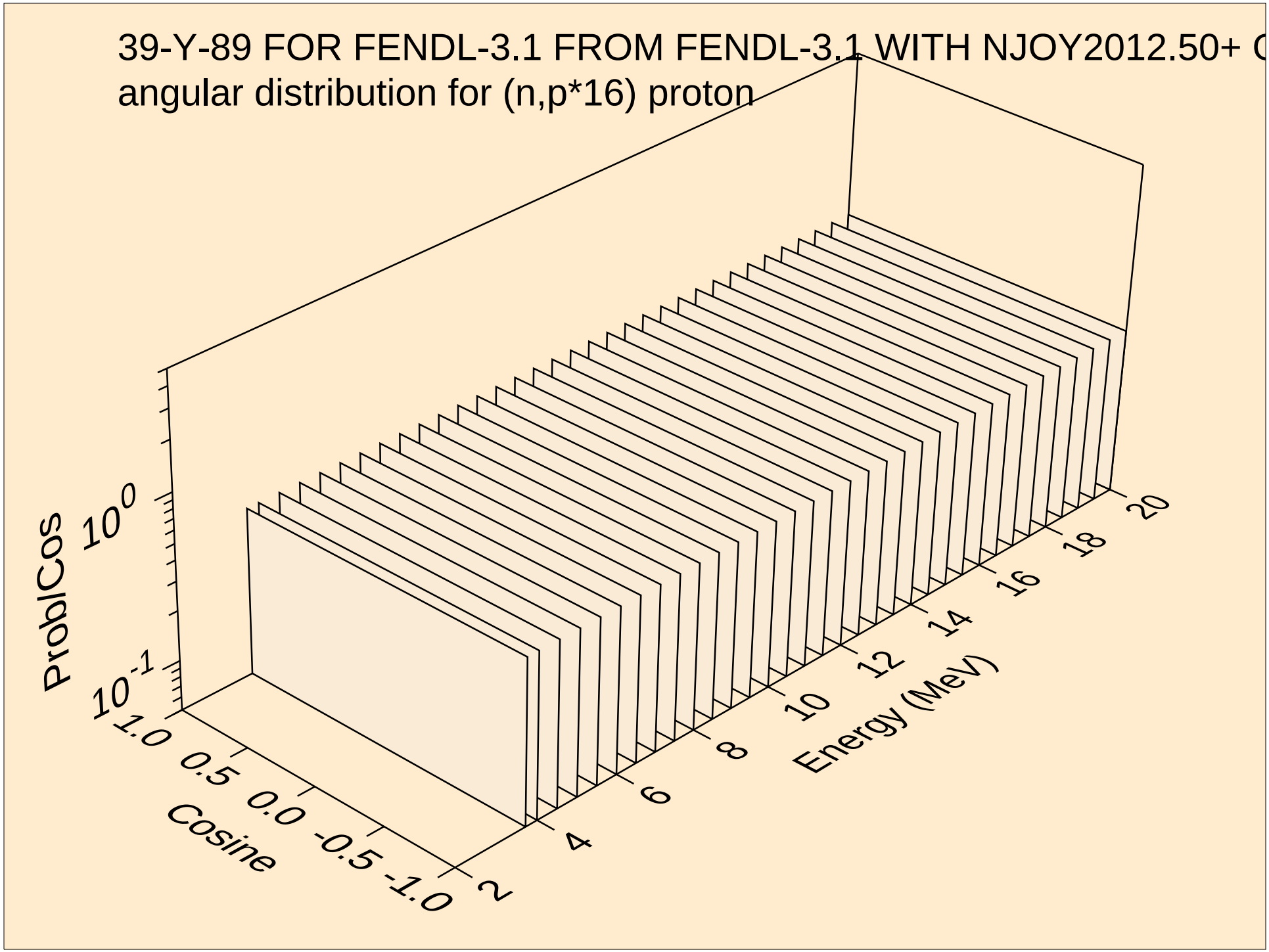

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*11) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

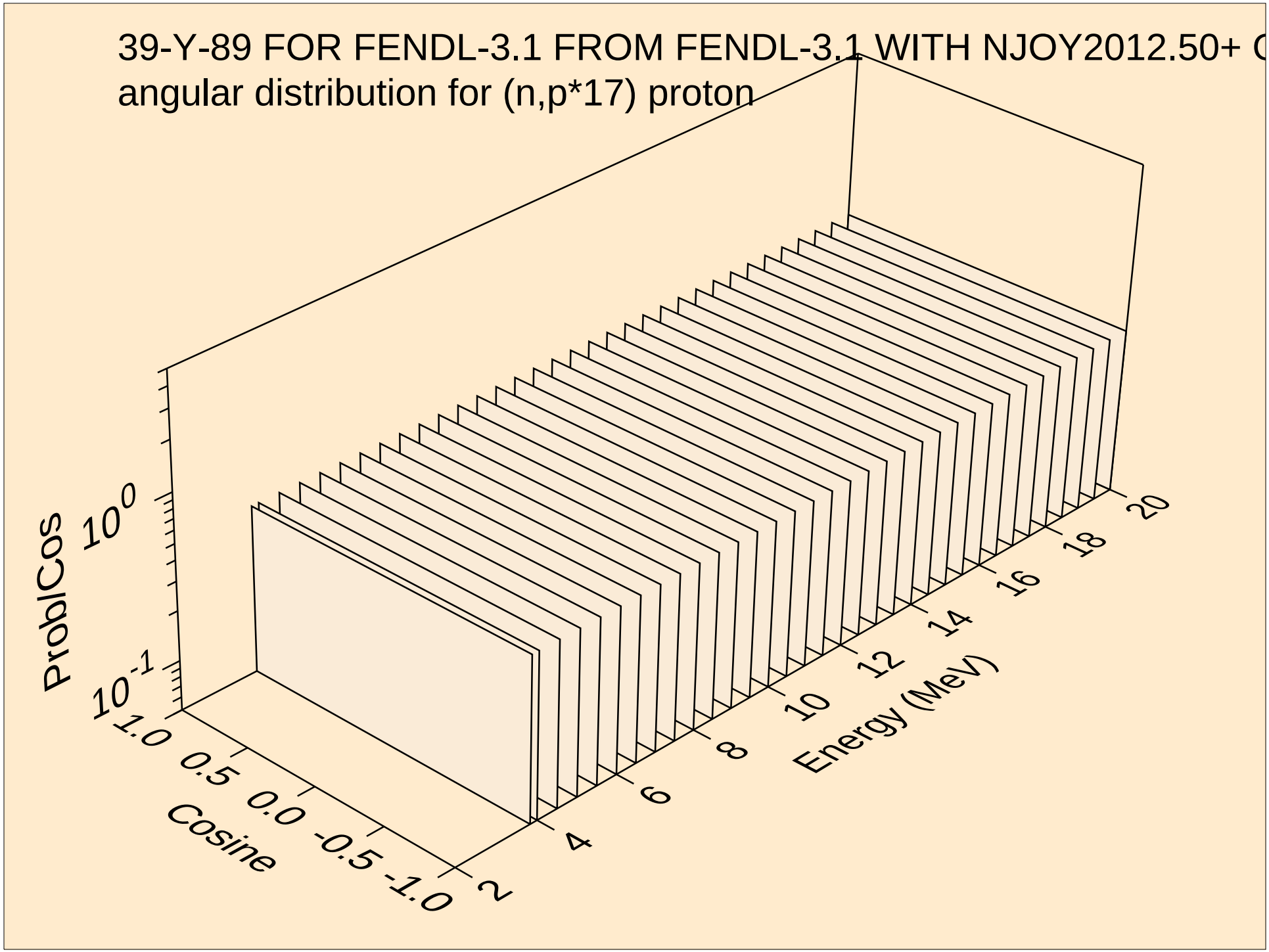

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*12) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

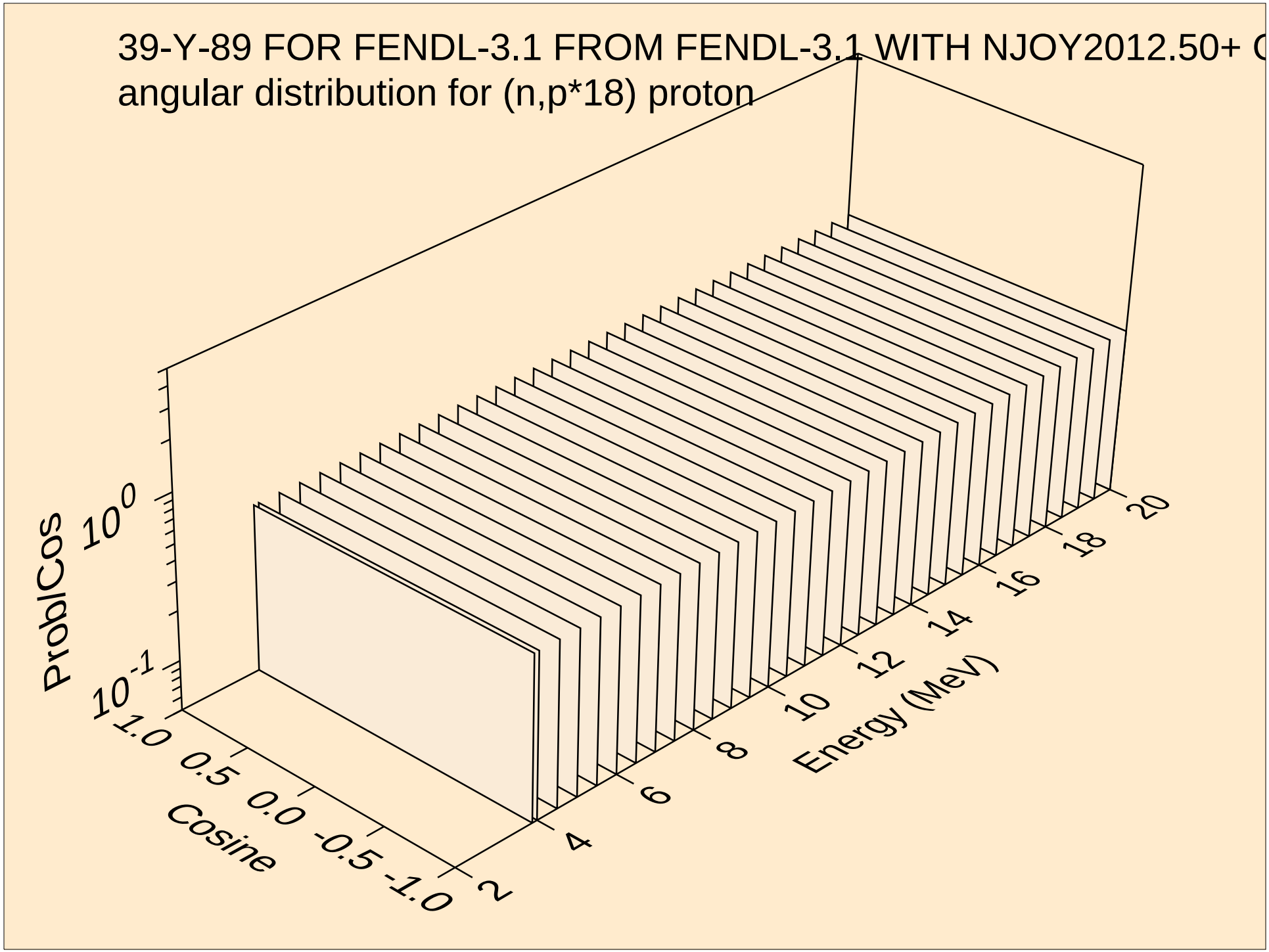

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*13) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

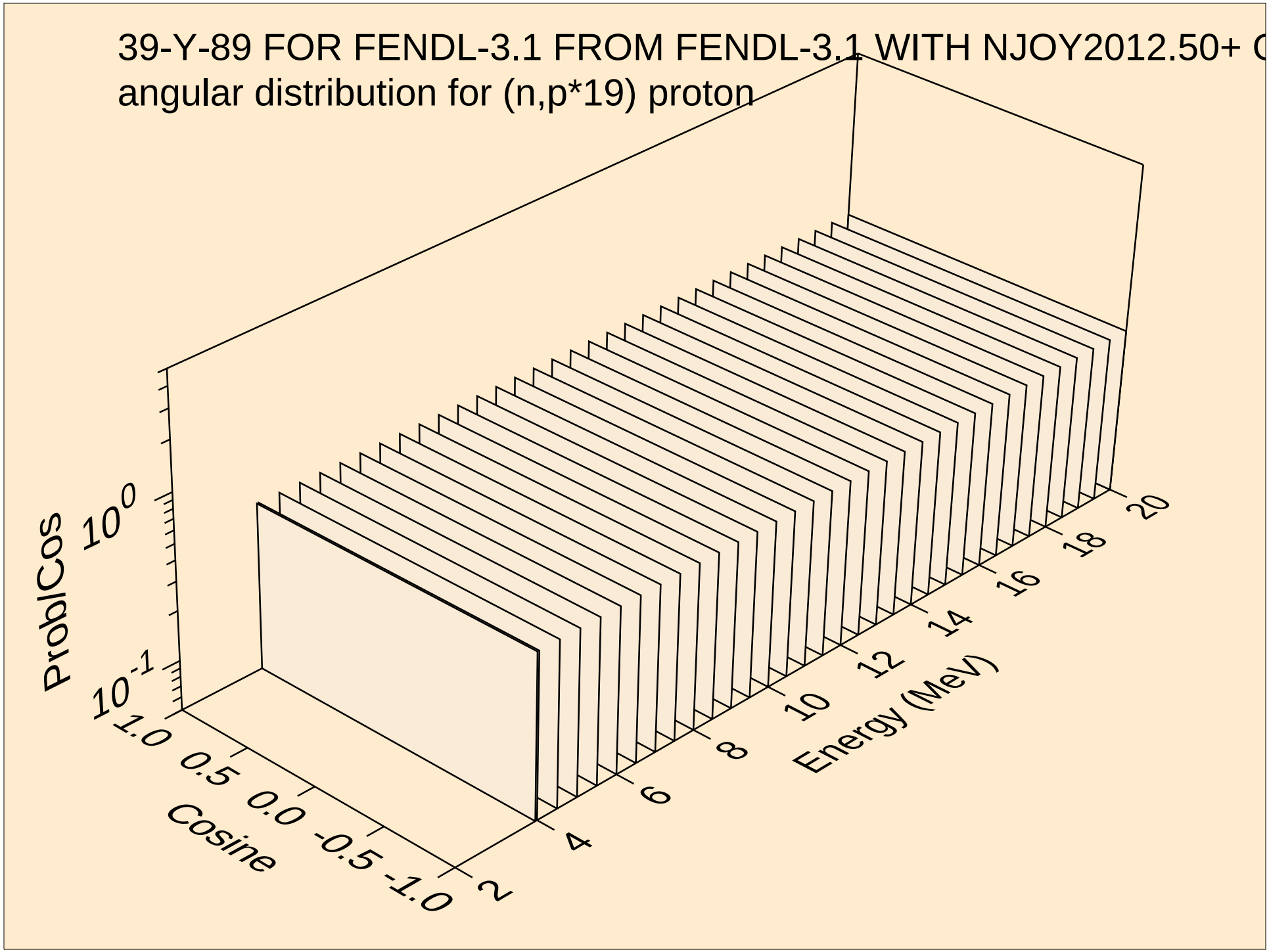

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*14) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

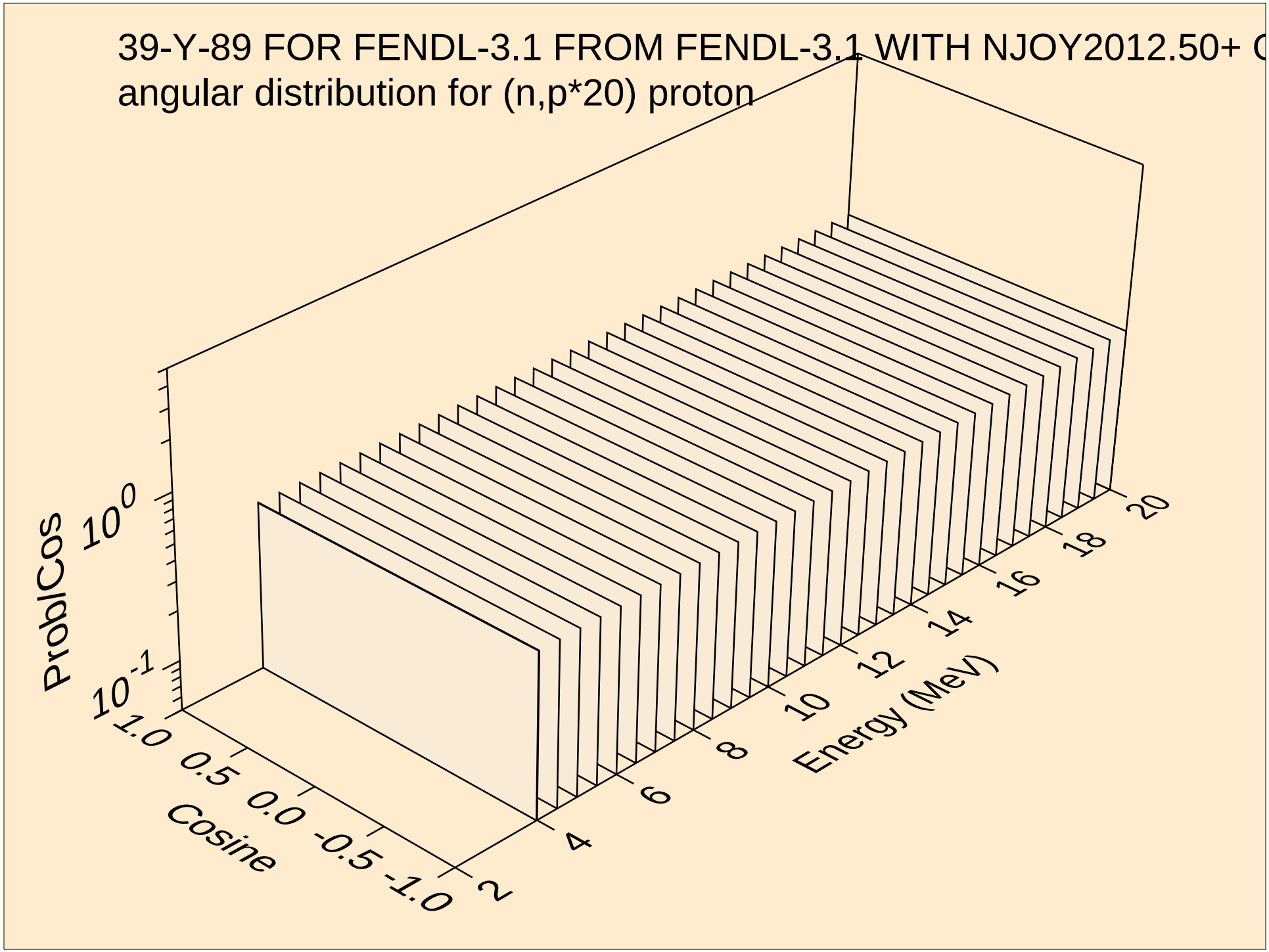

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*15) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

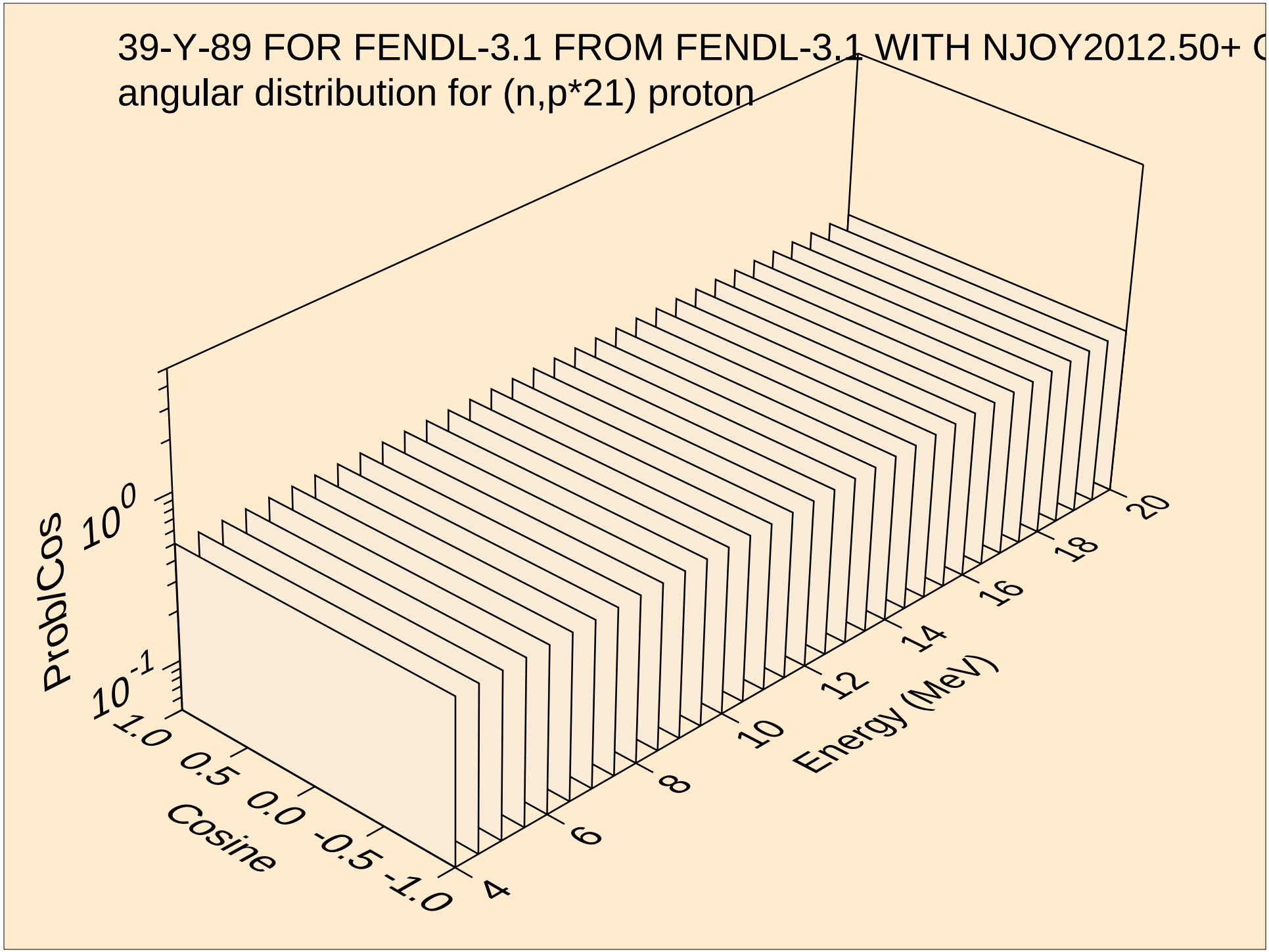

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*16) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

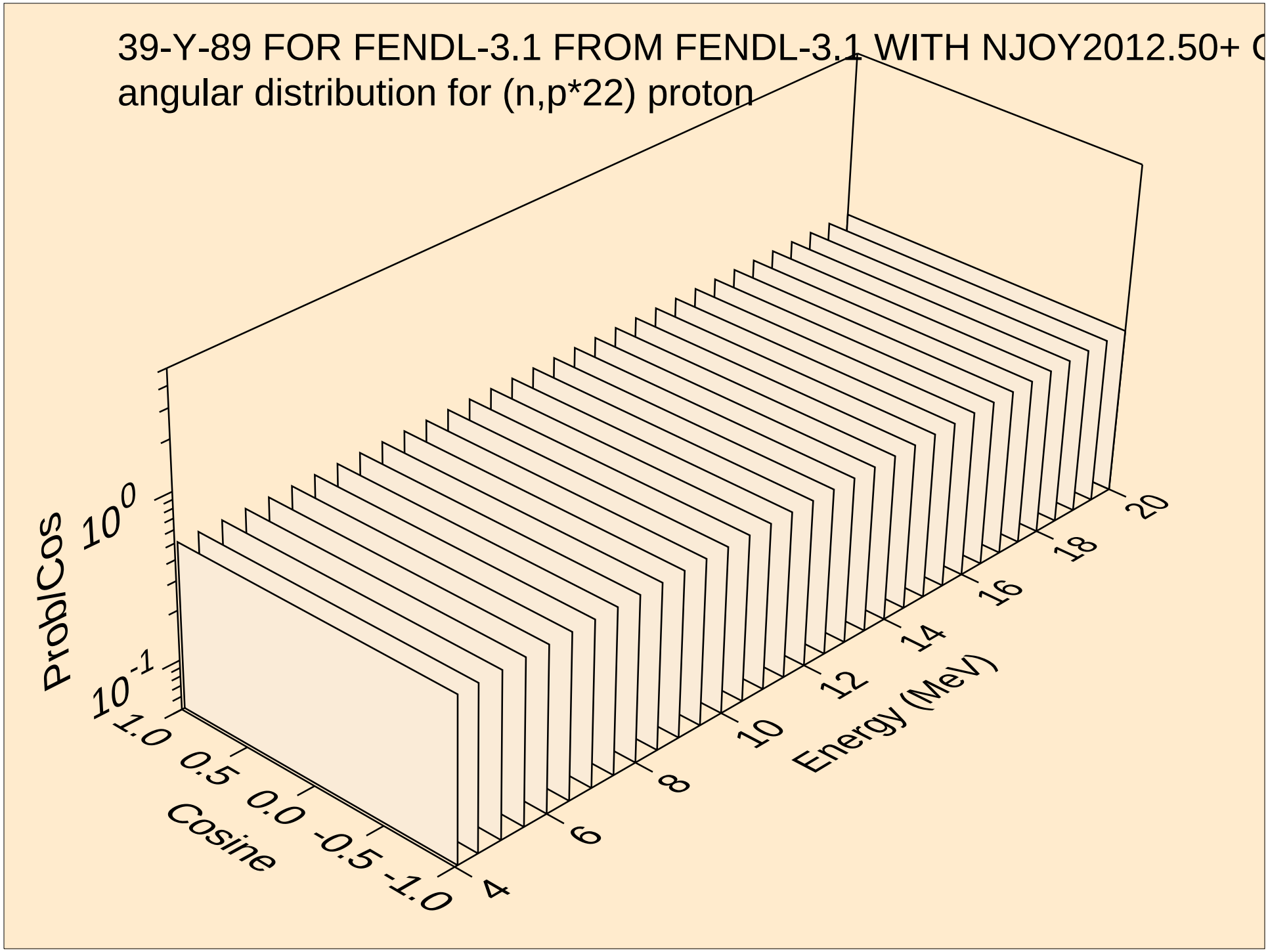

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*17) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

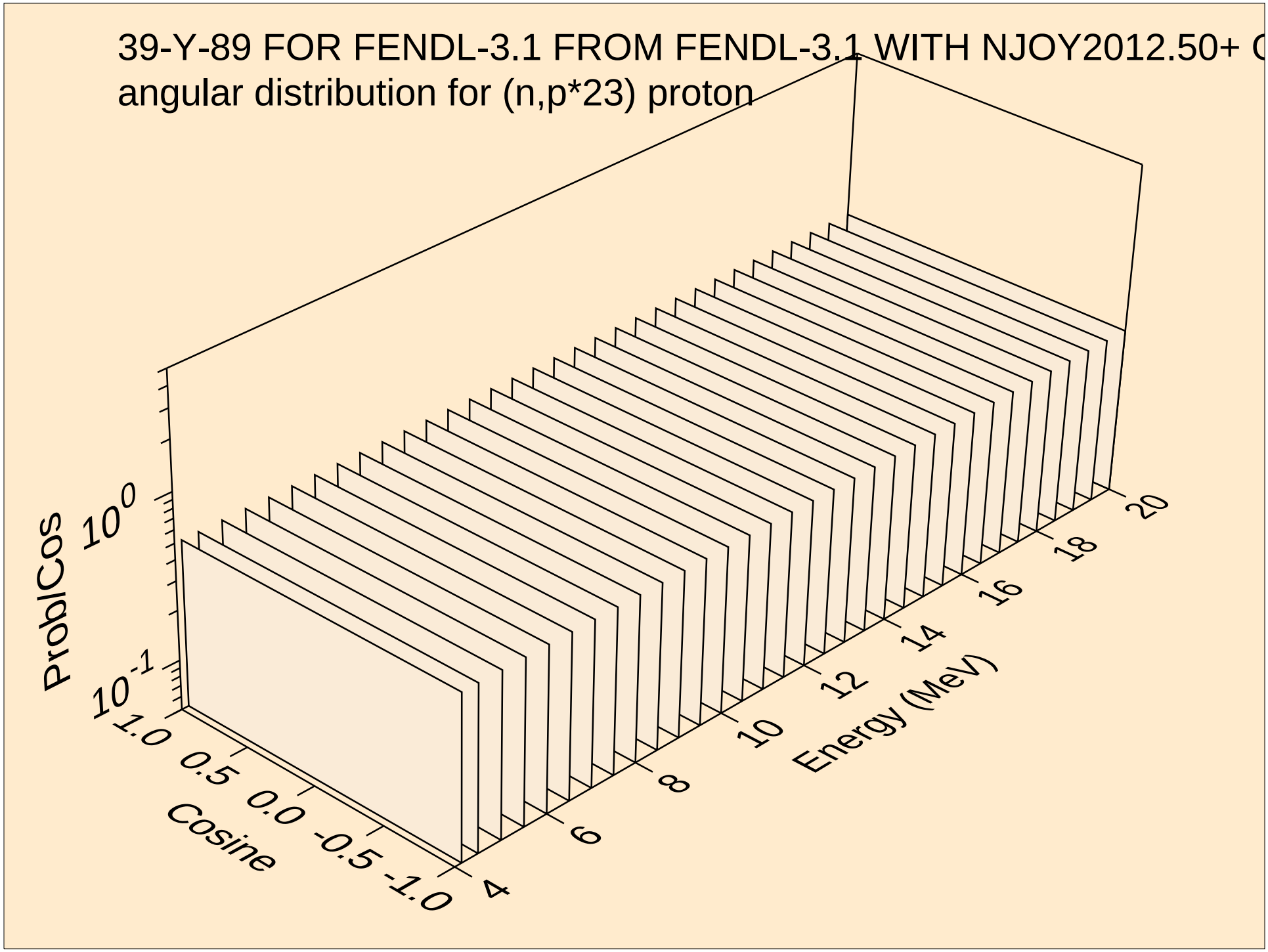

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*18) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

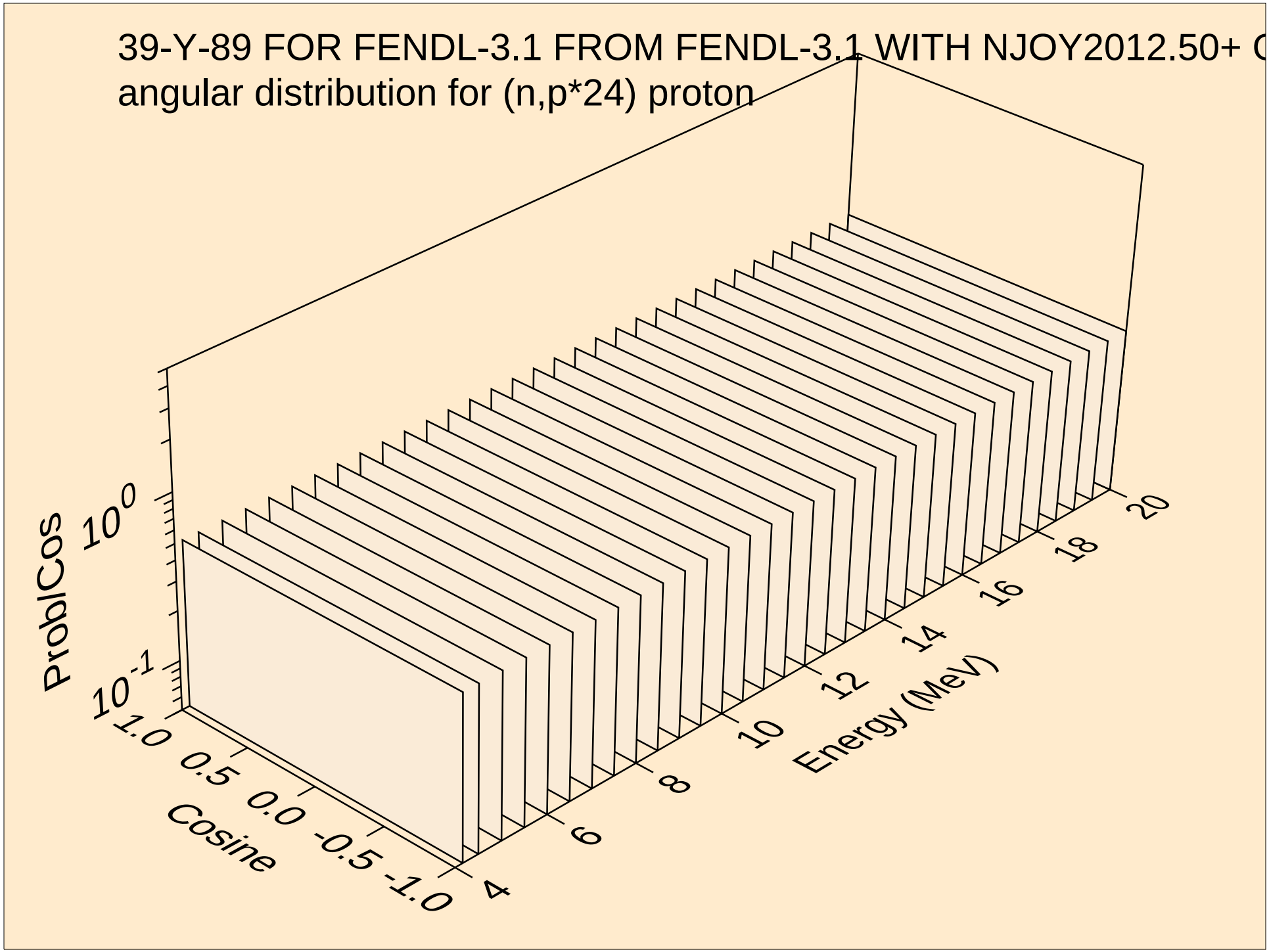

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*19) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

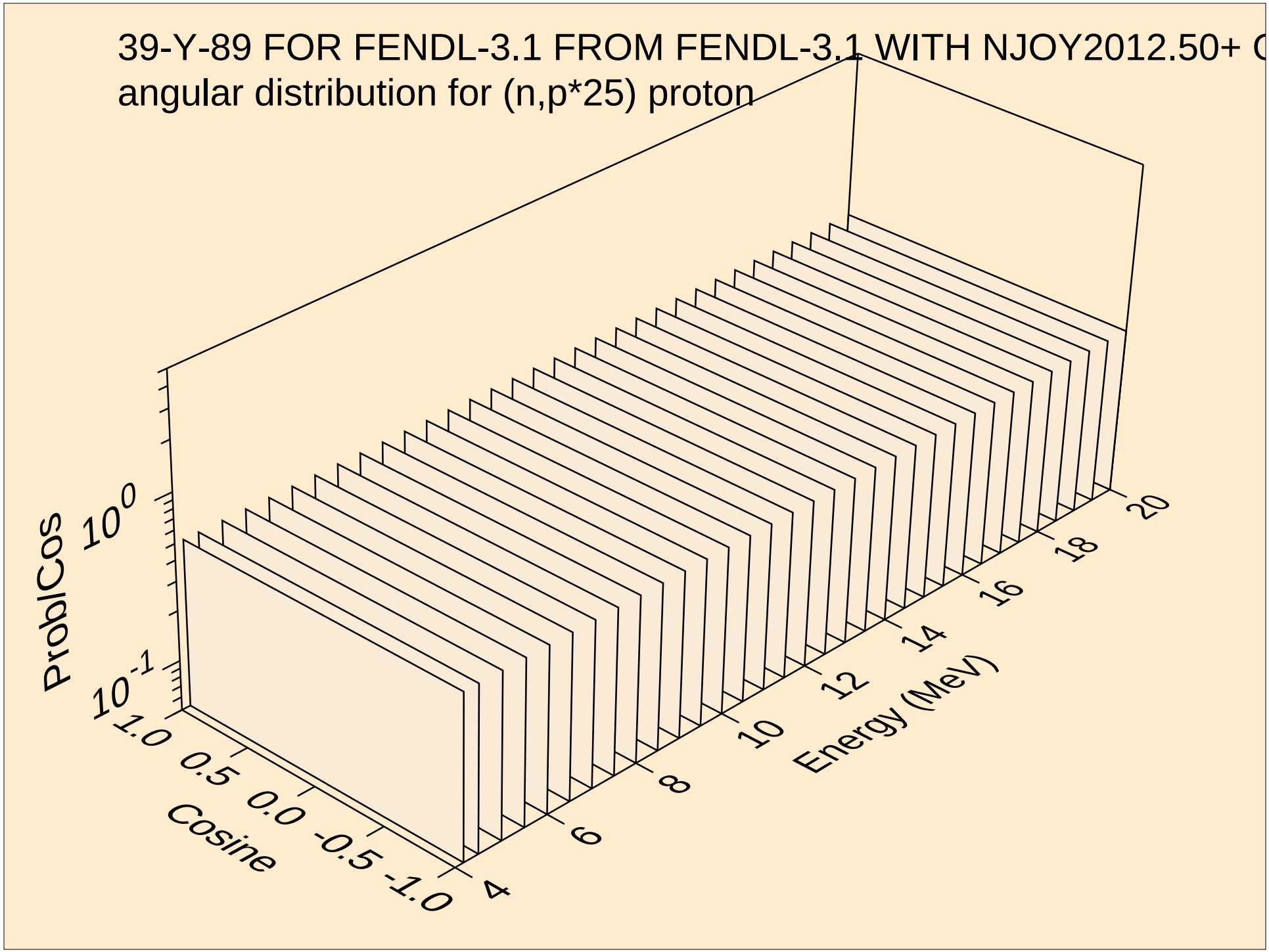

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*20) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

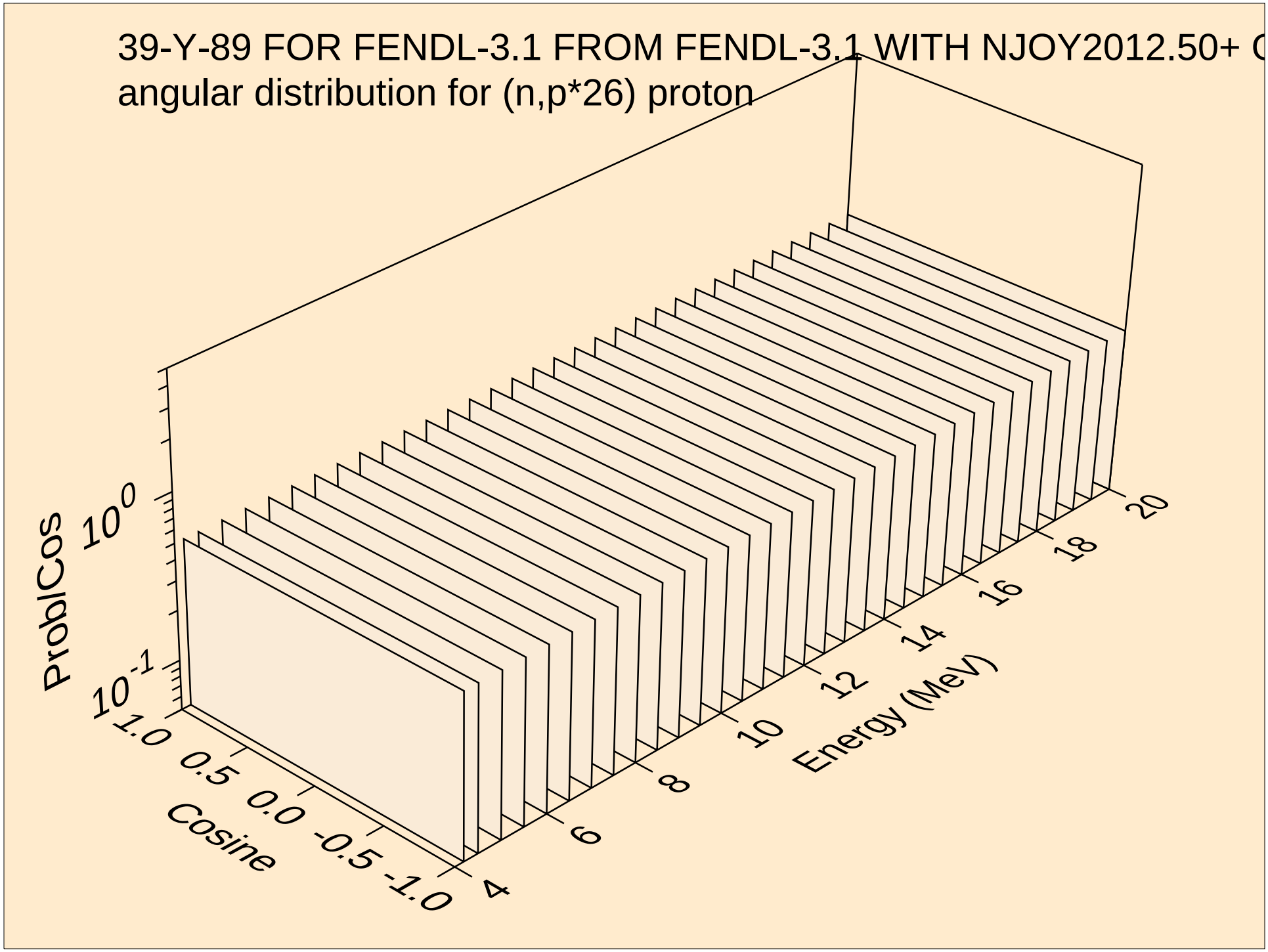

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*21) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

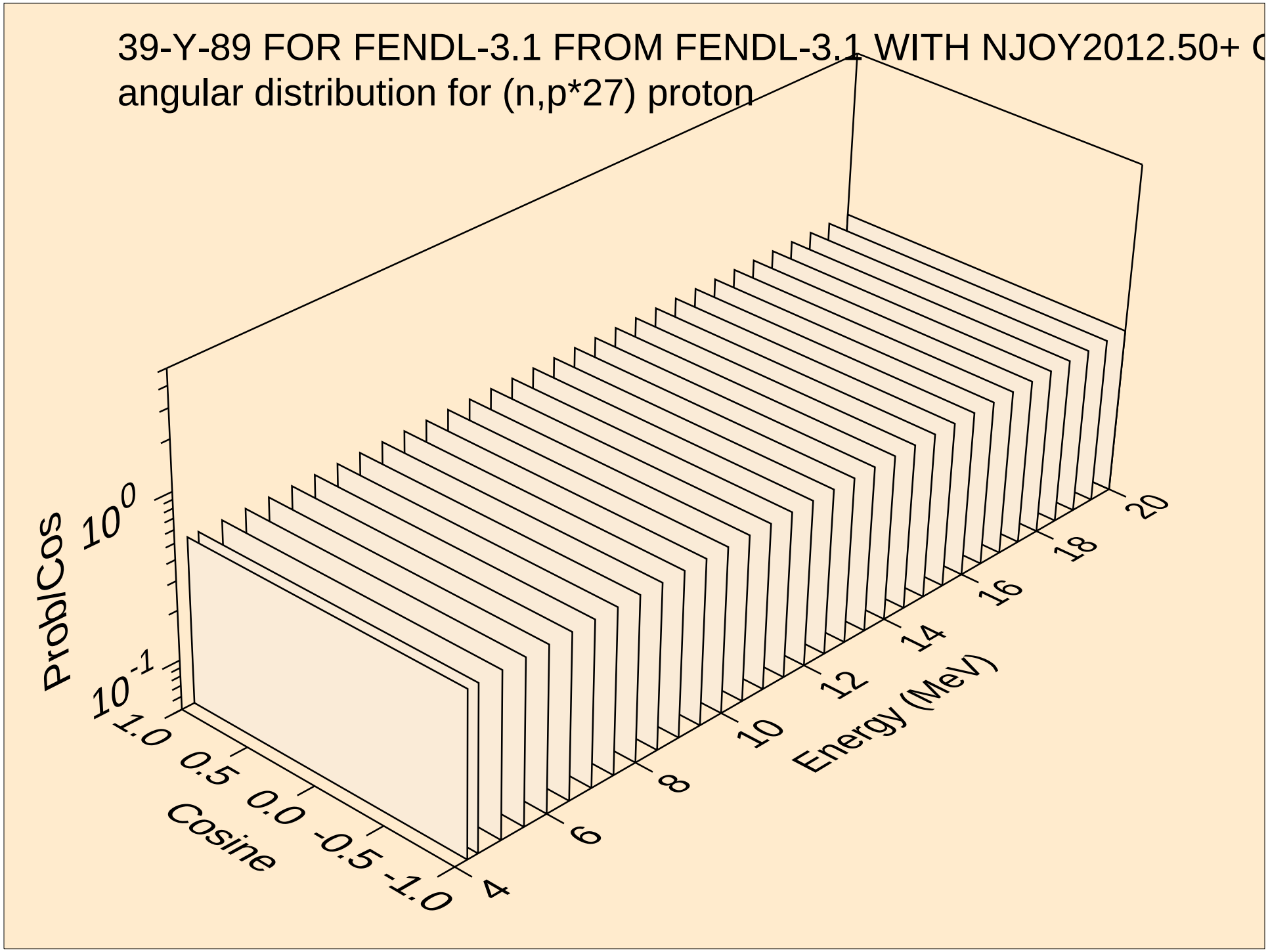

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*22) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

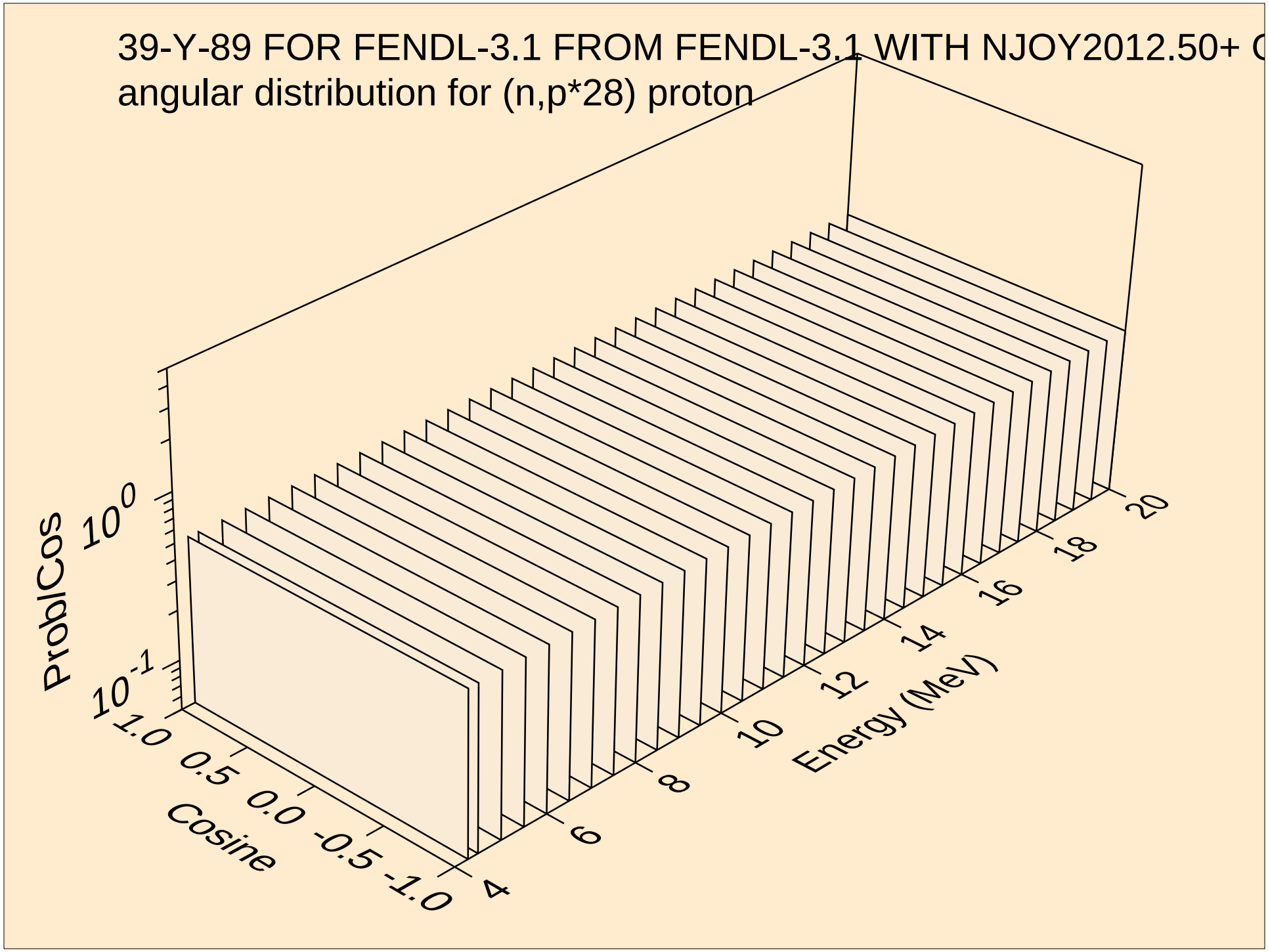

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*23) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

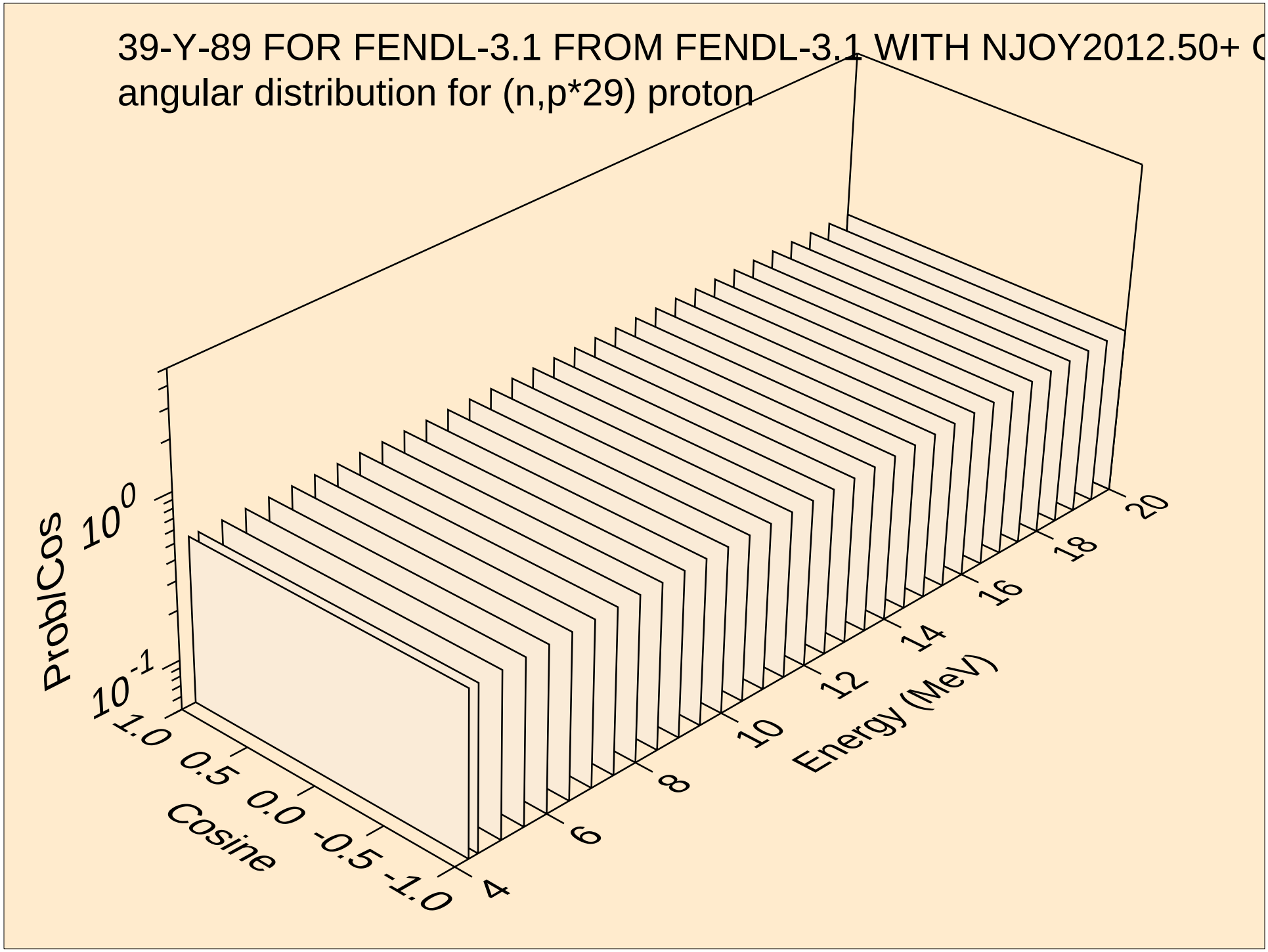

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*24) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

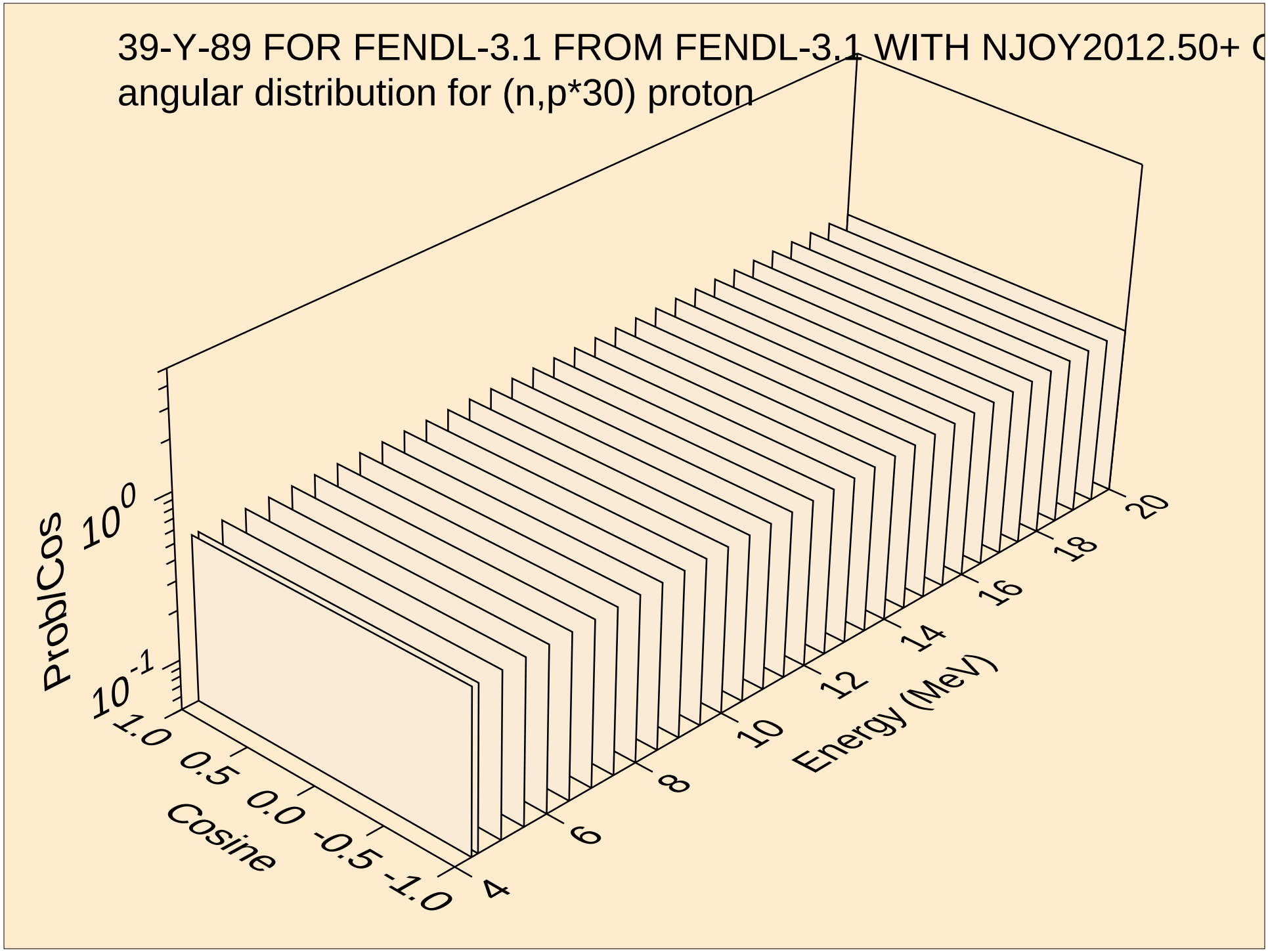

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*25) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

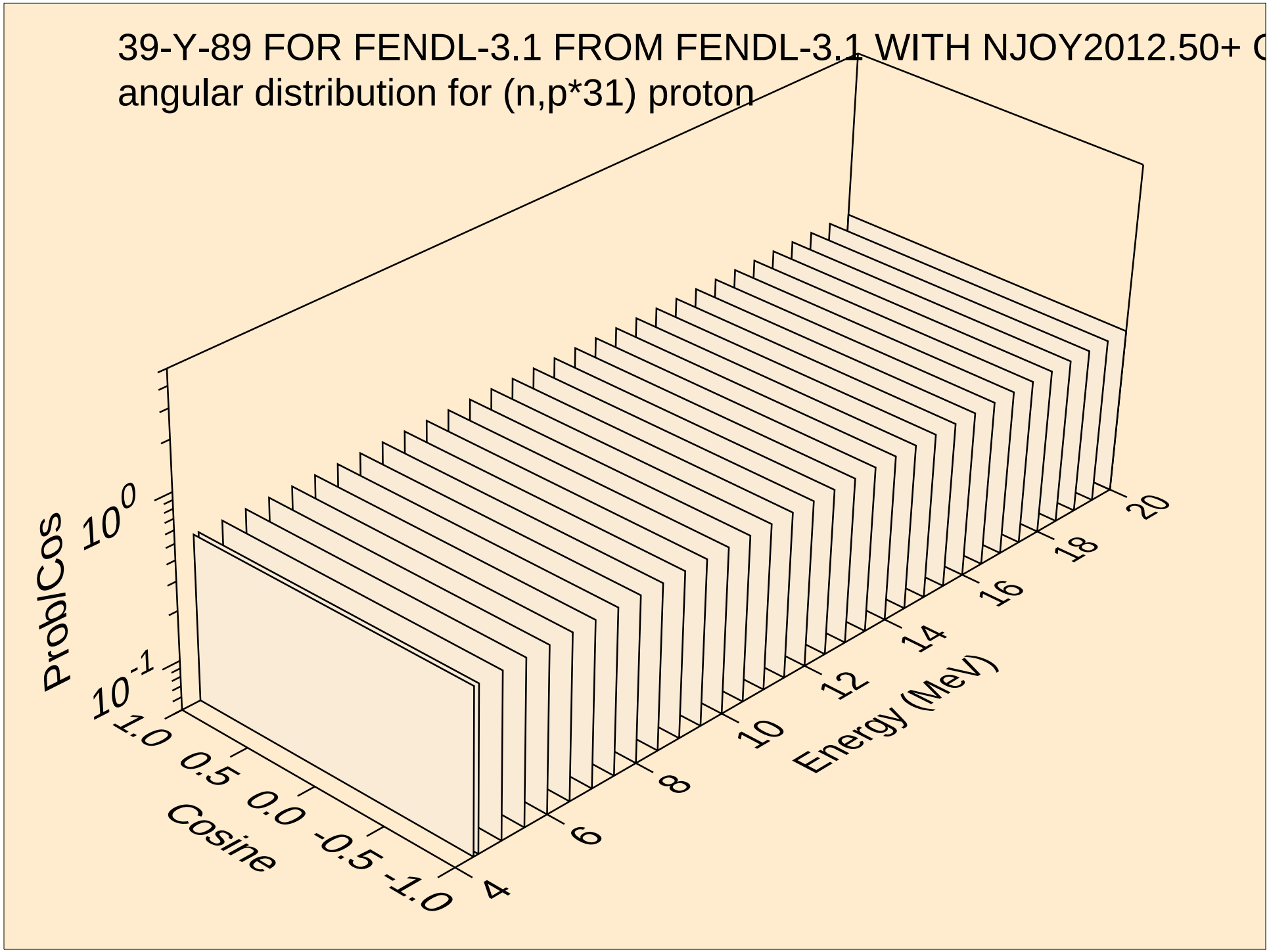

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*26) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

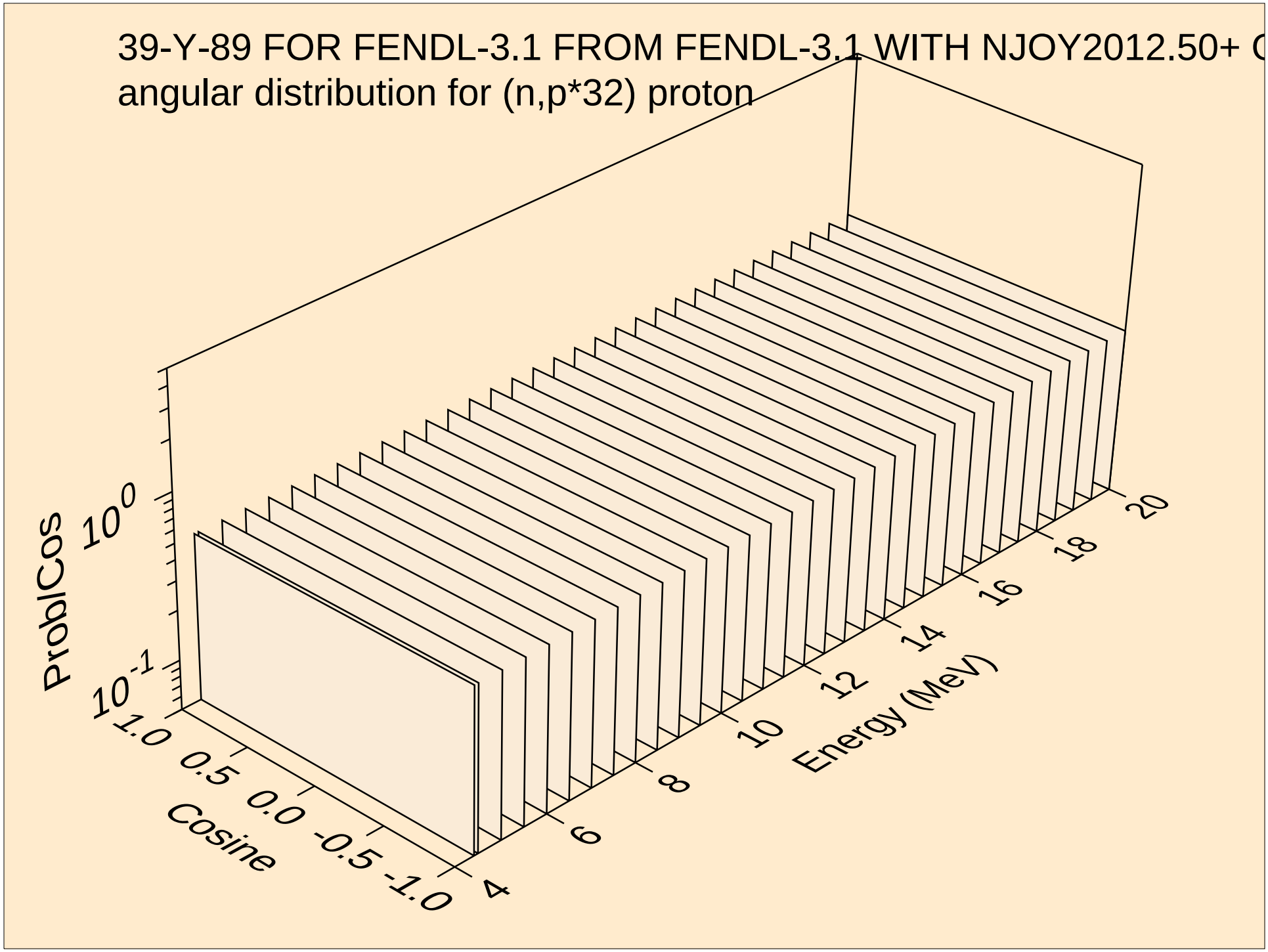

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*27) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

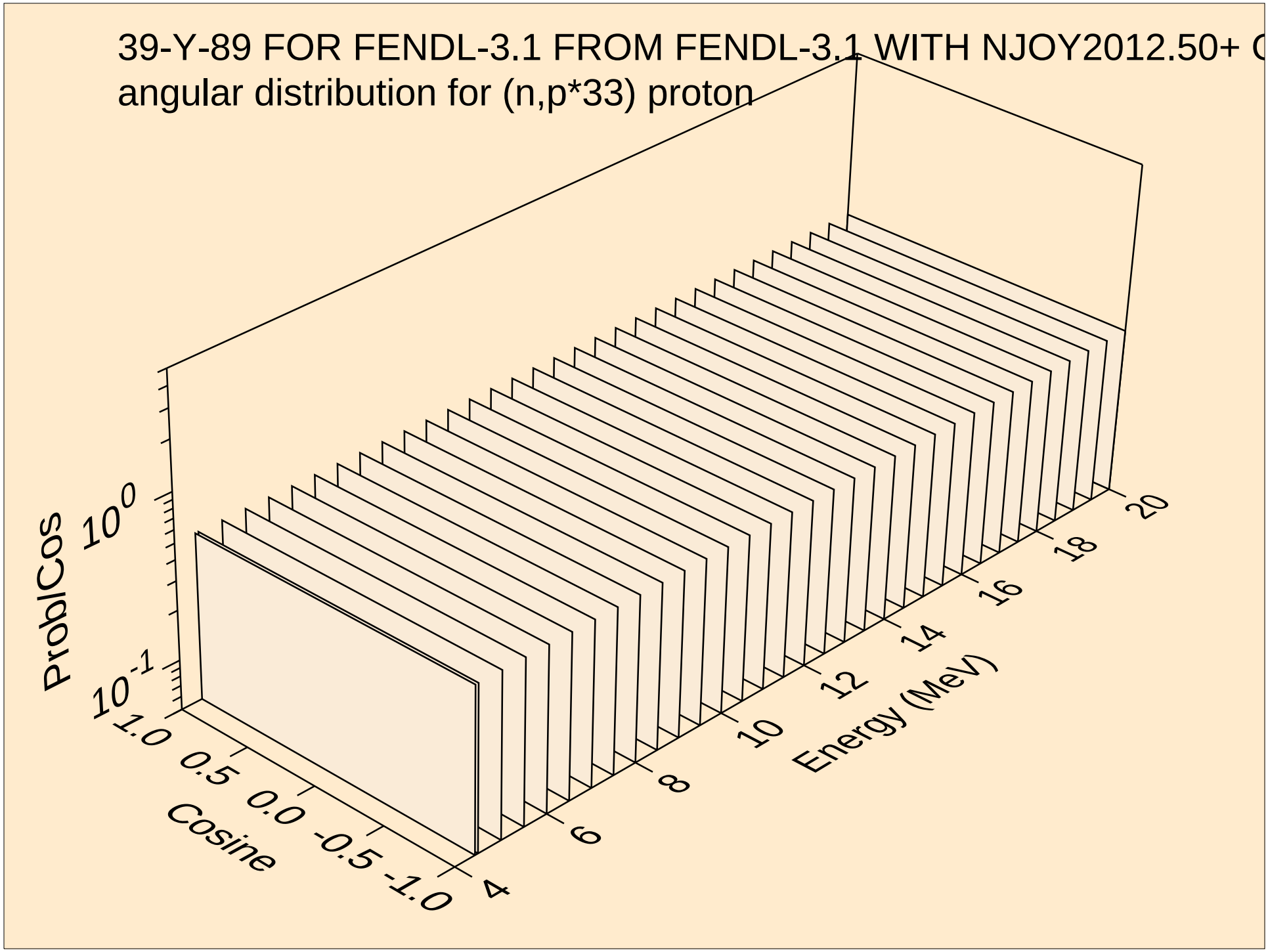

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*28) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

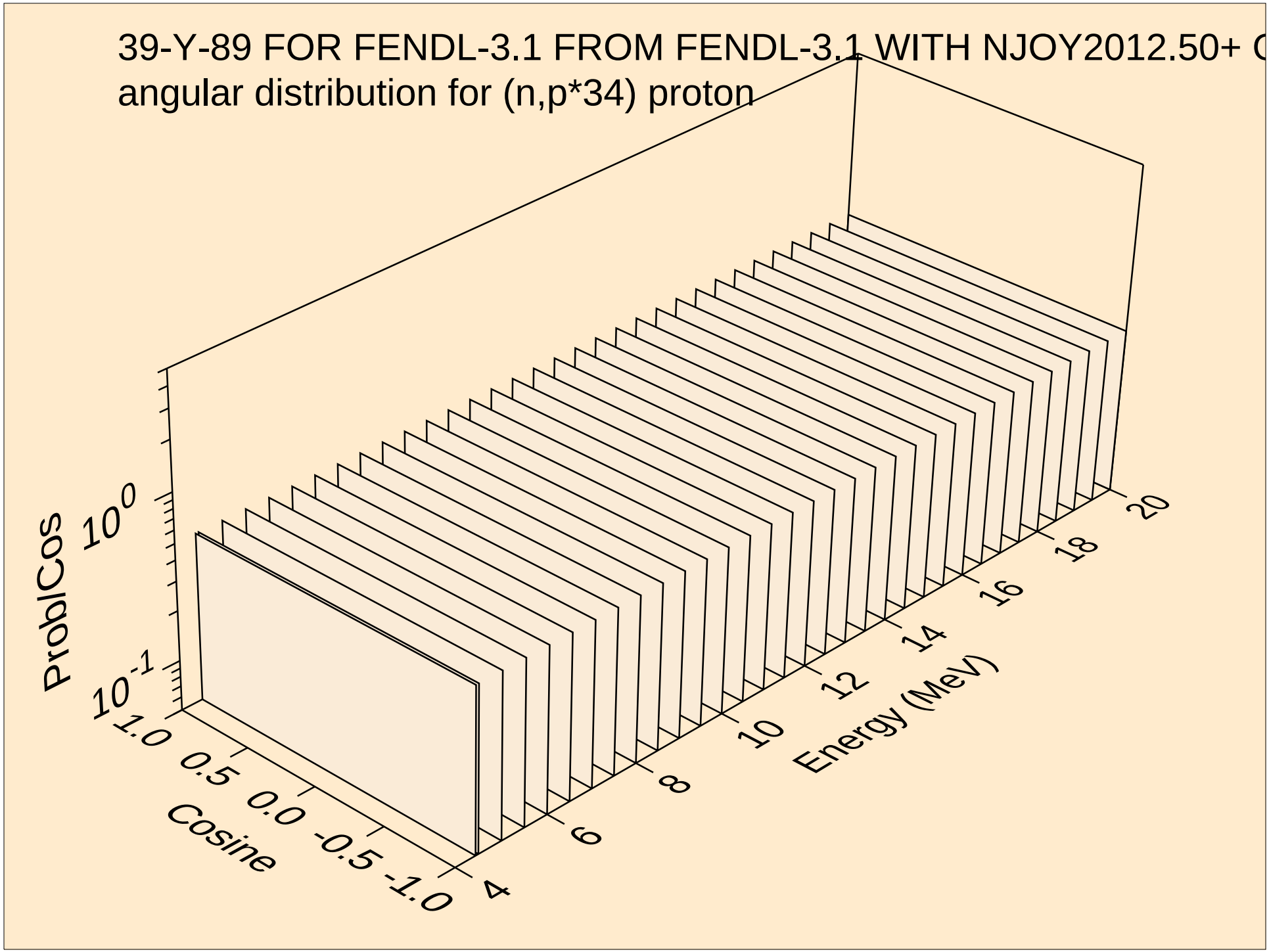

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*29) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

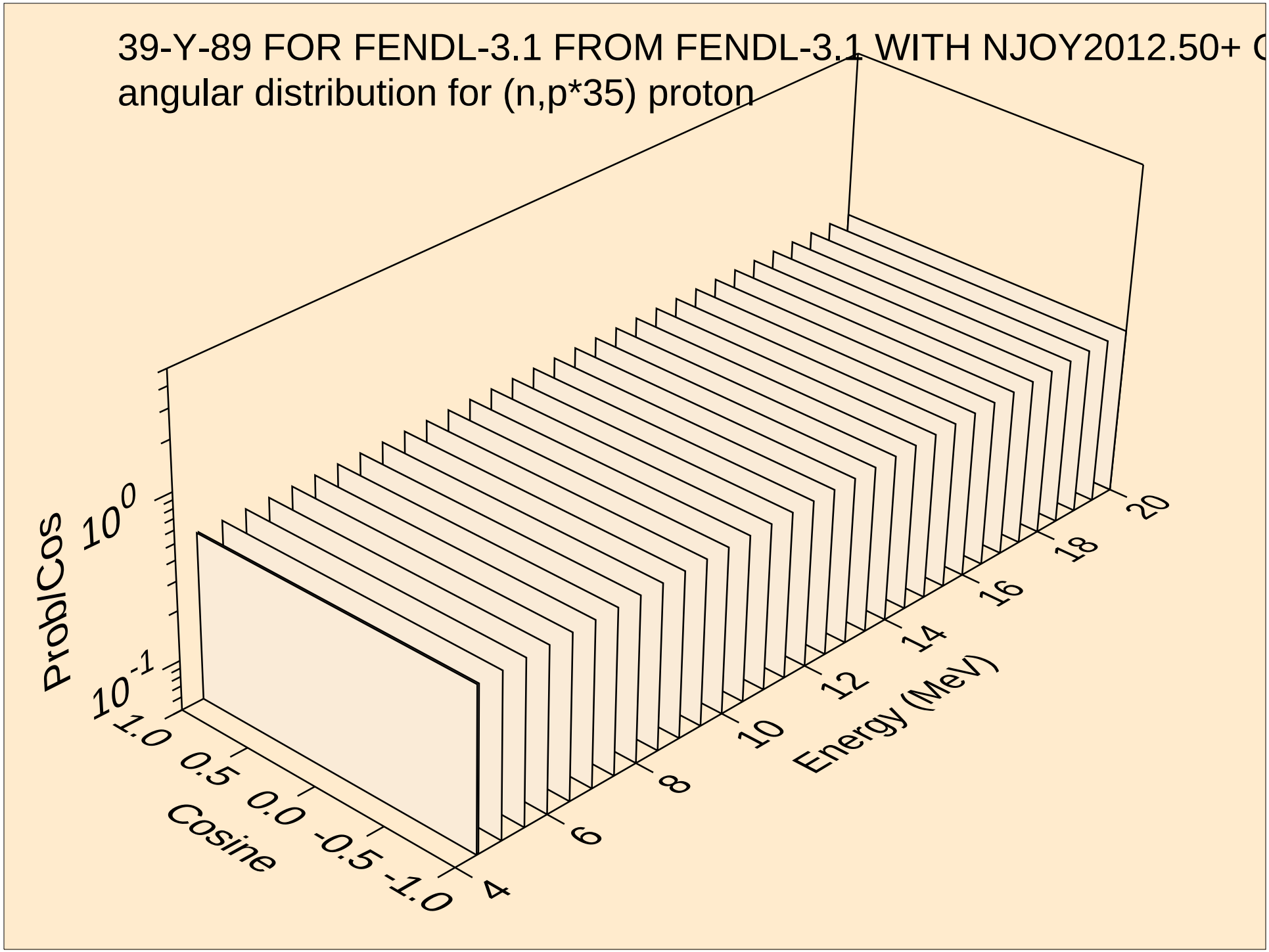

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*30) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

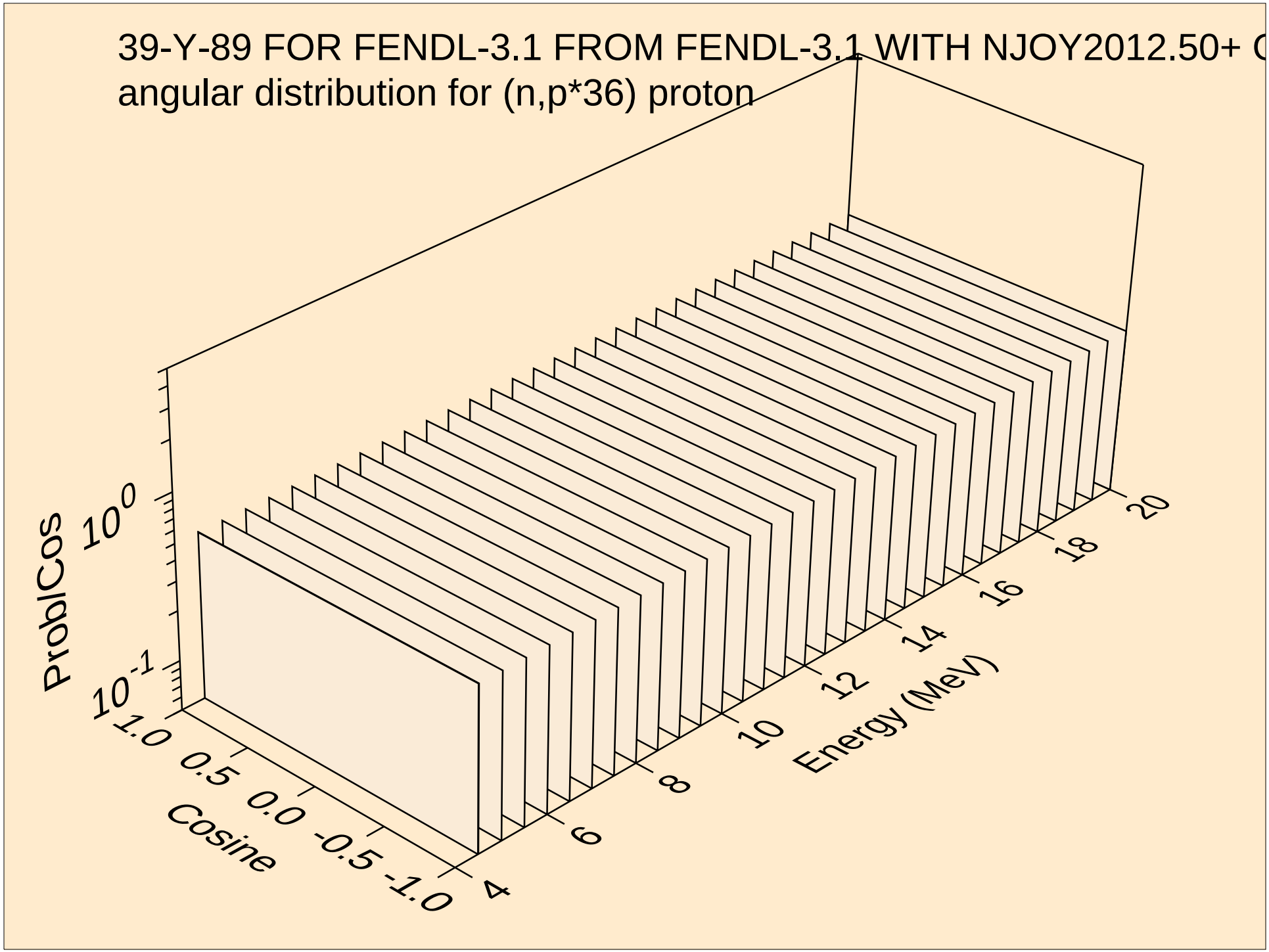

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*31) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

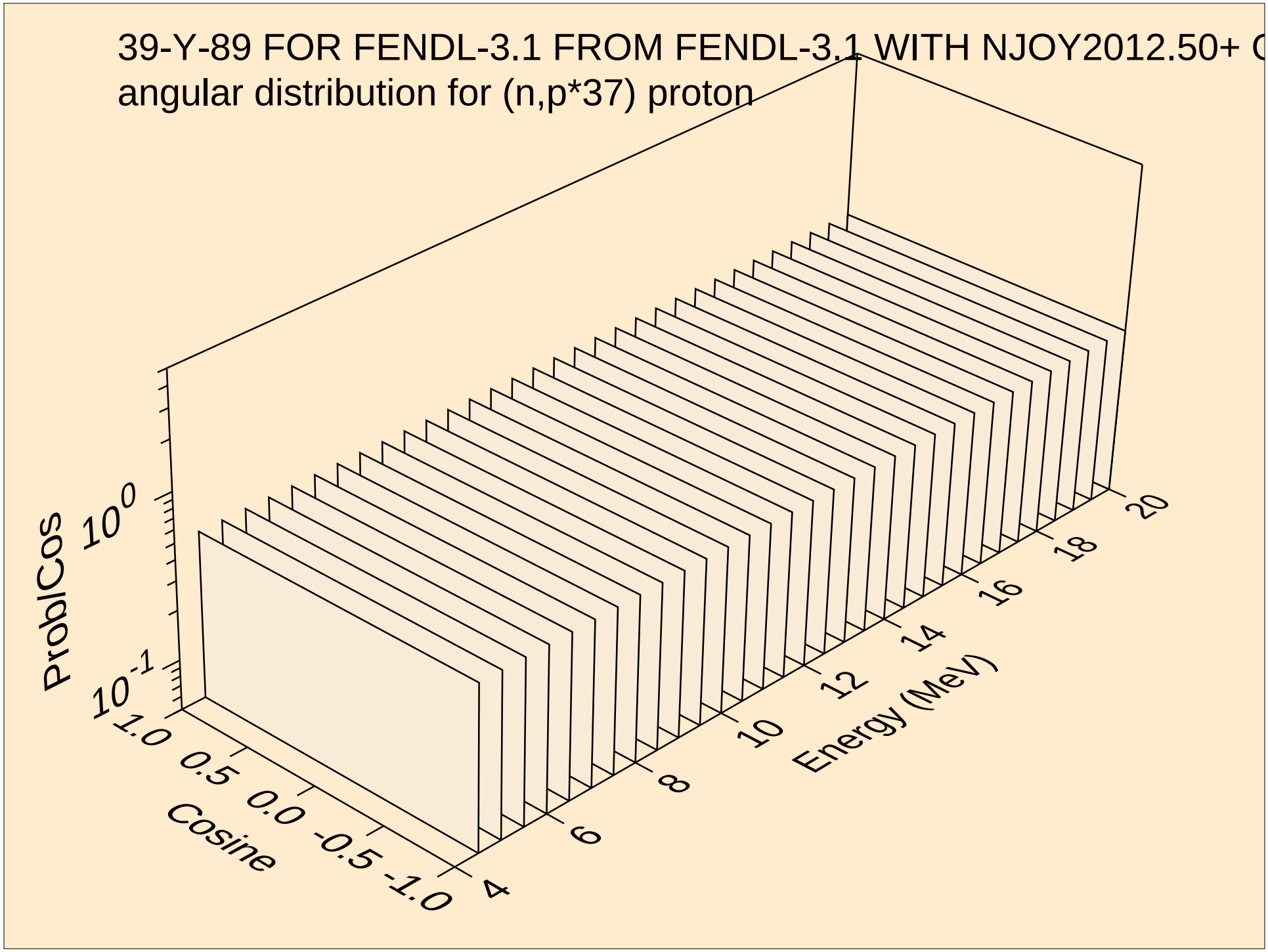

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*32) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

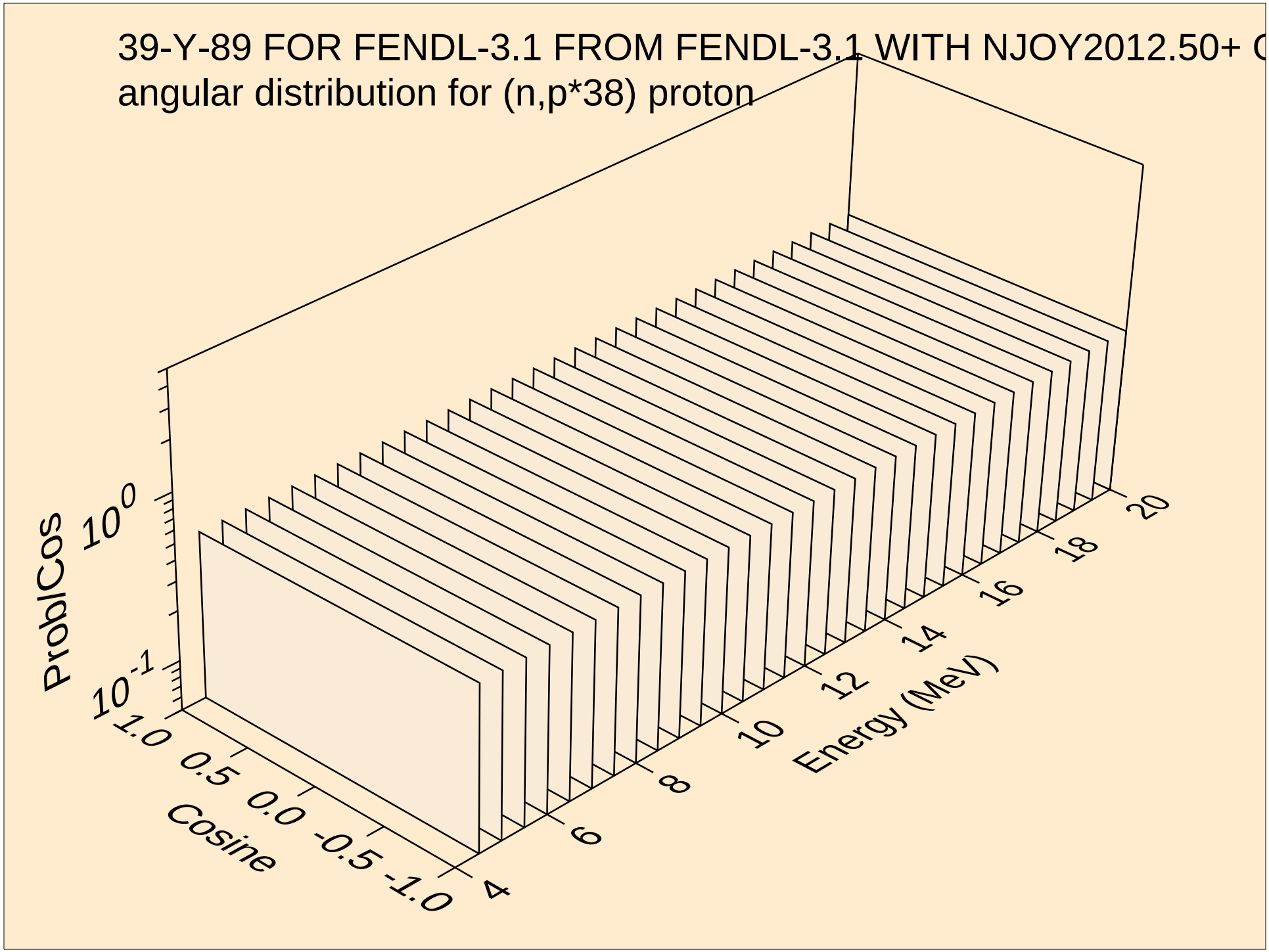

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*33) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

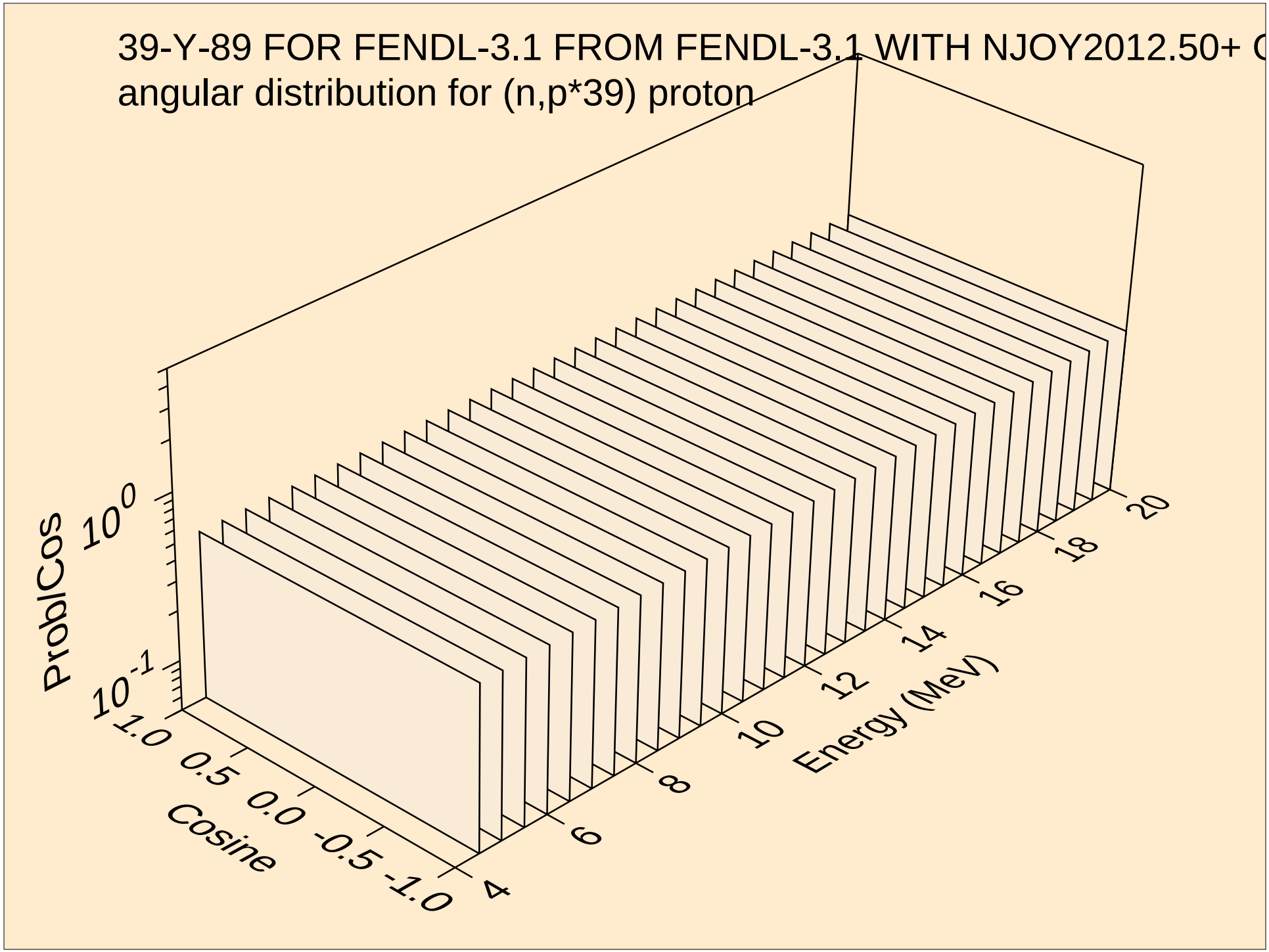

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*34) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

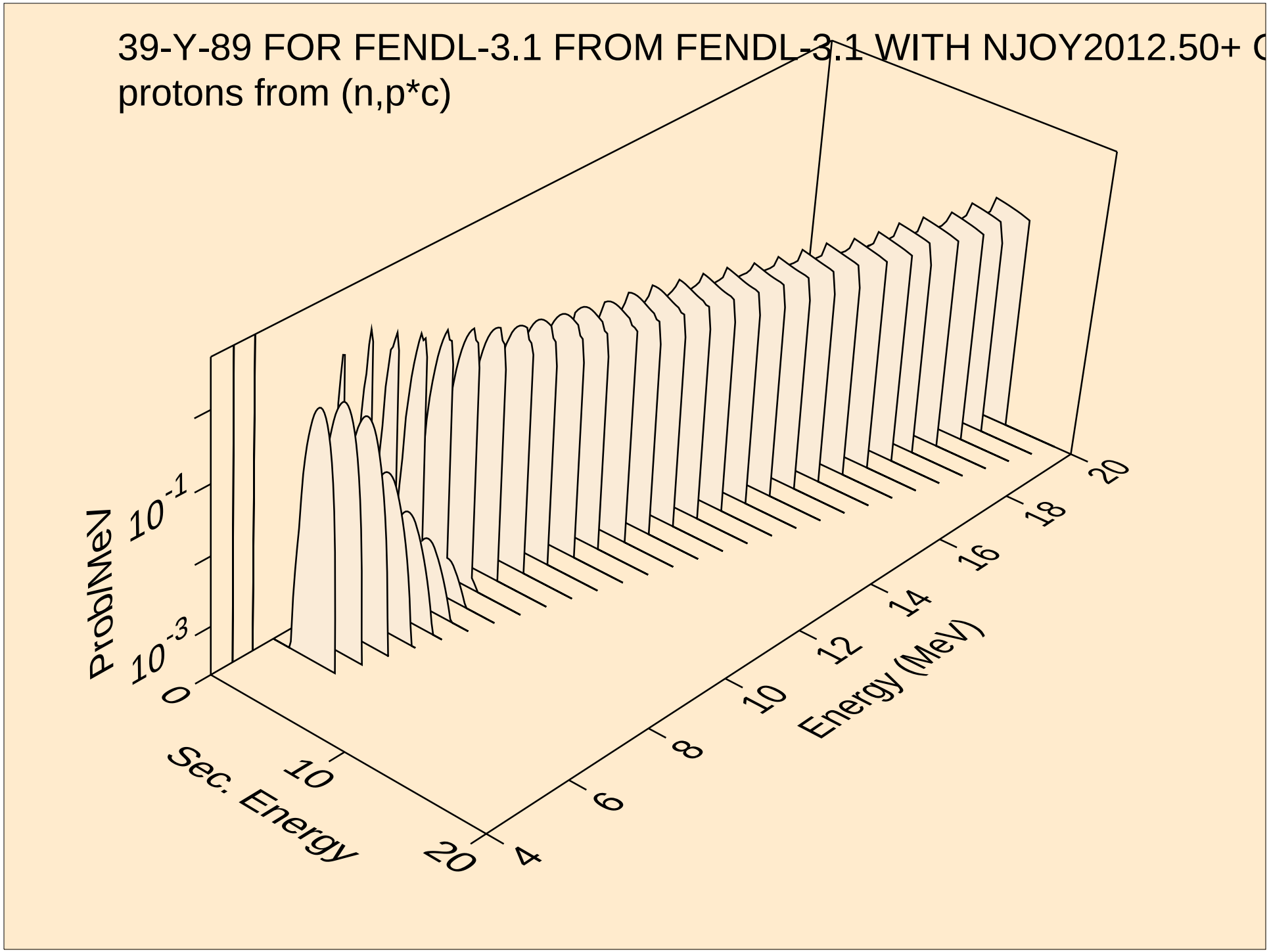

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*35) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

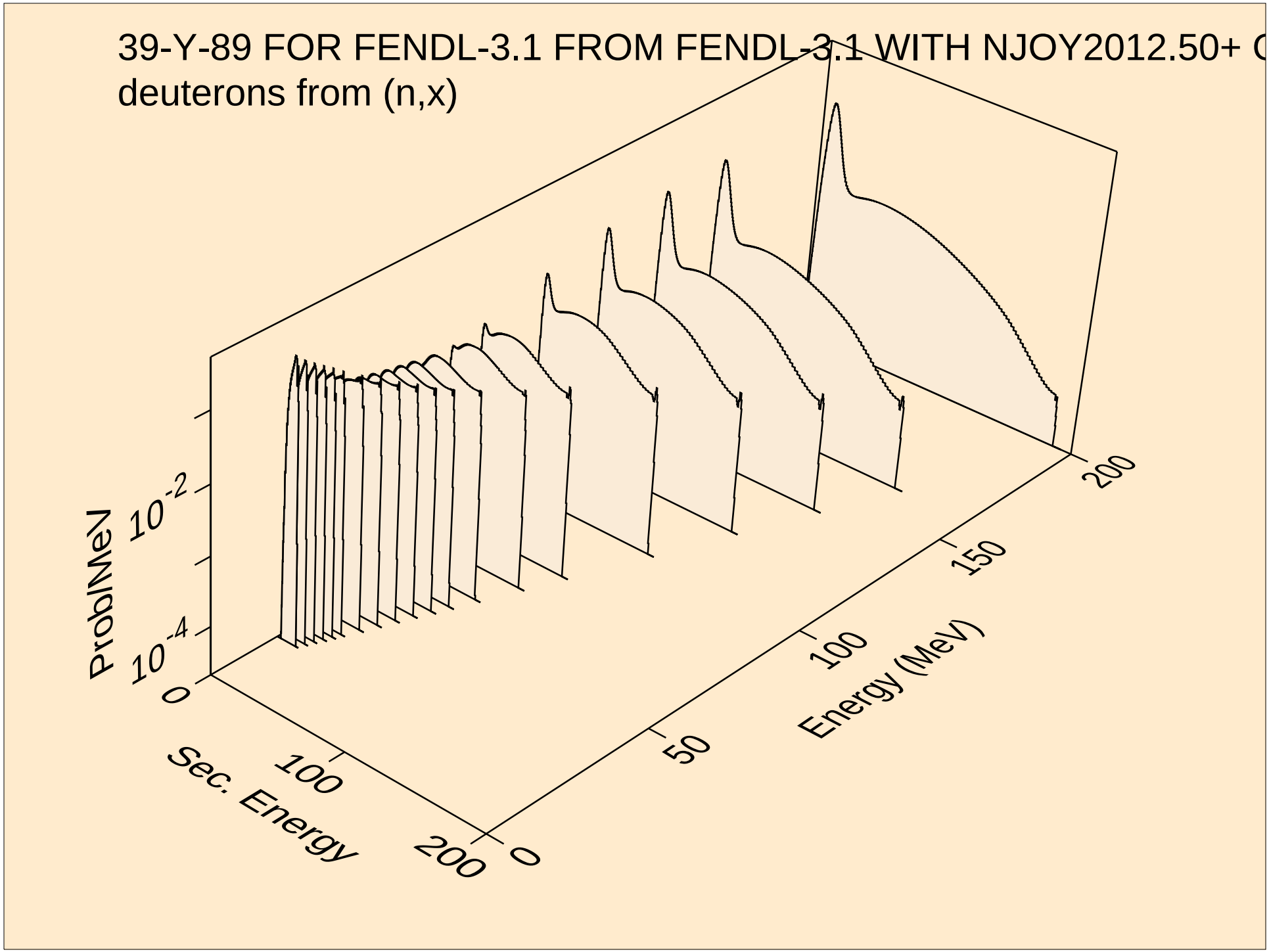

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*36) proton
ProblCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

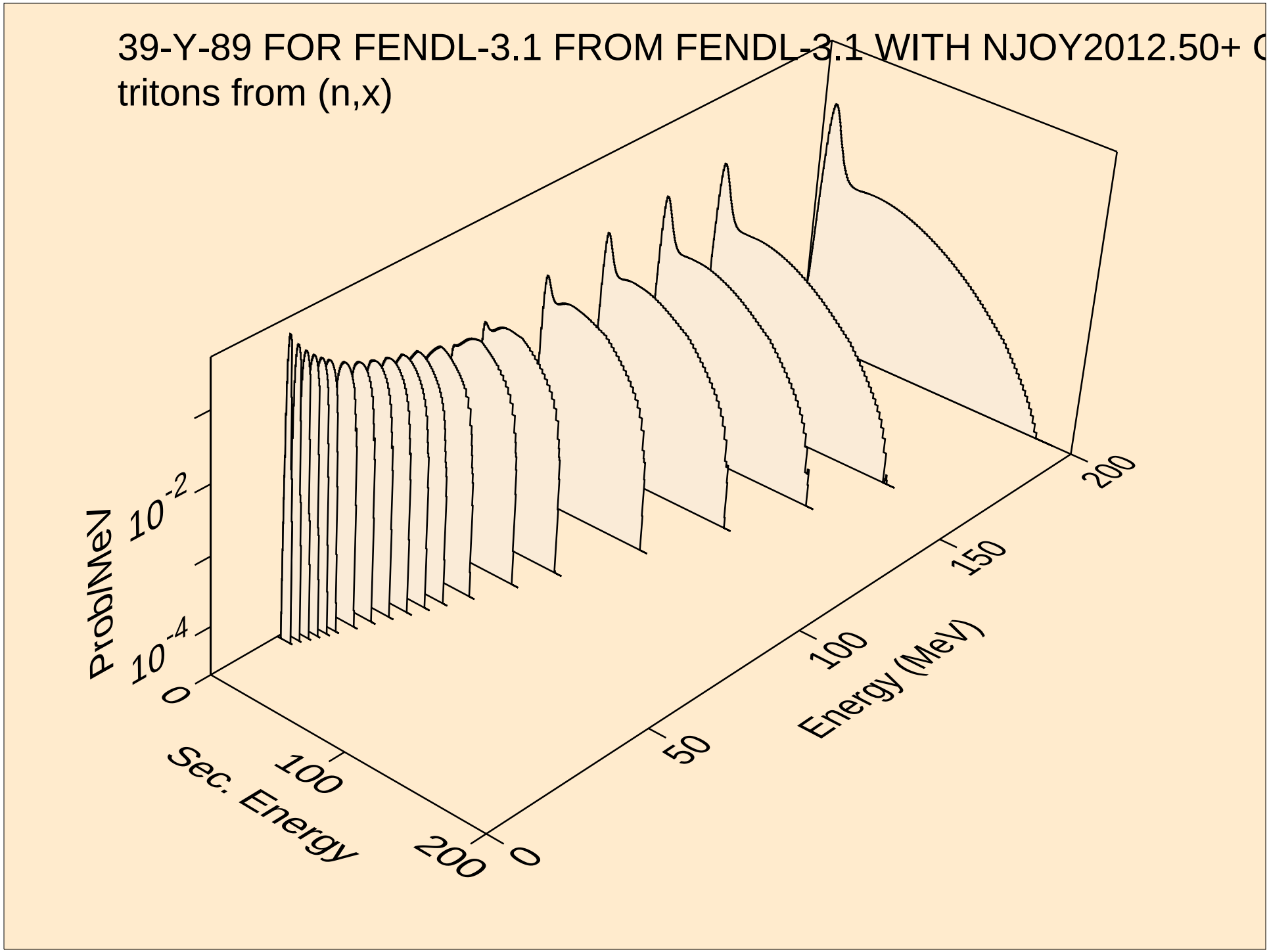

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*37) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

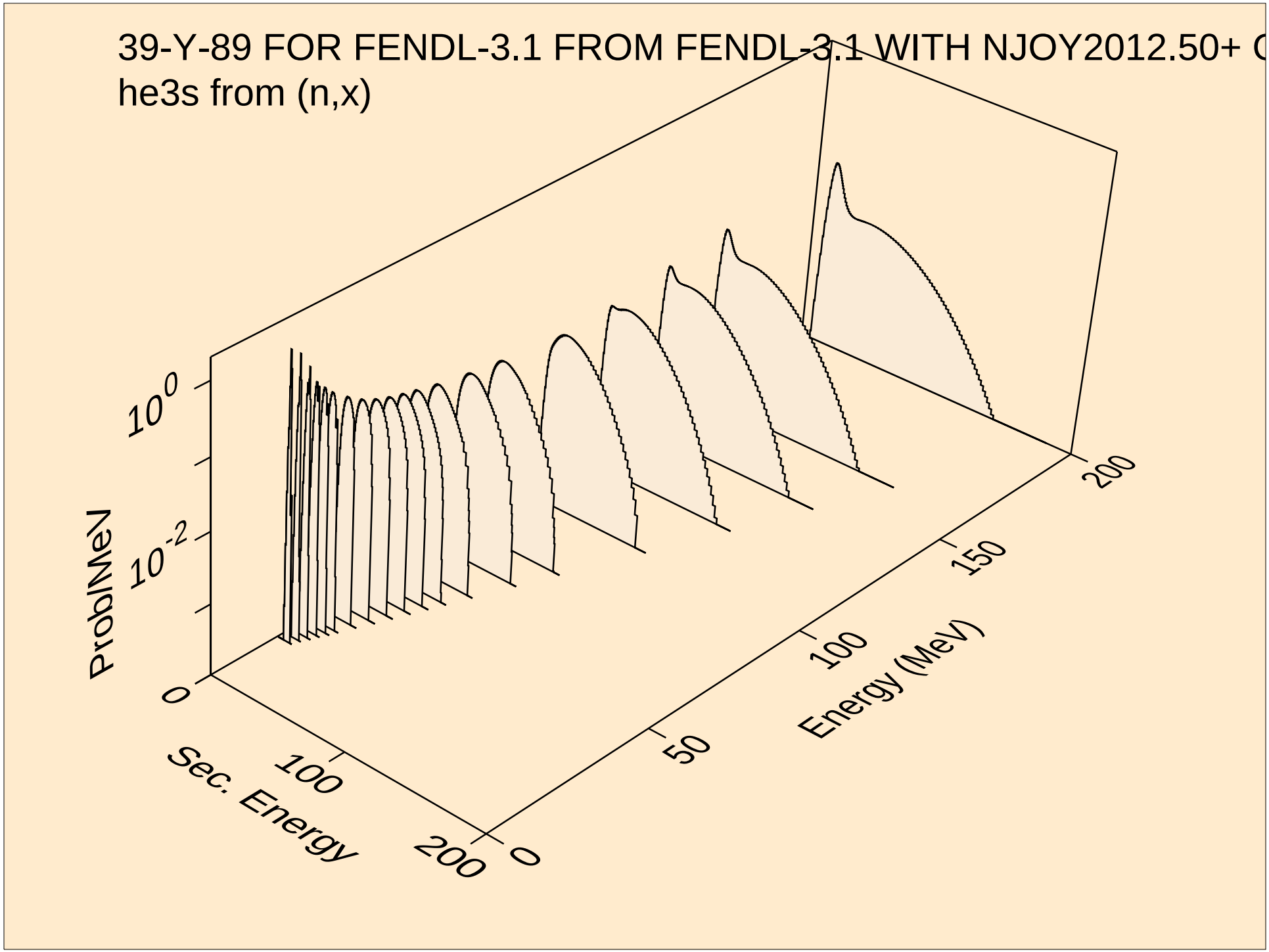

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*38) proton
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

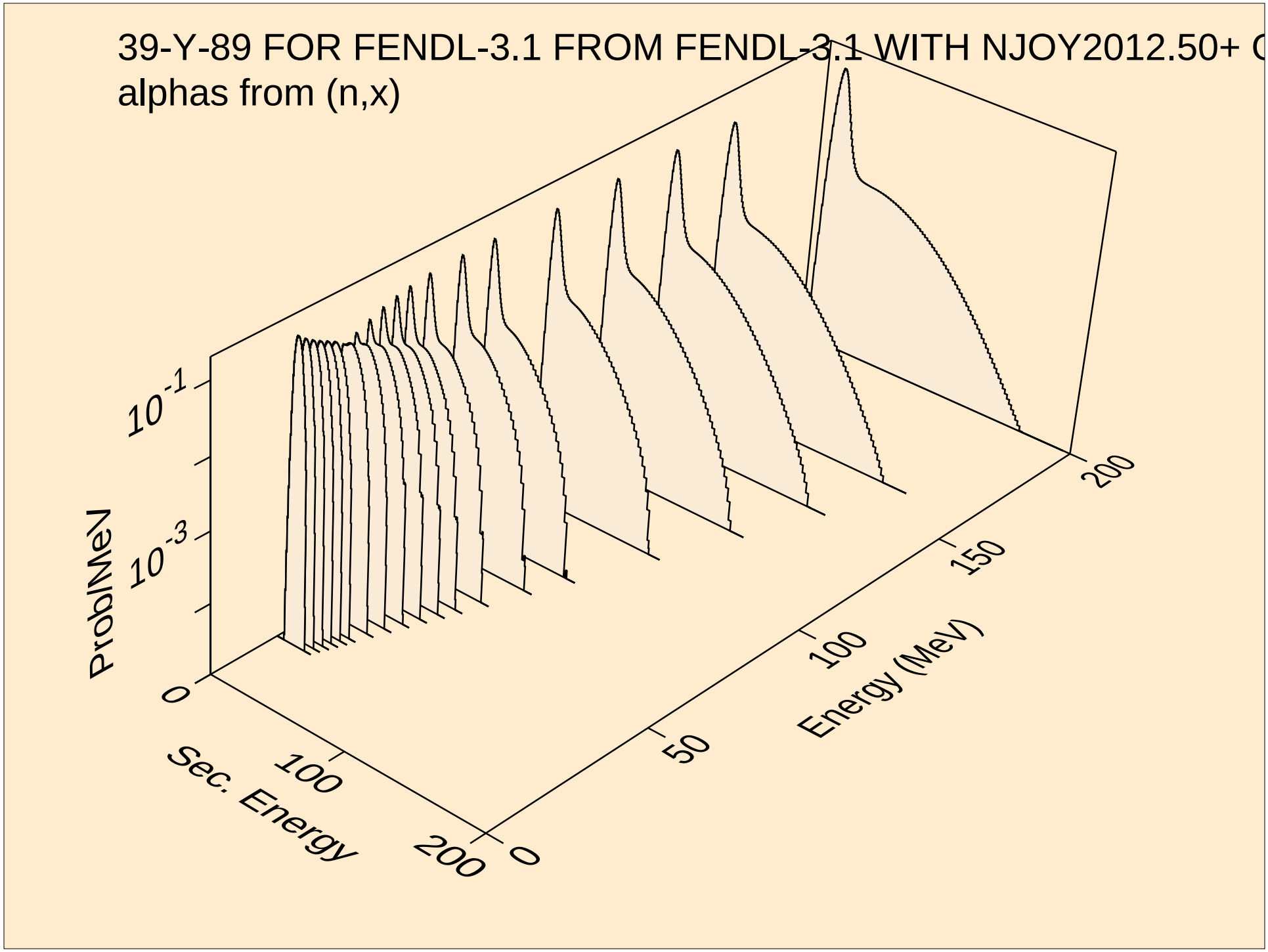

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,p*39) proton
Prob|Cos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
4
6
8
10
12
14
16
18
20
Energy (MeV)

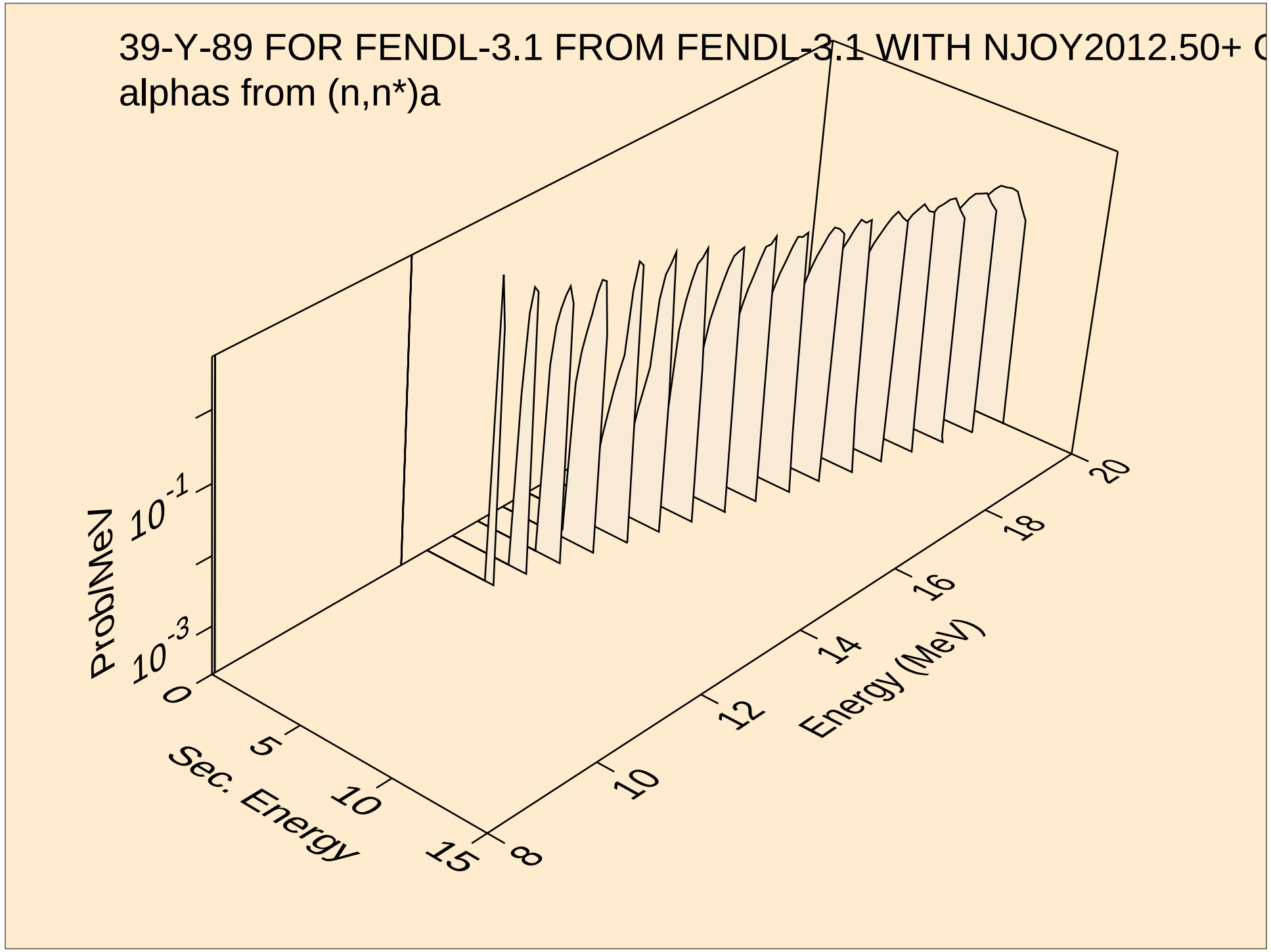

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
protons from (n,p*c)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
4
6
8
10
12
14
16
18
20
Energy (MeV)

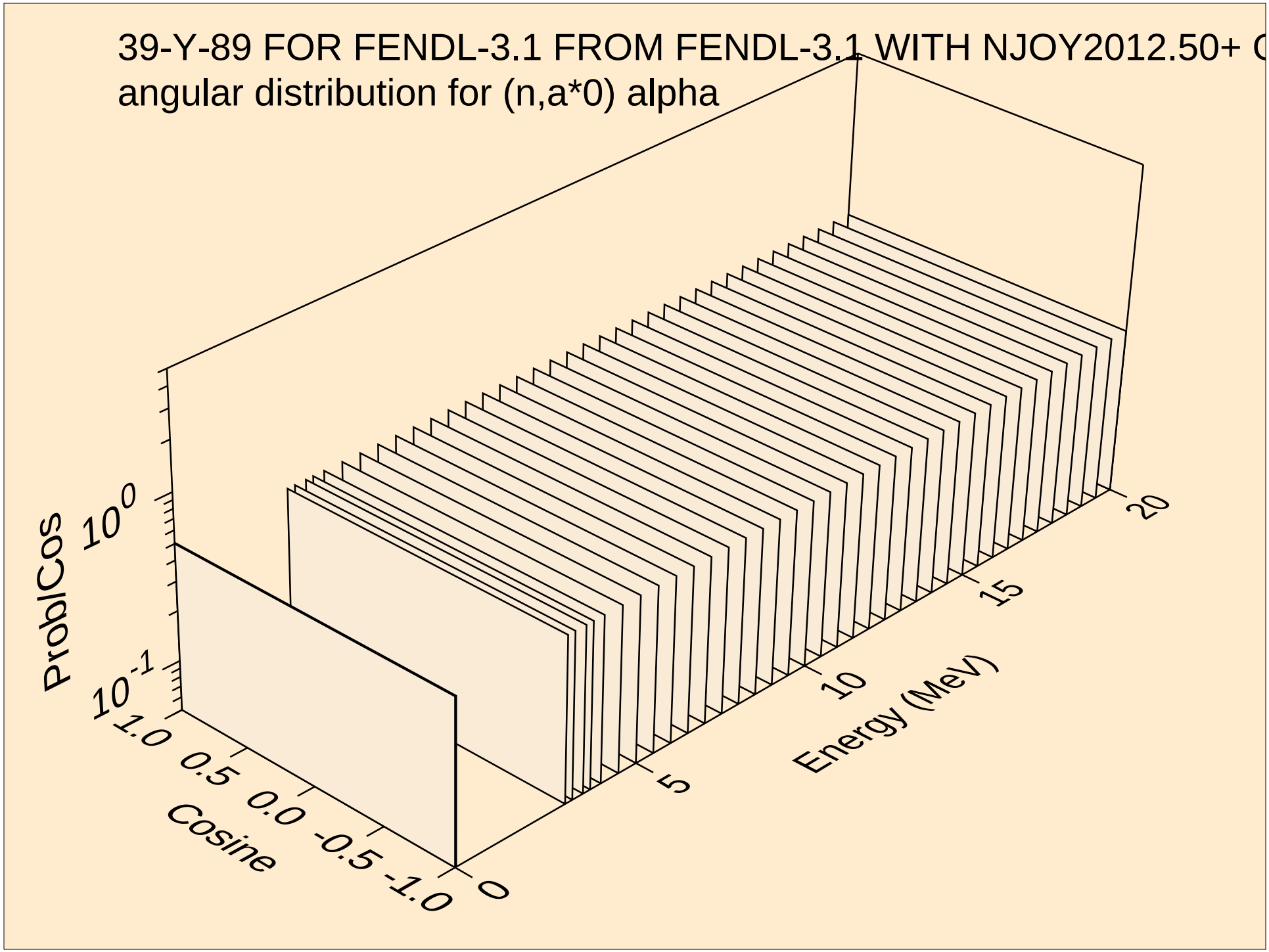

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
deuterons from (n,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

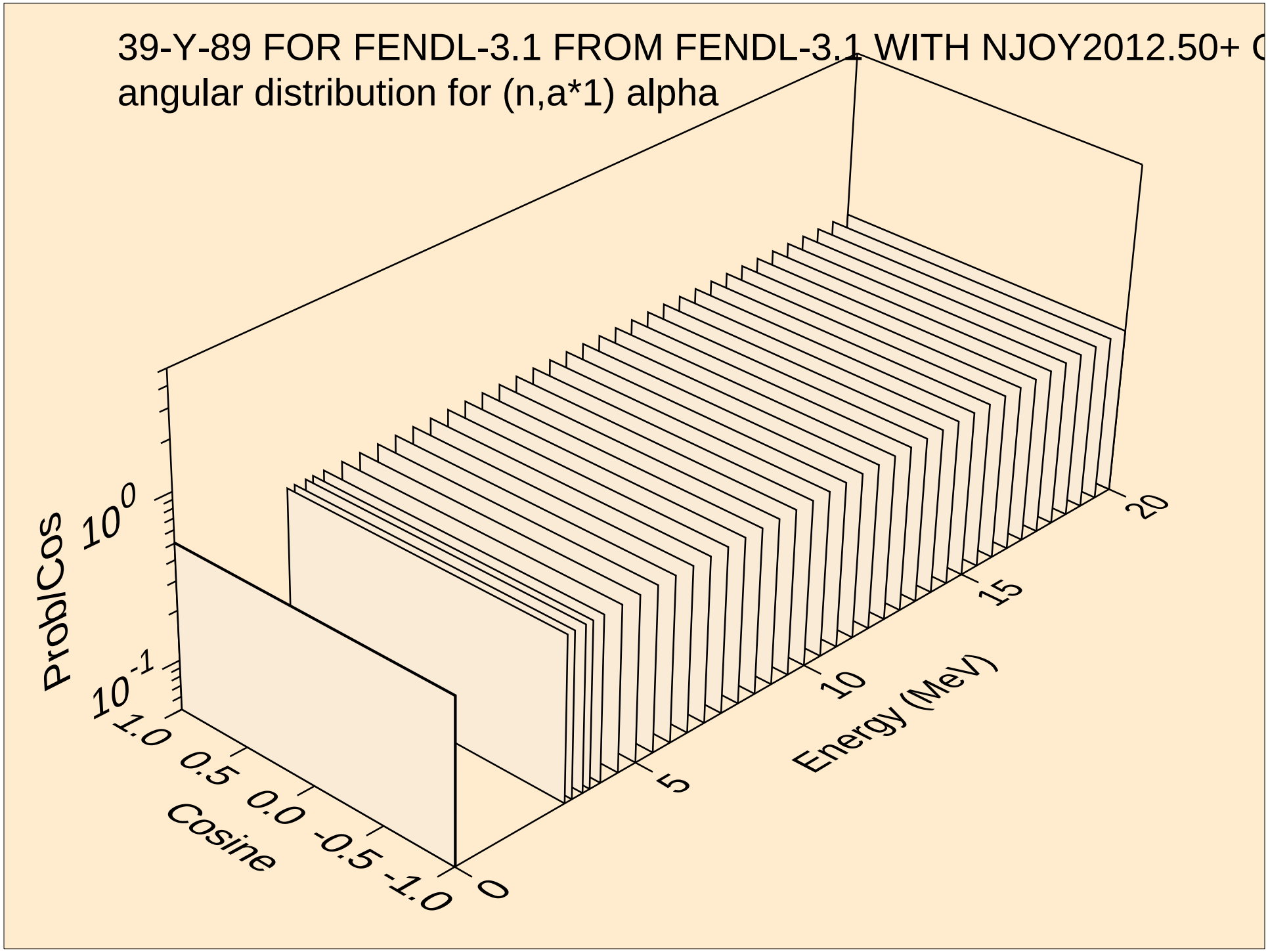

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
tritons from (n,x)
Prob/MeV
10-2
10-4
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)

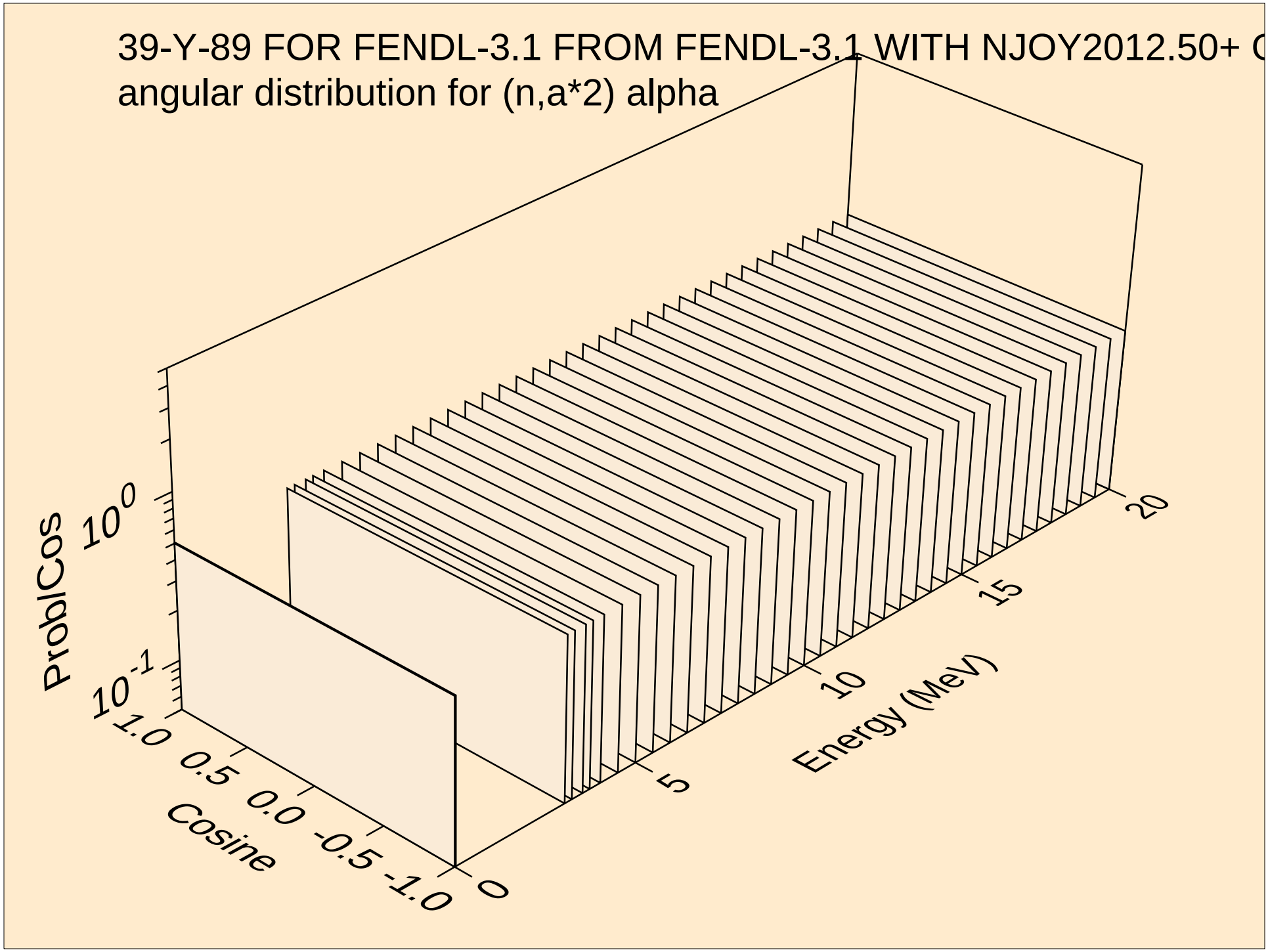

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
he3s from (n,x)
Prob/MeV
10^0
10^-2
0
Sec. Energy
100
200
0
50
100
Energy (MeV)
150
200

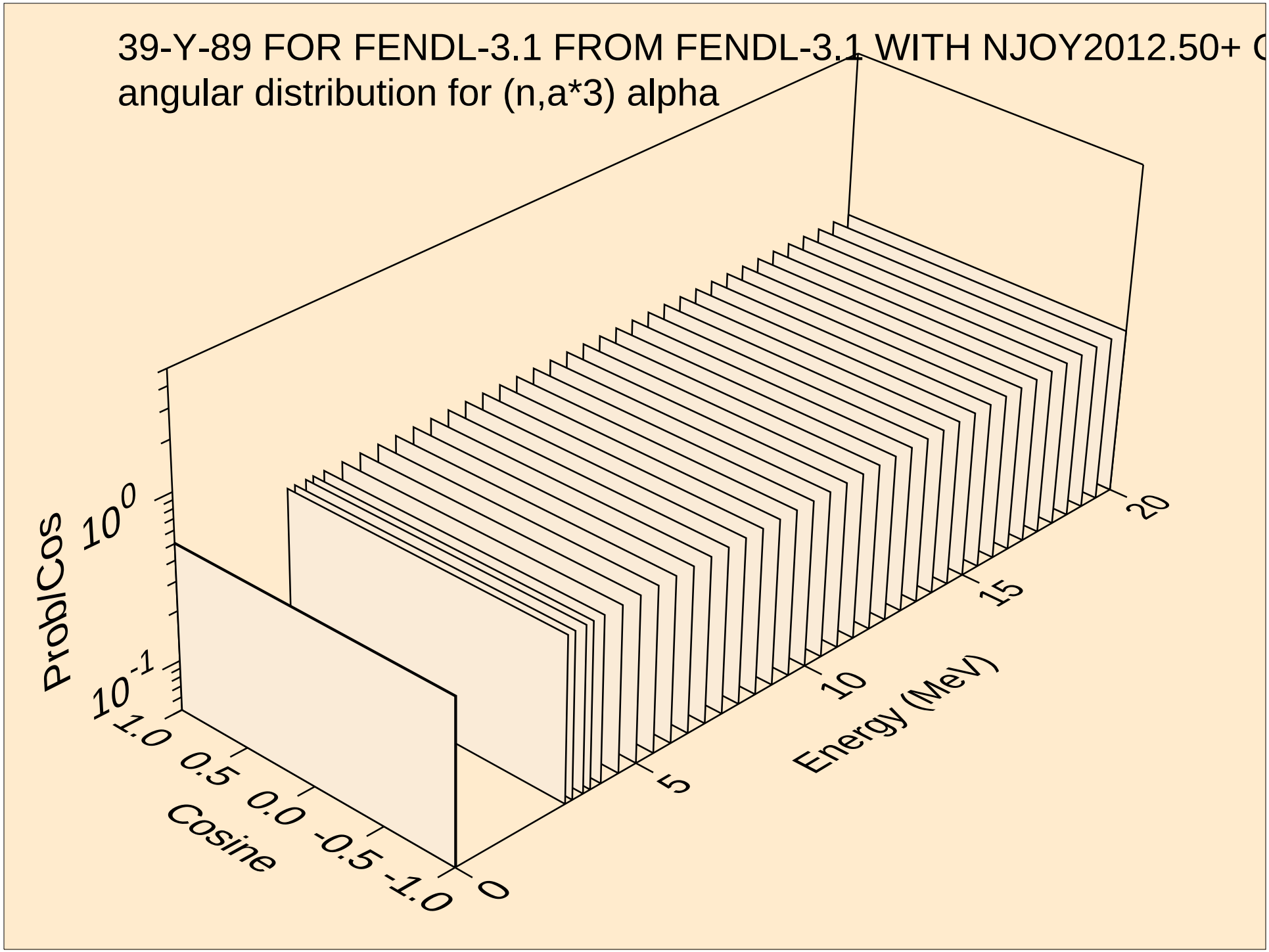

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
alphas from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)

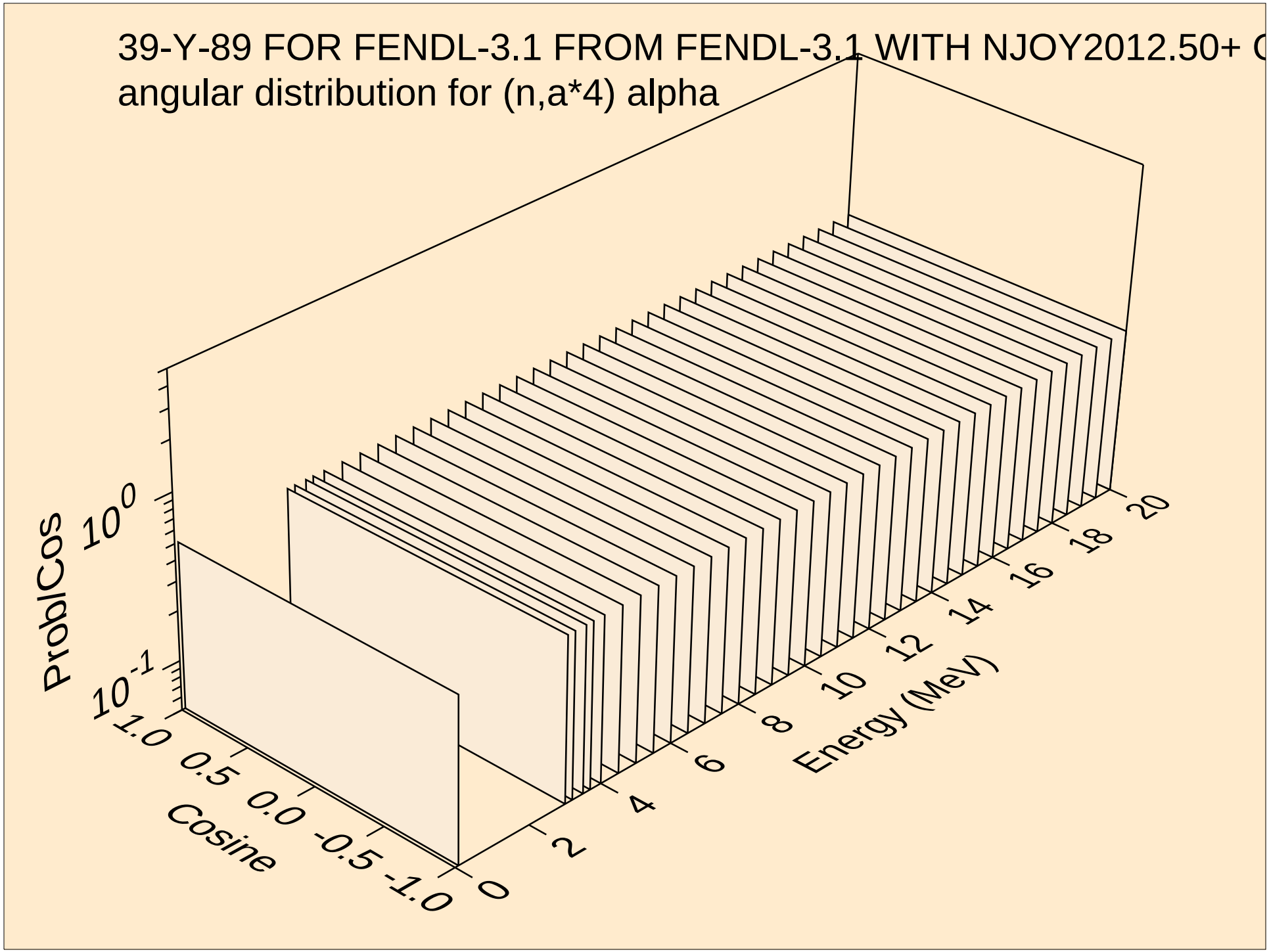

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
alphas from (n,n*)a
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

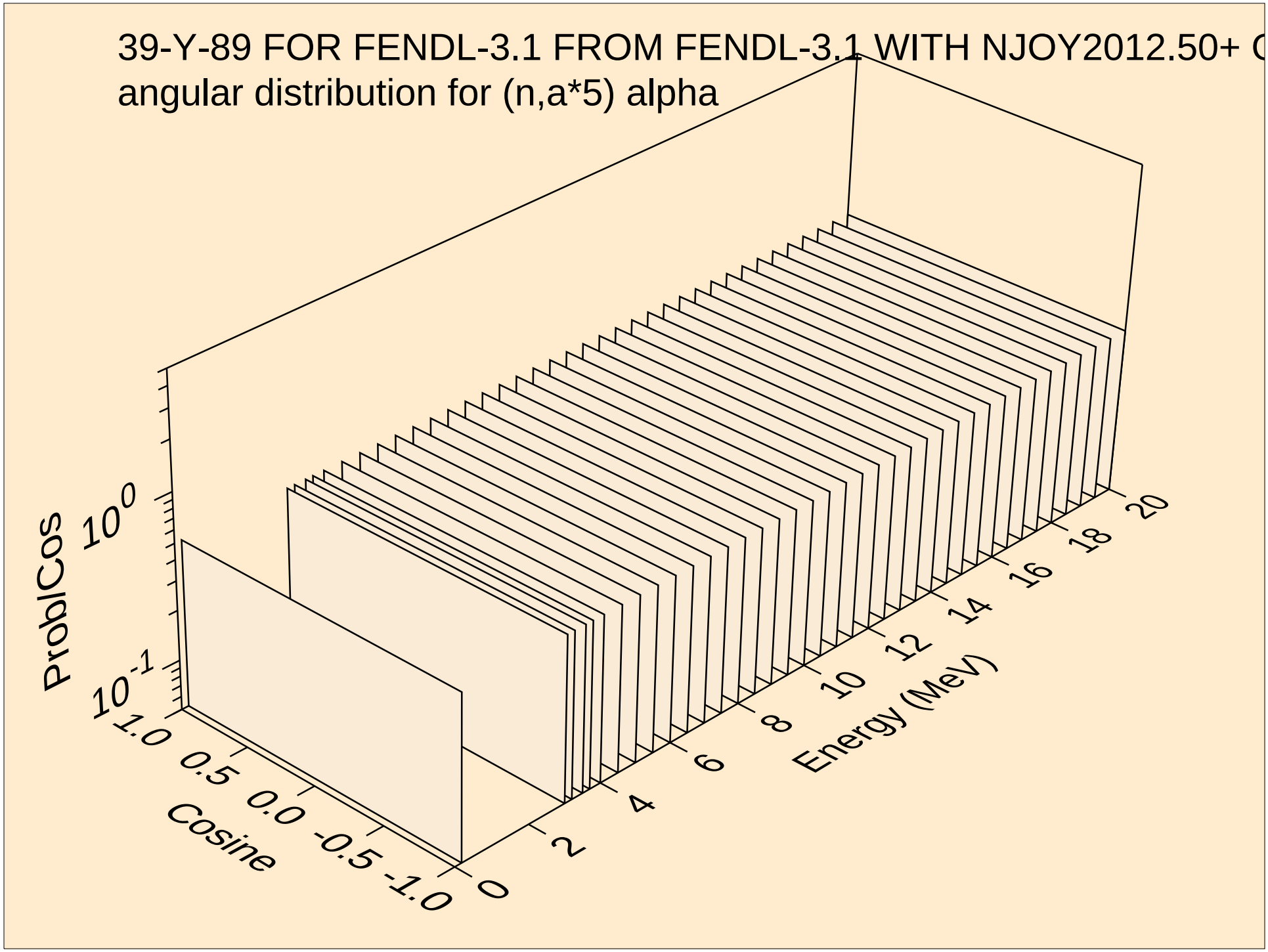

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*0) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

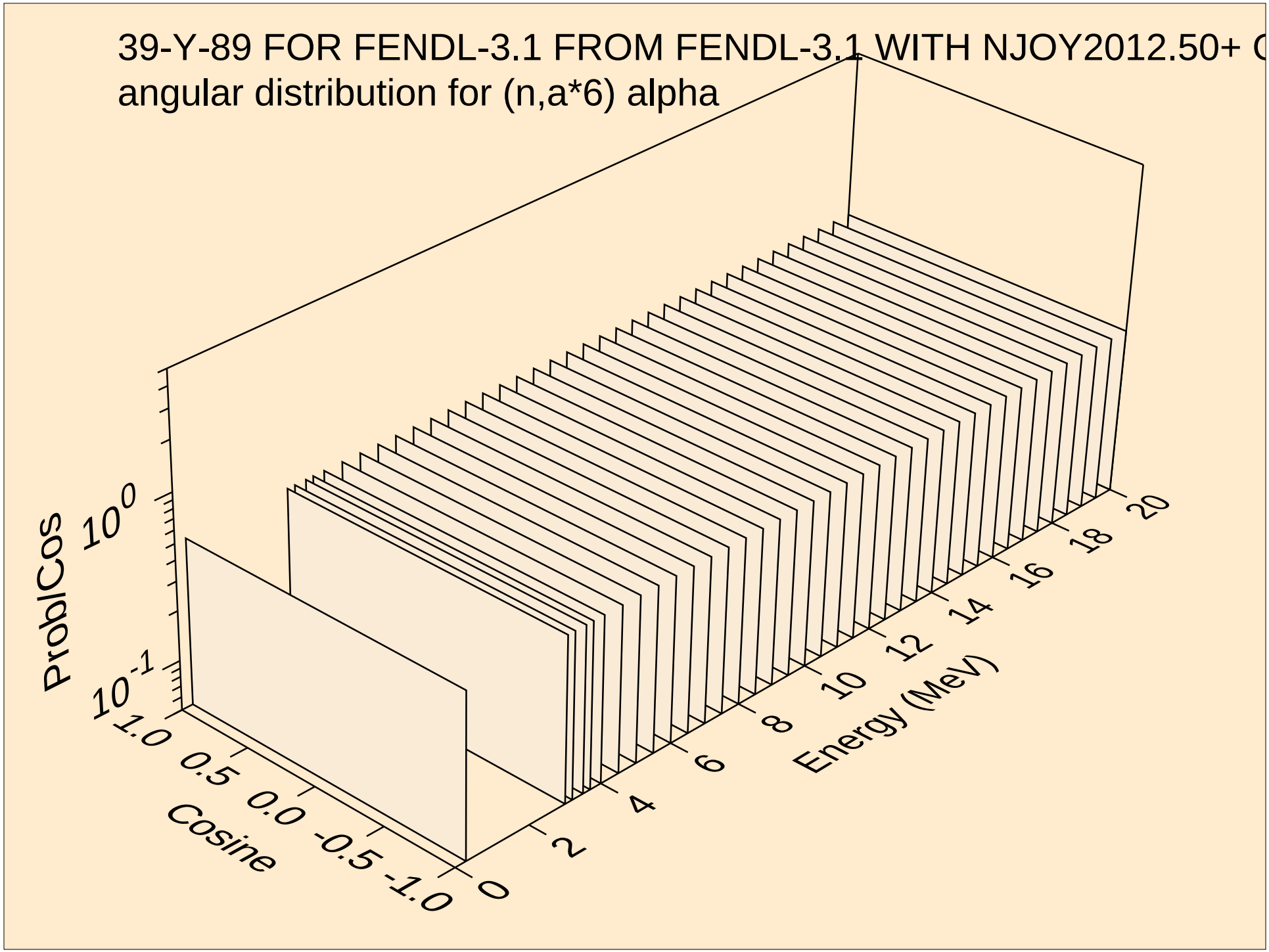

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*1) alpha
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

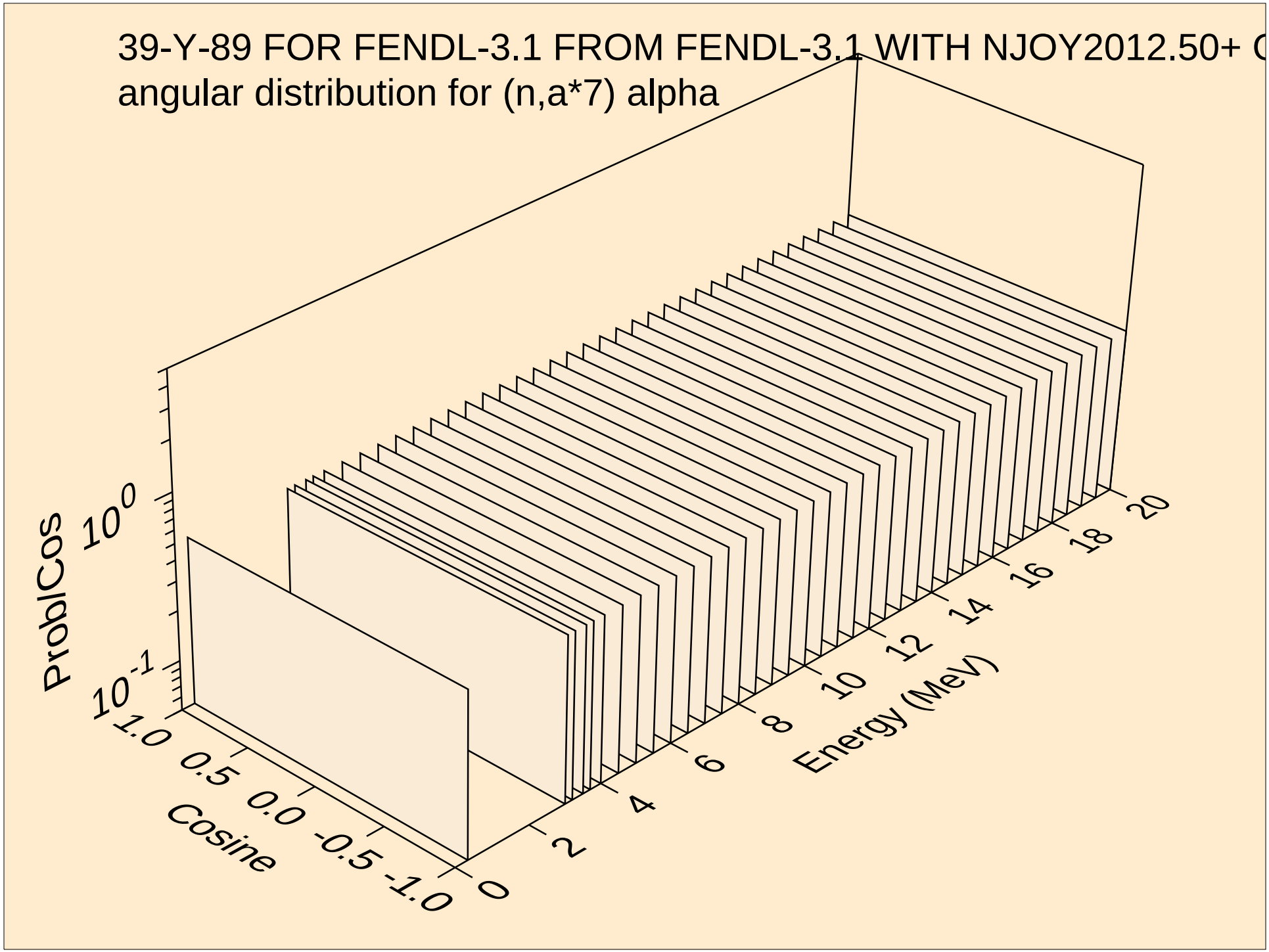

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*2) alpha
ProbICos
10^0
10^-1
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

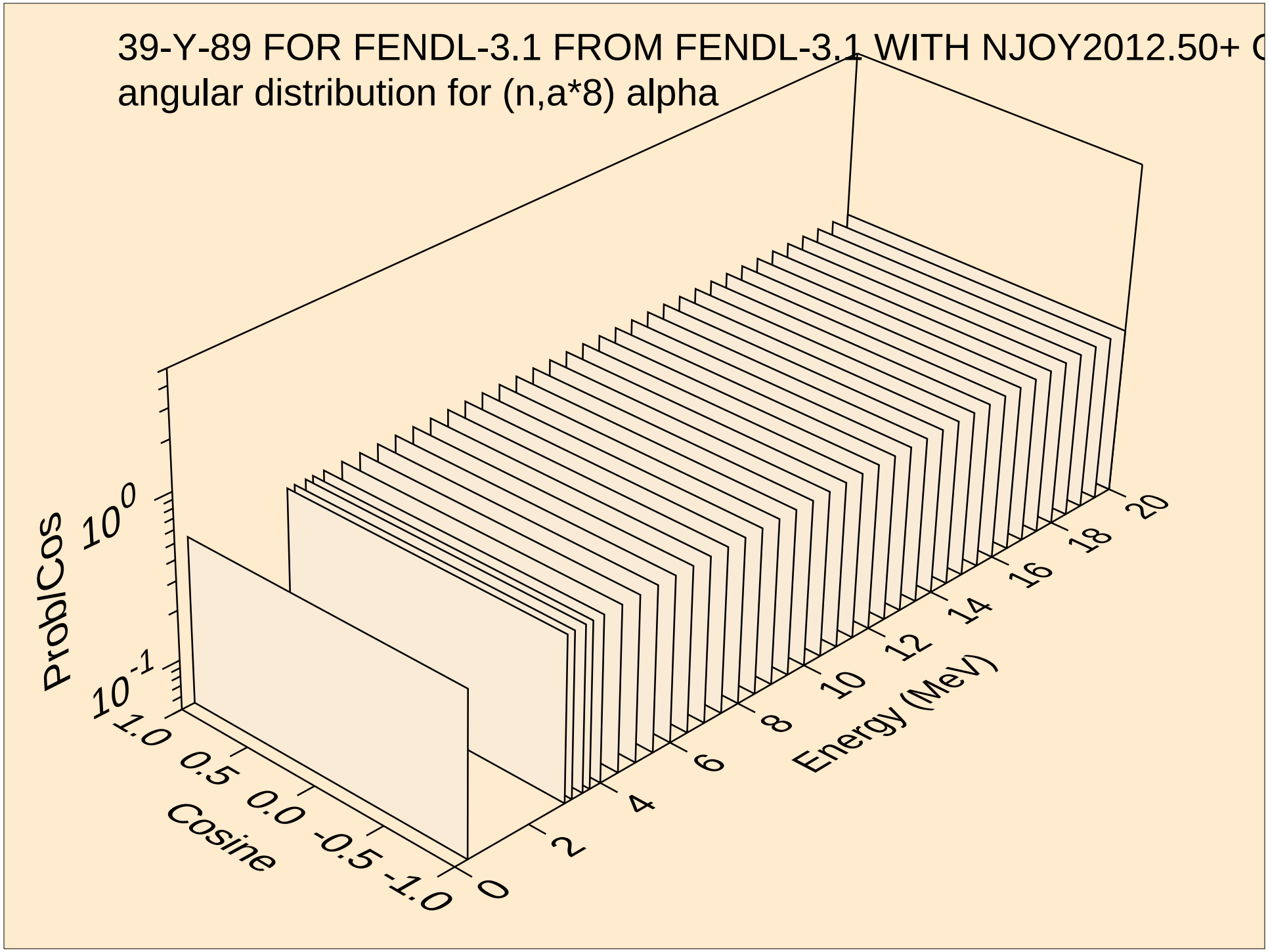

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*3) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

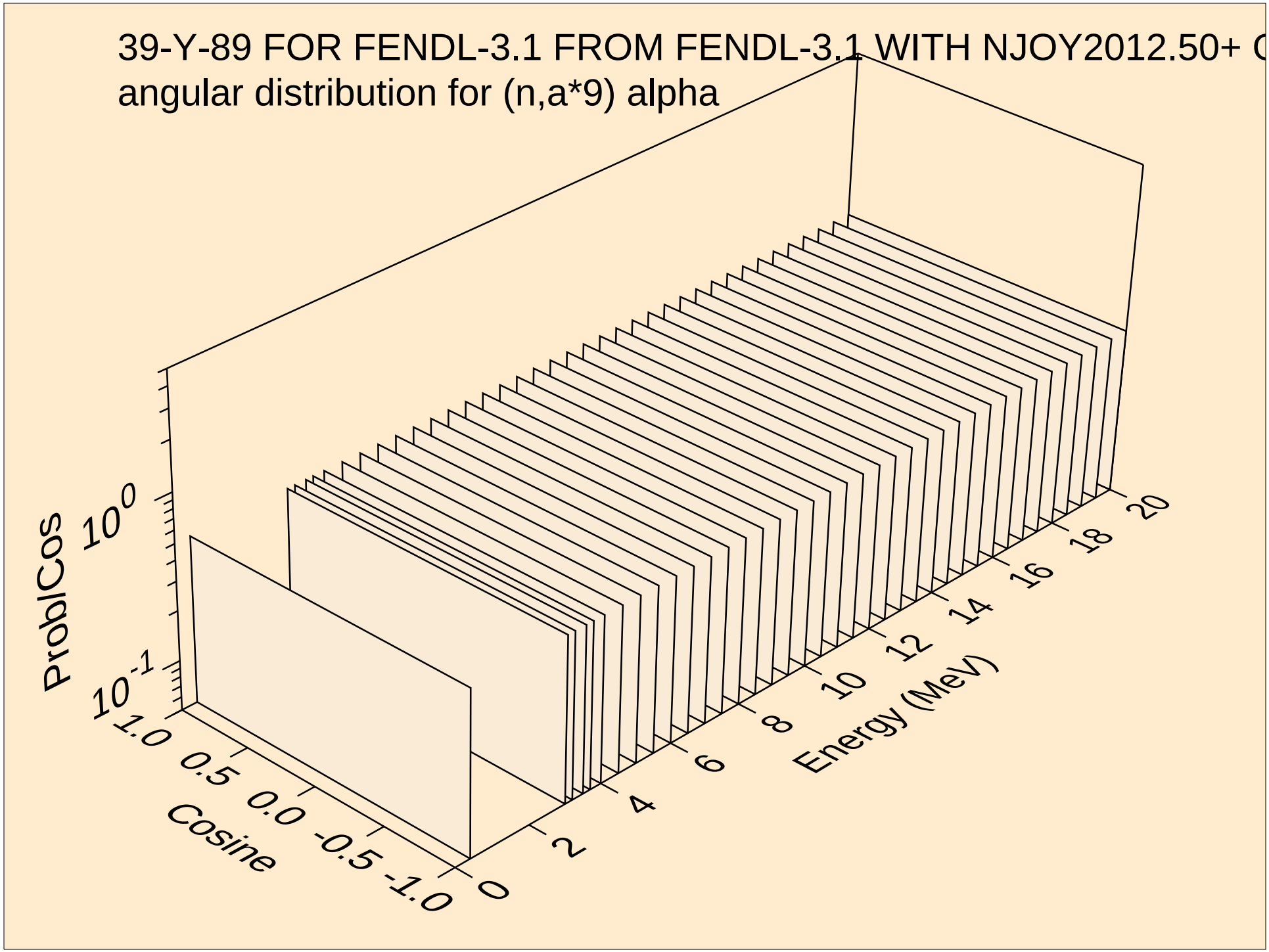

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*4) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

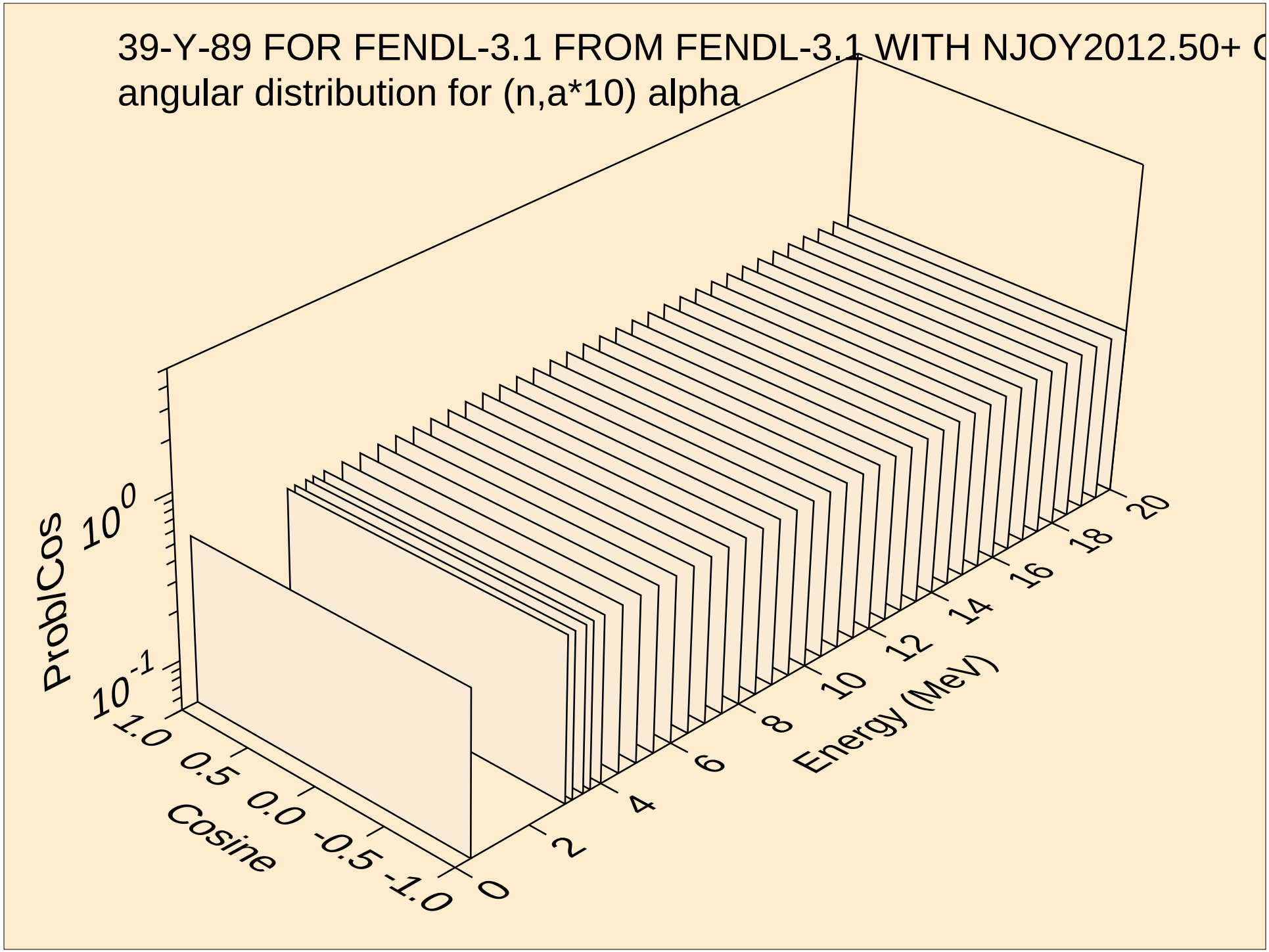

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*5) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

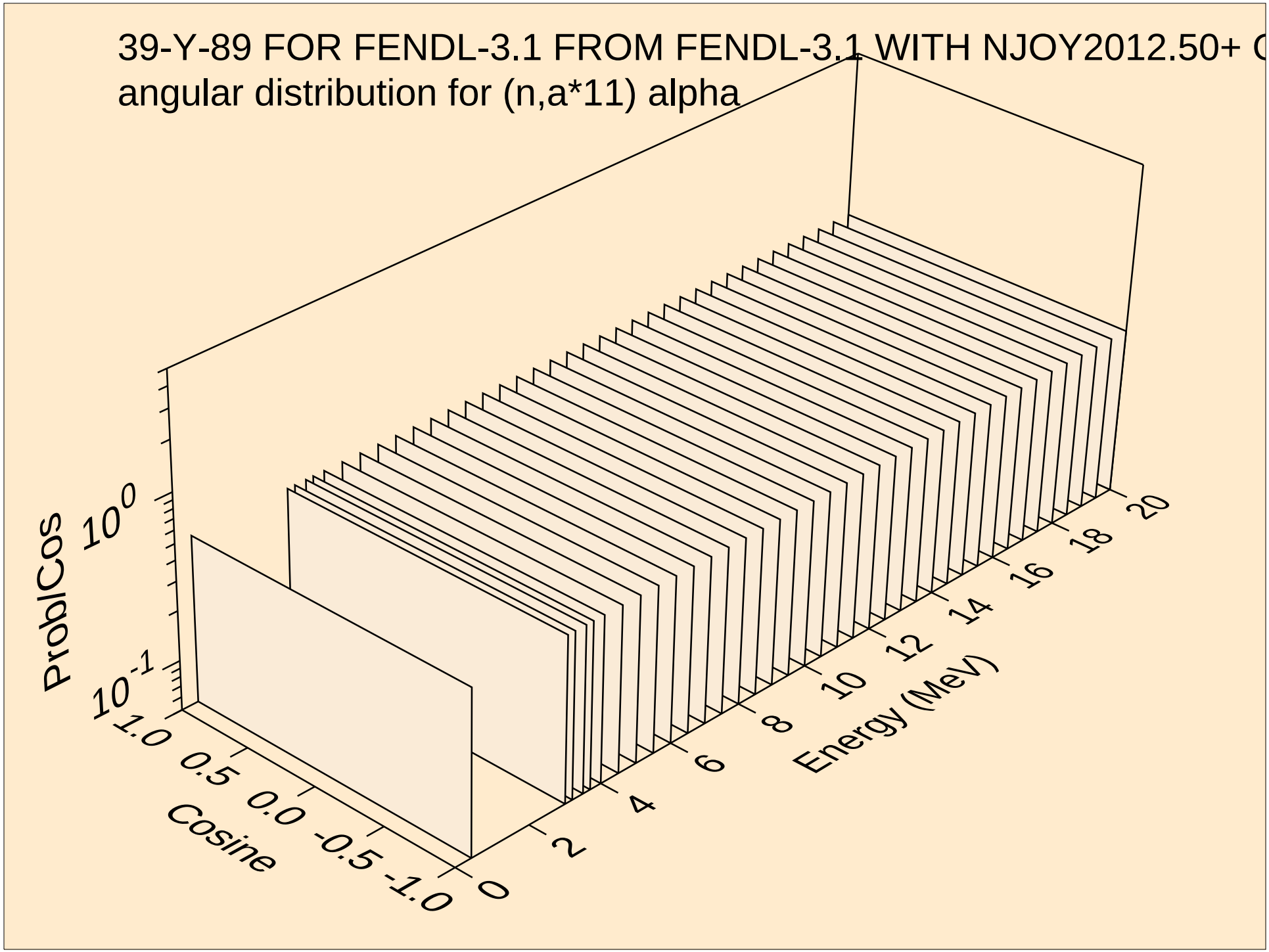

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*6) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

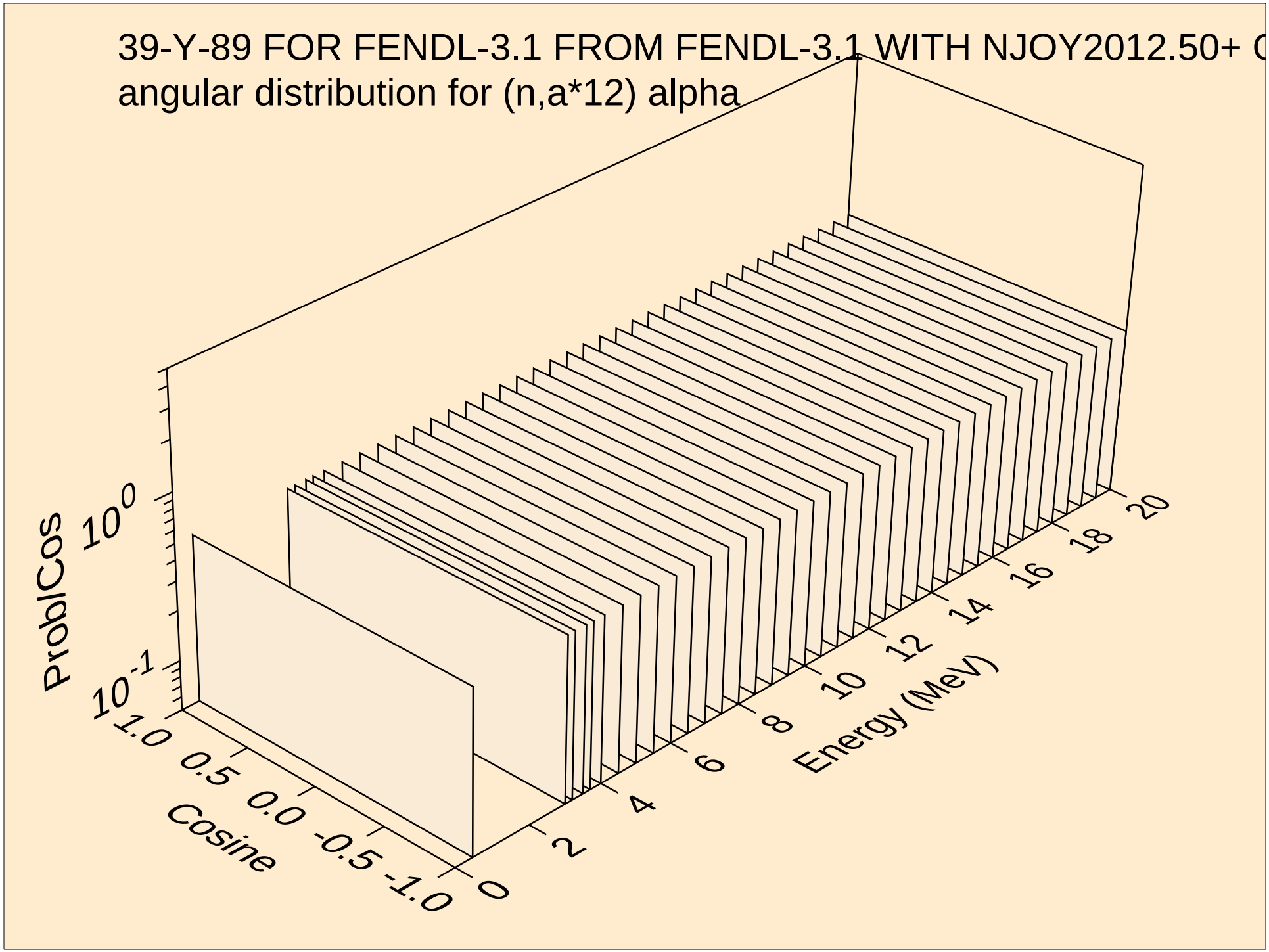

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*7) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

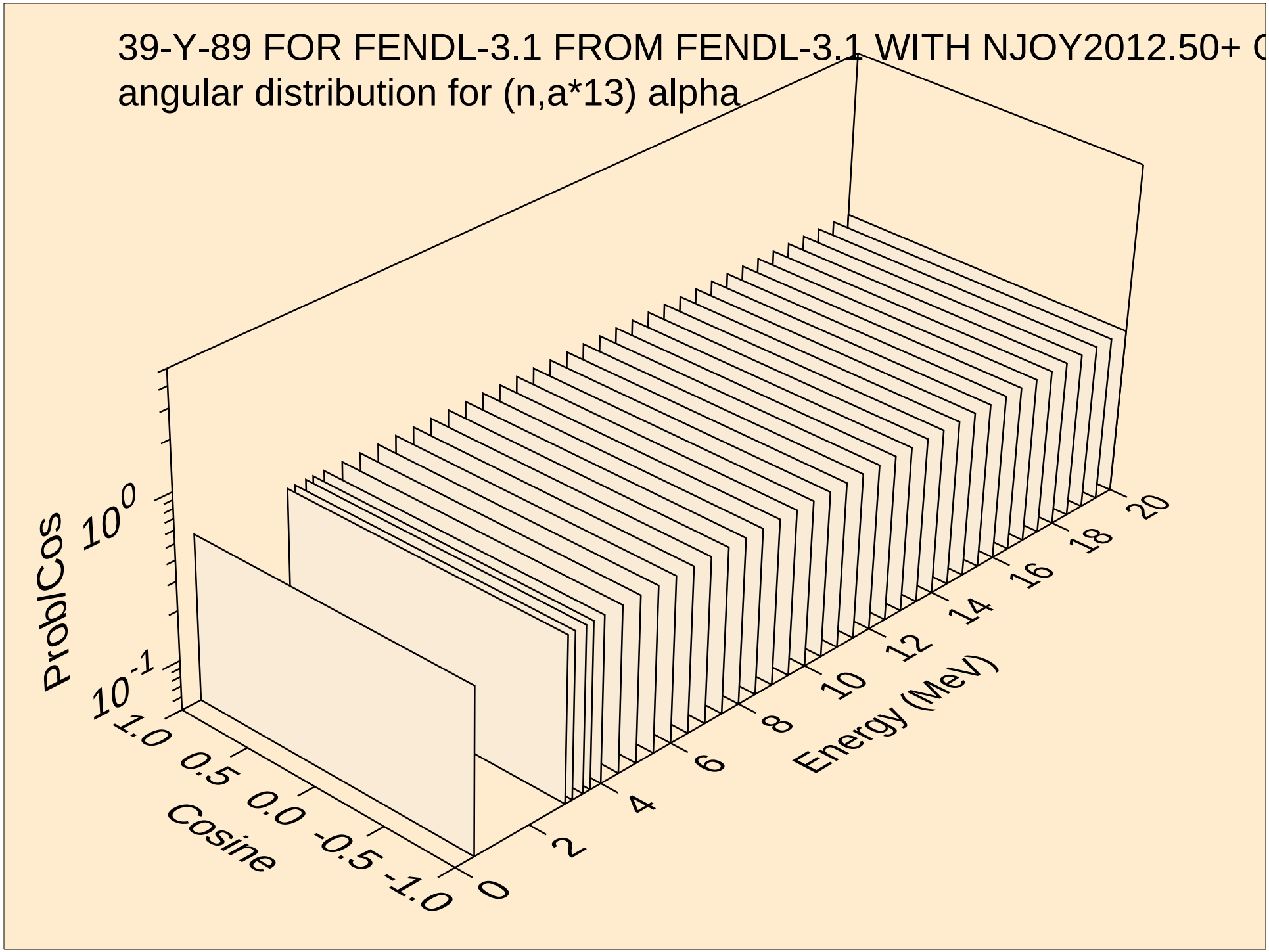

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*8) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

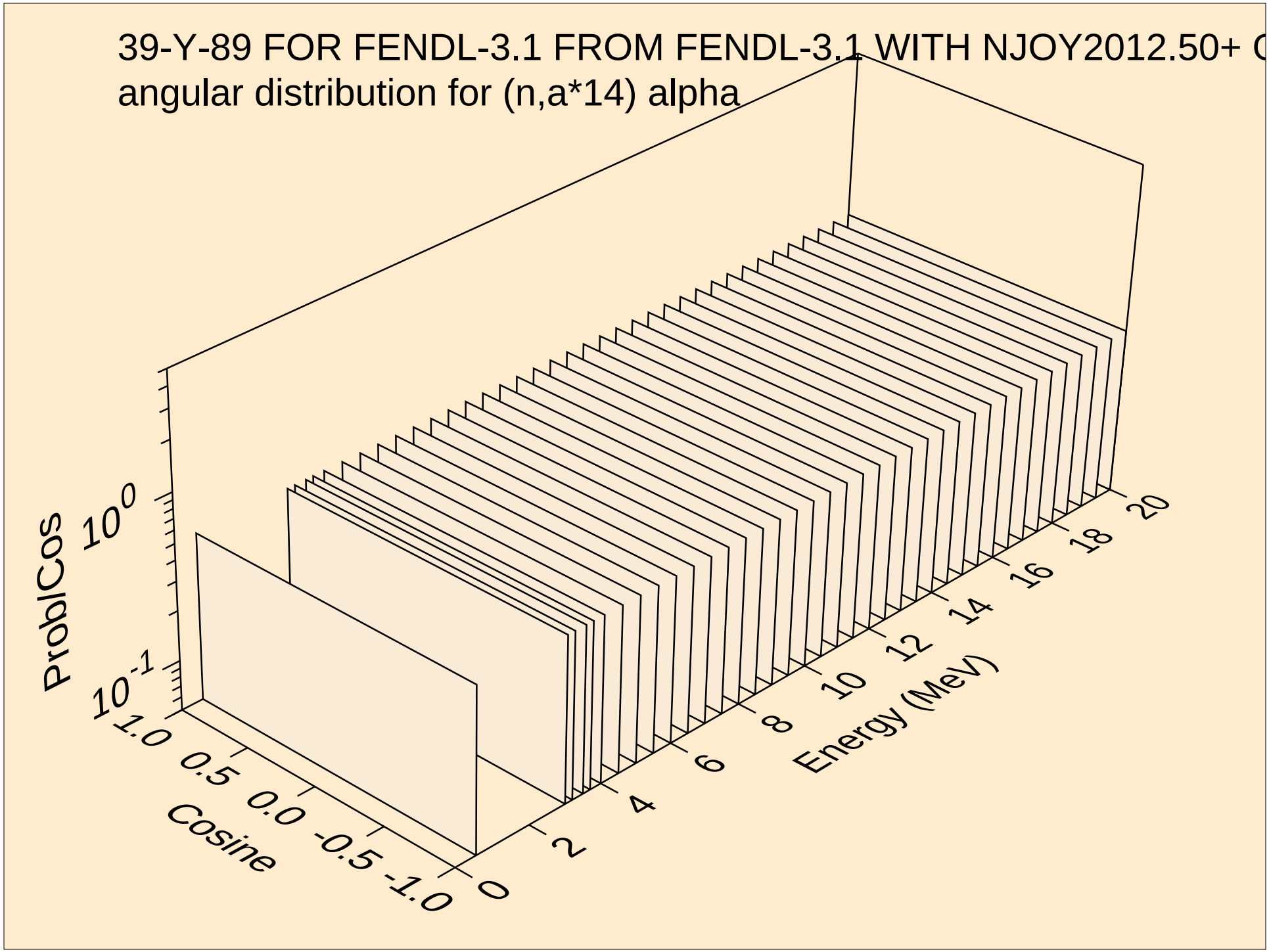

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*9) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

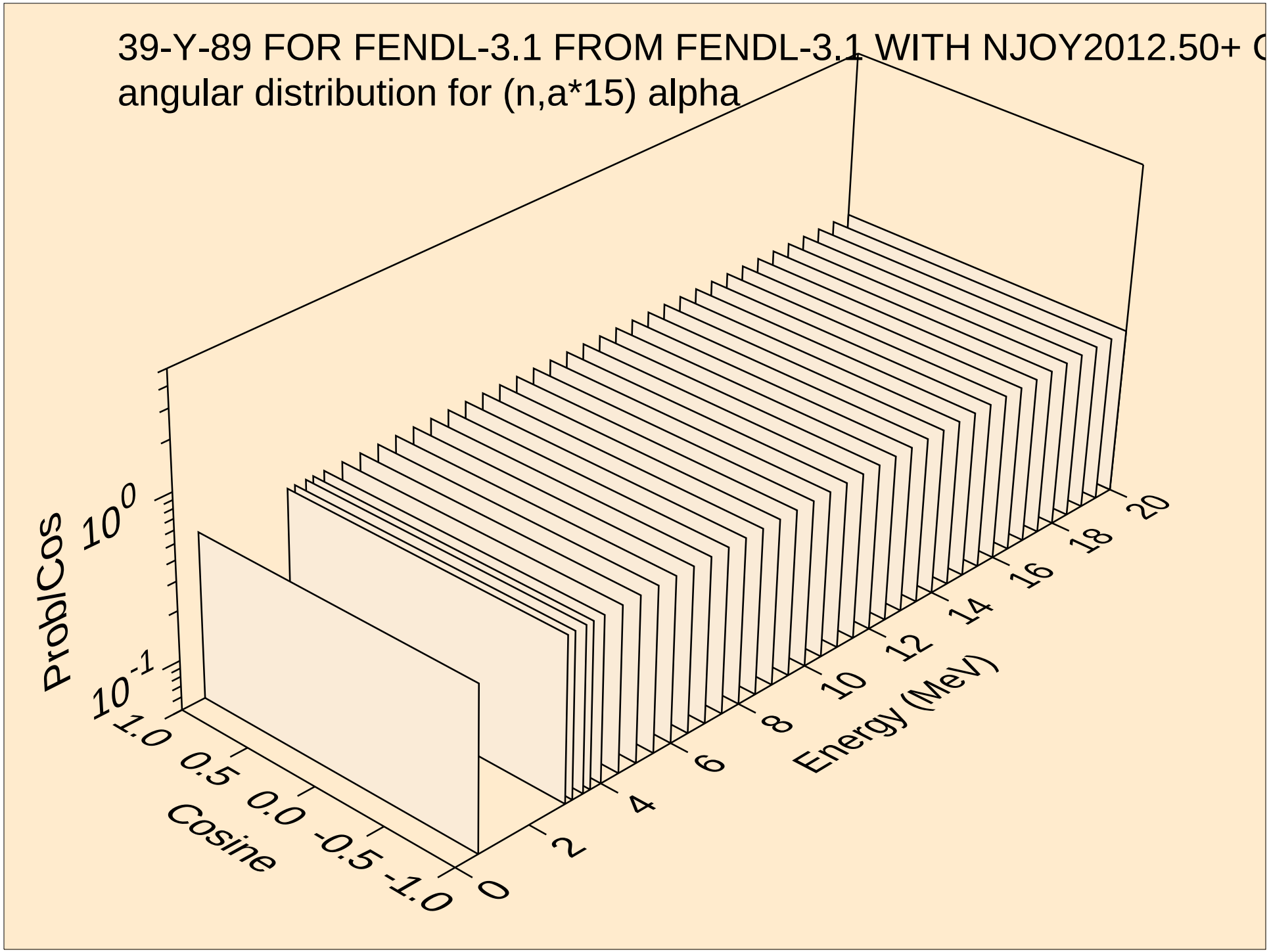

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*10) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

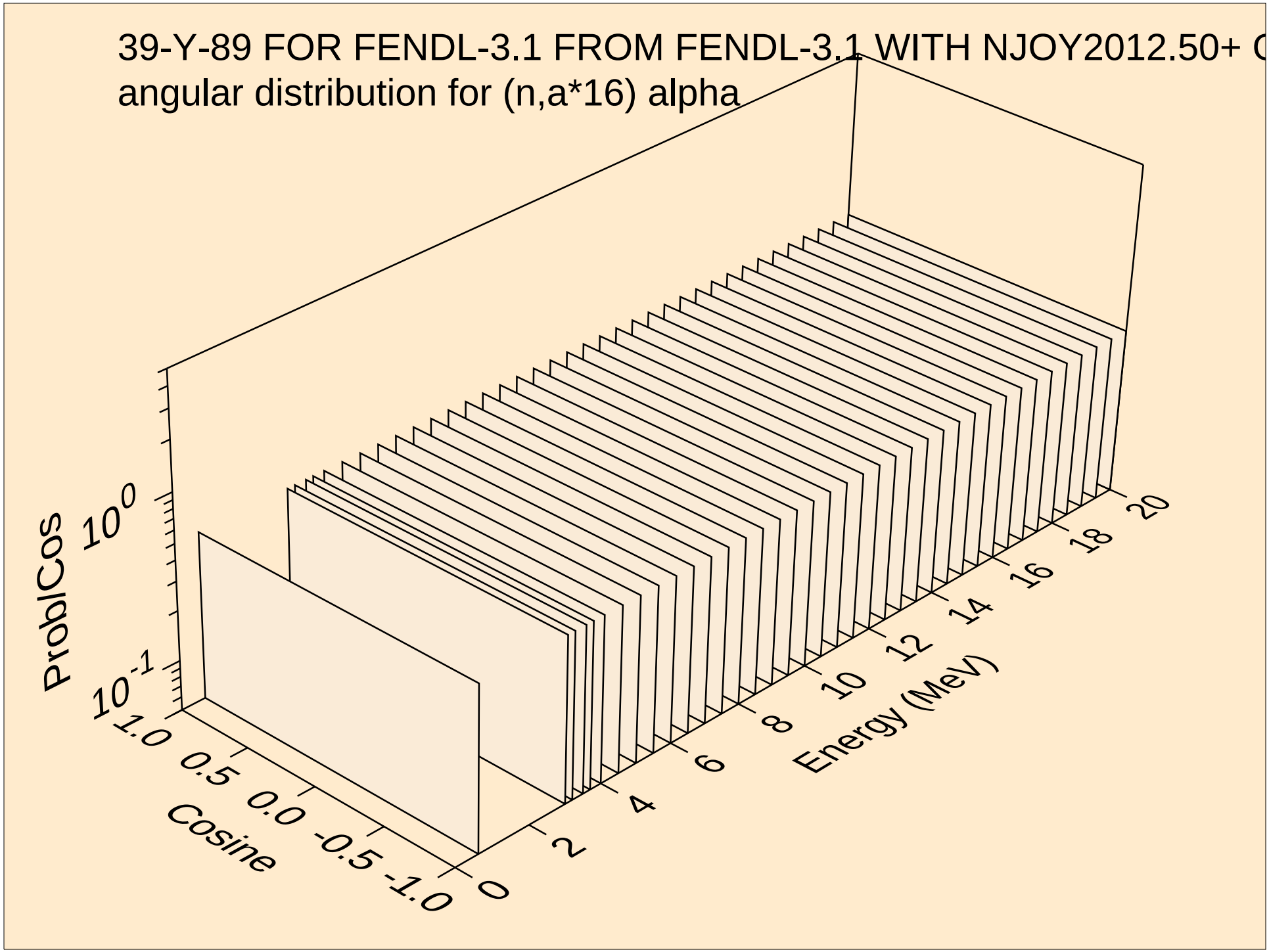

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*11) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

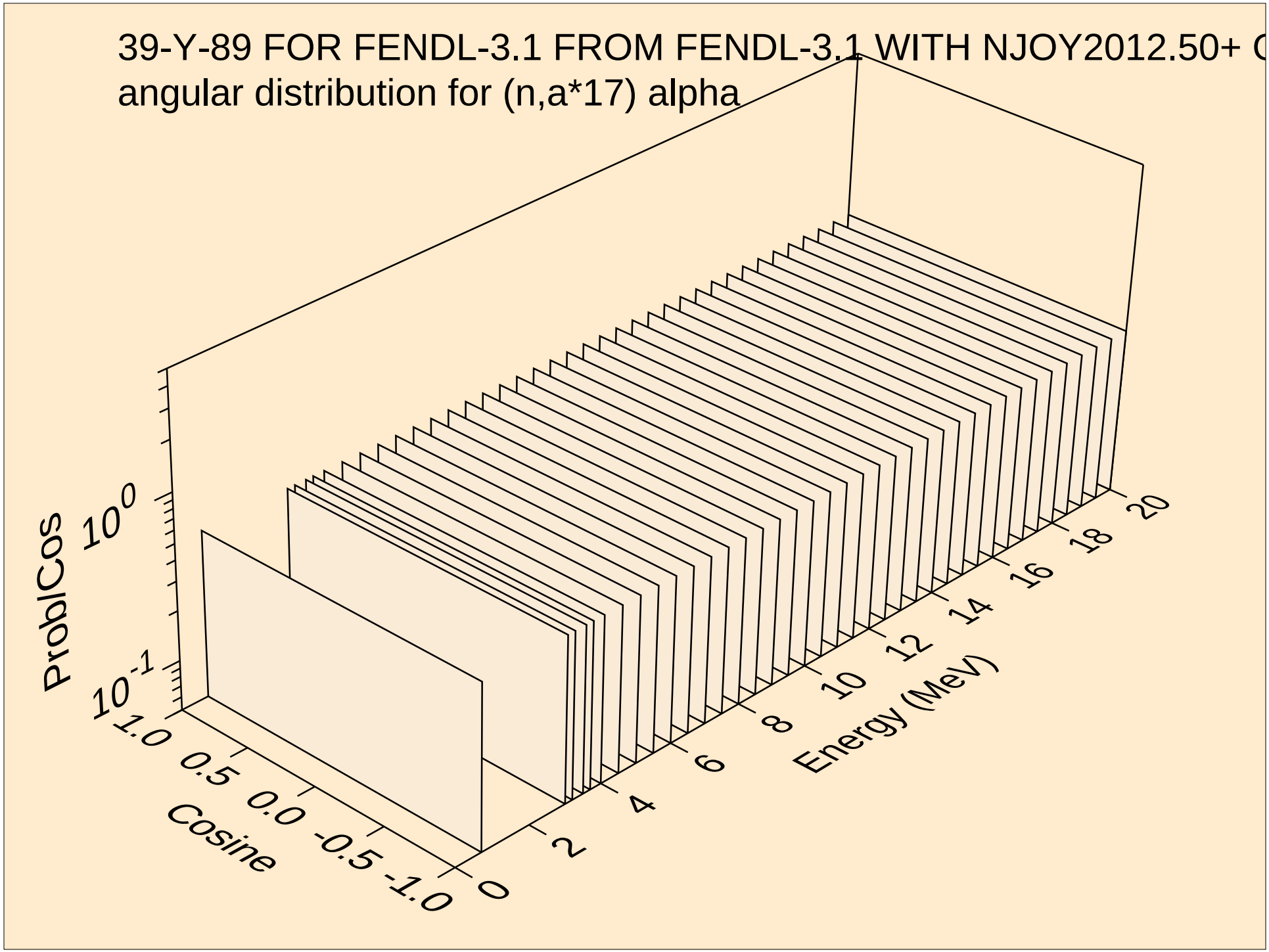

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*12) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

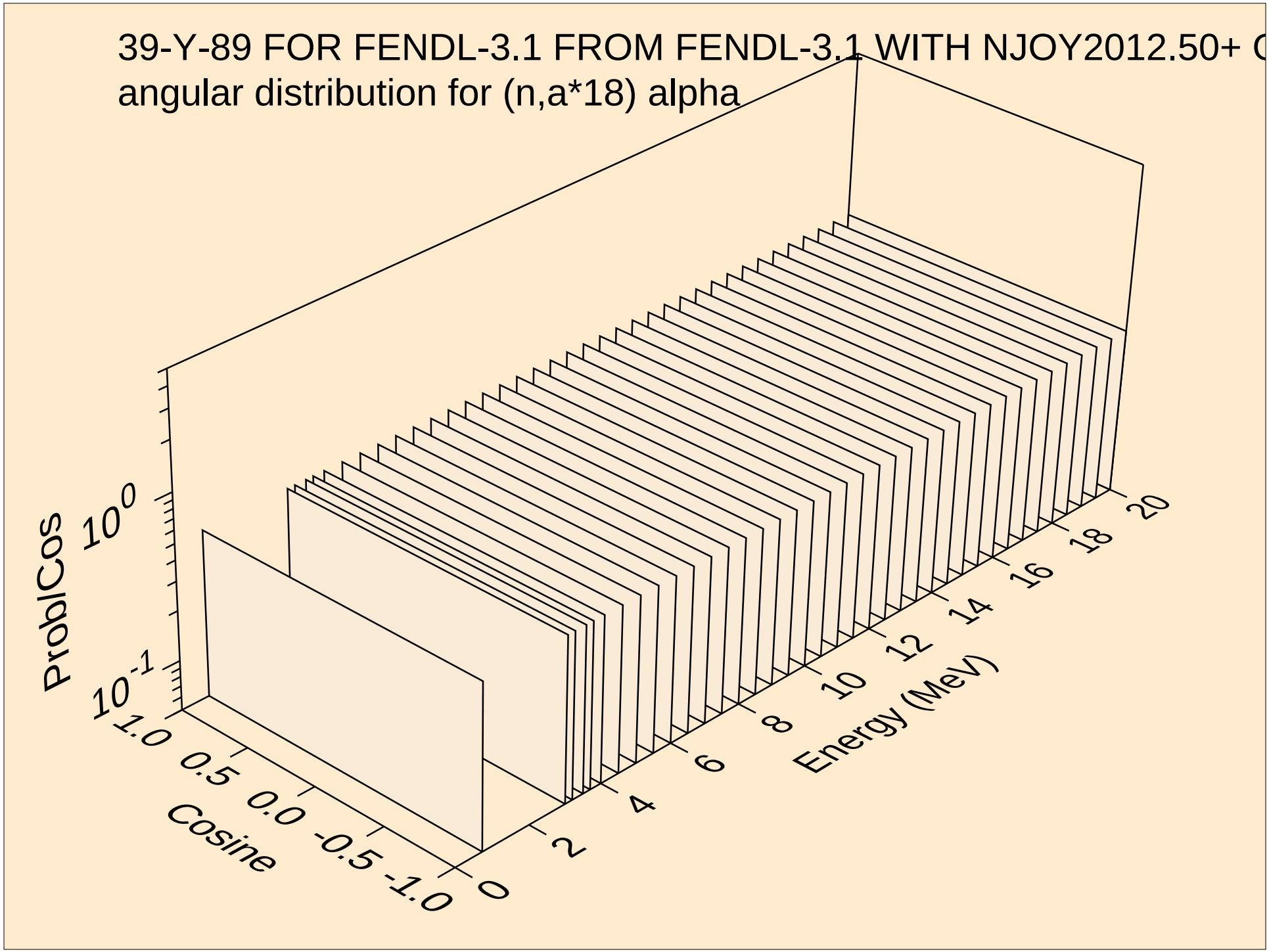

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*13) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

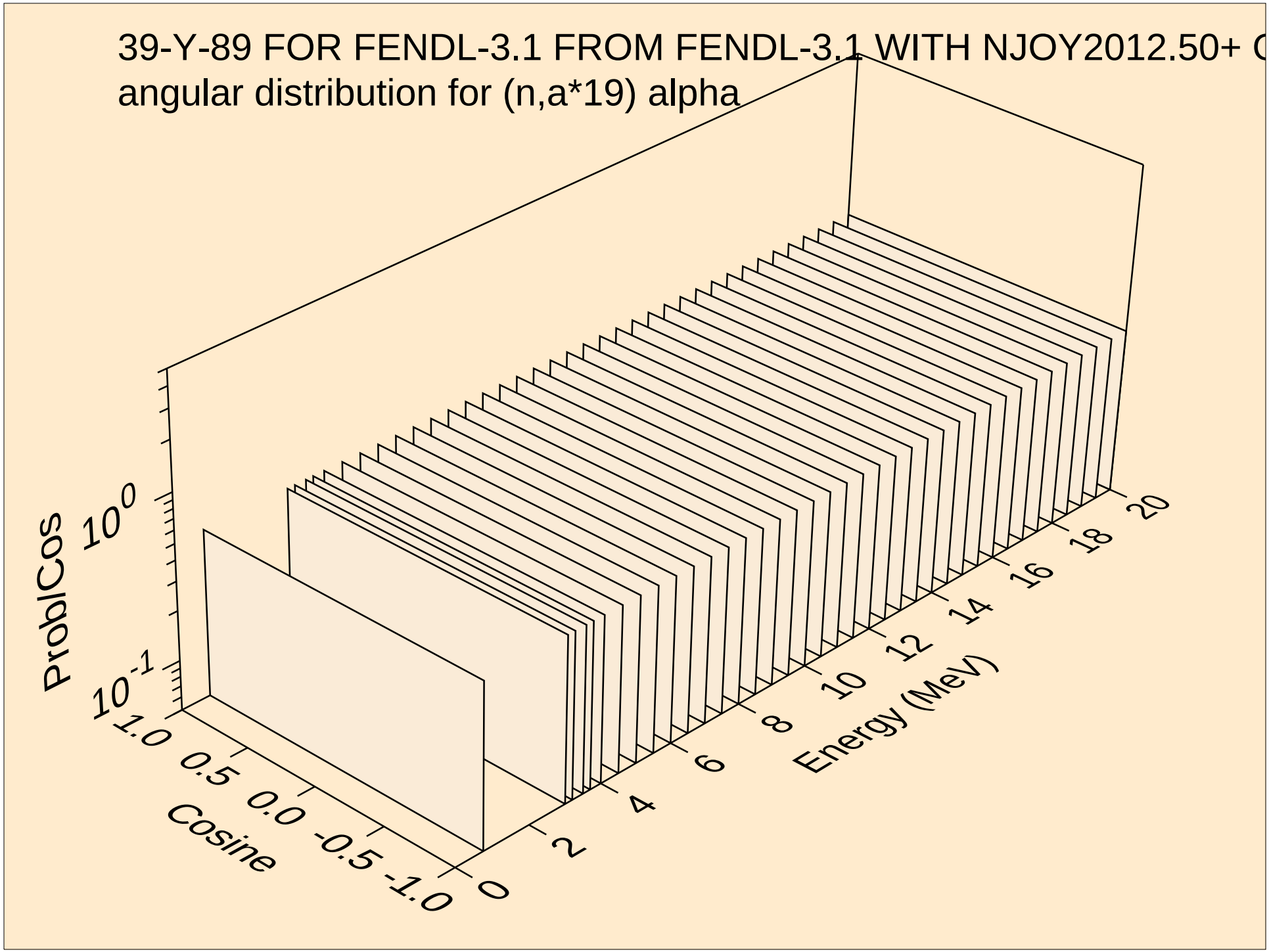

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*14) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

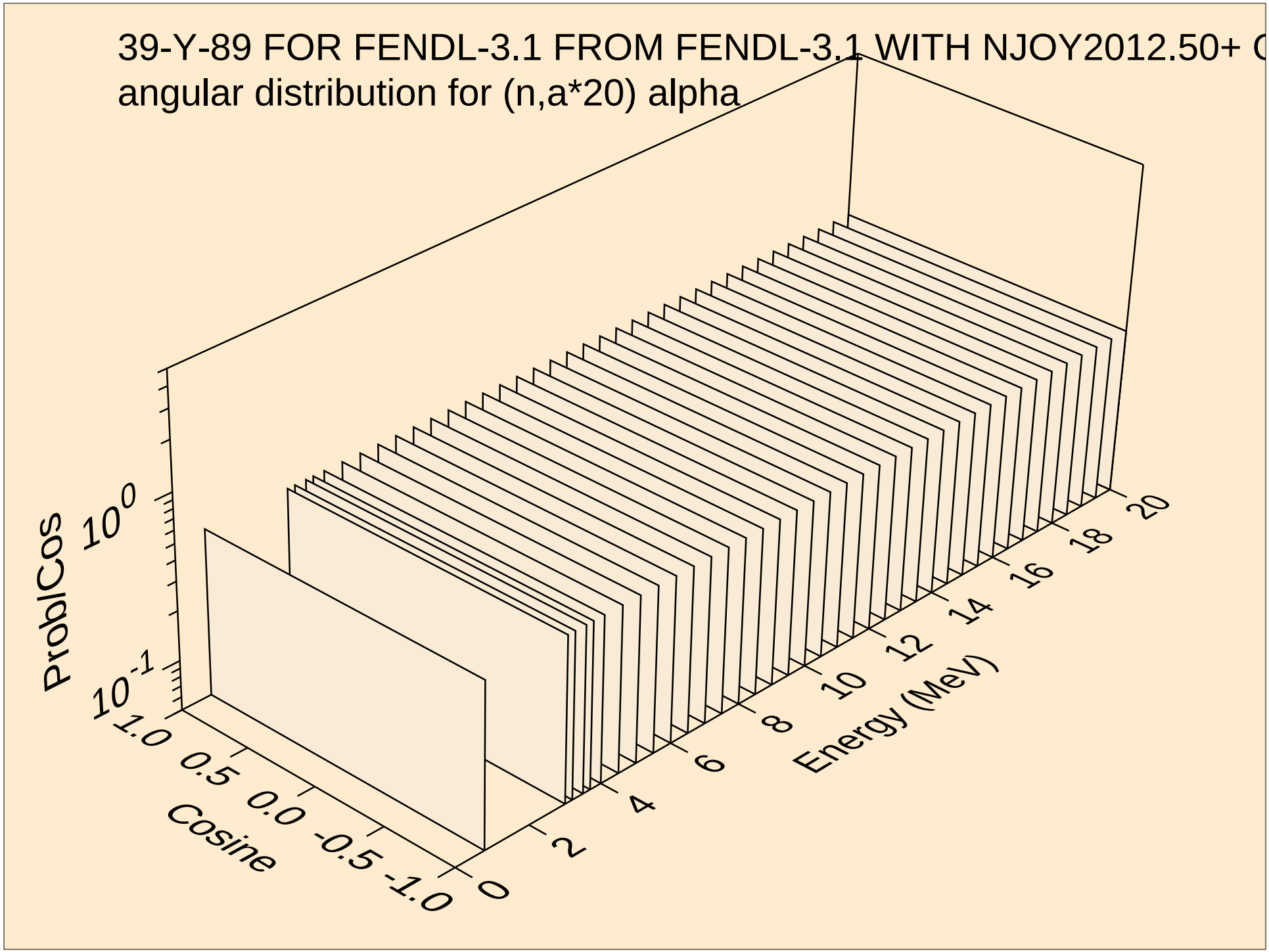

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*15) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

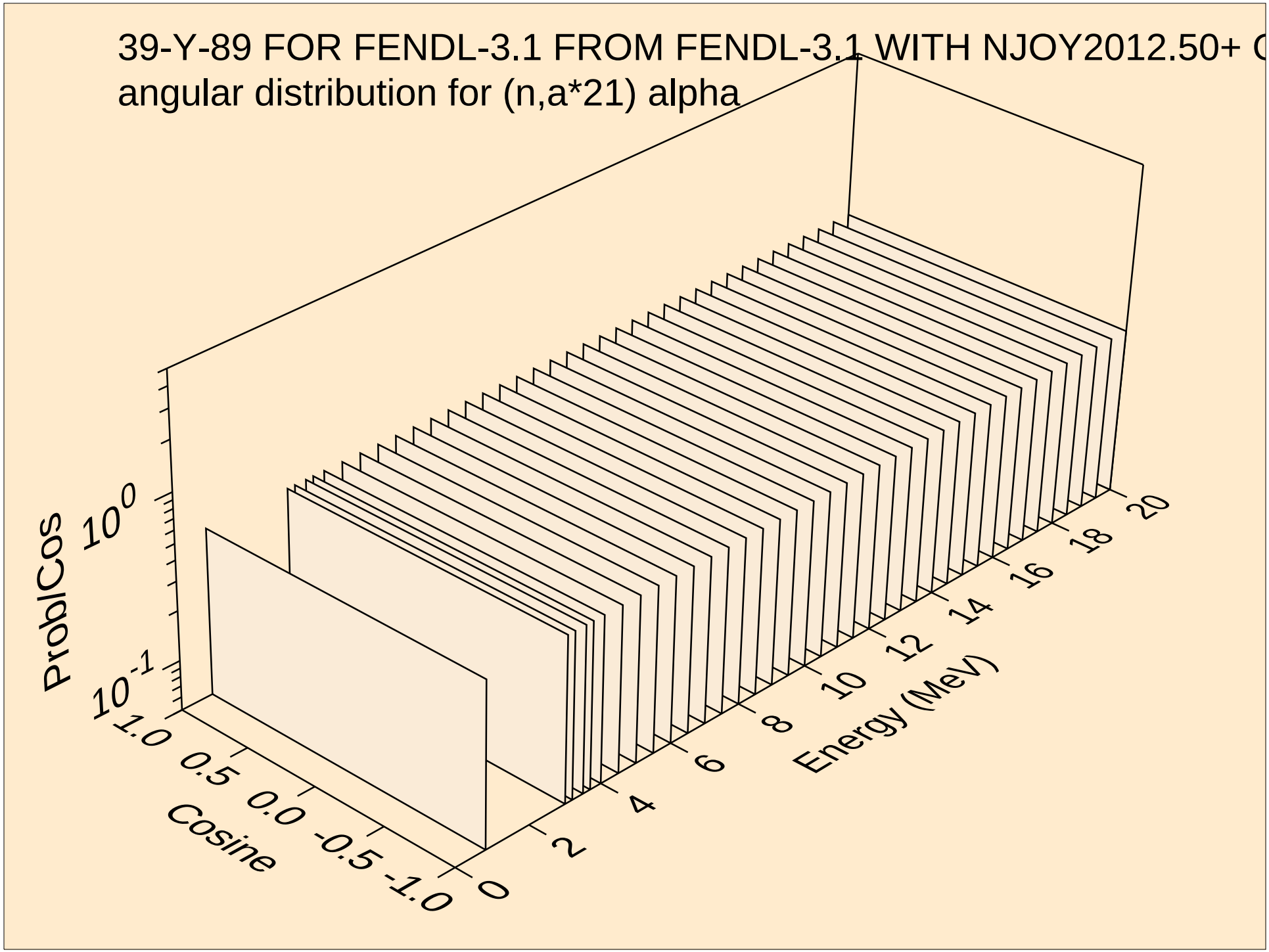

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*16) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

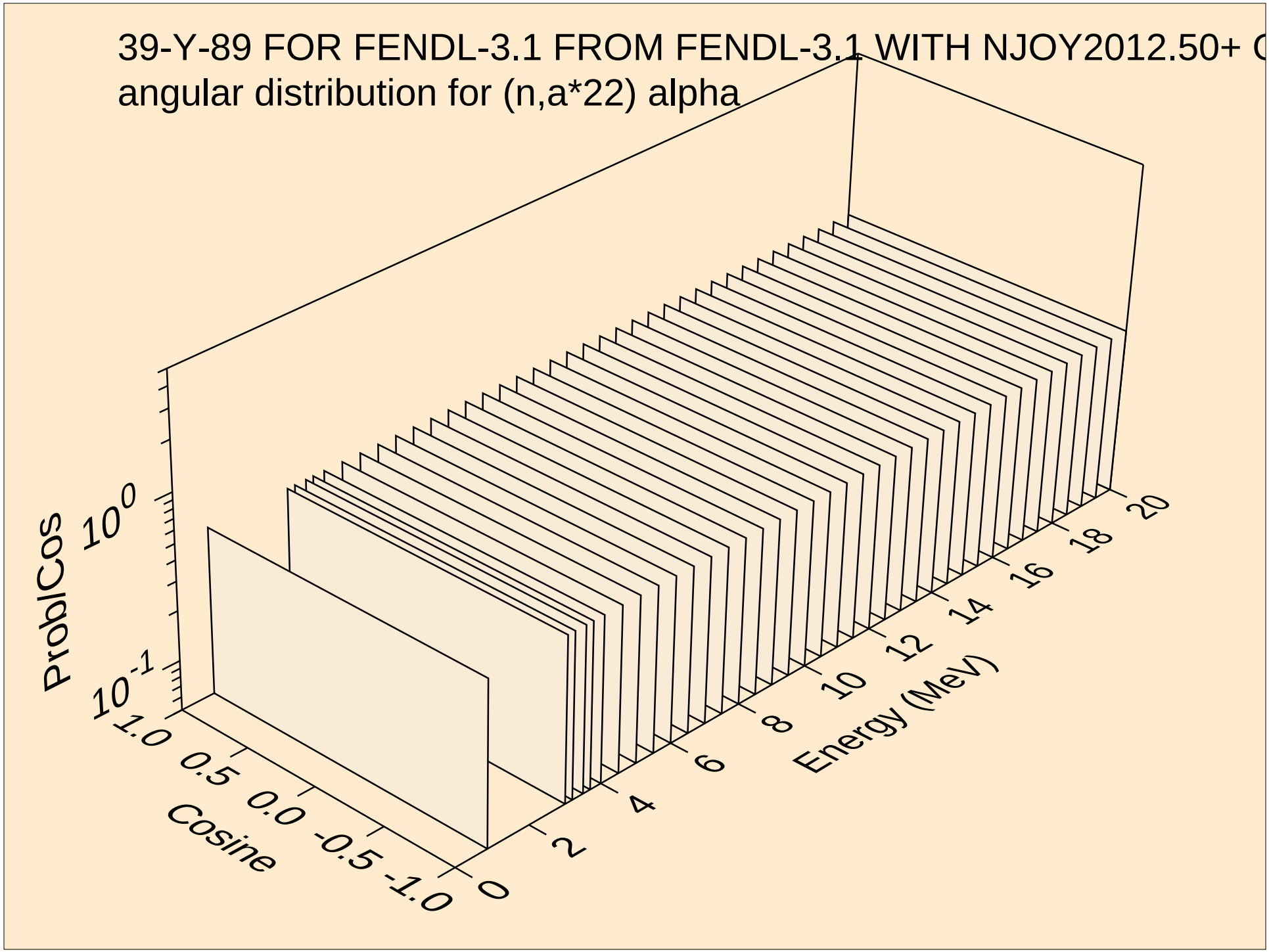

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*17) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

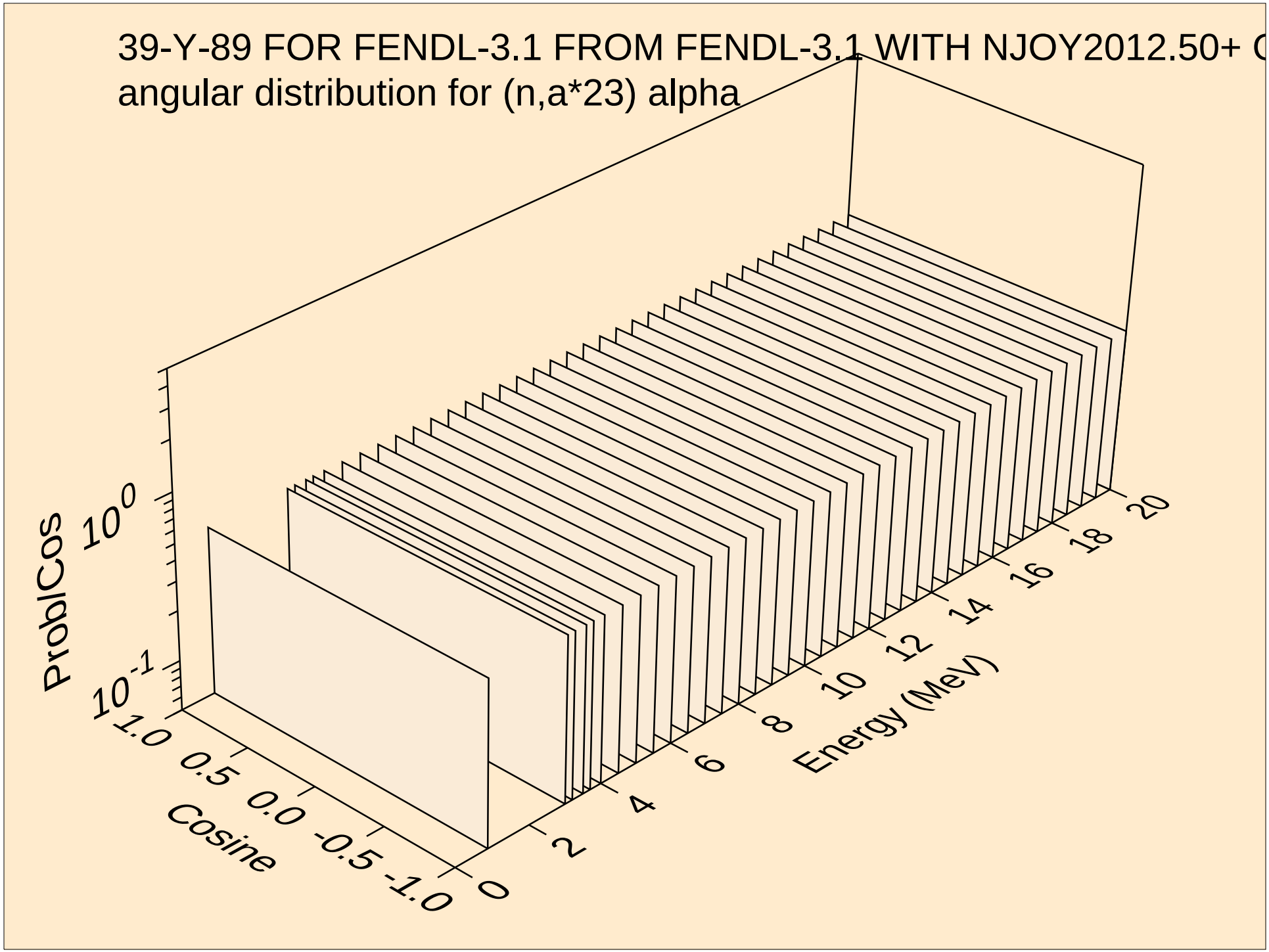

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*18) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

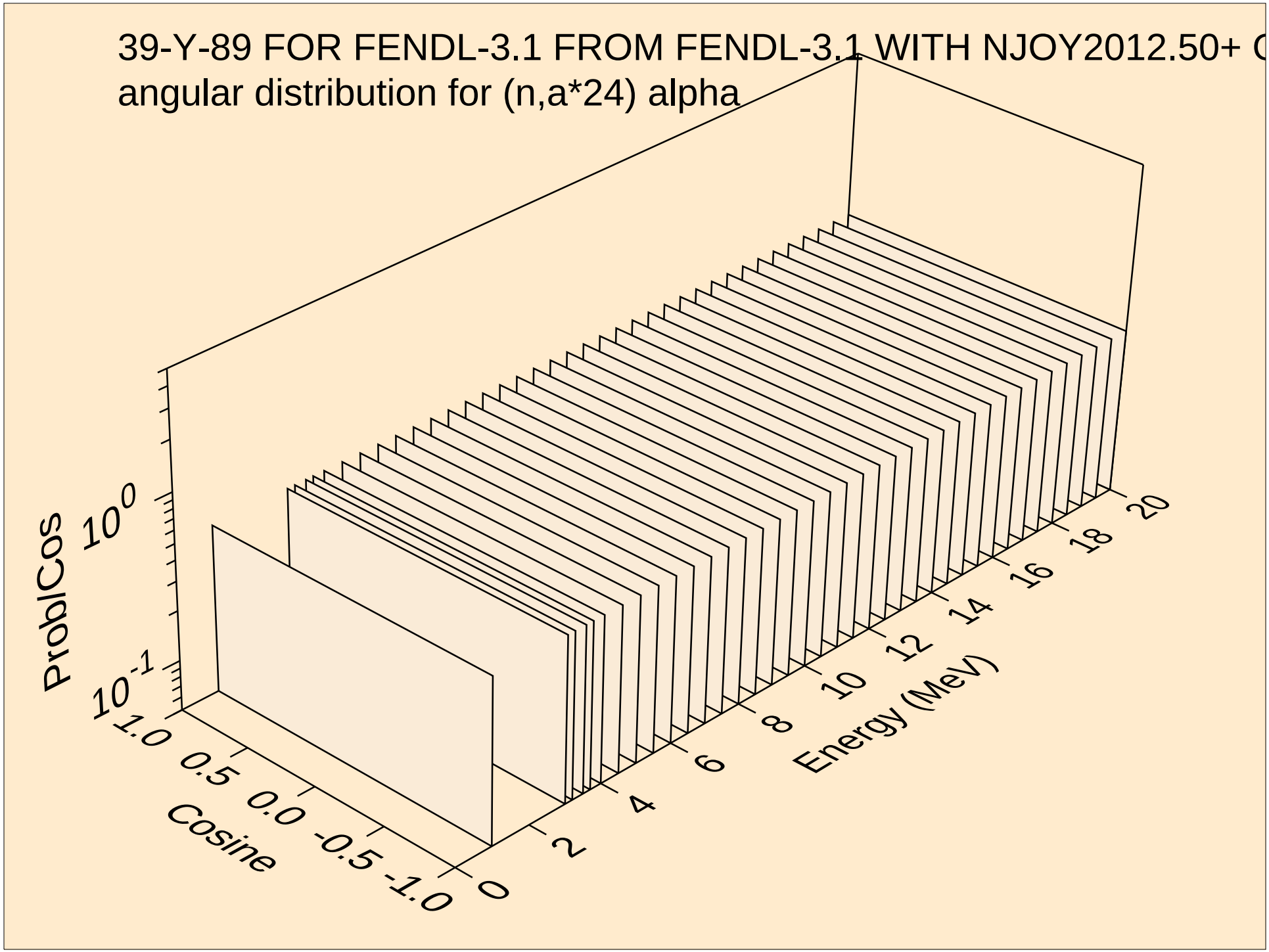

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*19) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

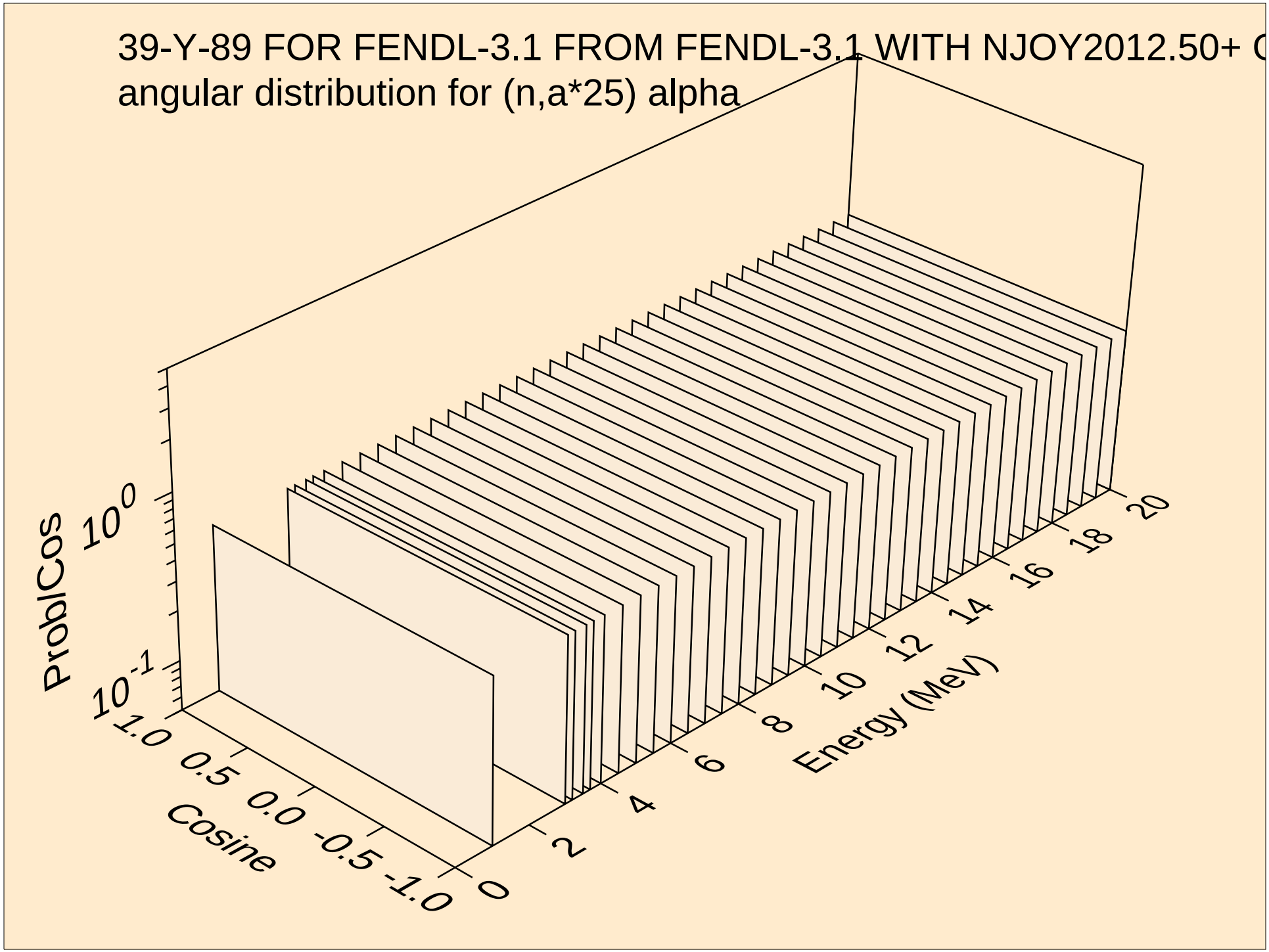

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*20) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

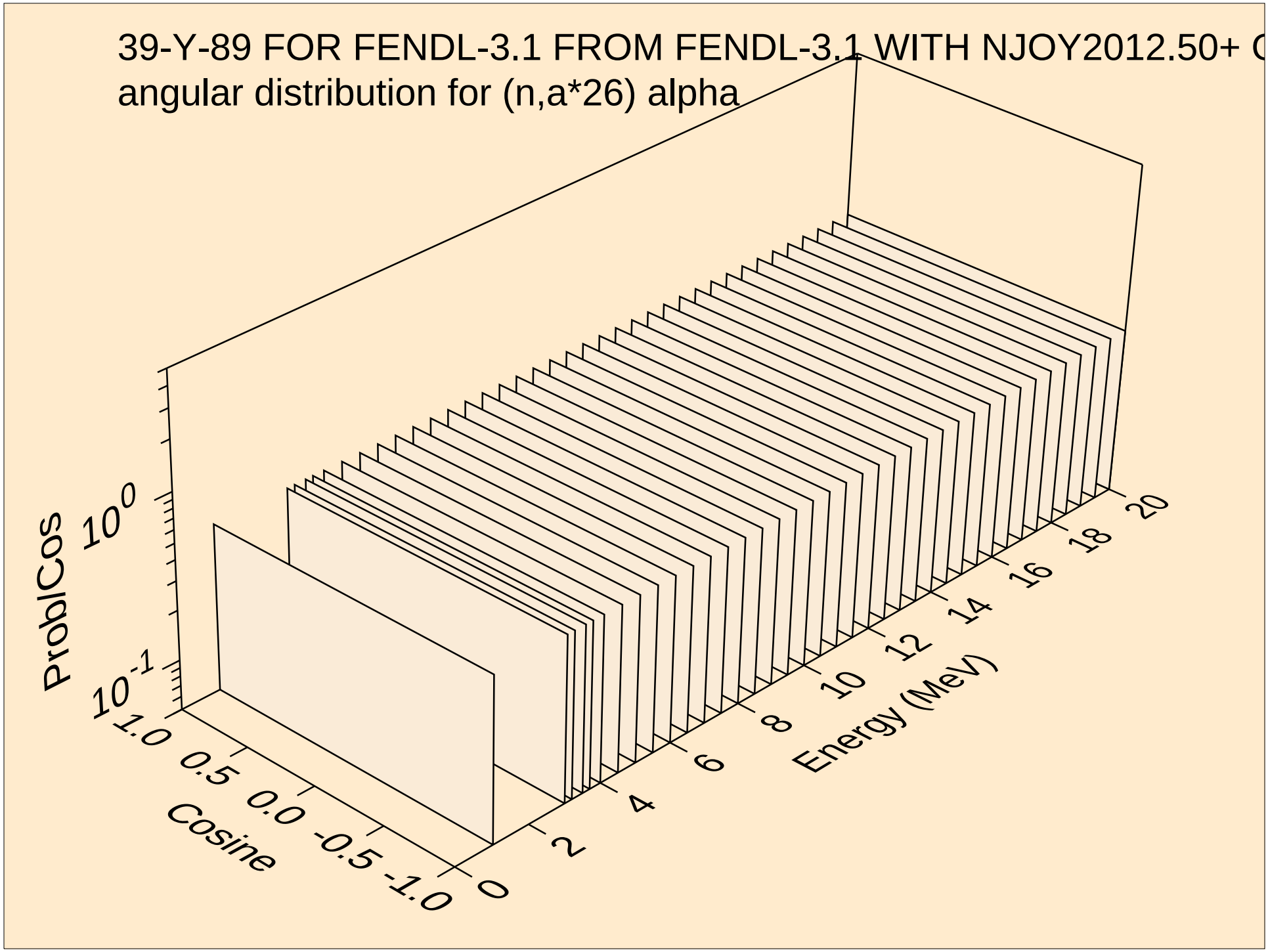

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*21) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

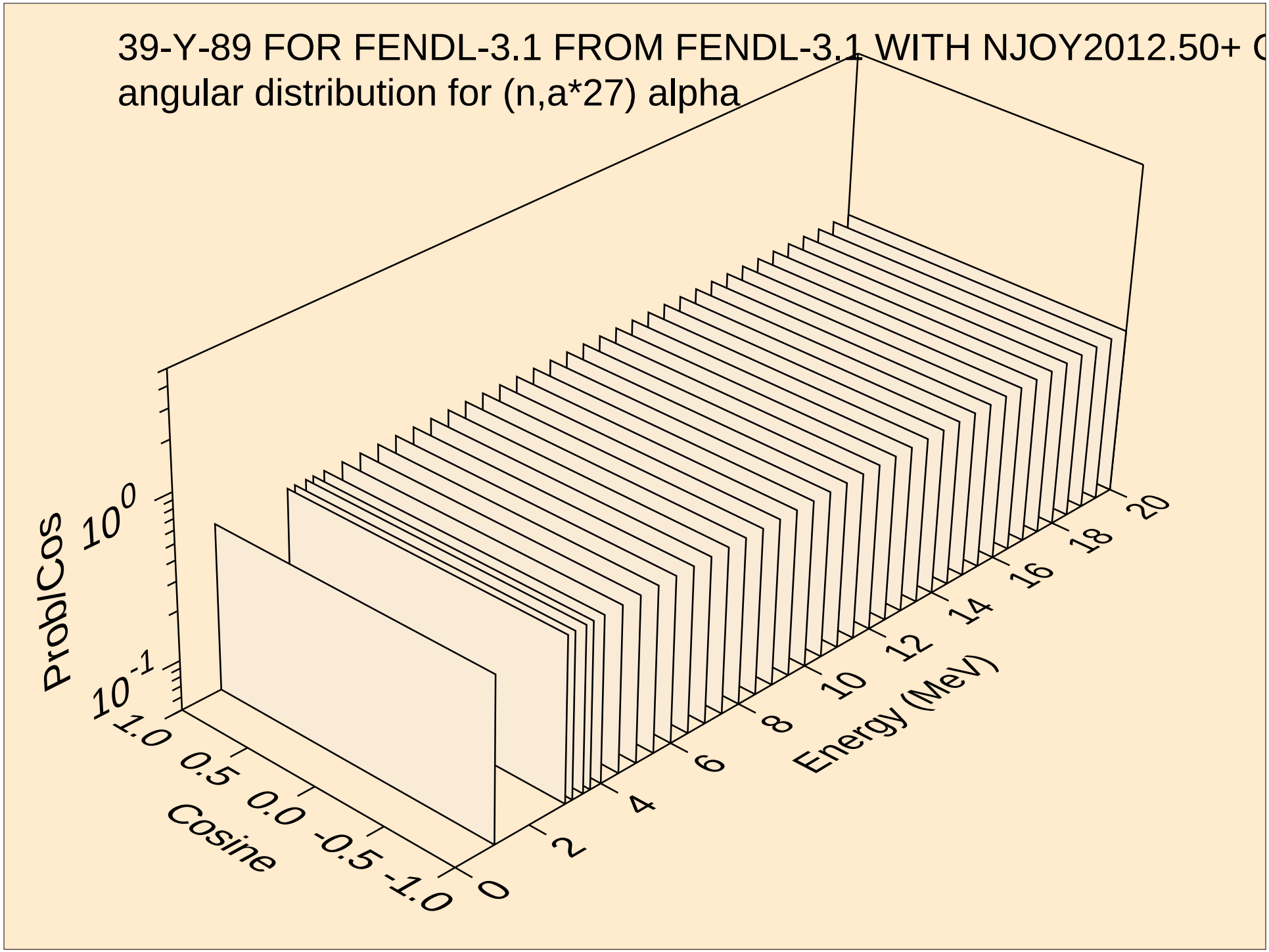

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*22) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

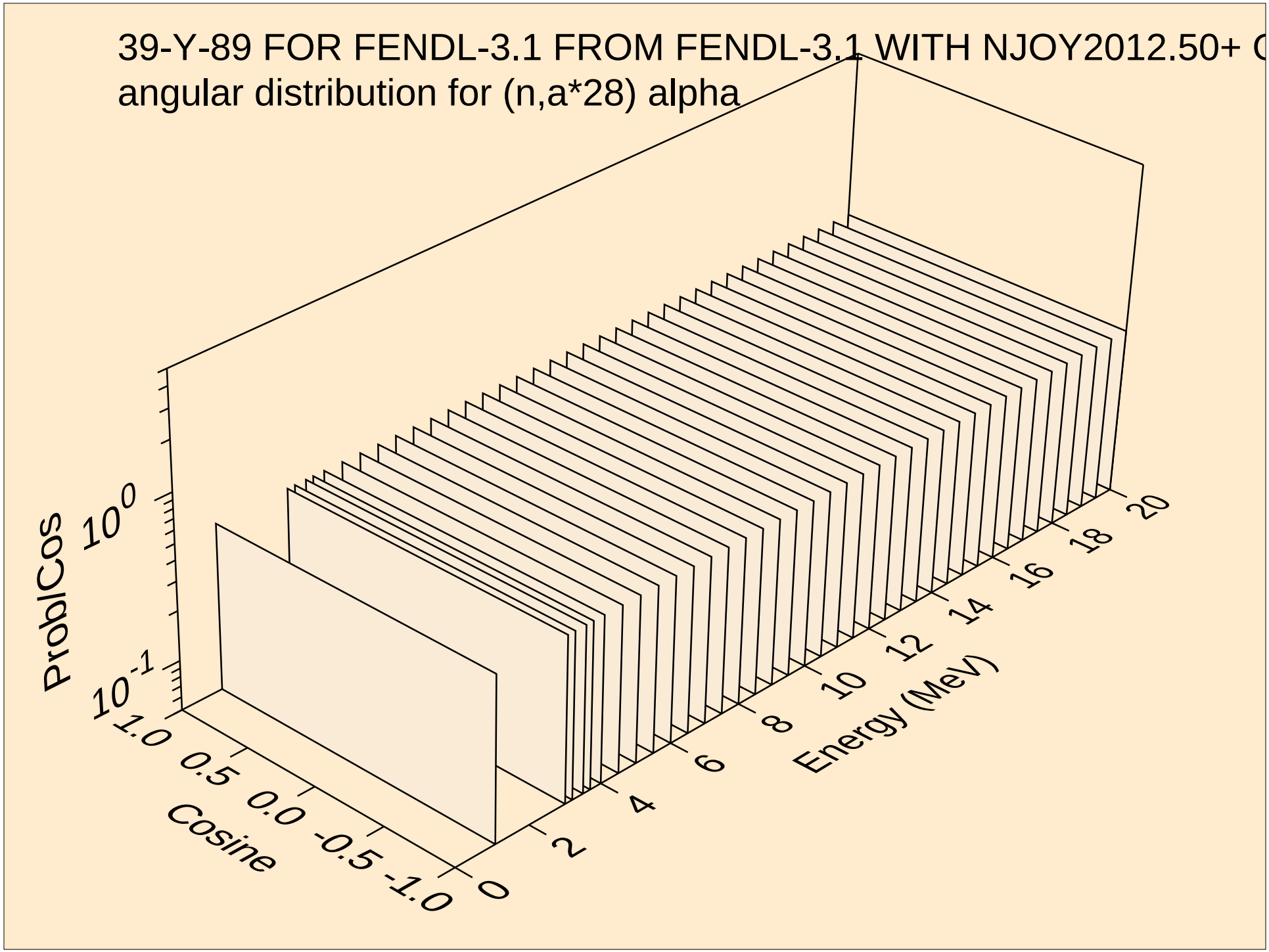

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*23) alpha
ProbICos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

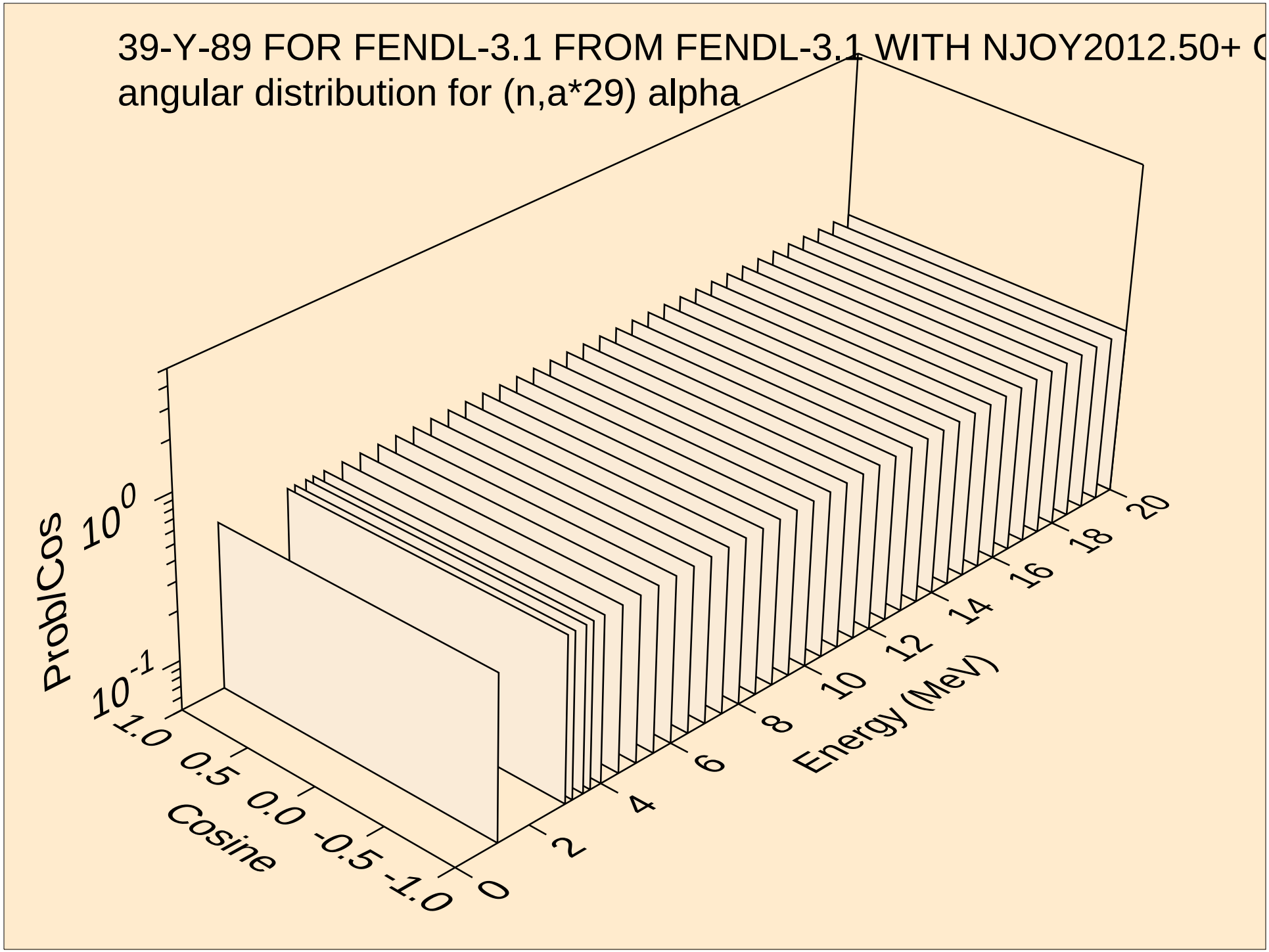

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*24) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

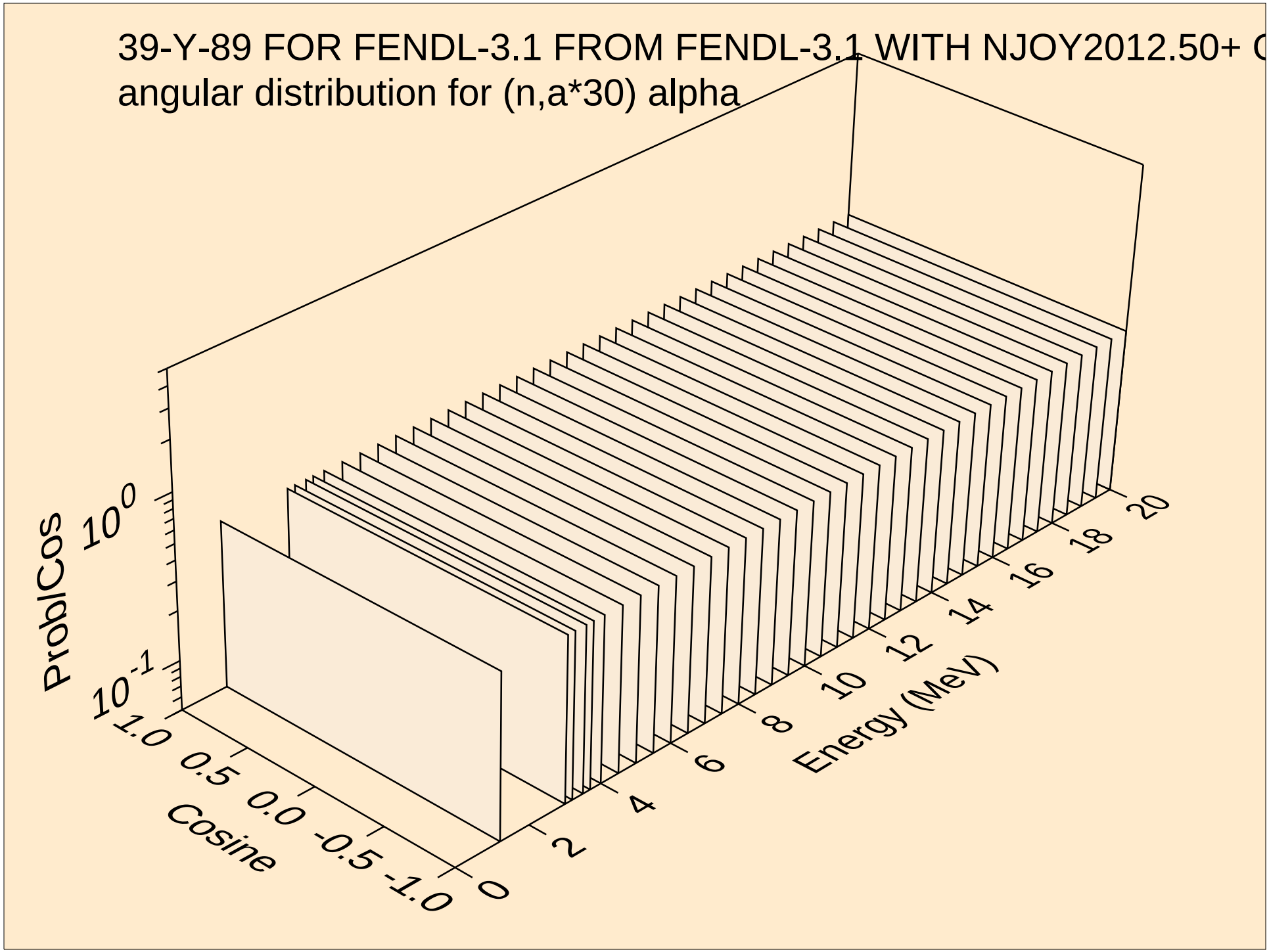

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*25) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

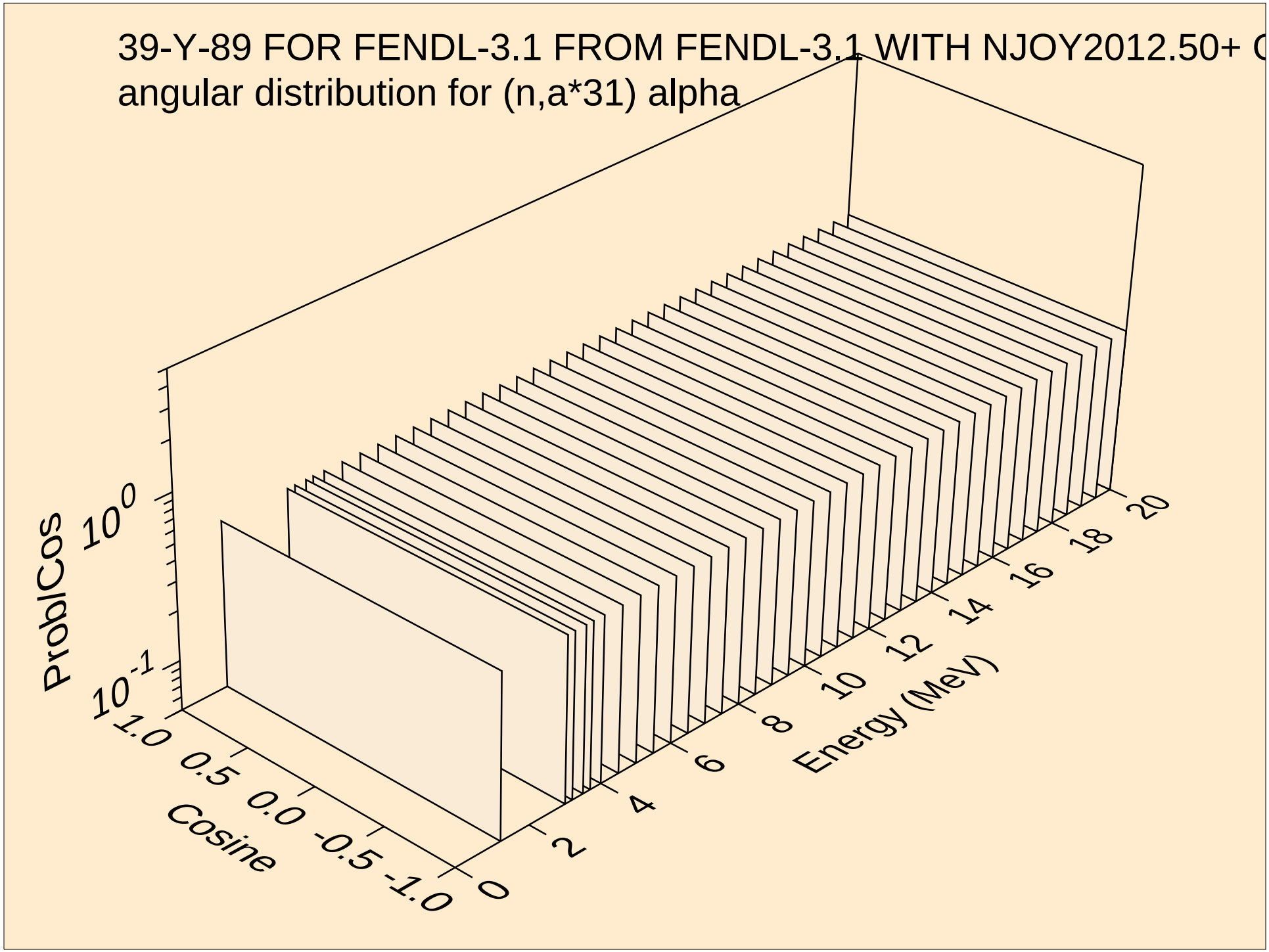

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*26) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

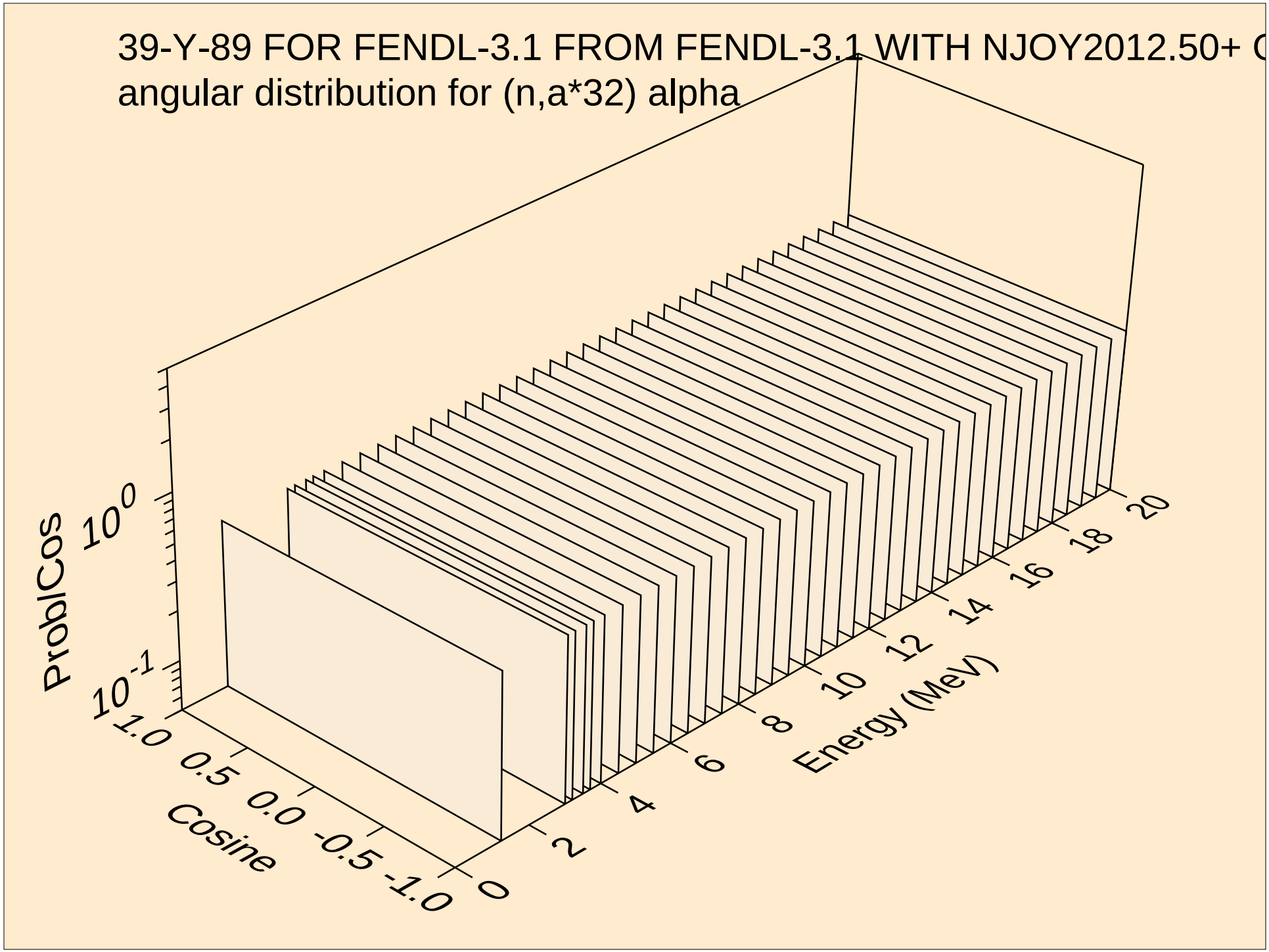

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*27) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

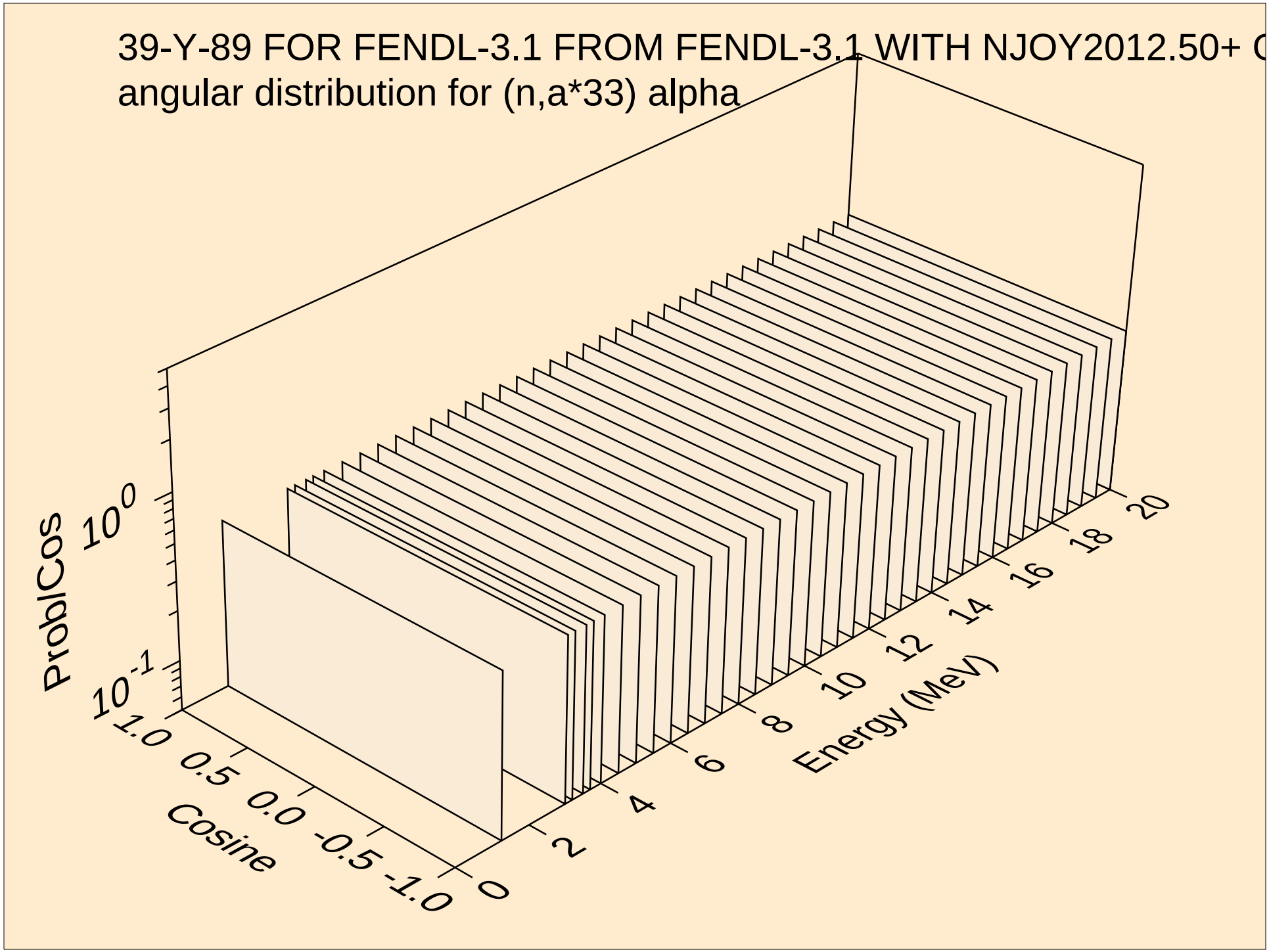

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*28) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

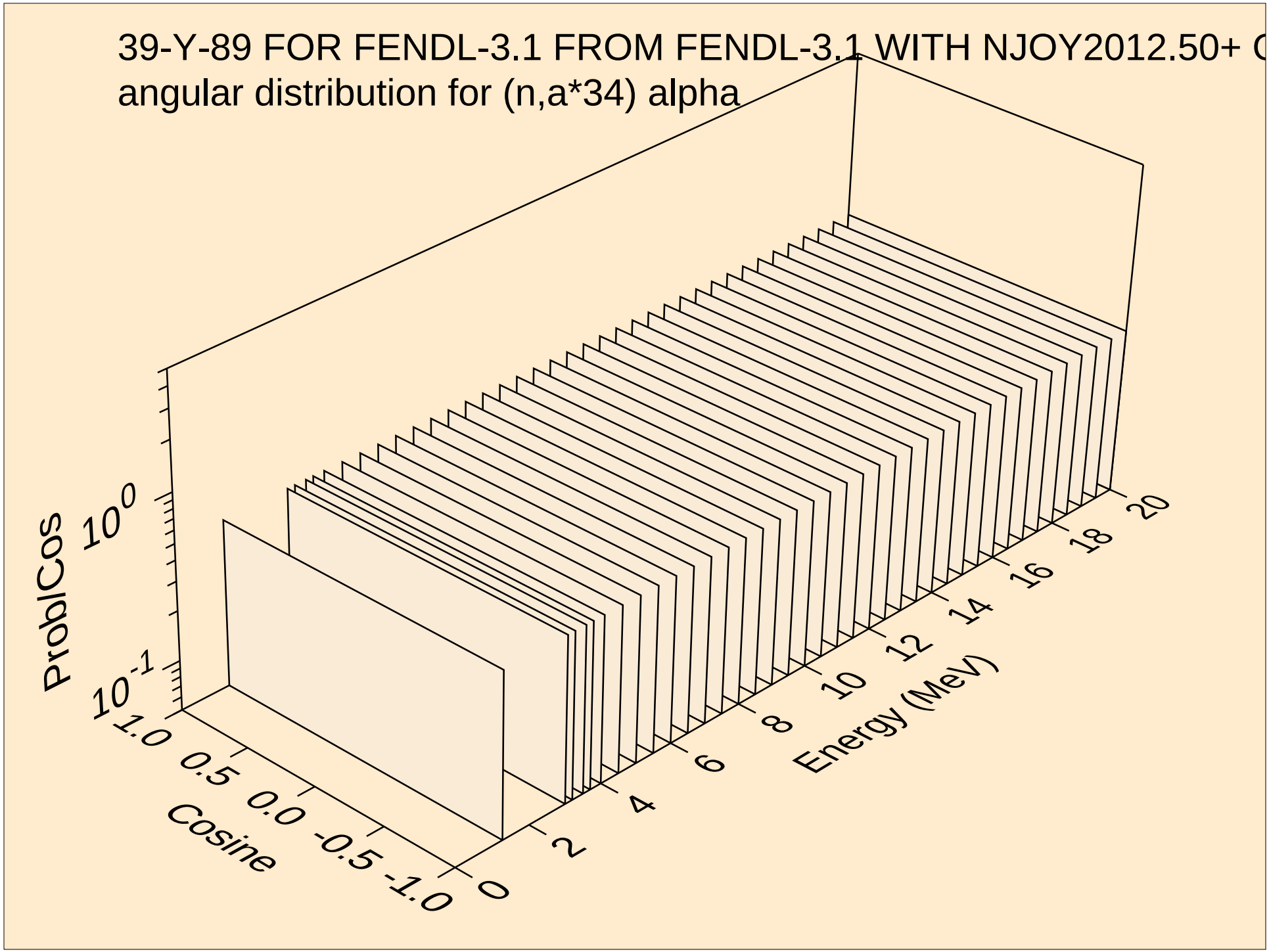

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*29) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

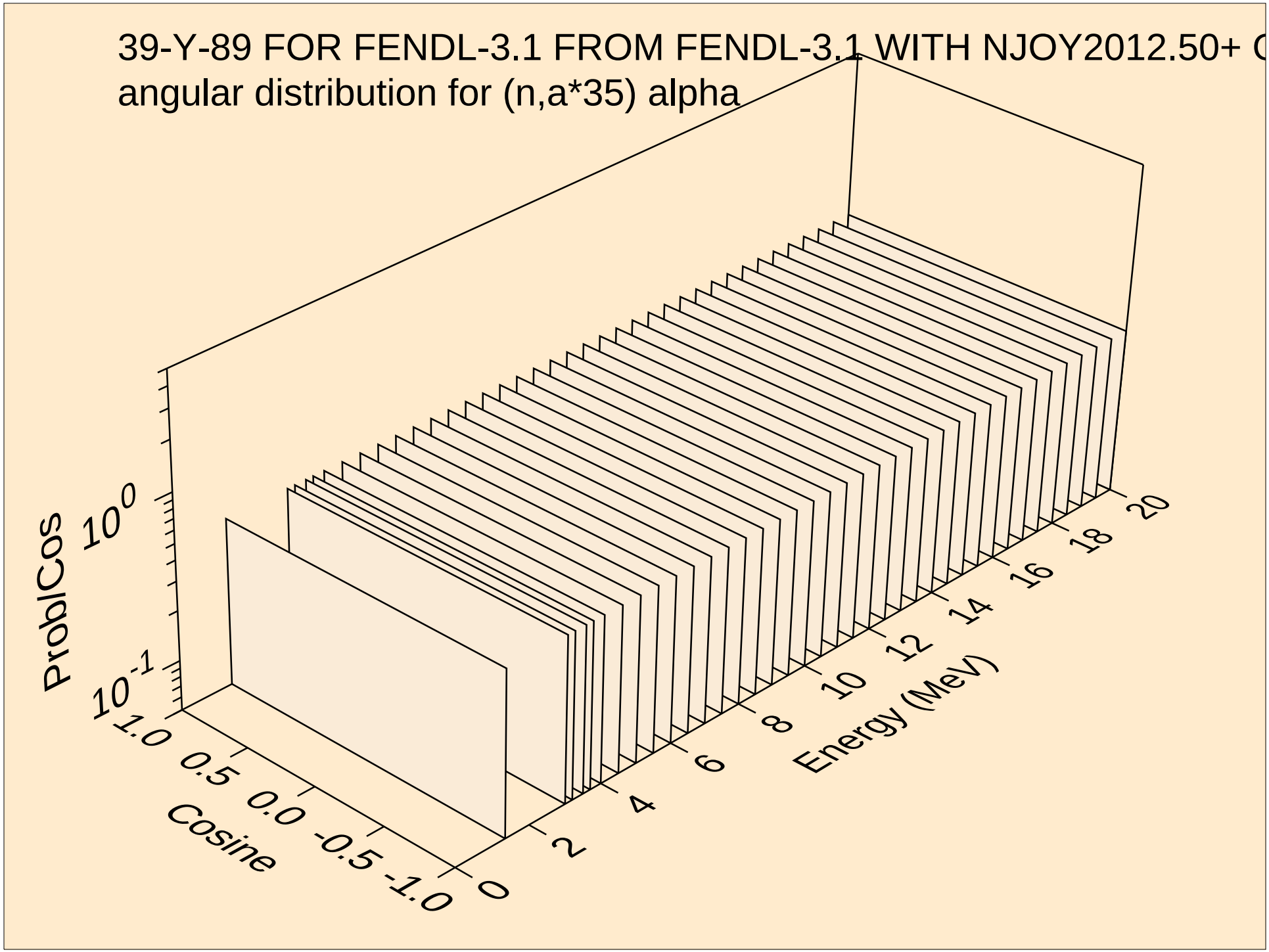

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*30) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

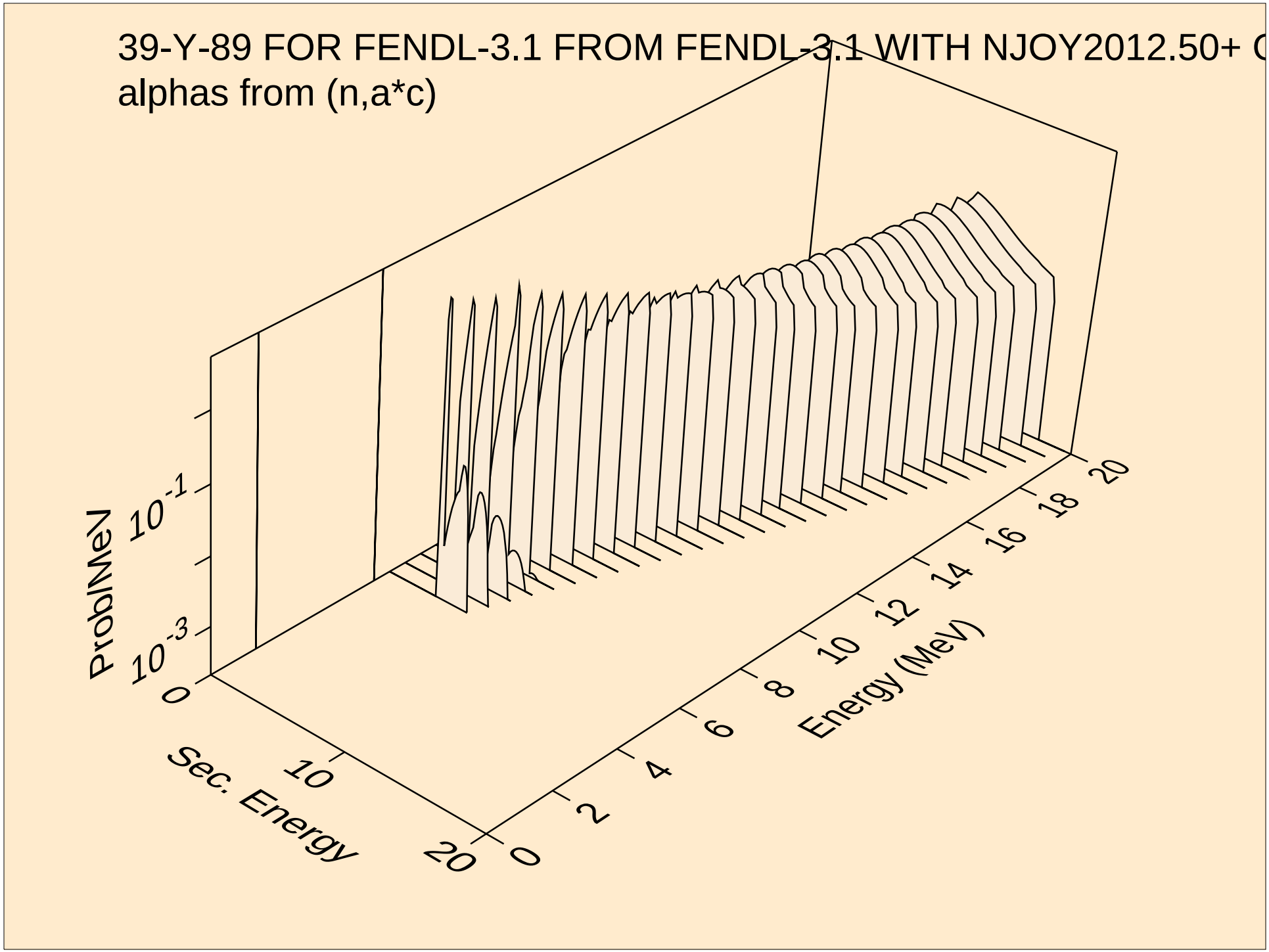

39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*31) alpha
ProbCos
$10^{0}$
$10^{-1}$
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)


39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*32) alpha
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)


39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*33) alpha
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)


39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*34) alpha
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)


39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
angular distribution for (n,a*35) alpha
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)


39-Y-89 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50+ C
alphas from (n,a*c)
Prob/MeV
10-1
10-3
0
Sec. Energy
10
20
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)