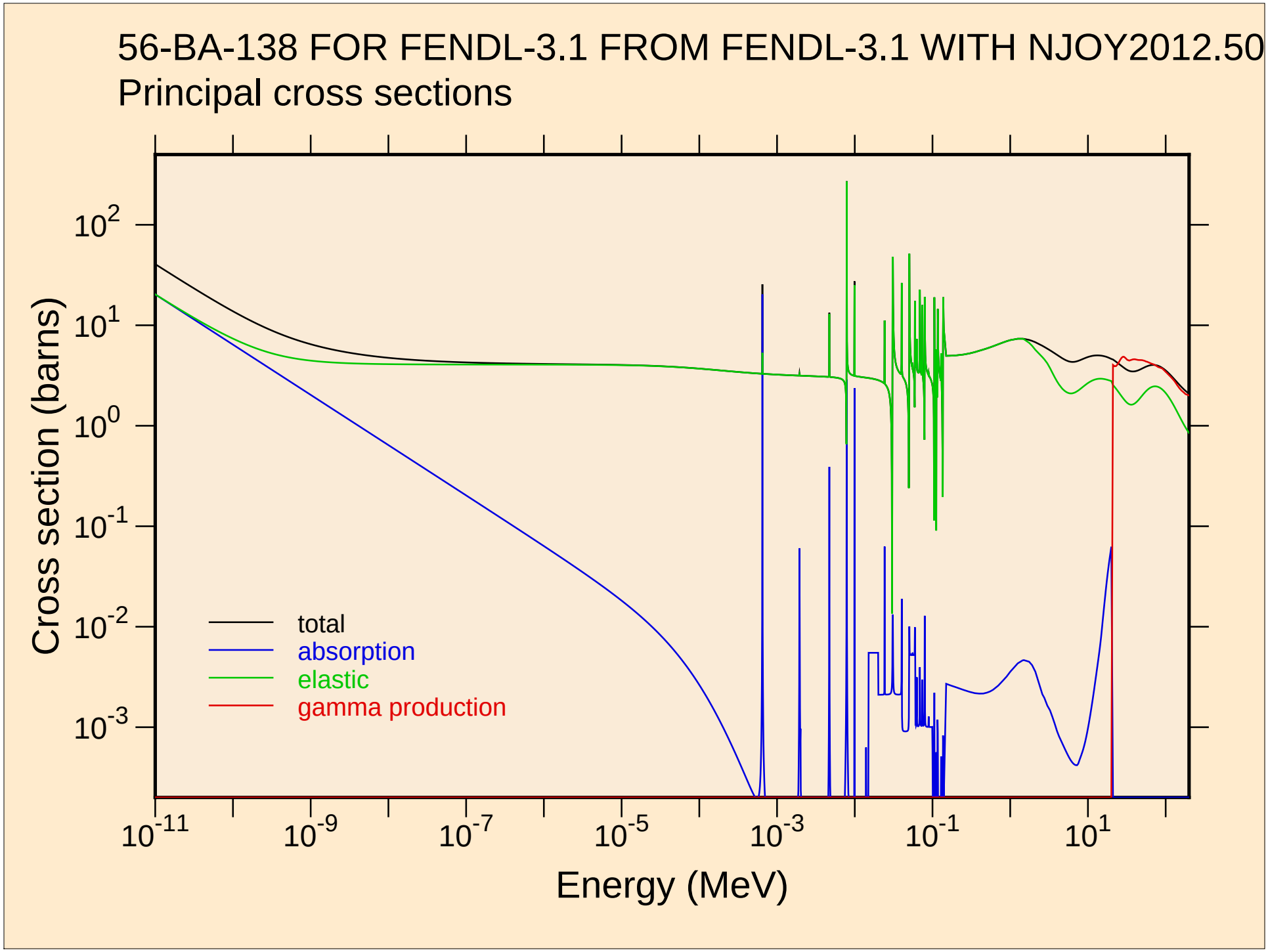
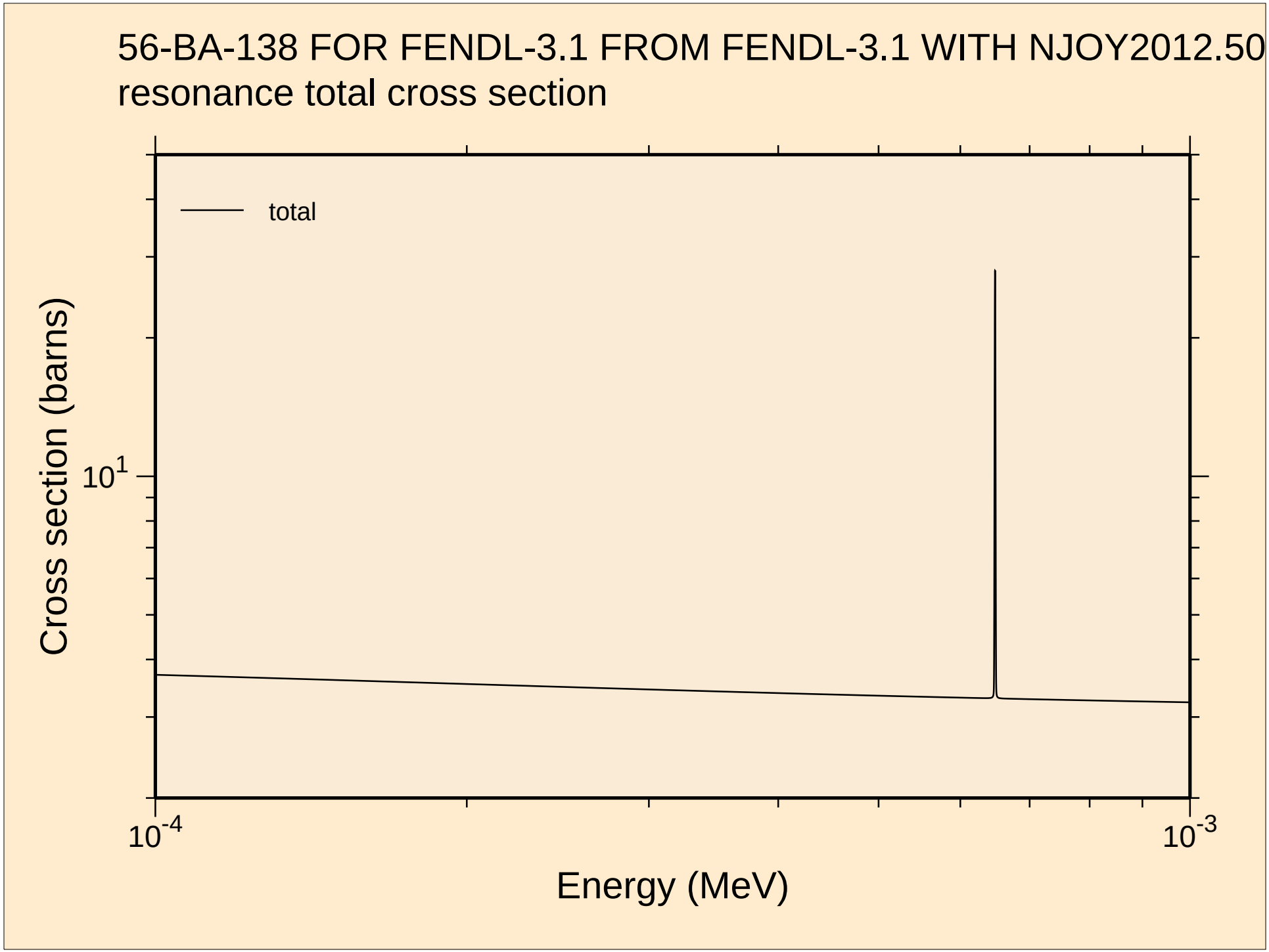
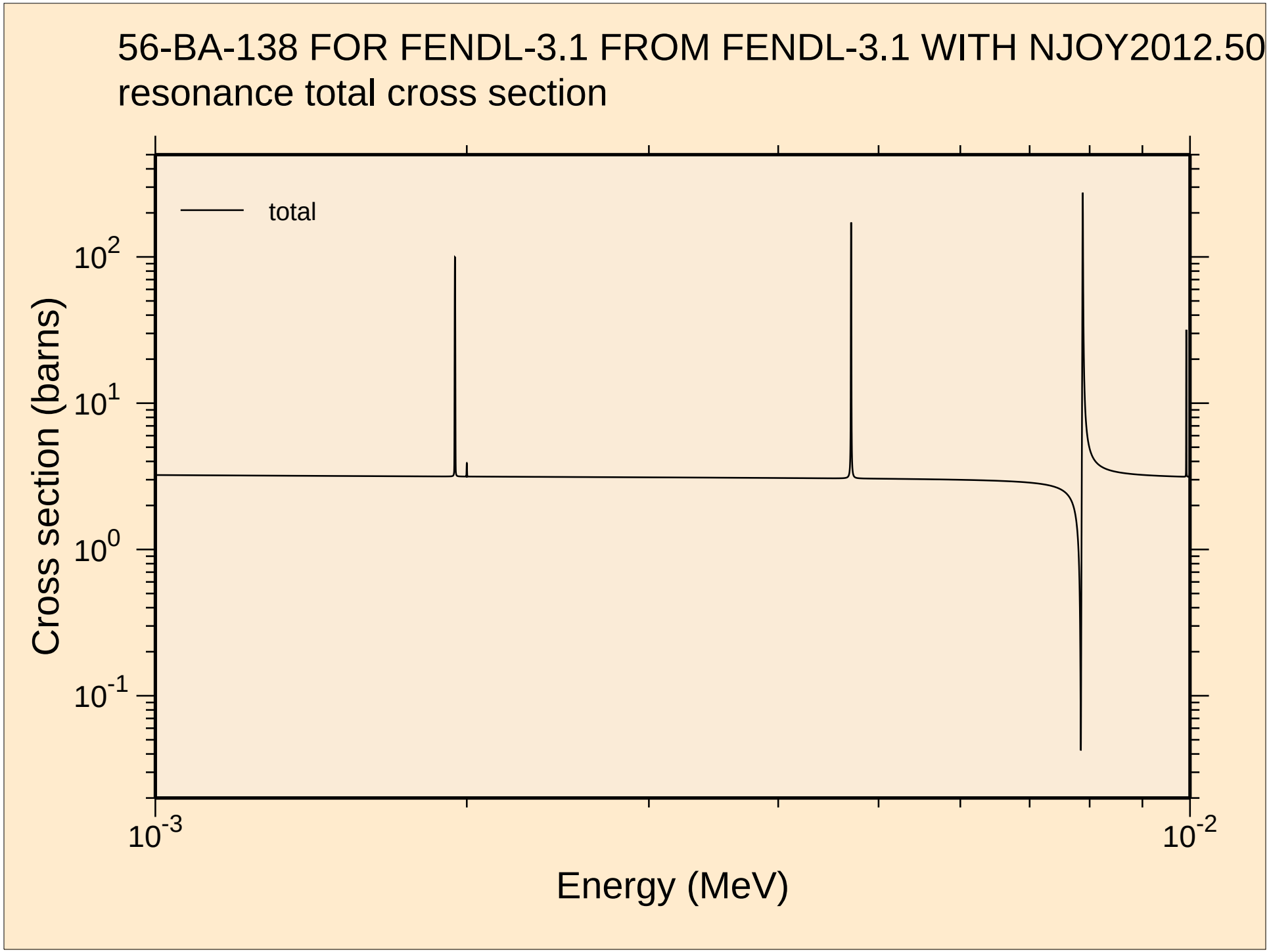
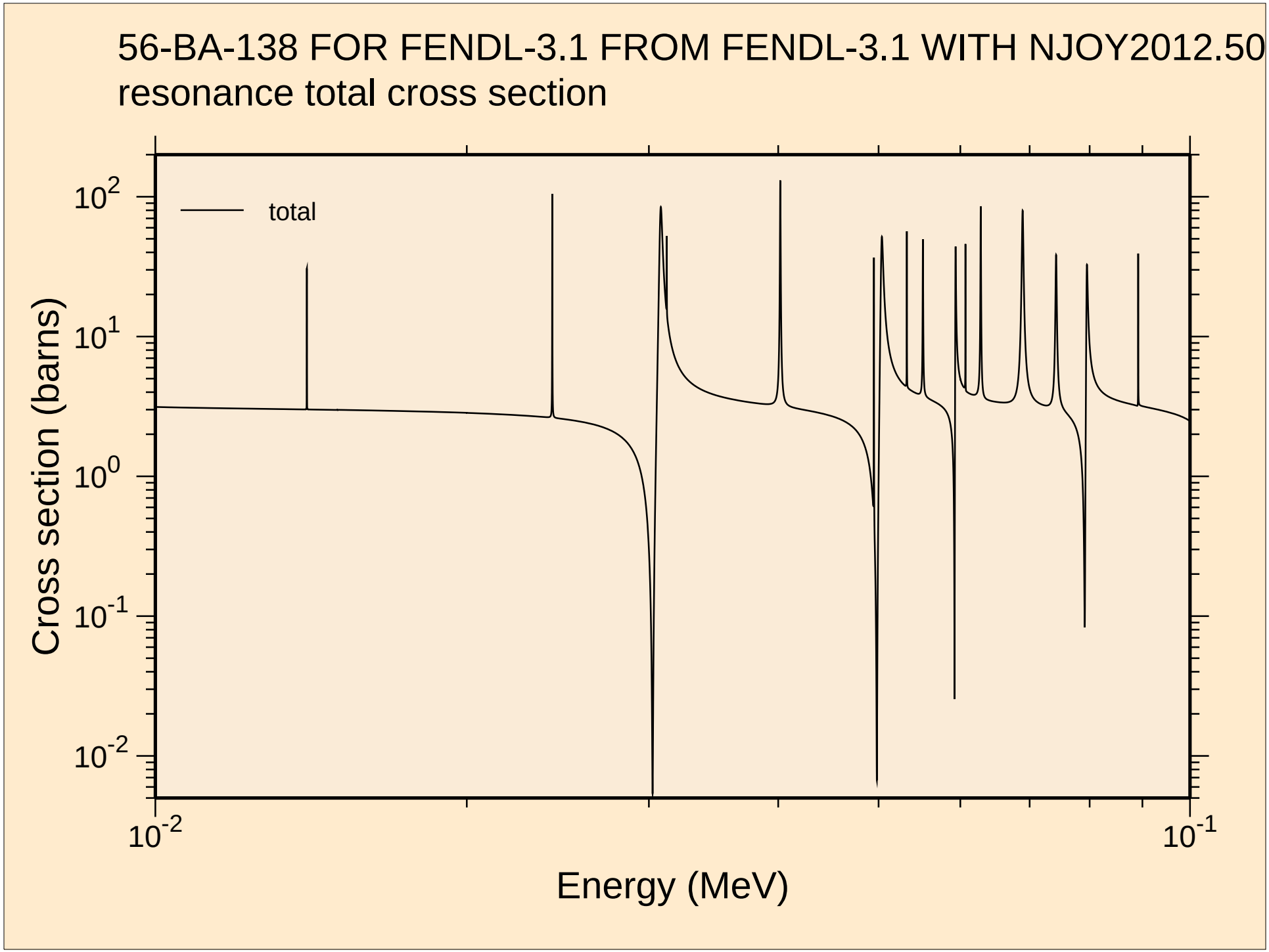
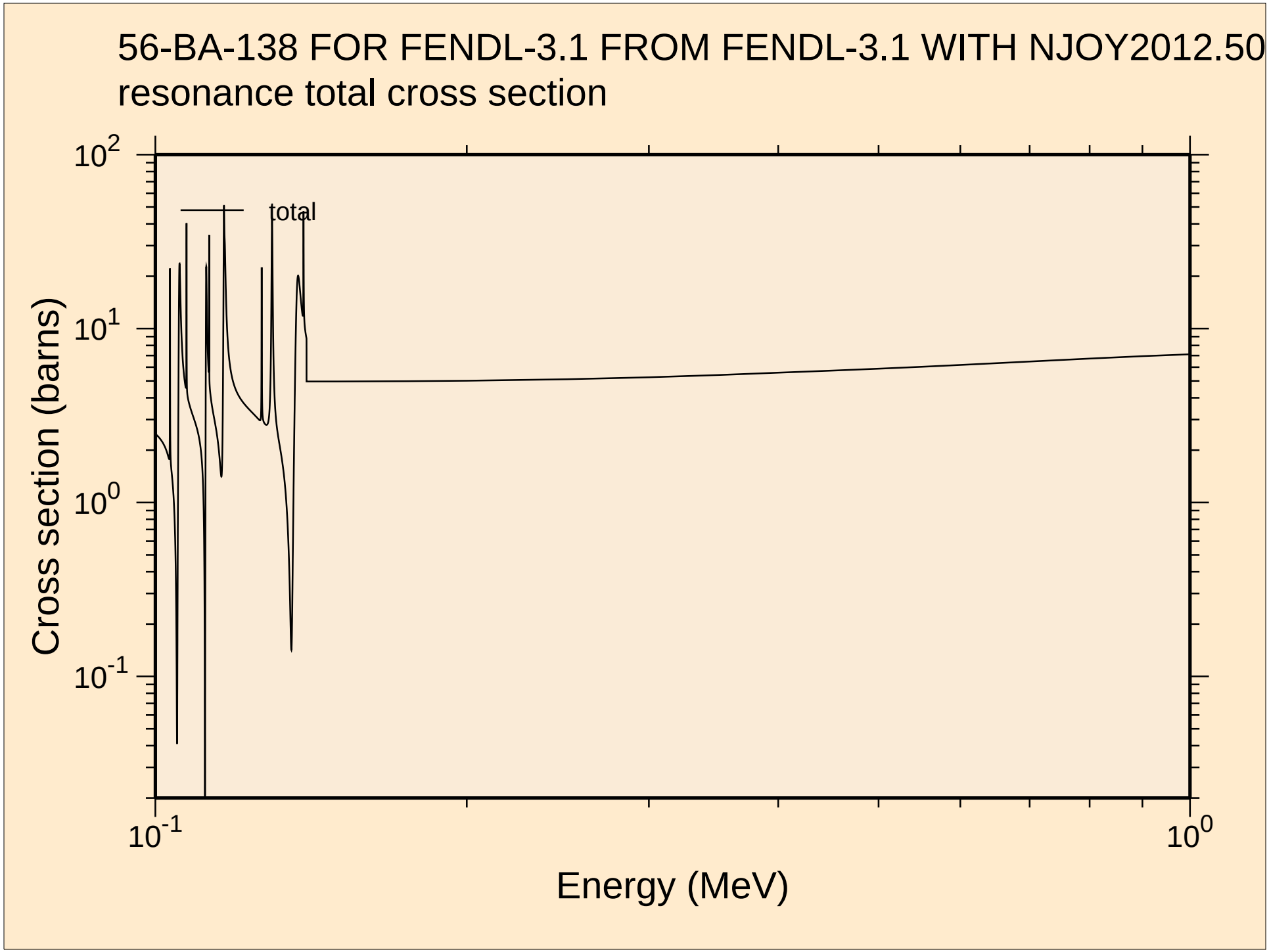
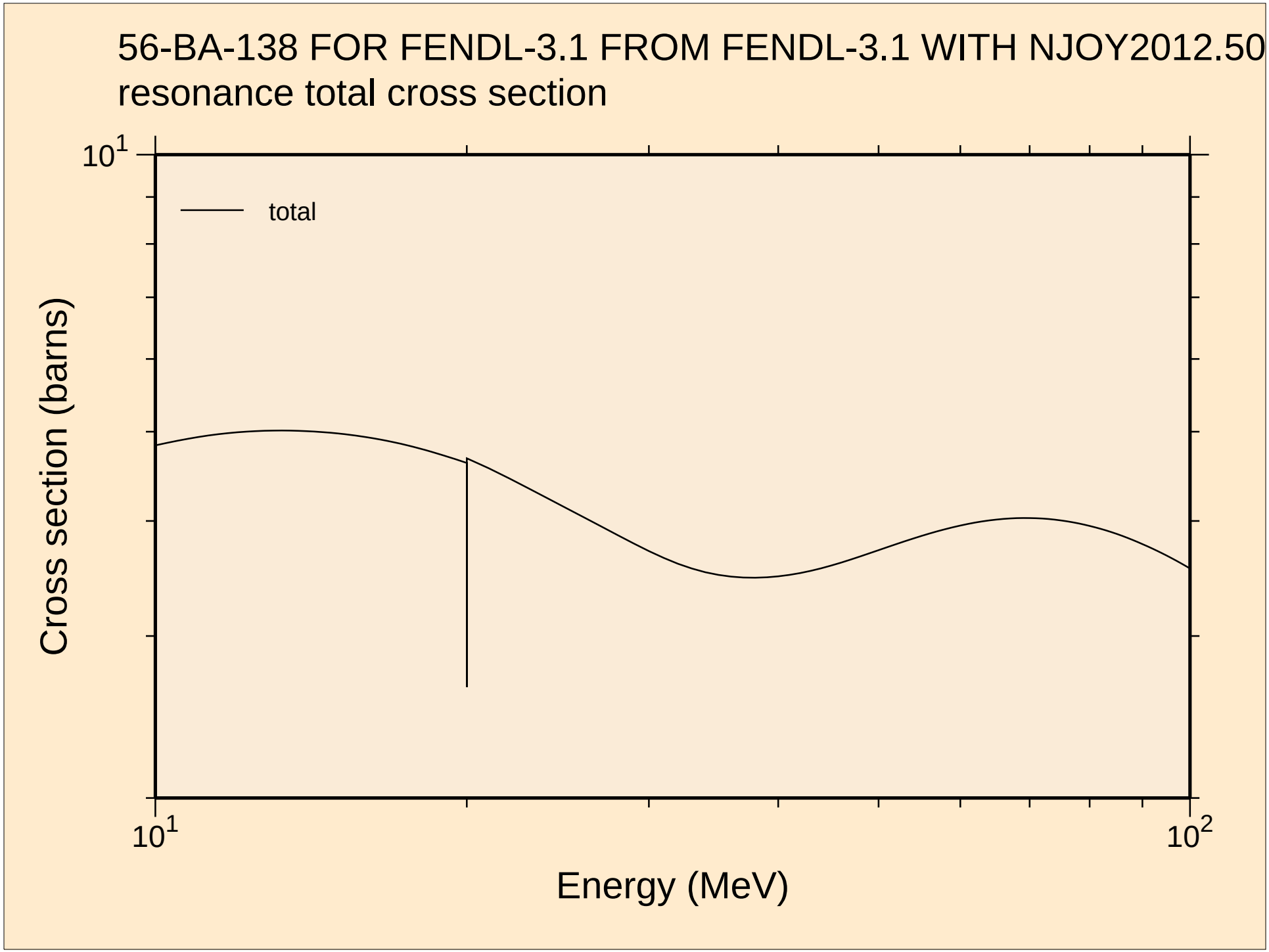

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Principal cross sections
Cross section (barns)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
total
absorption
elastic
gamma production
10^{-11}
10^{-9}
10^{-7}
10^{-5}
10^{-3}
10^{-1}
10^{1}
Energy (MeV)

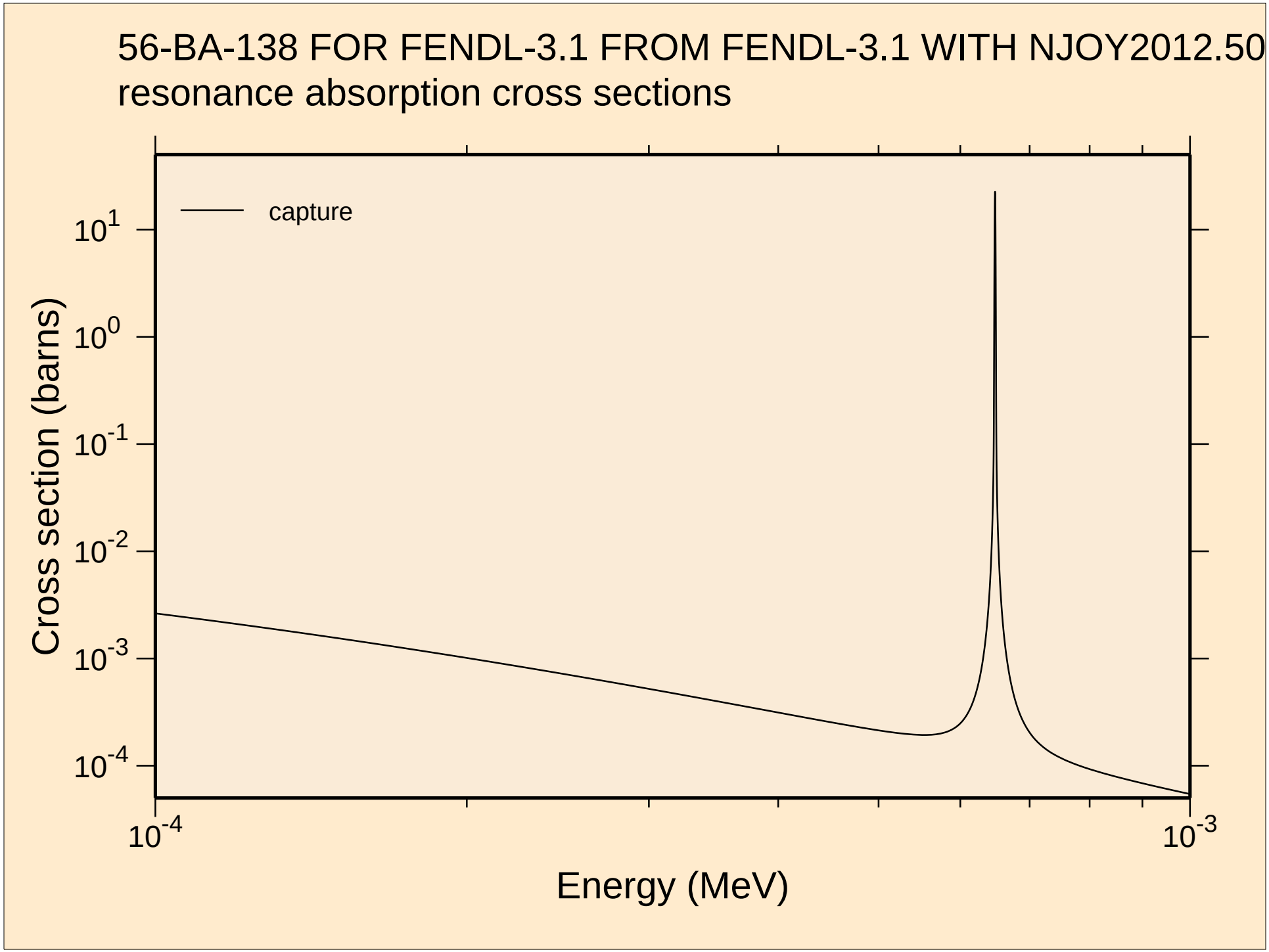

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance total cross section
total
Cross section (barns)
10^1
10^-4
10^-3
Energy (MeV)

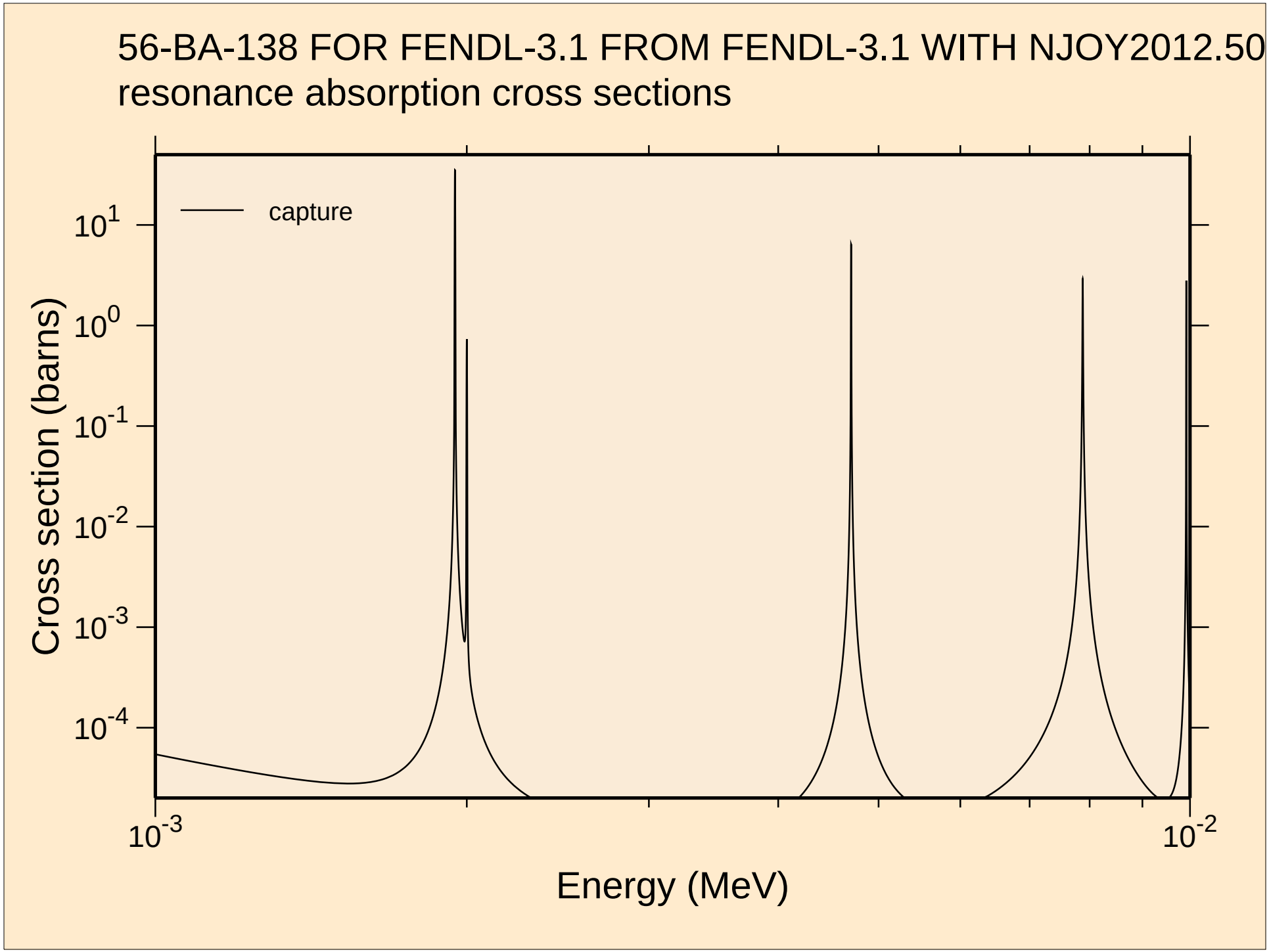

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance total cross section
total
Cross section (barns)
10^2
10^1
10^0
10^-1
10^-3
10^-2
Energy (MeV)


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance total cross section
total
Cross section (barns)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-2}
10^{-1}
Energy (MeV)

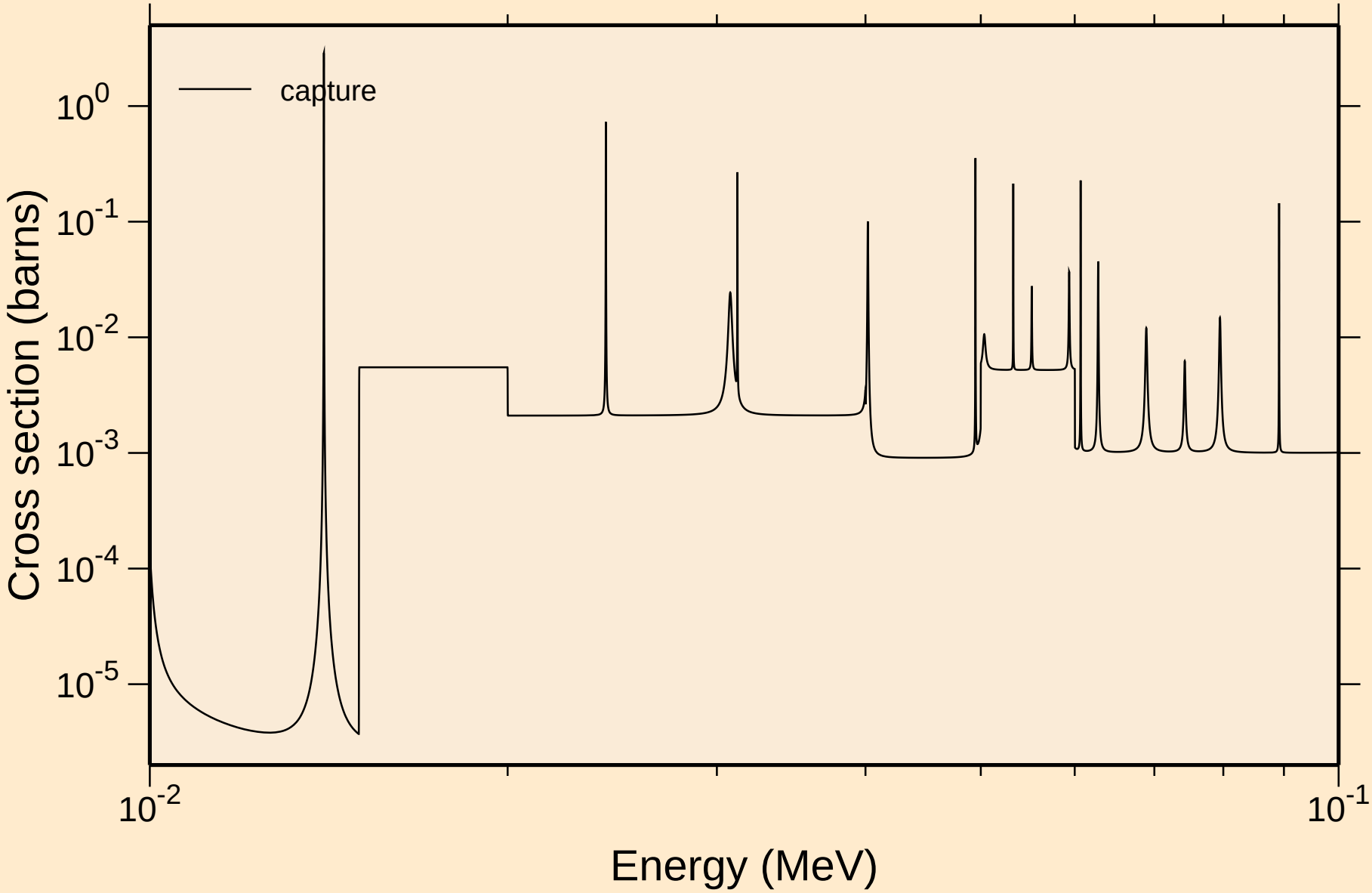

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance total cross section
total
Cross section (barns)
Energy (MeV)
10^2
10^1
10^0
10^-1
10^-1
10^0

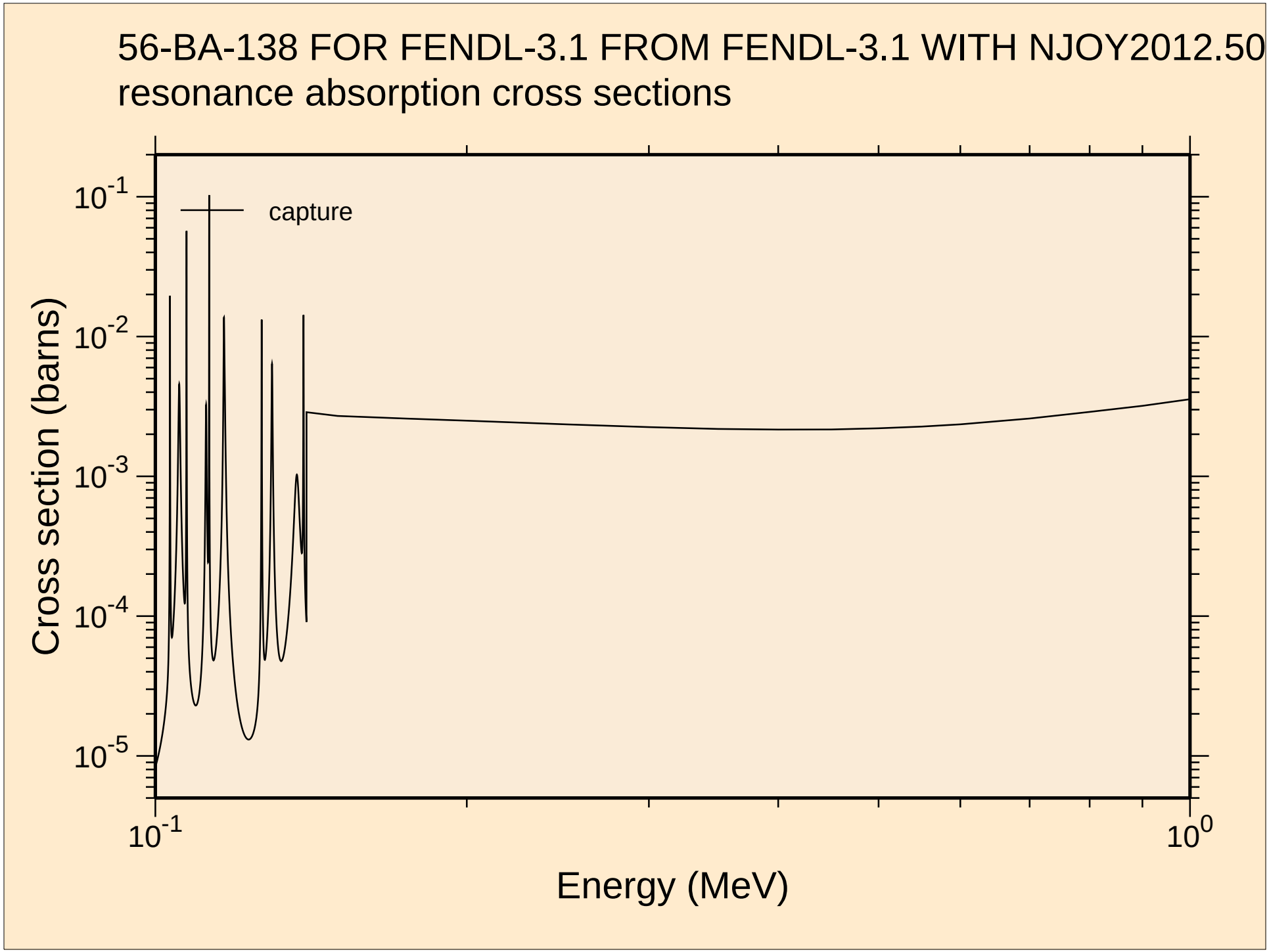

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance total cross section
10^1
total
Cross section (barns)
10^1
10^2
Energy (MeV)

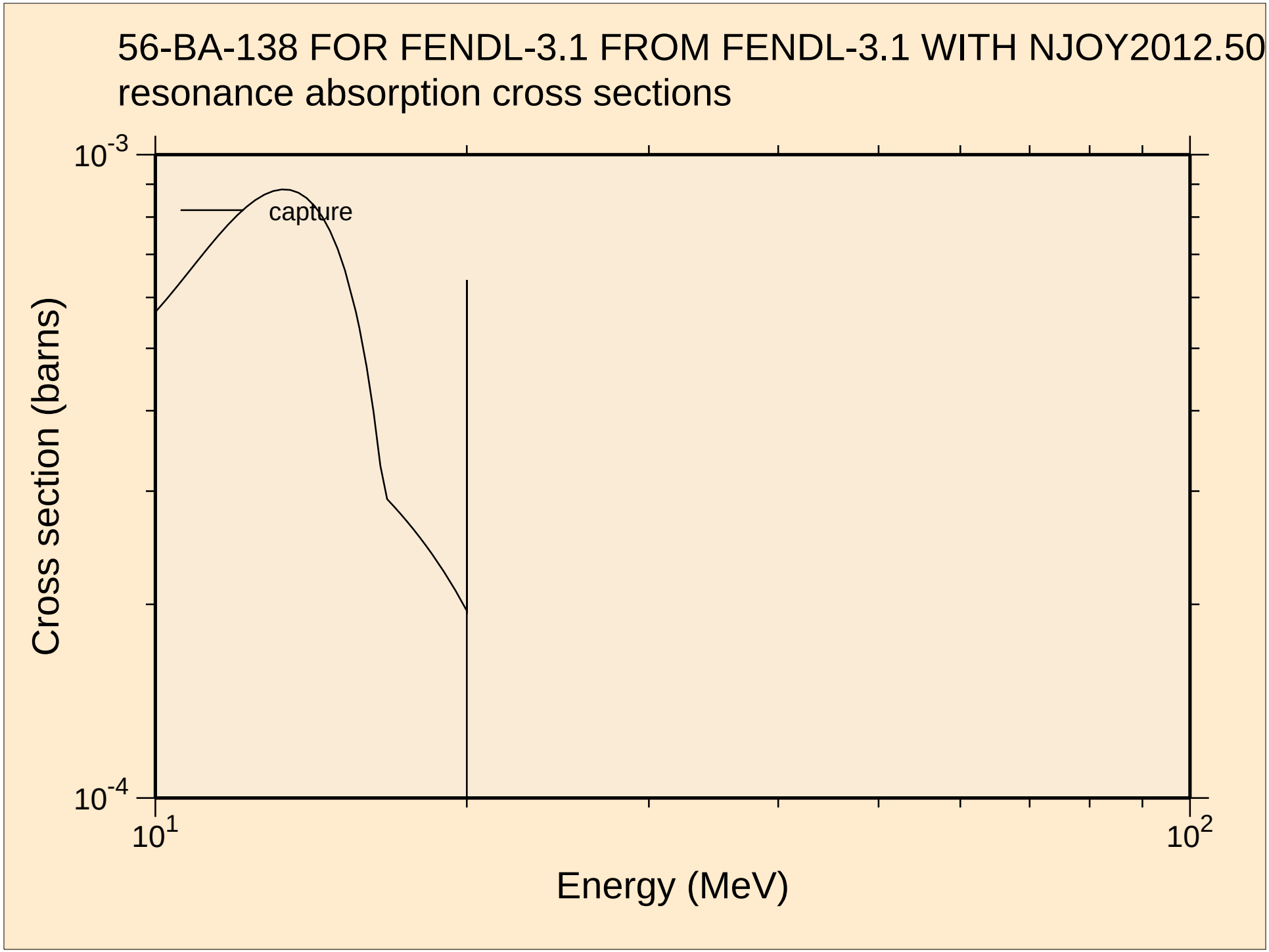

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-4
10^-3
Energy (MeV)

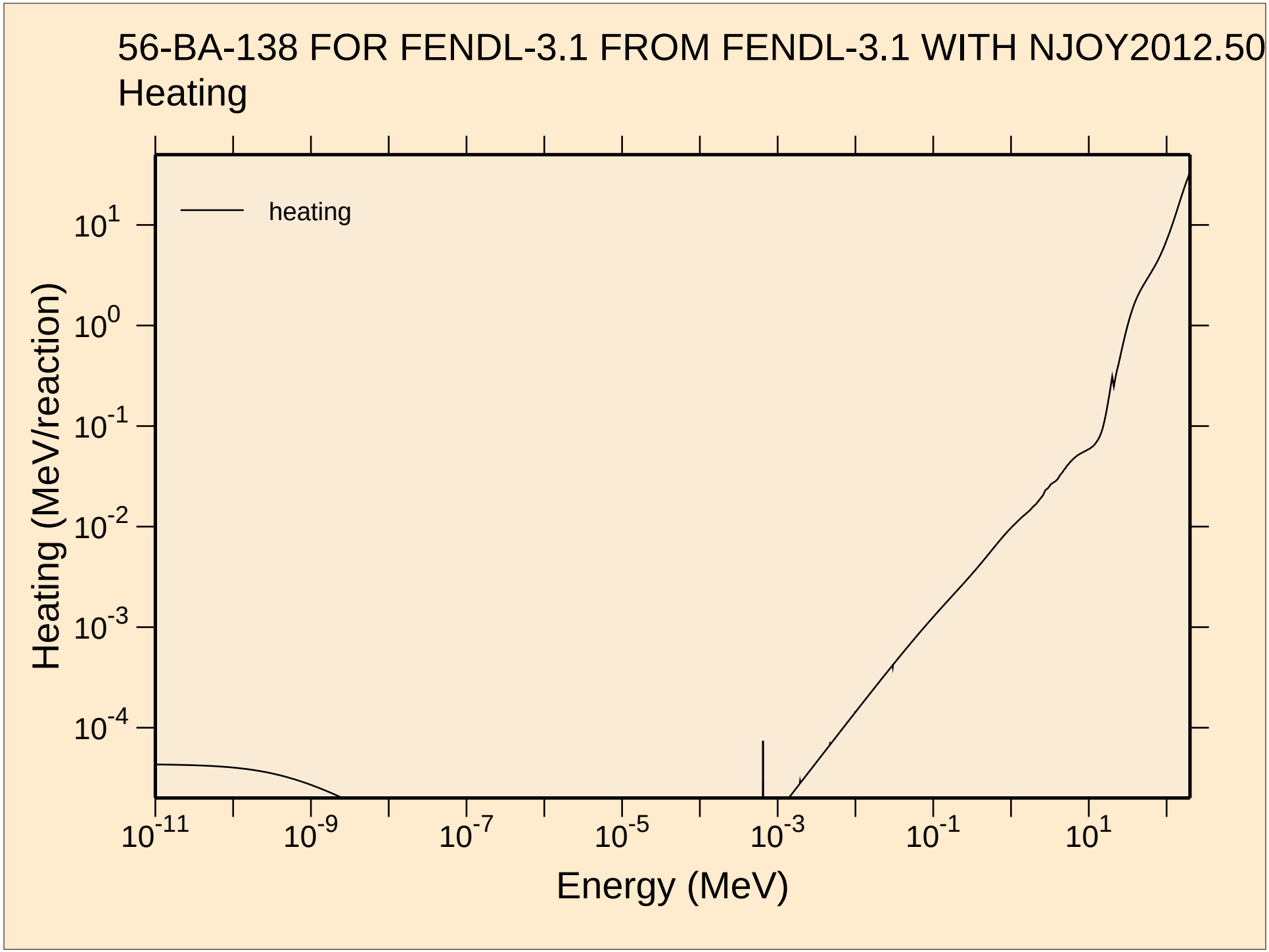

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance absorption cross sections
capture
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-3
10^-2
Energy (MeV)

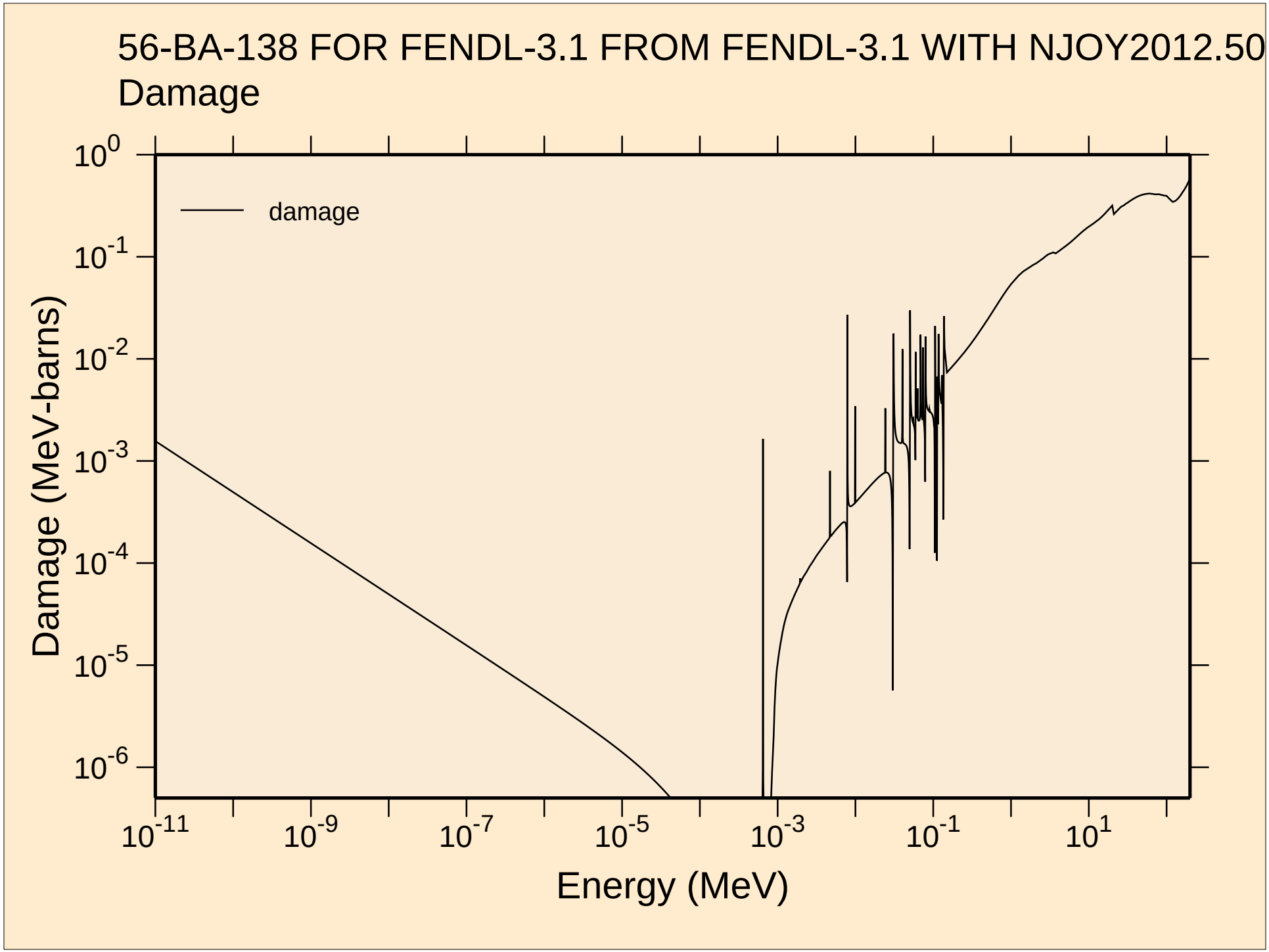
56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance absorption cross sections

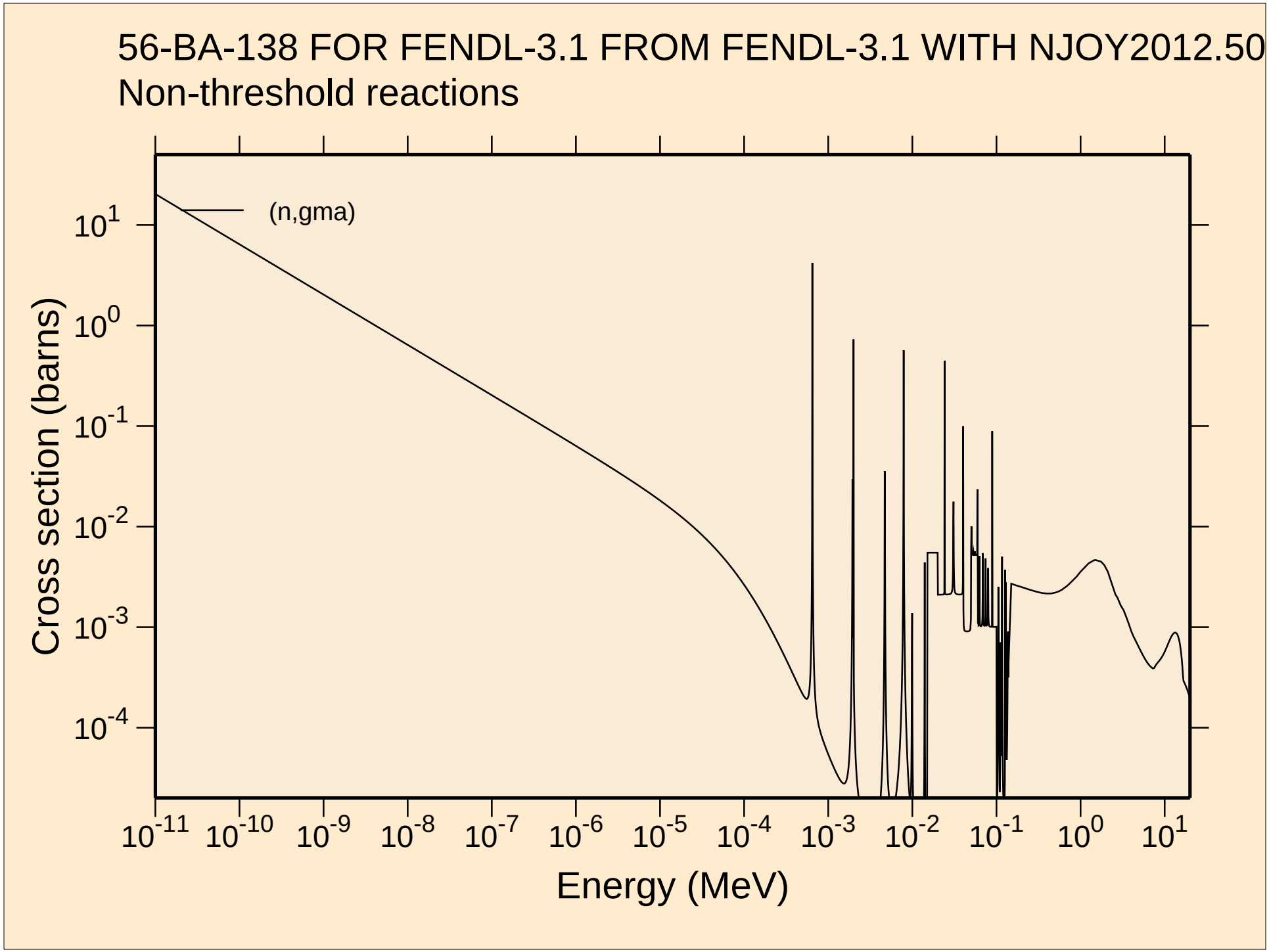


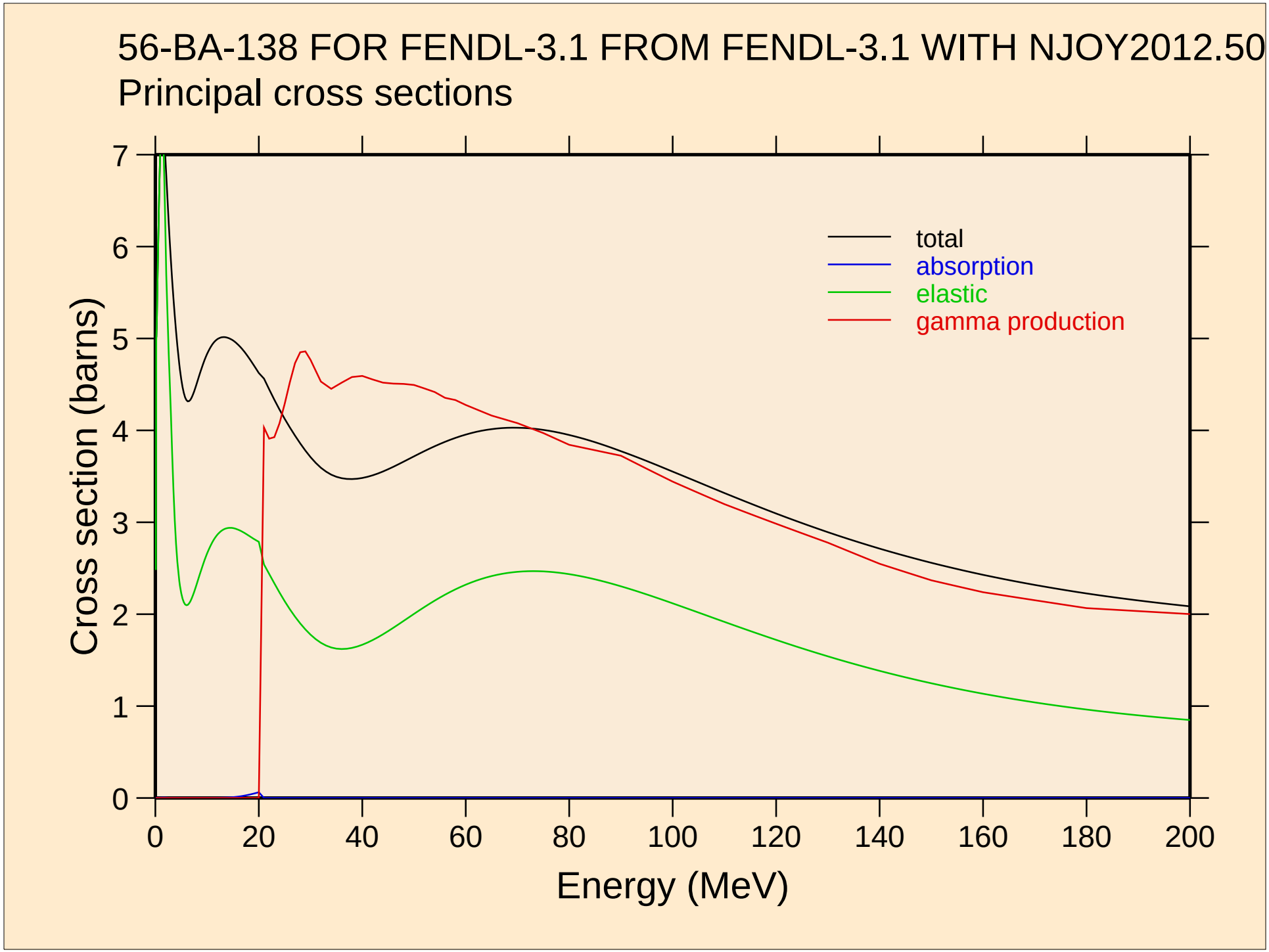

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance absorption cross sections
capture
Cross section (barns)
10-1
10-2
10-3
10-4
10-5
10-1
100
Energy (MeV)

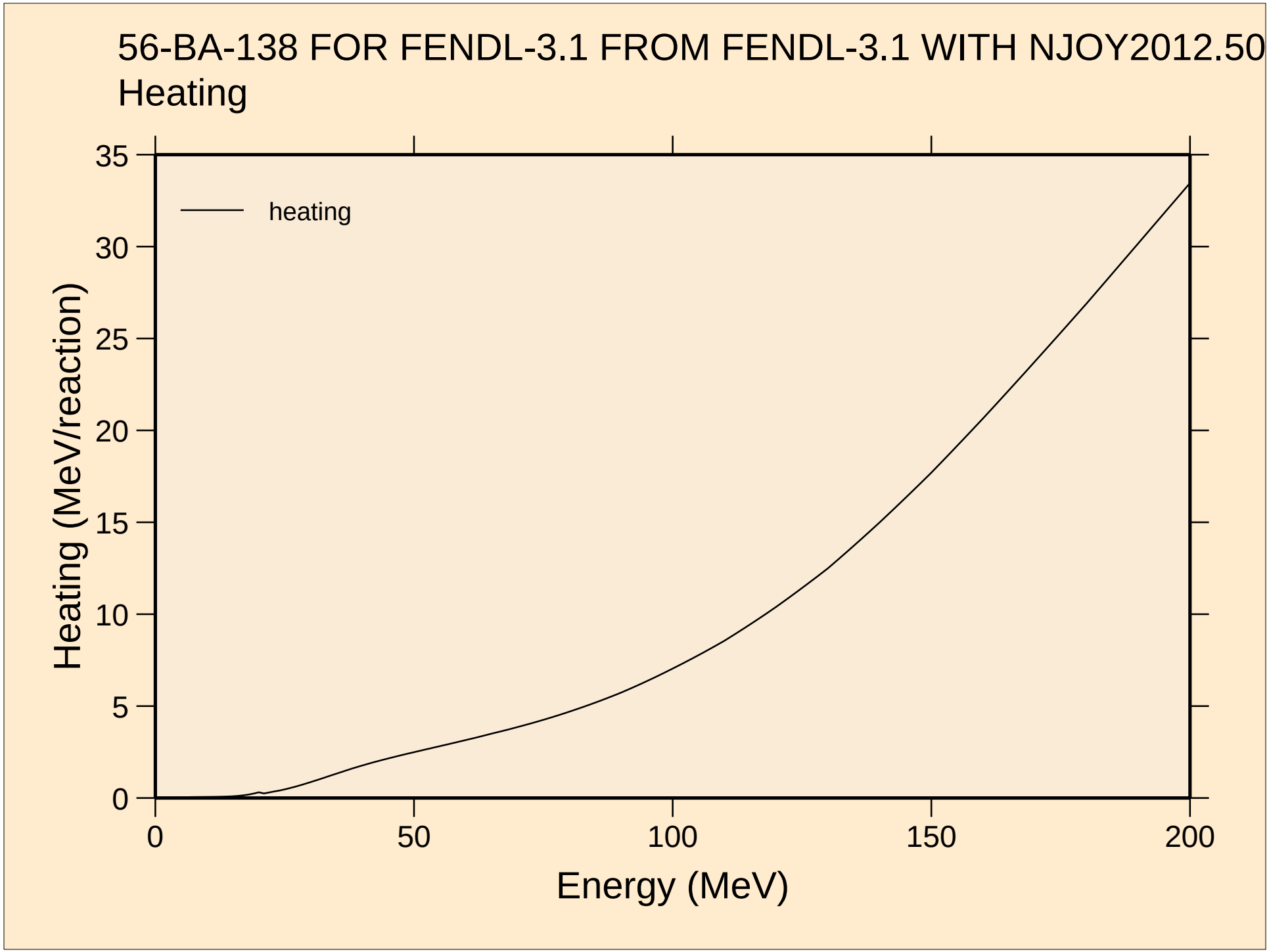

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
resonance absorption cross sections
capture
Cross section (barns)
10-3
10-4
101
102
Energy (MeV)

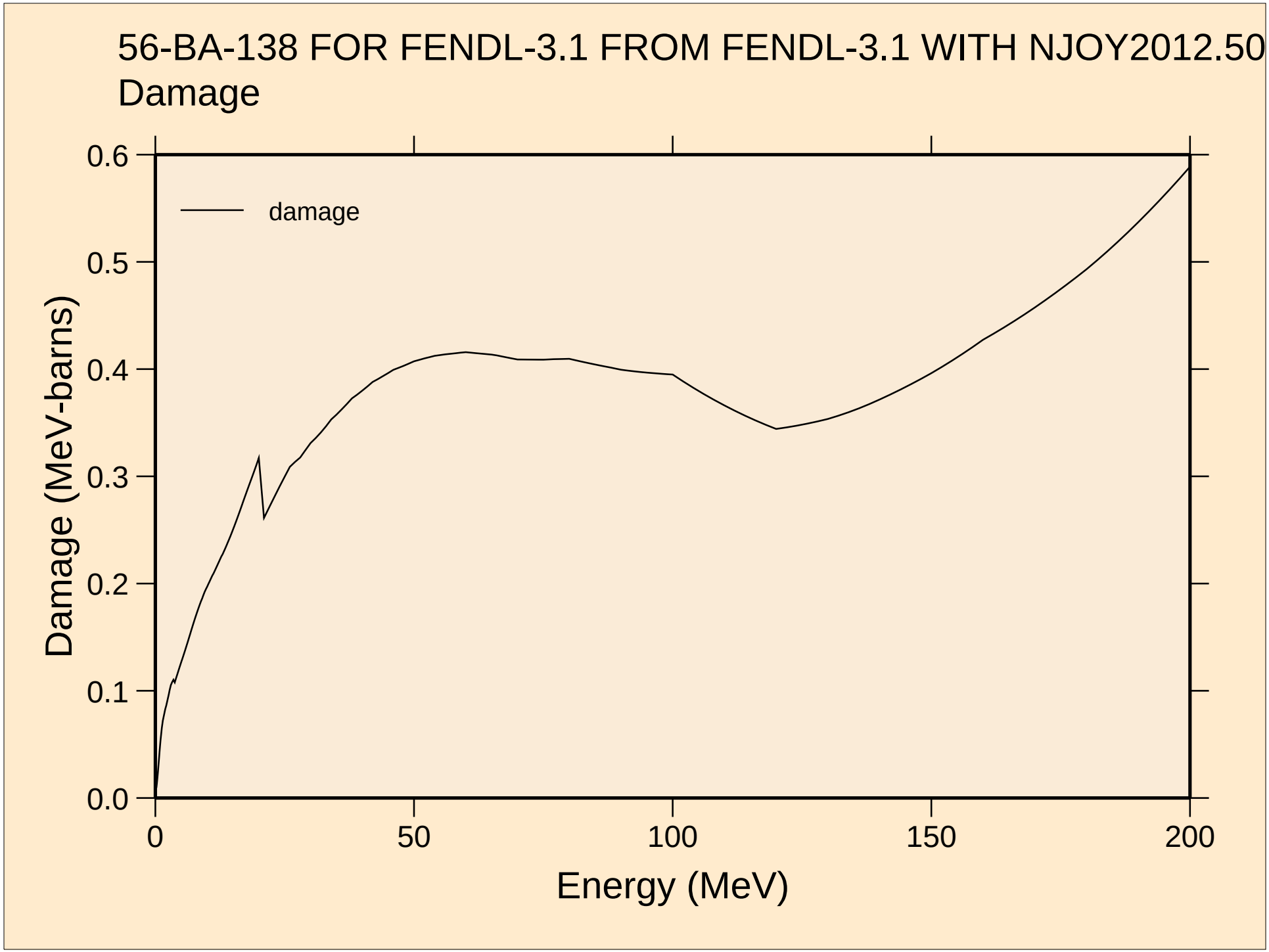

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Heating
heating
Heating (MeV/reaction)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1
Energy (MeV)

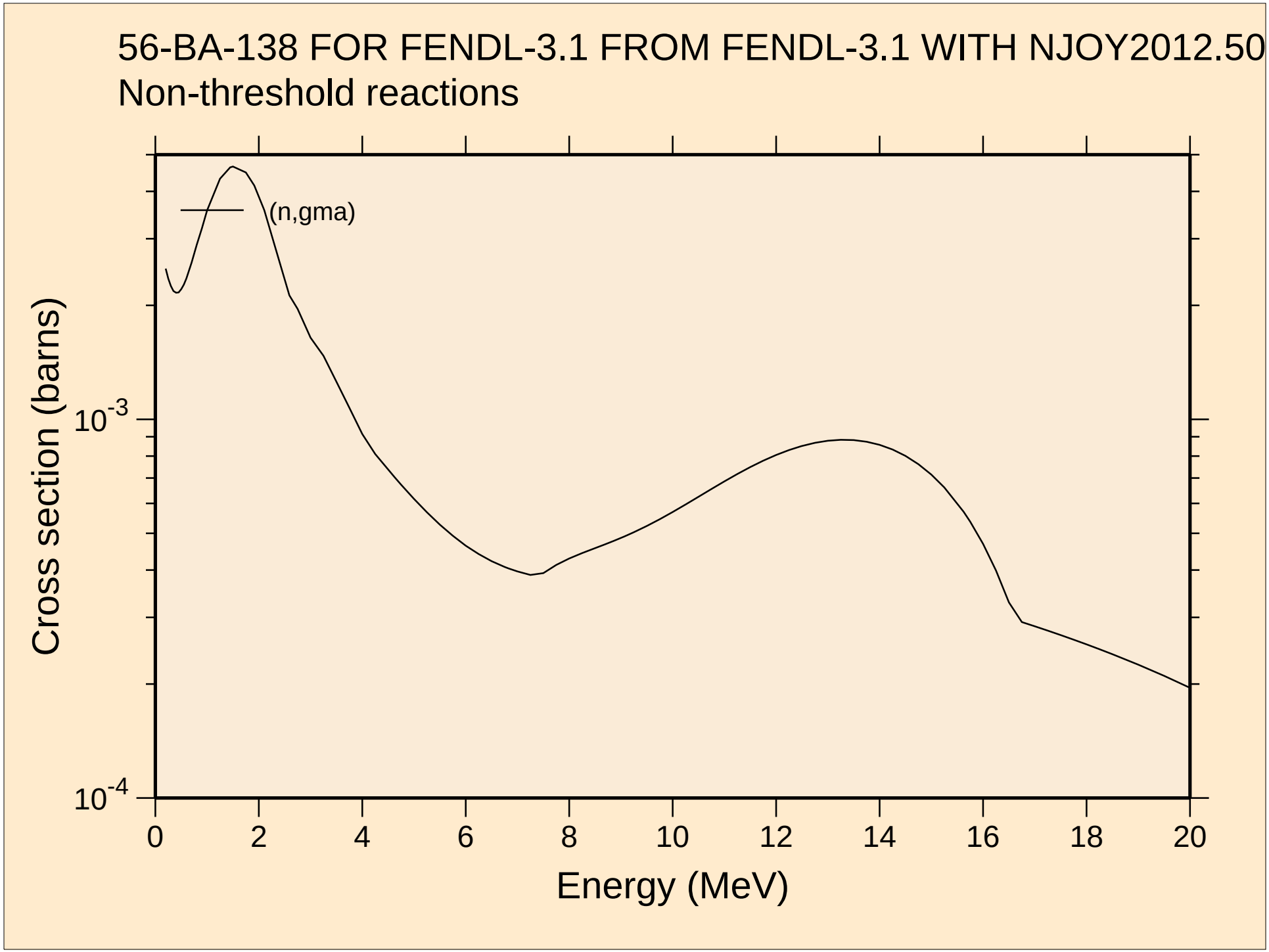

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Damage
damage
Damage (MeV-barns)
Energy (MeV)
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-11
10^-9
10^-7
10^-5
10^-3
10^-1
10^1

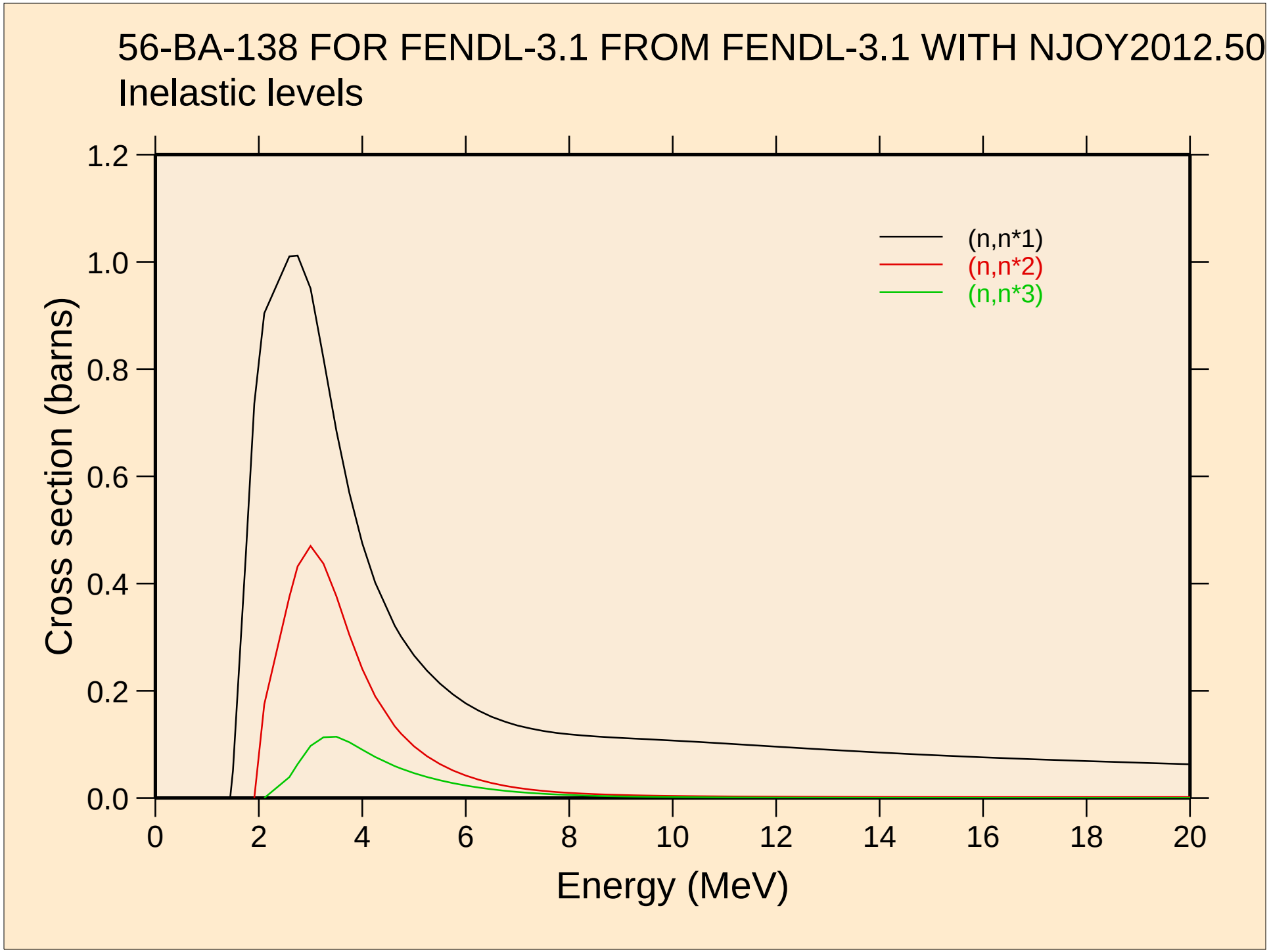

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Non-threshold reactions
(n,gma)
Cross section (barns)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-11 10^-10 10^-9 10^-8 10^-7 10^-6 10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1
Energy (MeV)

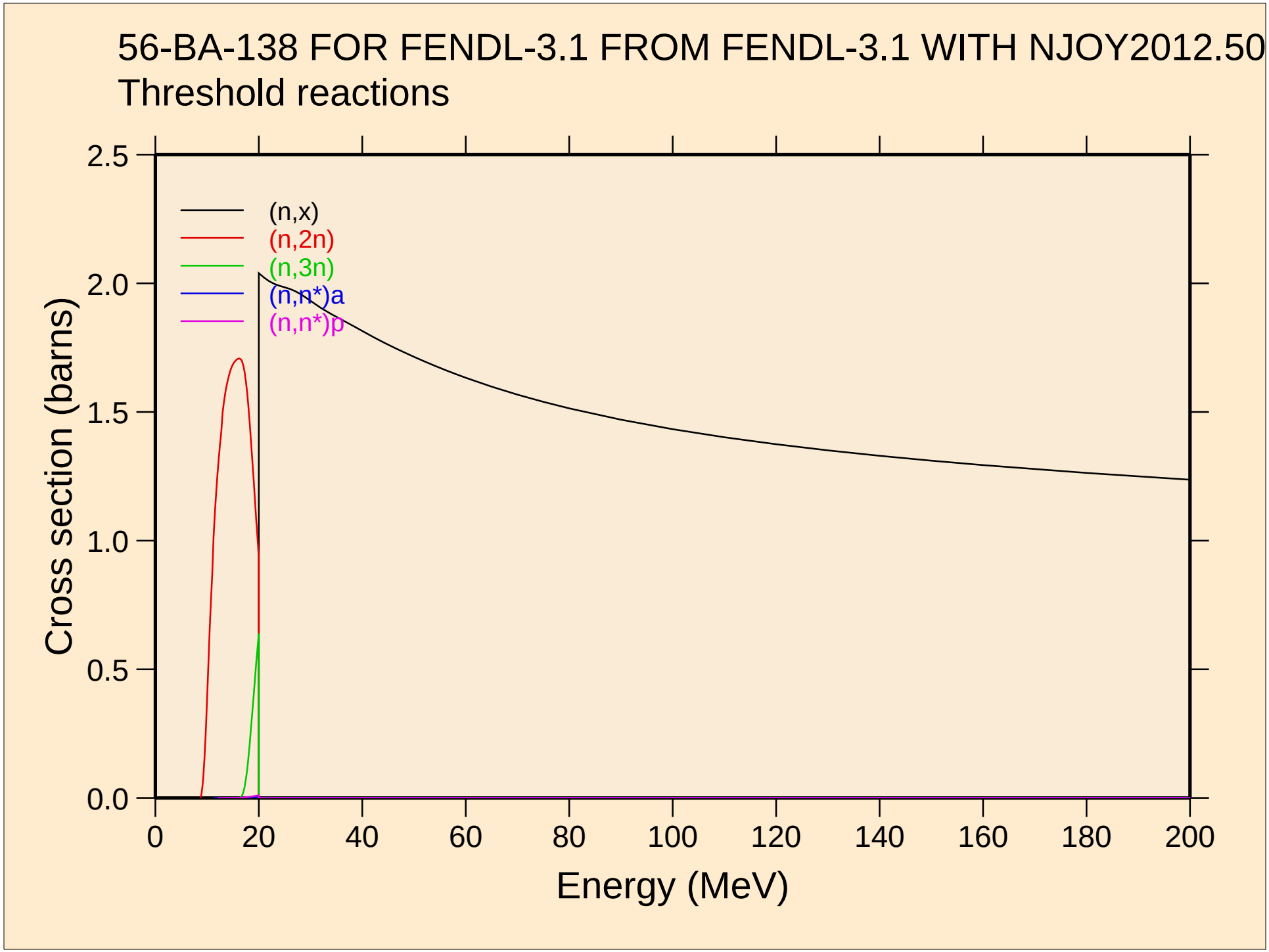

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Principal cross sections
Cross section (barns)
Energy (MeV)
total
absorption
elastic
gamma production
0
1
2
3
4
5
6
7
0
20
40
60
80
100
120
140
160
180
200

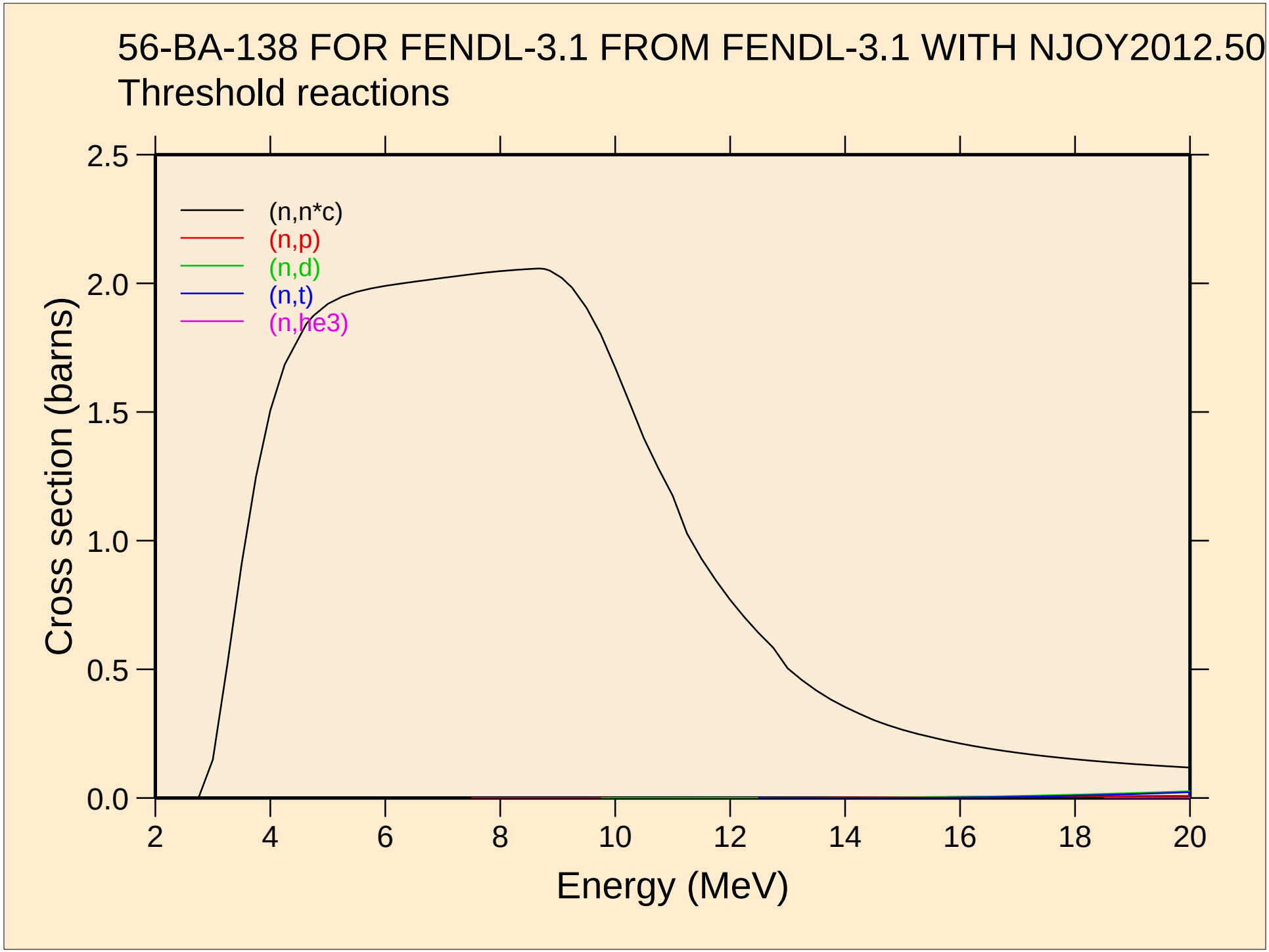

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
5
10
15
20
25
30
35
0
50
100
150
200

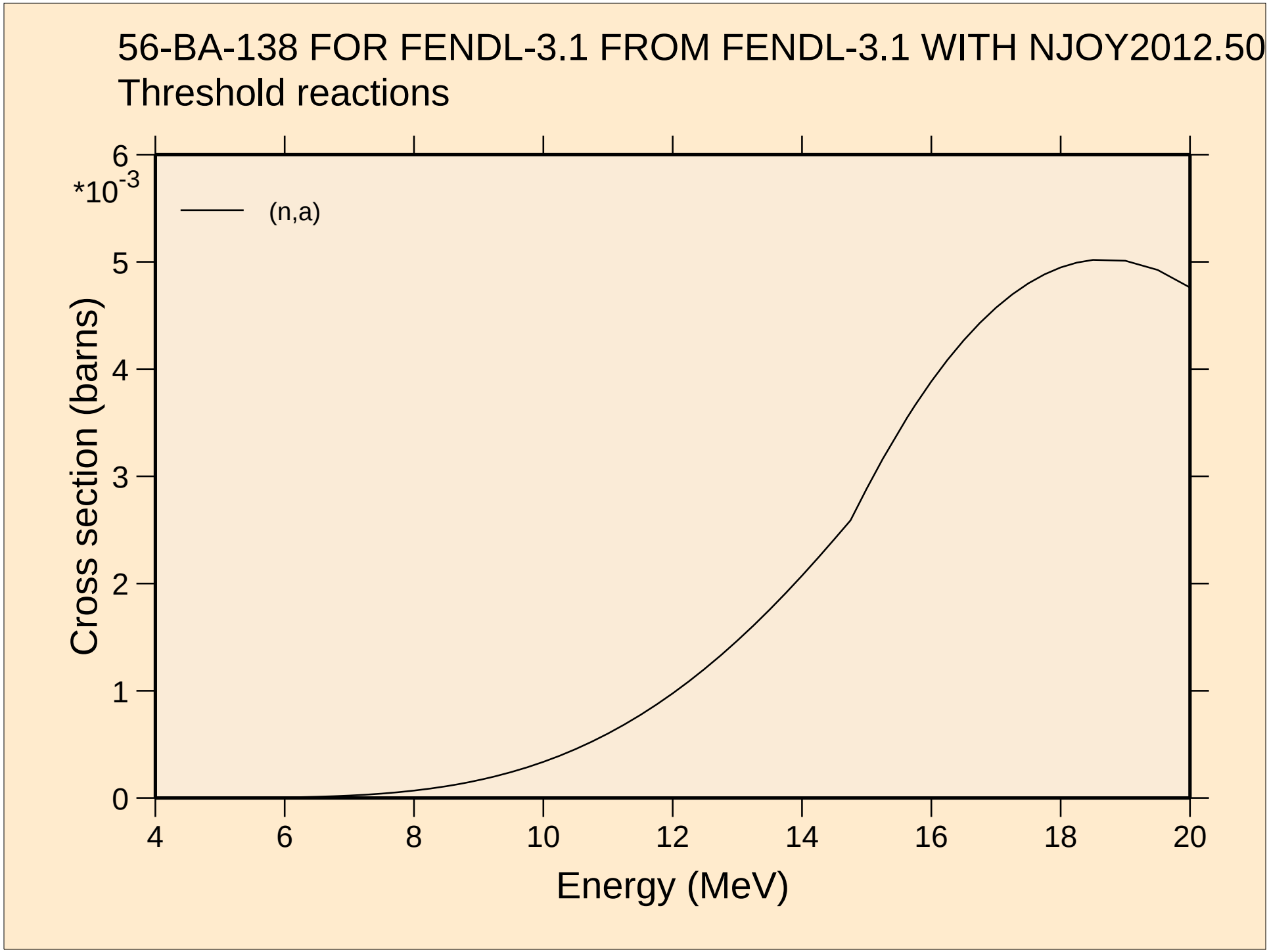

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Damage
damage
Damage (MeV-barns)
Energy (MeV)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
50
100
150
200

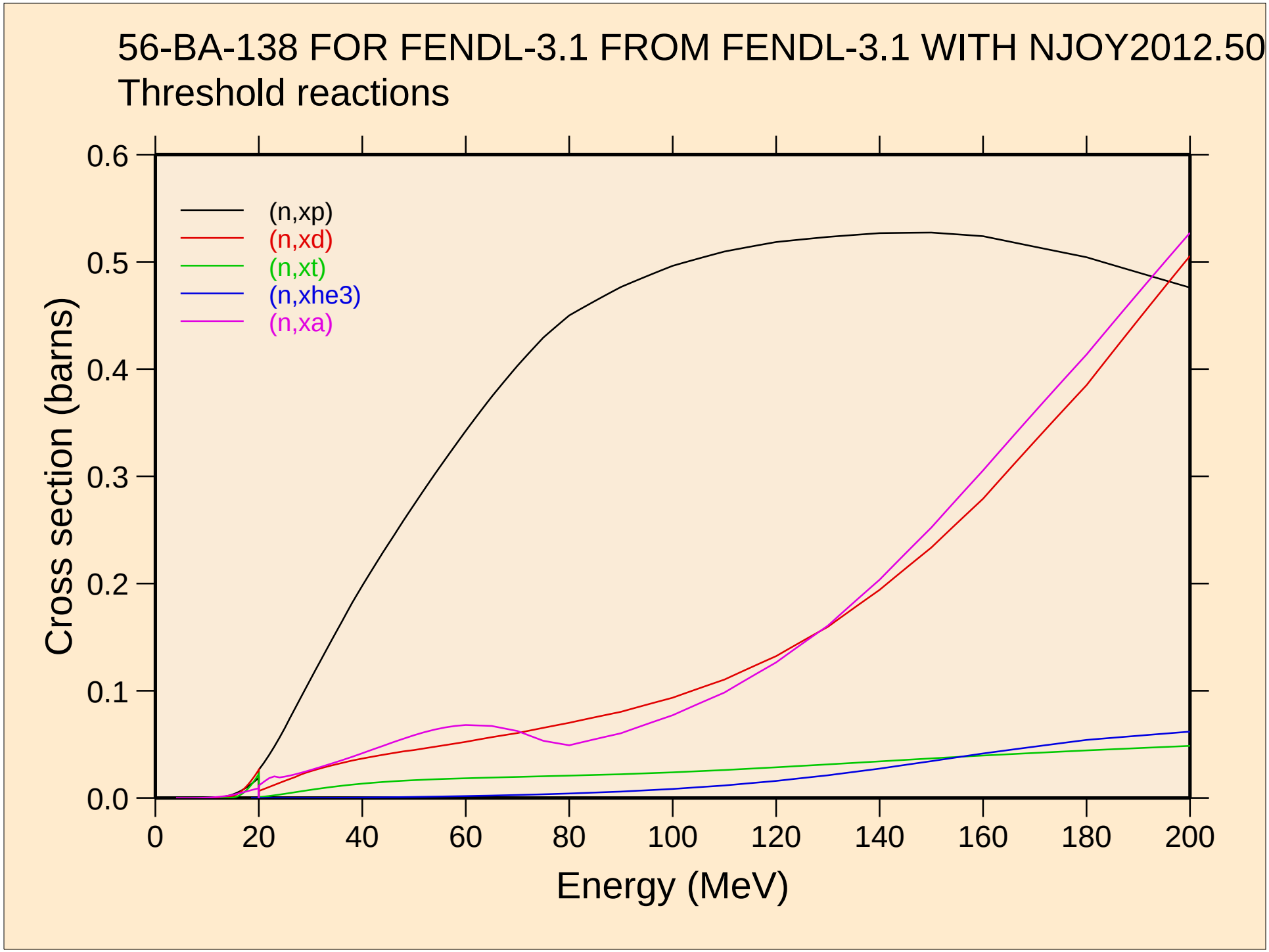

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Non-threshold reactions
(n,gma)
Cross section (barns)
10-3
10-4
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

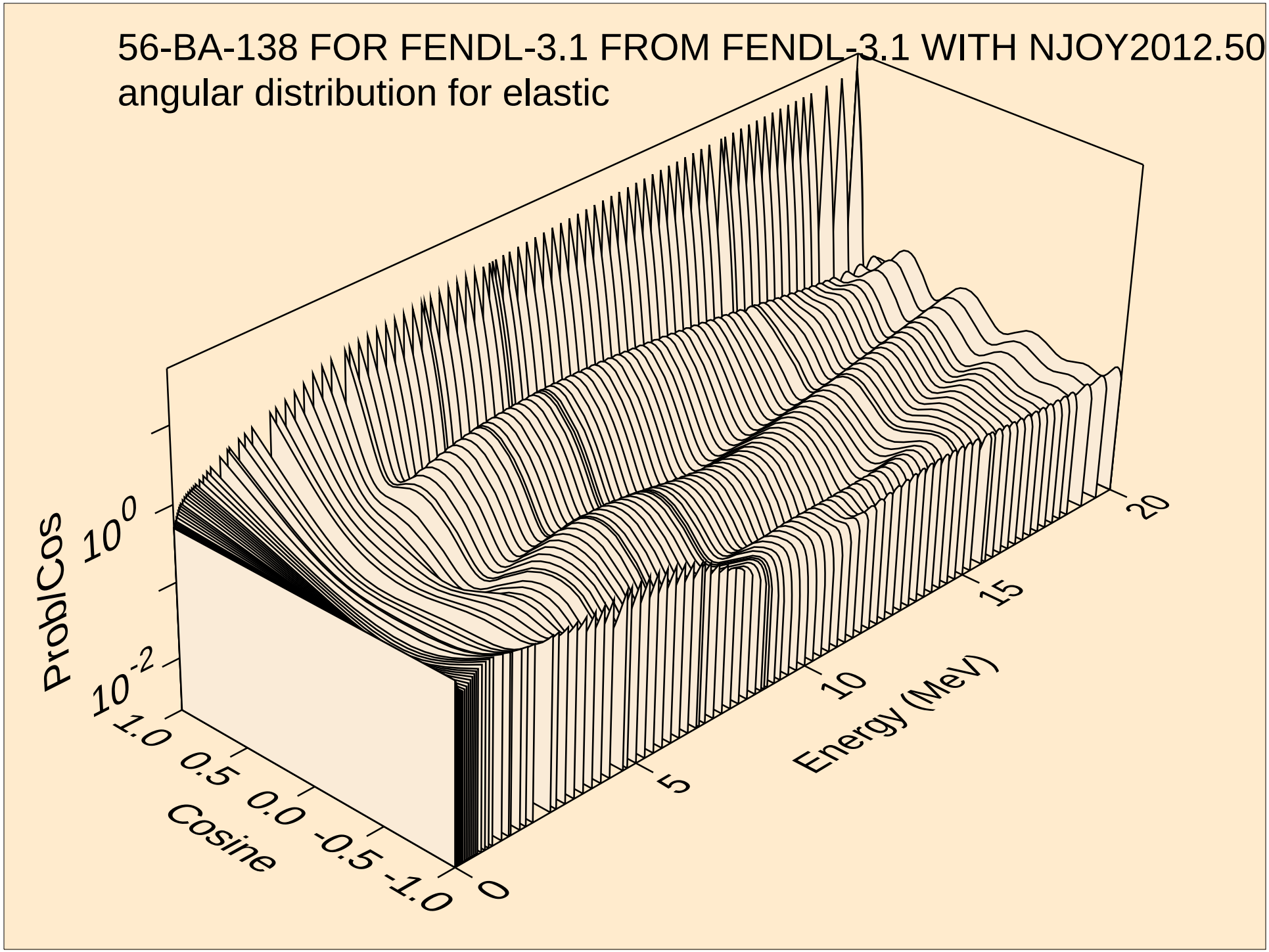

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Inelastic levels
Cross section (barns)
Energy (MeV)
(n,n*1)
(n,n*2)
(n,n*3)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
2
4
6
8
10
12
14
16
18
20

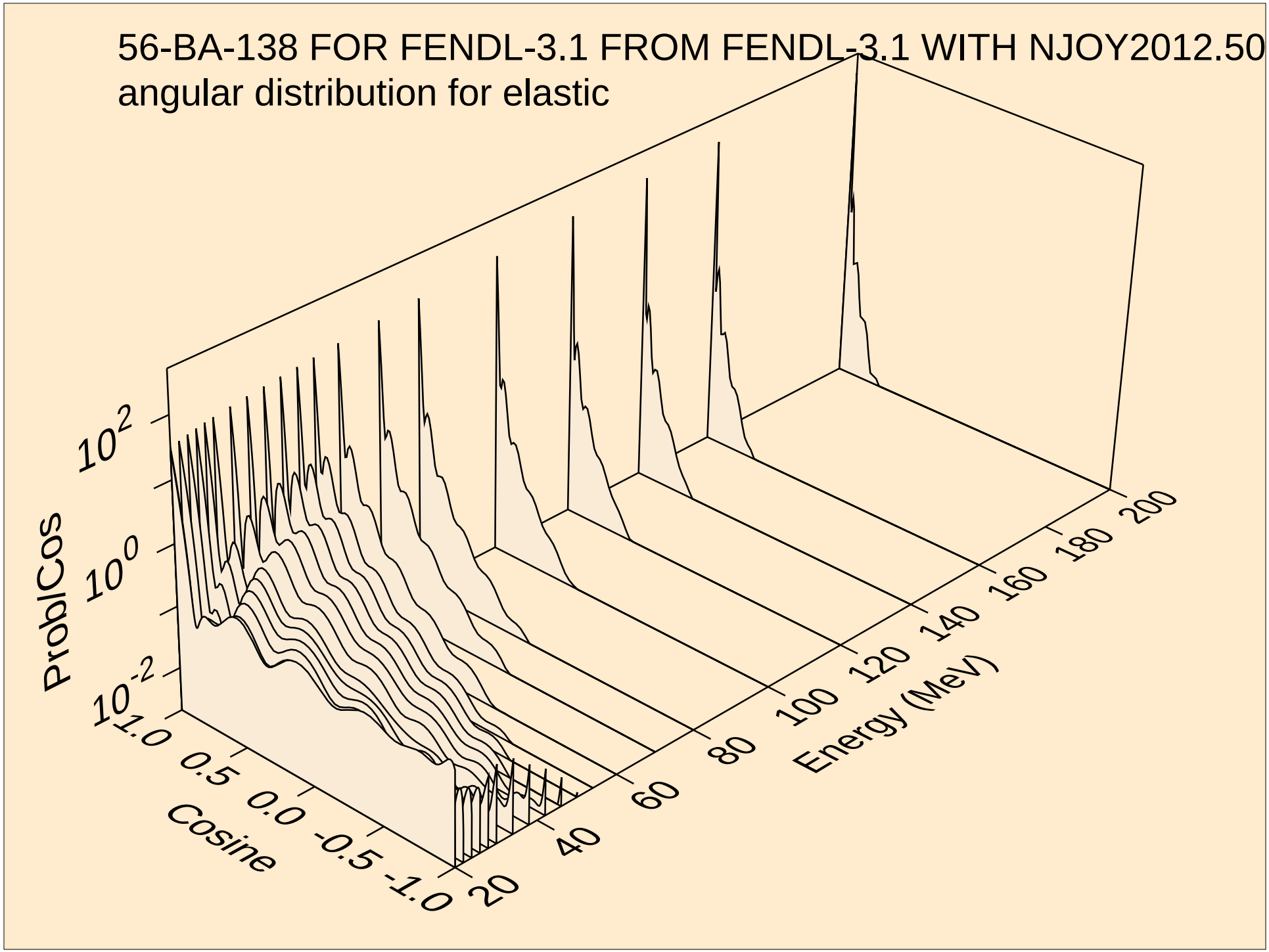

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Threshold reactions
(n,x)
(n,2n)
(n,3n)
(n,n*)a
(n,n*)p
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
0
20
40
60
80
100
120
140
160
180
200

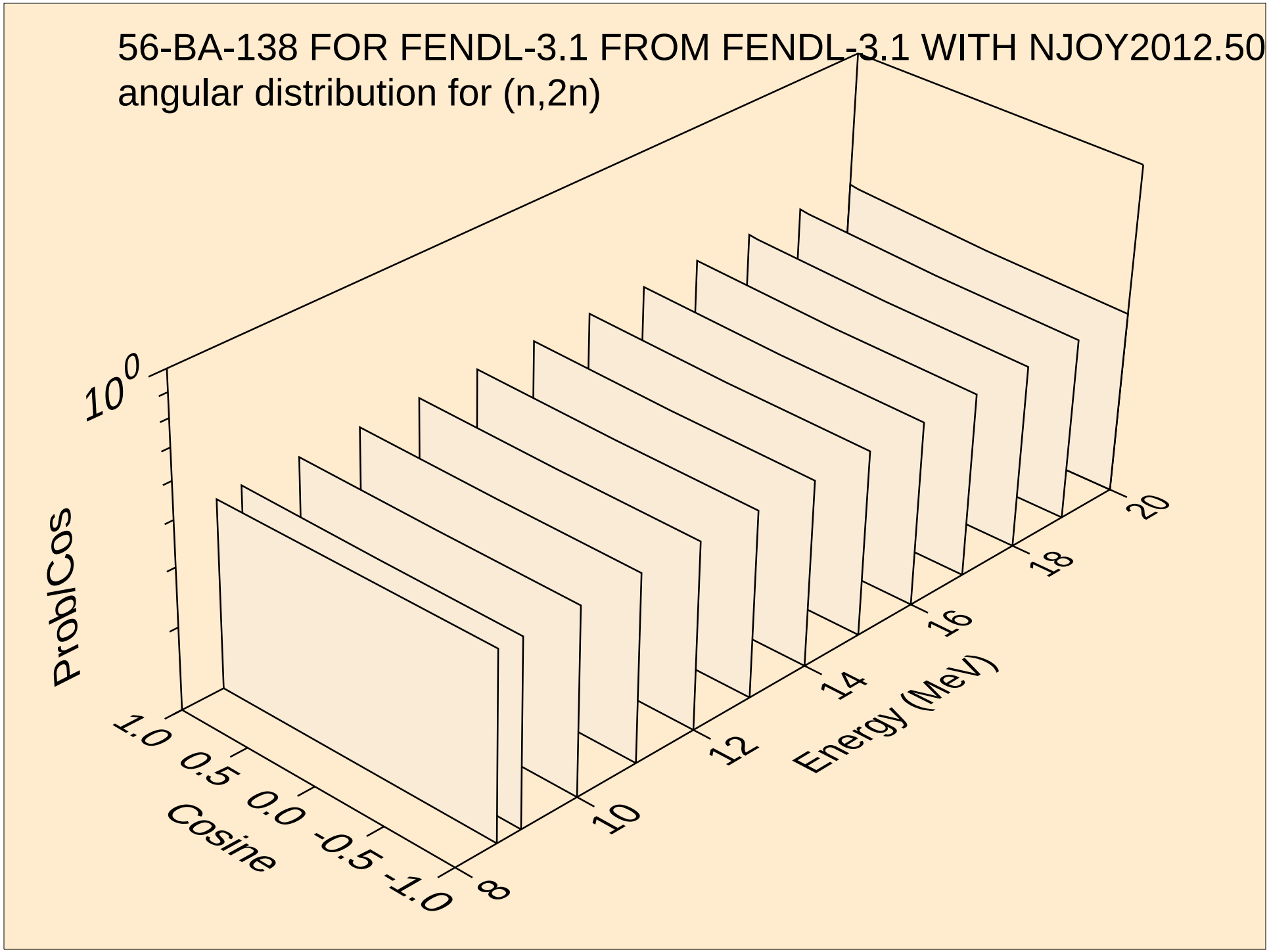

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Threshold reactions
(n,n*c)
(n,p)
(n,d)
(n,t)
(n,he3)
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
2
4
6
8
10
12
14
16
18
20

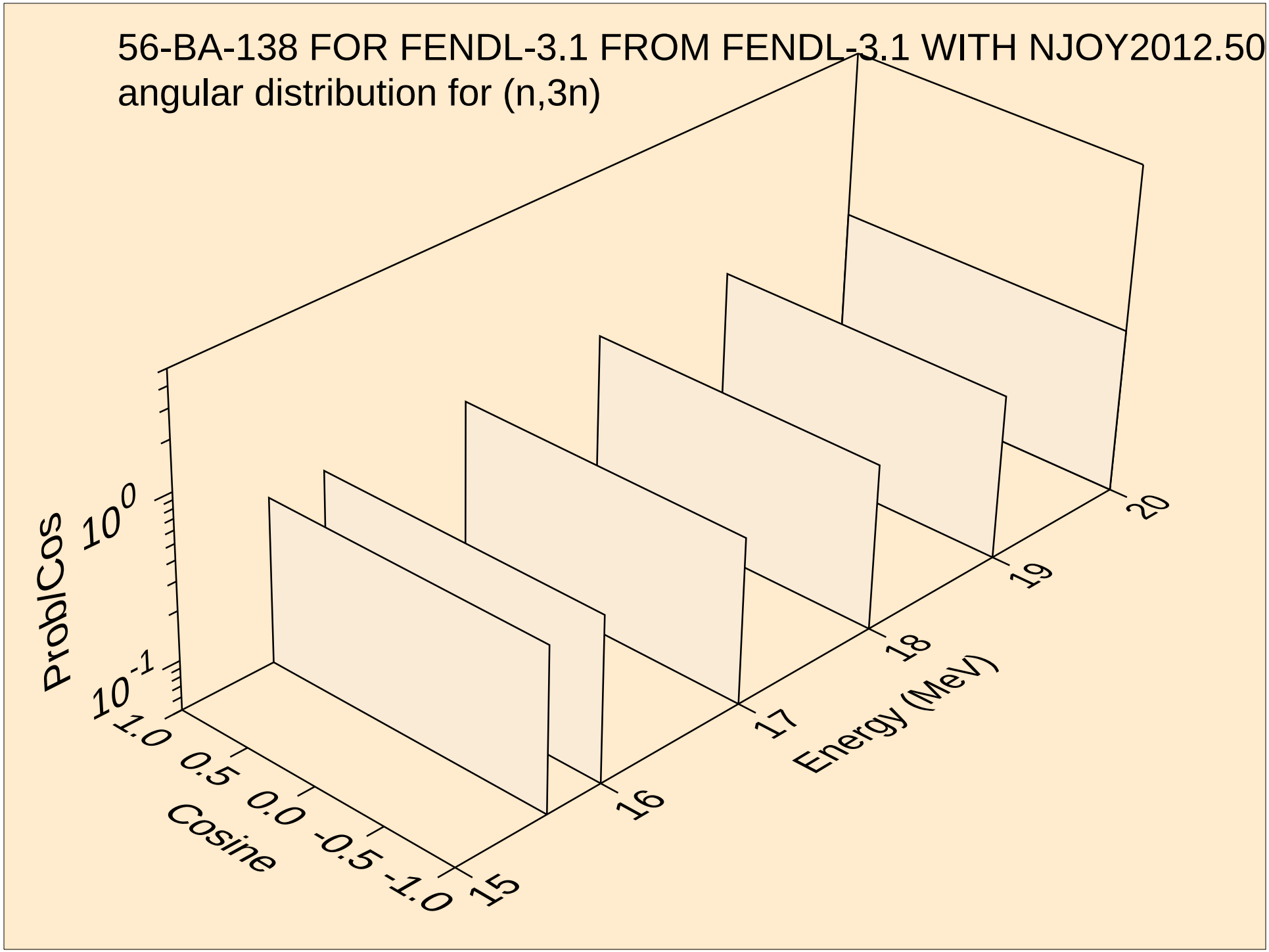

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Threshold reactions
*10-3
(n,a)
Cross section (barns)
0
1
2
3
4
5
6
4
6
8
10
12
14
16
18
20
Energy (MeV)

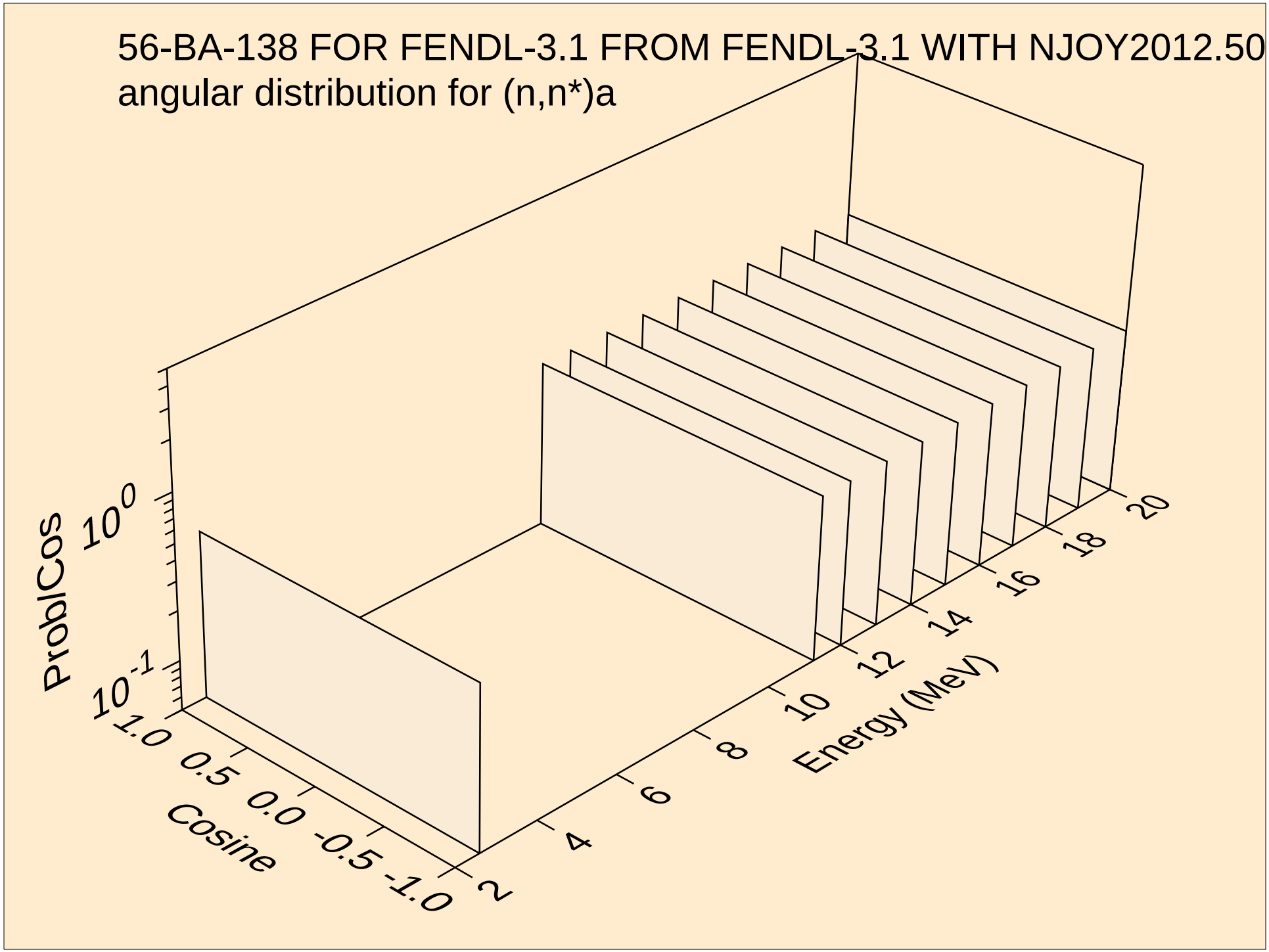

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Threshold reactions
(n,xp)
(n,xd)
(n,xt)
(n,xhe3)
(n,xa)
Cross section (barns)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

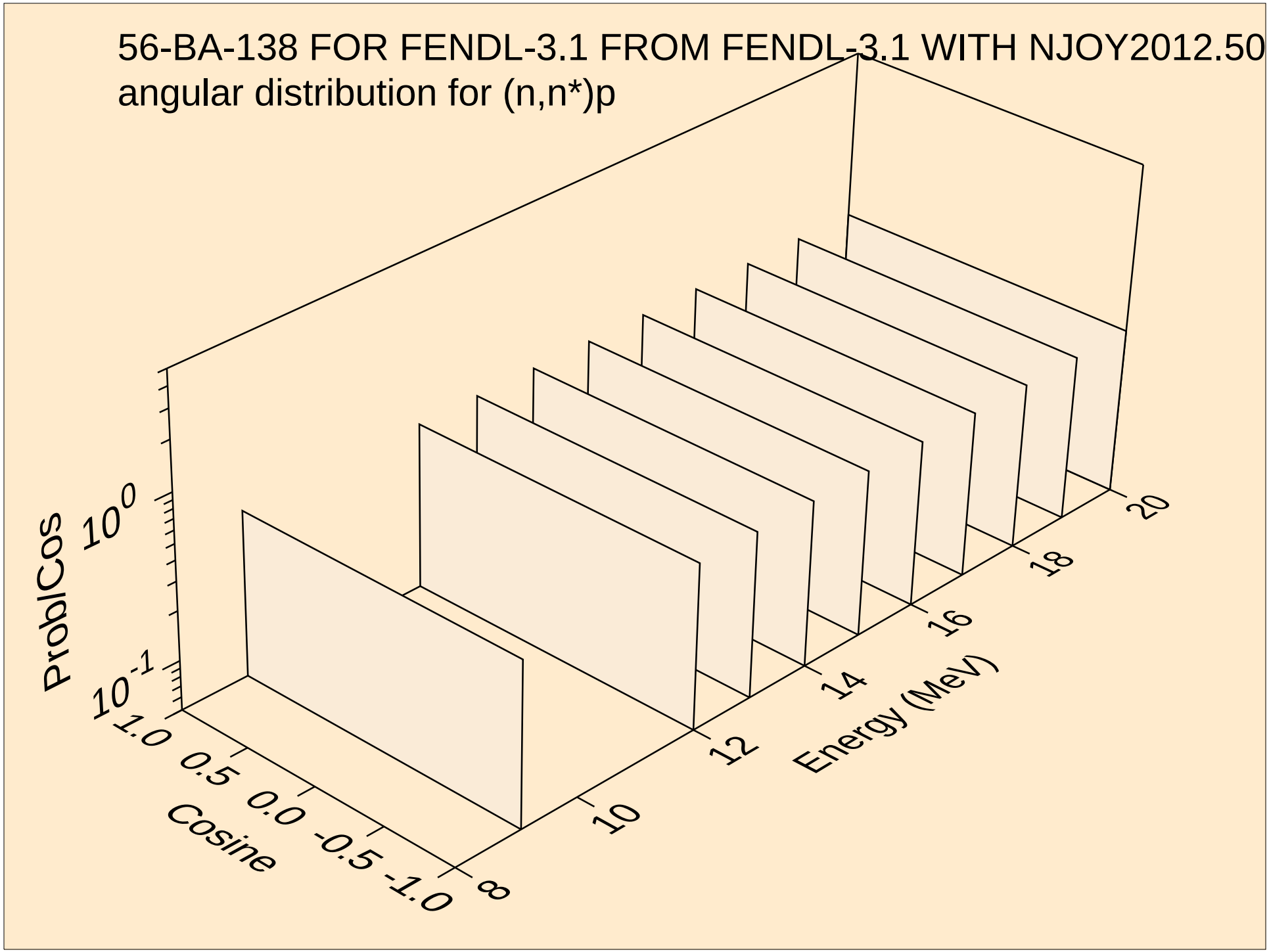

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for elastic
ProbICos
10^{0}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
5
10
15
20
Energy (MeV)

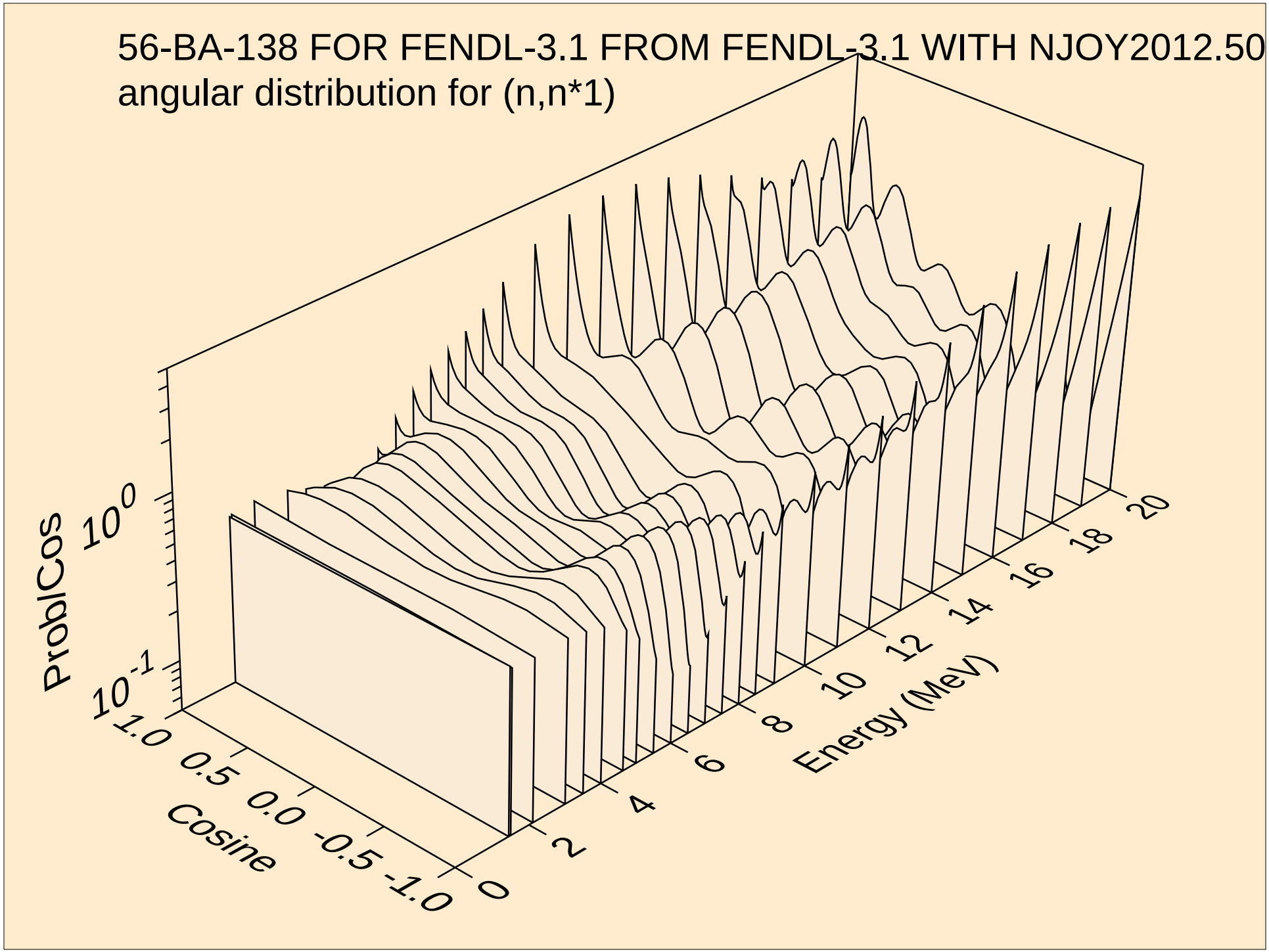

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for elastic
ProblCos
10^{2}
10^{0}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
180
200
Energy (MeV)

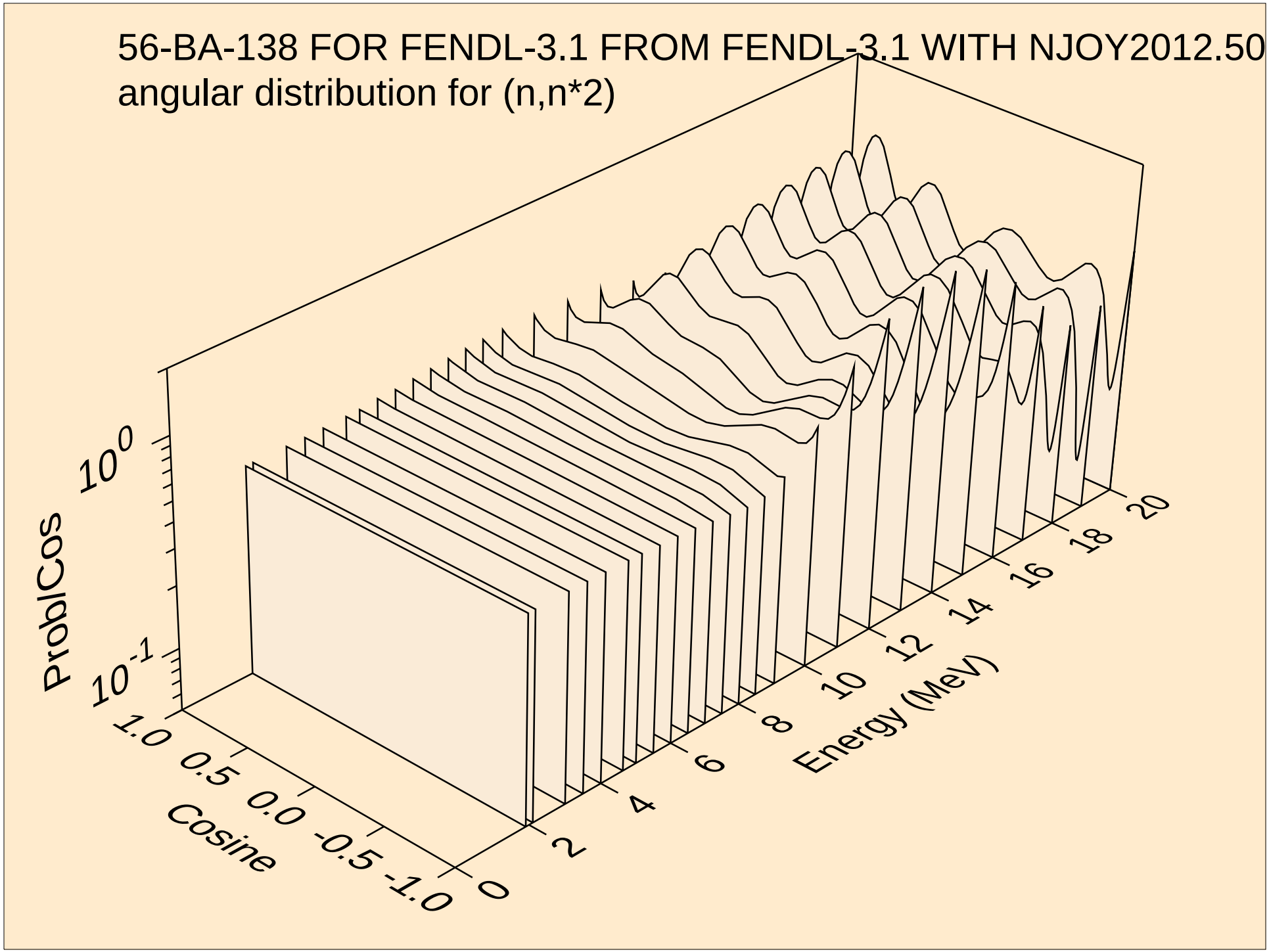

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,2n)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

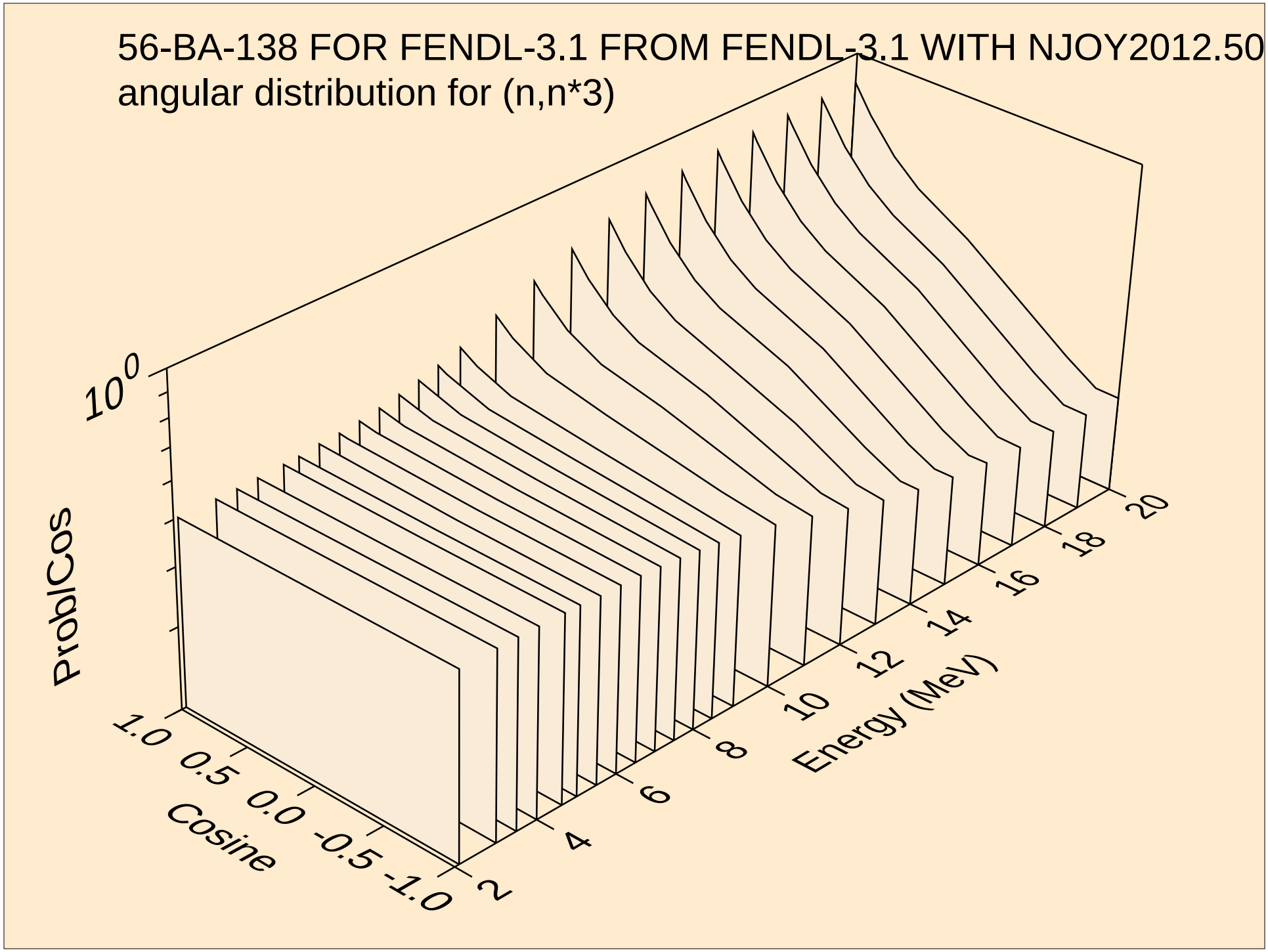

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,3n)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
15
16
17
18
19
20
Energy (MeV)

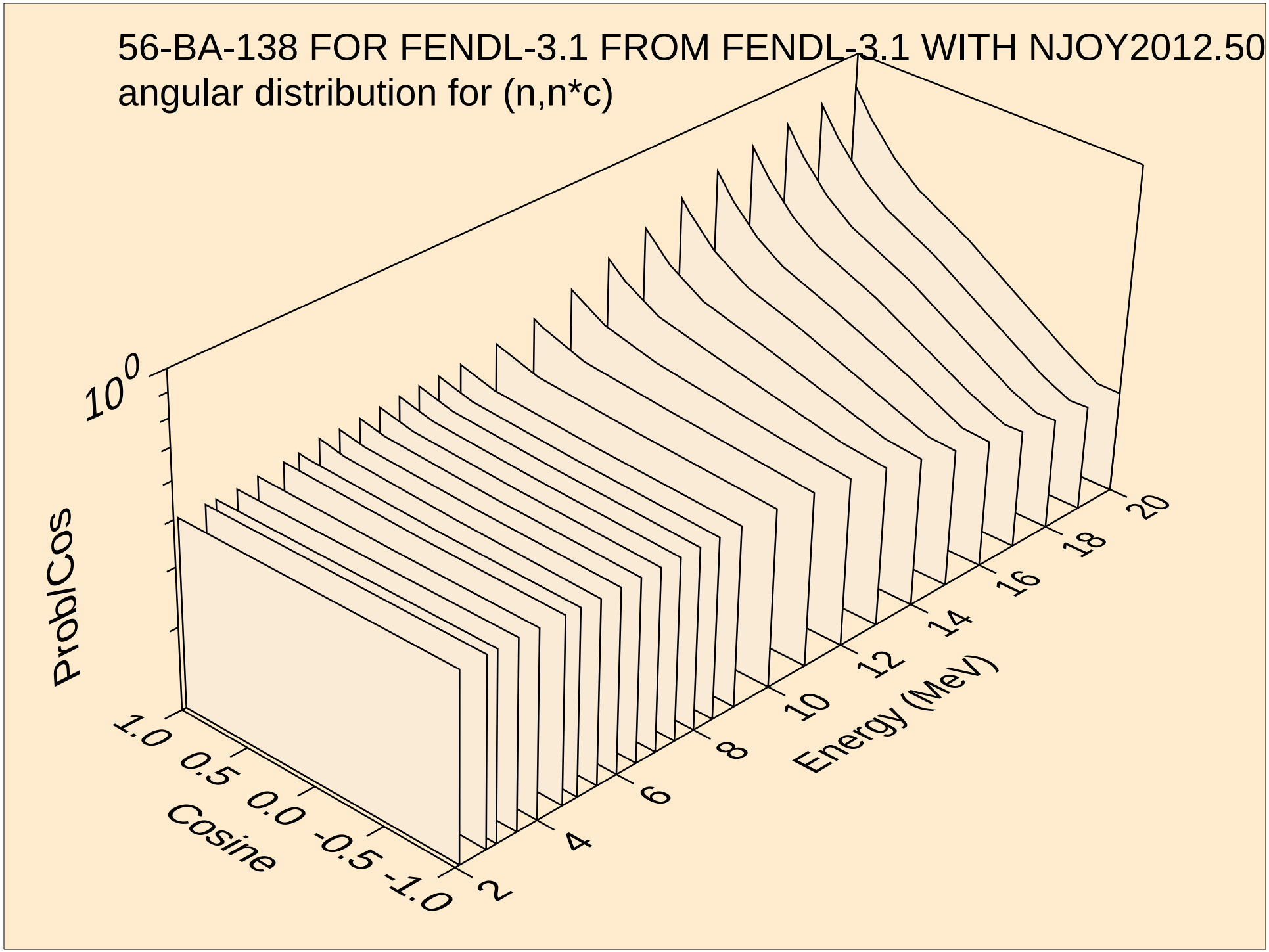

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*)a
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

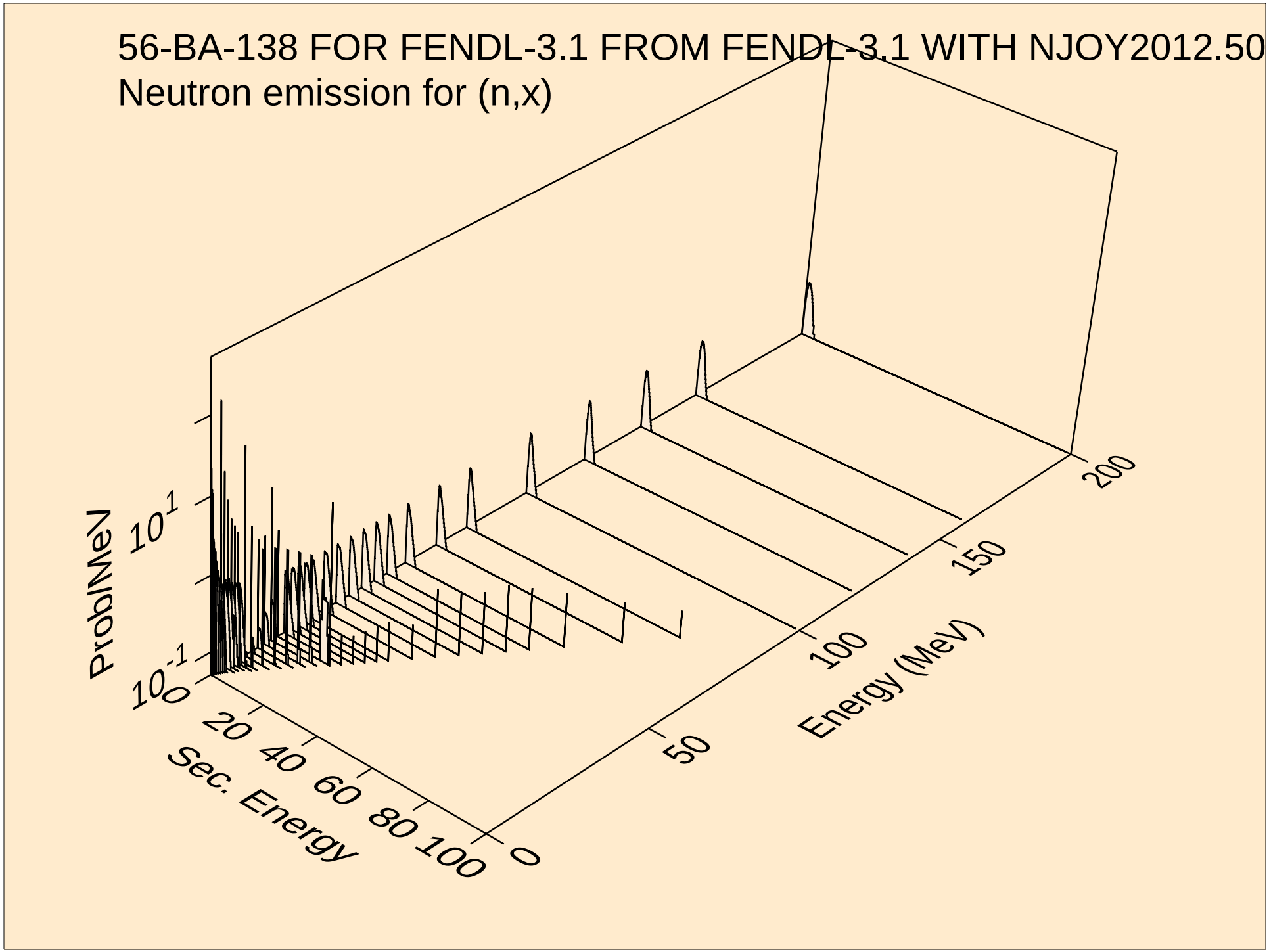

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*)p
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
8
10
12
14
16
18
20
Energy (MeV)

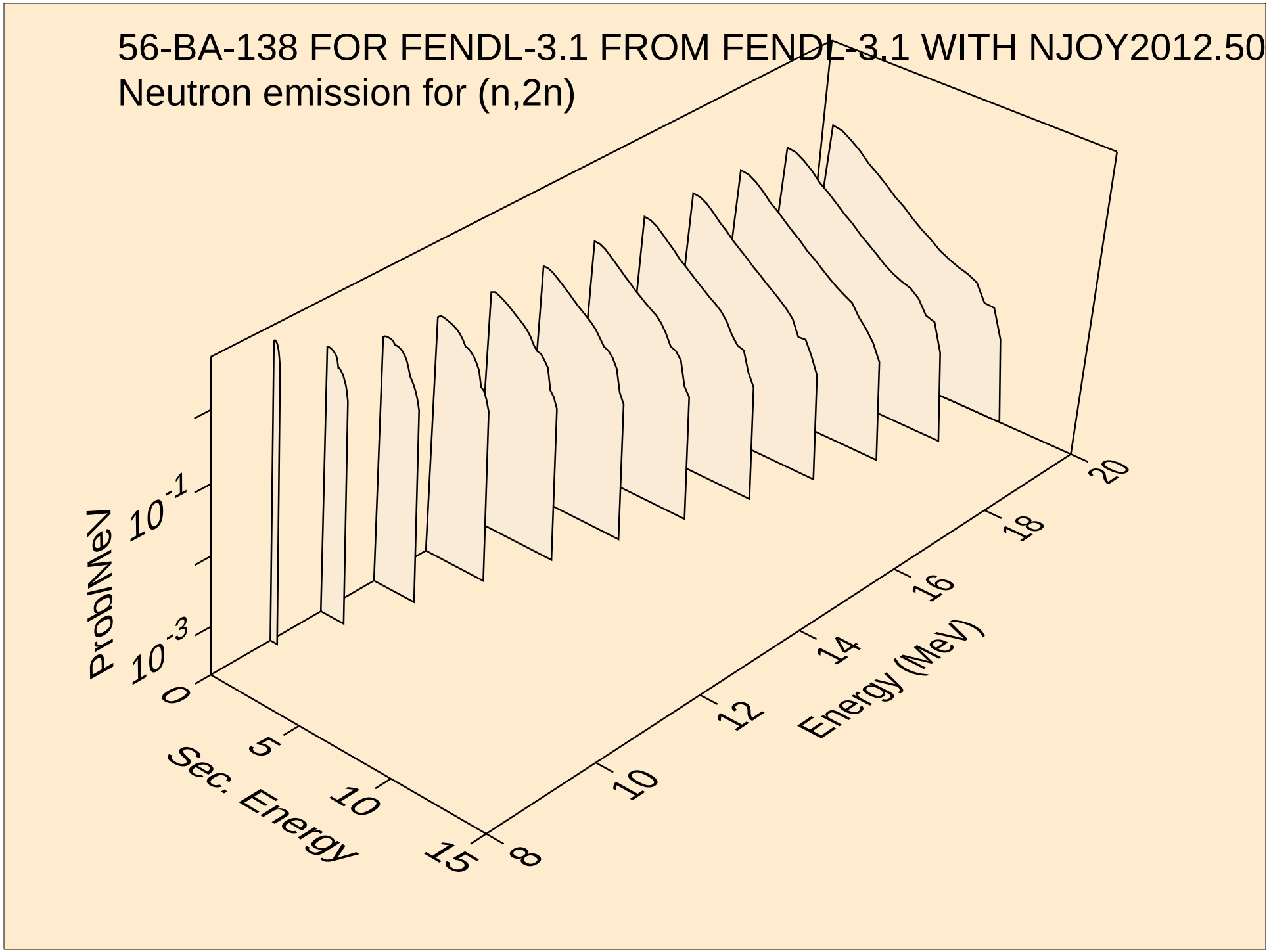

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*1)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

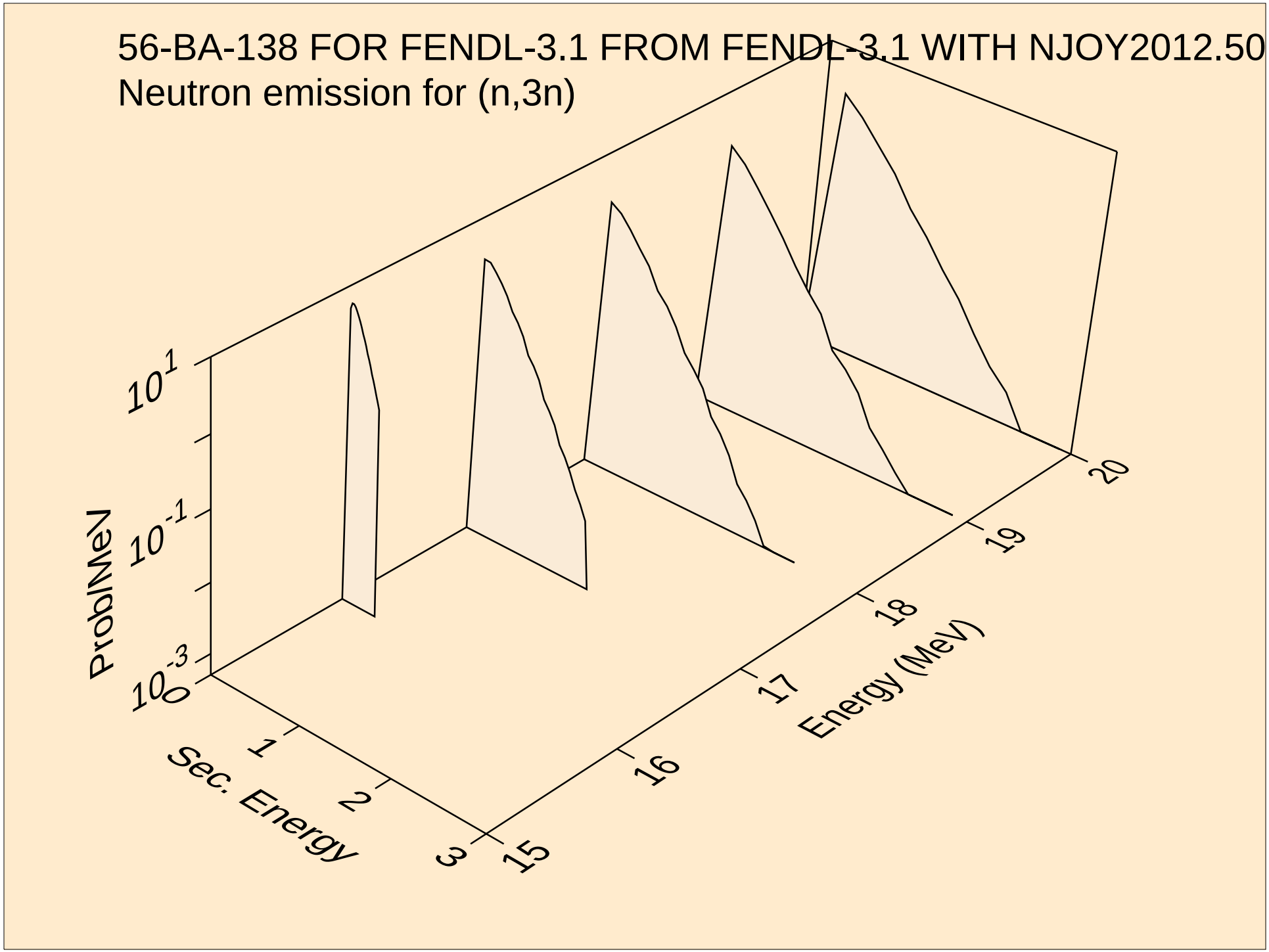

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*2)
ProbICos
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

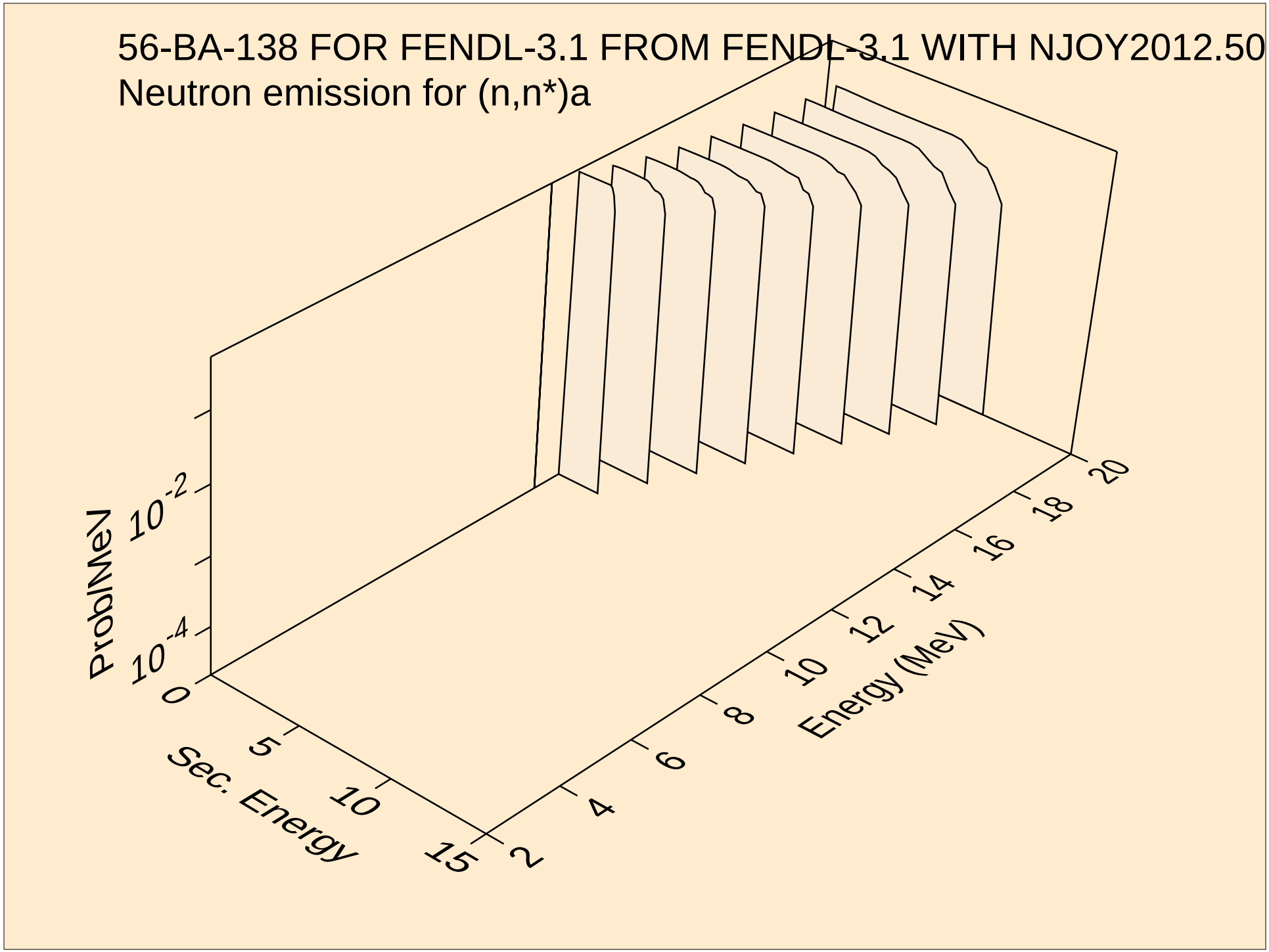

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*3)
10^0
ProbICos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

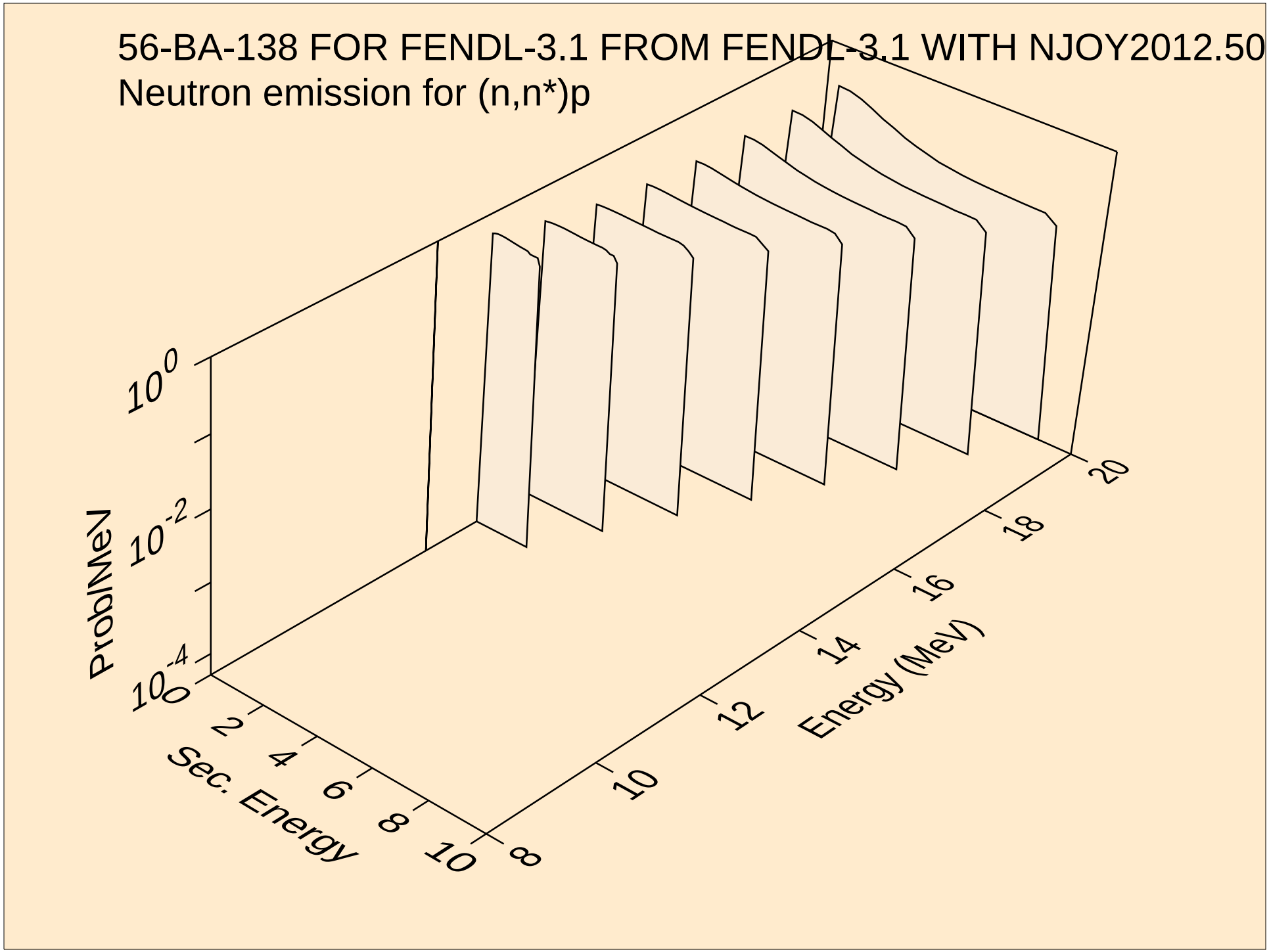

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
angular distribution for (n,n*c)
10^0
Prob\Cos
1.0
0.5
0.0
-0.5
-1.0
Cosine
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

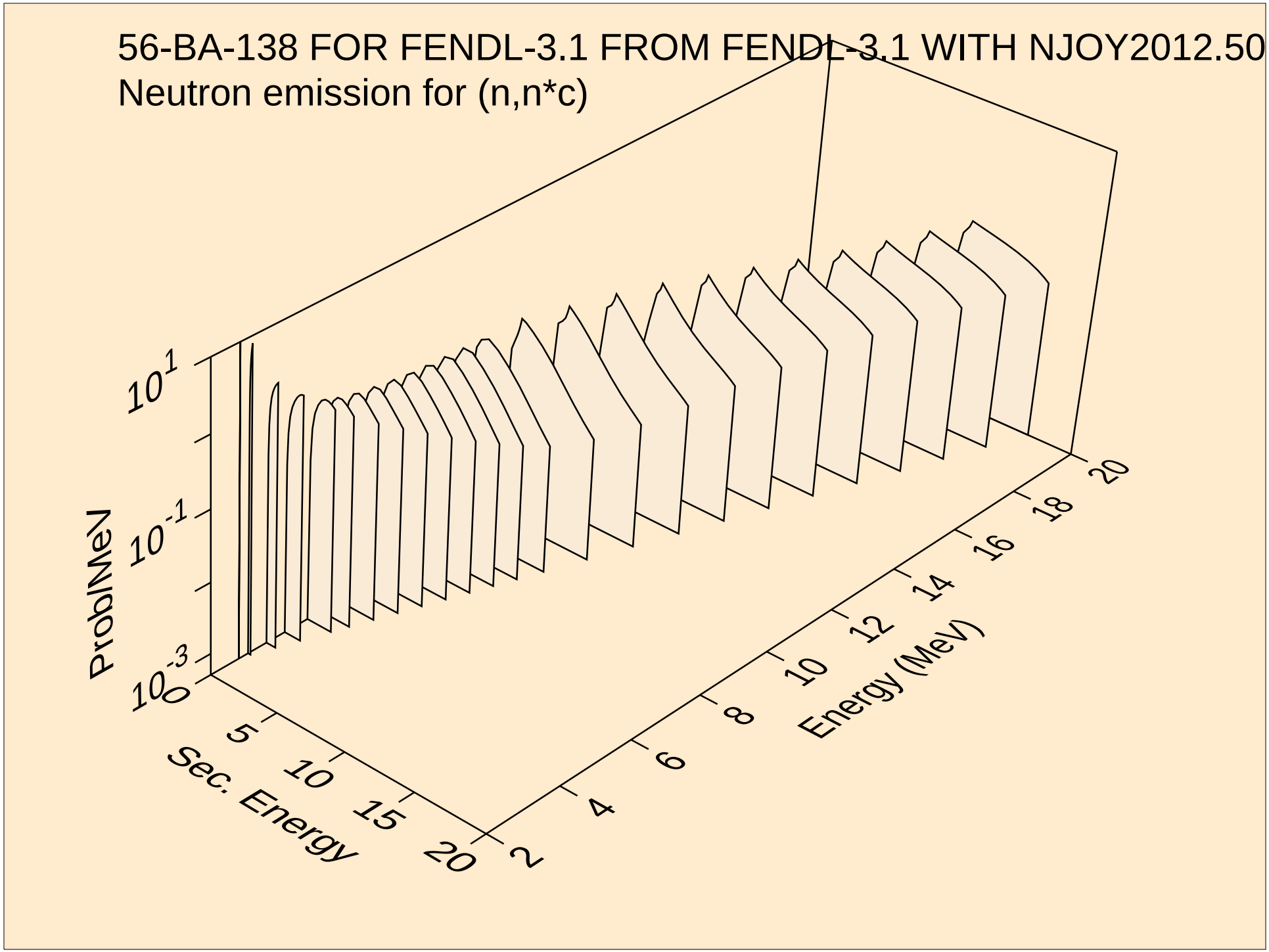

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,x)
Prob/MeV
10^1
10^-1
10^0
Sec. Energy
0
20
40
60
80
100
Energy (MeV)
50
100
150
200

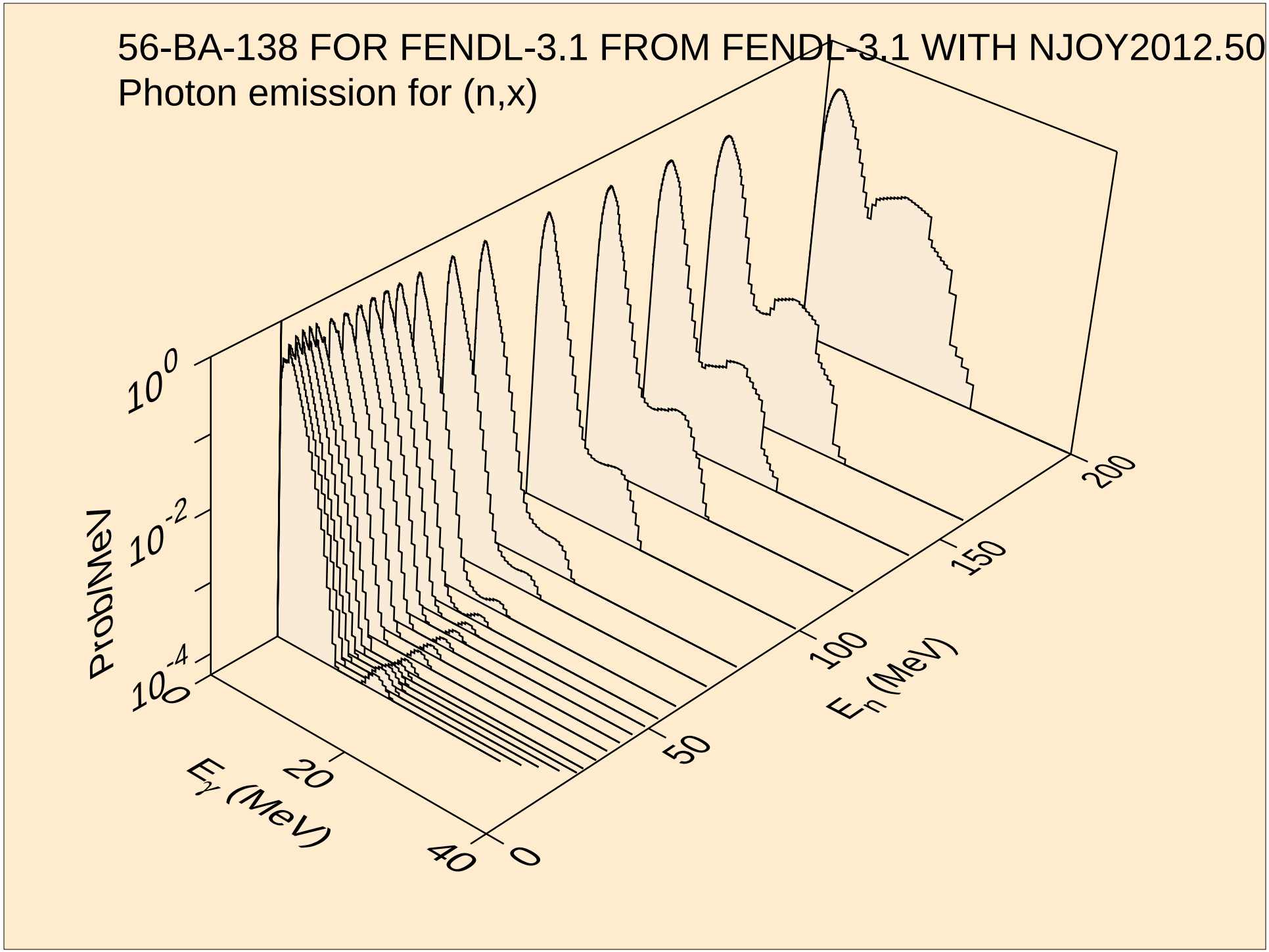

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,2n)
Prob/MeV
10-1
10-3
0
5
10
15
Sec. Energy
8
10
12
14
16
18
20
Energy (MeV)

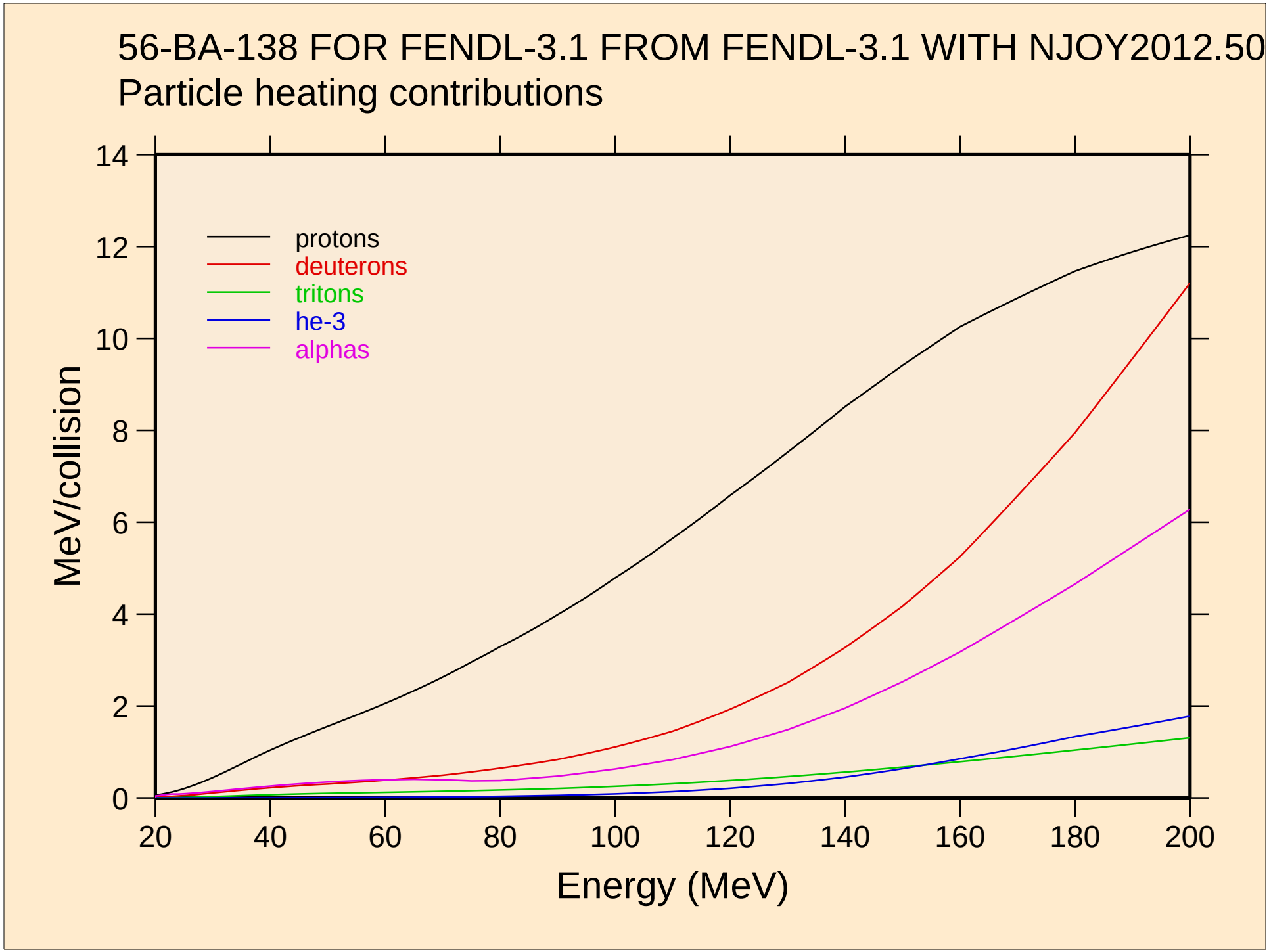

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,3n)
Prob/MeV
10^1
10^-1
10^-3
0
Sec. Energy
1
2
3
Energy (MeV)
15
16
17
18
19
20

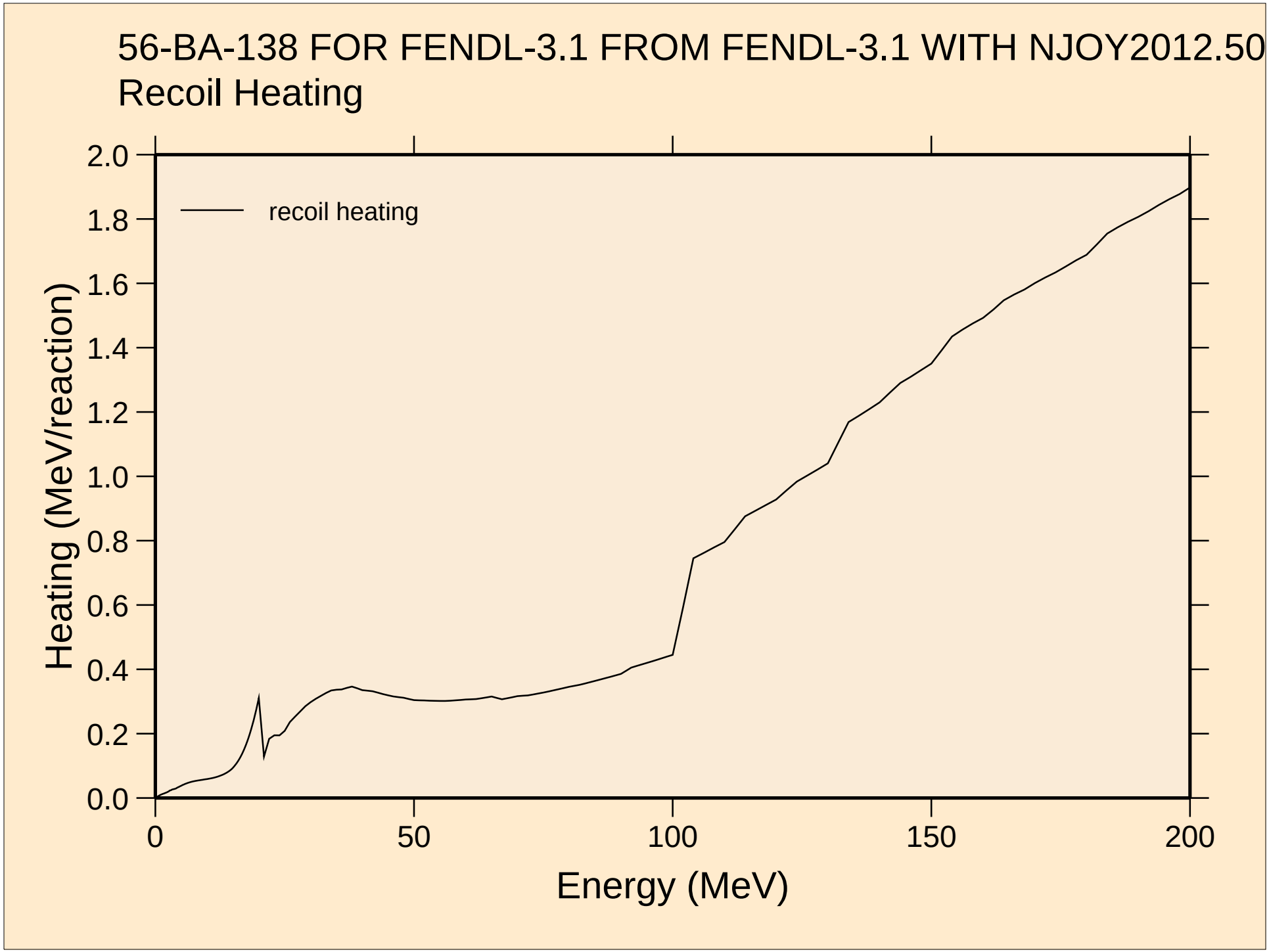

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,n*)a
Prob/MeV
10-2
10-4
0
5
10
15
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

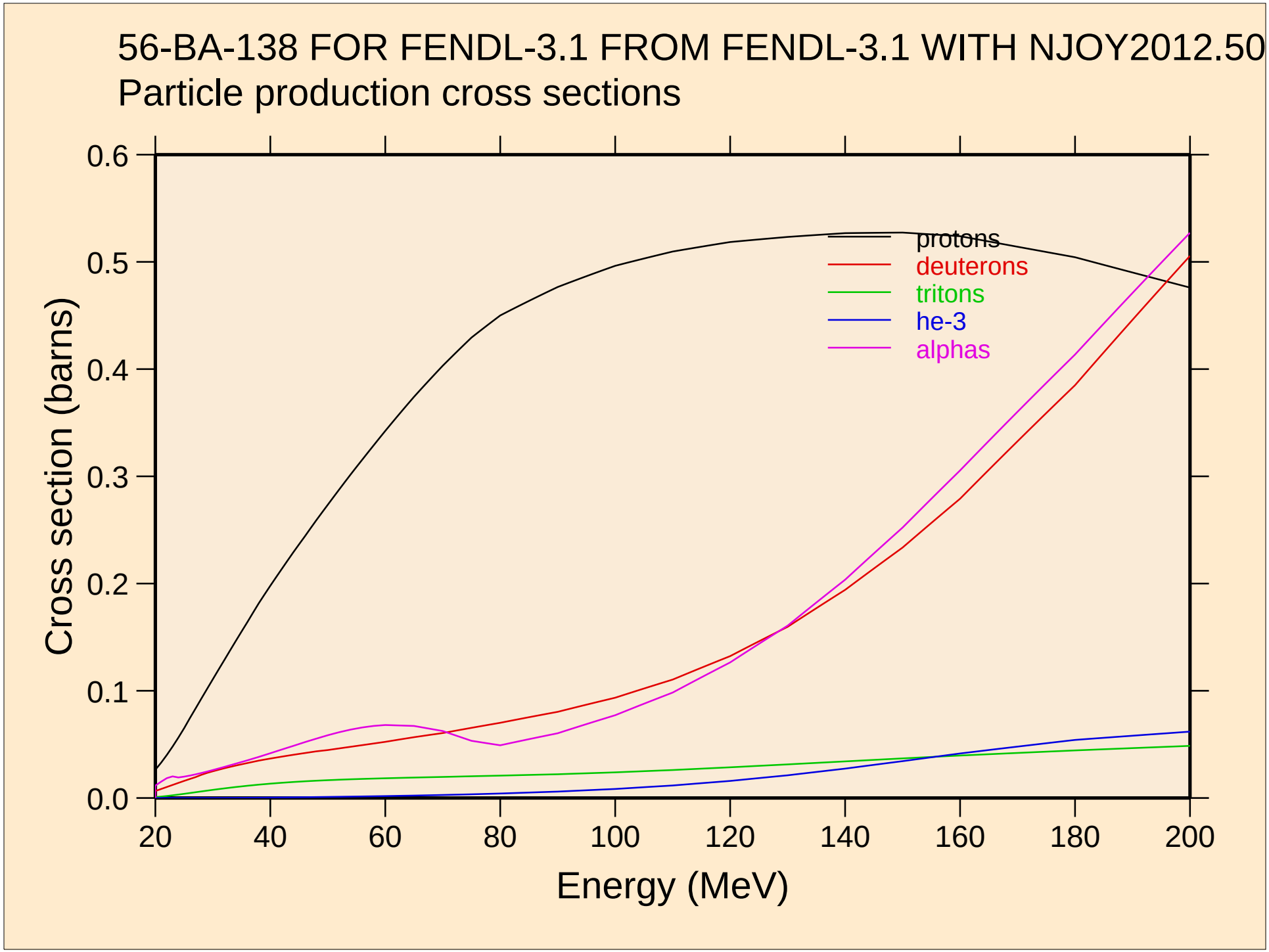

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,n*)p
Prob/MeV
10^0
10^-2
10^-4
Sec. Energy
2
4
6
8
10
8
10
12
14
16
18
20
Energy (MeV)

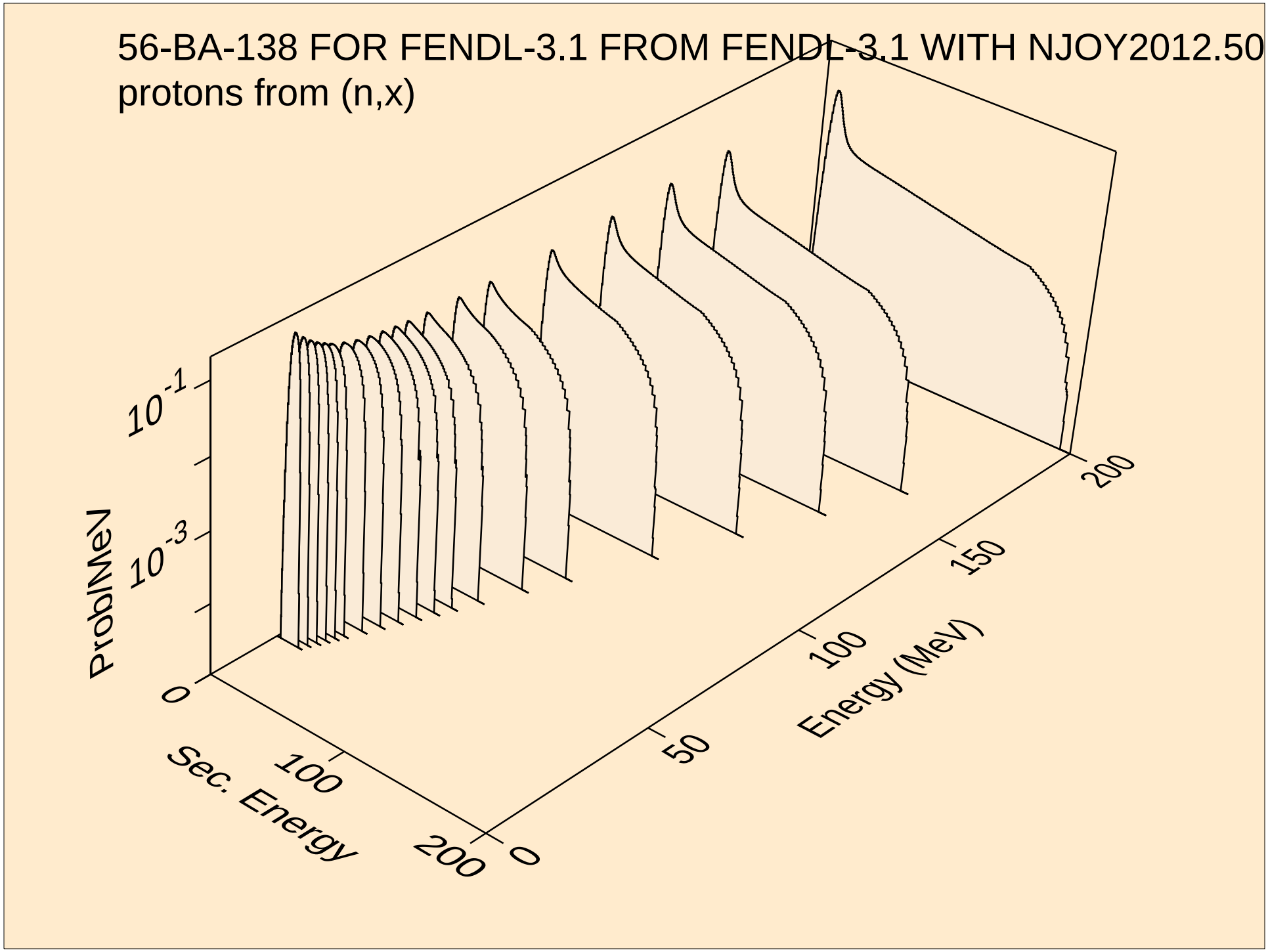

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Neutron emission for (n,n*c)
Prob/MeV
10^{1}
10^{-1}
10^{-3}
0
5
10
15
20
Sec. Energy
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

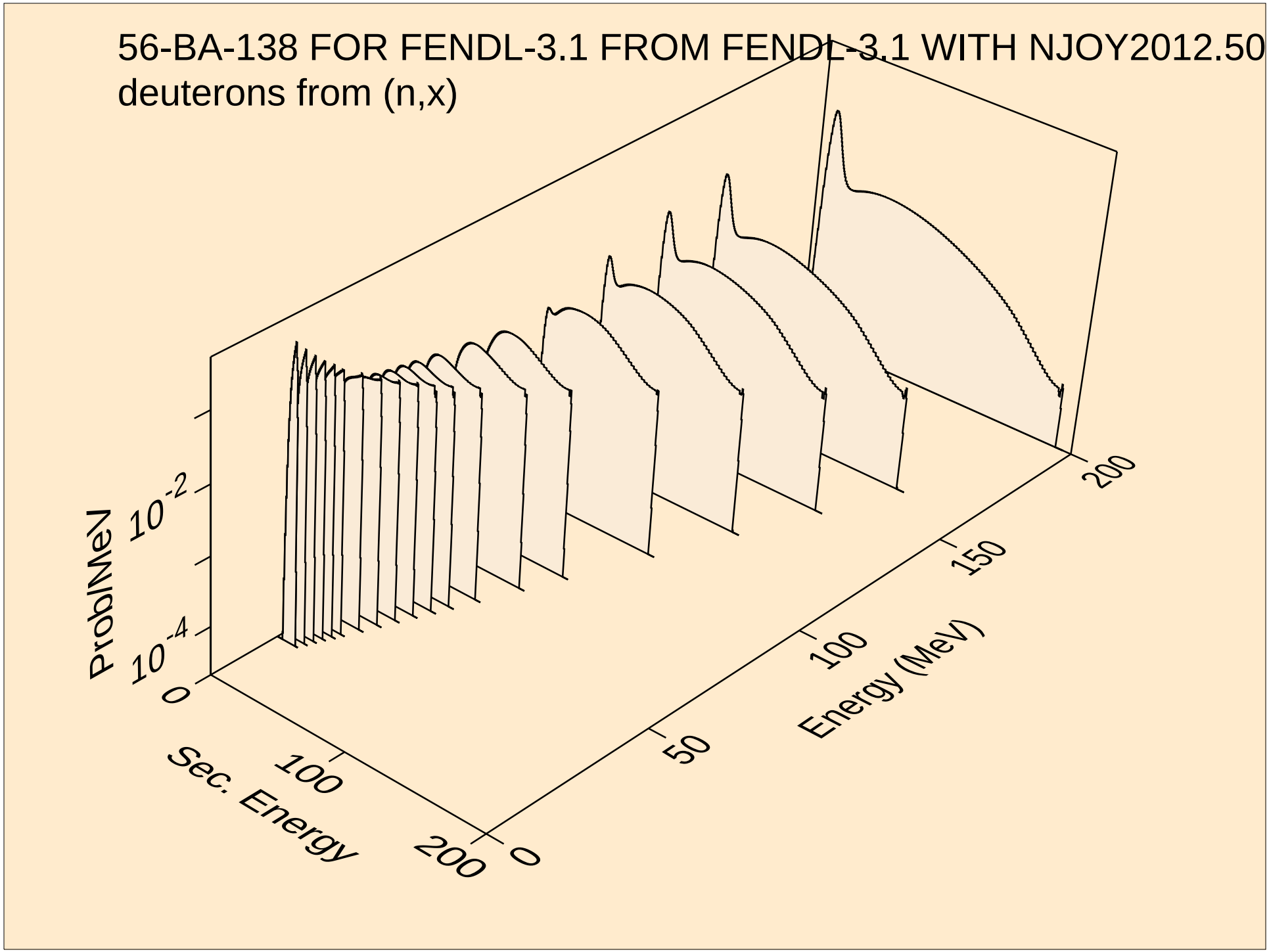

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Photon emission for (n,x)
Prob/MeV
10^{0}
10^{-2}
10^{-4}
E_γ (MeV)
0
20
40
E_n (MeV)
0
50
100
150
200

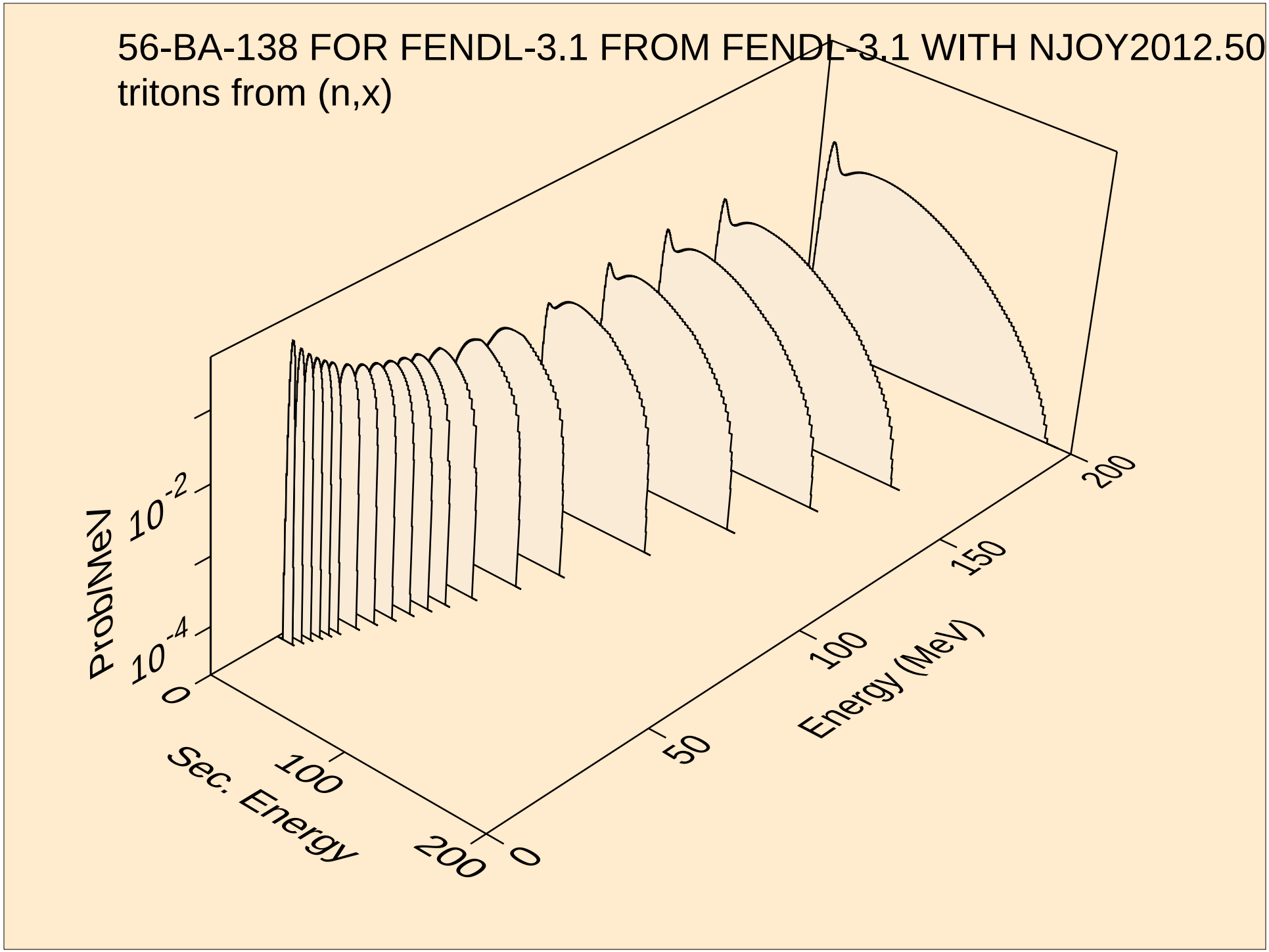

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Particle heating contributions
protons
deuterons
tritons
he-3
alphas
MeV/collision
Energy (MeV)
0
2
4
6
8
10
12
14
20
40
60
80
100
120
140
160
180
200

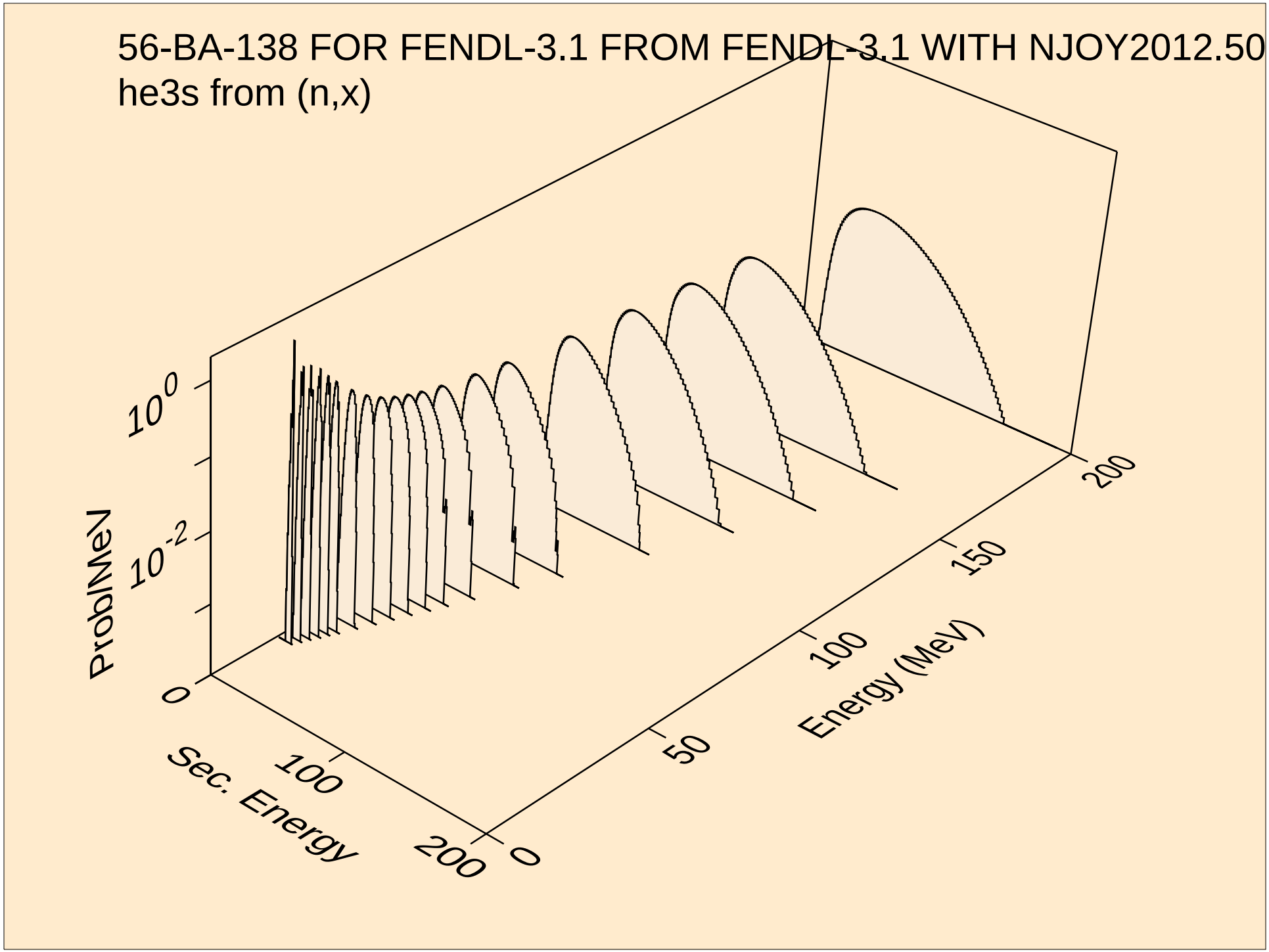

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Recoil Heating
recoil heating
Heating (MeV/reaction)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
0
50
100
150
200

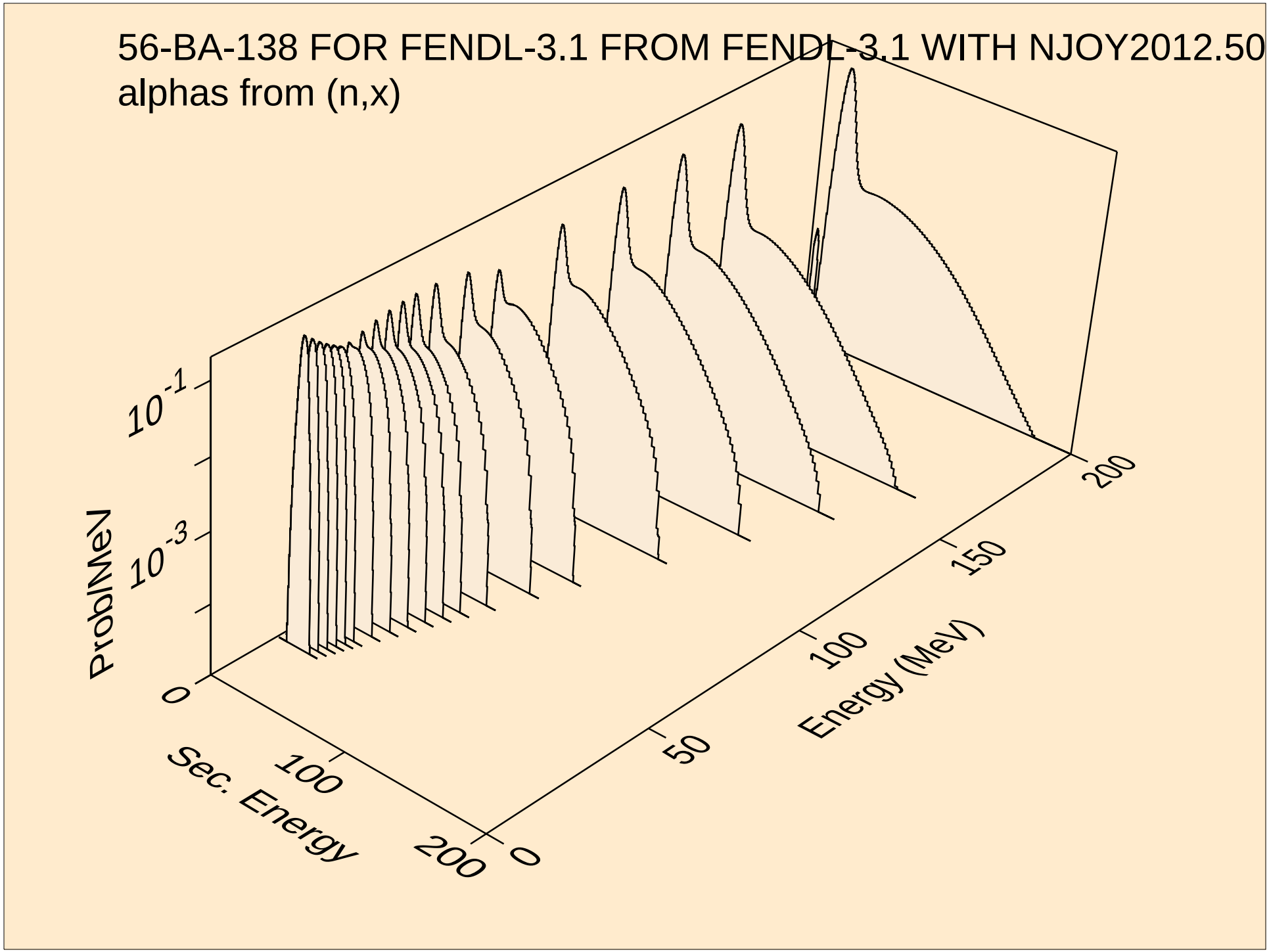

56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
Particle production cross sections
Cross section (barns)
Energy (MeV)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
20
40
60
80
100
120
140
160
180
200
protons
deuterons
tritons
he-3
alphas


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
protons from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
Energy (MeV)
150
200


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
deuterons from (n,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
tritons from (n,x)
Prob/MeV
10-2
10-4
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
he3s from (n,x)
Prob/MeV
10^{0}
10^{-2}
0
100
200
Sec. Energy
0
50
100
150
200
Energy (MeV)


56-BA-138 FOR FENDL-3.1 FROM FENDL-3.1 WITH NJOY2012.50
alphas from (n,x)
Prob/MeV
10-1
10-3
0
Sec. Energy
100
200
0
50
100
150
200
Energy (MeV)