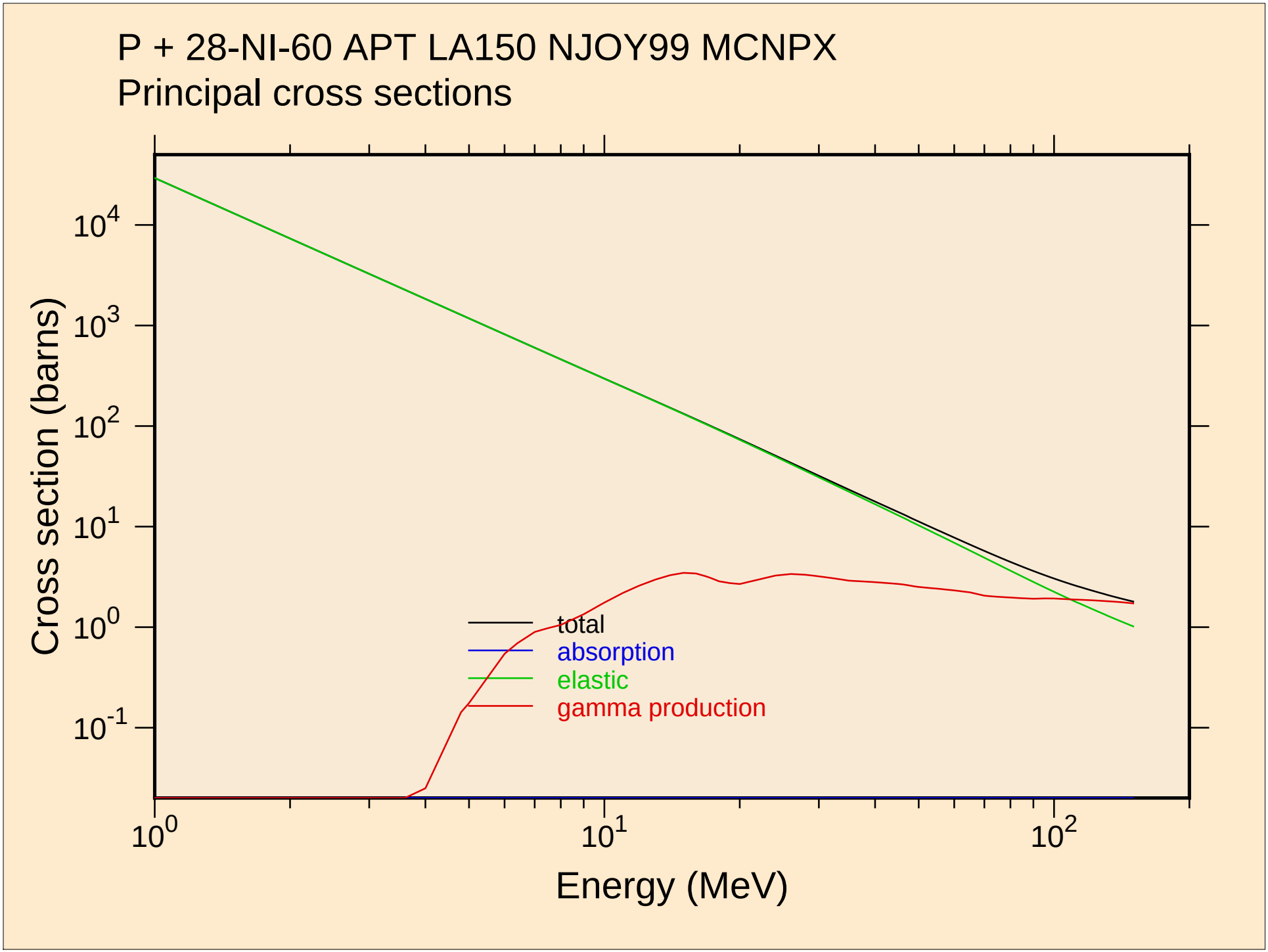
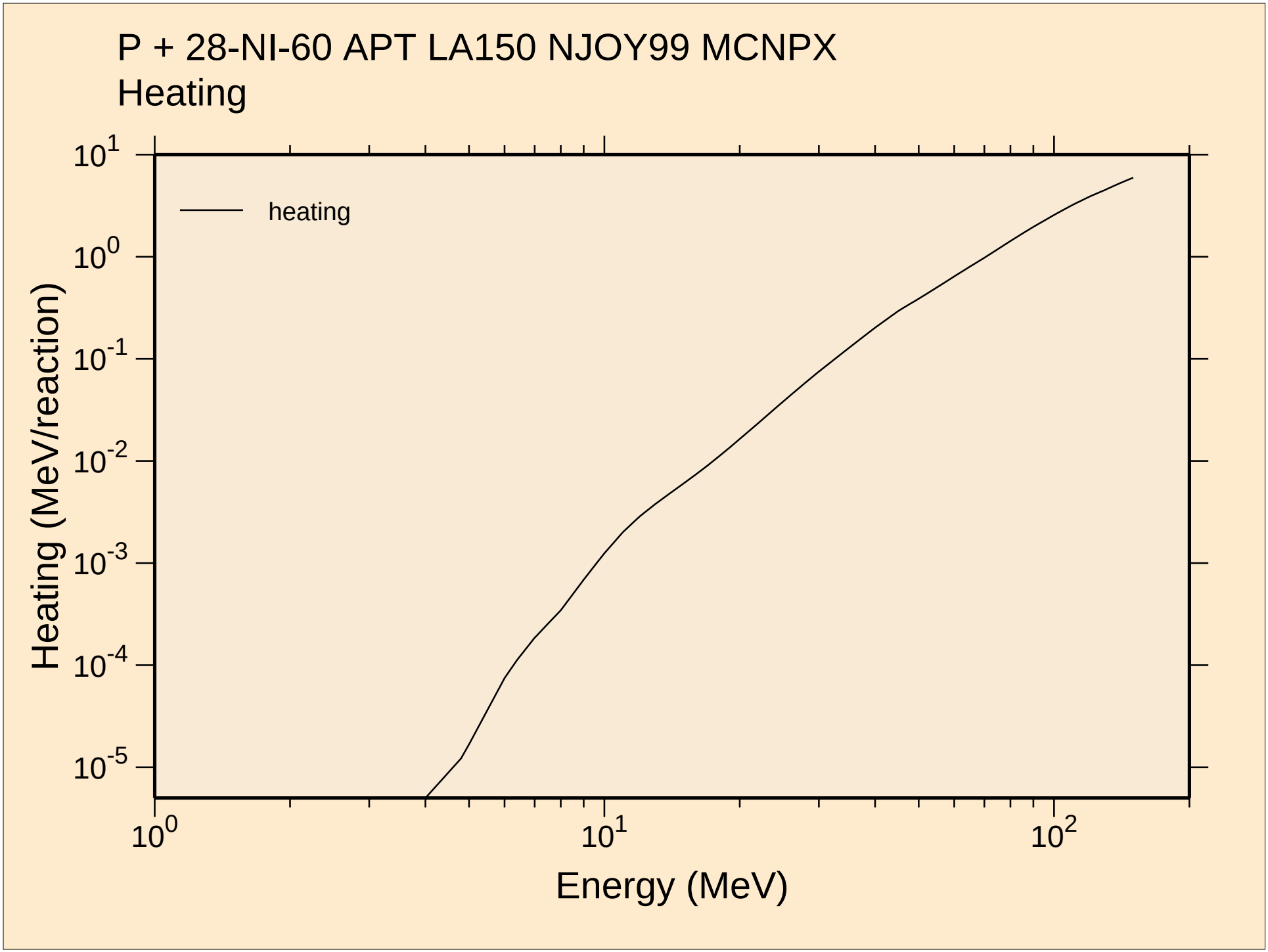
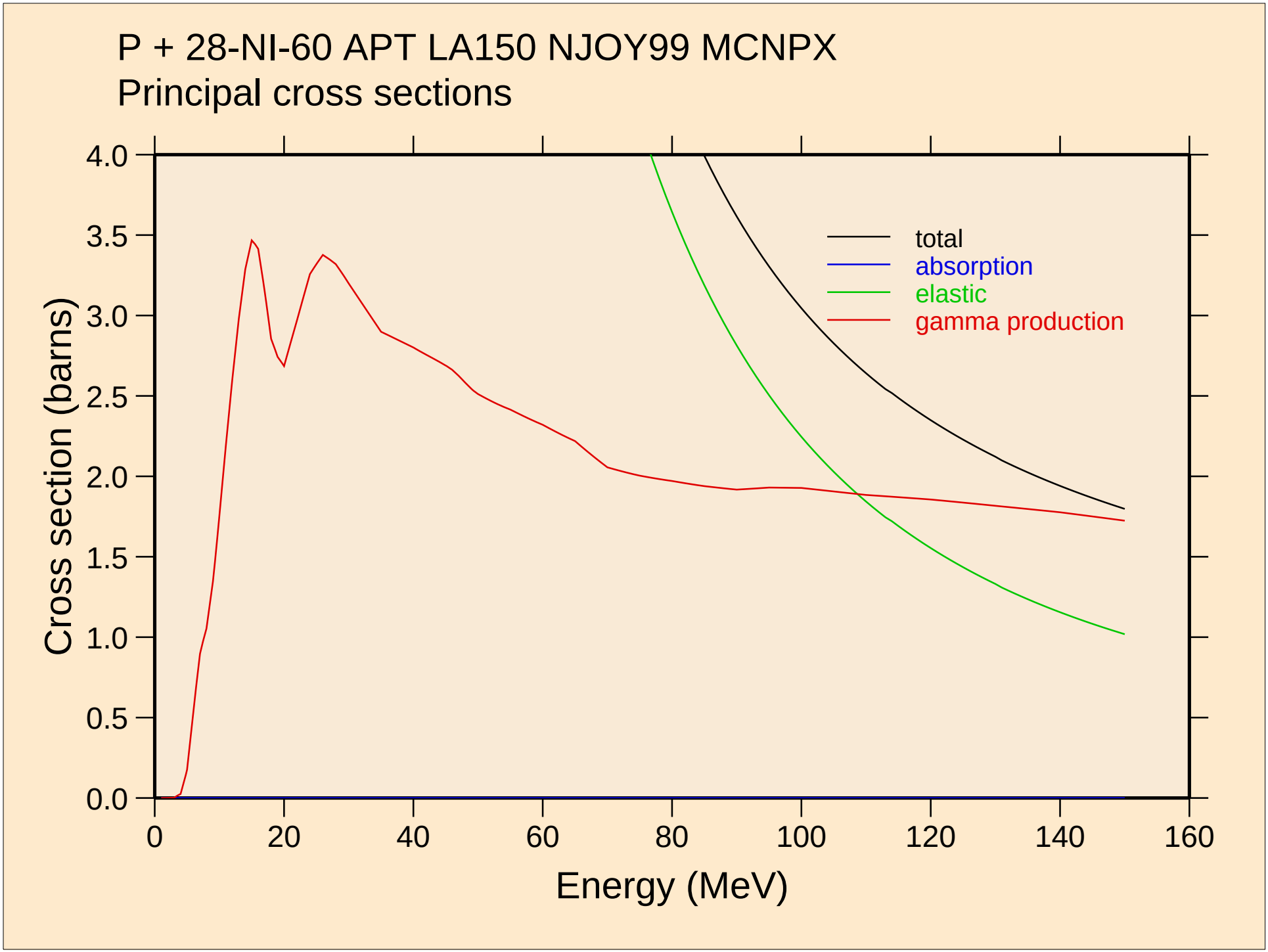
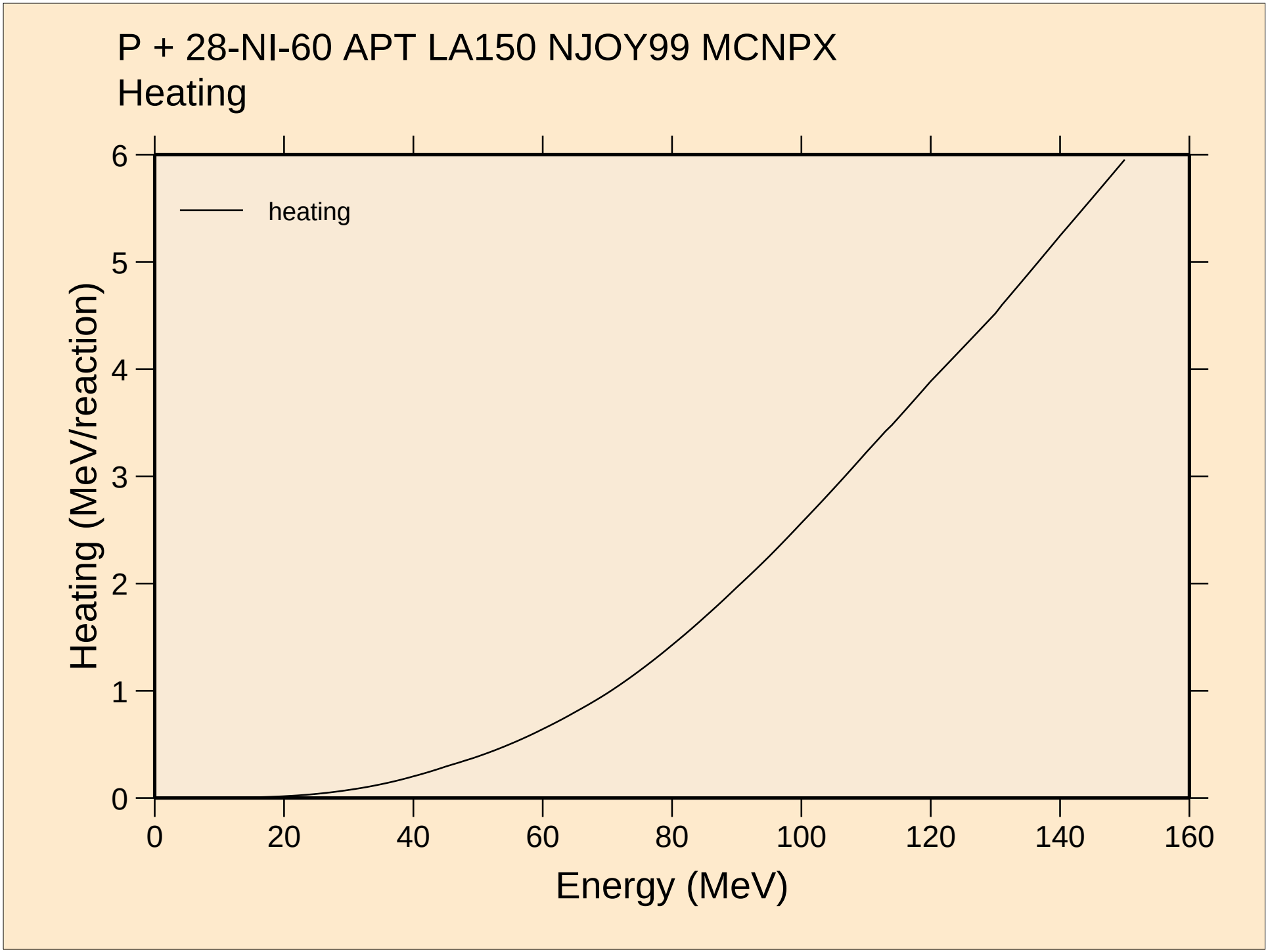
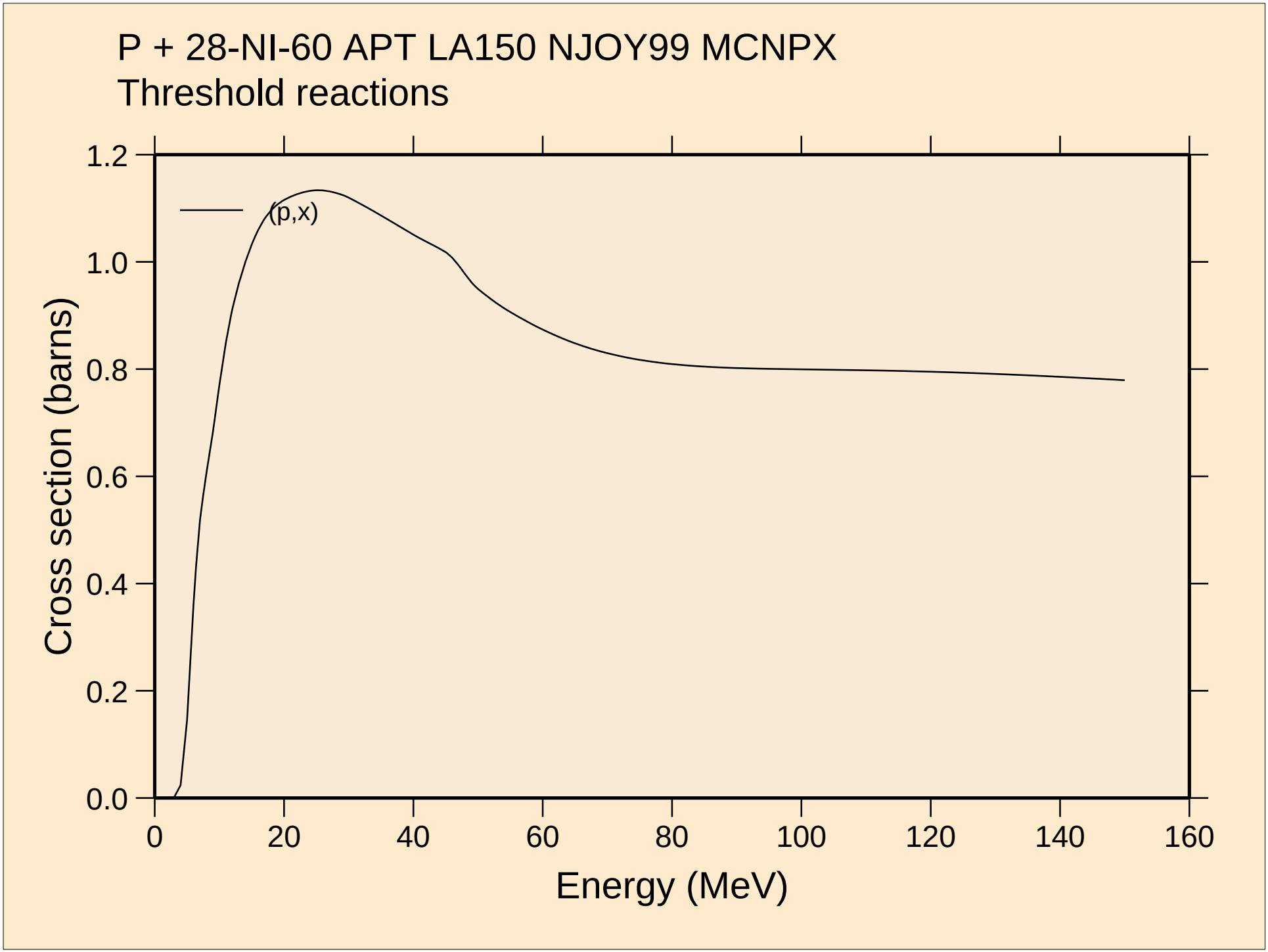
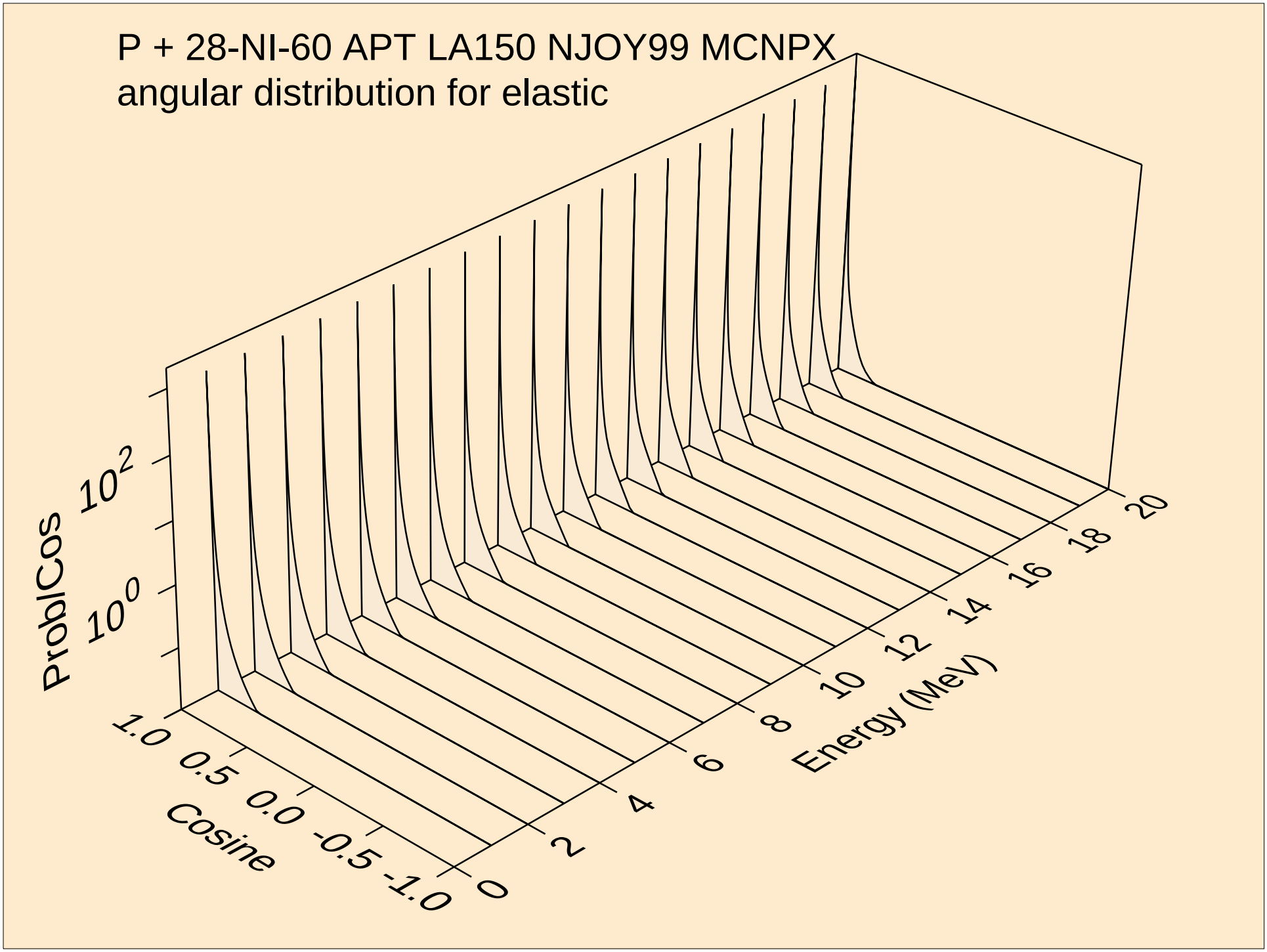

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Principal cross sections
Cross section (barns)
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
10^{0}
10^{1}
10^{2}
Energy (MeV)
total
absorption
elastic
gamma production

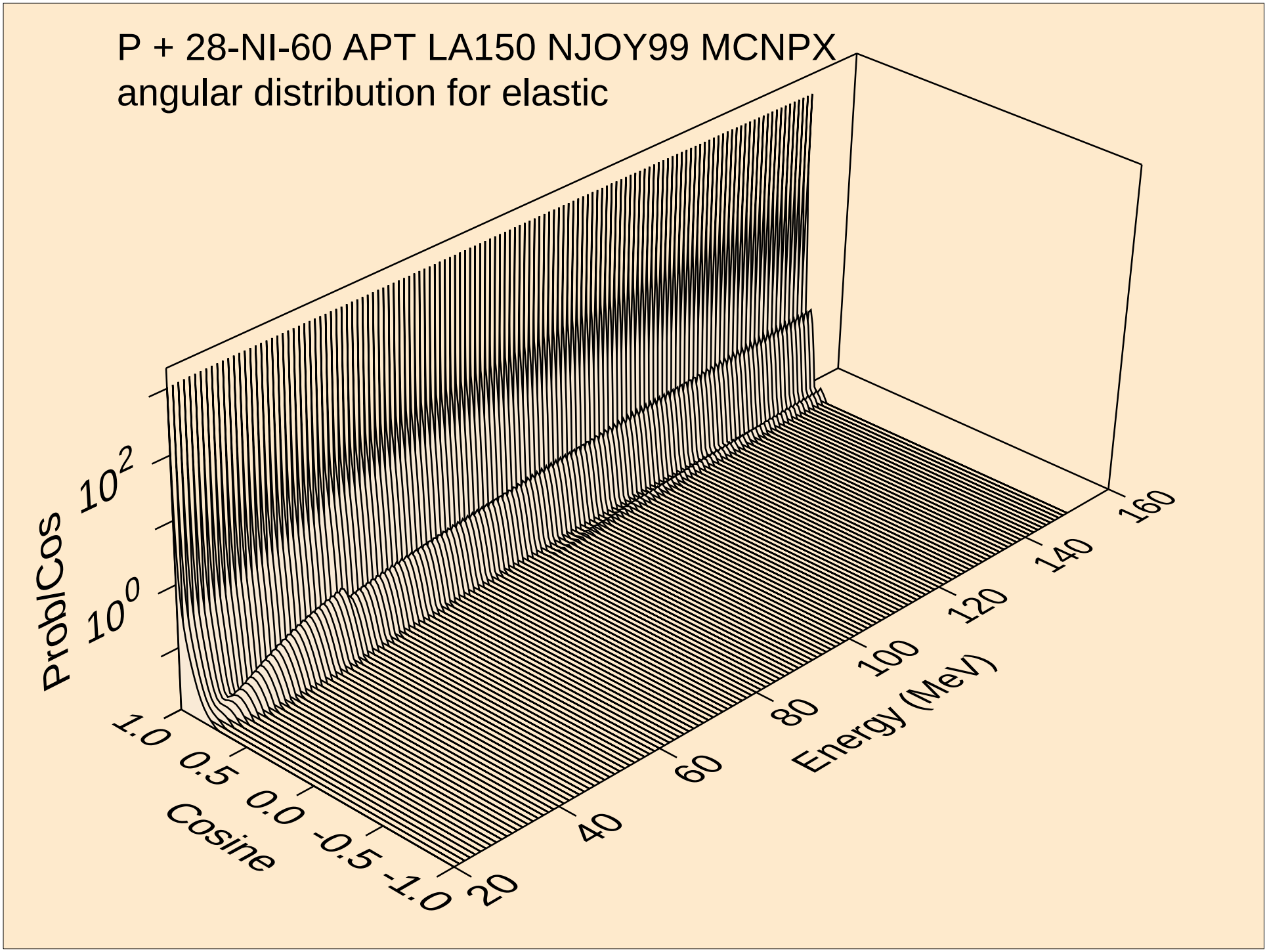

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^0
10^1
10^2

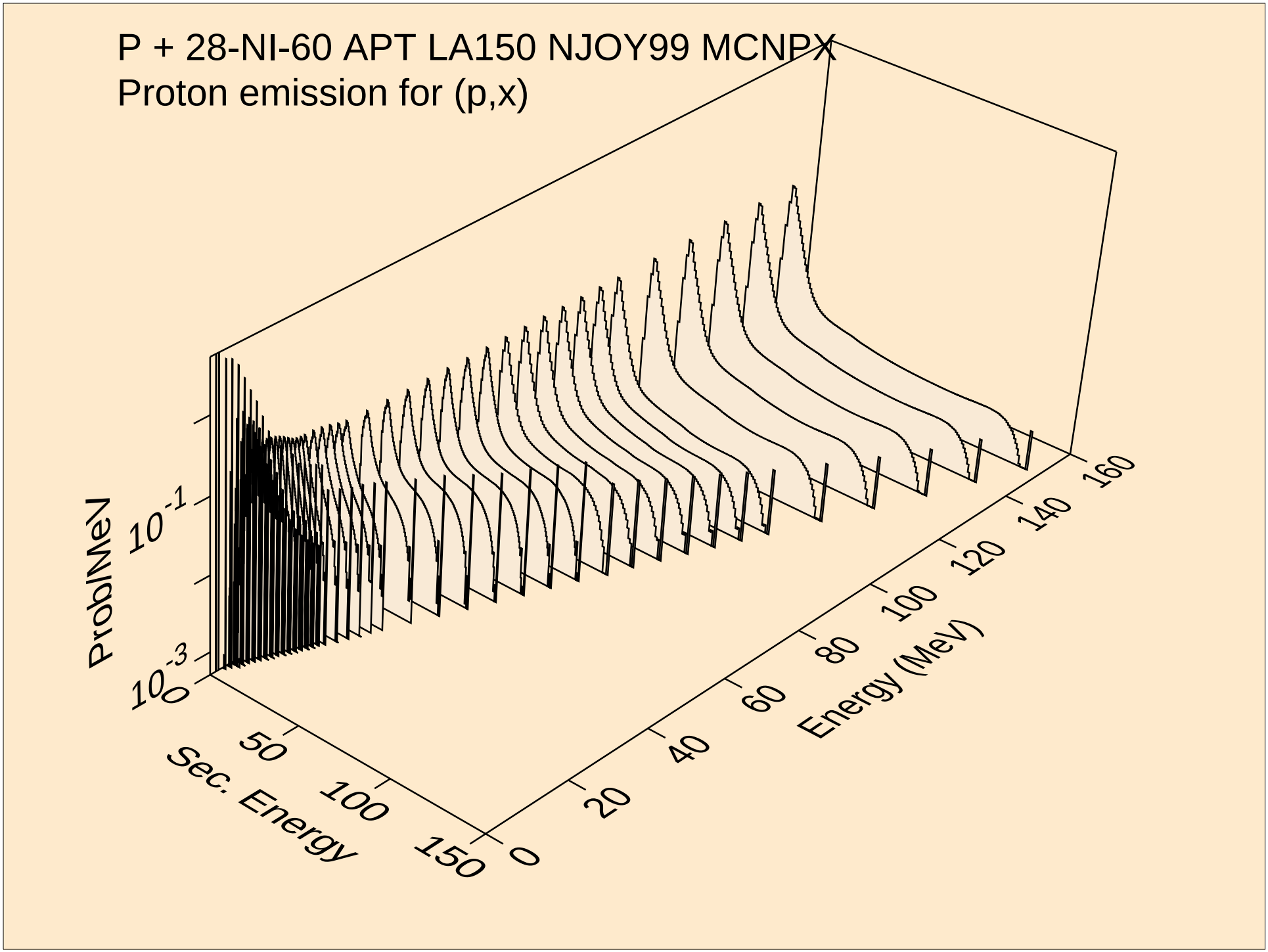

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Principal cross sections
Cross section (barns)
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
0
20
40
60
80
100
120
140
160
total
absorption
elastic
gamma production

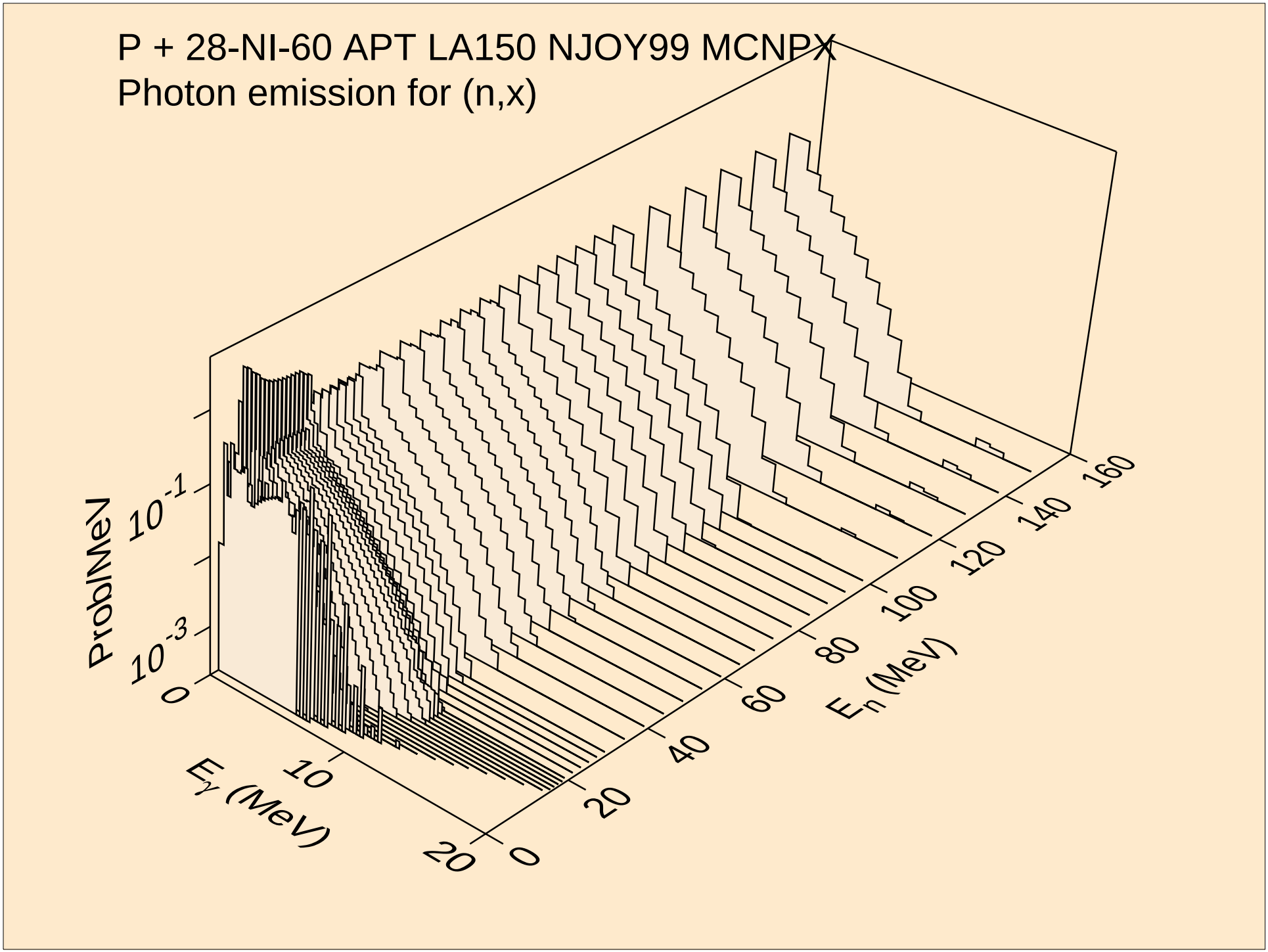

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Heating
heating
Heating (MeV/reaction)
Energy (MeV)
0
1
2
3
4
5
6
0
20
40
60
80
100
120
140
160

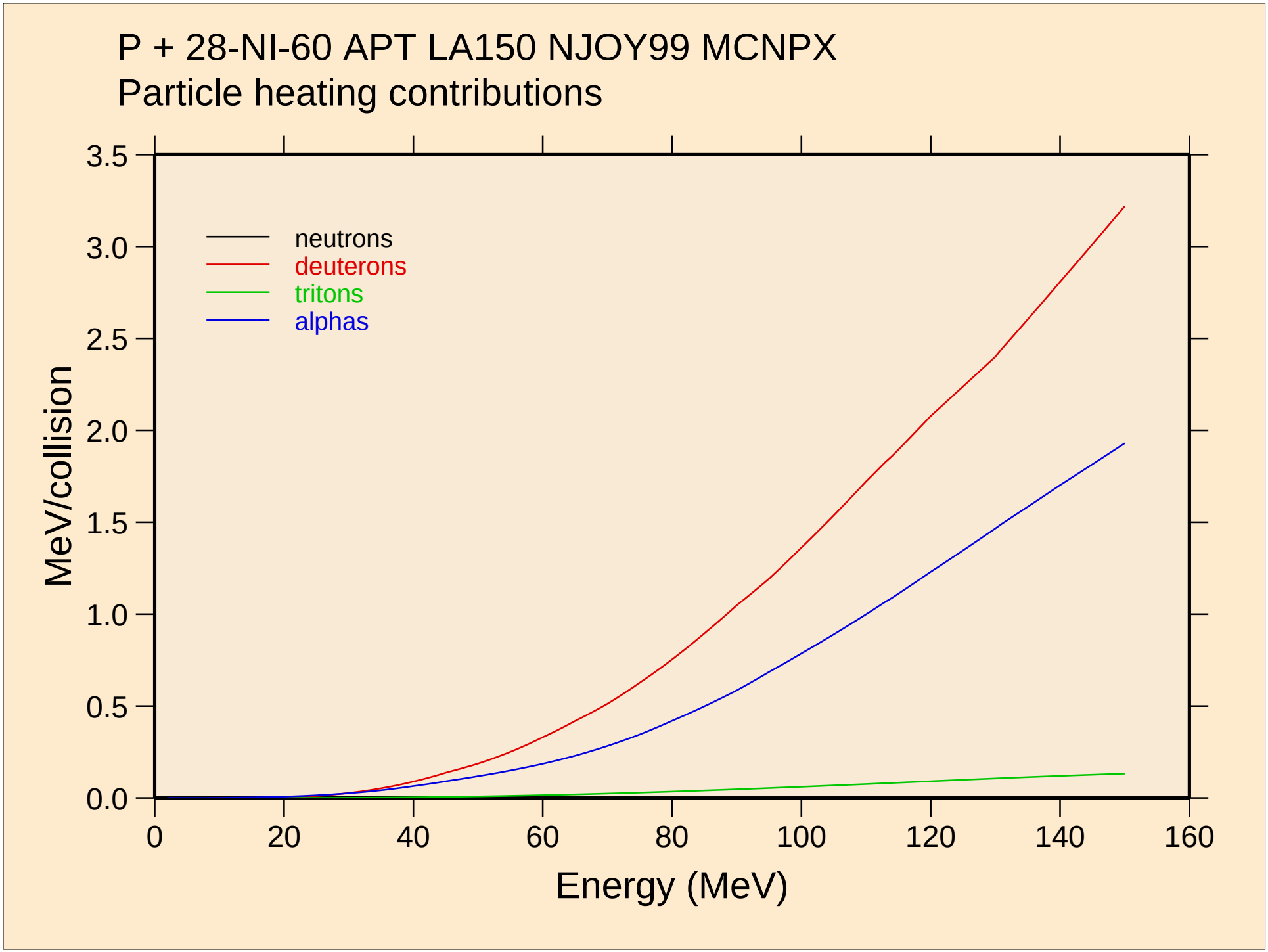

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Threshold reactions
(p,x)
Cross section (barns)
Energy (MeV)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
20
40
60
80
100
120
140
160

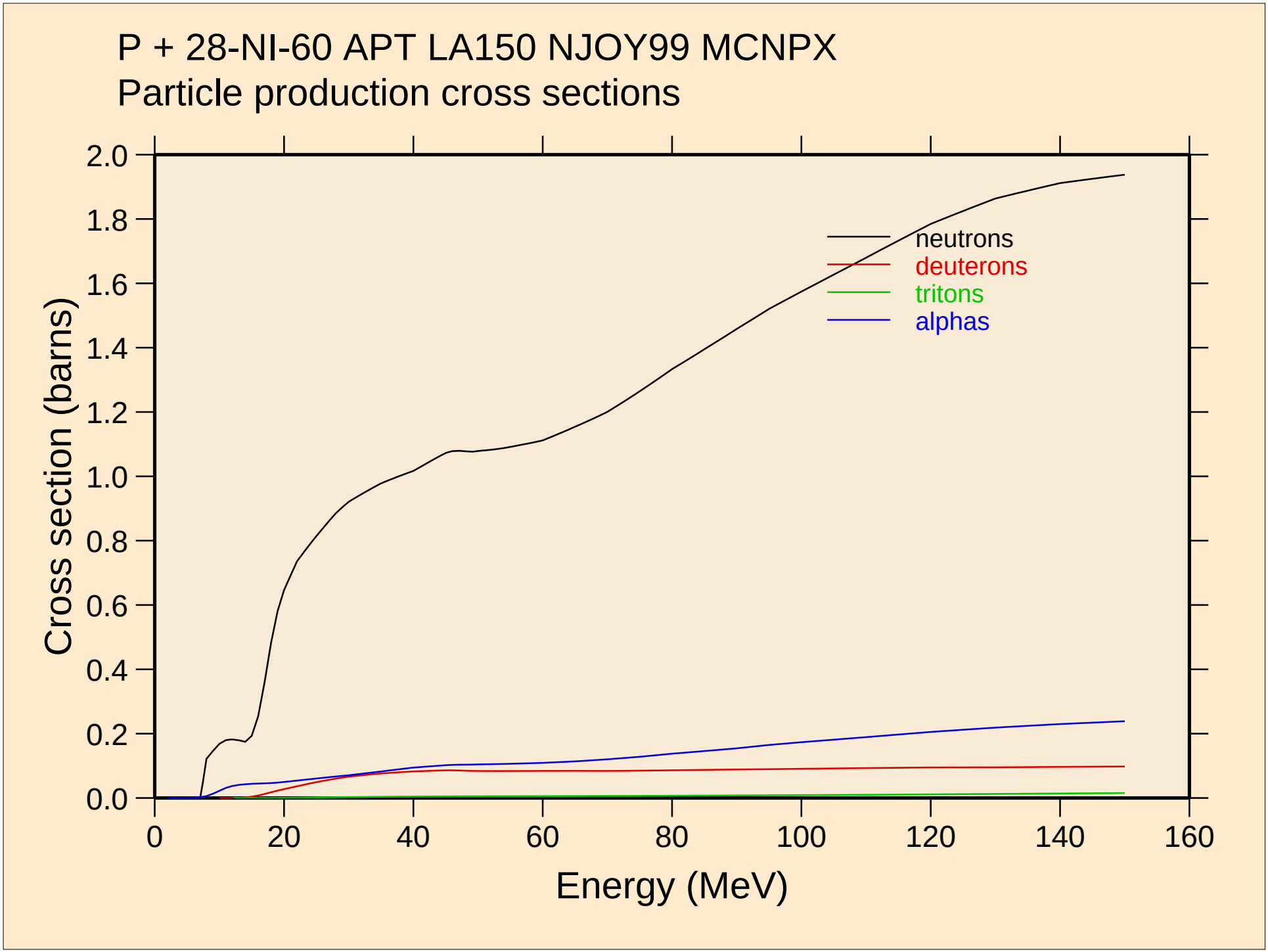

P + 28-NI-60 APT LA150 NJOY99 MCNPX
angular distribution for elastic
ProbICos
10^2
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
0
2
4
6
8
10
12
14
16
18
20
Energy (MeV)

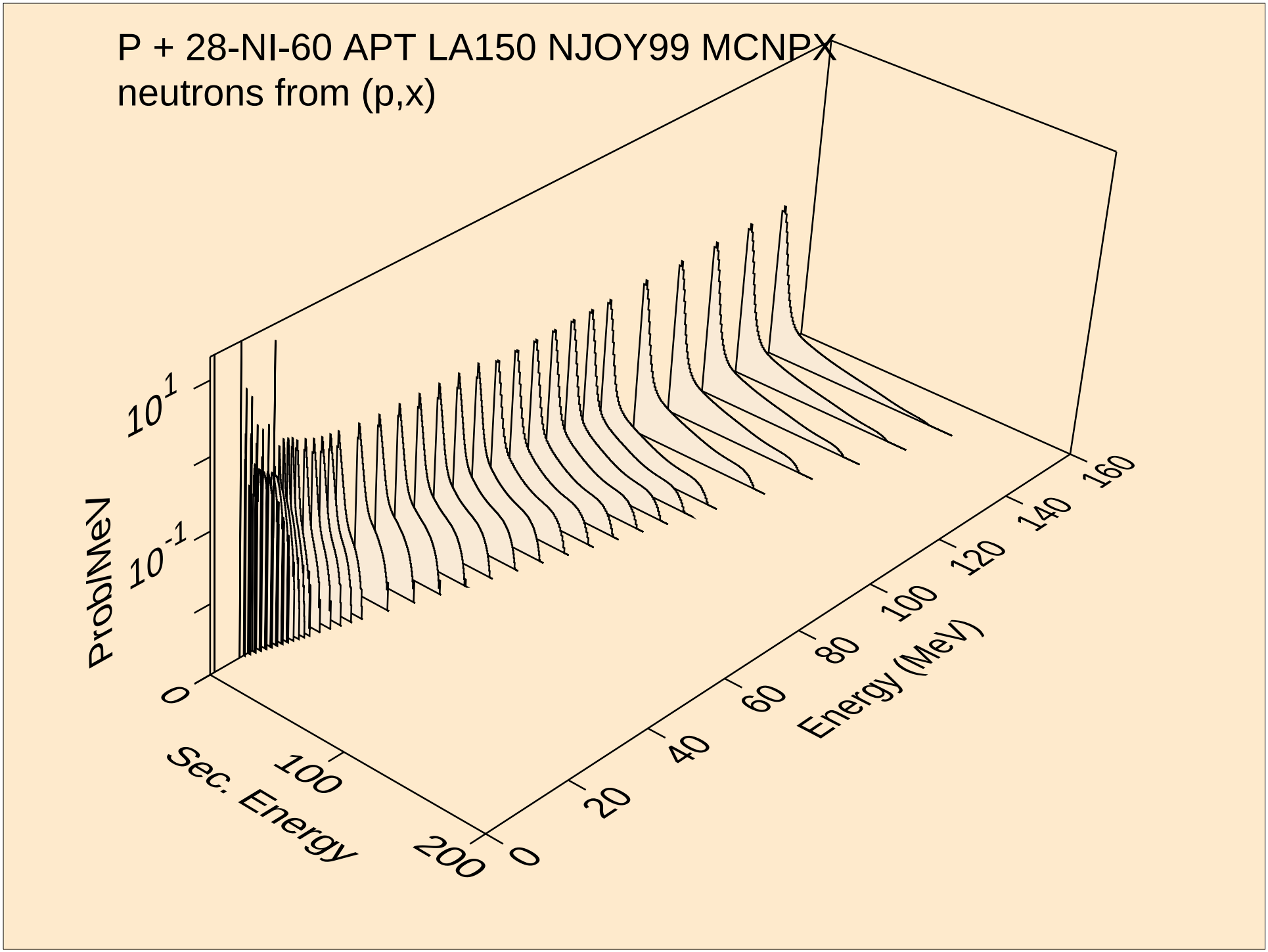

P + 28-NI-60 APT LA150 NJOY99 MCNPX
angular distribution for elastic
ProbICos
10^2
10^0
1.0
0.5
0.0
-0.5
-1.0
Cosine
20
40
60
80
100
120
140
160
Energy (MeV)

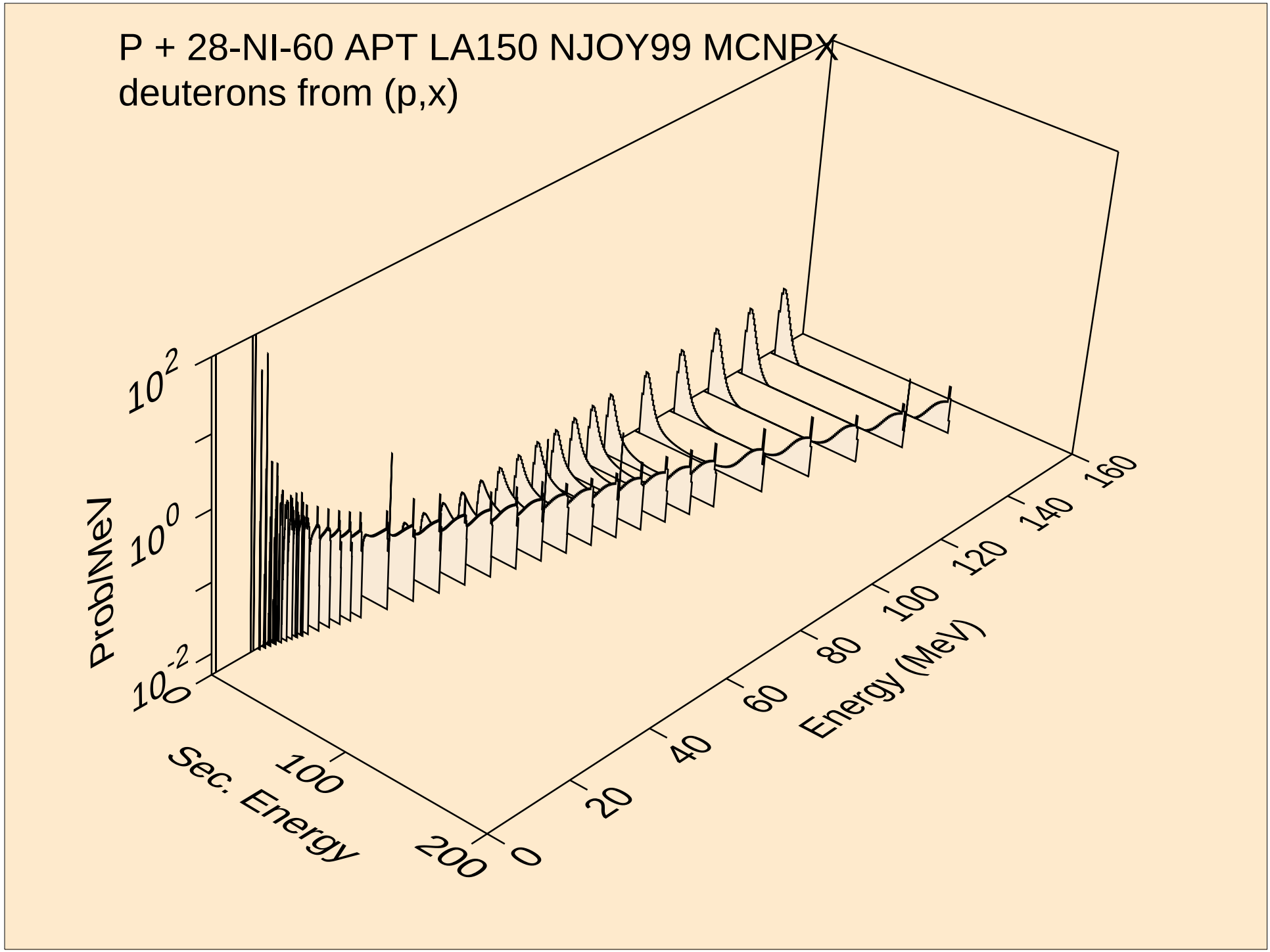

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Proton emission for (p,x)
Prob/MeV
10-1
10-3
0
50
100
150
Sec. Energy
0
20
40
60
80
100
120
140
160
Energy (MeV)

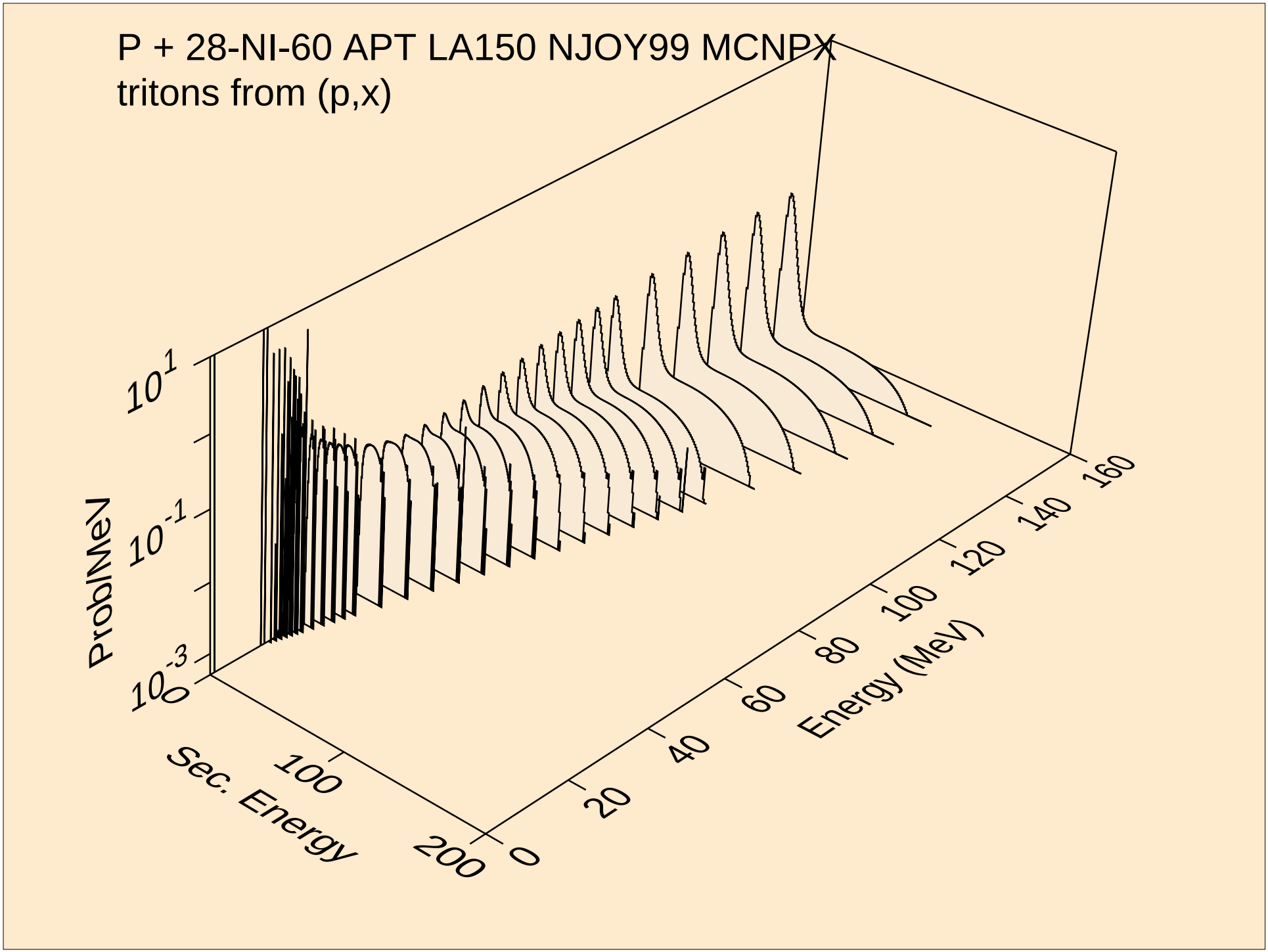

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Photon emission for (n,x)
Prob/MeV
10-1
10-3
0
Eγ (MeV)
10
20
0
20
40
60
80
100
120
140
160
En (MeV)

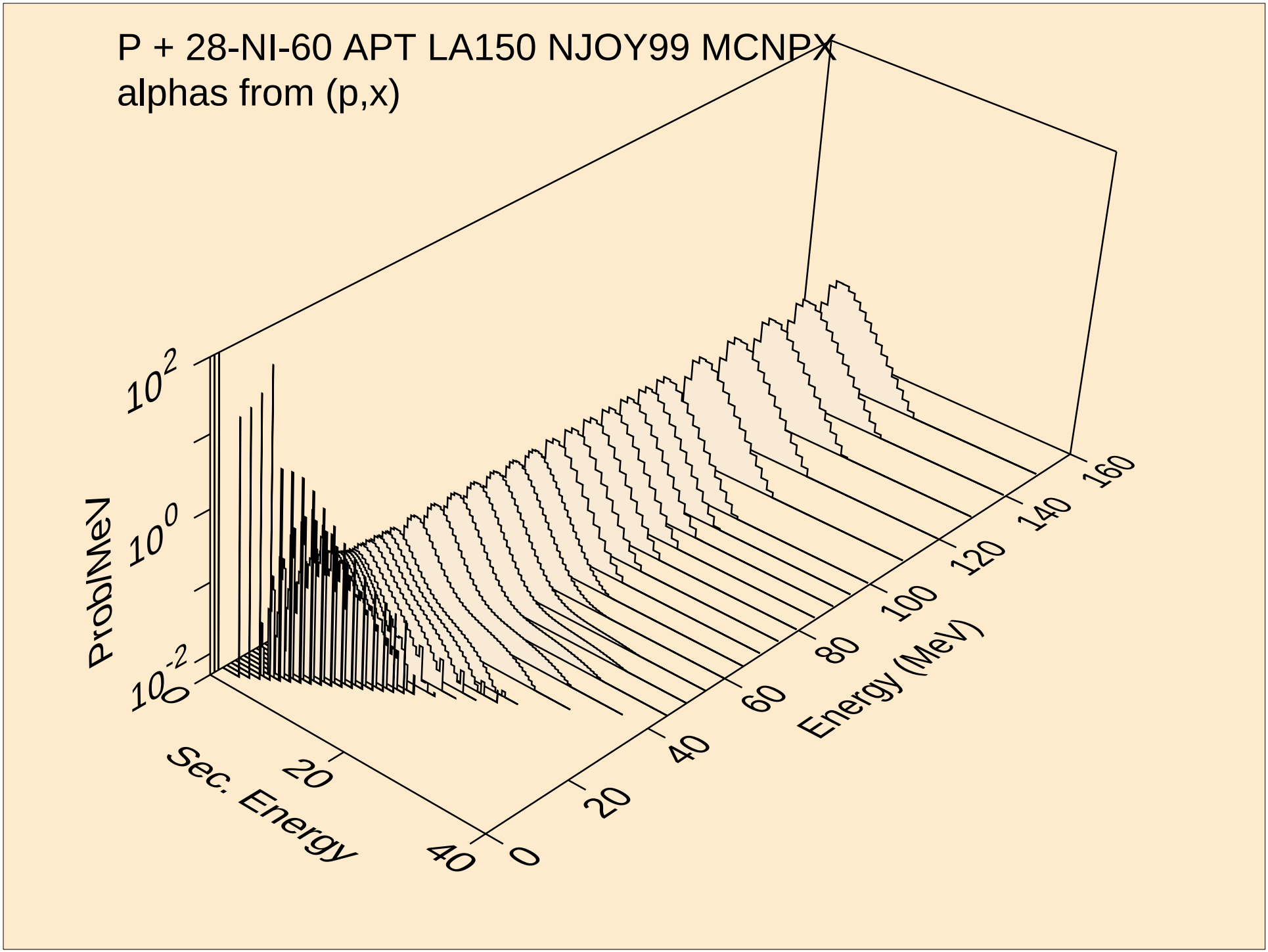

P + 28-NI-60 APT LA150 NJOY99 MCNPX
Particle heating contributions
neutrons
deuterons
tritons
alphas
MeV/collision
Energy (MeV)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
20
40
60
80
100
120
140
160


P + 28-NI-60 APT LA150 NJOY99 MCNPX
Particle production cross sections
Cross section (barns)
Energy (MeV)
neutrons
deuterons
tritons
alphas
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
0
20
40
60
80
100
120
140
160


P + 28-NI-60 APT LA150 NJOY99 MCNPX
neutrons from (p,x)
Prob/MeV
10^{1}
10^{-1}
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
Energy (MeV)


P + 28-NI-60 APT LA150 NJOY99 MCNPX
deuterons from (p,x)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
Energy (MeV)


P + 28-NI-60 APT LA150 NJOY99 MCNPX
tritons from (p,x)
Prob/MeV
10^1
10^-1
10^-3
0
100
200
Sec. Energy
0
20
40
60
80
100
120
140
160
Energy (MeV)


P + 28-NI-60 APT LA150 NJOY99 MCNPX
alphas from (p,x)
Prob/MeV
10^{2}
10^{0}
10^{-2}
0
20
40
Sec. Energy
0
20
40
60
80
100
120
140
160
Energy (MeV)