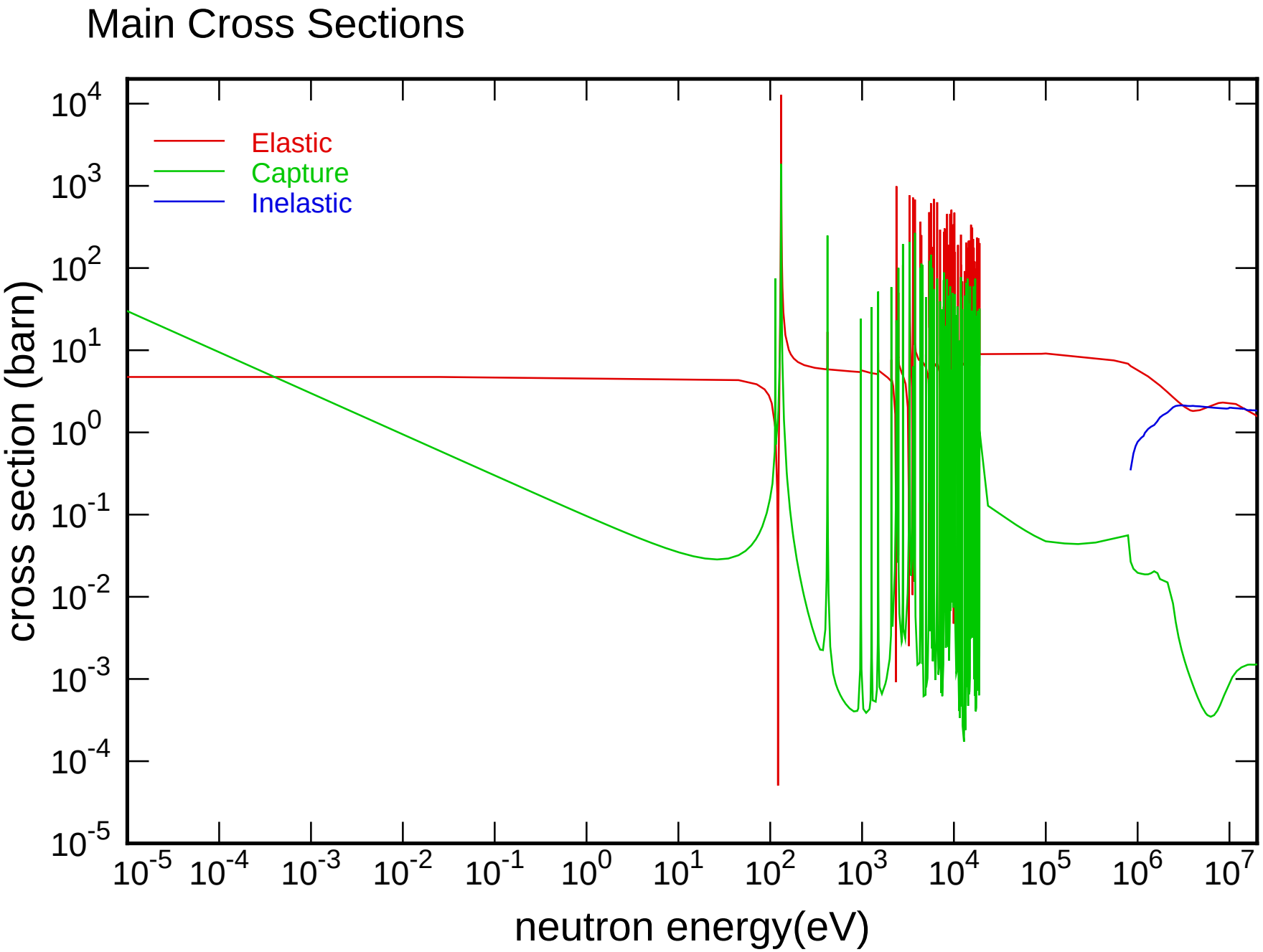
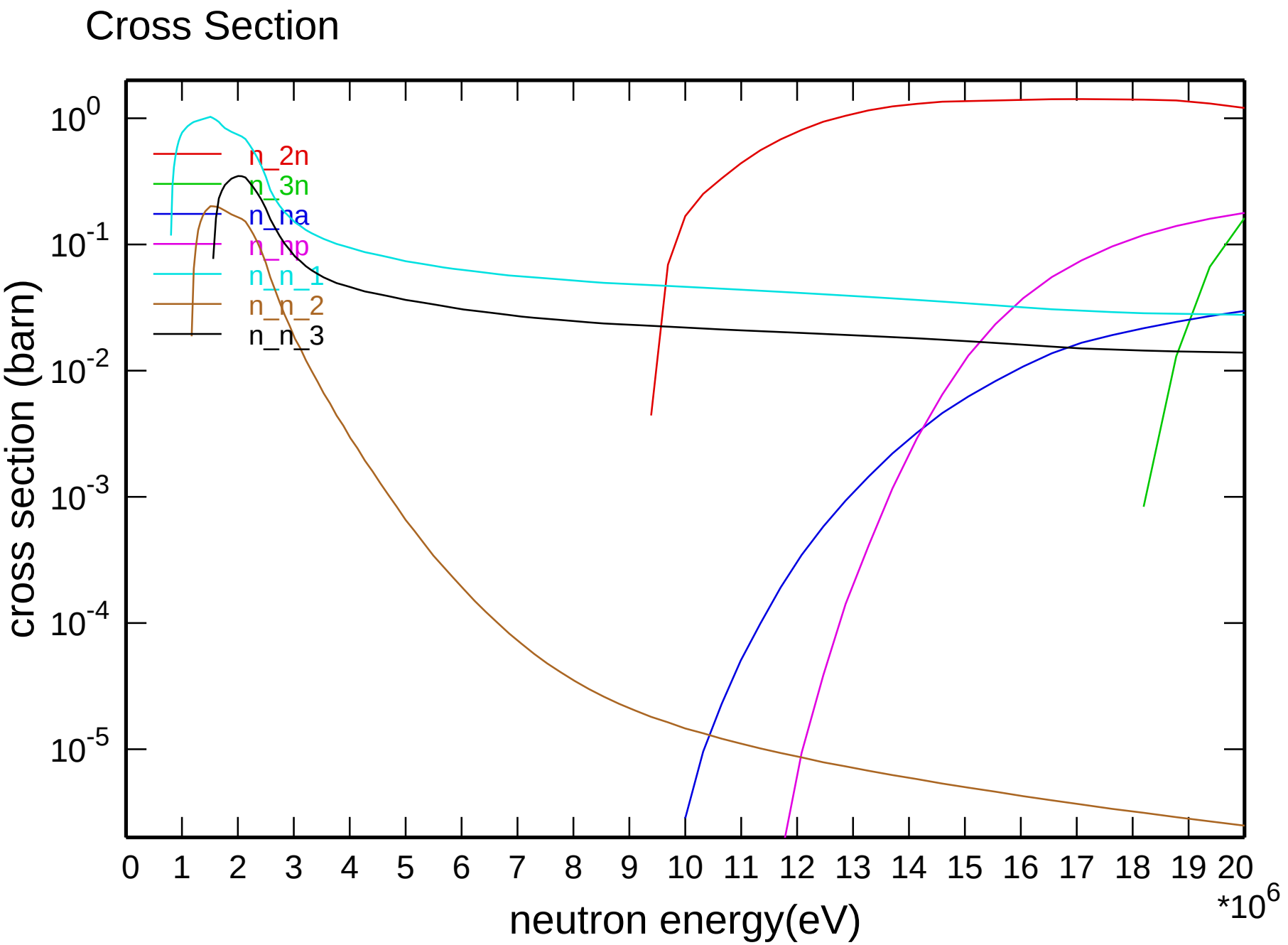
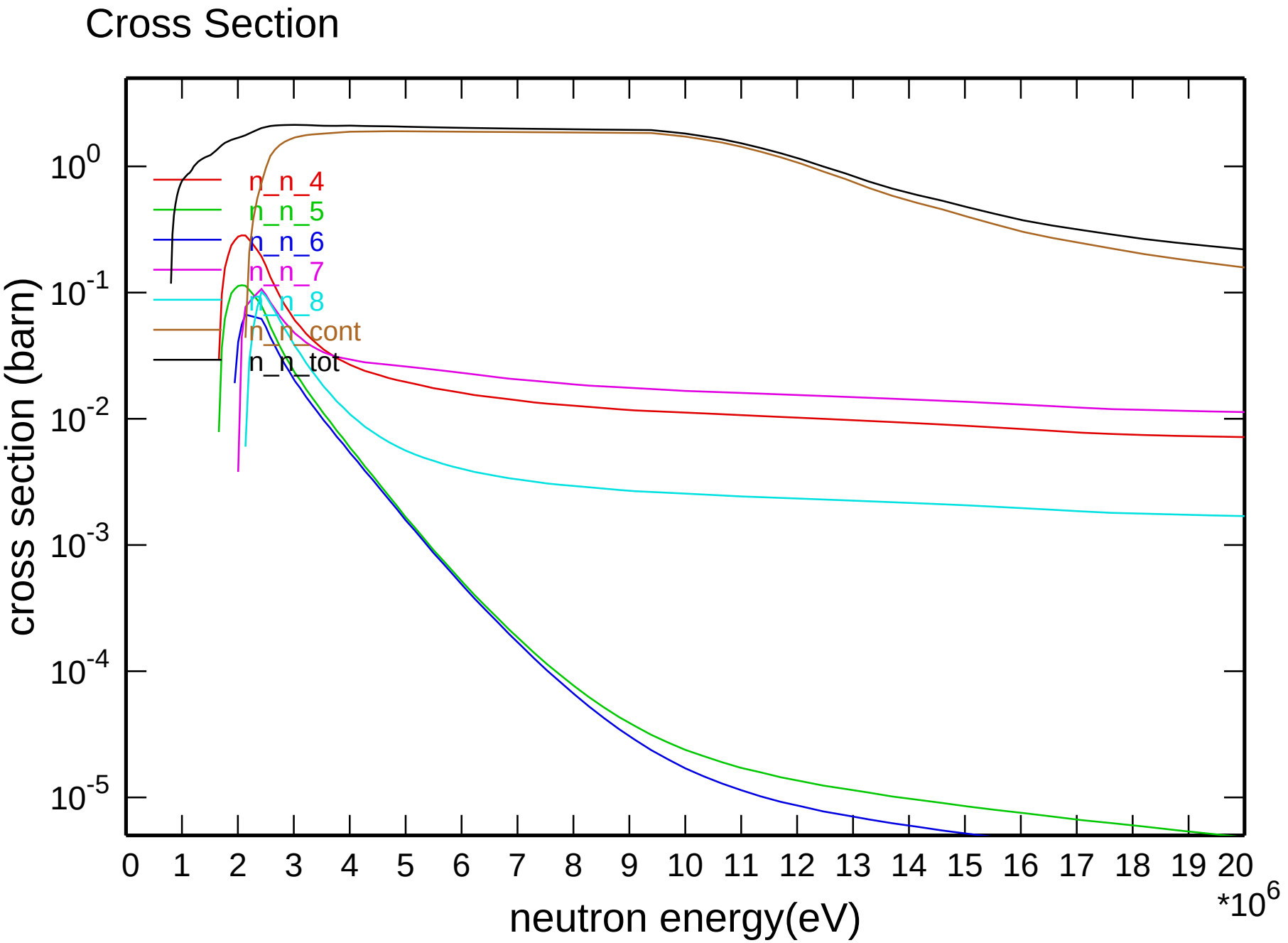
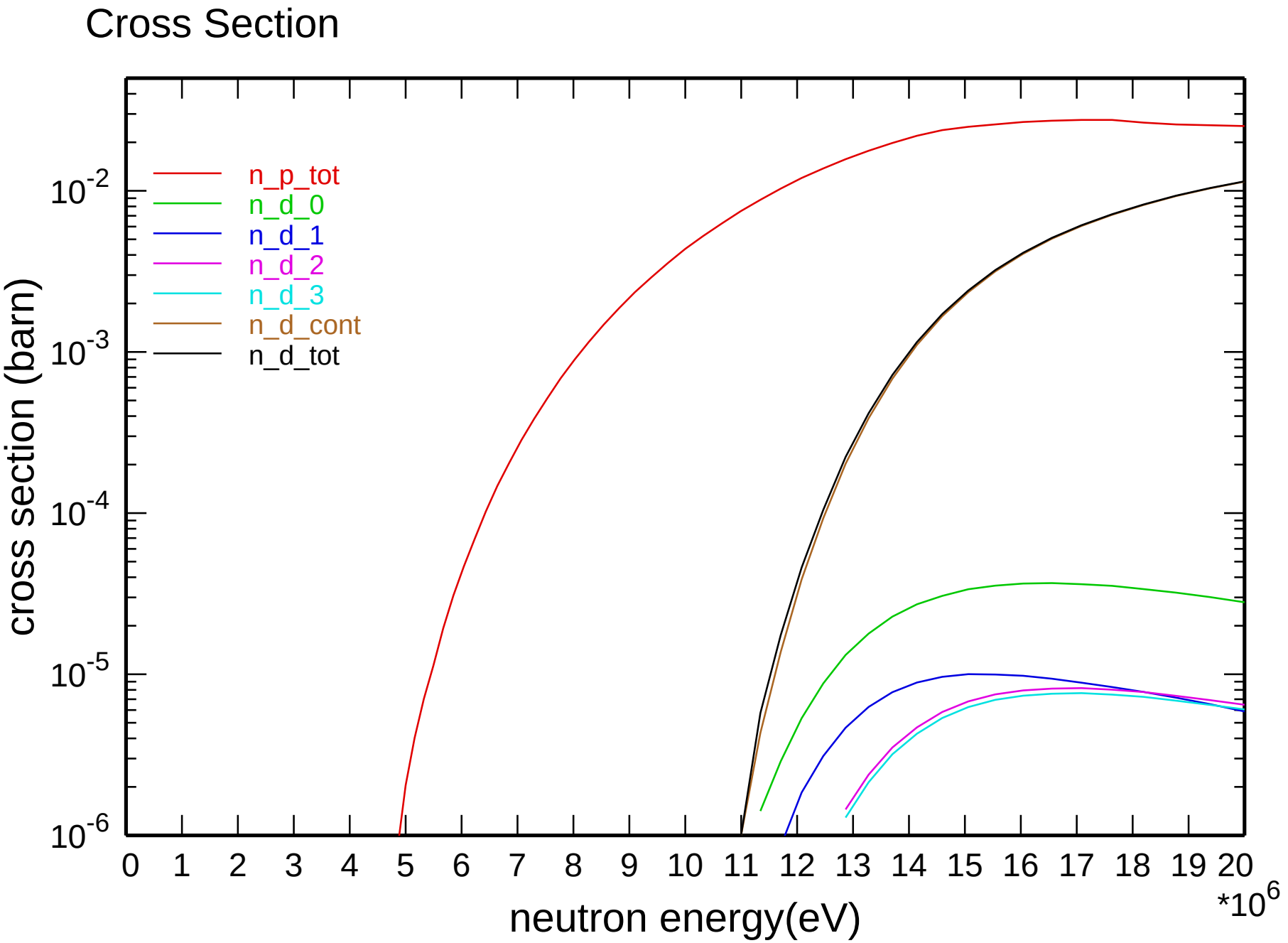
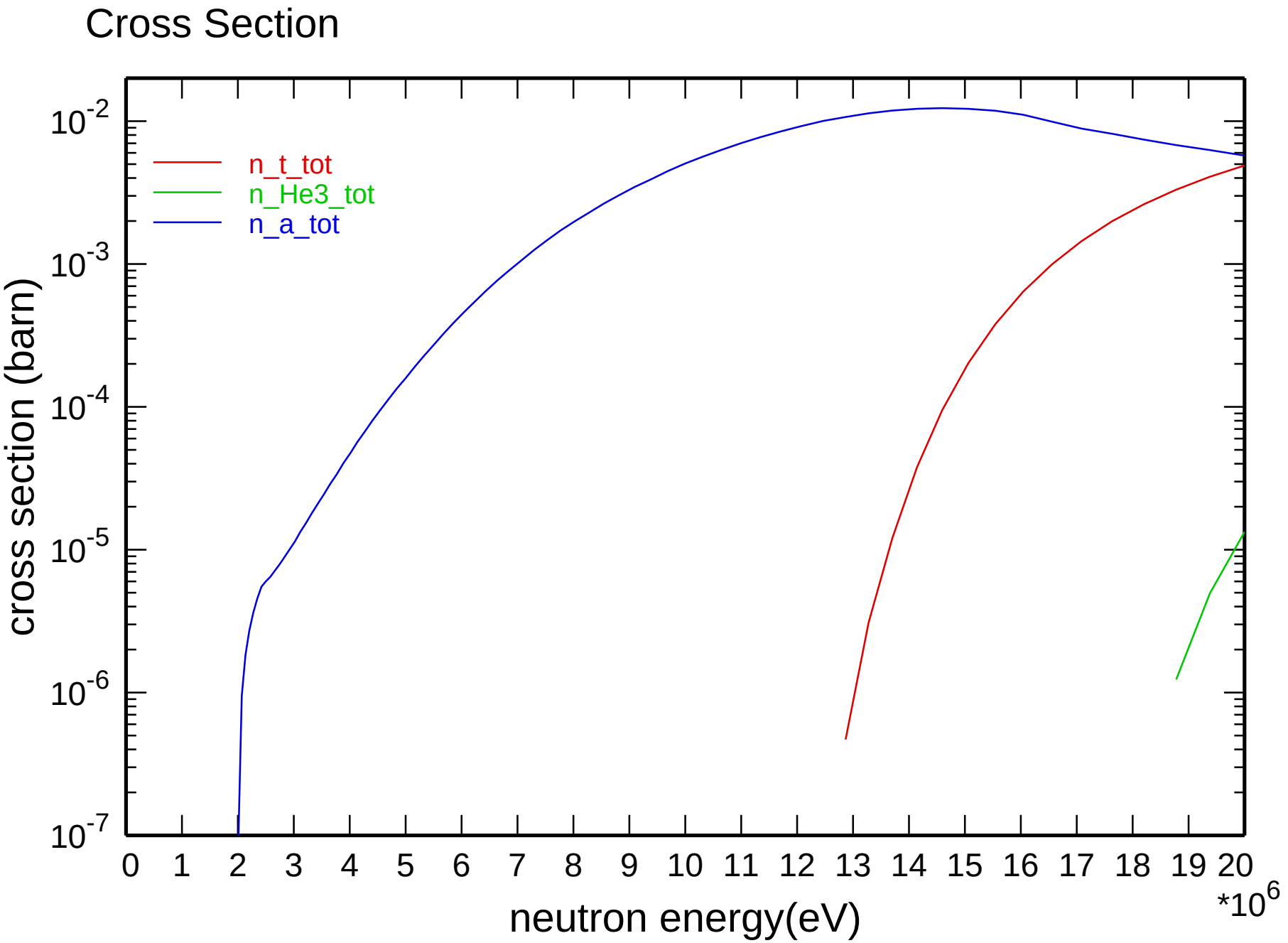
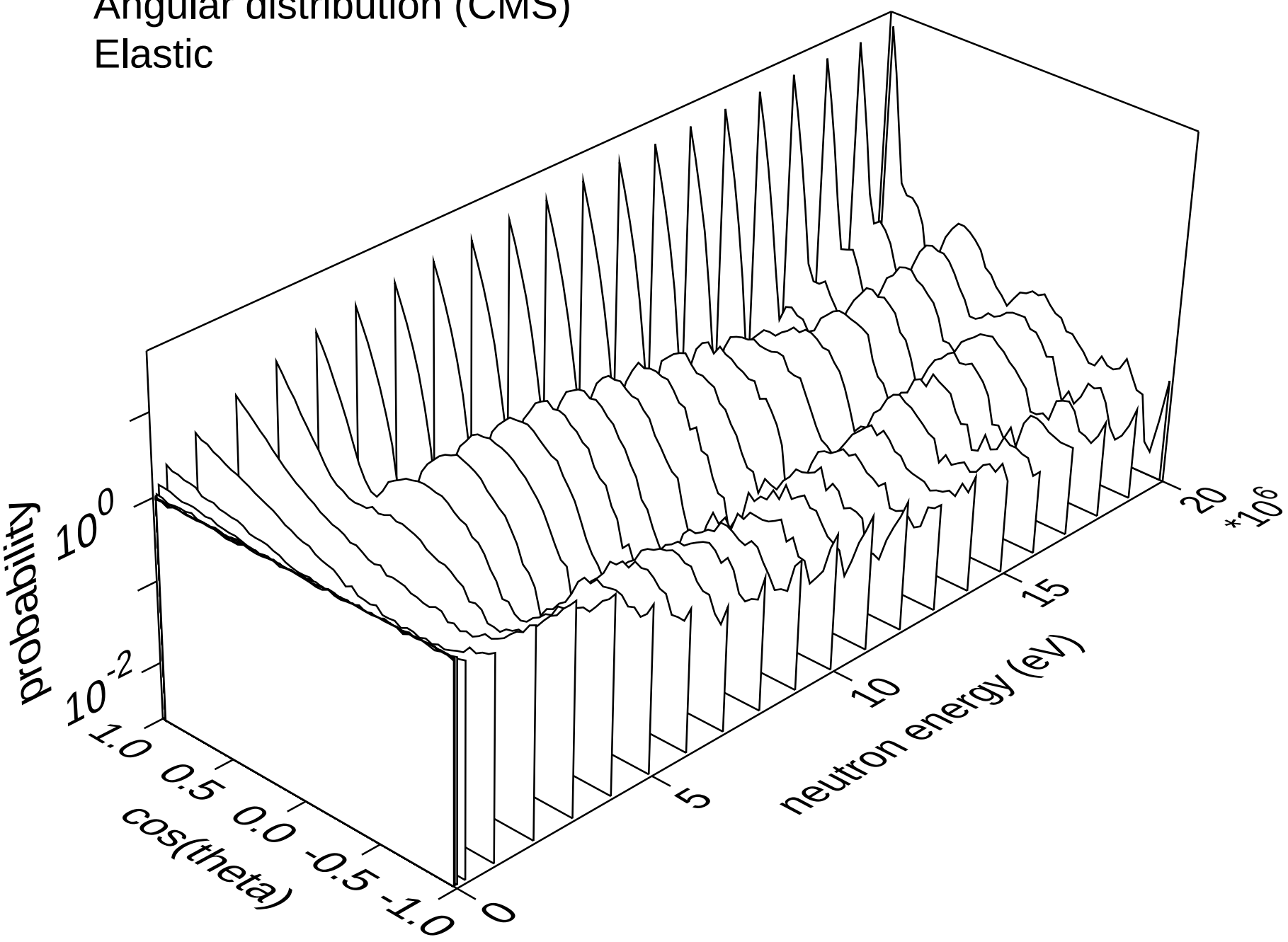

Main Cross Sections
Elastic
Capture
Inelastic
cross section (barn)
neutron energy(eV)
10^4
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7

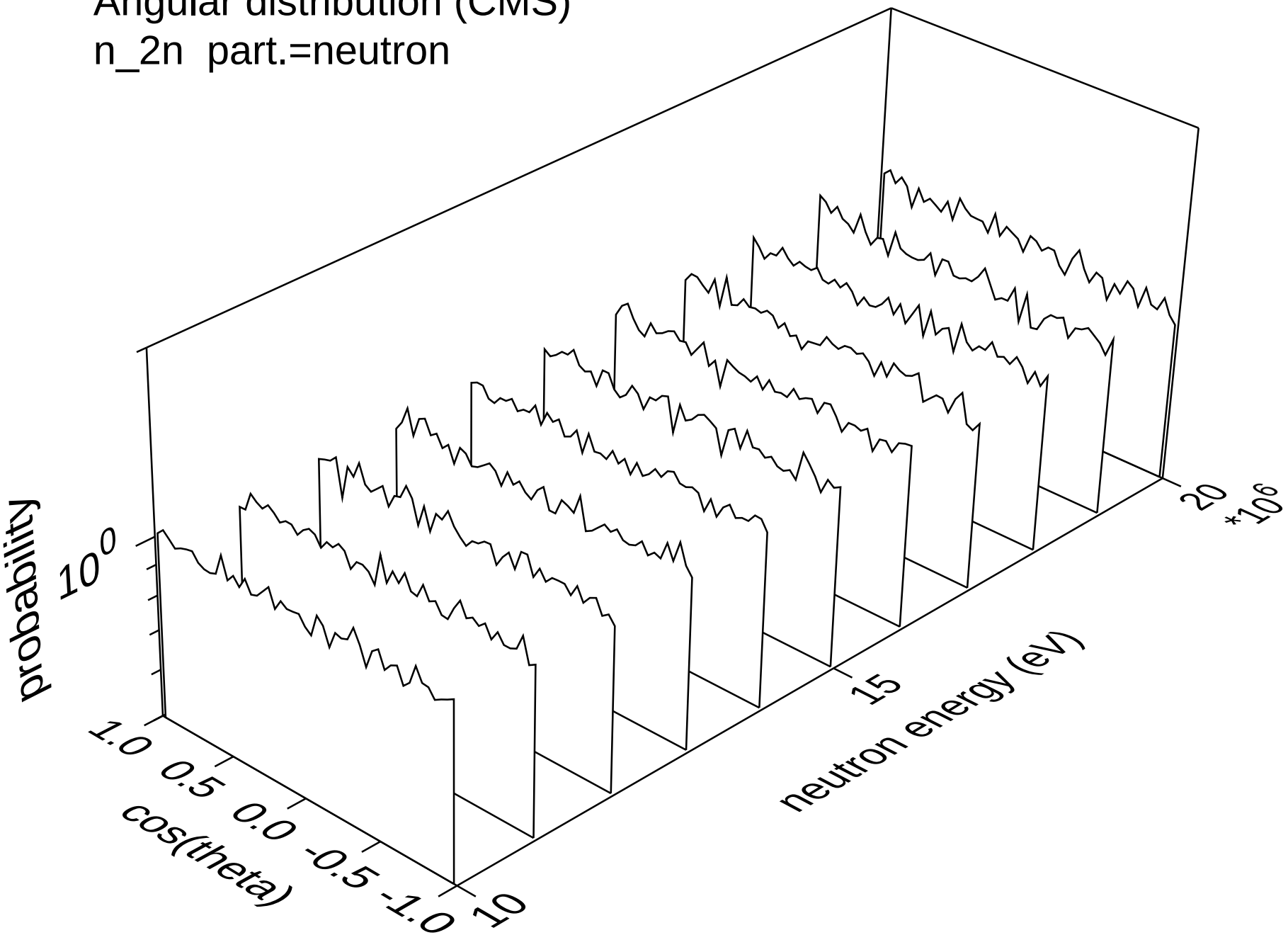

Cross Section
cross section (barn)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
n_2n
n_3n
n_na
n_np
n_n_1
n_n_2
n_n_3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^{6}
neutron energy(eV)

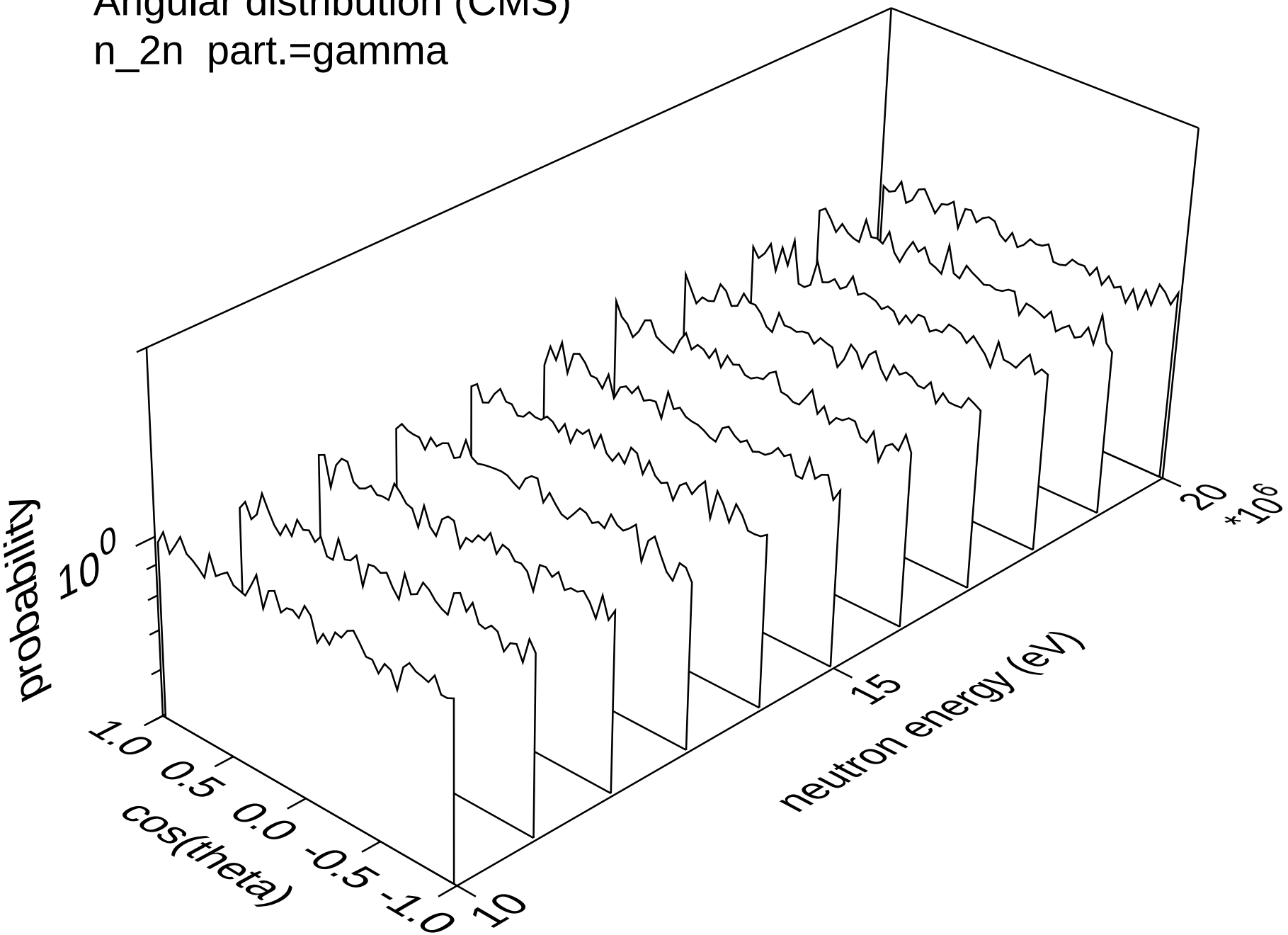

Cross Section
cross section (barn)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
n_n_4
n_n_5
n_n_6
n_n_7
n_n_8
n_n_cont
n_n_tot
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^{6}
neutron energy(eV)

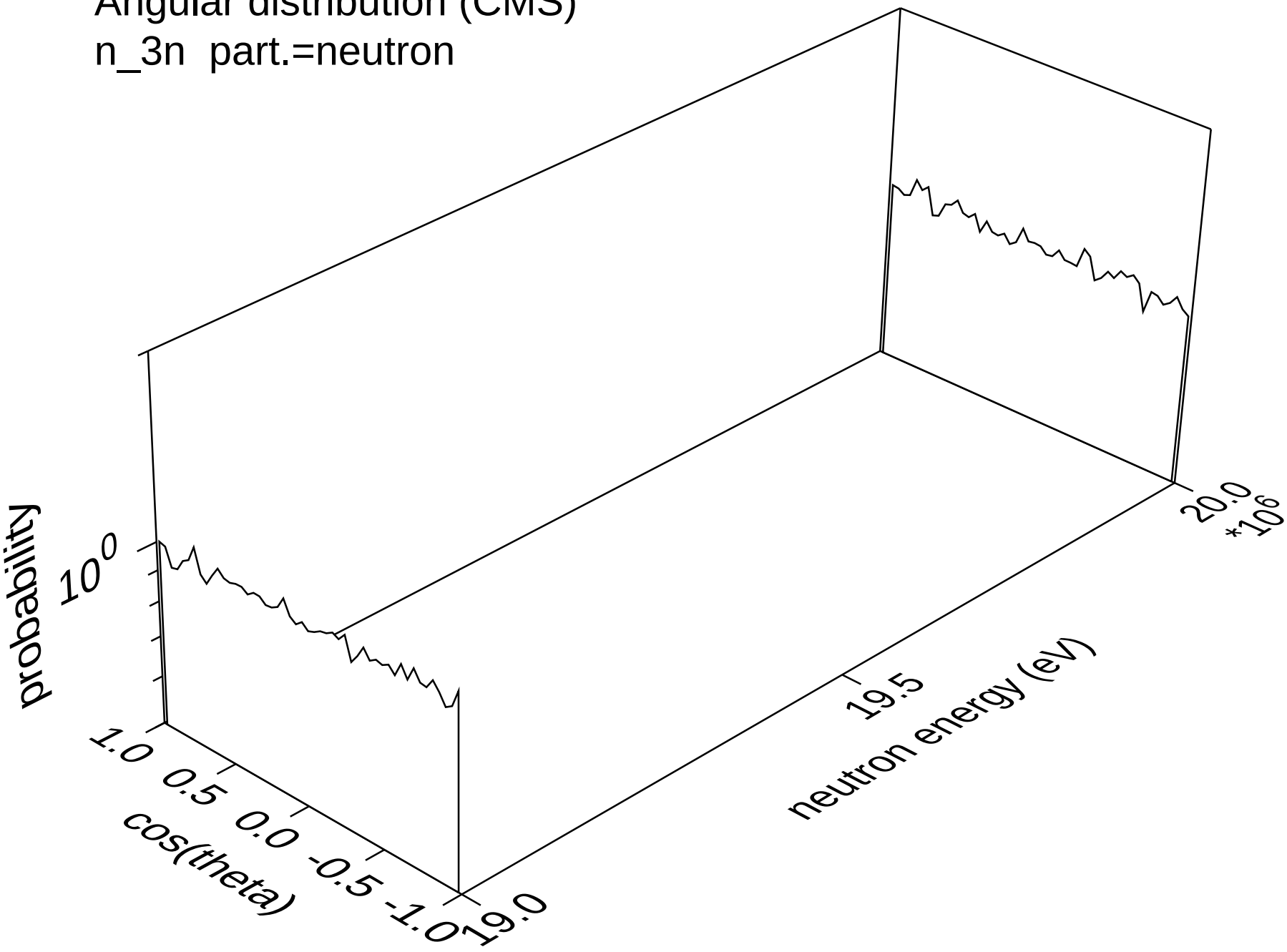

Cross Section
n_p_tot
n_d_0
n_d_1
n_d_2
n_d_3
n_d_cont
n_d_tot
cross section (barn)
10-2
10-3
10-4
10-5
10-6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^6
neutron energy(eV)

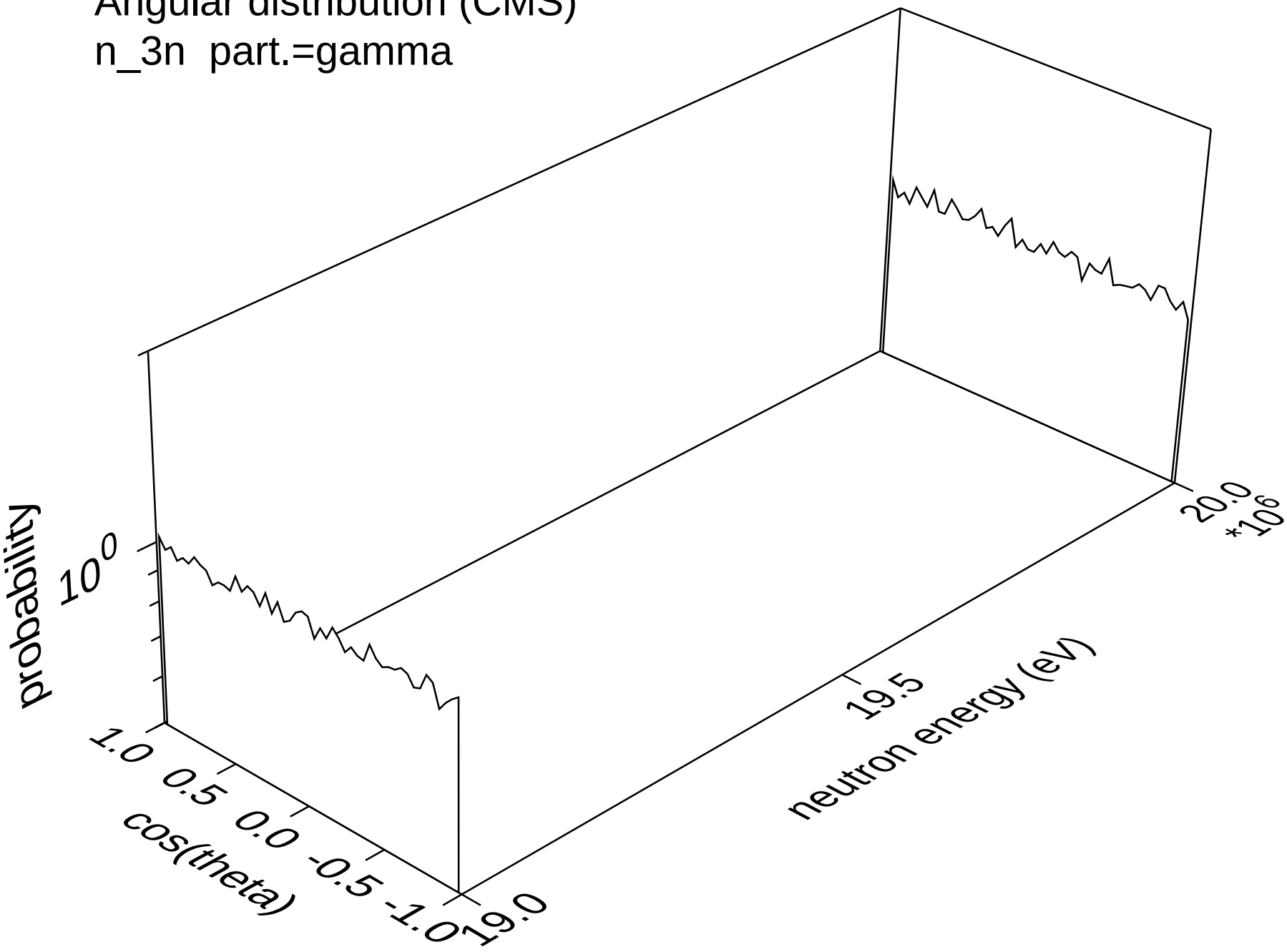

Cross Section
n_t_tot
n_He3_tot
n_a_tot
cross section (barn)
10-2
10-3
10-4
10-5
10-6
10-7
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^6
neutron energy(eV)

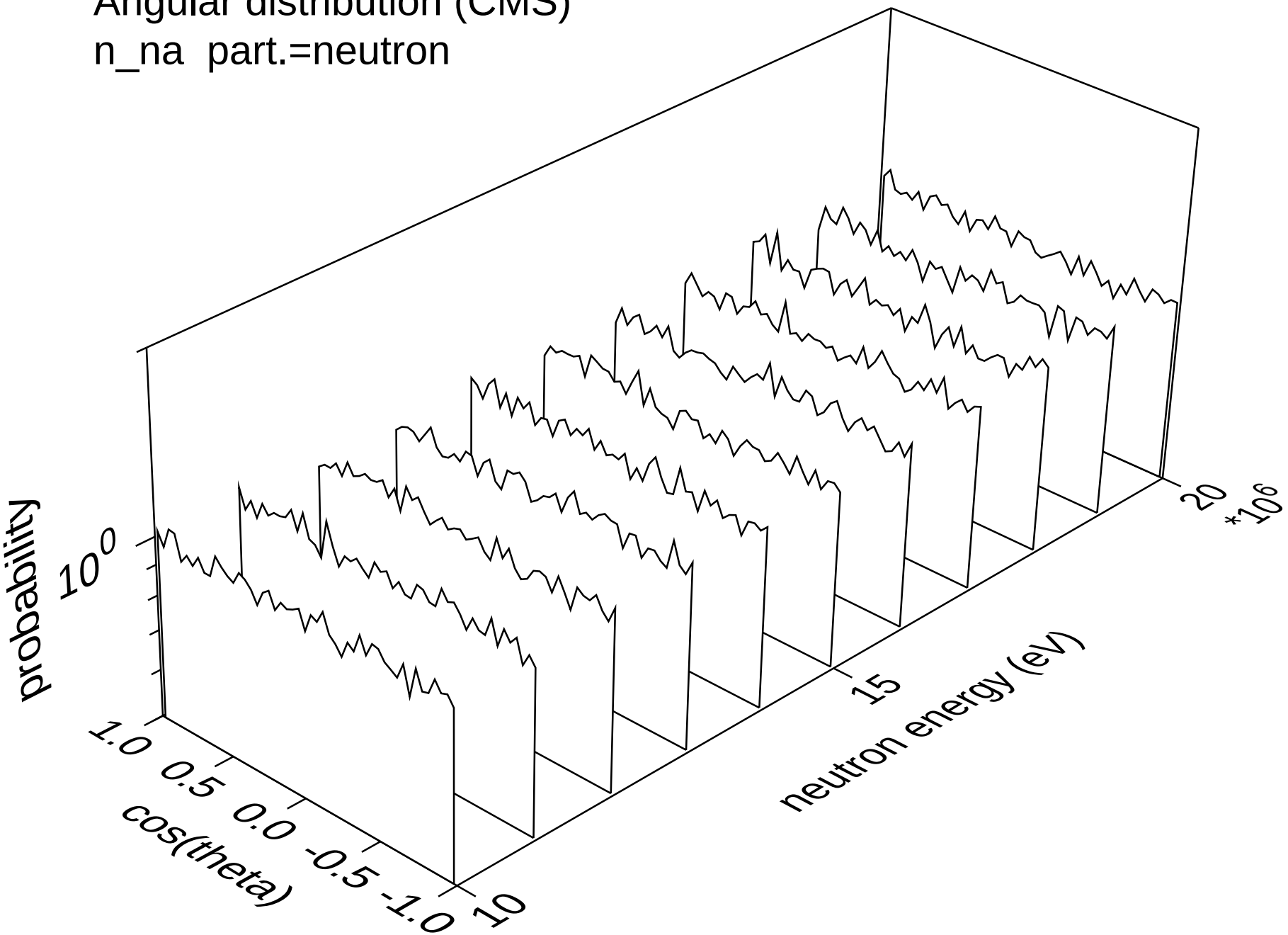

Angular distribution (CMS)
Elastic
probability
10^{0}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

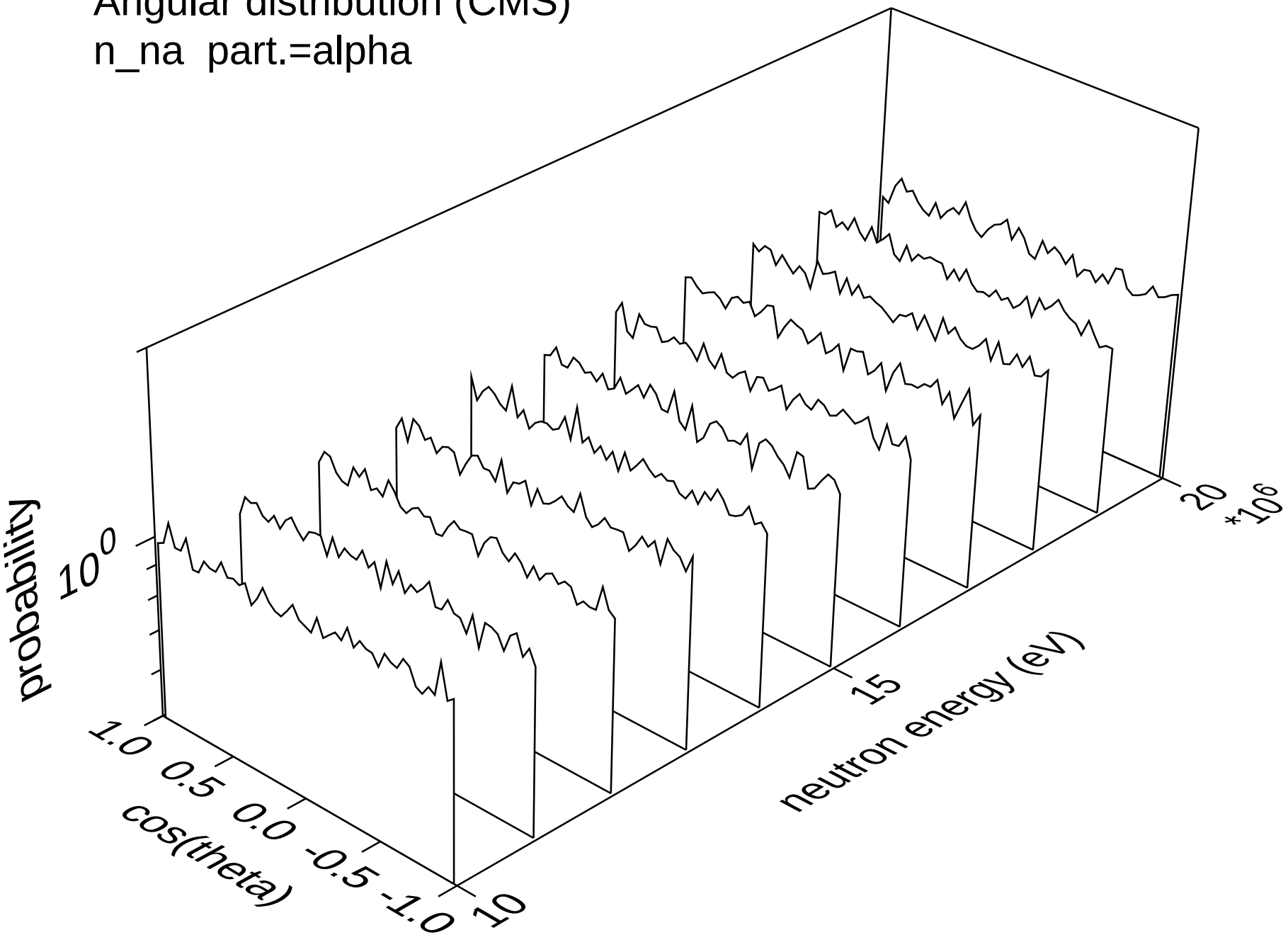

Angular distribution (CMS)
n_2n part.=neutron
probability
10^0
1.0 0.5 0.0 -0.5 -1.0
cos(theta)
10
15
20
*10^6
neutron energy (eV)

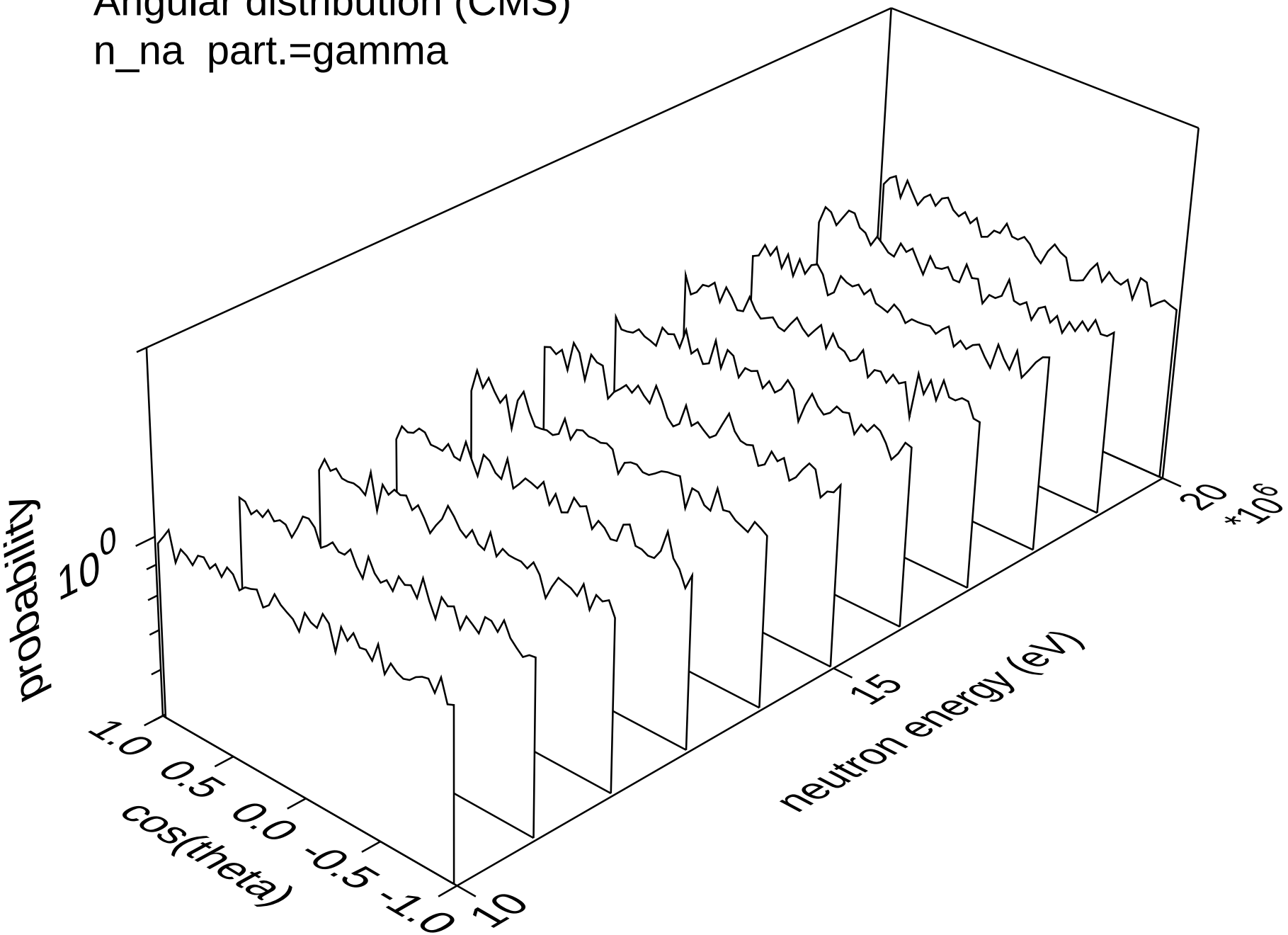

Angular distribution (CMS)
n_2n part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
15
20
*10^6
neutron energy (eV)

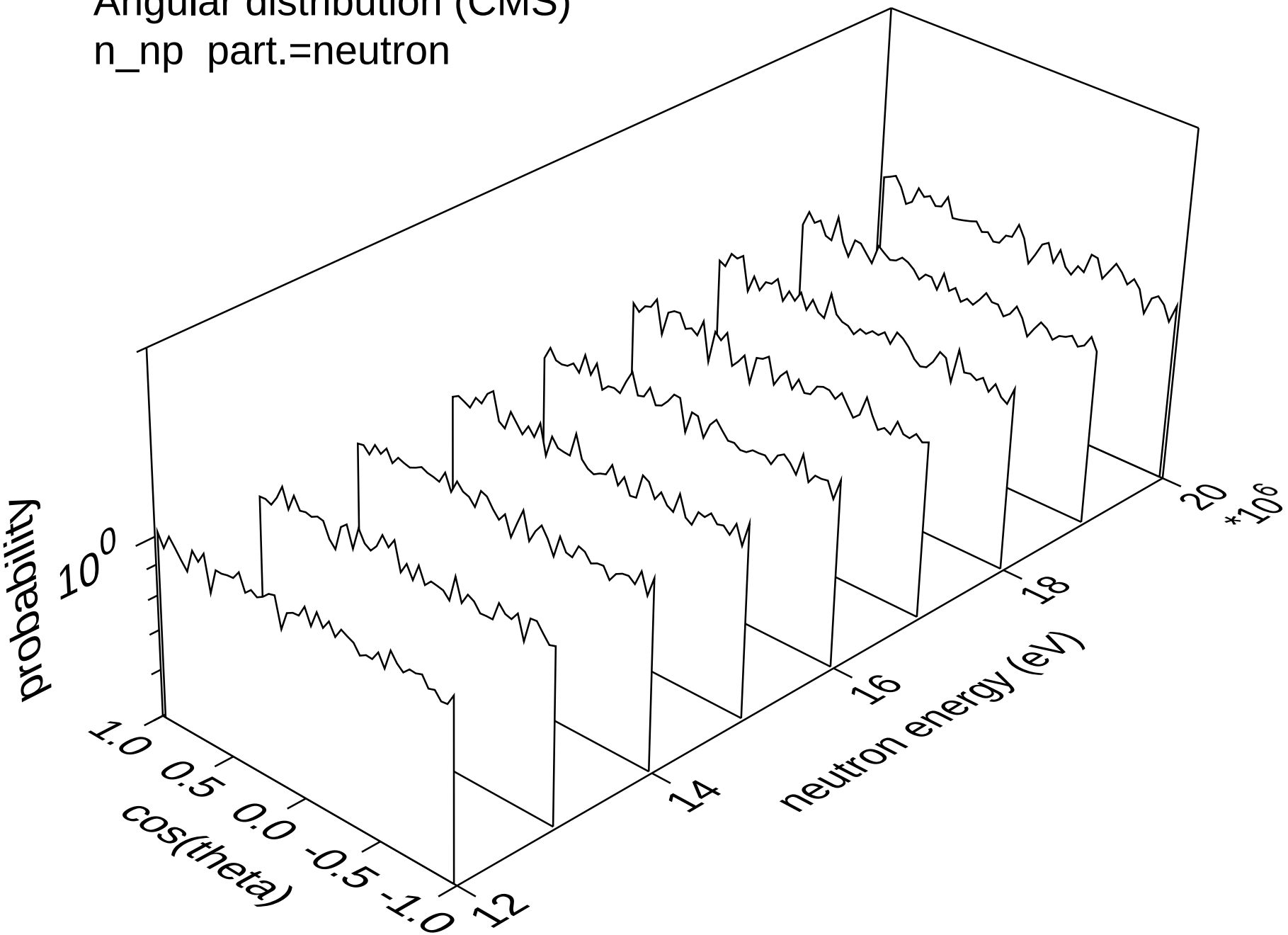

Angular distribution (CMS)
n_3n part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

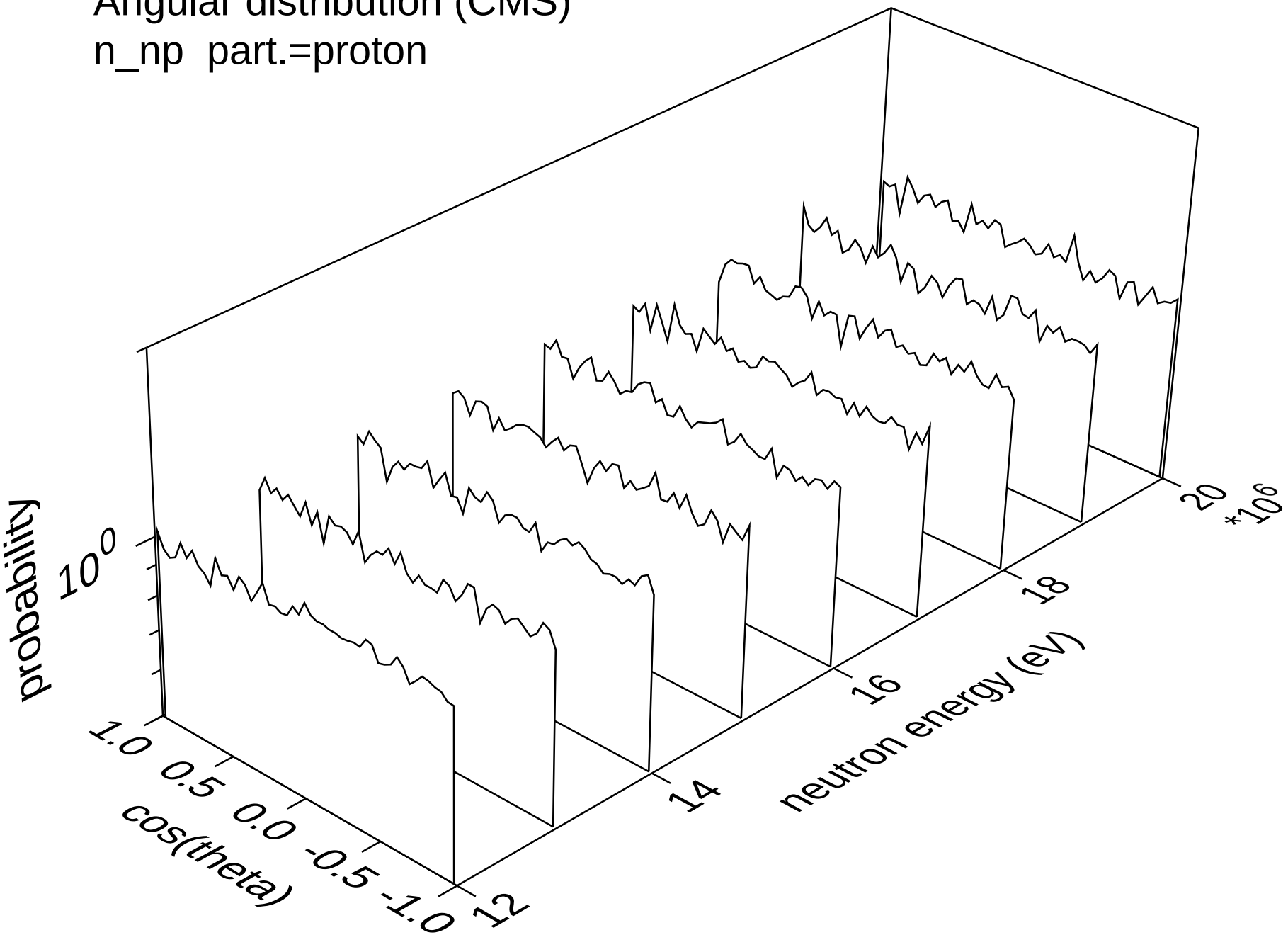

Angular distribution (CMS)
n_3n part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

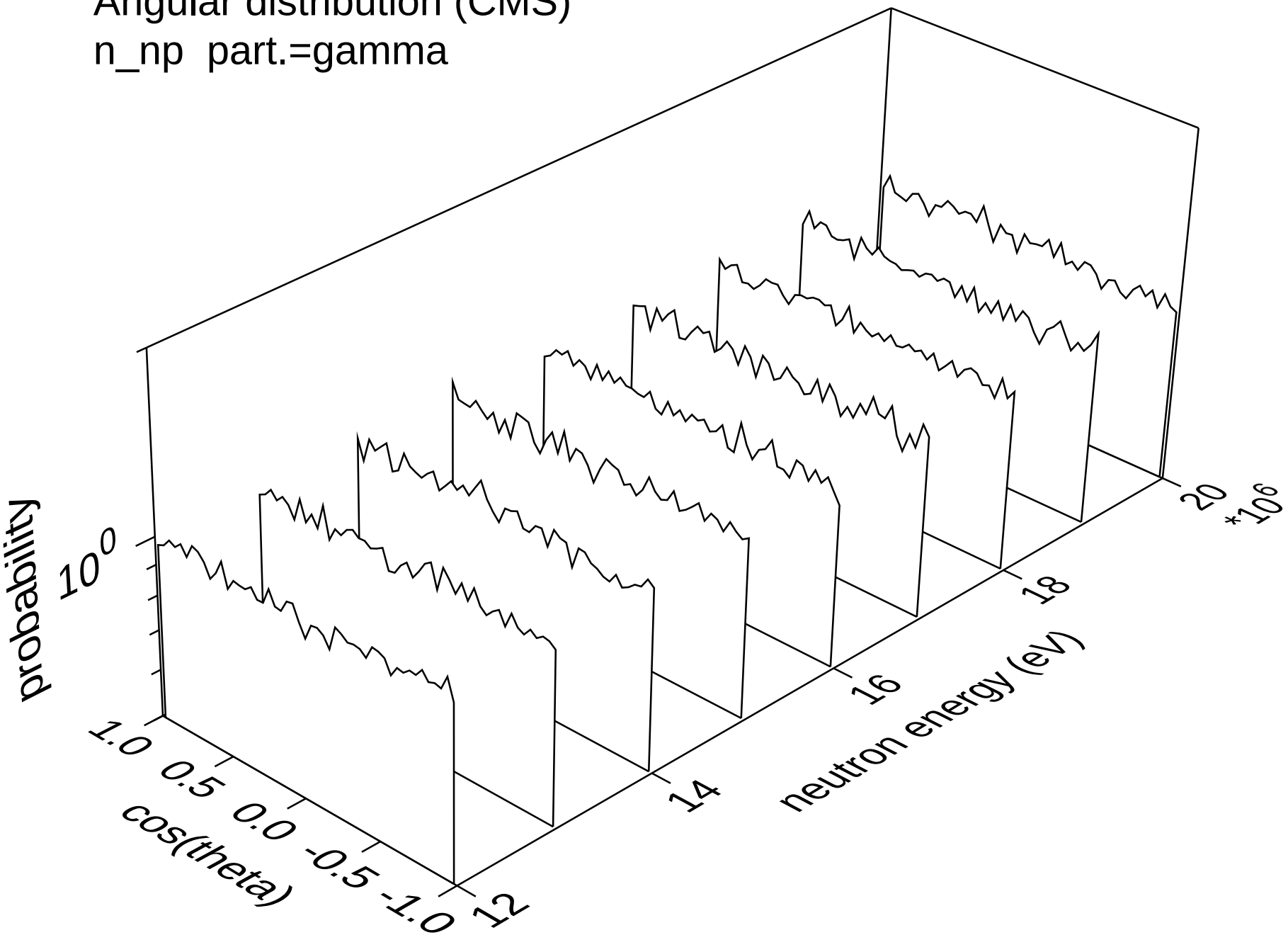

Angular distribution (CMS)
n_na part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
15
20
*10^6
neutron energy (eV)

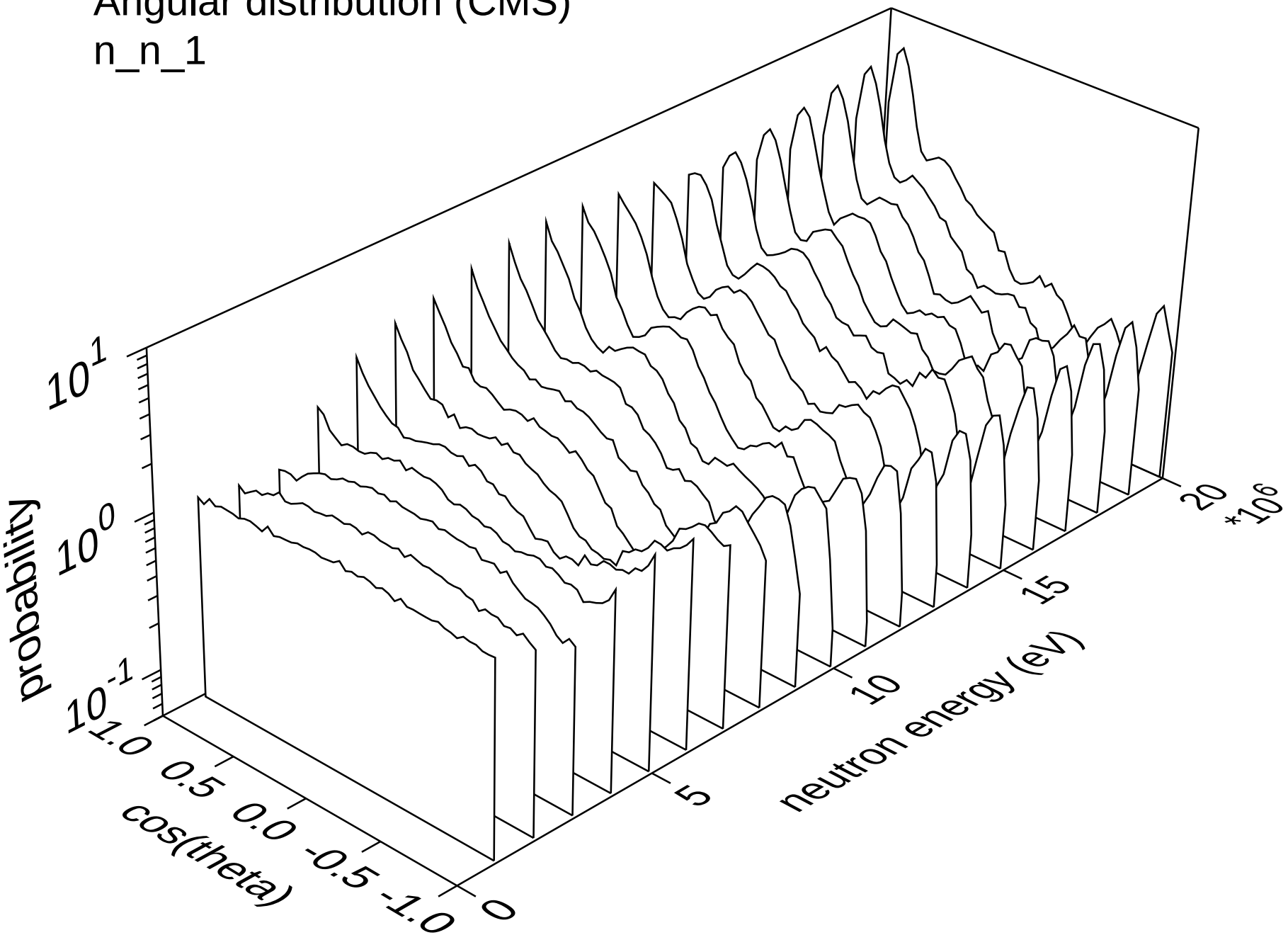

Angular distribution (CMS)
n_na part.=alpha
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
15
20
*10^6
neutron energy (eV)

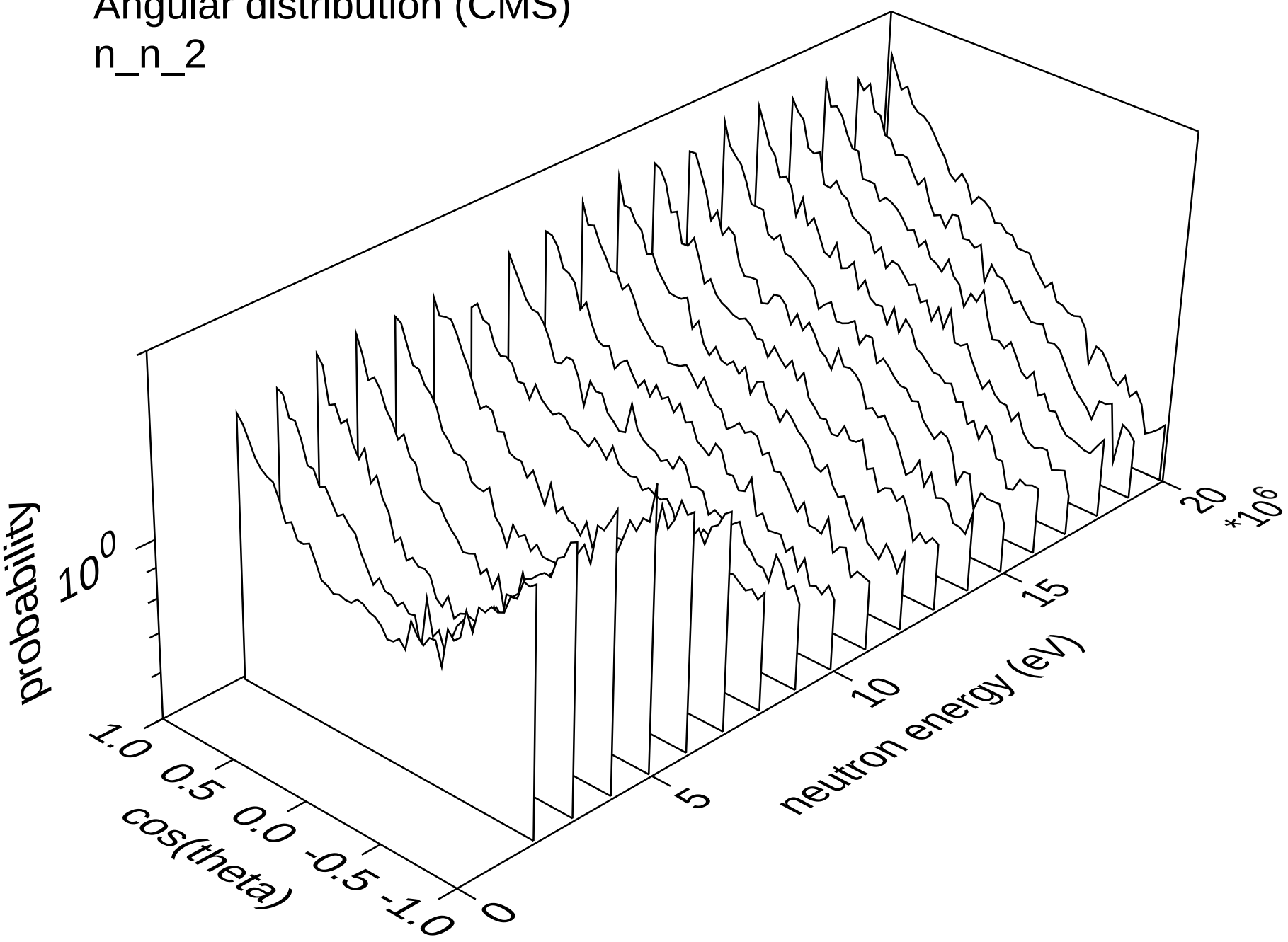

Angular distribution (CMS)
n_na part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
15
20
*10^6
neutron energy (eV)

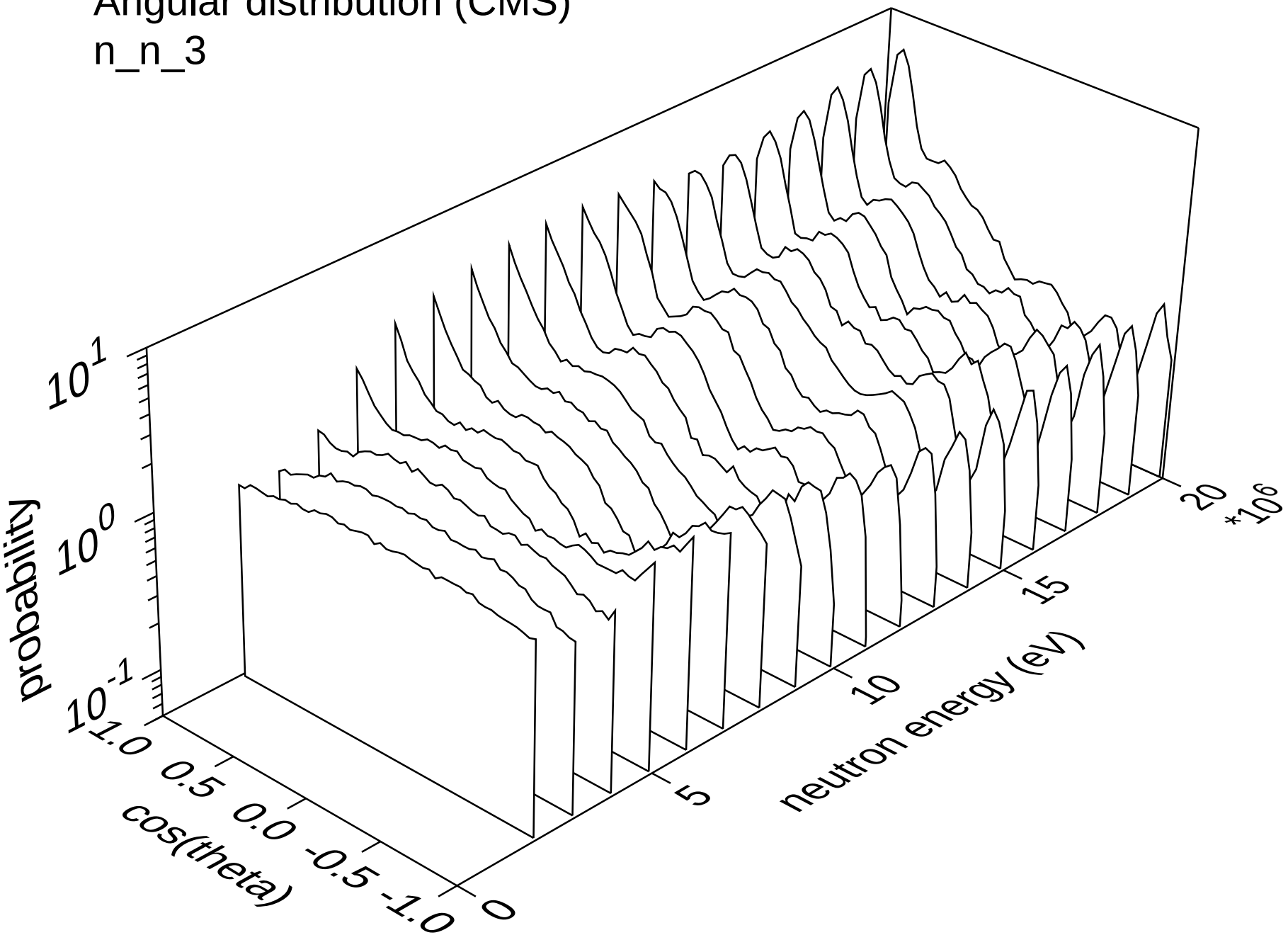

Angular distribution (CMS)
n_np part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

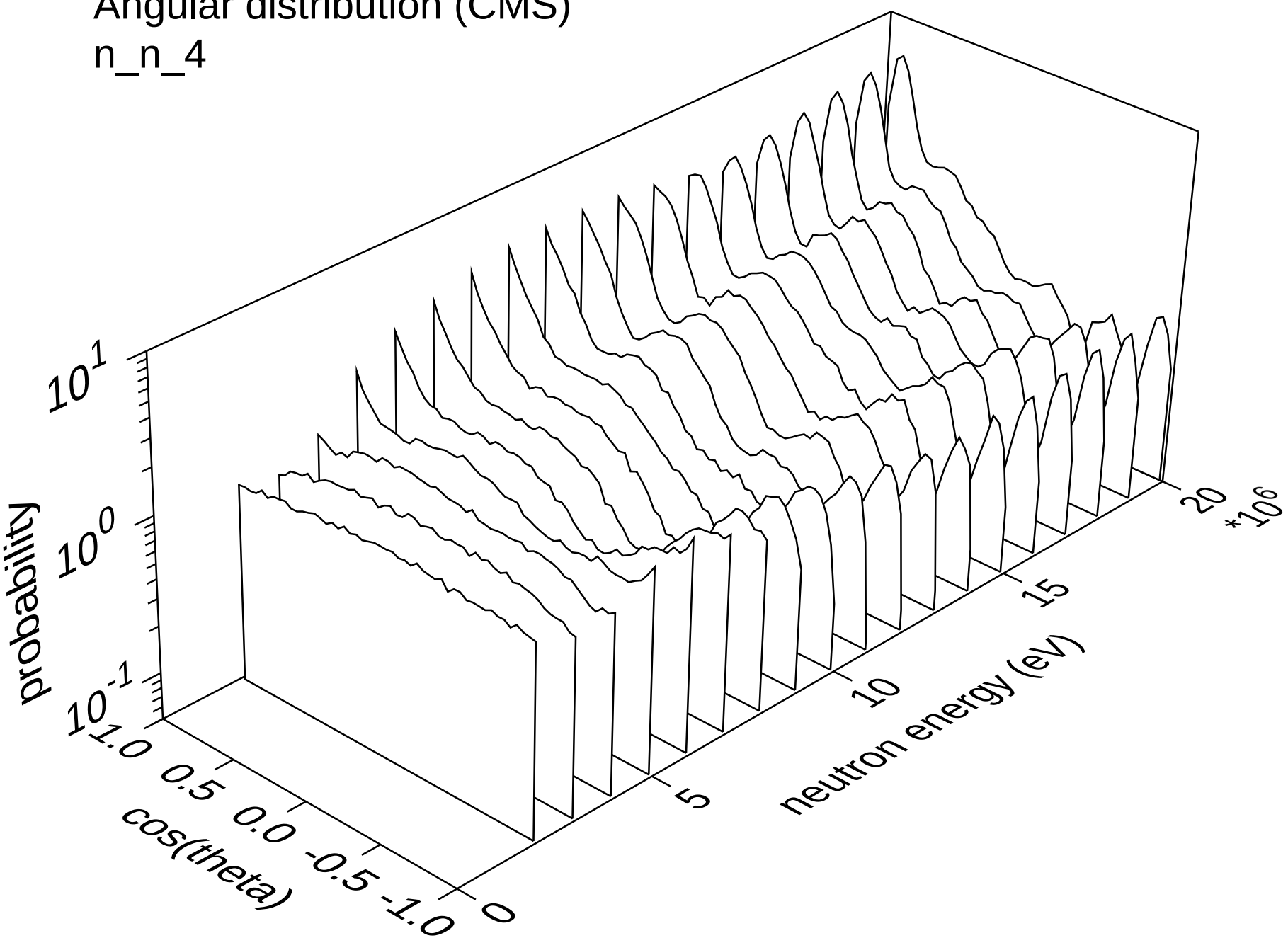

Angular distribution (CMS)
n_np part.=proton
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

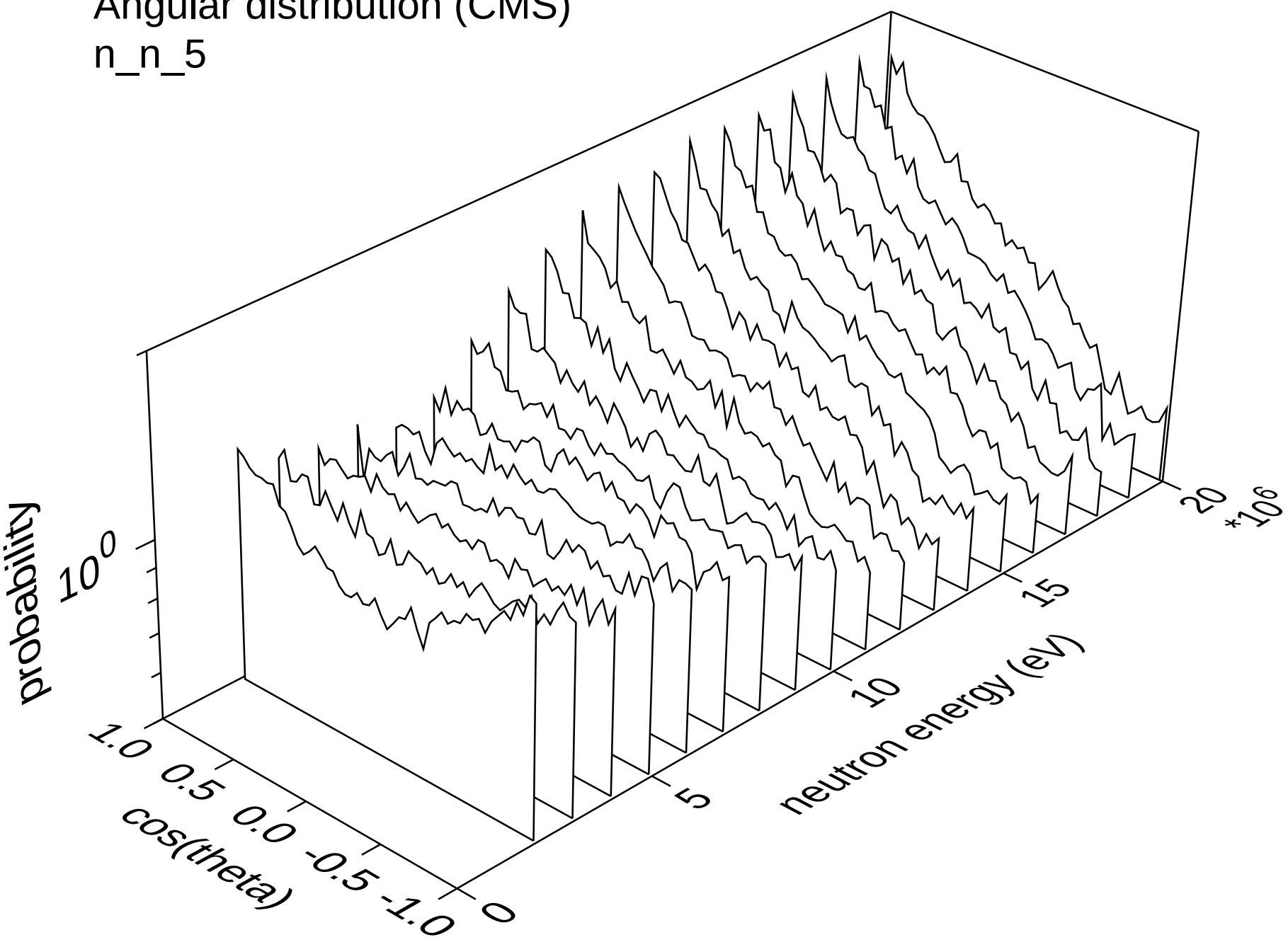

Angular distribution (CMS)
n_np part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

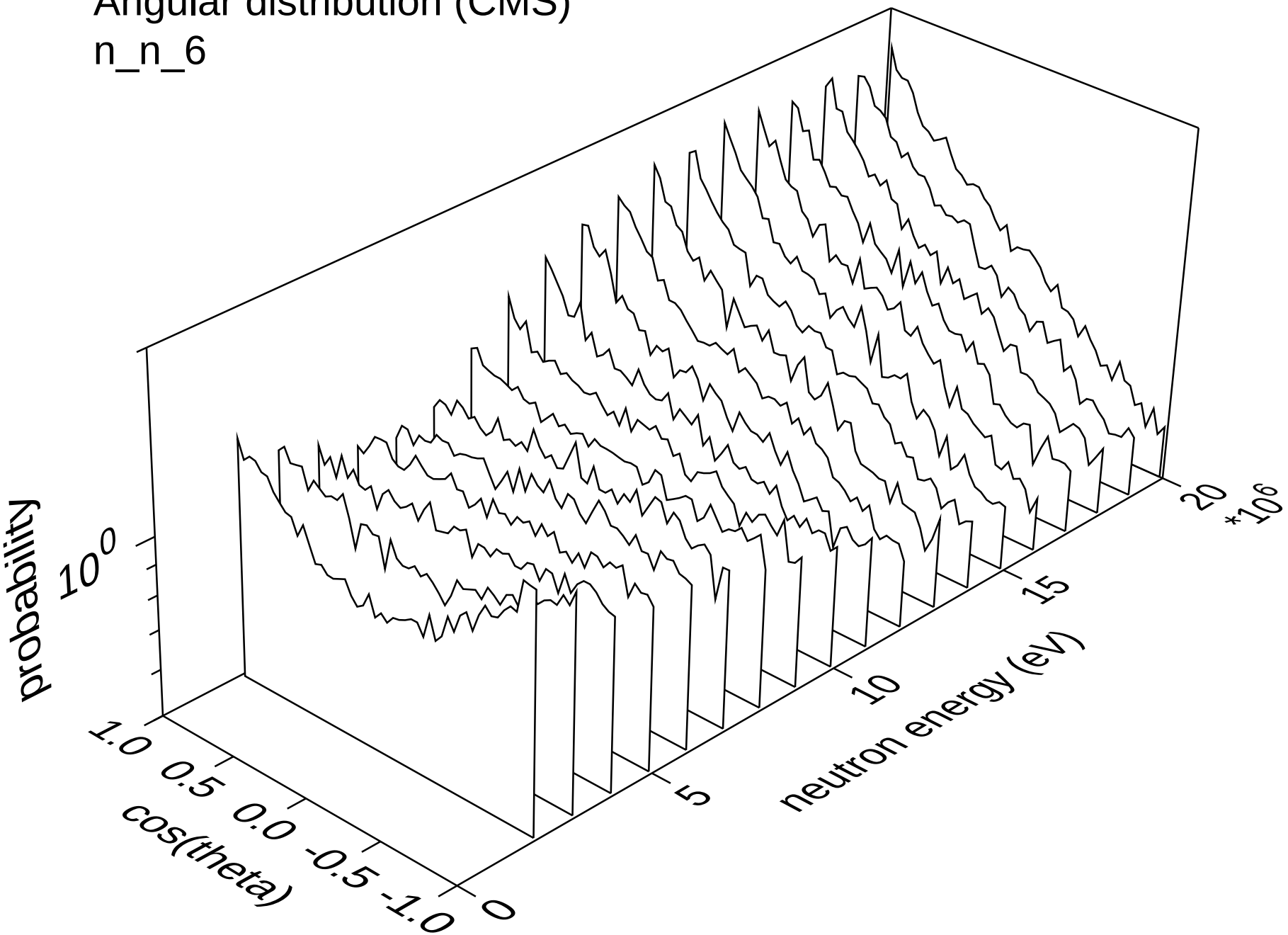

Angular distribution (CMS)
n_n_1
probability
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

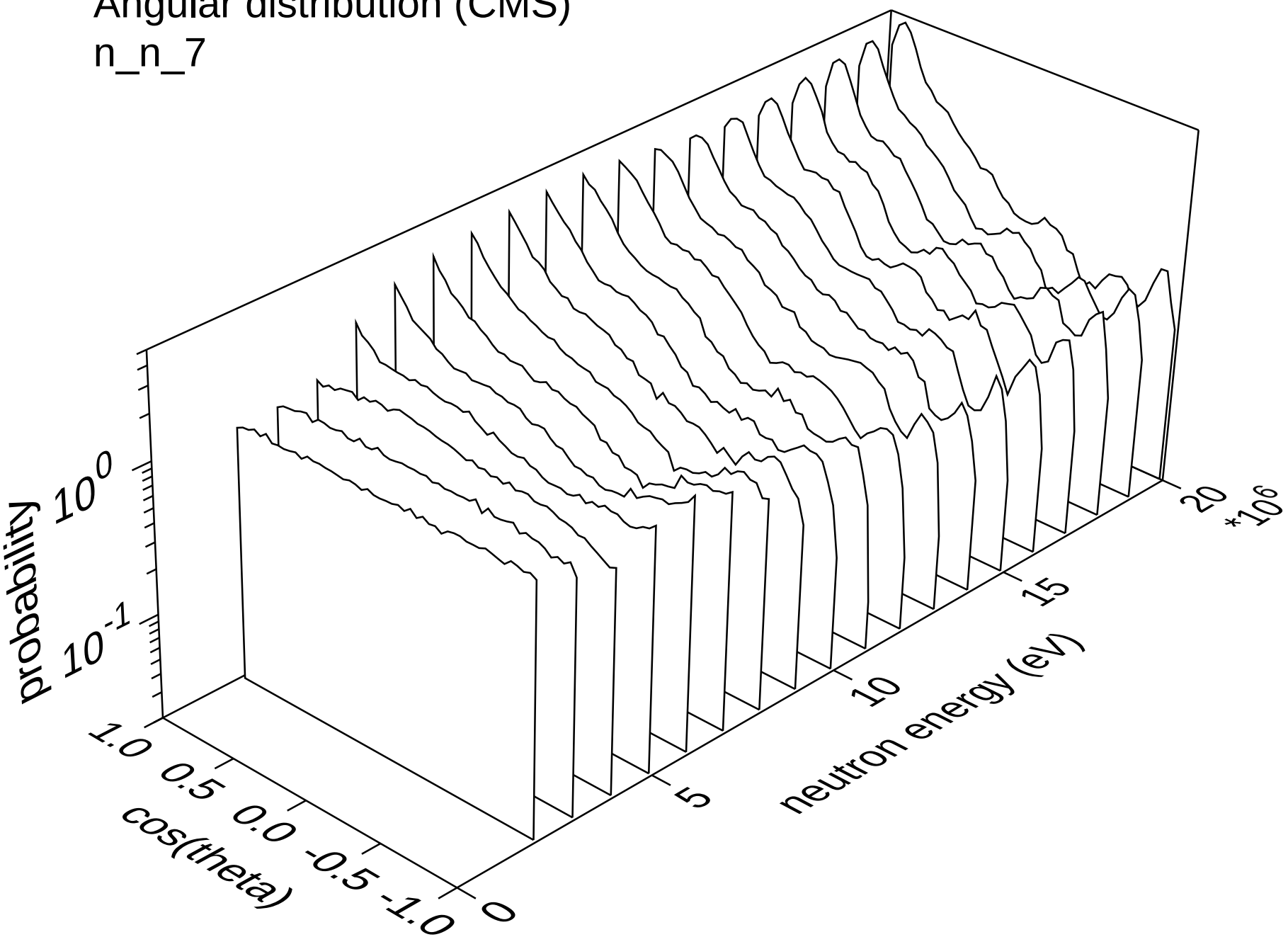

Angular distribution (CMS)
n_n_2
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

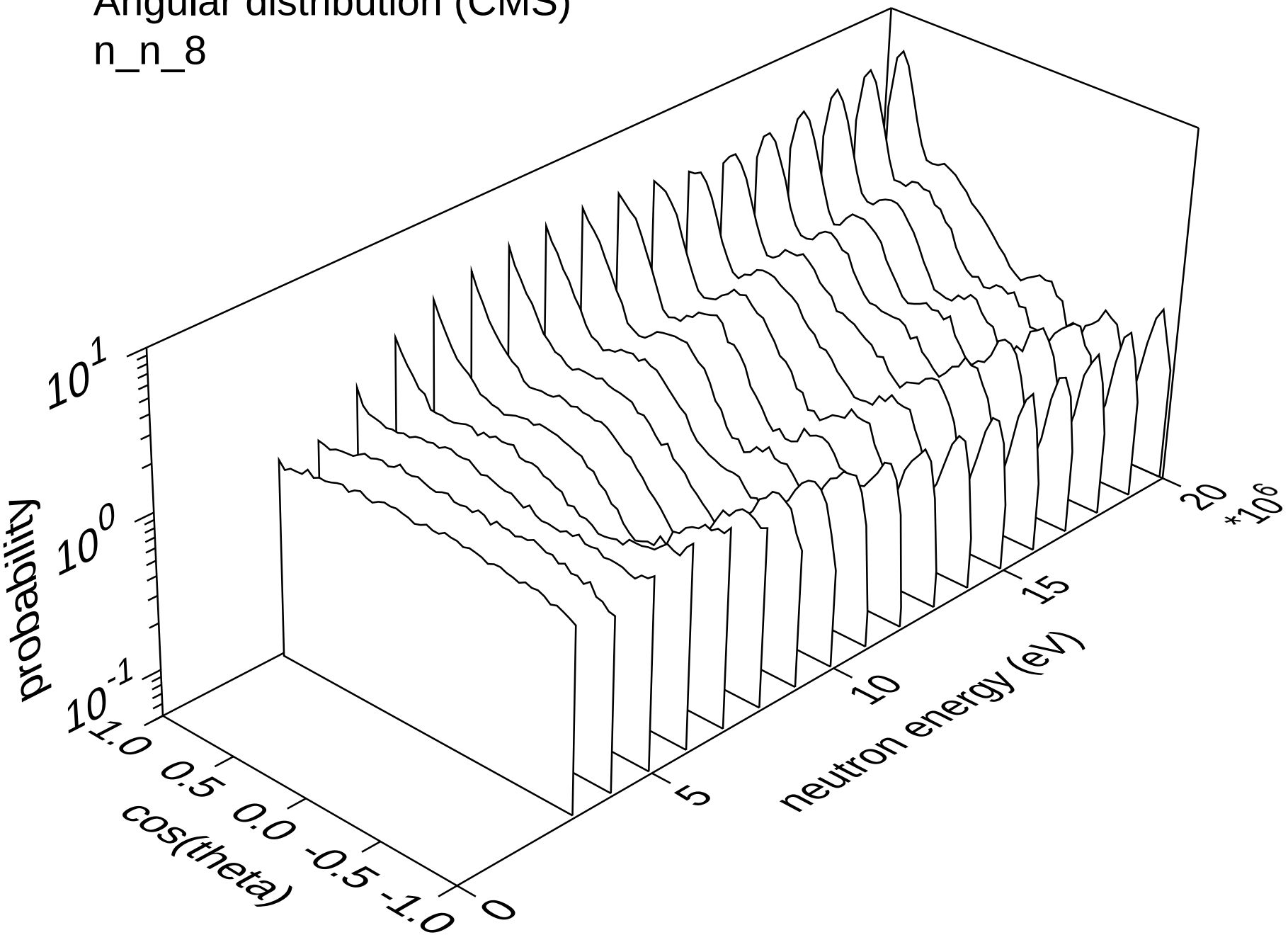

Angular distribution (CMS)
n_n_3
probability
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

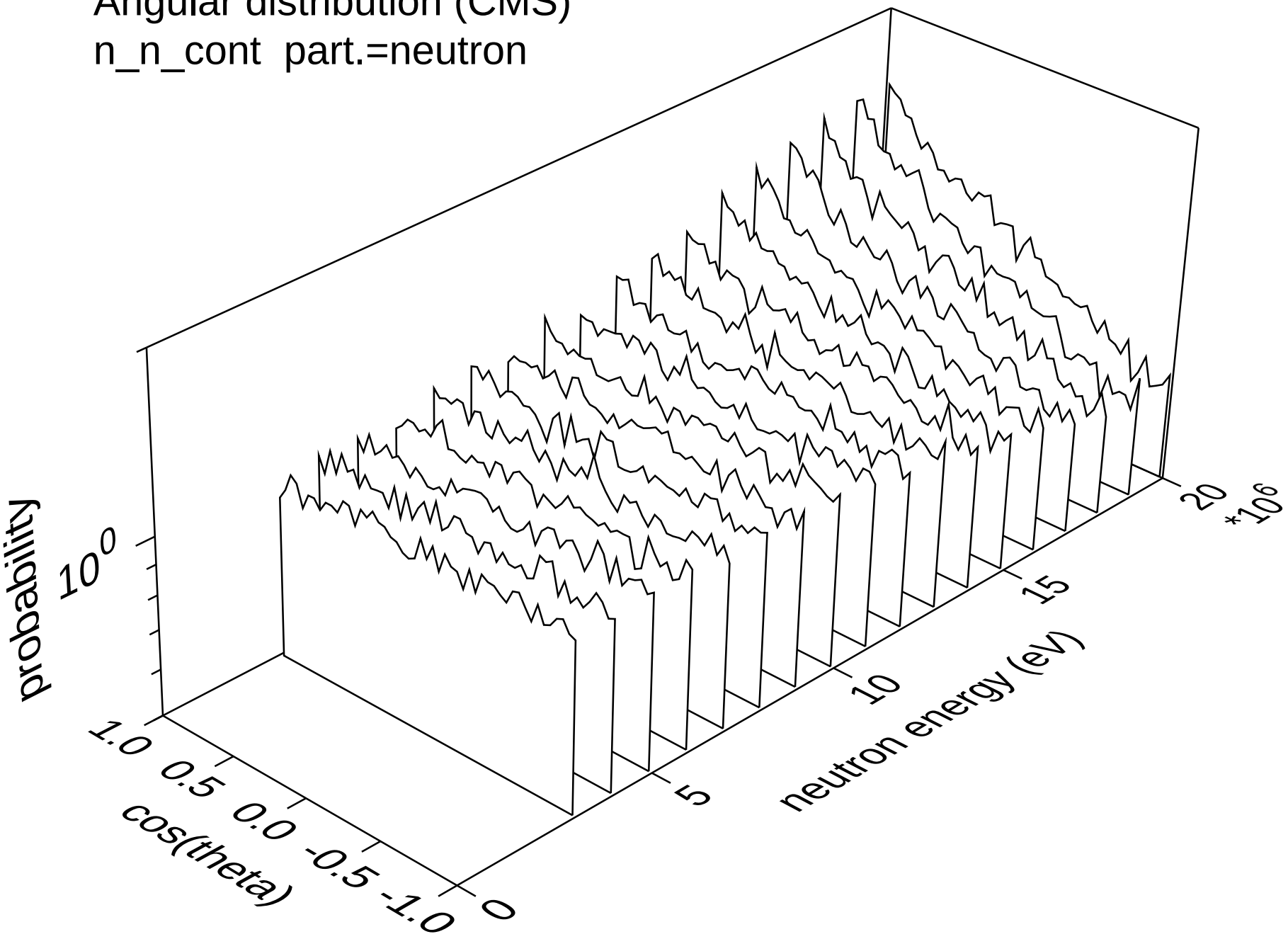

Angular distribution (CMS)
n_n_4
probability
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

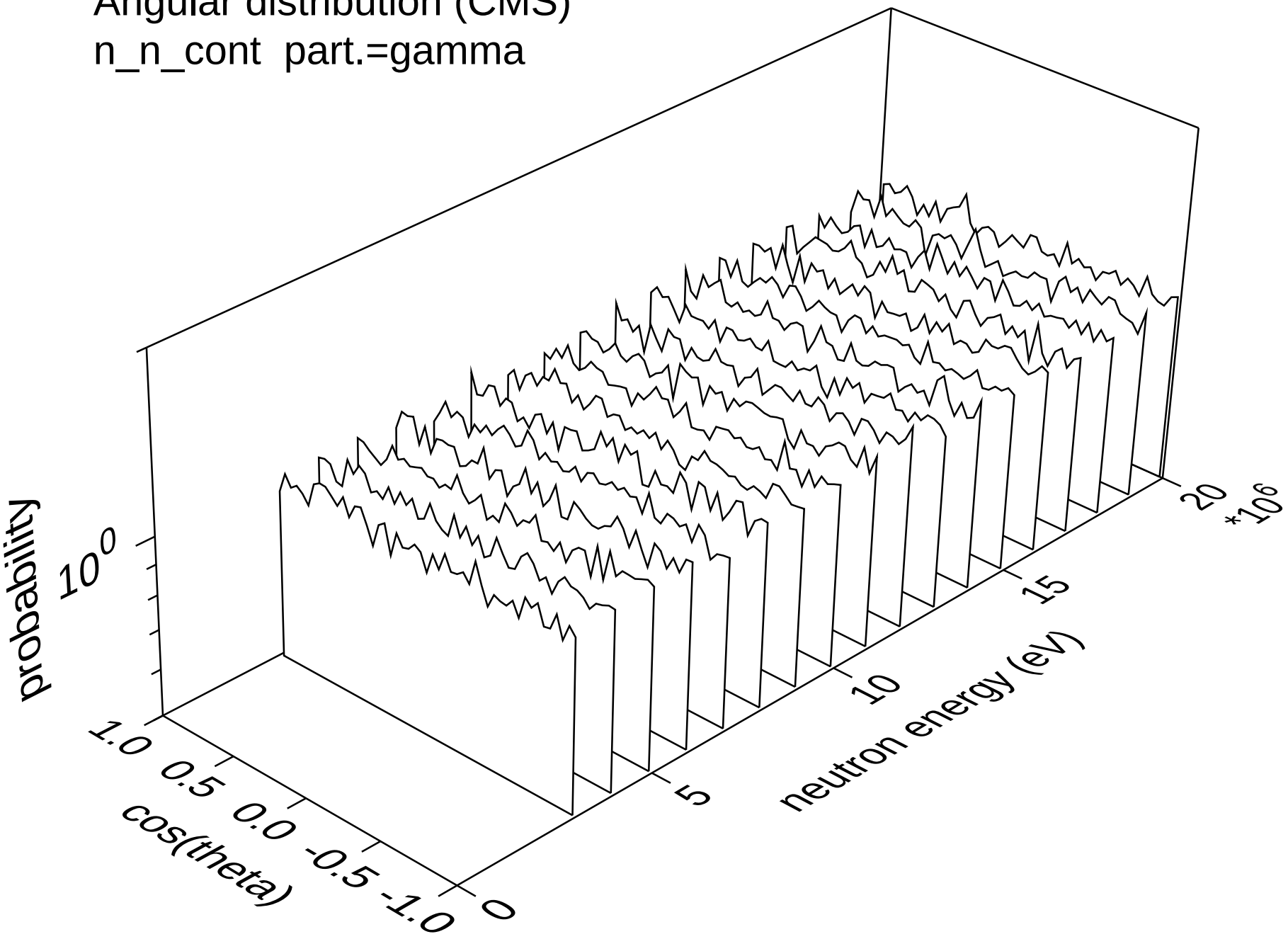

Angular distribution (CMS)
n_n_5
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

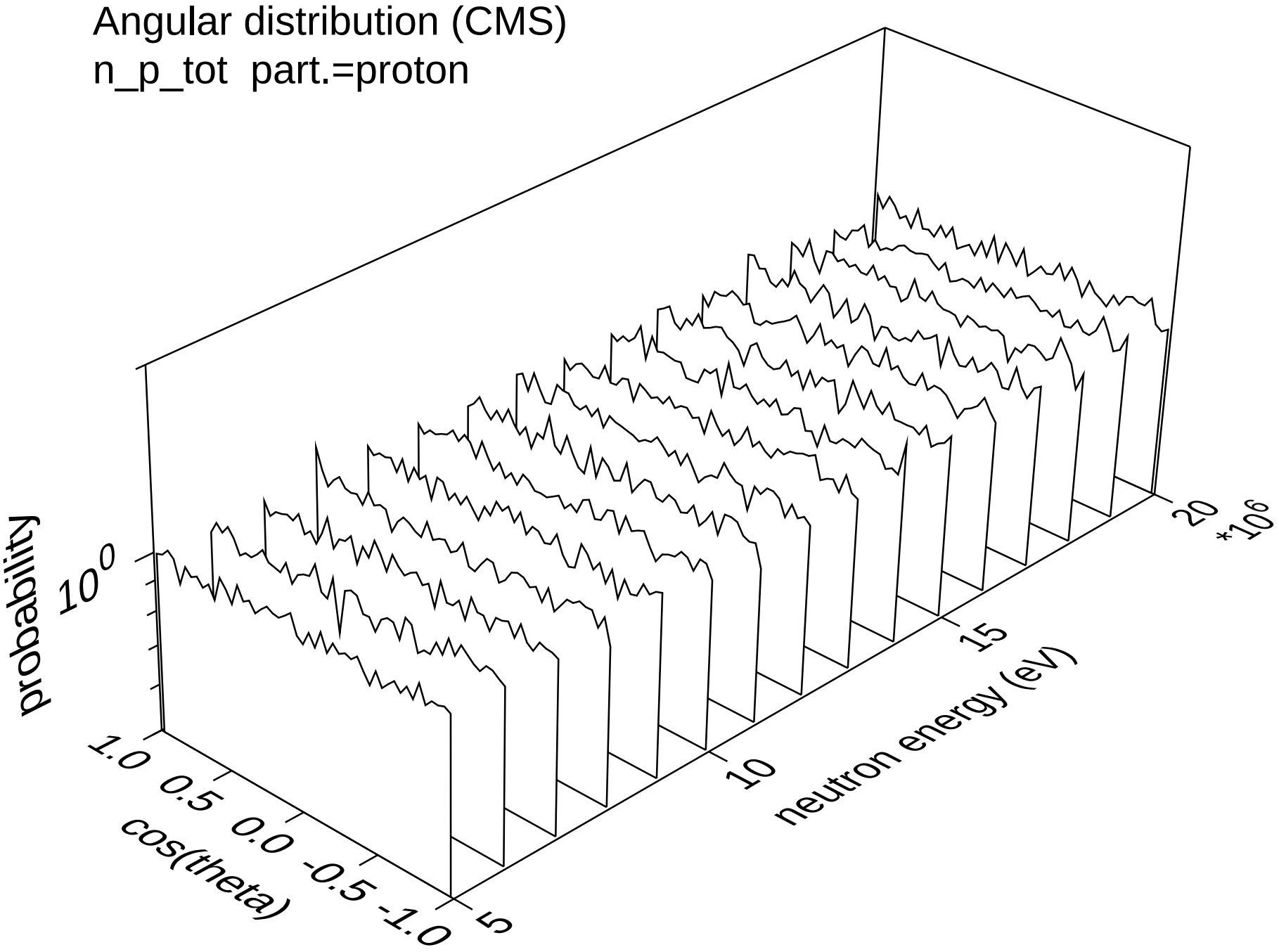

Angular distribution (CMS)
n_n_6
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

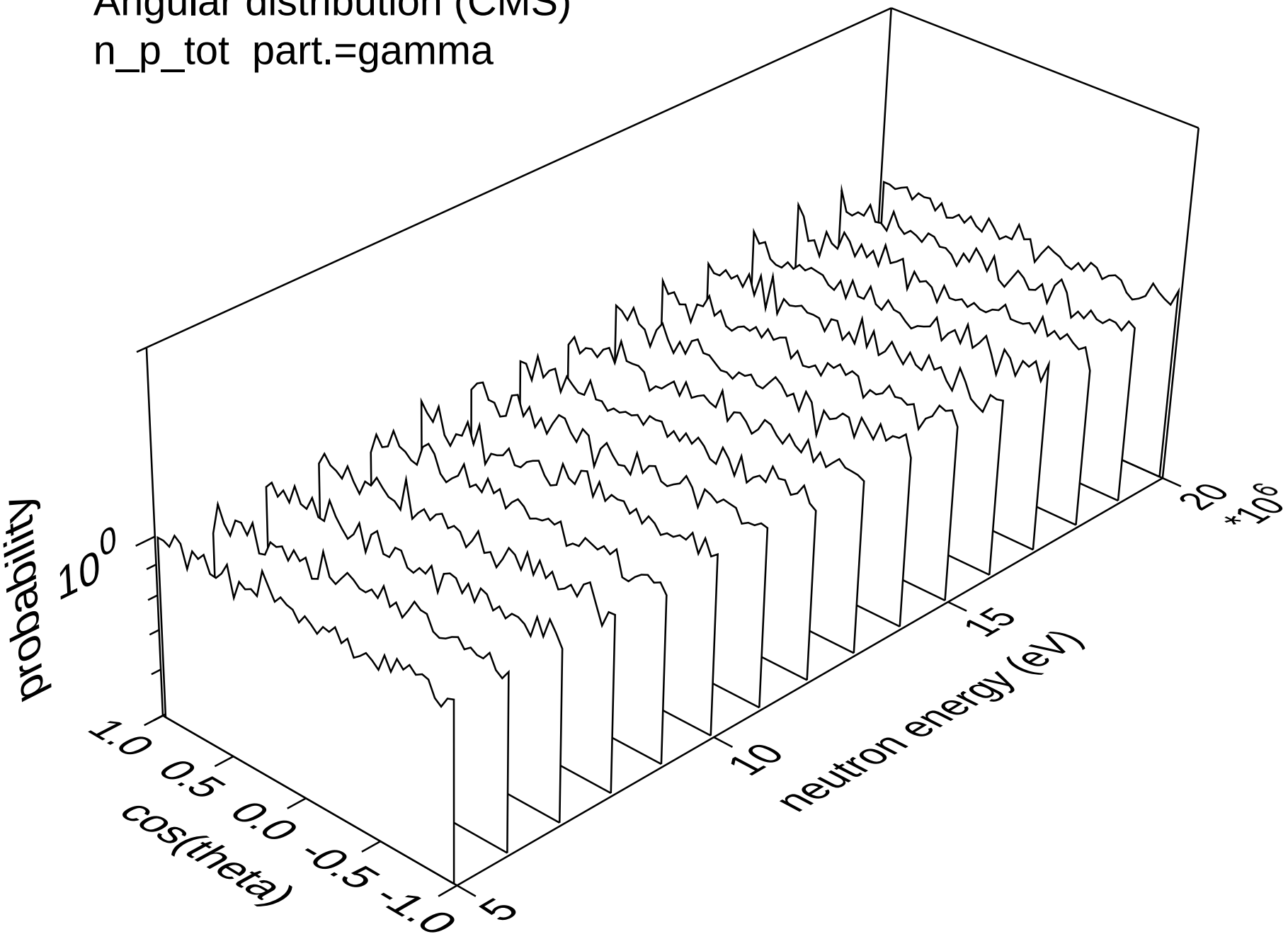

Angular distribution (CMS)
n_n_7
probability
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

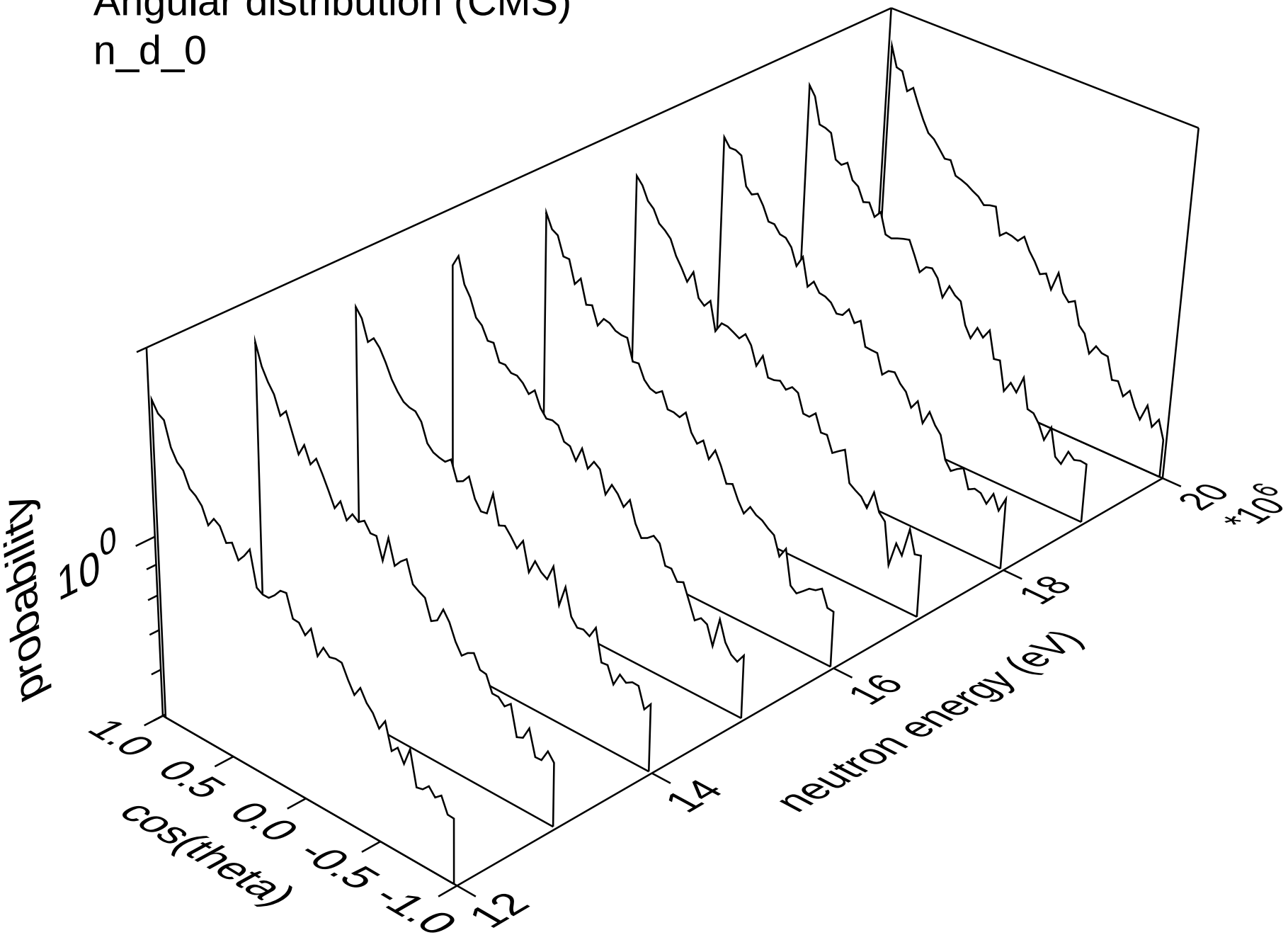

Angular distribution (CMS)
n_n_8
probability
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

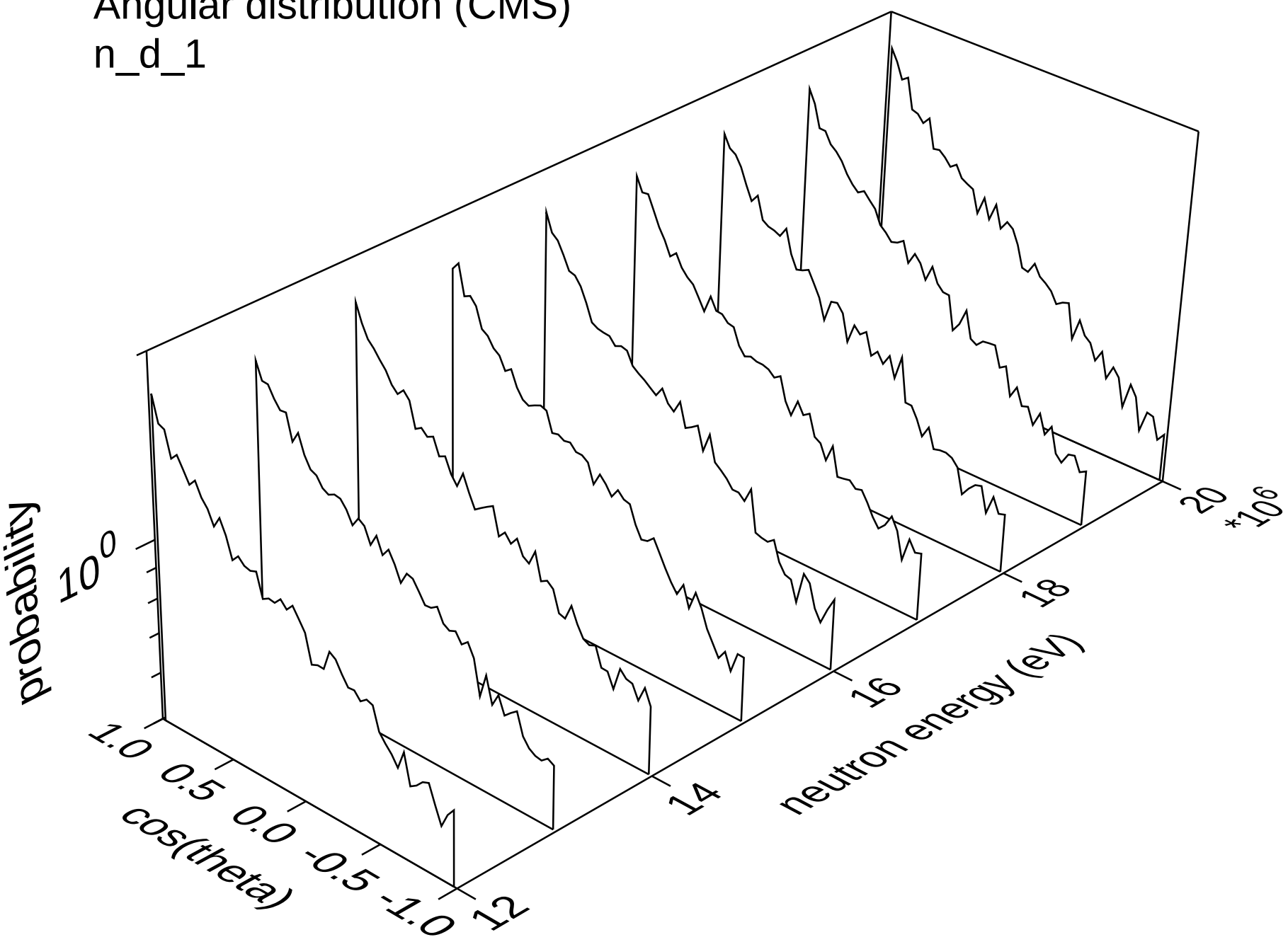

Angular distribution (CMS)
n_n_cont part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

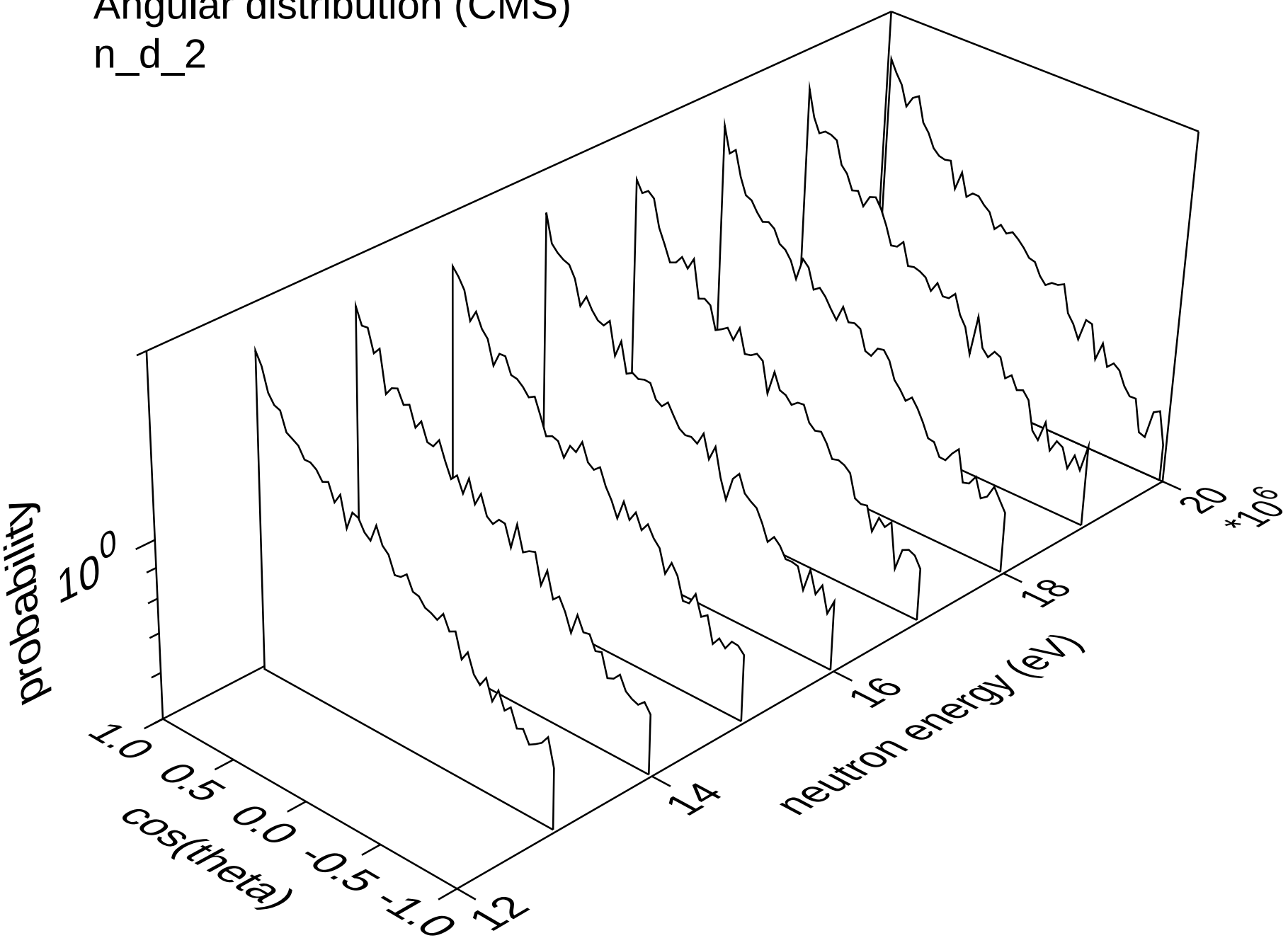

Angular distribution (CMS)
n_n_cont part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

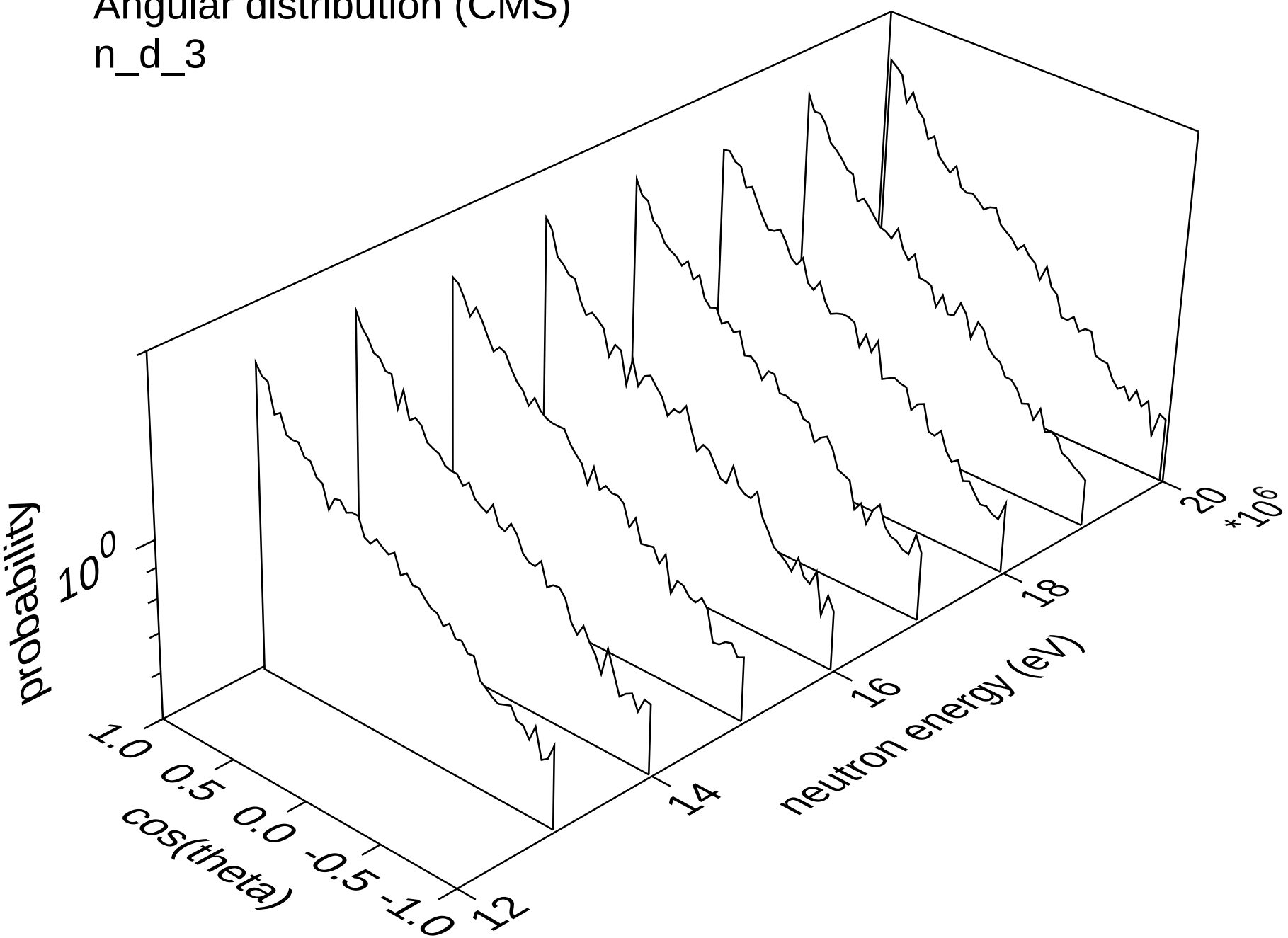

Angular distribution (CMS)
n_p_tot part.=proton
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
5
10
15
20
*10^6
neutron energy (eV)

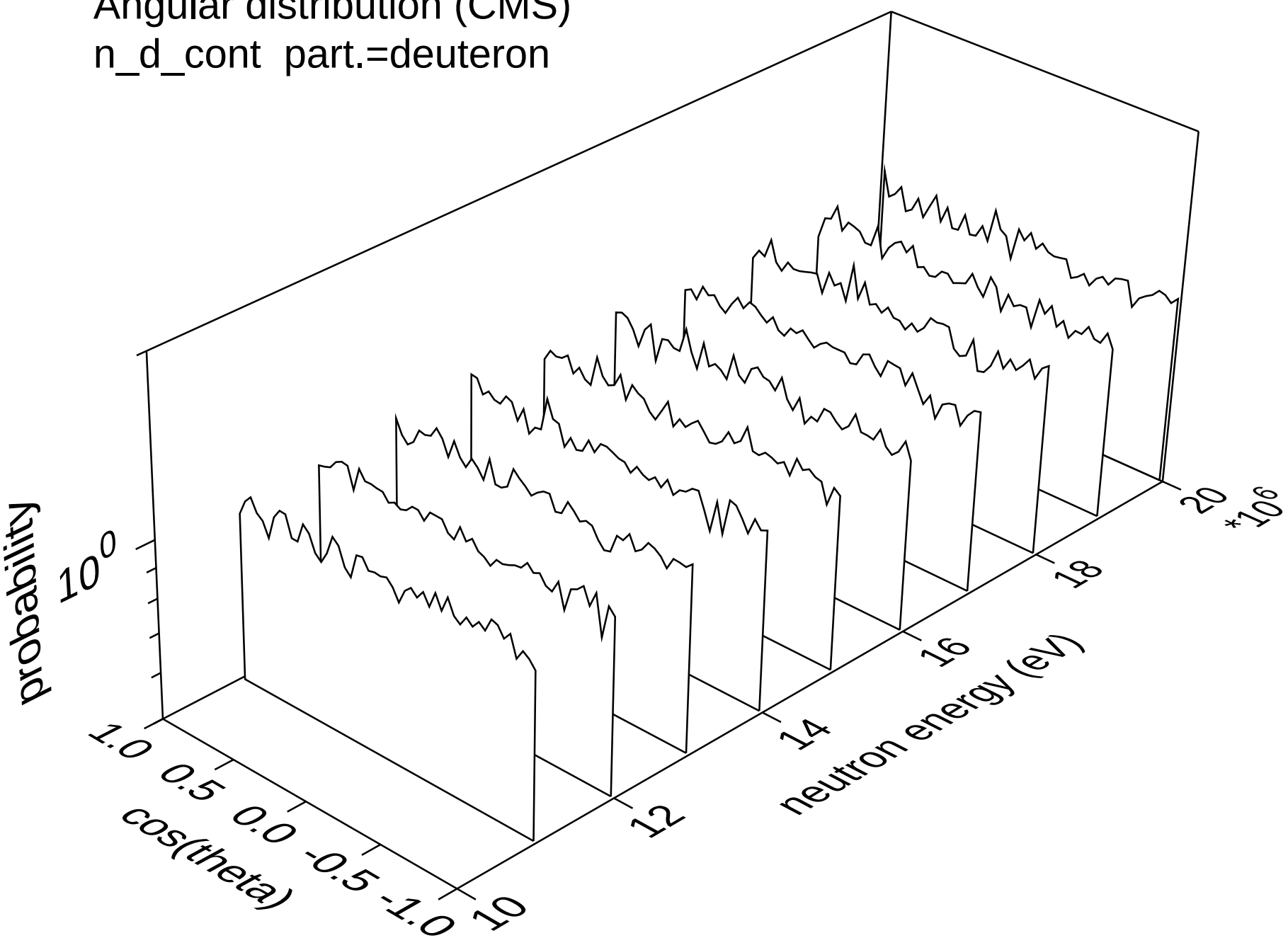

Angular distribution (CMS)
n_p_tot part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
5
10
15
20
*10^6
neutron energy (eV)

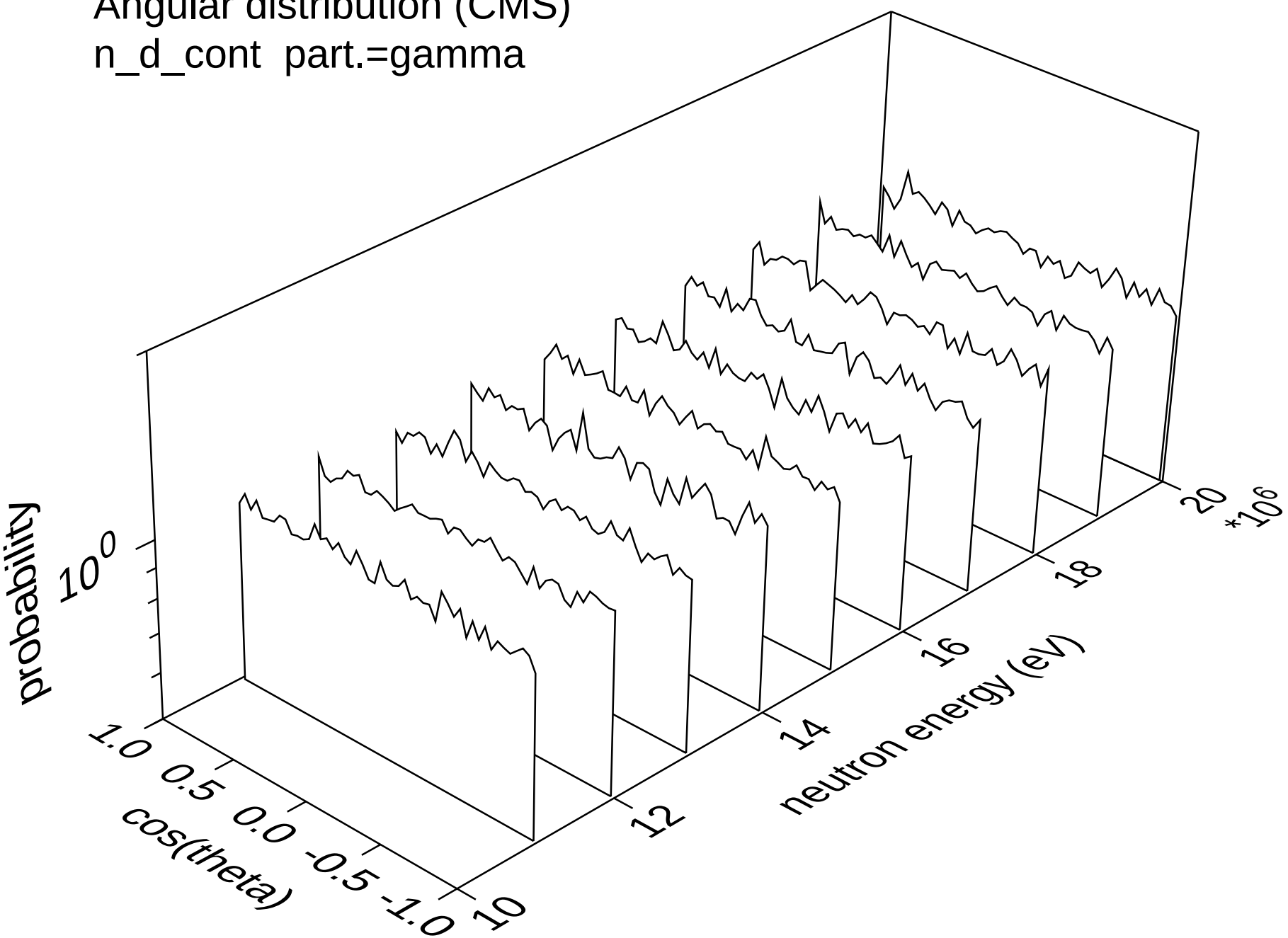

Angular distribution (CMS)
n_d_0
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

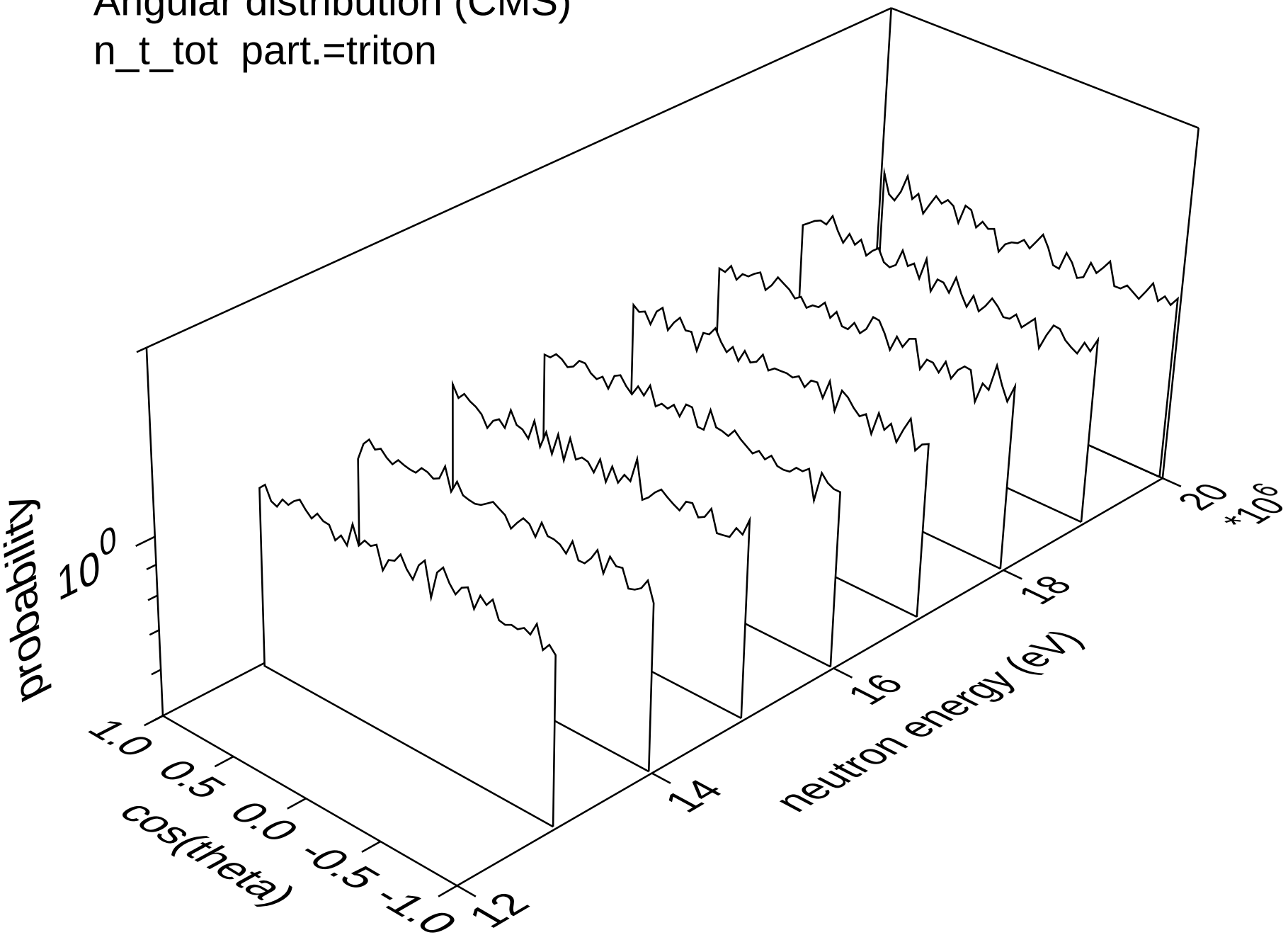

Angular distribution (CMS)
n_d_1
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

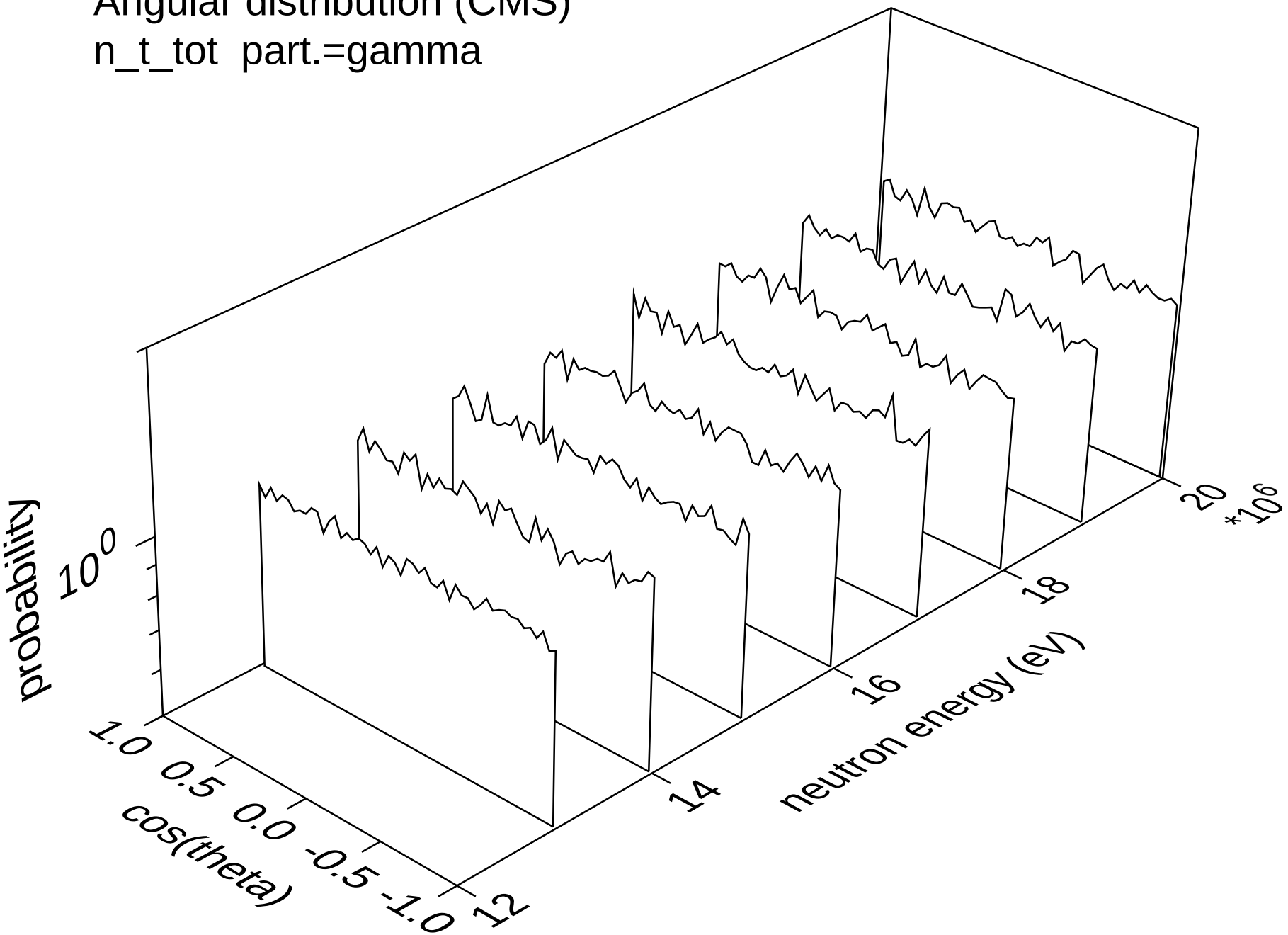

Angular distribution (CMS)
n_d_2
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

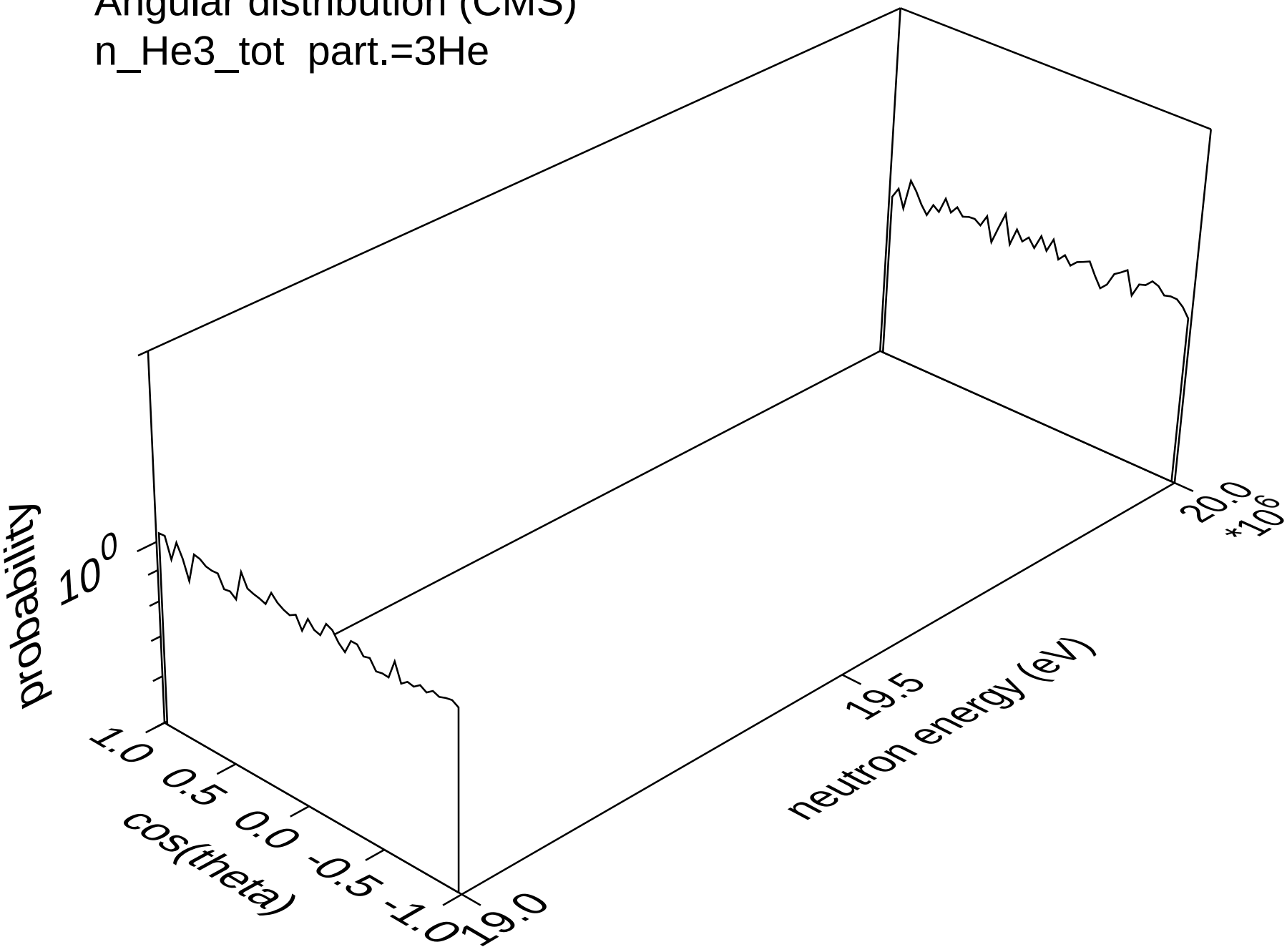

Angular distribution (CMS)
n_d_3
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

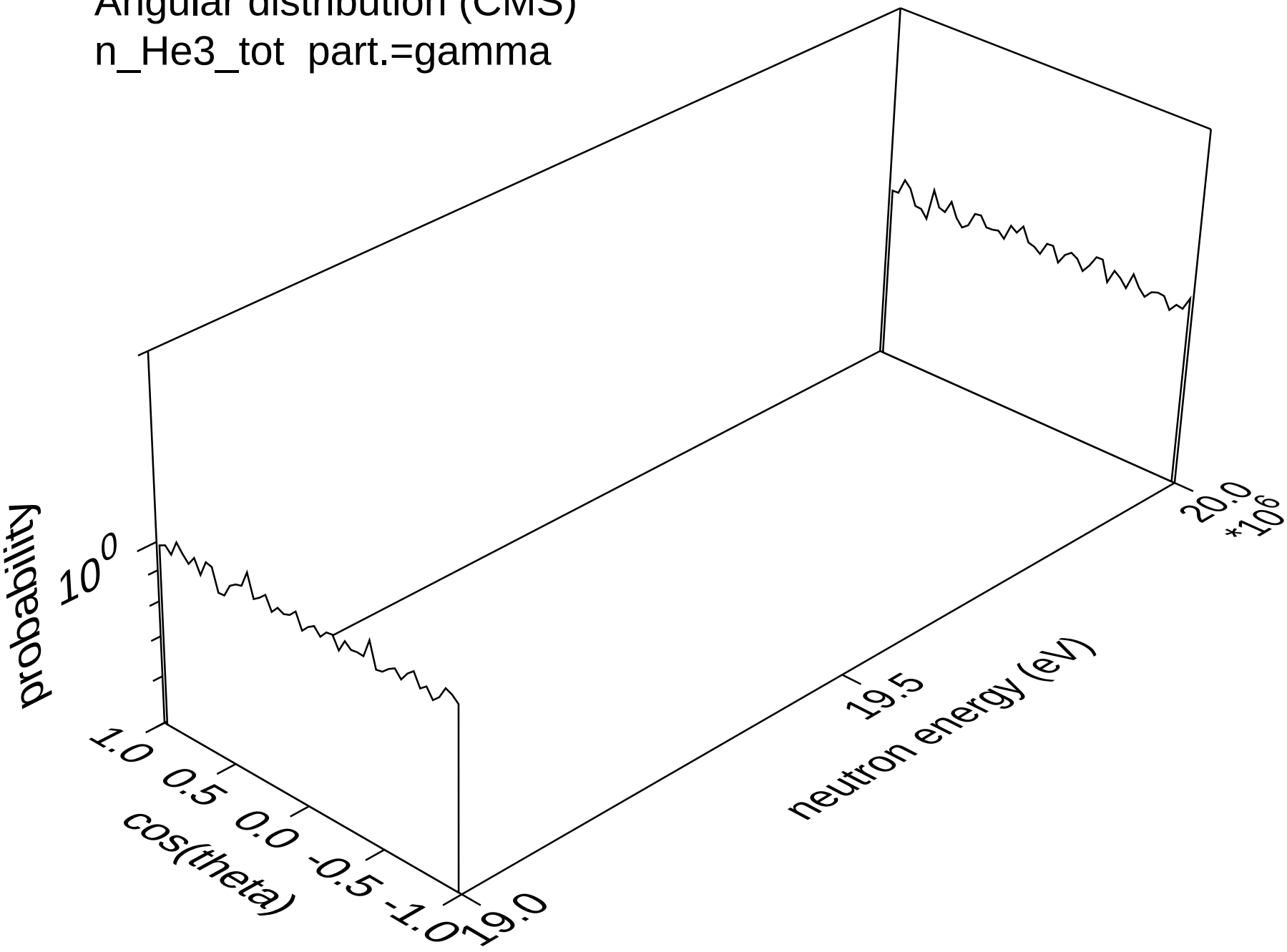

Angular distribution (CMS)
n_d_cont part.=deuteron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
12
14
16
18
20
*10^6
neutron energy (eV)

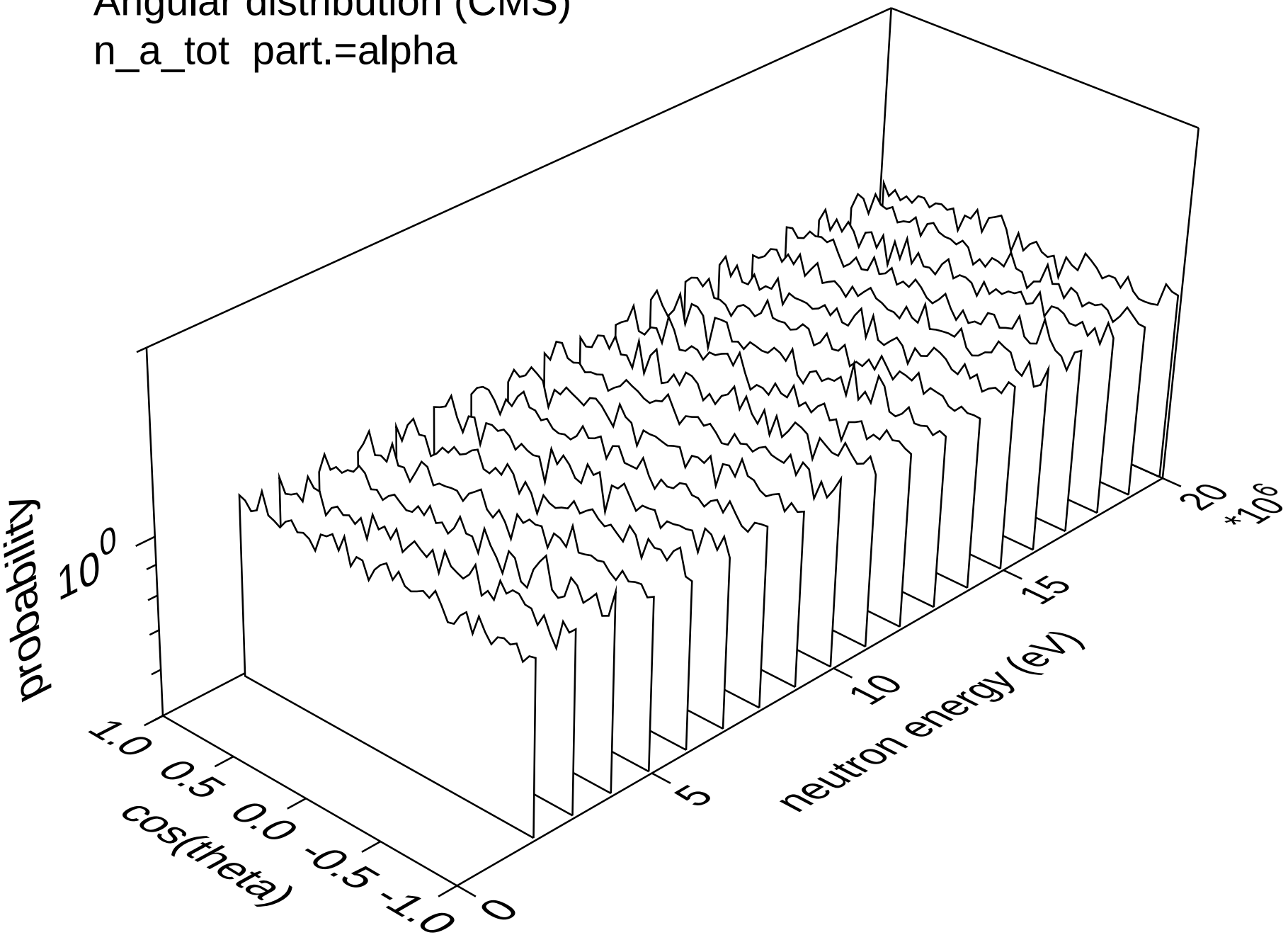

Angular distribution (CMS)
n_d_cont part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
10
12
14
16
18
20
*10^6
neutron energy (eV)

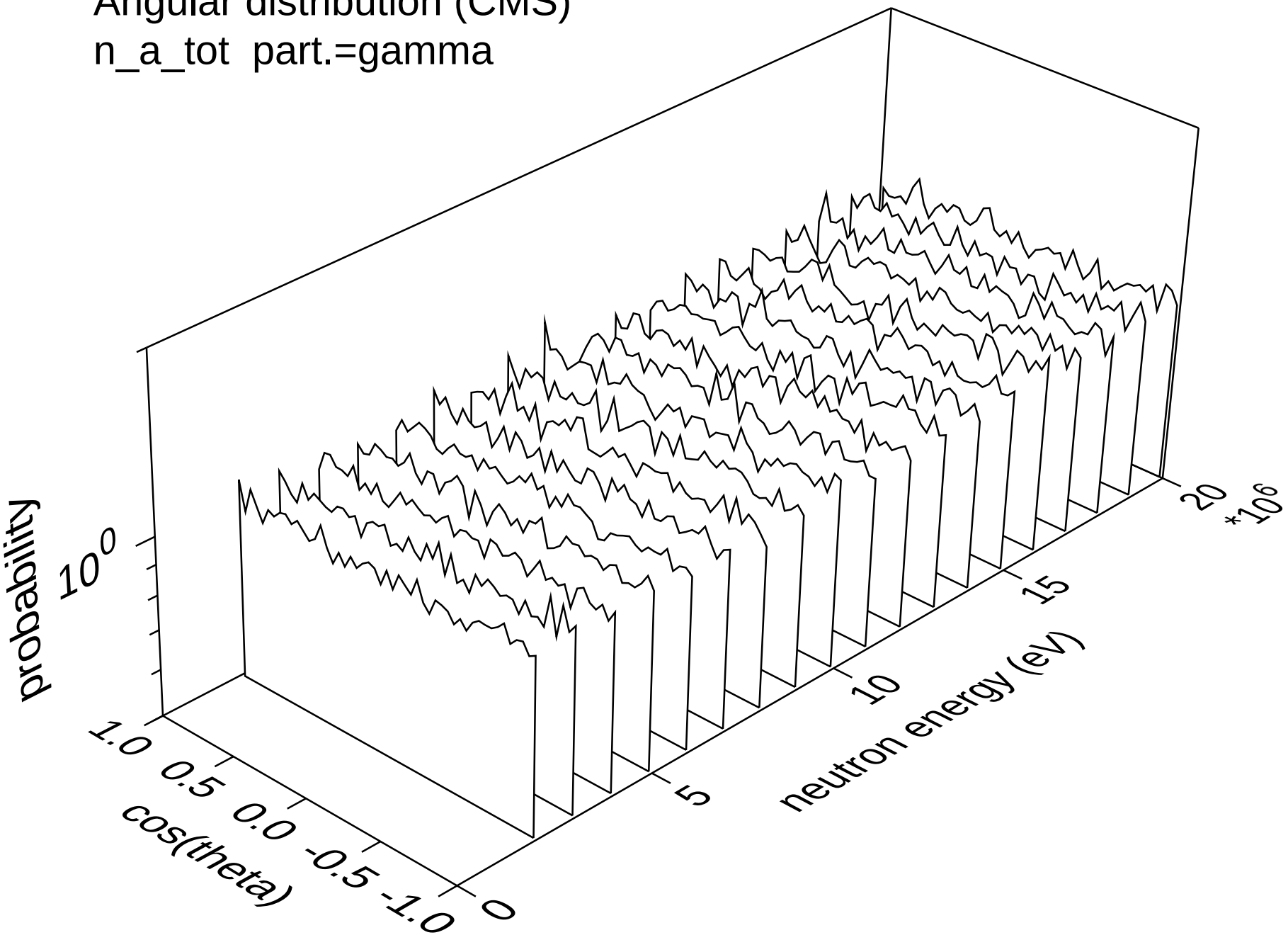

Angular distribution (CMS)
n_t_tot part.=triton
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

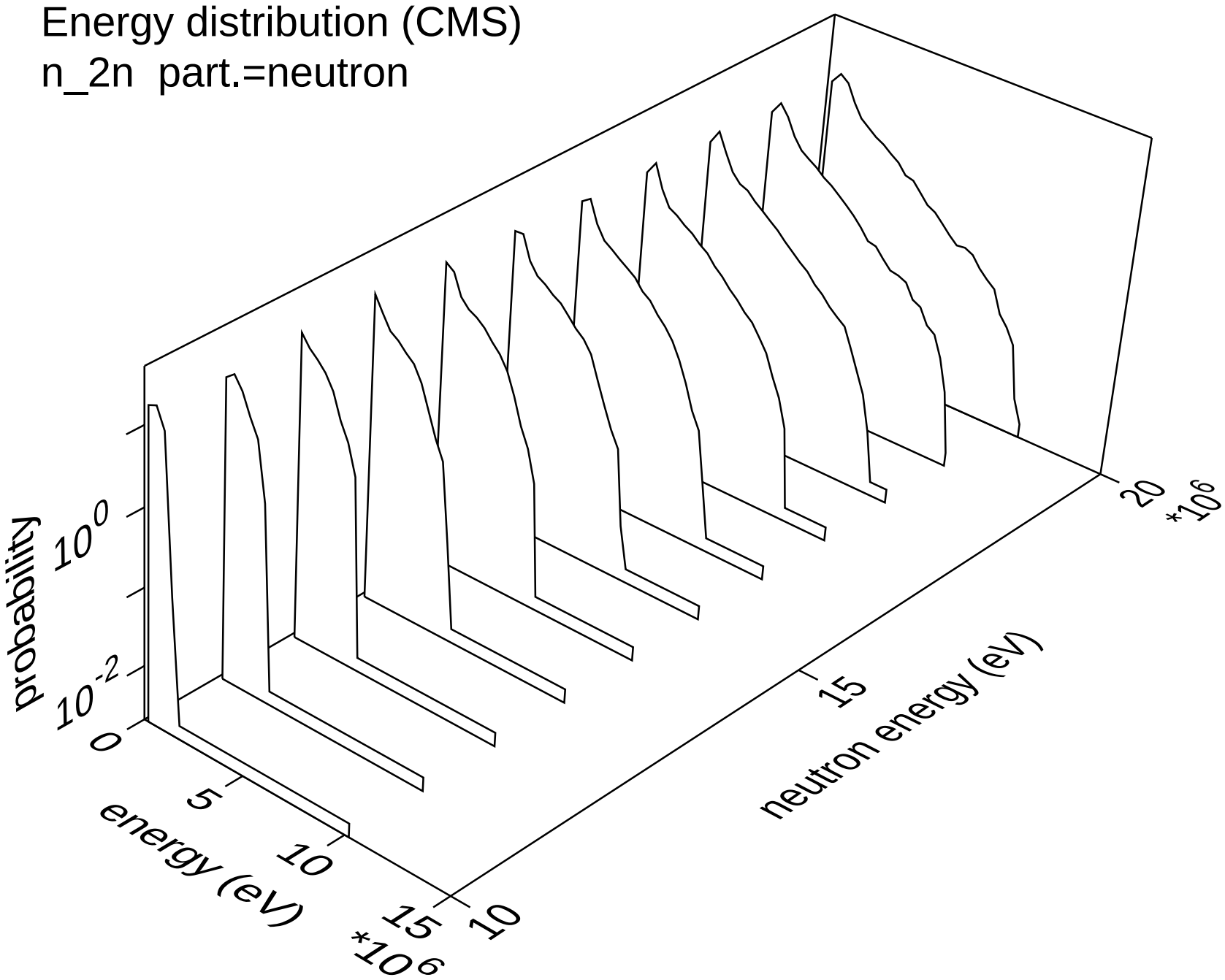

Angular distribution (CMS)
n_t_tot part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

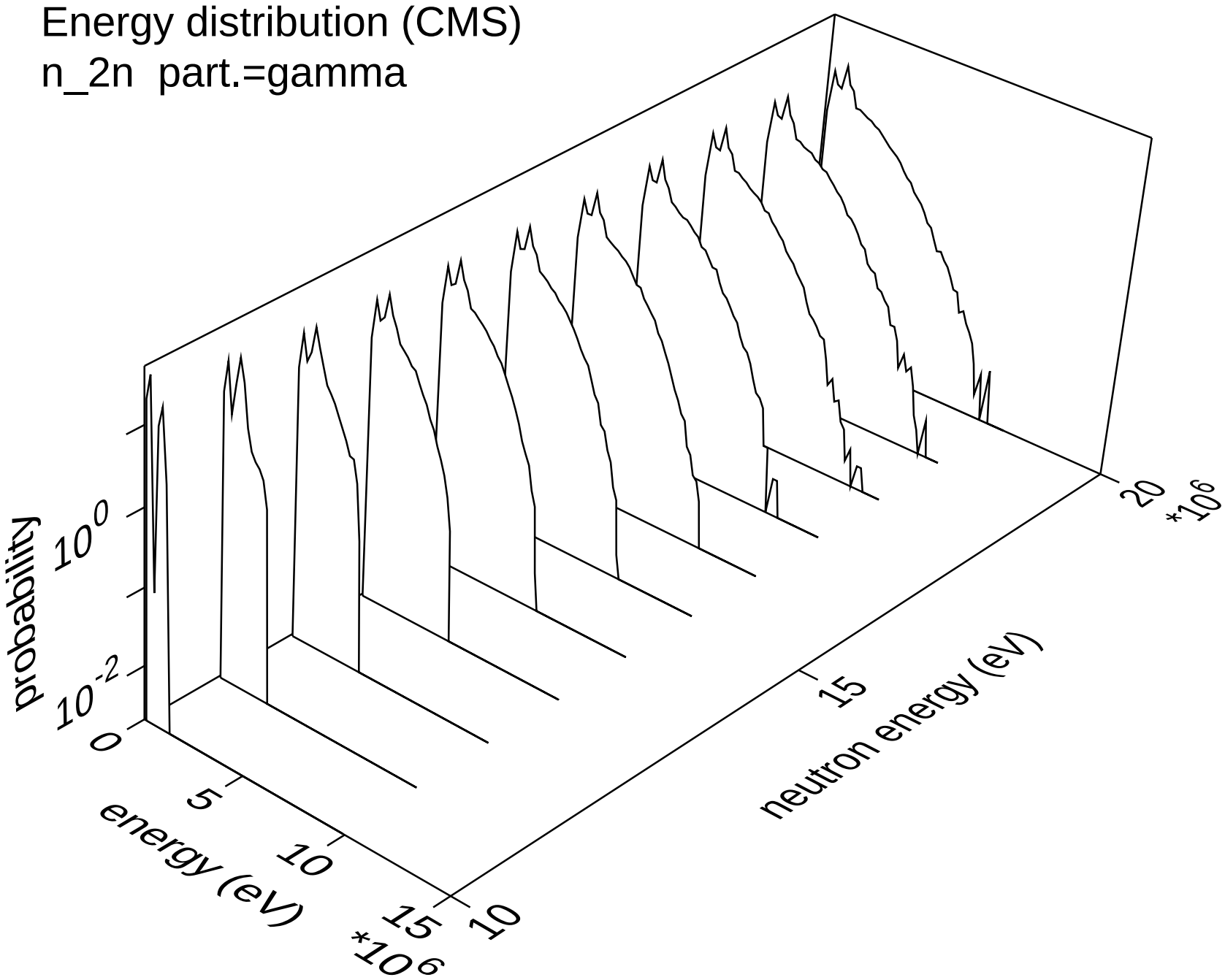

Angular distribution (CMS)
n_He3_tot part.=3He
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

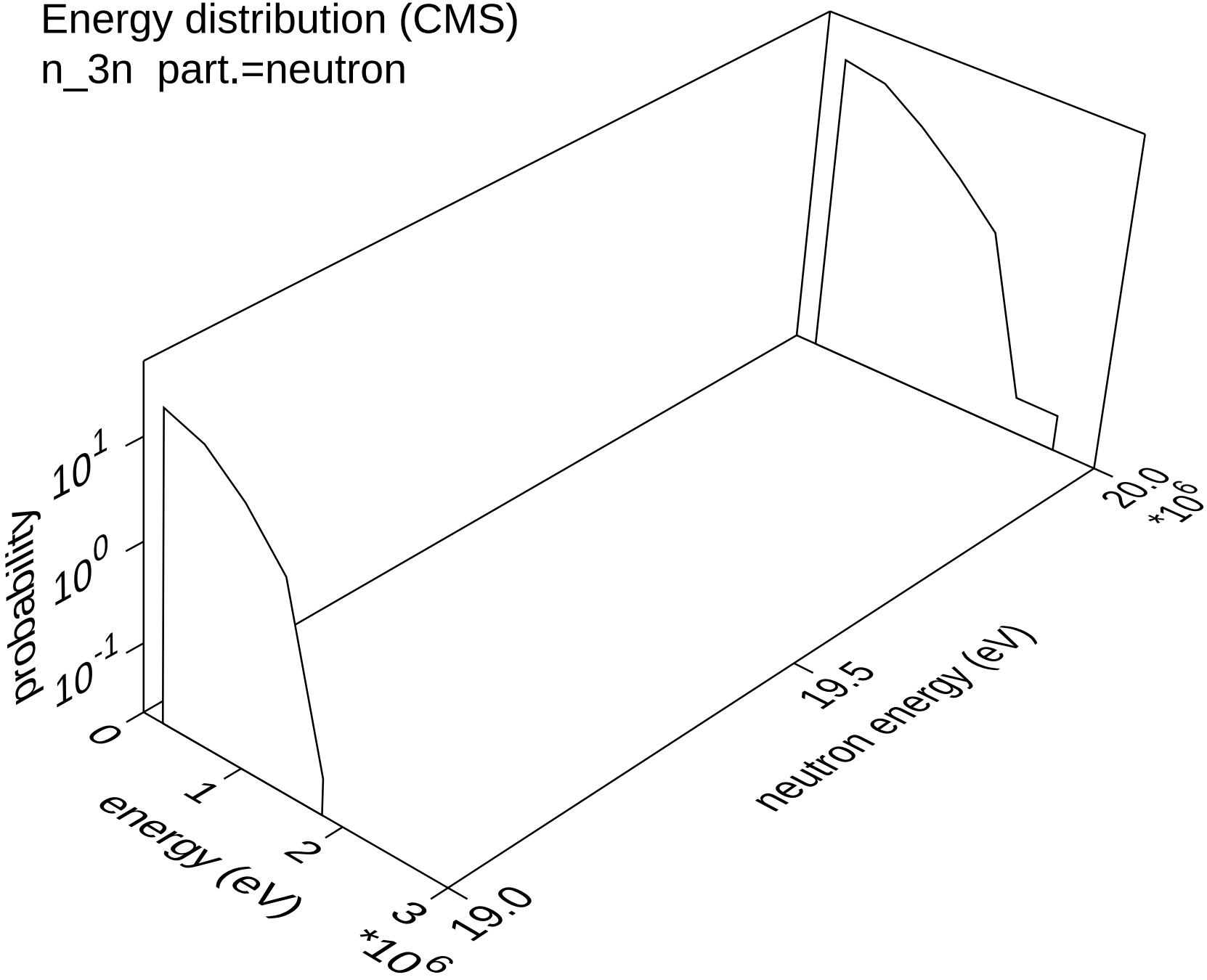

Angular distribution (CMS)
n_He3_tot part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

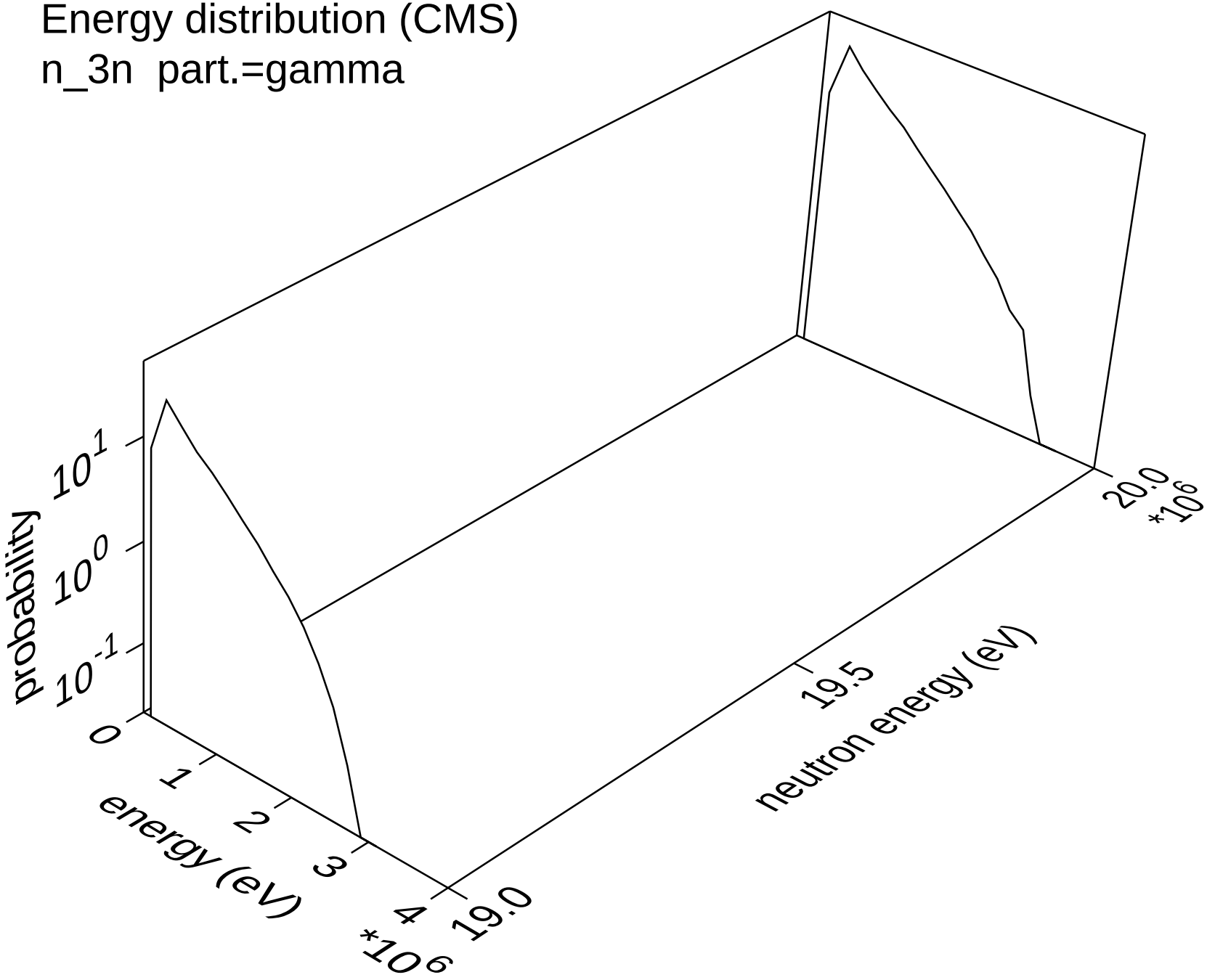

Angular distribution (CMS)
n_a_tot part.=alpha
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

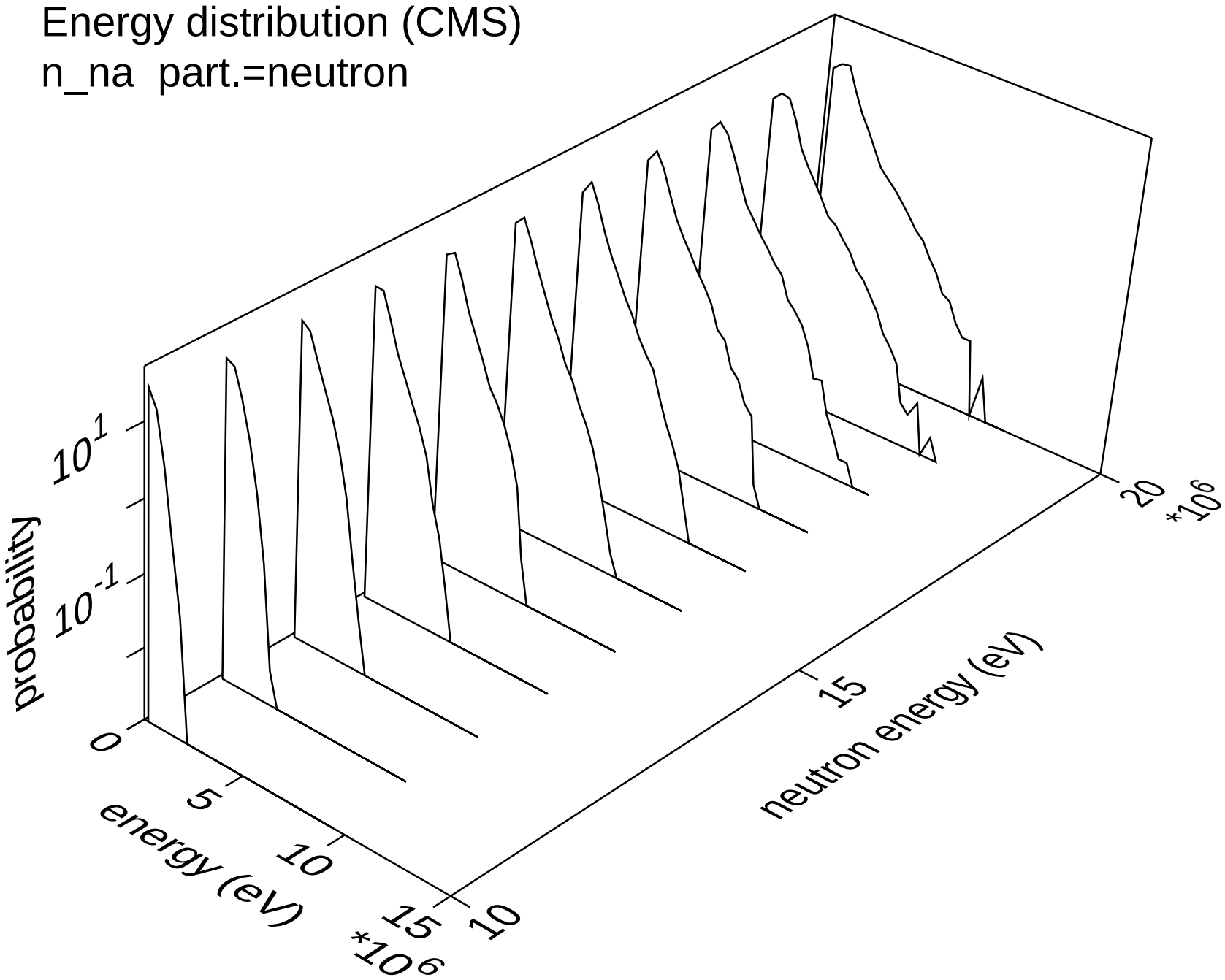

Angular distribution (CMS)
n_a_tot part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

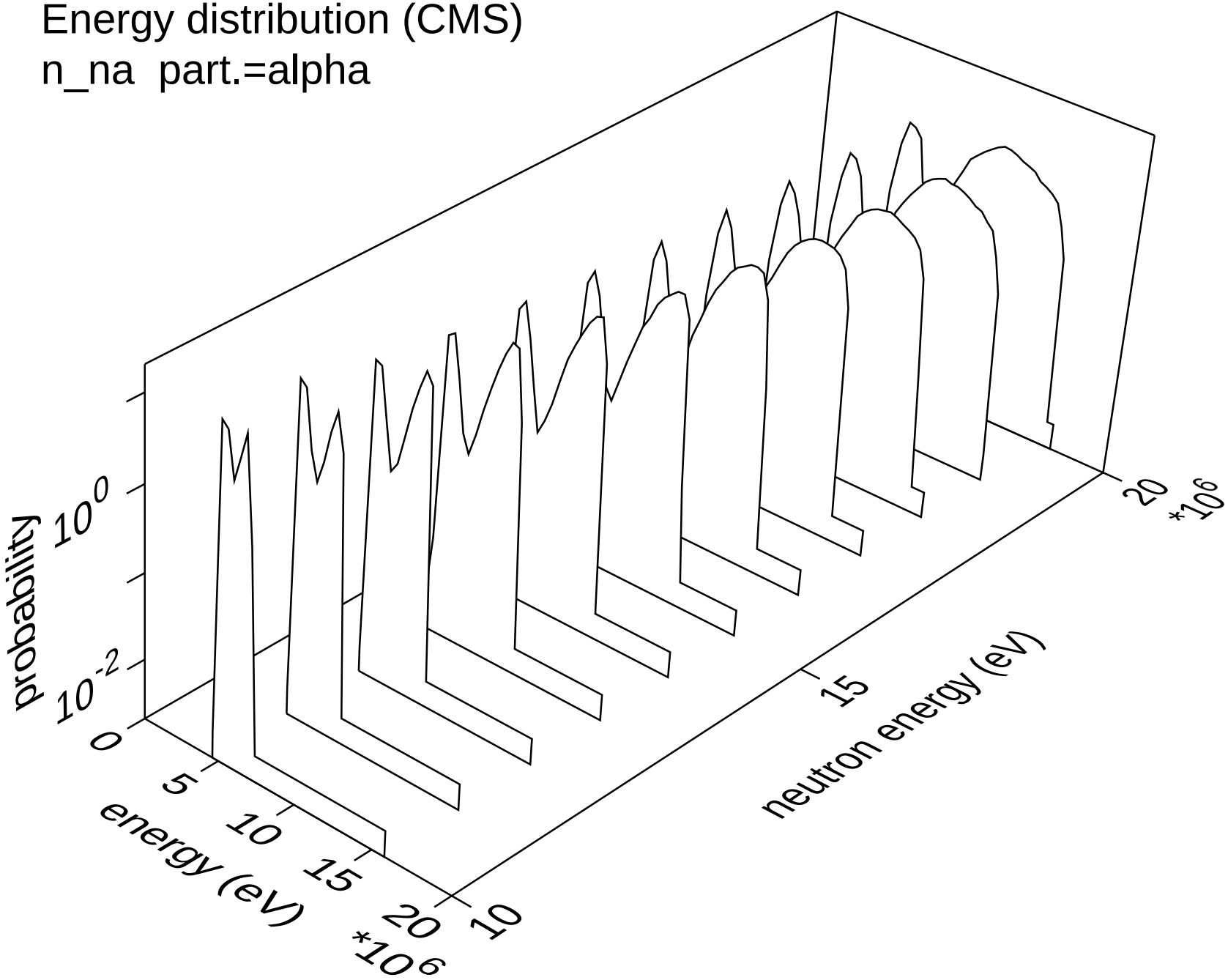

Energy distribution (CMS)
n_2n part.=neutron
probability
10^0
10^-2
0
energy (eV)
5
10
15
*10^6
10
15
neutron energy (eV)
20
*10^6

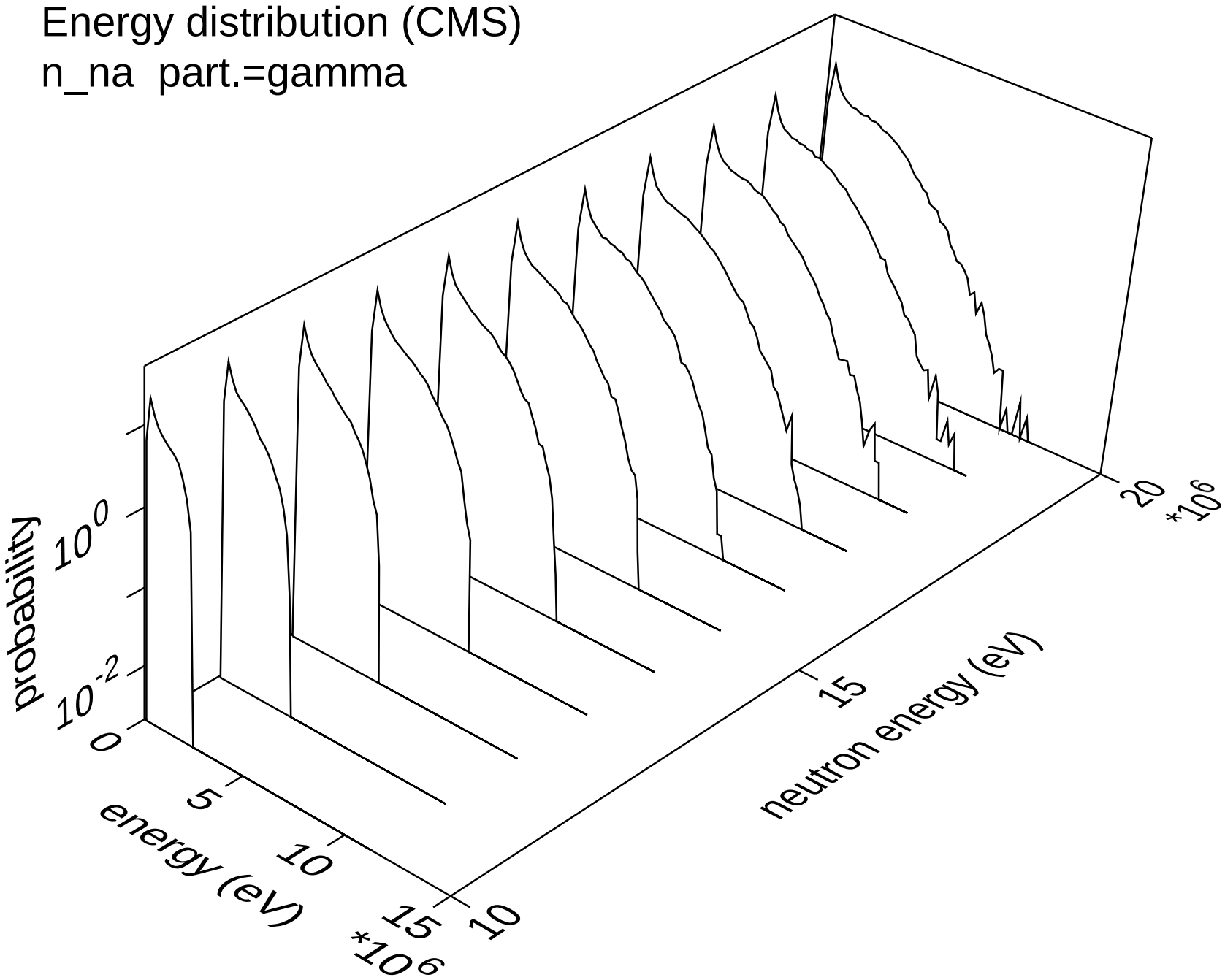

Energy distribution (CMS)
n_2n part.=gamma
probability
10^{0}
10^{-2}
0
5
10
15
energy (eV)
*10^6
10
15
20
neutron energy (eV)
*10^6

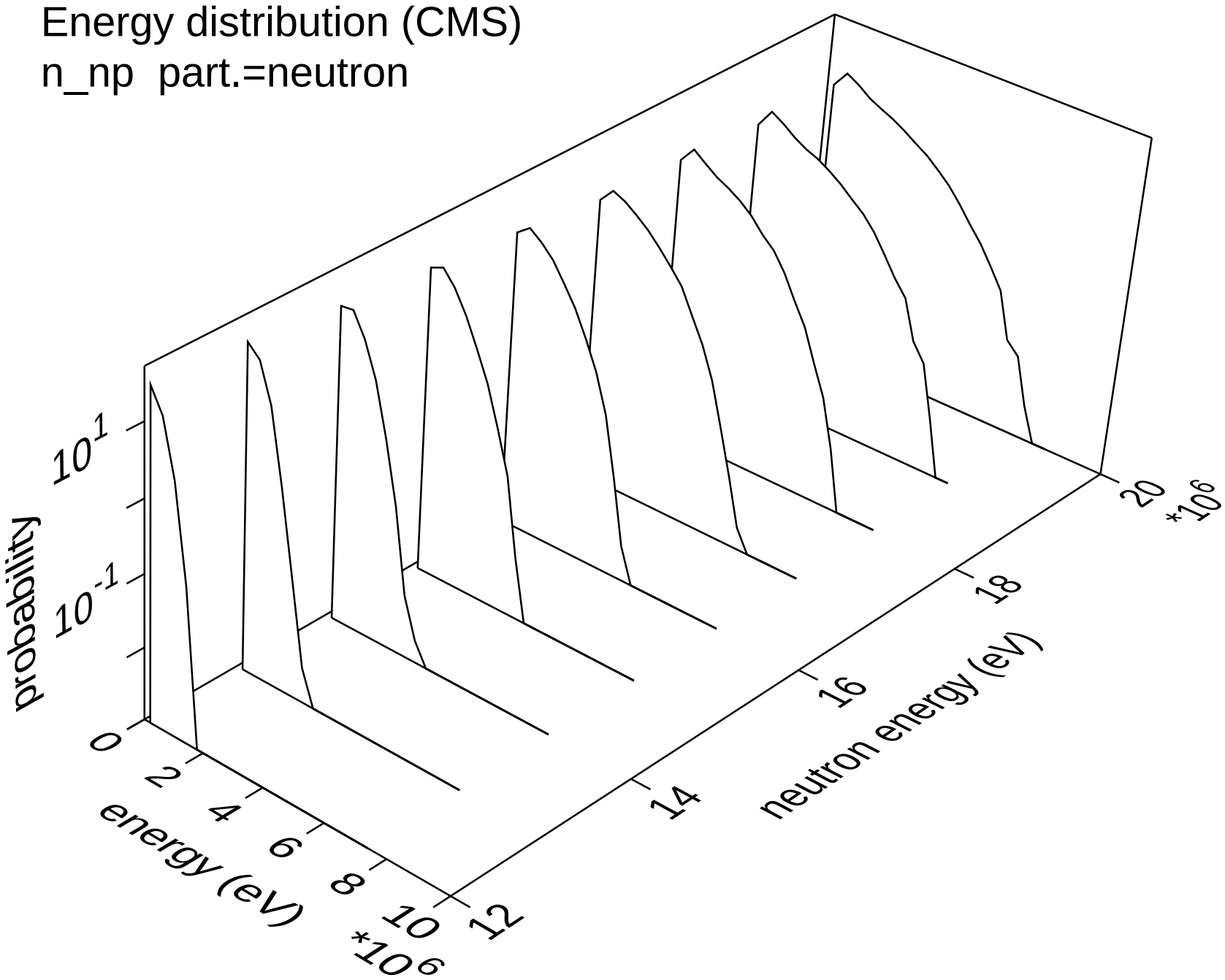

Energy distribution (CMS)
n_3n part.=neutron
probability
10^{1}
10^{0}
10^{-1}
0
energy (eV)
1
2
3
*10 6
19.0
19.5
neutron energy (eV)
20.0
*10 6

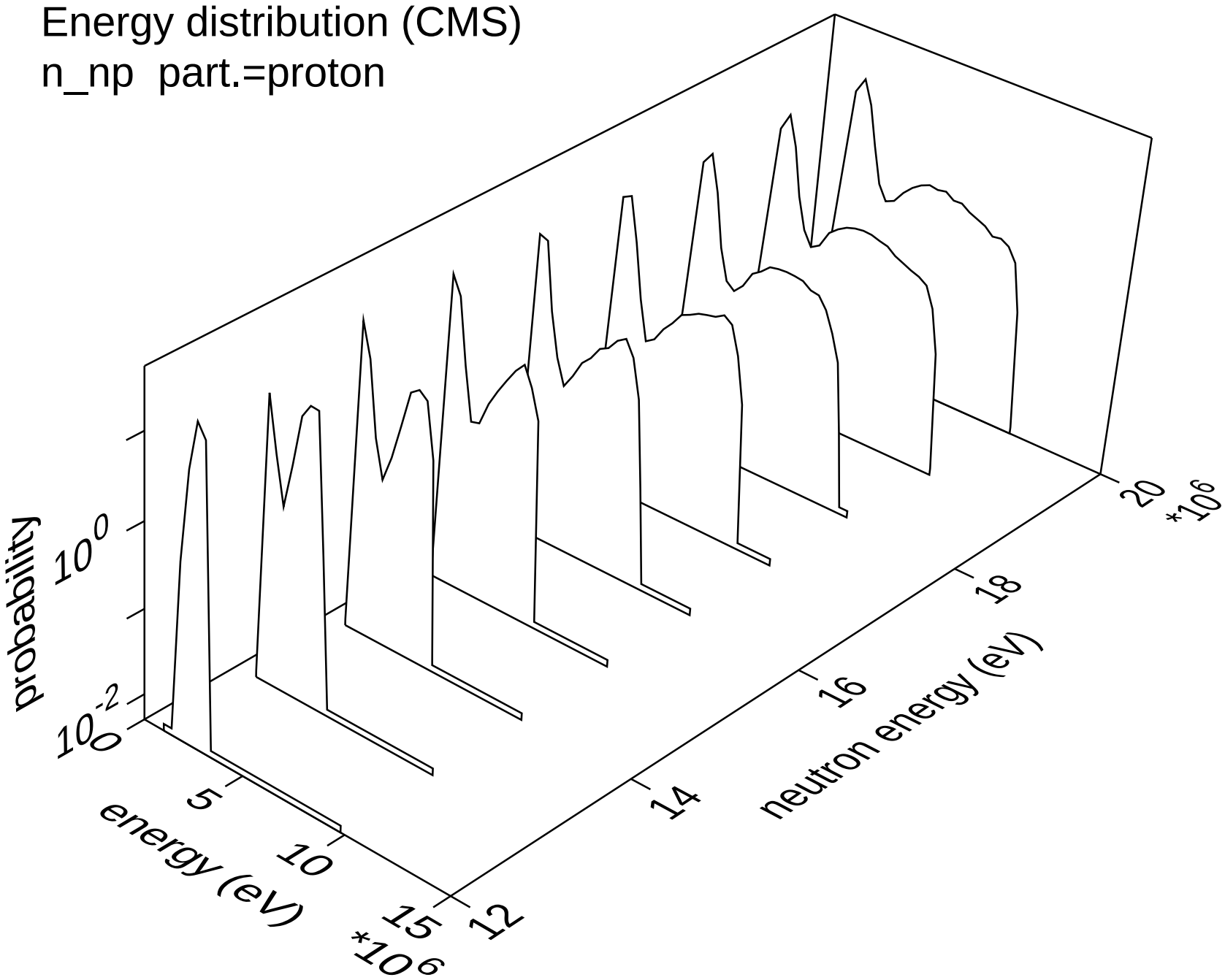

Energy distribution (CMS)
n_3n part.=gamma
probability
10^{1}
10^{0}
10^{-1}
0
1
2
3
4
*10 6
energy (eV)
19.0
19.5
20.0
*10 6
neutron energy (eV)

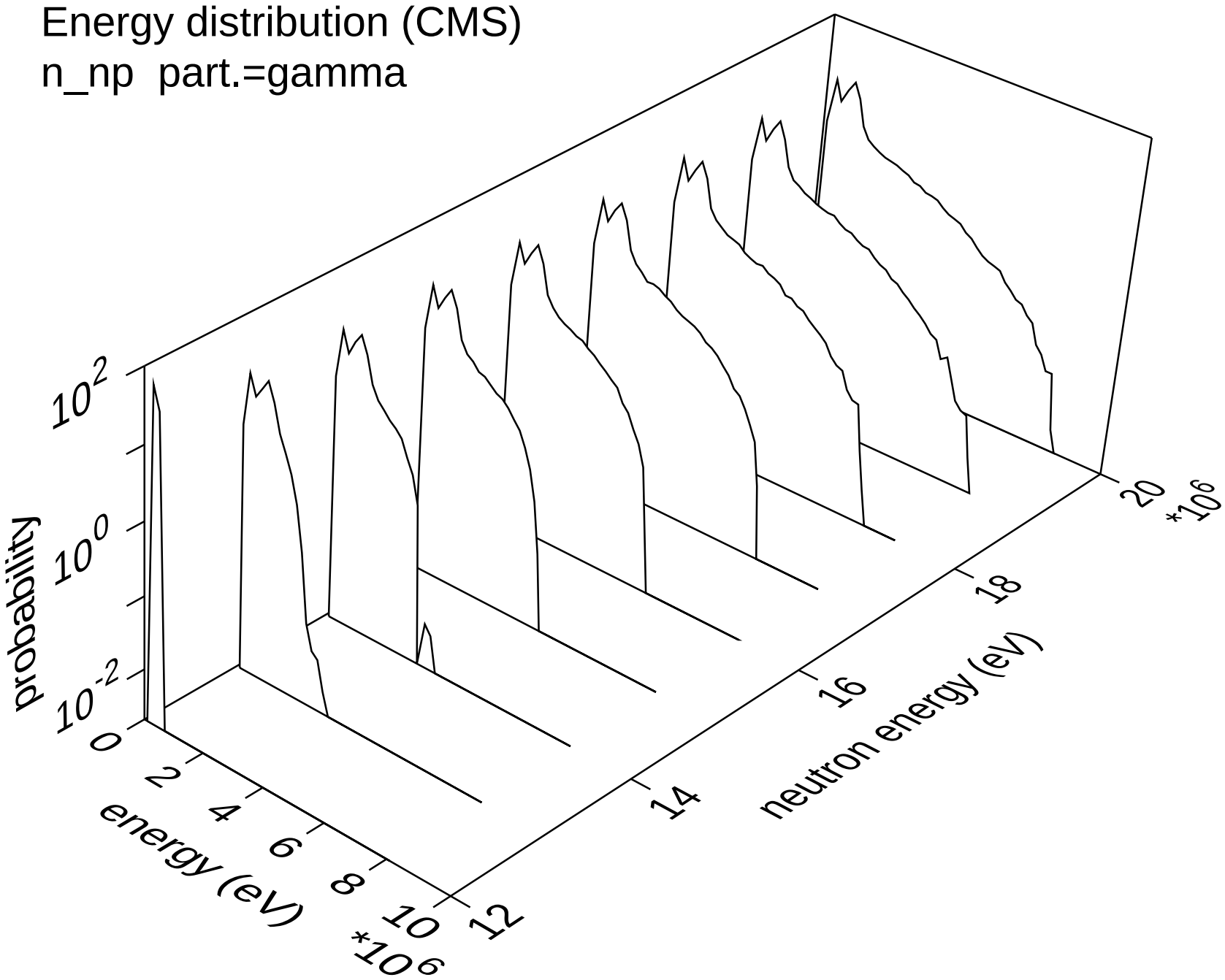

Energy distribution (CMS)
n_na part.=neutron
probability
10^{1}
10^{-1}
0
5
10
15
energy (eV)
*10^6
10
15
20
*10^6
neutron energy (eV)

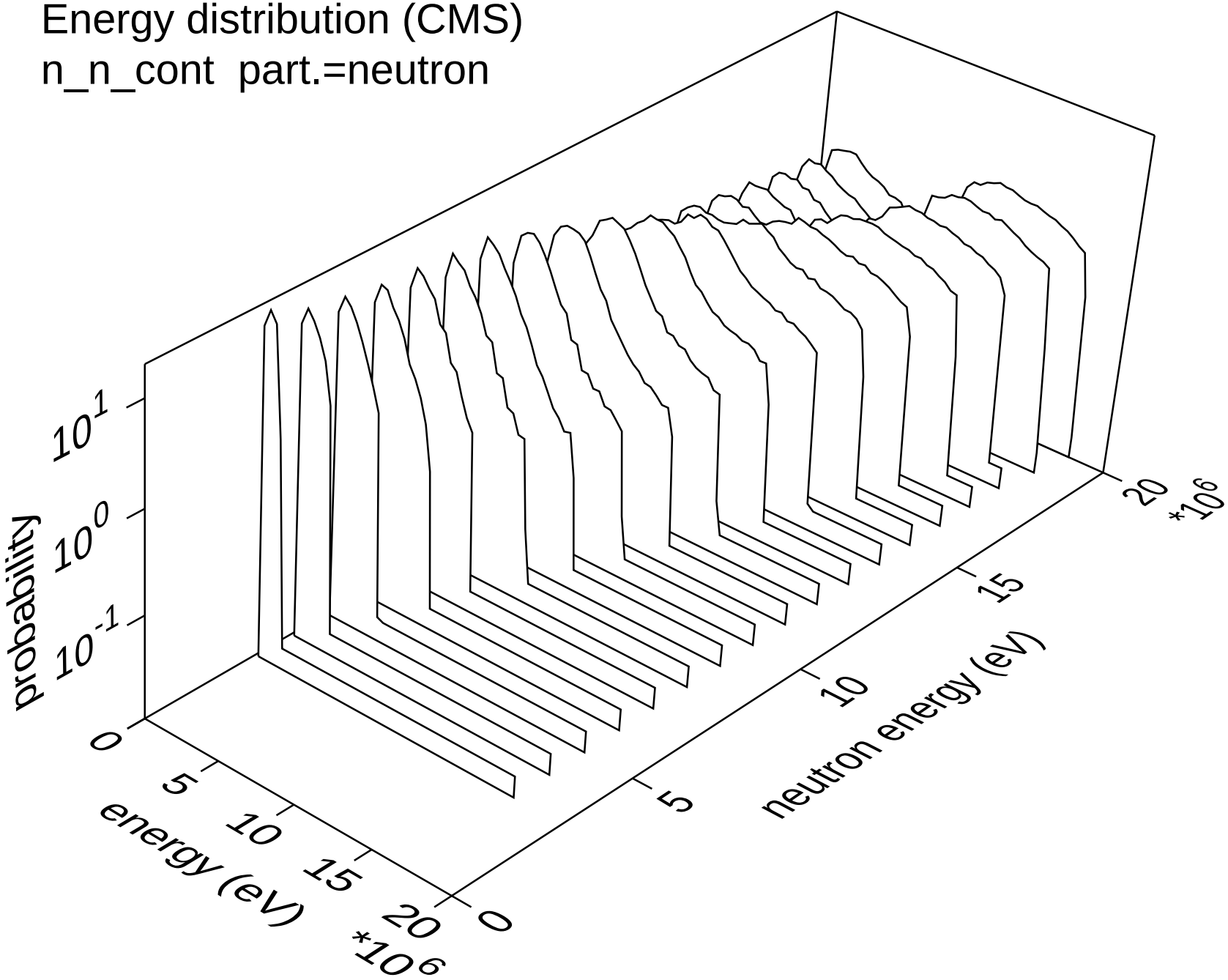

Energy distribution (CMS)
n_na part.=alpha
probability
10^0
10^{-2}
0
5
10
15
20
*10^6
energy (eV)
10
15
20
*10^6
neutron energy (eV)

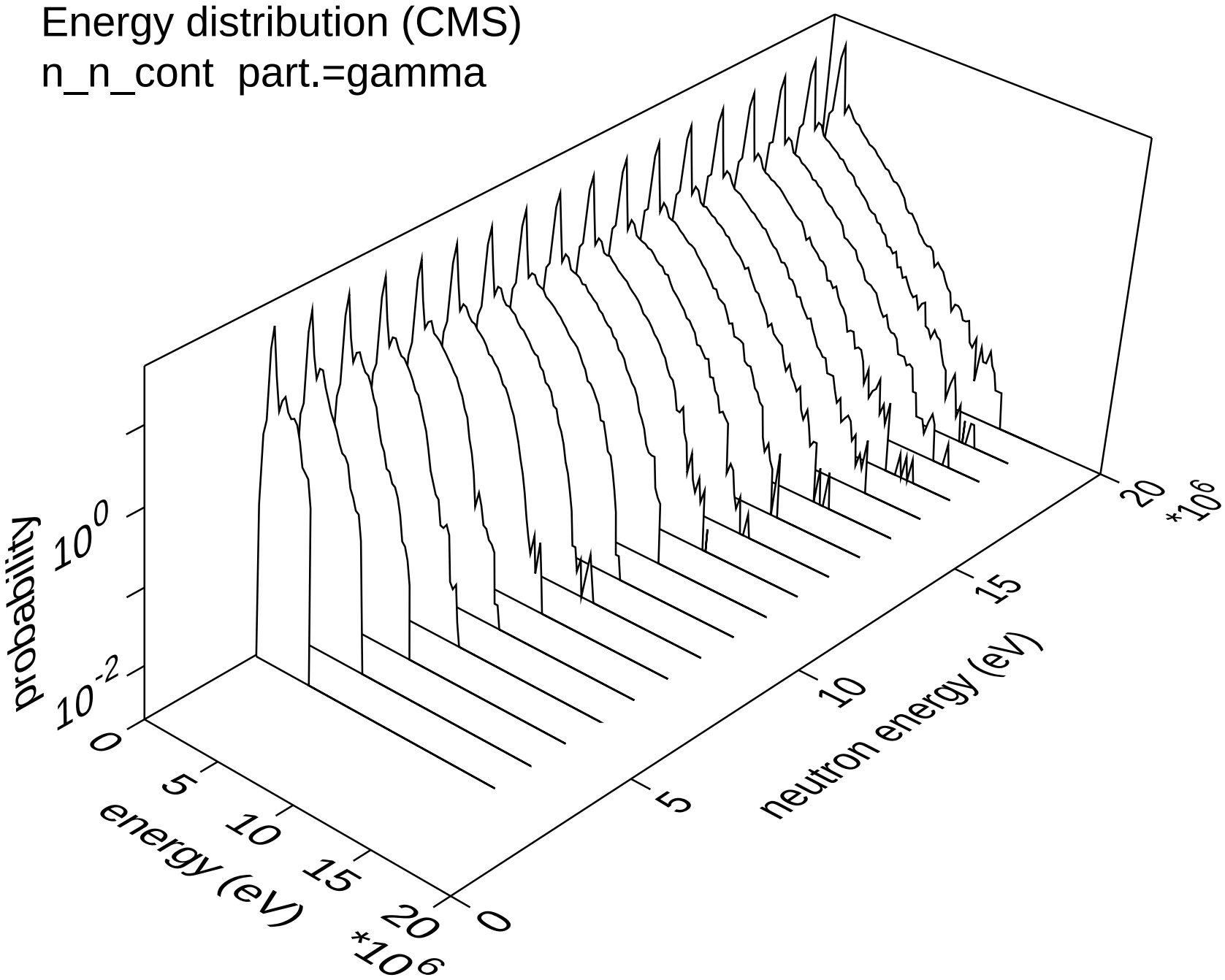

Energy distribution (CMS)
n_na part.=gamma
probability
10^0
10^{-2}
0
5
10
15
*10^6
energy (eV)
10
15
20
*10^6
neutron energy (eV)

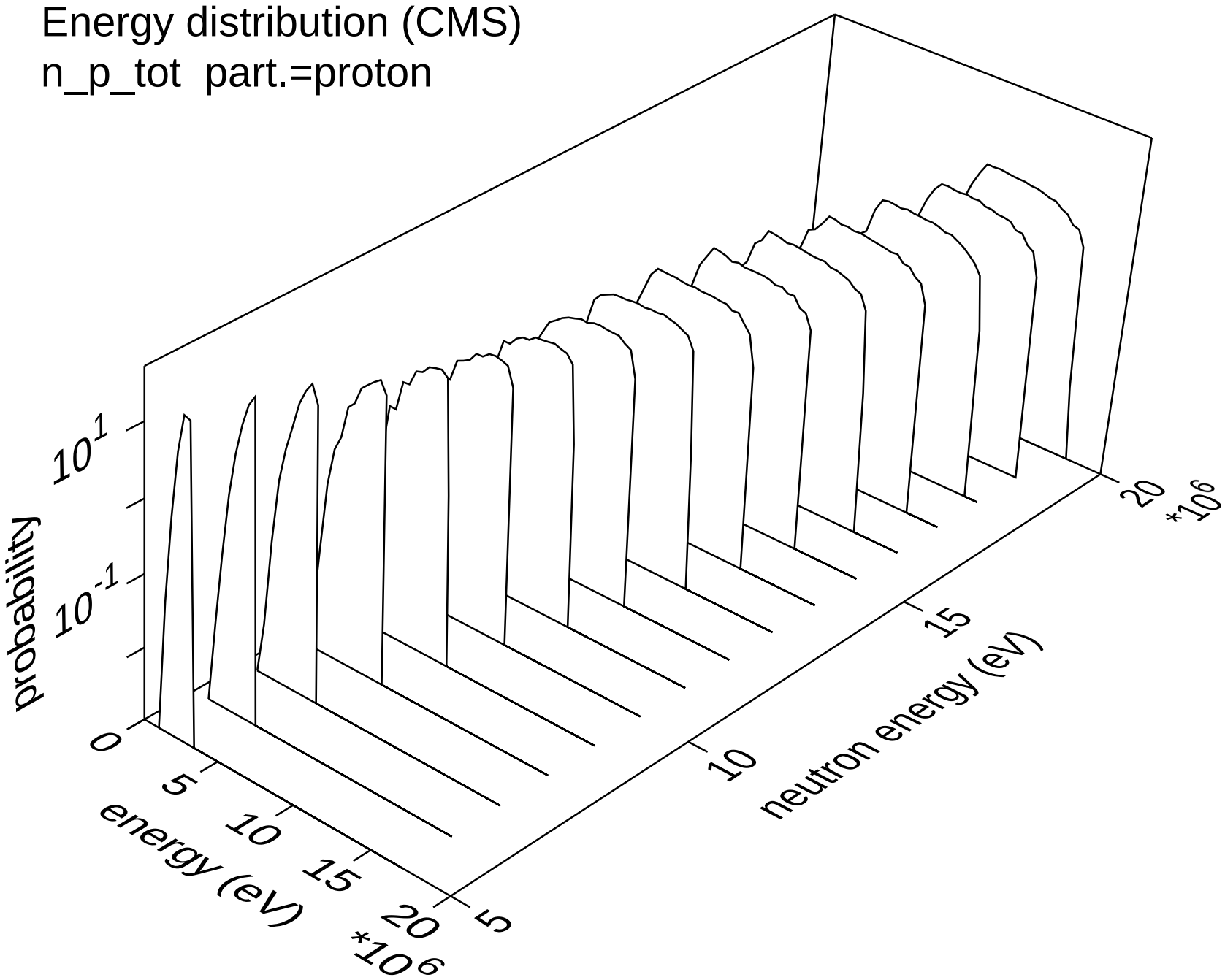

Energy distribution (CMS)
n_np part.=neutron
probability
10^{1}
10^{-1}
0
2
4
6
8
10
12
*10^6
energy (eV)
14
16
18
20
*10^6
neutron energy (eV)

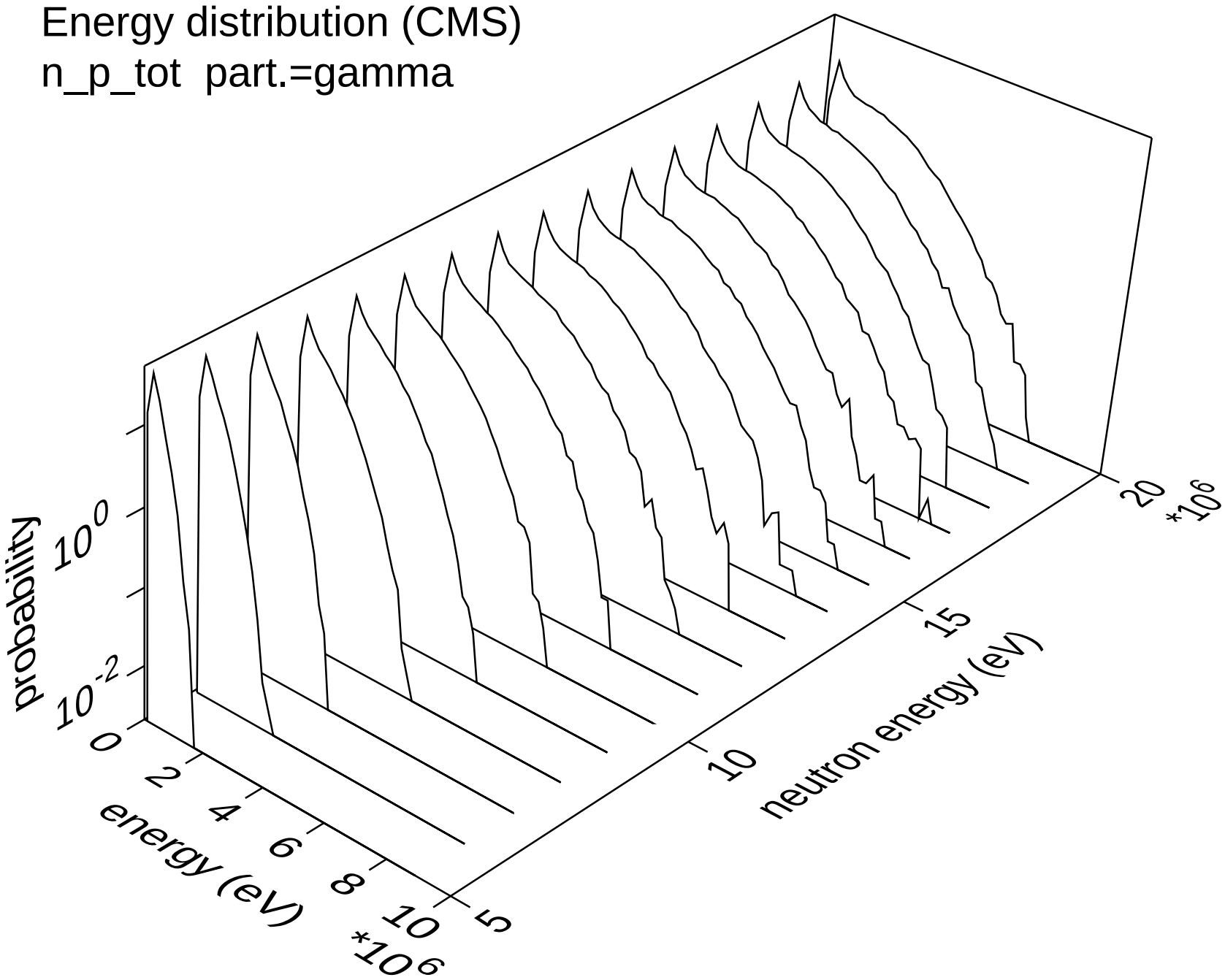

Energy distribution (CMS)
n_np part.=proton
probability
10^{0}
10^{-2}
0
5
10
15
*10^6
energy (eV)
12
14
16
18
20
*10^6
neutron energy (eV)

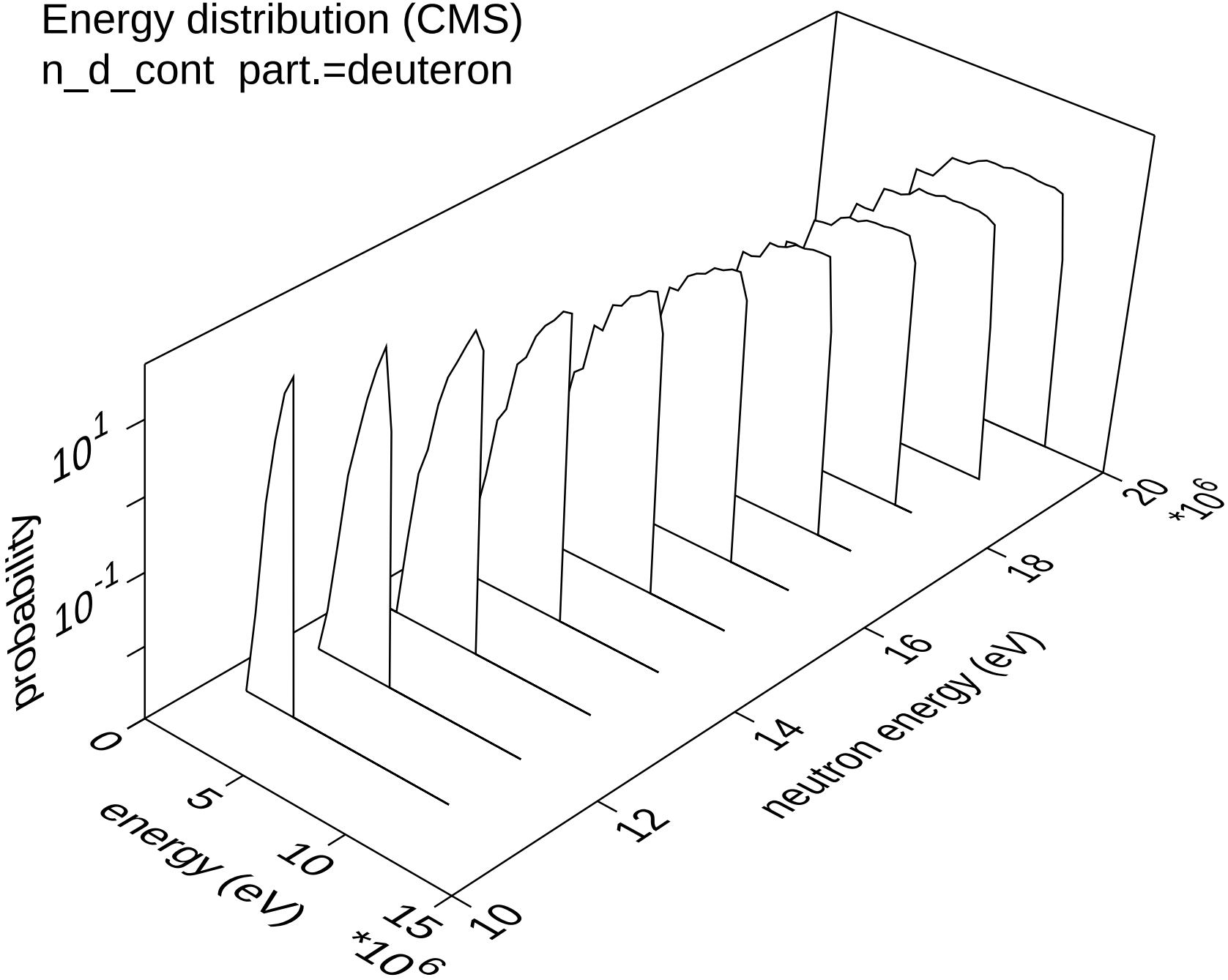

Energy distribution (CMS)
n_np part.=gamma
probability
10^{2}
10^{0}
10^{-2}
0
2
4
6
8
10
12
energy (eV)
*10^6
14
16
18
20
neutron energy (eV)
*10^6

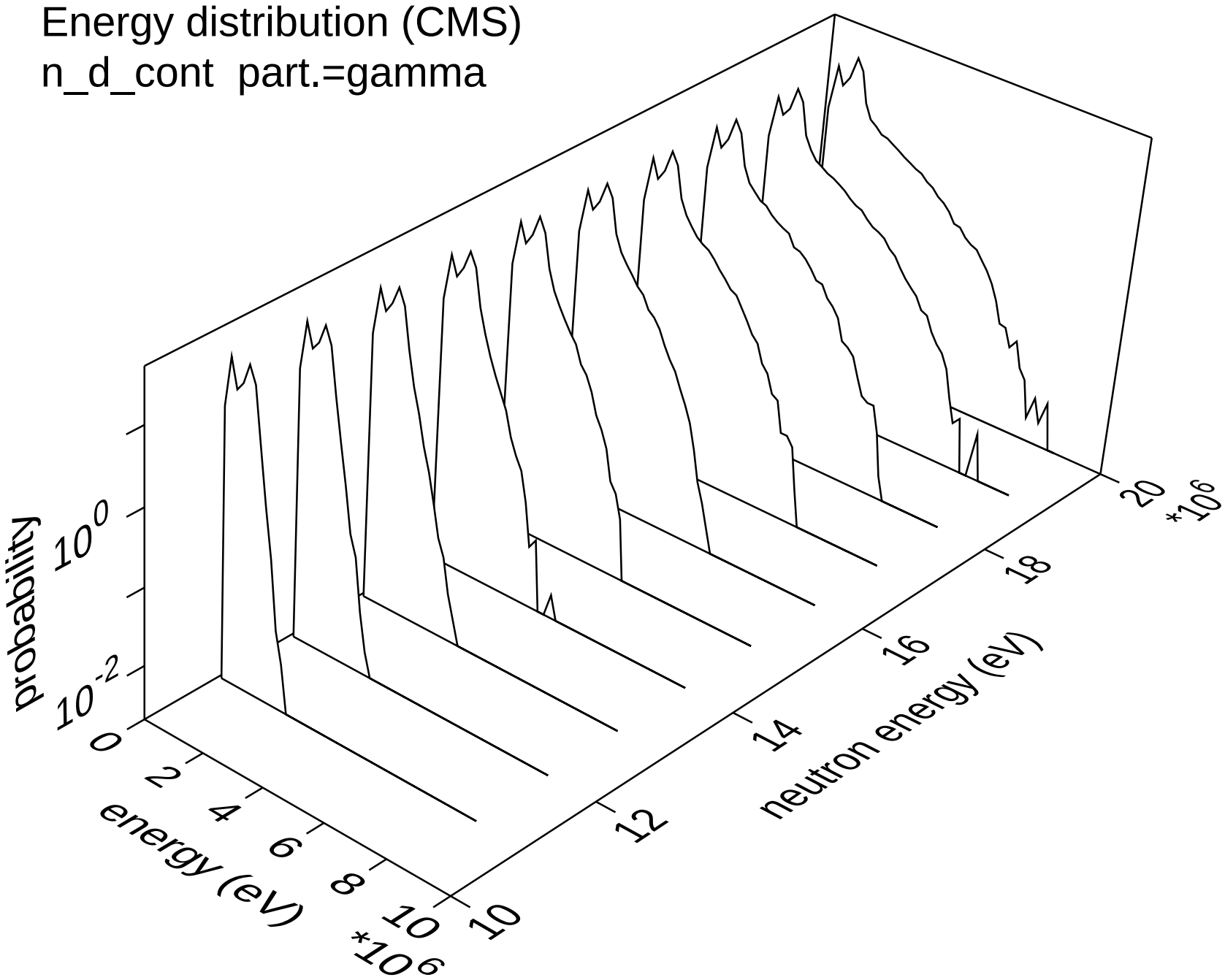

Energy distribution (CMS)
n_n_cont part.=neutron
probability
10^{1}
10^{0}
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

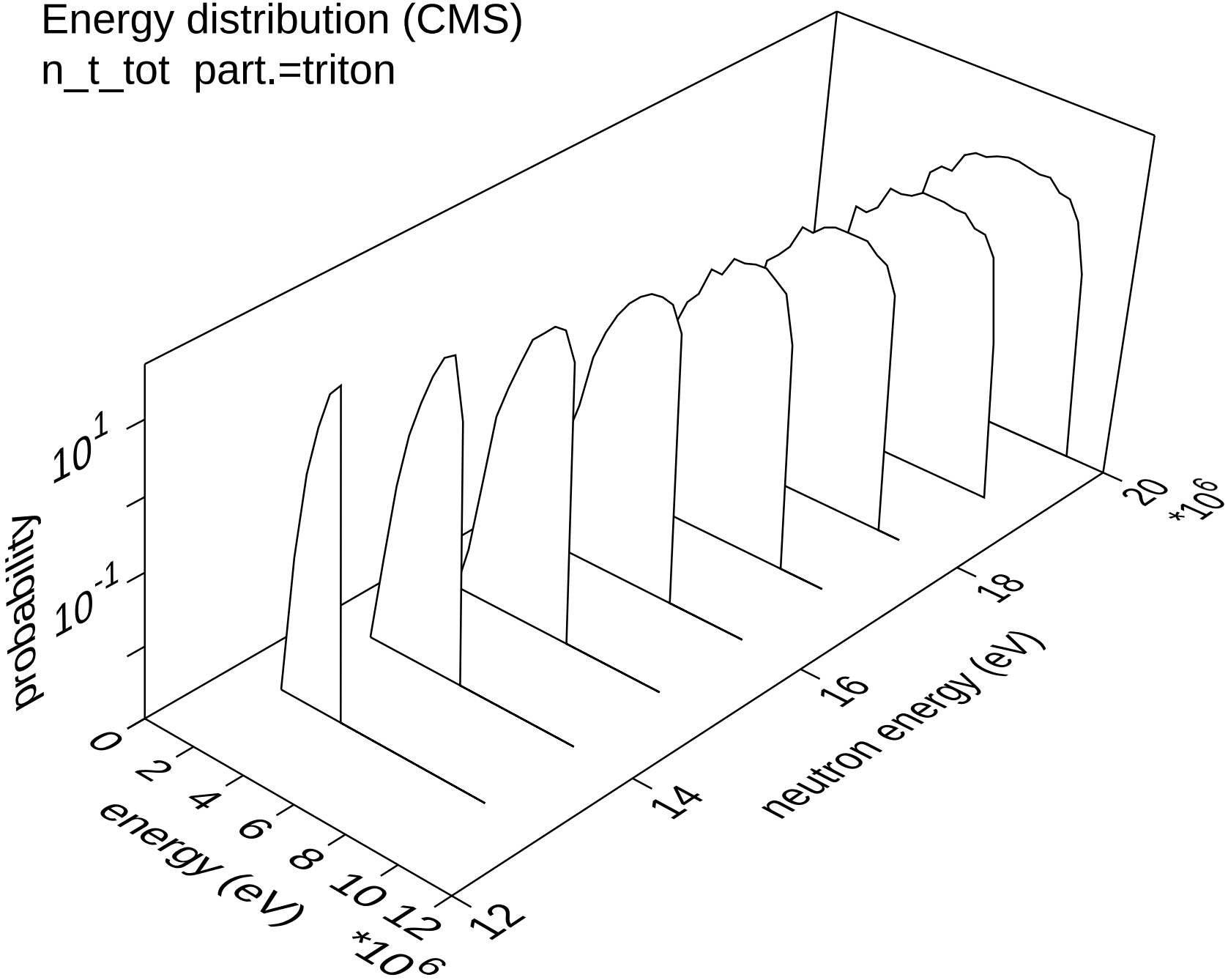

Energy distribution (CMS)
n_n_cont part.=gamma
probability
10^{0}
10^{-2}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

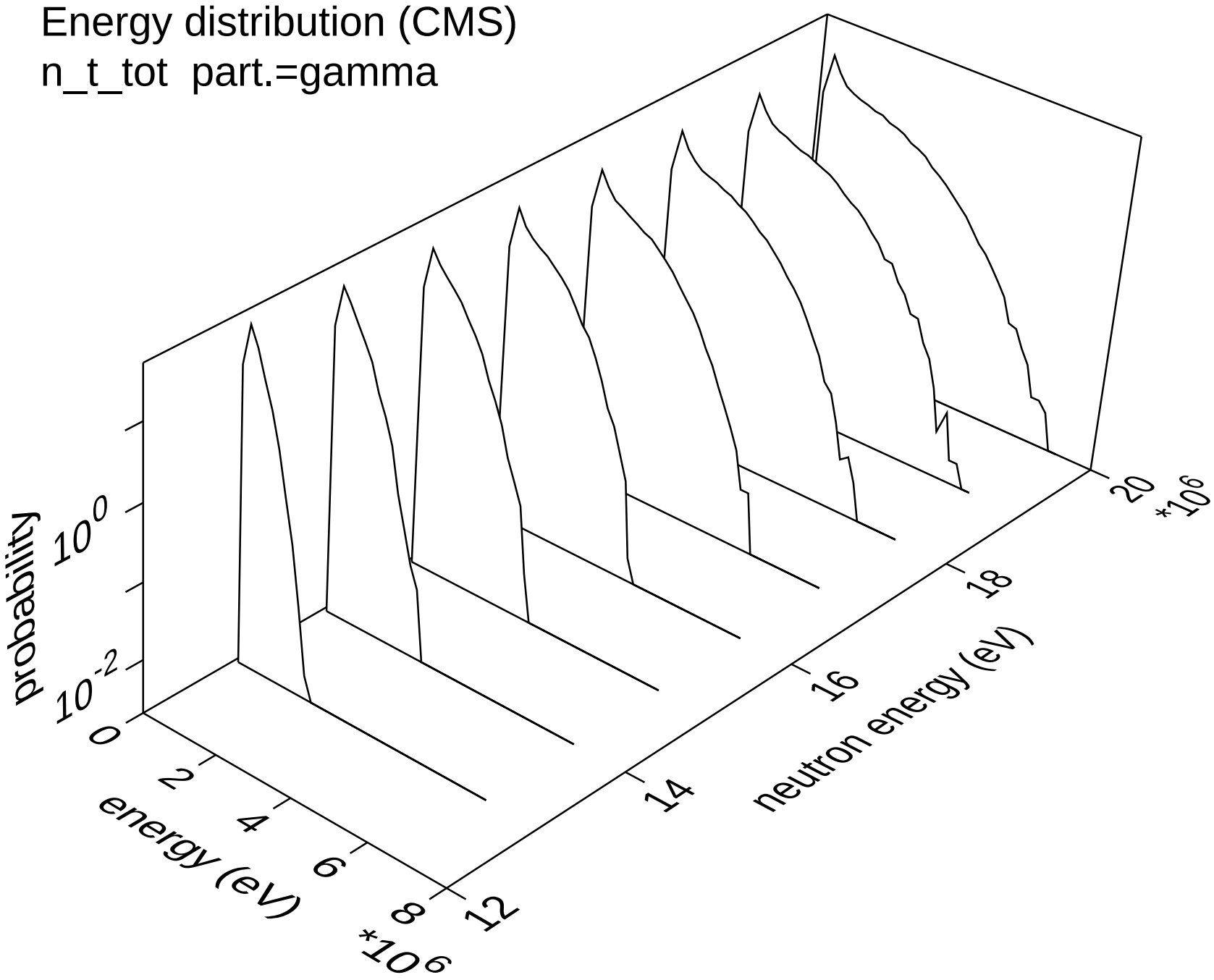

Energy distribution (CMS)
n_p_tot part.=proton
probability
10^{1}
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
5
10
15
20
*10^6
neutron energy (eV)

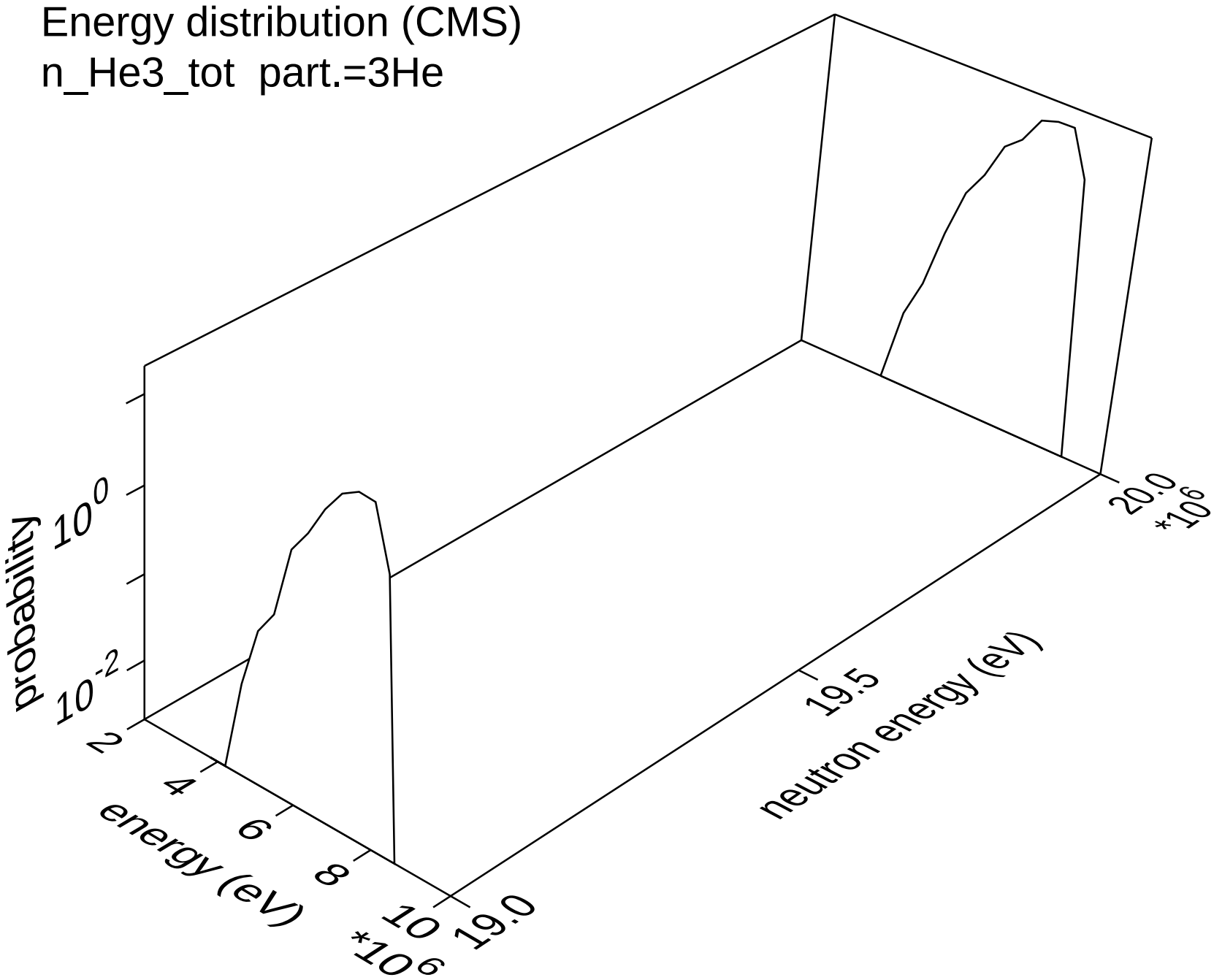

Energy distribution (CMS)
n_p_tot part.=gamma
probability
10^0
10^-2
0
2
4
6
8
10
*10^6
energy (eV)
5
10
15
20
*10^6
neutron energy (eV)

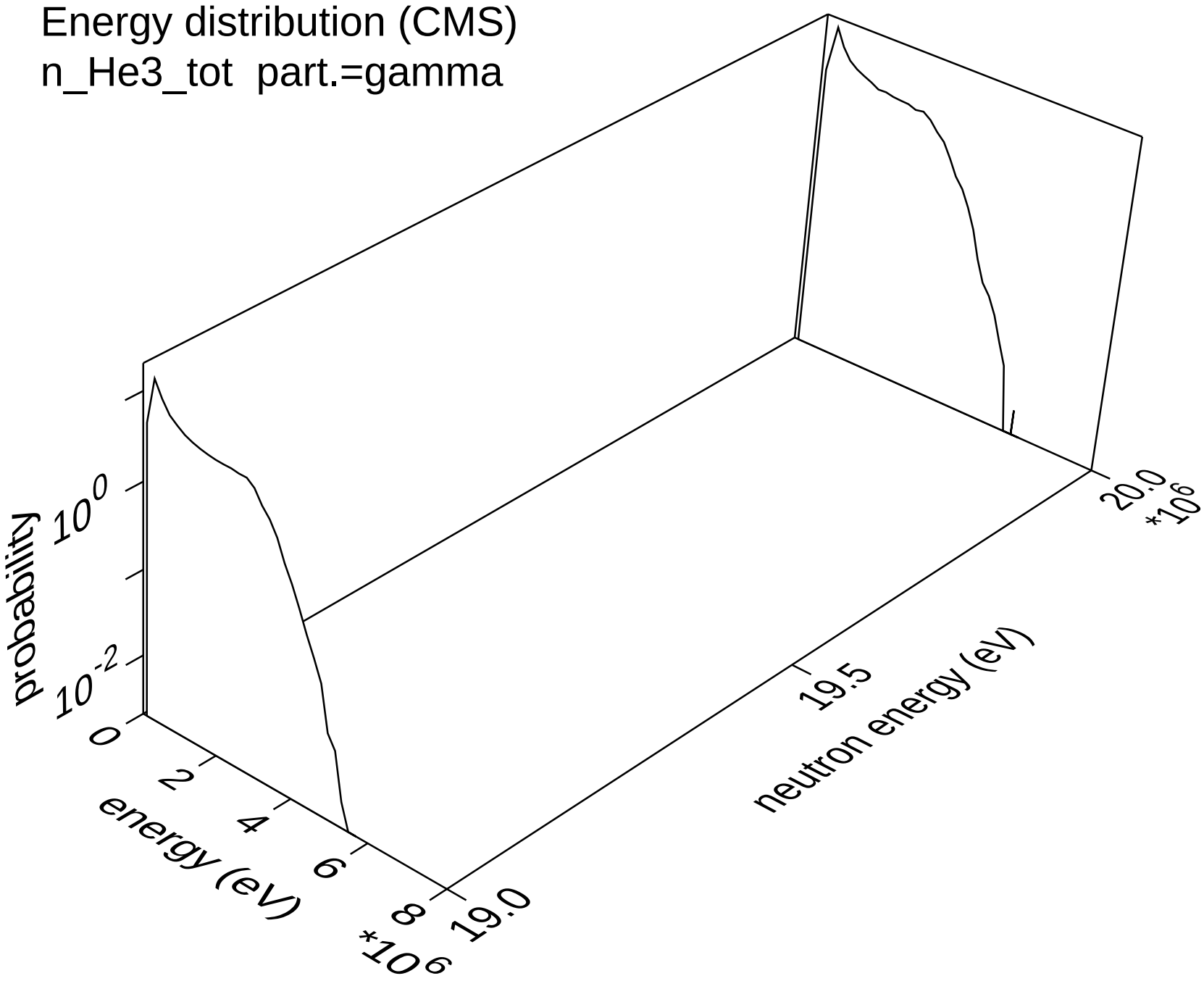

Energy distribution (CMS)
n_d_cont part.=deuteron
probability
10^1
10^-1
0
energy (eV)
5
10
15
*10^6
10
12
14
16
18
20
*10^6
neutron energy (eV)

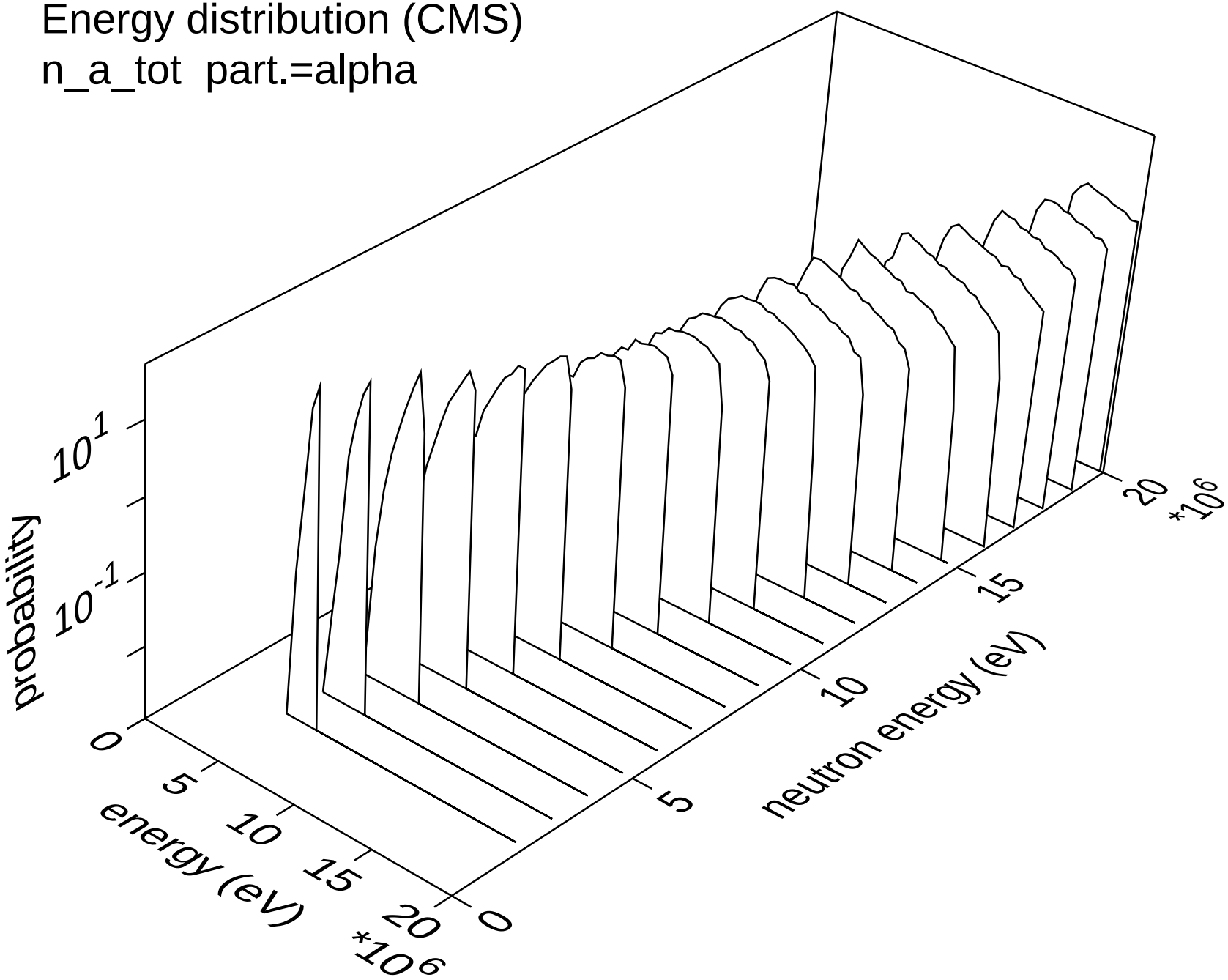

Energy distribution (CMS)
n_d_cont part.=gamma
probability
10^{0}
10^{-2}
0
2
4
6
8
10
*10^6
energy (eV)
10
12
14
16
18
20
*10^6
neutron energy (eV)

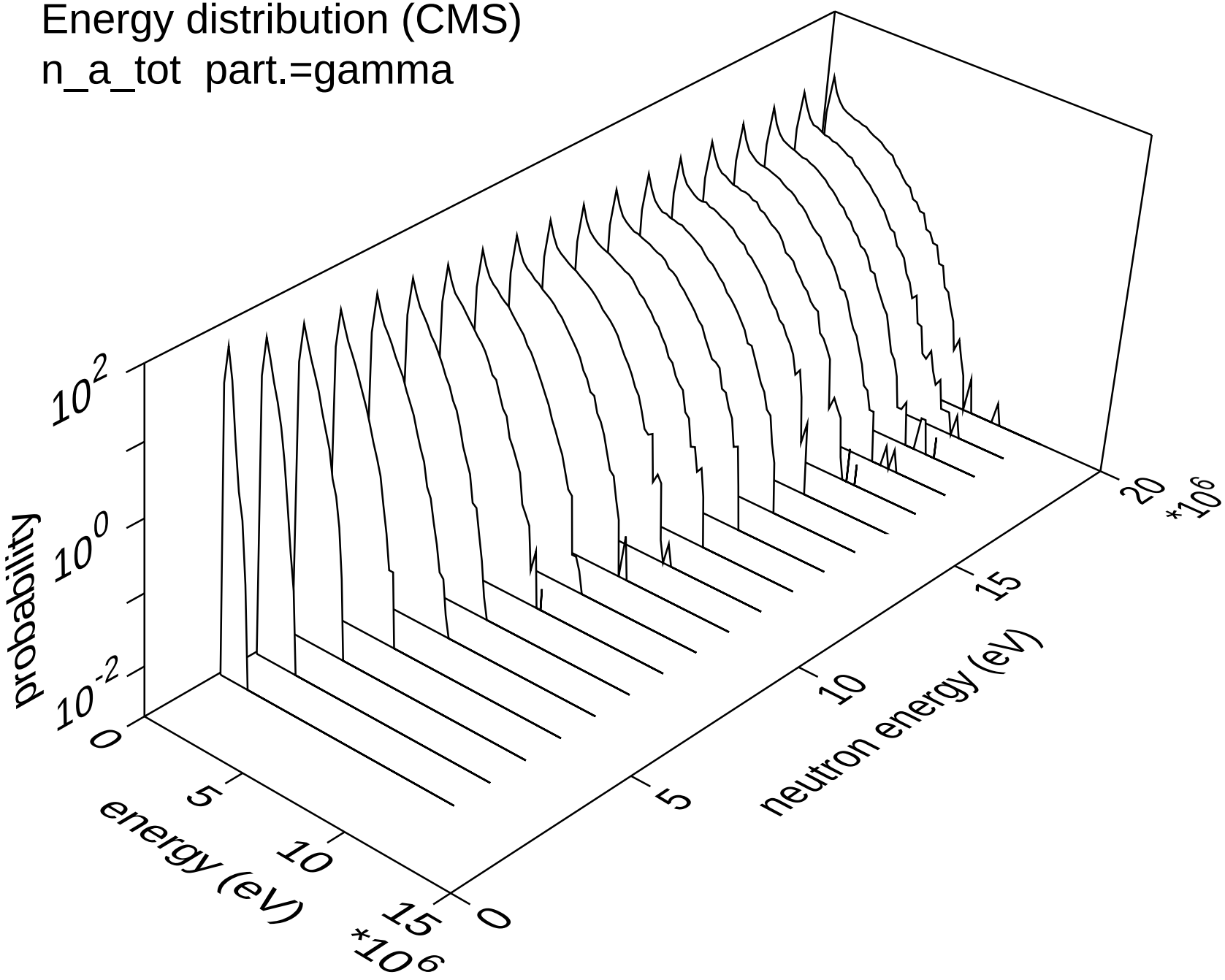

Energy distribution (CMS)
n_t_tot part.=triton
probability
10^{1}
10^{-1}
0
2
4
6
8
10
12
energy (eV)
*10 6
12
14
16
18
20
neutron energy (eV)
*10^6

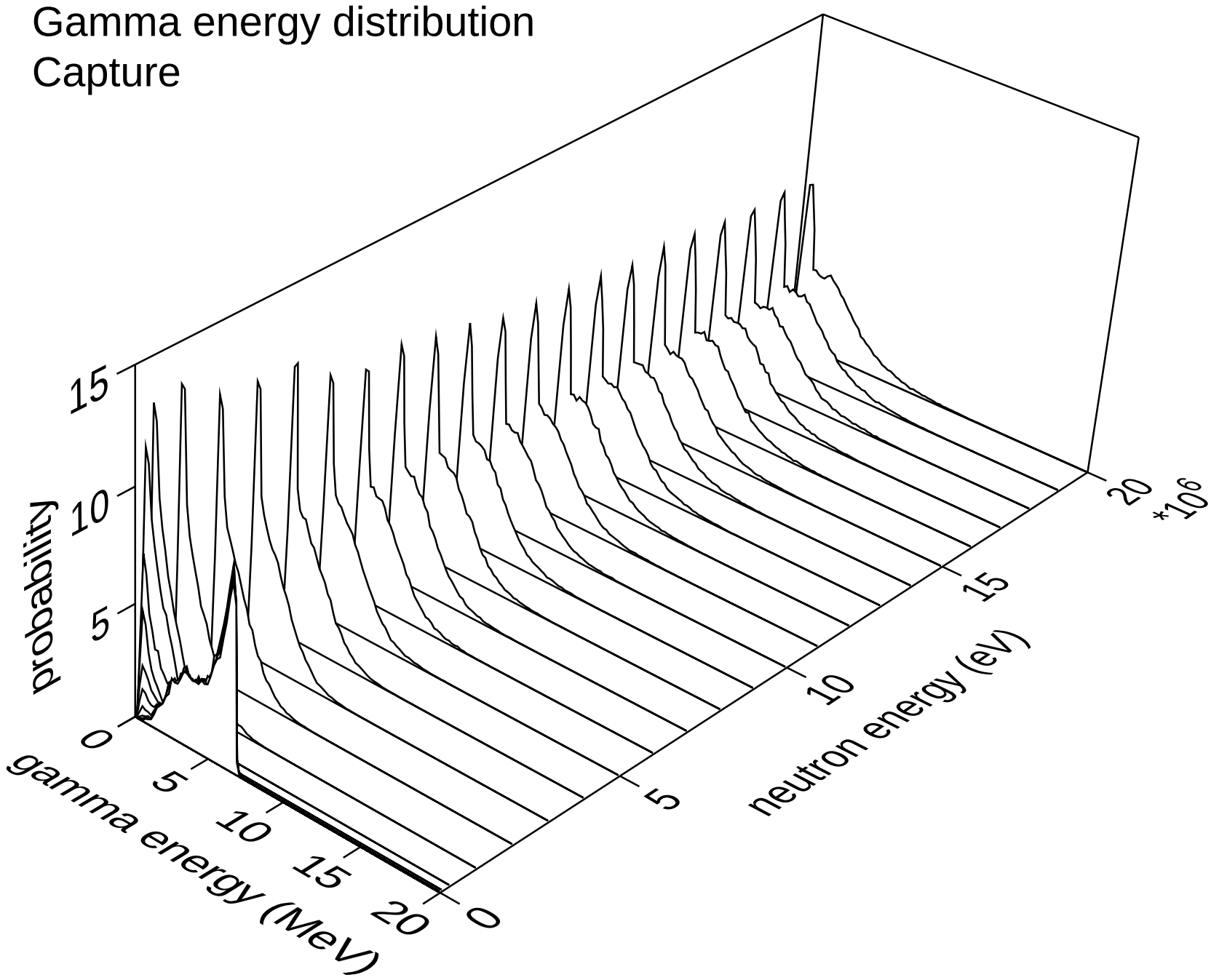

Energy distribution (CMS)
n_t_tot part.=gamma
probability
10^0
10^-2
0
2
4
6
8
*10^6
energy (eV)
12
14
16
18
20
*10^6
neutron energy (eV)

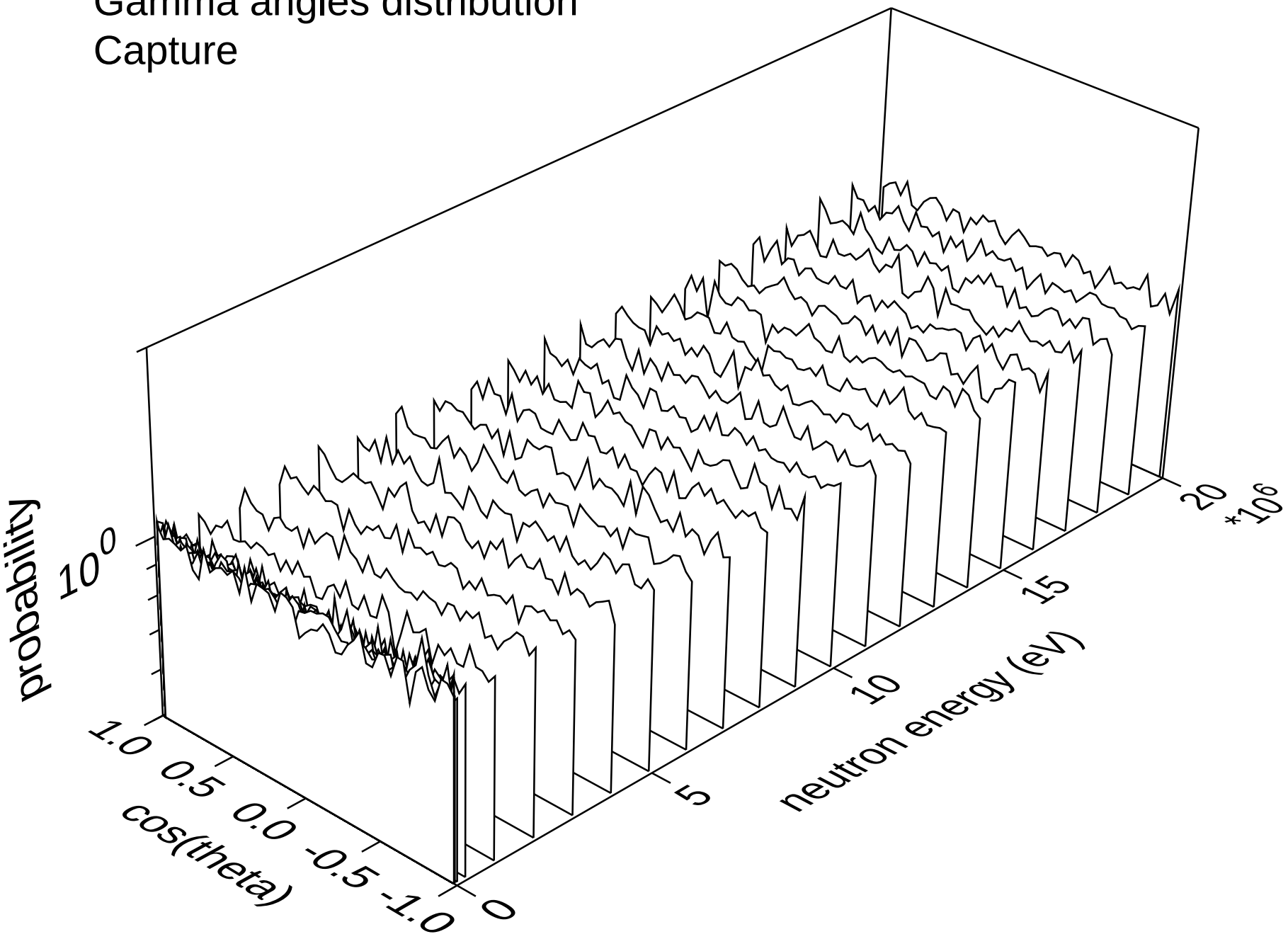

Energy distribution (CMS)
n_He3_tot part.=3He
probability
10^{0}
10^{-2}
2
4
6
8
10
*10^6
energy (eV)
19.0
19.5
20.0
*10^6
neutron energy (eV)


Energy distribution (CMS)
n_He3_tot part.=gamma
probability
10^{0}
10^{-2}
0
2
4
6
8
*10 6
energy (eV)
19.0
19.5
20.0
*10⁶
neutron energy (eV)

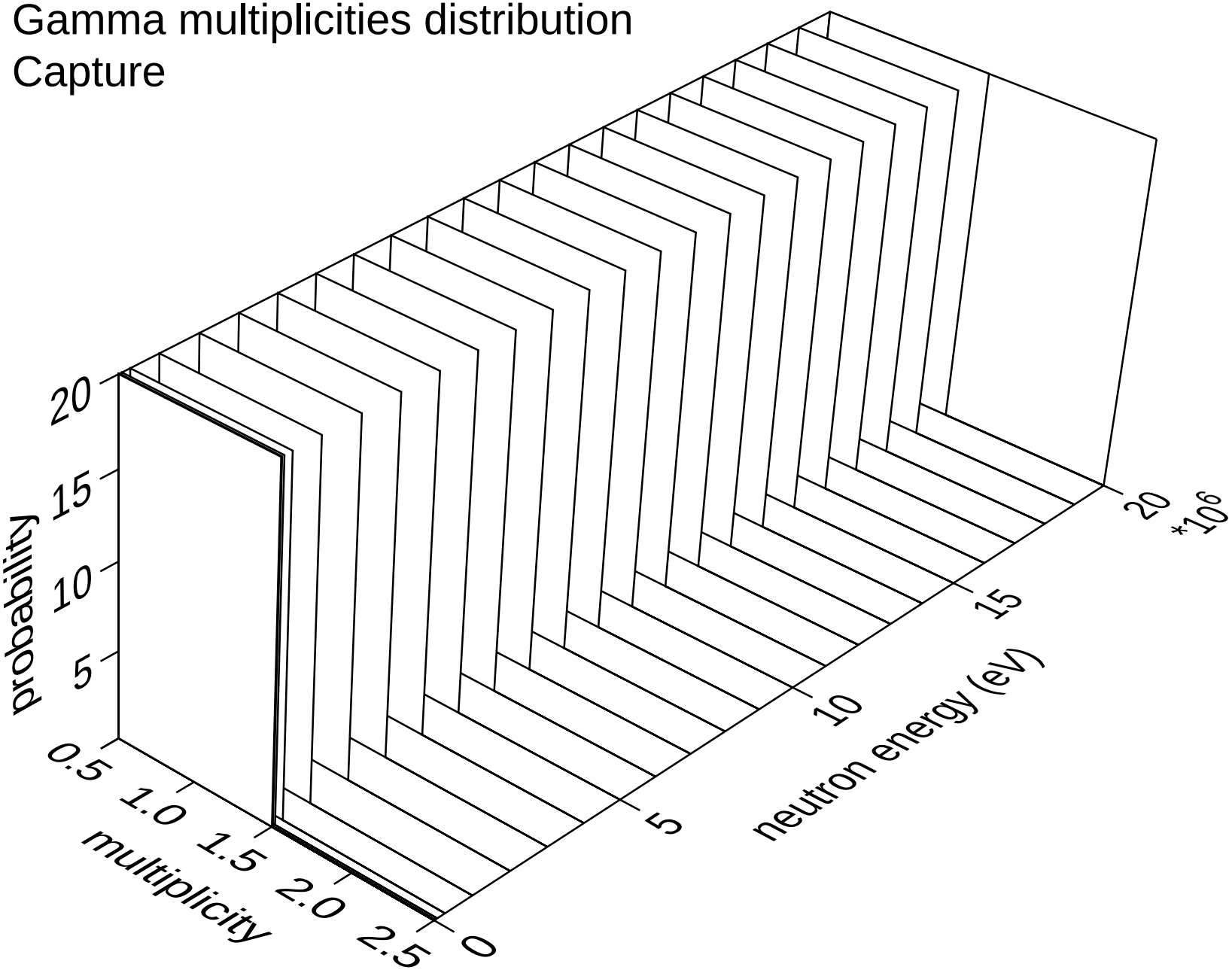

Energy distribution (CMS)
n_a_tot part.=alpha
probability
10^{1}
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

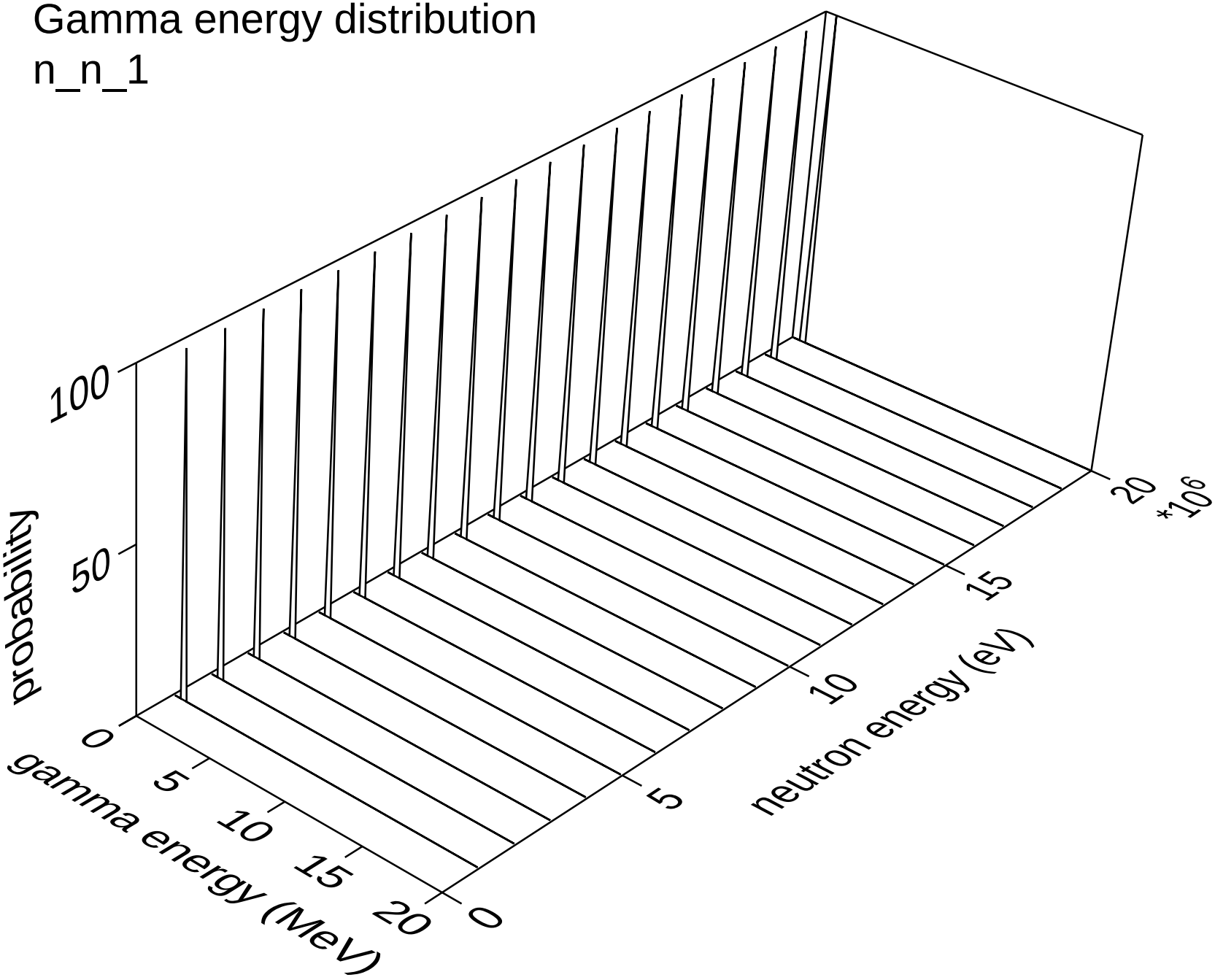

Energy distribution (CMS)
n_a_tot part.=gamma
probability
10^{2}
10^{0}
10^{-2}
0
5
10
15
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

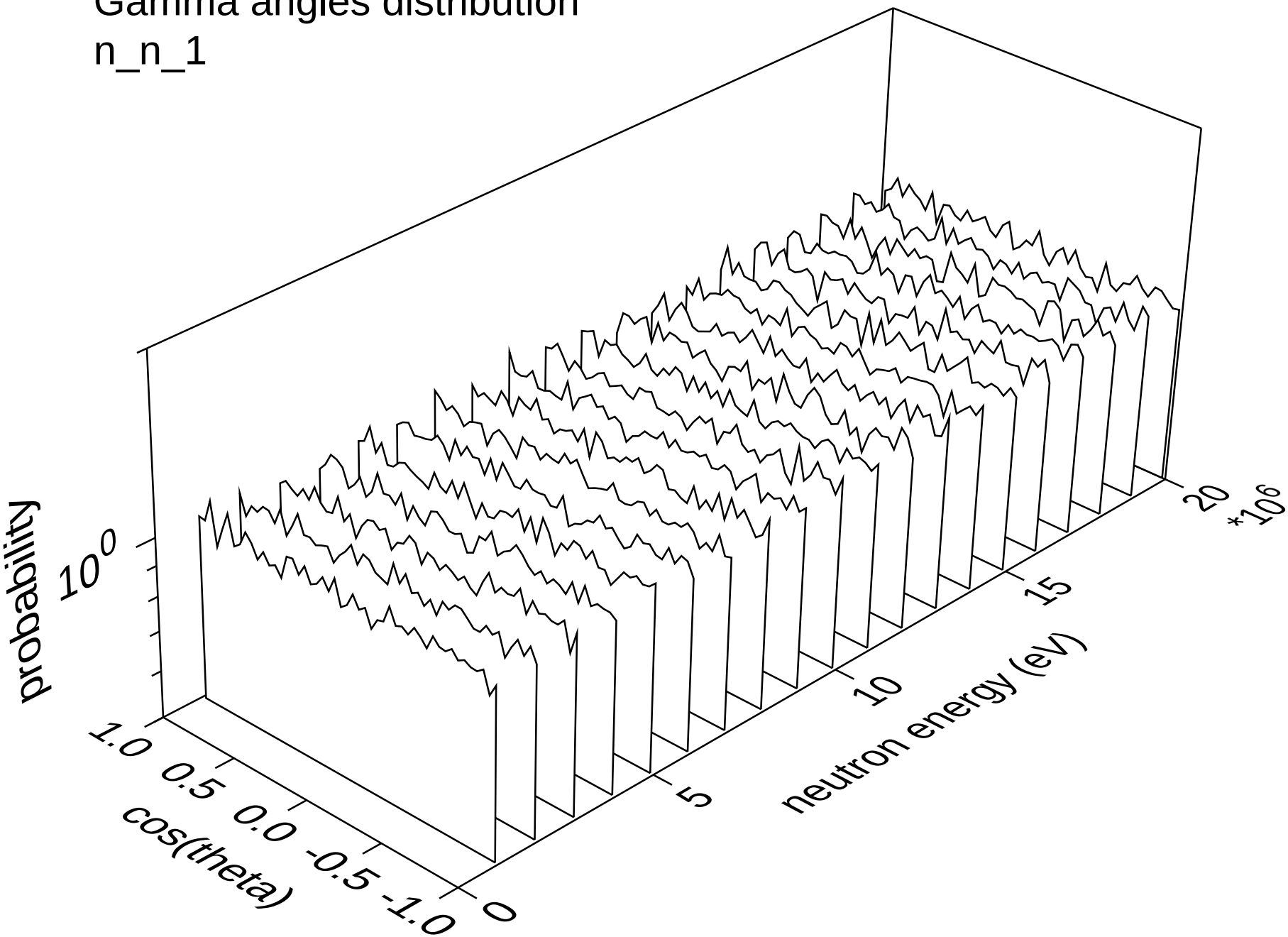

Gamma energy distribution
Capture
probability
15
10
5
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
Capture
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
neutron energy (eV)
*10^6

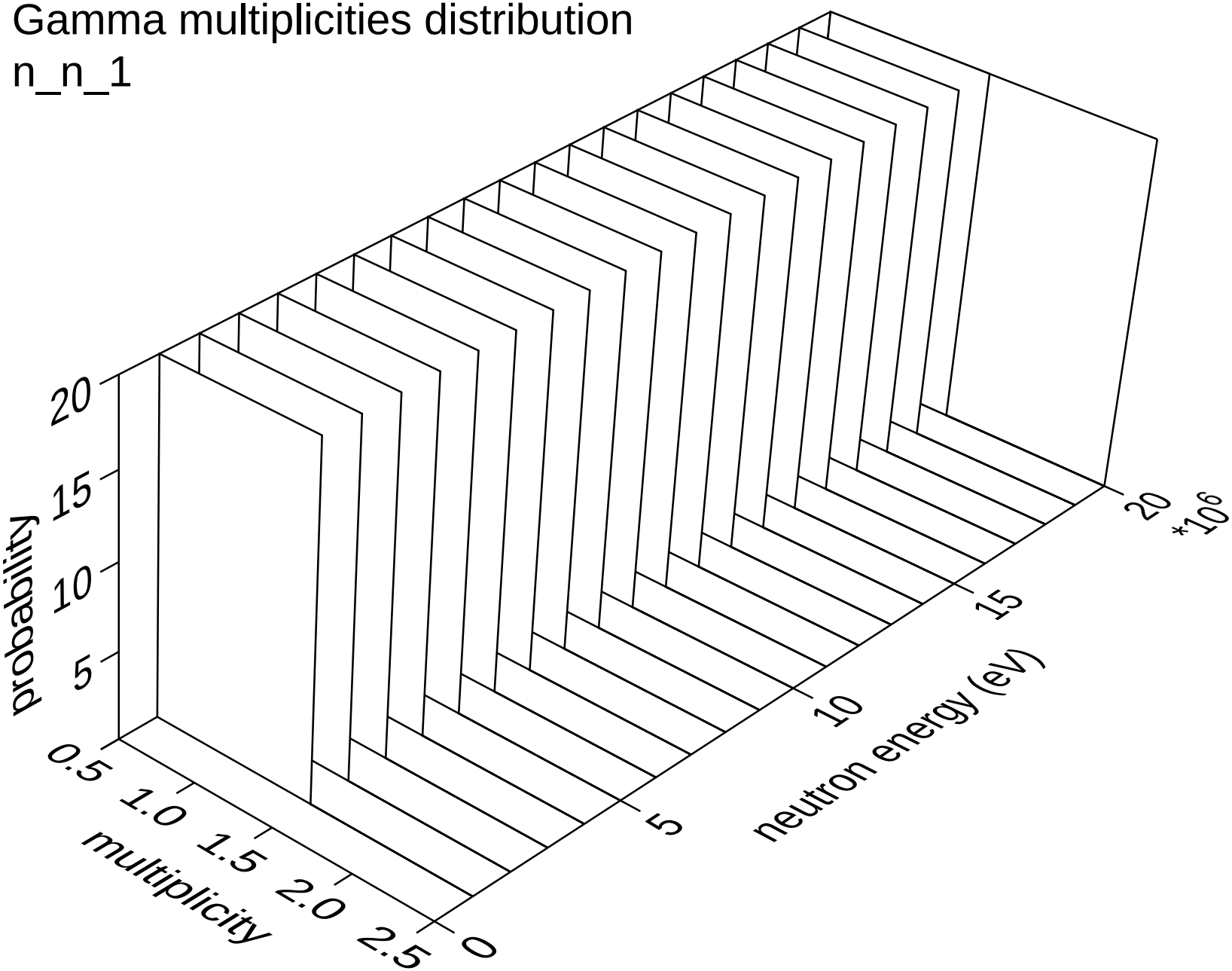
Gamma multiplicities distribution
Capture

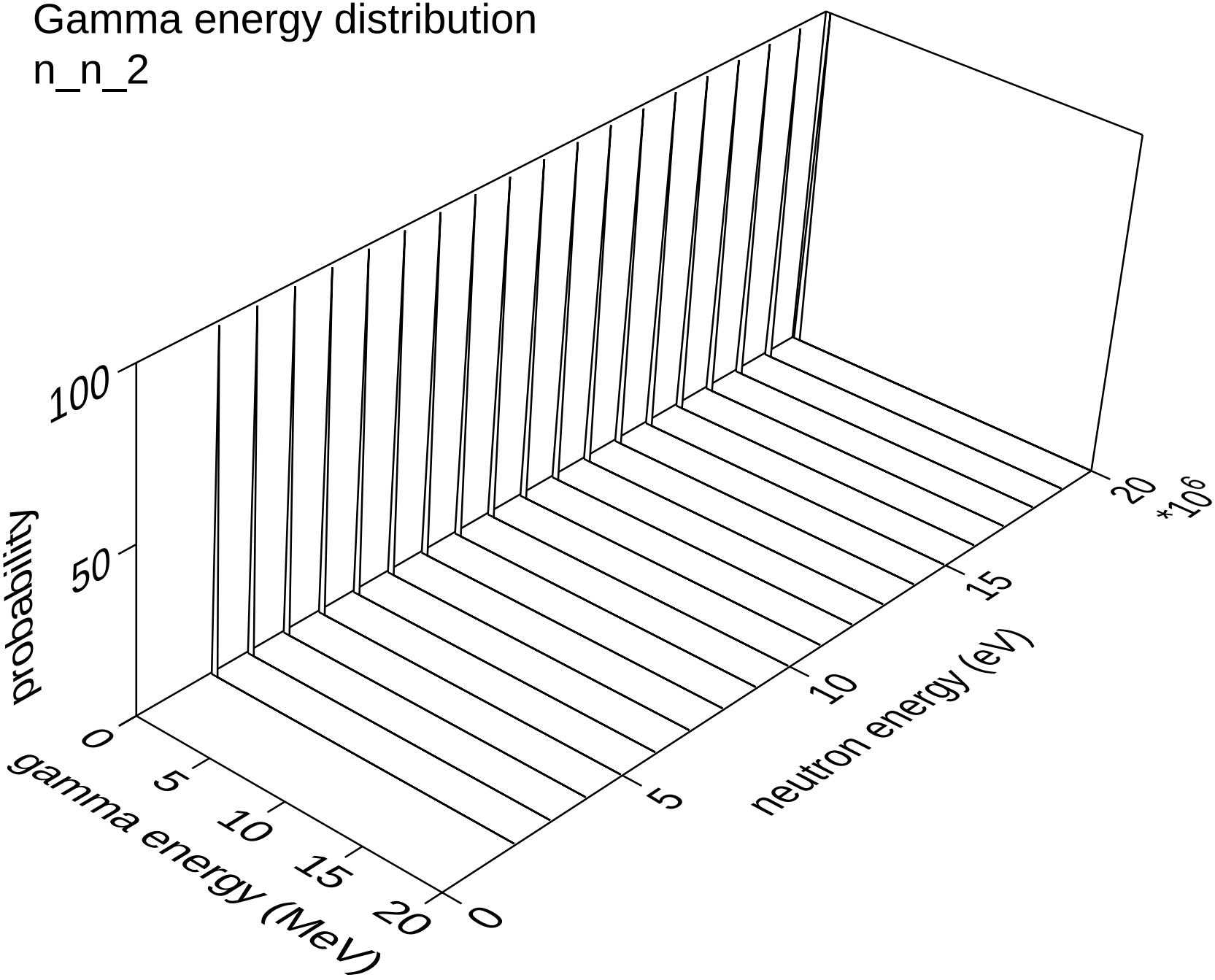


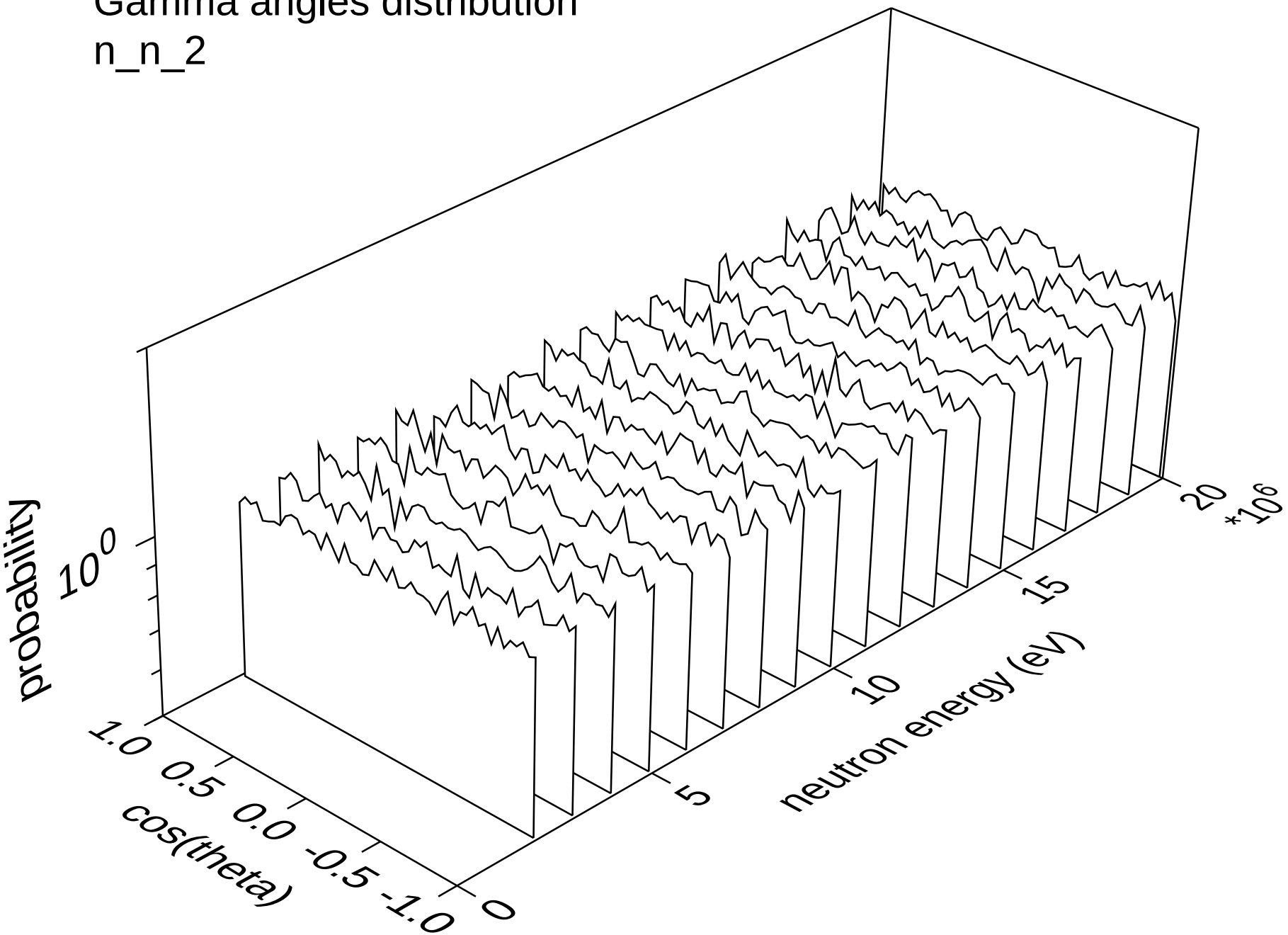

Gamma energy distribution
n_n_1
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_1
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

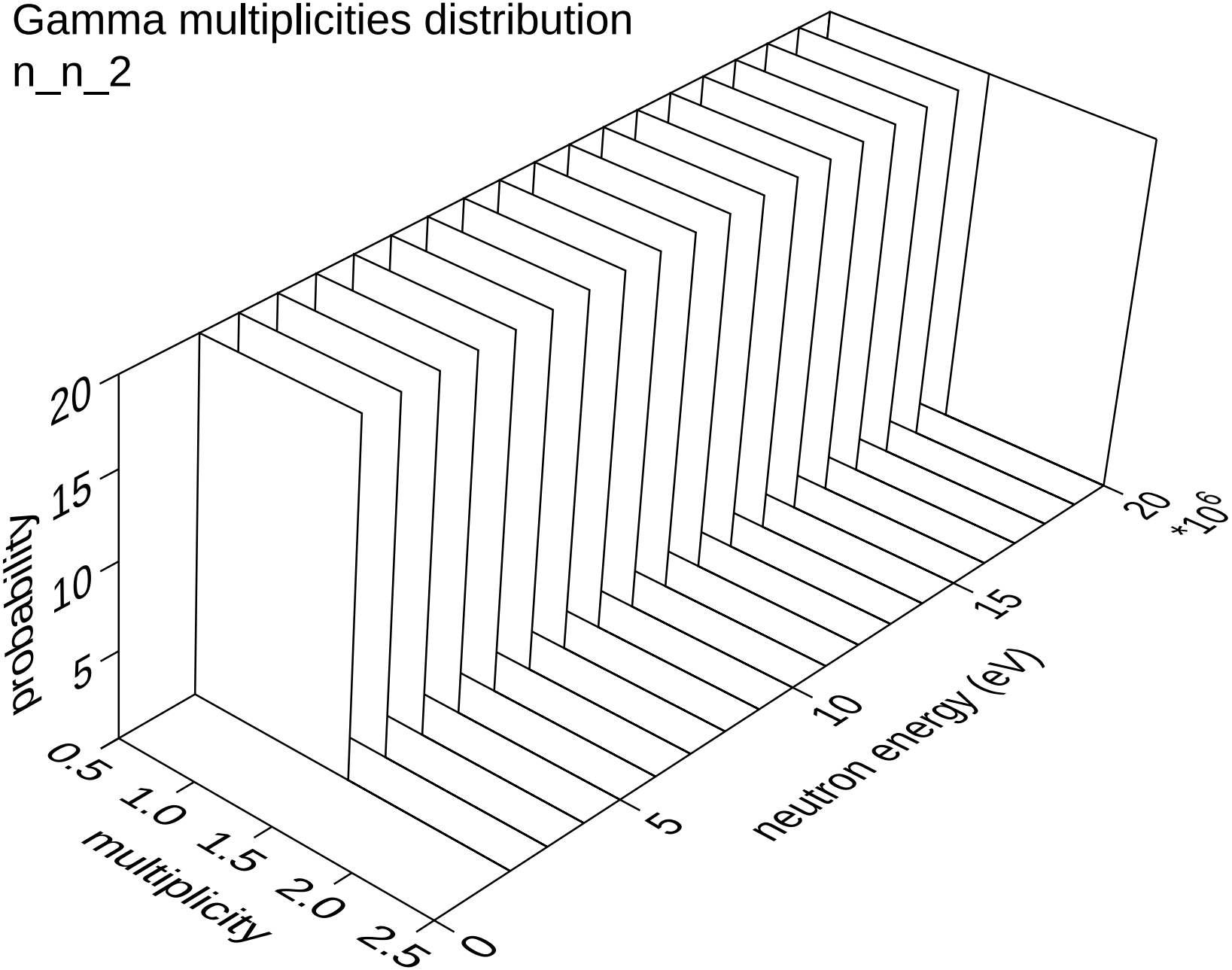
Gamma multiplicities distribution
n_n_1

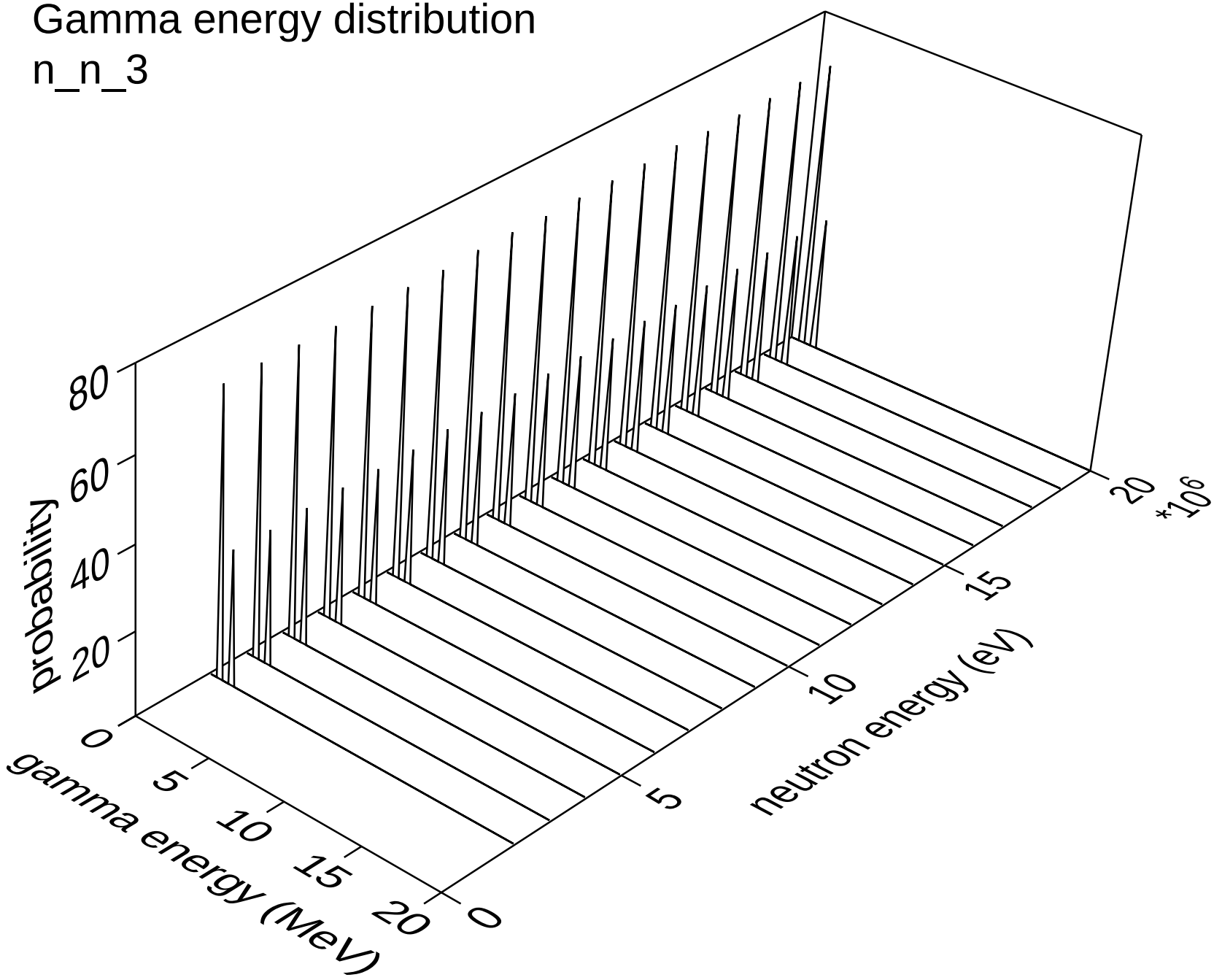


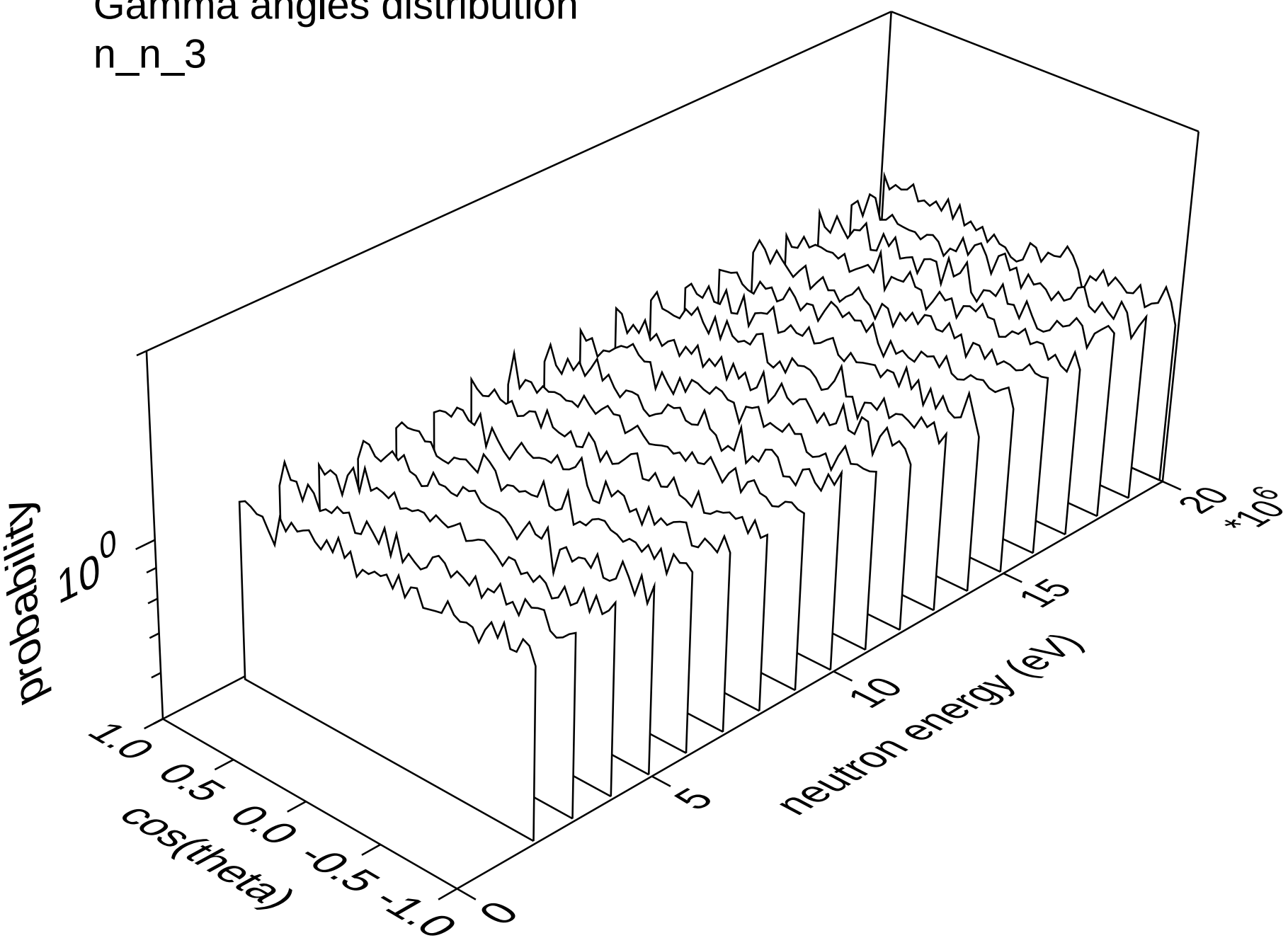

Gamma energy distribution
n_n_2
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_2
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

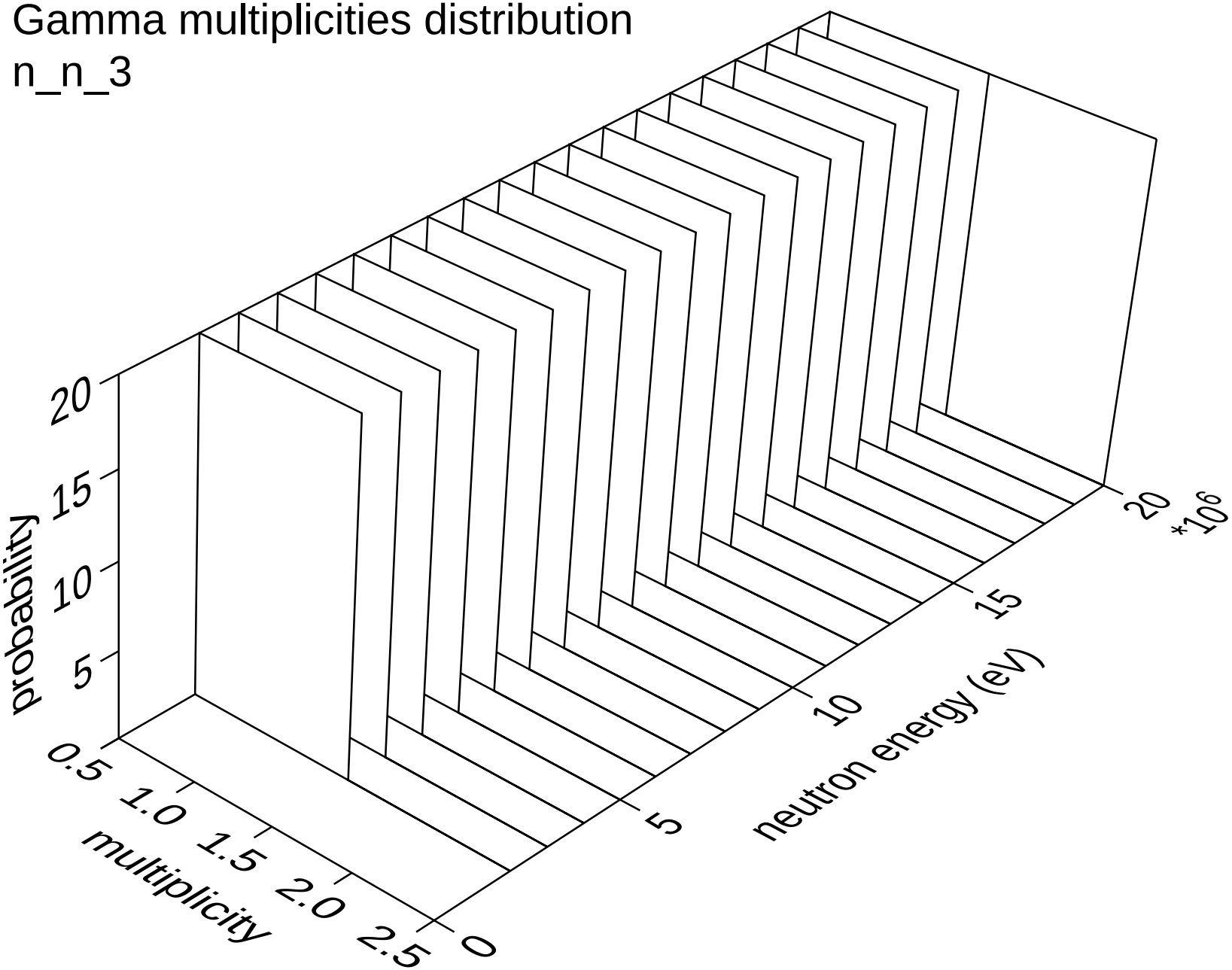
Gamma multiplicities distribution
n_n_2

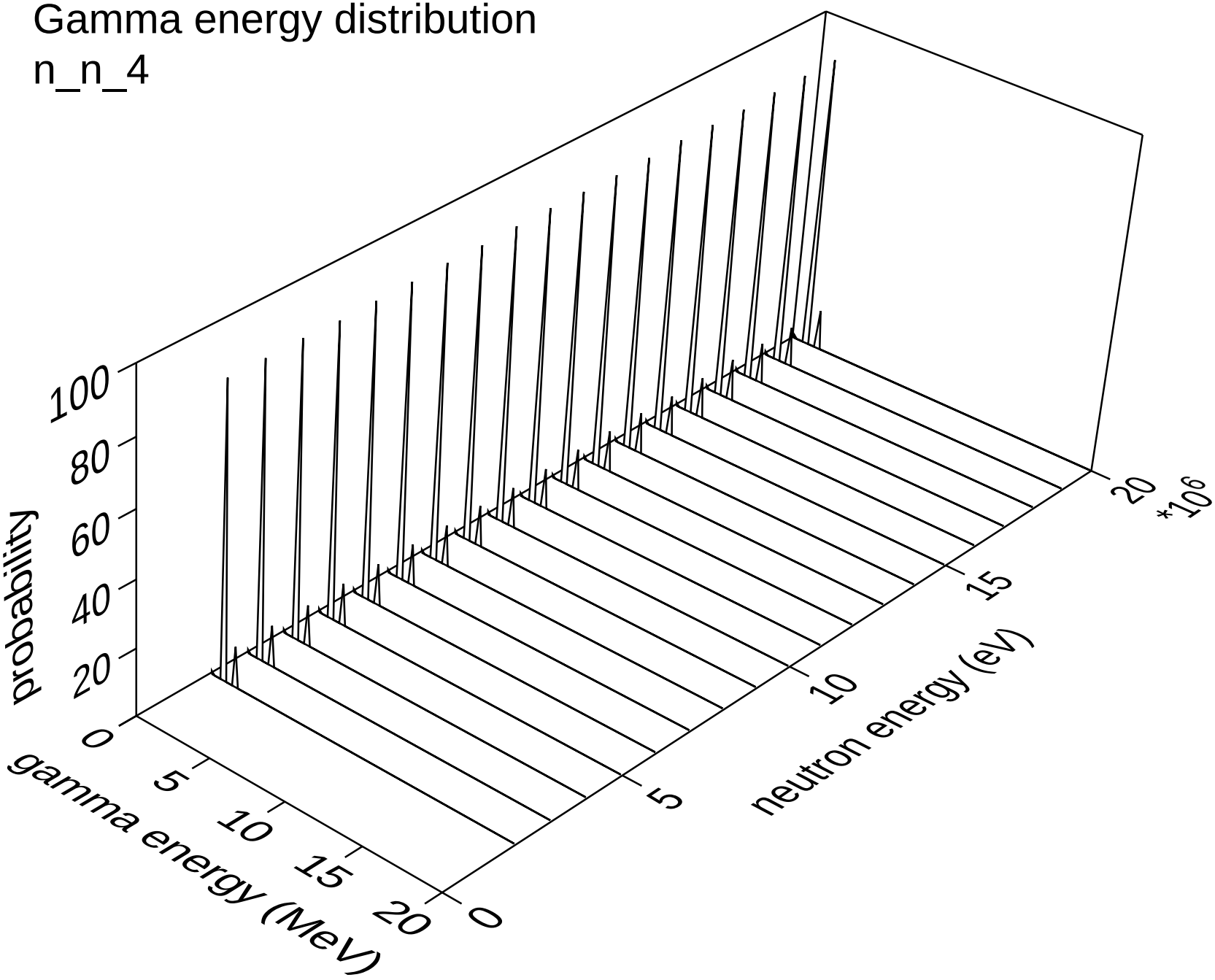


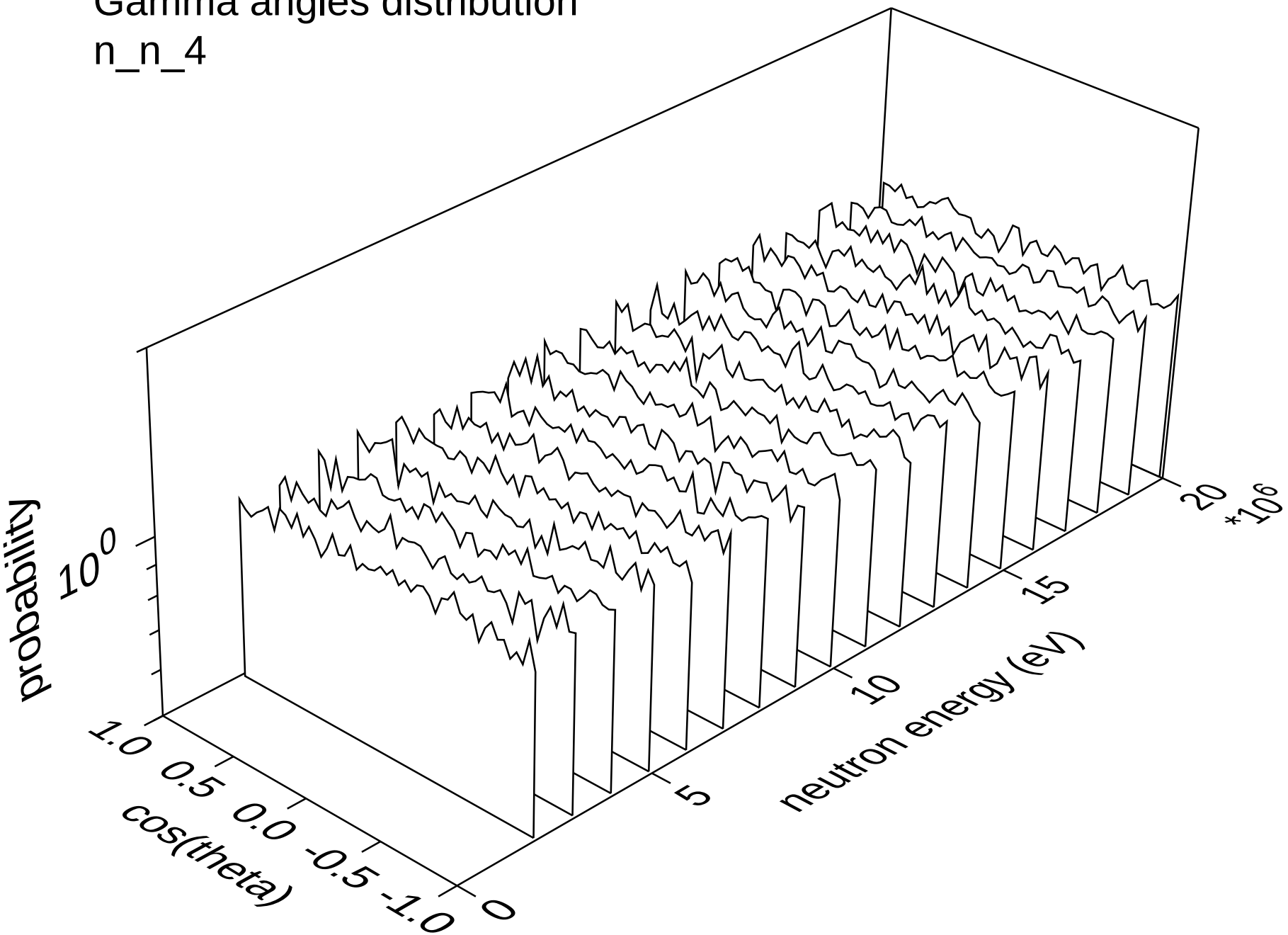

Gamma energy distribution
n_n_3
probability
0
20
40
60
80
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
5
10
15
20
*10^6


Gamma angles distribution
n_n_3
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

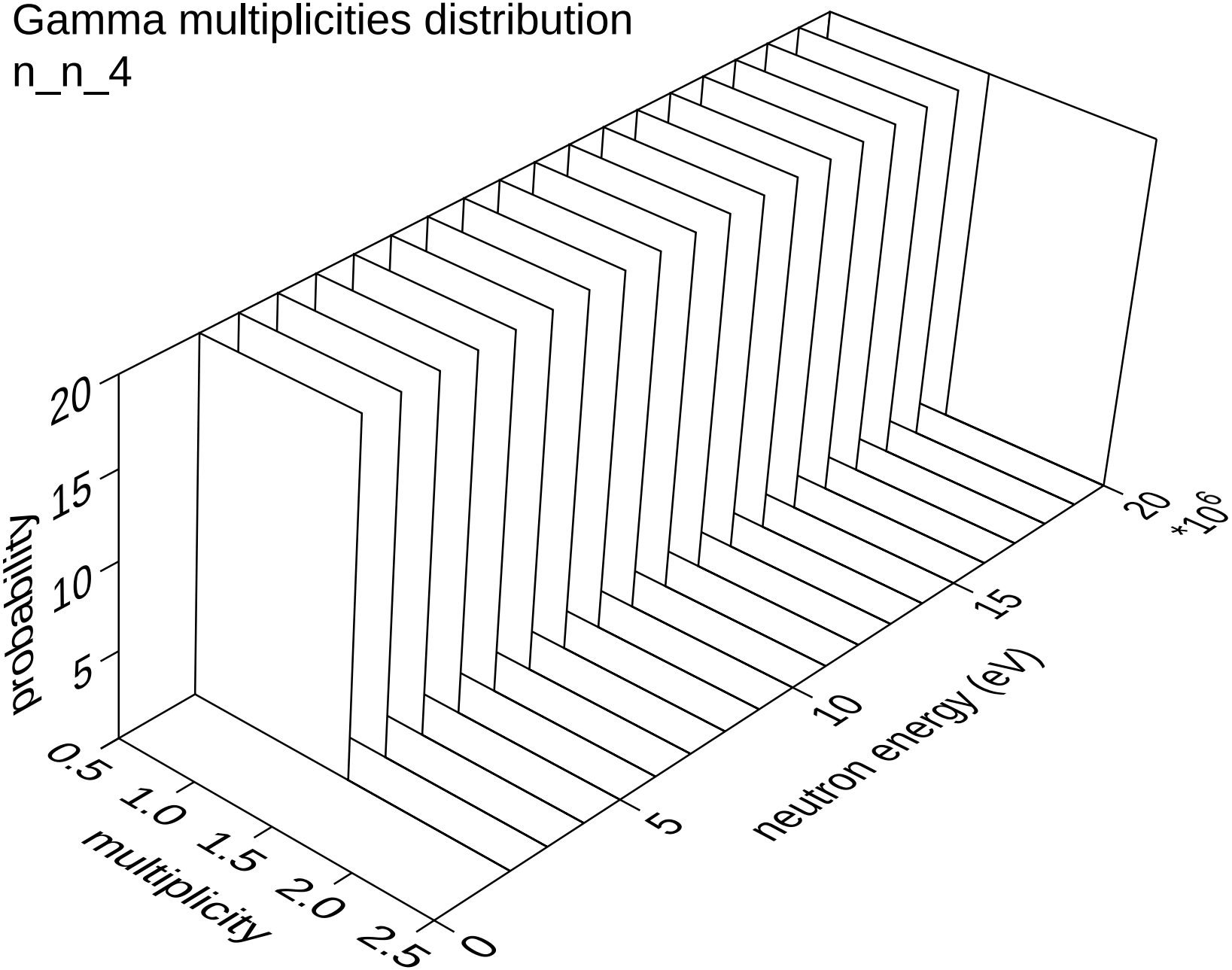
Gamma multiplicities distribution
n_n_3

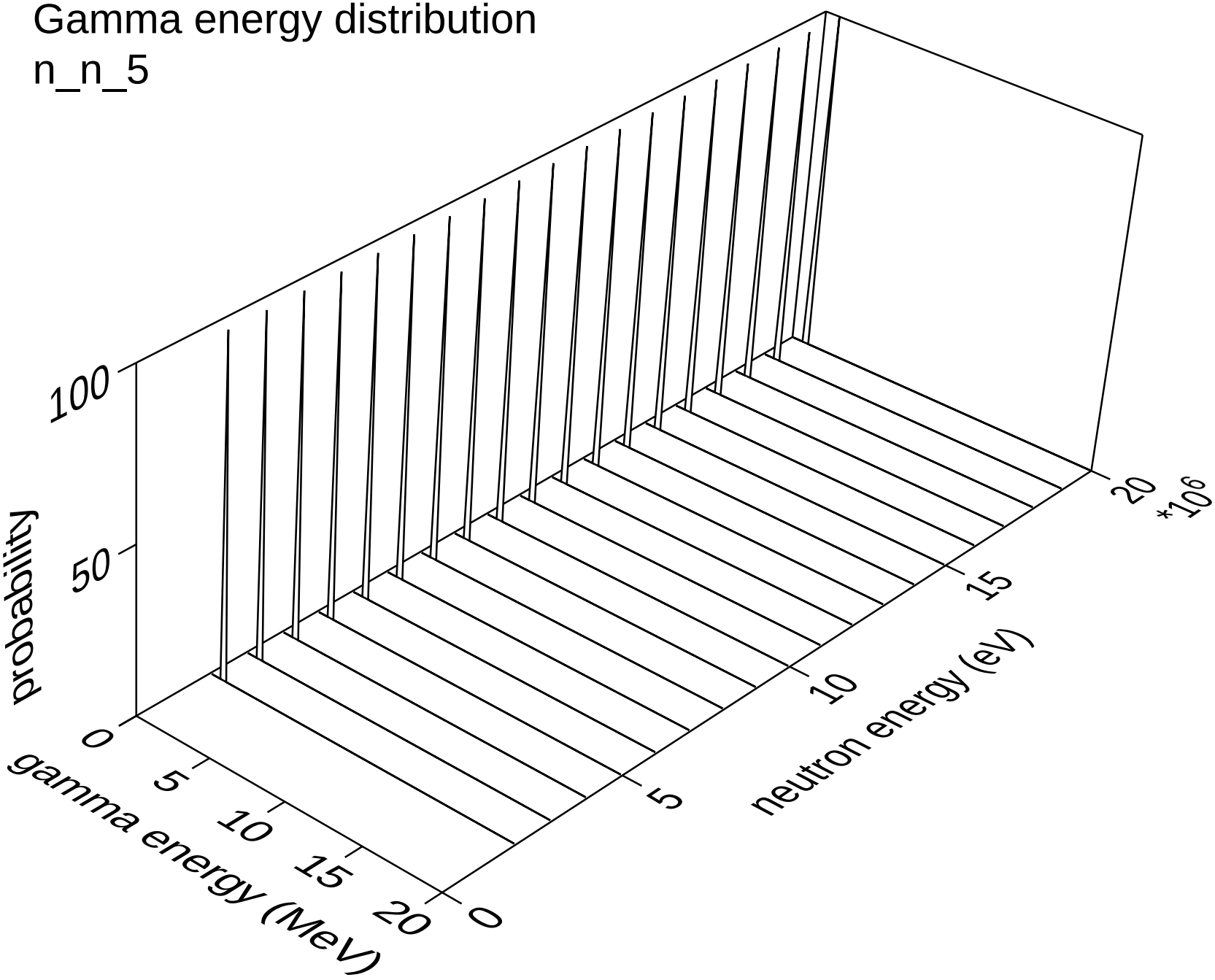


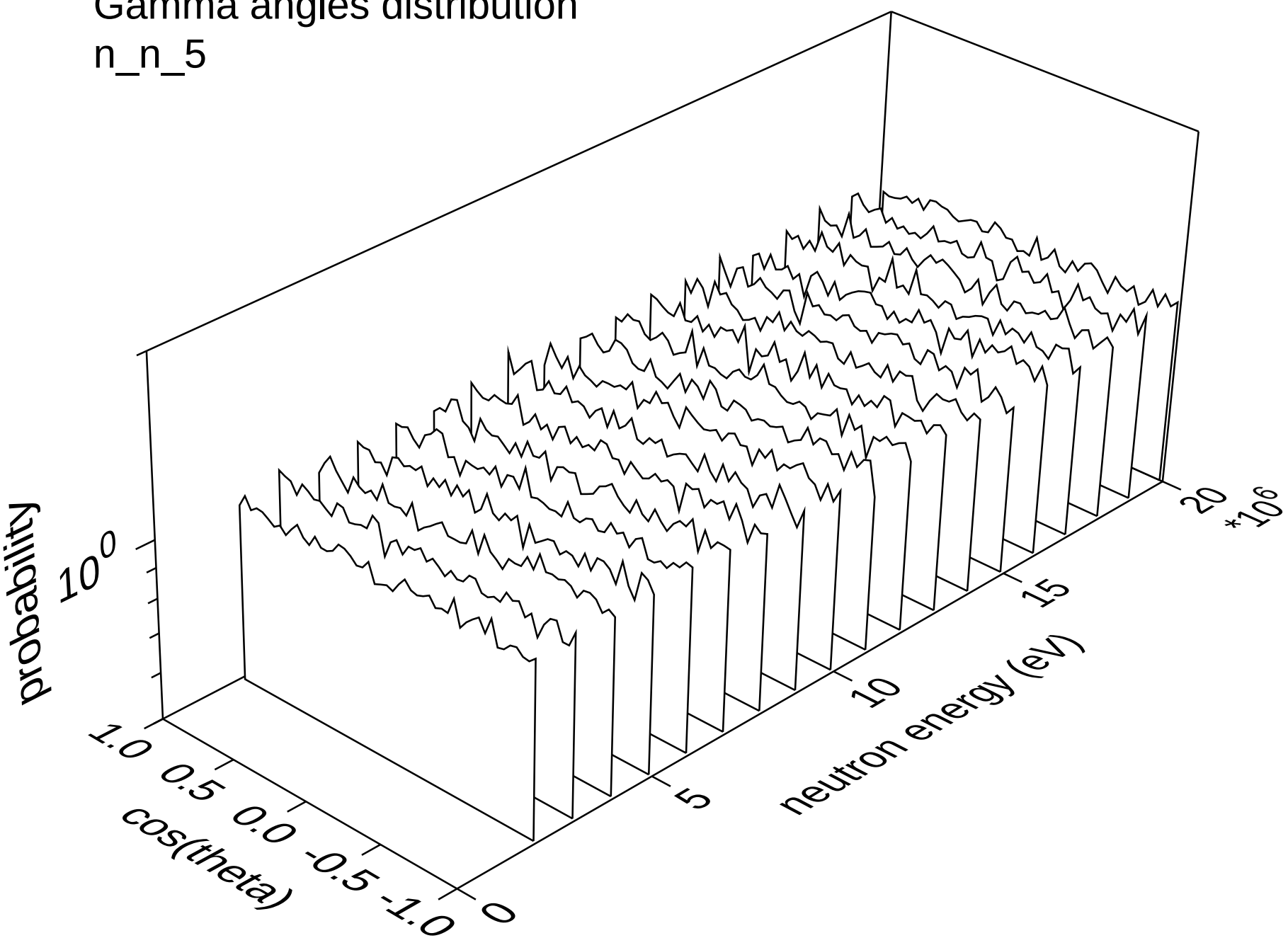

Gamma energy distribution
n_n_4
probability
100
80
60
40
20
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_4
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

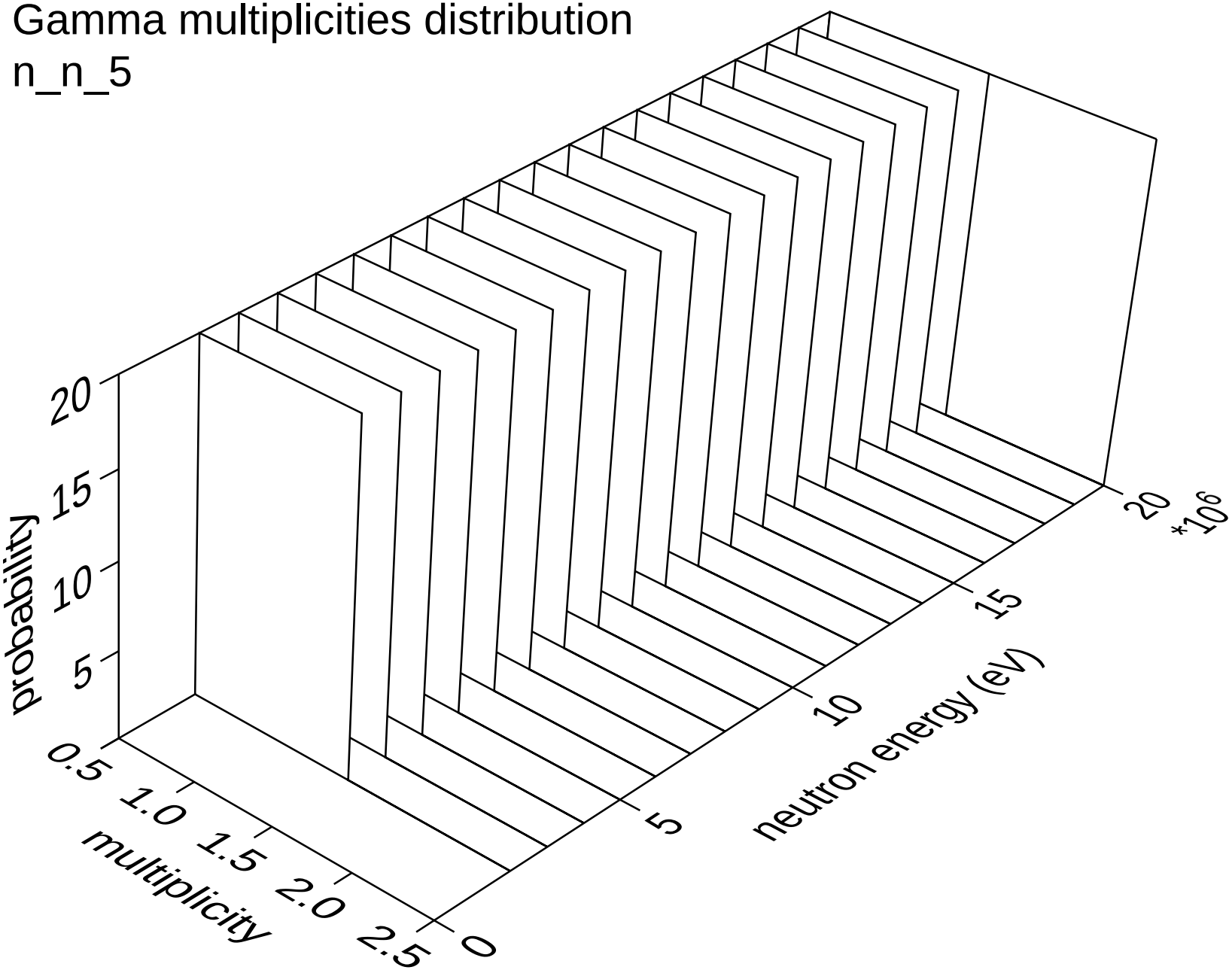
Gamma multiplicities distribution
n_n_4

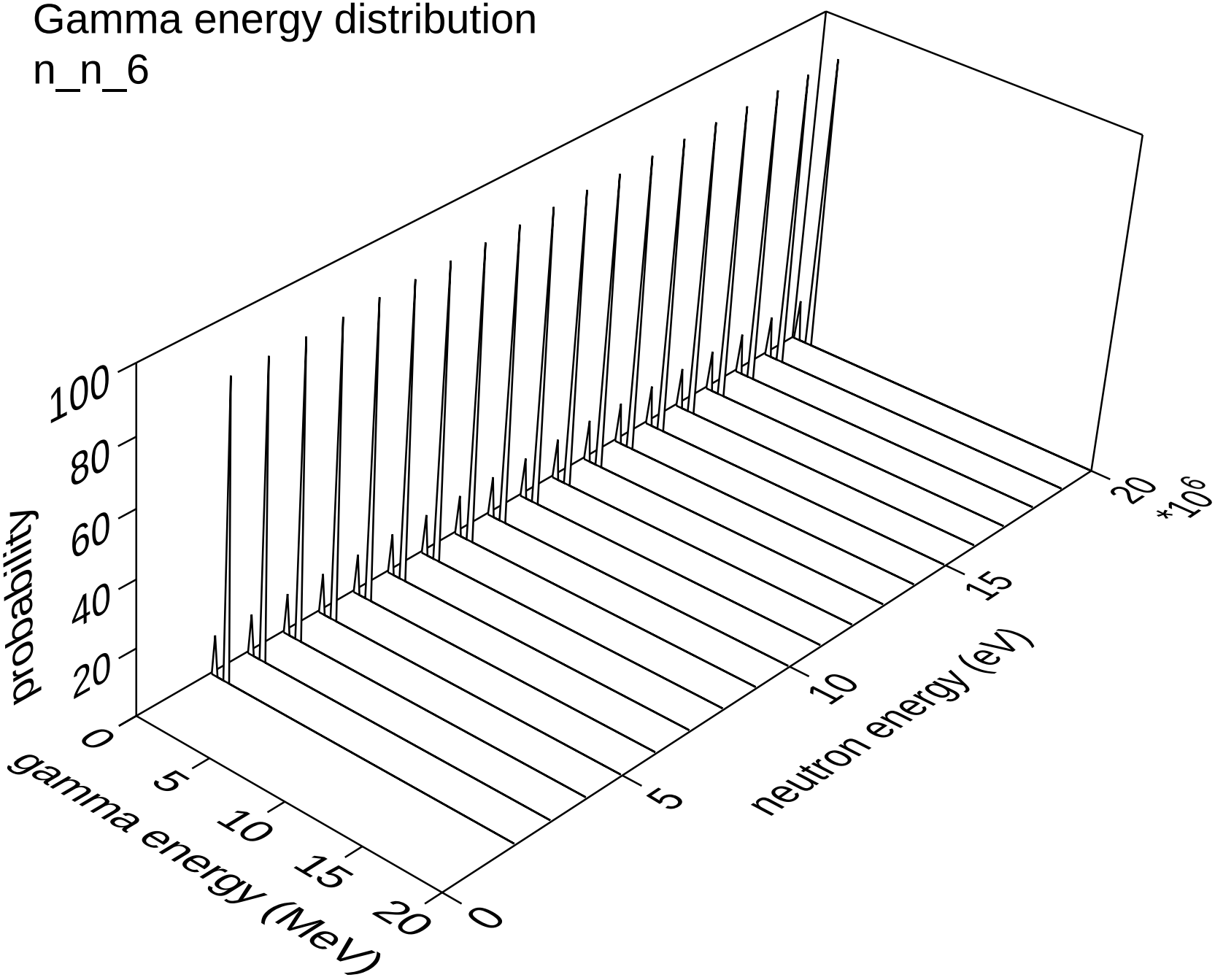


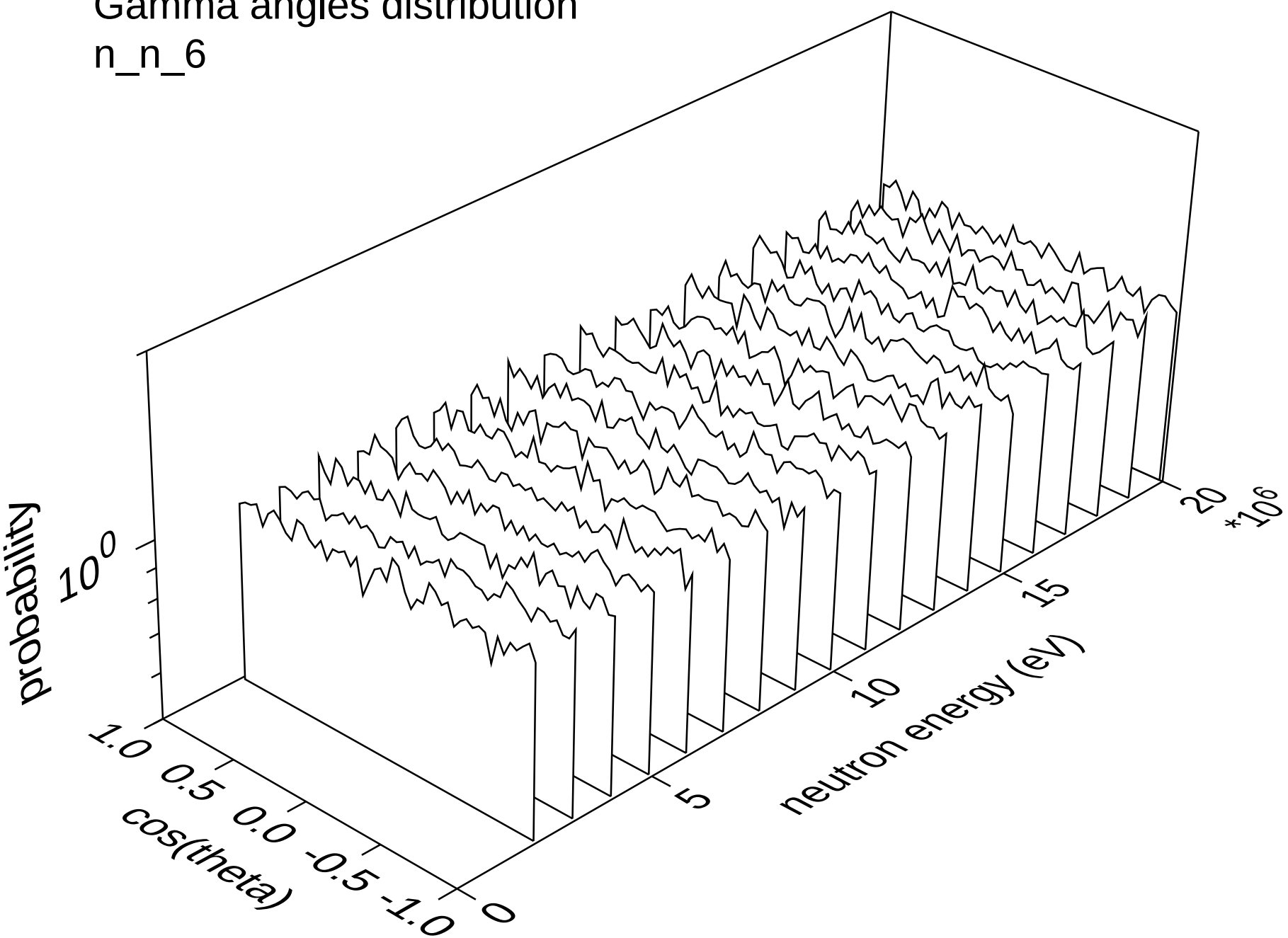

Gamma energy distribution
n_n_5
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_5
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

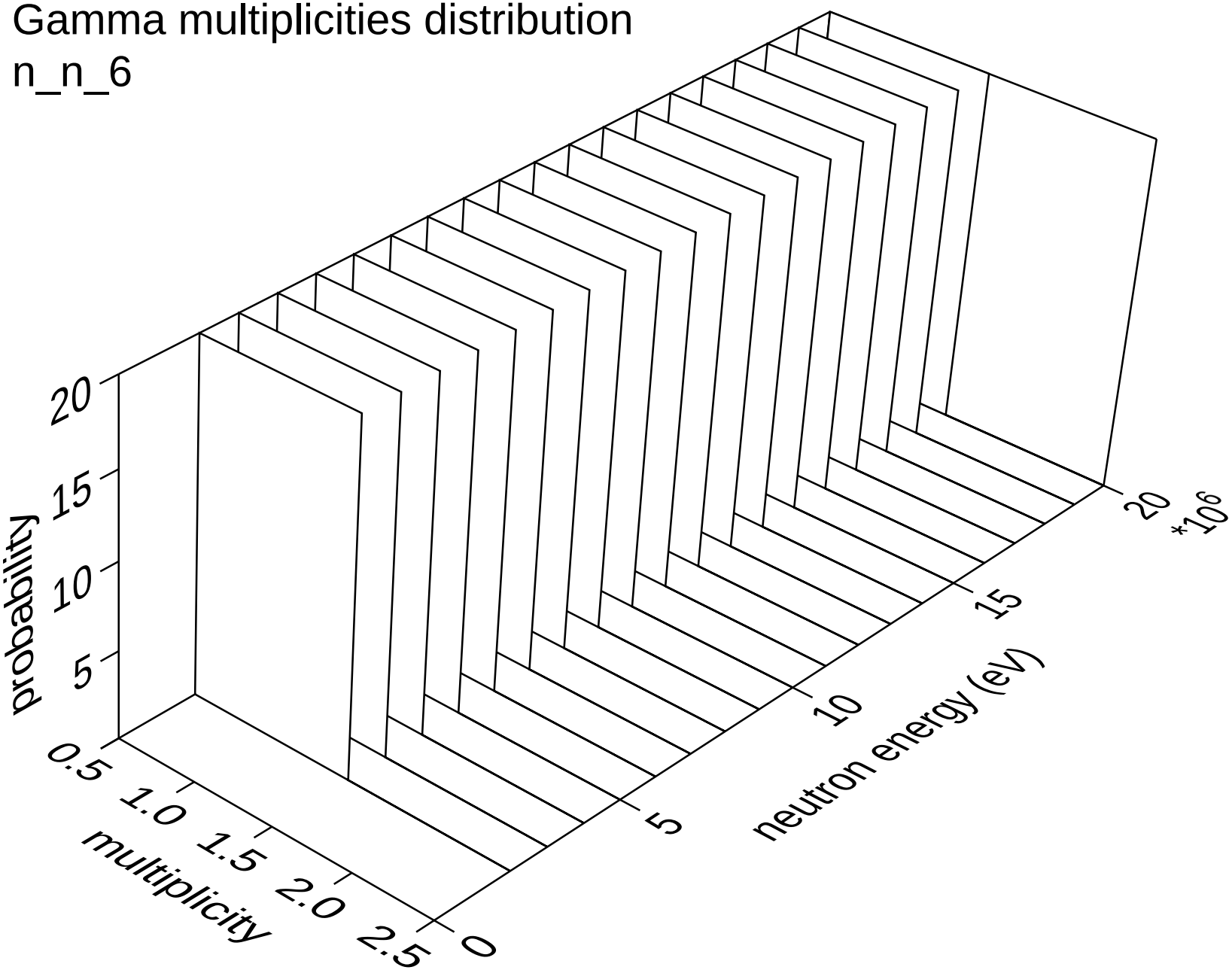
Gamma multiplicities distribution
n_n_5

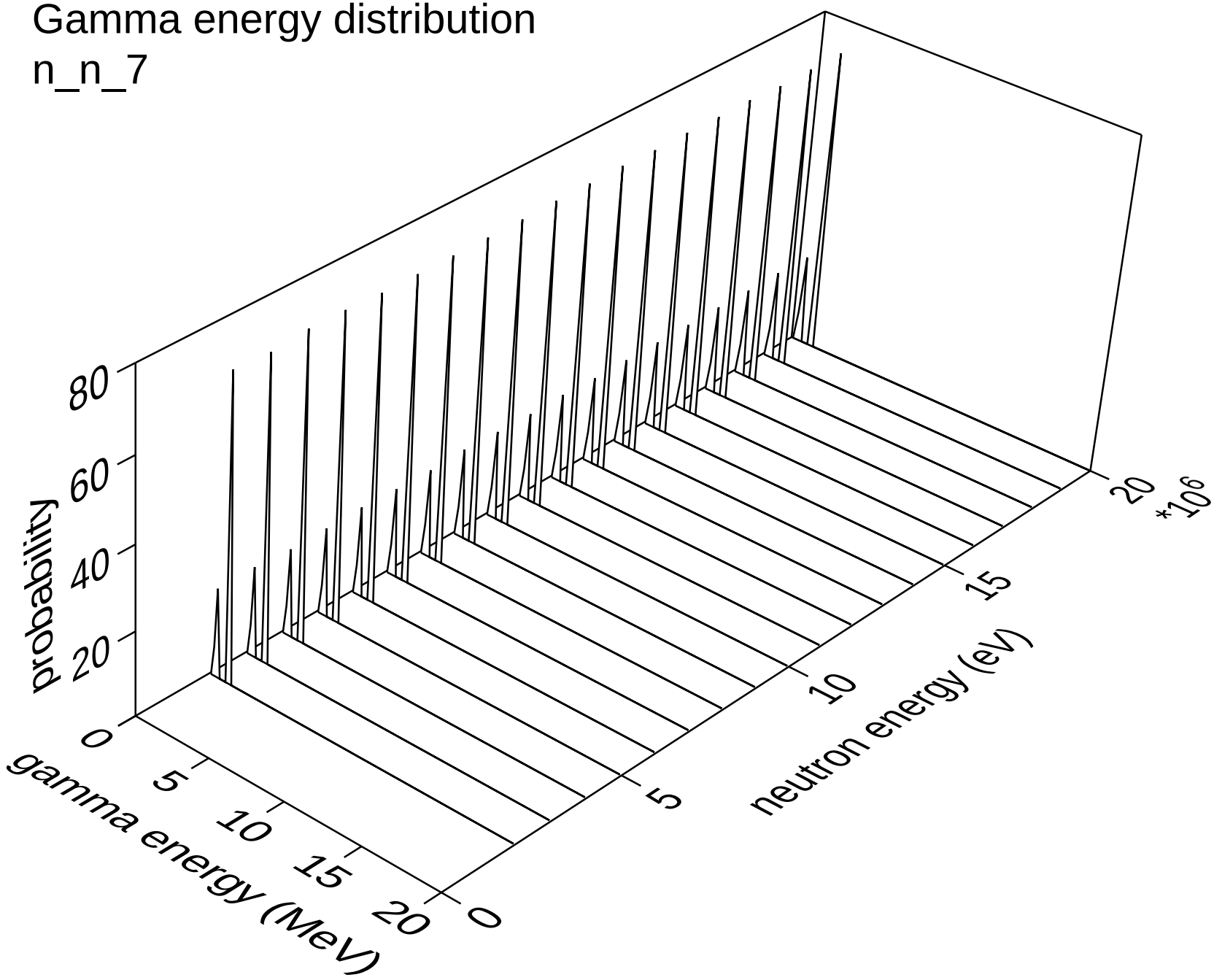


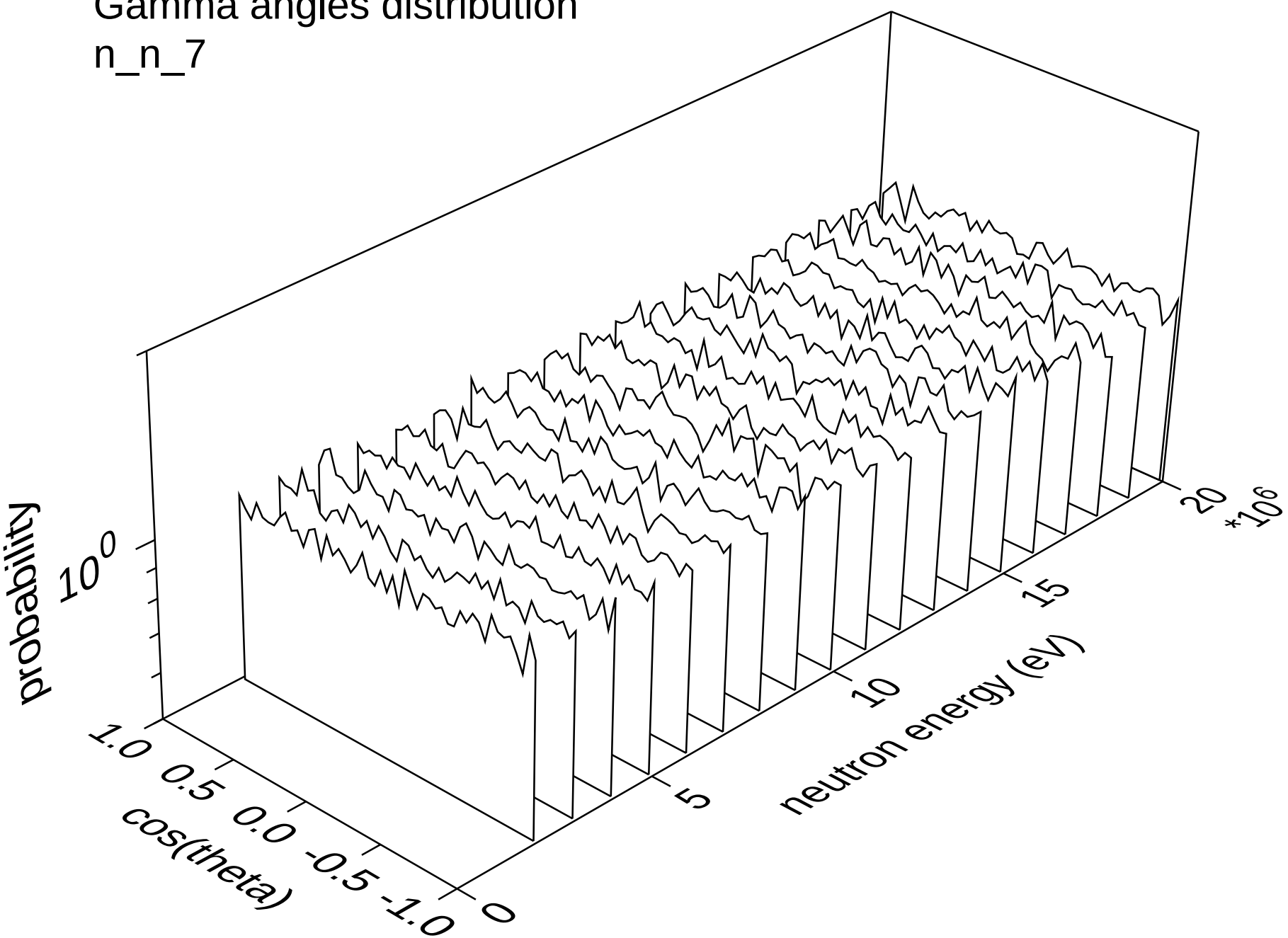

Gamma energy distribution
n_n_6
probability
100
80
60
40
20
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_6
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

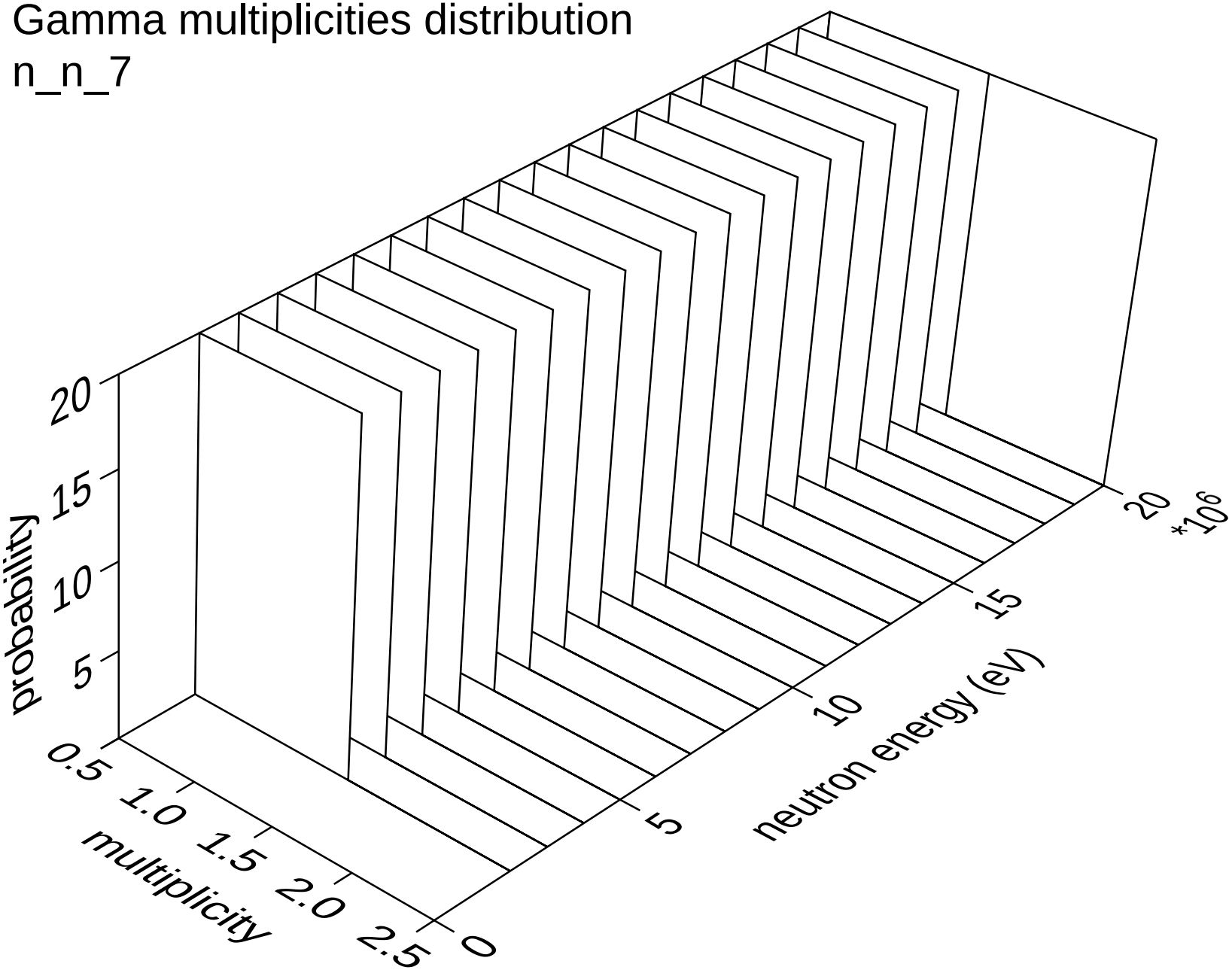
Gamma multiplicities distribution
n_n_6

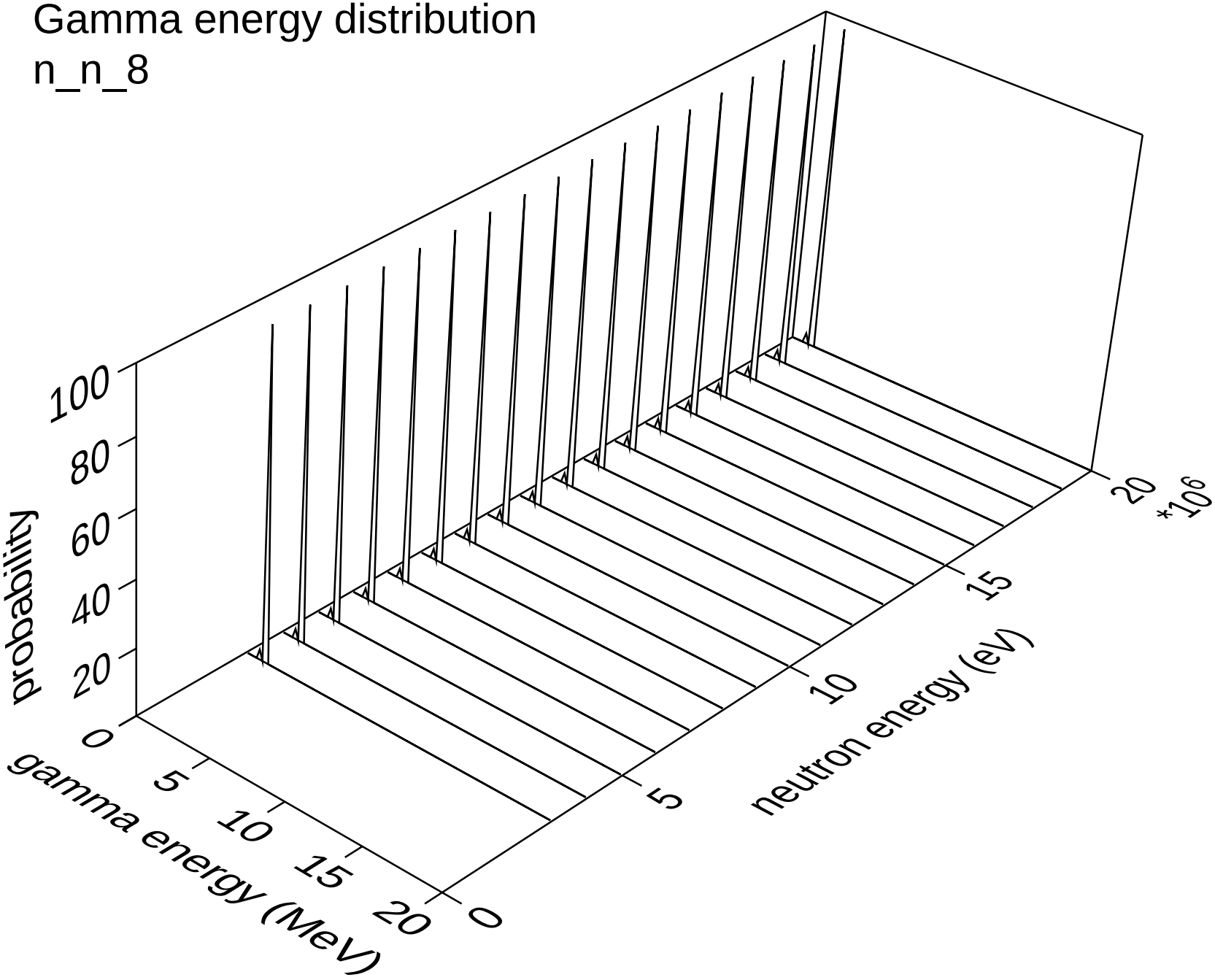


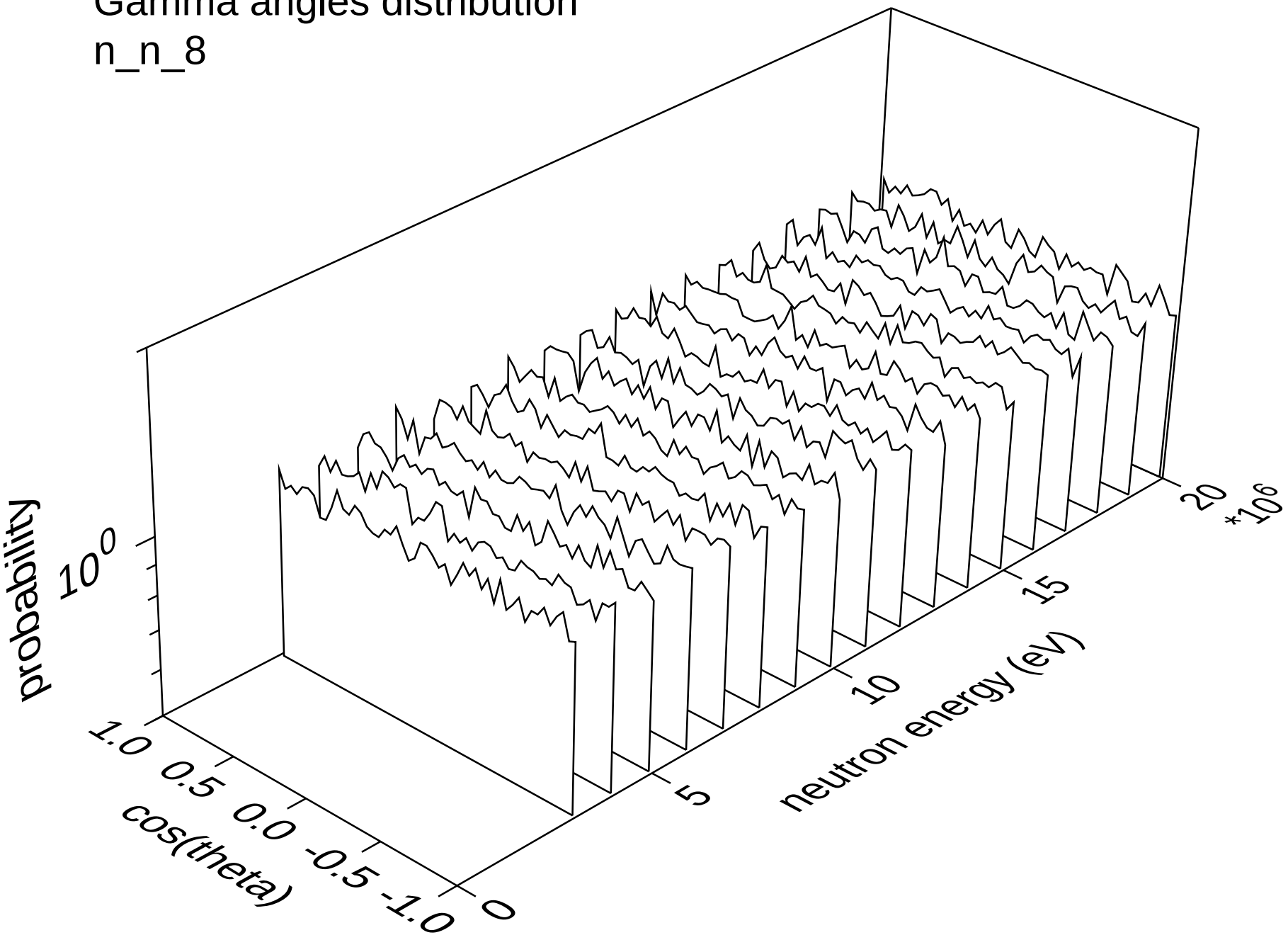

Gamma energy distribution
n_n_7
probability
80
60
40
20
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
5
10
15
20
*10^6


Gamma angles distribution
n_n_7
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

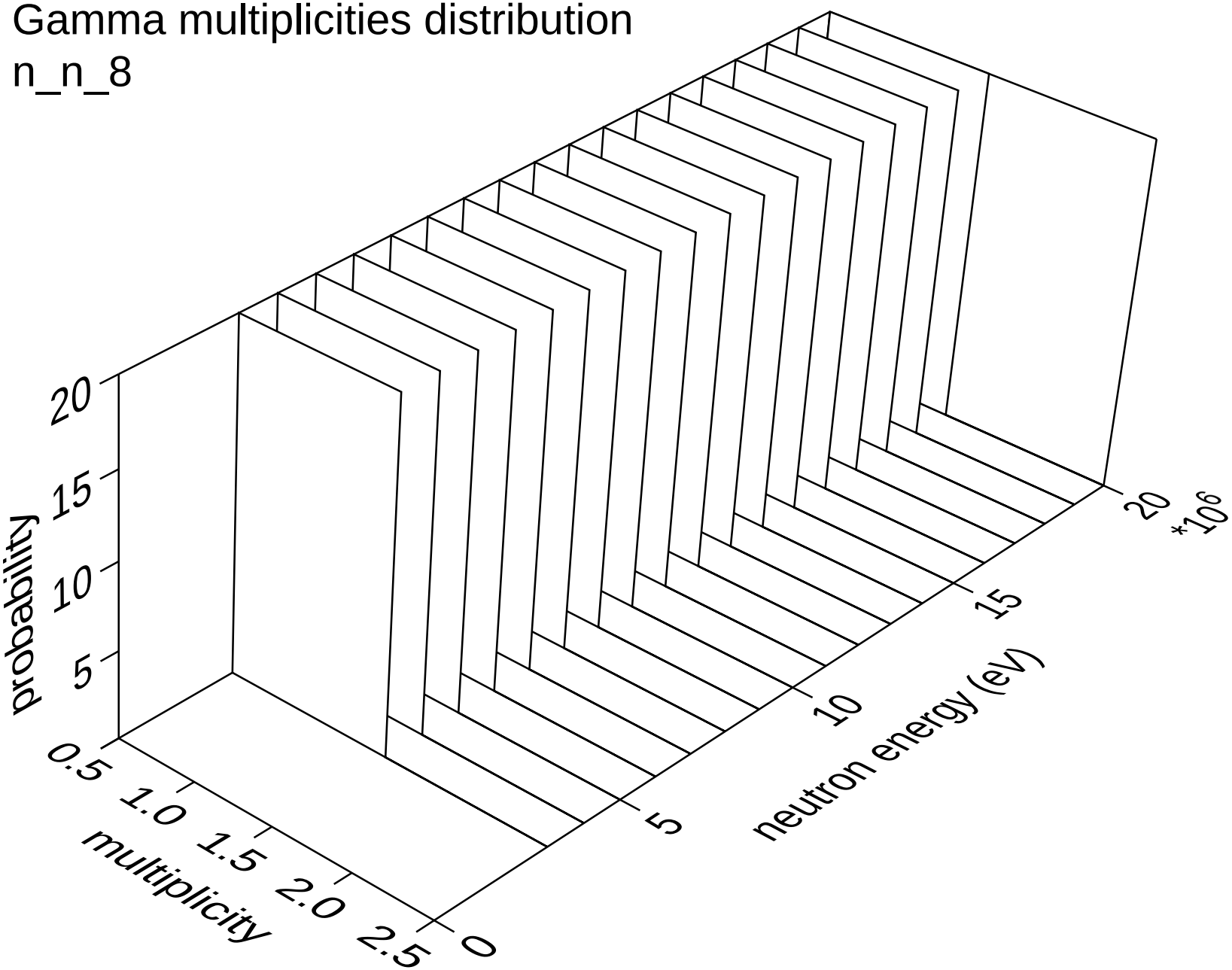
Gamma multiplicities distribution
n_n_7

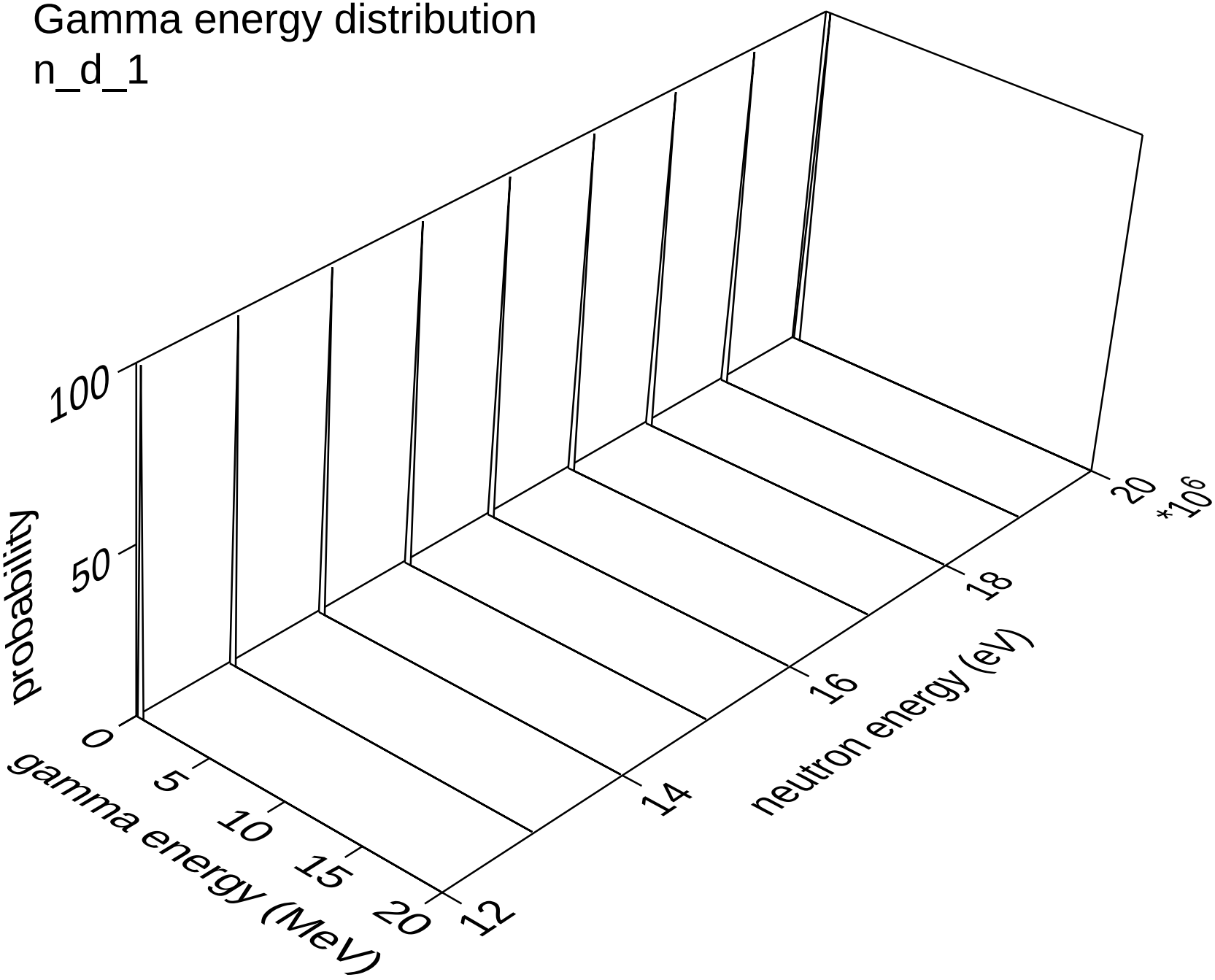


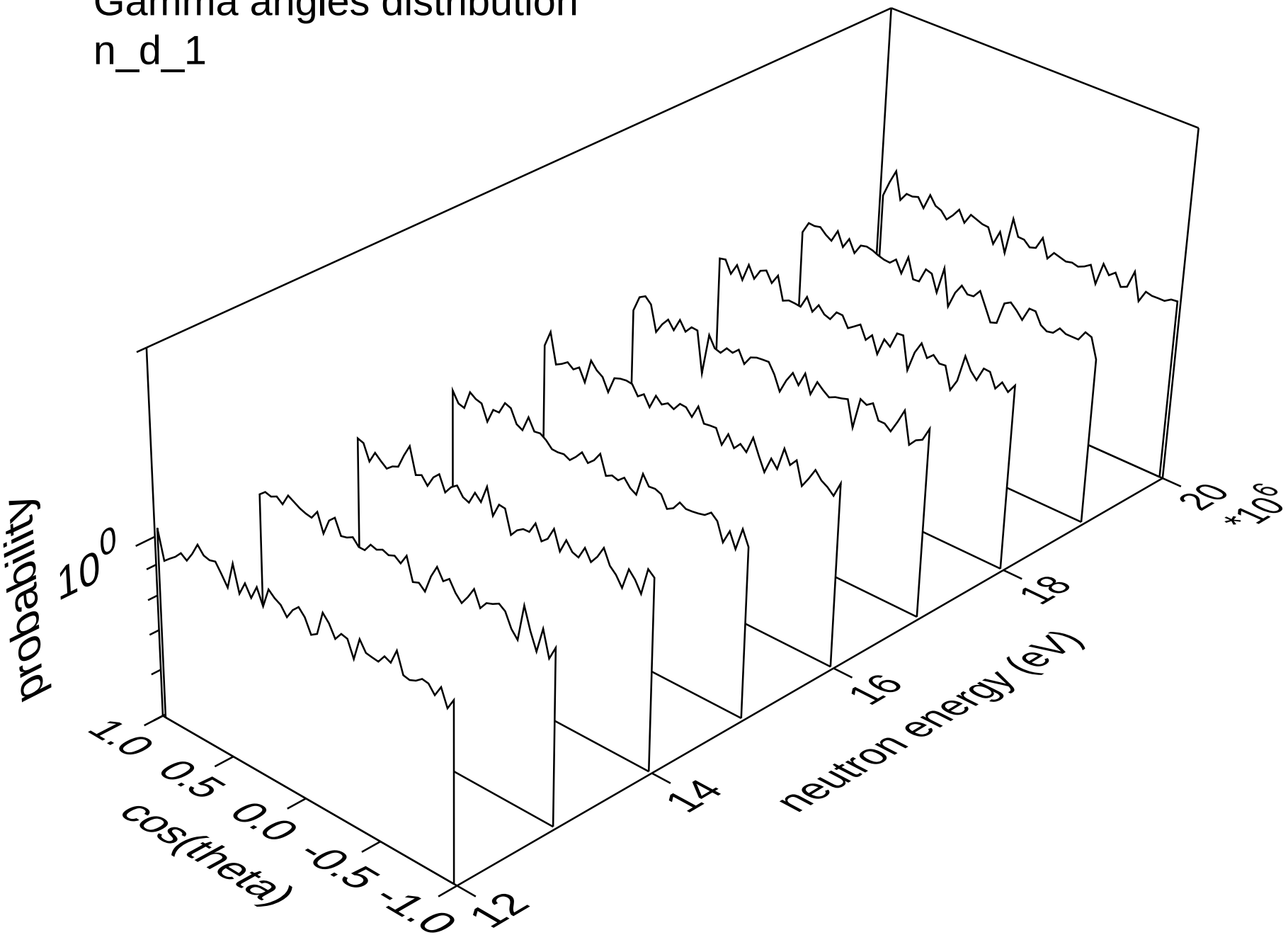

Gamma energy distribution
n_n_8
probability
100
80
60
40
20
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
0
5
10
15
20
*10^6


Gamma angles distribution
n_n_8
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

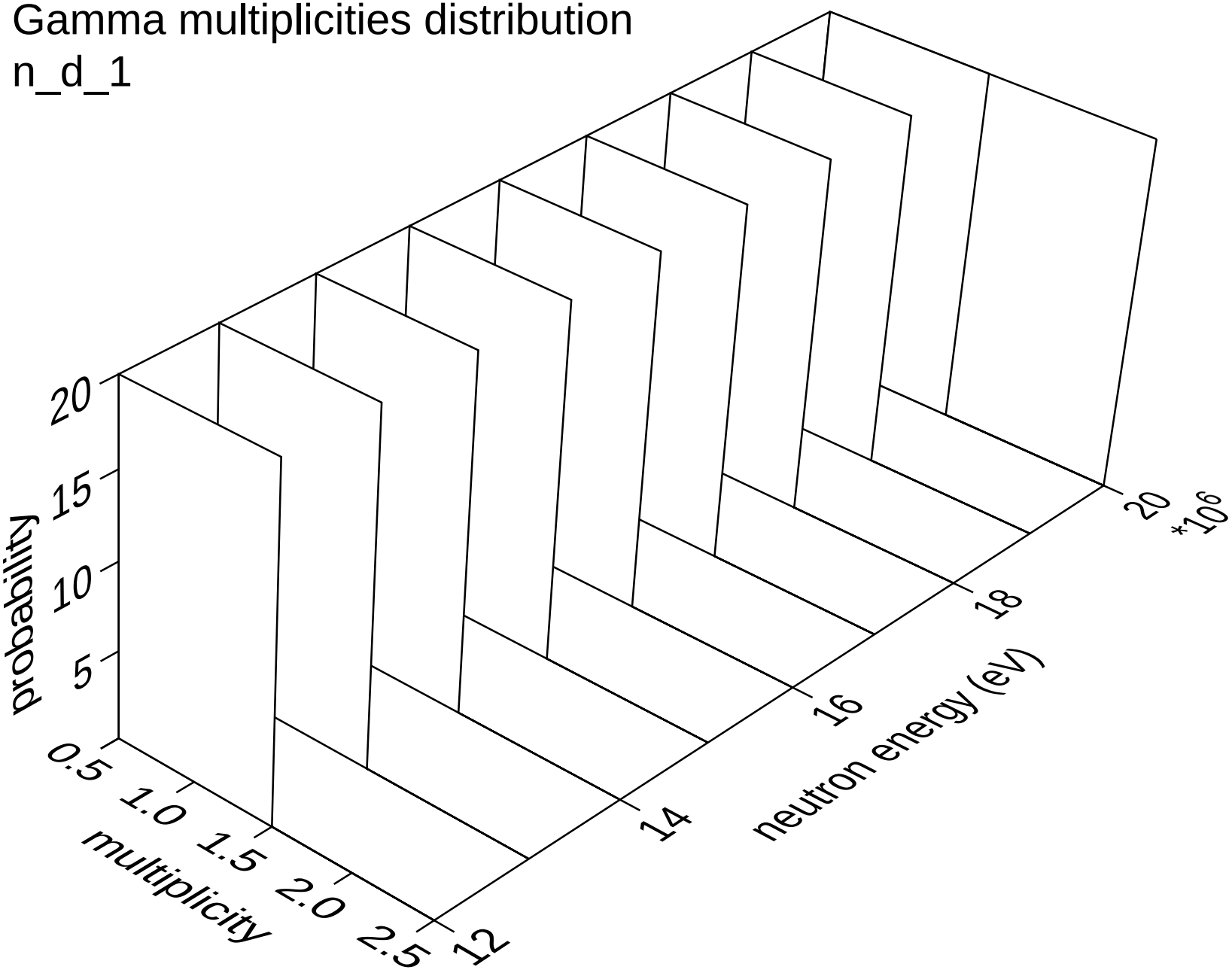
Gamma multiplicities distribution
n_n_8

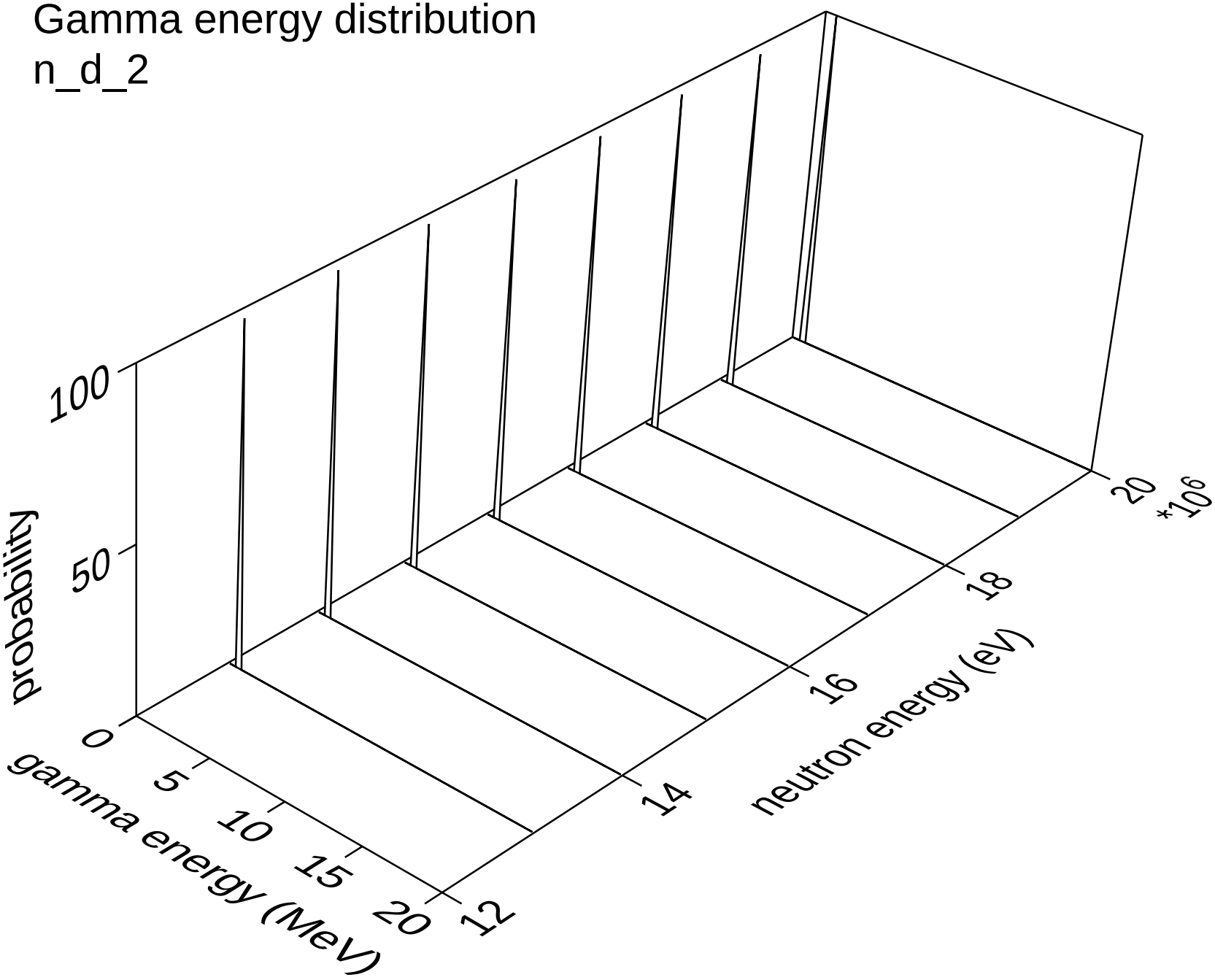


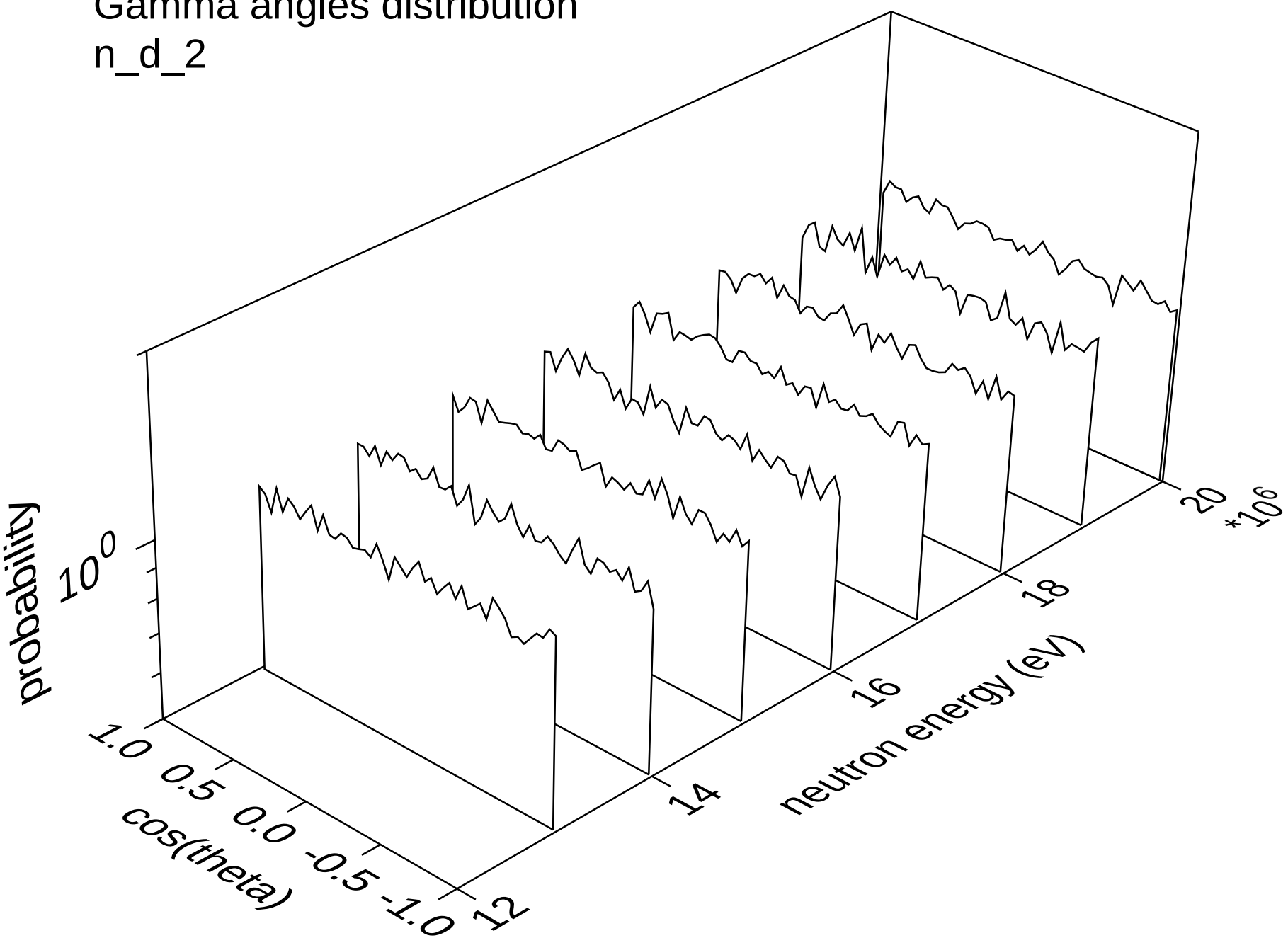

Gamma energy distribution
n_d_1
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
12
14
16
18
20
*10^6


Gamma angles distribution
n_d_1
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

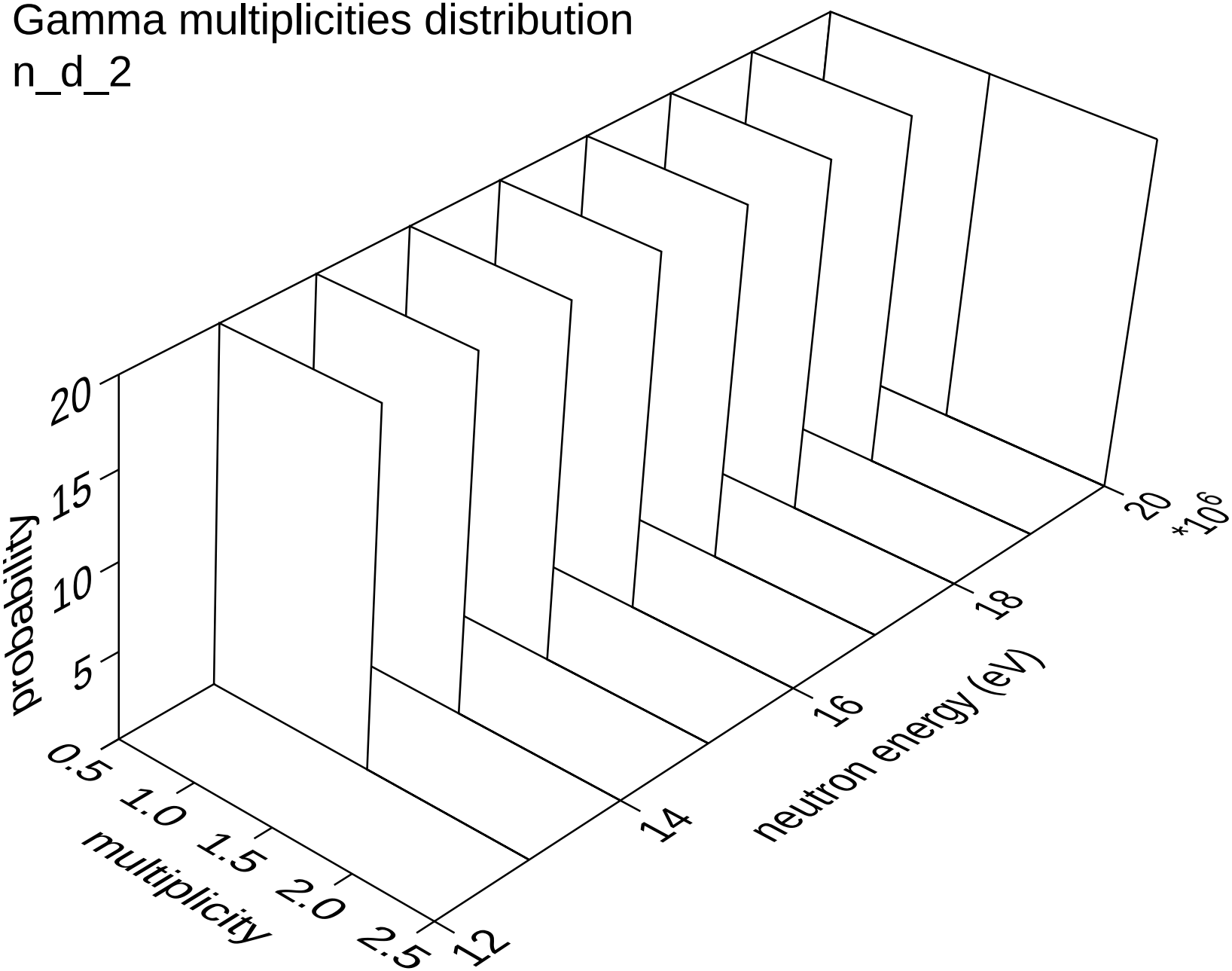
Gamma multiplicities distribution
n_d_1

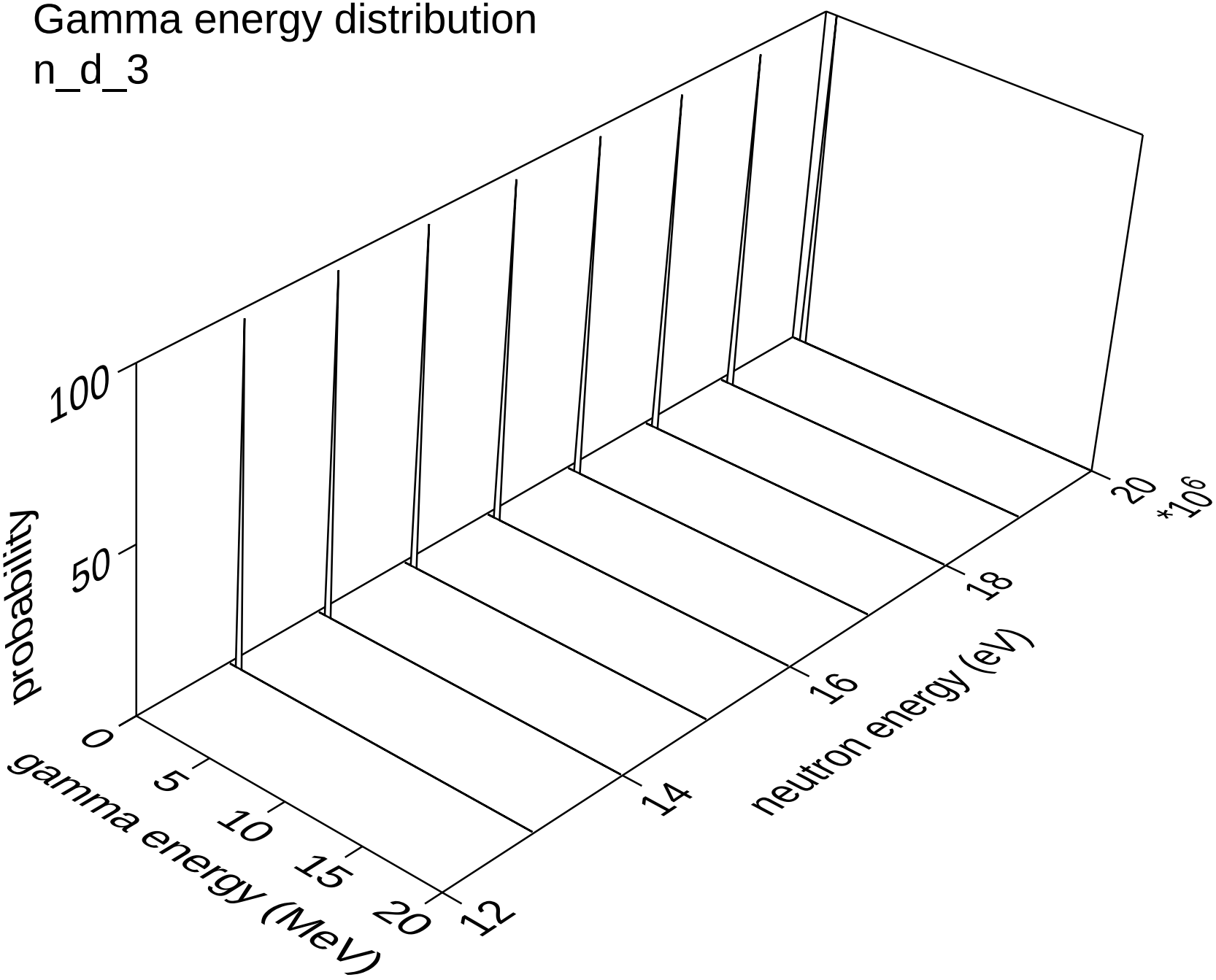


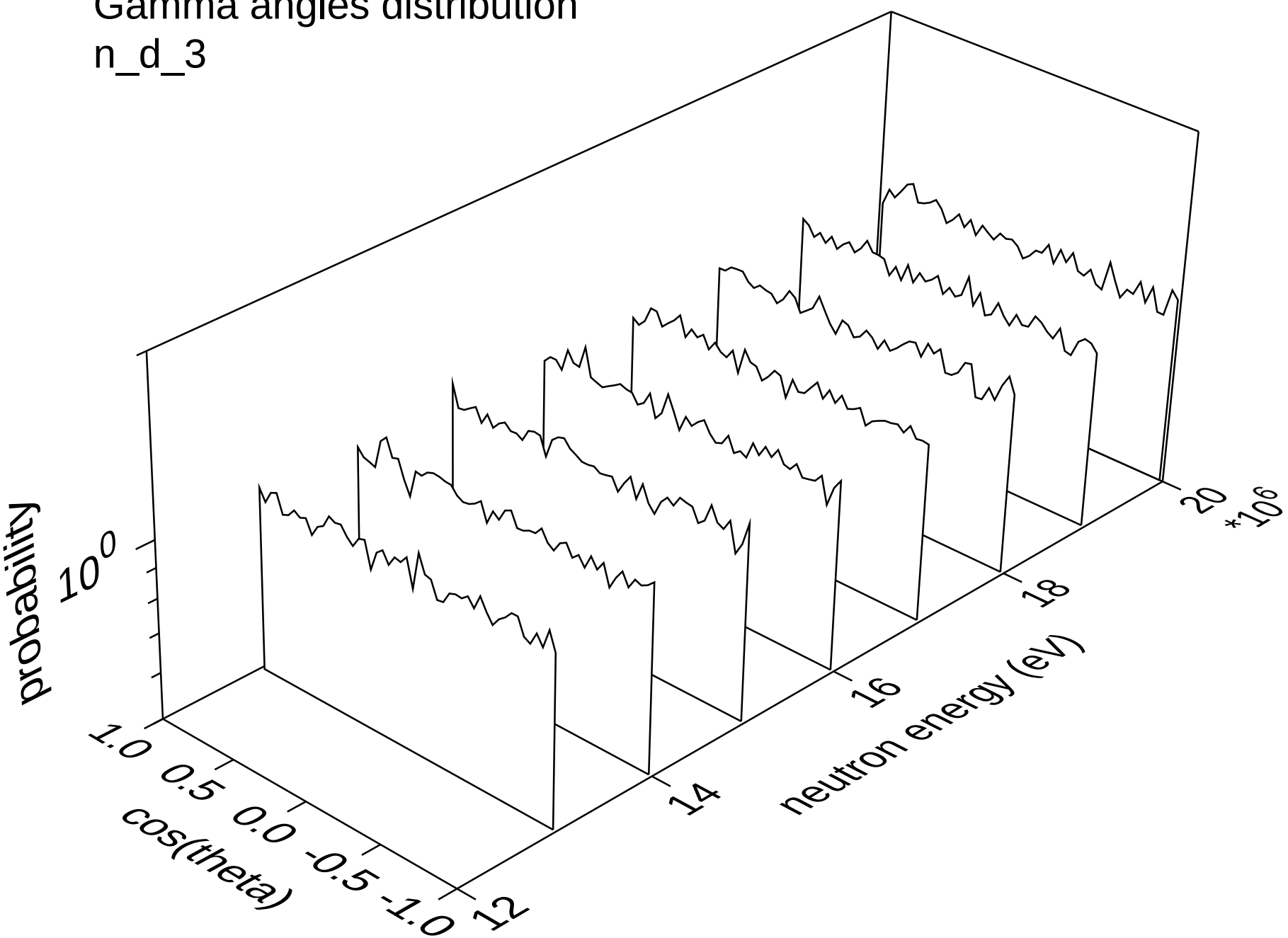
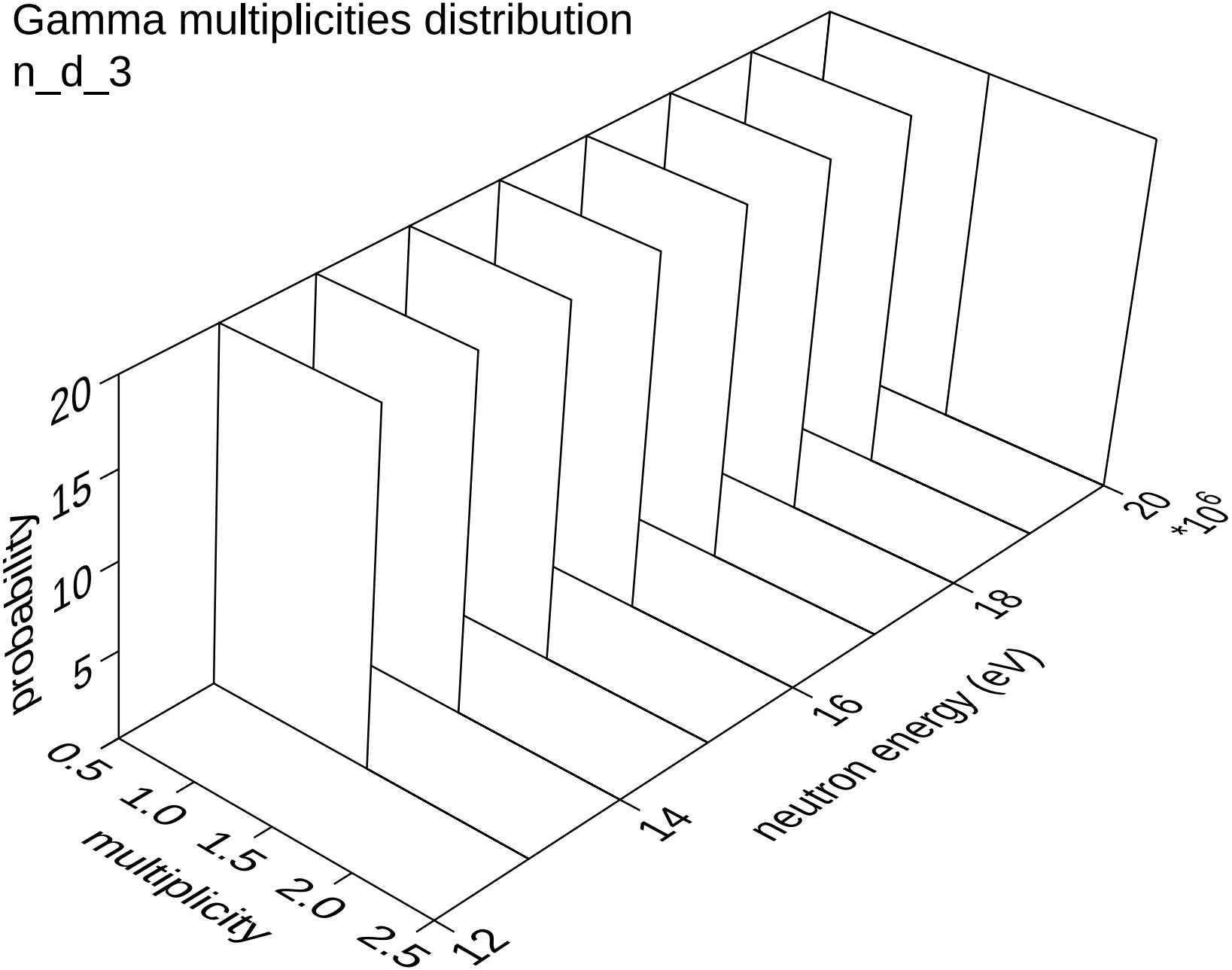

Gamma energy distribution
n_d_2
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
12
14
16
18
20
*10^6


Gamma angles distribution
n_d_2
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

Gamma multiplicities distribution
n_d_2




Gamma energy distribution
n_d_3
probability
100
50
0
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
12
14
16
18
20
*10^6


Gamma angles distribution
n_d_3
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

Gamma multiplicities distribution
n_d_3