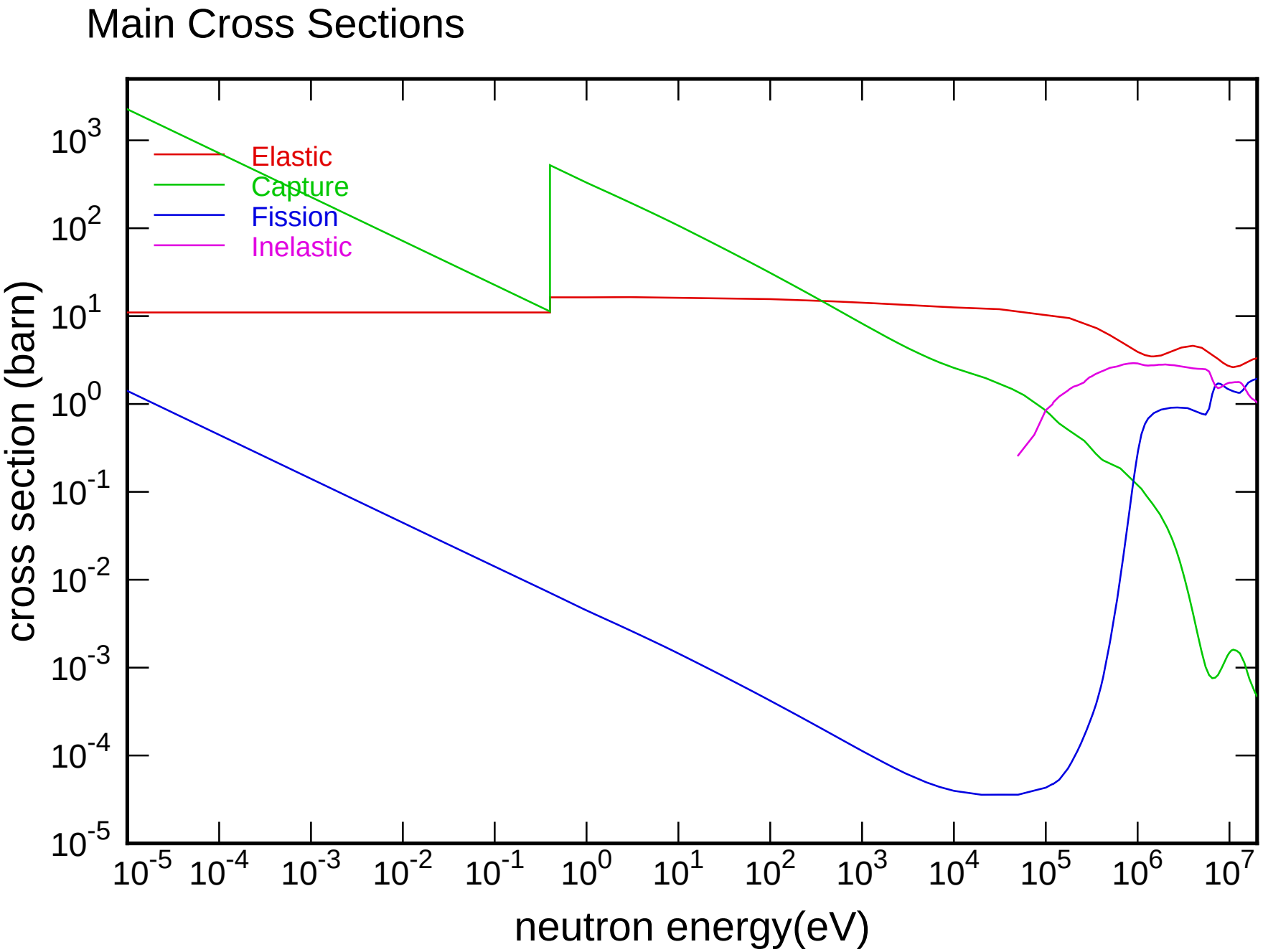
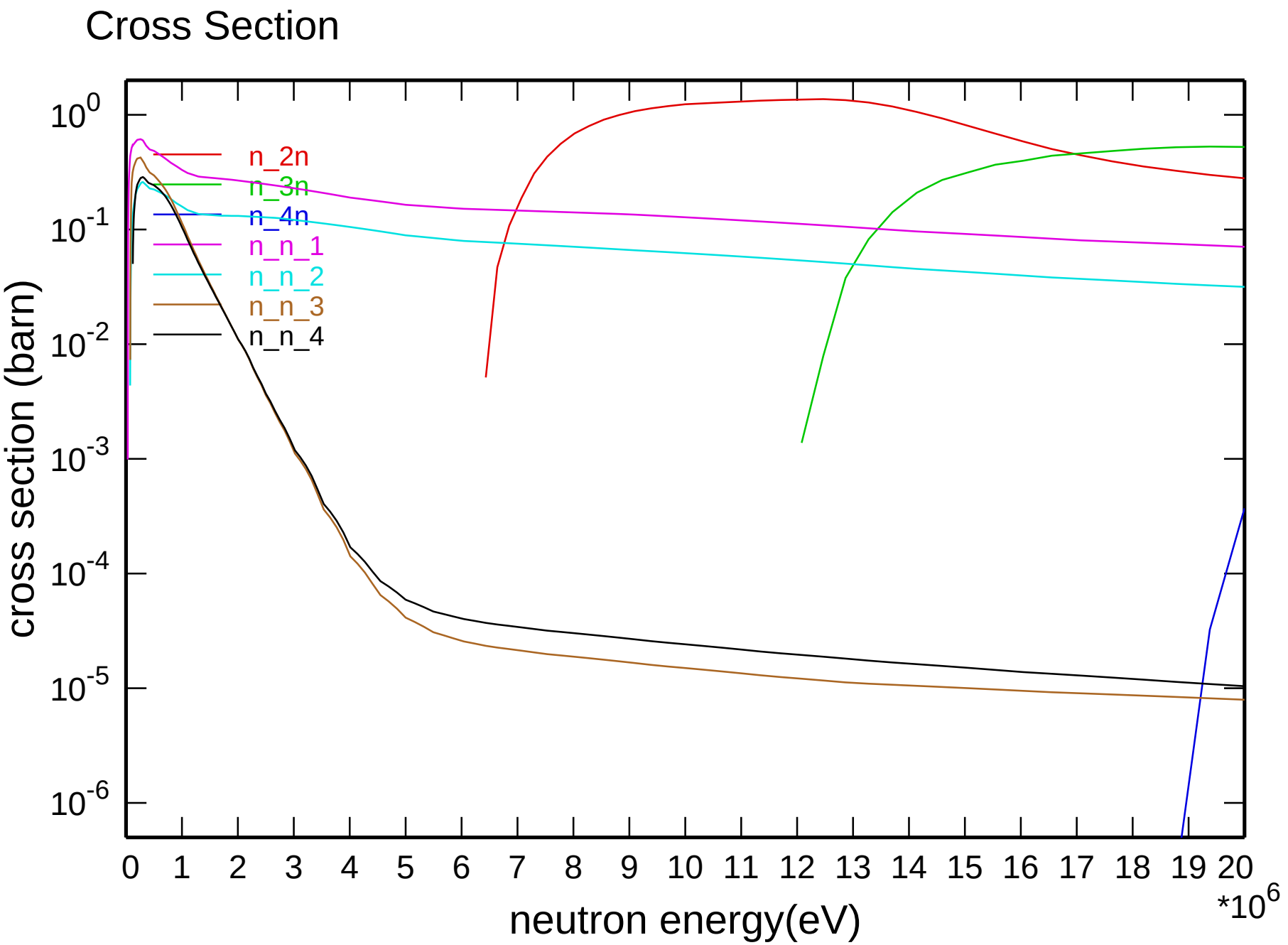
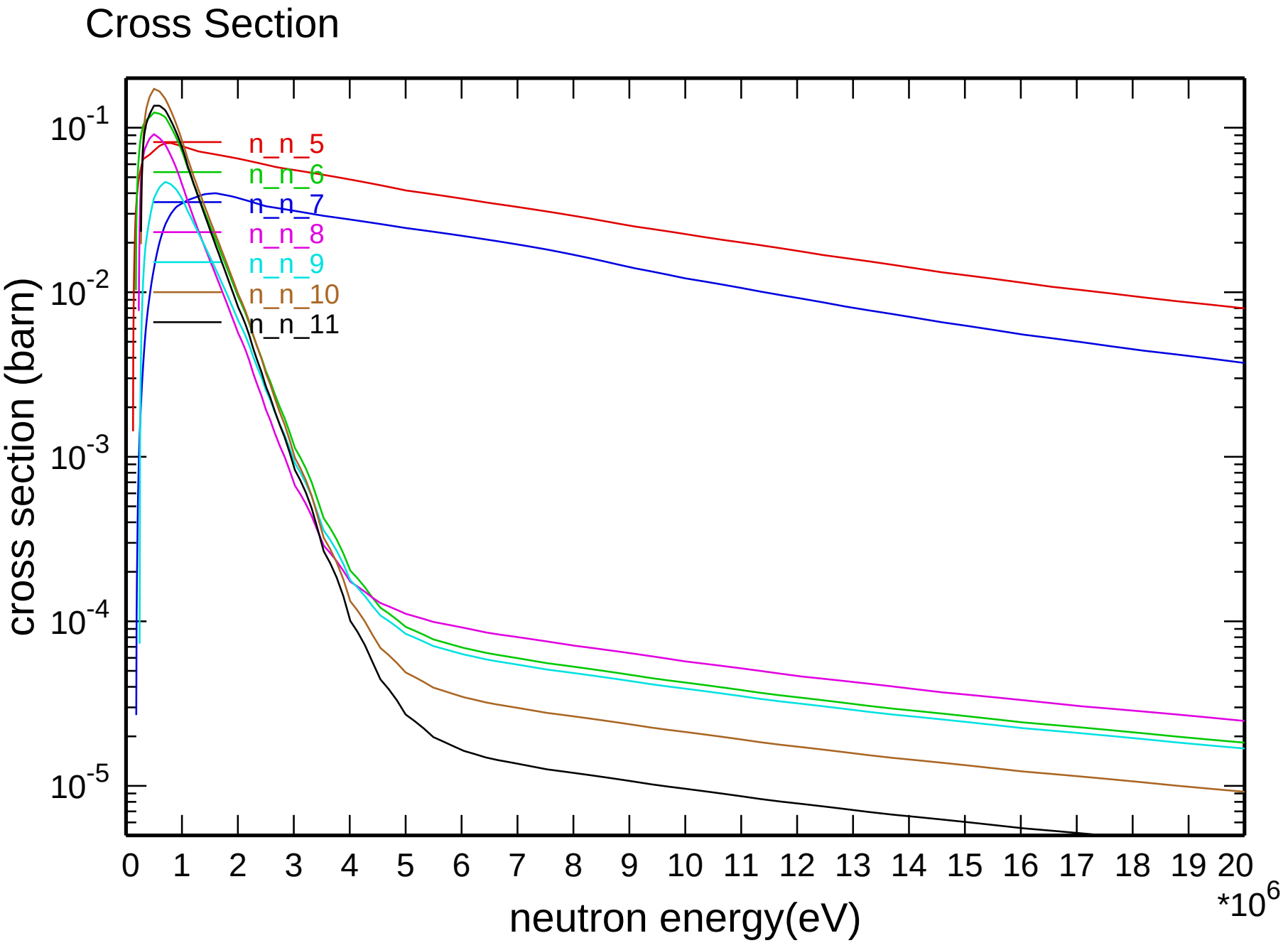
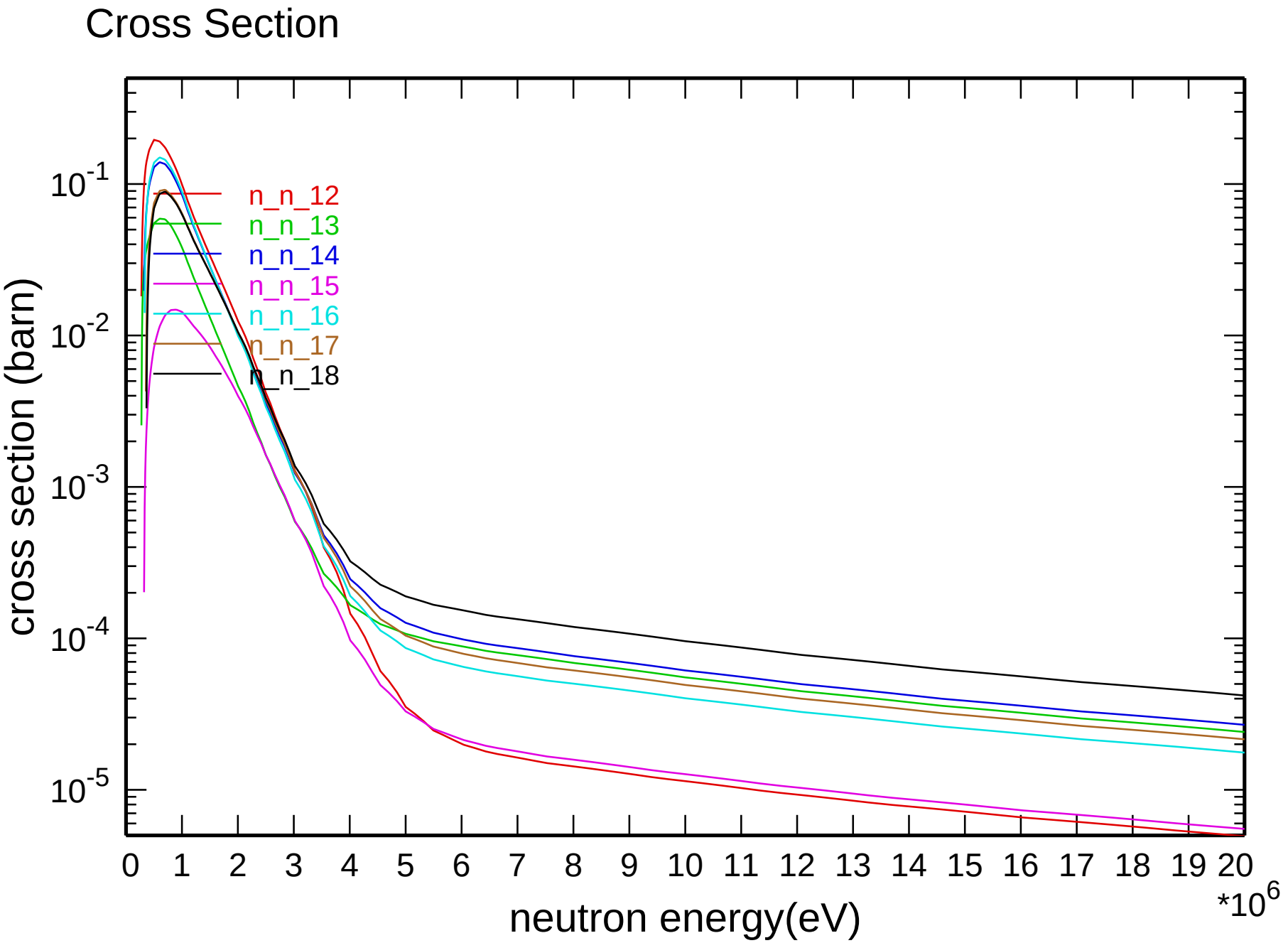
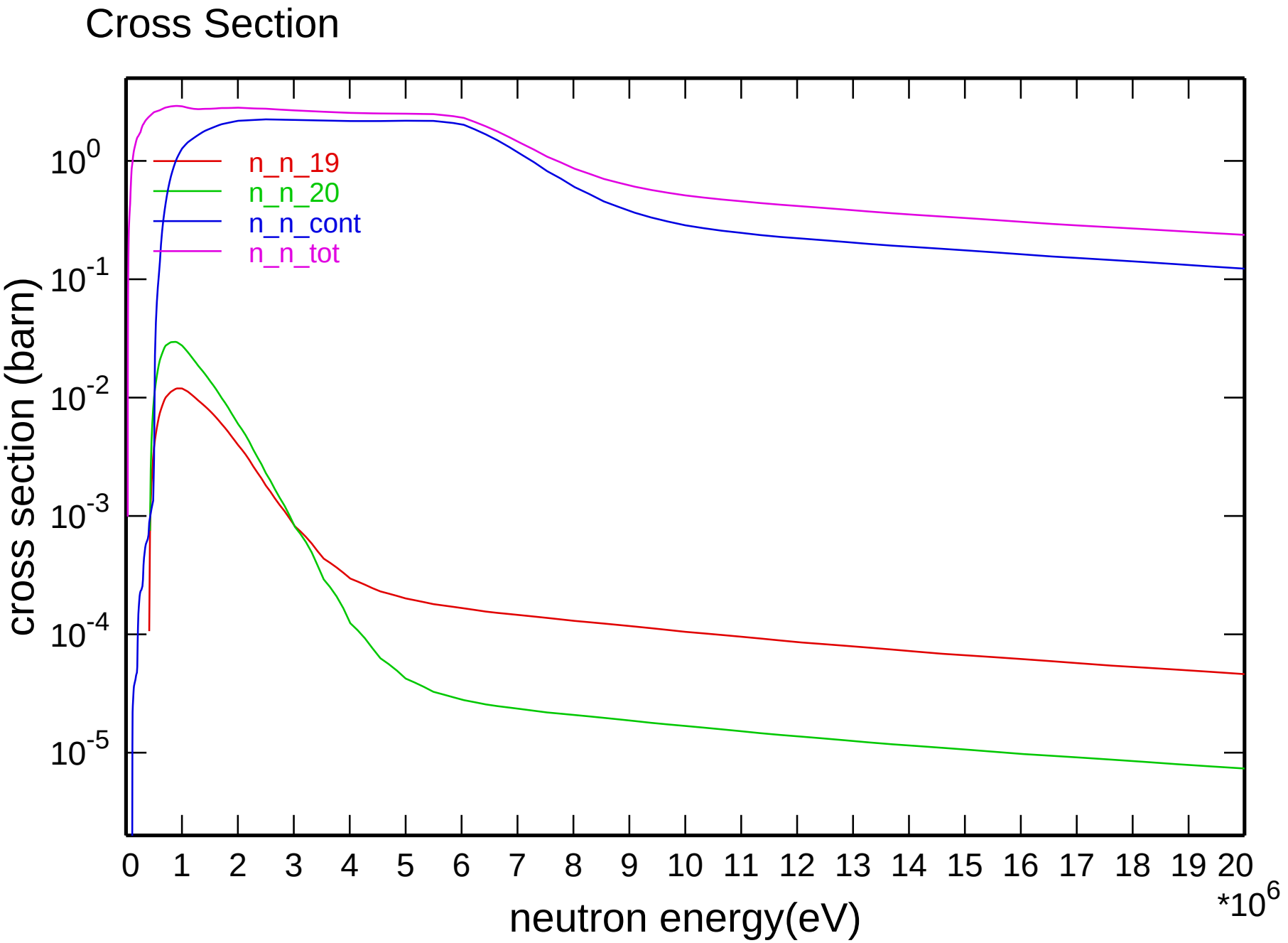
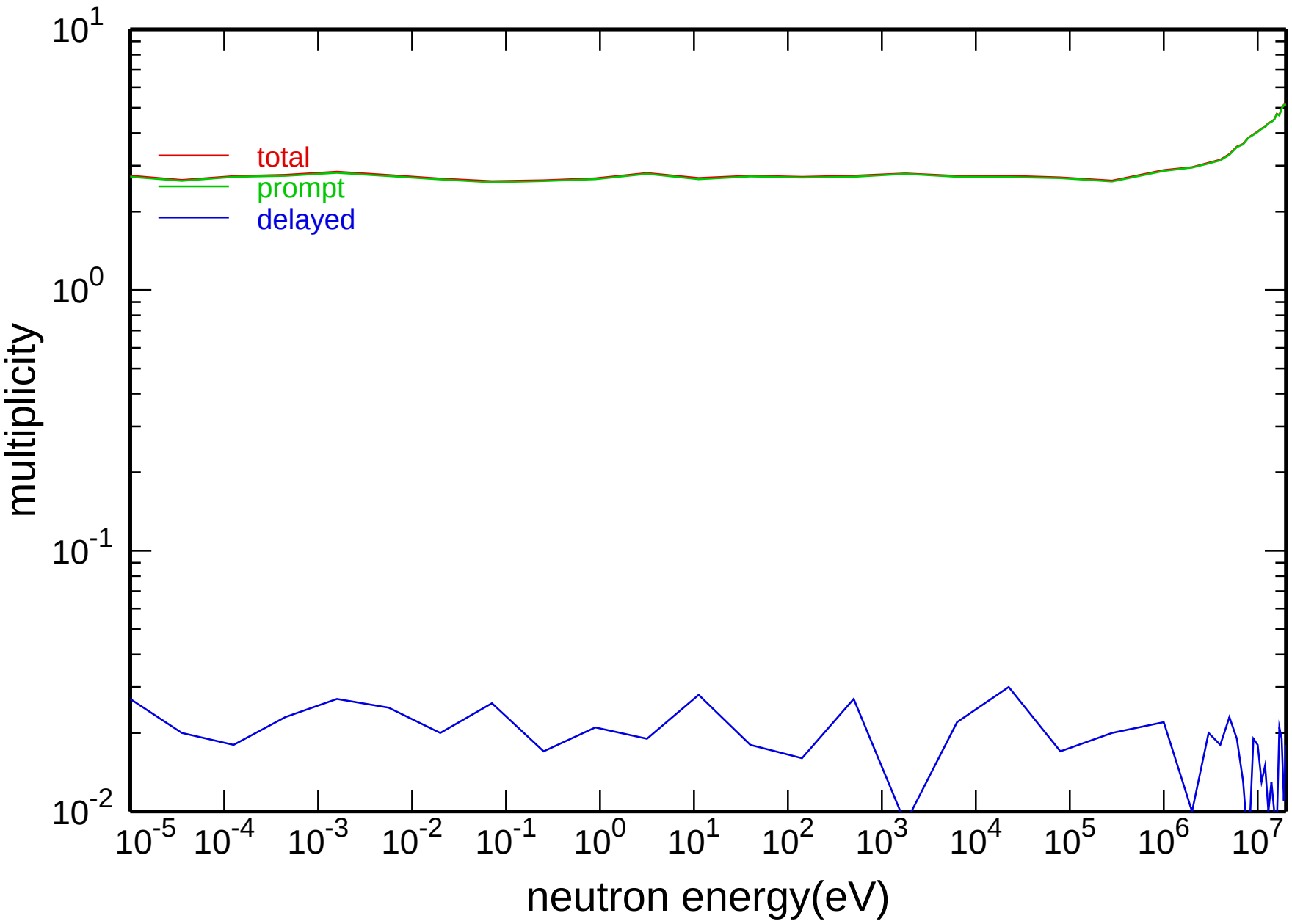

Main Cross Sections
Elastic
Capture
Fission
Inelastic
cross section (barn)
neutron energy(eV)
10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-5 10^-4 10^-3 10^-2 10^-1 10^0 10^1 10^2 10^3 10^4 10^5 10^6 10^7

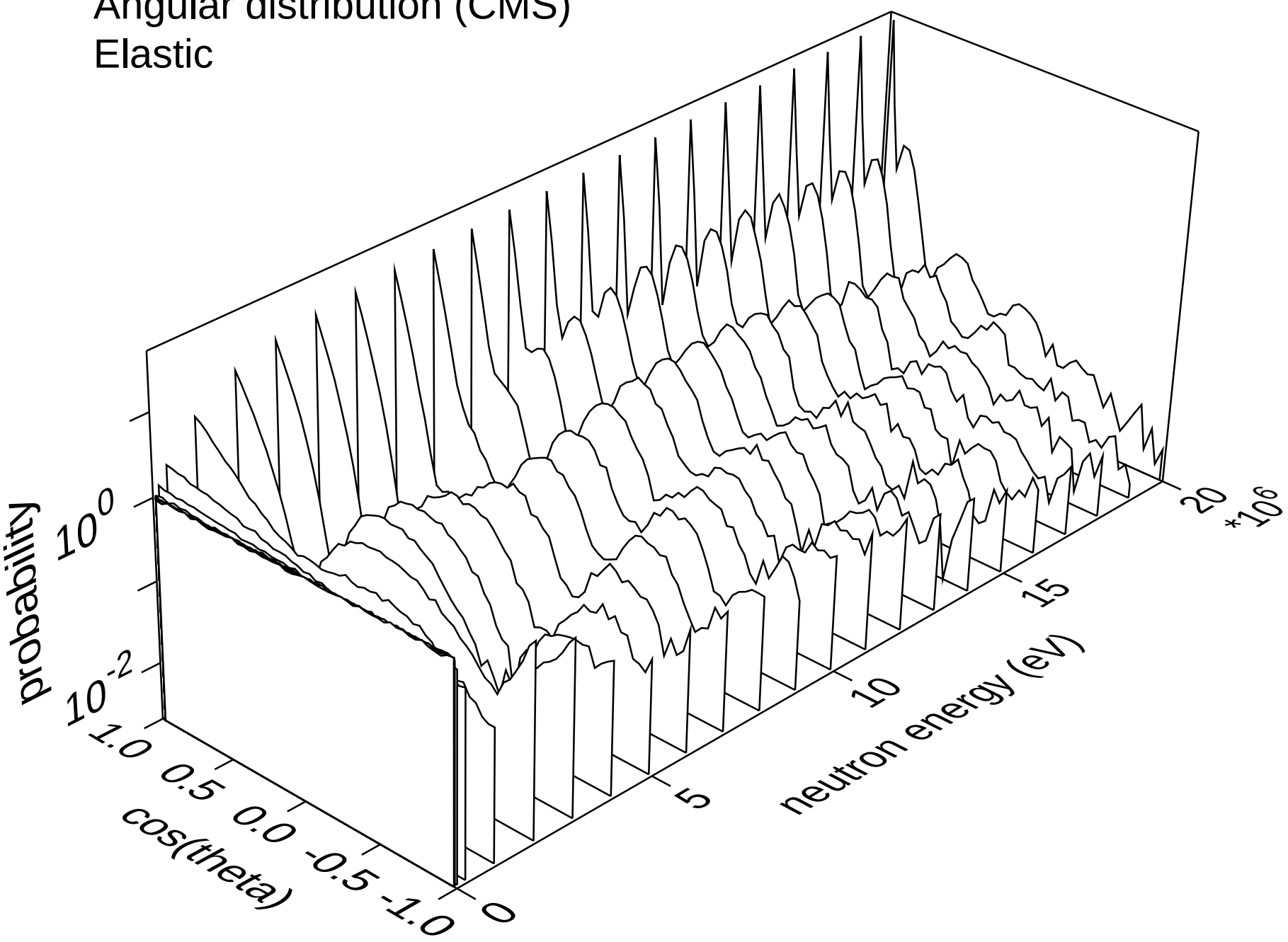

Cross Section
cross section (barn)
neutron energy(eV)
*10^6
n_2n
n_3n
n_4n
n_n_1
n_n_2
n_n_3
n_n_4
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

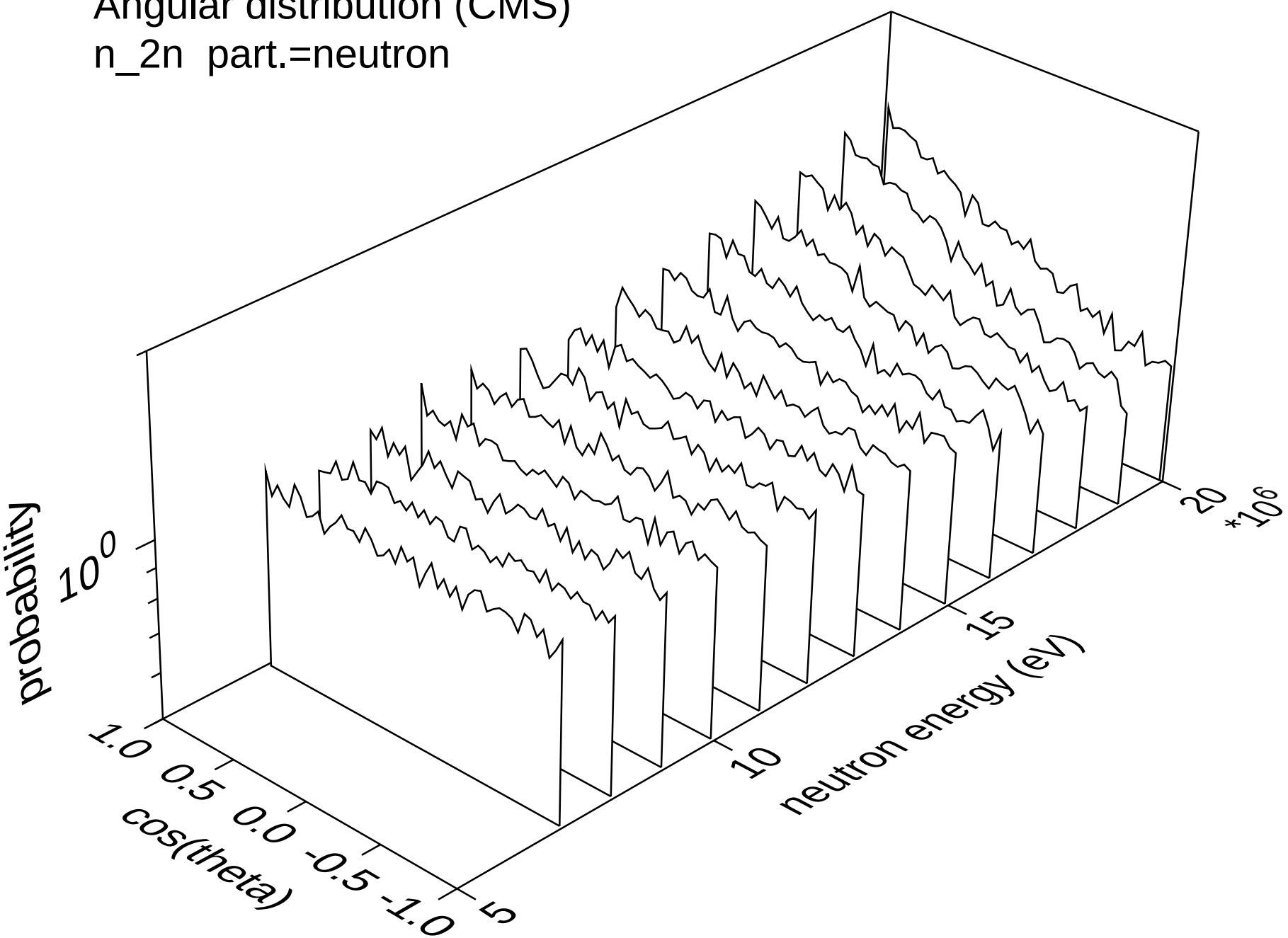

Cross Section
cross section (barn)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
n_n_5
n_n_6
n_n_7
n_n_8
n_n_9
n_n_10
n_n_11
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^{6}
neutron energy(eV)

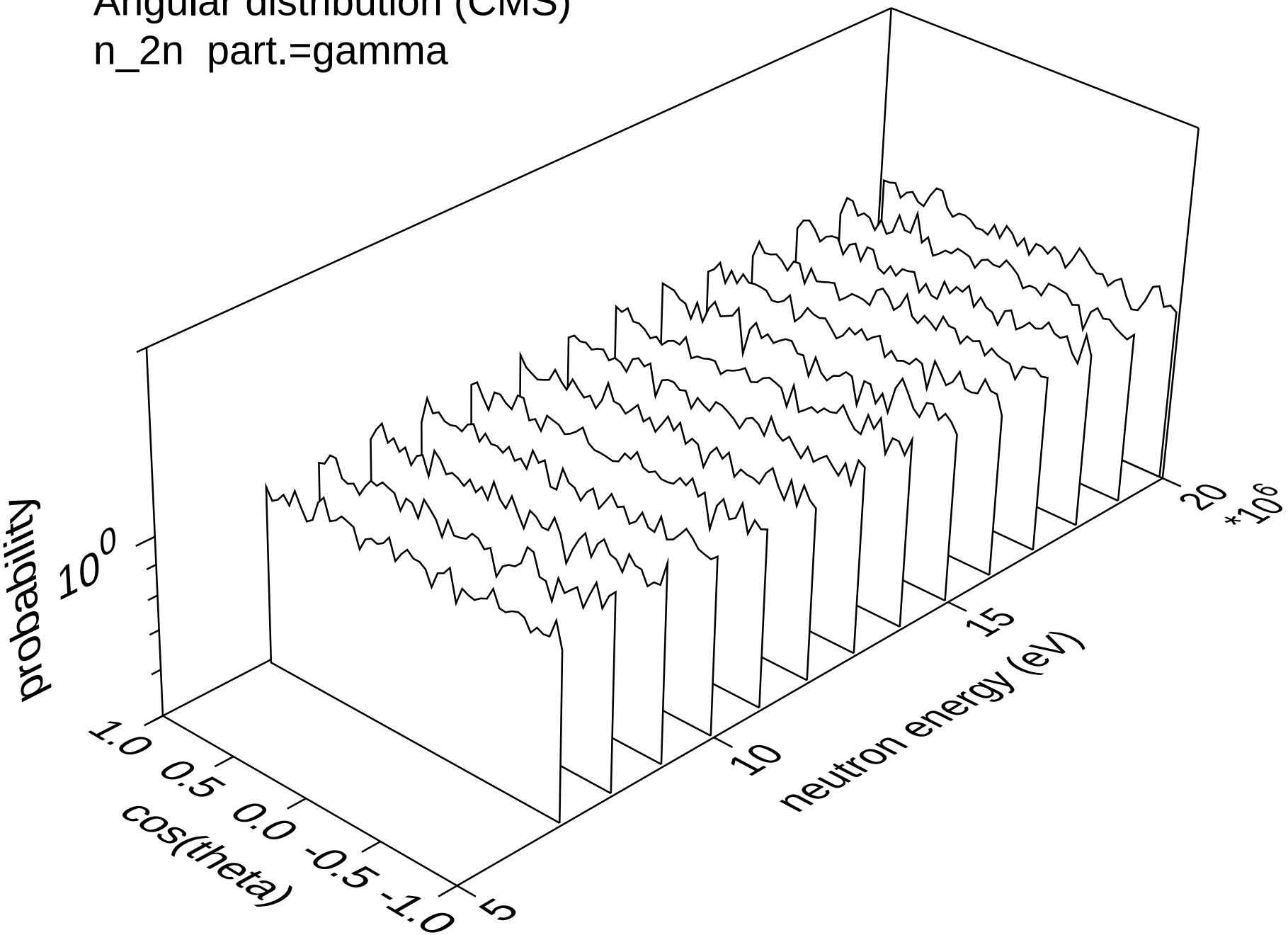

Cross Section
cross section (barn)
10-1
10-2
10-3
10-4
10-5
n_n_12
n_n_13
n_n_14
n_n_15
n_n_16
n_n_17
n_n_18
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^6
neutron energy(eV)

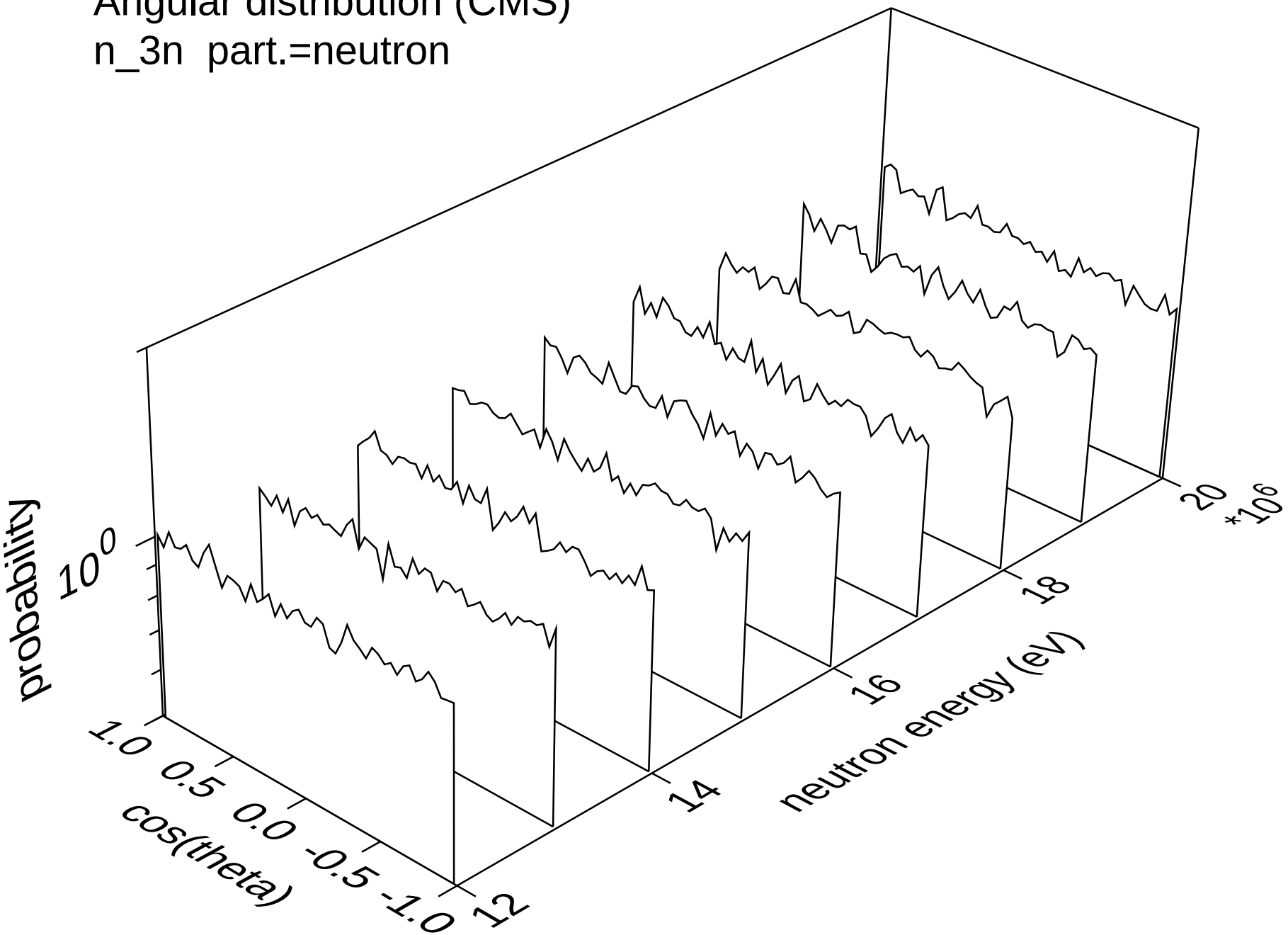

Cross Section
n_n_19
n_n_20
n_n_cont
n_n_tot
cross section (barn)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
*10^{6}
neutron energy(eV)

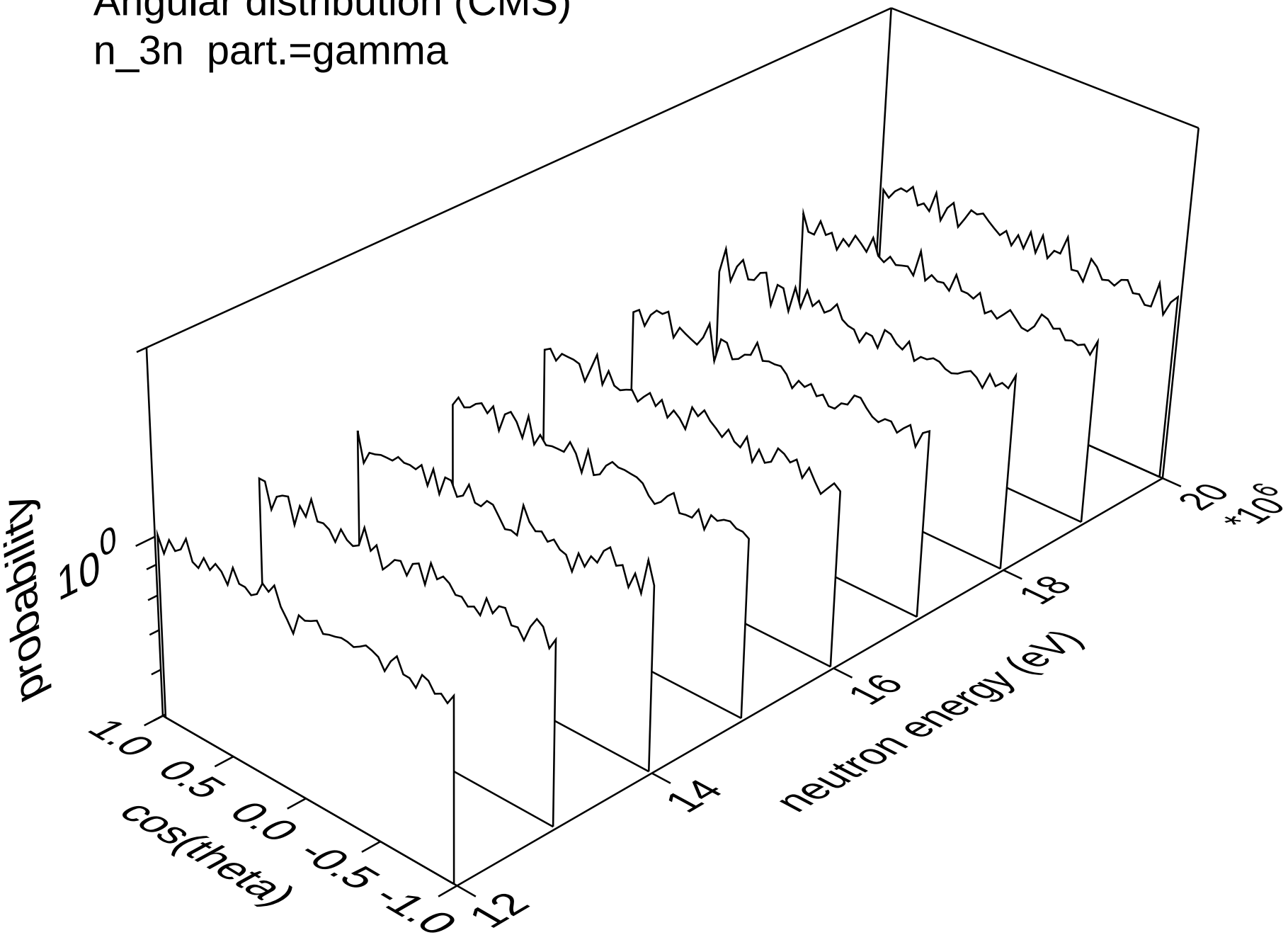

neutron multiplicity for fission
total
prompt
delayed
multiplicity
neutron energy(eV)
10^1
10^0
10^-1
10^-2
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1
10^2
10^3
10^4
10^5
10^6
10^7

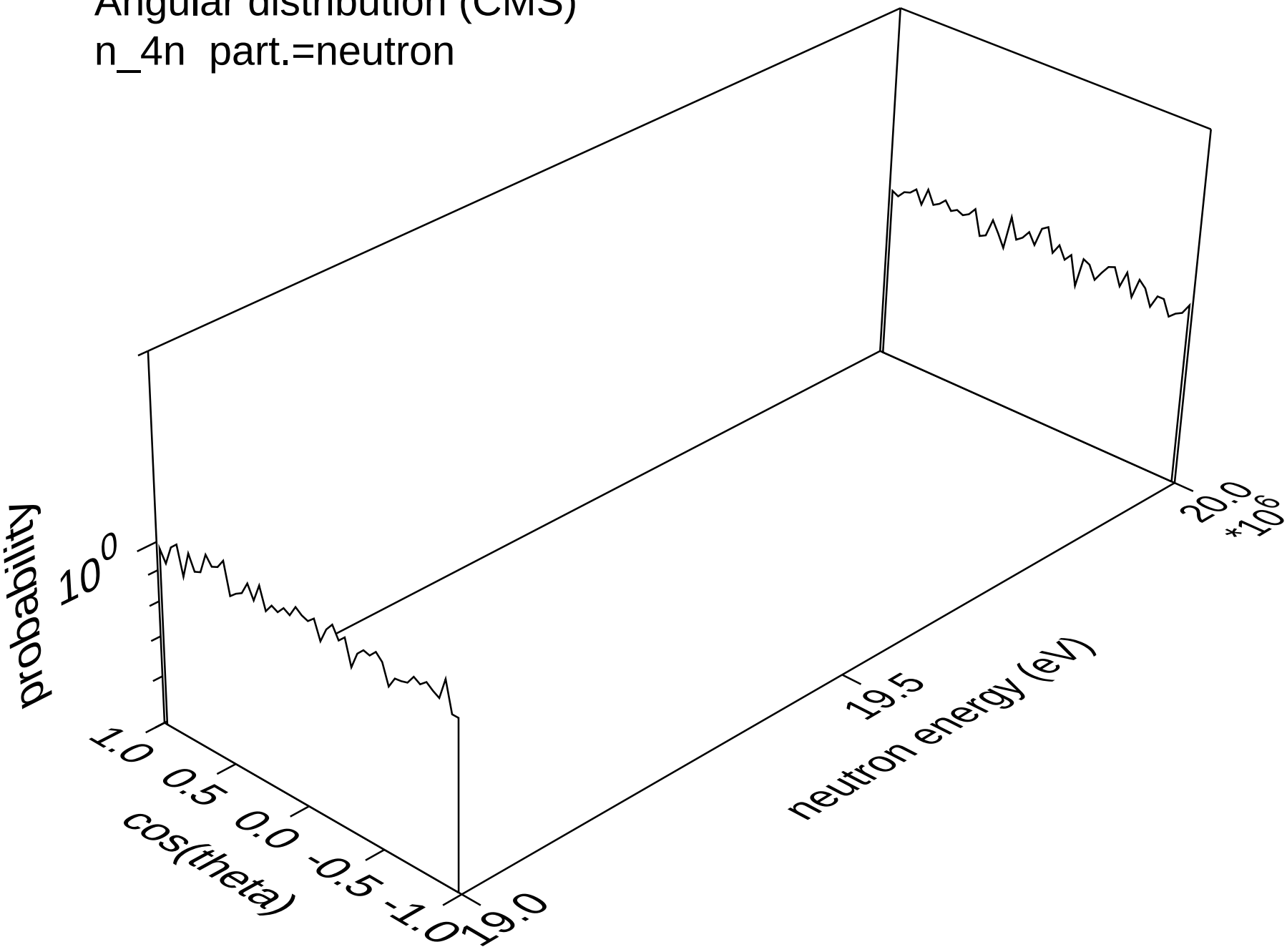

Angular distribution (CMS)
Elastic
probability
10^{0}
10^{-2}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

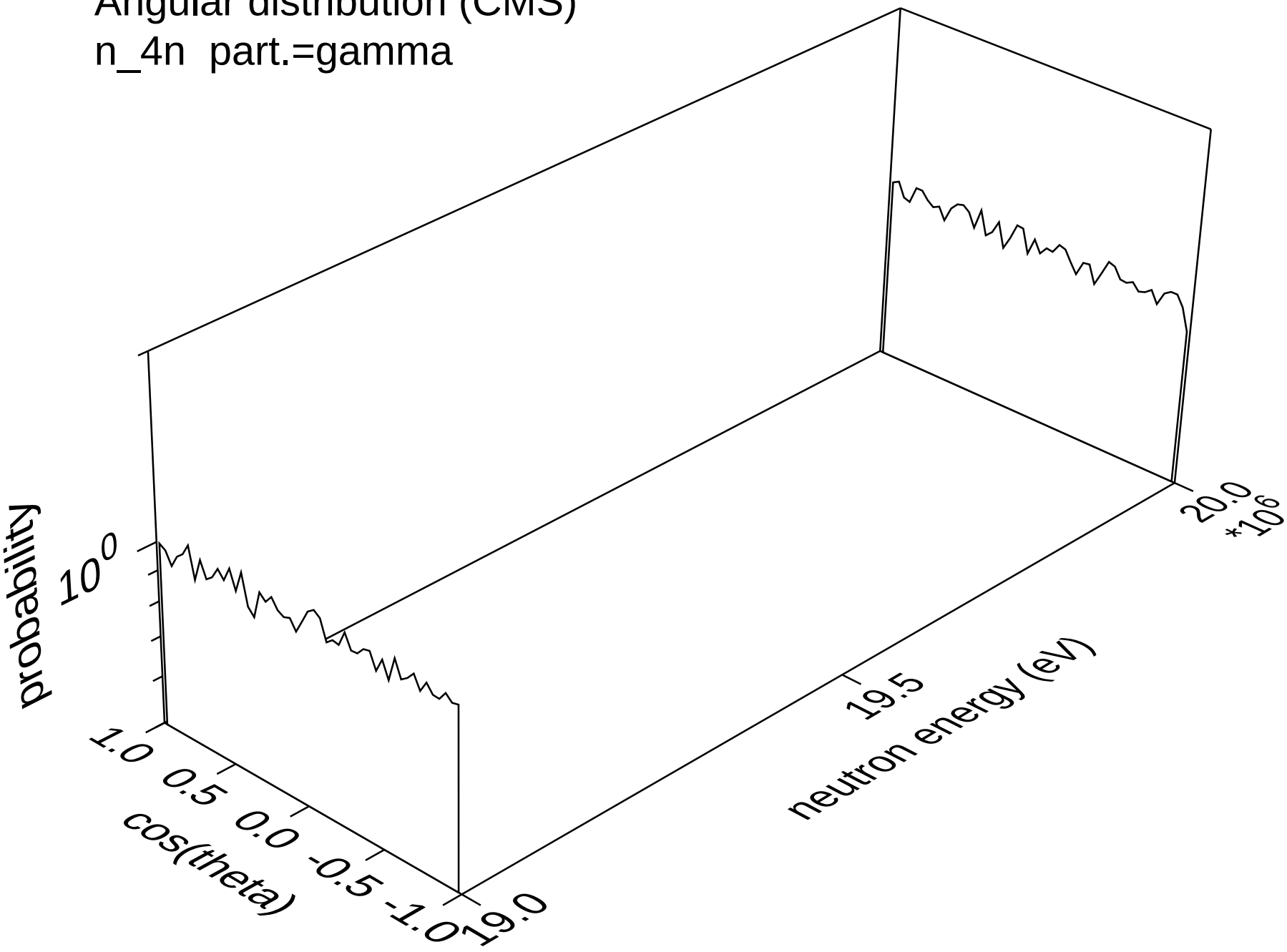

Angular distribution (CMS)
n_2n part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
5
10
15
20
*10^6
neutron energy (eV)

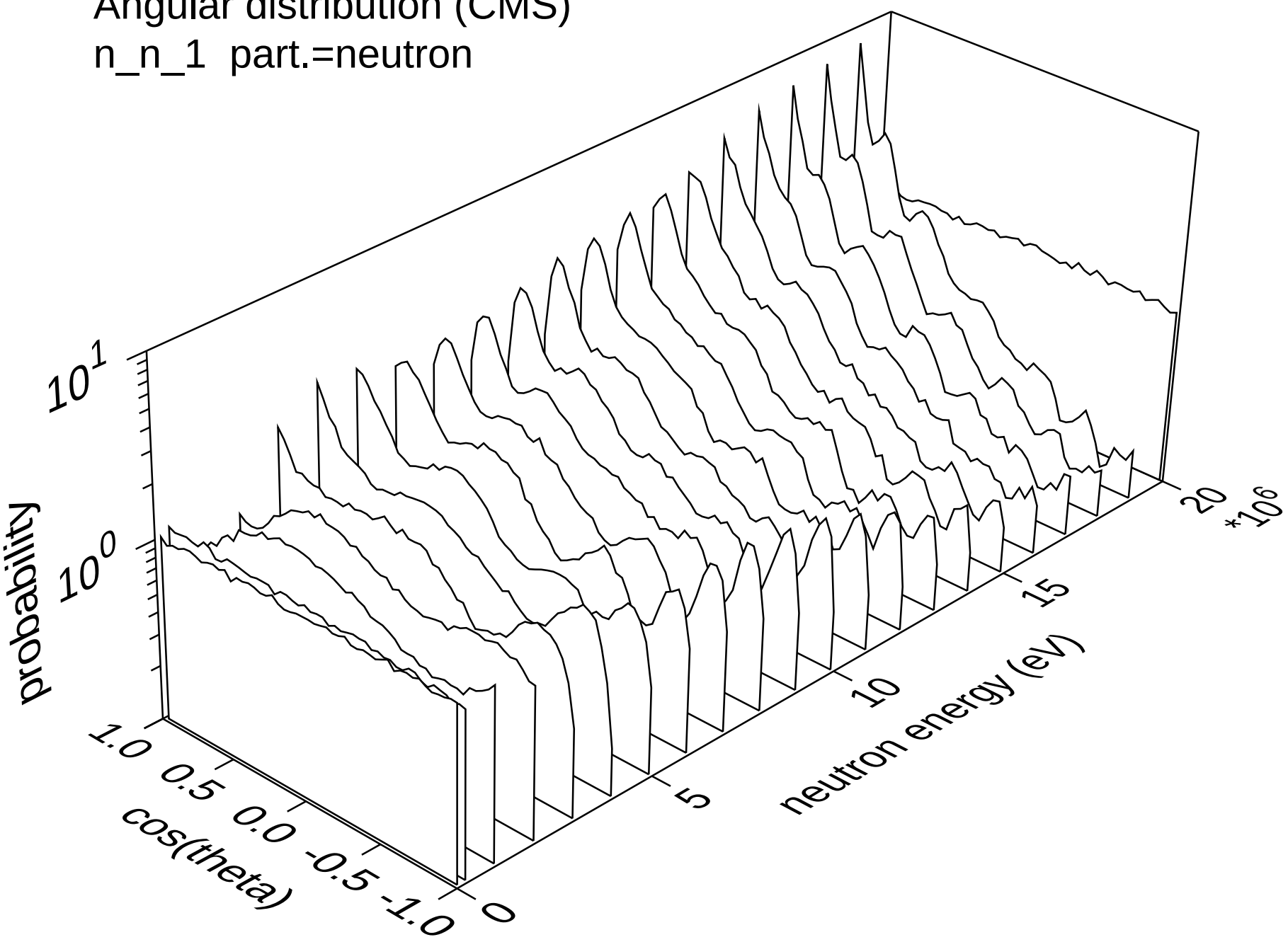

Angular distribution (CMS)
n_2n part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
5
10
15
20
*10^6
neutron energy (eV)

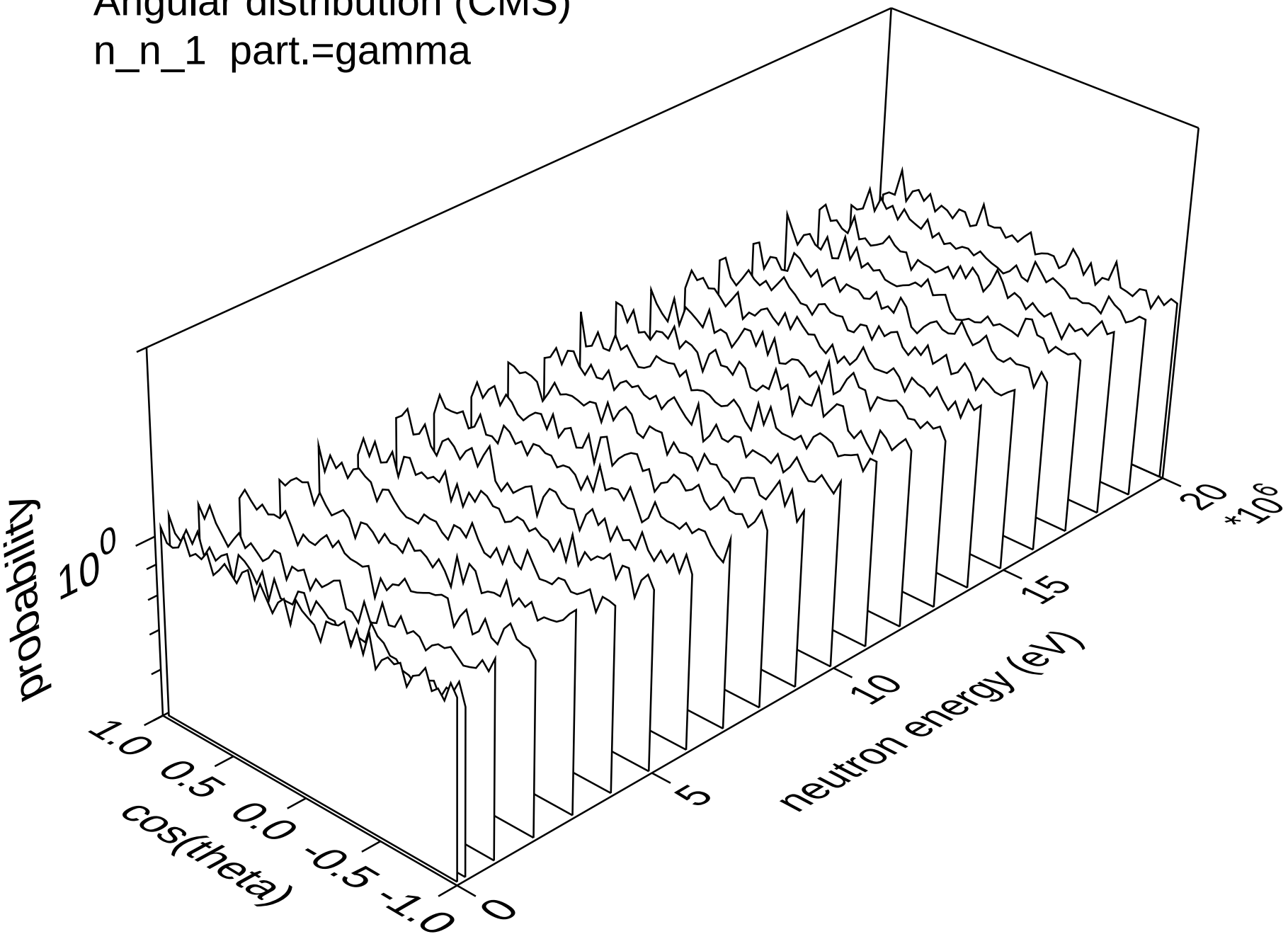

Angular distribution (CMS)
n_3n part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

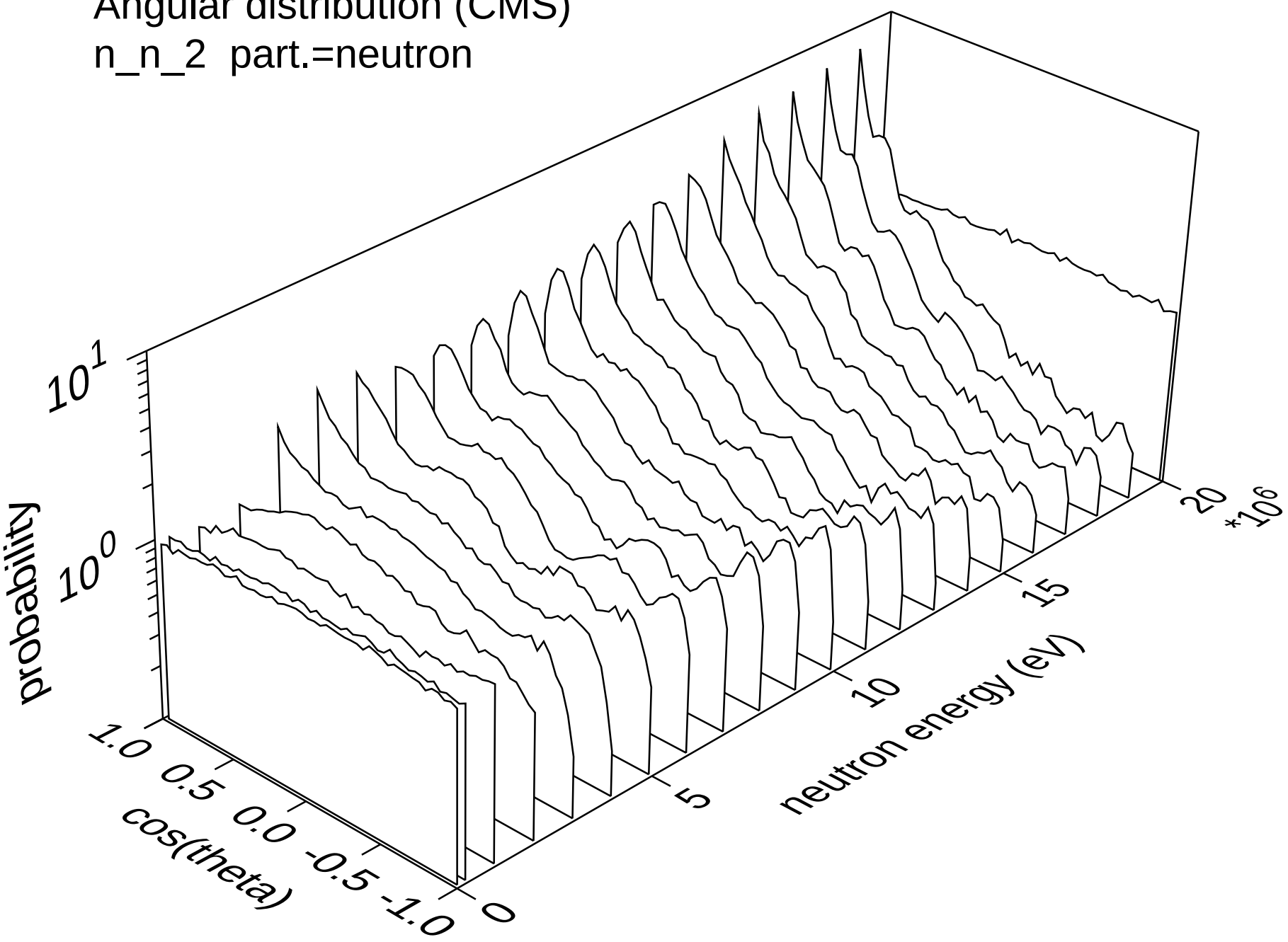

Angular distribution (CMS)
n_3n part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
12
14
16
18
20
*10^6
neutron energy (eV)

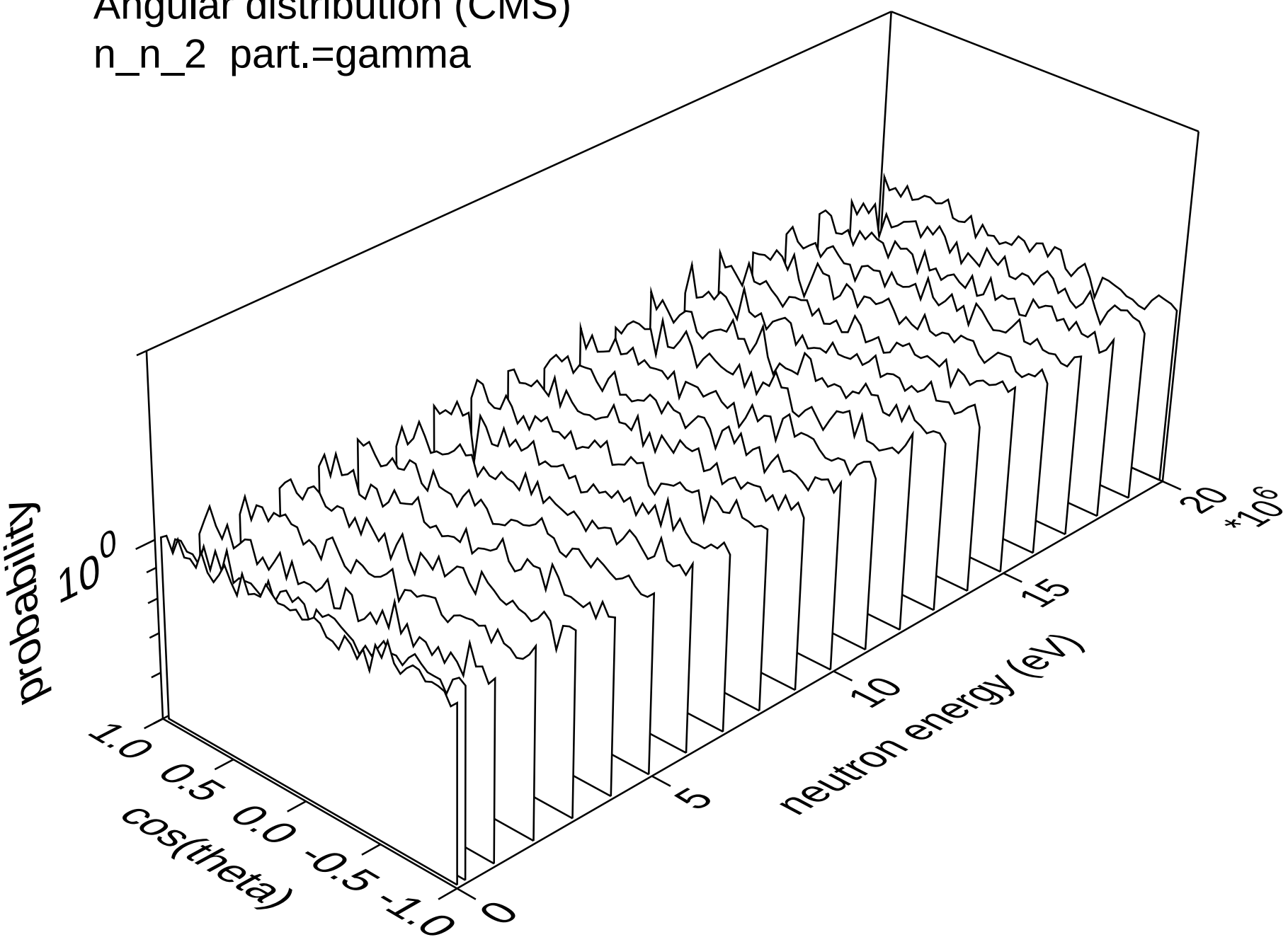

Angular distribution (CMS)
n_4n part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

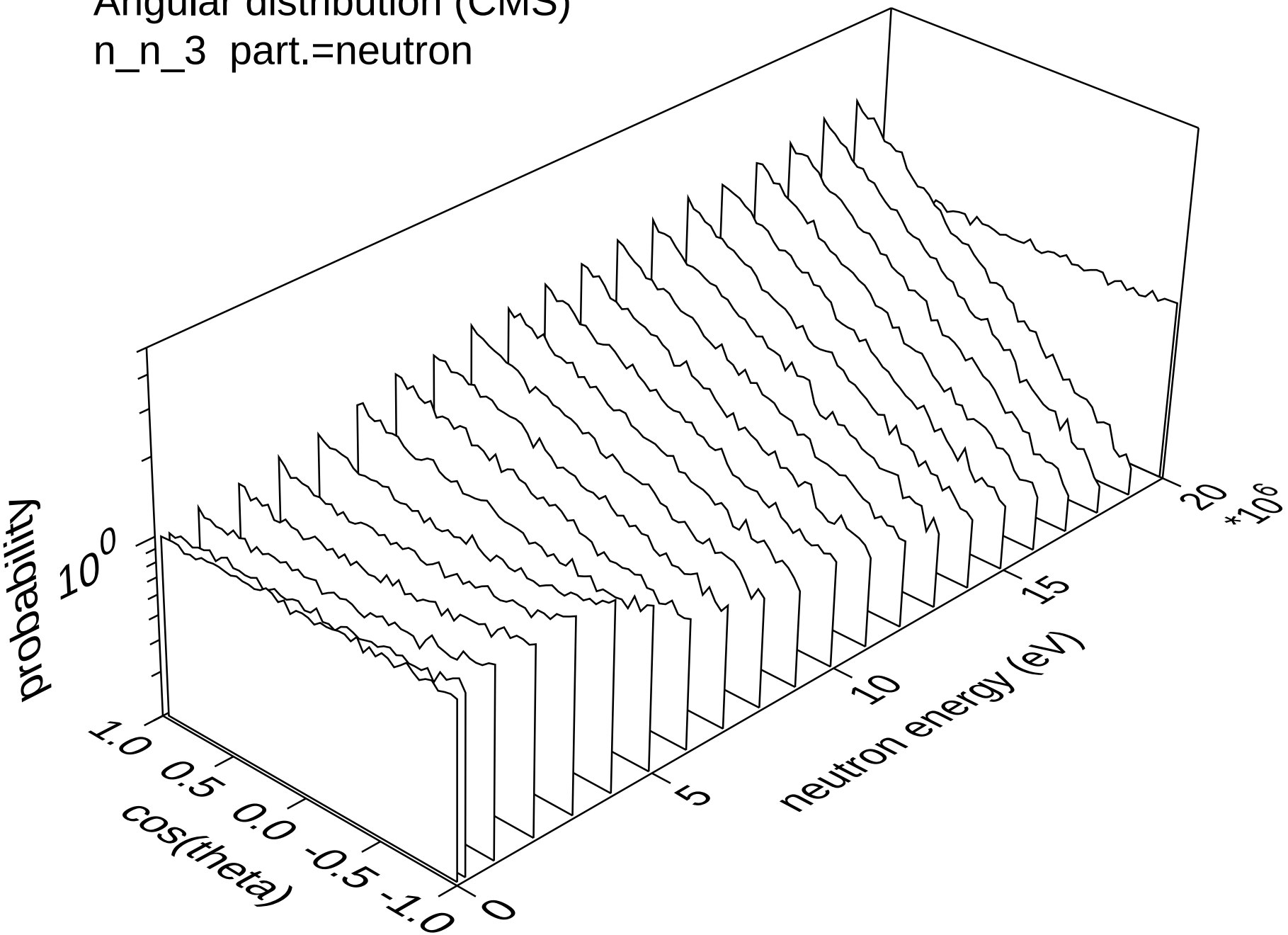

Angular distribution (CMS)
n_4n part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
19.0
19.5
20.0
*10^6
neutron energy (eV)

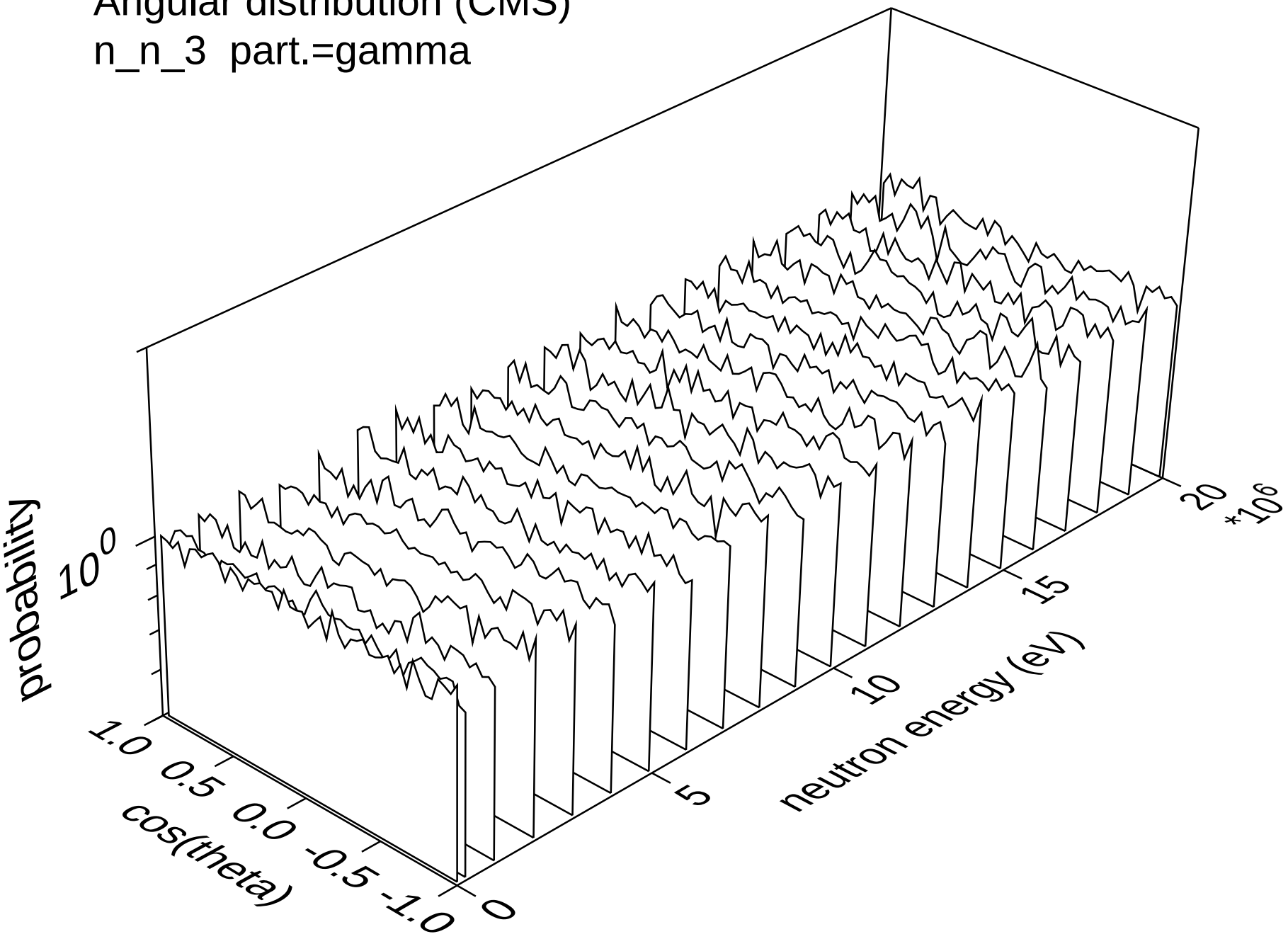

Angular distribution (CMS)
n_n_1 part.=neutron
probability
10^1
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

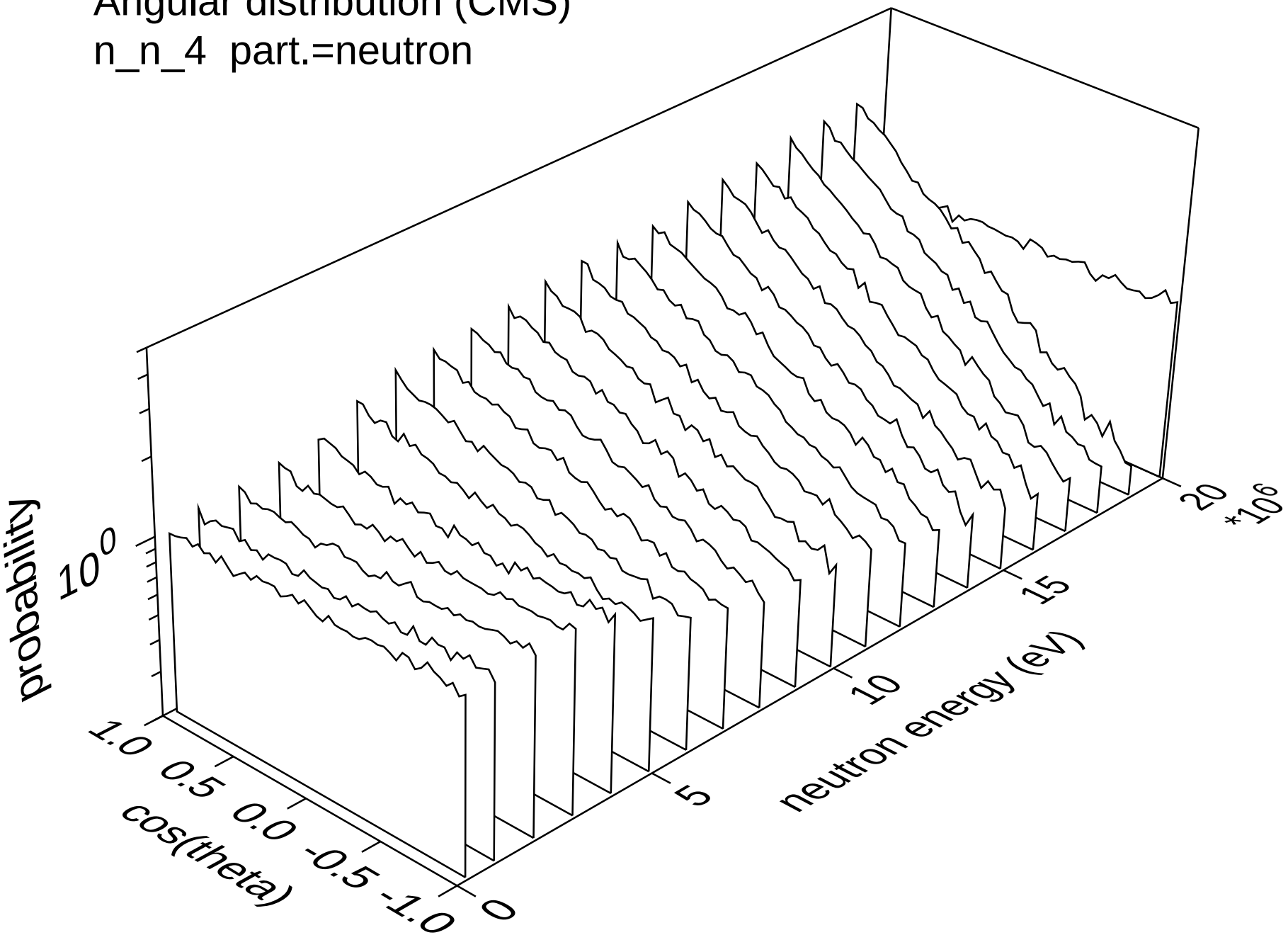

Angular distribution (CMS)
n_n_1 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

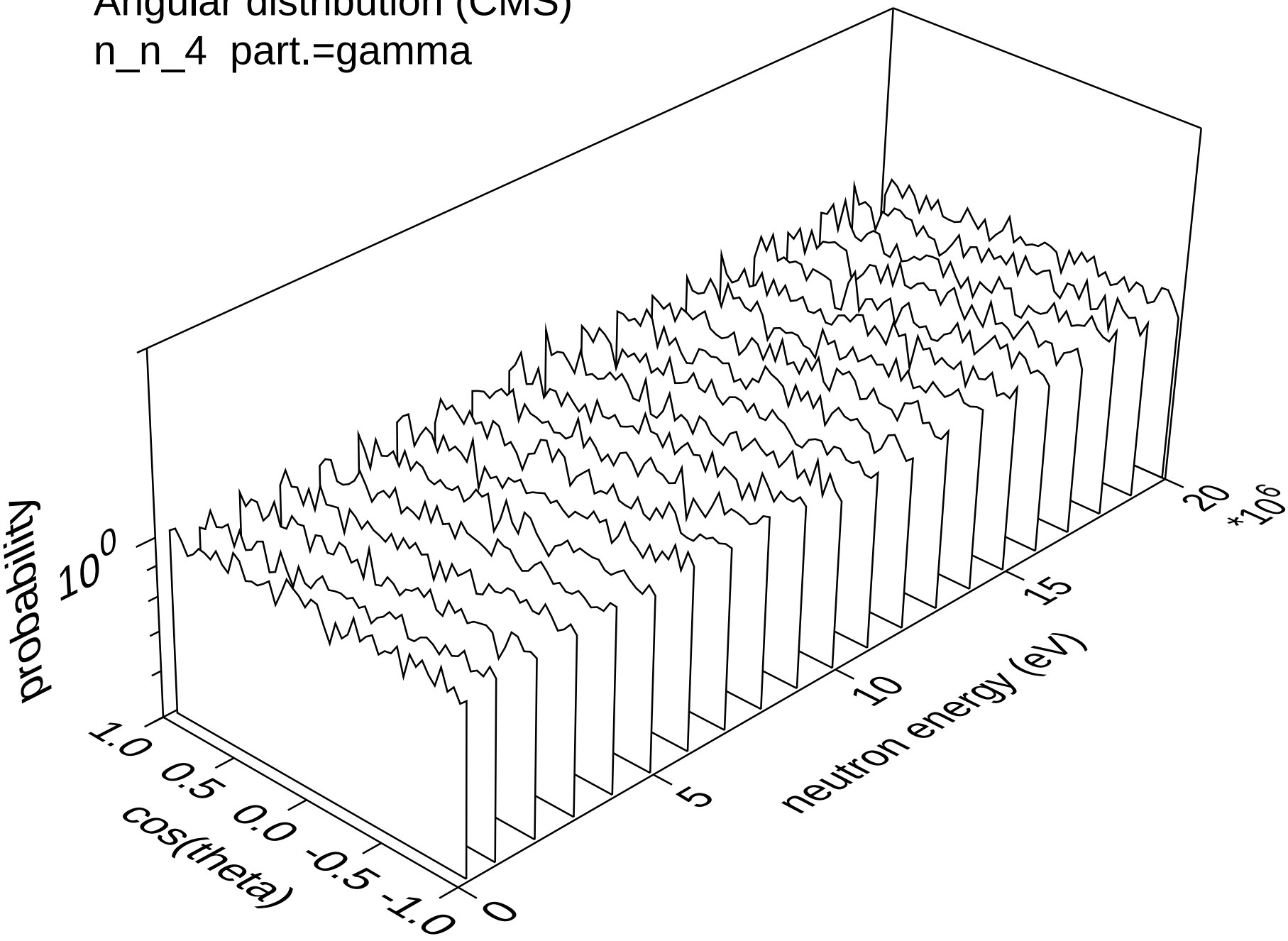

Angular distribution (CMS)
n_n_2 part.=neutron
probability
10^1
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

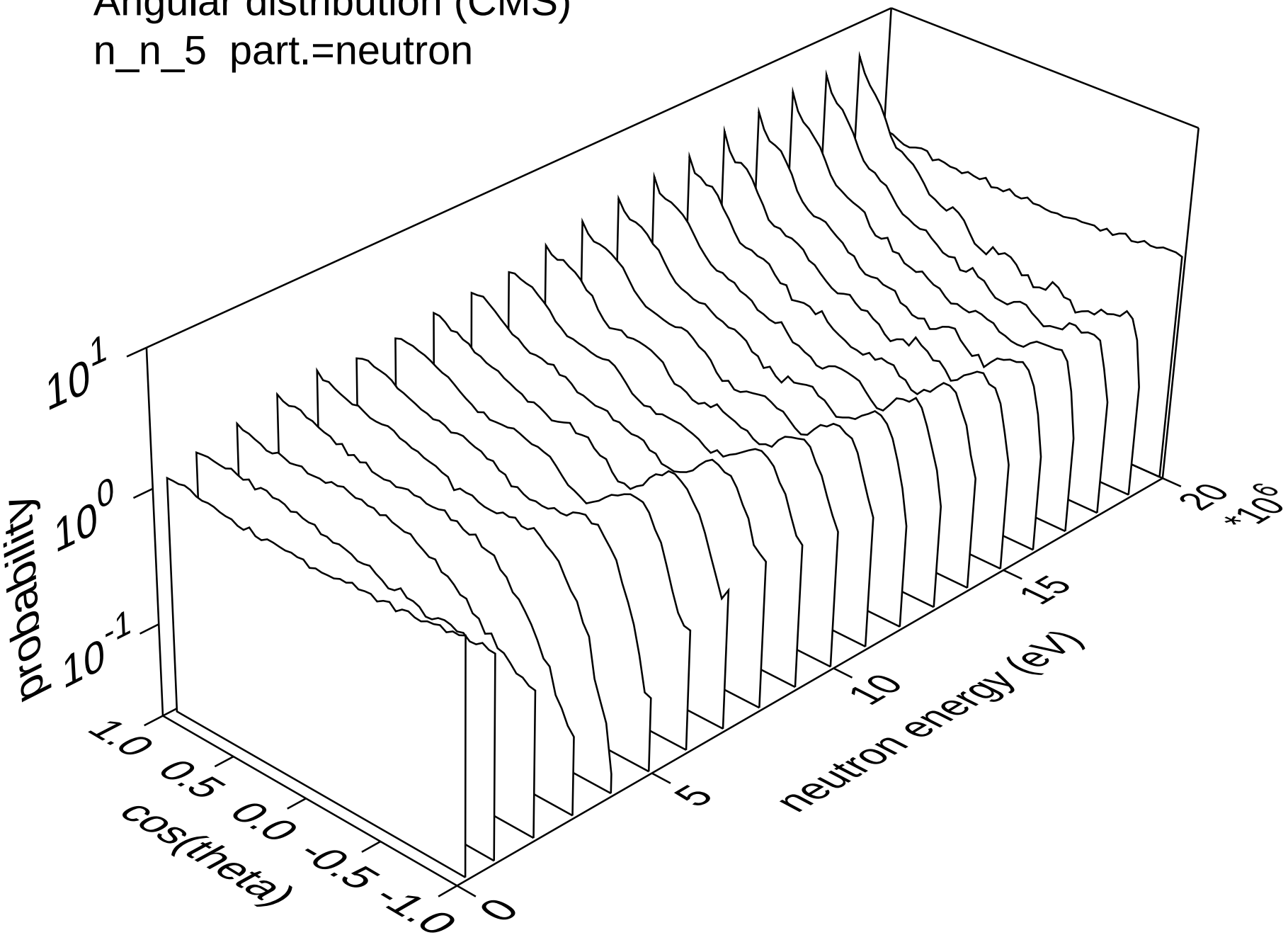

Angular distribution (CMS)
n_n_2 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

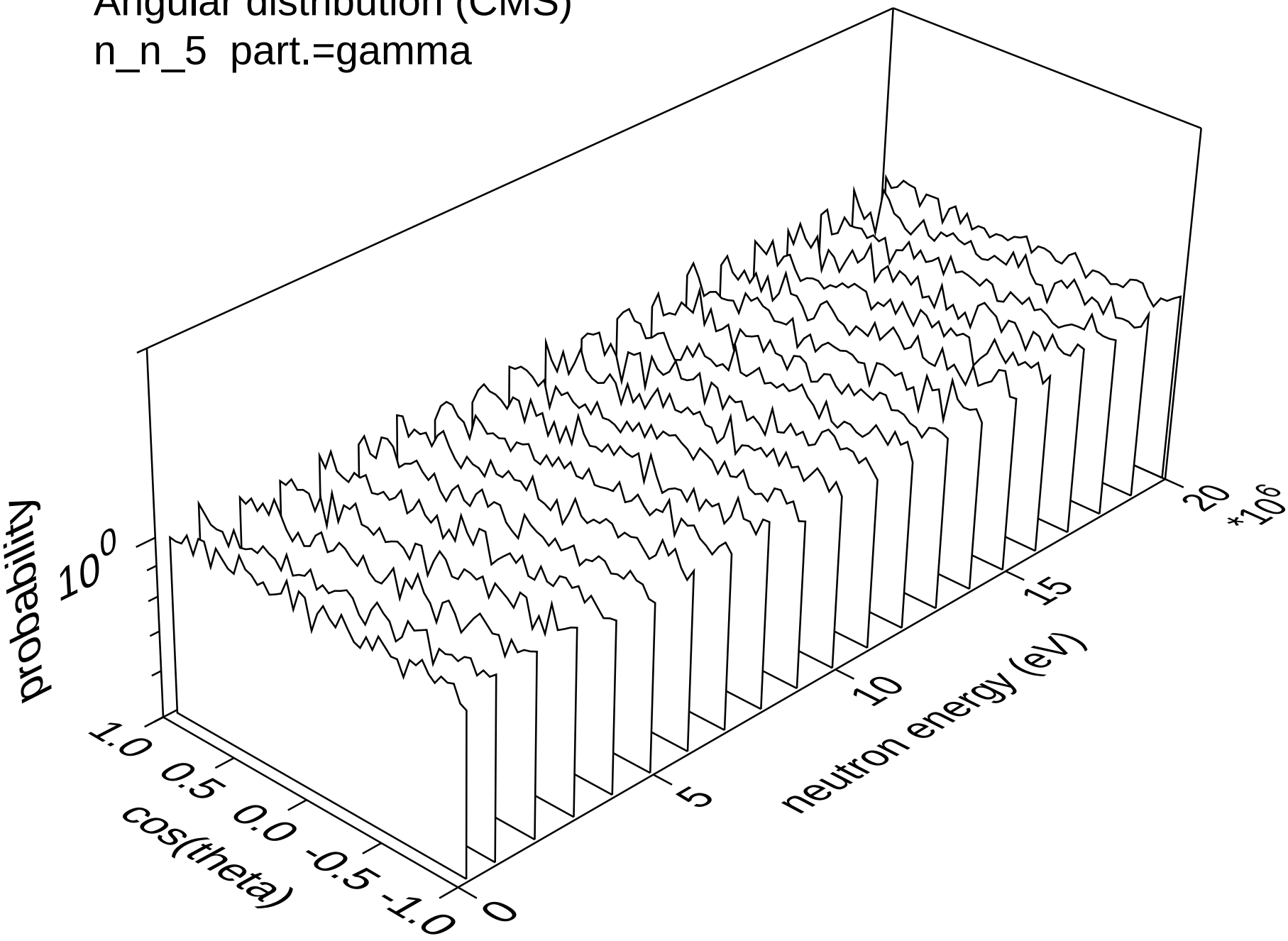

Angular distribution (CMS)
n_n_3 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

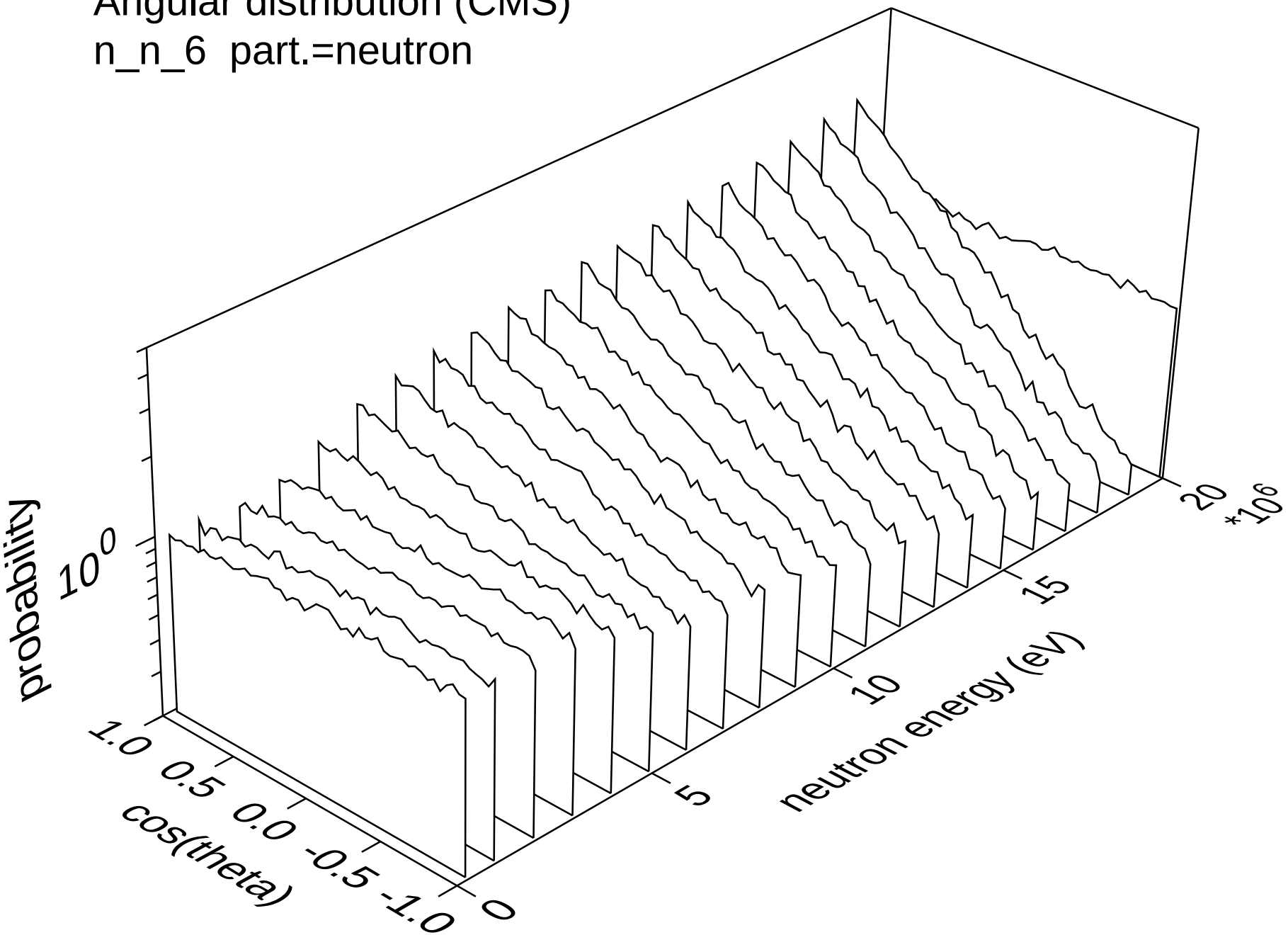

Angular distribution (CMS)
n_n_3 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

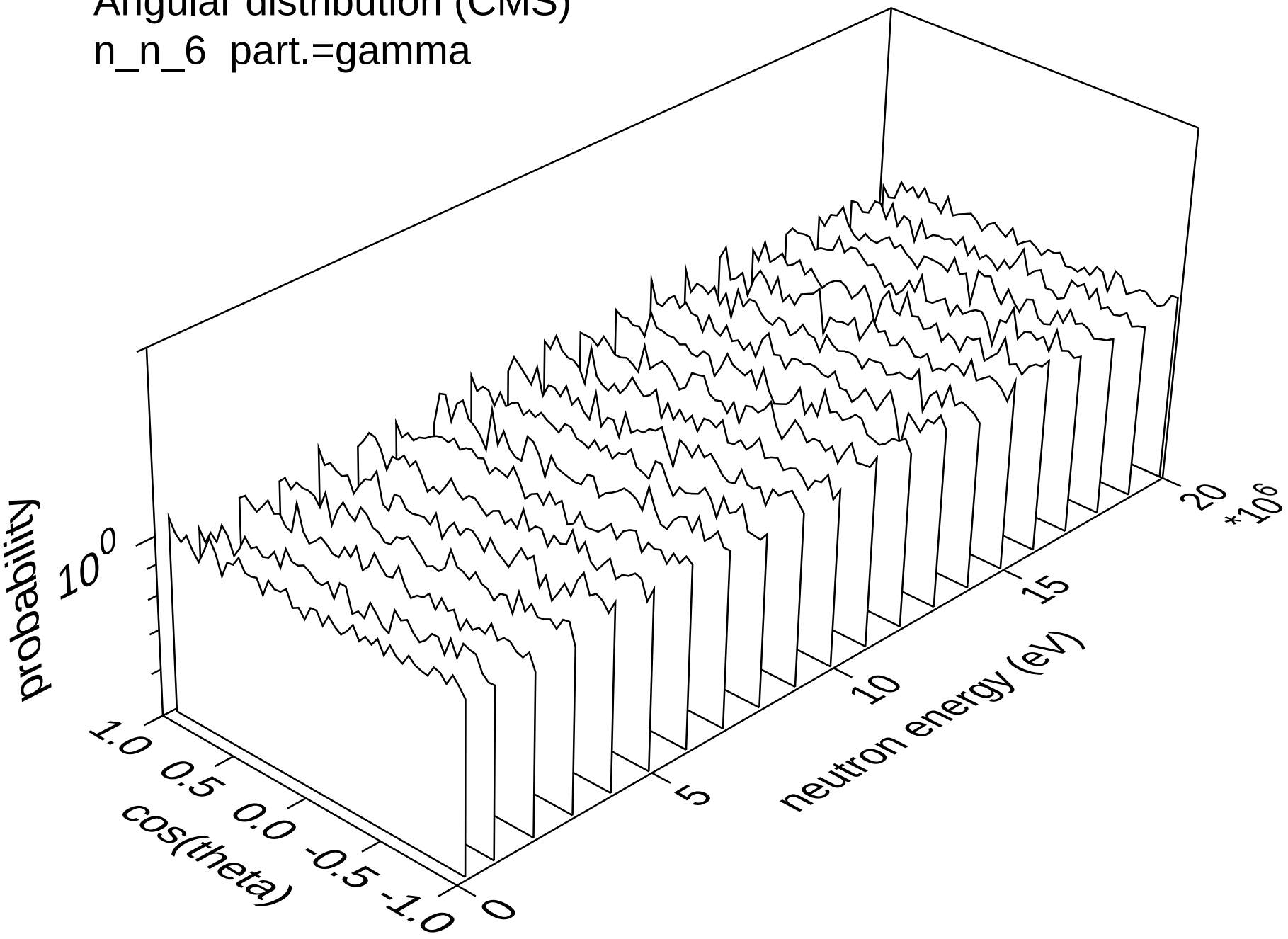

Angular distribution (CMS)
n_n_4 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

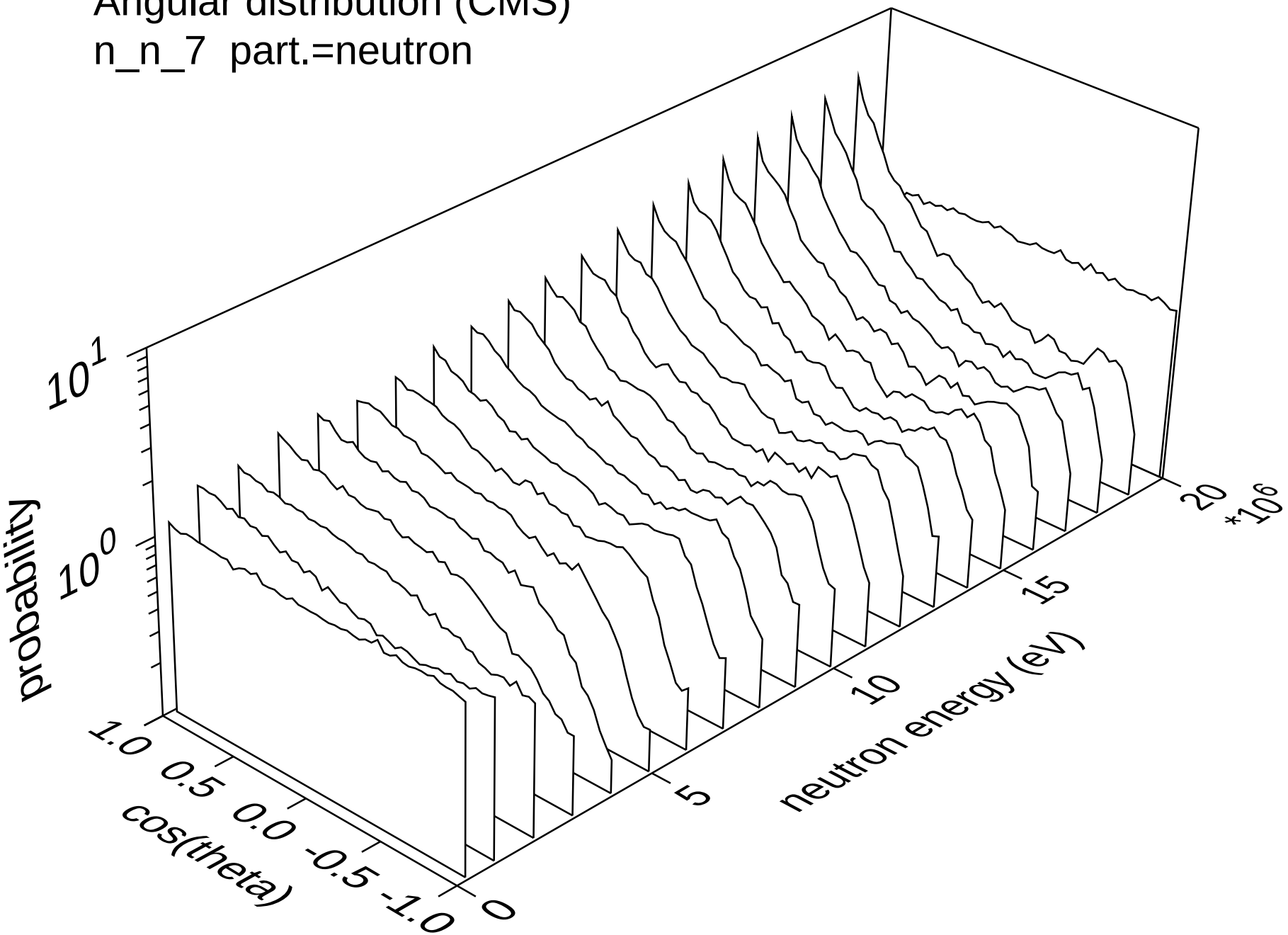

Angular distribution (CMS)
n_n_4 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

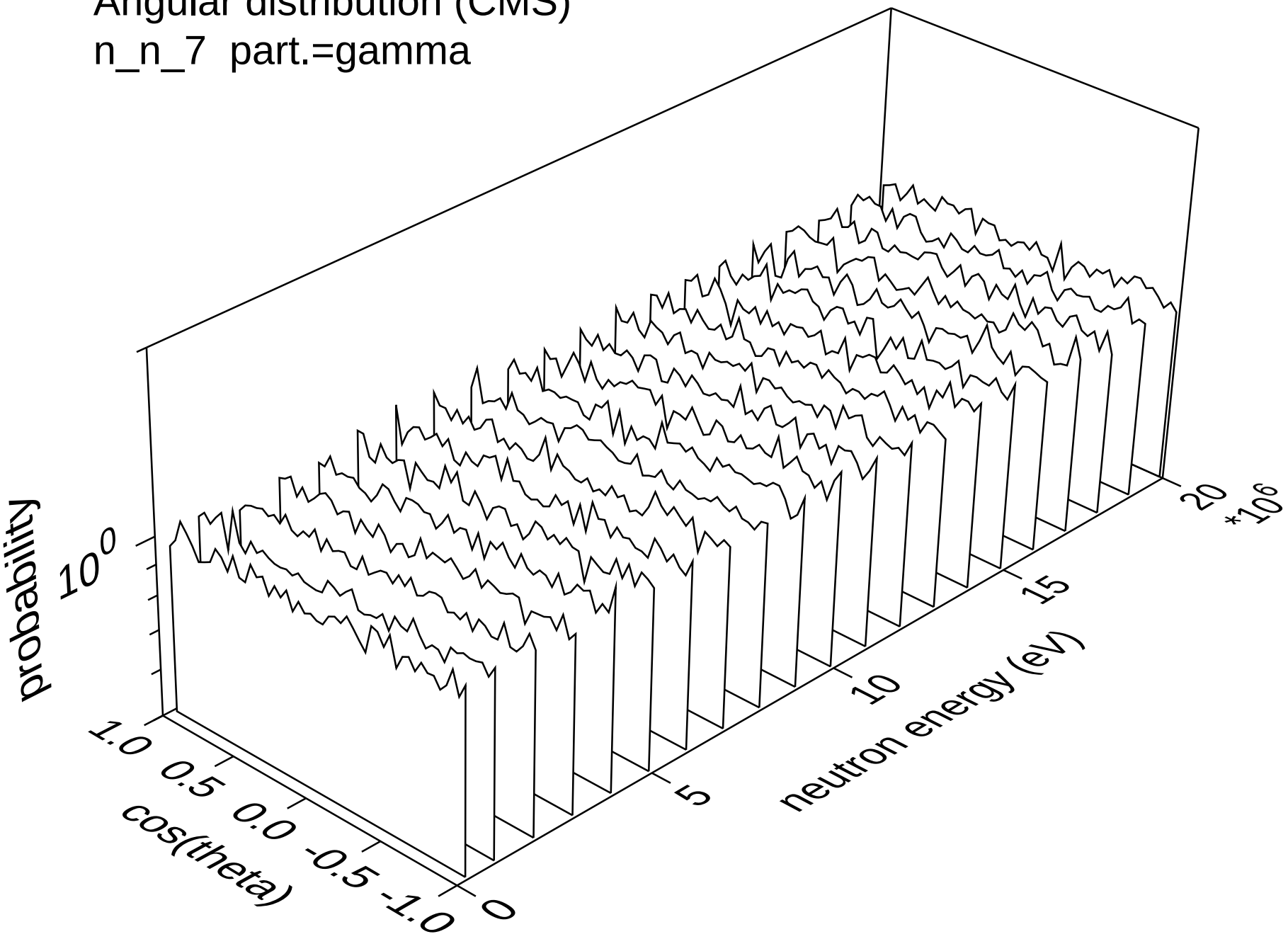

Angular distribution (CMS)
n_n_5 part.=neutron
probability
10^{1}
10^{0}
10^{-1}
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

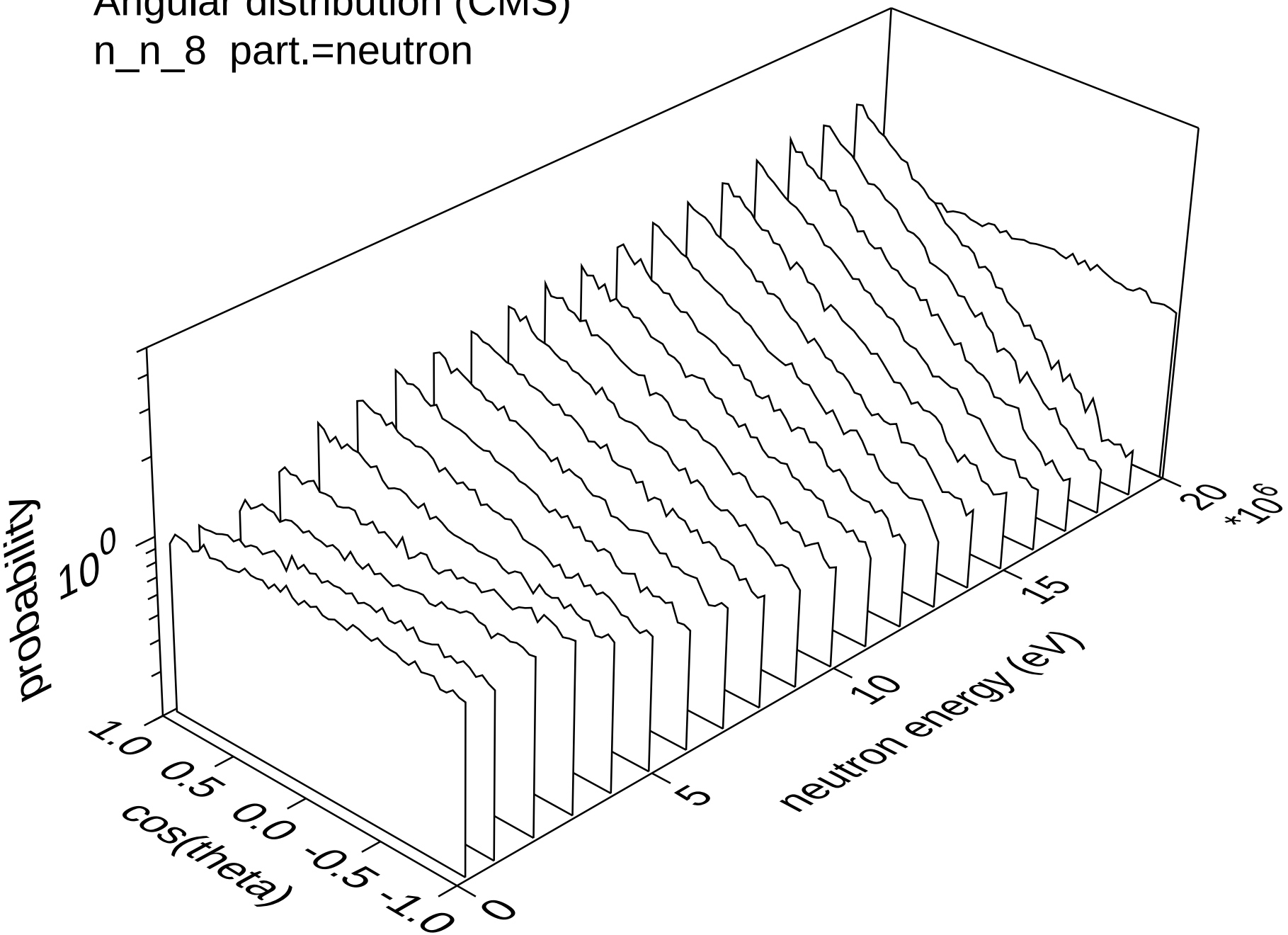

Angular distribution (CMS)
n_n_5 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

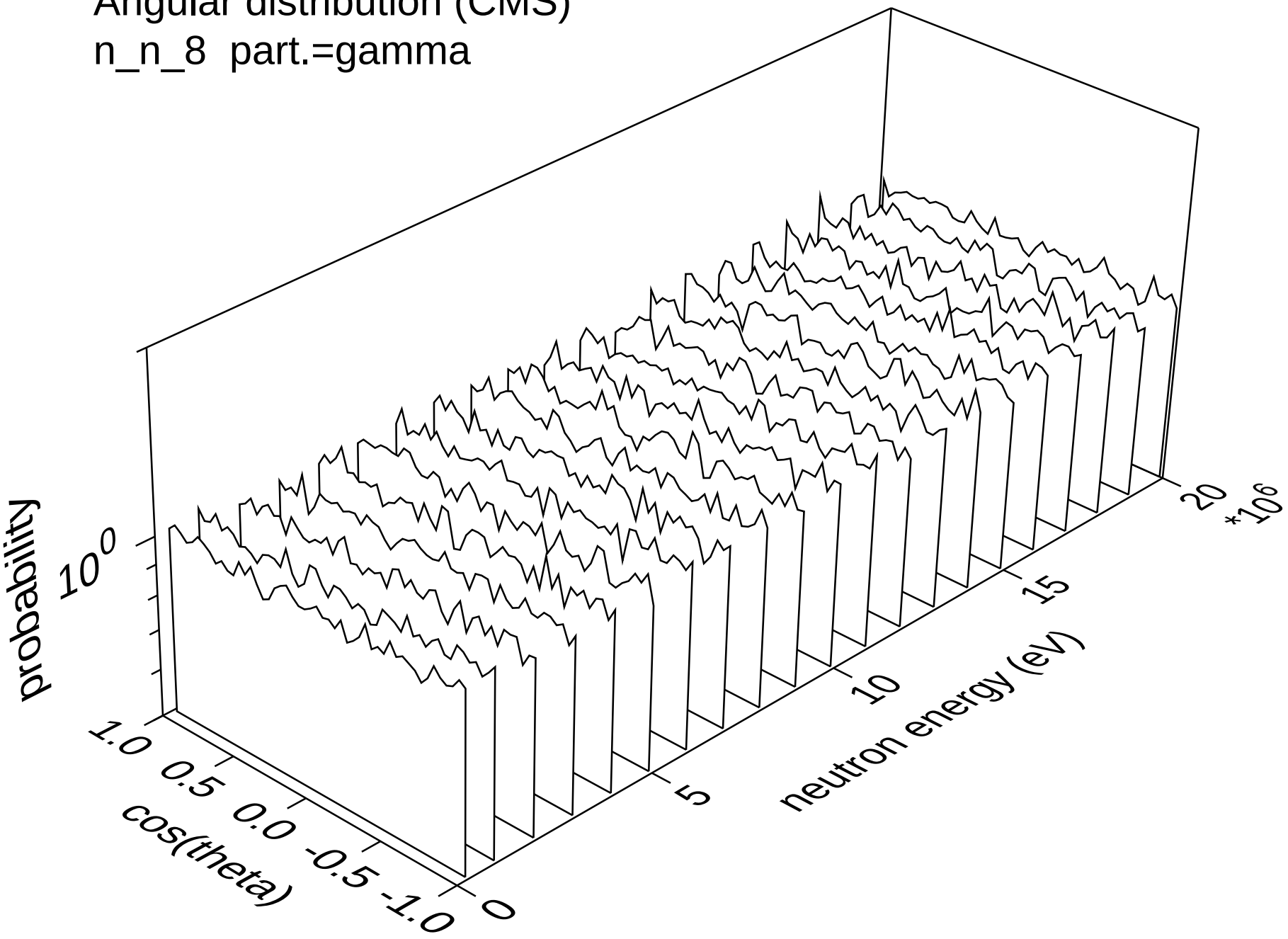

Angular distribution (CMS)
n_n_6 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

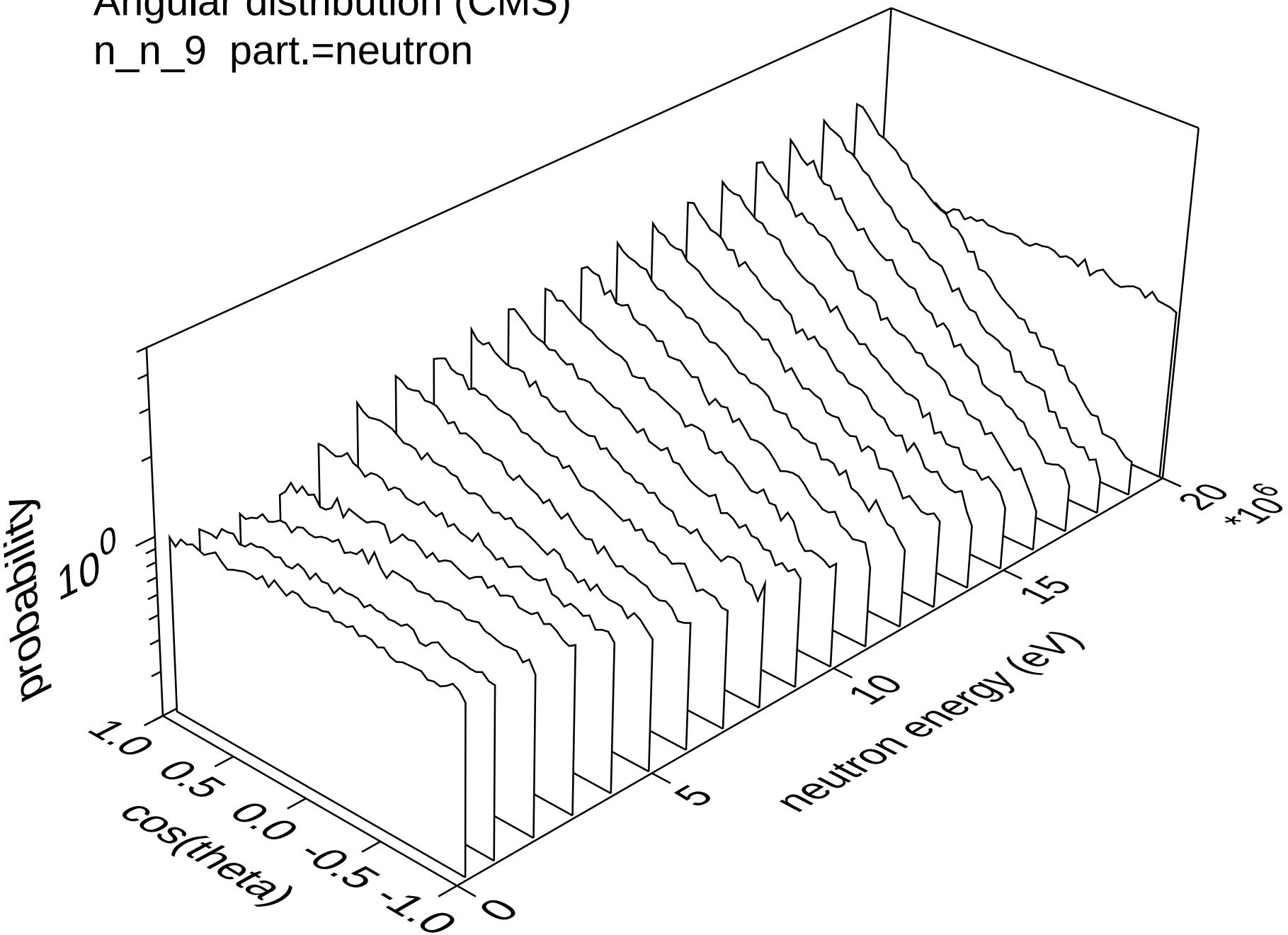

Angular distribution (CMS)
n_n_6 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

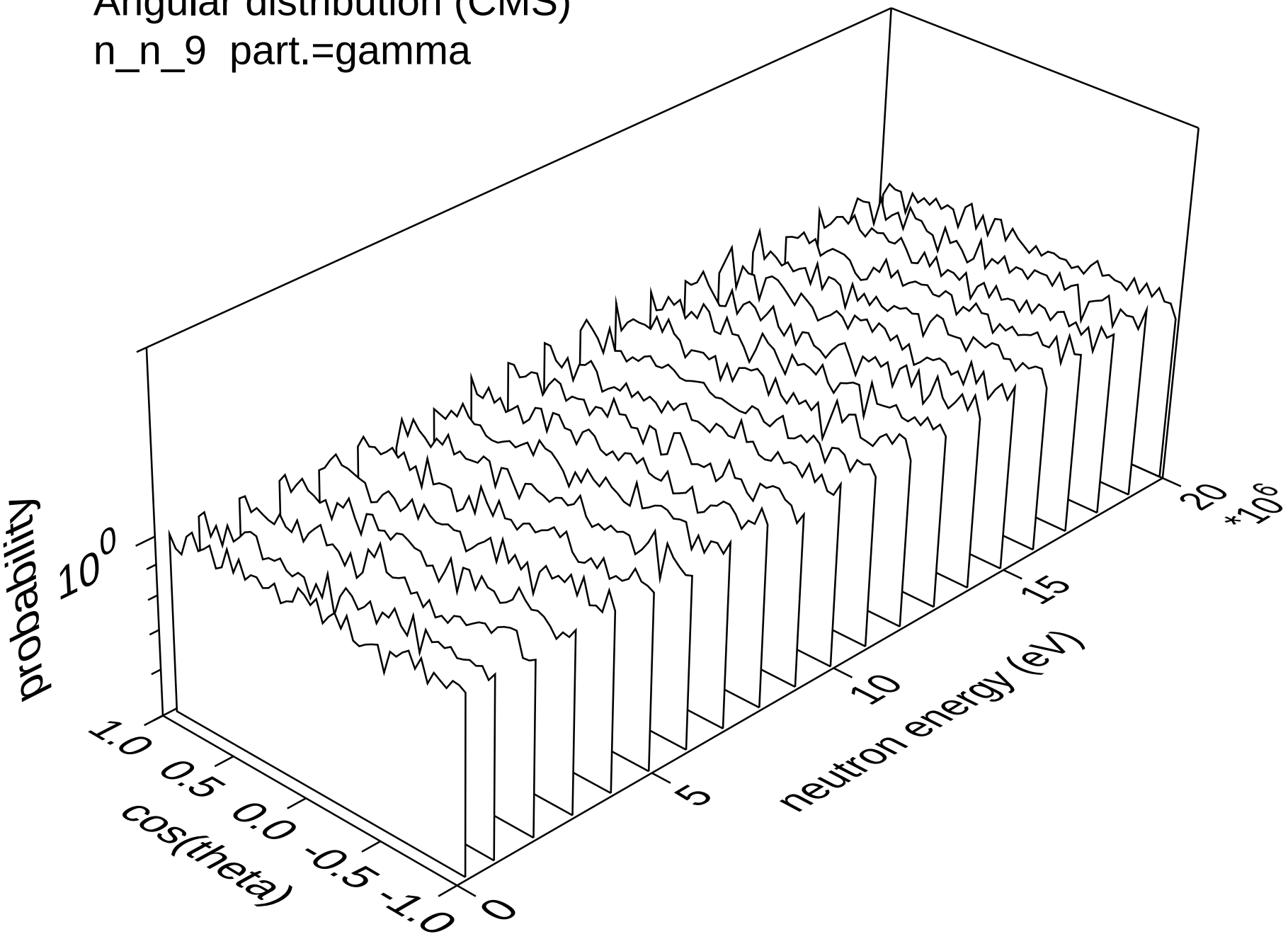

Angular distribution (CMS)
n_n_7 part.=neutron
probability
10^1
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

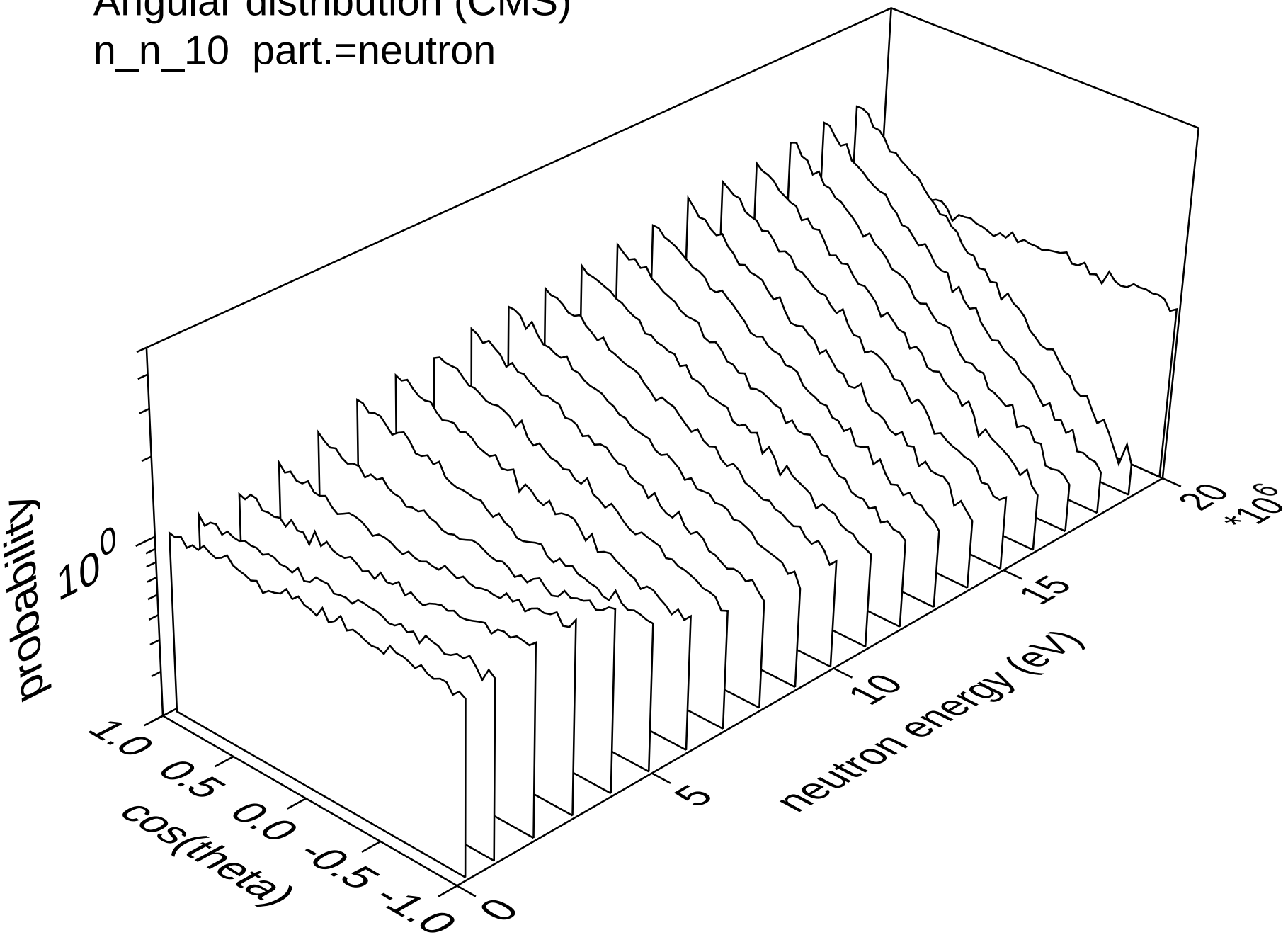

Angular distribution (CMS)
n_n_7 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

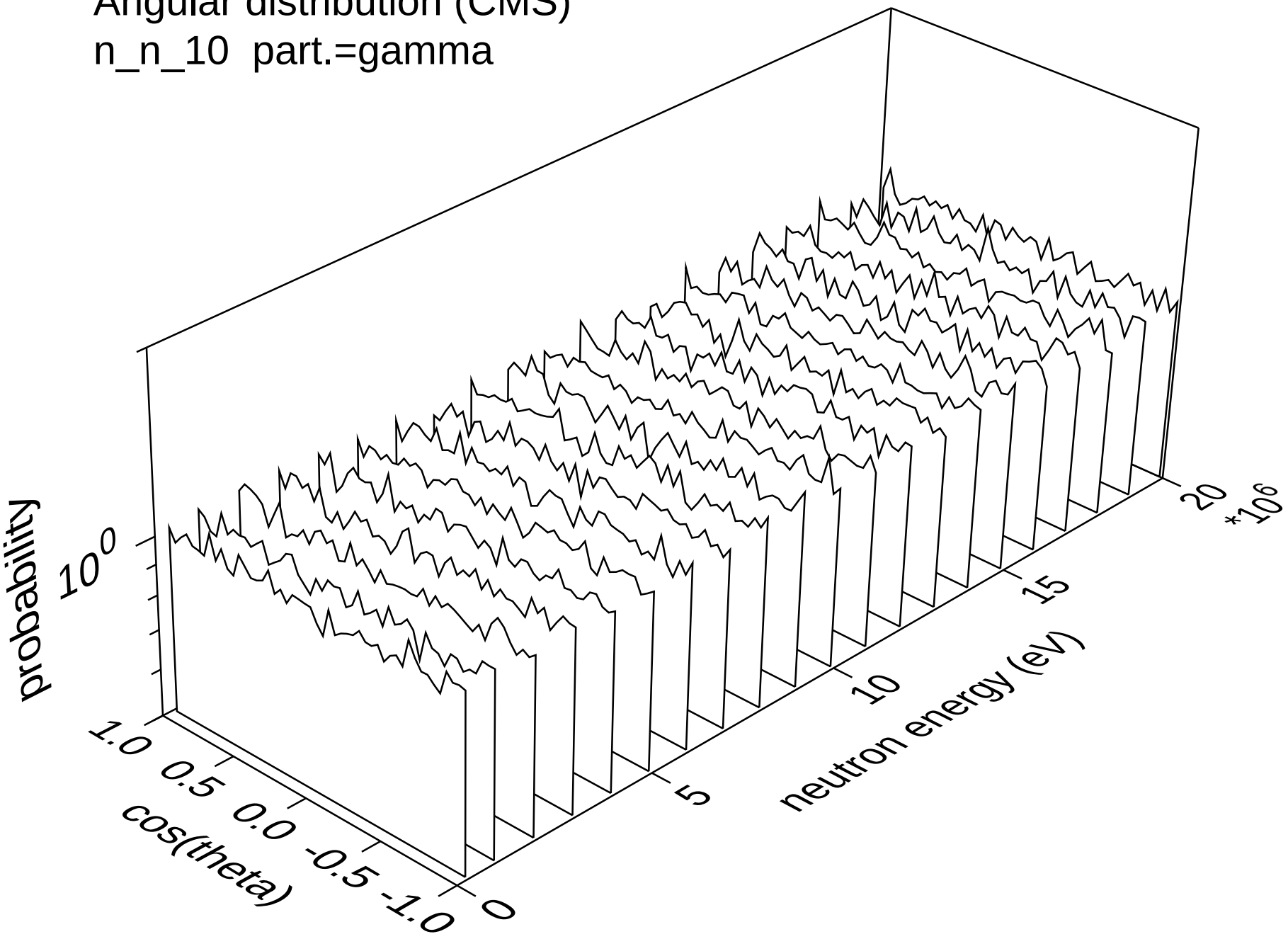

Angular distribution (CMS)
n_n_8 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

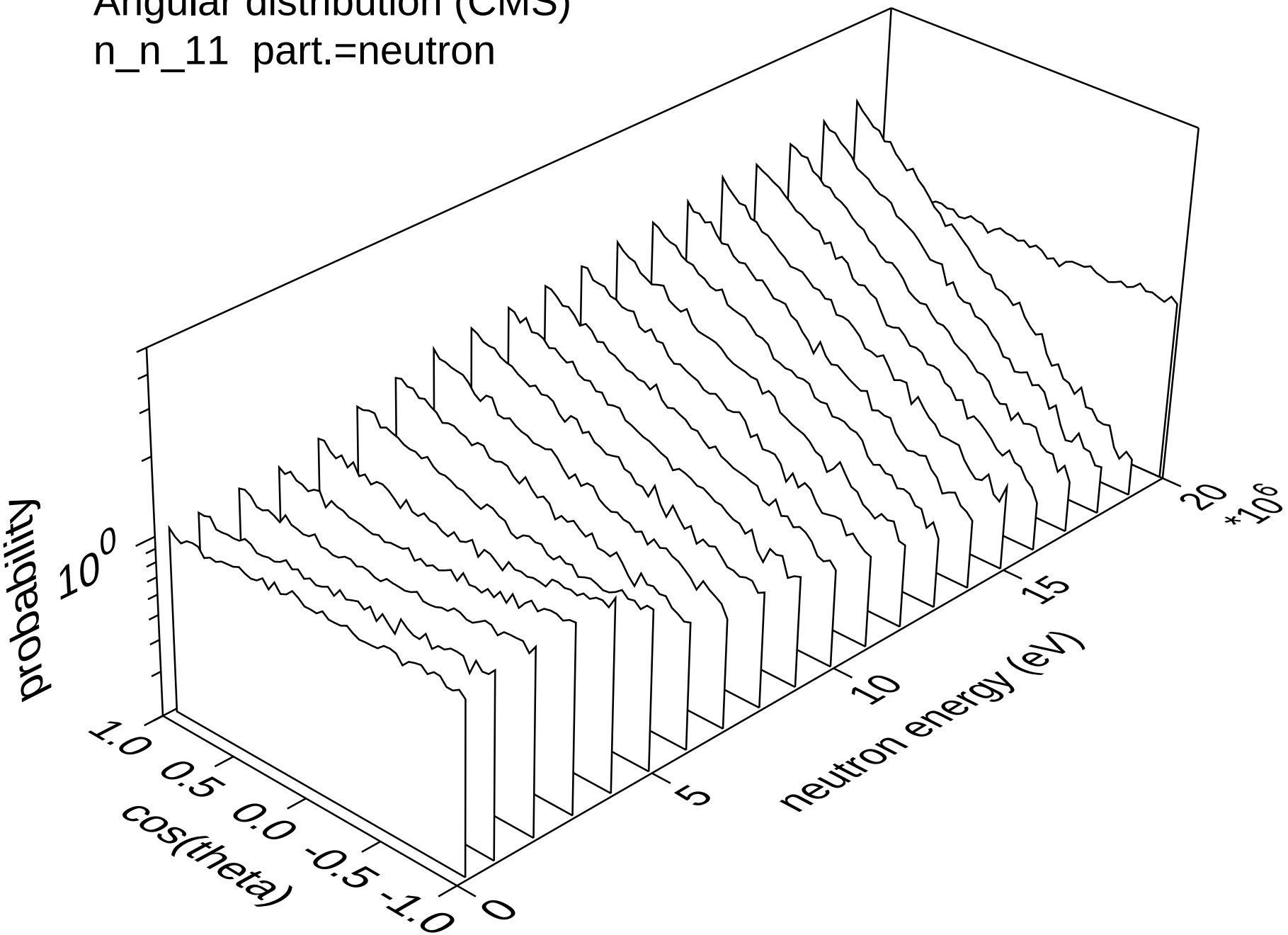

Angular distribution (CMS)
n_n_8 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

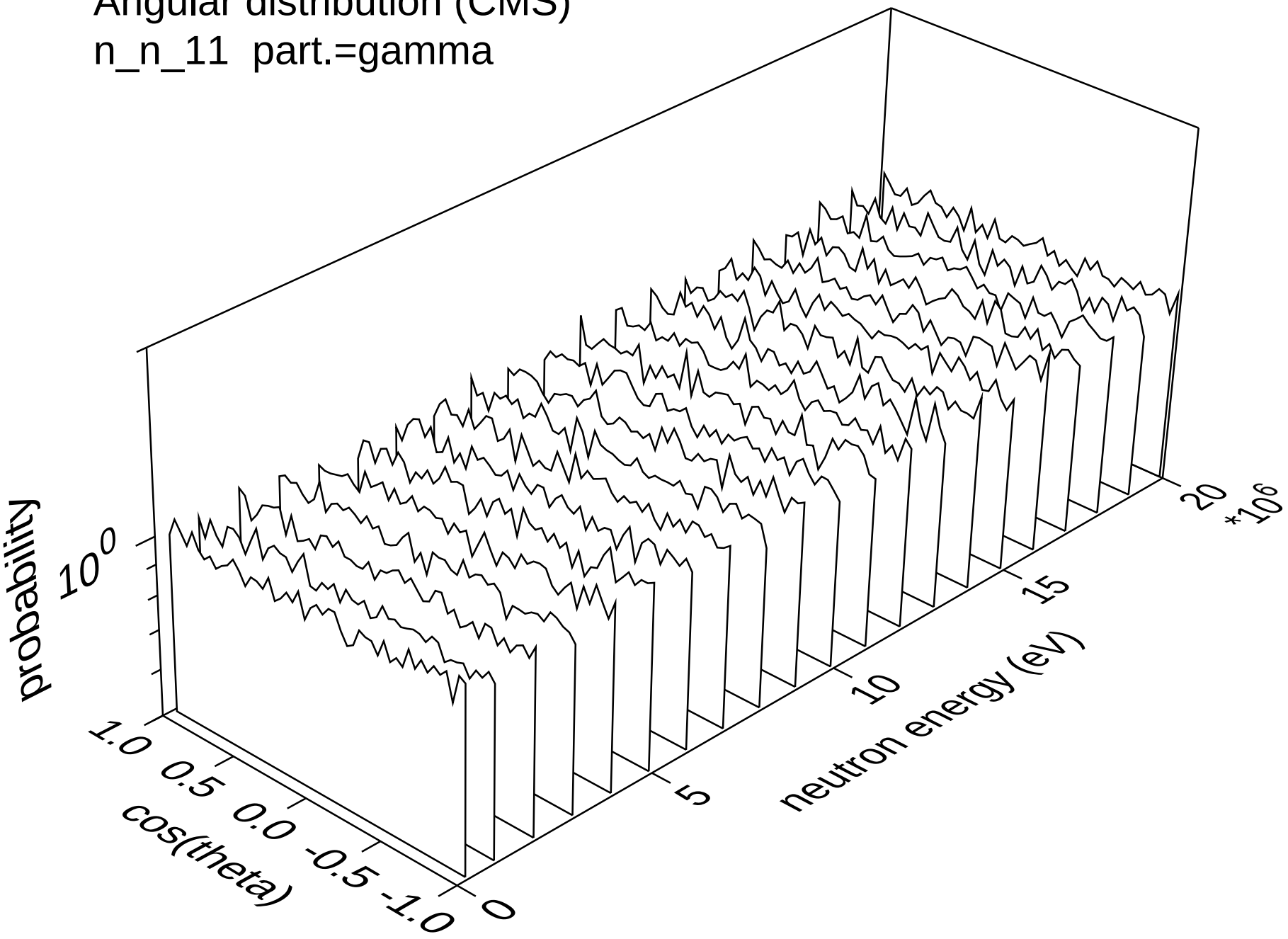

Angular distribution (CMS)
n_n_9 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

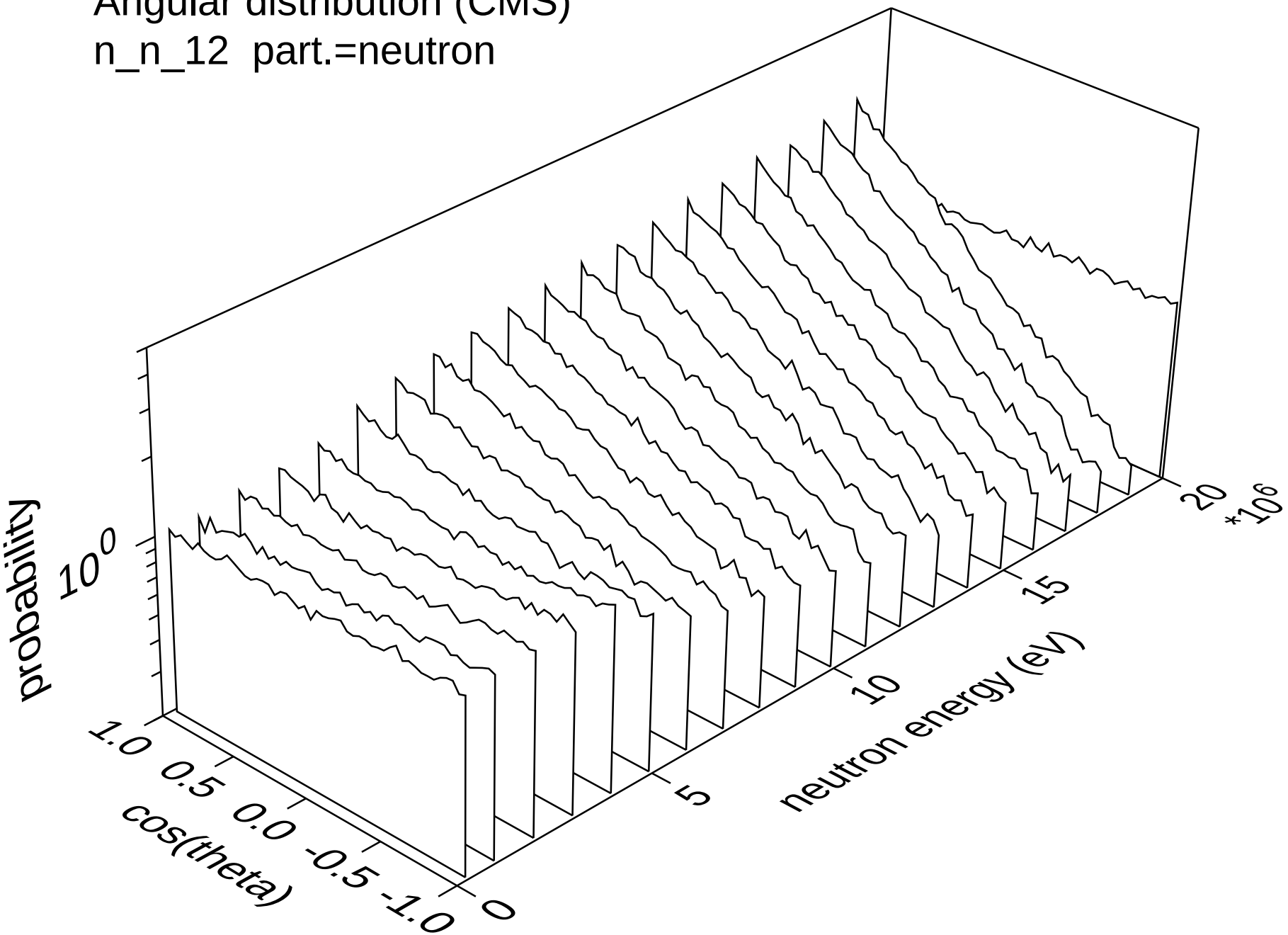

Angular distribution (CMS)
n_n_9 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

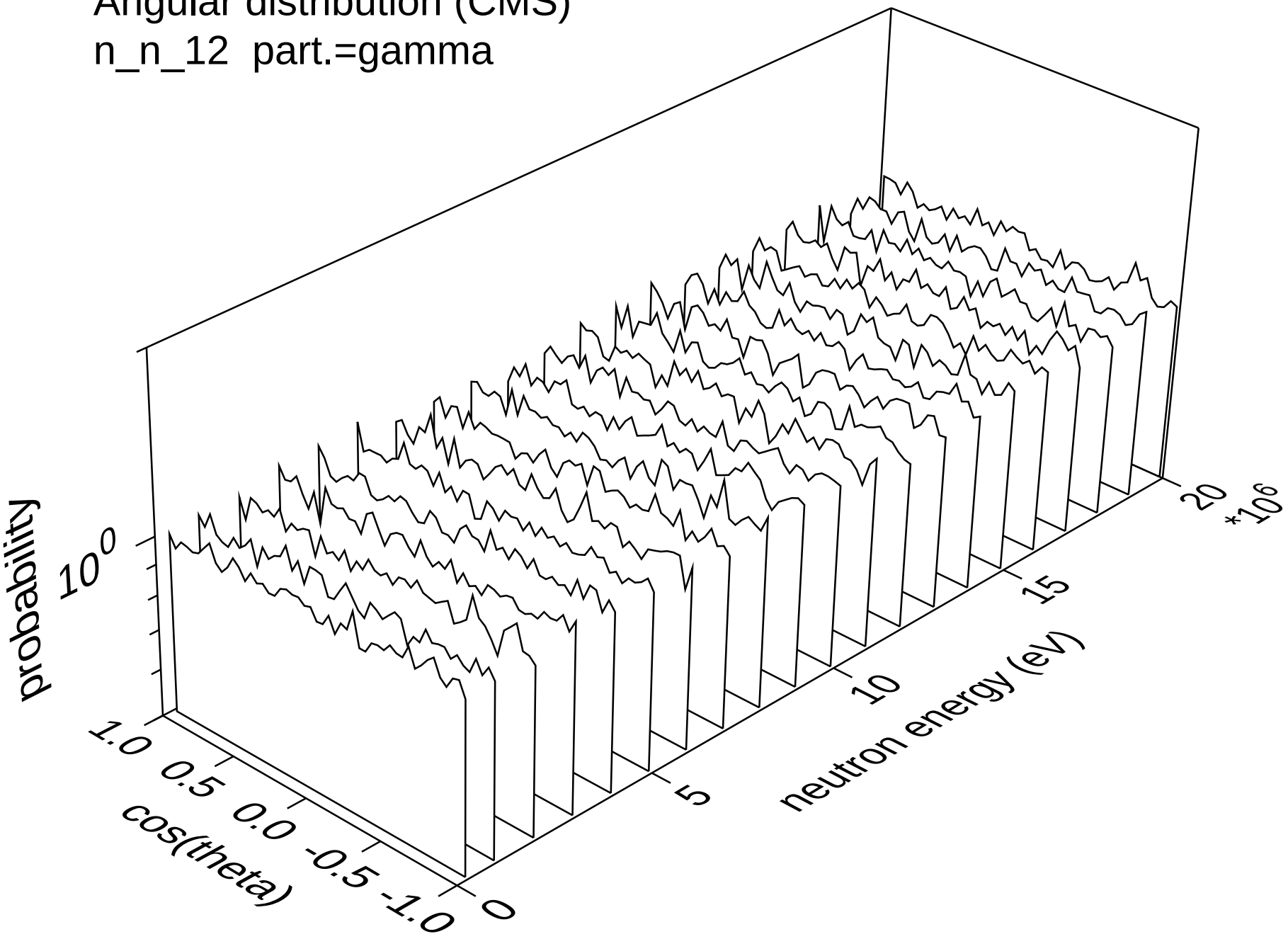

Angular distribution (CMS)
n_n_10 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

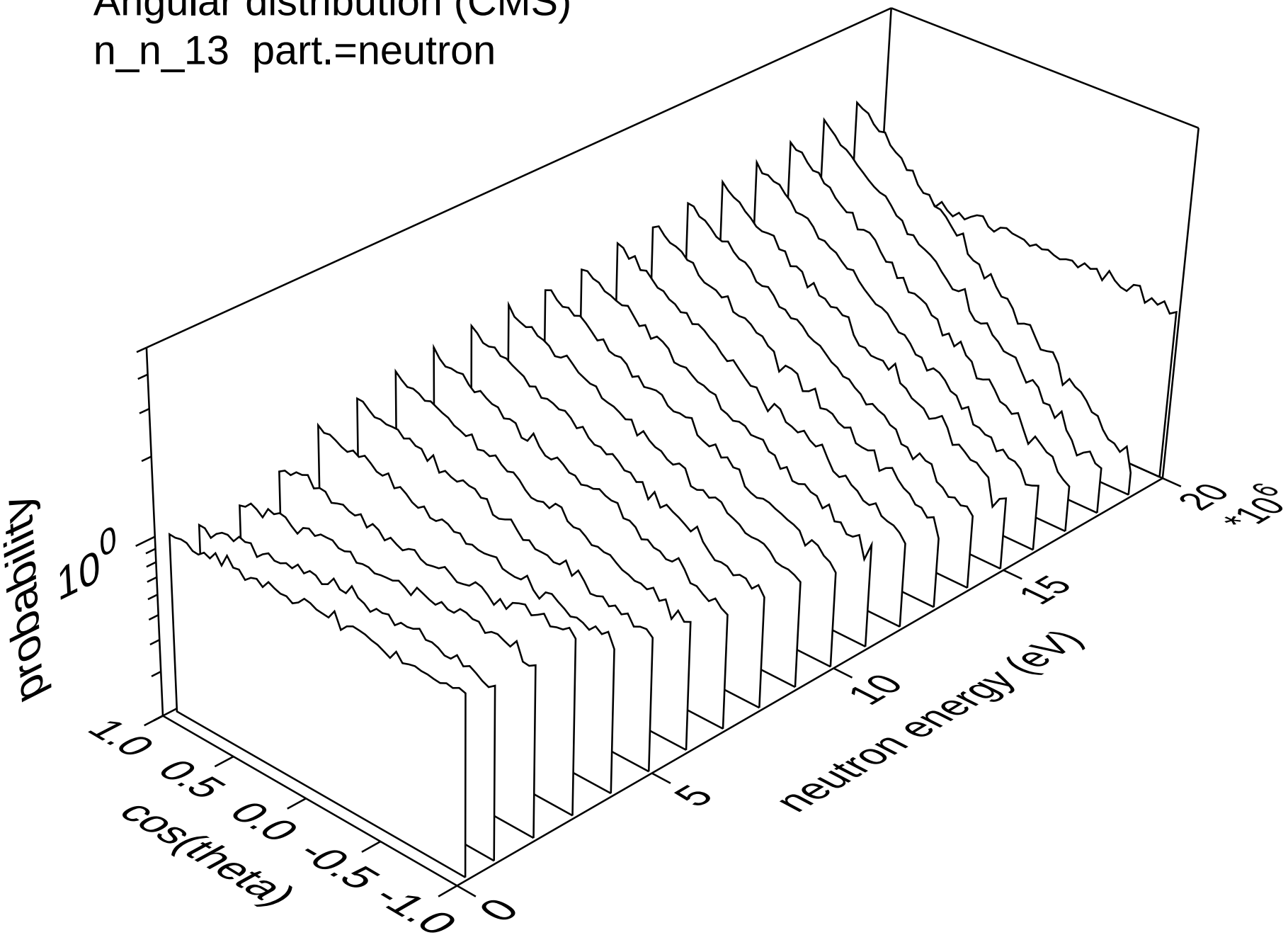

Angular distribution (CMS)
n_n_10 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

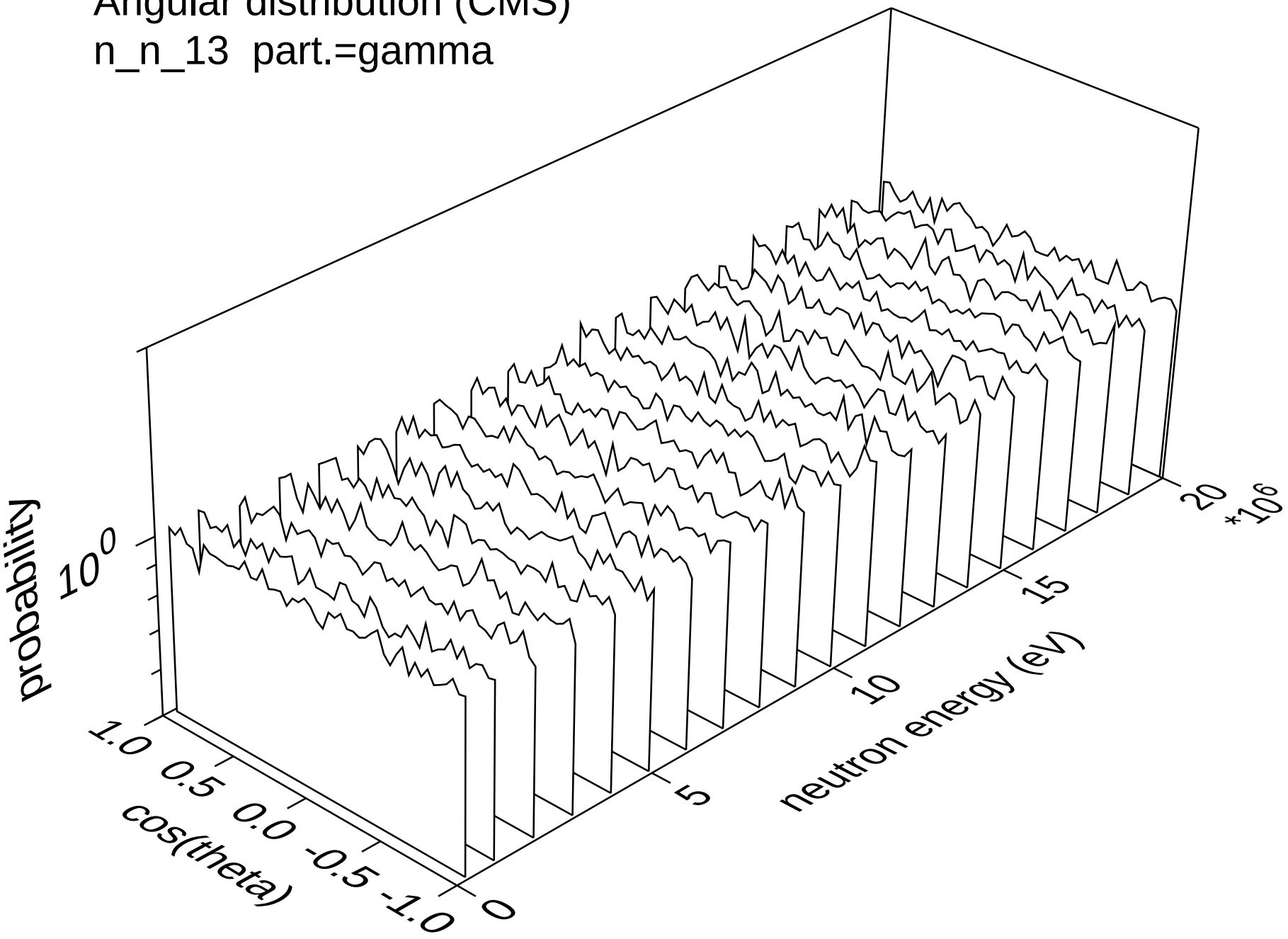

Angular distribution (CMS)
n_n_11 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

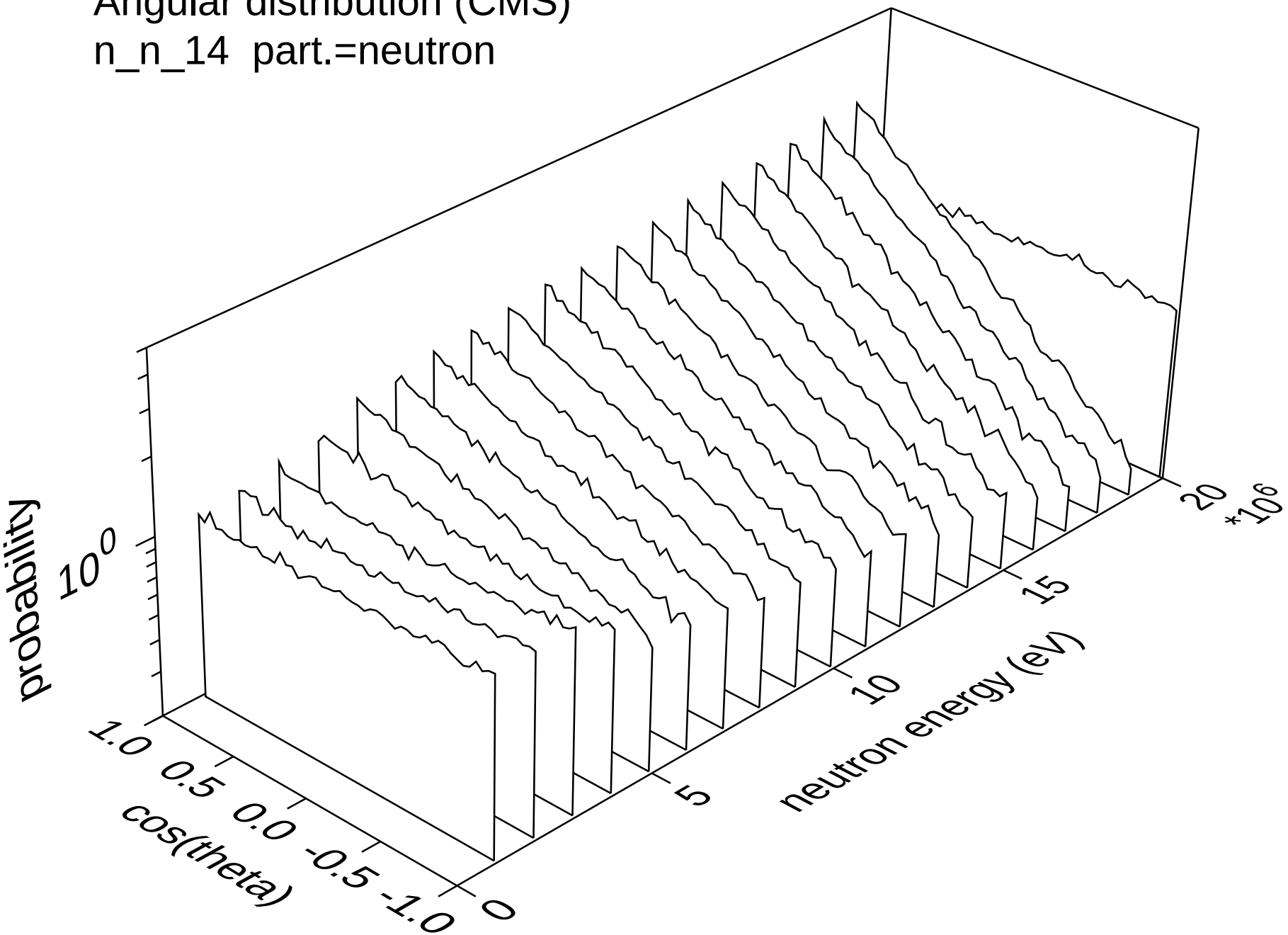

Angular distribution (CMS)
n_n_11 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

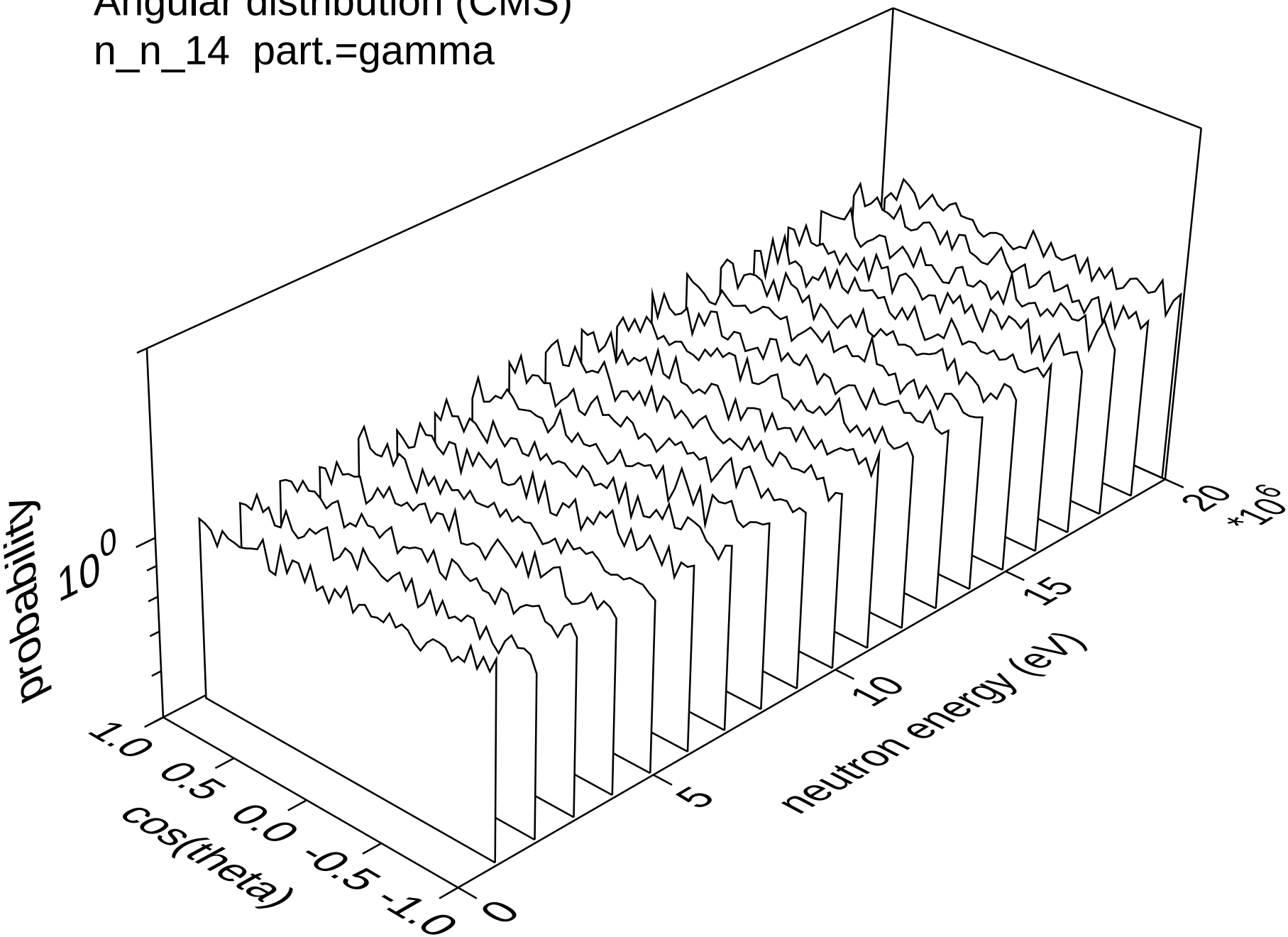

Angular distribution (CMS)
n_n_12 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

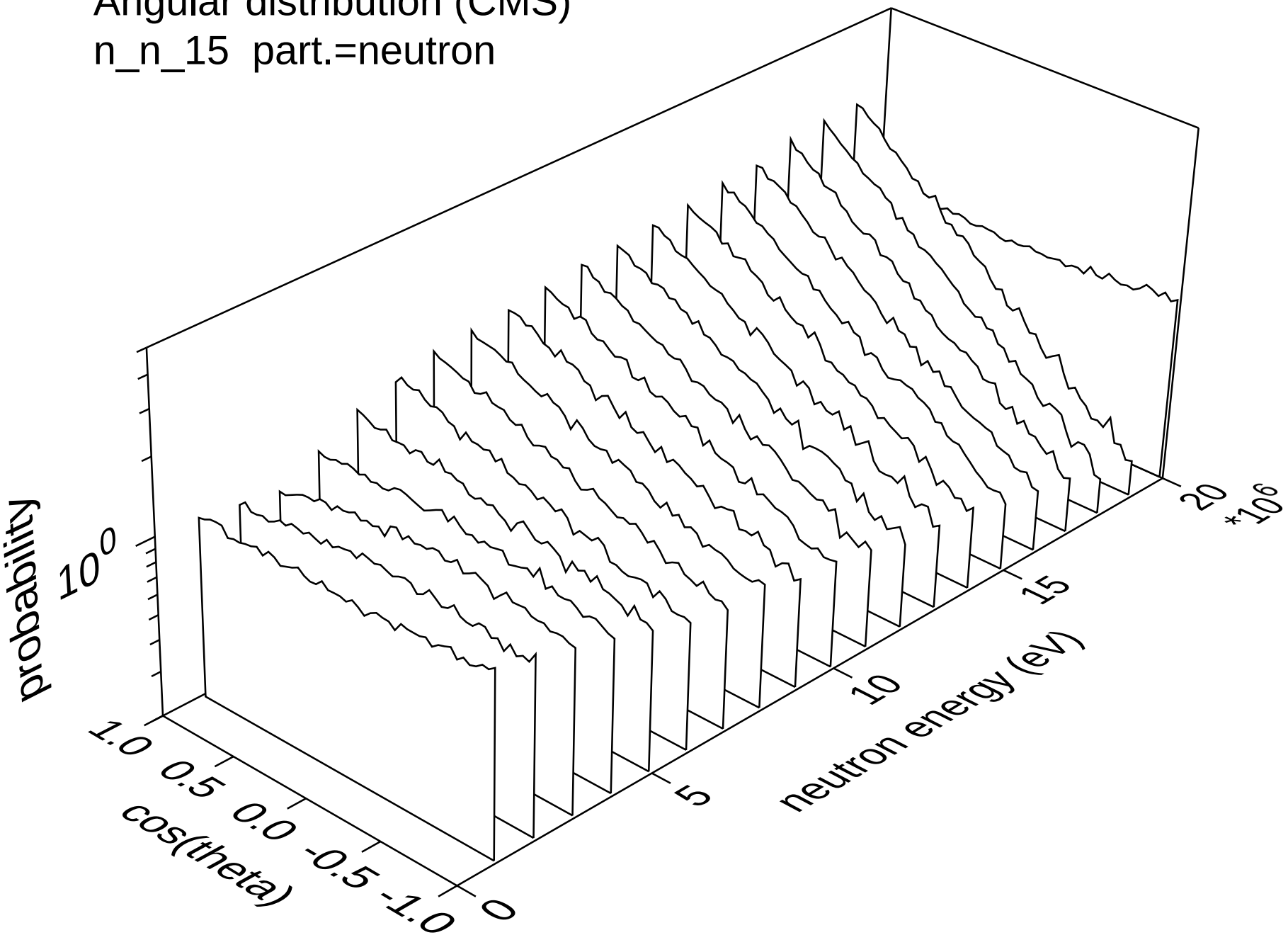

Angular distribution (CMS)
n_n_12 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

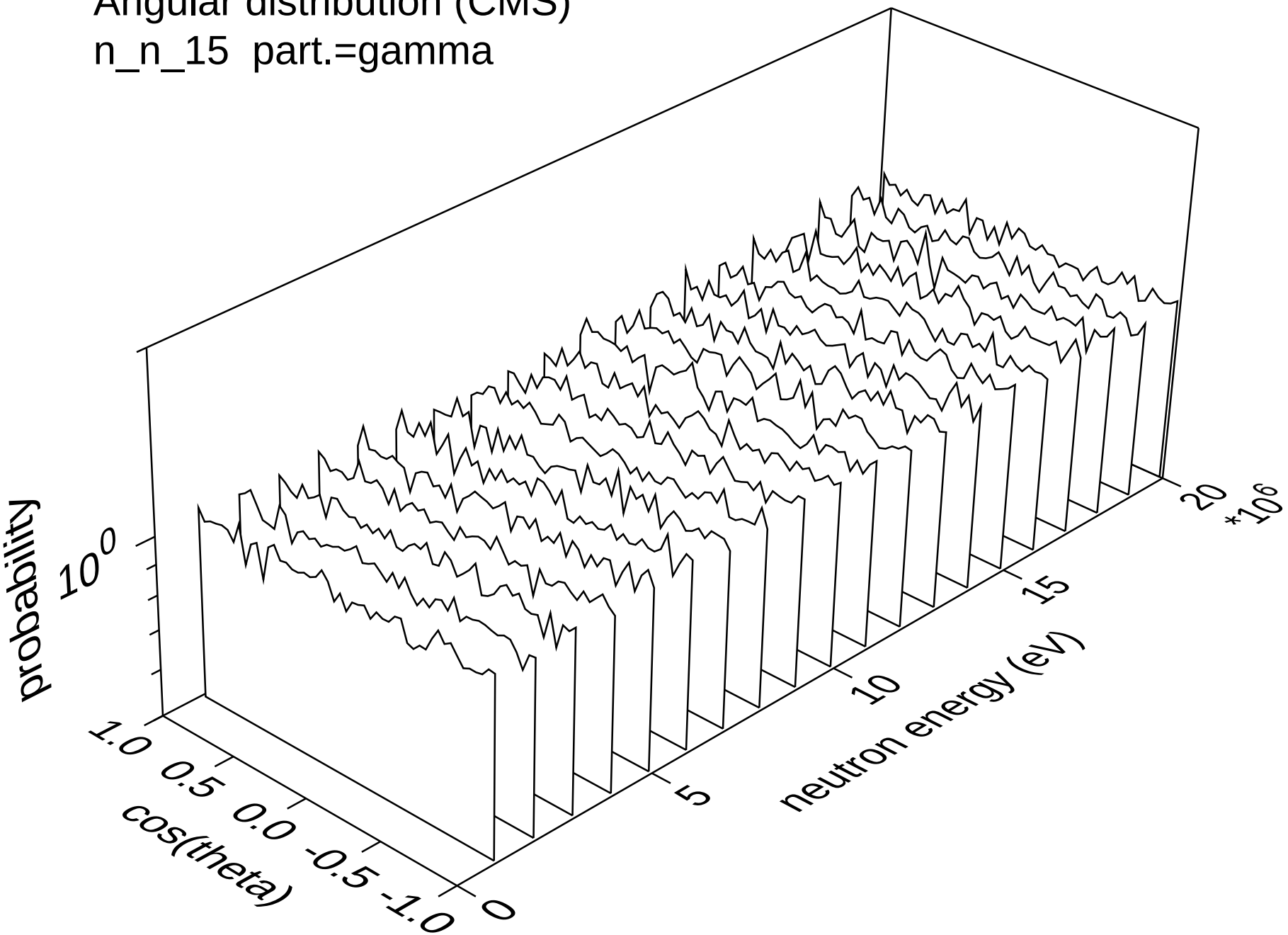

Angular distribution (CMS)
n_n_13 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

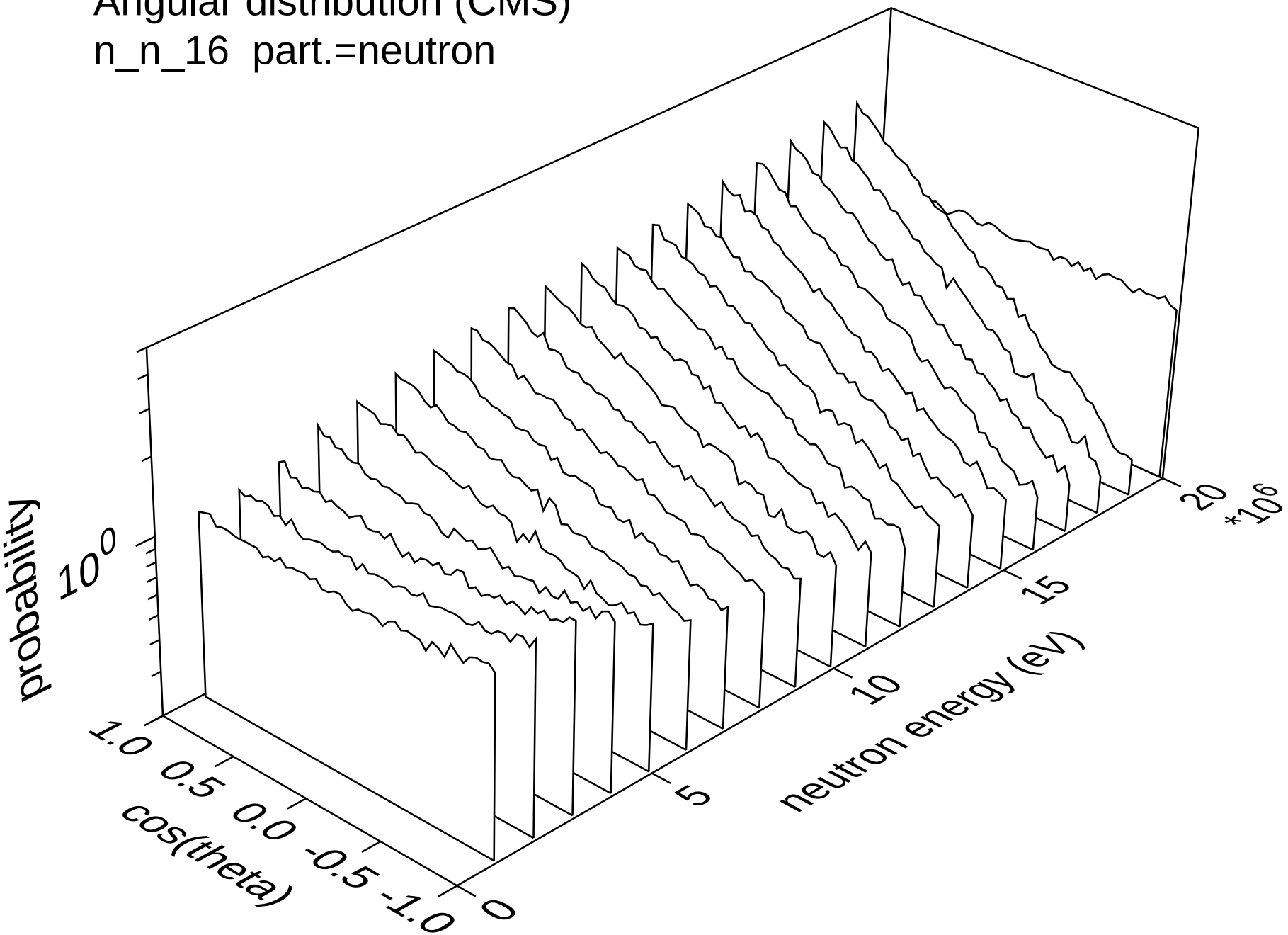

Angular distribution (CMS)
n_n_13 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

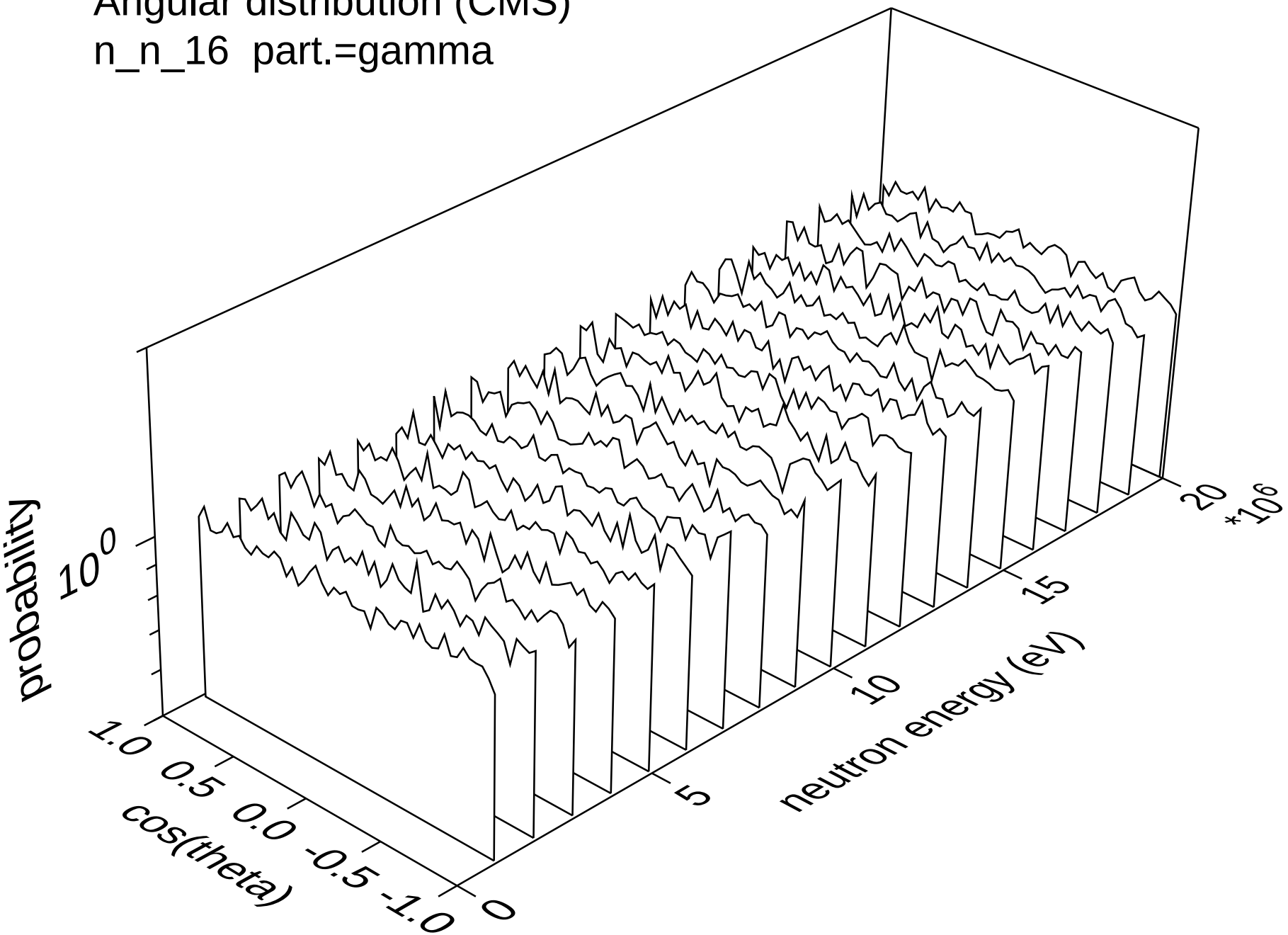

Angular distribution (CMS)
n_n_14 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

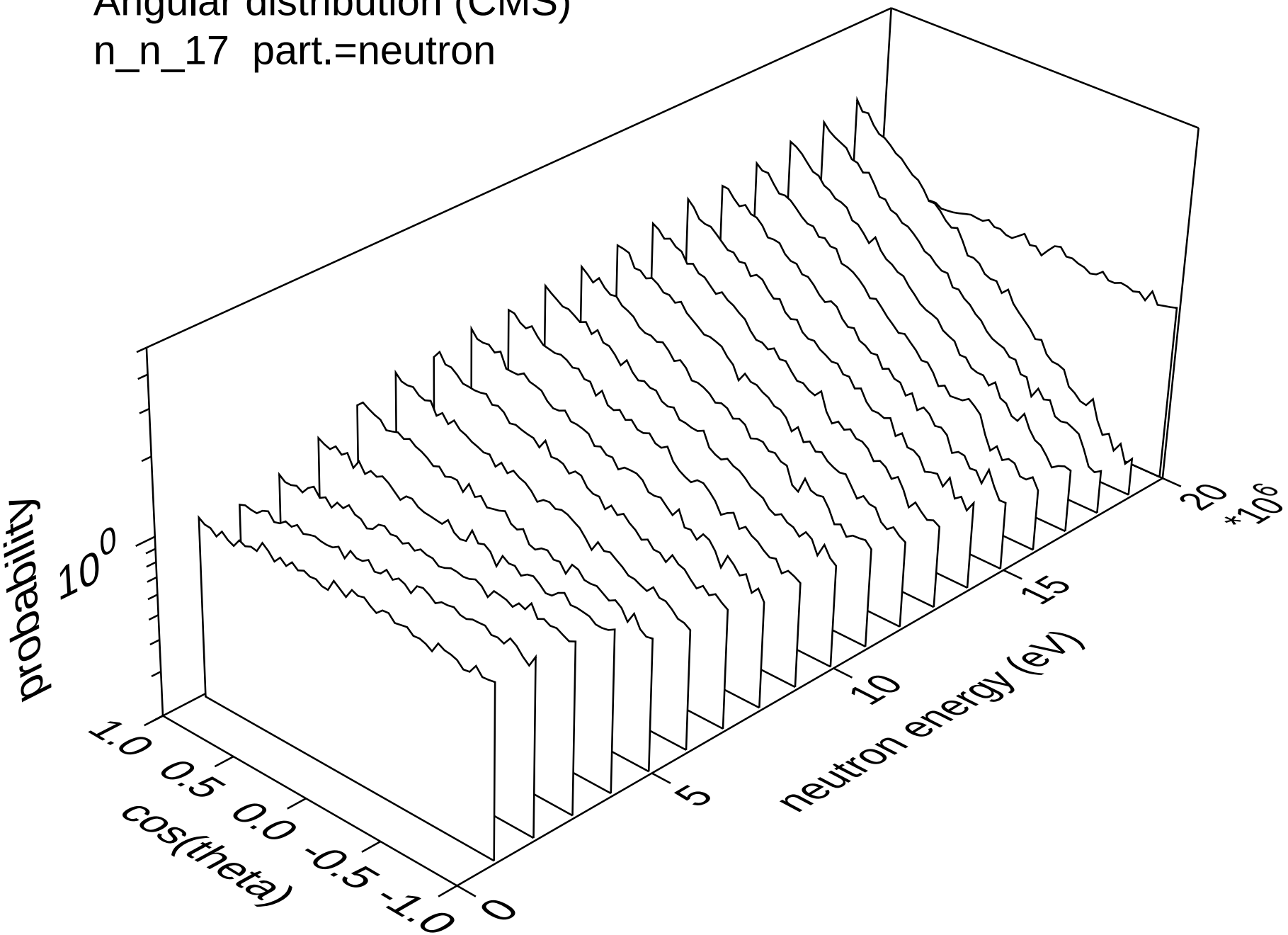

Angular distribution (CMS)
n_n_14 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

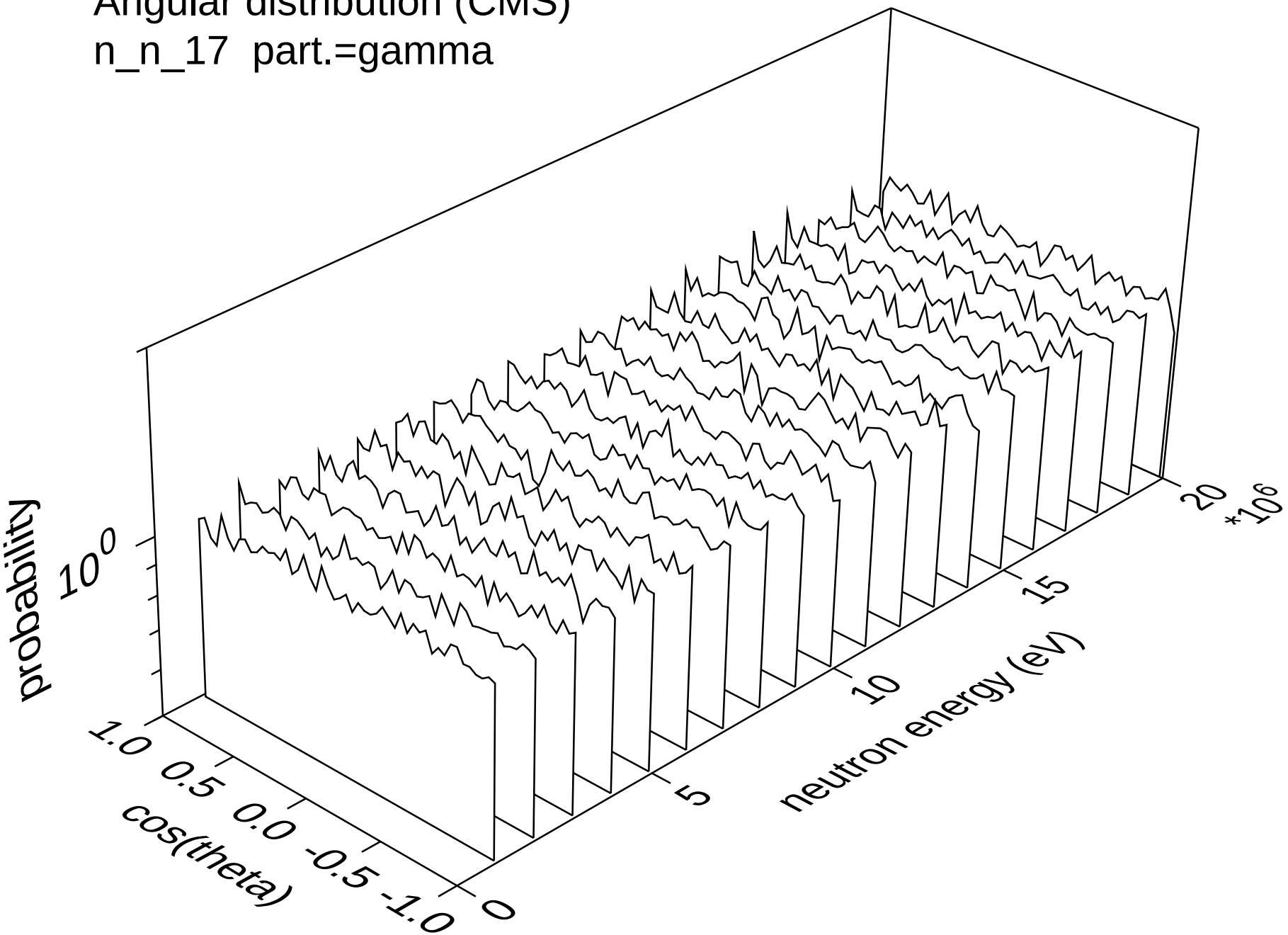

Angular distribution (CMS)
n_n_15 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

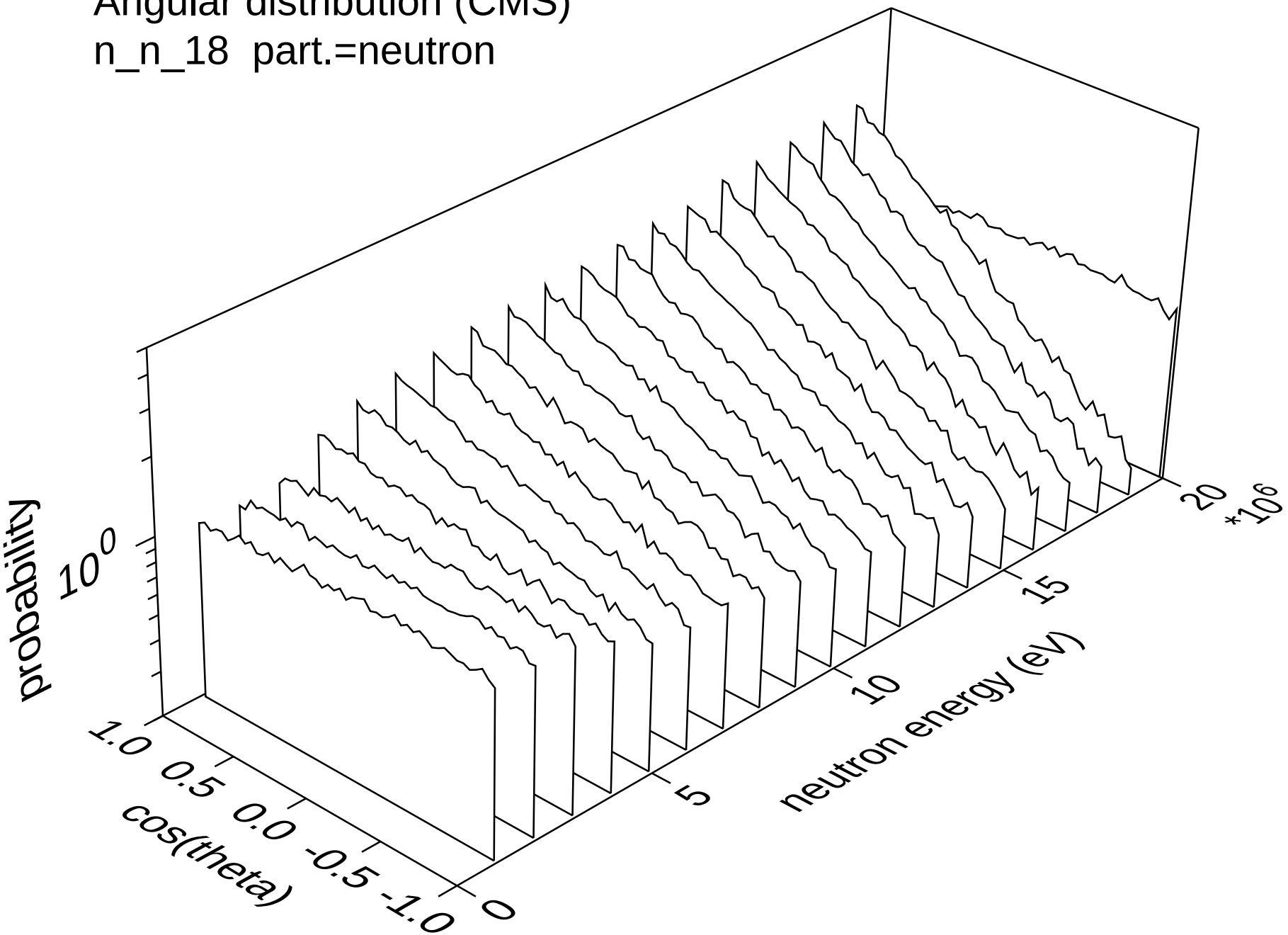

Angular distribution (CMS)
n_n_15 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

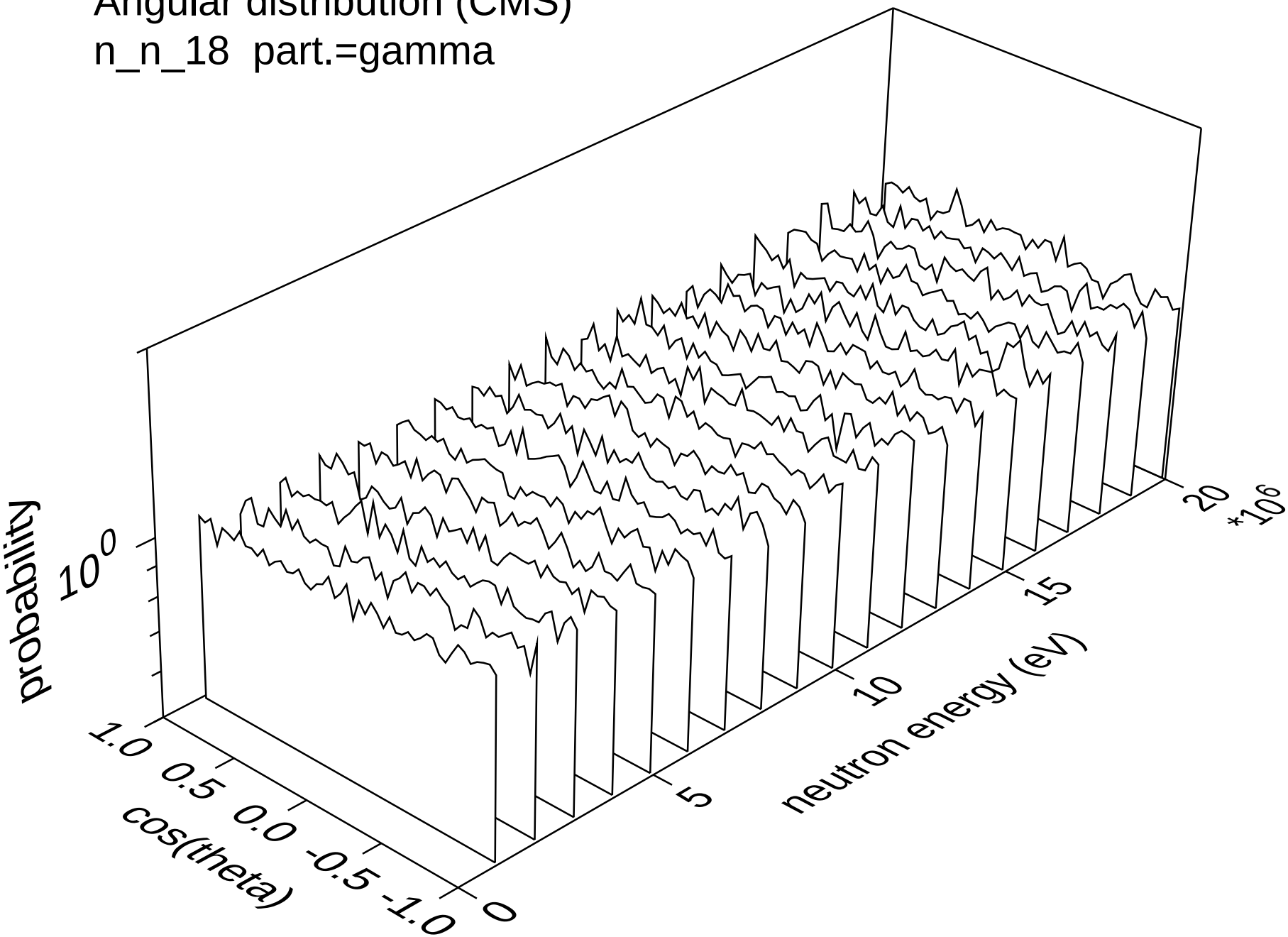

Angular distribution (CMS)
n_n_16 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

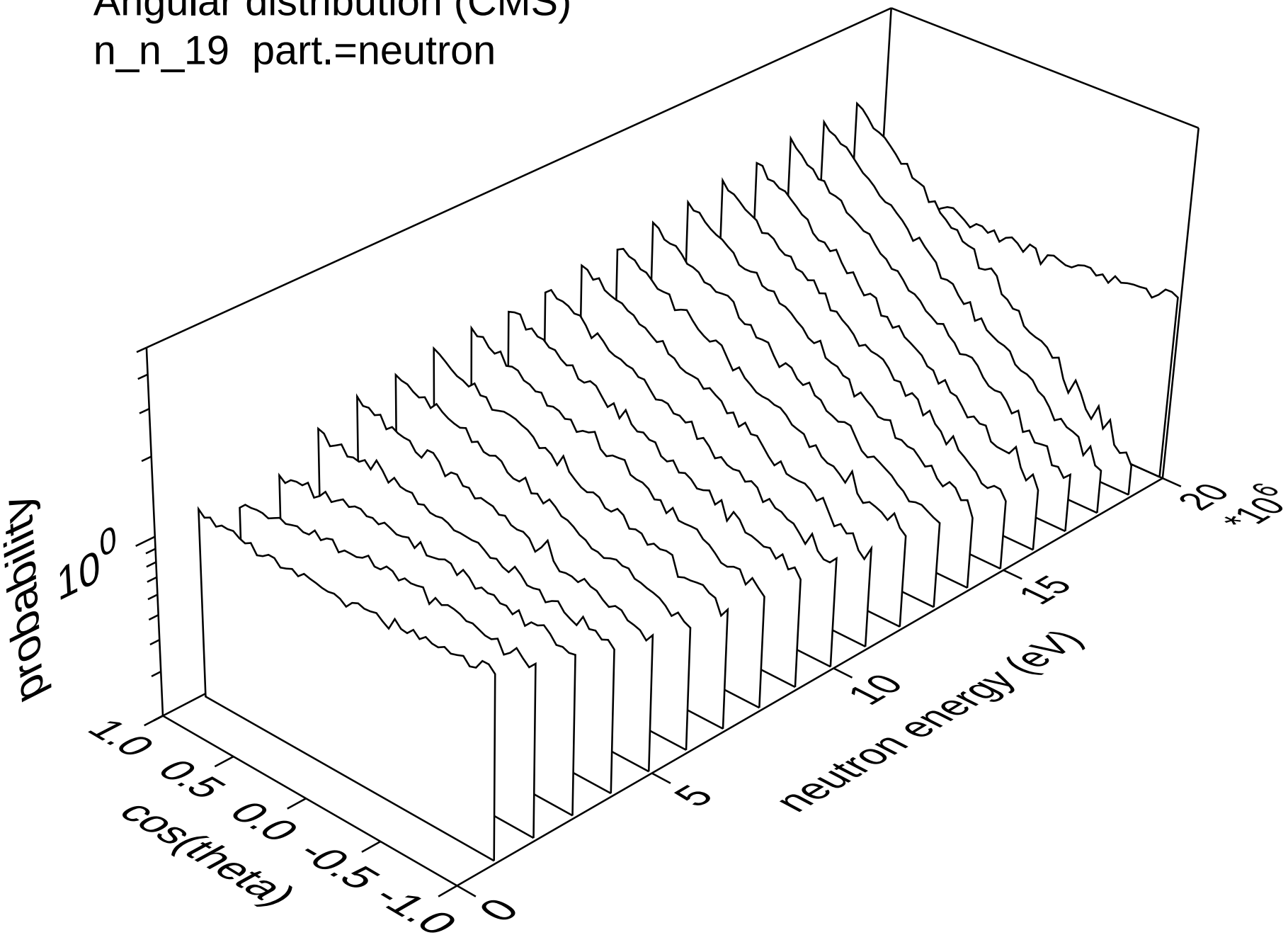

Angular distribution (CMS)
n_n_16 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

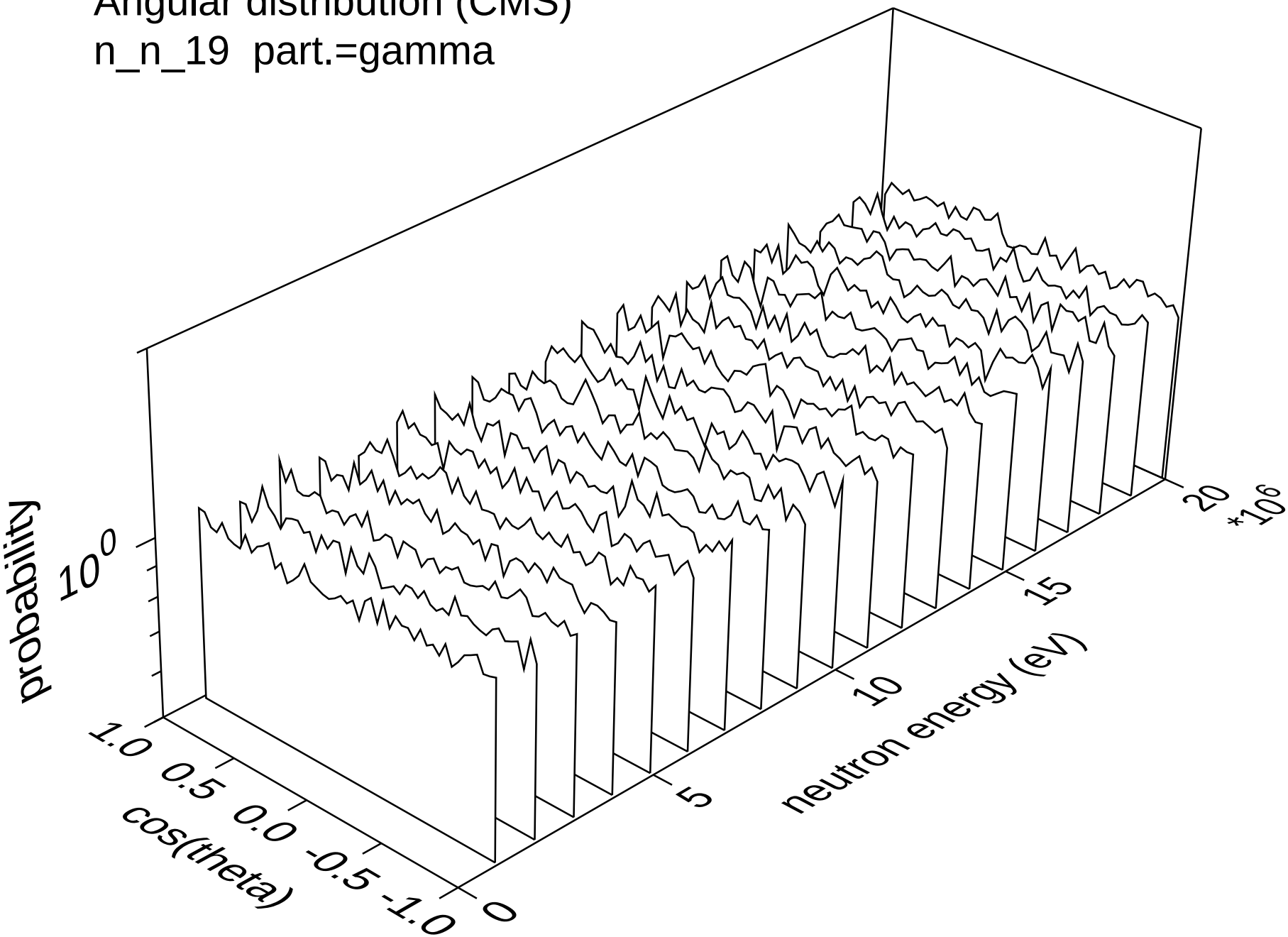

Angular distribution (CMS)
n_n_17 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

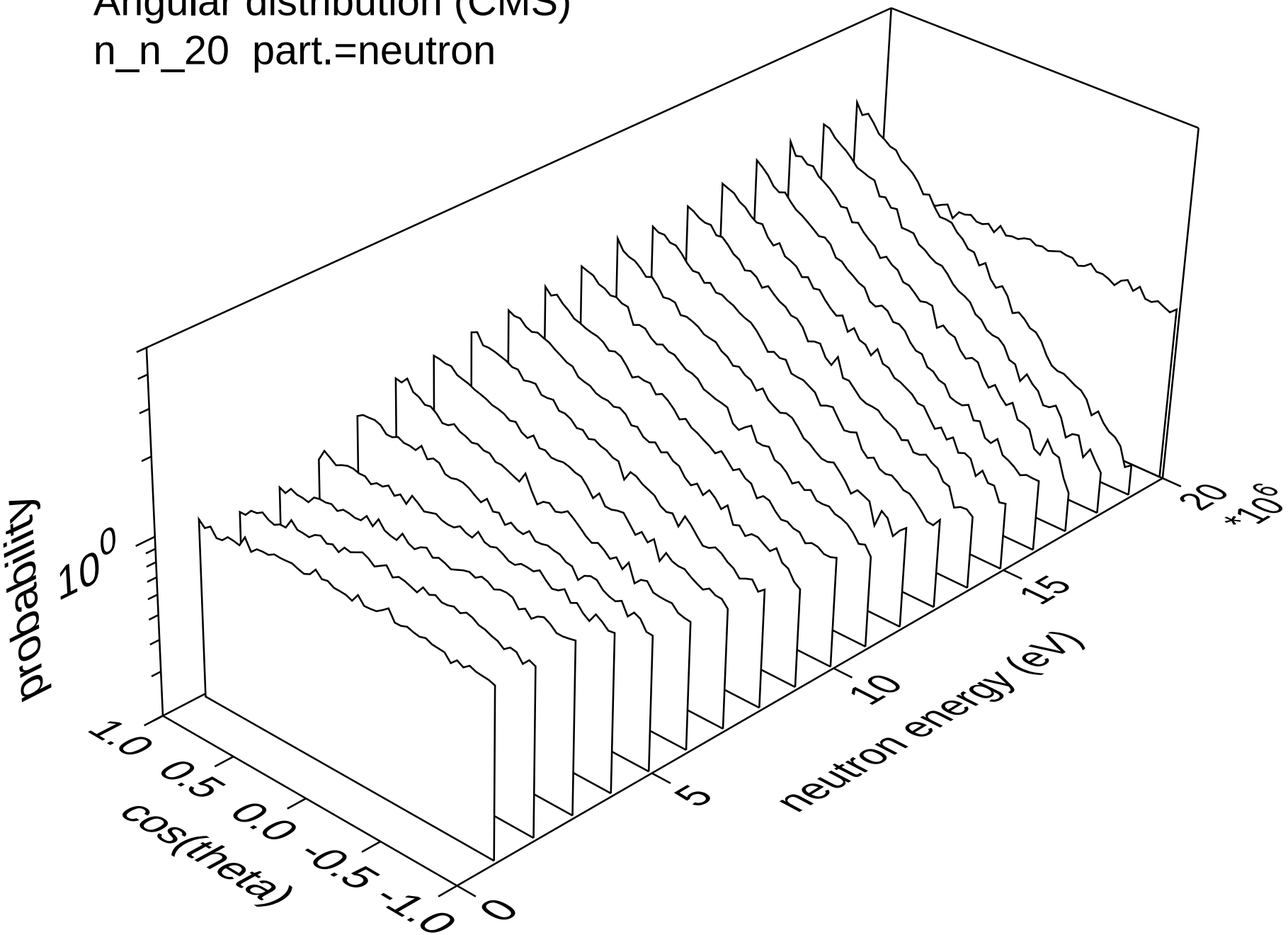

Angular distribution (CMS)
n_n_17 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

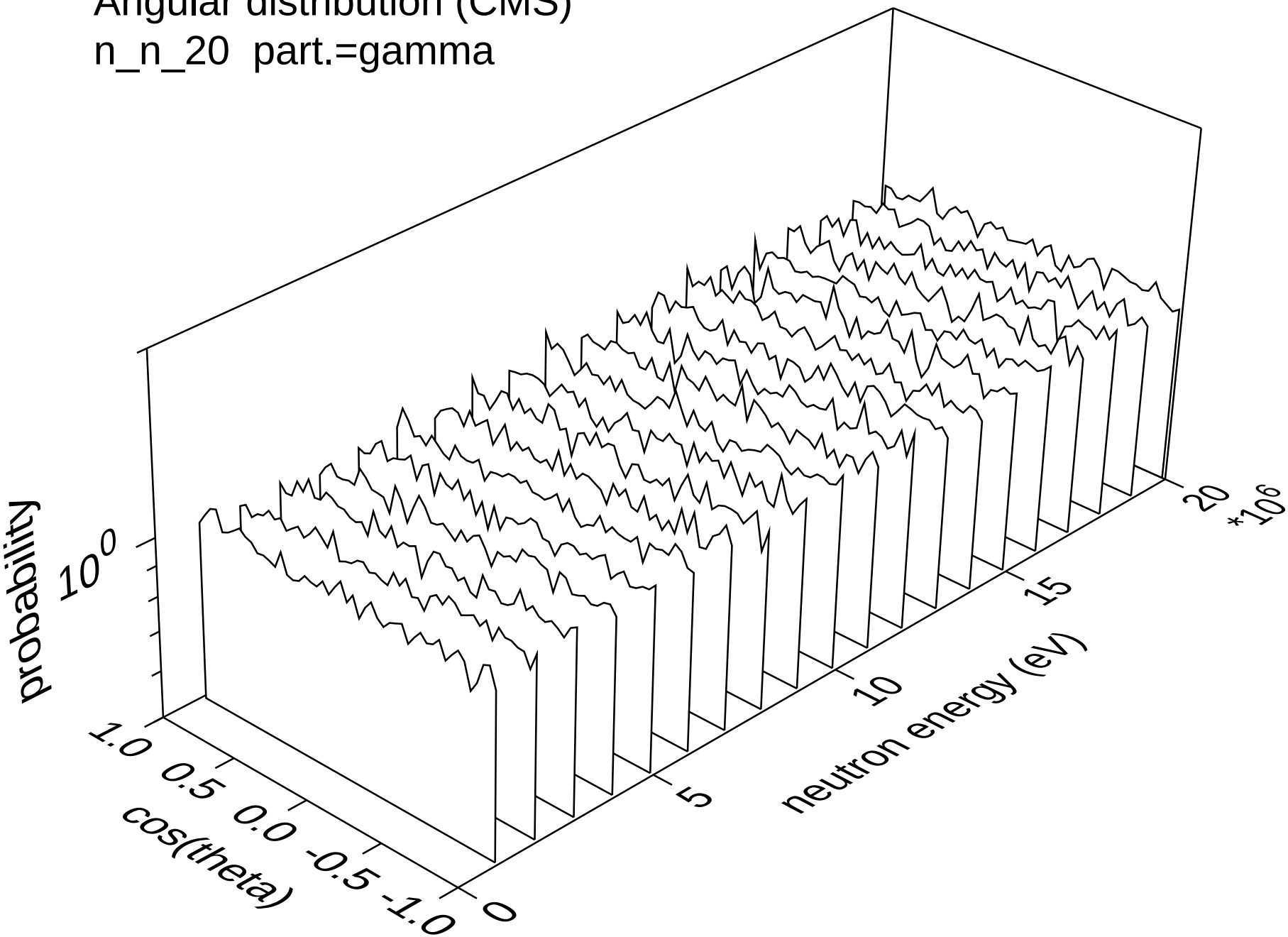

Angular distribution (CMS)
n_n_18 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

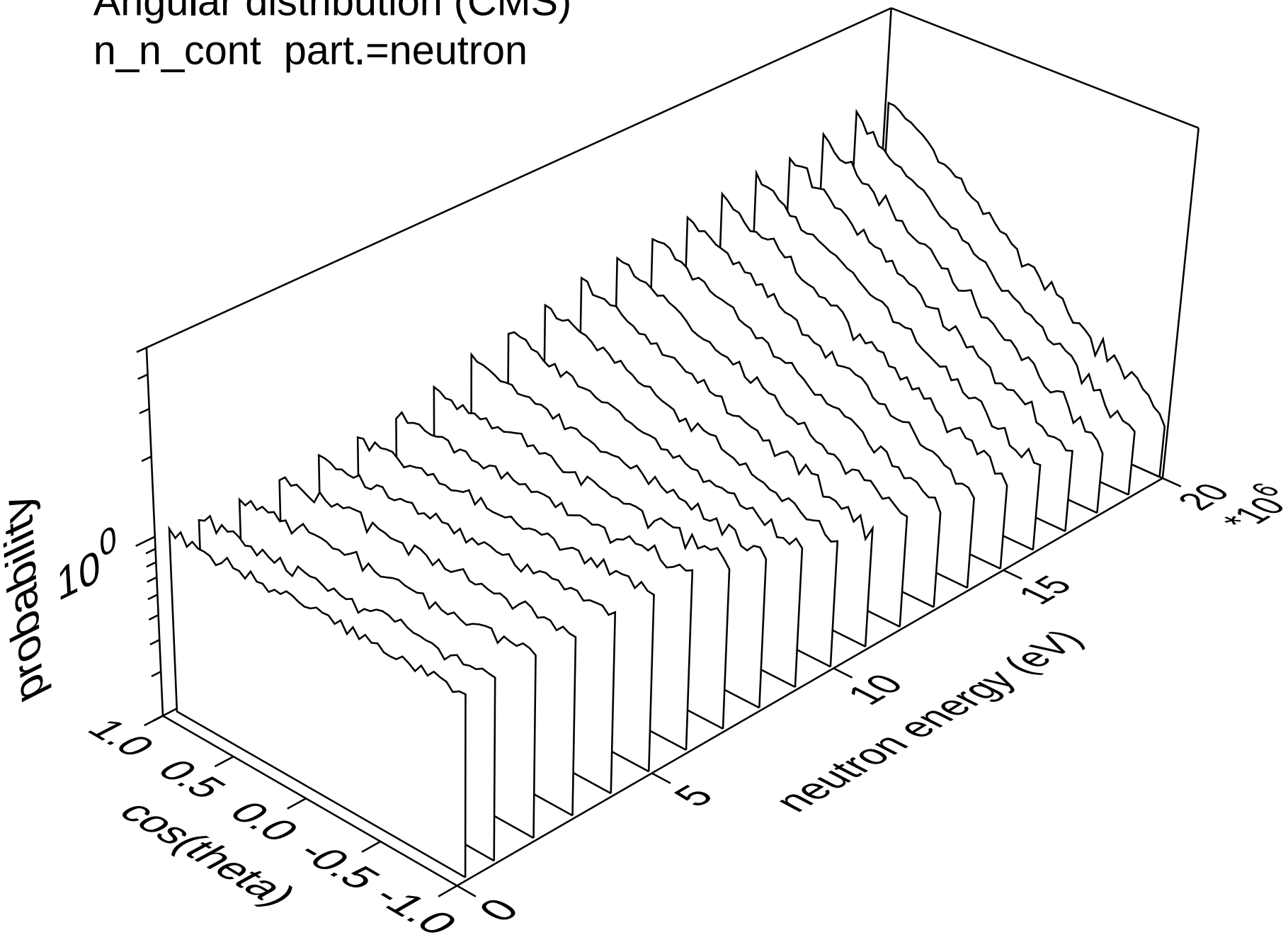

Angular distribution (CMS)
n_n_18 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

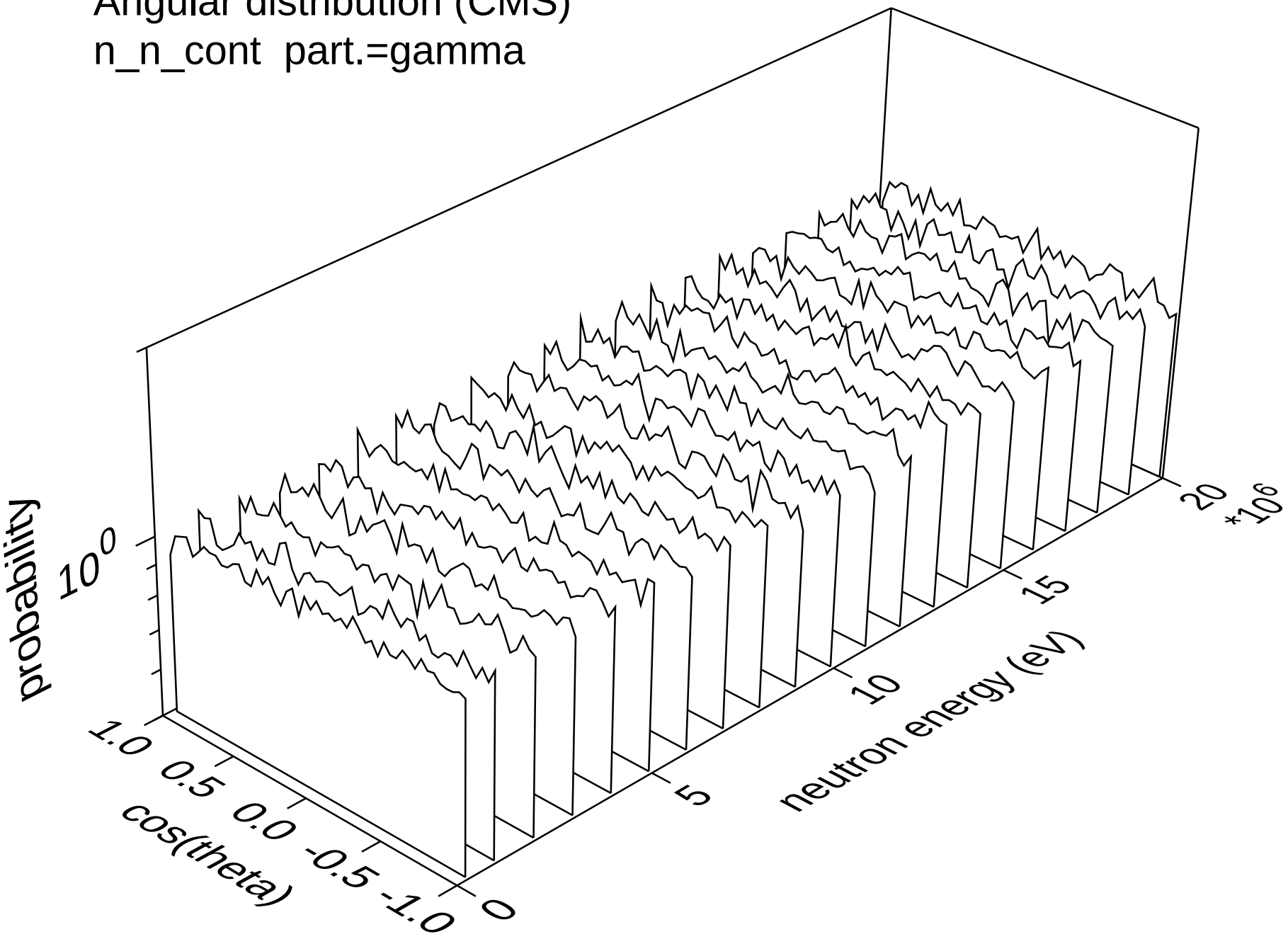

Angular distribution (CMS)
n_n_19 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

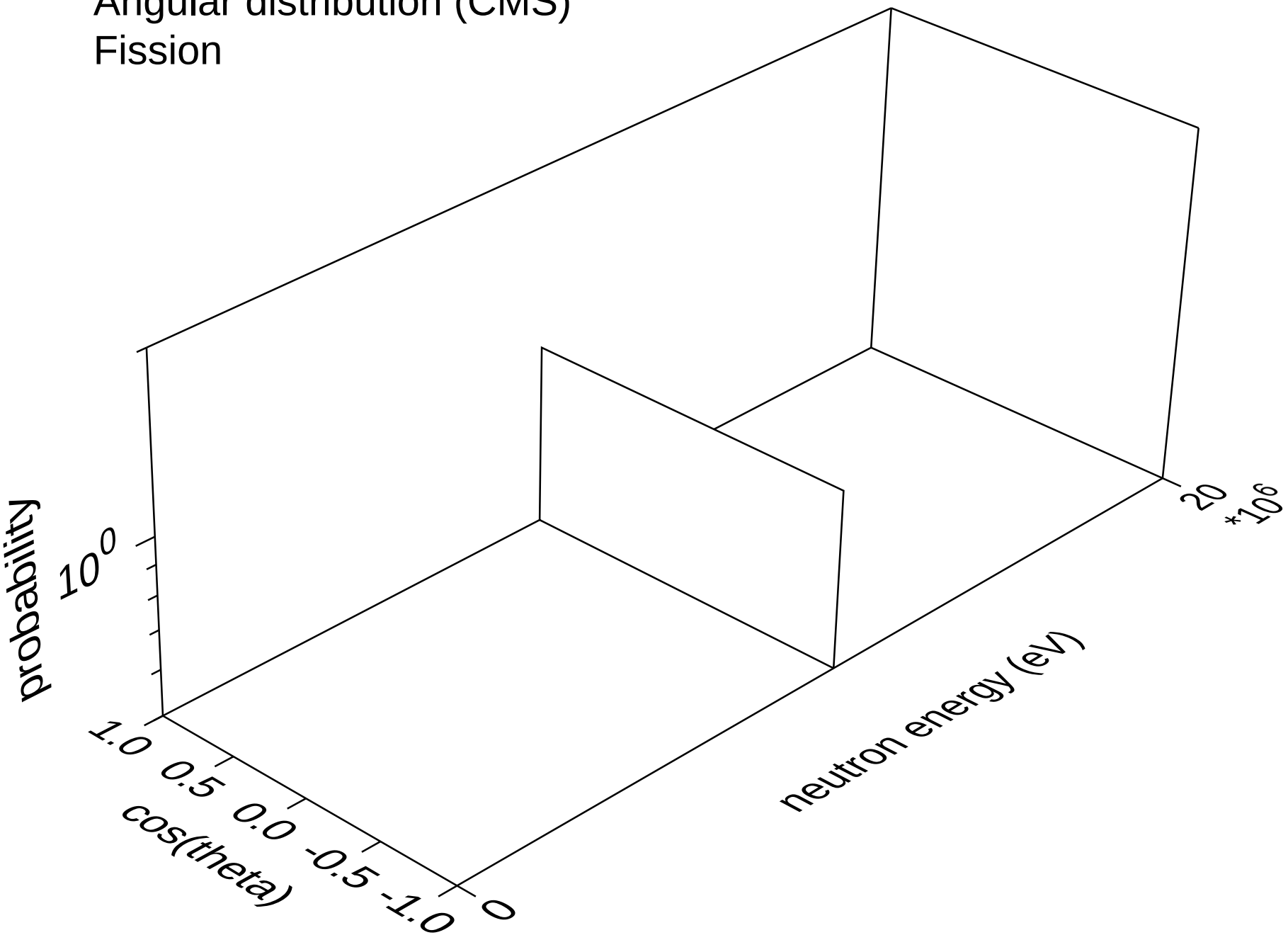

Angular distribution (CMS)
n_n_19 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

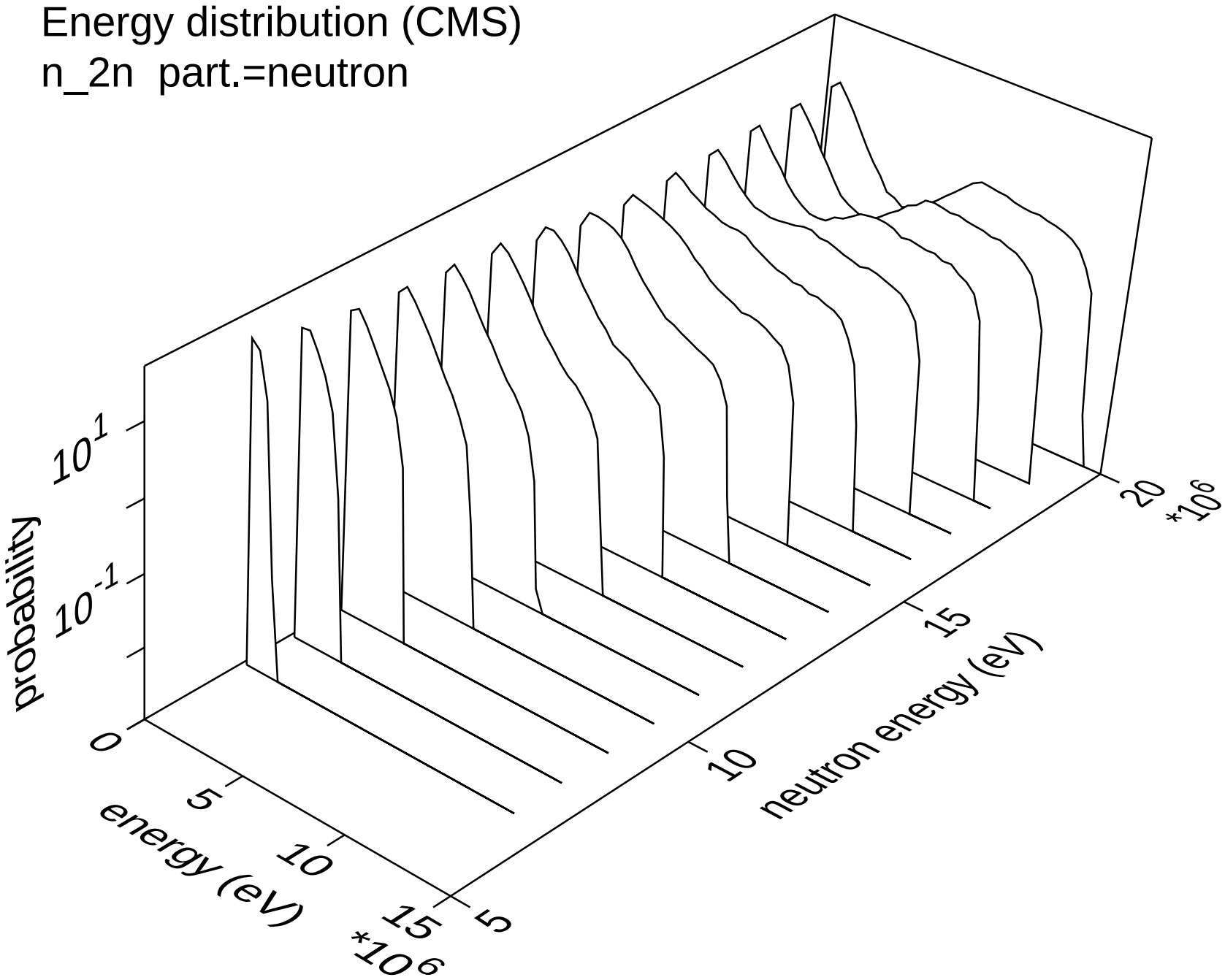

Angular distribution (CMS)
n_n_20 part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

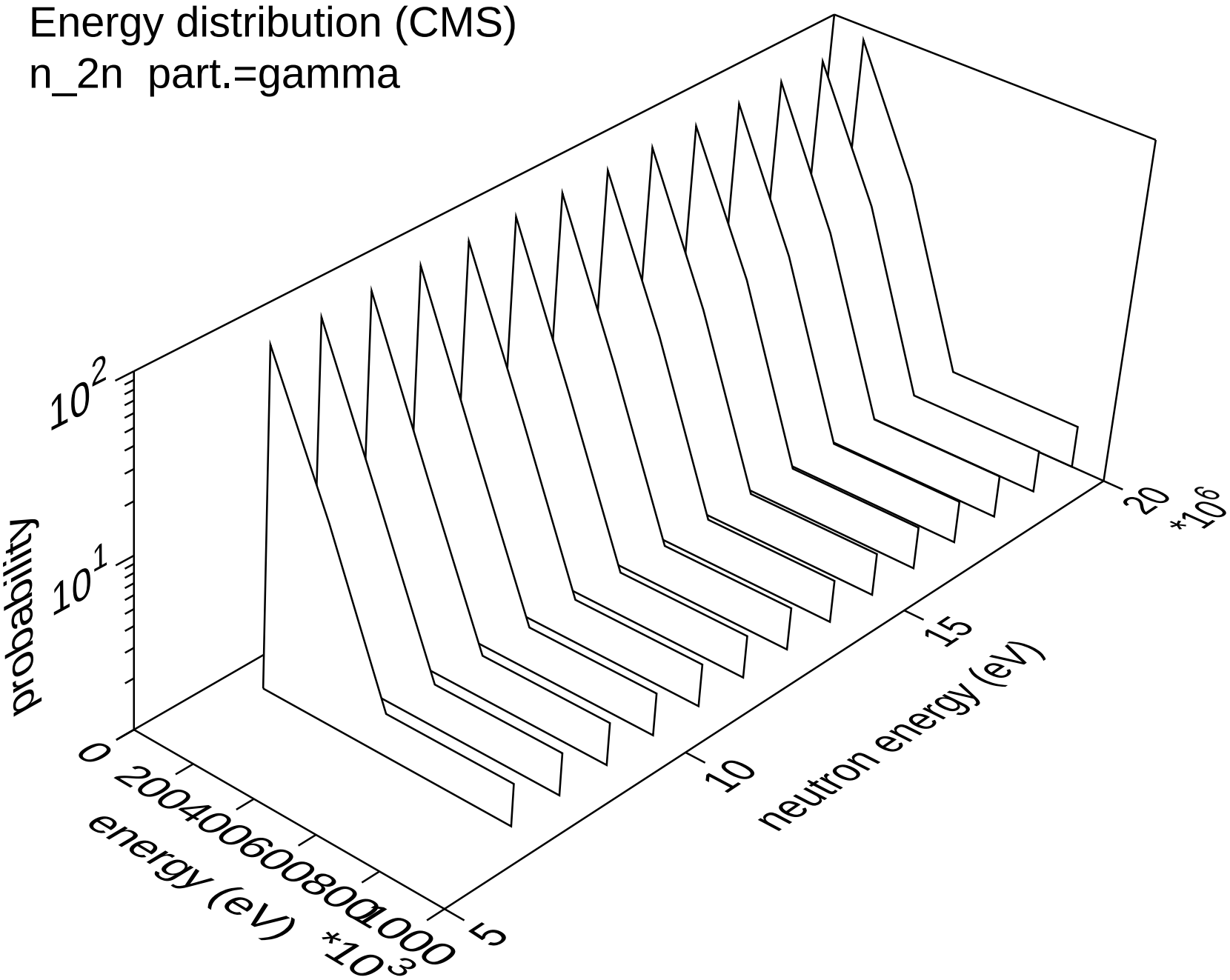

Angular distribution (CMS)
n_n_20 part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

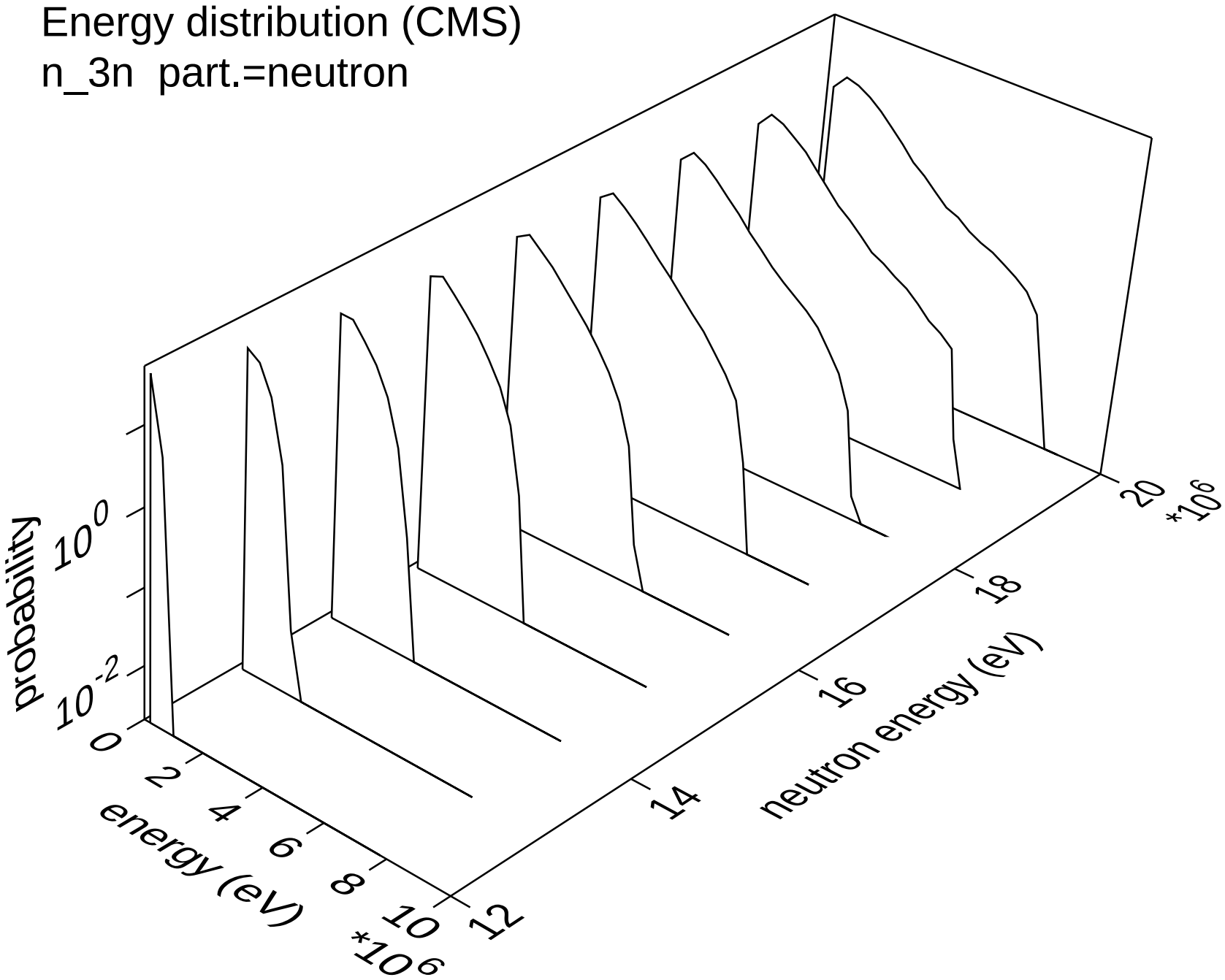

Angular distribution (CMS)
n_n_cont part.=neutron
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)

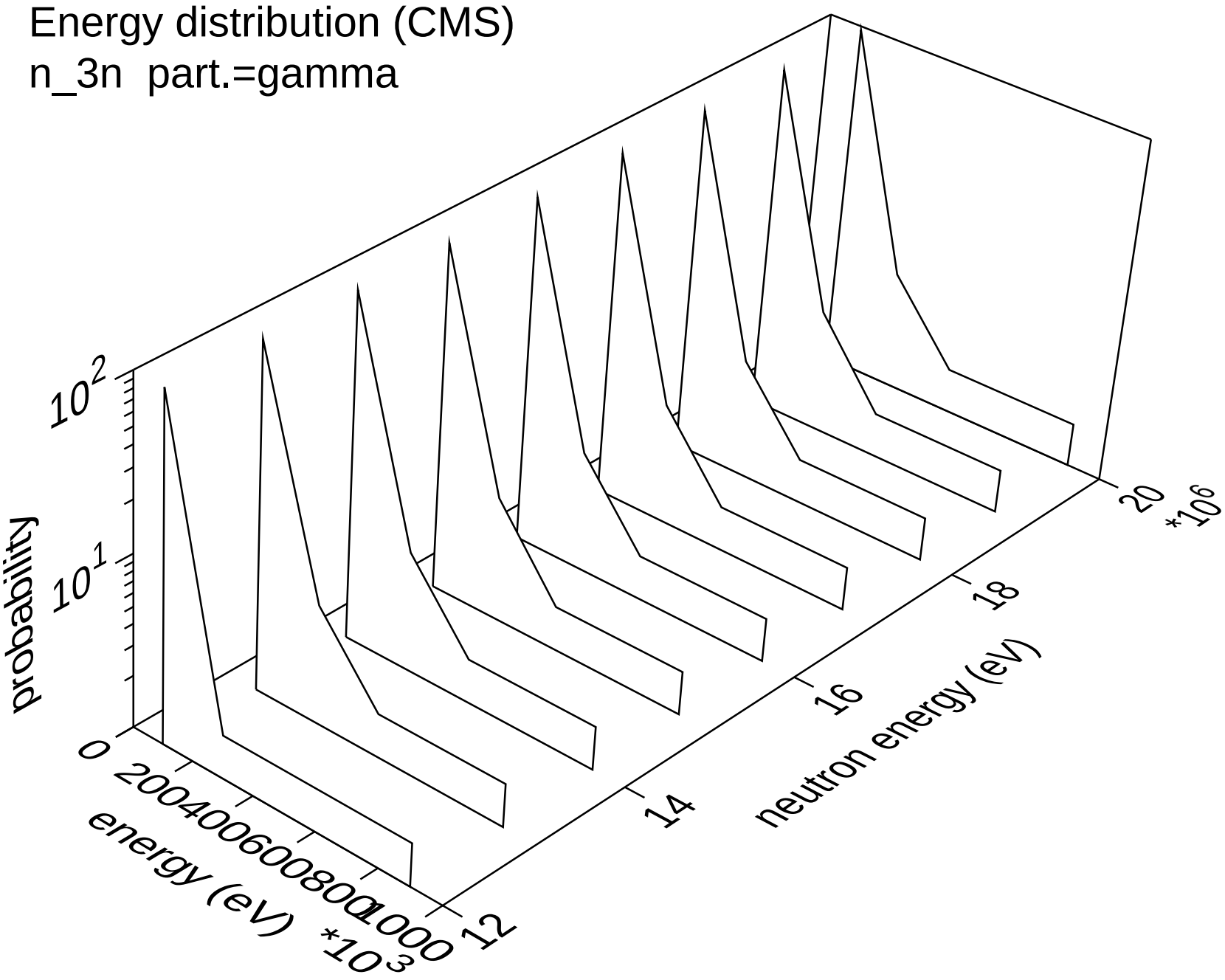

Angular distribution (CMS)
n_n_cont part.=gamma
probability
10^0
1.0
0.5
0.0
-0.5
-1.0
cos(theta)
0
5
10
15
20
*10^6
neutron energy (eV)


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

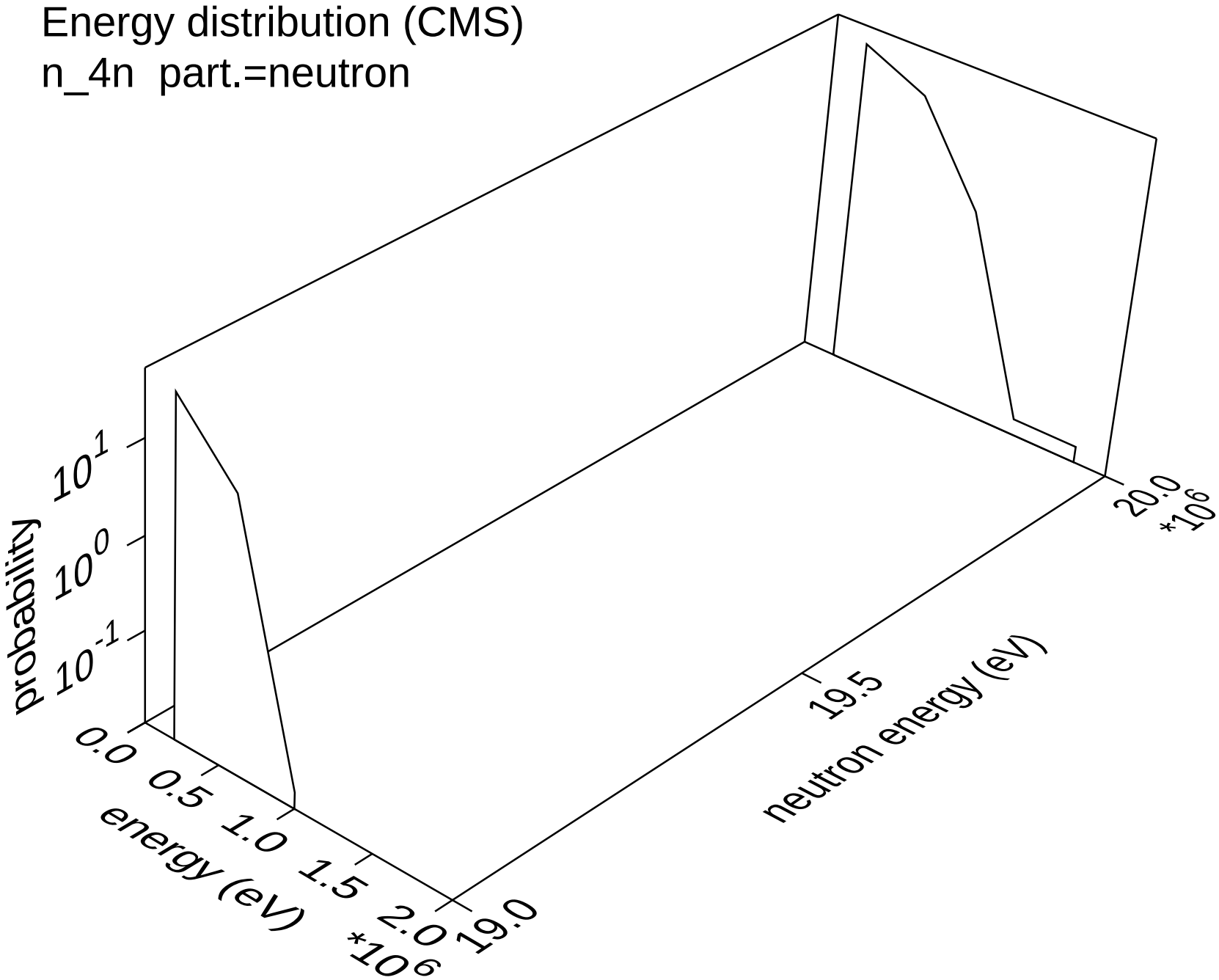

Energy distribution (CMS)
n_2n part.=neutron
probability
10^{1}
10^{-1}
0
energy (eV)
5
10
15
*10^6
5
10
15
20
*10^6
neutron energy (eV)

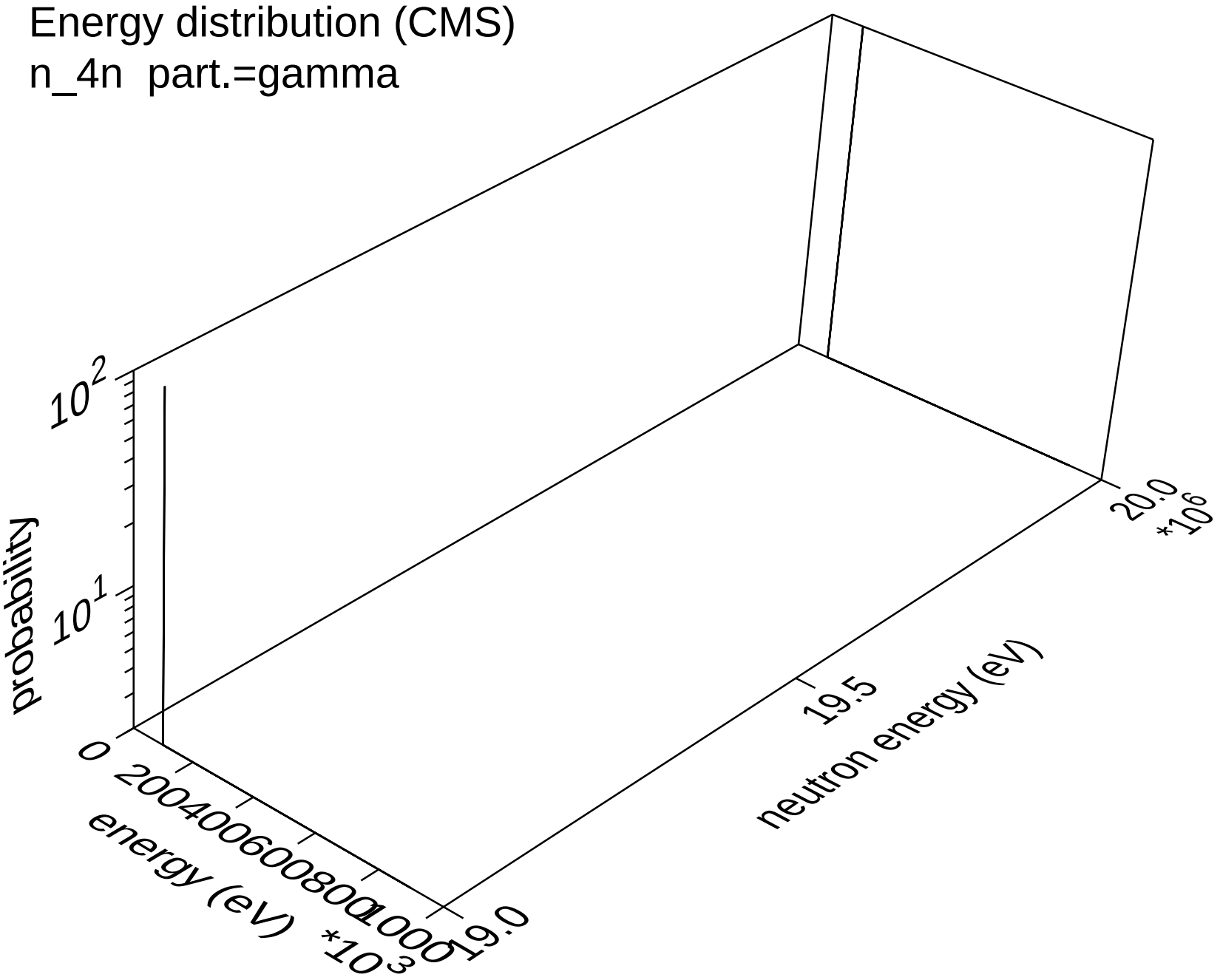

Energy distribution (CMS)
n_2n part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
5
10
15
20
neutron energy (eV) *10^6

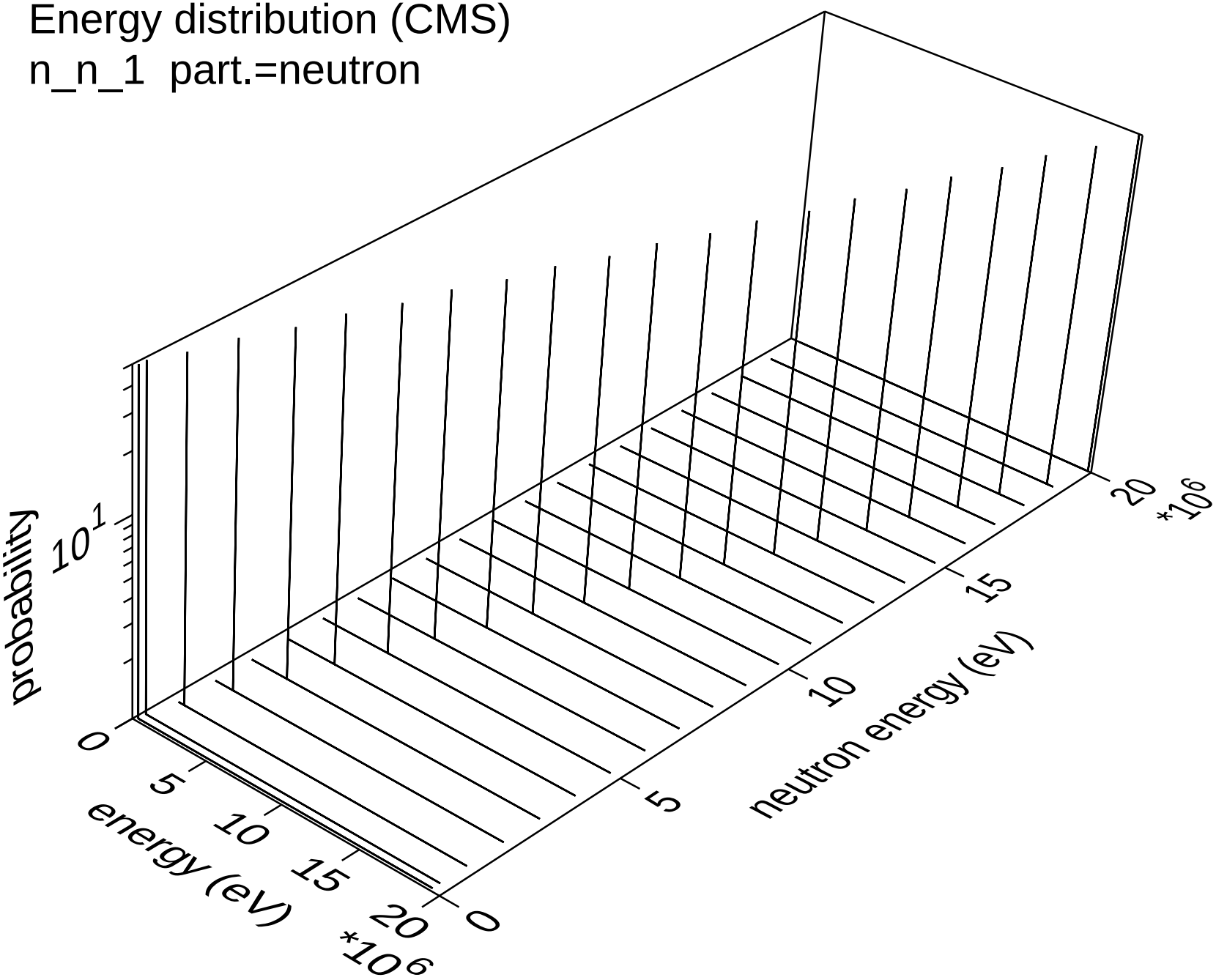

Energy distribution (CMS)
n_3n part.=neutron
probability
10^{0}
10^{-2}
0
2
4
6
8
10
12
*10^6
energy (eV)
14
16
18
20
*10^6
neutron energy (eV)

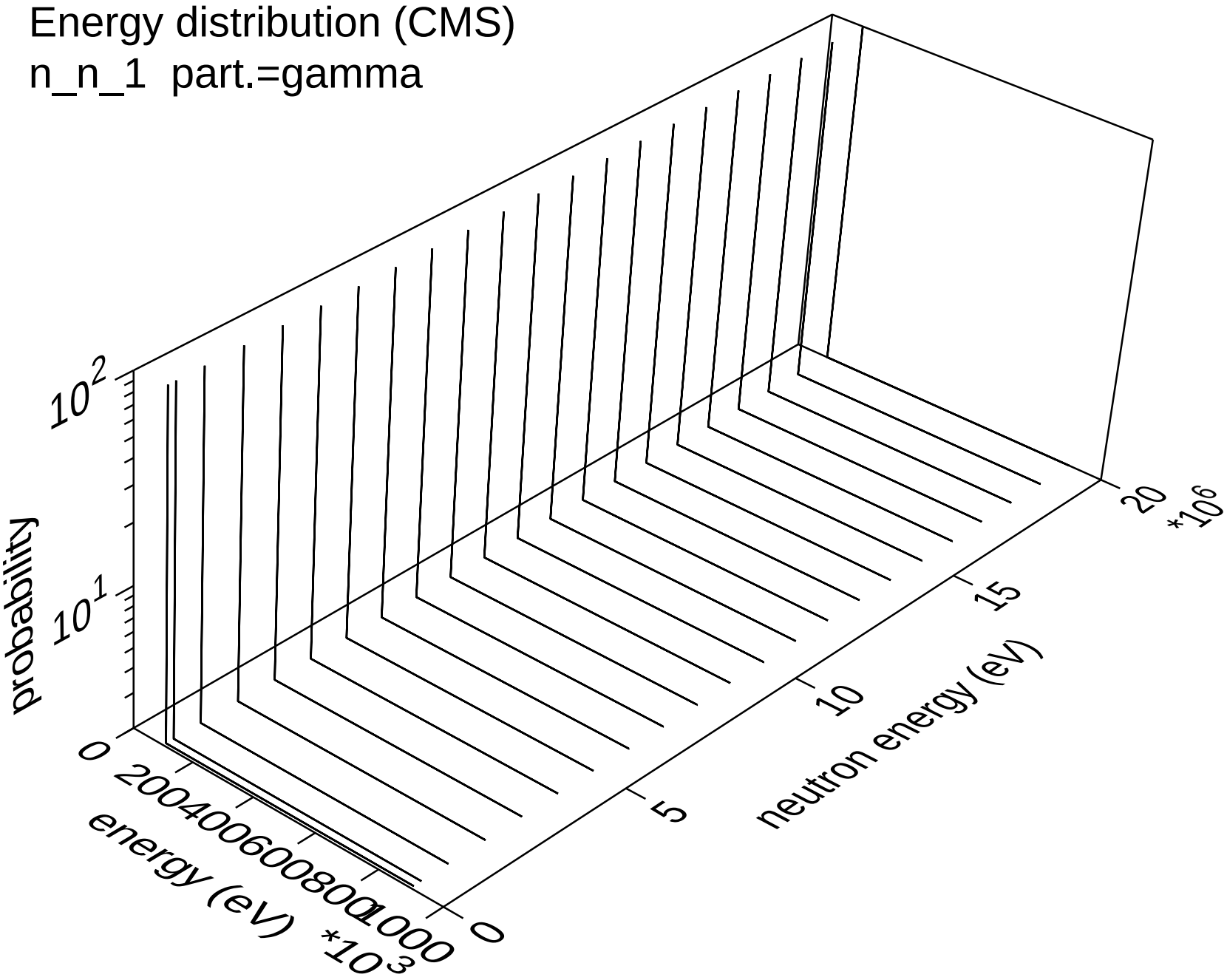


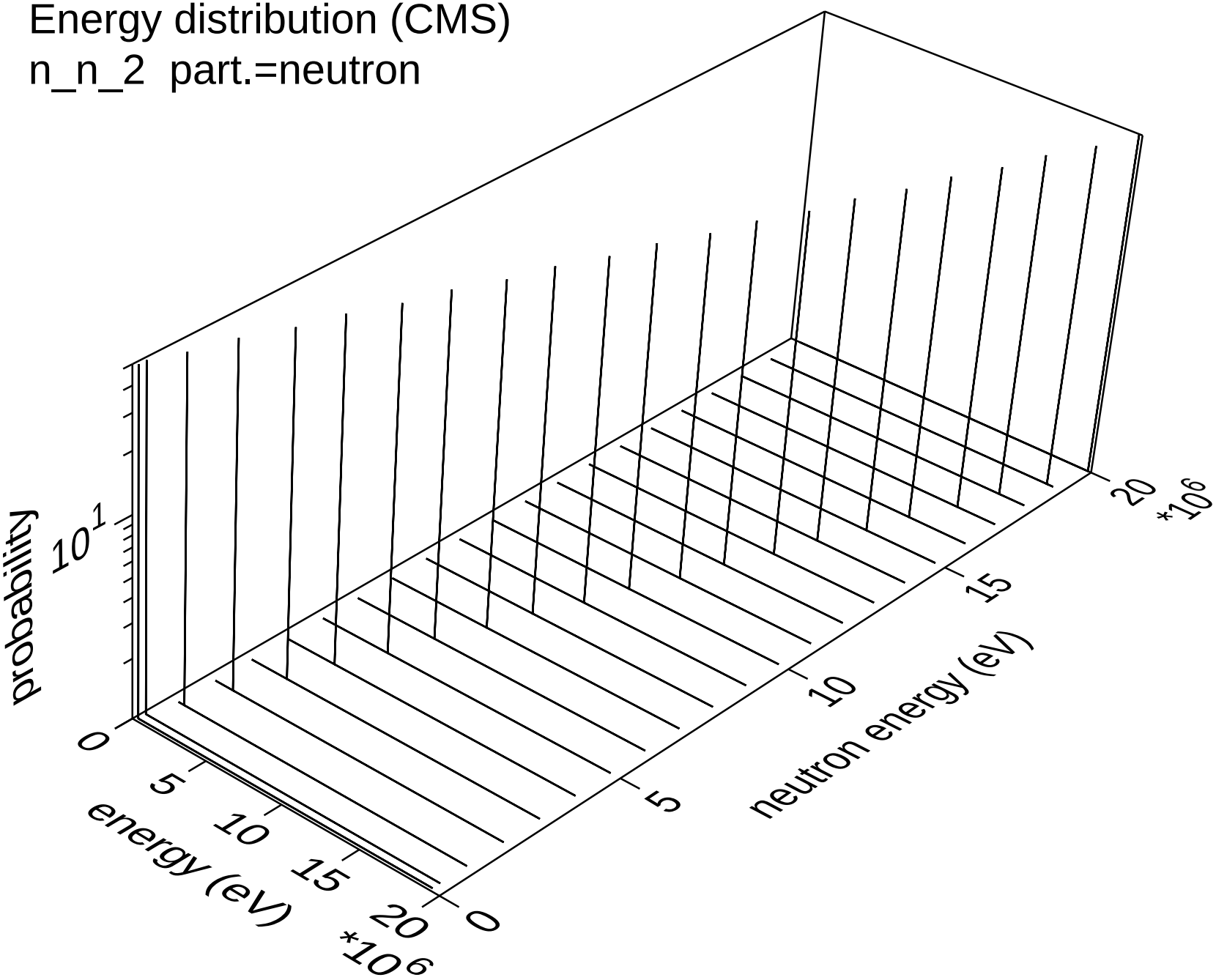
Energy distribution (CMS)
n_3n part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV)
*10^3
12
14
16
18
20
neutron energy (eV)
*10^6

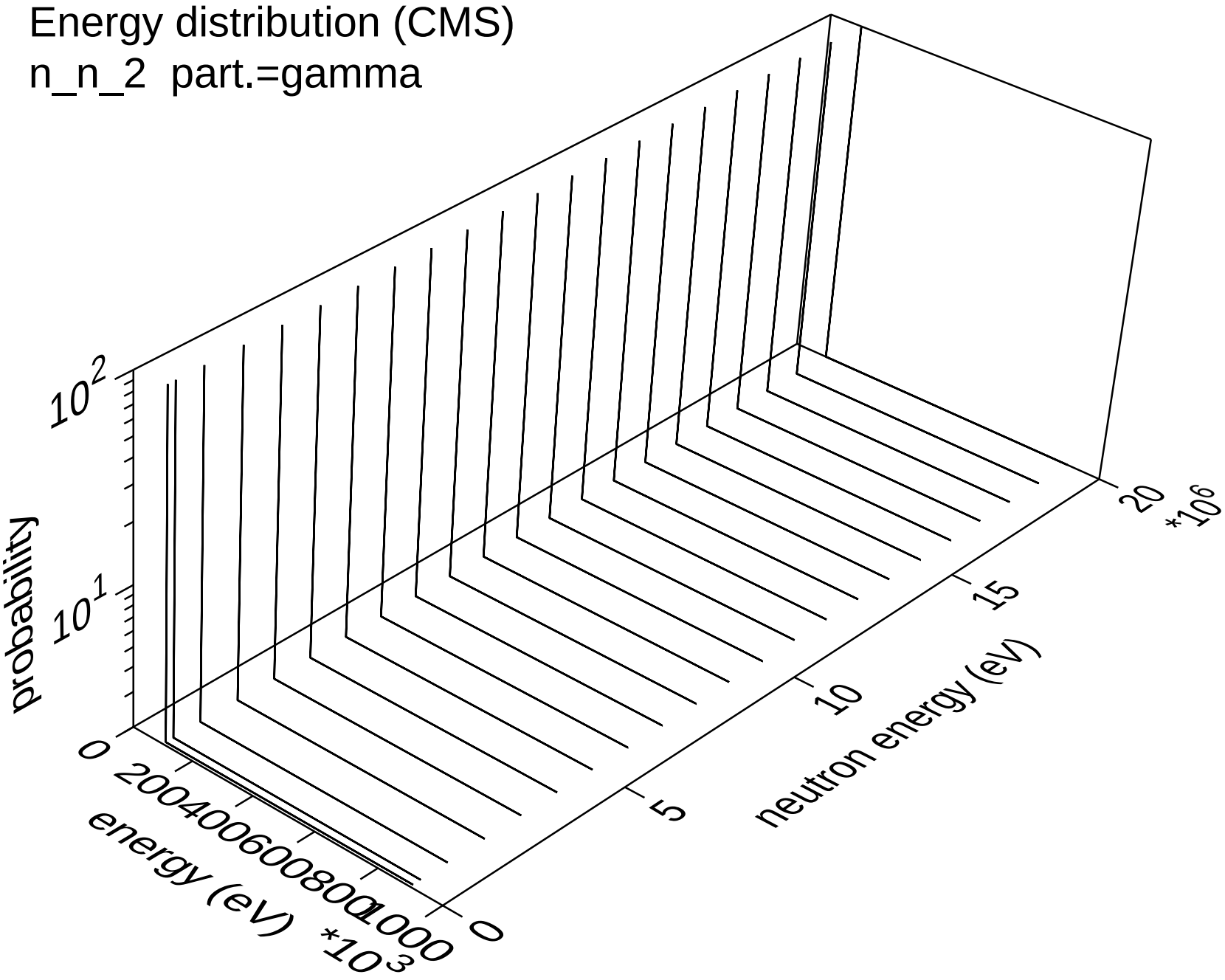

Energy distribution (CMS)
n_4n part.=neutron
probability
10^{1}
10^{0}
10^{-1}
0.0
0.5
1.0
1.5
2.0
*10^6
energy (eV)
19.0
19.5
20.0
*10^6
neutron energy (eV)

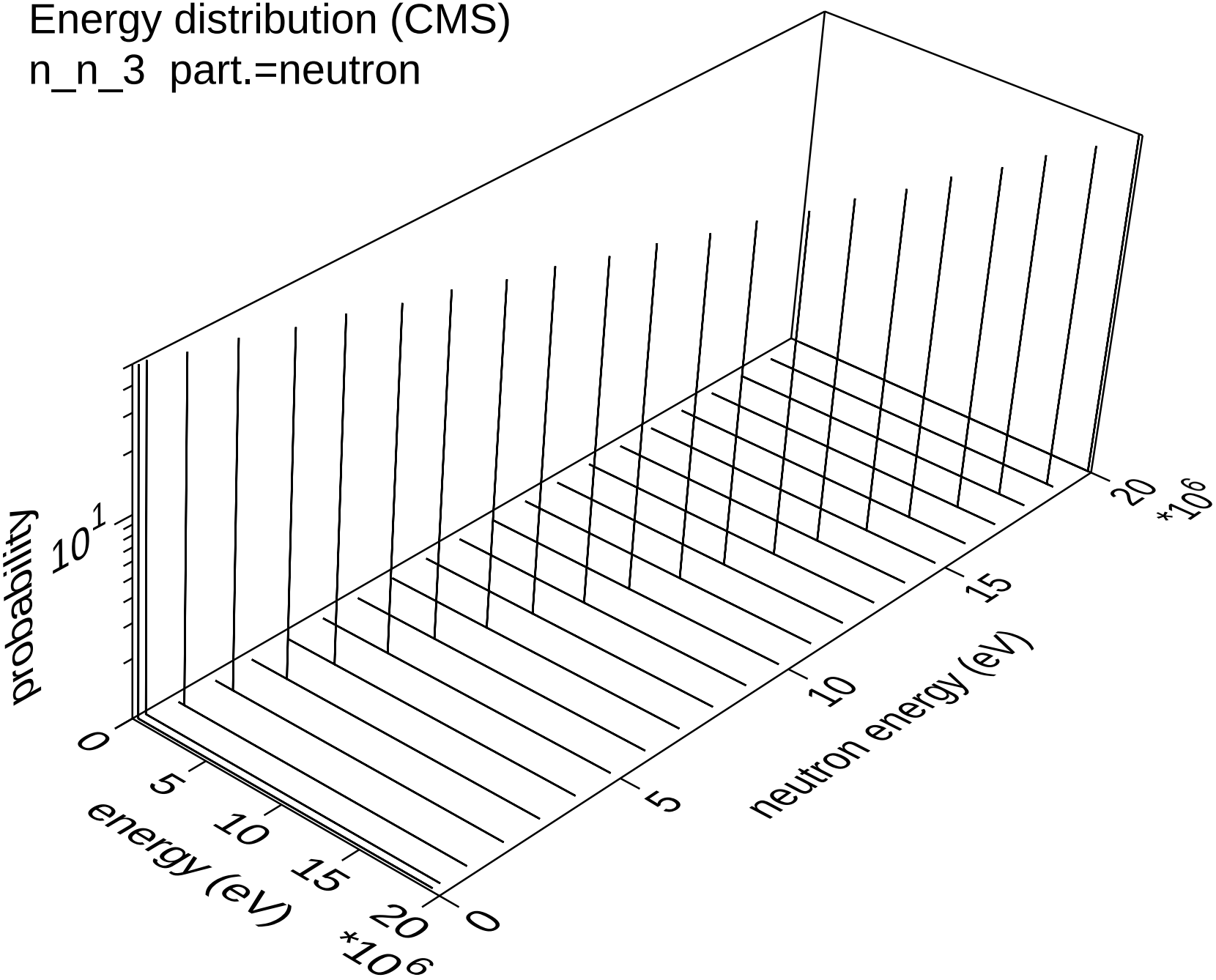

Energy distribution (CMS)
n_4n part.=gamma
probability
10^2
10^1
0
2004006008001000
energy (eV) *10^3
19.0
19.5
20.0
*10^6
neutron energy (eV)

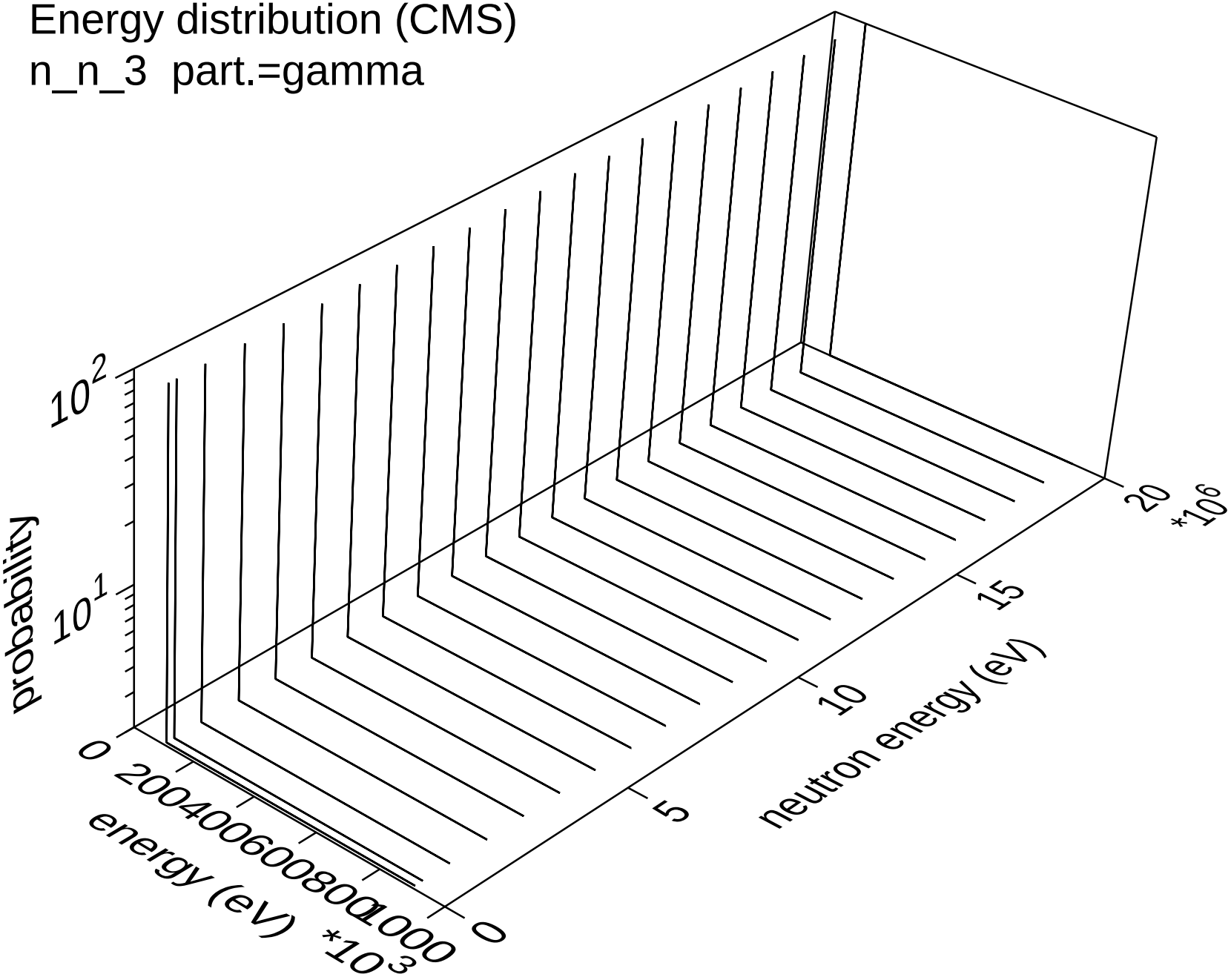

Energy distribution (CMS)
n_n_1 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

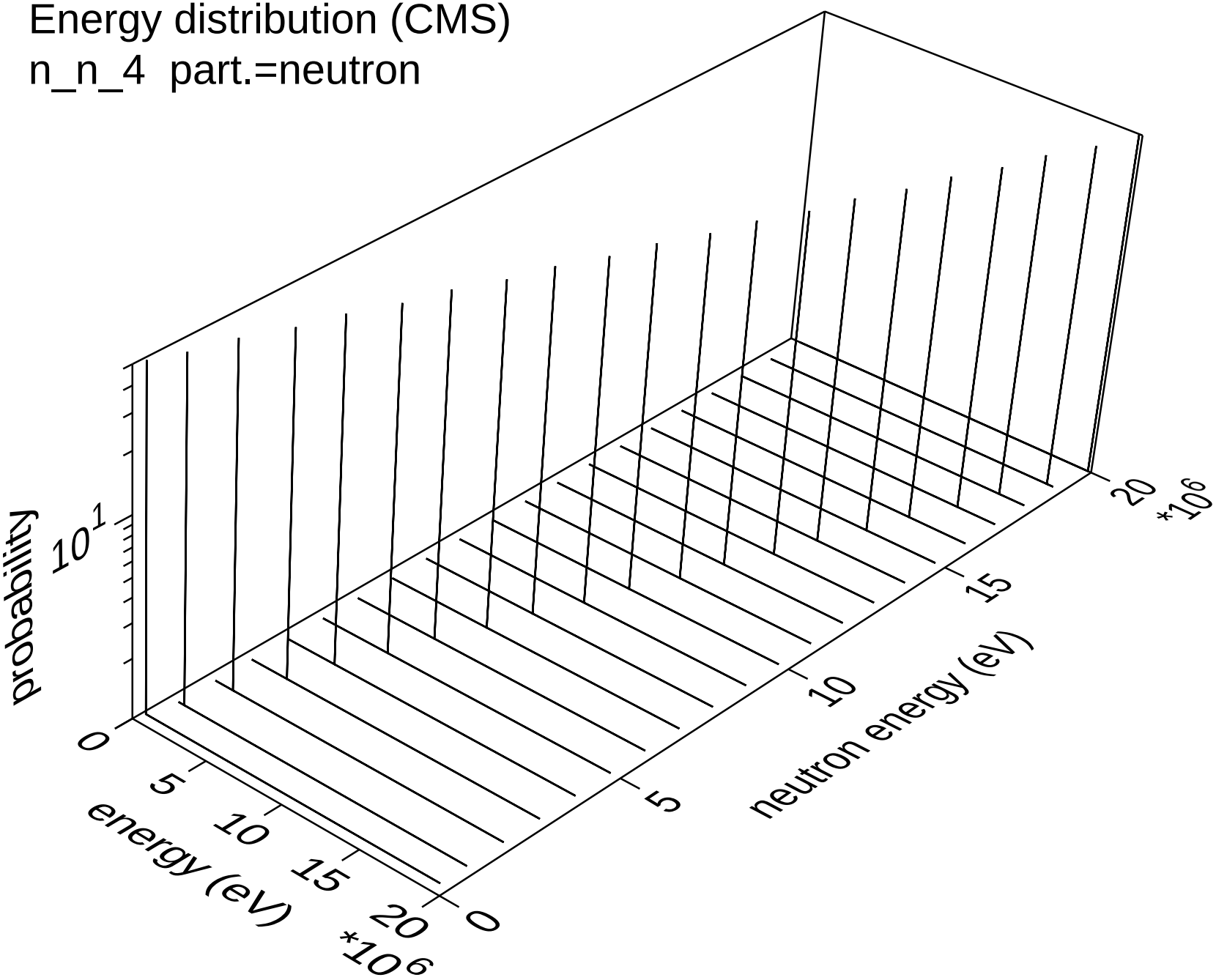

Energy distribution (CMS)
n_n_1 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

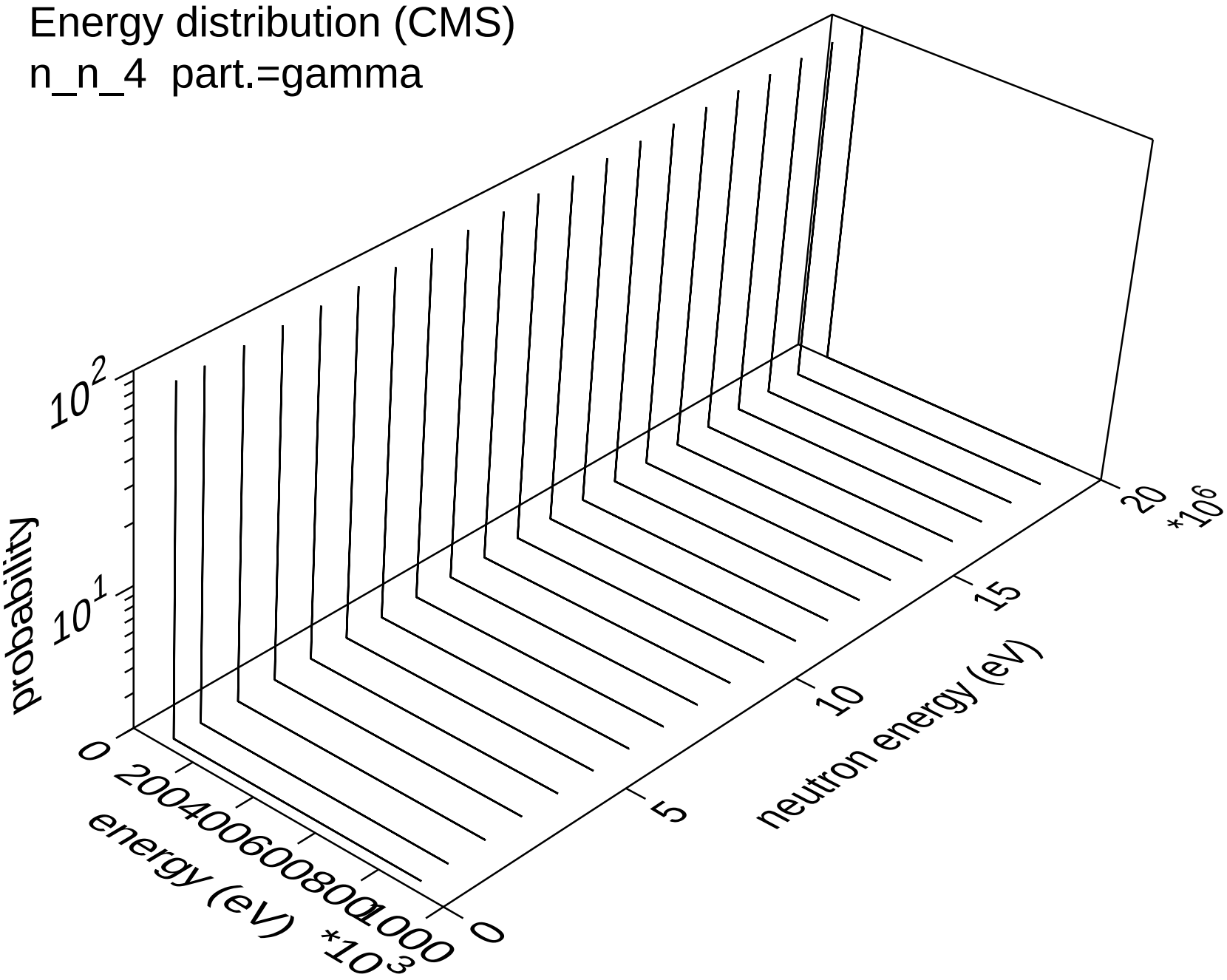

Energy distribution (CMS)
n_n_2 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

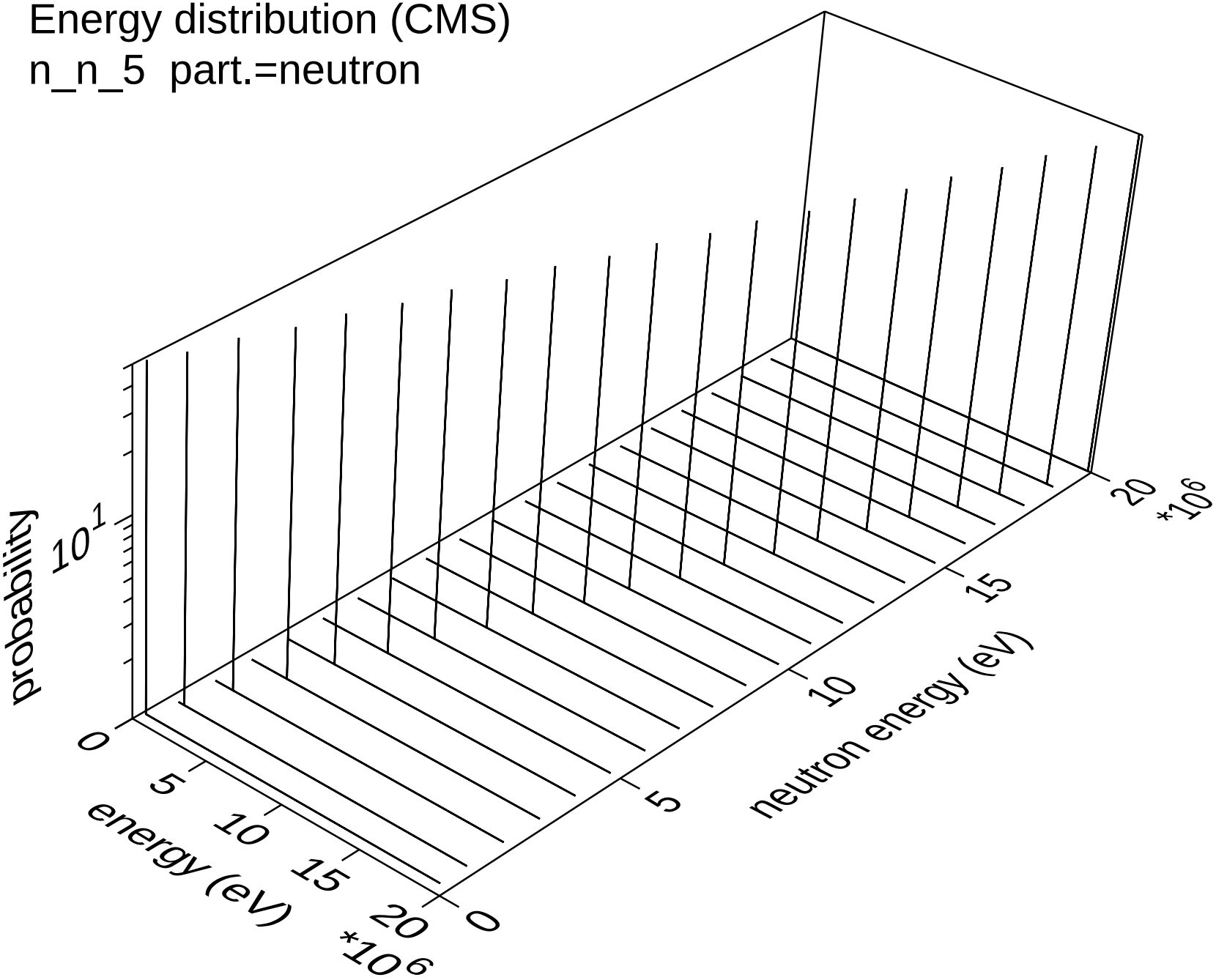

Energy distribution (CMS)
n_n_2 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

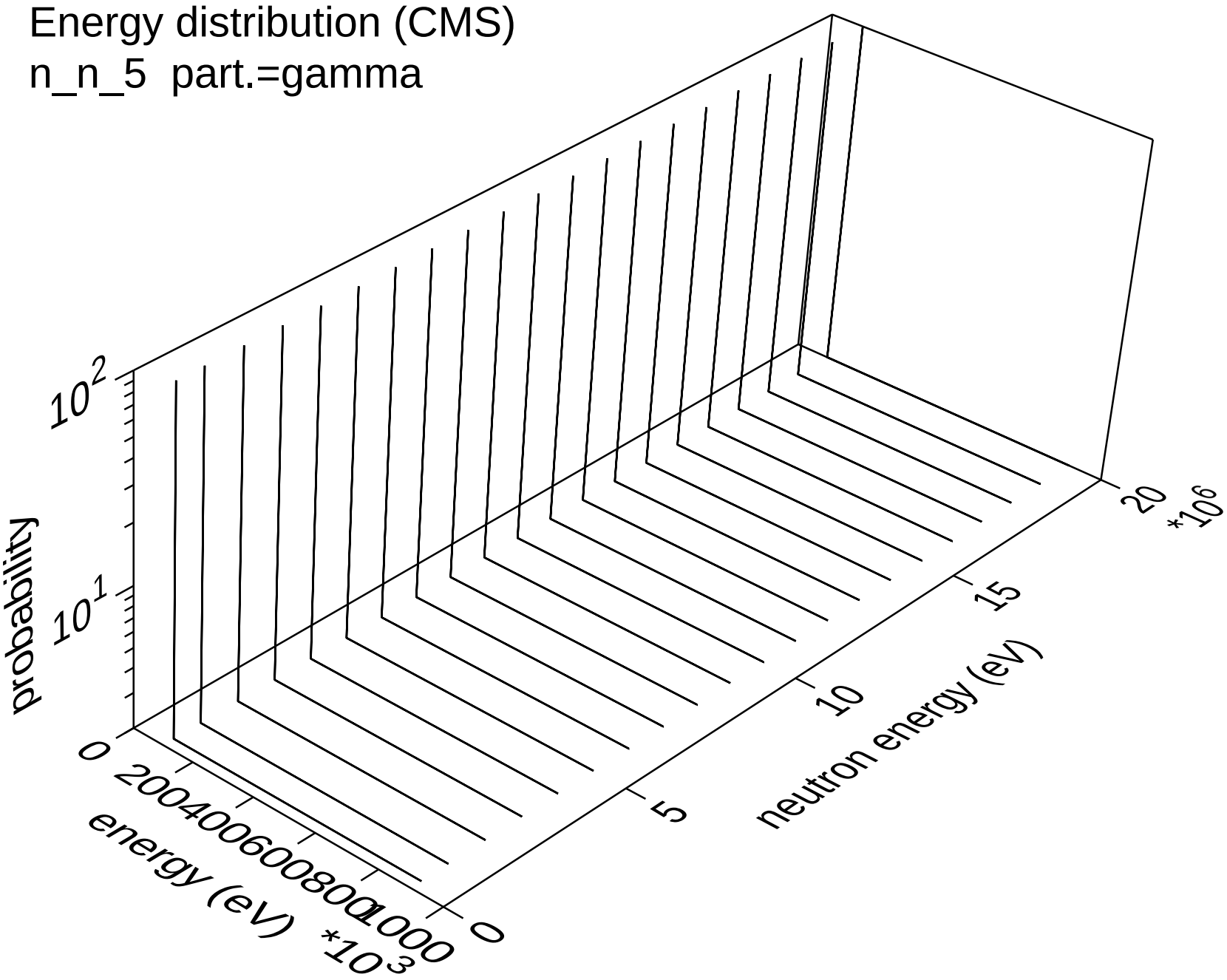

Energy distribution (CMS)
n_n_3 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

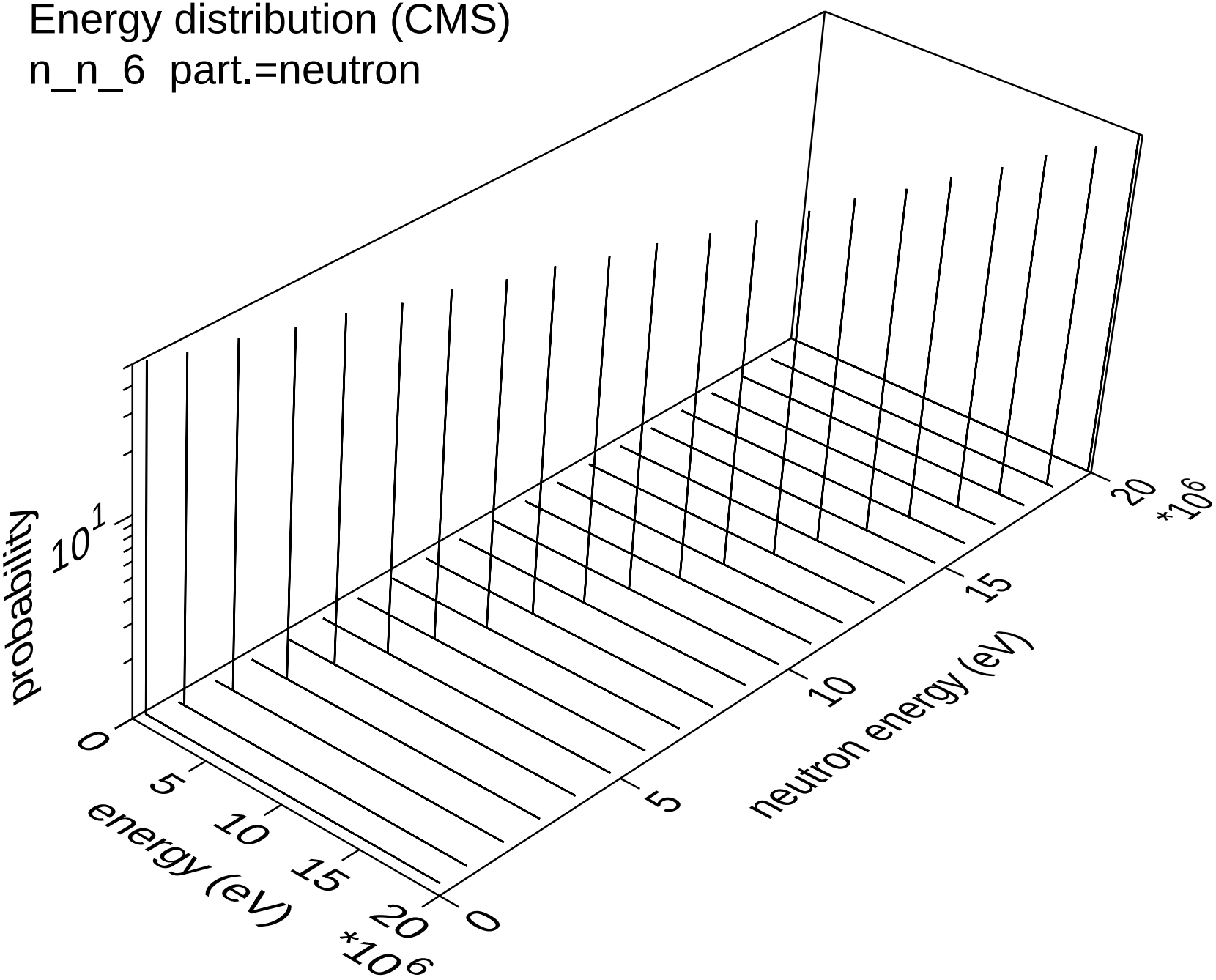

Energy distribution (CMS)
n_n_3 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
0
energy (eV) *10^3
5
10
15
20
*10^6
neutron energy (eV)

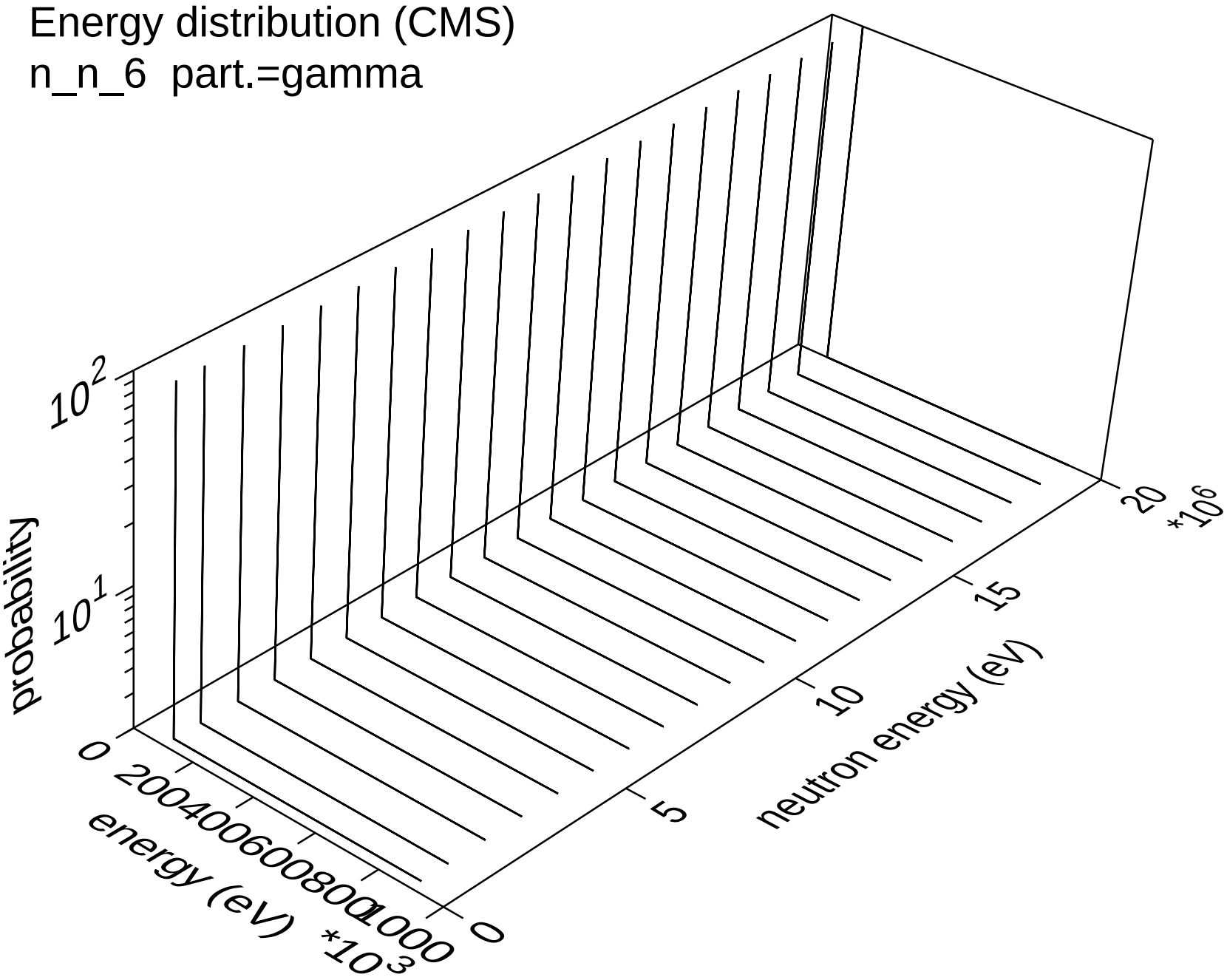

Energy distribution (CMS)
n_n_4 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

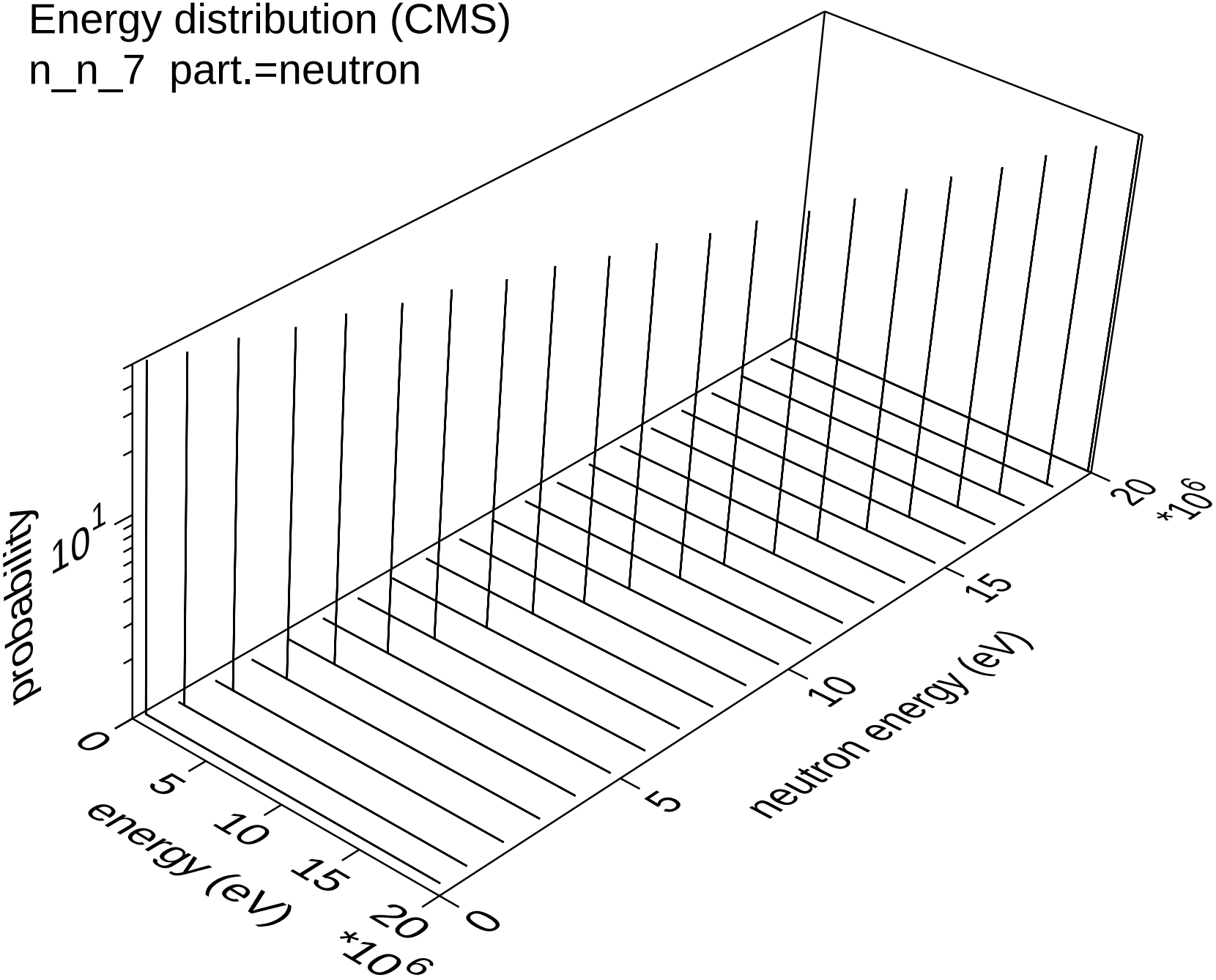

Energy distribution (CMS)
n_n_4 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

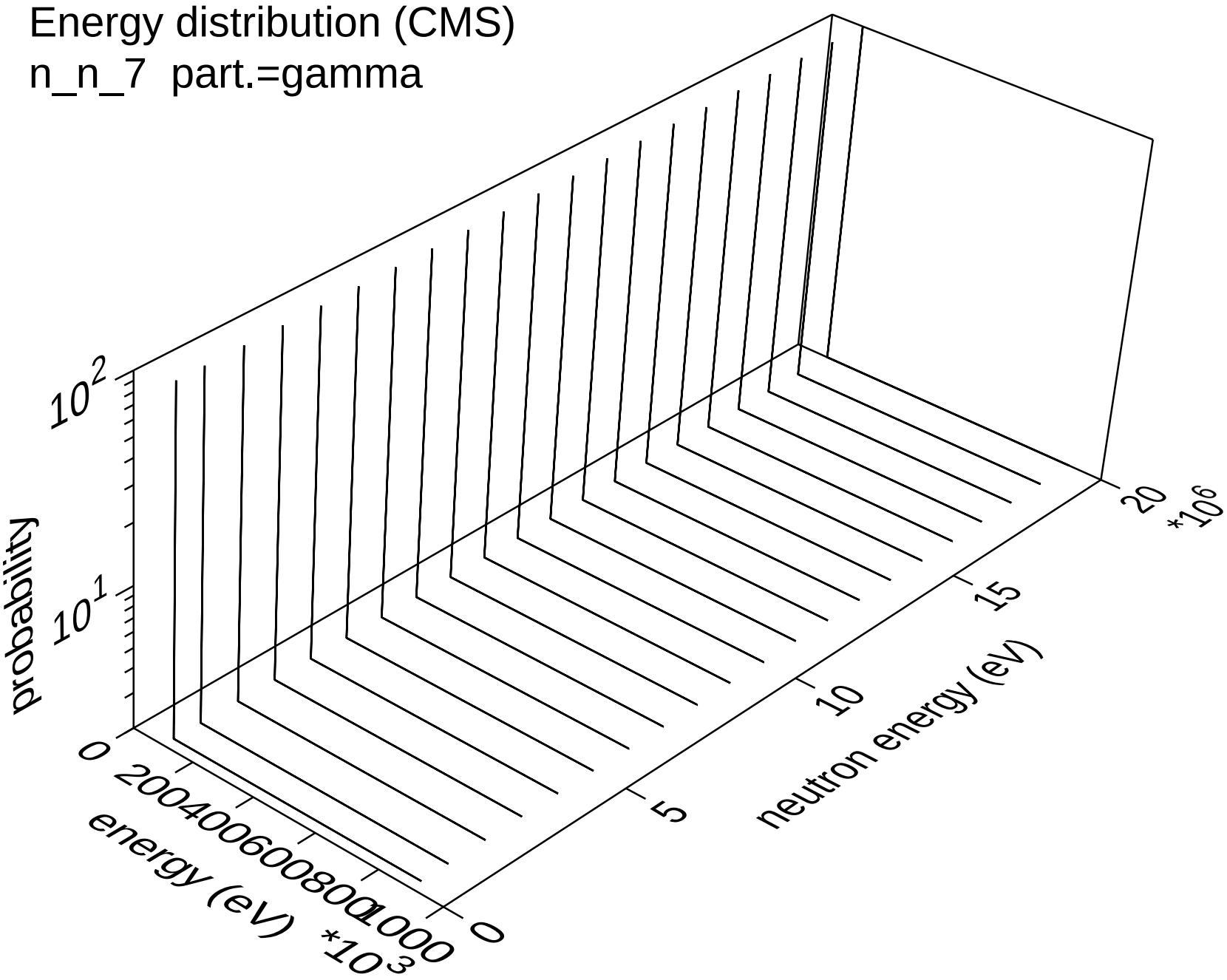

Energy distribution (CMS)
n_n_5 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

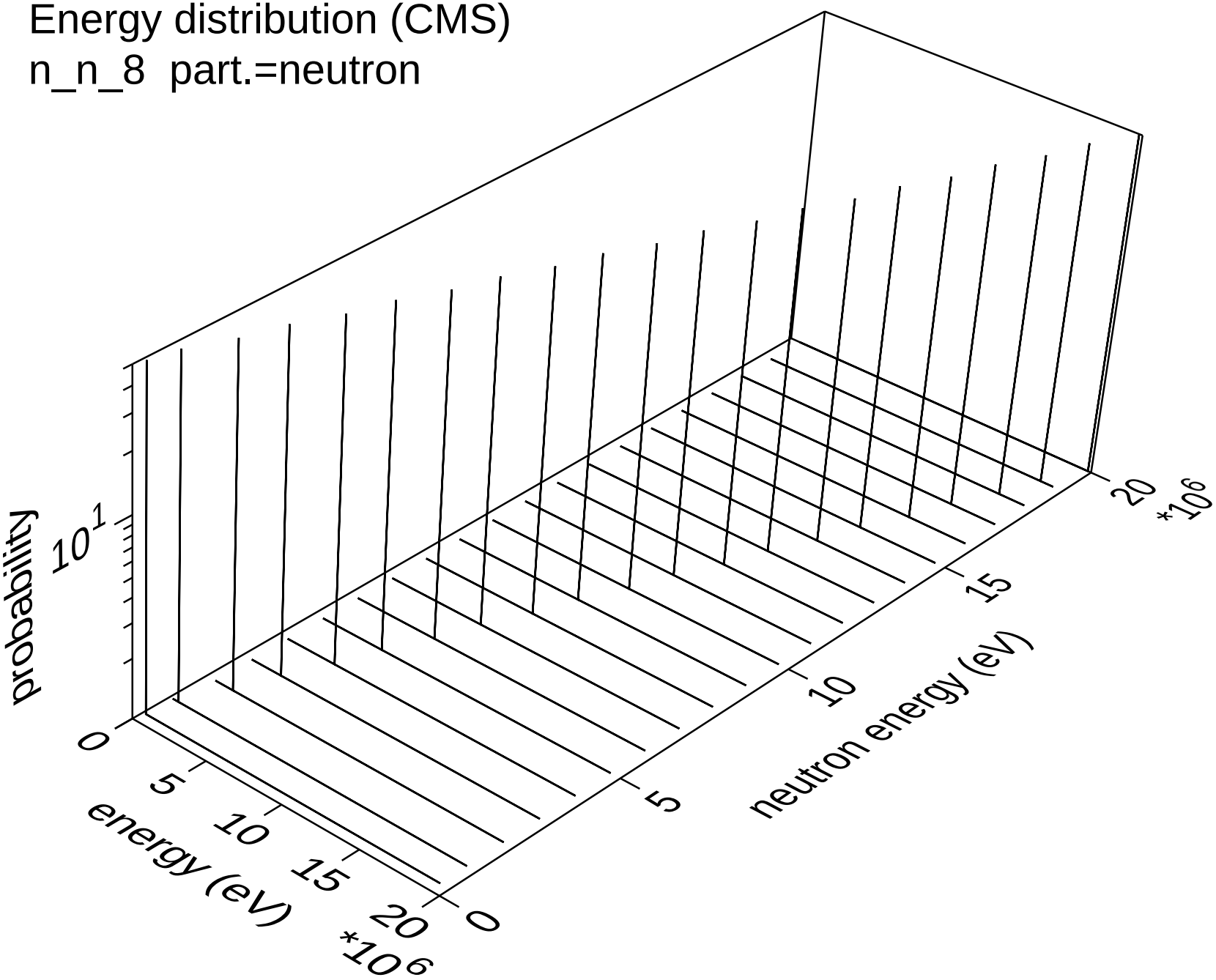

Energy distribution (CMS)
n_n_5 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

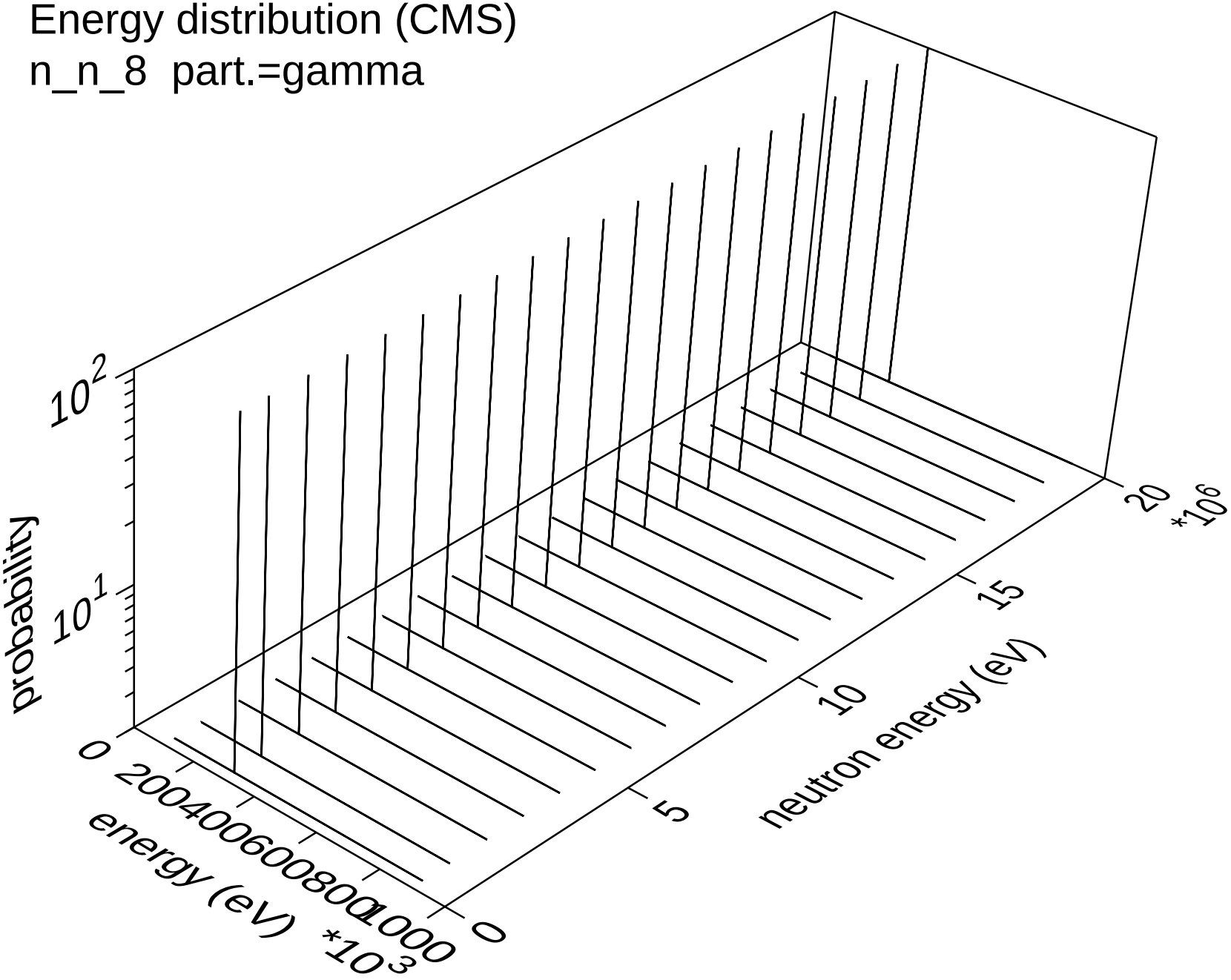

Energy distribution (CMS)
n_n_6 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

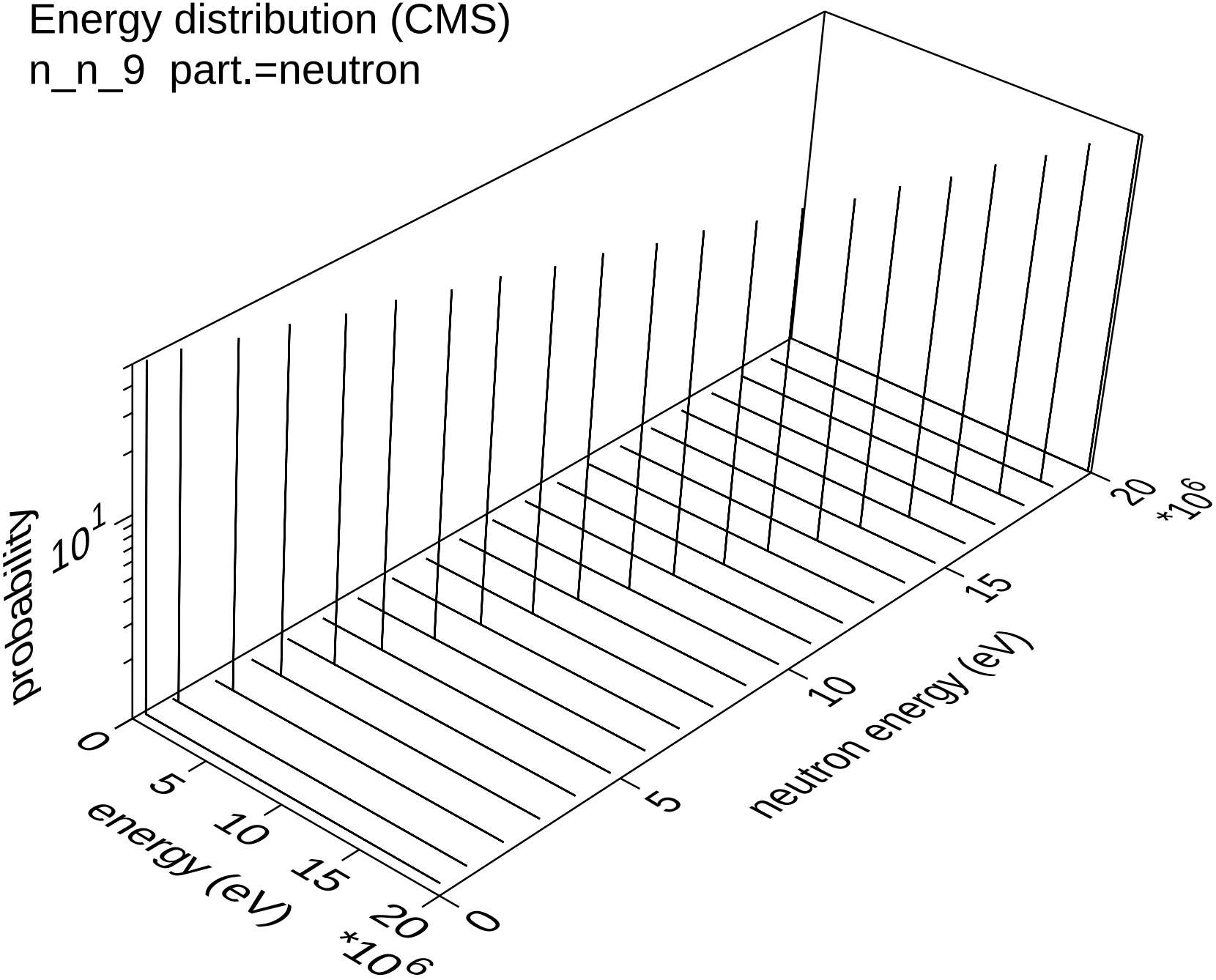

Energy distribution (CMS)
n_n_6 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

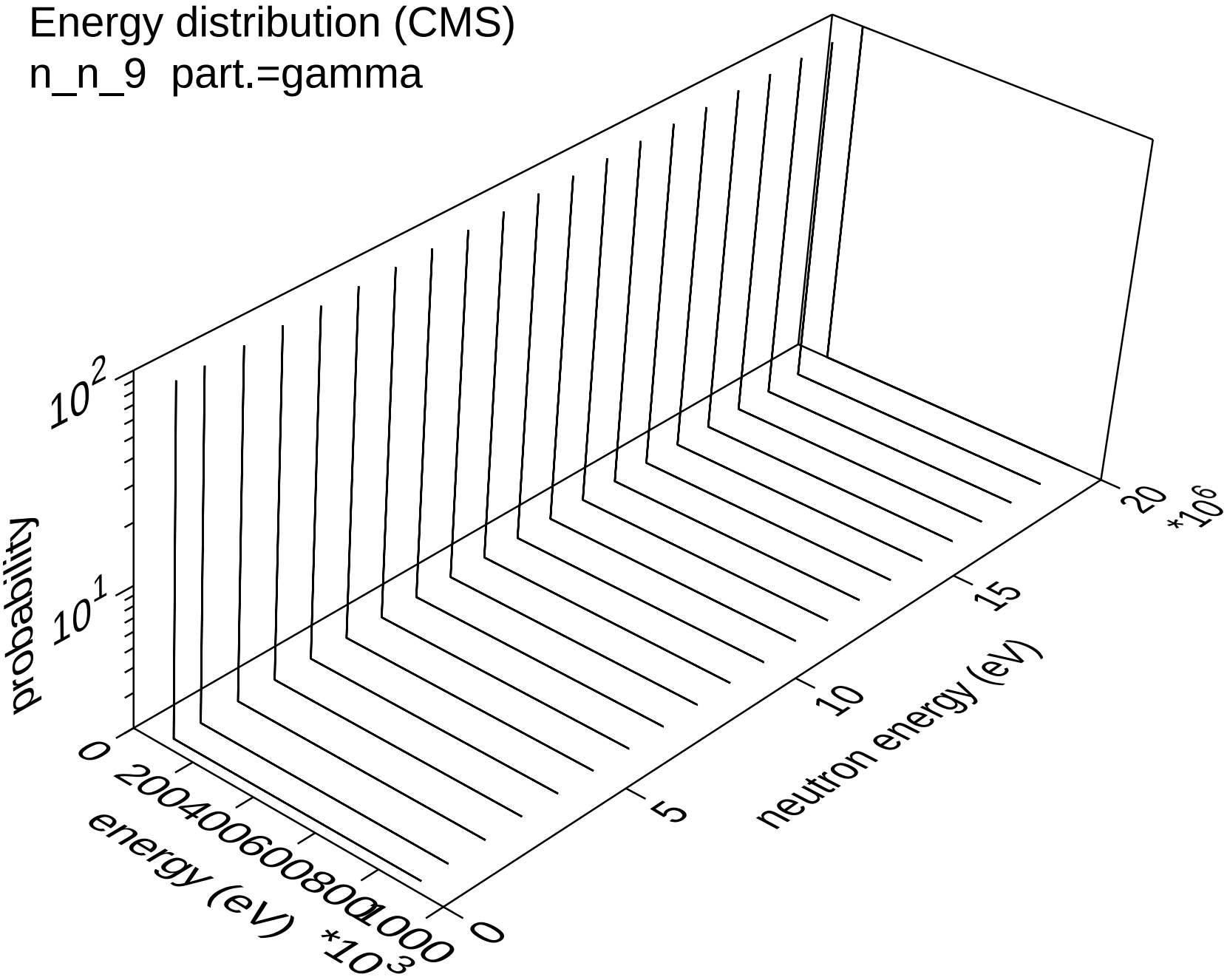

Energy distribution (CMS)
n_n_7 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

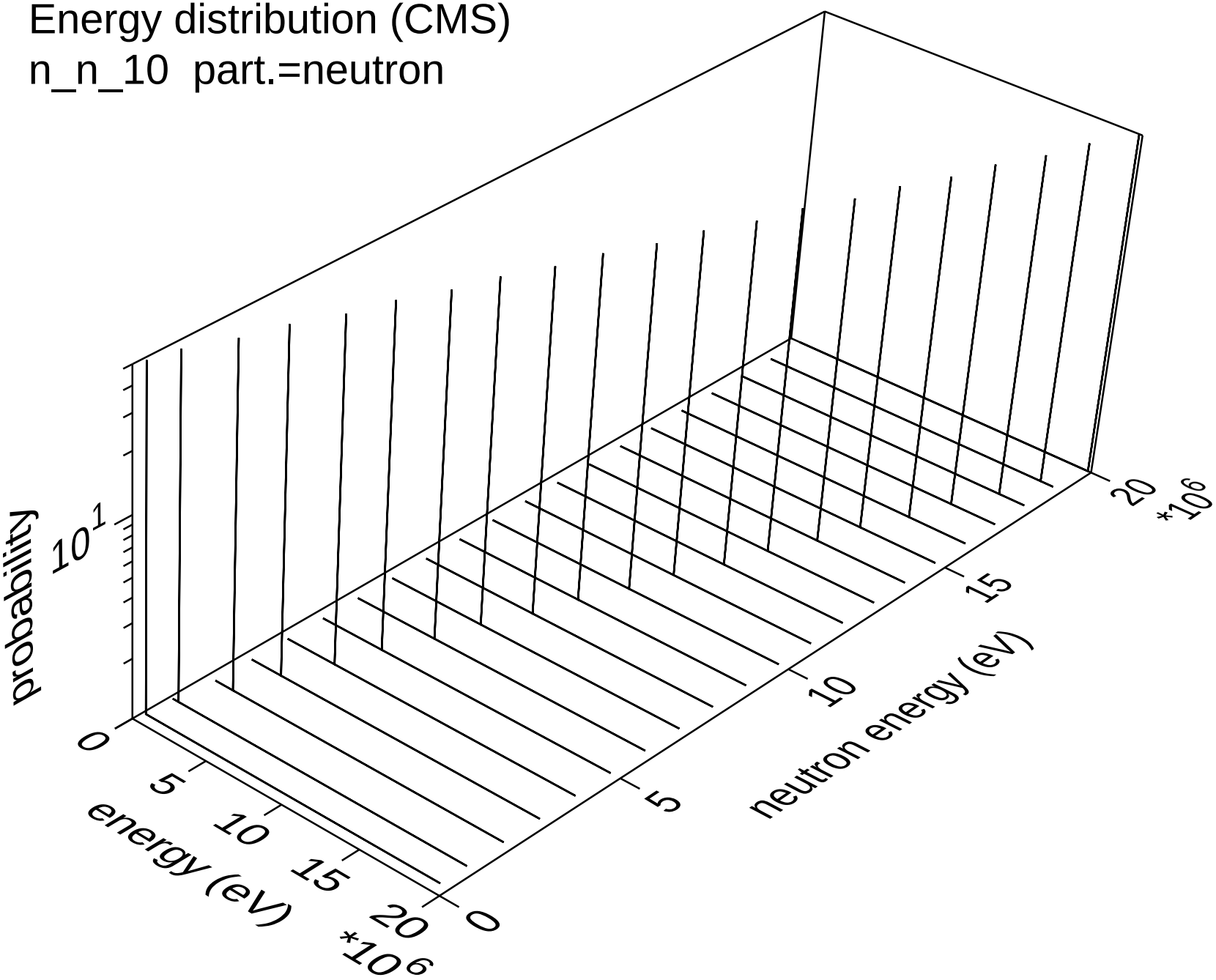

Energy distribution (CMS)
n_n_7 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
0
energy (eV) *10^3
5
10
15
20
neutron energy (eV) *10^6

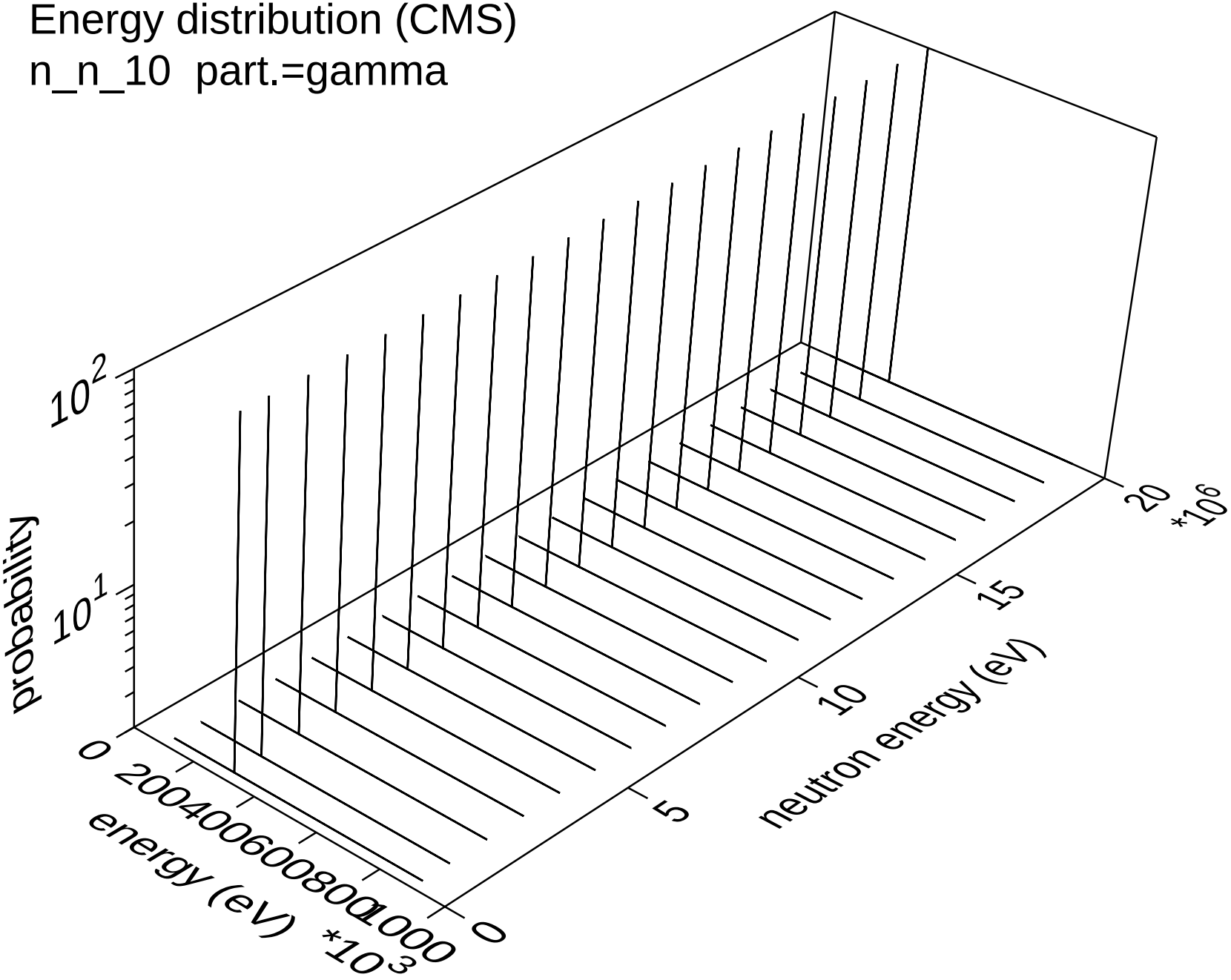

Energy distribution (CMS)
n_n_8 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

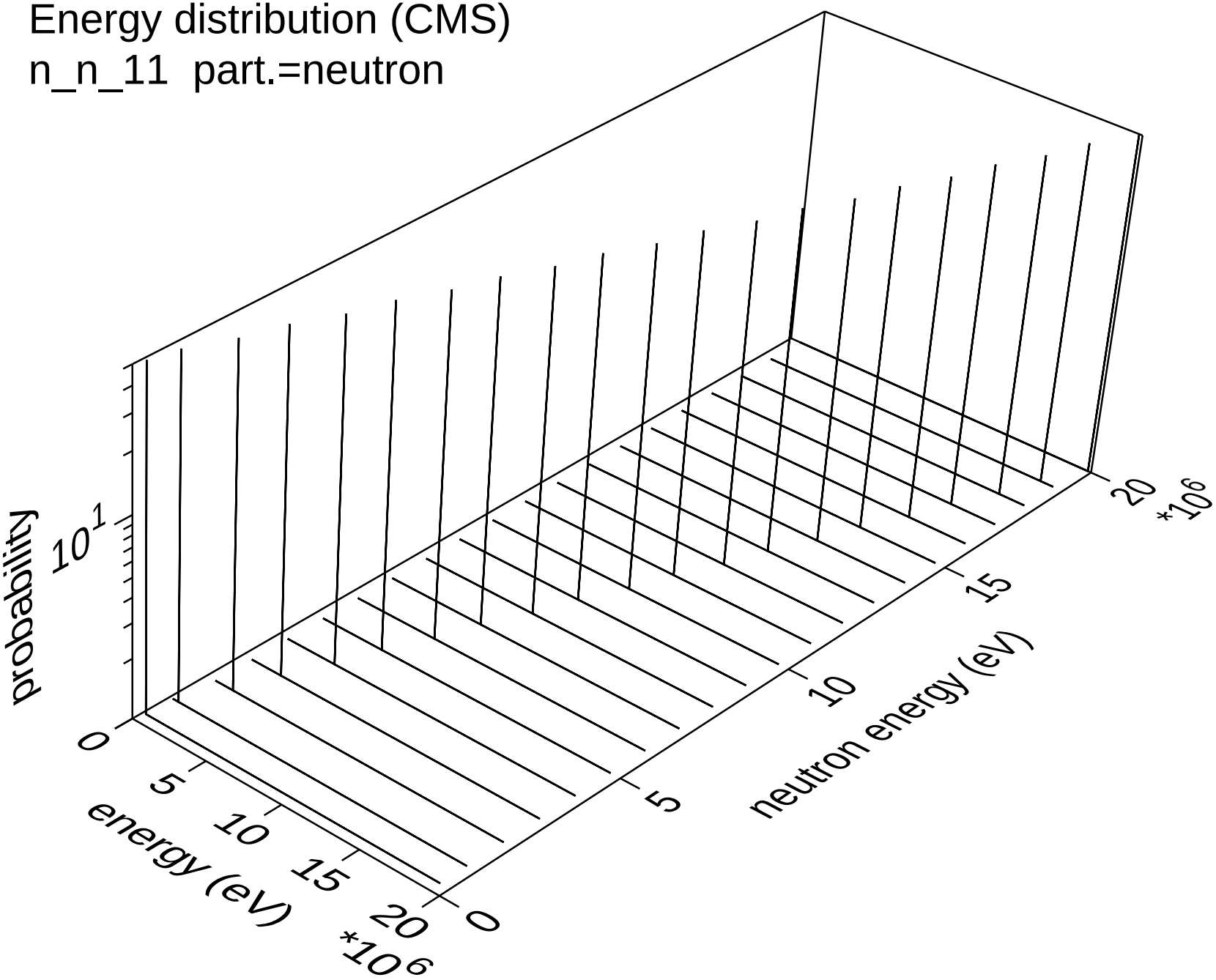

Energy distribution (CMS)
n_n_8 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

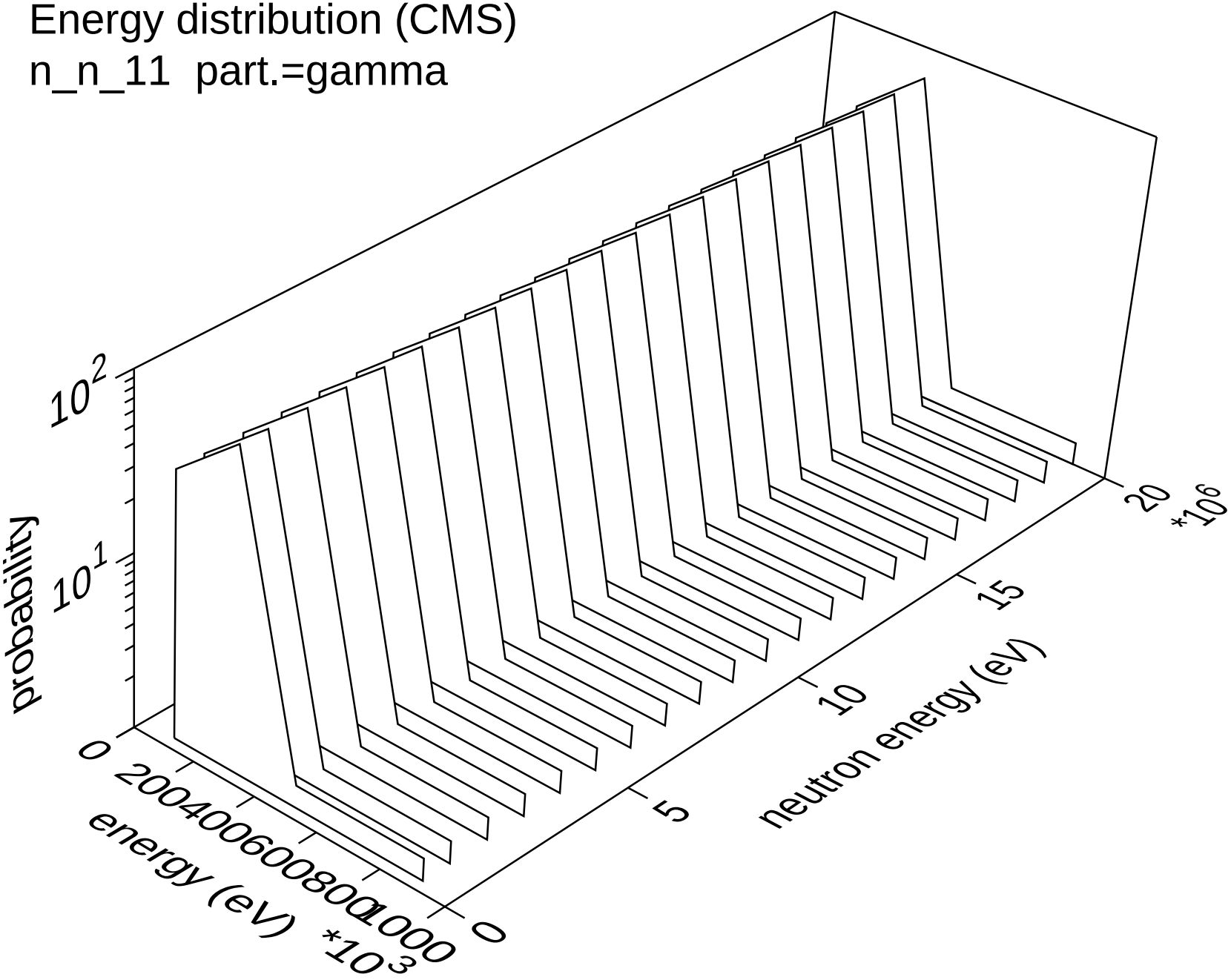

Energy distribution (CMS)
n_n_9 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

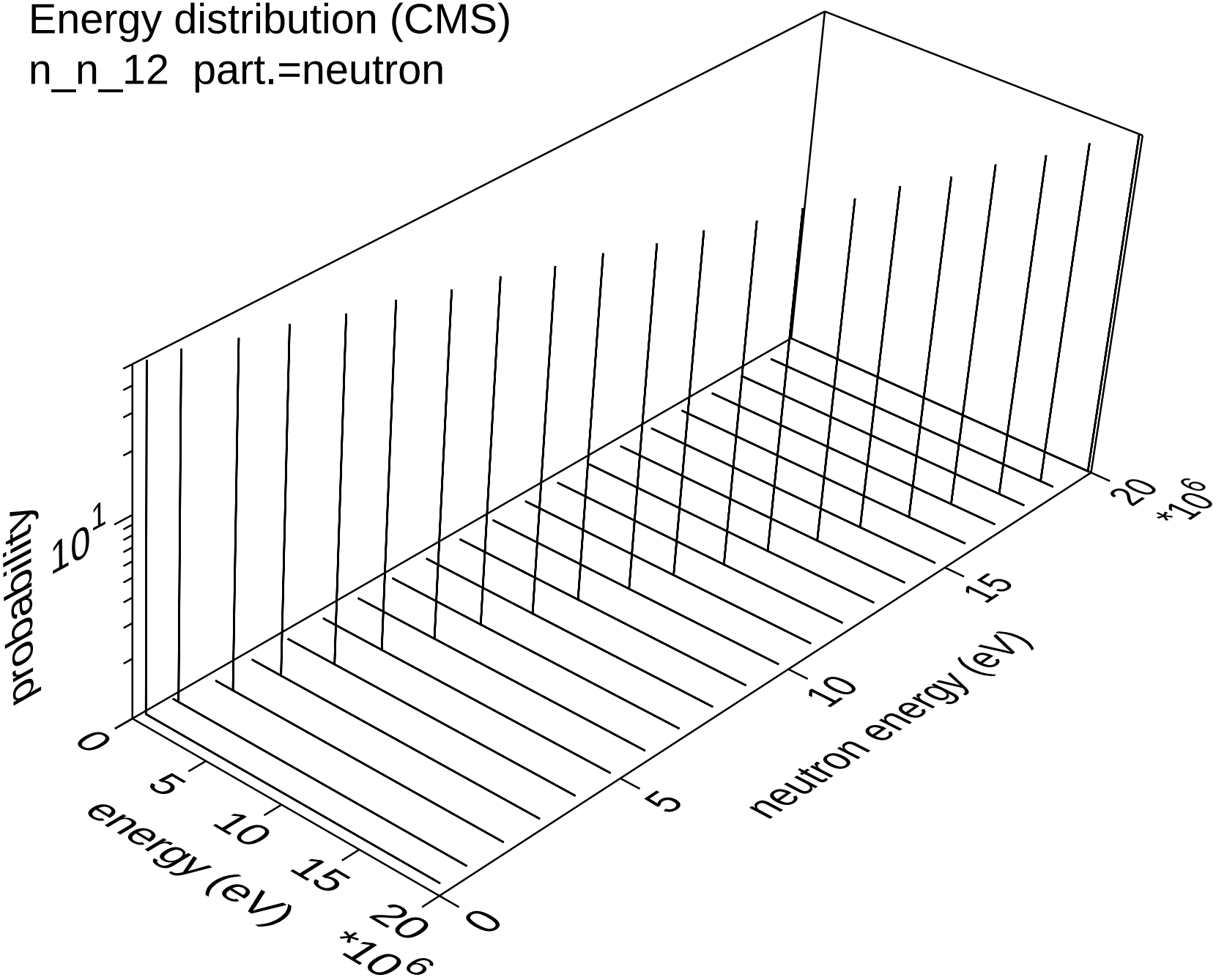

Energy distribution (CMS)
n_n_9 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

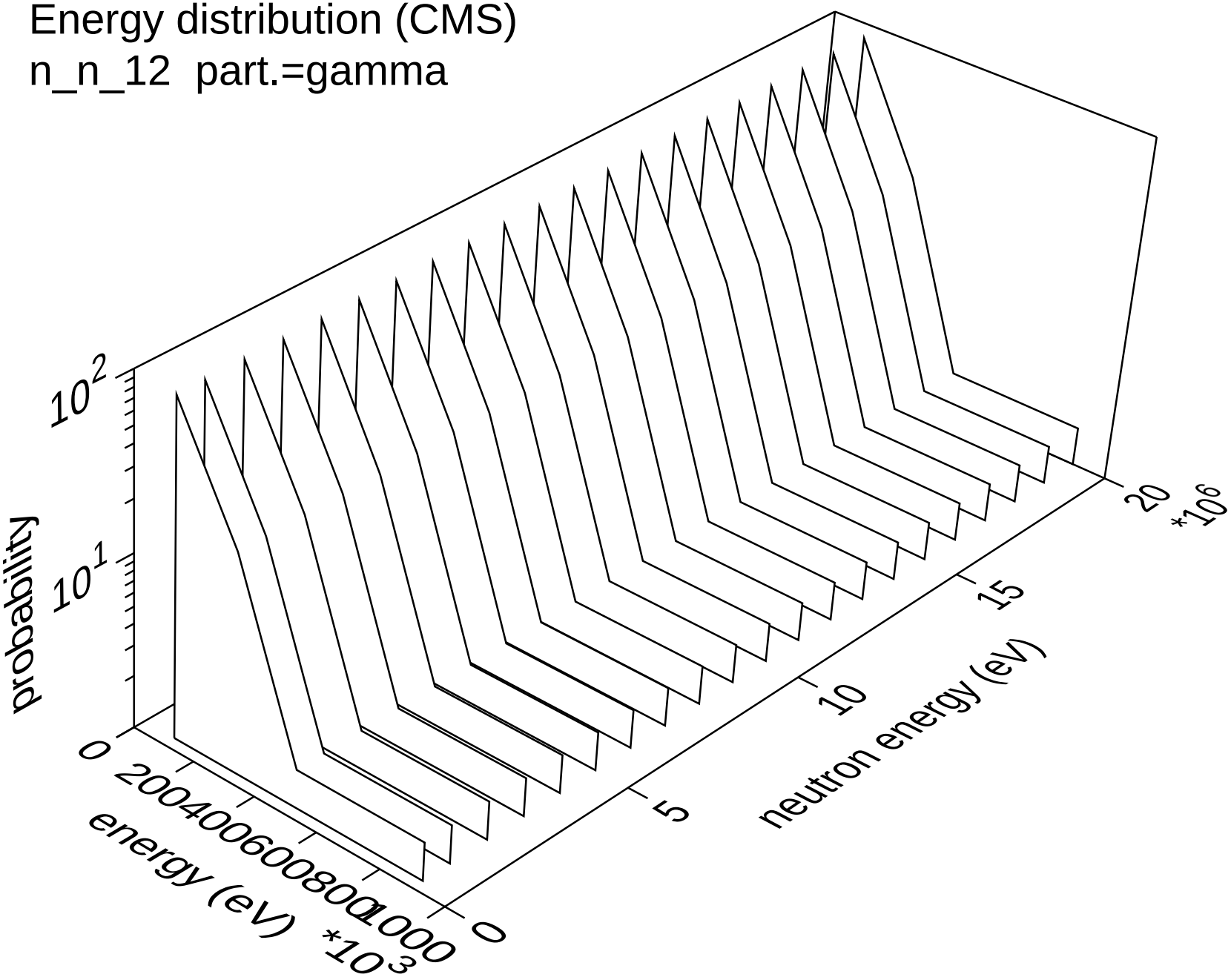

Energy distribution (CMS)
n_n_10 part.=neutron
probability
10^{1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

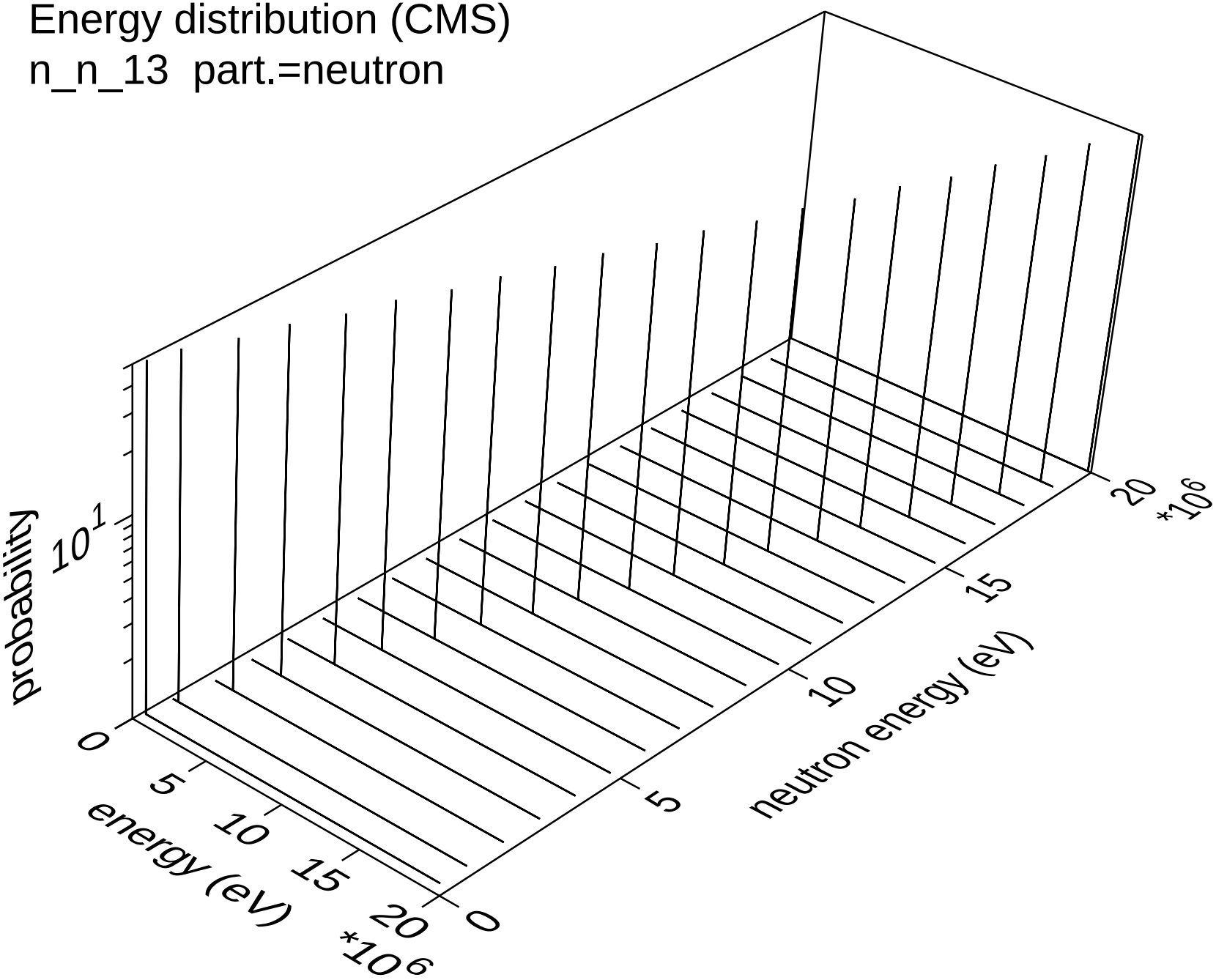

Energy distribution (CMS)
n_n_10 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

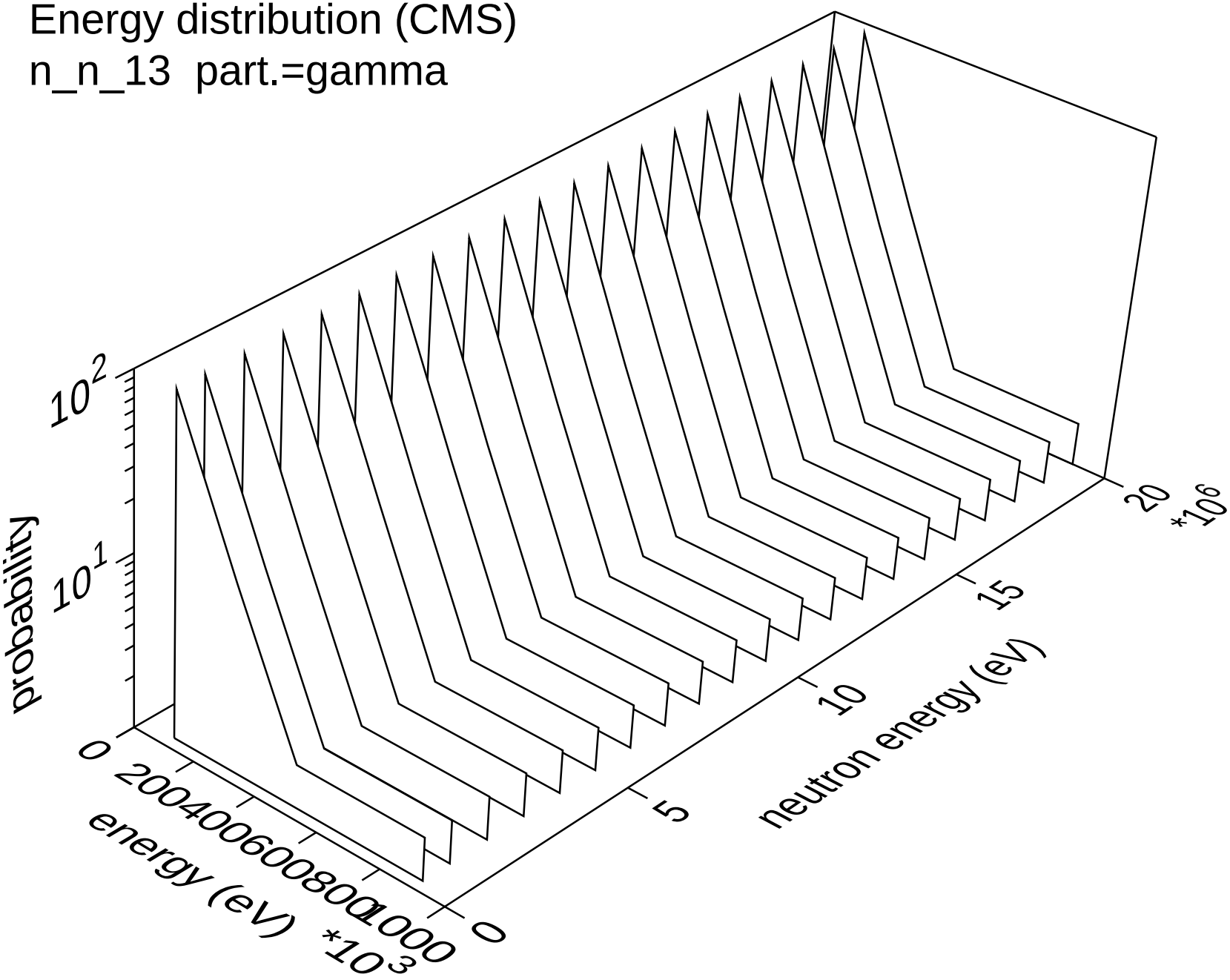

Energy distribution (CMS)
n_n_11 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

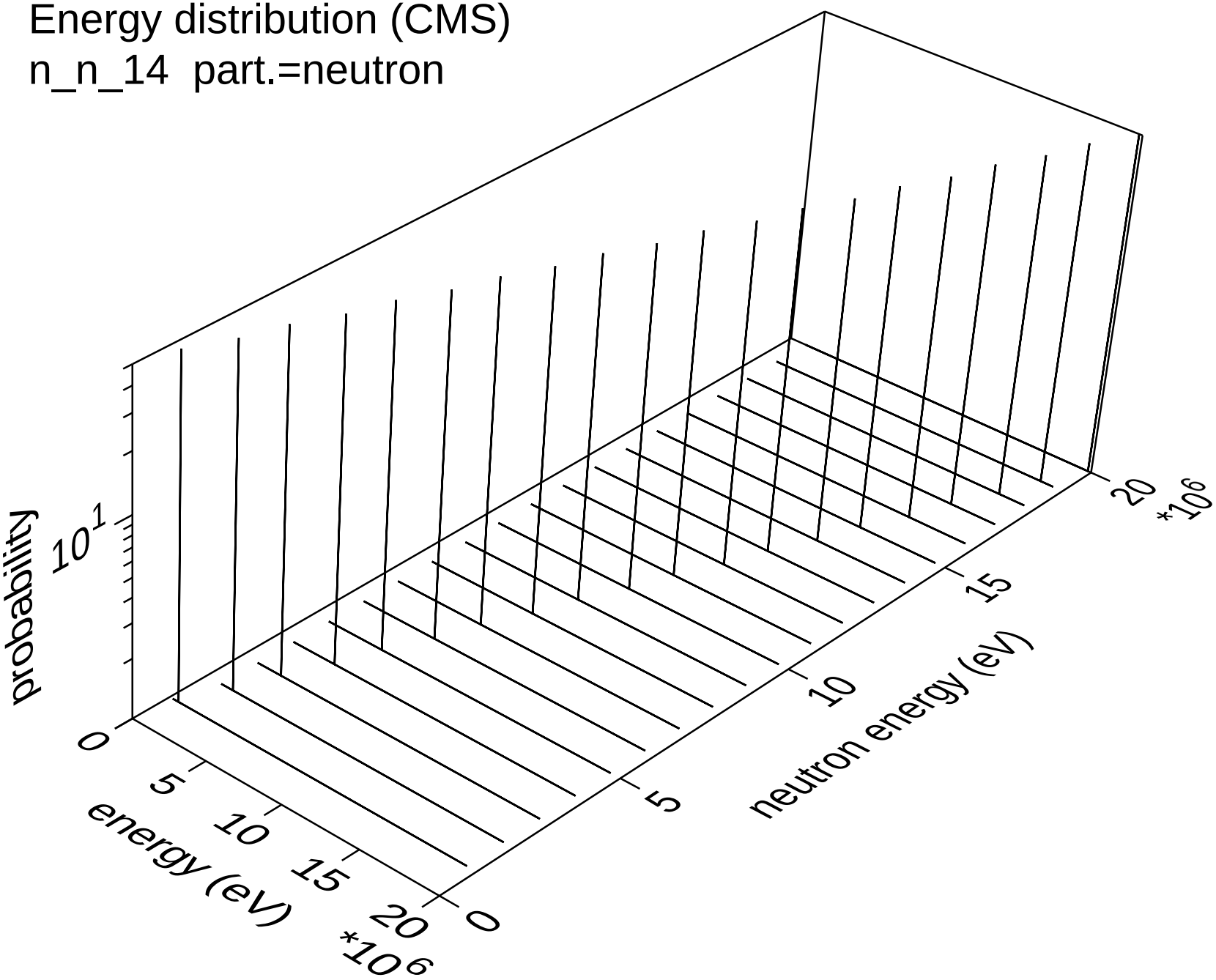

Energy distribution (CMS)
n_n_11 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

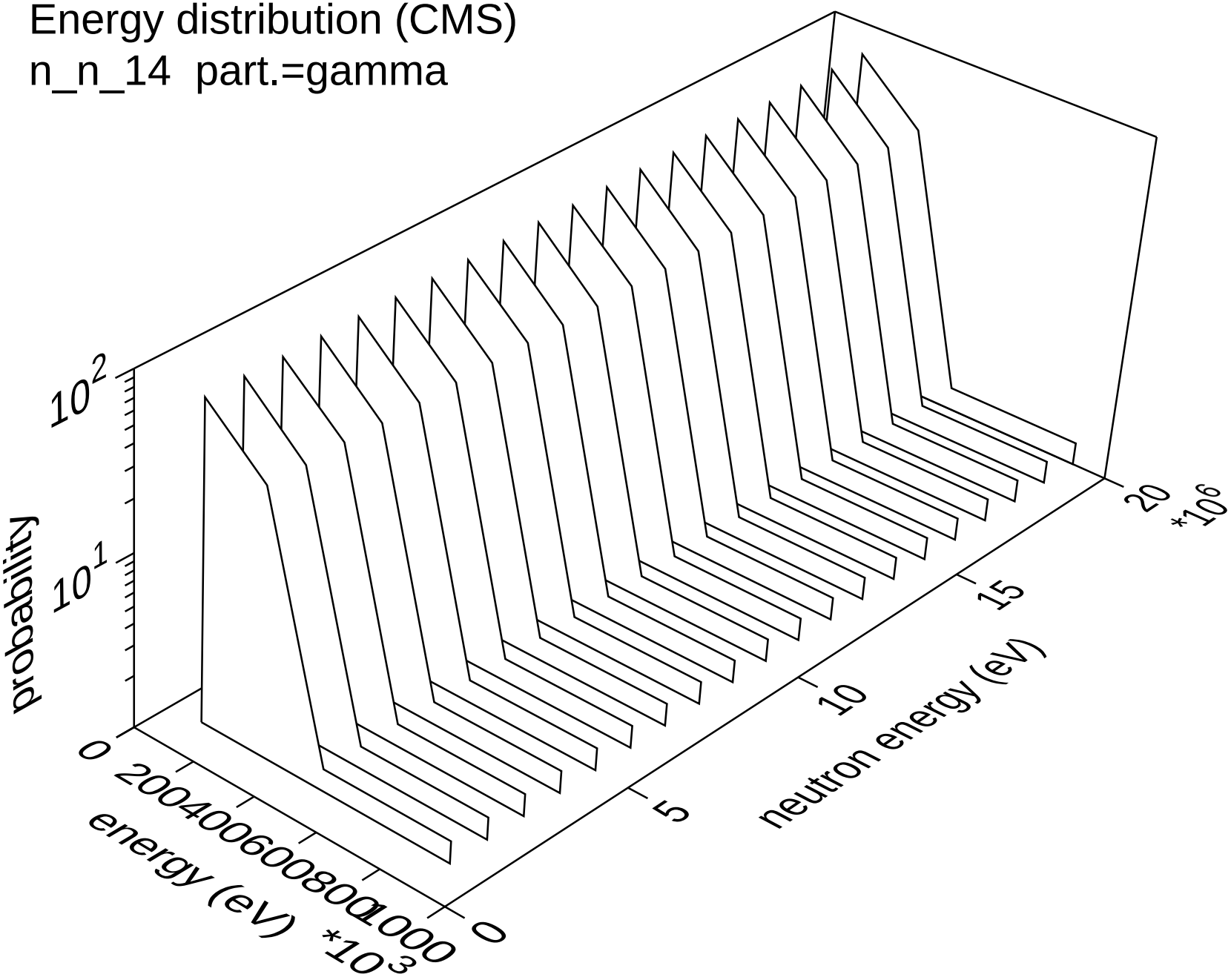

Energy distribution (CMS)
n_n_12 part.=neutron
probability
10^{1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

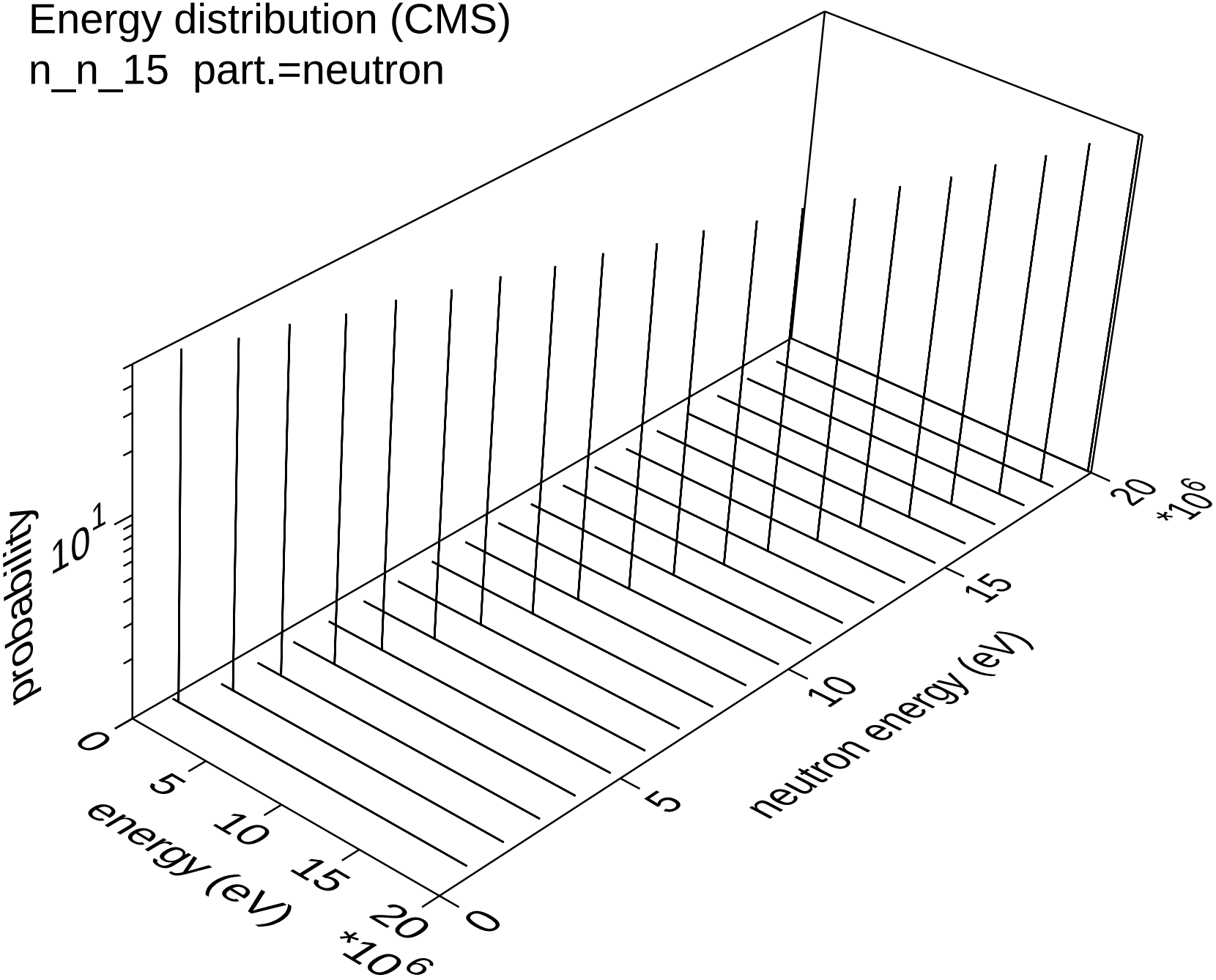

Energy distribution (CMS)
n_n_12 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

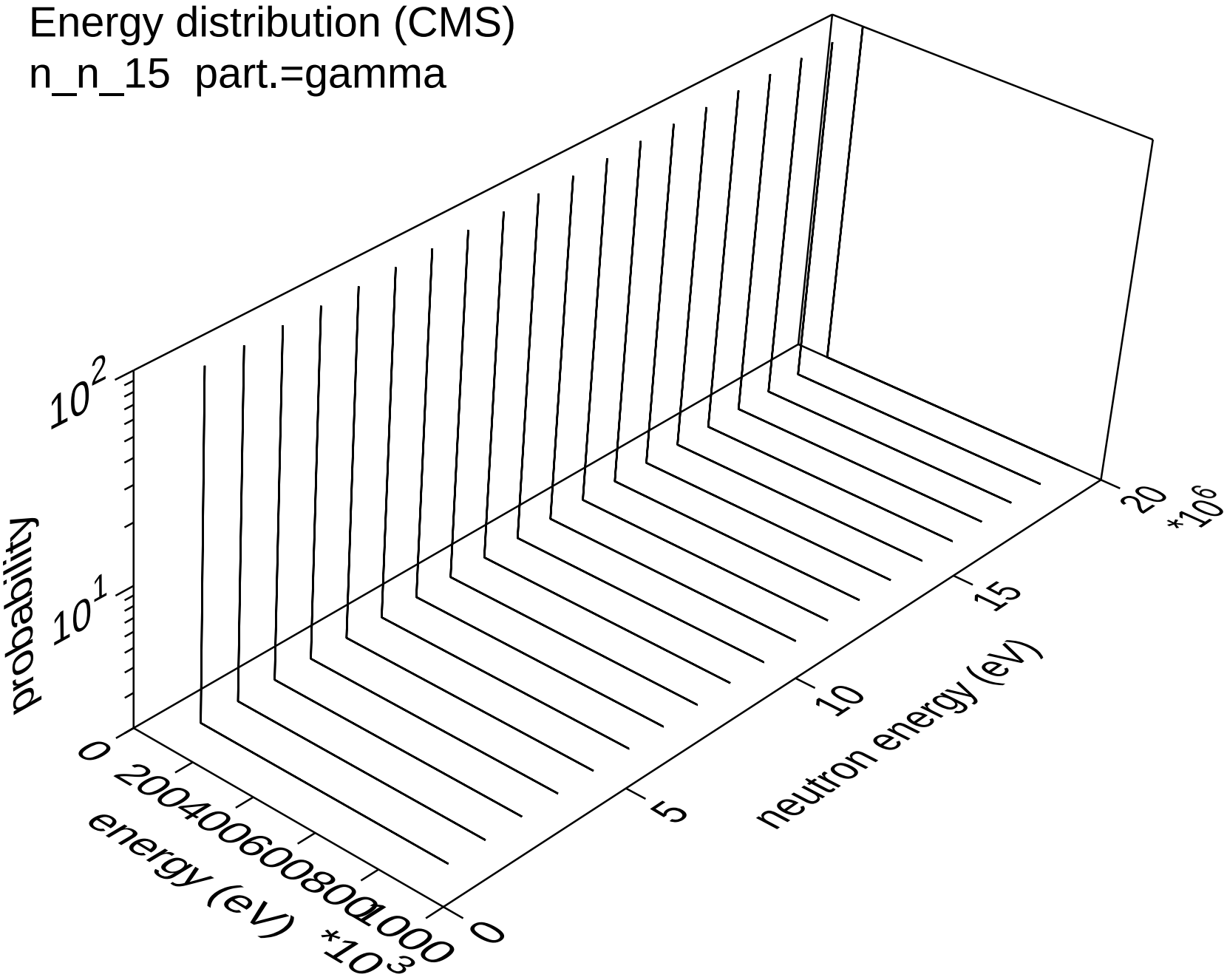

Energy distribution (CMS)
n_n_13 part.=neutron
probability
10^{1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

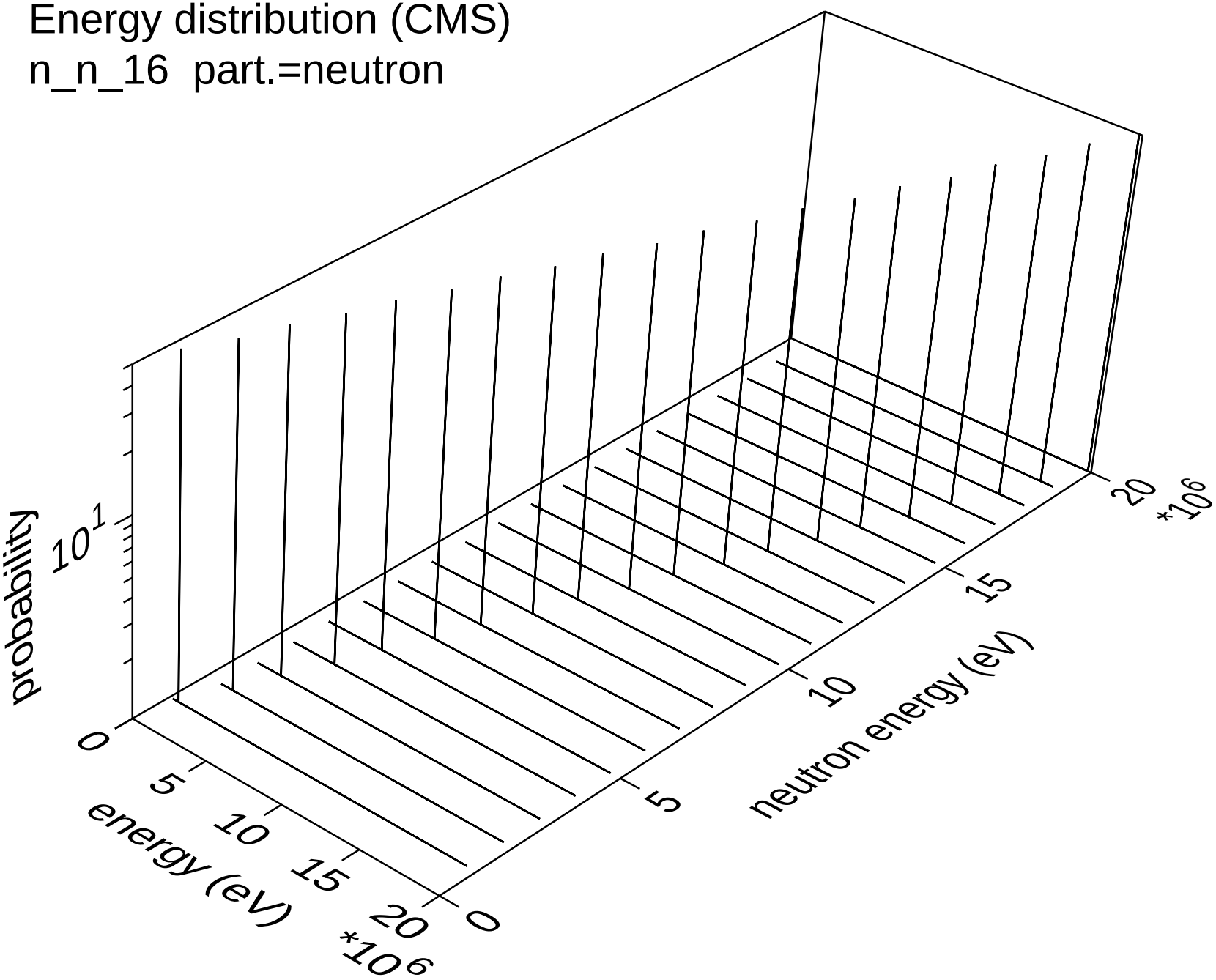

Energy distribution (CMS)
n_n_13 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

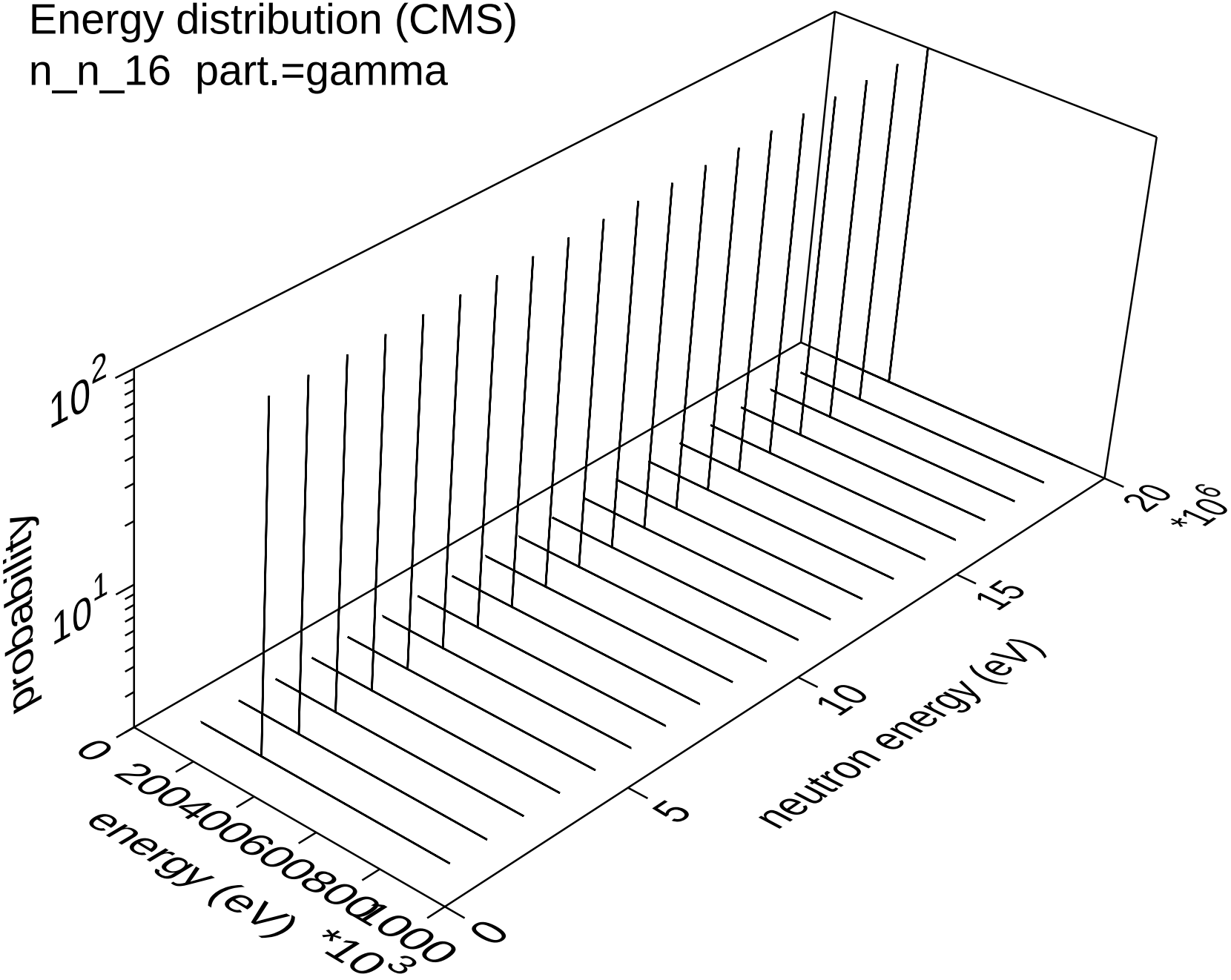

Energy distribution (CMS)
n_n_14 part.=neutron
probability
10^{1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

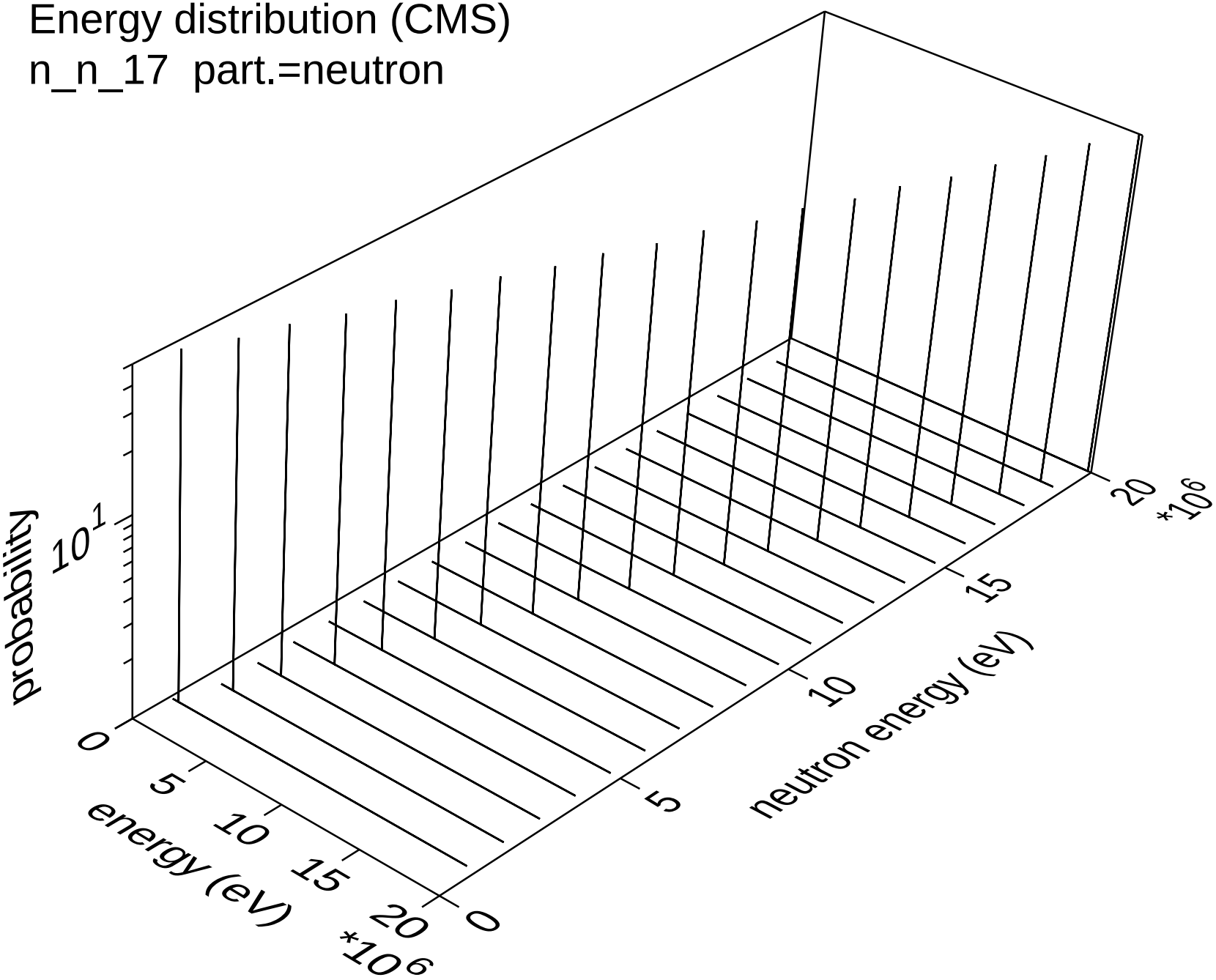

Energy distribution (CMS)
n_n_14 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

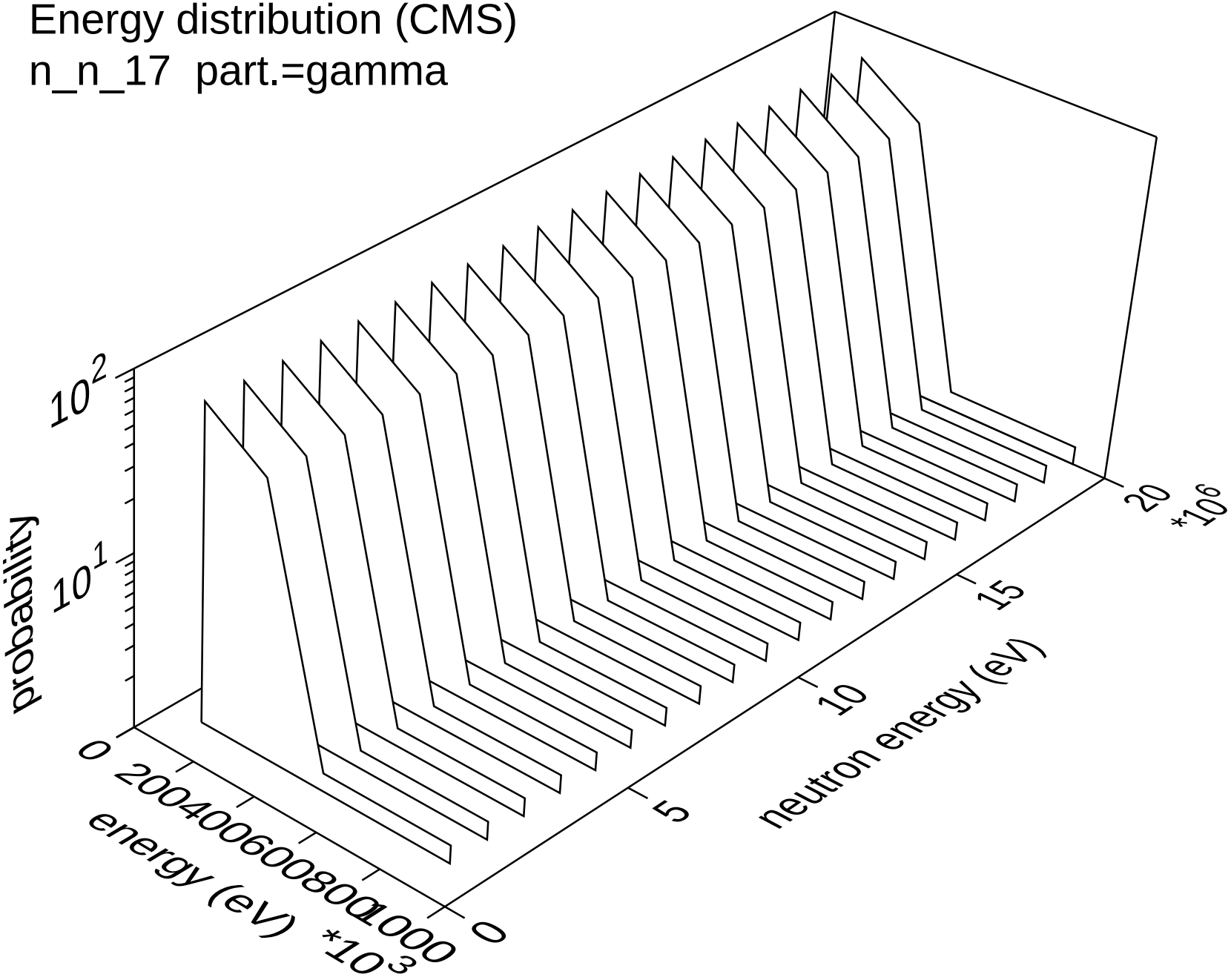

Energy distribution (CMS)
n_n_15 part.=neutron
probability
10^{1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

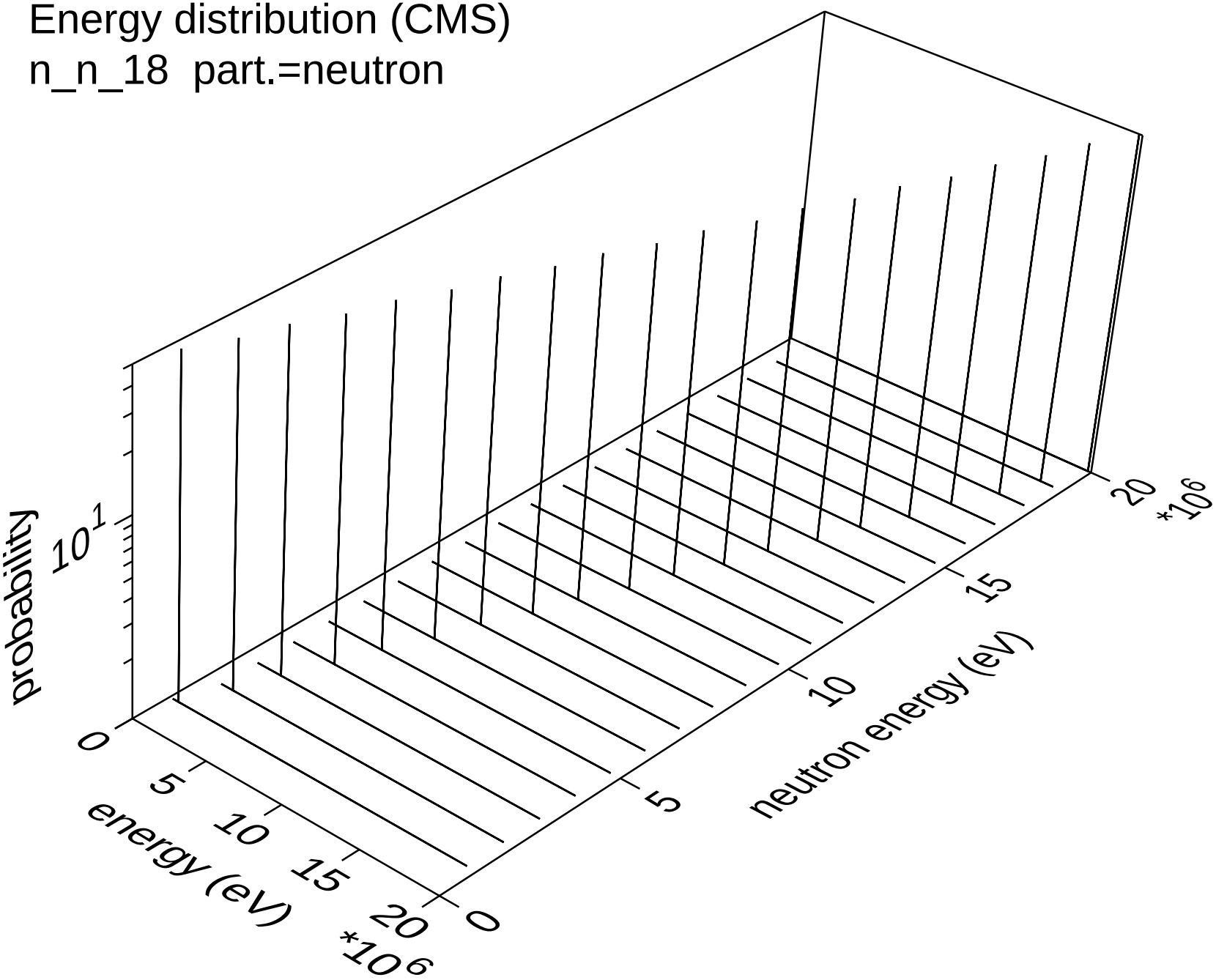

Energy distribution (CMS)
n_n_15 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

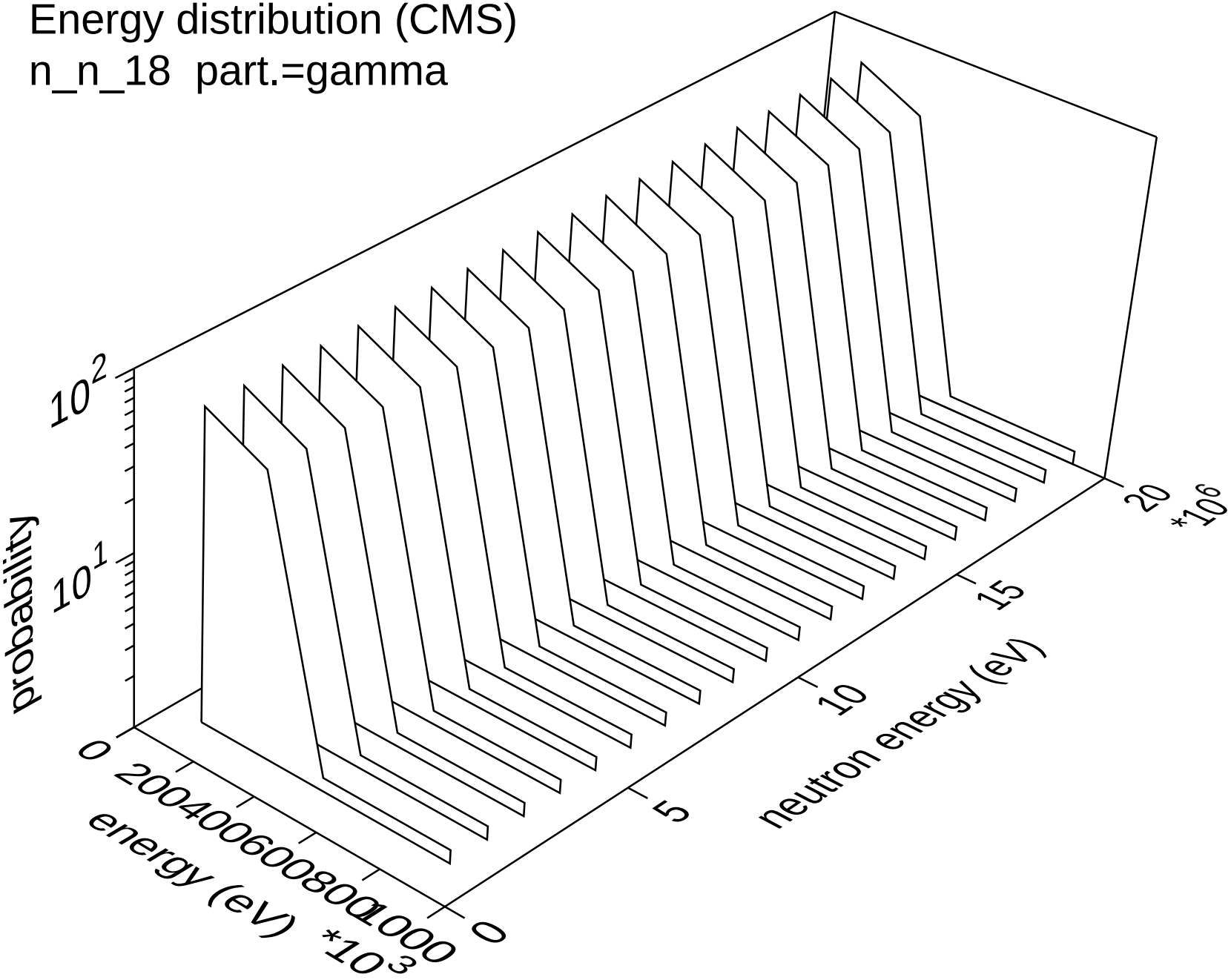

Energy distribution (CMS)
n_n_16 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

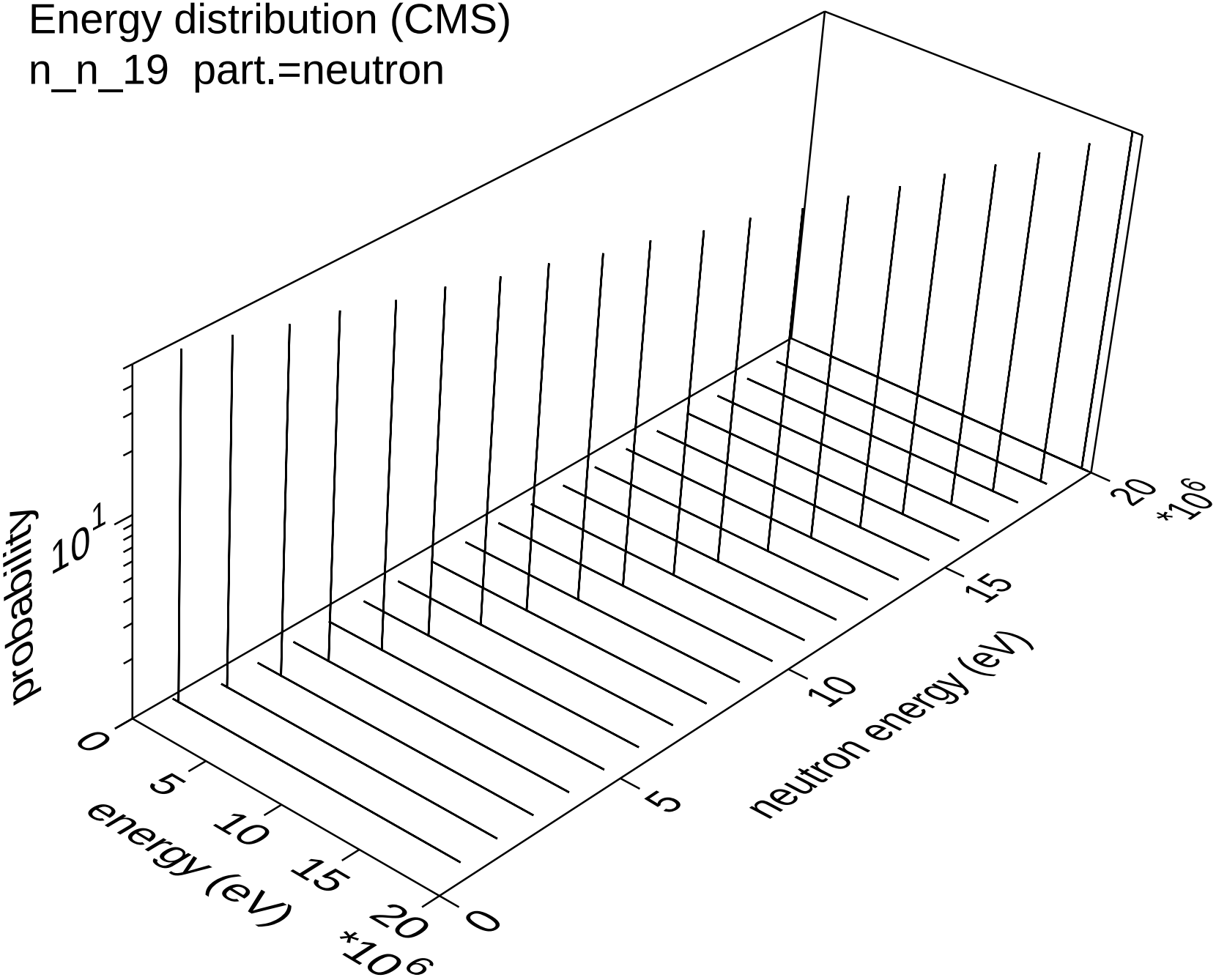

Energy distribution (CMS)
n_n_16 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

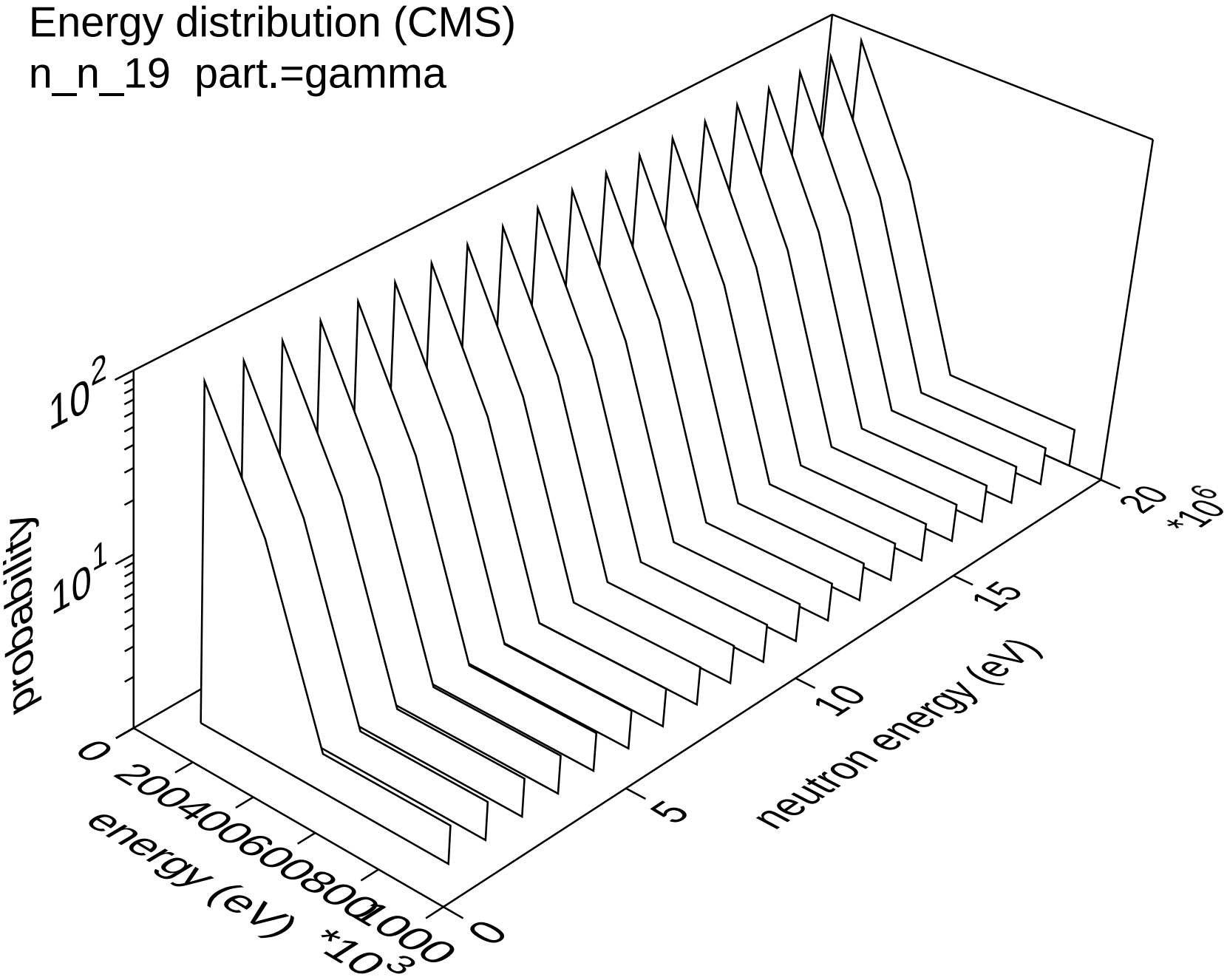

Energy distribution (CMS)
n_n_17 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

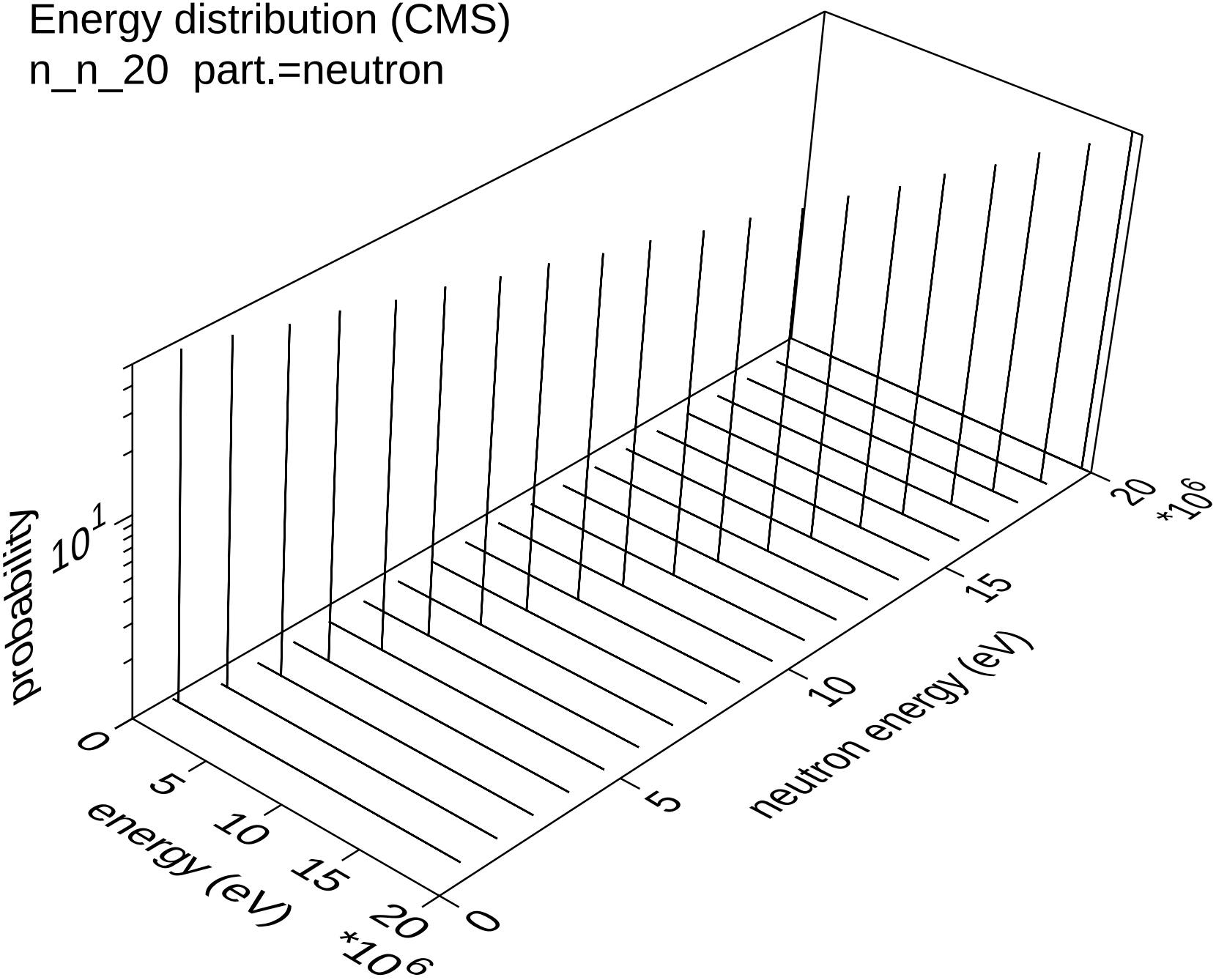

Energy distribution (CMS)
n_n_17 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

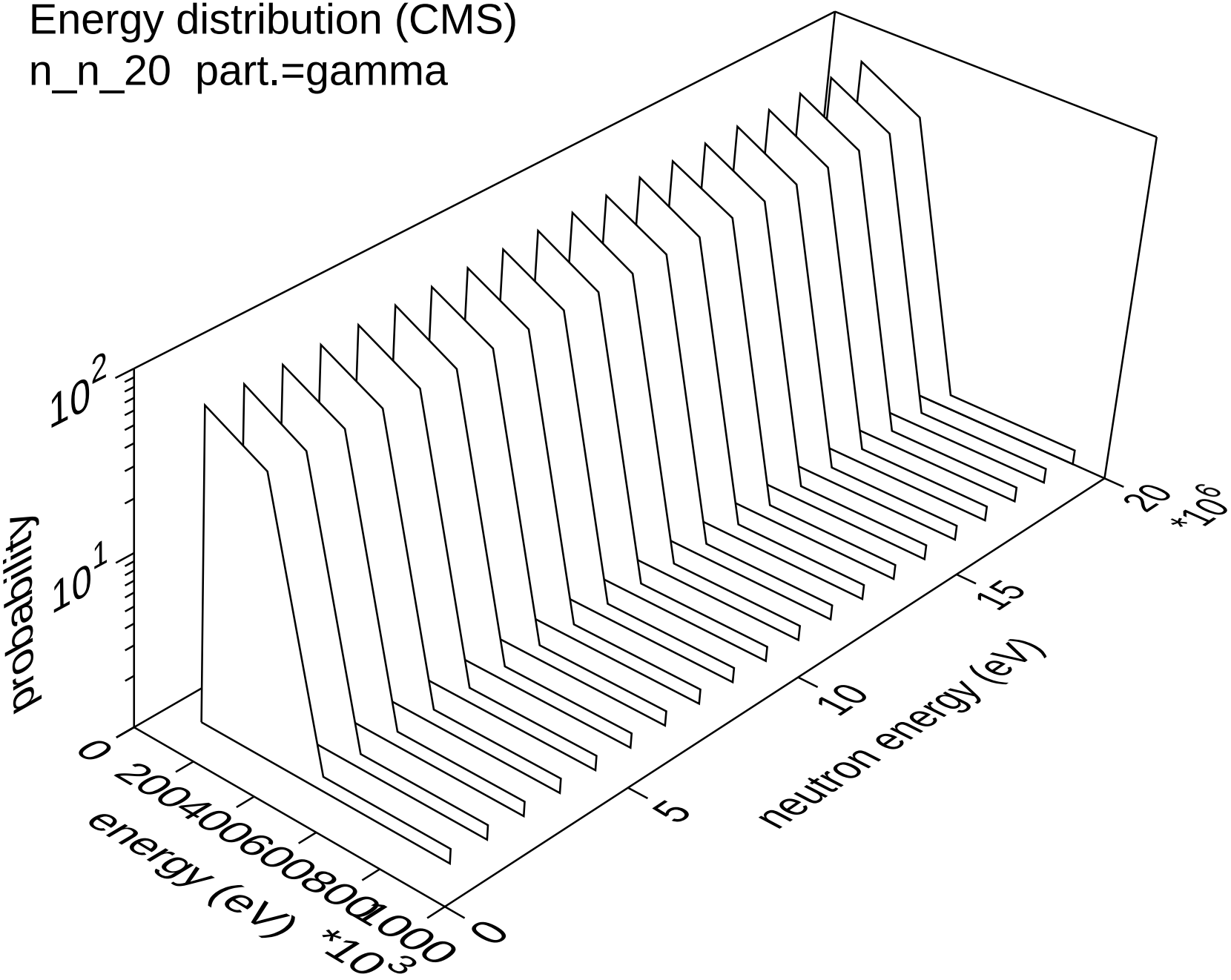

Energy distribution (CMS)
n_n_18 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

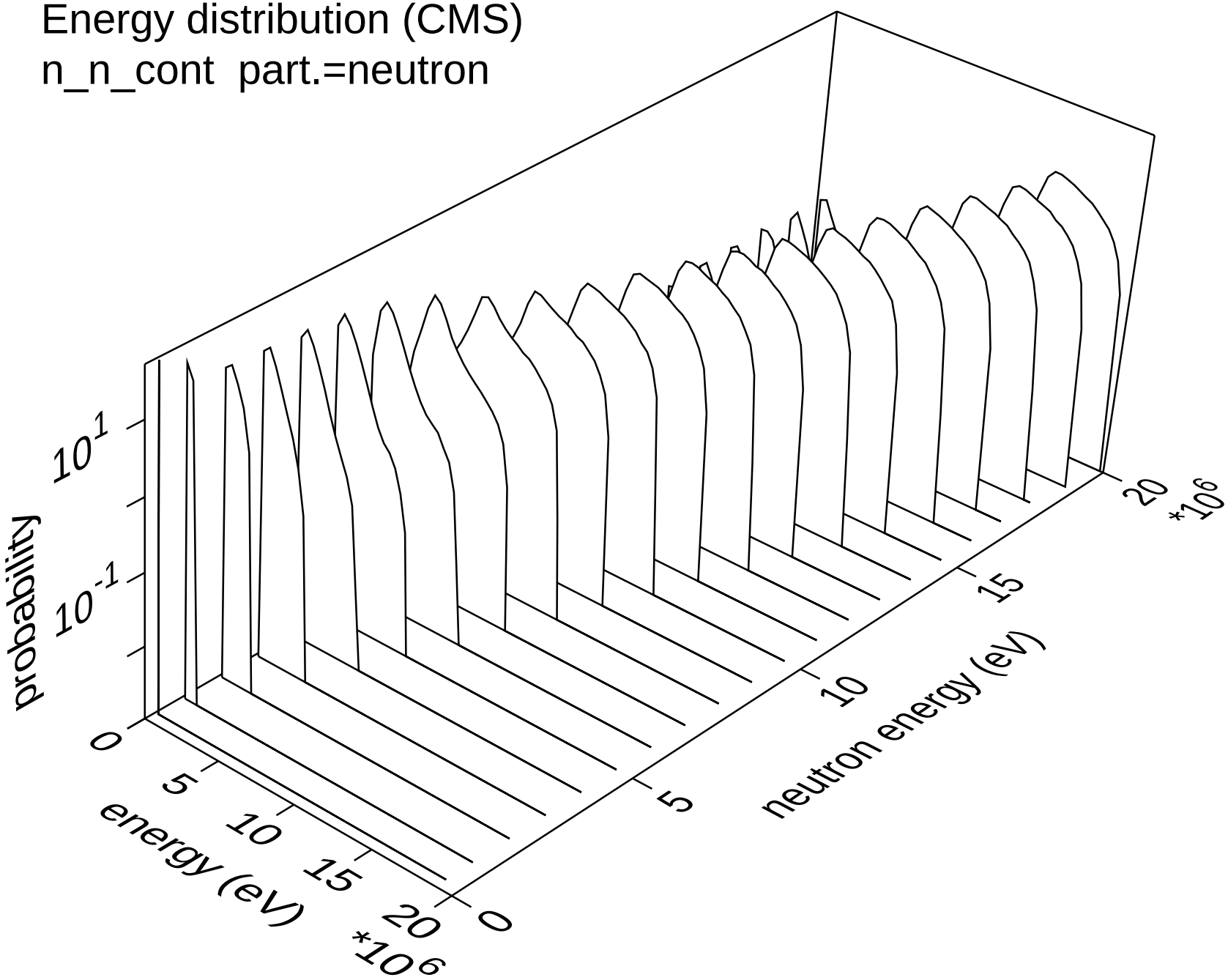

Energy distribution (CMS)
n_n_18 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

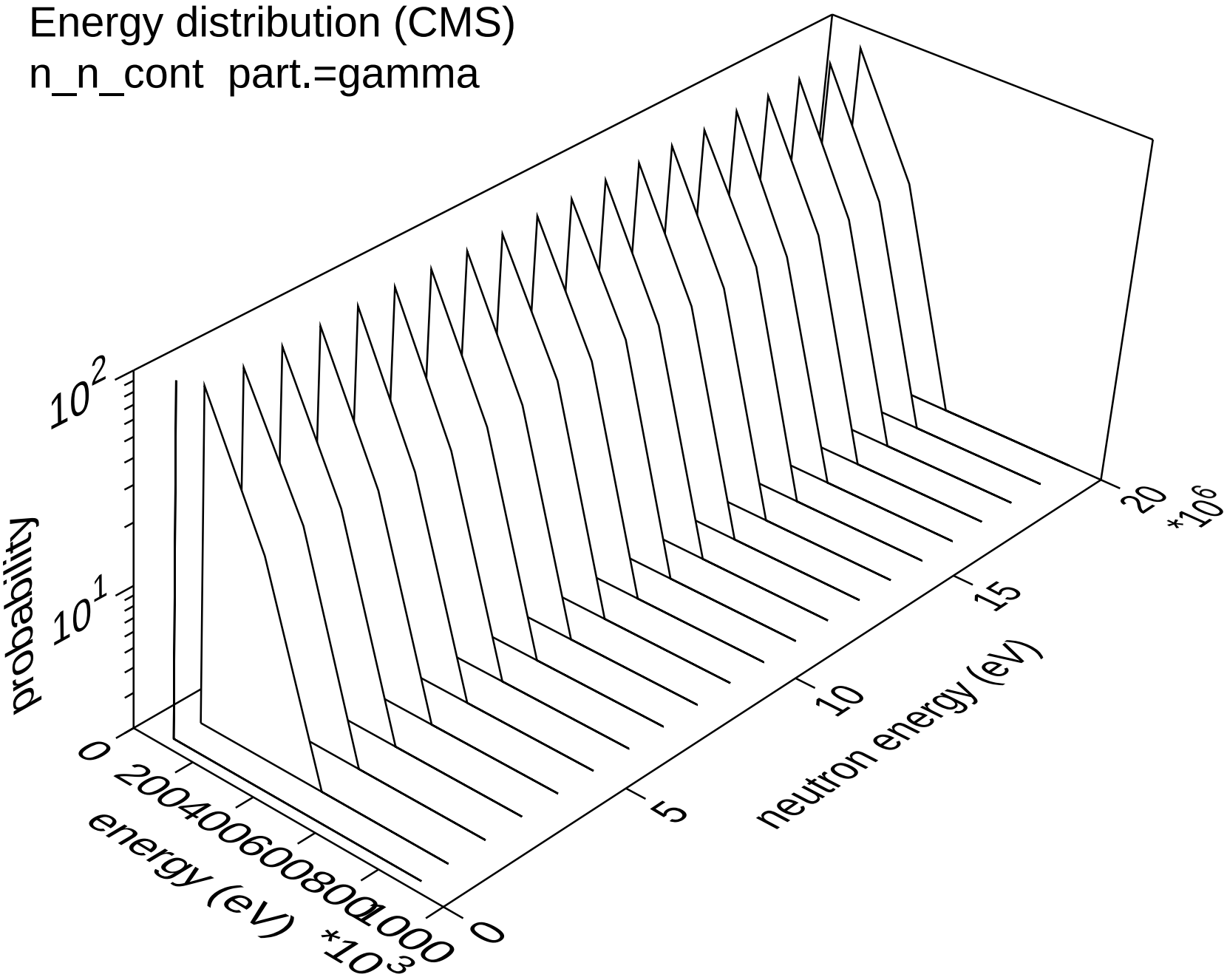

Energy distribution (CMS)
n_n_19 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

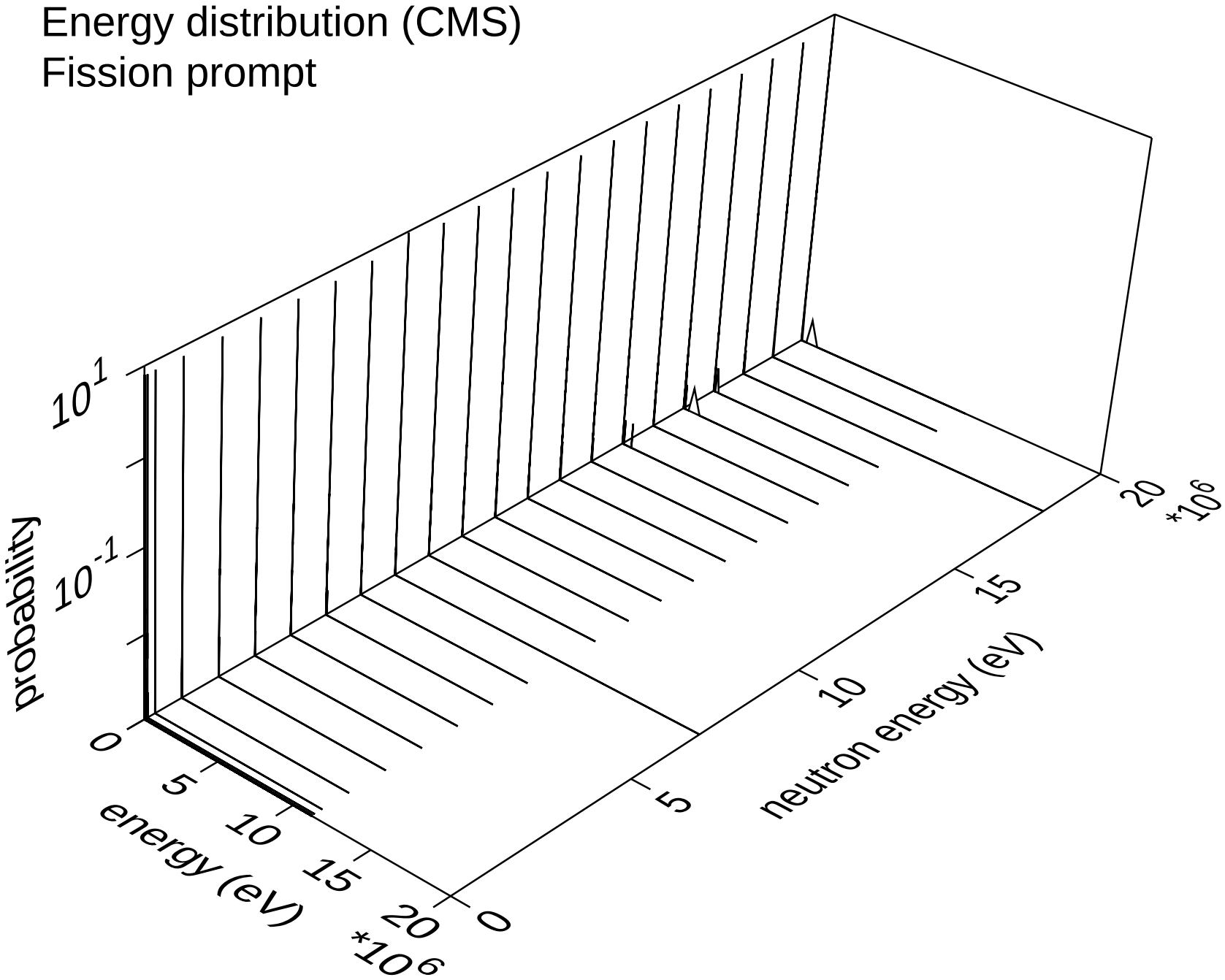

Energy distribution (CMS)
n_n_19 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6

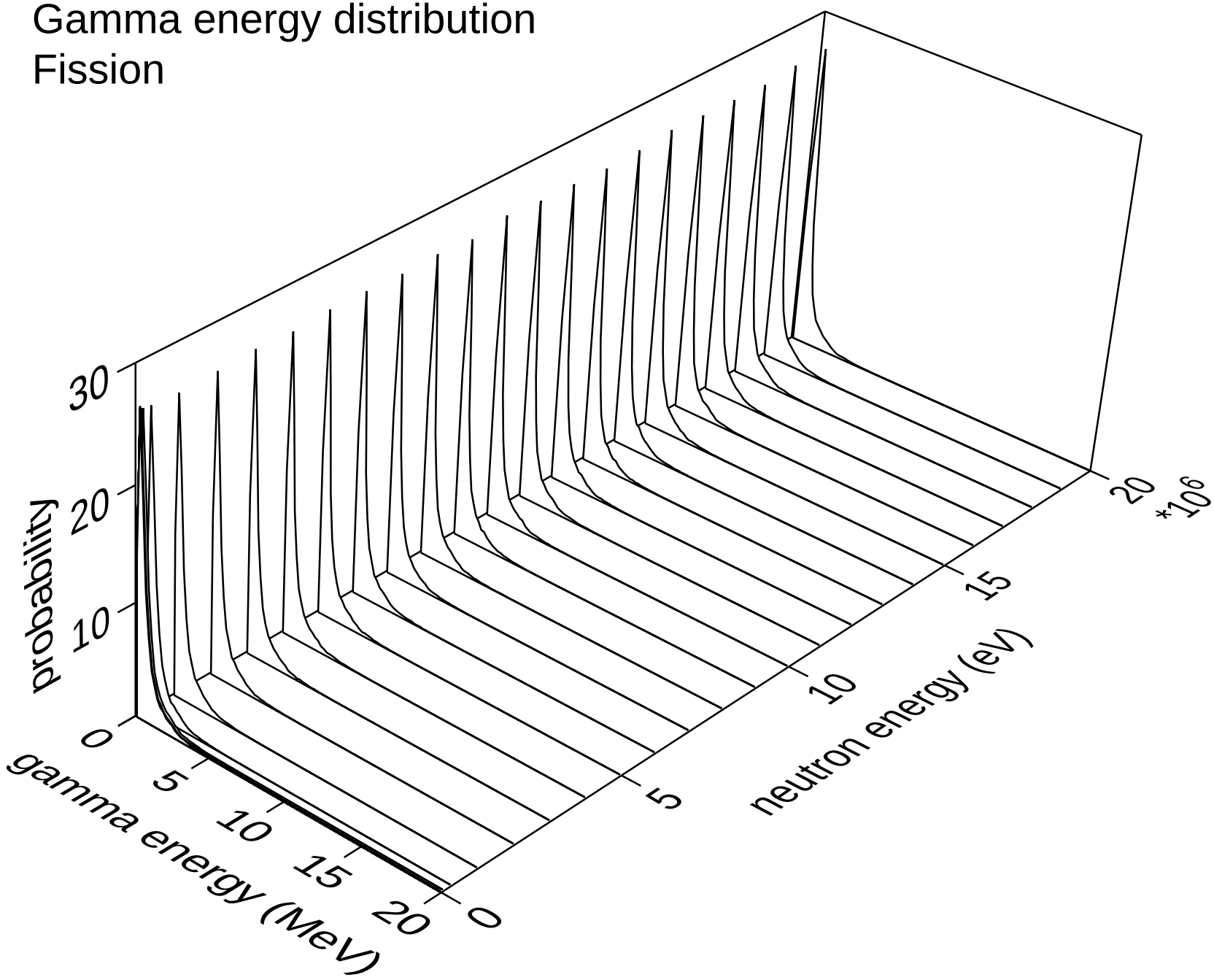

Energy distribution (CMS)
n_n_20 part.=neutron
probability
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)

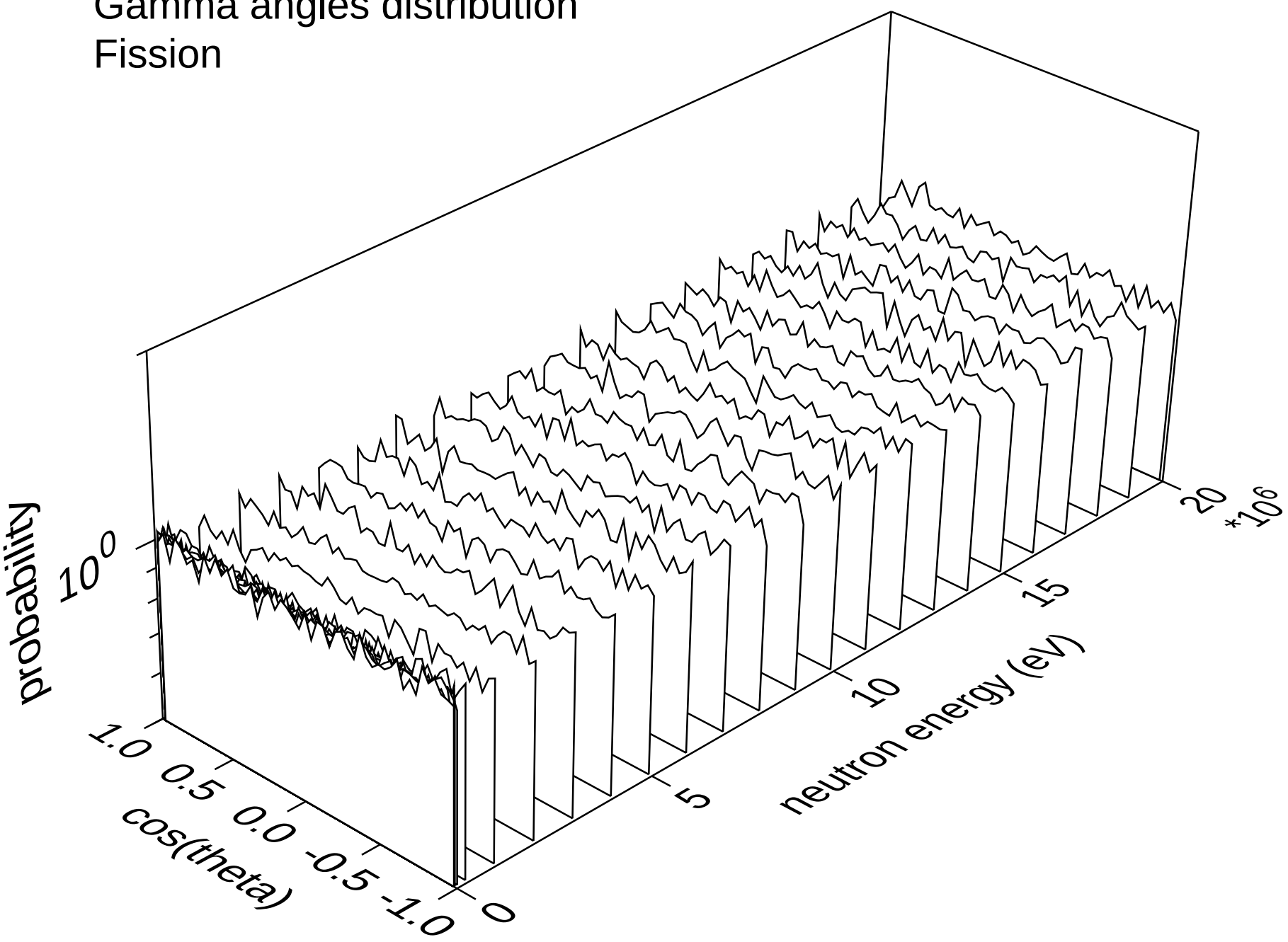
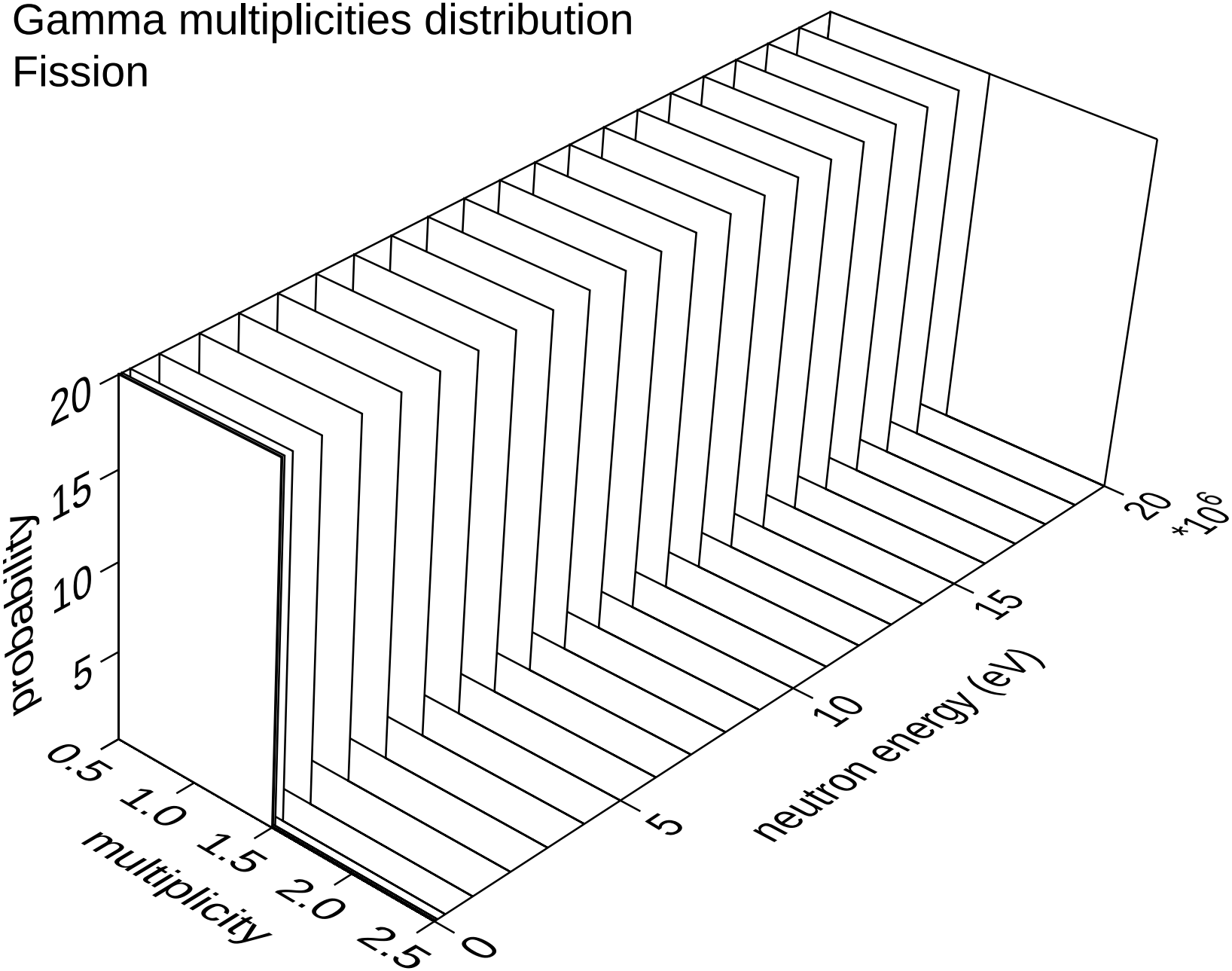

Energy distribution (CMS)
n_n_20 part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6


Energy distribution (CMS)
n_n_cont part.=neutron
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_n_cont part.=gamma
probability
10^2
10^1
0
200
400
600
800
1000
energy (eV) *10^3
0
5
10
15
20
neutron energy (eV) *10^6


Energy distribution (CMS)
Fission prompt
probability
10^{1}
10^{-1}
0
5
10
15
20
*10^6
energy (eV)
0
5
10
15
20
*10^6
neutron energy (eV)


Gamma energy distribution
Fission
probability
0
10
20
30
gamma energy (MeV)
0
5
10
15
20
neutron energy (eV)
5
10
15
20
*10^6


Gamma angles distribution
Fission
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
Fission