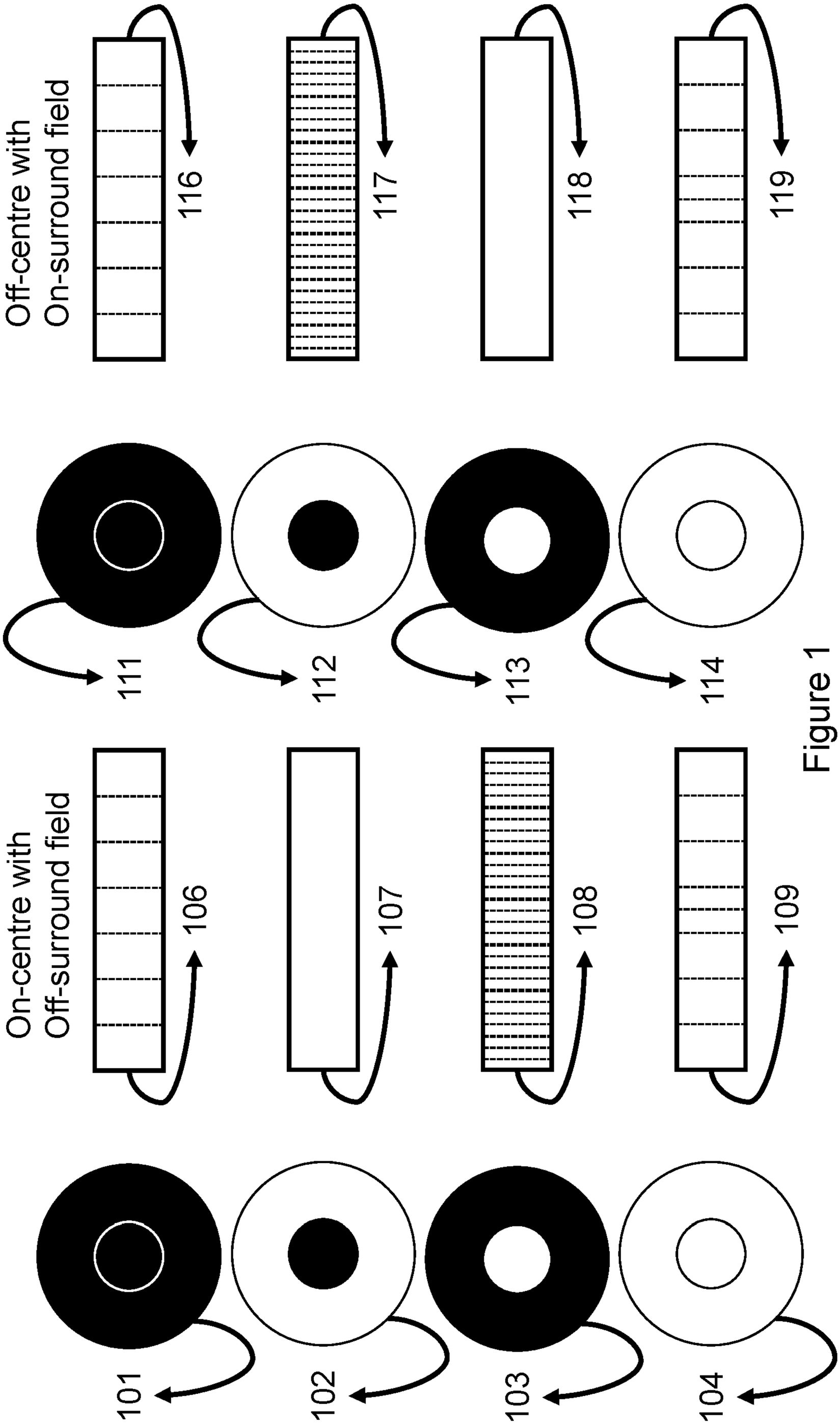

On-centre with
Off-surround field
106
107
108
109
101
102
103
104
Off-centre with
On-surround field
116
117
118
119
111
112
113
114

Figure 1

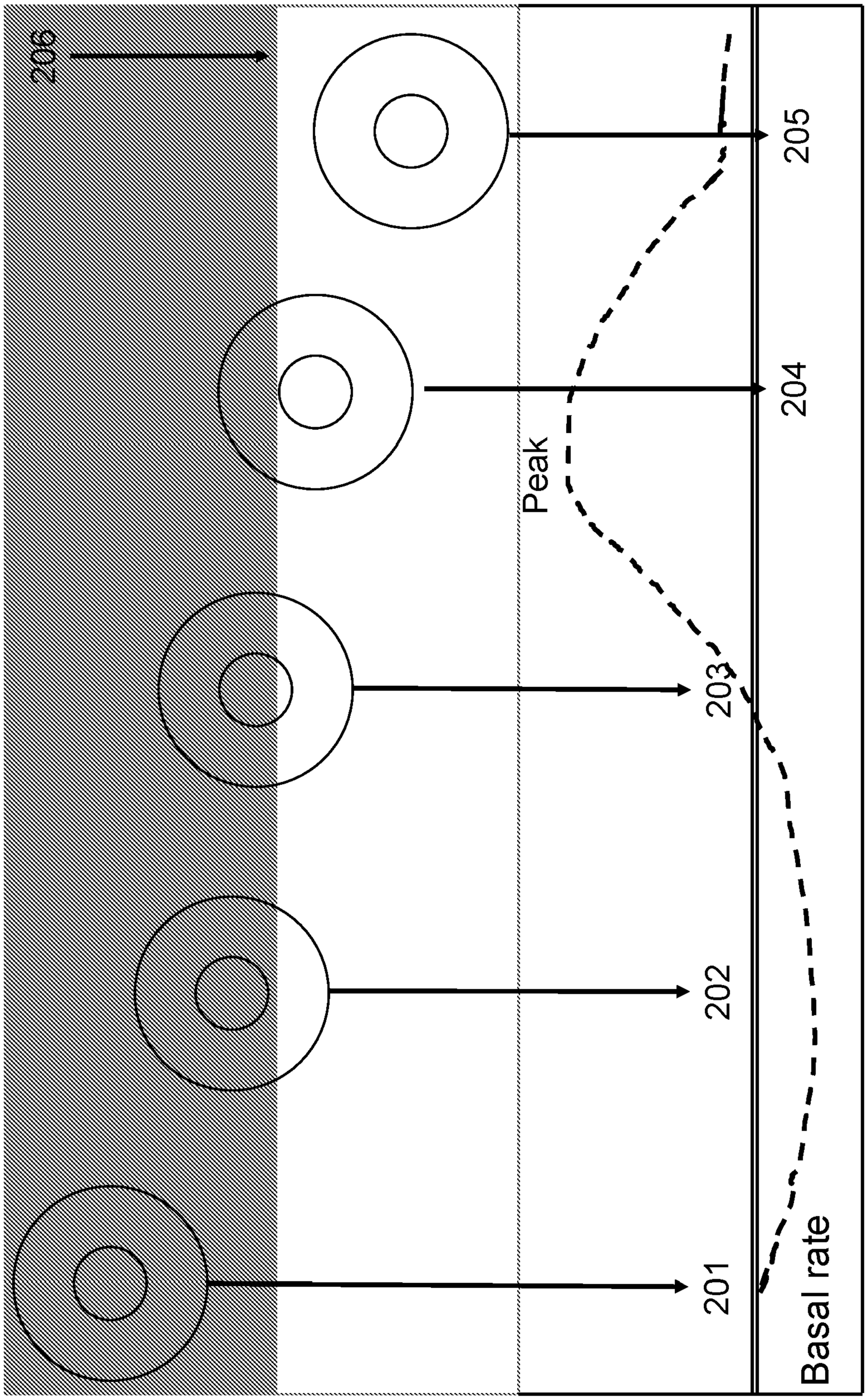

206
205
204
Peak
203
202
201
Basal rate
Ganglion cell
(Firing Rate)
On-Centre / Off-Surround
Ganglion Receptive field

Figure 2

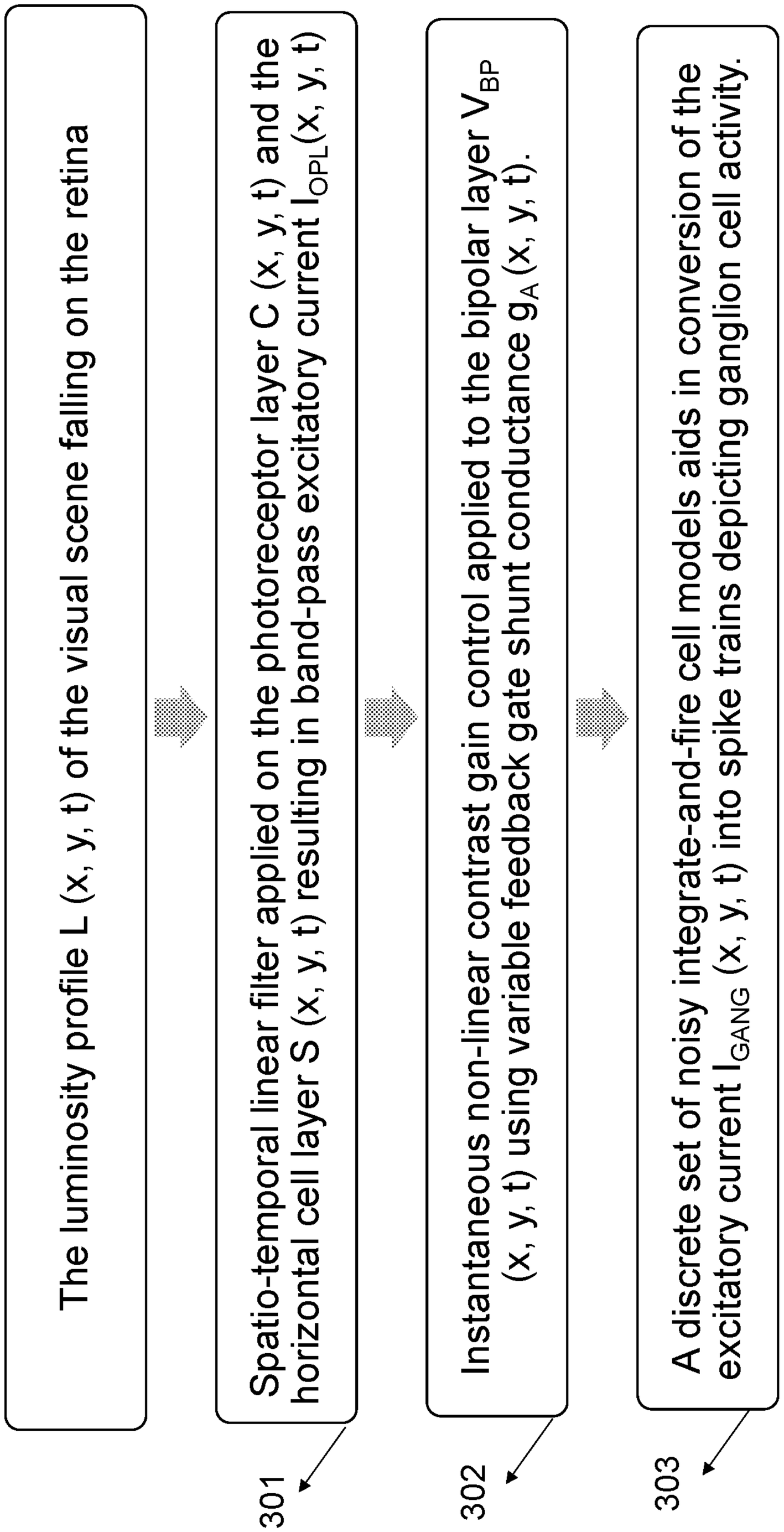

The luminosity profile L (x, y, t) of the visual scene falling on the retina
Spatio-temporal linear filter applied on the photoreceptor layer C (x, y, t) and the horizontal cell layer S (x, y, t) resulting in band-pass excitatory current $I_{OPL}(x, y, t)$
Instantaneous non-linear contrast gain control applied to the bipolar layer V_{BP} (x, y, t) using variable feedback gate shunt conductance $g_A(x, y, t)$.
A discrete set of noisy integrate-and-fire cell models aids in conversion of the excitatory current $I_{GANG}(x, y, t)$ into spike trains depicting ganglion cell activity.
301
302
303

Figure 3

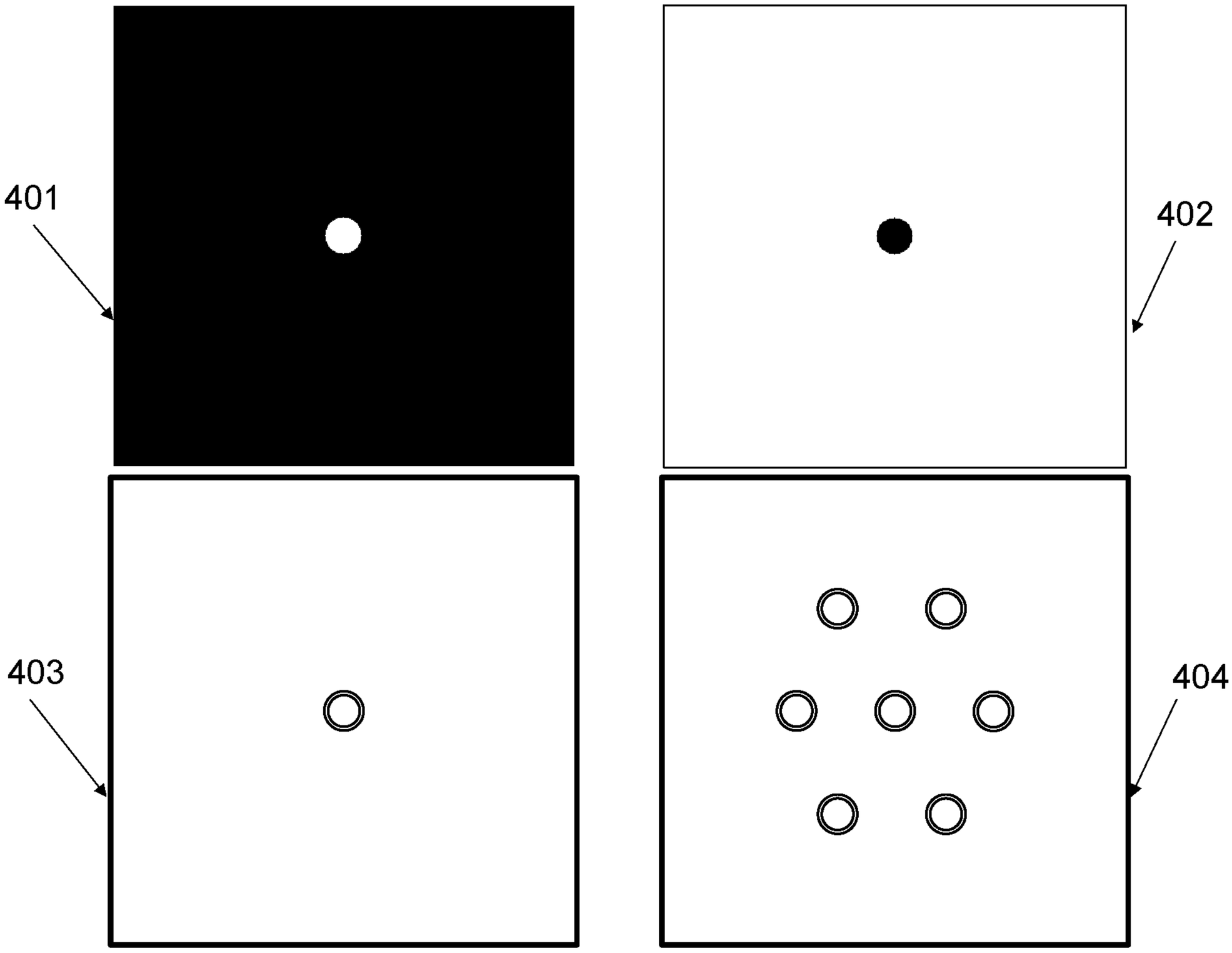


Figure 4

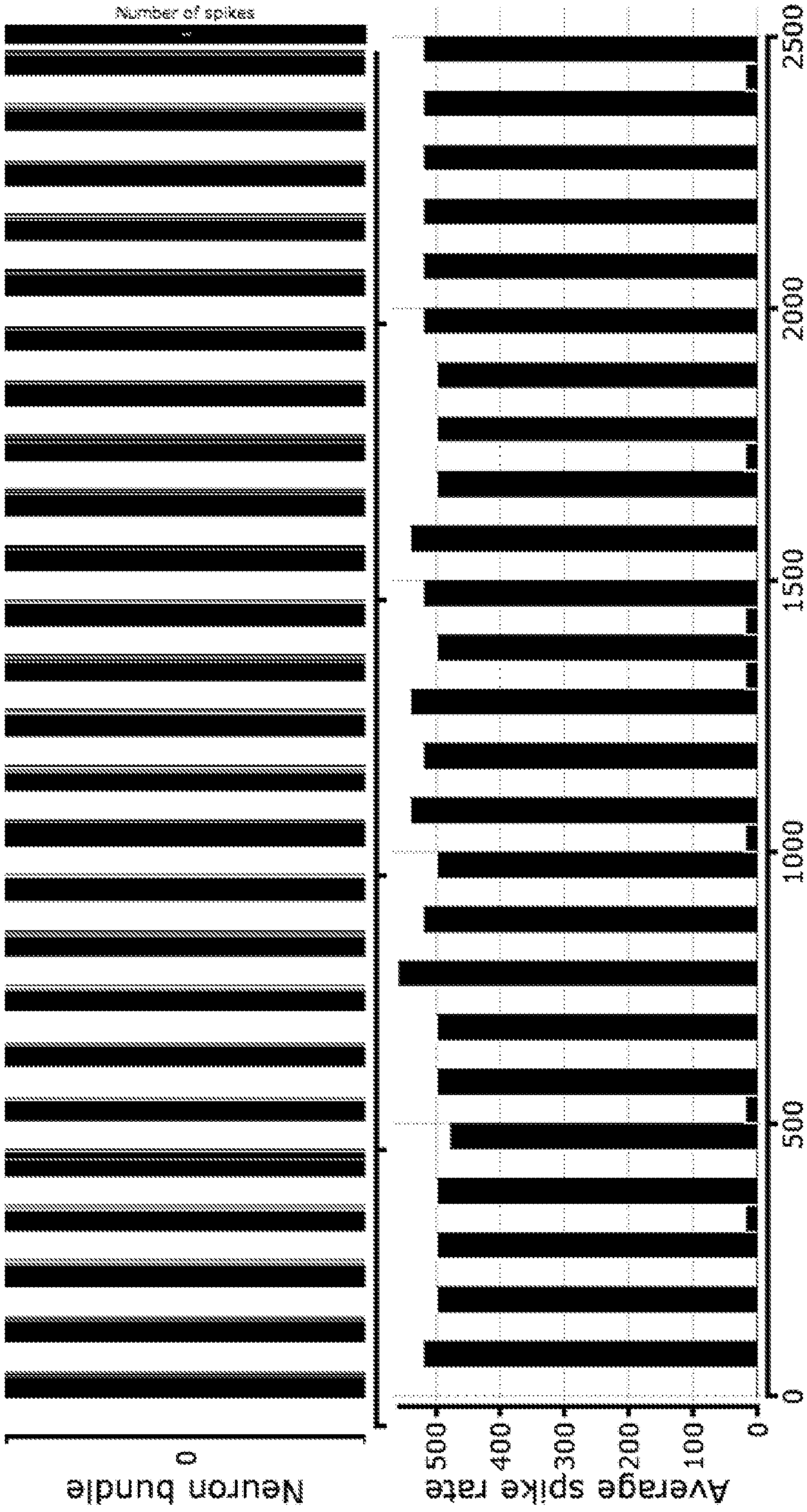

Number of spikes
2500
2000
1500
1000
500
0
Time (milli-seconds)
Average spike rate
500
400
300
200
100
0
Neuron bundle
0

Figure 5

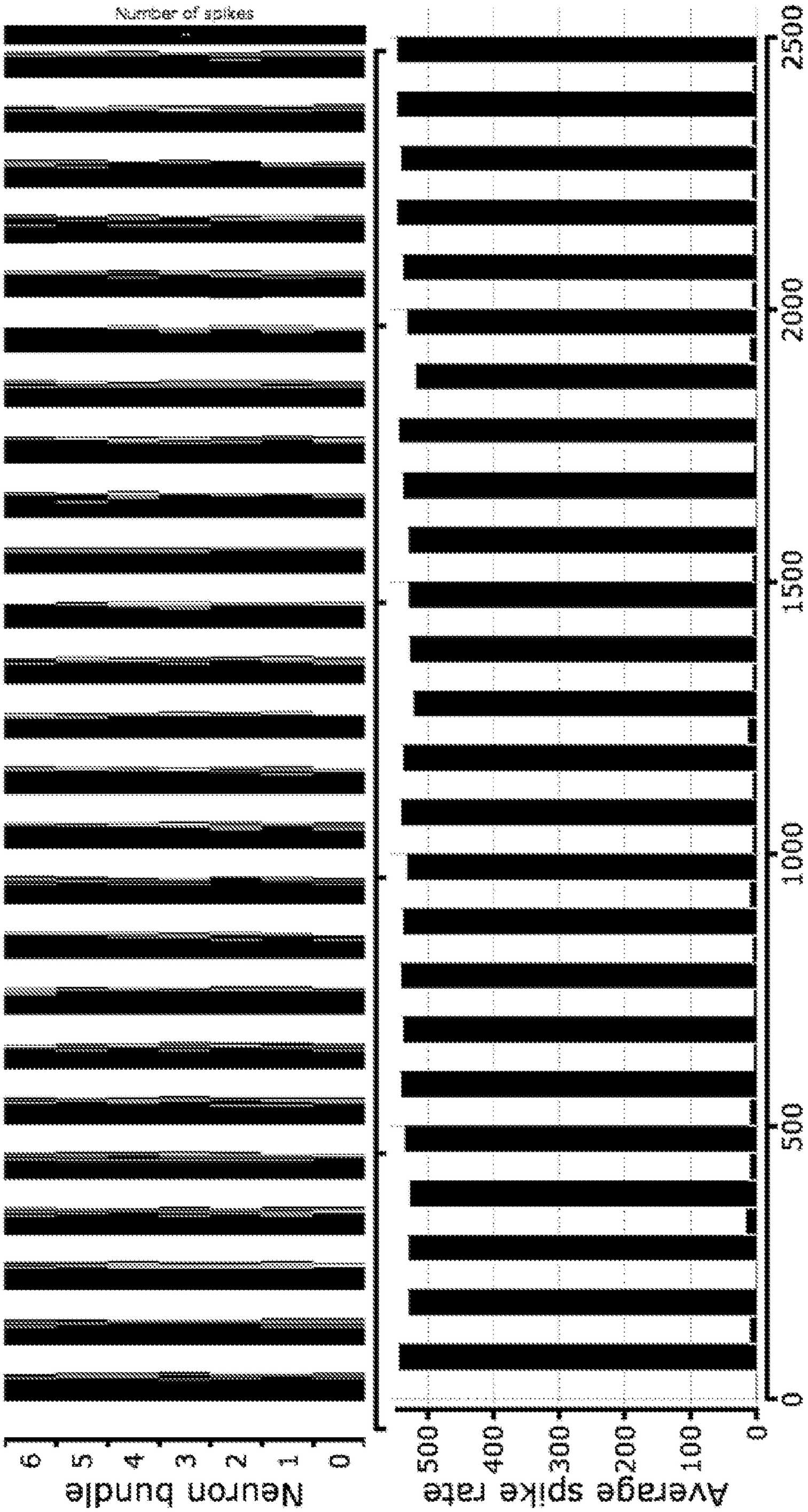

Number of spikes
Neuron bundle
0
1
2
3
4
5
6
Average spike rate
0
100
200
300
400
500
Time (milli-seconds)
0
500
1000
1500
2000
2500

Figure 6

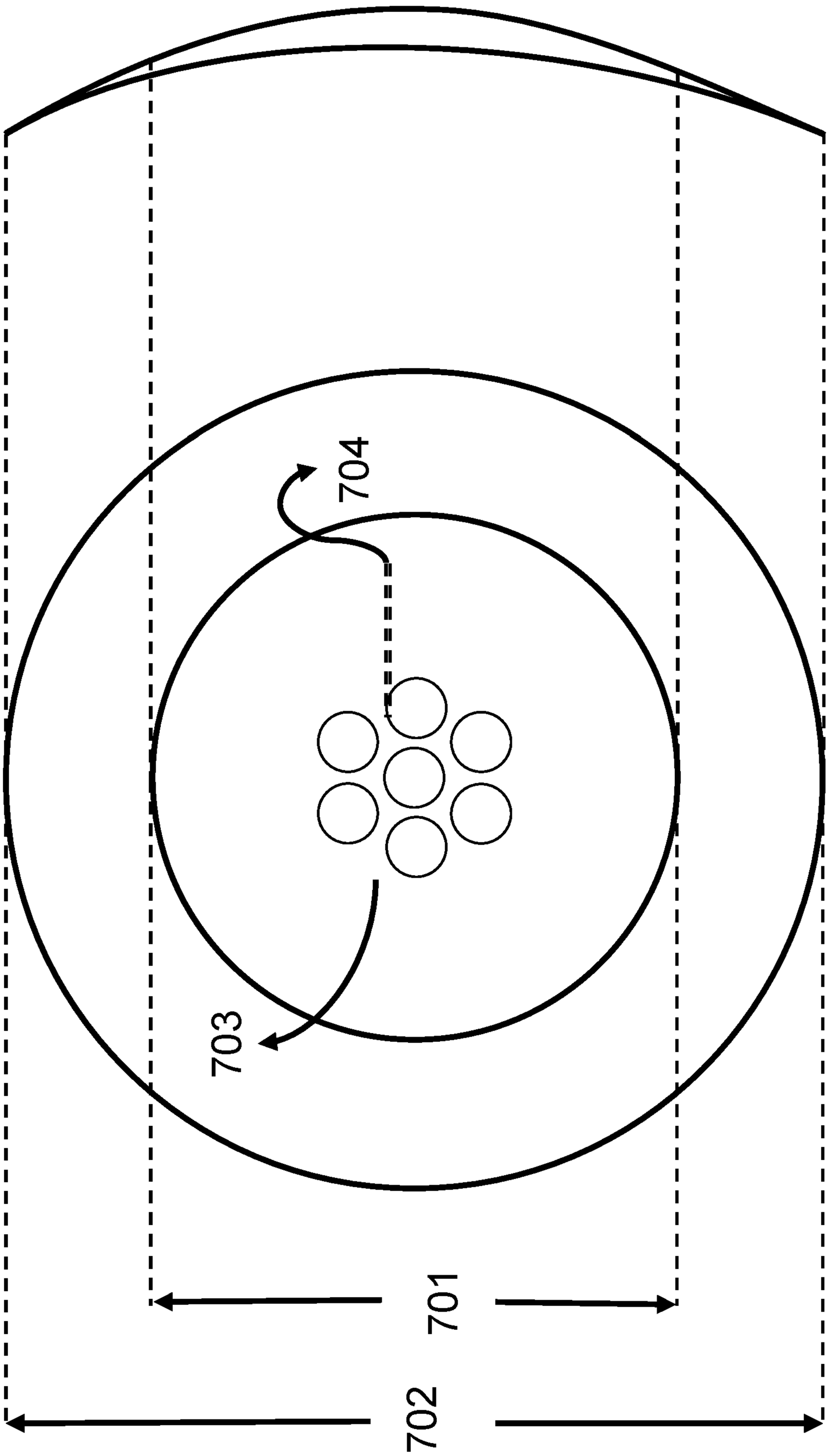


Figure 7

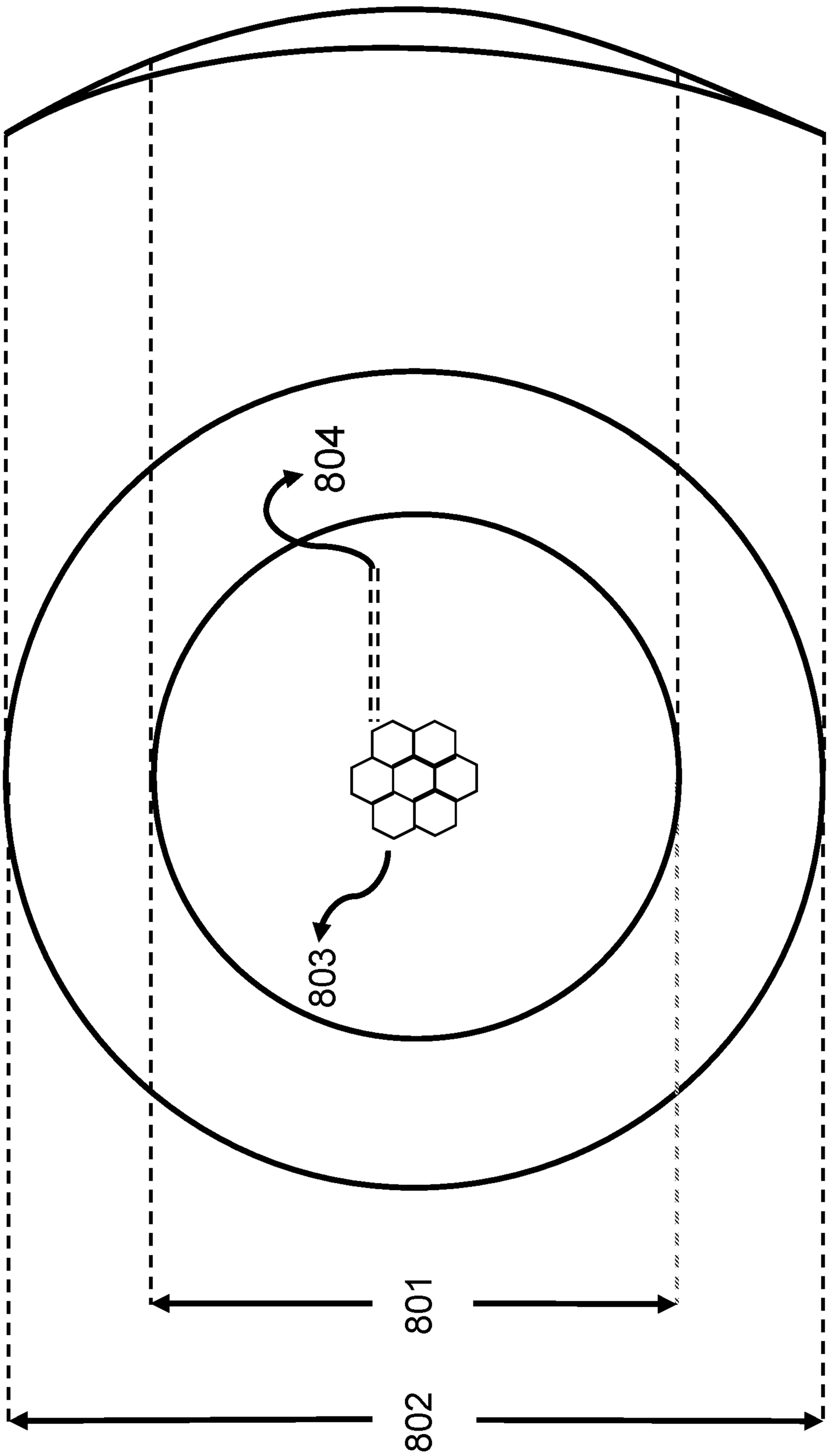


Figure 8

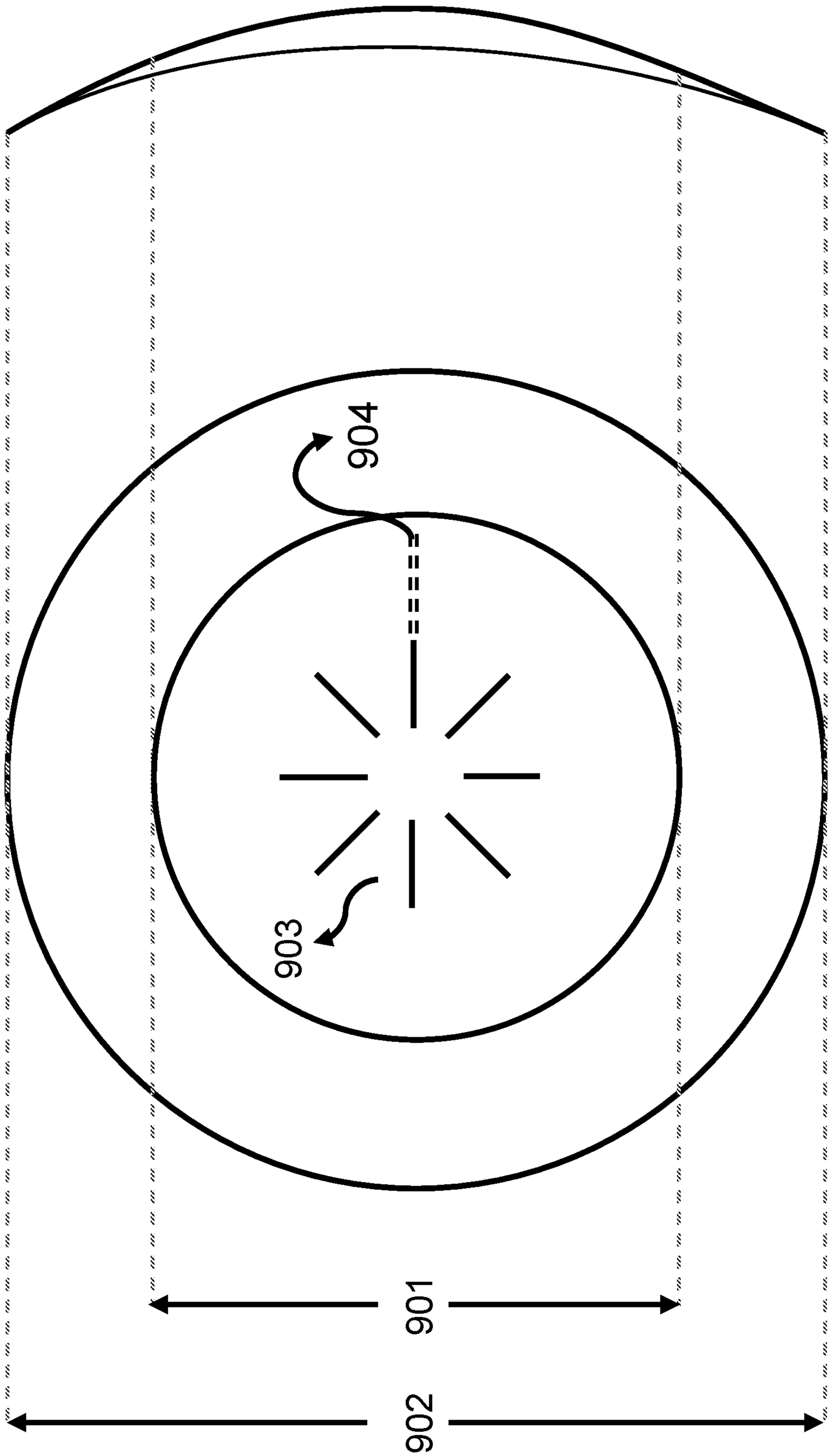


Figure 9

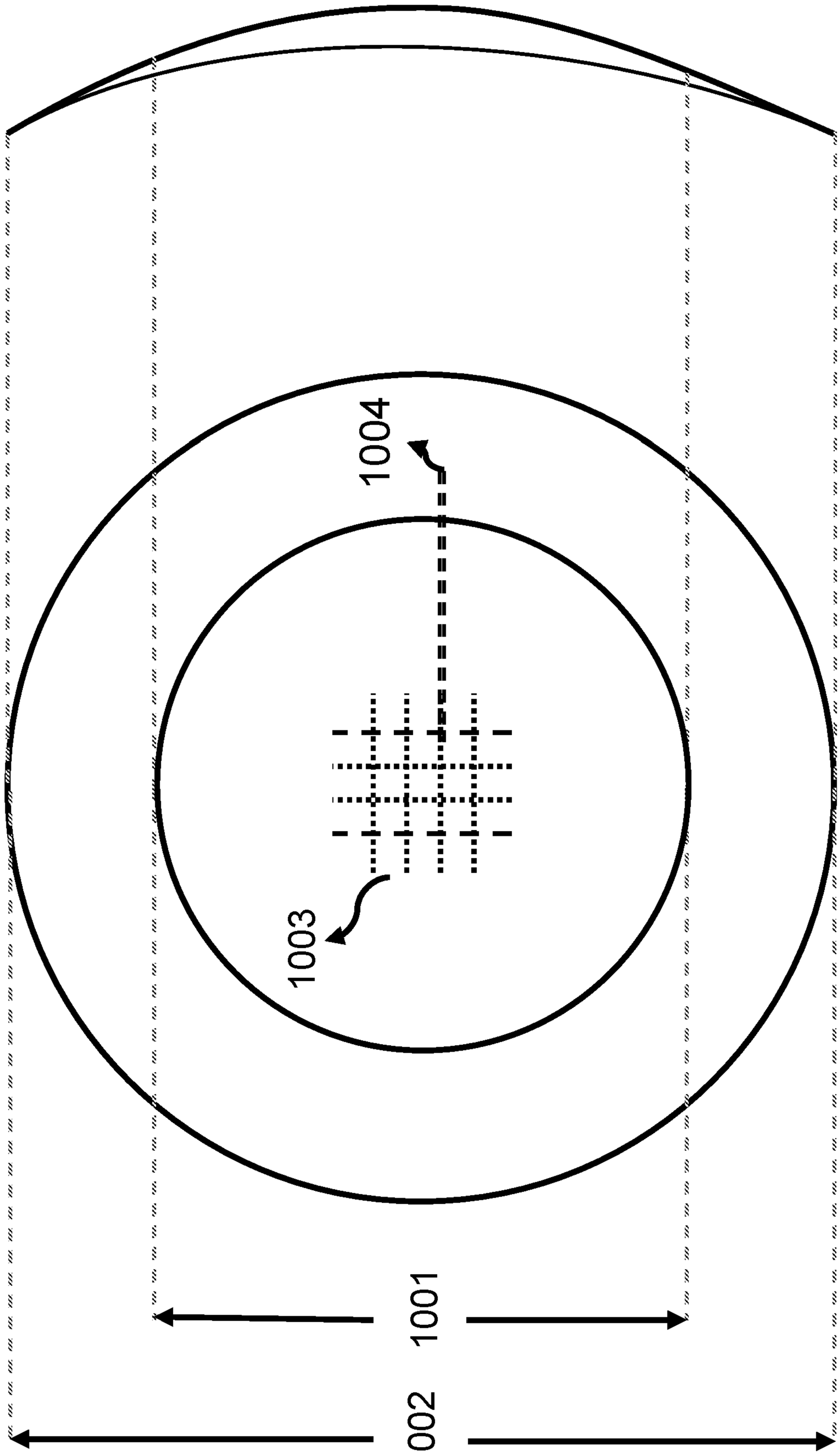


Figure 10

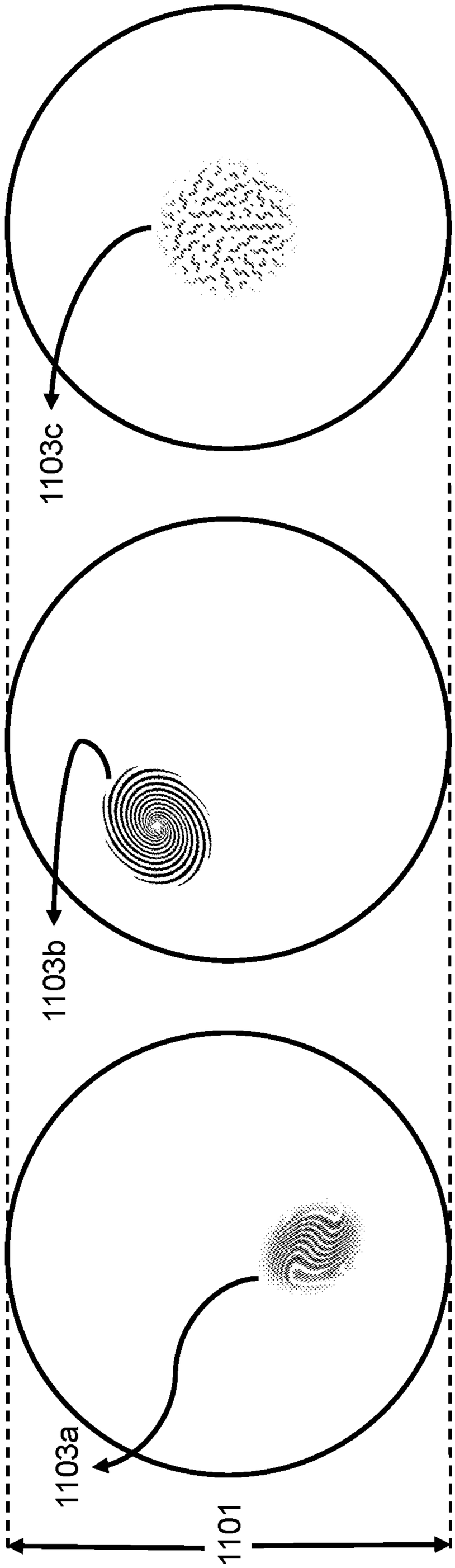


Figure 11

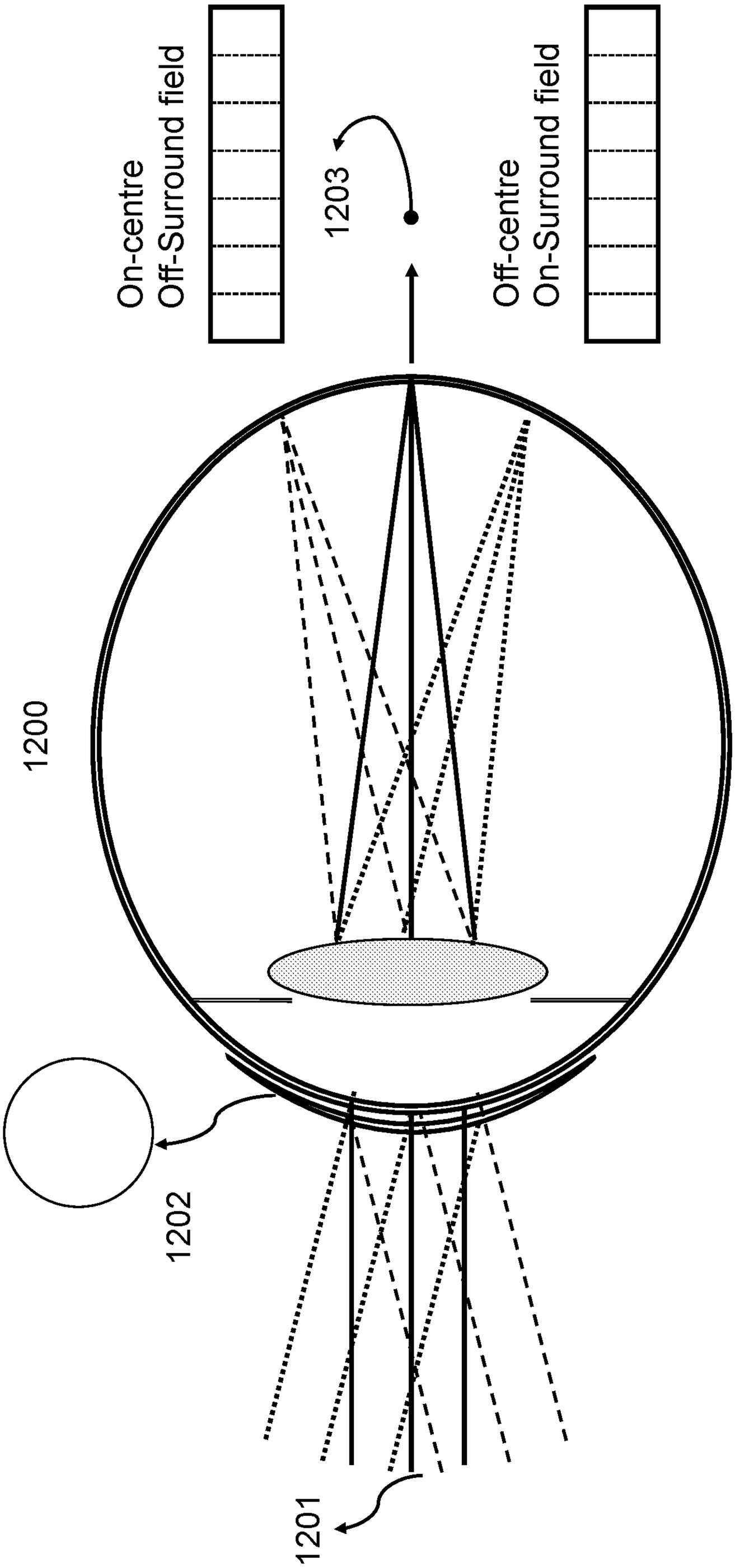

On-centre
Off-Surround field
1203
Off-centre
On-Surround field
1200
1202
1201

Figure 12

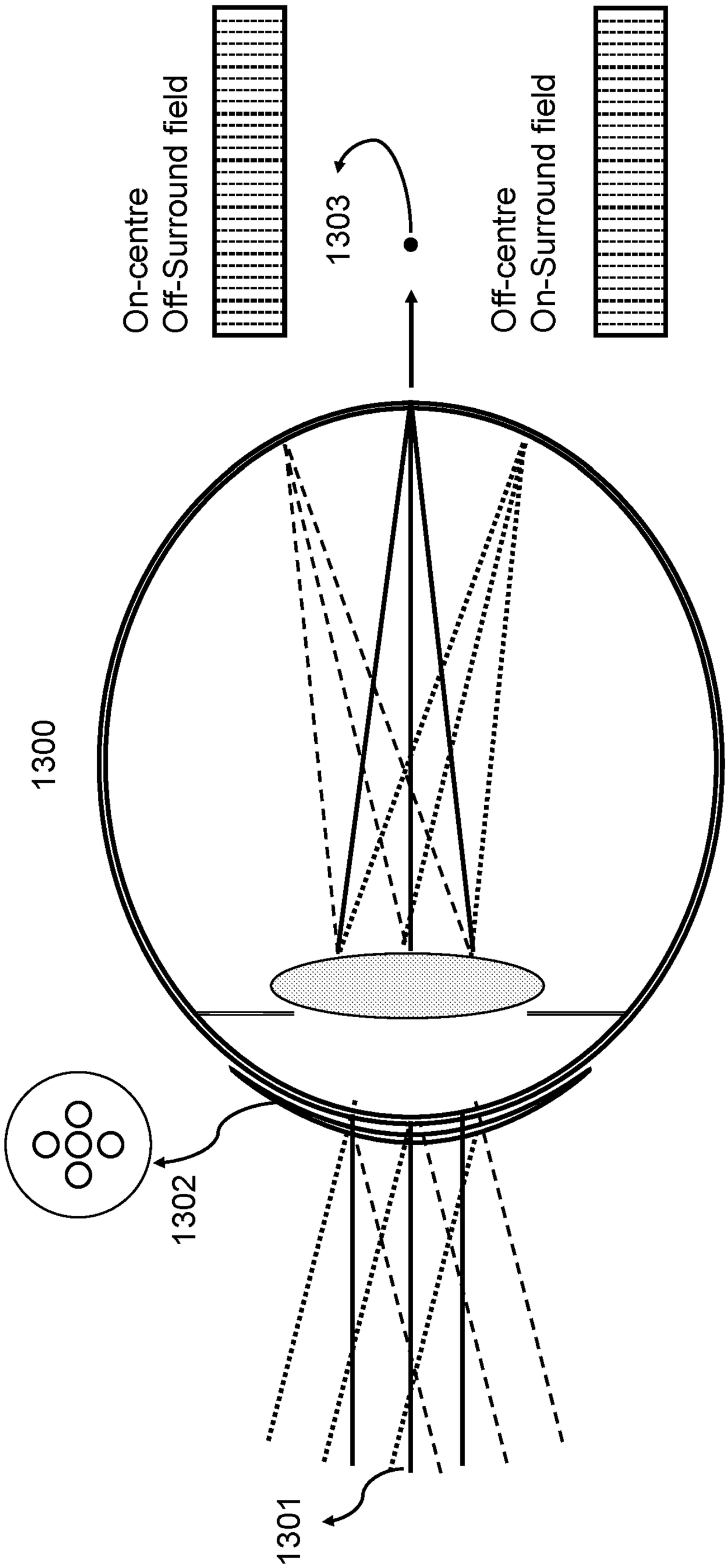

On-centre
Off-Surround field
1303
Off-centre
On-Surround field
1300
1302
1301

Figure 13

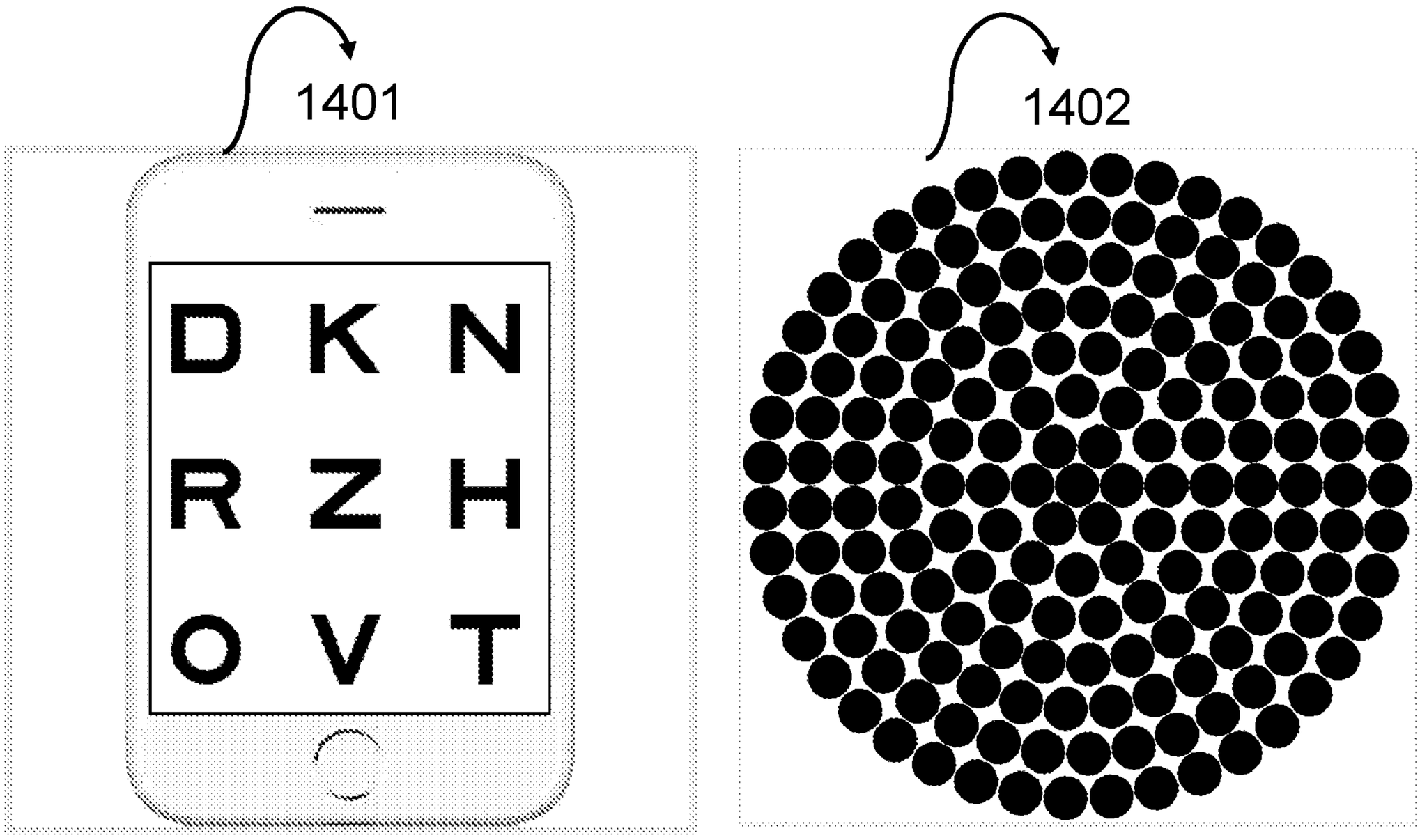


Figure 14

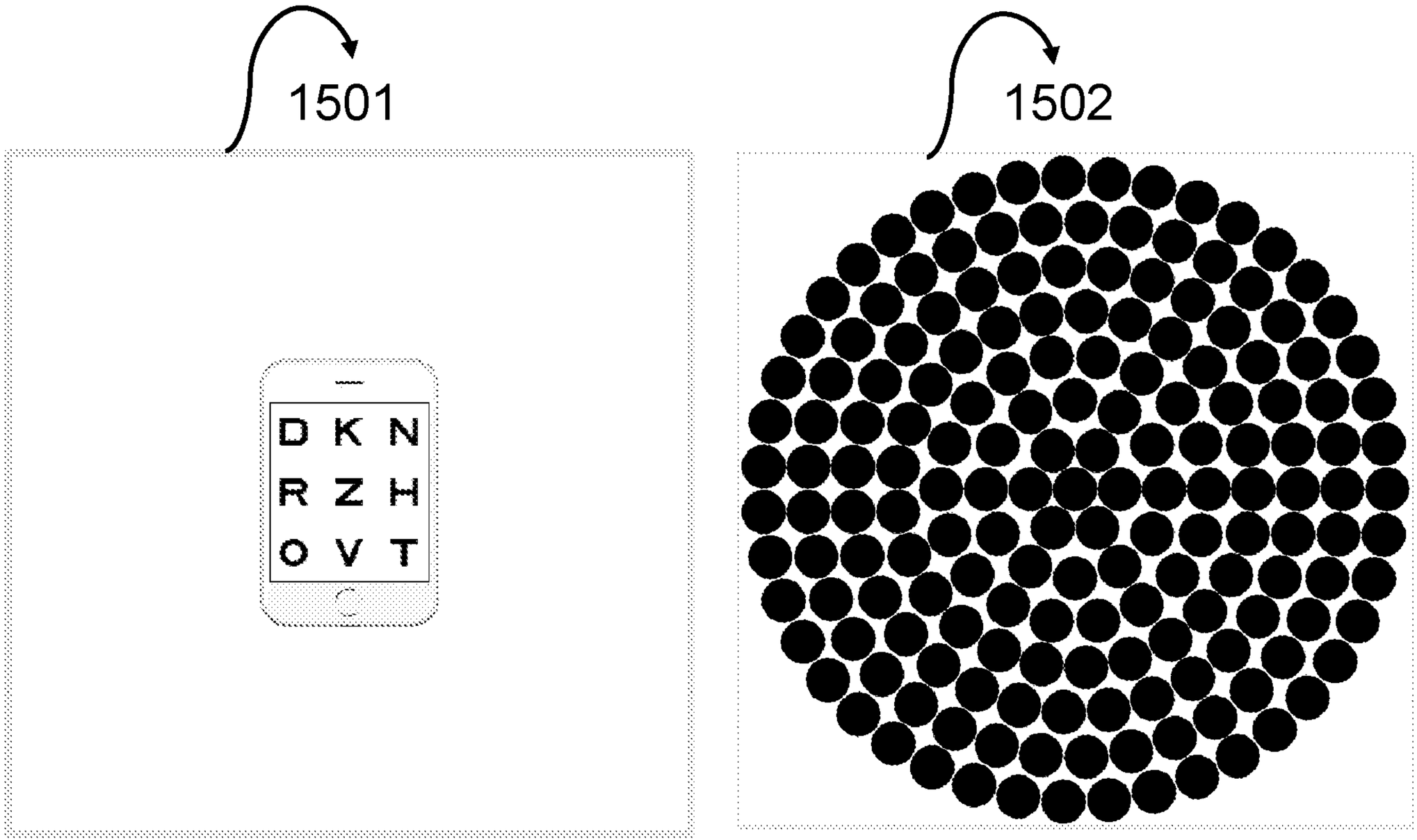


Figure 15

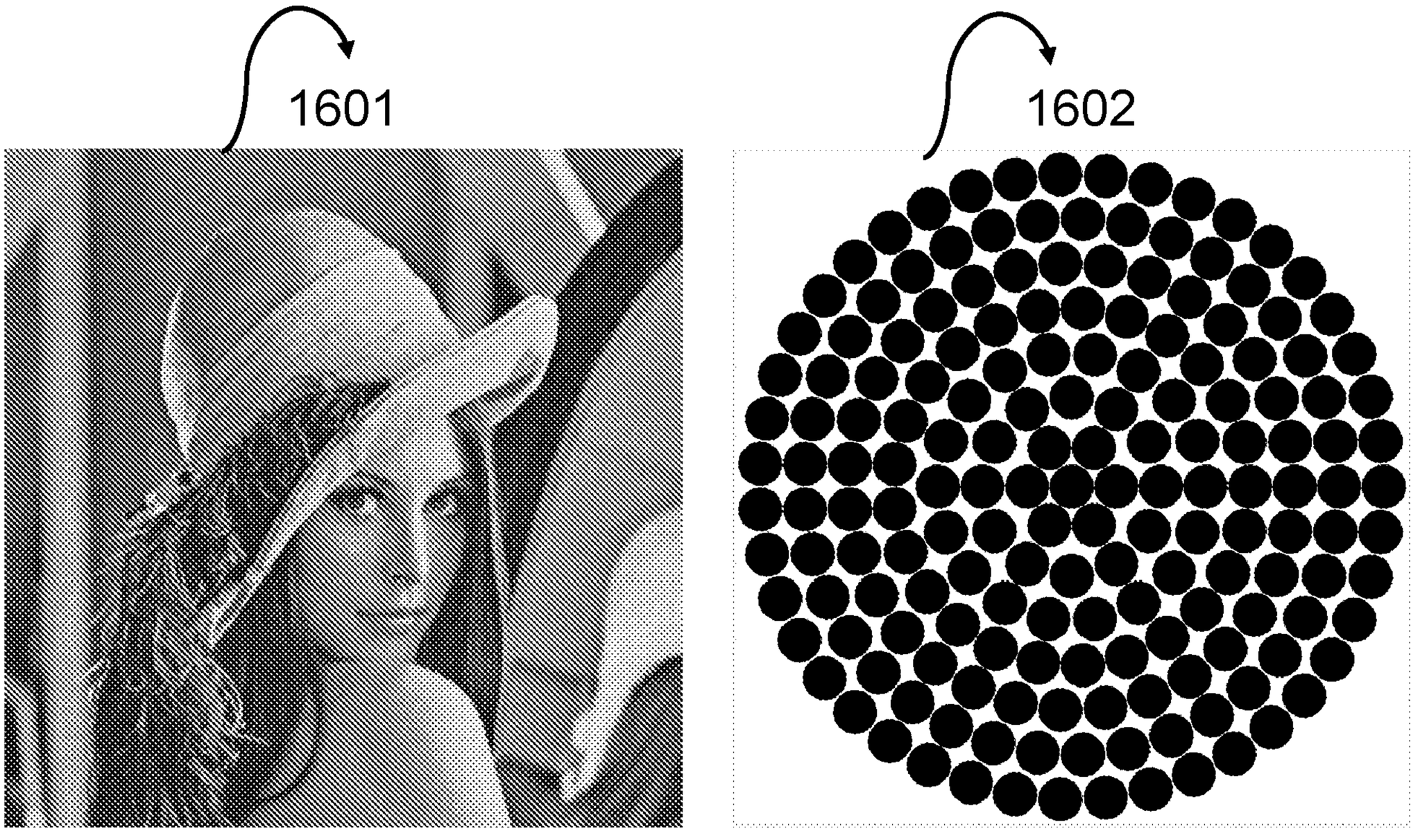


Figure 16

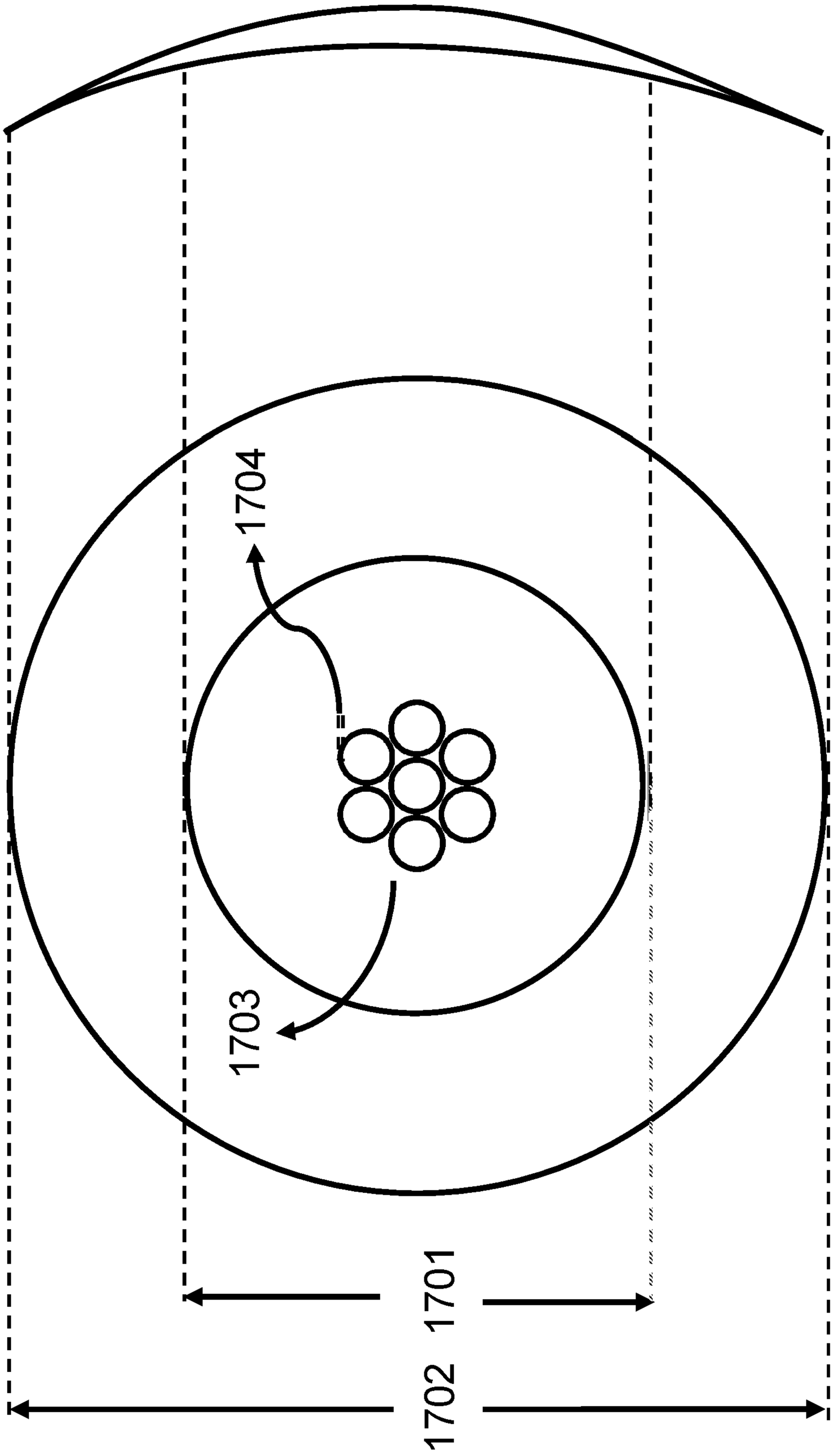


Figure 17

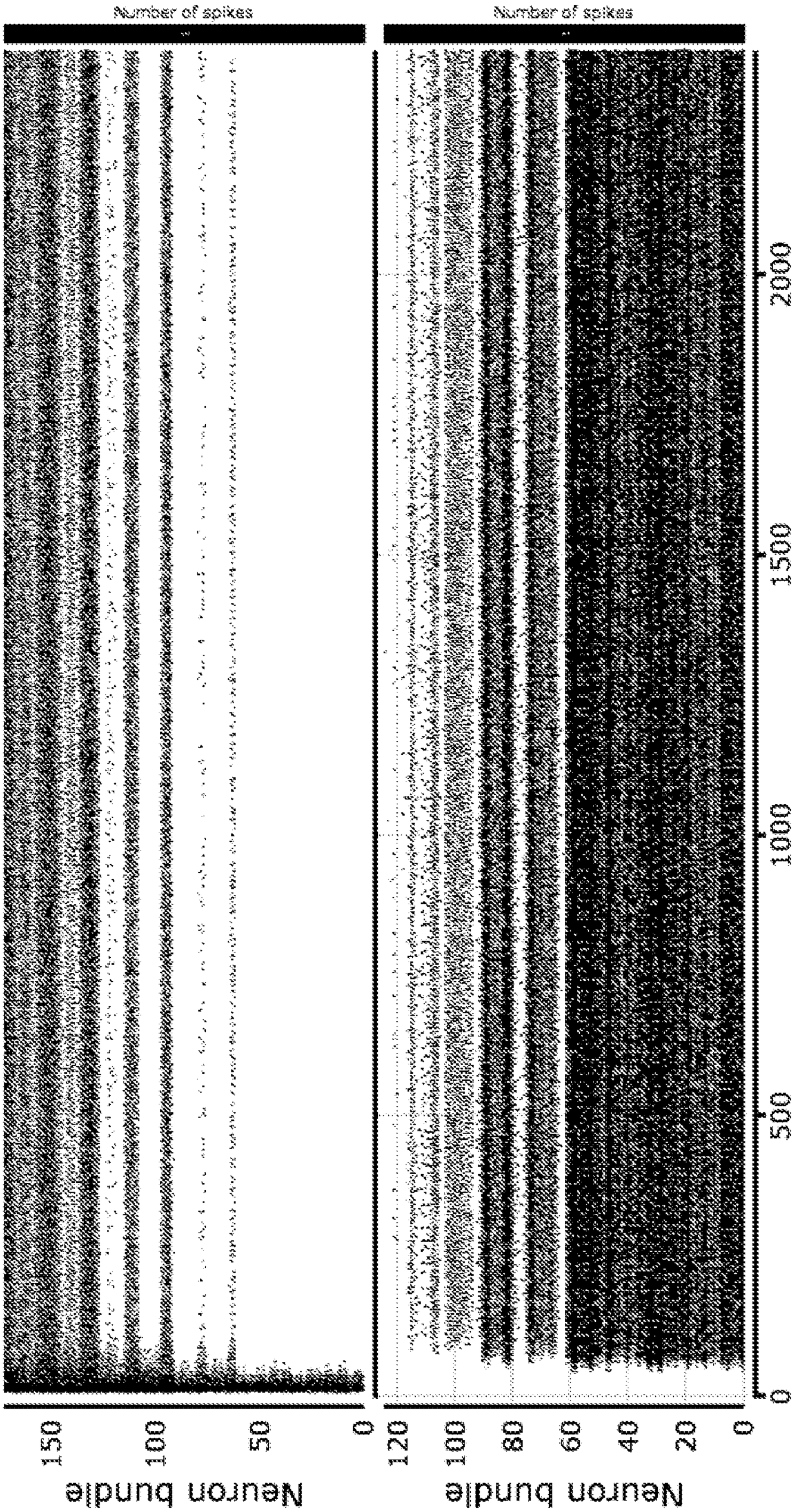

Number of spikes
Number of spikes
Time (milli-seconds)
Neuron bundle
Neuron bundle

Figure 18

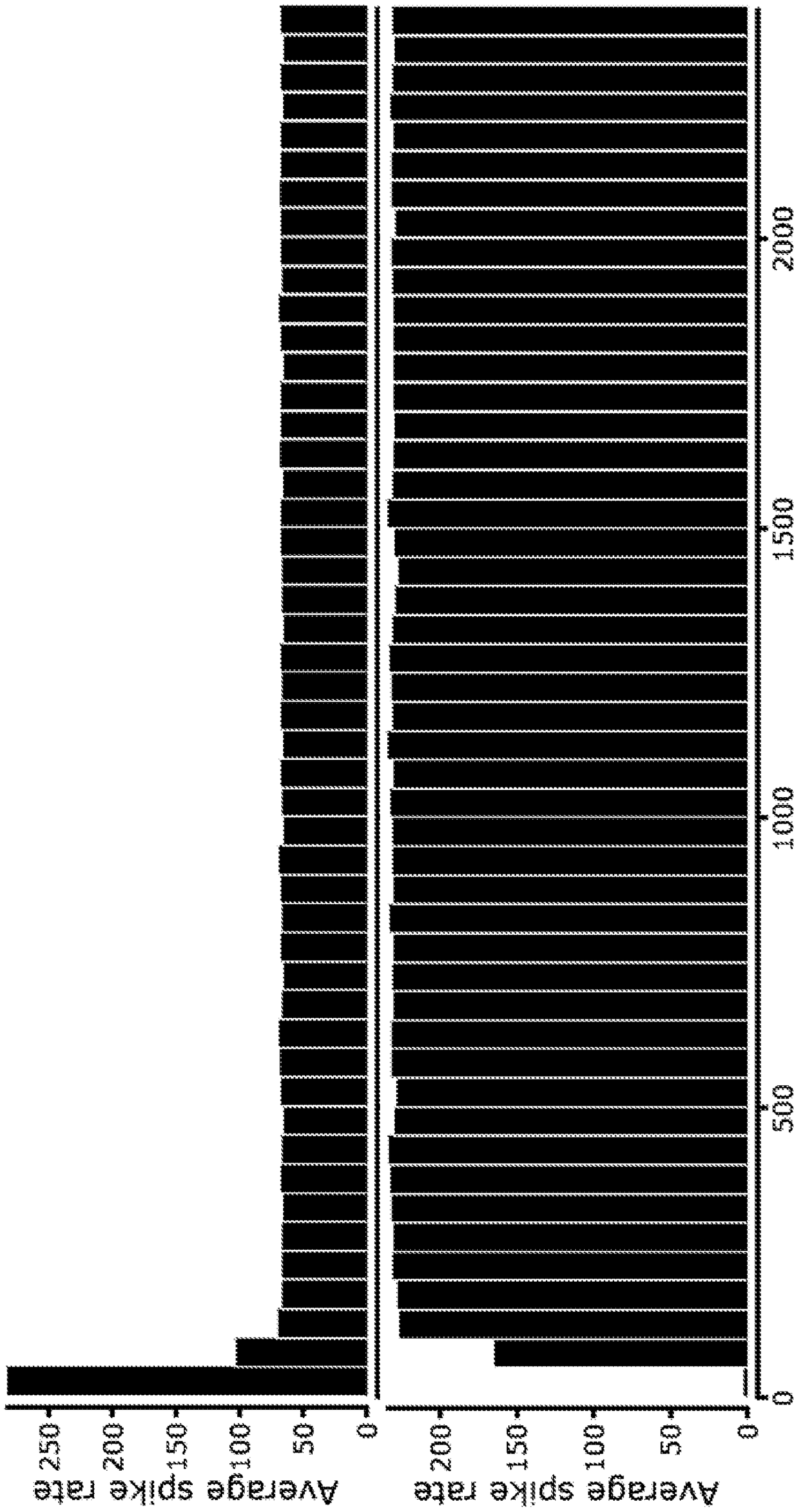

2000
1500
1000
500
0
Time (milli-seconds)
Average spike rate
250
200
150
100
50
0
Average spike rate
200
150
100
50
0

Figure 19

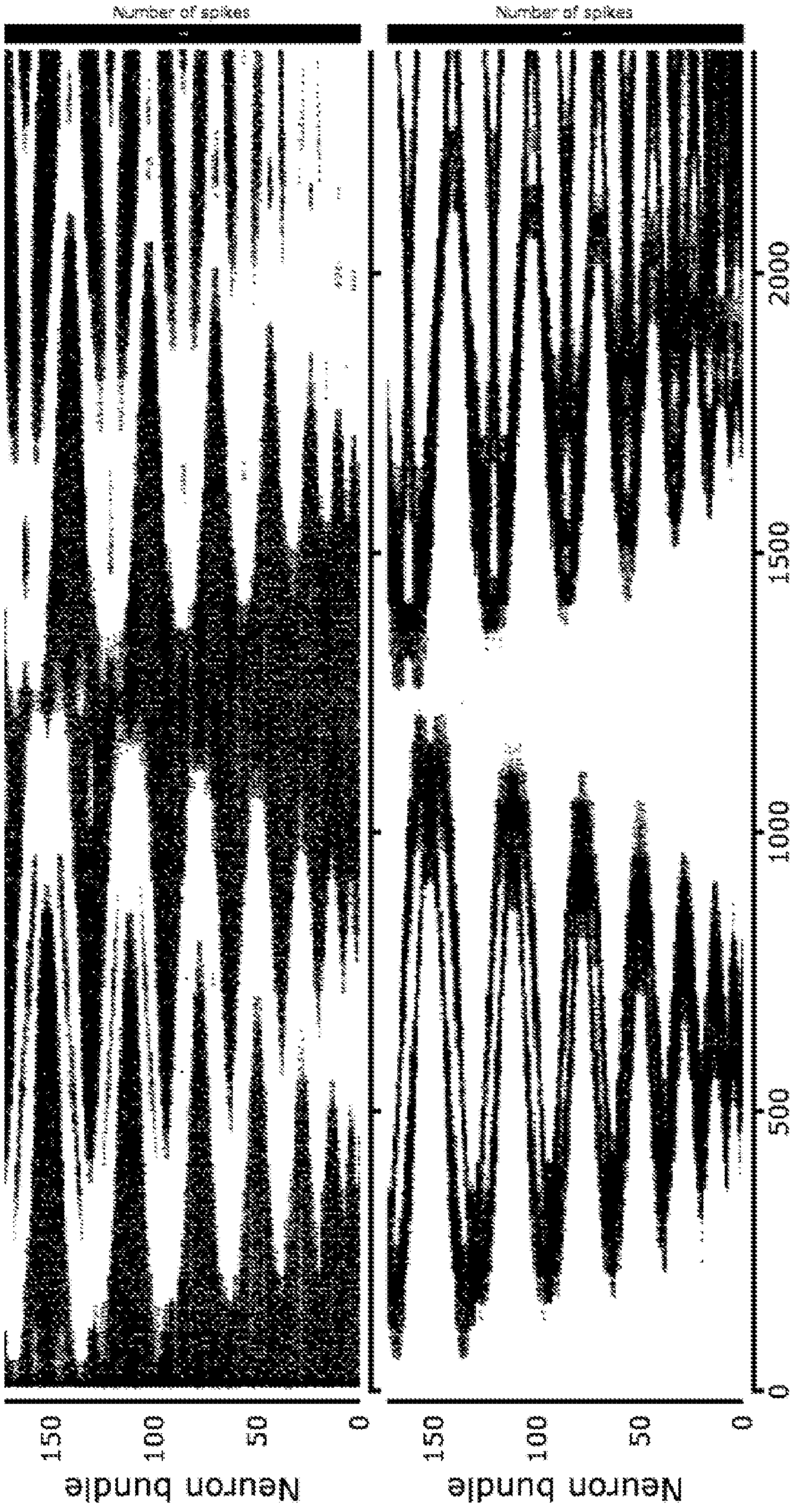

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
150
100
50
0
500
1000
1500
2000
Time (milli-seconds)

Figure 20

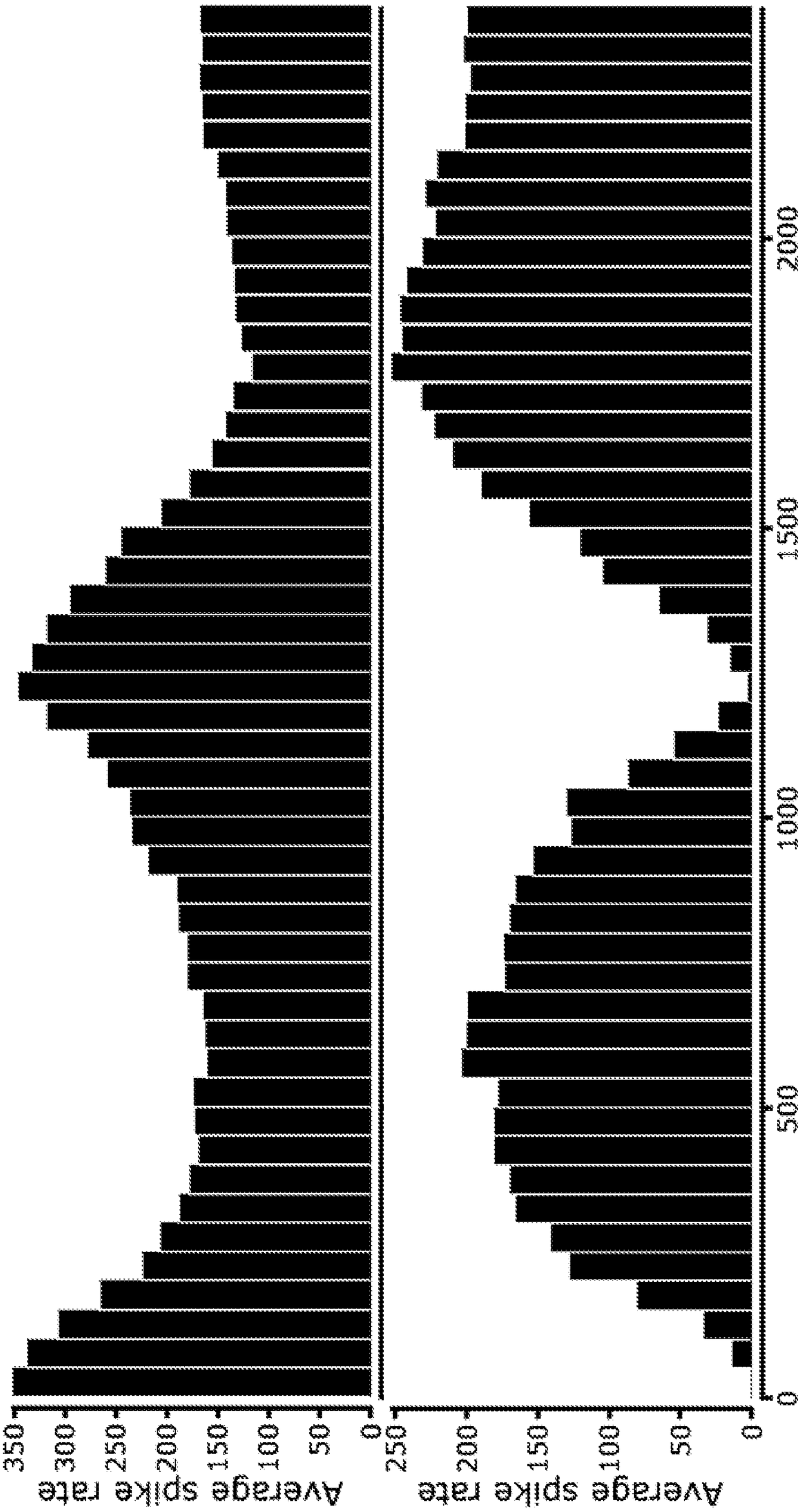

Average spike rate
350
300
250
200
150
100
50
0
Time (milli-seconds)
500
1000
1500
2000
Average spike rate
250
200
150
100
50
0
0

Figure 21

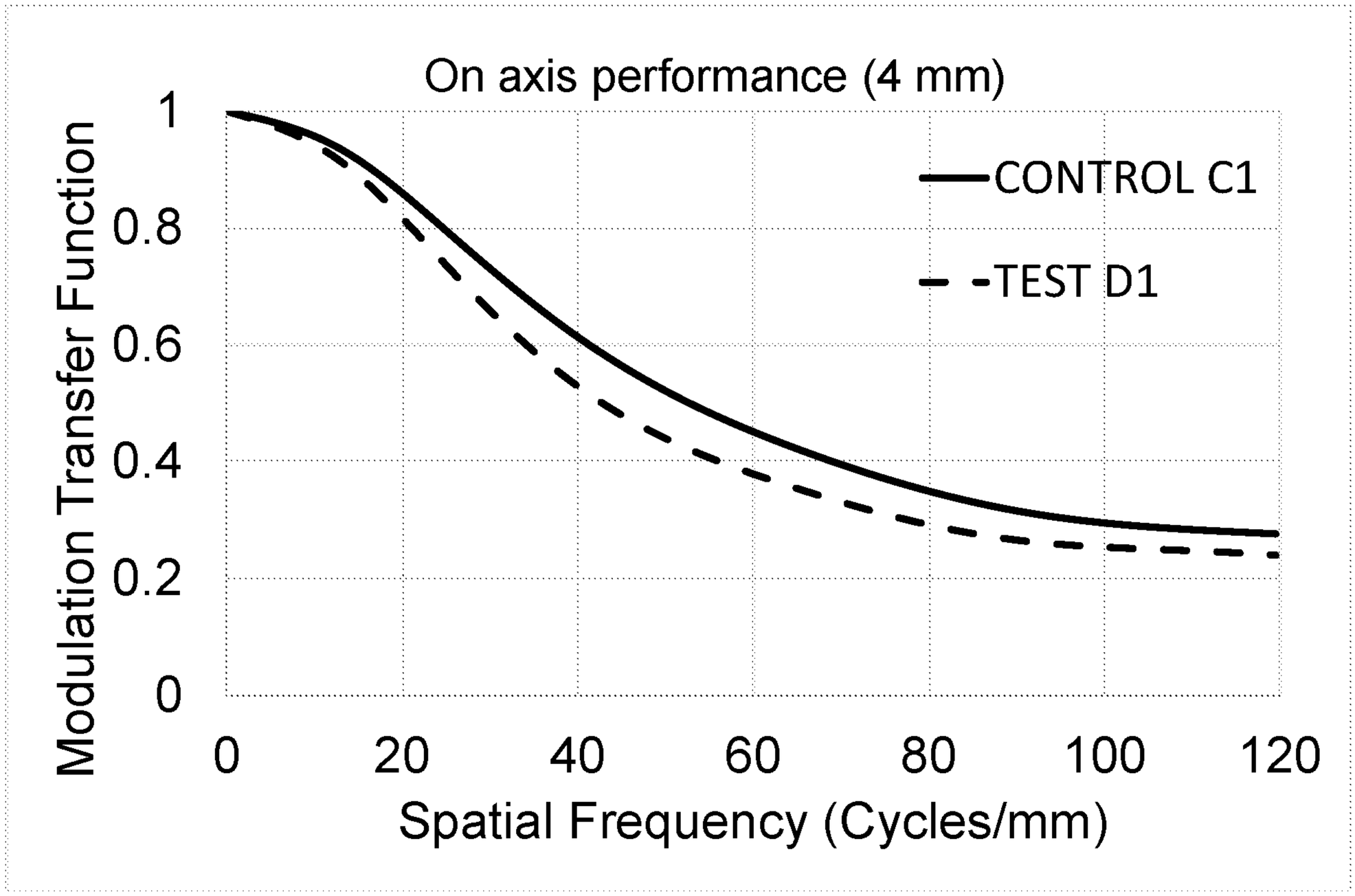


Figure 22

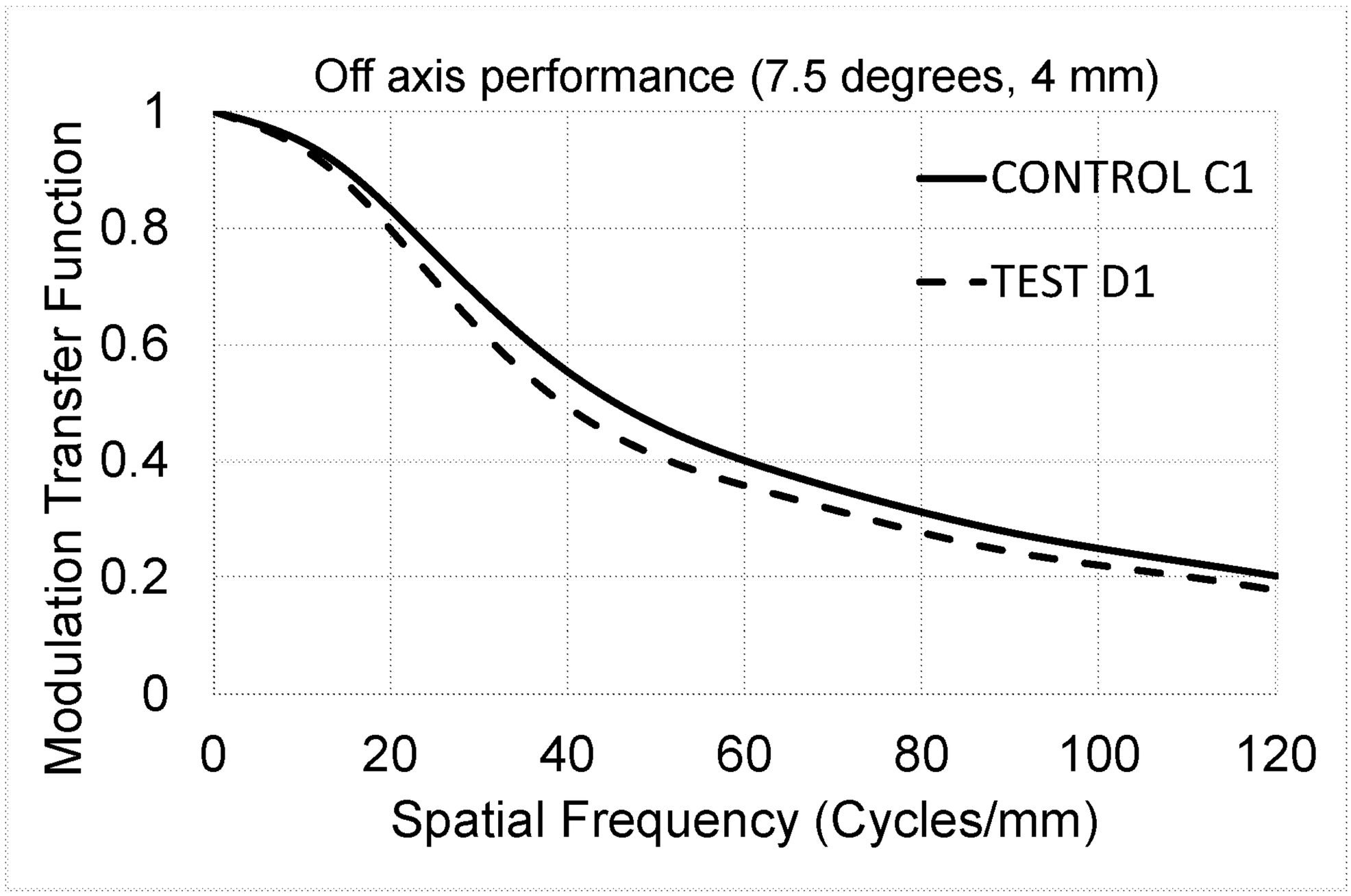


Figure 23

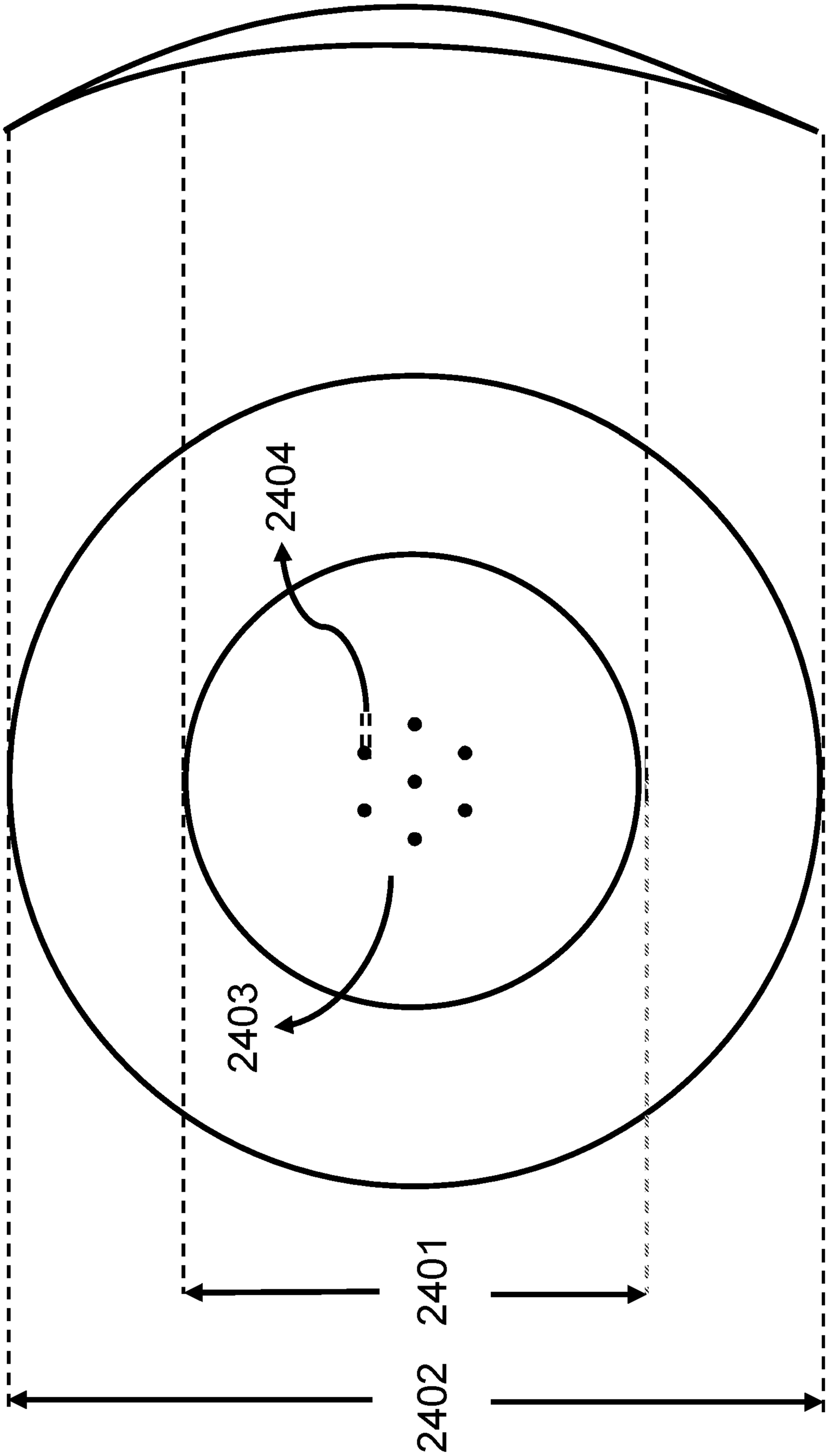


Figure 24

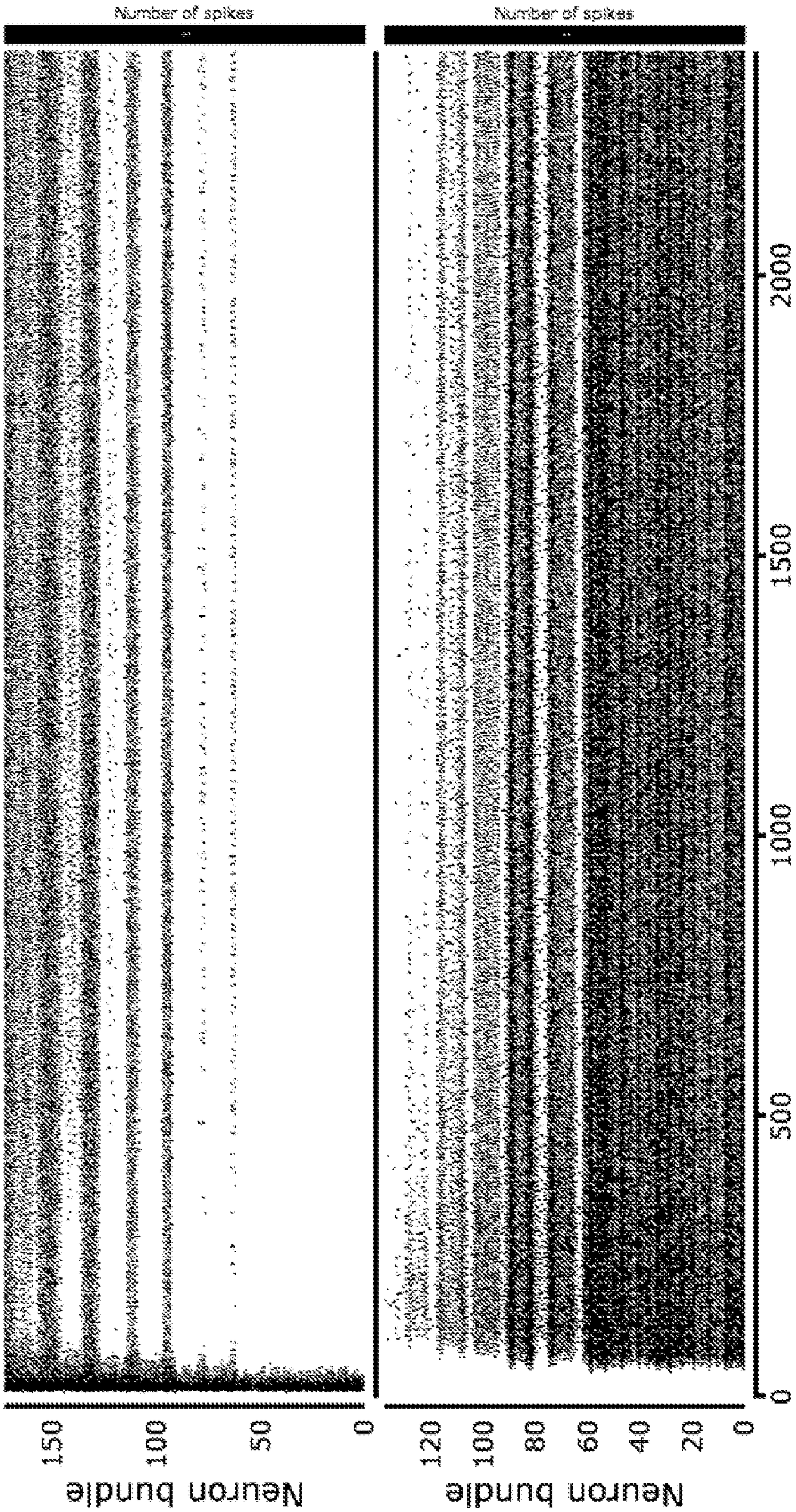

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
Time (milli-seconds)
Time (milli-seconds)

Figure 25

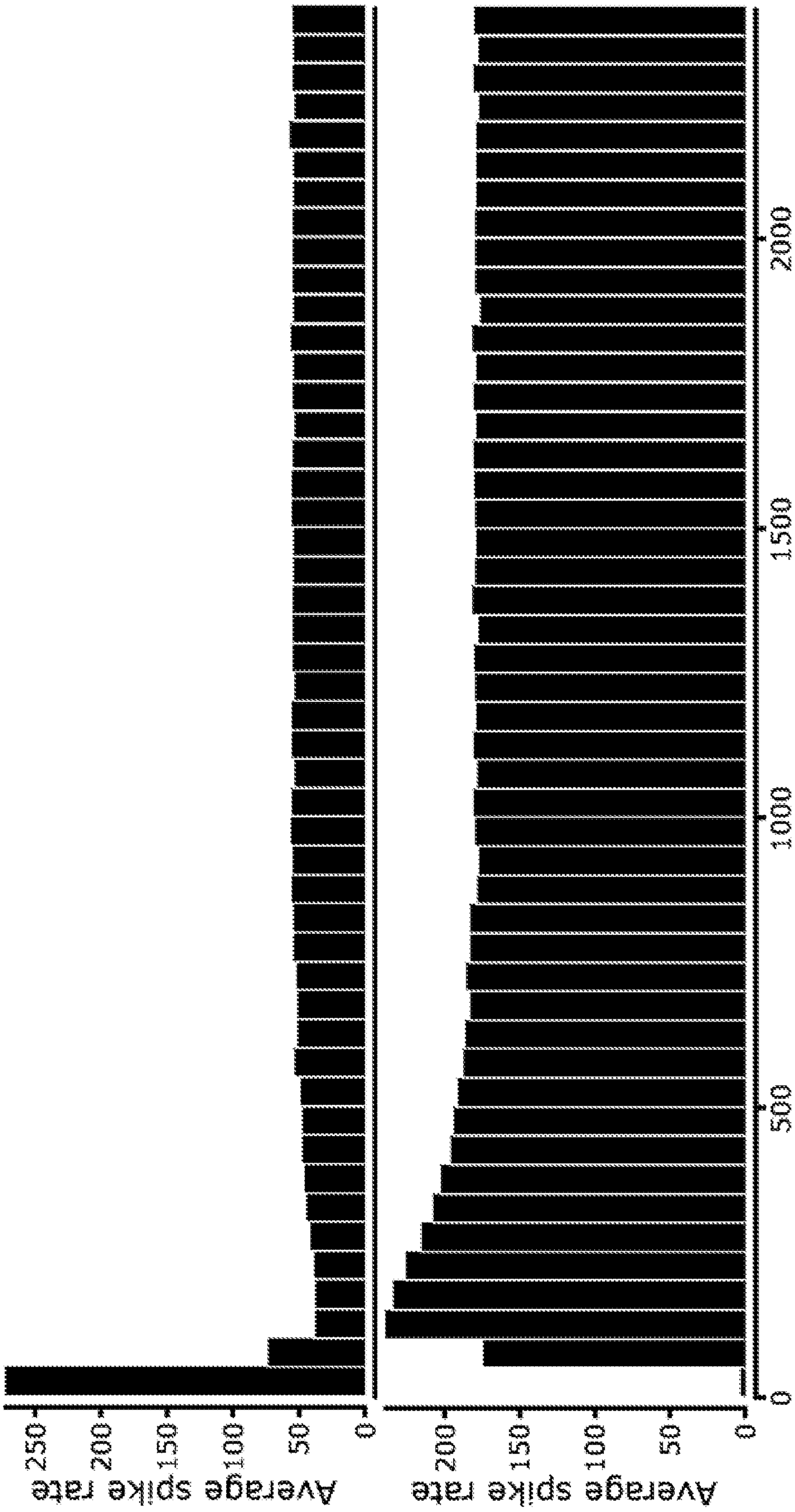

Average spike rate
250
200
150
100
50
0
Average spike rate
200
150
100
50
0
500
1000
1500
2000
Time (milli-seconds)

Figure 26

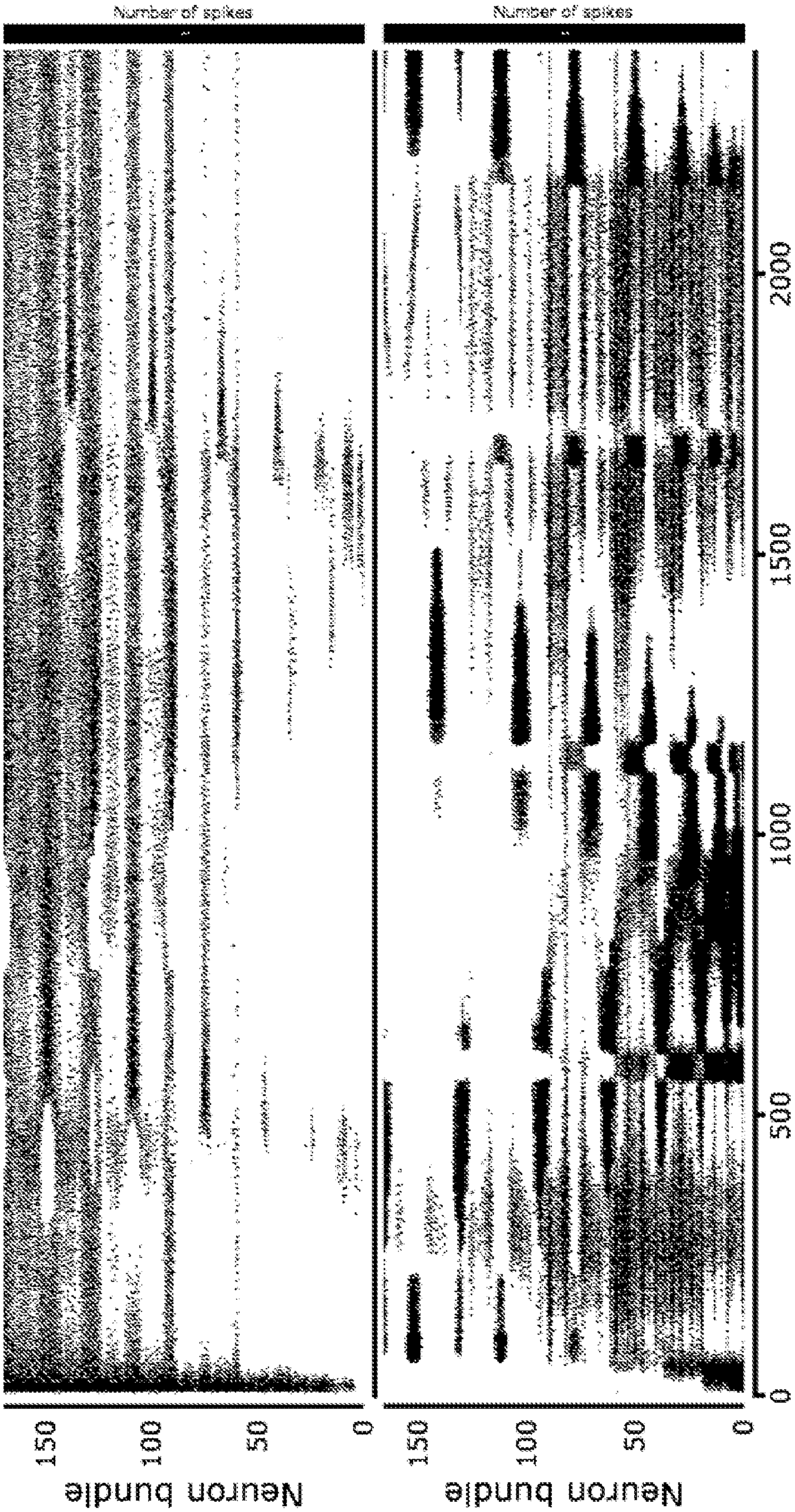

Number of spikes
Number of spikes
Time (milli-seconds)
Neuron bundle
Neuron bundle

Figure 27

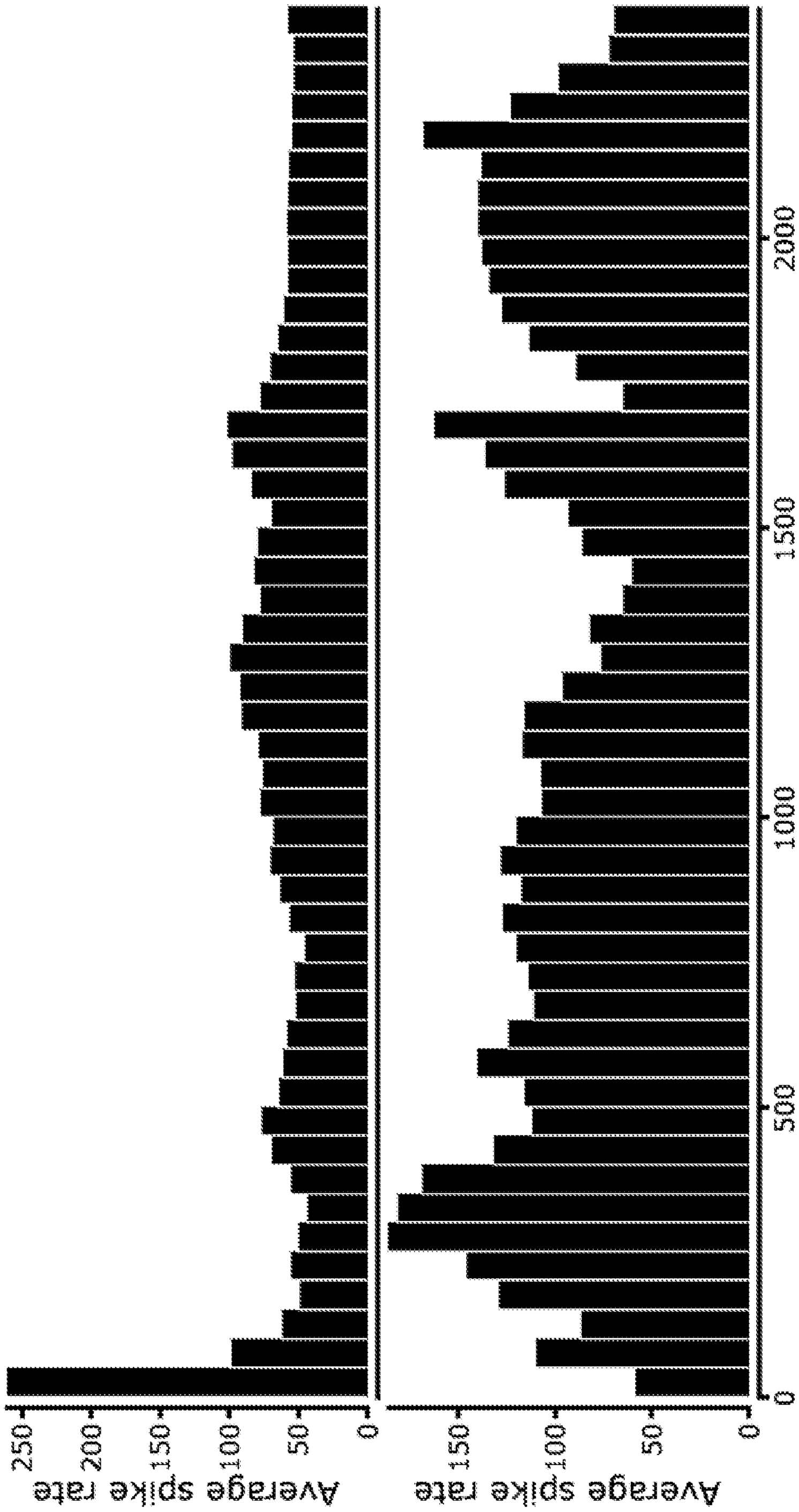

Average spike rate
250
200
150
100
50
0
Average spike rate
150
100
50
0
500
1000
1500
2000
Time (milli-seconds)

Figure 28

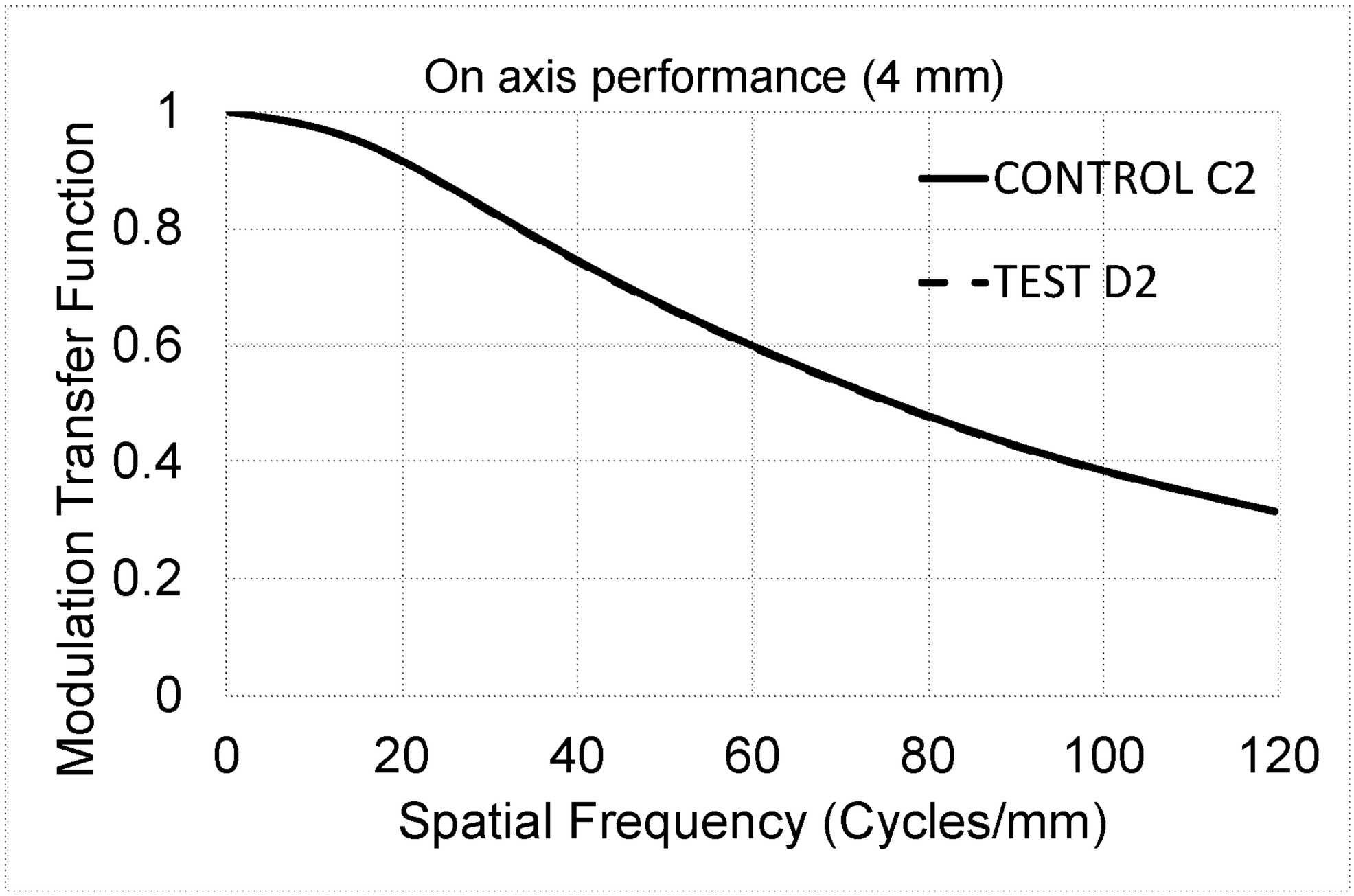


Figure 29

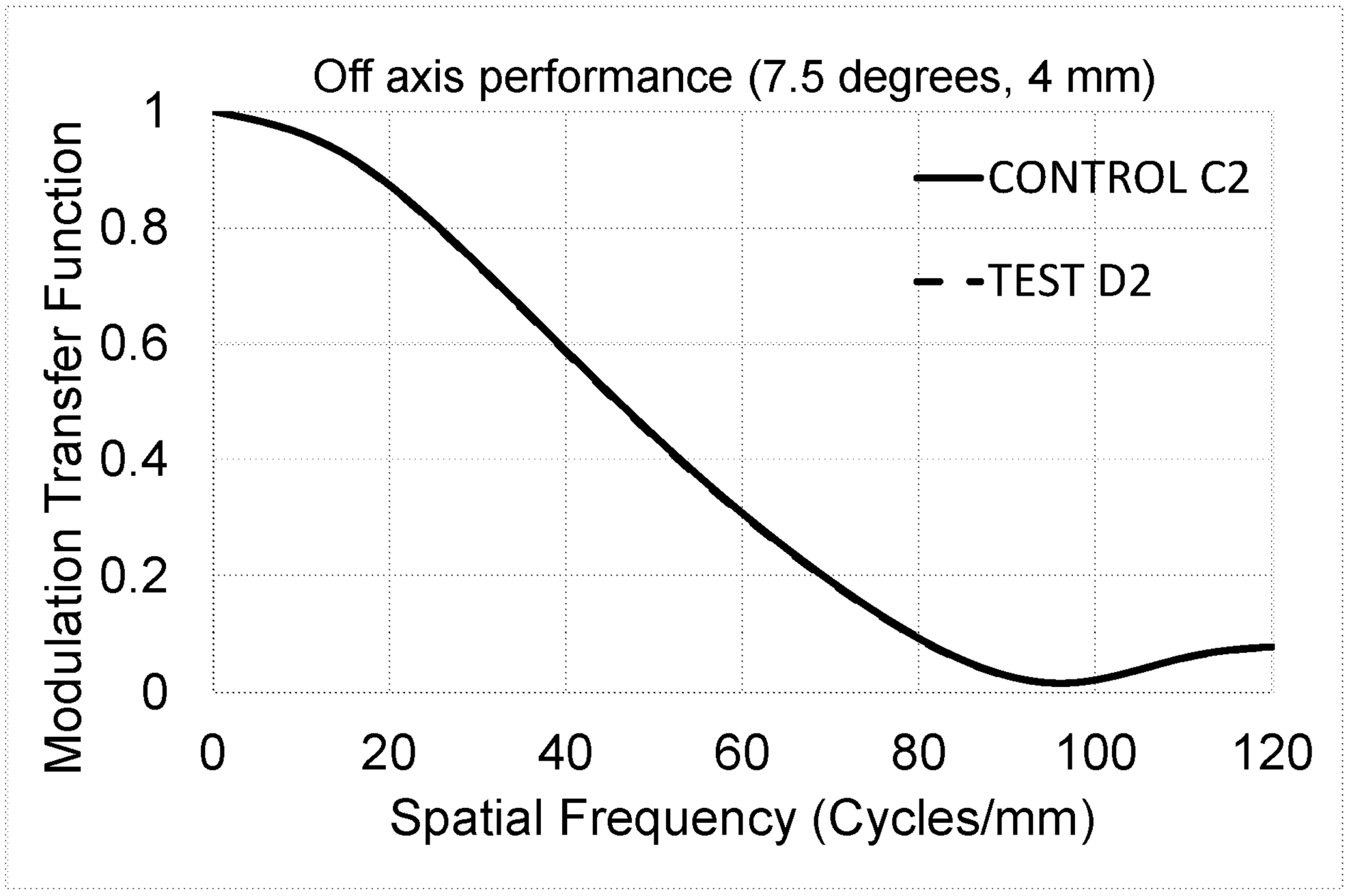


Figure 30

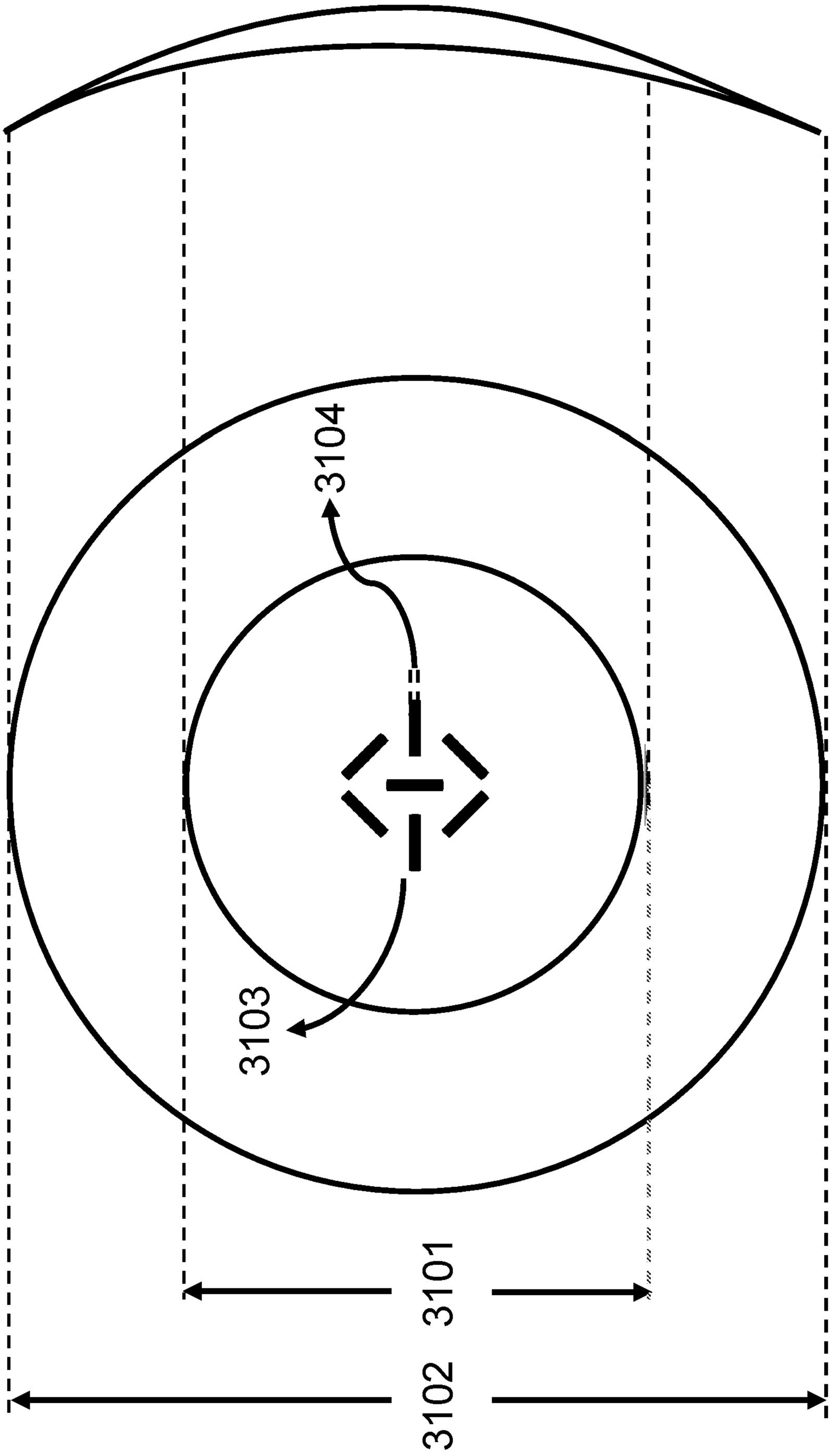


Figure 31

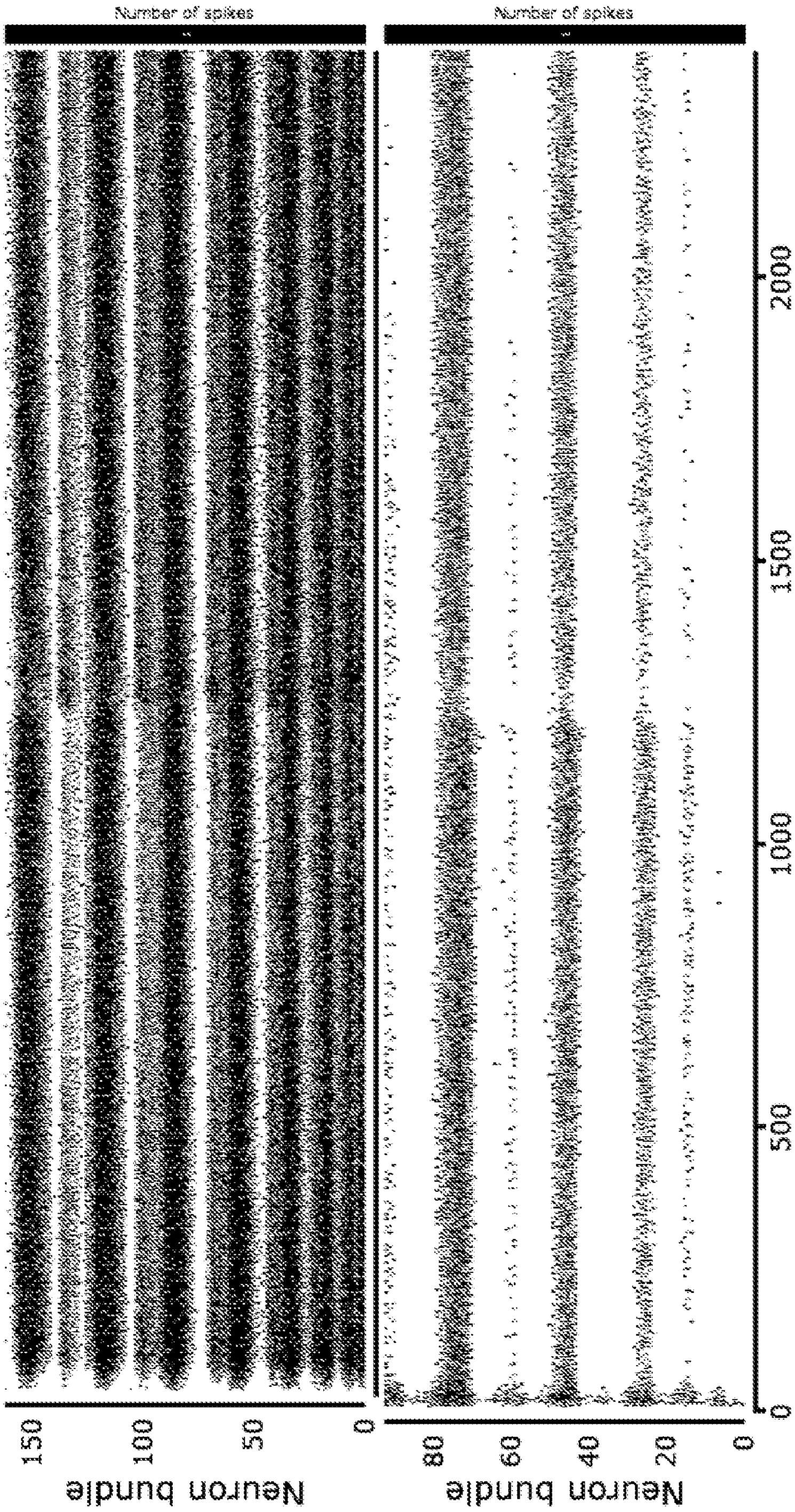

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
Time (milli-seconds)
150
100
50
0
80
60
40
20
0
500
1000
1500
2000

Figure 32

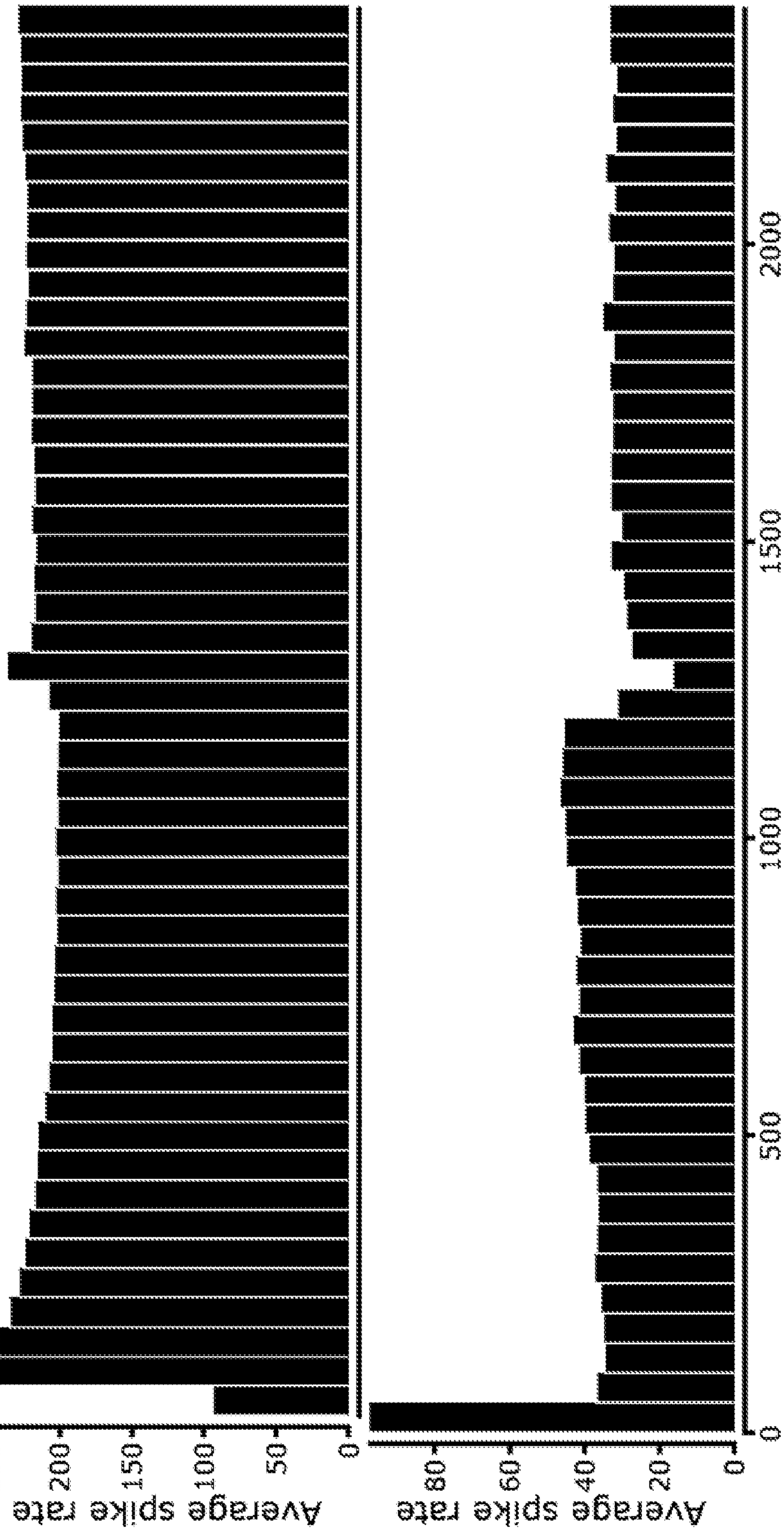

Average spike rate
250
200
150
100
50
0
Average spike rate
80
60
40
20
0
Time (milli-seconds)
500
1000
1500
2000
0

Figure 33

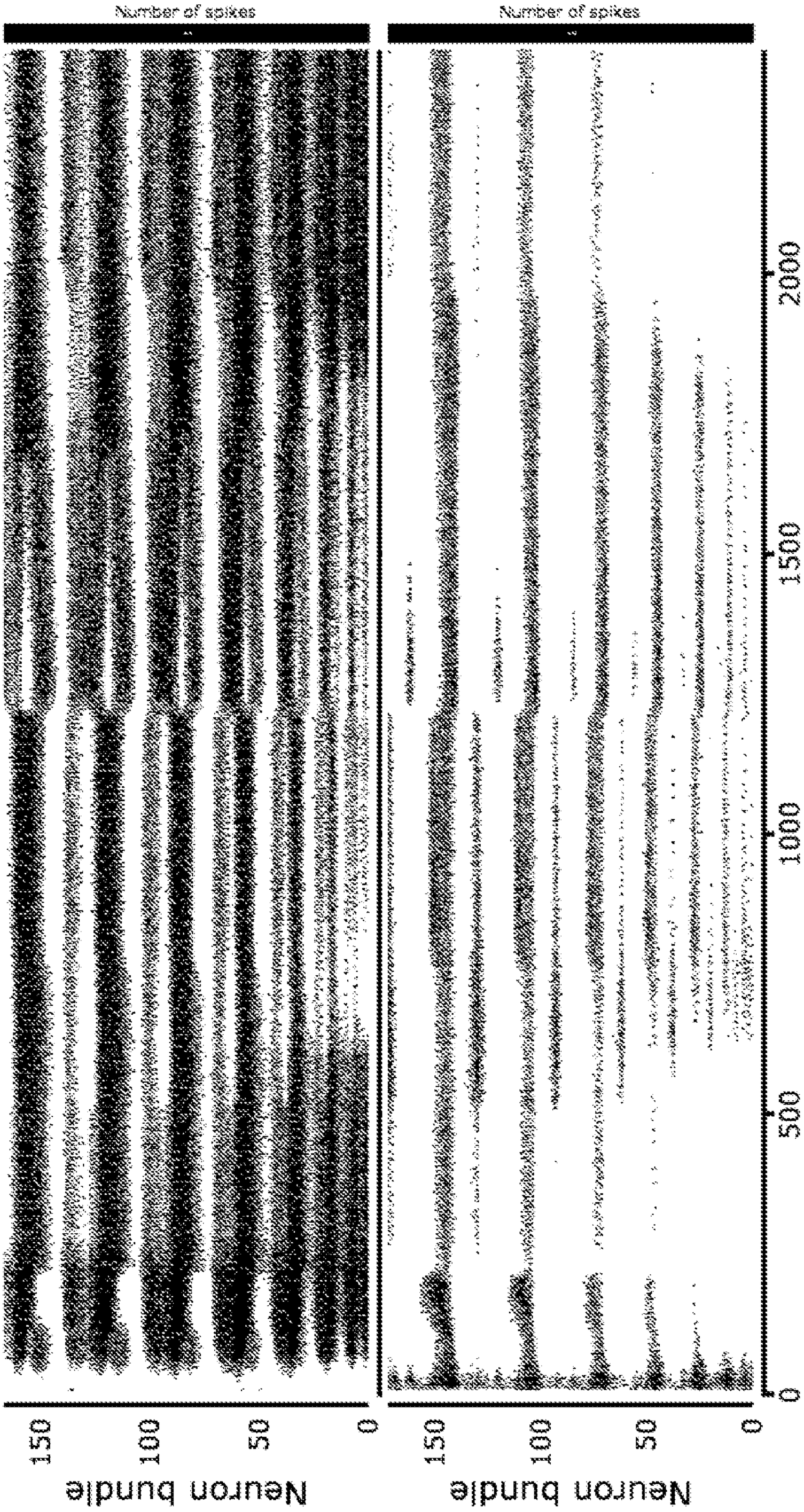

Number of spikes
Number of spikes
1500
1000
500
0
Time (milli-seconds)
150
100
50
0
Neuron bundle
150
100
50
0
Neuron bundle

Figure 34

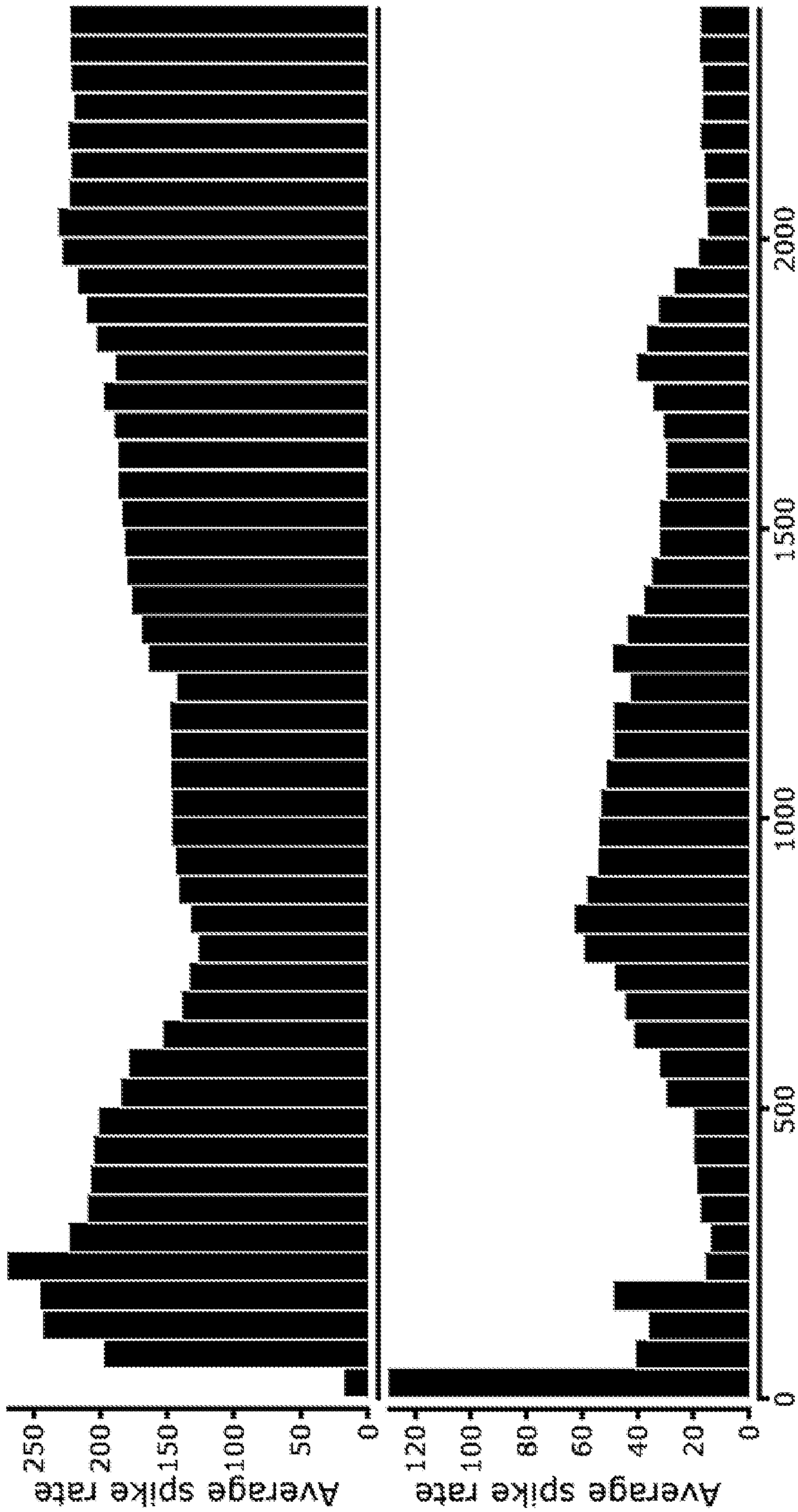

Average spike rate
250
200
150
100
50
0
Average spike rate
120
100
80
60
40
20
0
500
1000
1500
2000
Time (milli-seconds)

Figure 35

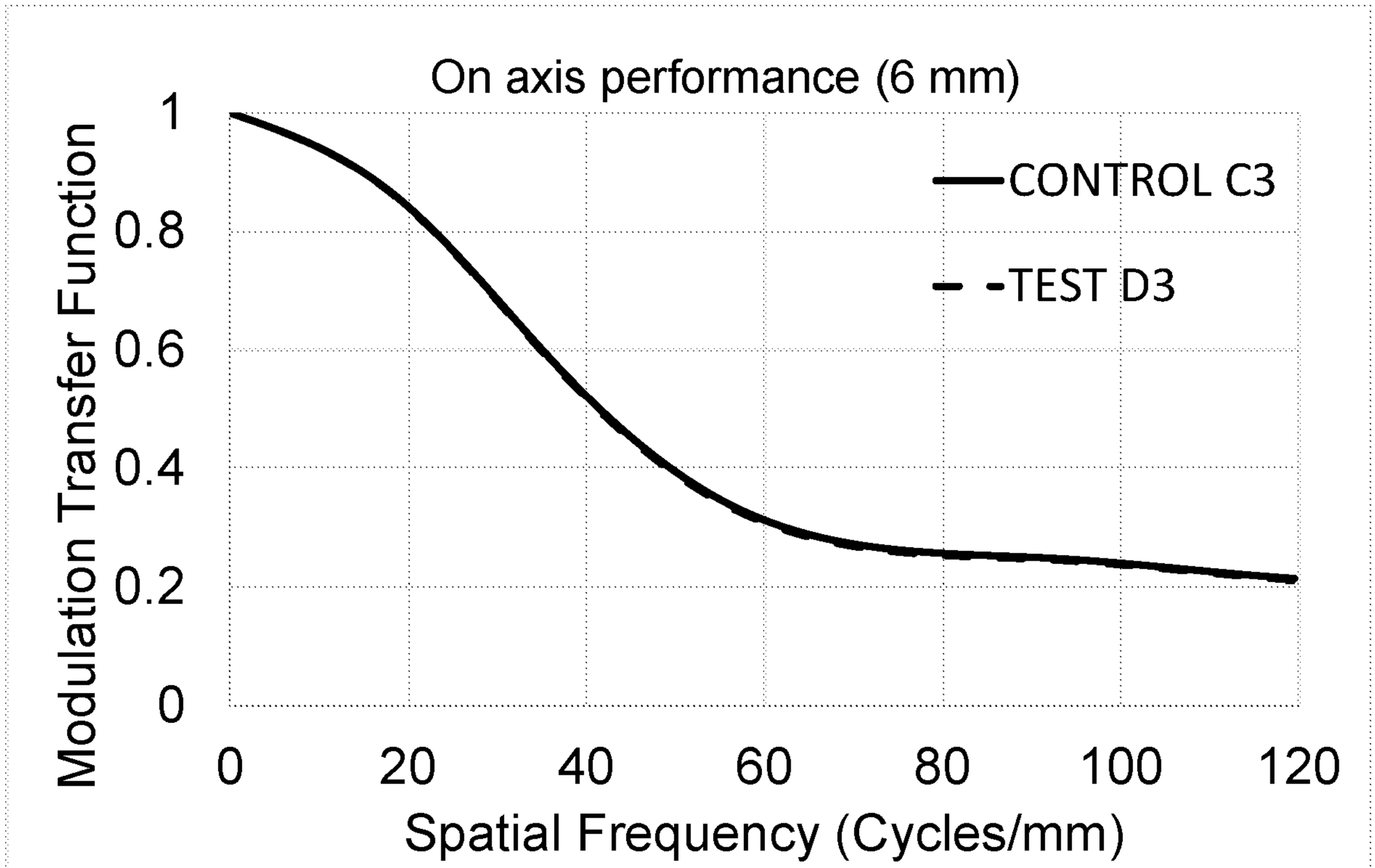


Figure 36

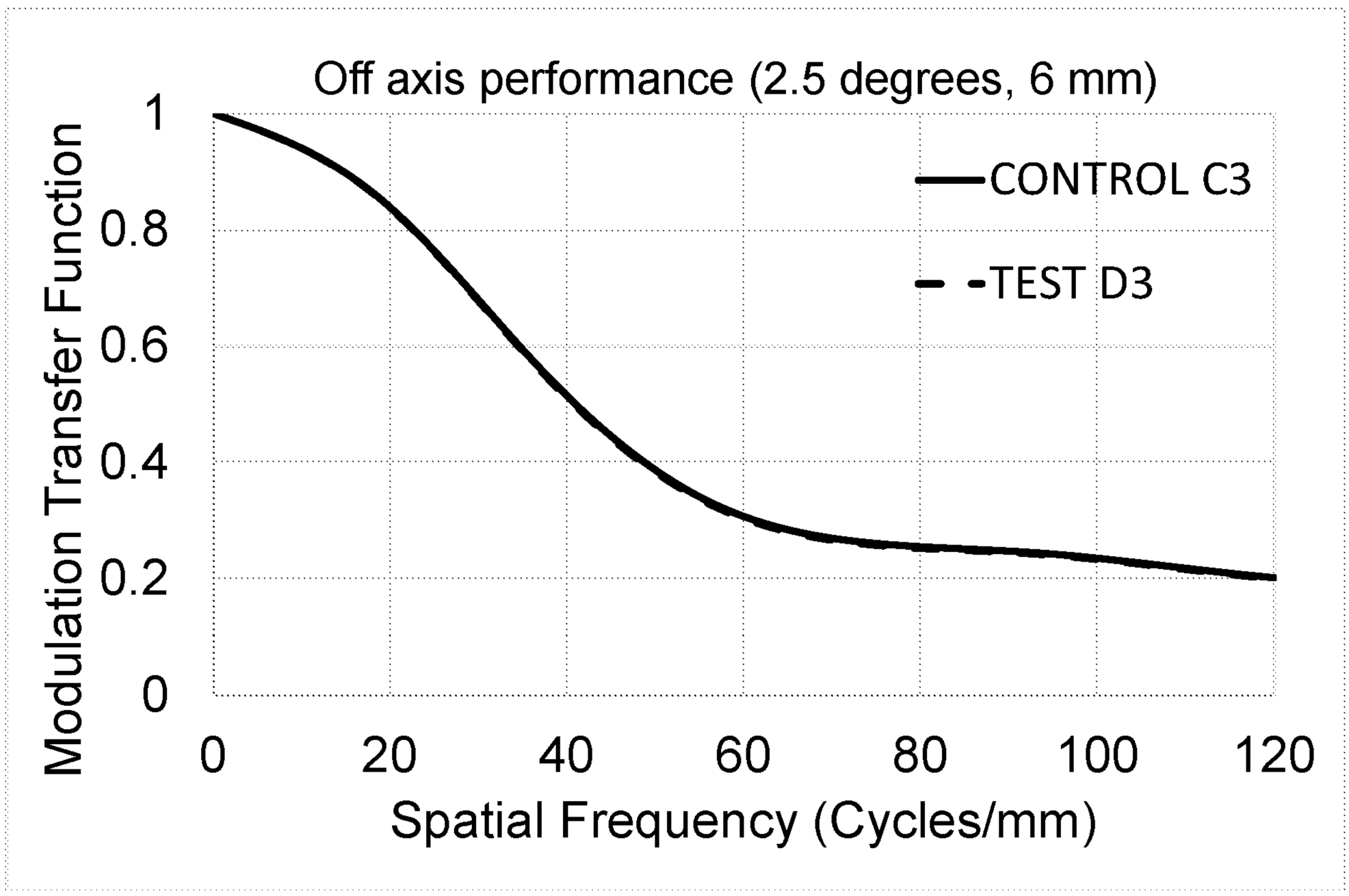


Figure 37

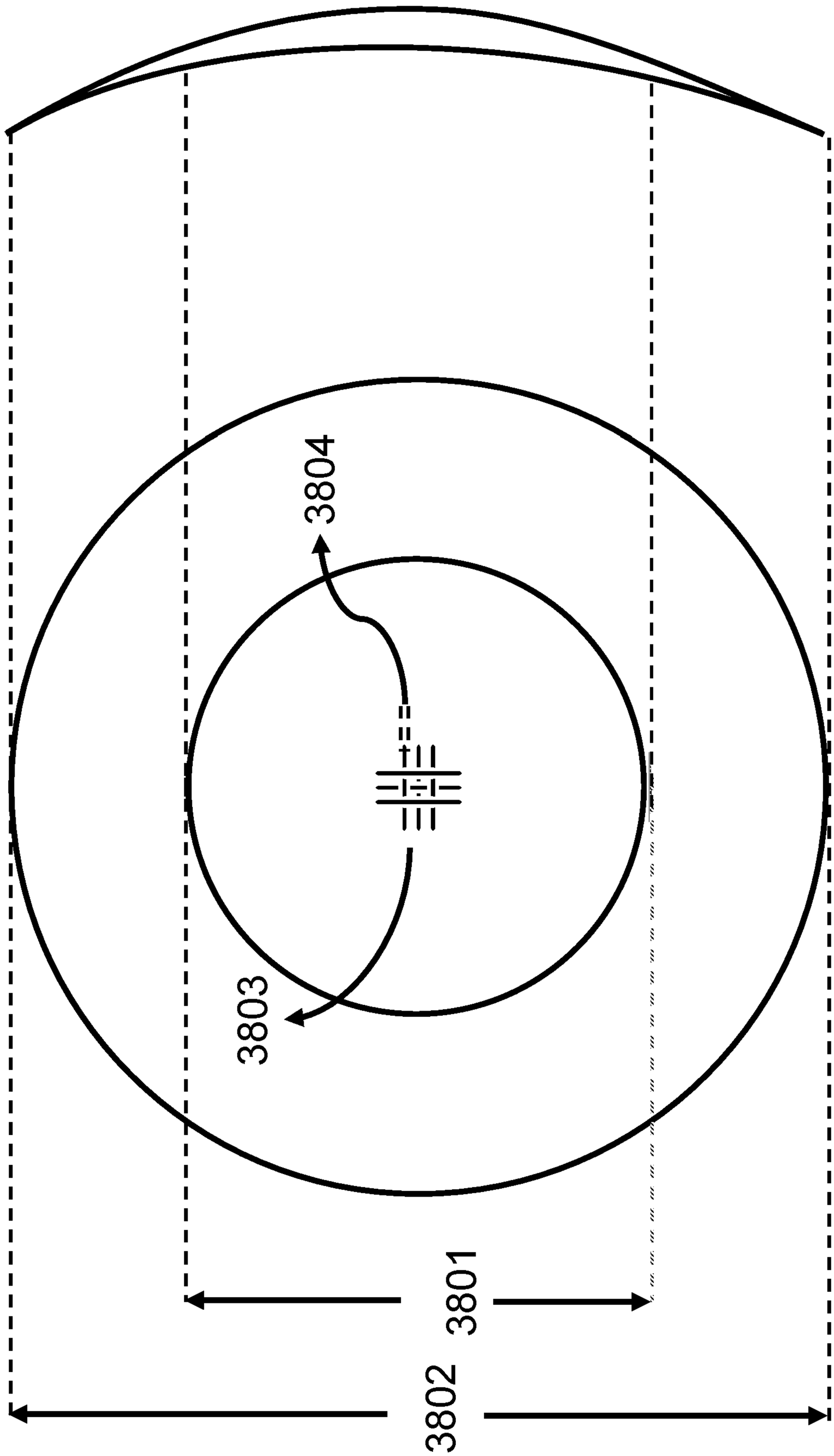


Figure 38

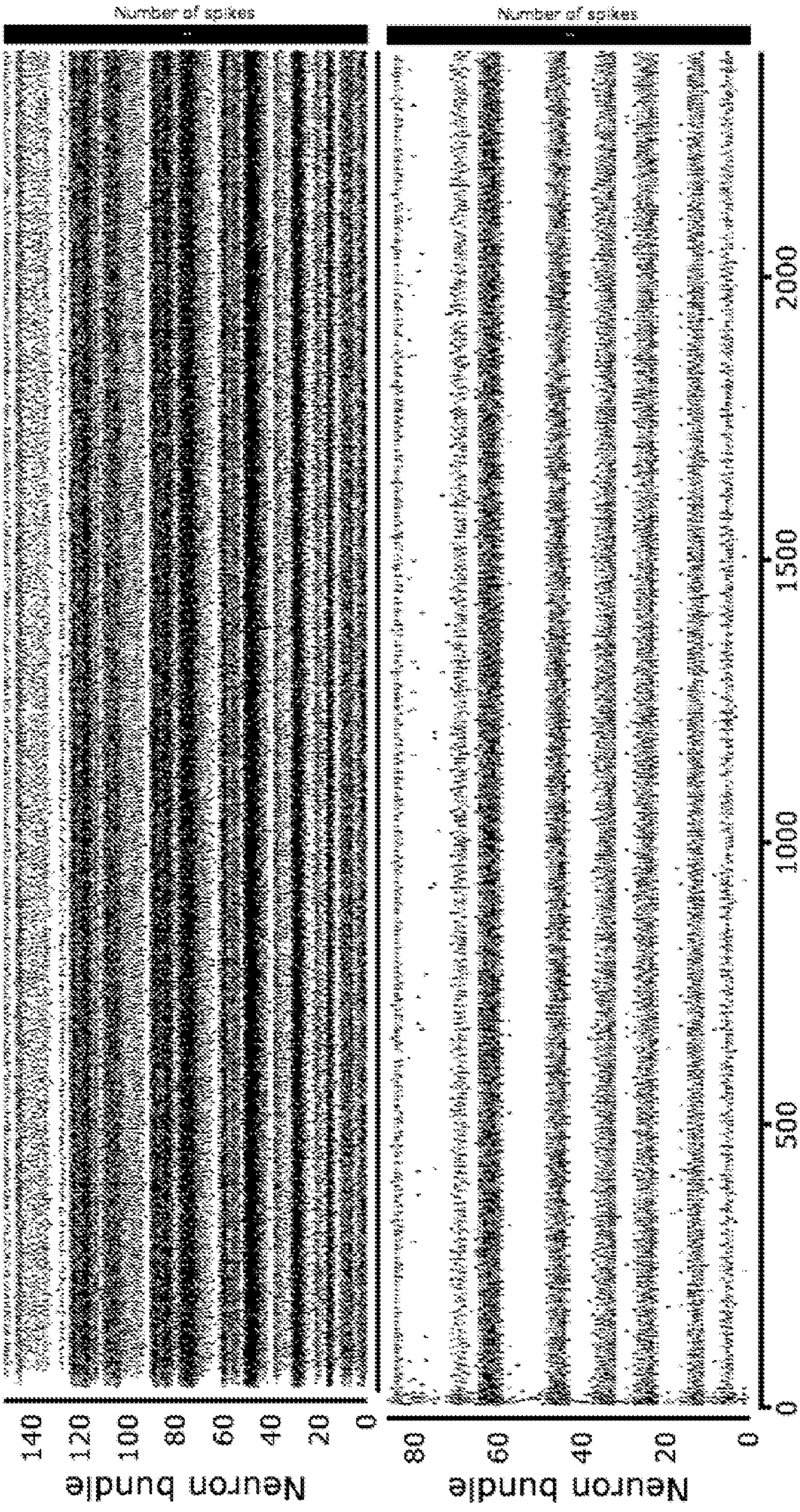

Number of spikes
Number of spikes
Time (milli-seconds)
Time (milli-seconds)
Neuron bundle
Neuron bundle

Figure 39

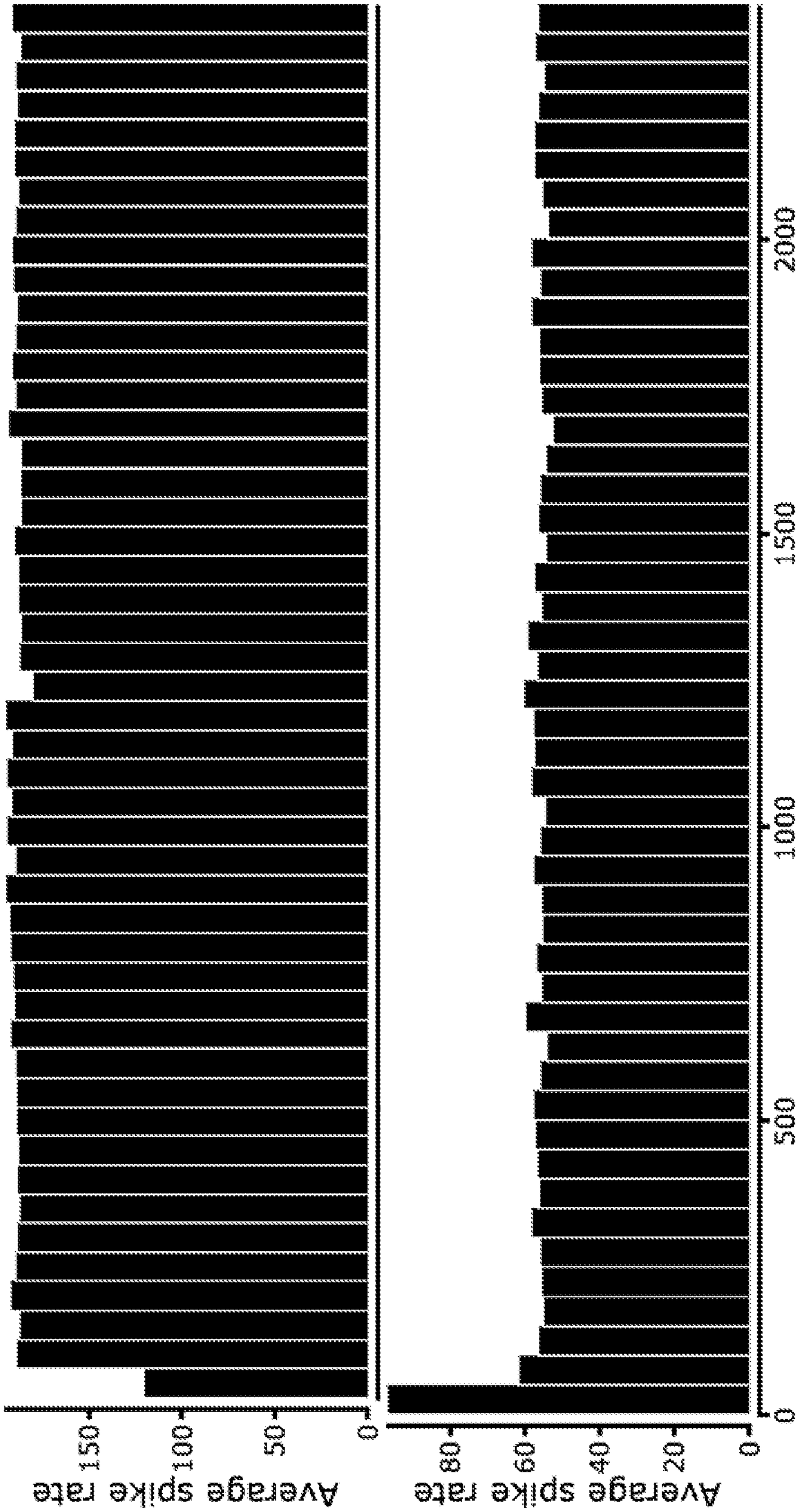

Time (milli-seconds)
0
500
1000
1500
2000
Average spike rate
0
20
40
60
80
Average spike rate
0
50
100
150

Figure 40

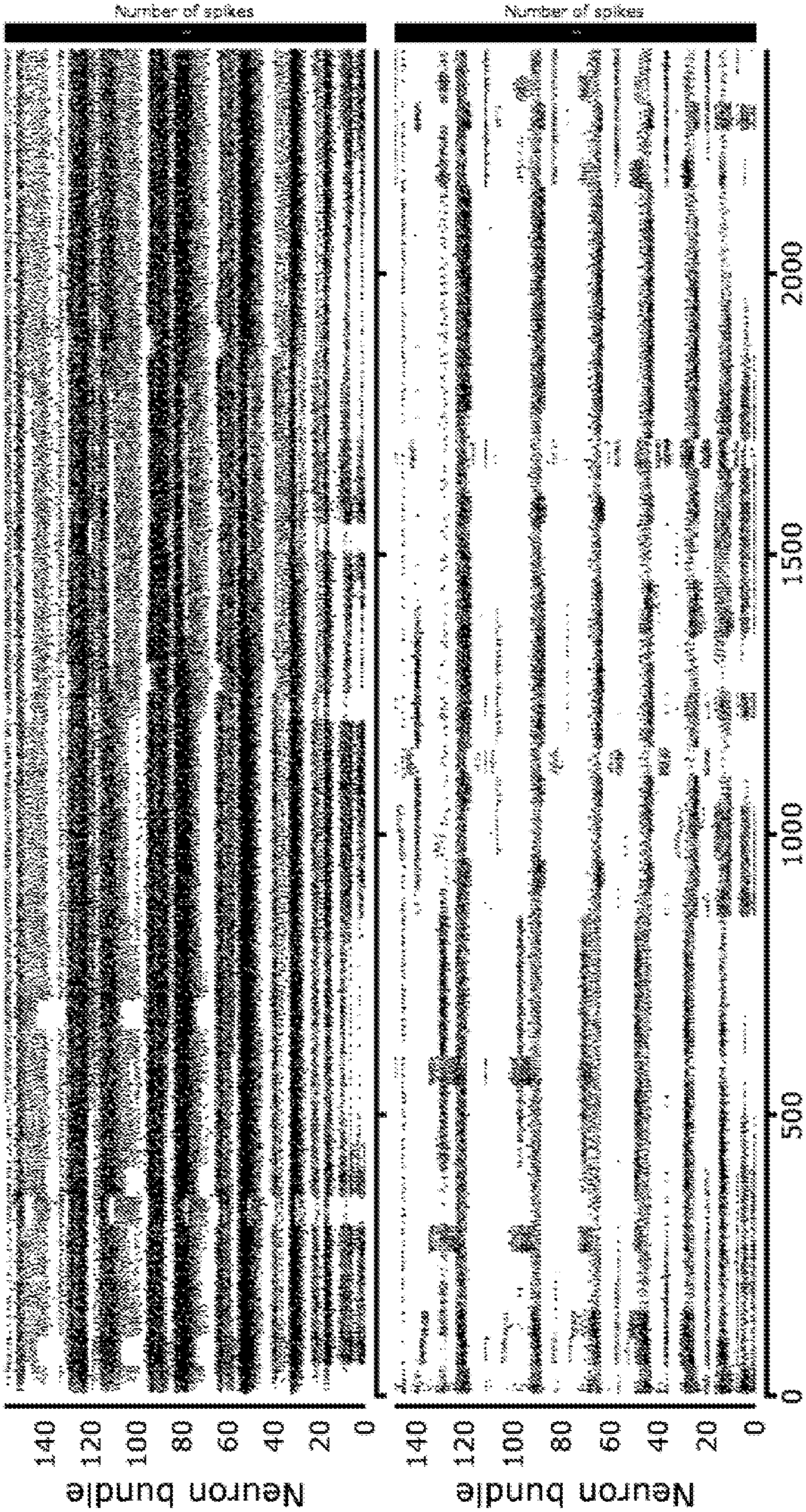

Number of spikes
Number of spikes
Time (milli-seconds)
Neuron bundle
Neuron bundle

Figure 41

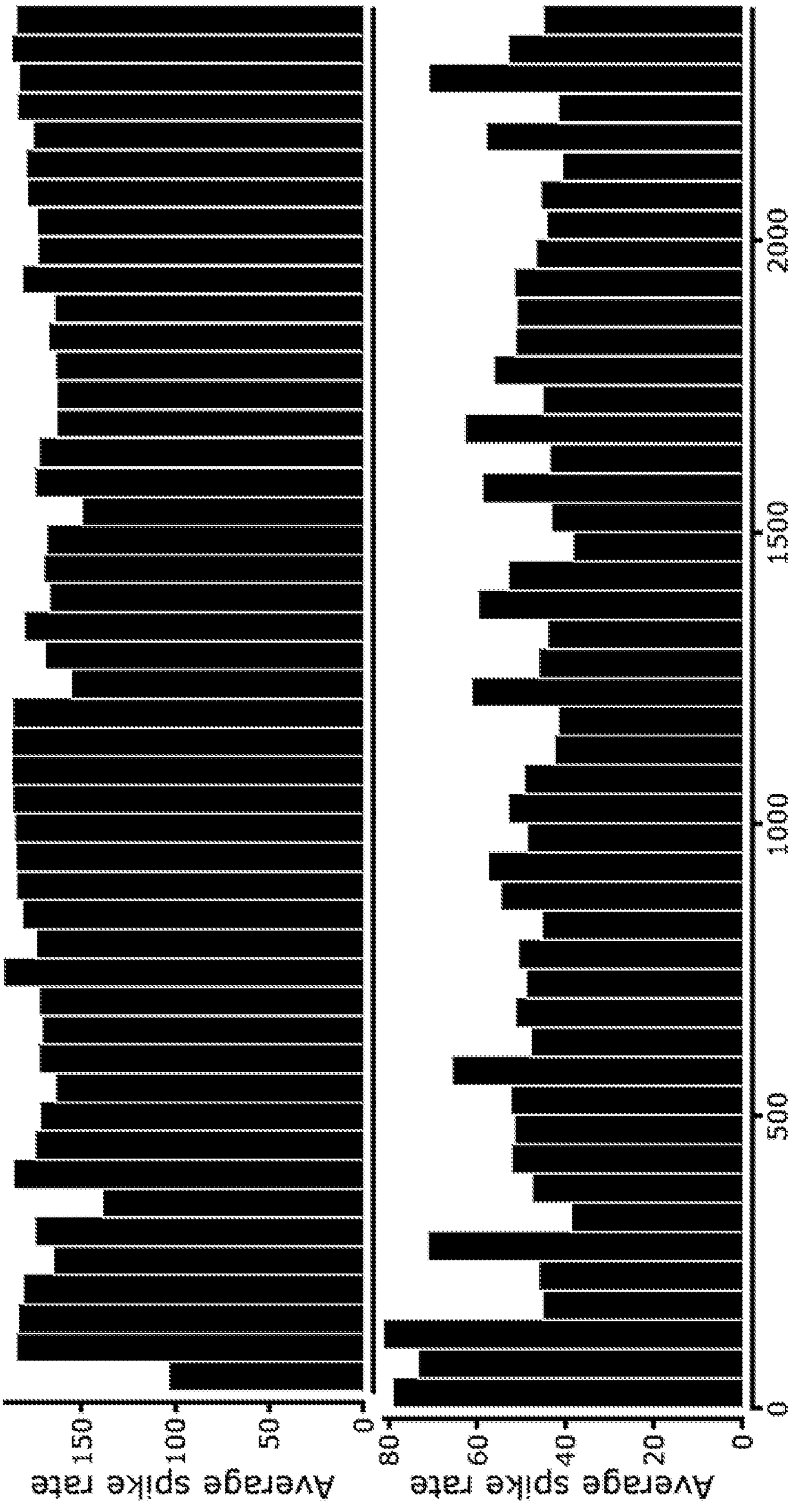

Average spike rate
150
100
50
0
Average spike rate
80
60
40
20
0
Time (milli-seconds)
500
1000
1500
2000

Figure 42

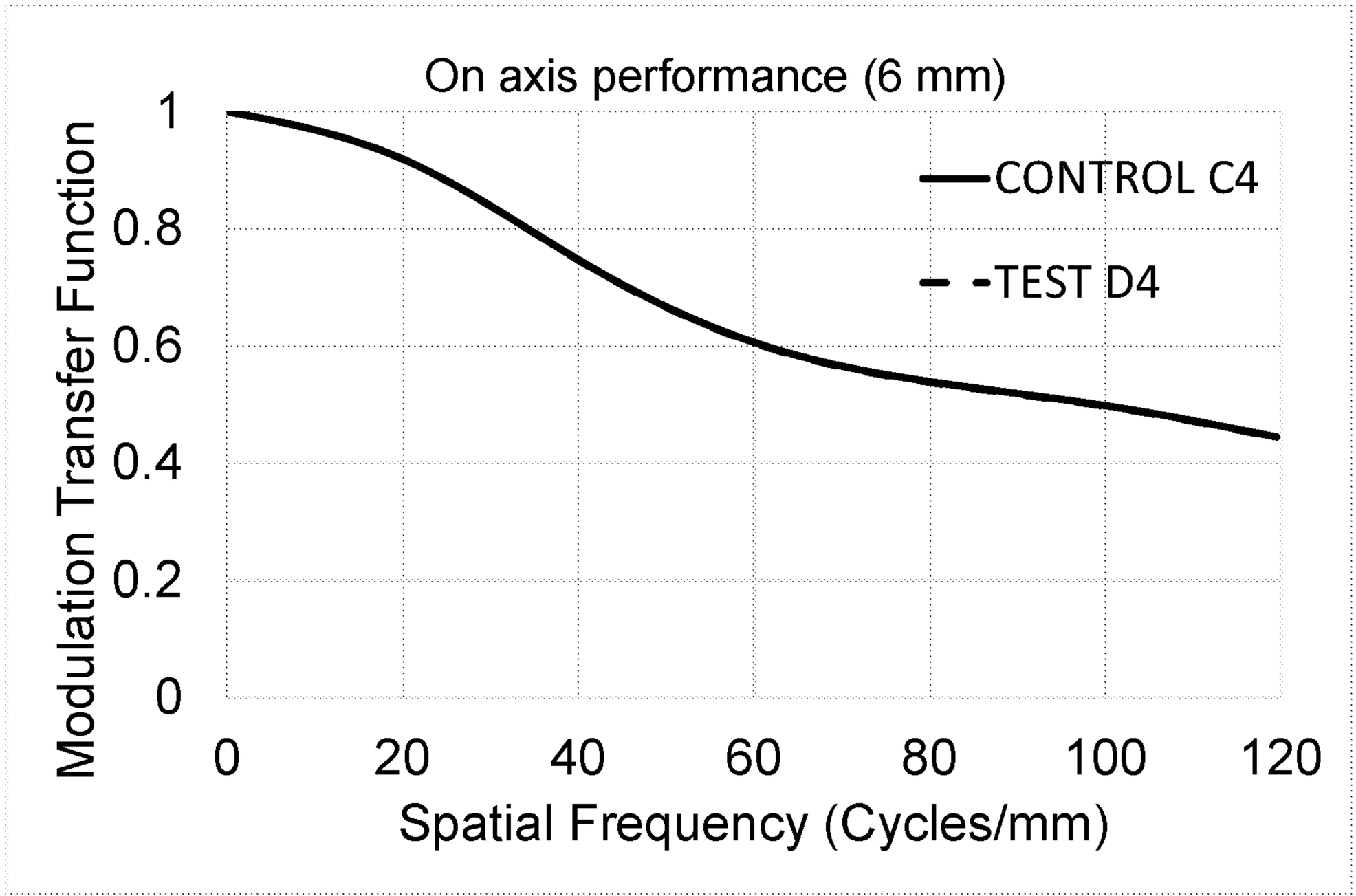


Figure 43

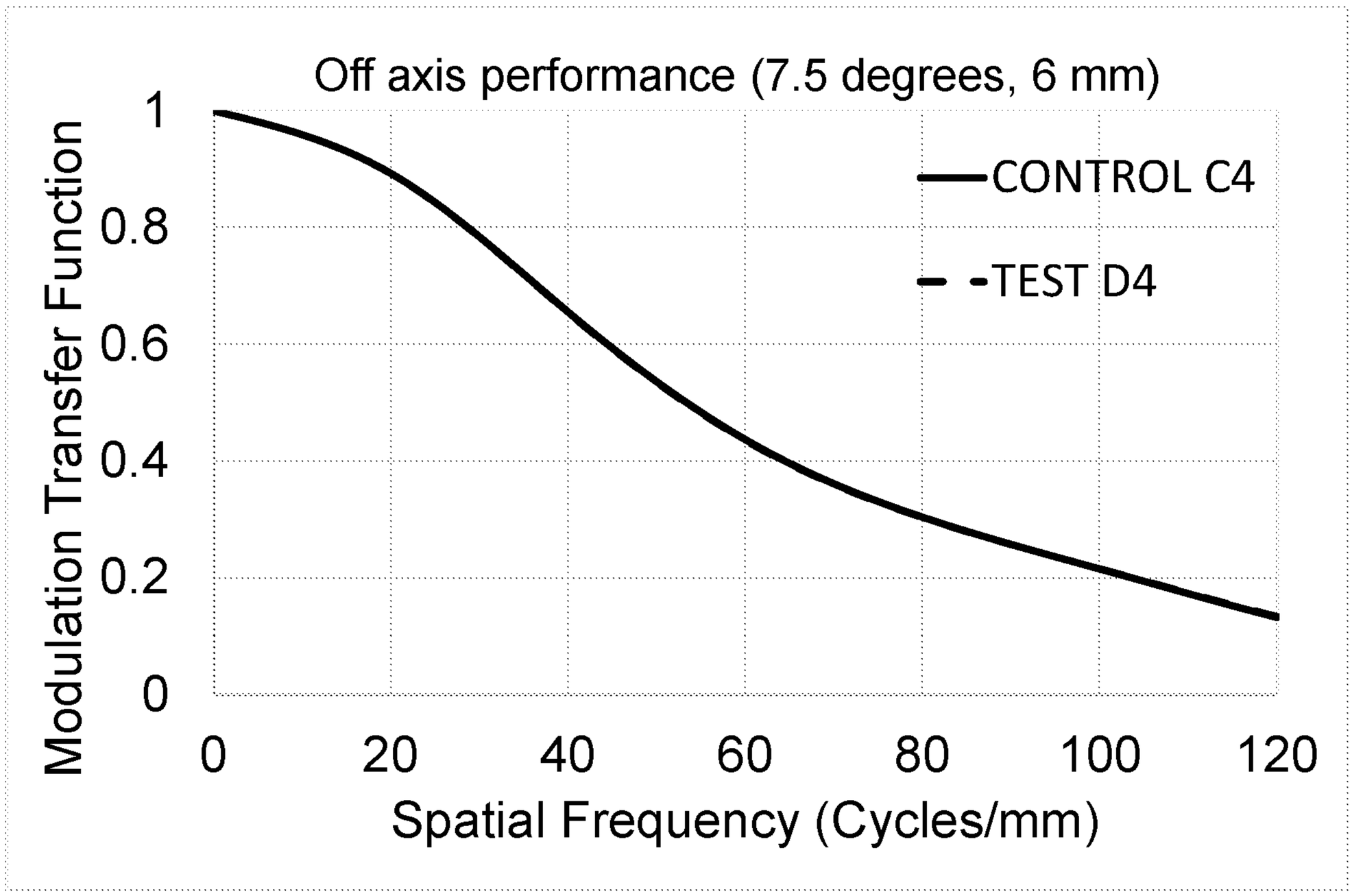


Figure 44

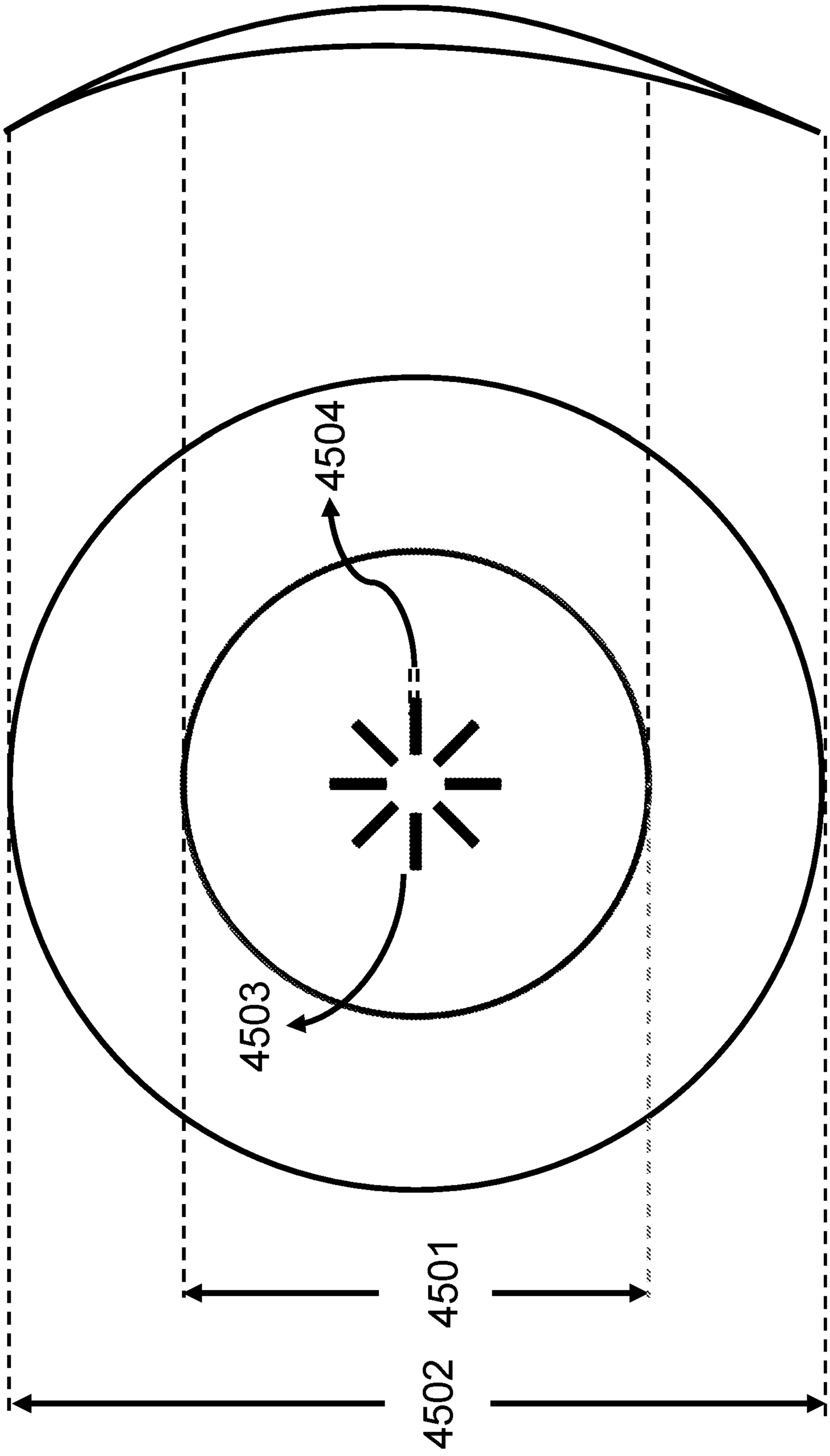


Figure 45

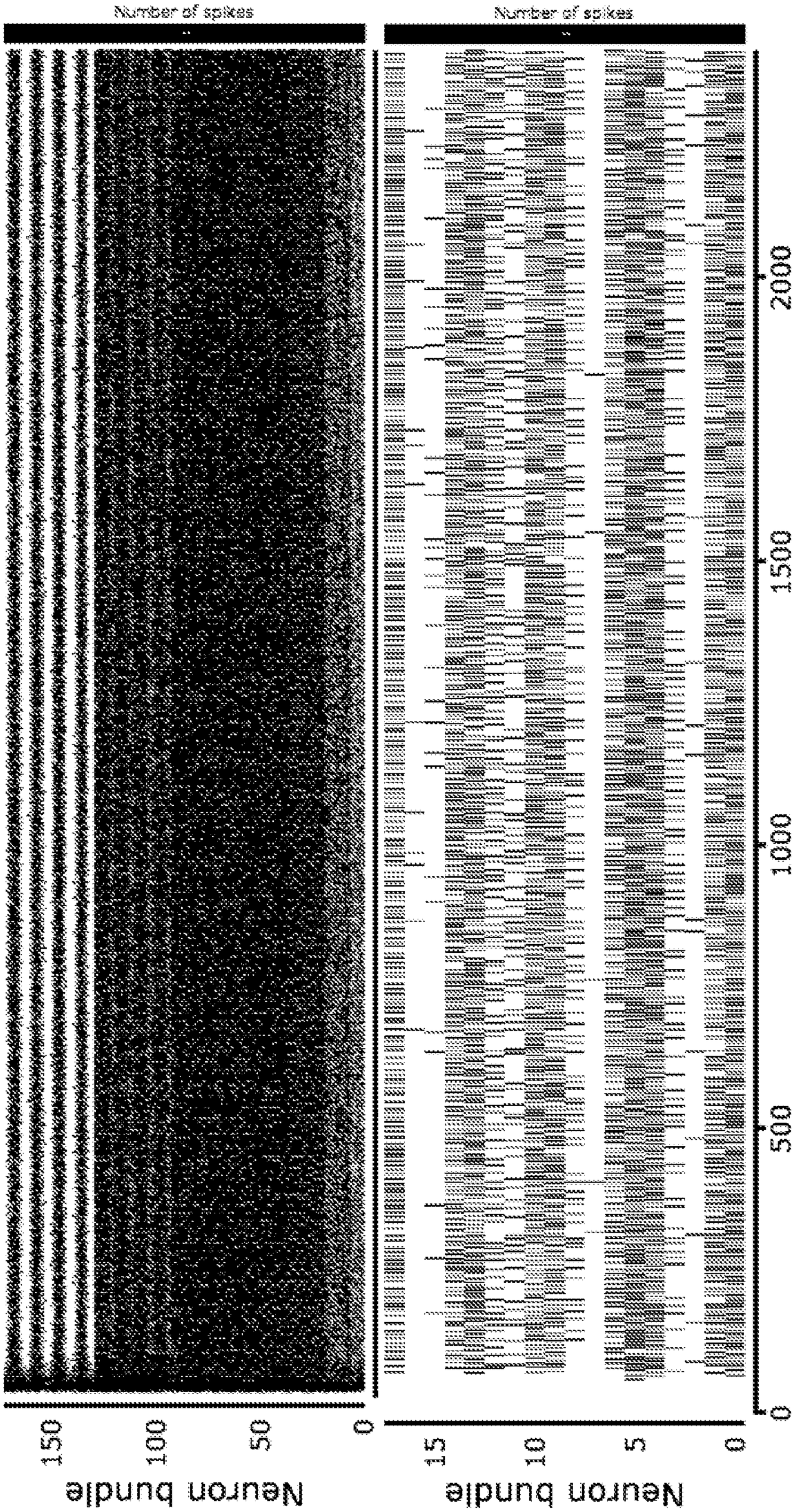

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
Time (milli-seconds)

Figure 46

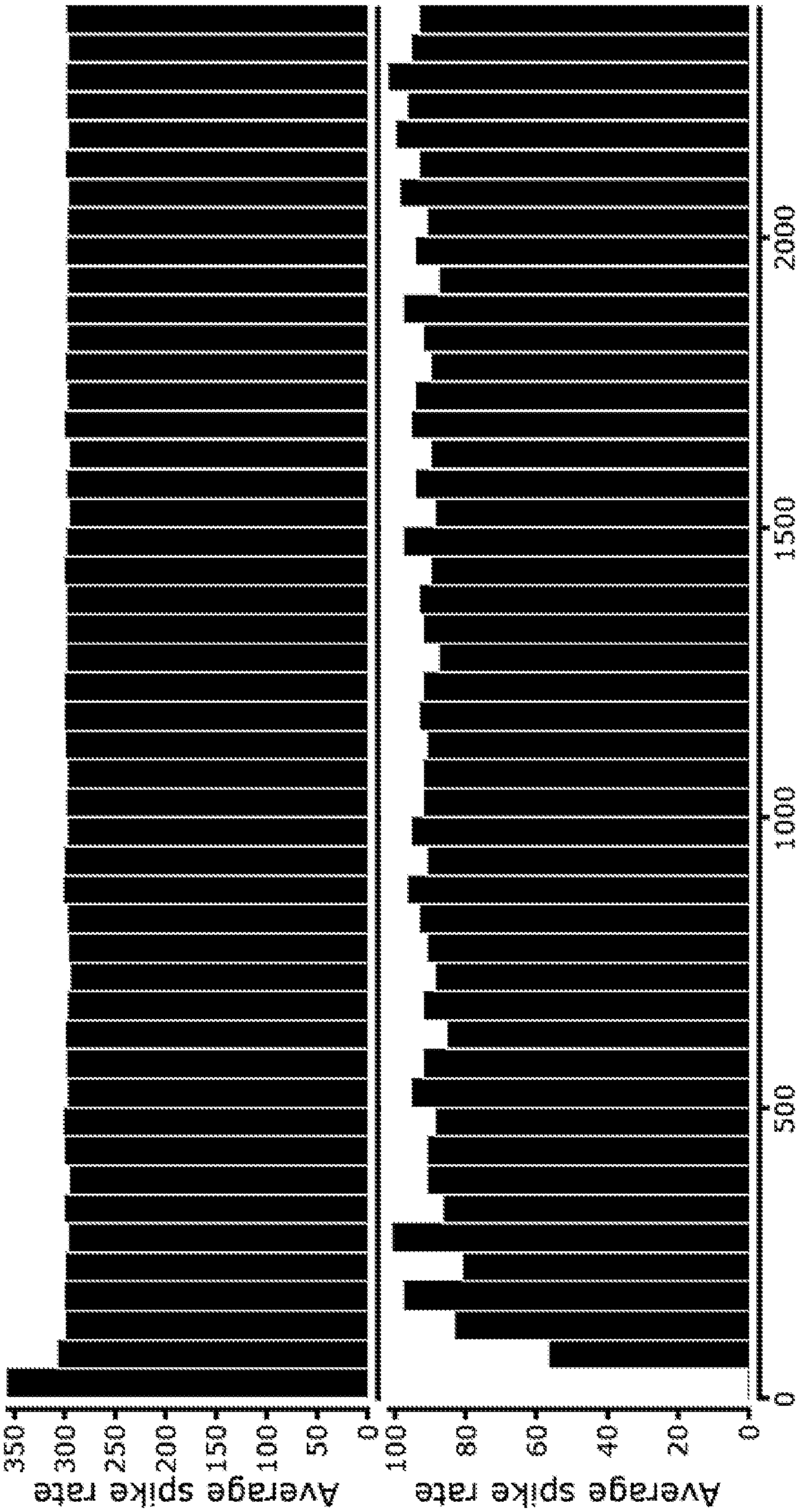

Average spike rate
0
20
40
60
80
100
Average spike rate
0
50
100
150
200
250
300
350
0
500
1000
1500
2000
Time (milli-seconds)

Figure 47

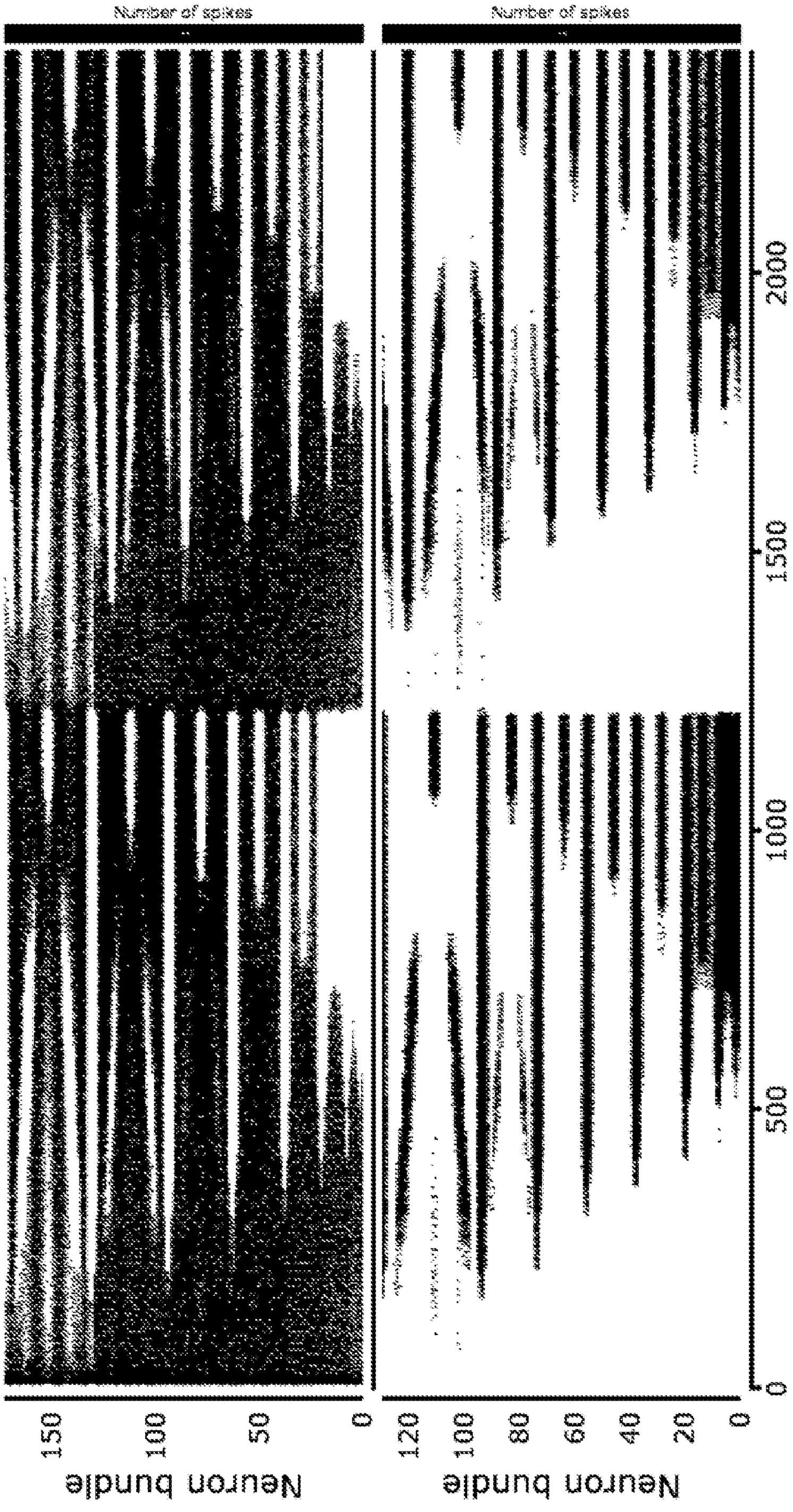

Number of spikes
Number of spikes
2000
1500
1000
500
0
Time (milli-seconds)
150
100
50
0
120
100
80
60
40
20
0
Neuron bundle
Neuron bundle

Figure 48

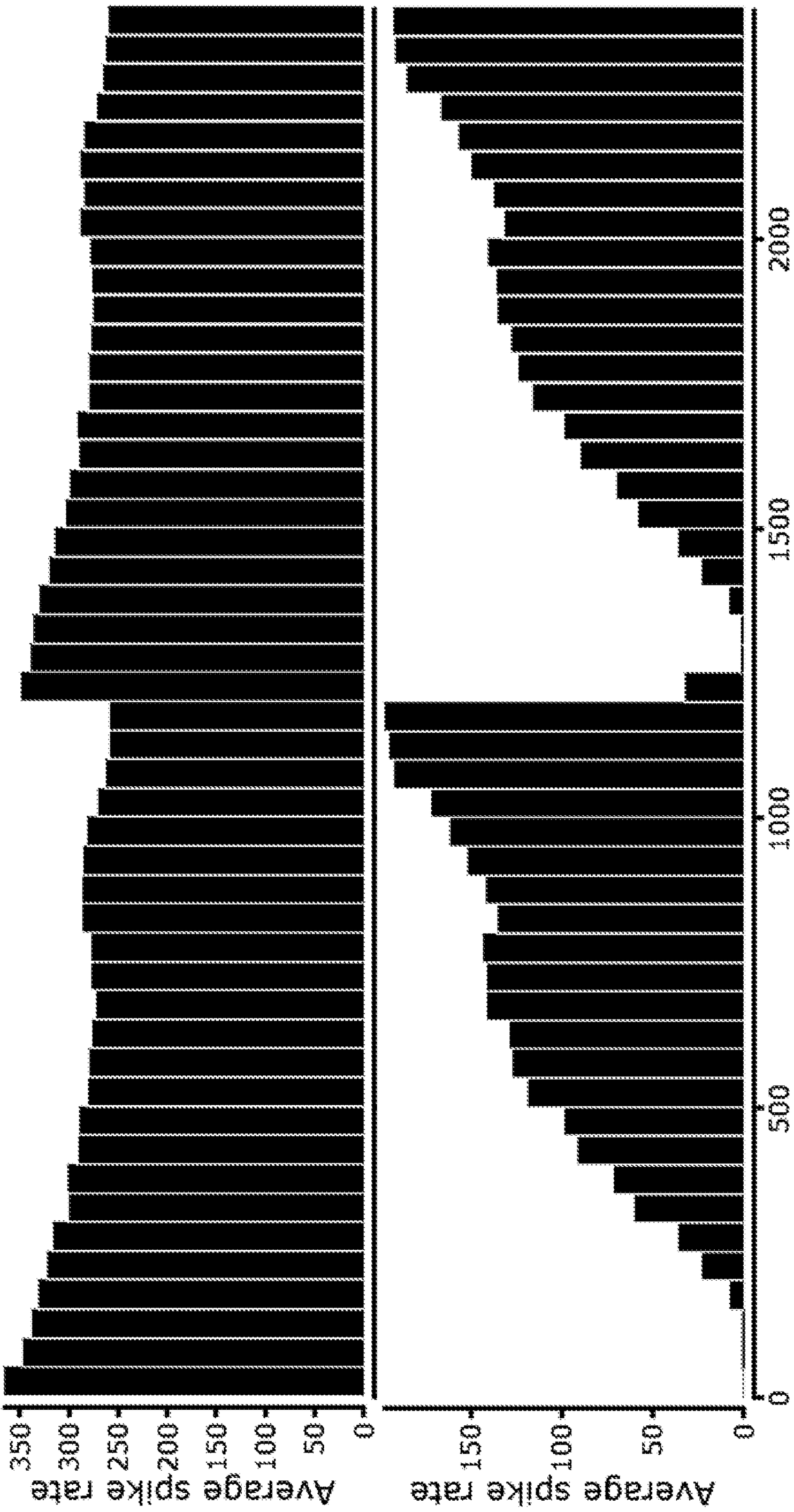

Average spike rate
350
300
250
200
150
100
50
0
Average spike rate
150
100
50
0
Time (milli-seconds)
2000
1500
1000
500
0

Figure 49

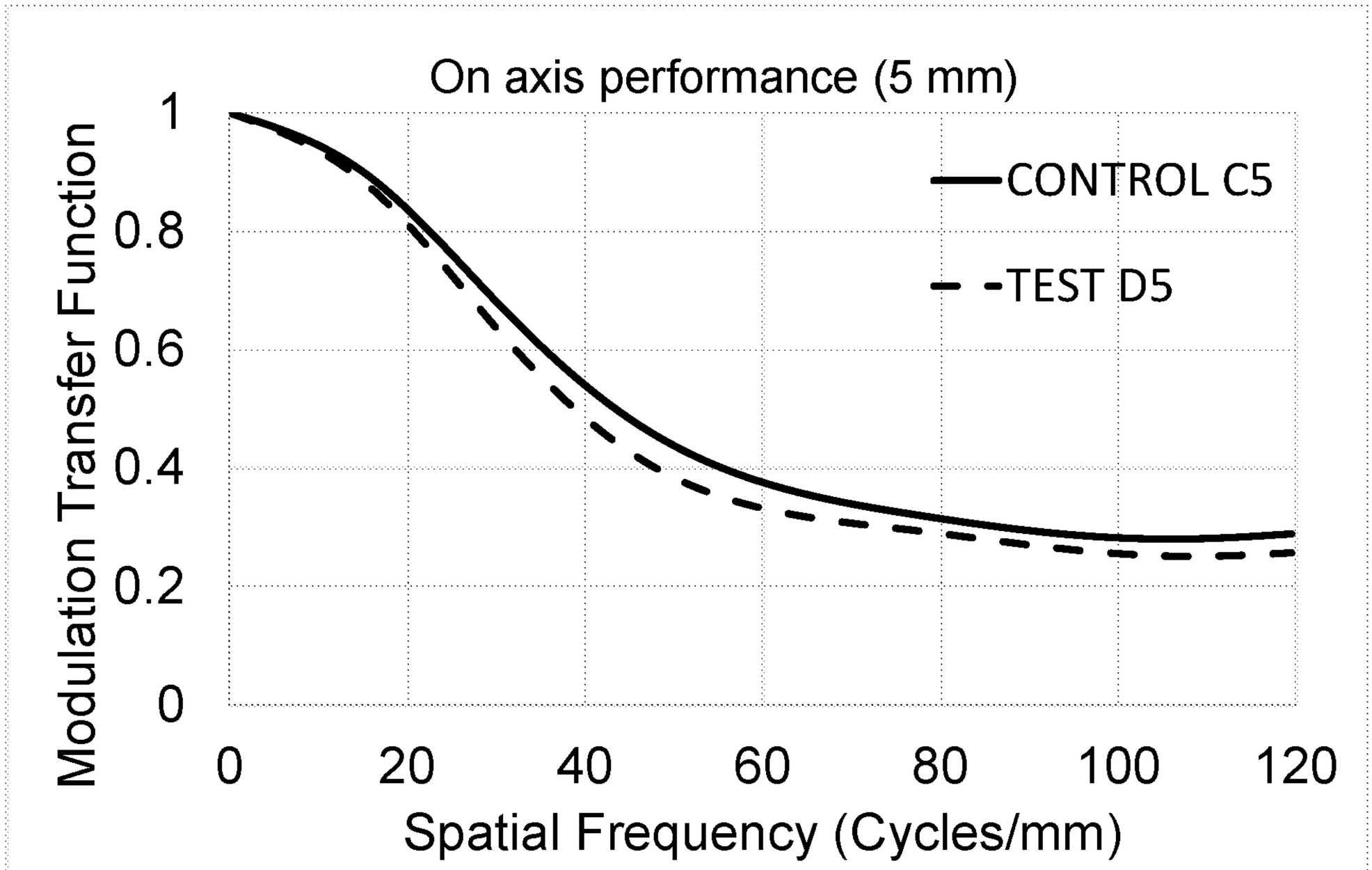


Figure 50

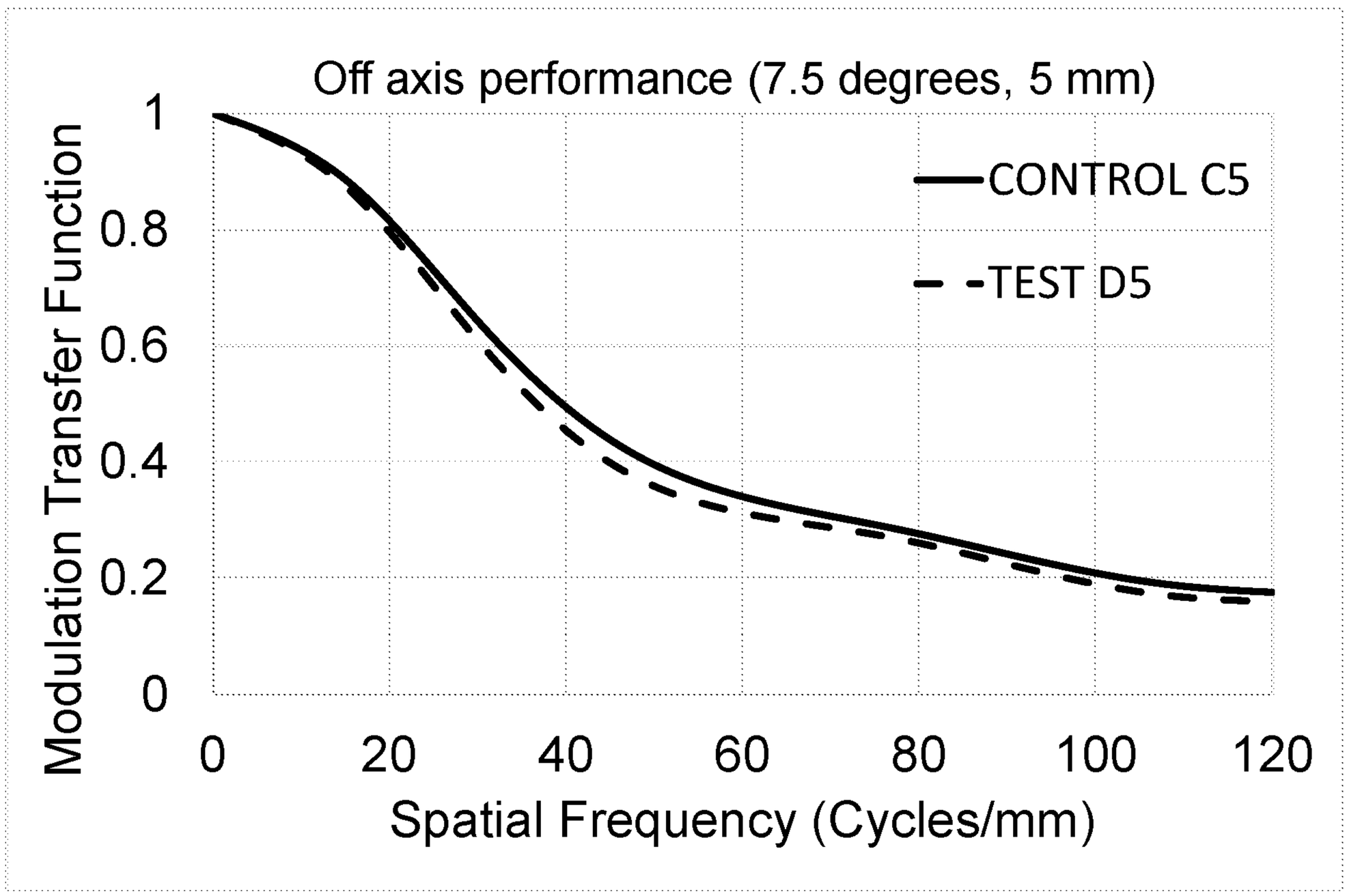


Figure 51

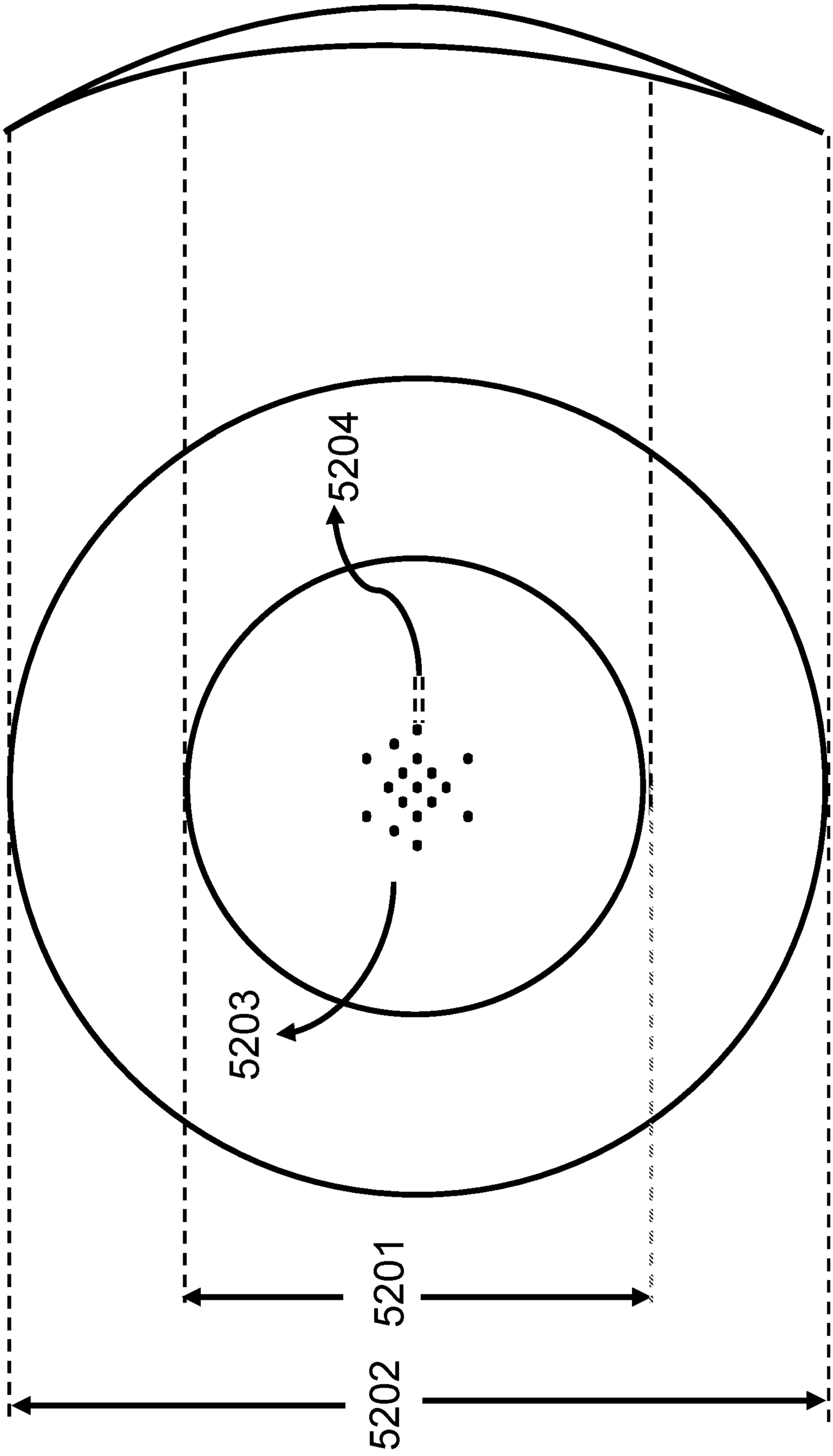


Figure 52

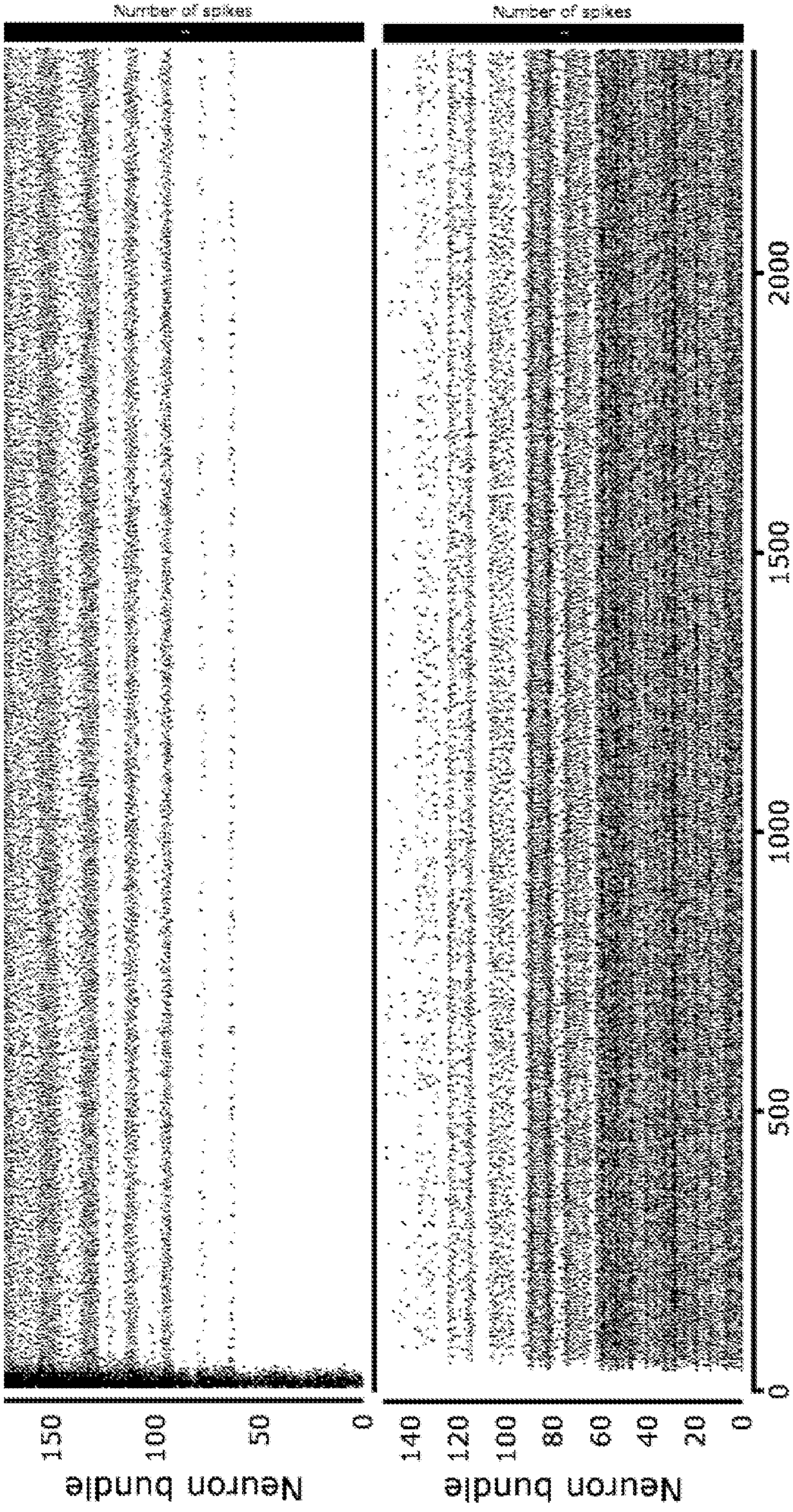

Number of spikes
Number of spikes
Time (milli-seconds)
Neuron bundle
Neuron bundle
0
500
1000
1500
2000
0
20
40
60
80
100
120
140
0
50
100
150

Figure 53

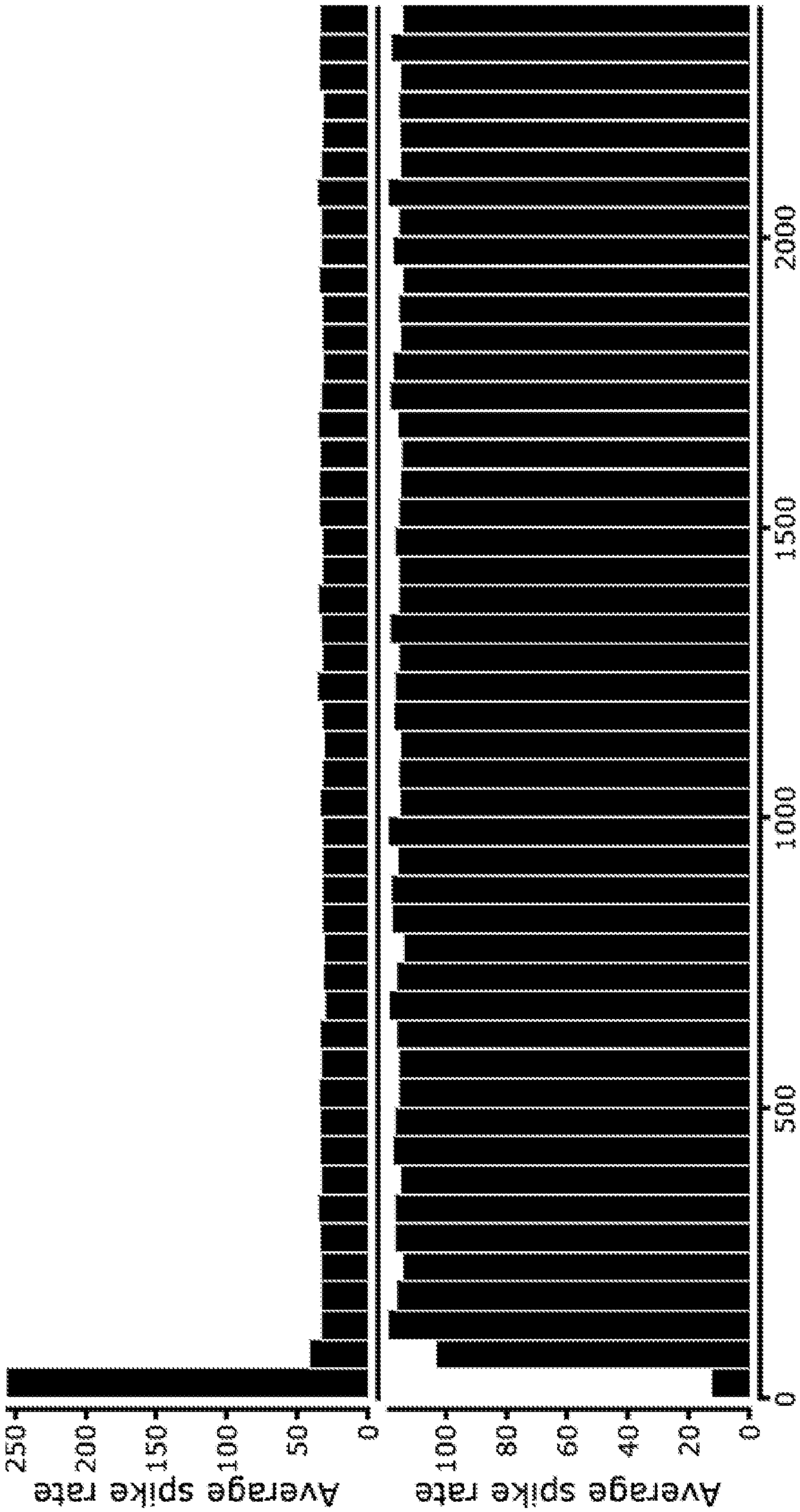

Average spike rate
250
200
150
100
50
0
Average spike rate
100
80
60
40
20
0
Time (milli-seconds)
500
1000
1500
2000

Figure 54

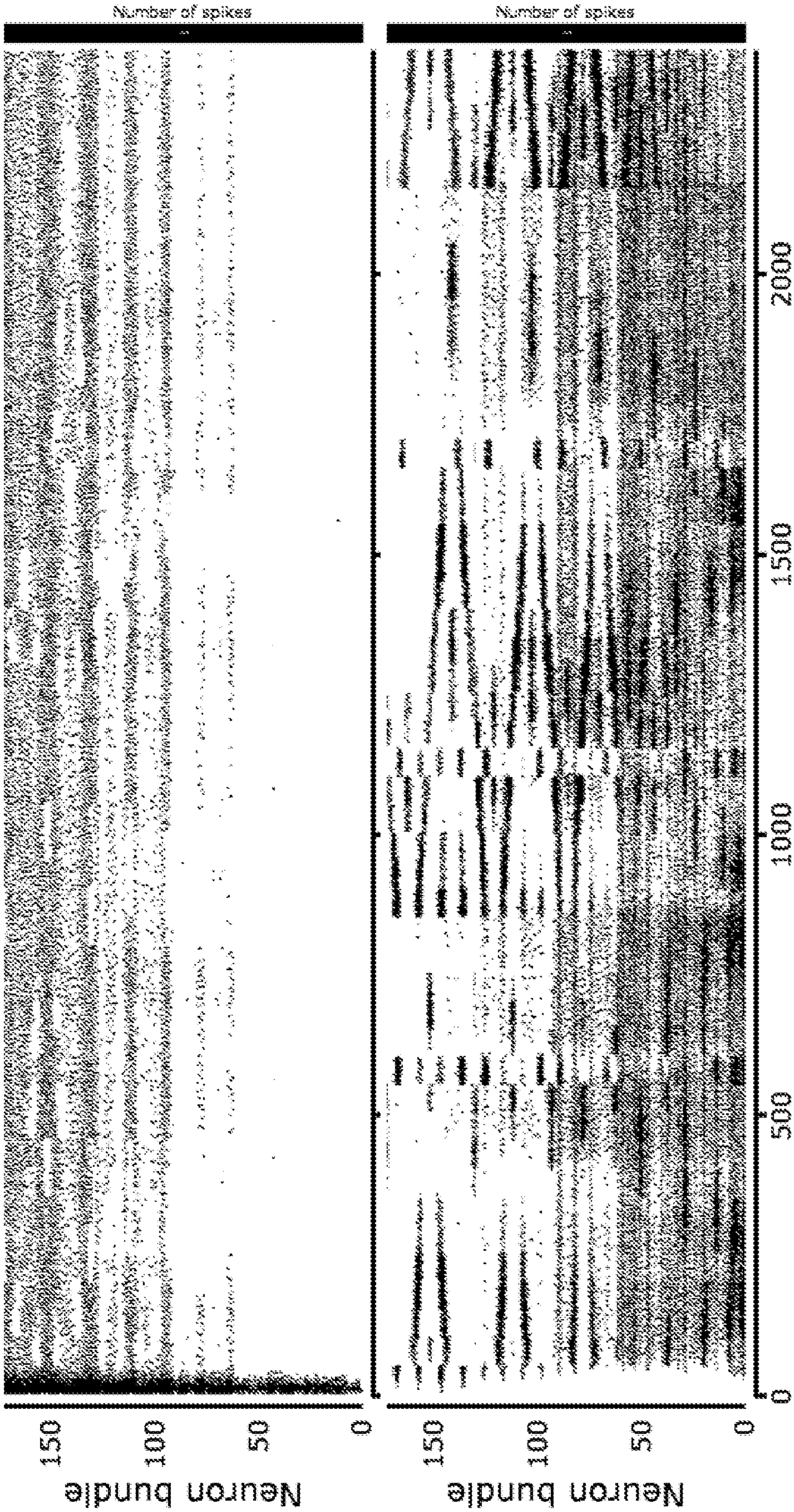

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
150
100
50
0
150
100
50
0
500
1000
1500
2000
Time (milli-seconds)

Figure 55

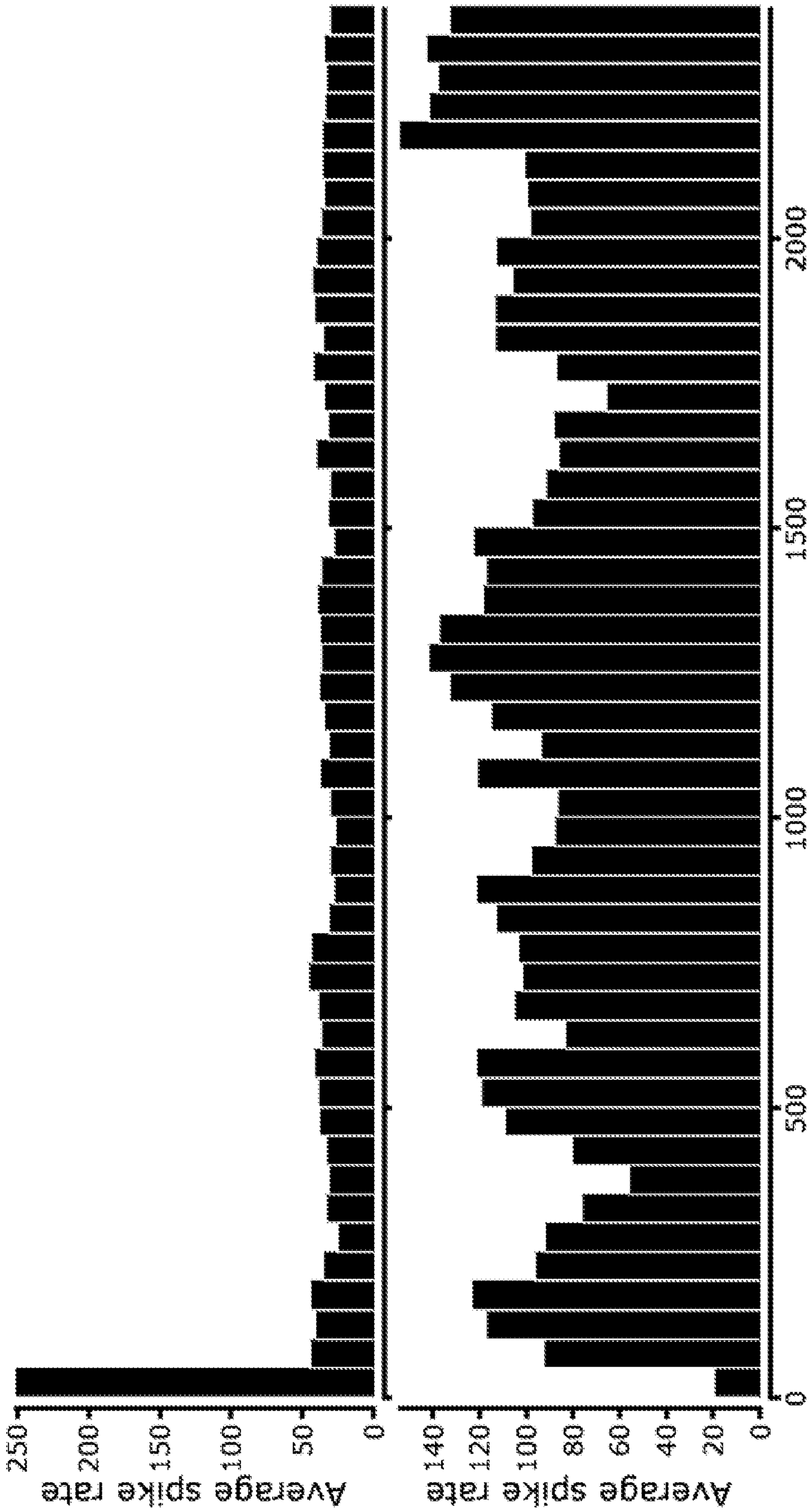

Average spike rate
0
20
40
60
80
100
120
140
Average spike rate
0
50
100
150
200
250
0
500
1000
1500
2000
Time (milli-seconds)

Figure 56

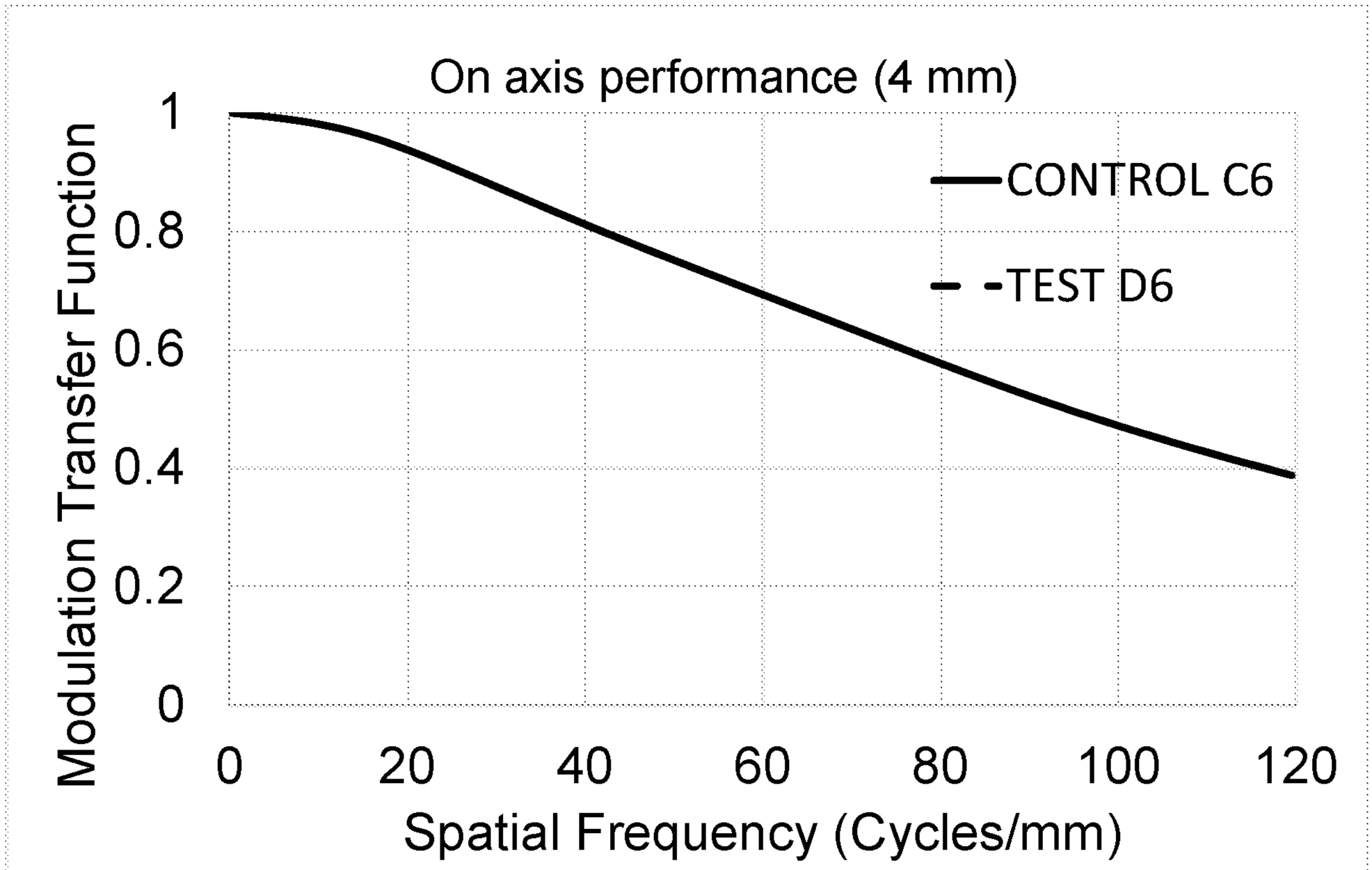


Figure 57

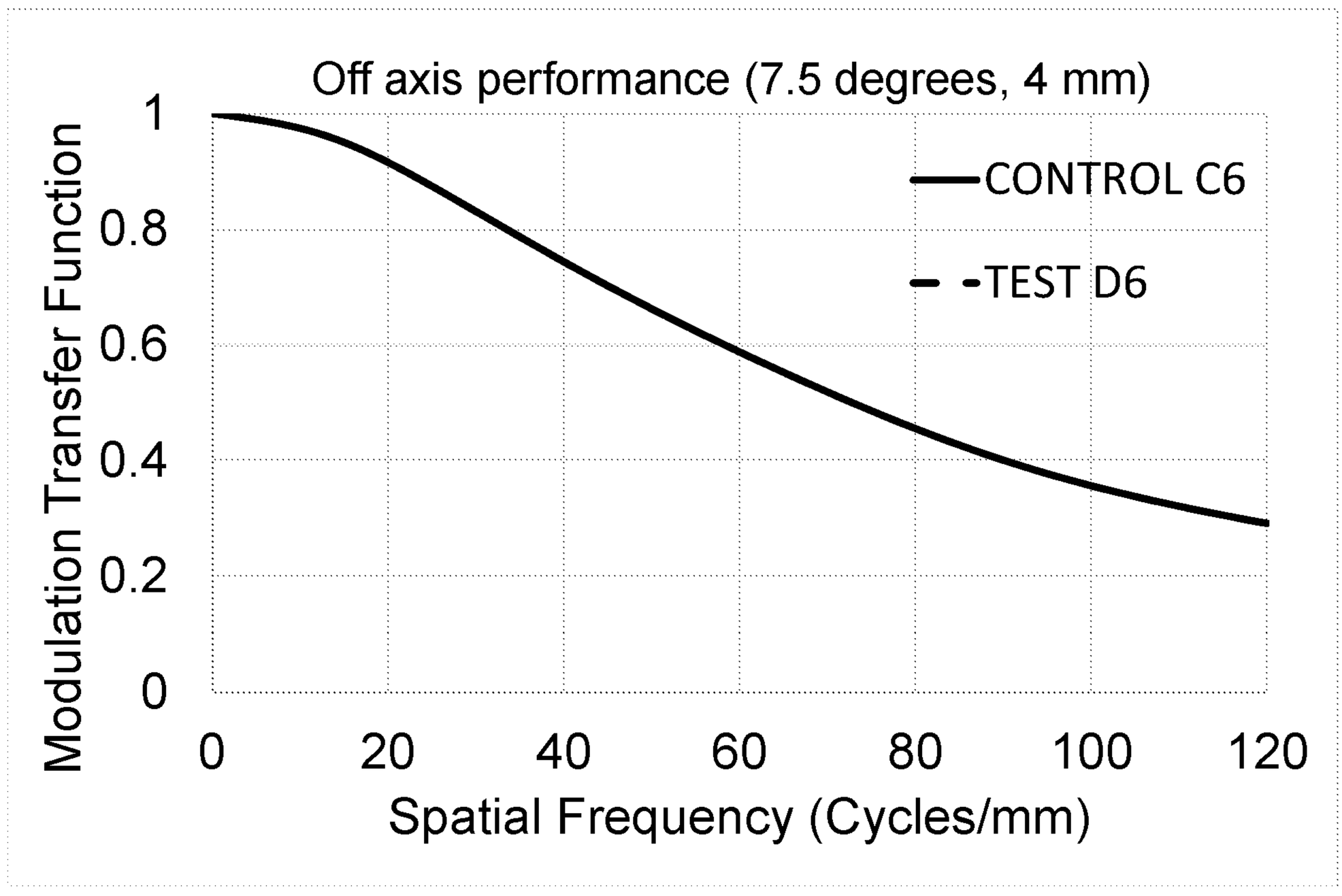


Figure 58

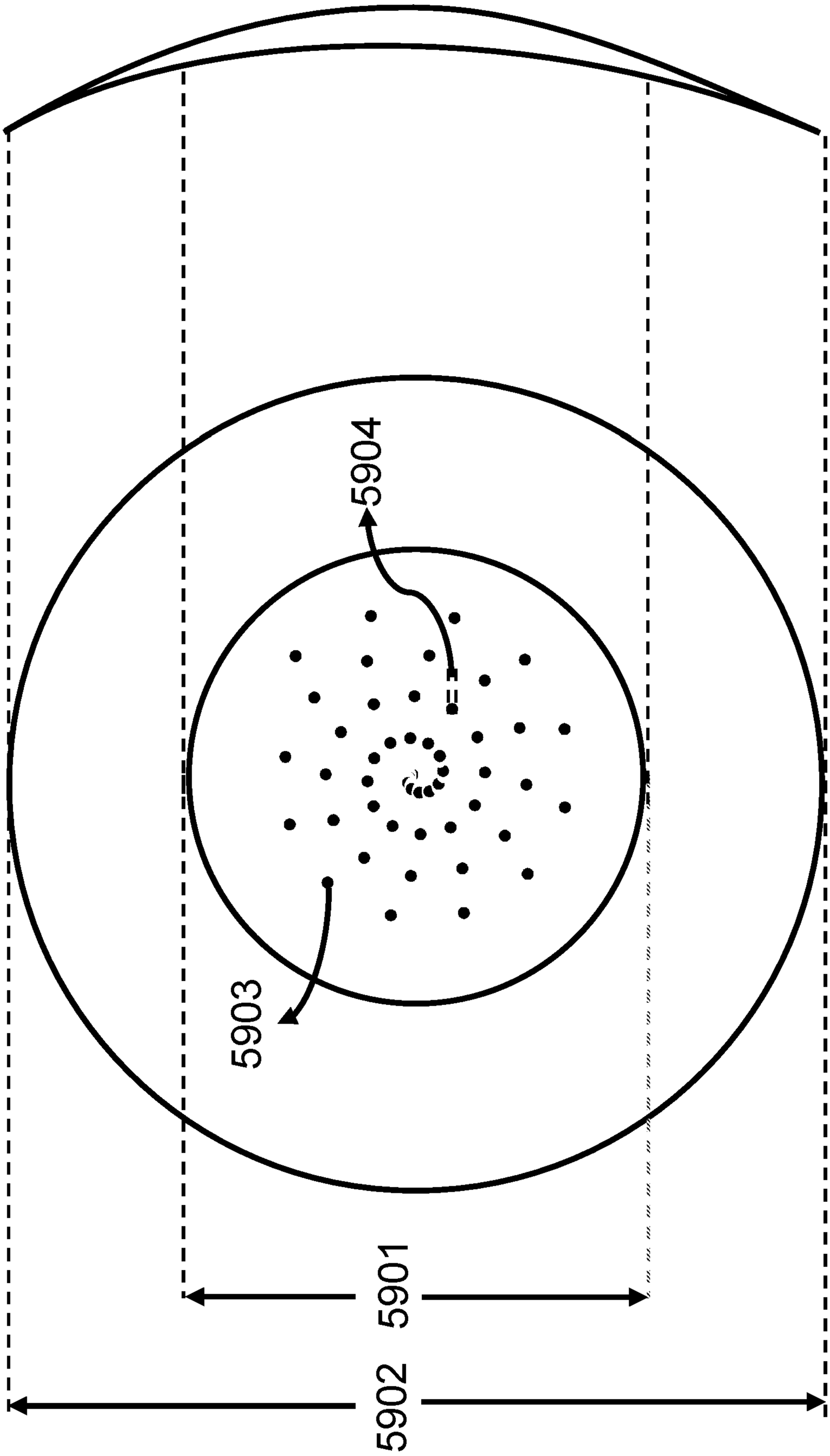


Figure 59

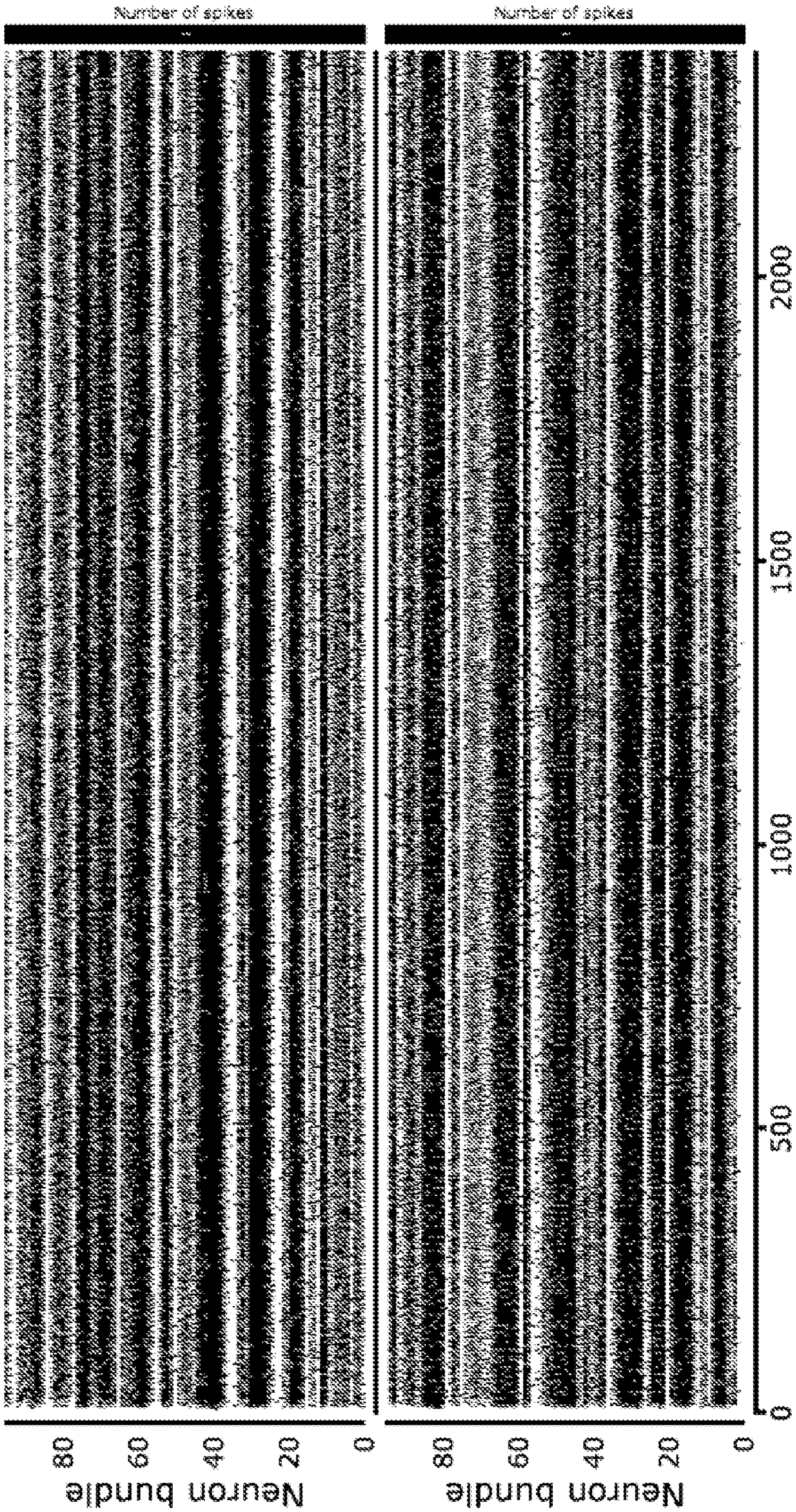

Number of spikes
Number of spikes
Neuron bundle
Neuron bundle
0
20
40
60
80
0
20
40
60
80
0
500
1000
1500
2000
Time (milli-seconds)

Figure 60

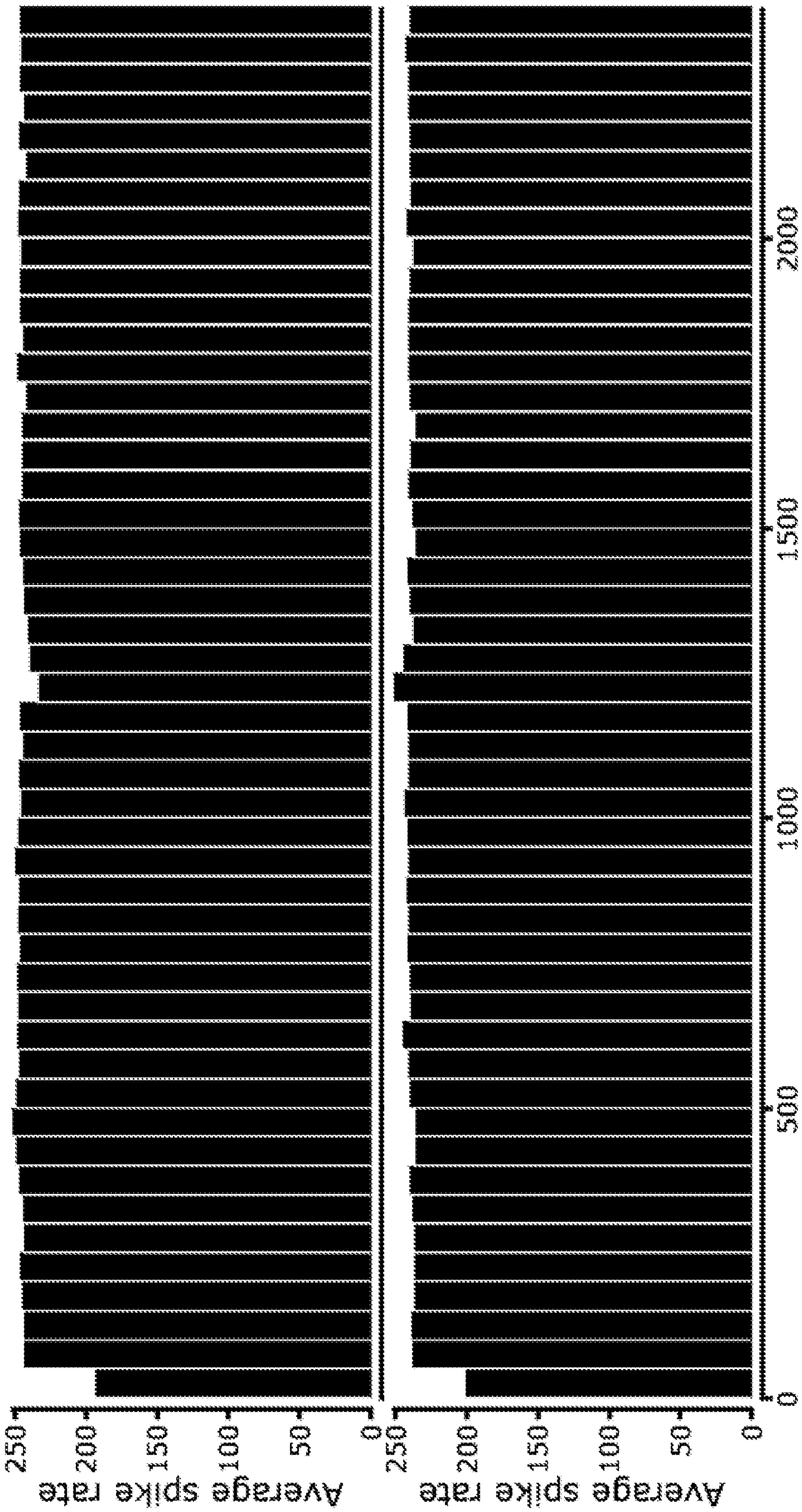

Average spike rate
250
200
150
100
50
0
Average spike rate
250
200
150
100
50
0
Time (milli-seconds)
0
500
1000
1500
2000

Figure 61

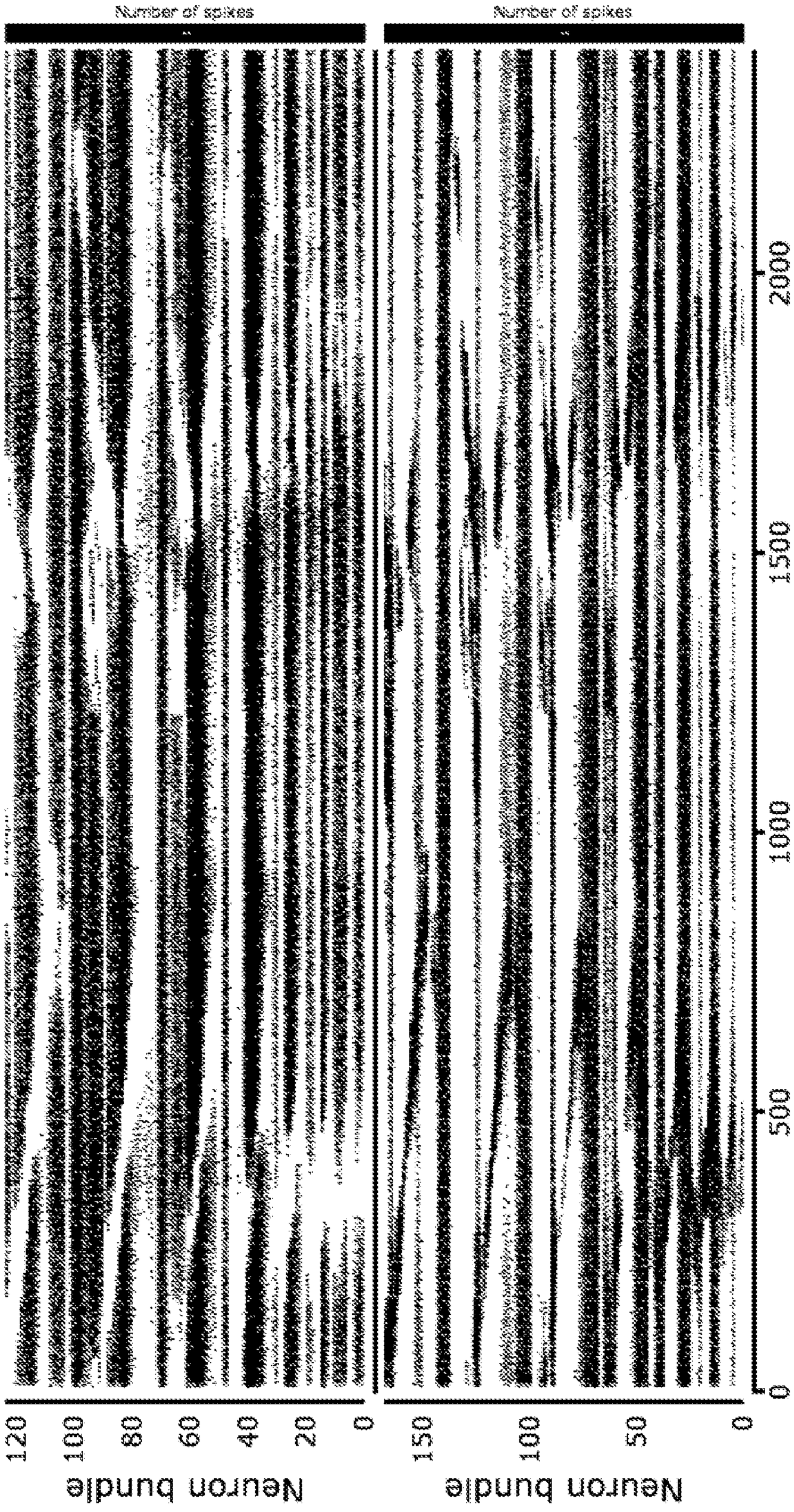

Number of spikes
Number of spikes
2000
1500
1000
500
0
Time (milli-seconds)
120
100
80
60
40
20
0
150
100
50
0
Neuron bundle
Neuron bundle

Figure 62

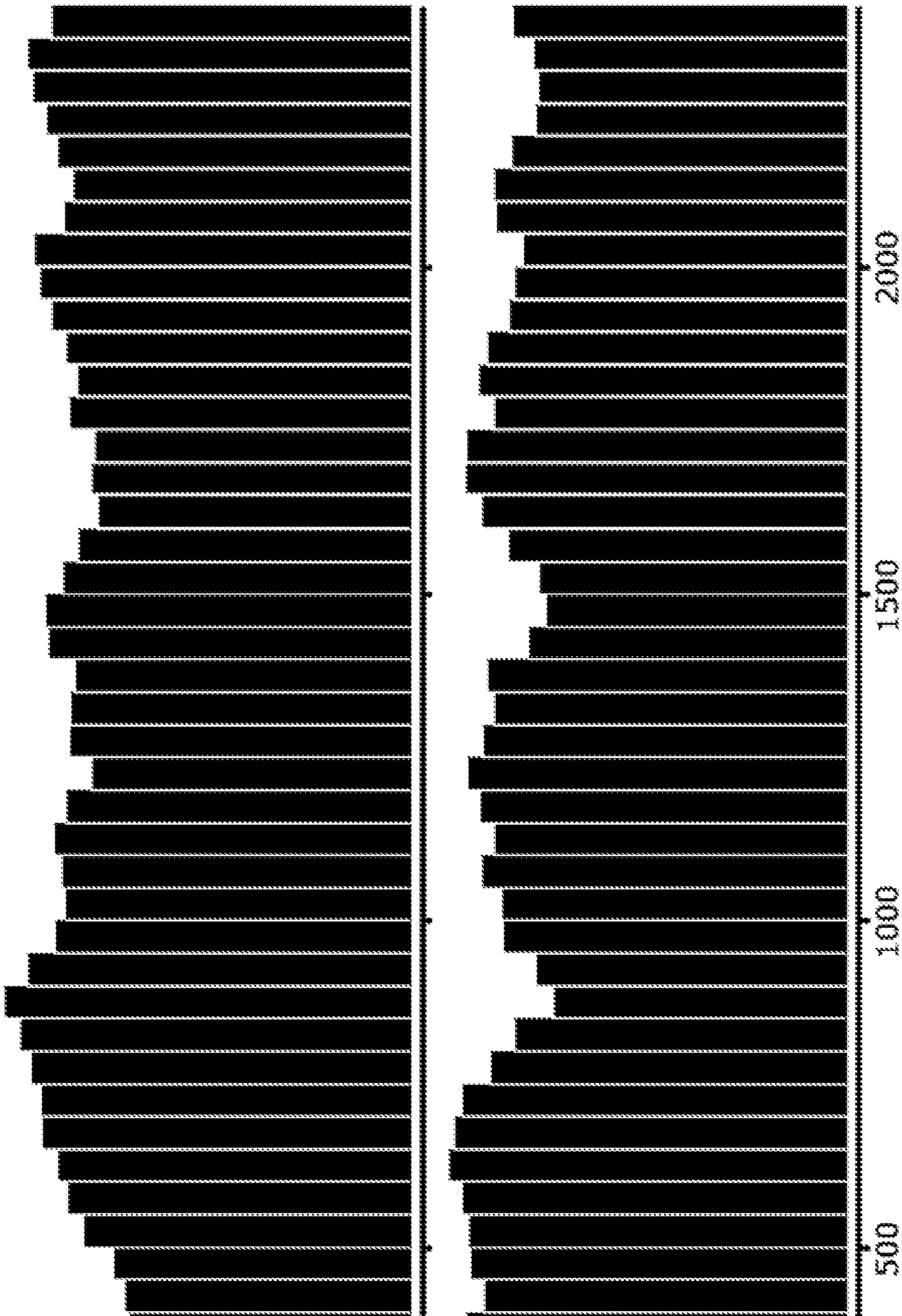

Average spike rate
200
150
100
50
0
Average spike rate
150
100
50
0
Time (milli-seconds)
500
1000
1500
2000
0

Figure 63

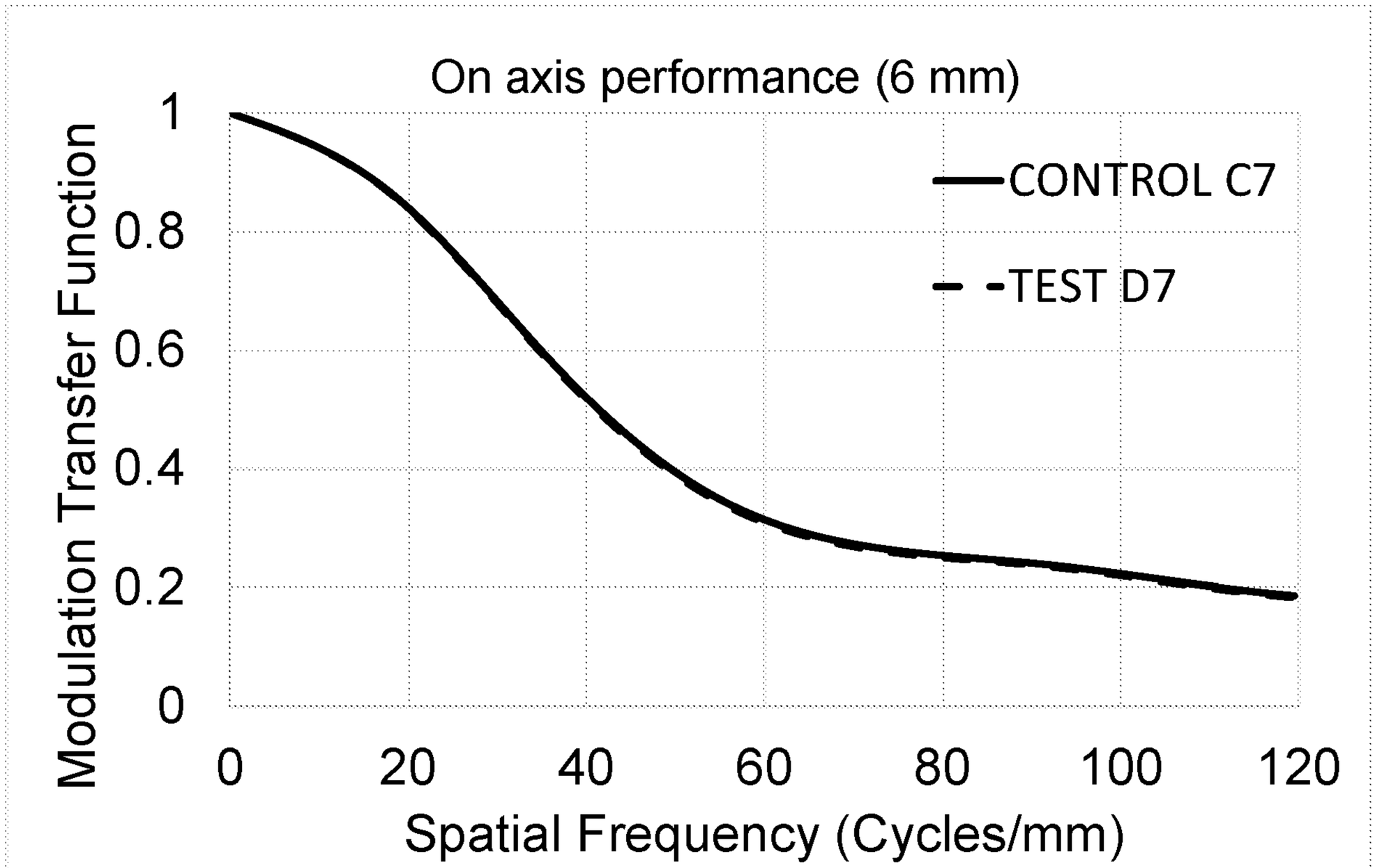


Figure 64

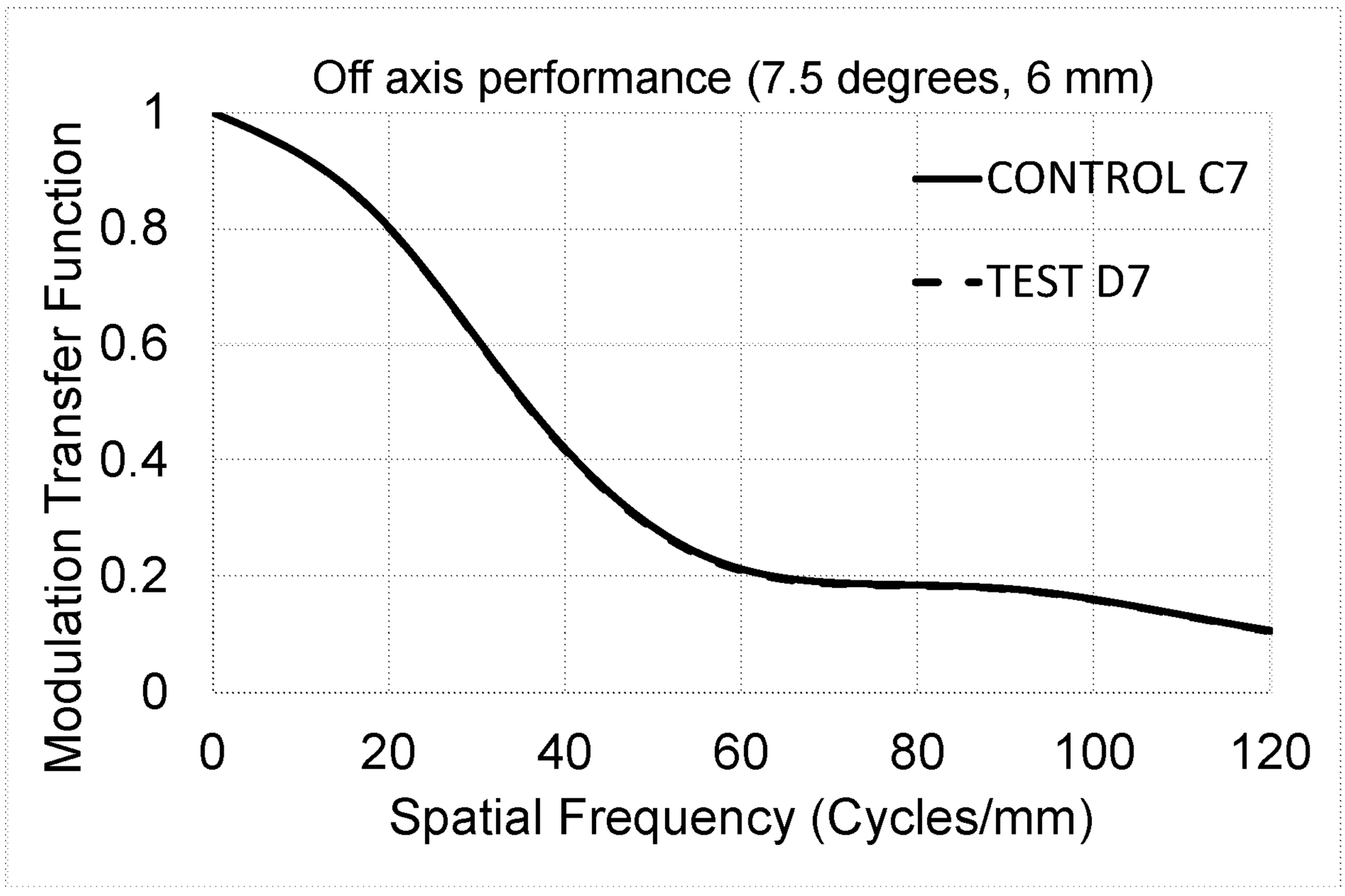


Figure 65

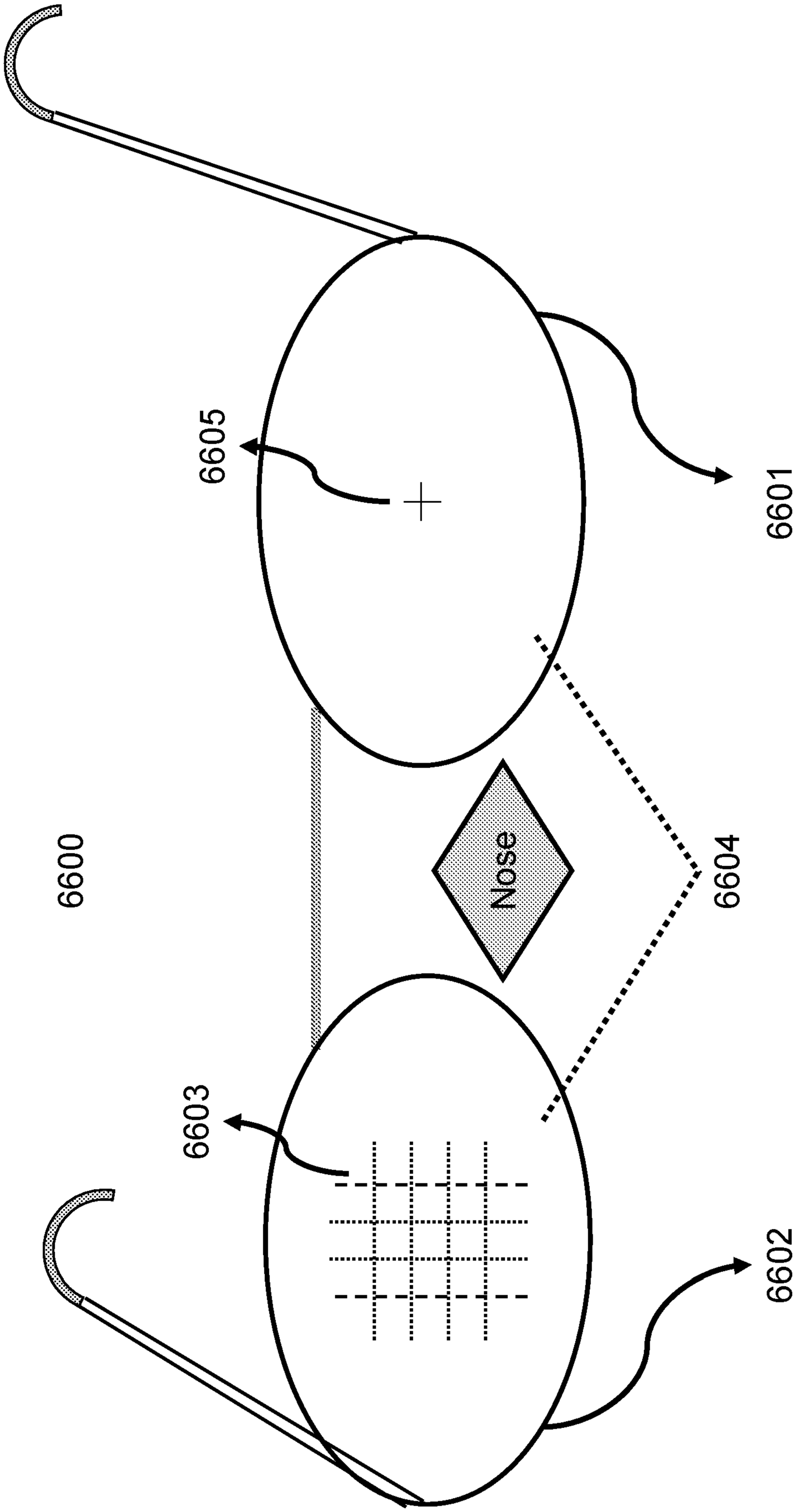


Figure 66

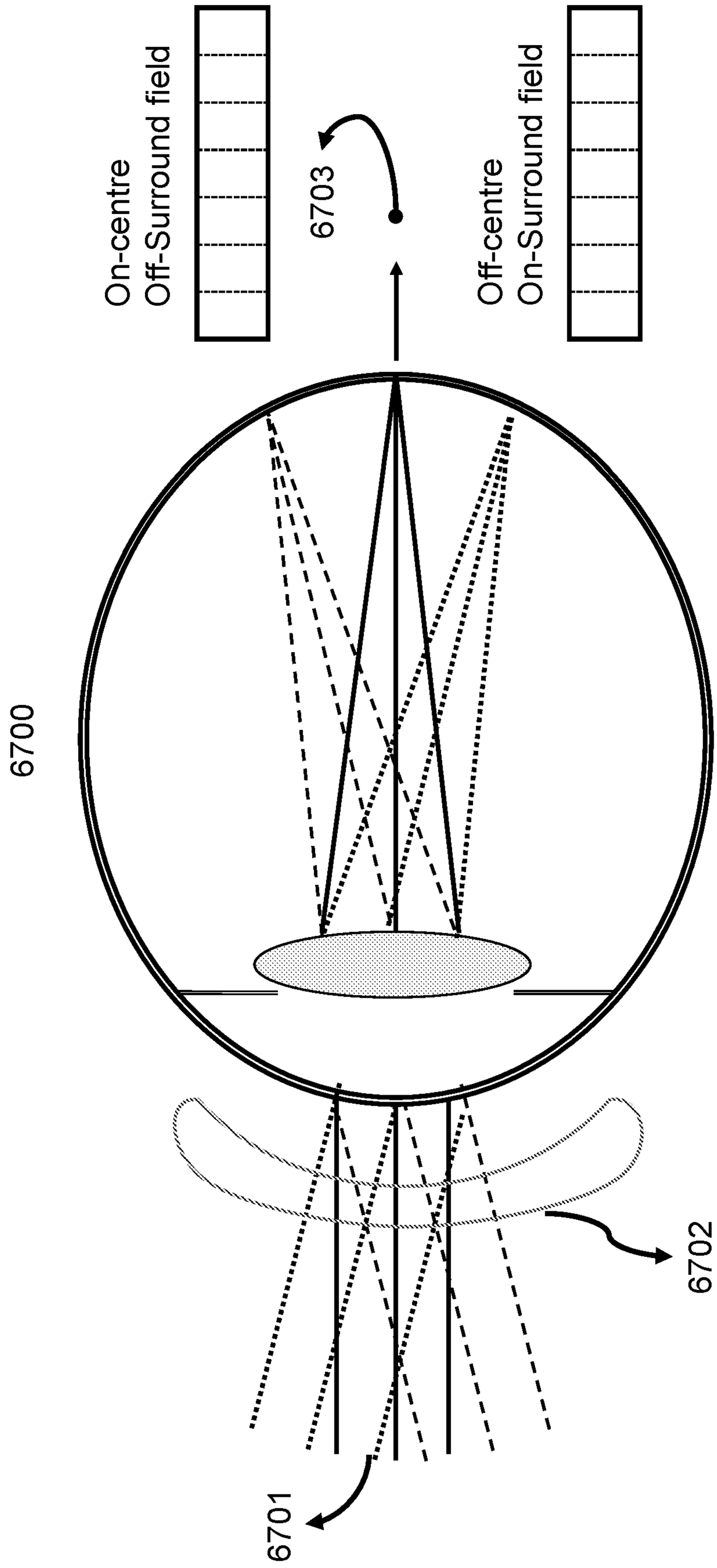

On-centre
Off-Surround field
6703
Off-centre
On-Surround field
6700
6702
6701

Figure 67

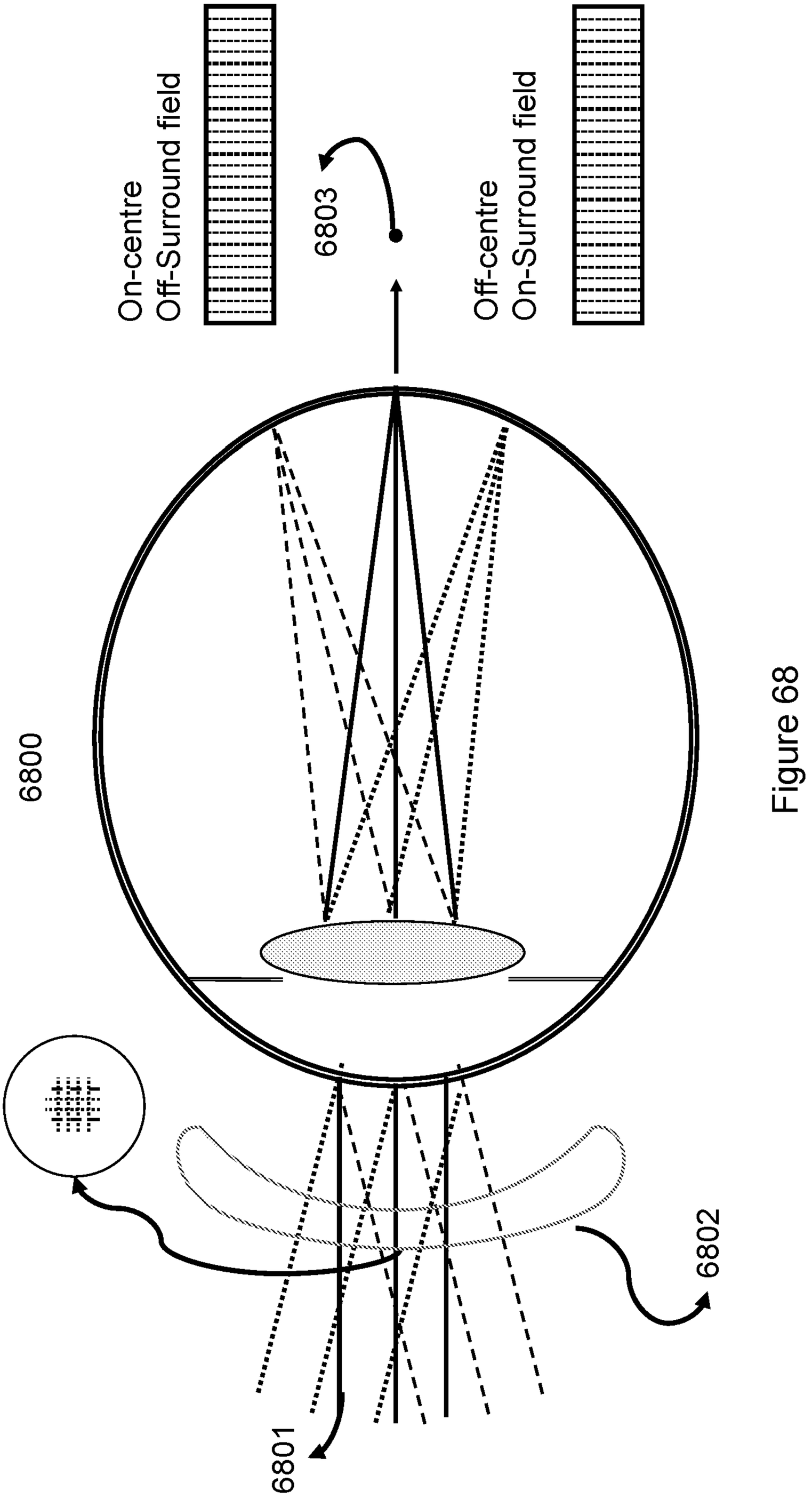

On-centre
Off-Surround field
6803
Off-centre
On-Surround field
6800
6802
6801

Figure 68

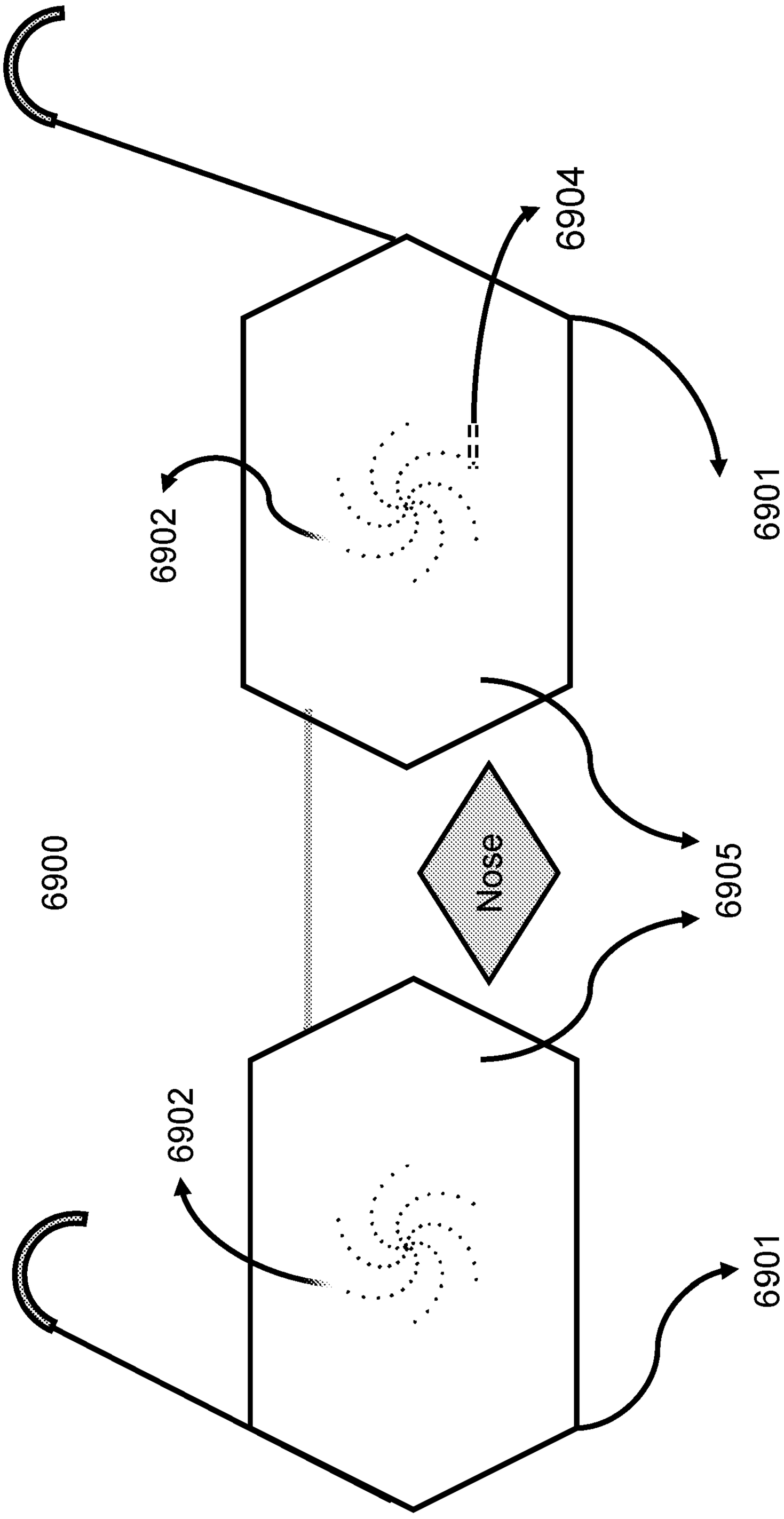


Figure 69

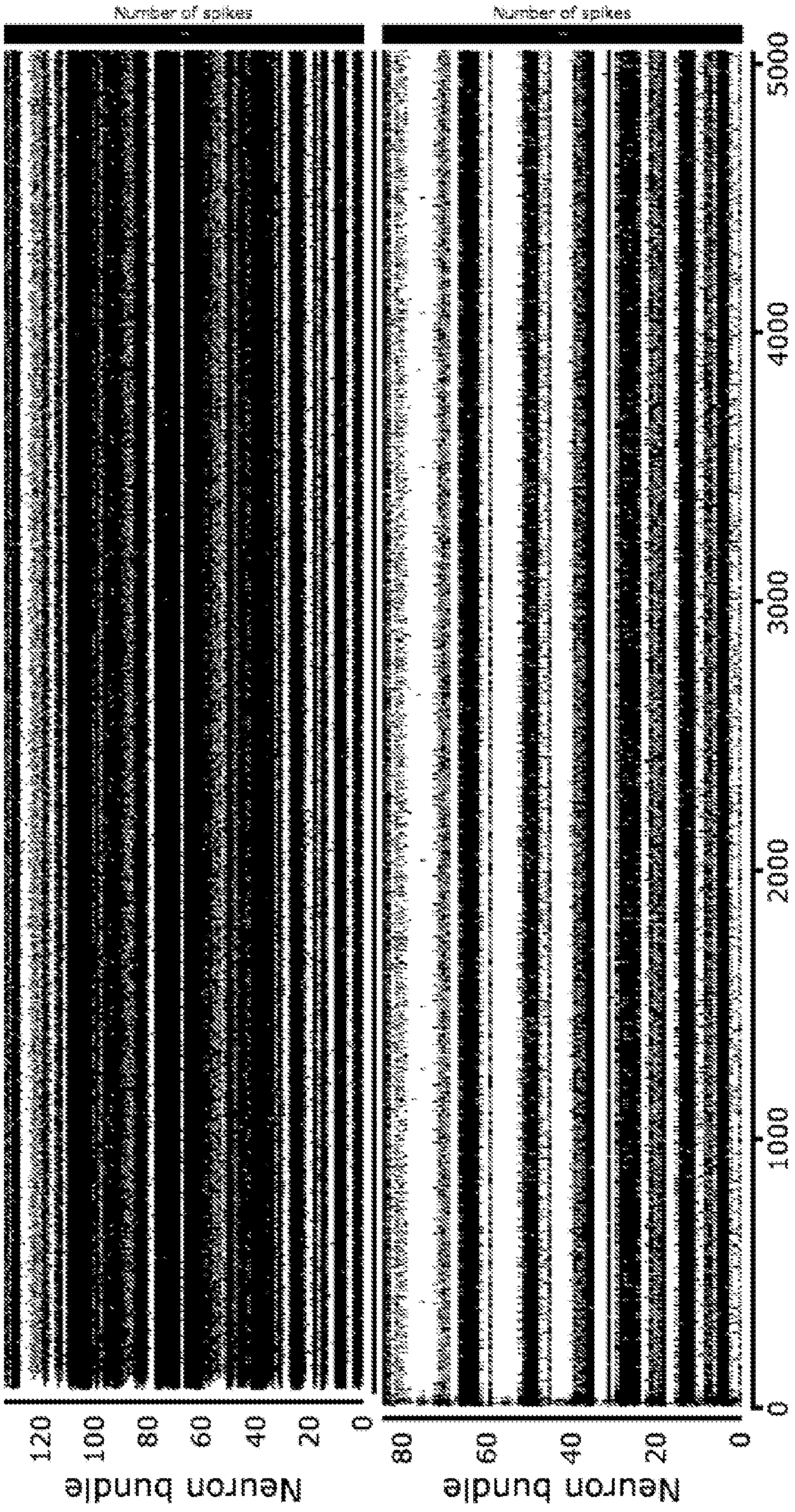

Number of spikes
Number of spikes
5000
4000
3000
2000
1000
0
Time (milli-seconds)
Neuron bundle
120
100
80
60
40
20
0
Neuron bundle
80
60
40
20
0
100
0

Figure 70

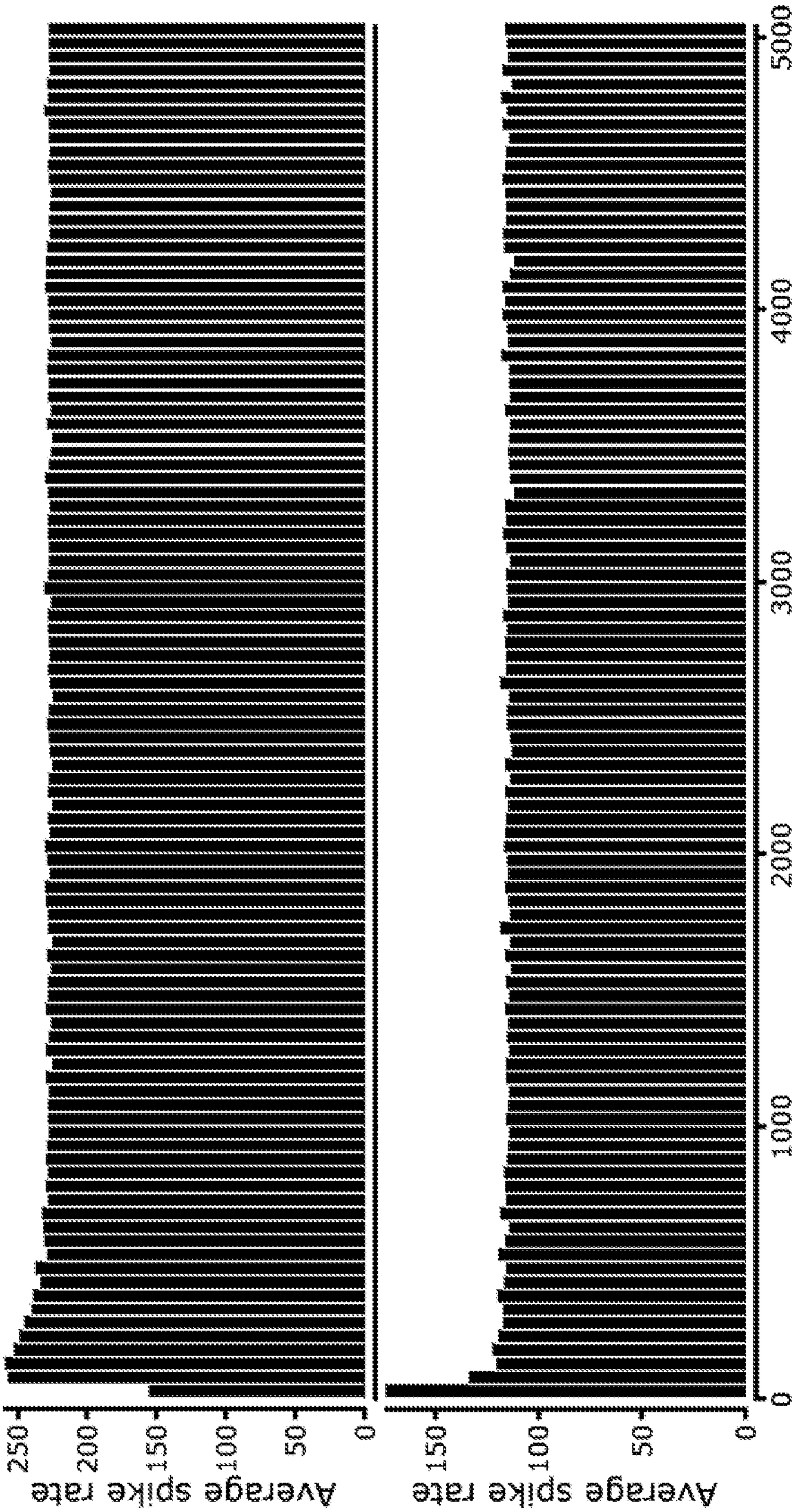
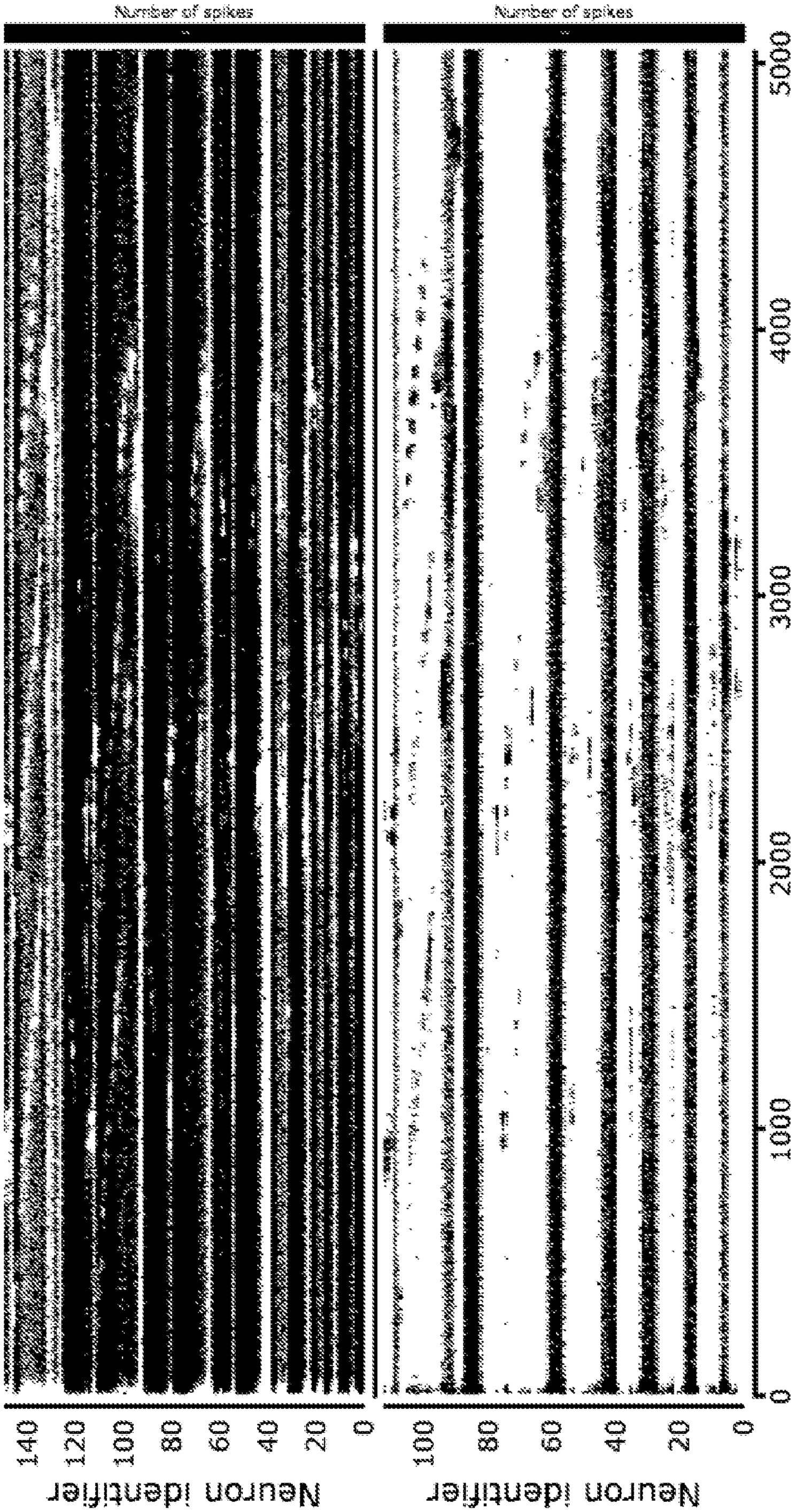

Average spike rate
250
200
150
100
50
0
Average spike rate
150
100
50
0
1000
2000
3000
4000
5000
Time (milli-seconds)

Figure 71


Number of spikes
Number of spikes
5000
4000
3000
2000
1000
0
Time (milli-seconds)
Figure 72
140
120
100
80
60
40
20
0
Neuron identifier
100
80
60
40
20
0
Neuron identifier

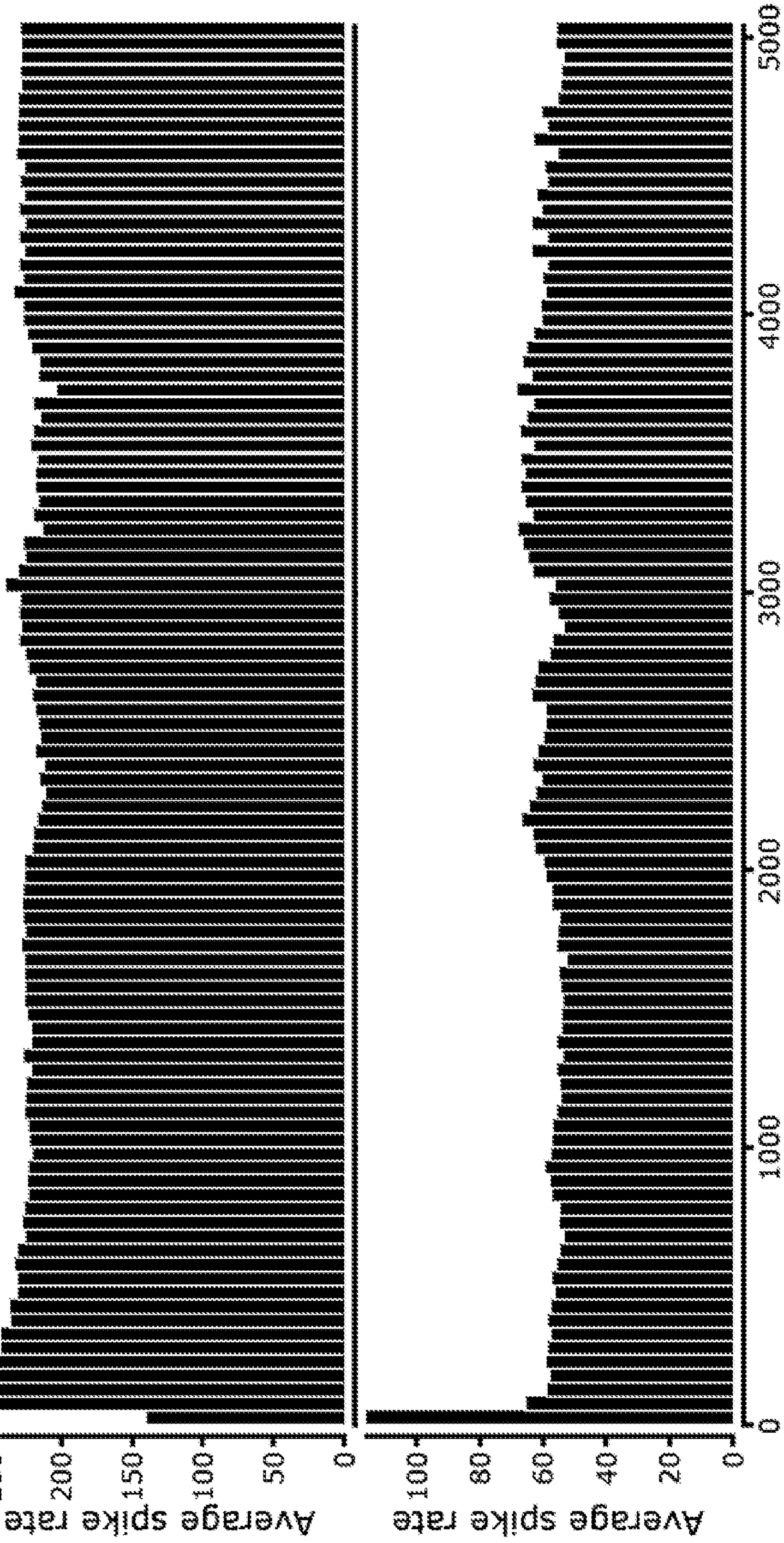

Average spike rate
250
200
150
100
50
0
Average spike rate
100
80
60
40
20
0
1000
2000
3000
4000
5000
Time (milli-seconds)

Figure 73

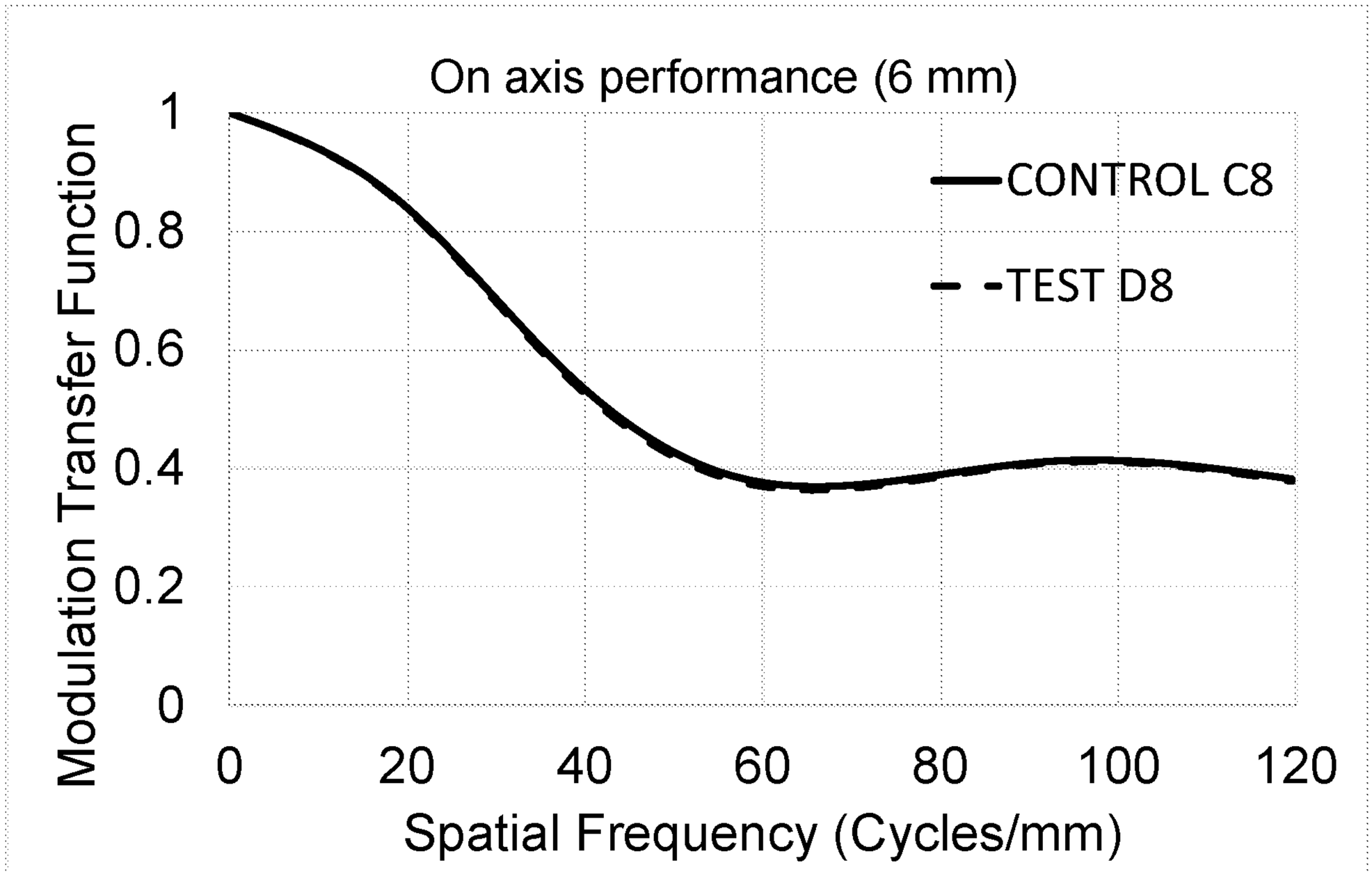


Figure 74

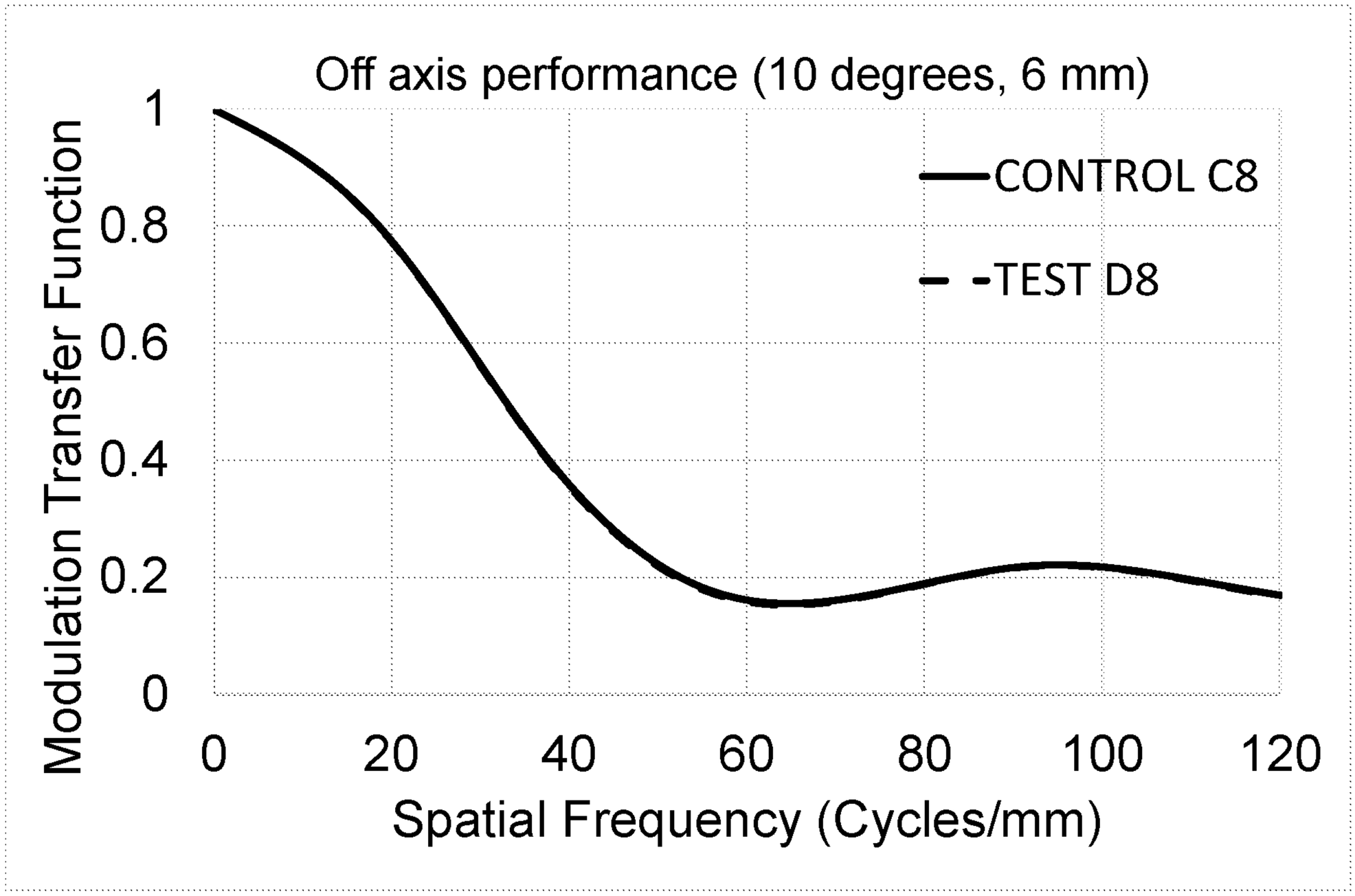


Figure 75

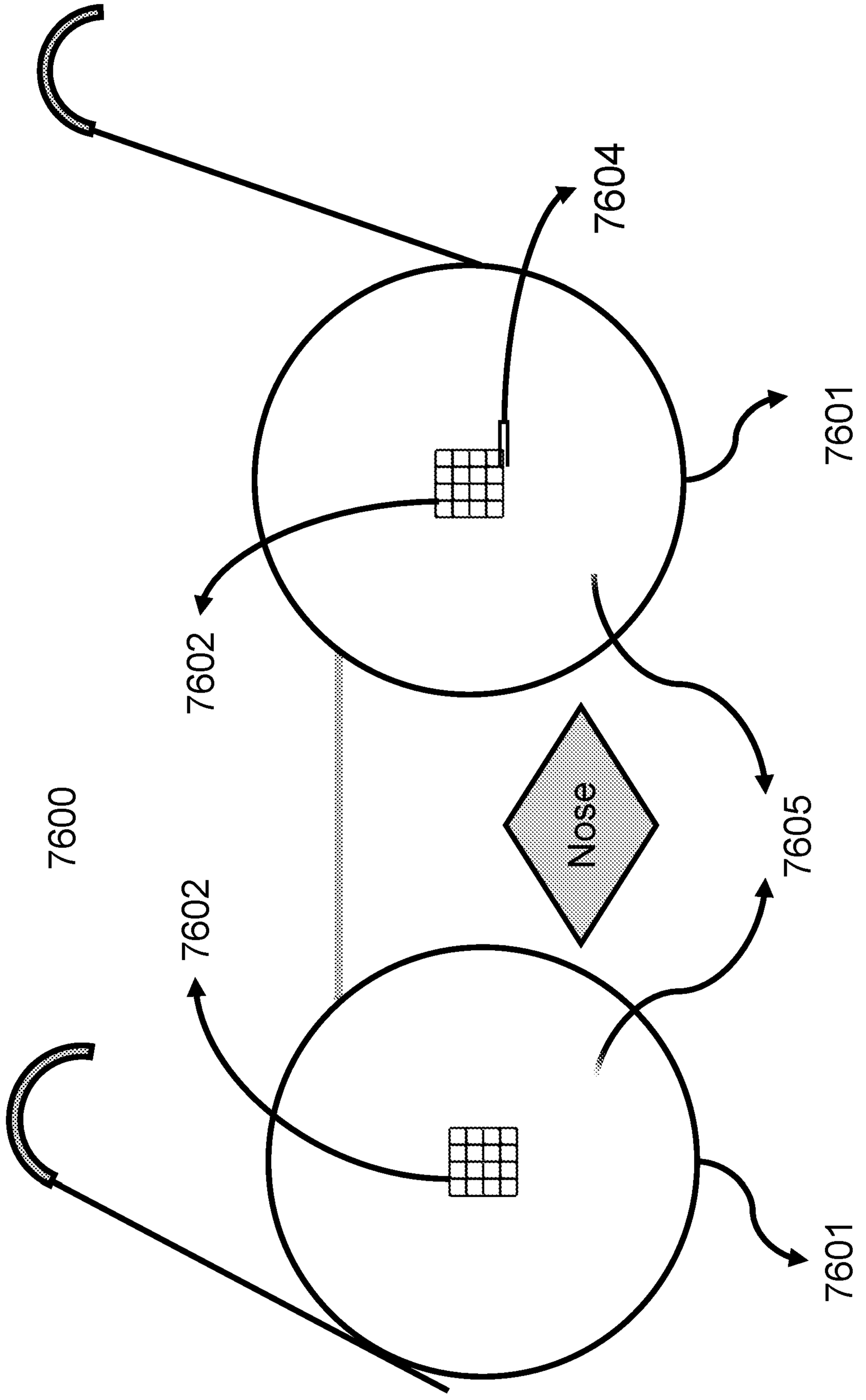


Figure 76

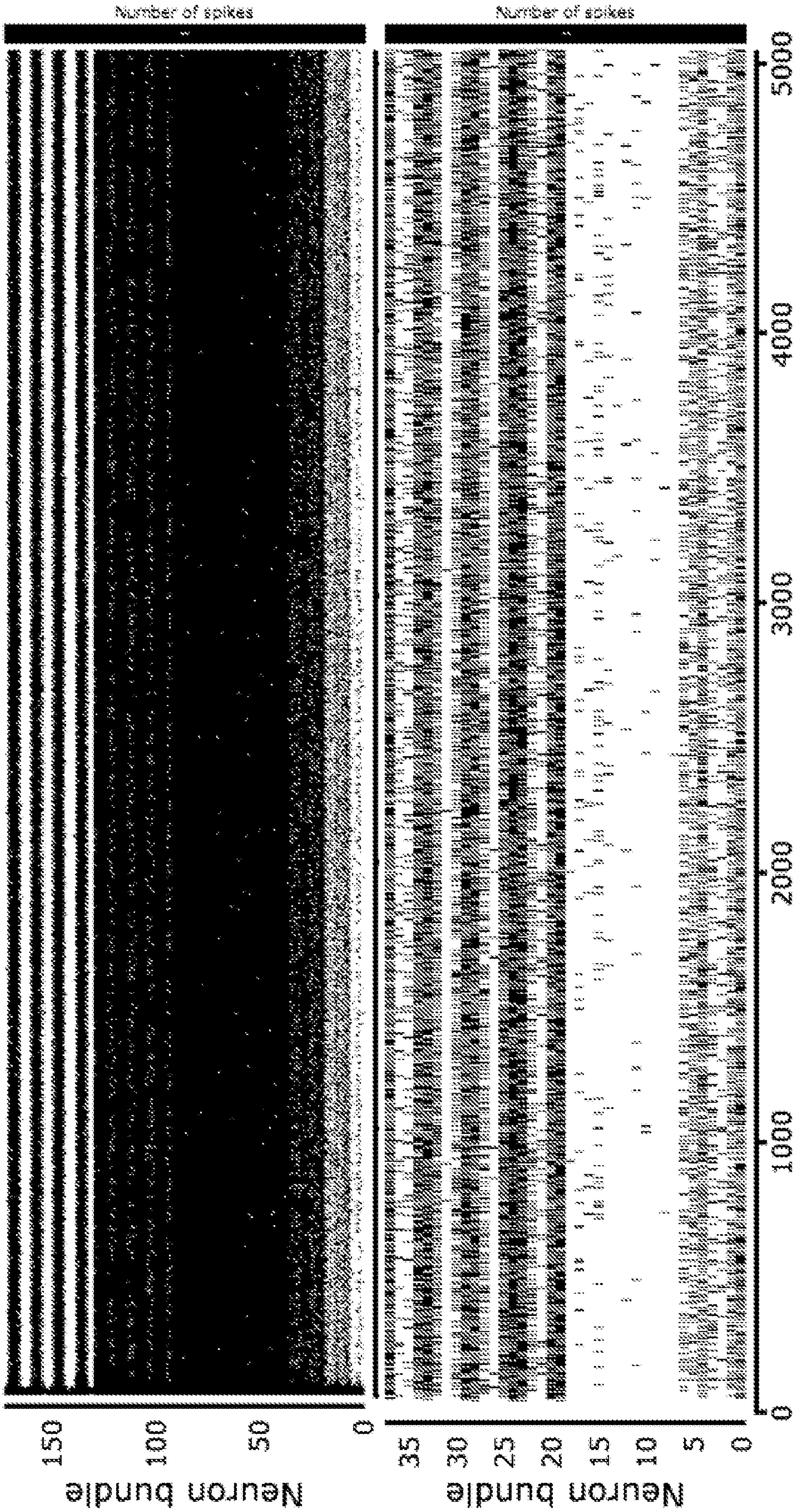

Number of spikes
Number of spikes
5000
4000
3000
2000
1000
0
Time (milli-seconds)
Neuron bundle
150
100
50
0
Neuron bundle
35
30
25
20
15
10
5
0

Figure 77

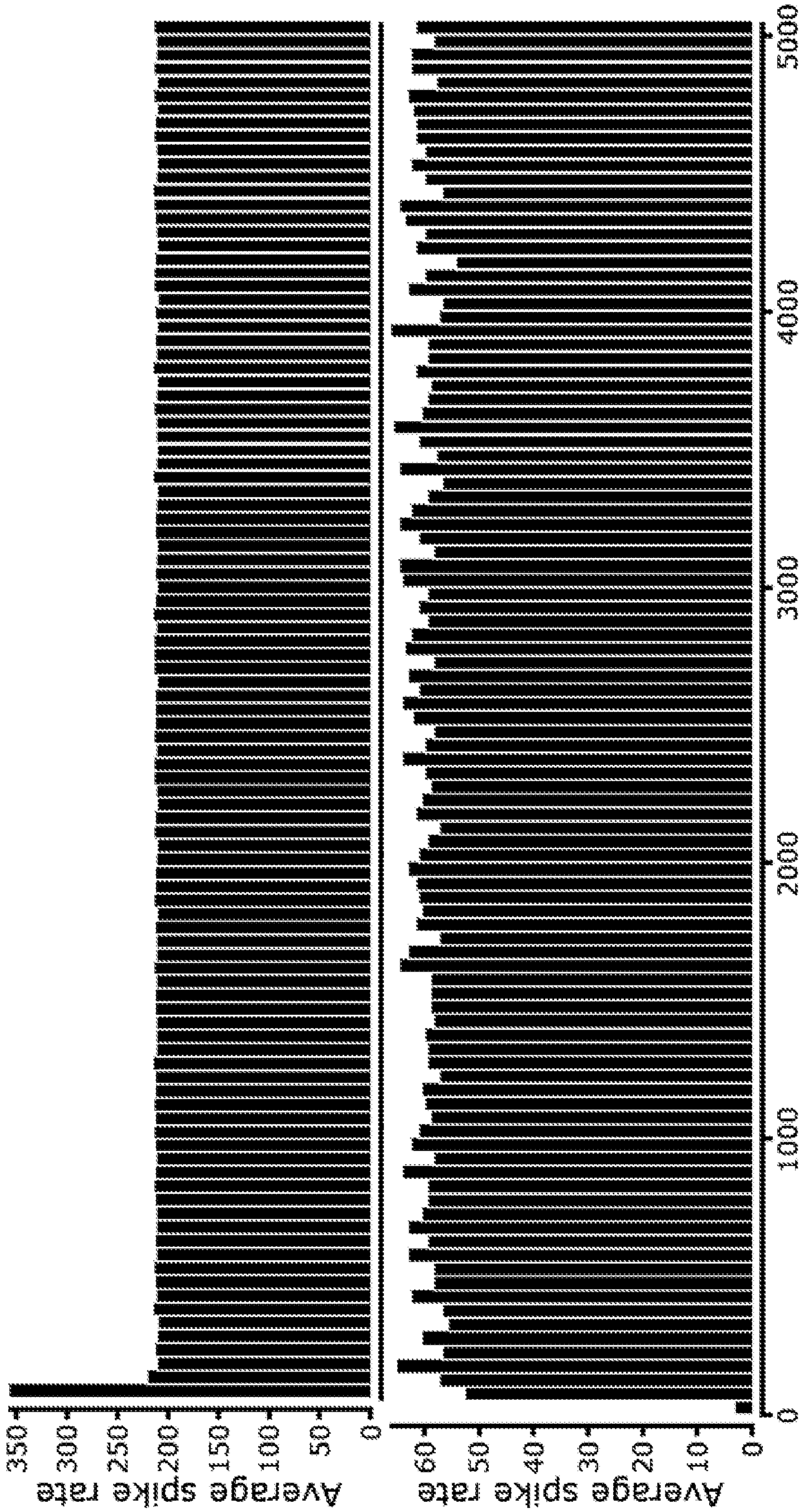

Average spike rate
0
50
100
150
200
250
300
350
Average spike rate
0
10
20
30
40
50
60
Time (milli-seconds)
0
1000
2000
3000
4000
5000

Figure 78

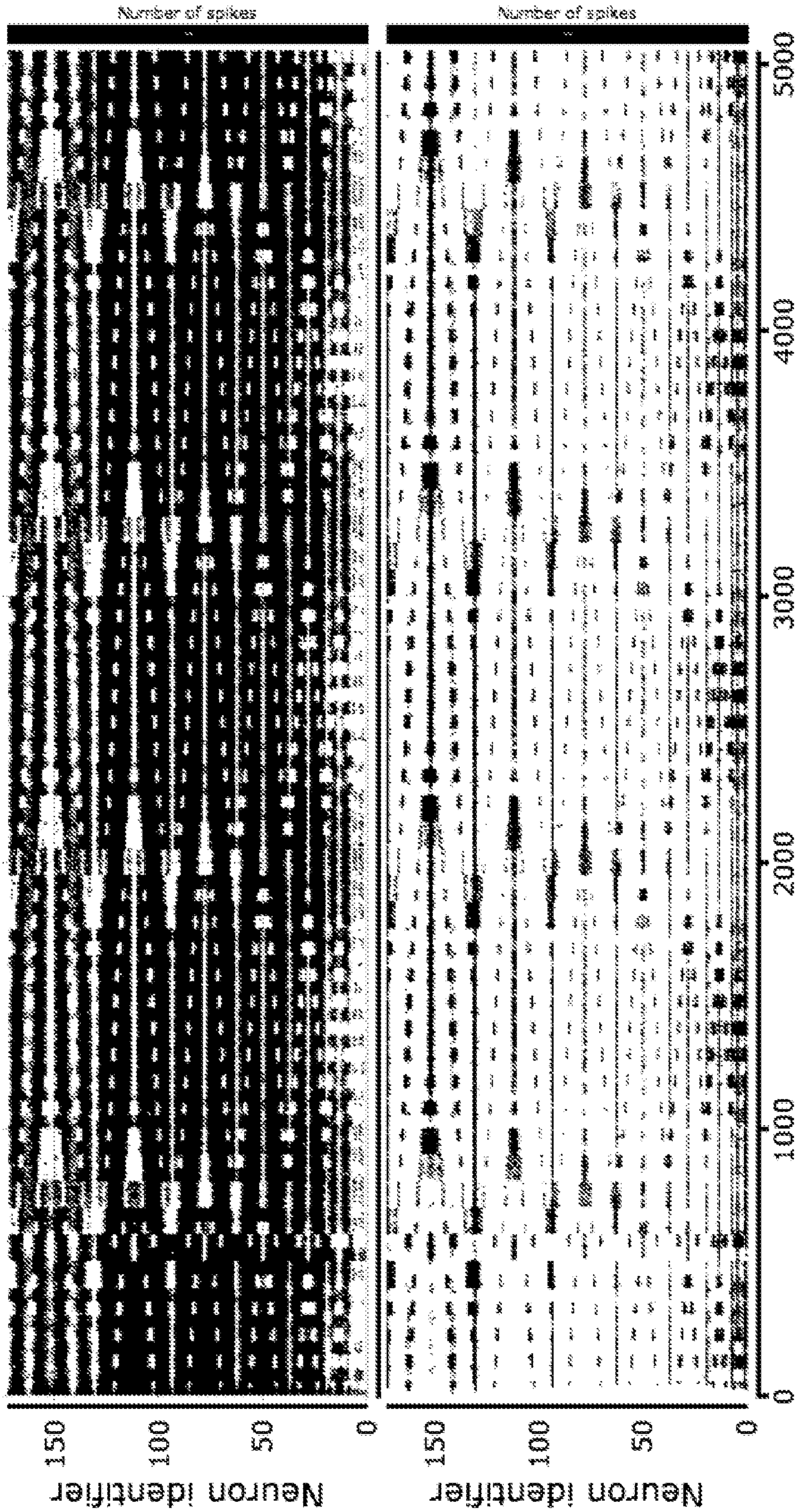

Number of spikes
Number of spikes
5000
4000
3000
2000
1000
0
Time (milli-seconds)
150
100
50
0
Neuron identifier
150
100
50
0
Neuron identifier

Figure 79

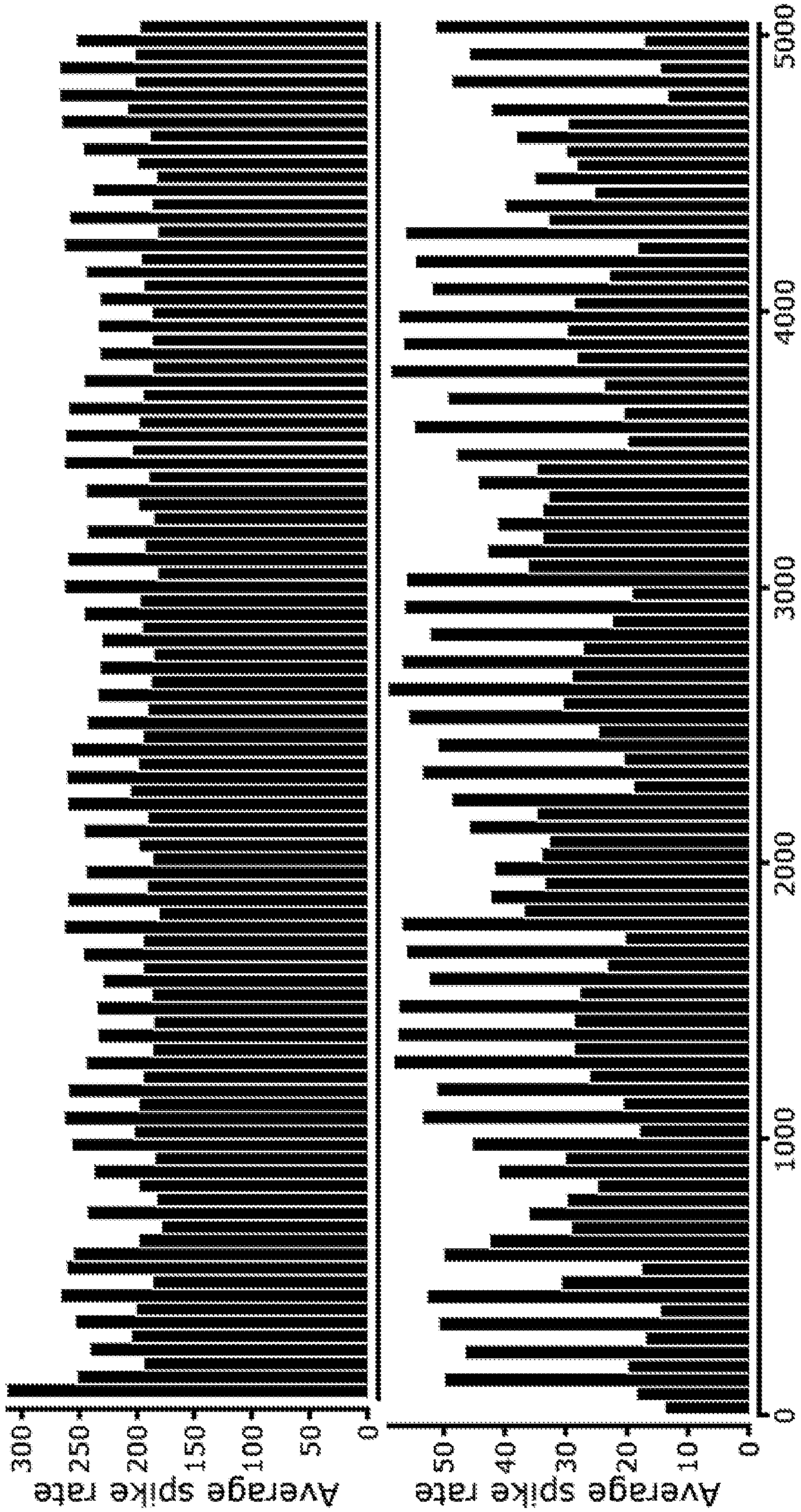

5000
4000
3000
2000
1000
0
Time (milli-seconds)
Average spike rate
50
40
30
20
10
0
Average spike rate
300
250
200
150
100
50
0

Figure 80

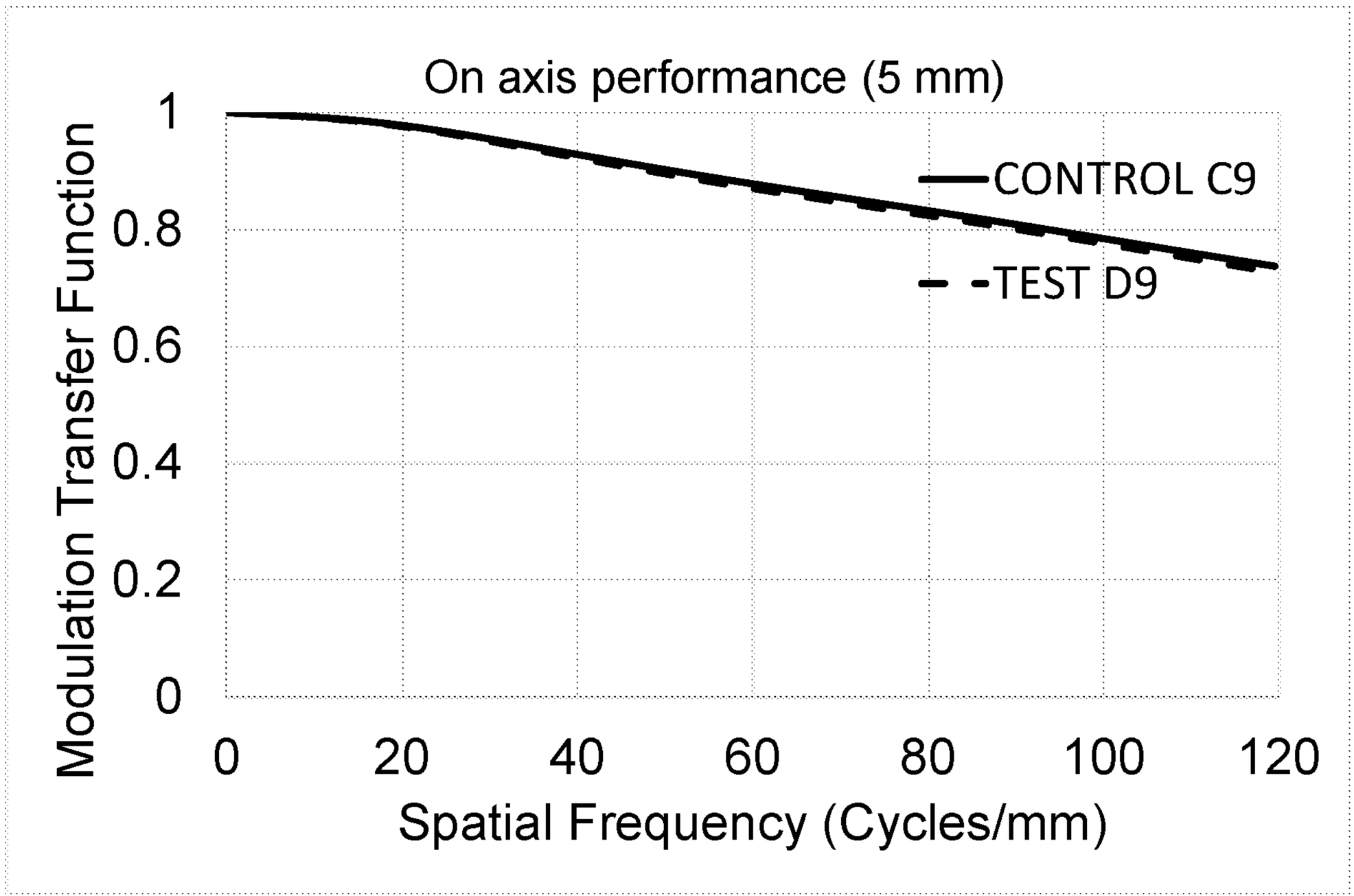


Figure 81

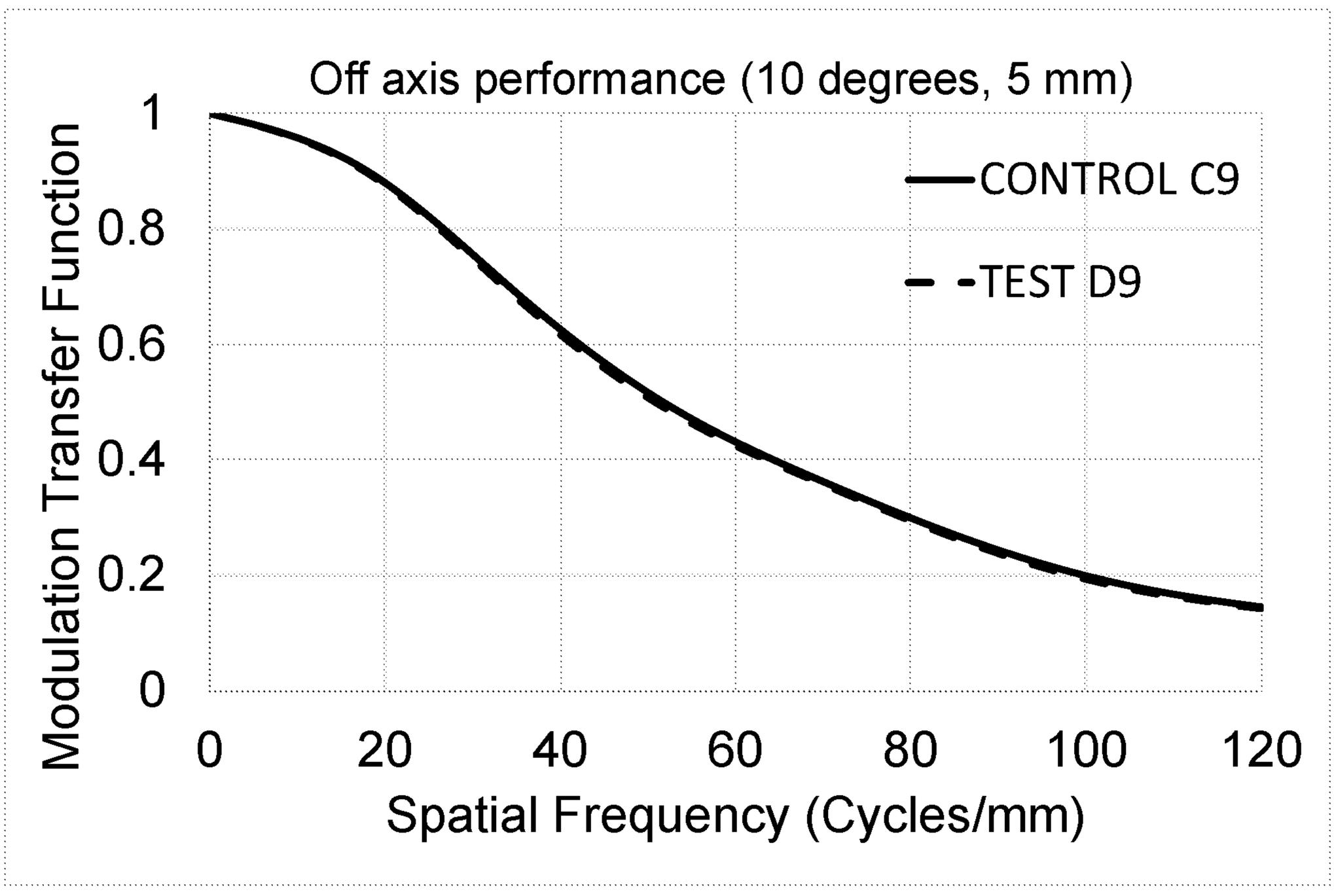


Figure 82

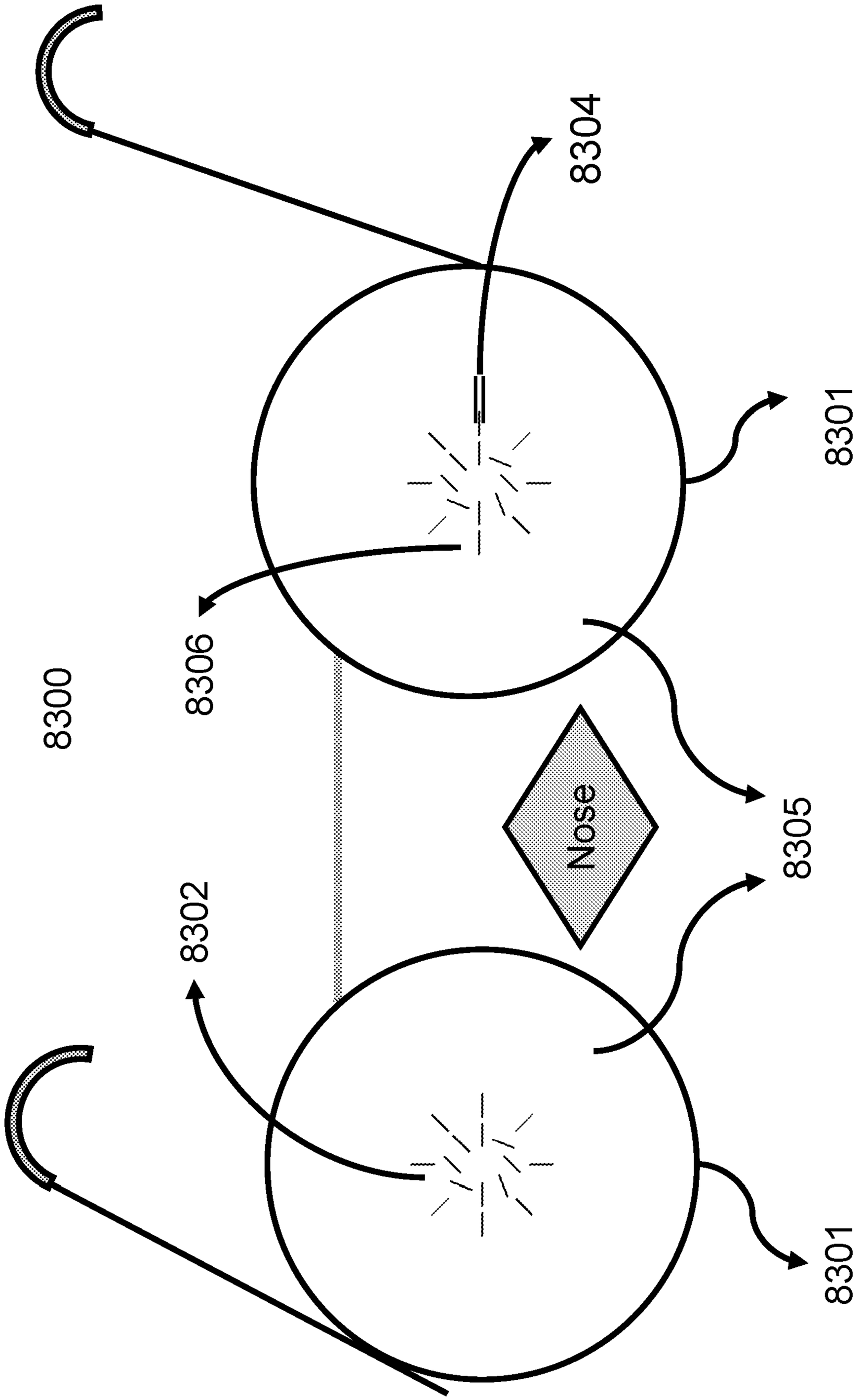


Figure 83

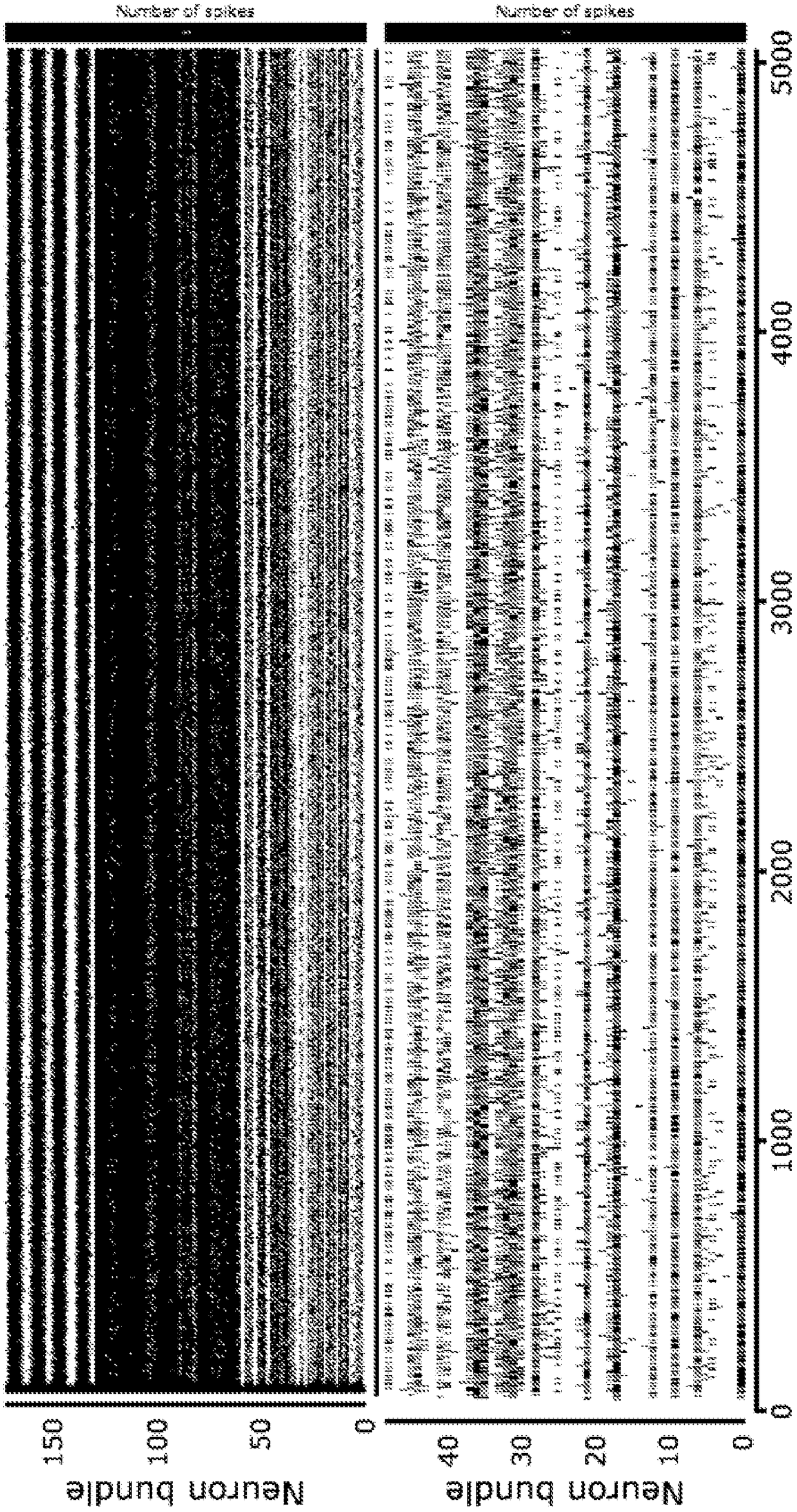

Number of spikes
Number of spikes
5000
4000
3000
2000
1000
Time (milli-seconds)
Neuron bundle
Neuron bundle
150
100
50
0
40
30
20
10
0

Figure 84

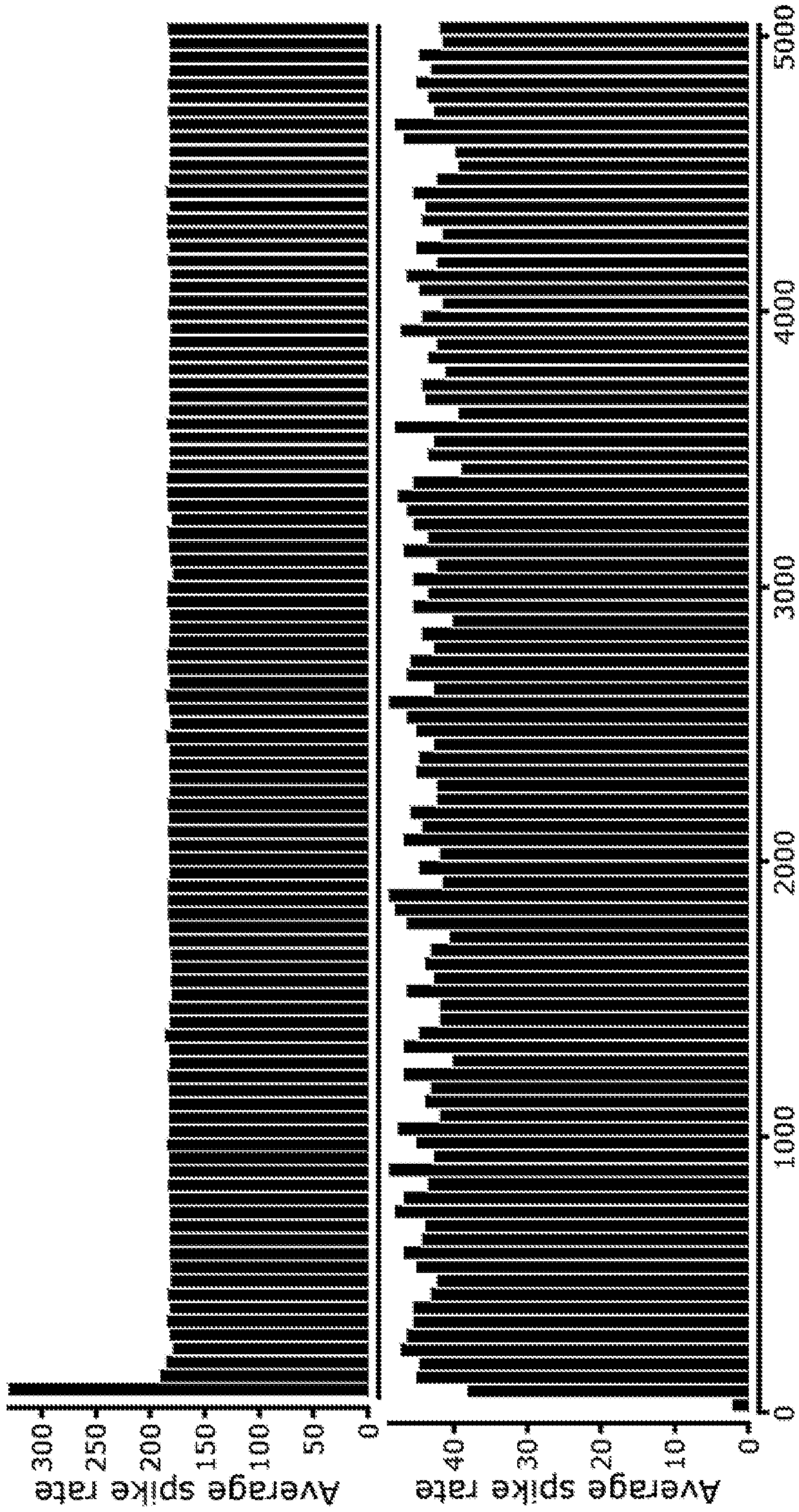

Average spike rate
300
250
200
150
100
50
0
Average spike rate
40
30
20
10
0
Time (milli-seconds)
1000
2000
3000
4000
5000

Figure 85


Number of spikes
Number of spikes
5000
0
3000
4000
2000
1000
Time (milli-seconds)
150
100
50
0
100
80
60
40
20
0
Neuron bundle
Neuron bundle

Figure 86

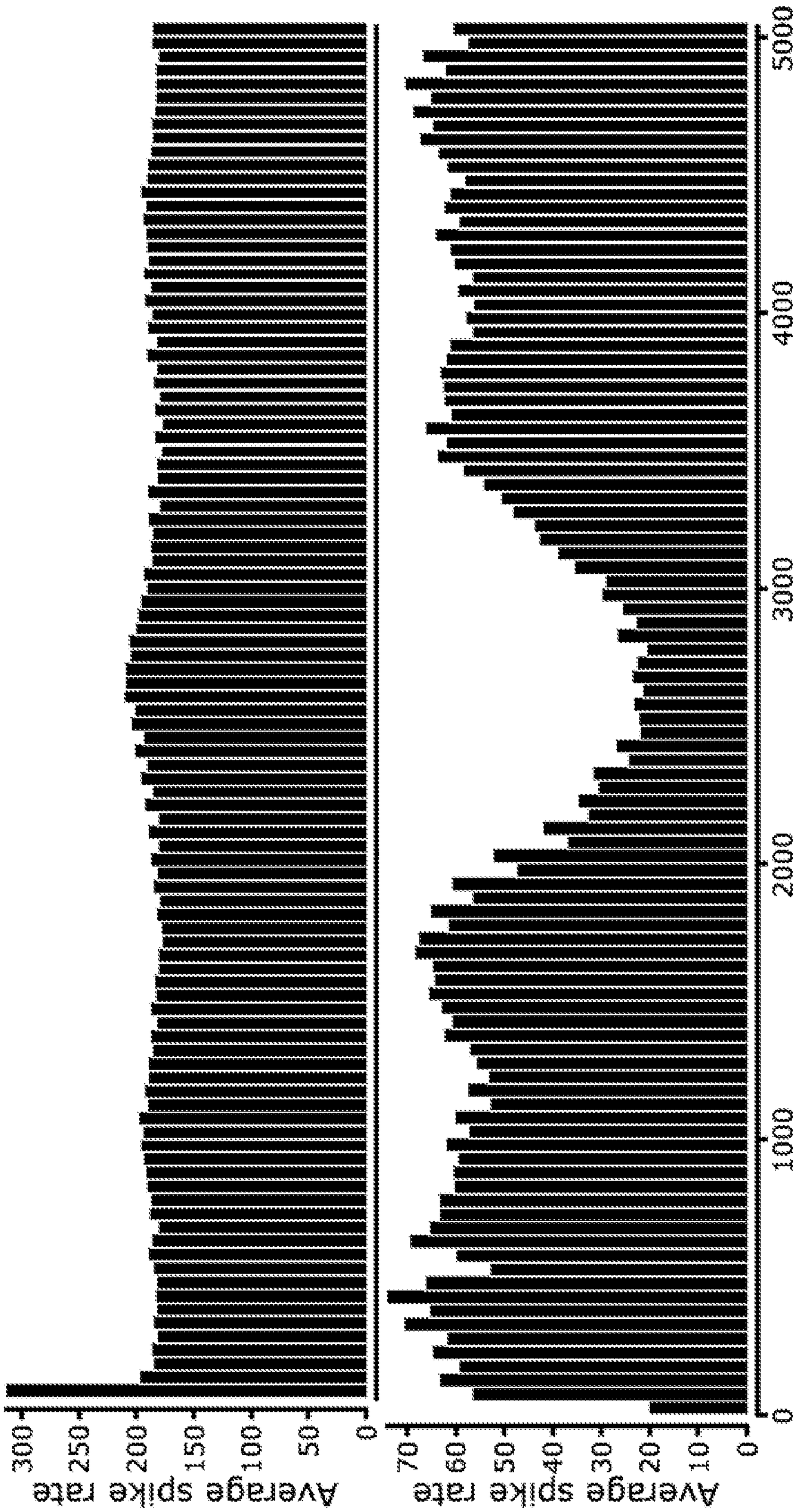

5000
4000
3000
2000
1000
0
Time (milli-seconds)
Average spike rate
70
60
50
40
30
20
10
0
Average spike rate
300
250
200
150
100
50
0

Figure 87

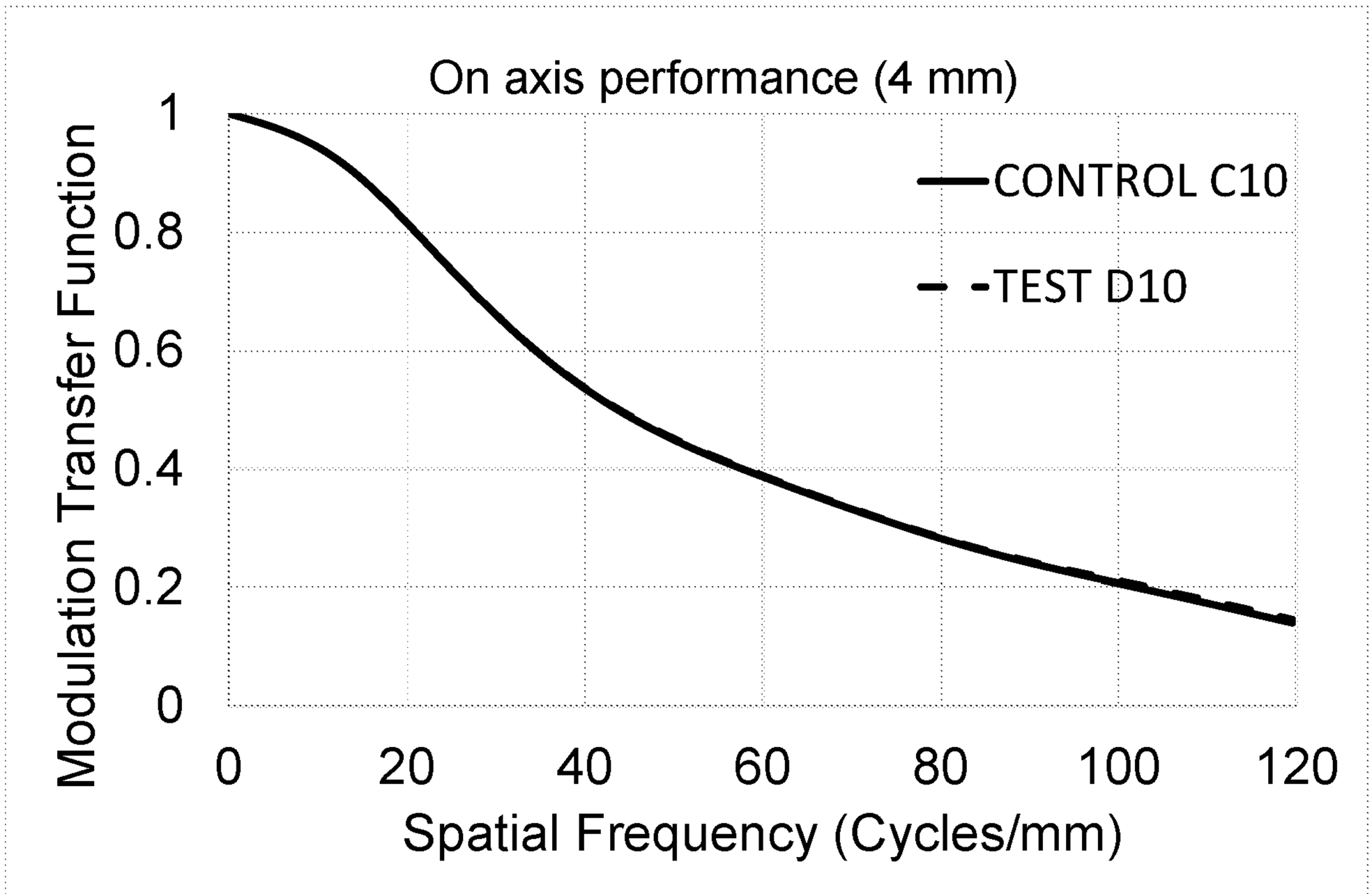


Figure 88

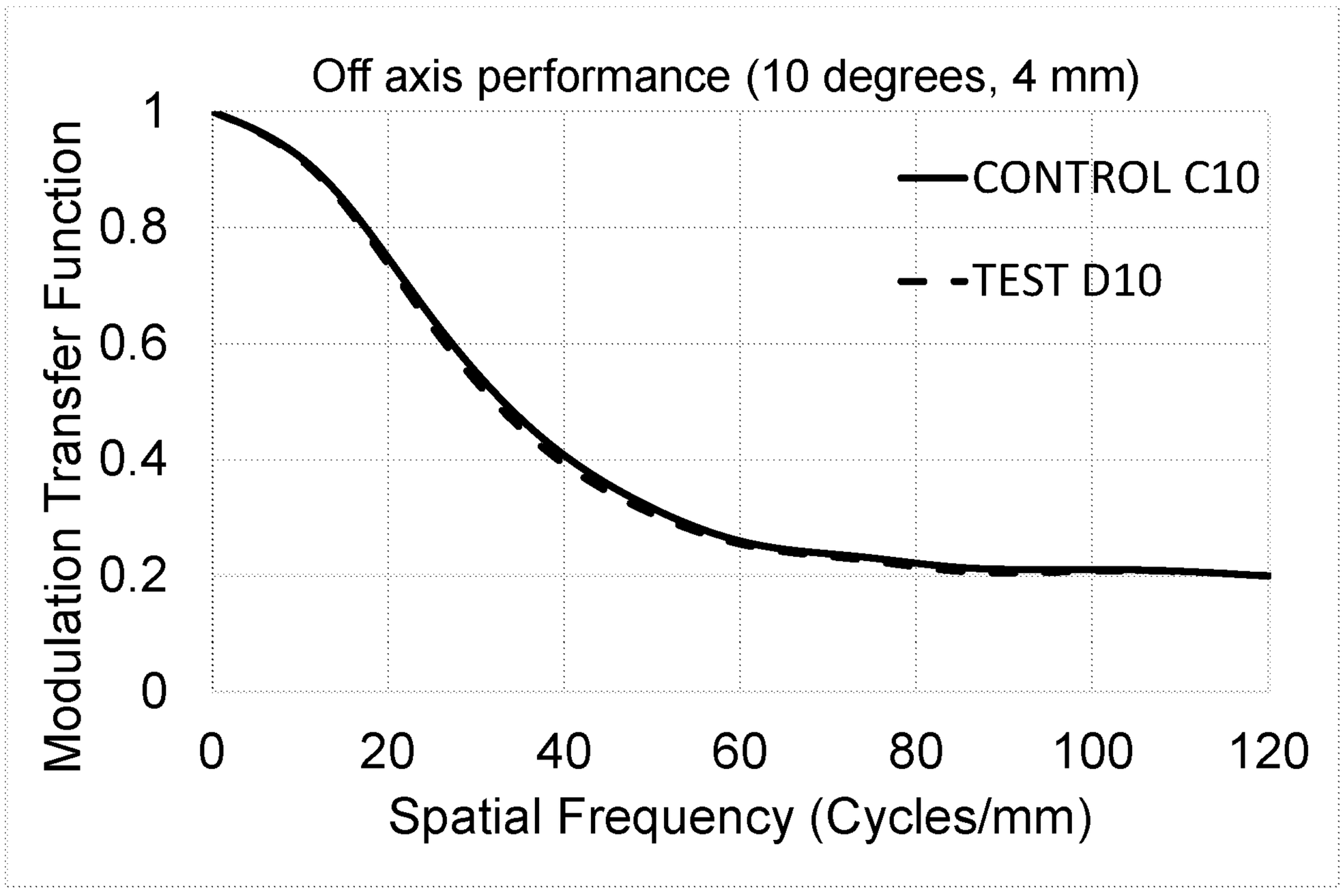


Figure 89