First row: Original spike waveforms 100% 4 100% 60% 20% Unit-2 Amplitude (a.u.) Learned feature-2 Unit-3 200 Unit-1 True True Probablity Unit-2 50% 506 147.5 148 148.5 Number of spikes Number of spikes Unit-3 Unit-1 -200 Unit-4 True 0% 20% -15 -10 0.6 0.8 0.4 6 Unit-1 Unit-2 Unit-3 Unit-4 Time (msec) Learned feature-1 Number of clusters 64 70 Number of spikes Second row: SNR=2.5 100% Unit-3 Amplitude (a.u.) 20% Unit-1 _earned feature-2 Probablity Unit-2 147.5 148 148.5 500 50% Number of spikes Number of spikes -200 Unit-3 -2 Unit-4 -400 0 0%2 0.5 -10 -5 Unit-1 Unit-2 Unit-3 Unit-4 Time (msec) 65 Learned feature-1 Number of clusters Number of spikes Third row: SNR=1.5 80% 200 Unit-1 Learned feature-2 Unit-3 Probablity 90% 0.8 Amplitude (a.u.) True number Unit-2 0.6 2 350 500 650 2 148 154 Number of spikes 142 Number of spikes 0.4 Unit-3 -200 20% 0.2 Unit-4 -400<u>\</u> 0% Unit-3 6 0.5 -15 -10 Jrite Spite Spite 2 20 60 10 Number of spikes Number of clusters Time (msec) Learned feature-1 Spike waveforms for 2-D plots based on the first Posterior distributions of Confusion matrix Heatmap Posterior distributions of

clusters number

each clusters

2 learned features

spikes number for sparsely-

firing units