



S 5. Fig. **Two stimuli presentation.** Upper panel, another realization of the network with the same parameters as chosen in the main text and  $\tau_\alpha = 20\text{ms}$ . Lower panel, network with  $\tau_\alpha = 2\text{ms}$ . From left to right it is depicted the raster plot colored according to the *k-means* algorithm with  $k=25$ , vertical lines indicates the change of the presented stimulus. In the middle column is reported the state transition matrix calculated over a time span of 20 seconds (the stimulation protocol is repeated 5 times). Rightmost column reports the state transition matrix for a block  $4\text{ s} \times 4\text{ s}$  averaged over  $r = 5$  successive presentations of the inputs.