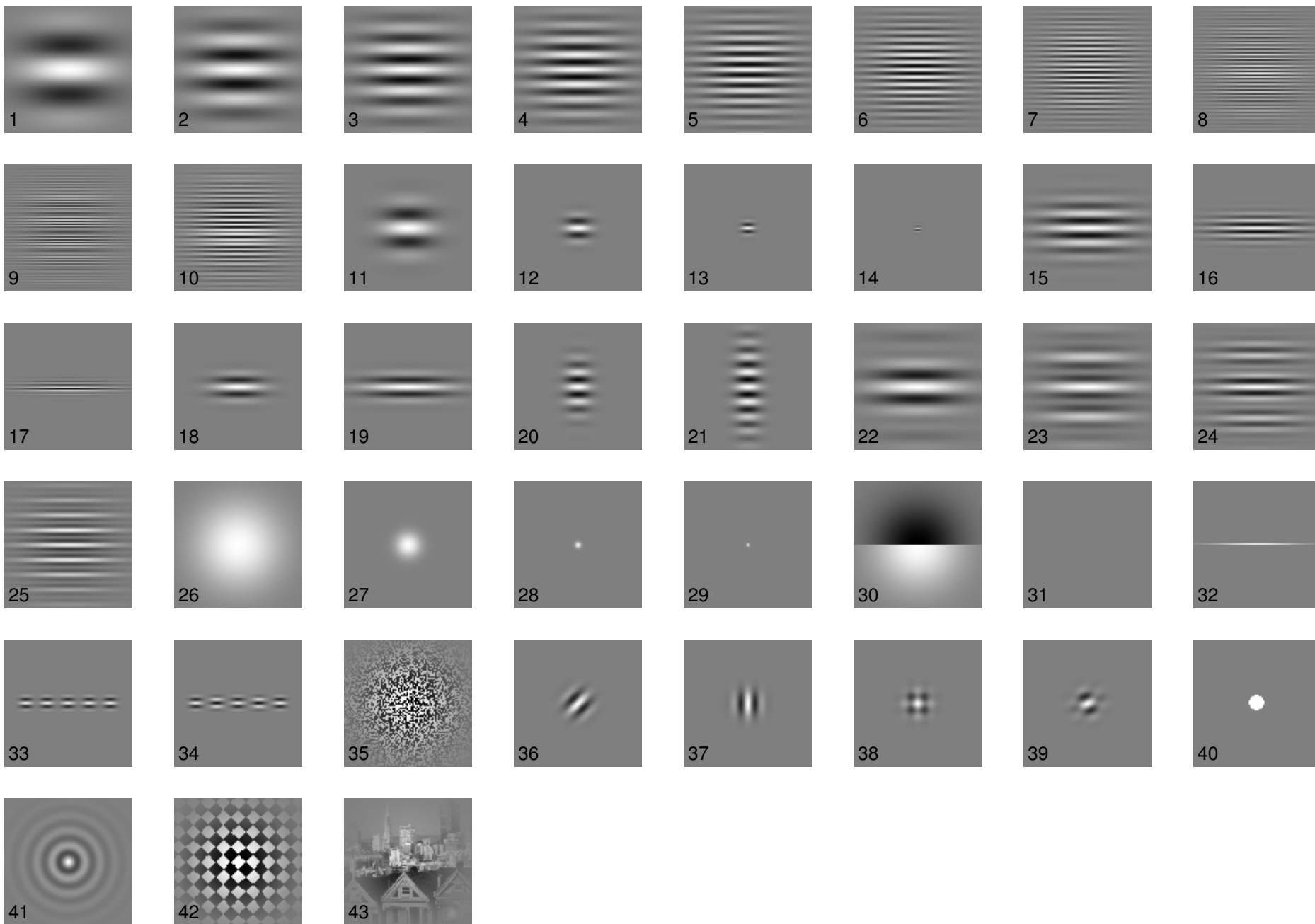
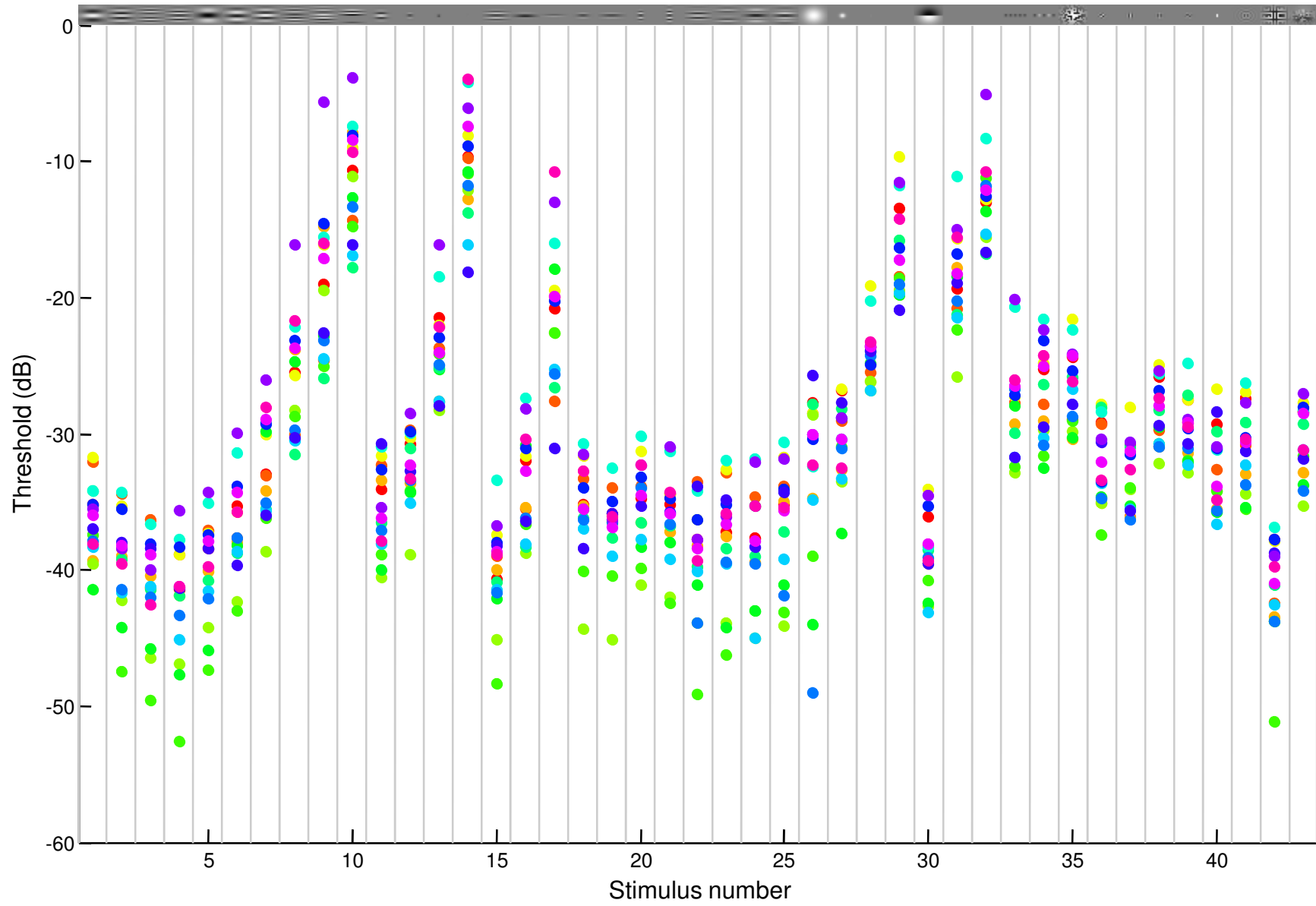


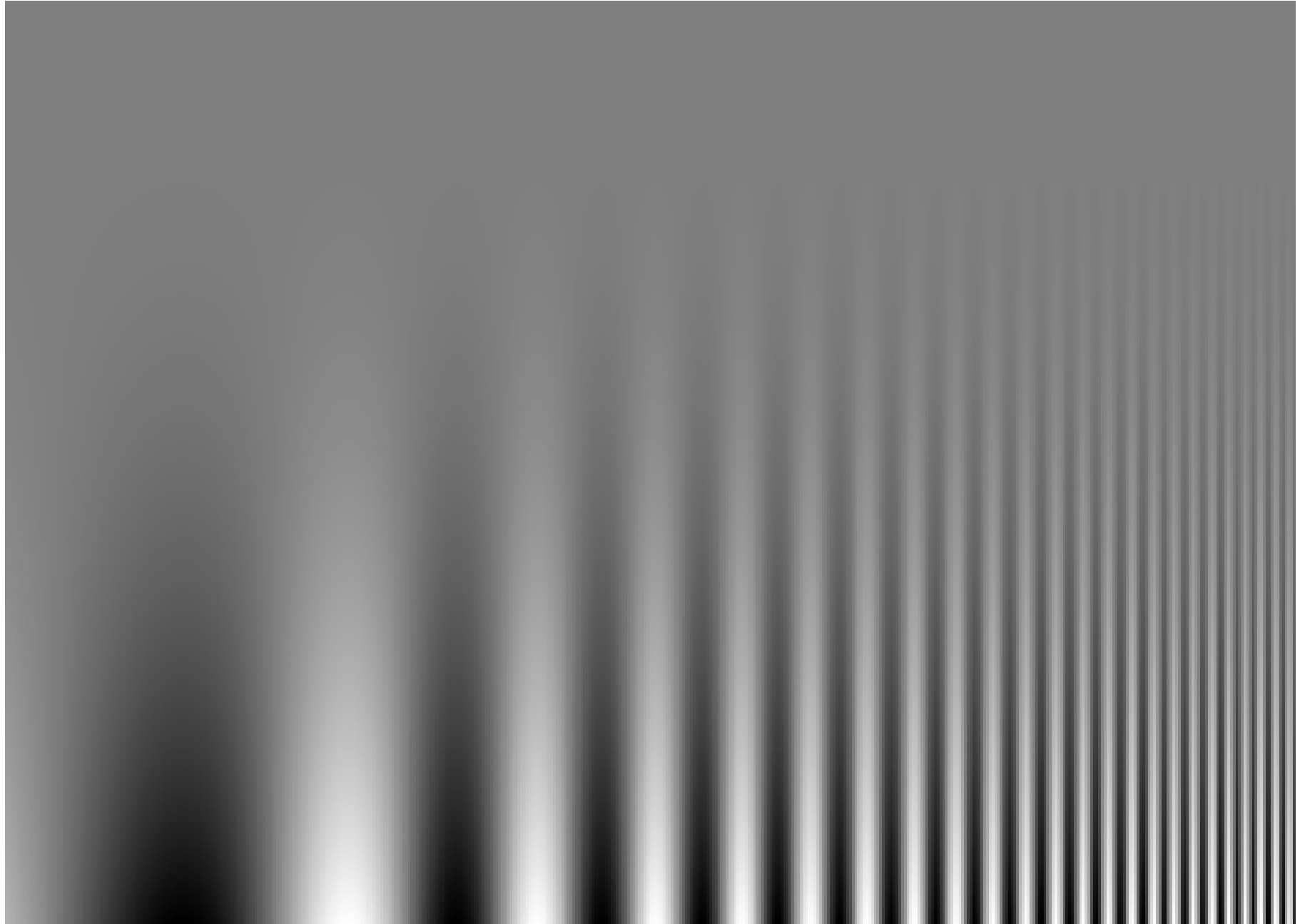
ModelFest Stimuli



ModelFest Psychophysical Data



The spatial frequency contrast sensitivity function



1st 10 ModelFest stimuli measure the contrast sensitivity function

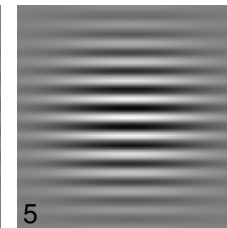
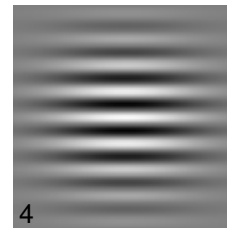
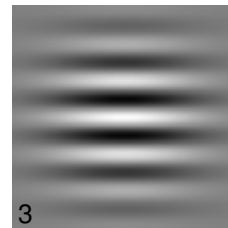
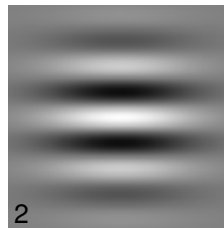
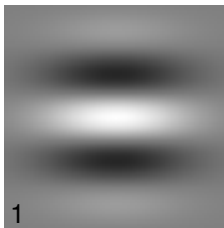
1.12 c/deg

2

2.83

4

5.6



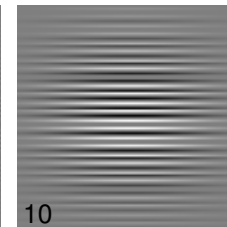
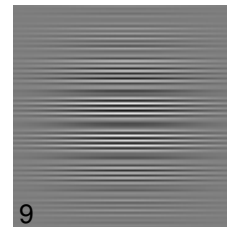
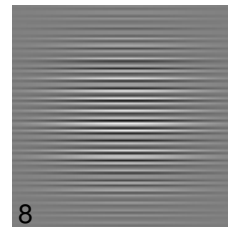
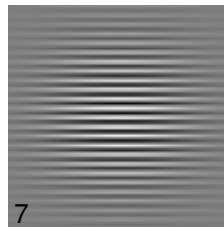
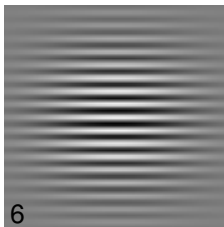
8

11.3

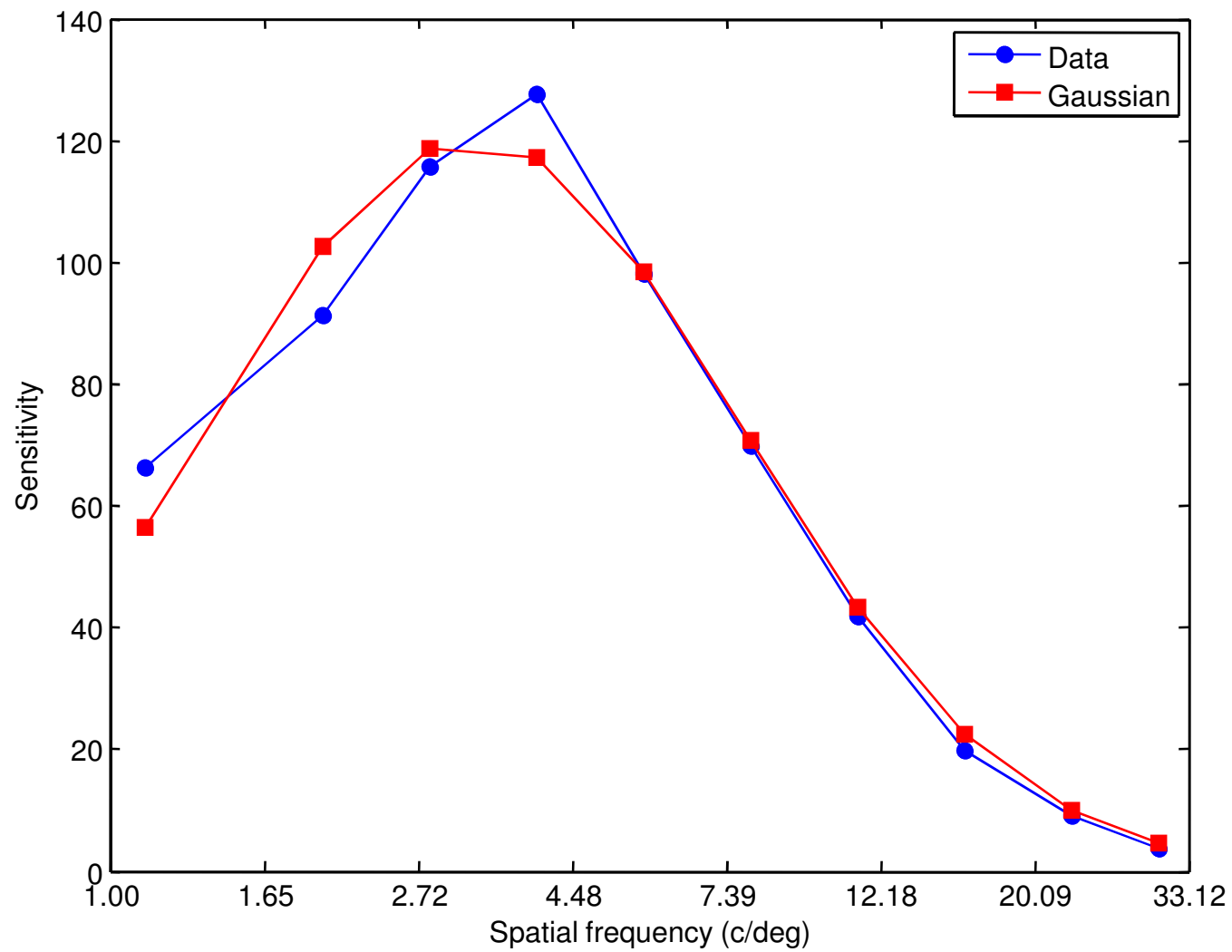
16

22.6

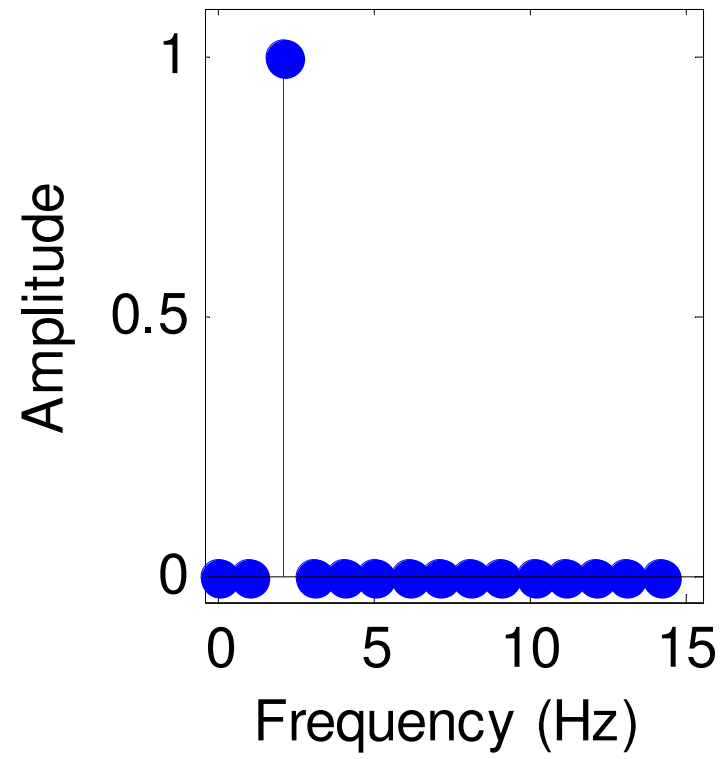
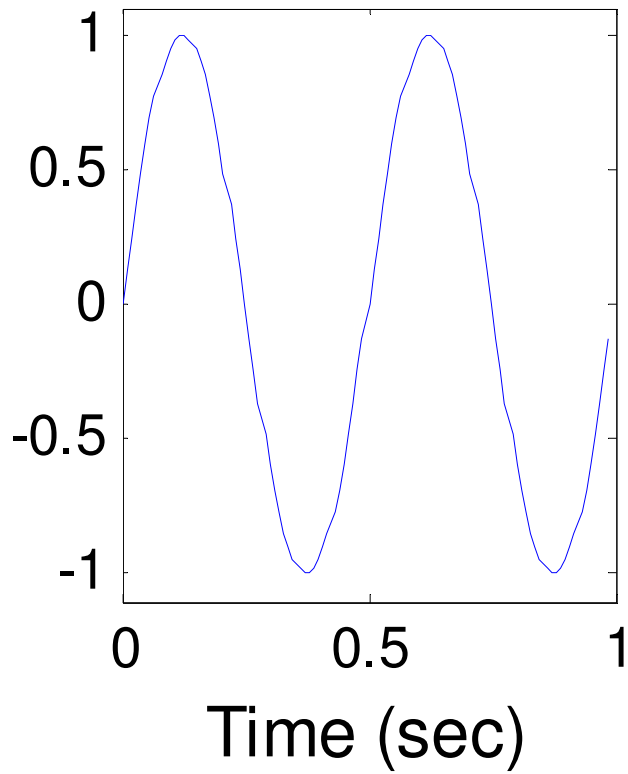
30



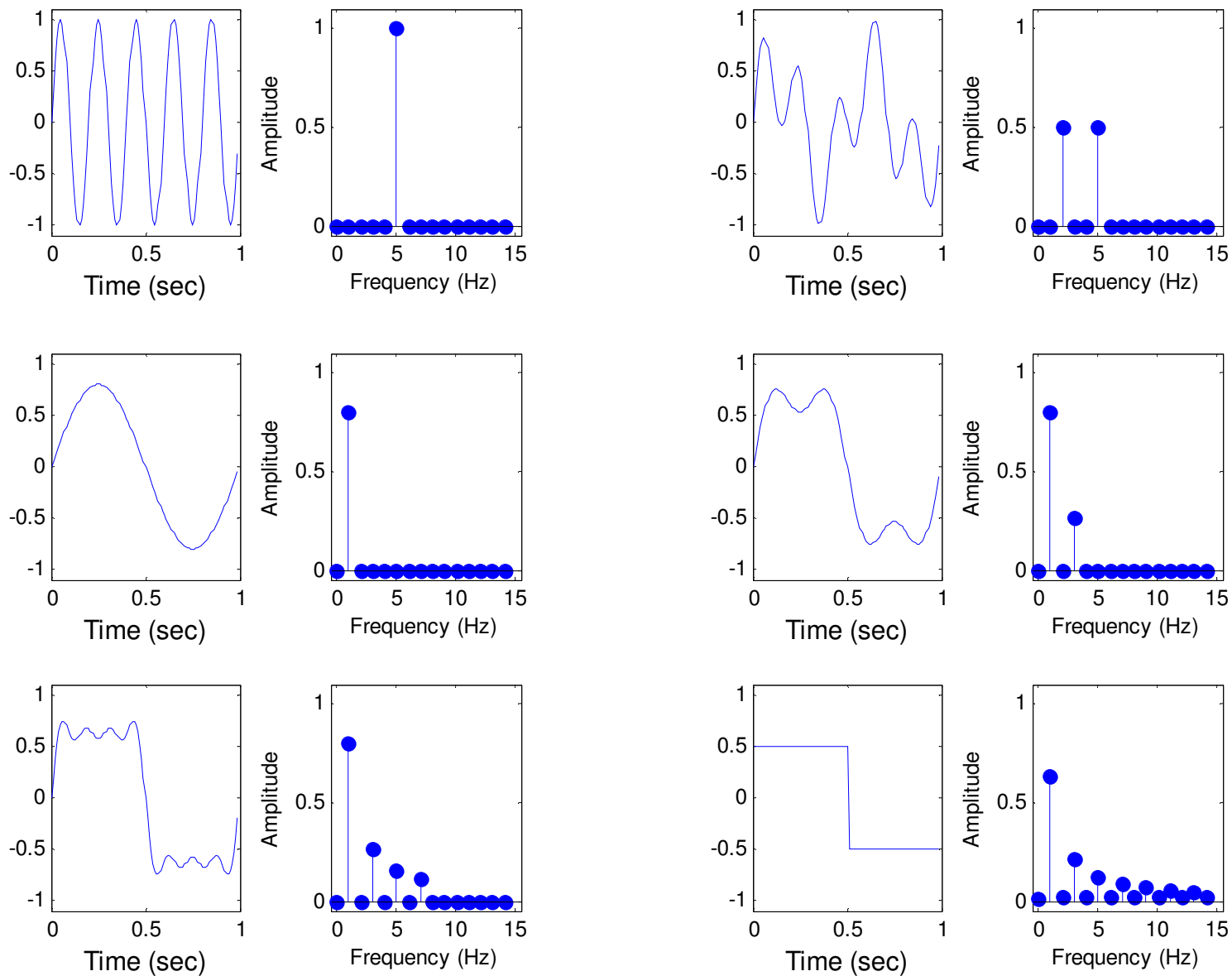
1/Threshold for the first 10 stimuli



The 1-D Fourier Transform

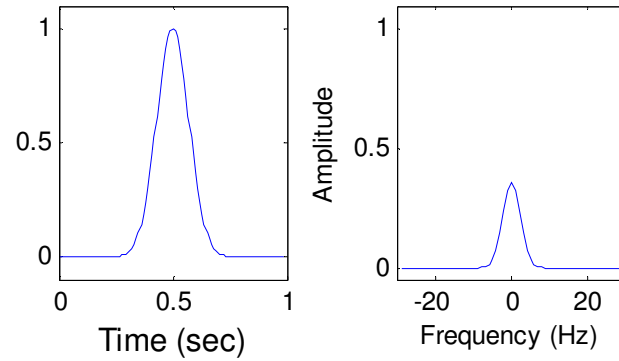
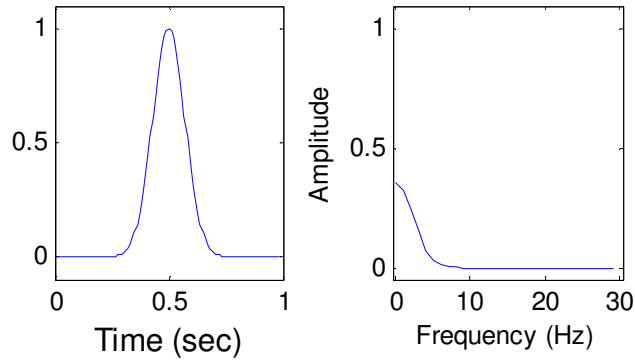


The 1-D Fourier Transform

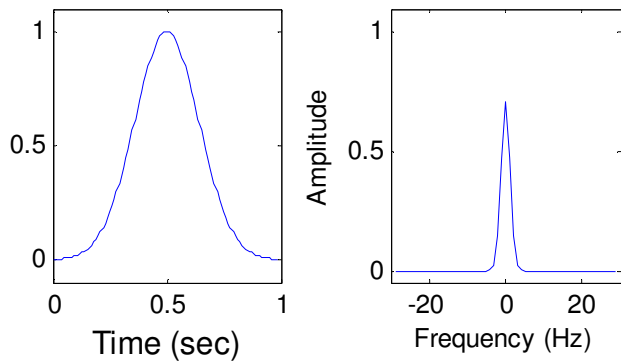


Fourier transform of a Gaussian is a Gaussian

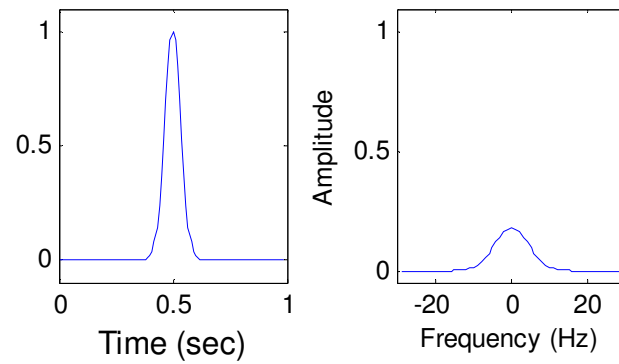
Including
'negative' frequencies



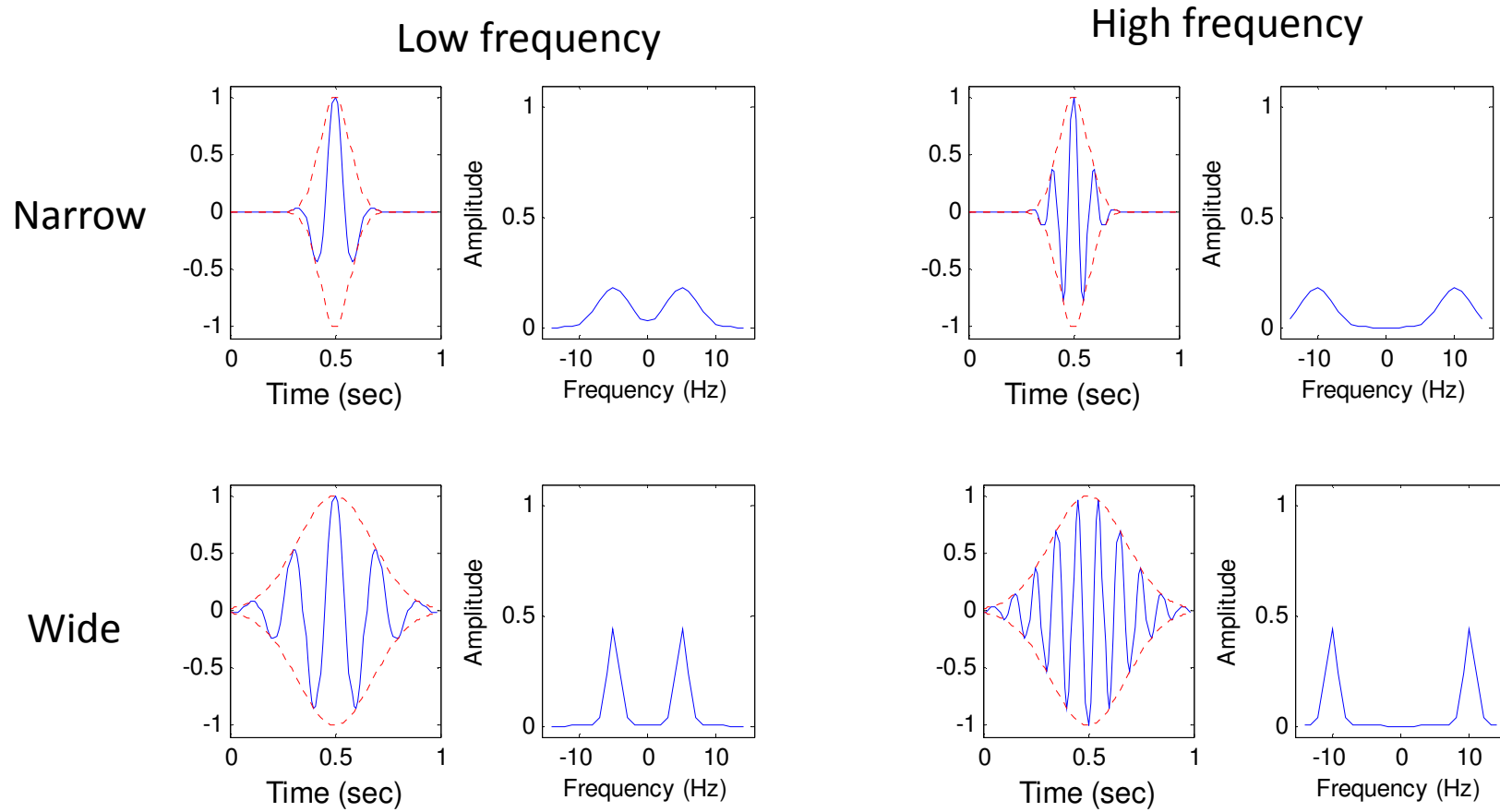
Wide



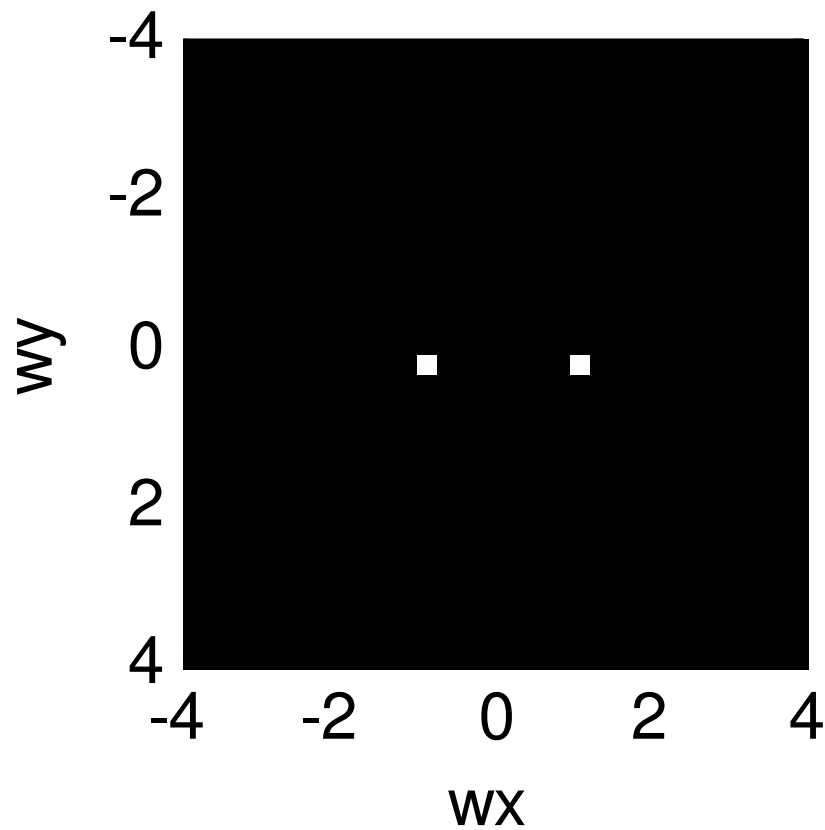
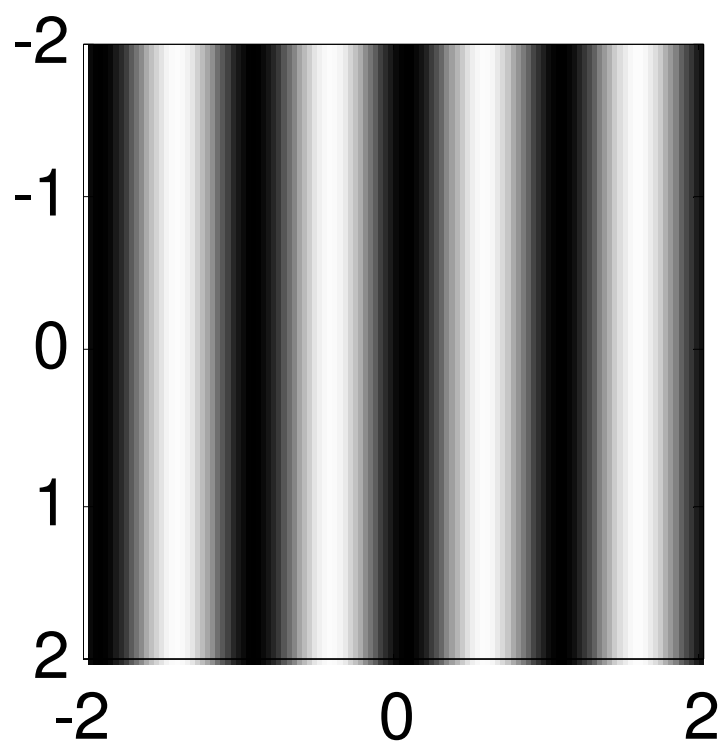
Narrow



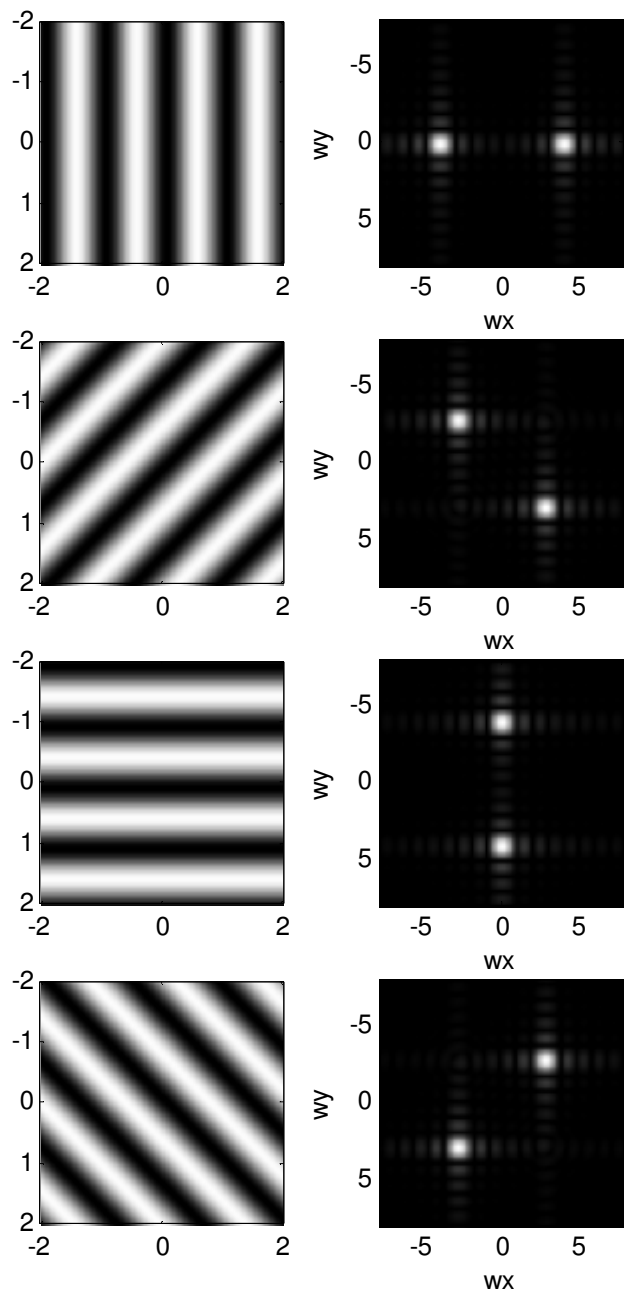
Fourier transform of a Gabor is a Gaussian centered at the 'carrier frequency'



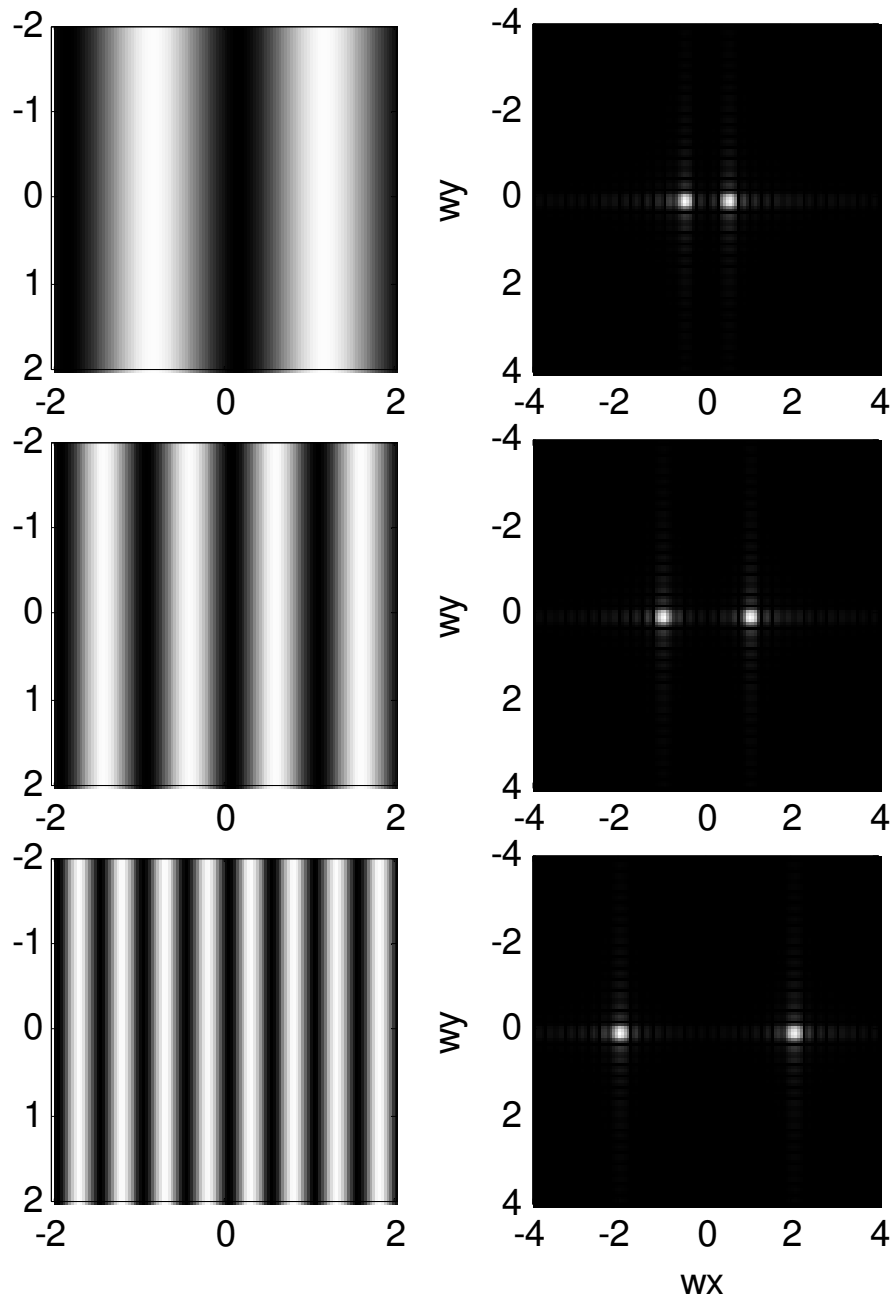
2D Fourier Transform



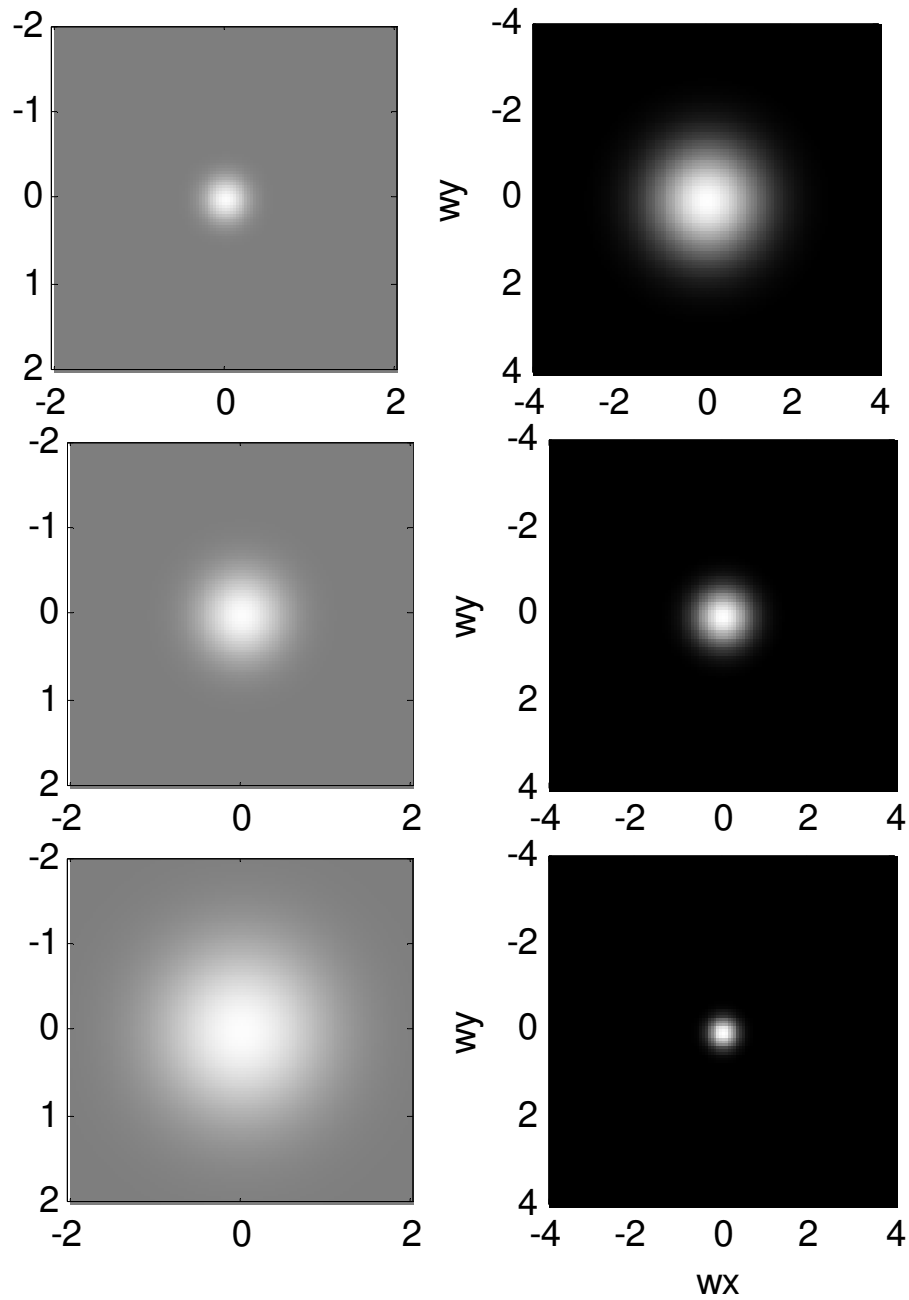
Gratings: Orientation



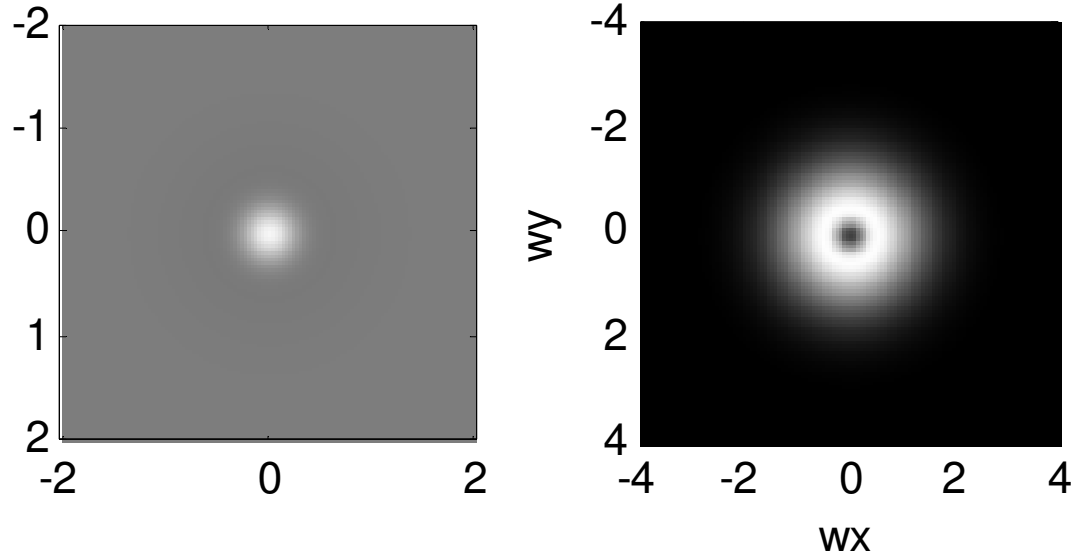
Gratings: Spatial Frequency



FFT of a Gaussian is a Gaussian



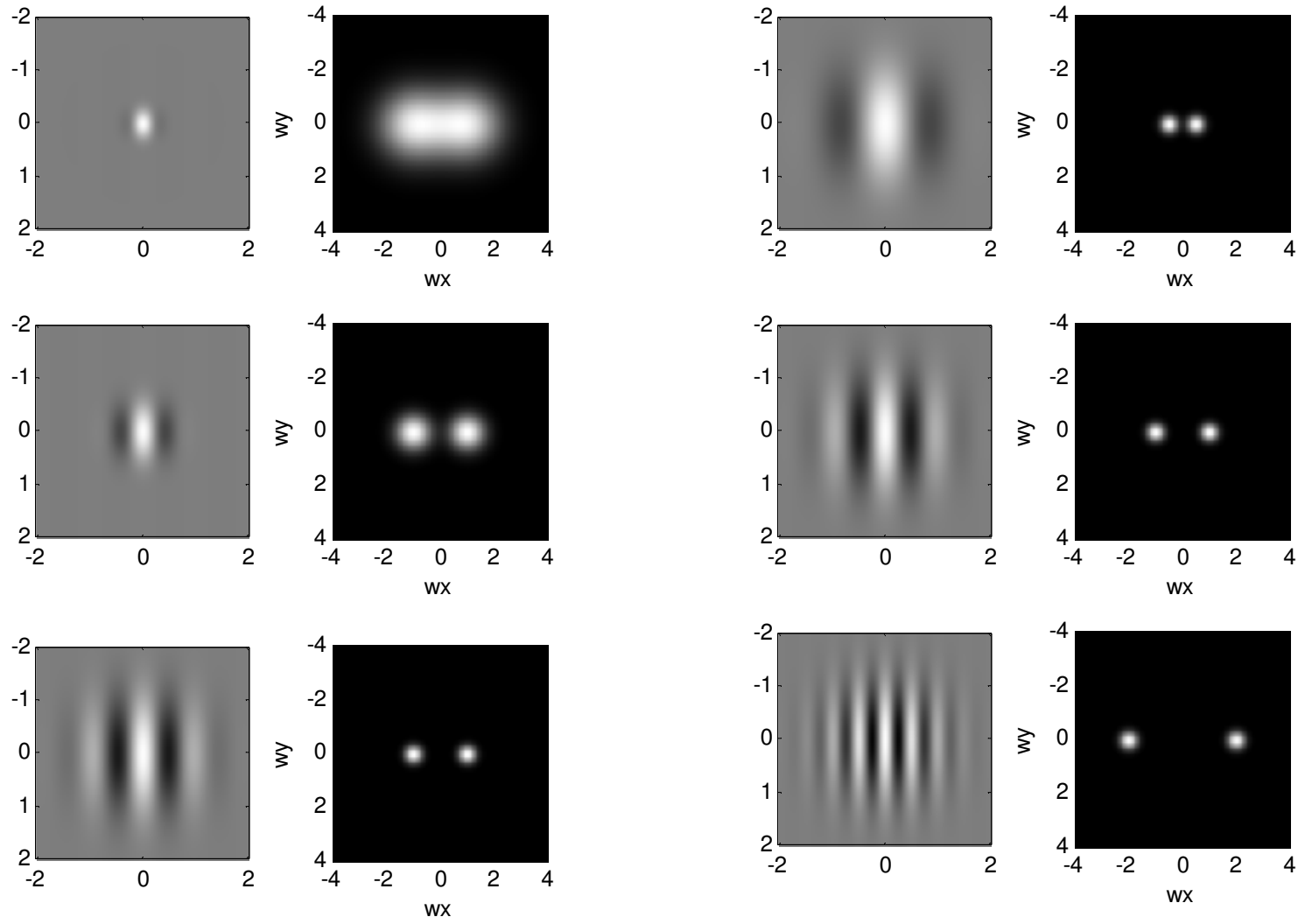
Difference of Gaussians

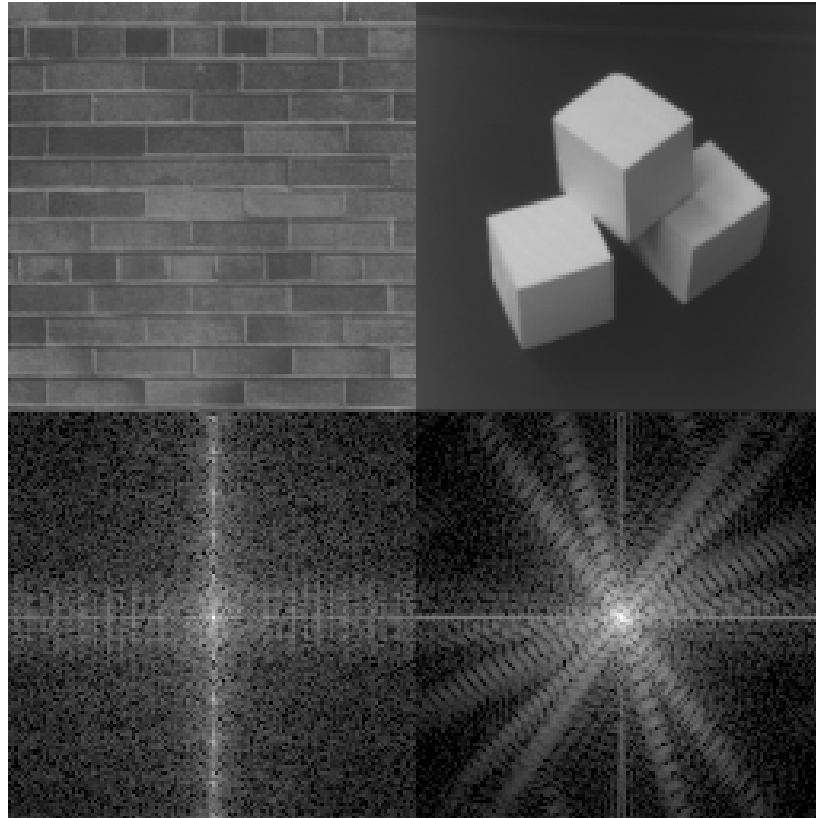


By thinking of receptive fields in the Fourier domain, we can get an intuition about what spatial frequencies and orientations that the receptive field is sensitive to.

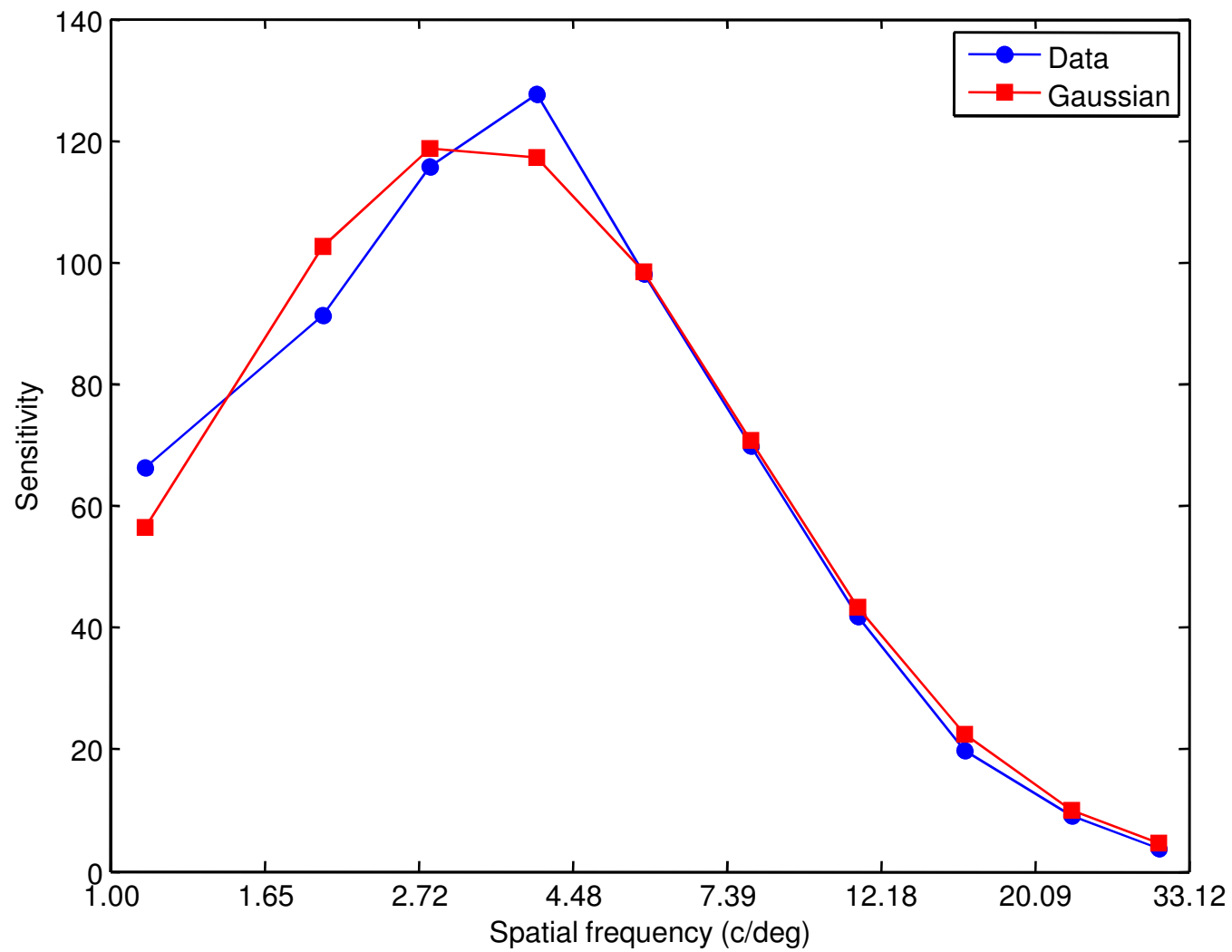
This is a 'band-pass' filter – sensitive to intermediate spatial frequencies but not selective to orientation

FFTs of Gabors

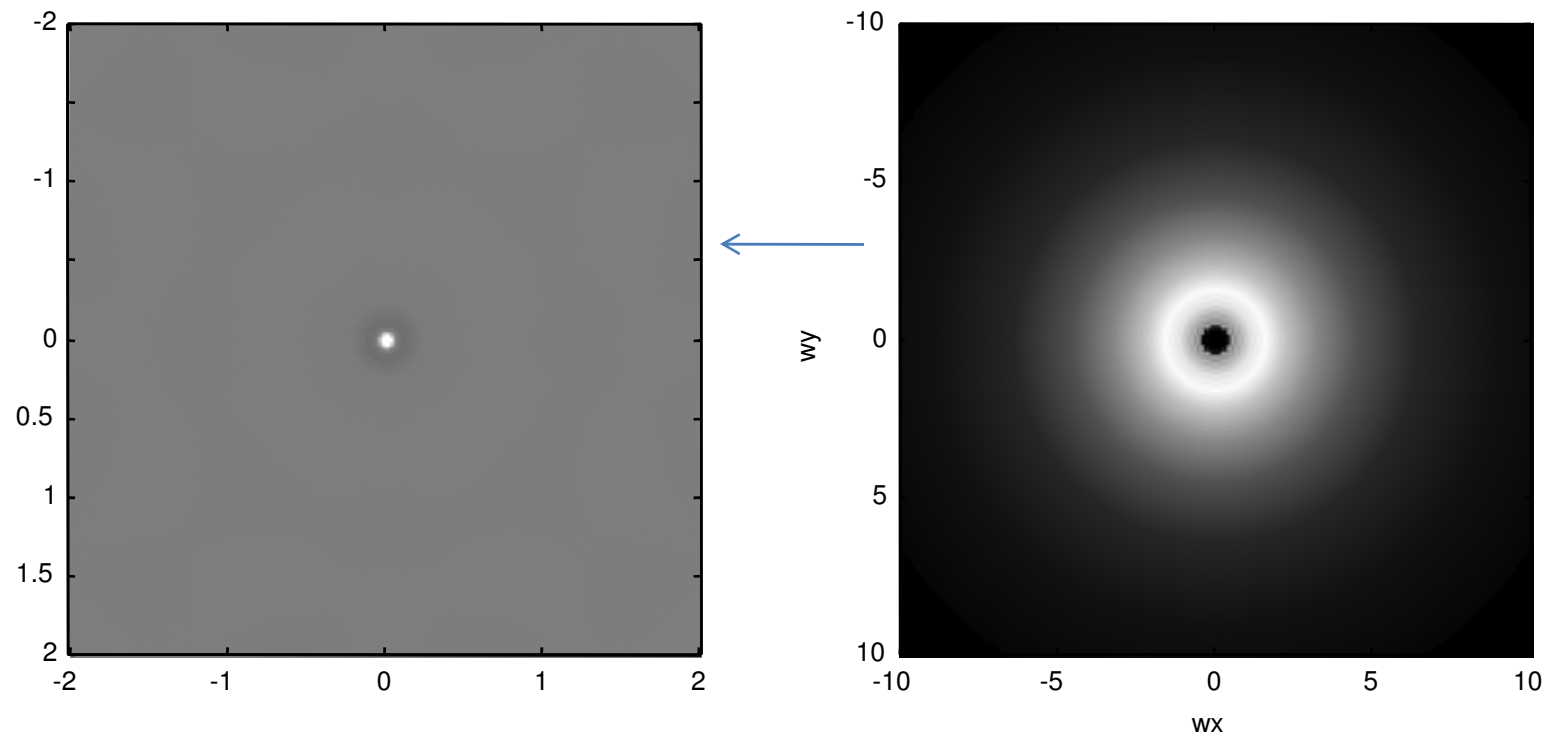




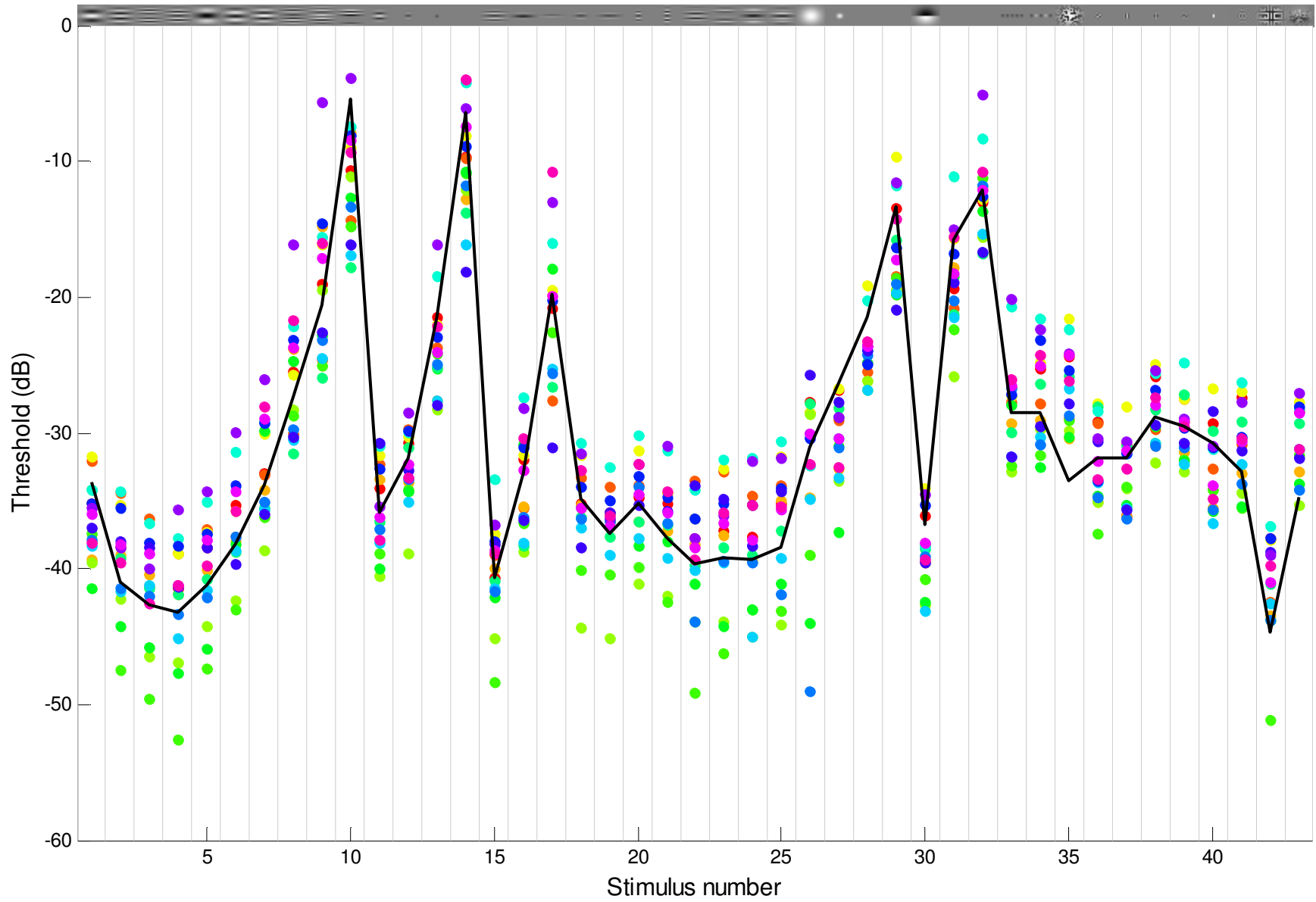
1/Threshold for the first 10 stimuli



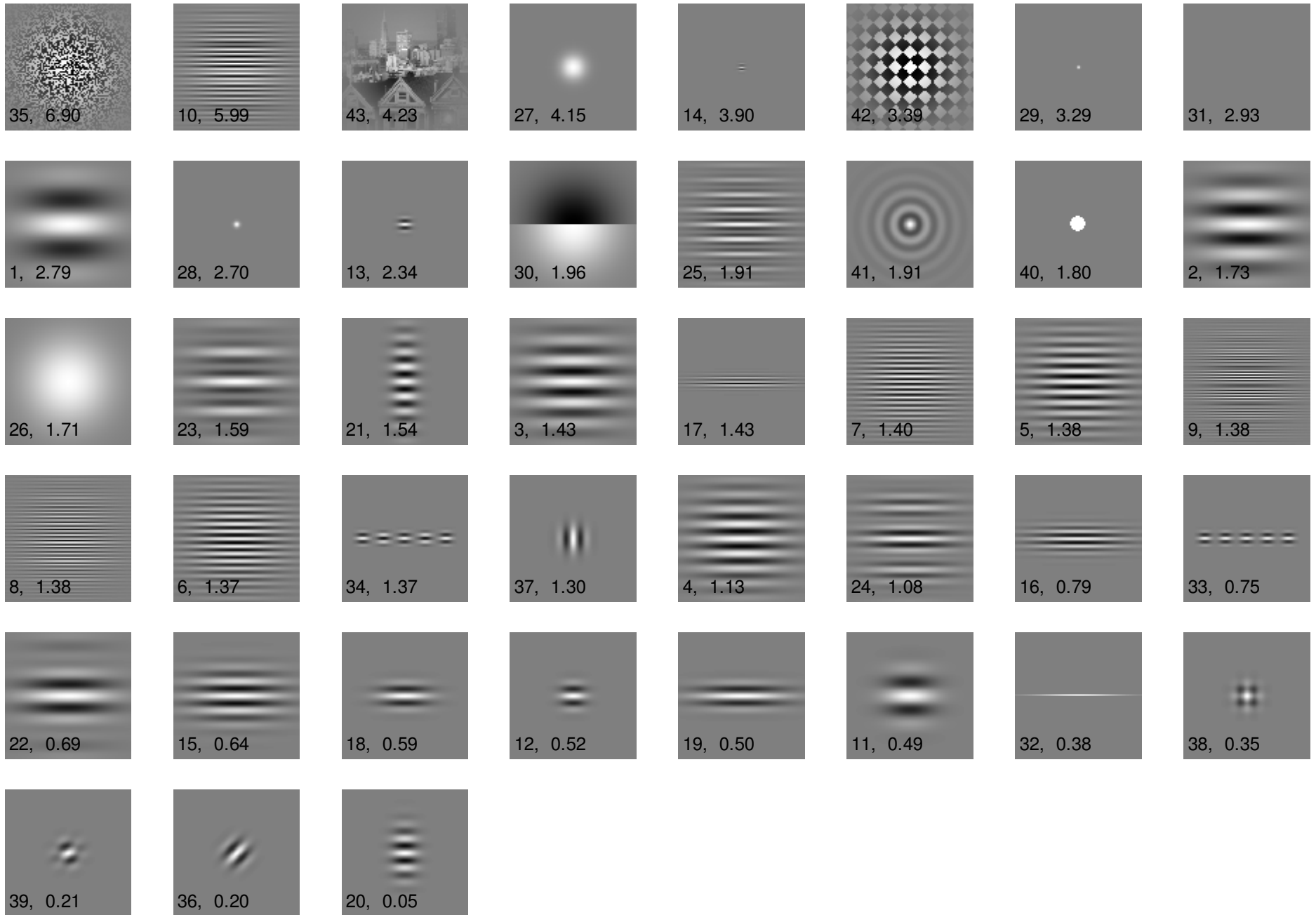
The 'inverse Fourier transform' was used to create a receptive field based on the contrast sensitivity function



Predictions from the best fitting 'Contrast Energy' model (3 parameter fit)



Deviations between model and thresholds, in descending order



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How to think about the model in the Fourier domain

