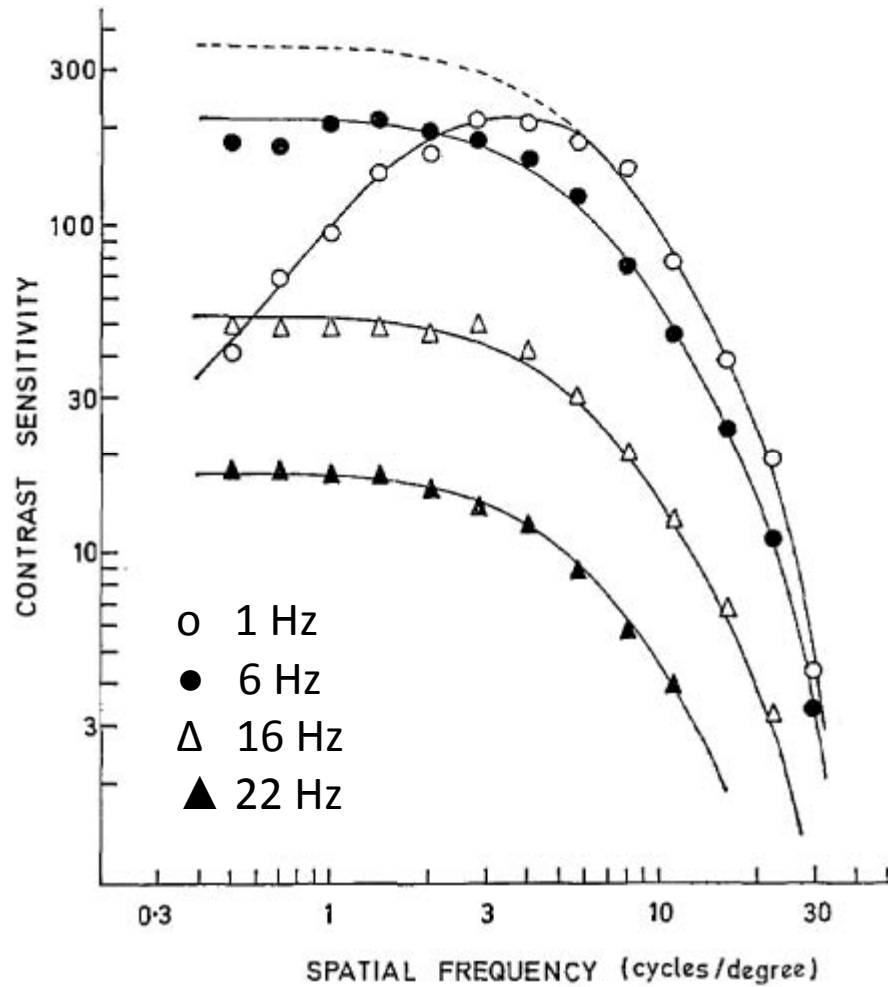
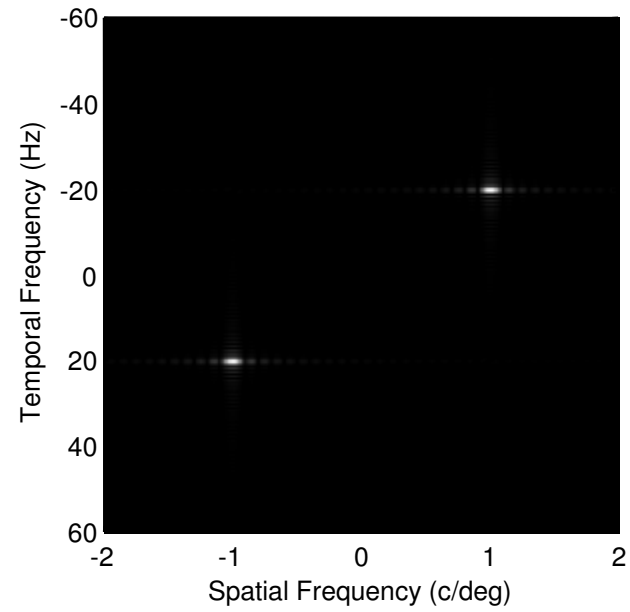
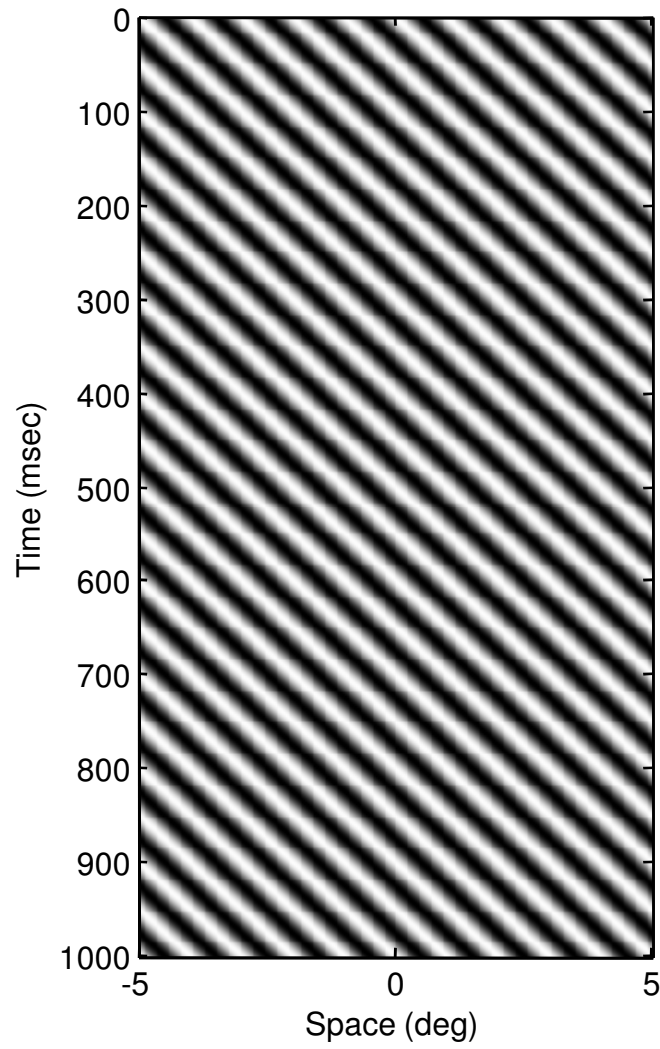


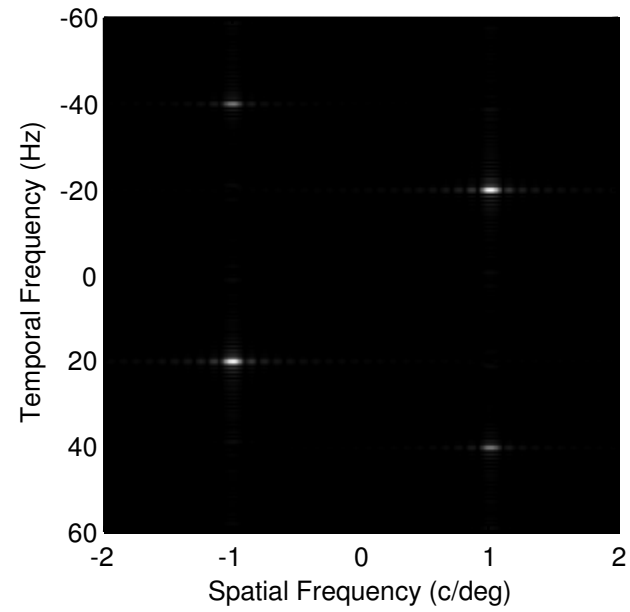
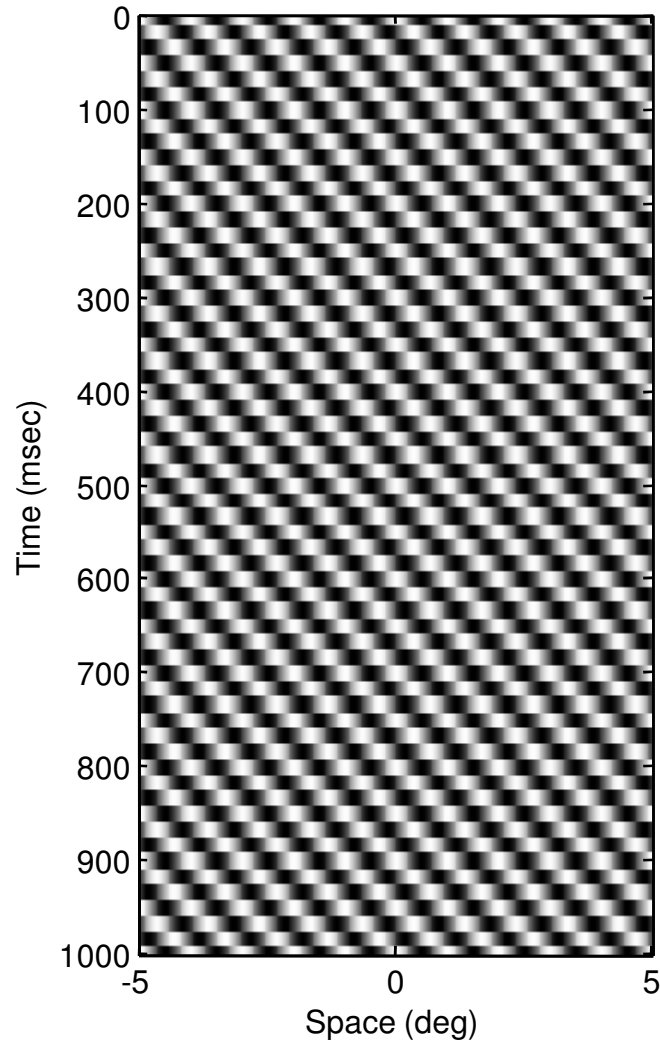
The spatio-temporal contrast sensitivity function:  
Spatial contrast sensitivity depends on temporal frequency



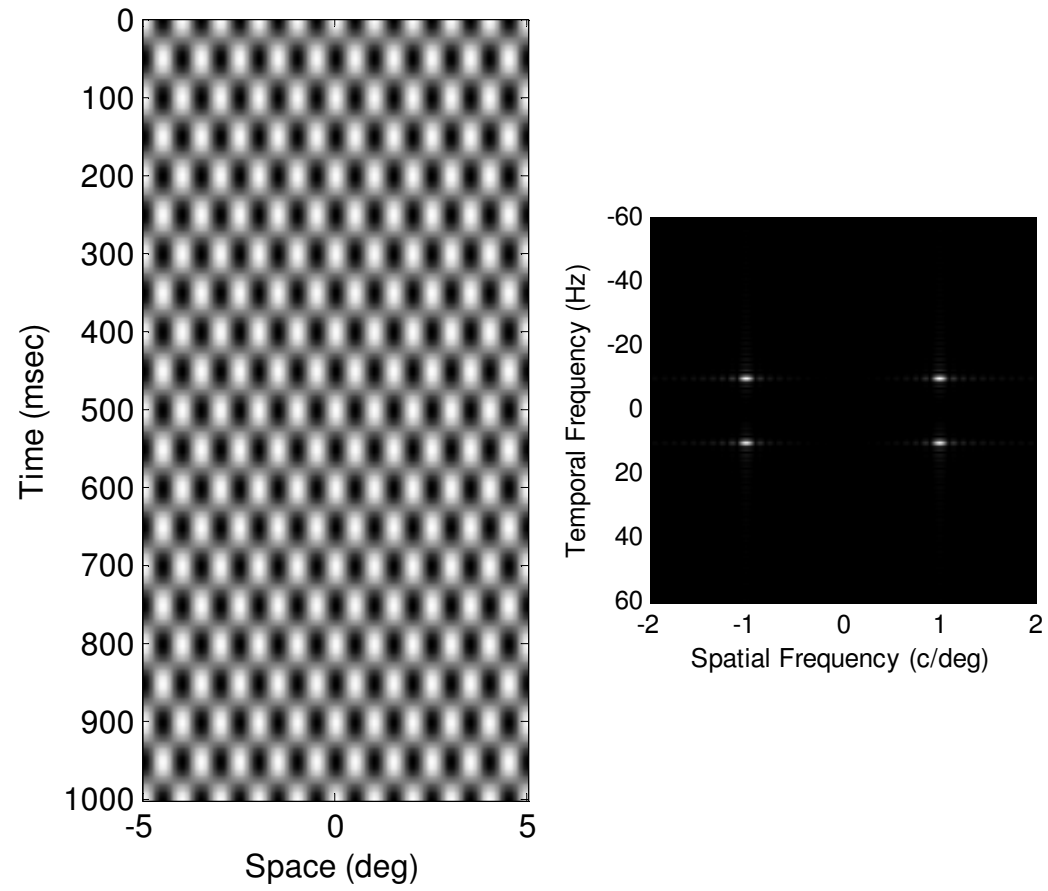
# Smoothly moving grating



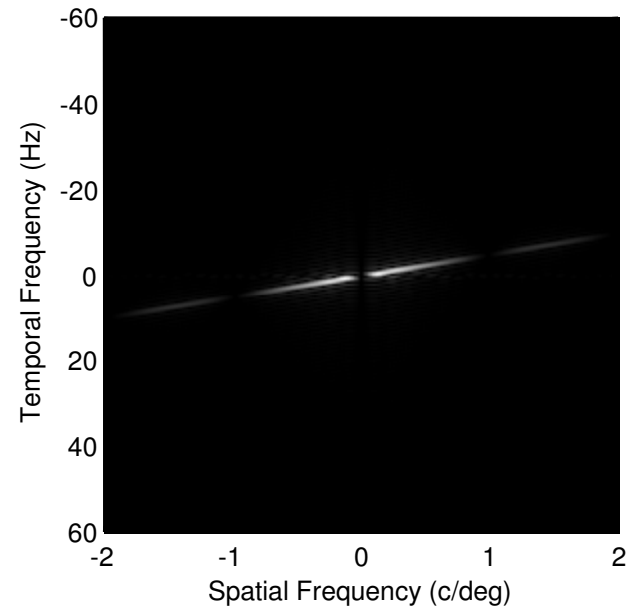
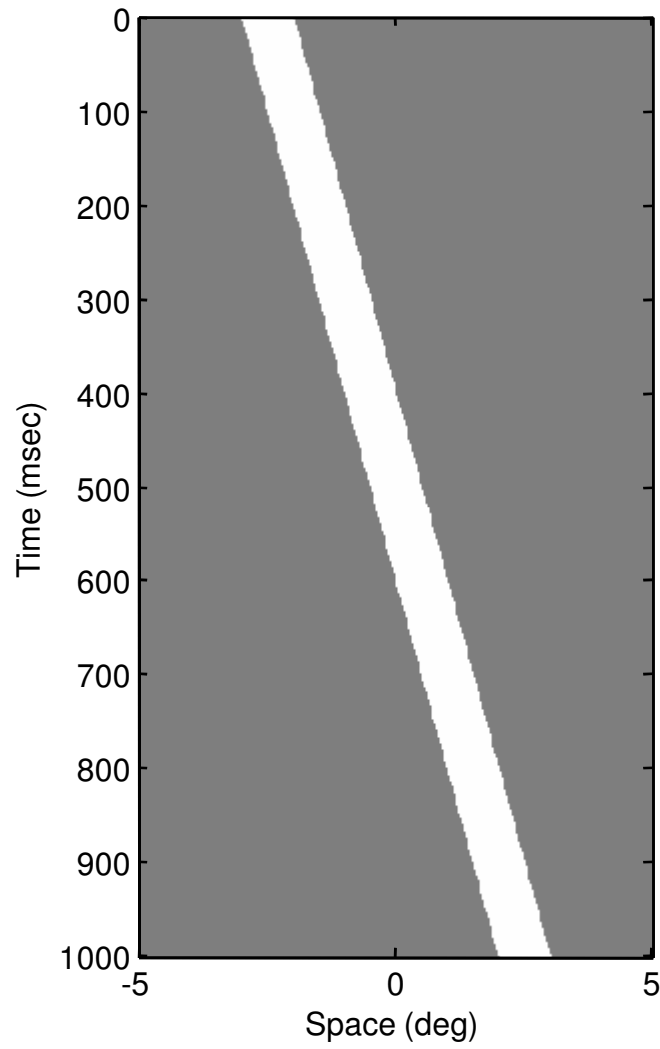
Sampled moving grating (60Hz)



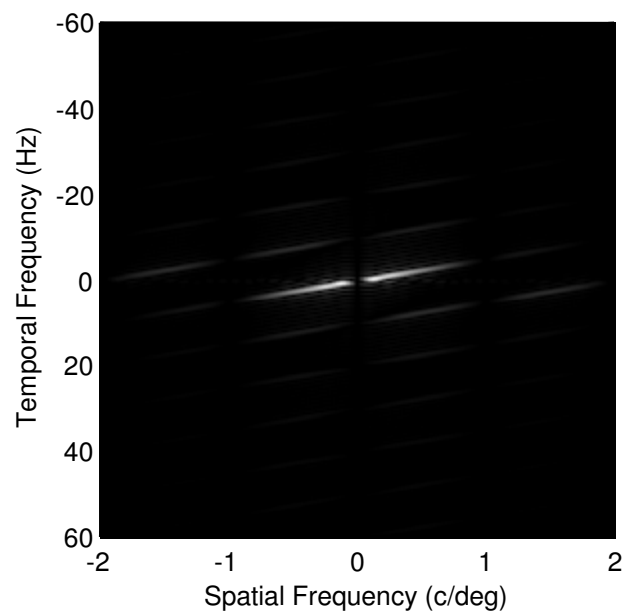
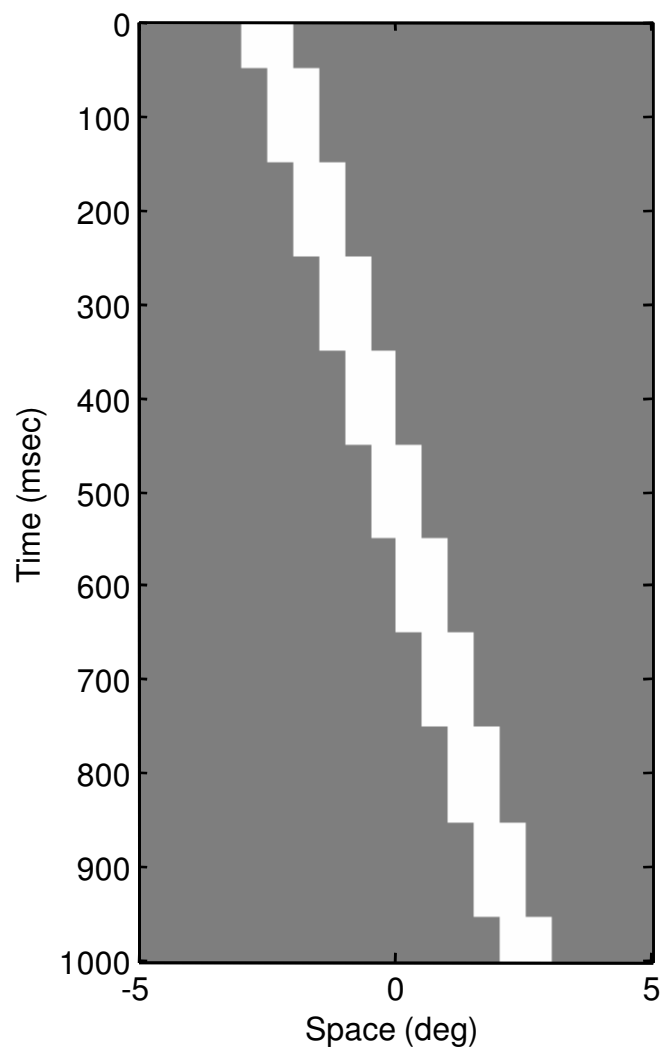
# Counterphase grating



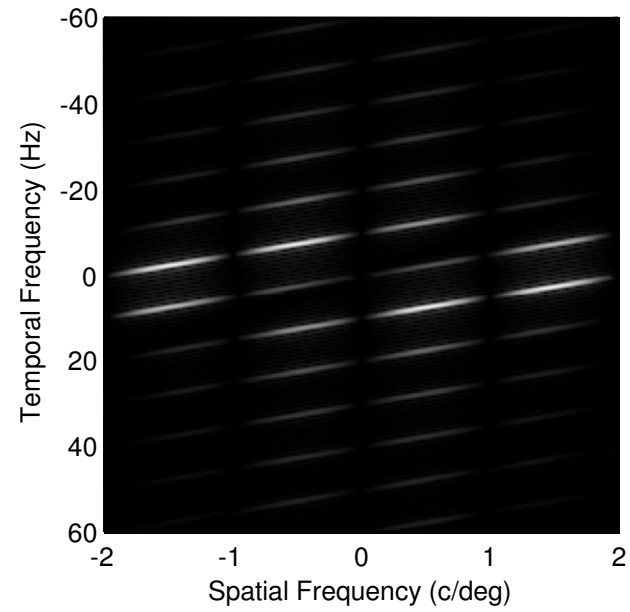
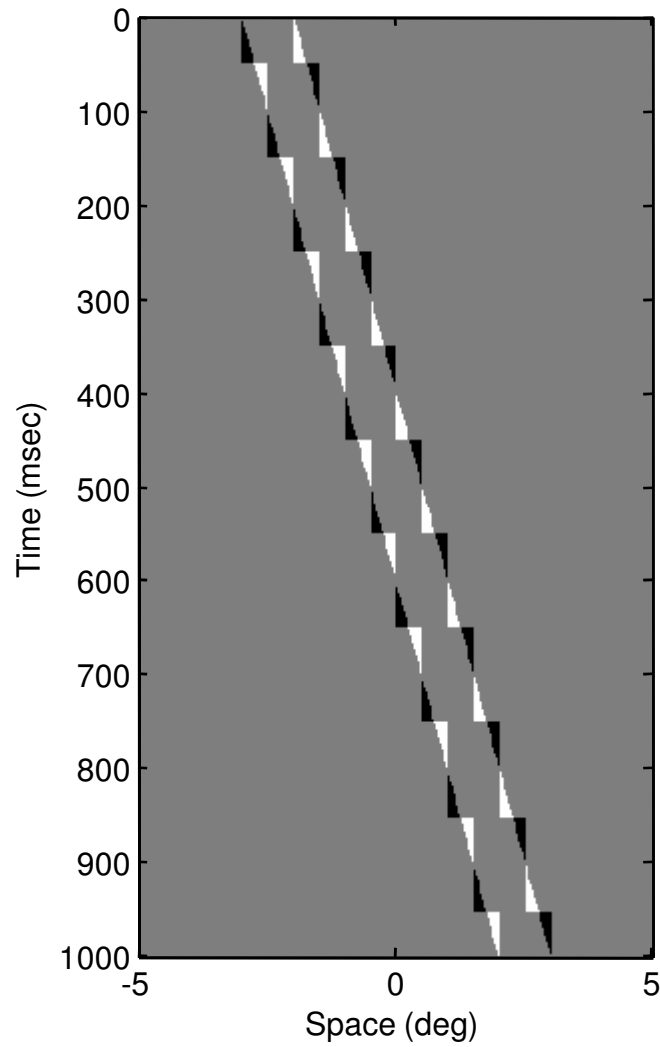
# Smoothly moving bar



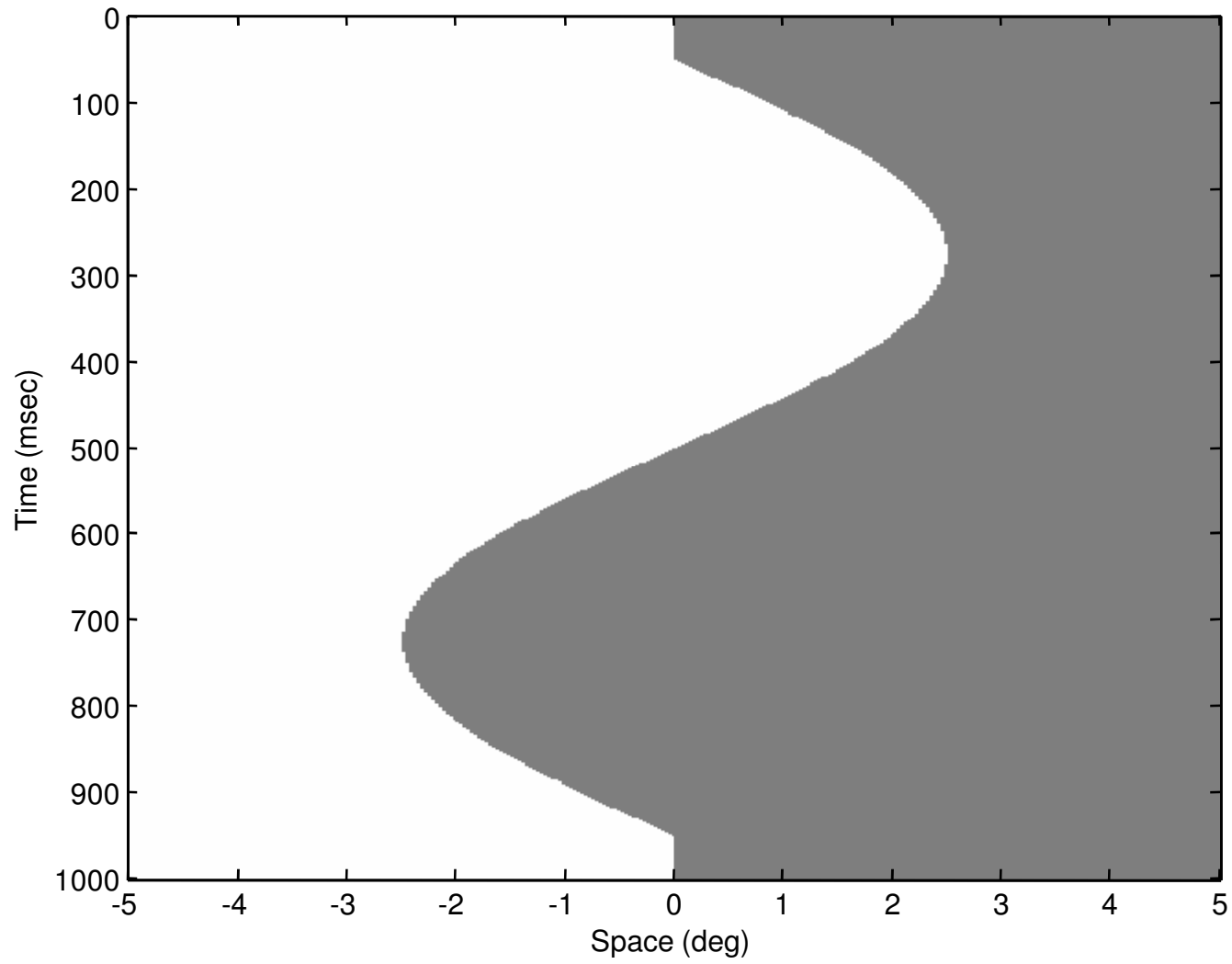
# Sampled moving bar



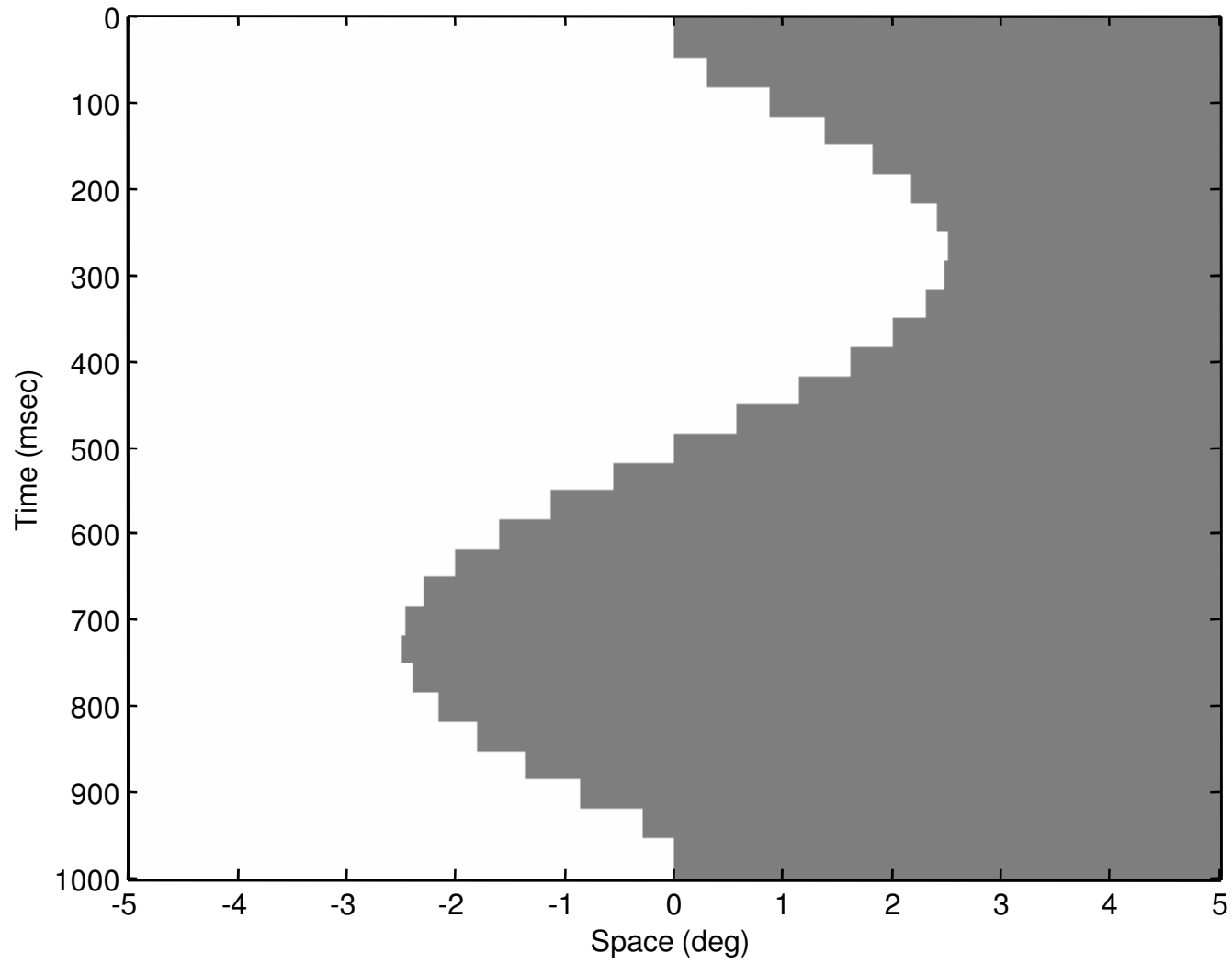
# Difference between smooth and sampled moving bar



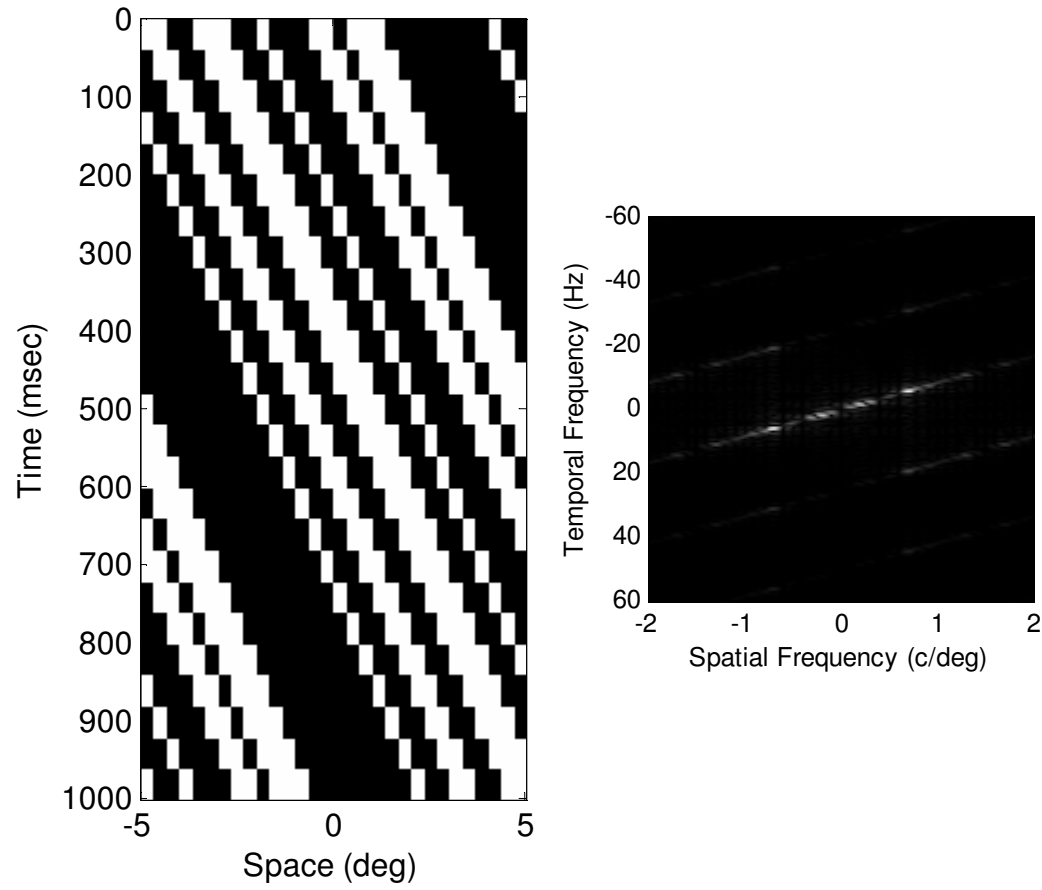
# Sinusoidally moving edge



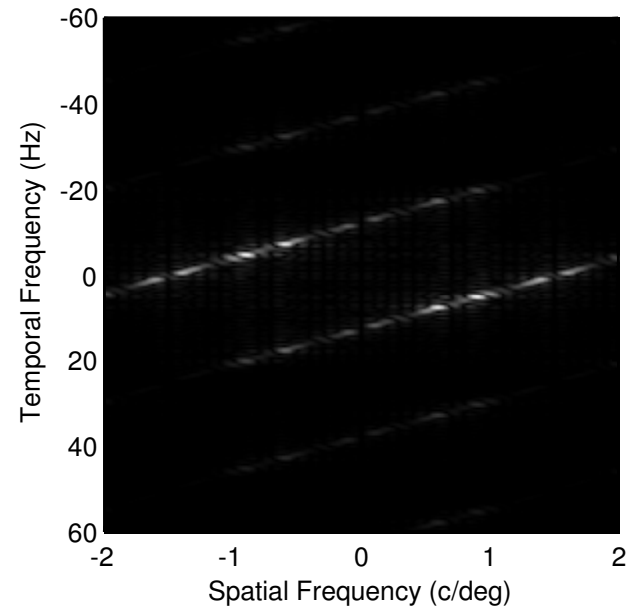
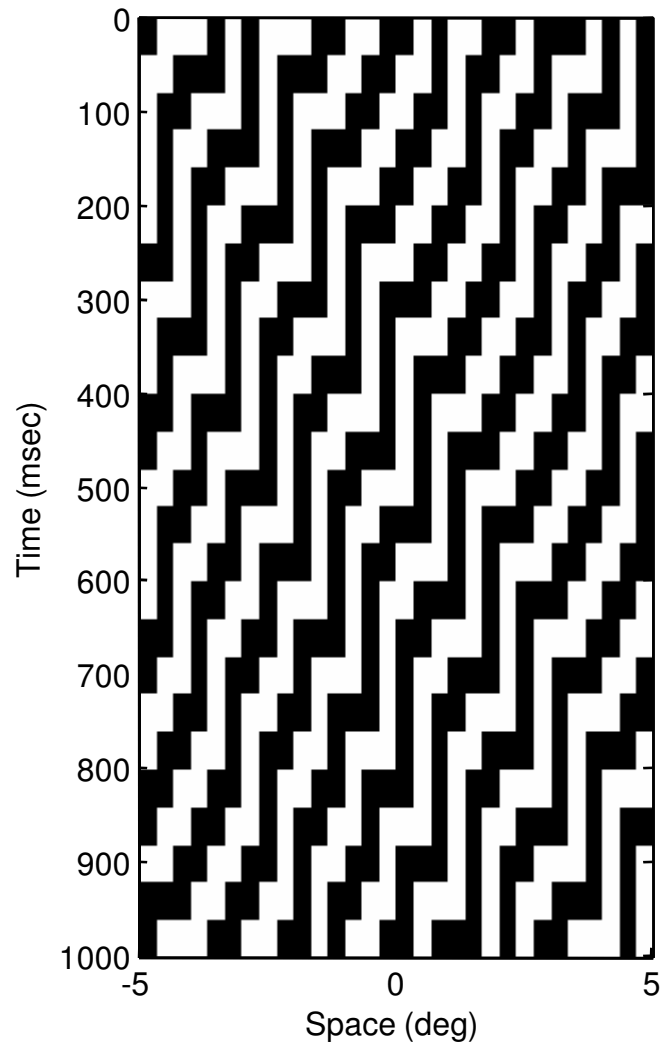
Sampled sinusoidally moving edge (10 Hz)



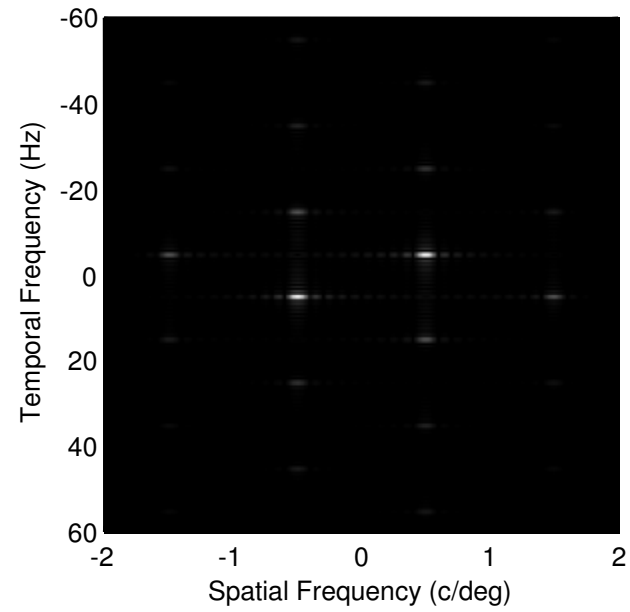
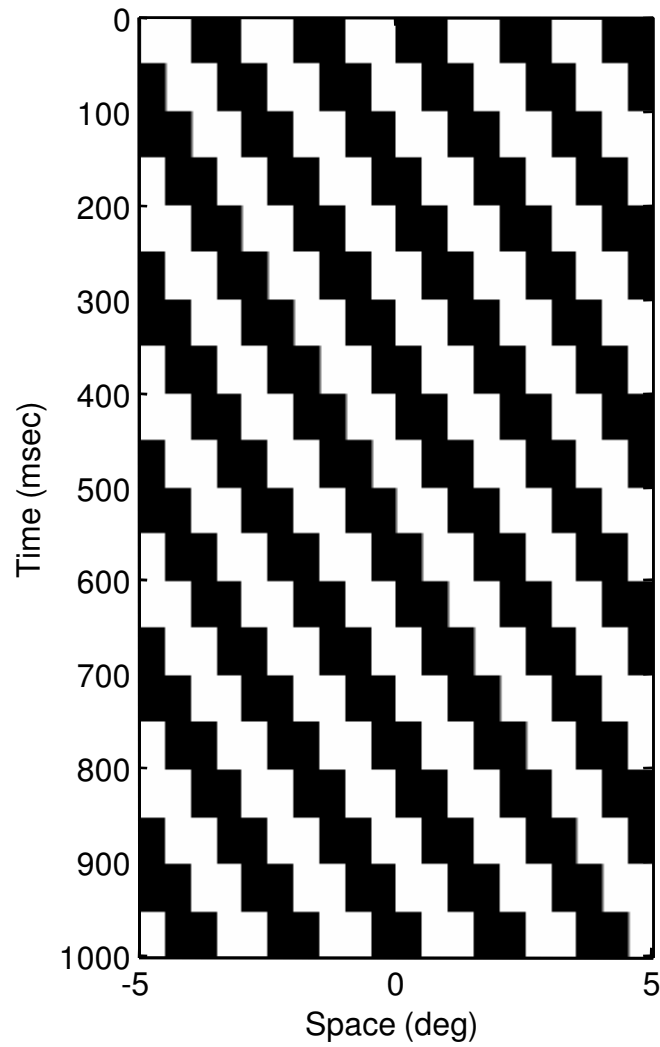
# Sampled rightward noise (25 Hz)



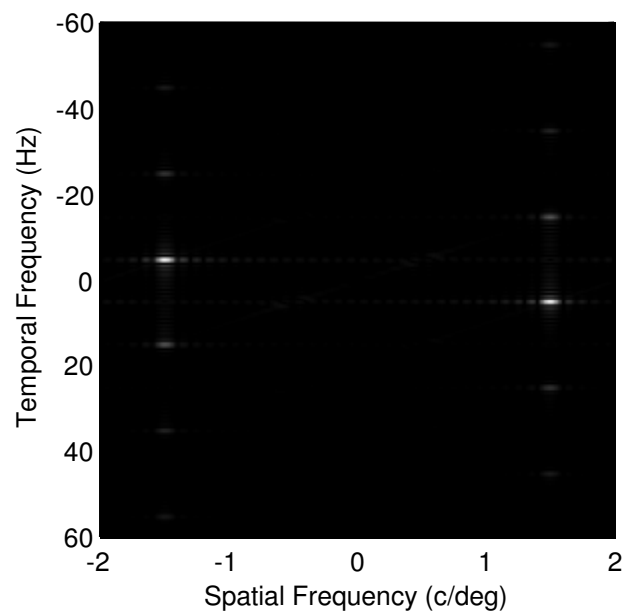
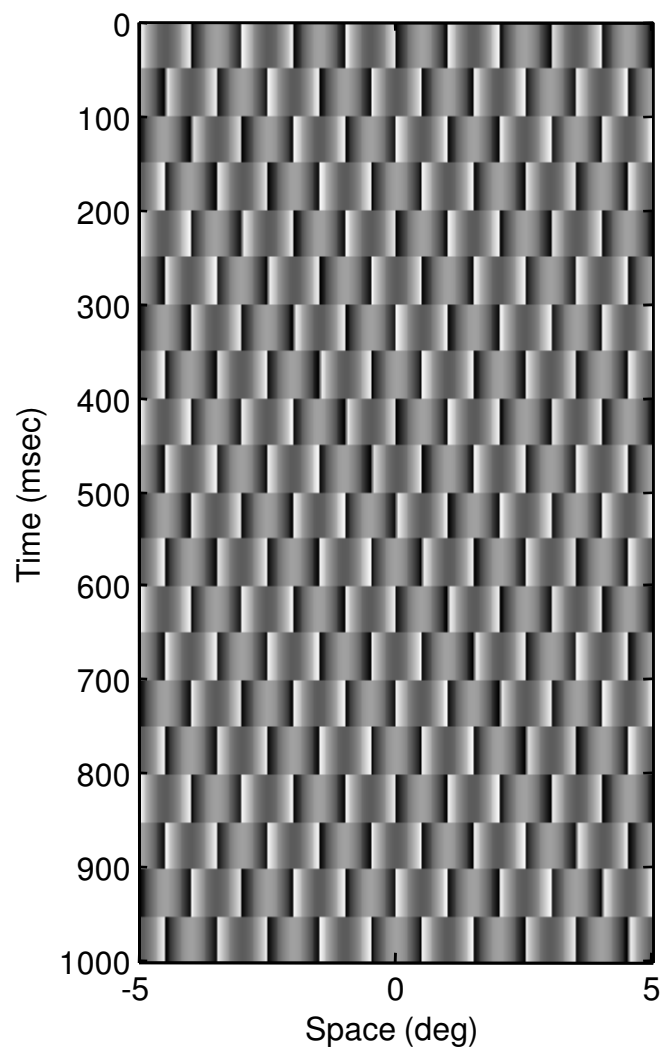
rightward 'reverse phi'



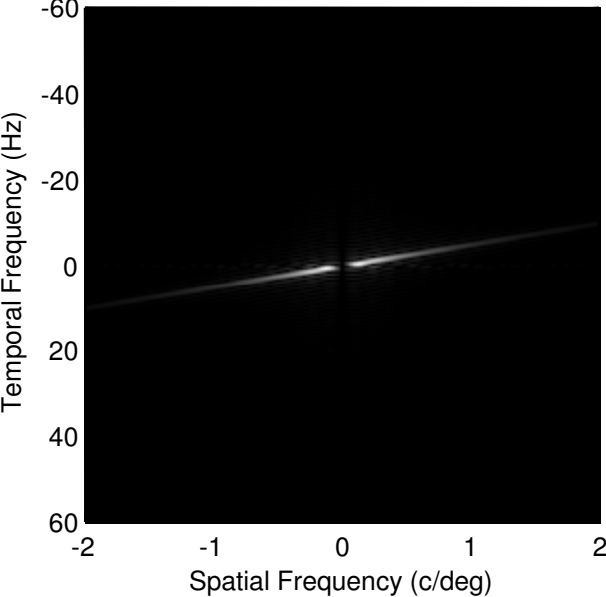
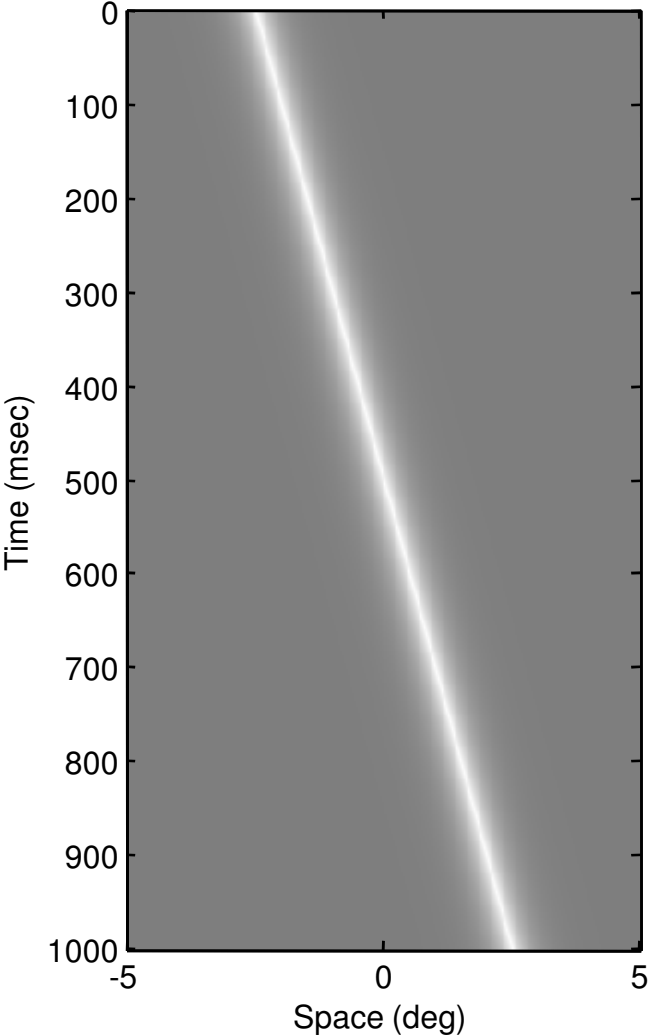
# Sampled rightward square wave



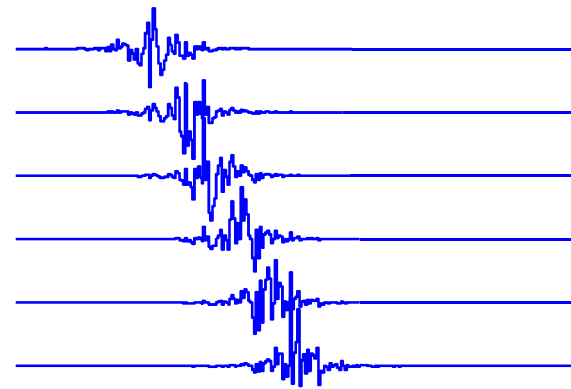
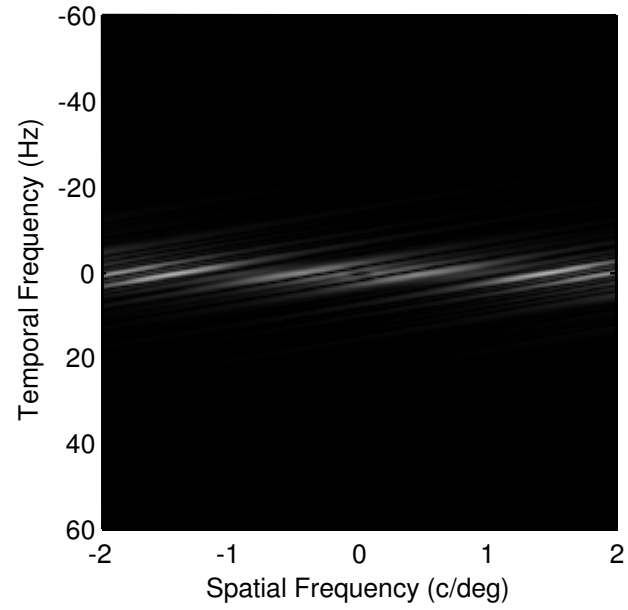
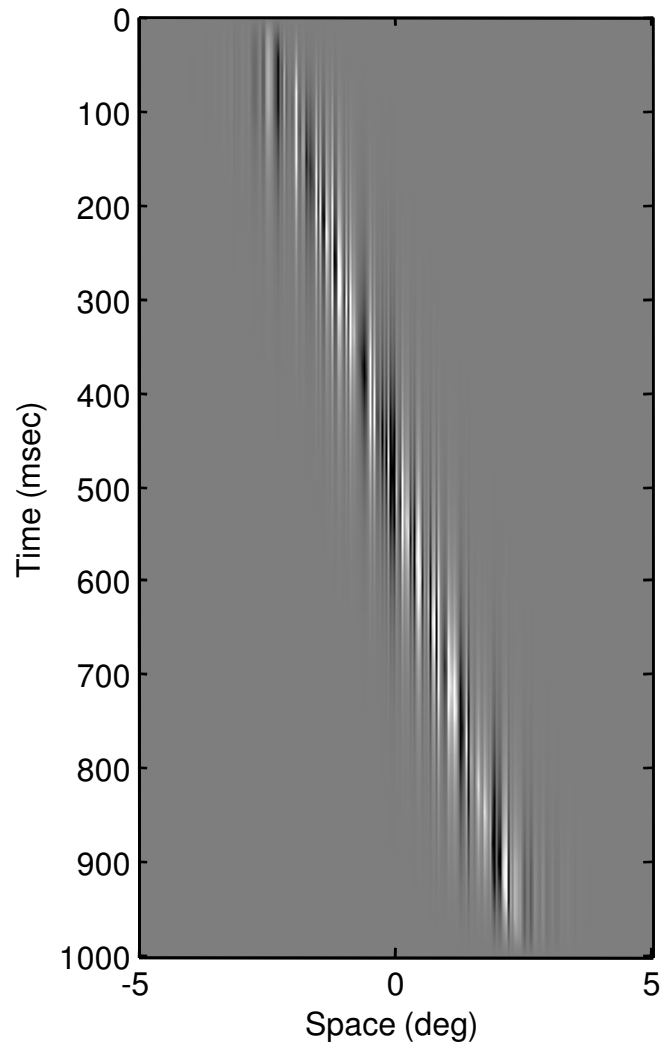
Sampled rightward 'fluted' square wave



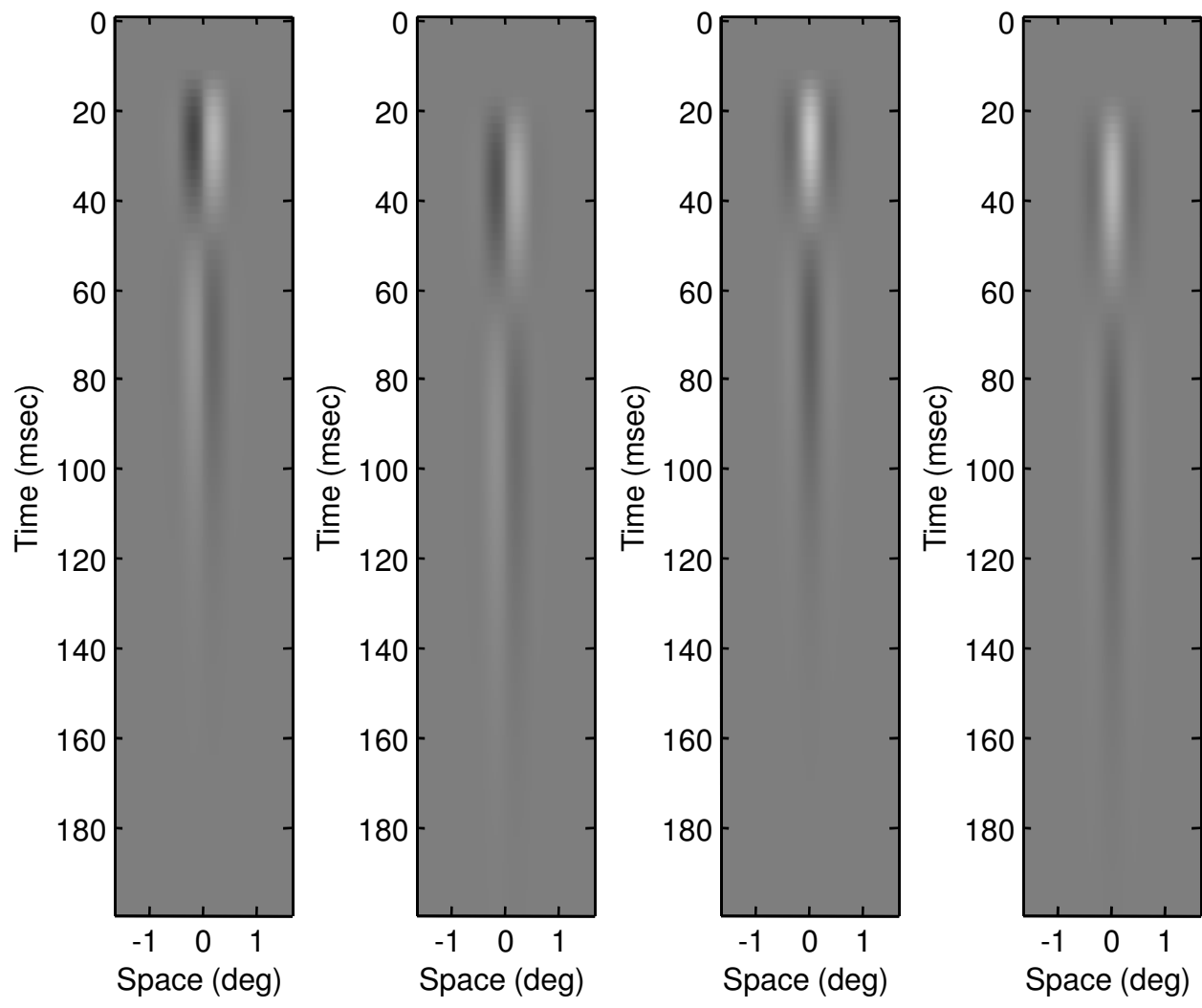
'First order' motion



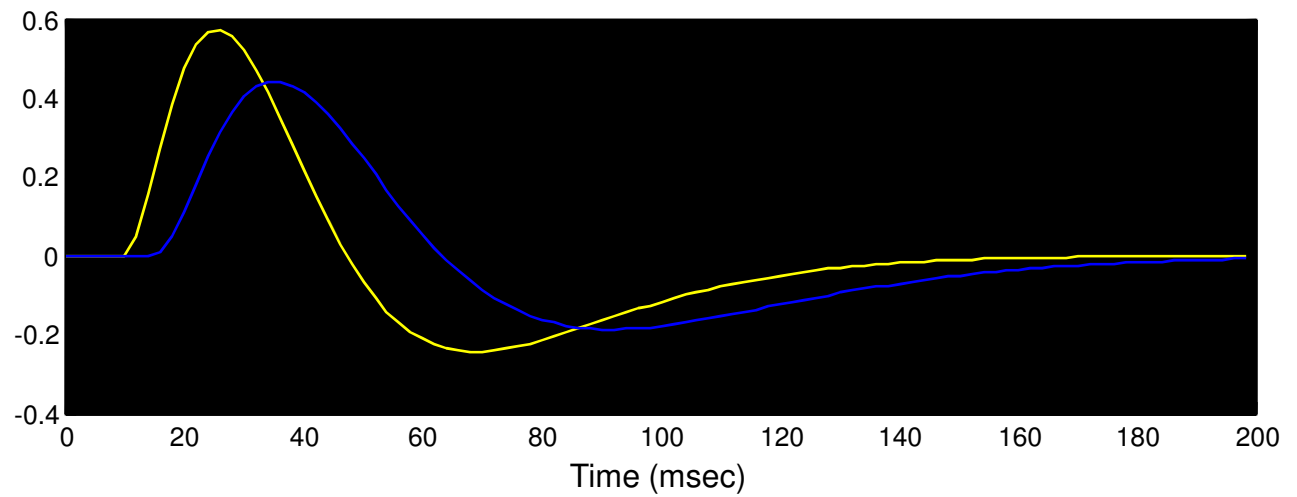
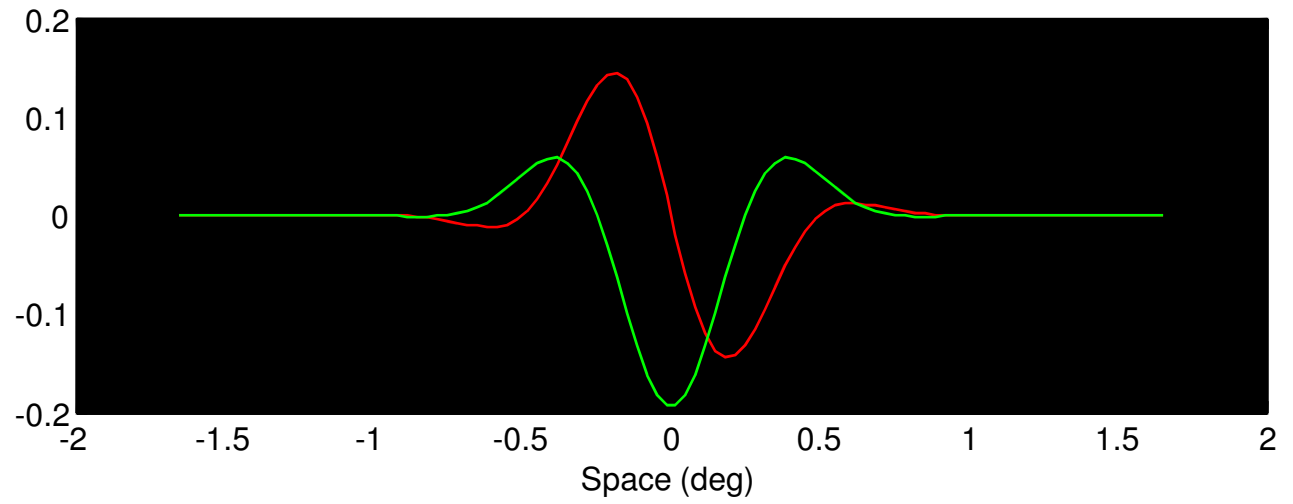
'Second order' motion



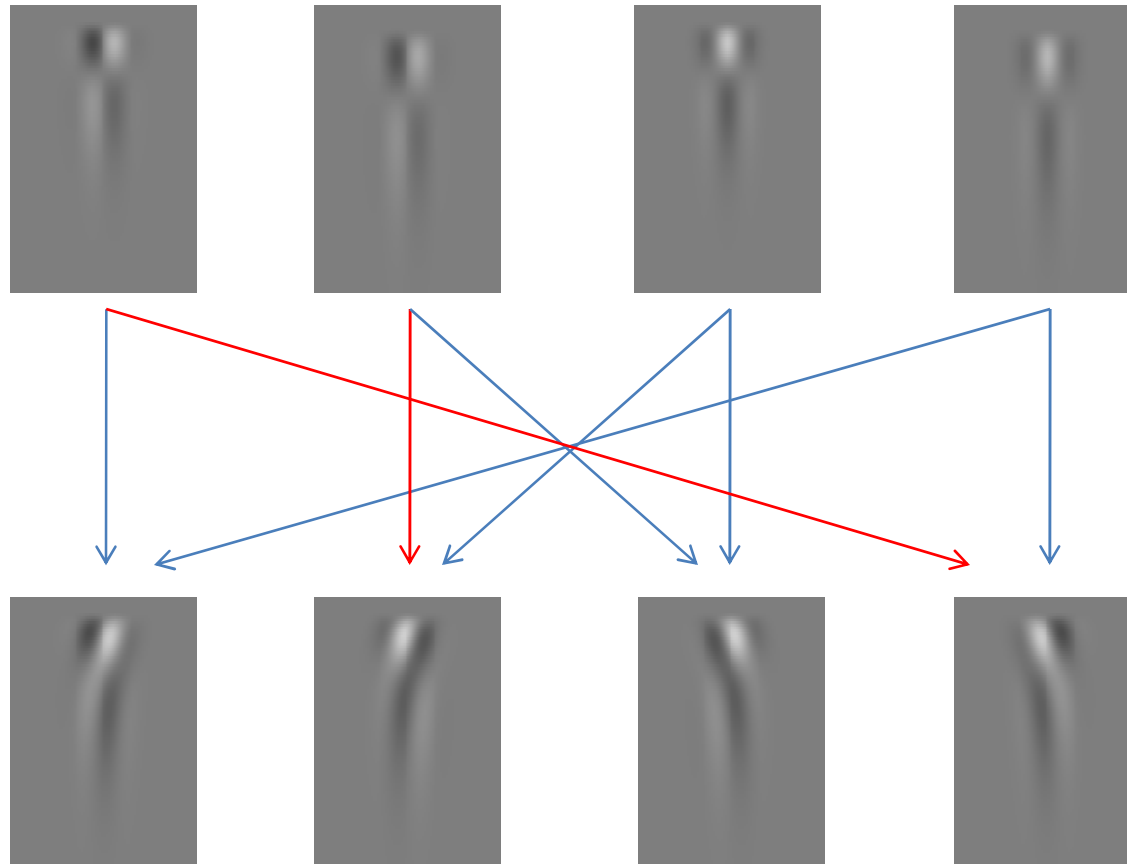
# Four separable linear filters



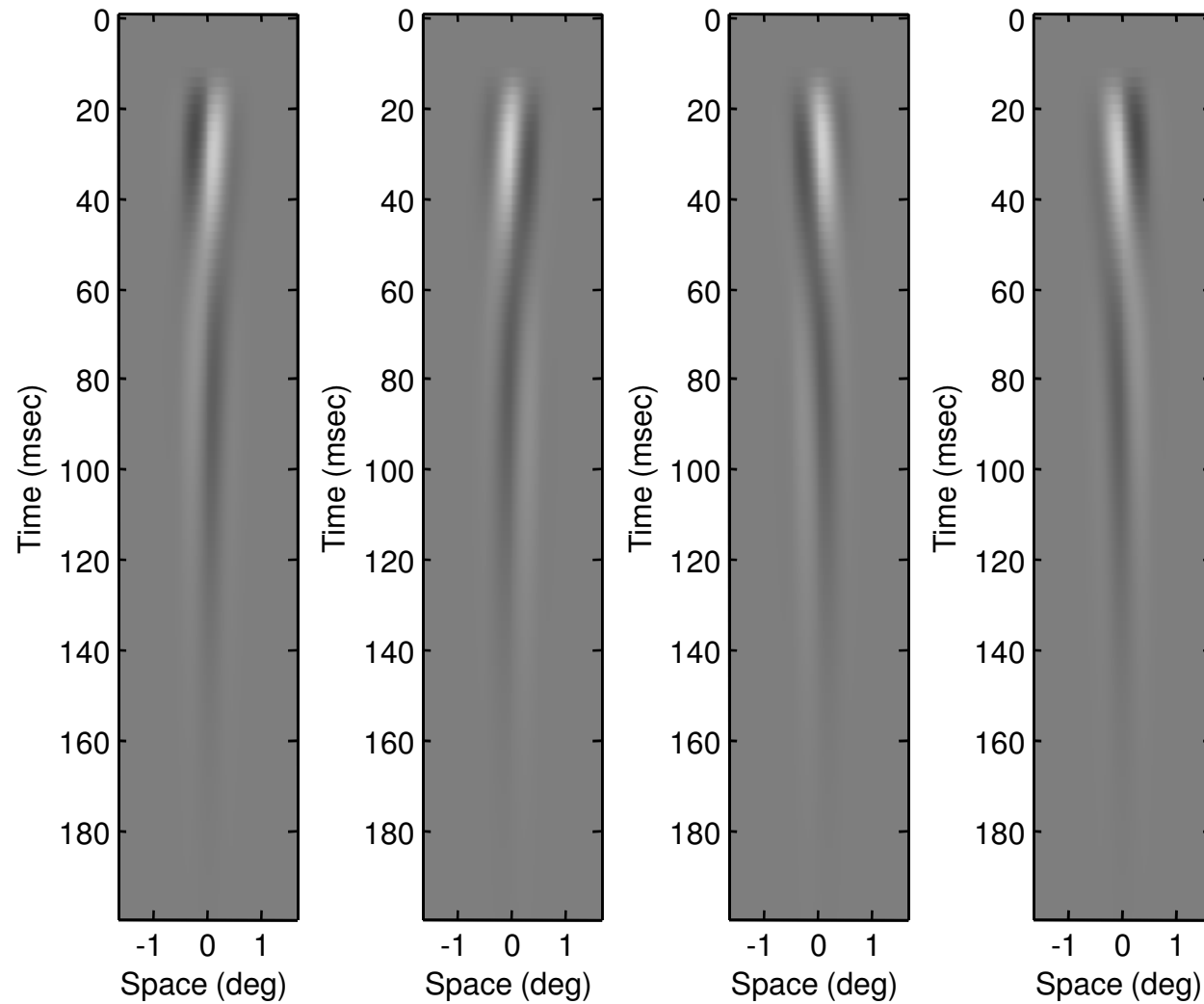
# Cross-sections in space and time



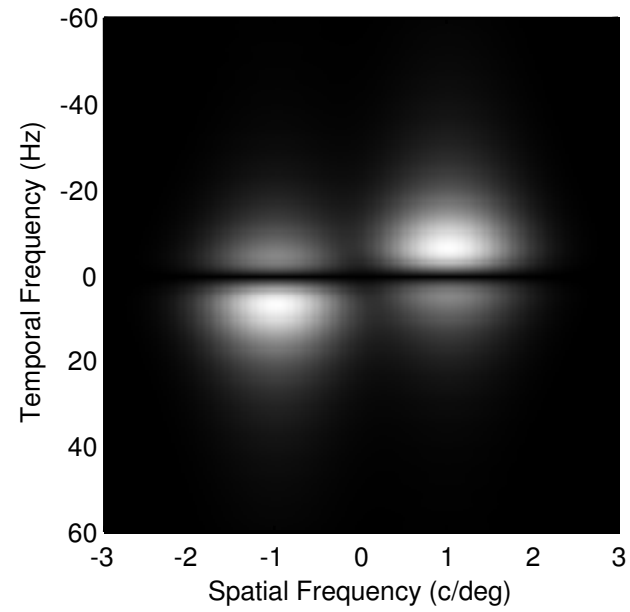
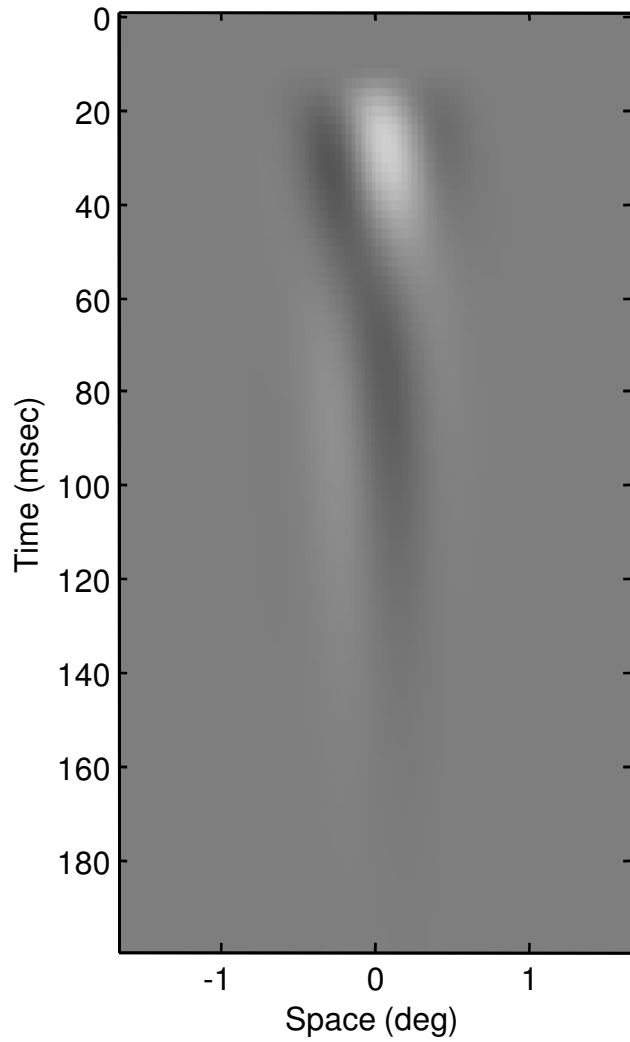
Four space-time oriented filters generated by adding and subtracting the separable linear filters



Four space-time oriented filters generated by adding and subtracting the separable linear filters

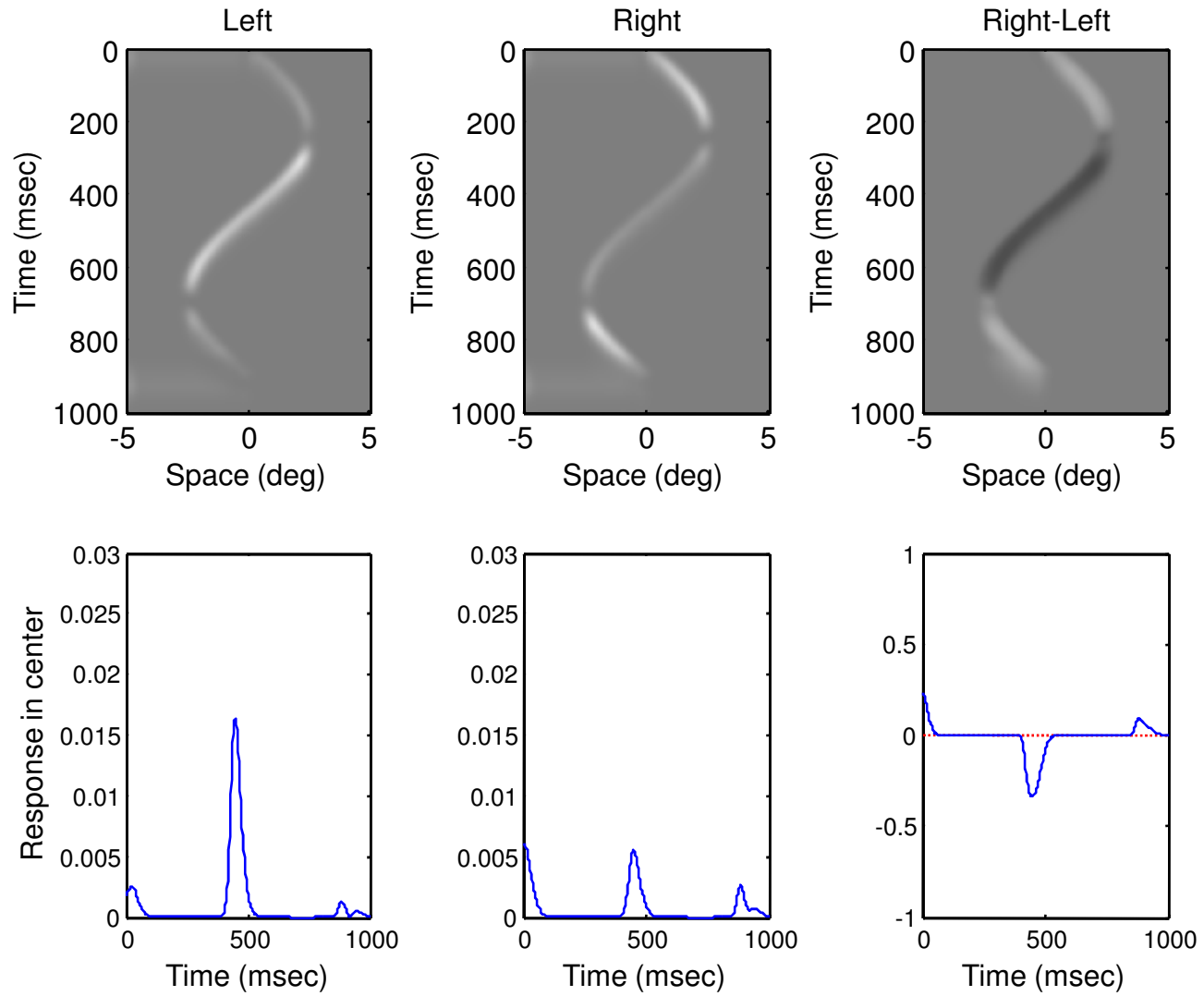


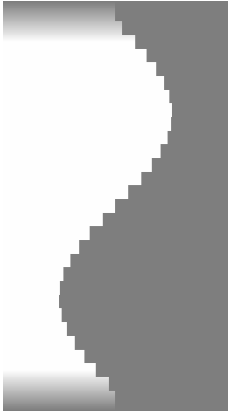
# Space-time oriented filters in the space and Fourier domain



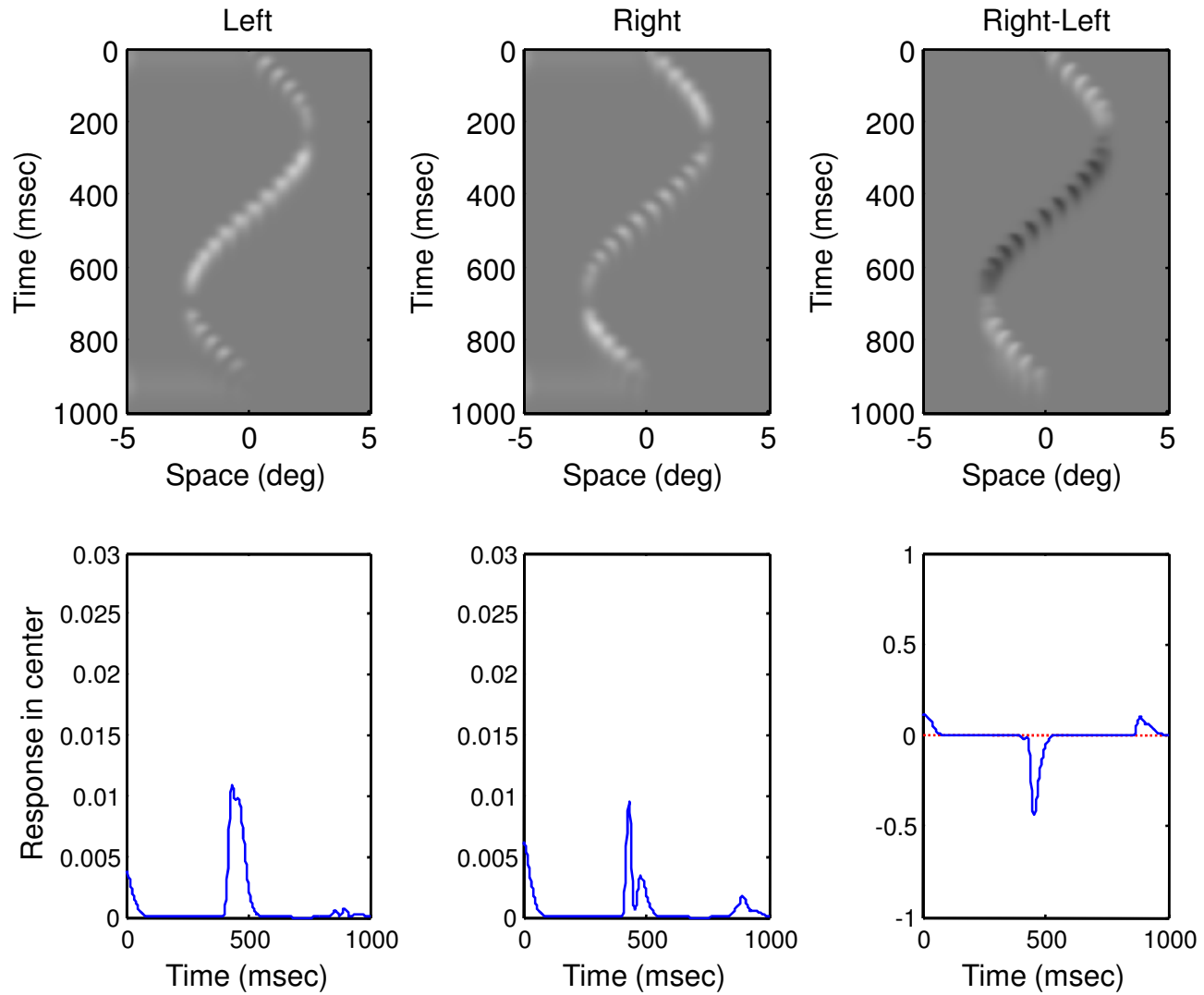


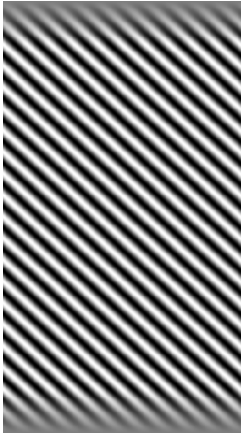
# Response of 'Energy mechanisms' to a moving sinusoidal edge



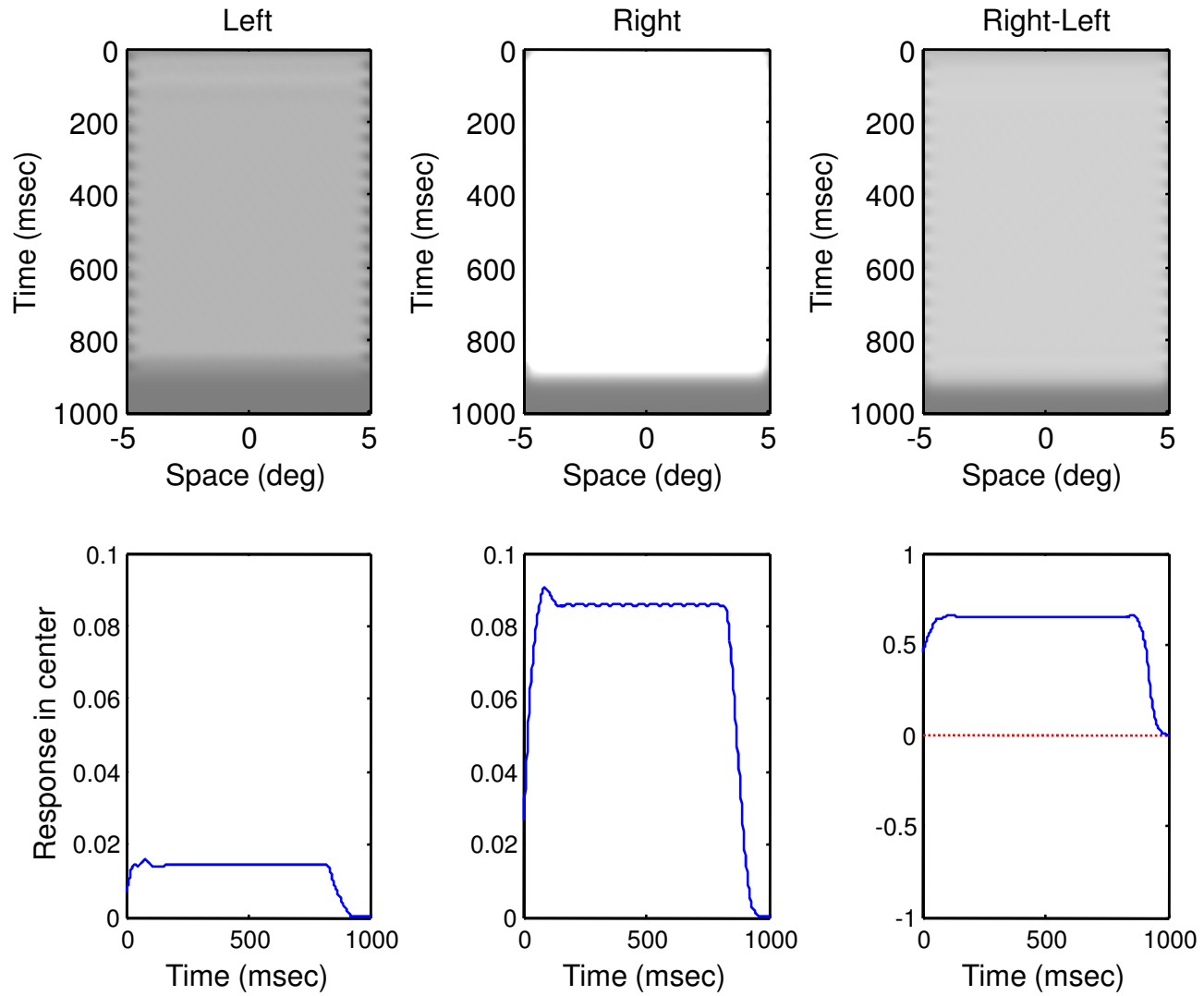


# Response of 'Energy mechanisms' to a sampled moving sinusoidal edge

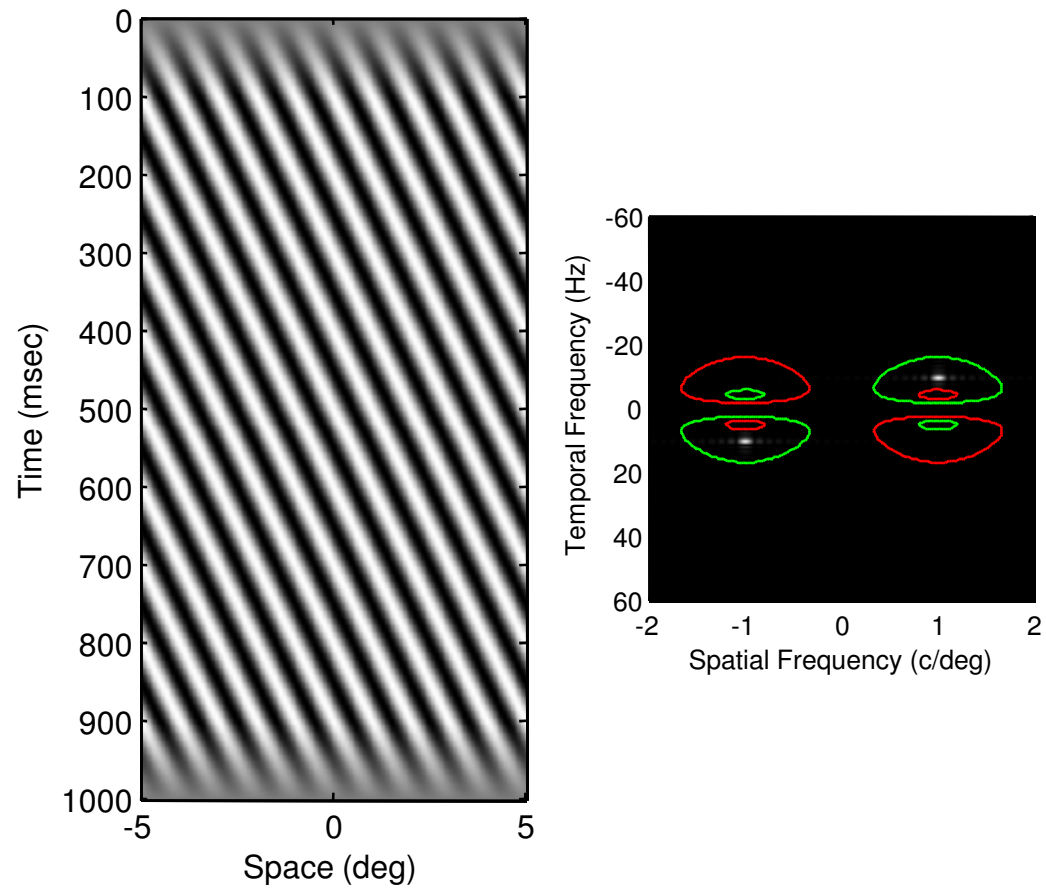


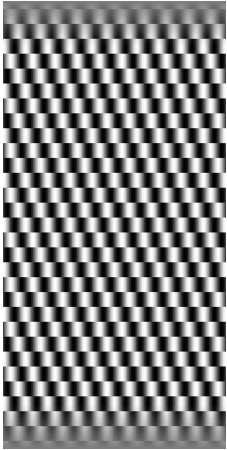


# Response of 'Energy mechanisms' to a moving grating

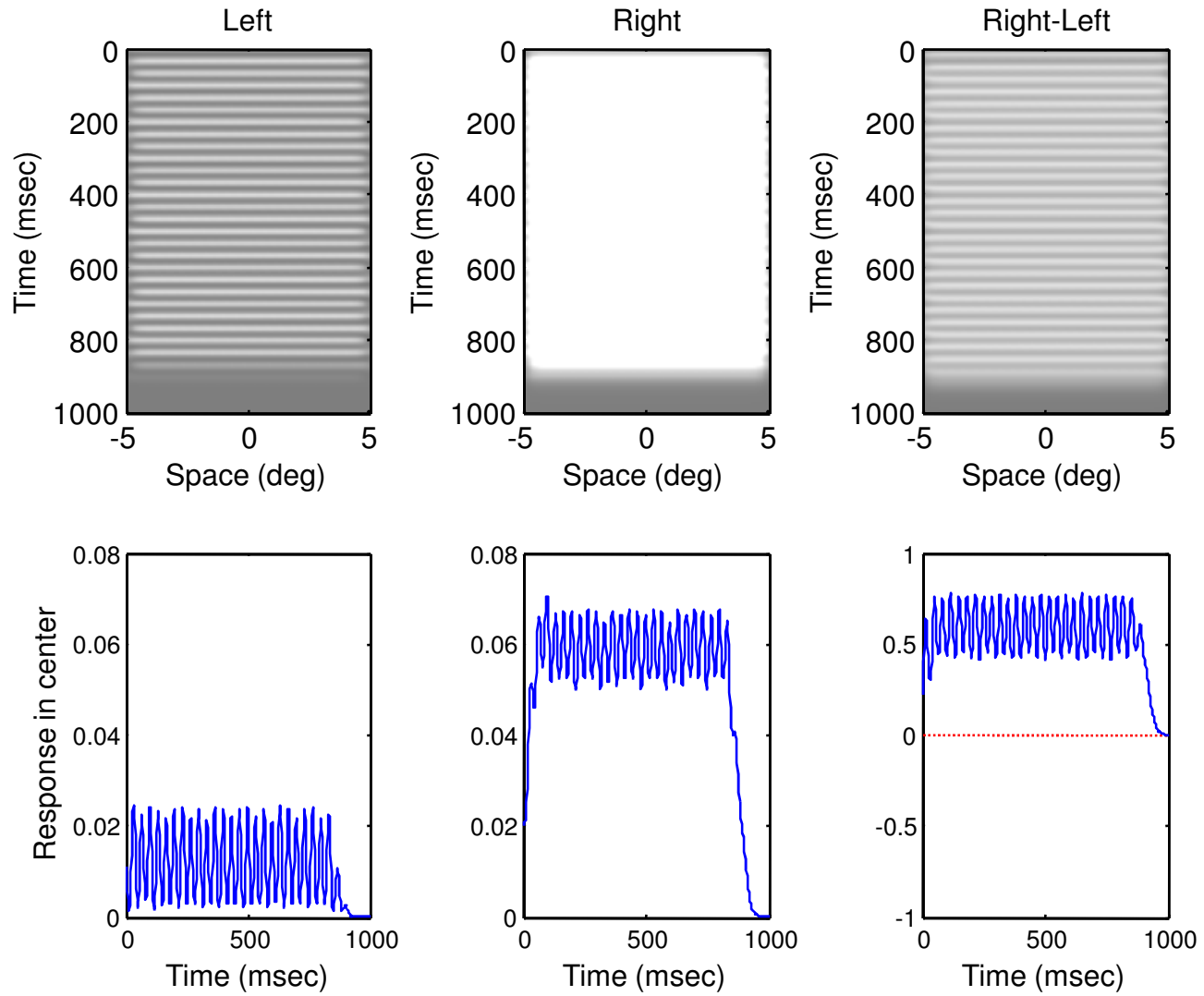


Response of 'Energy mechanisms' to a moving grating

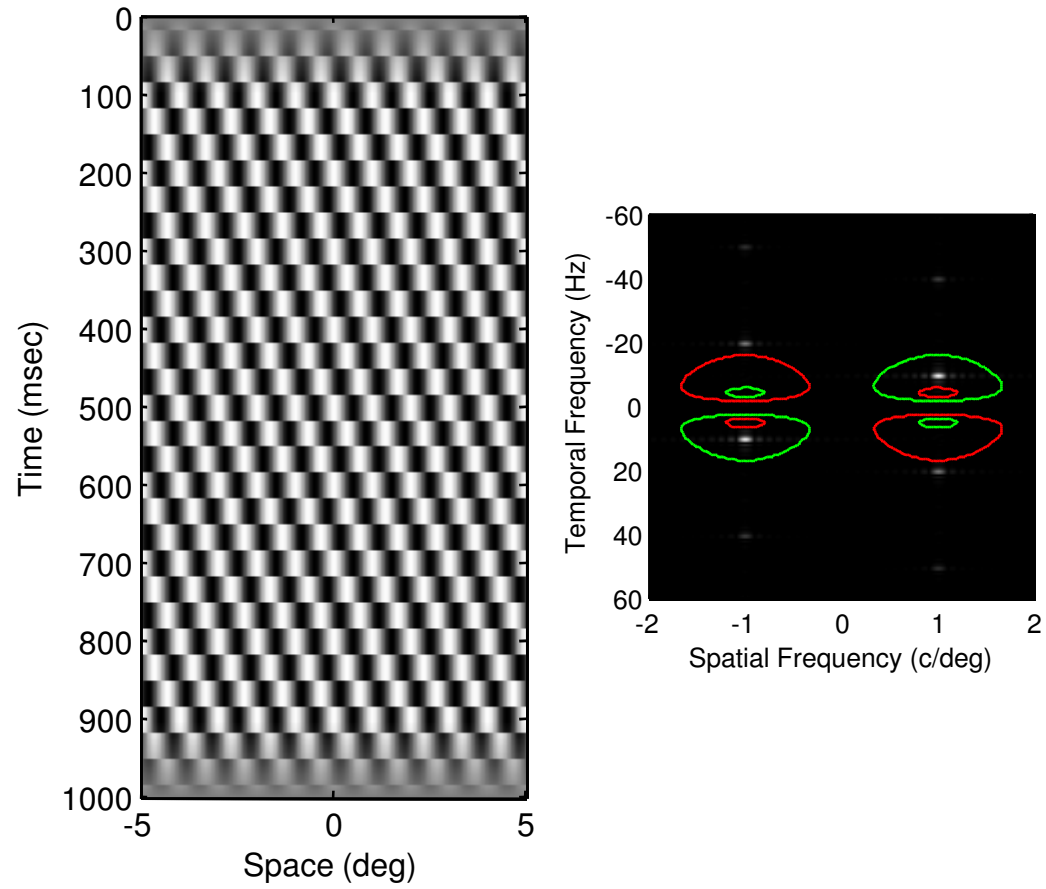




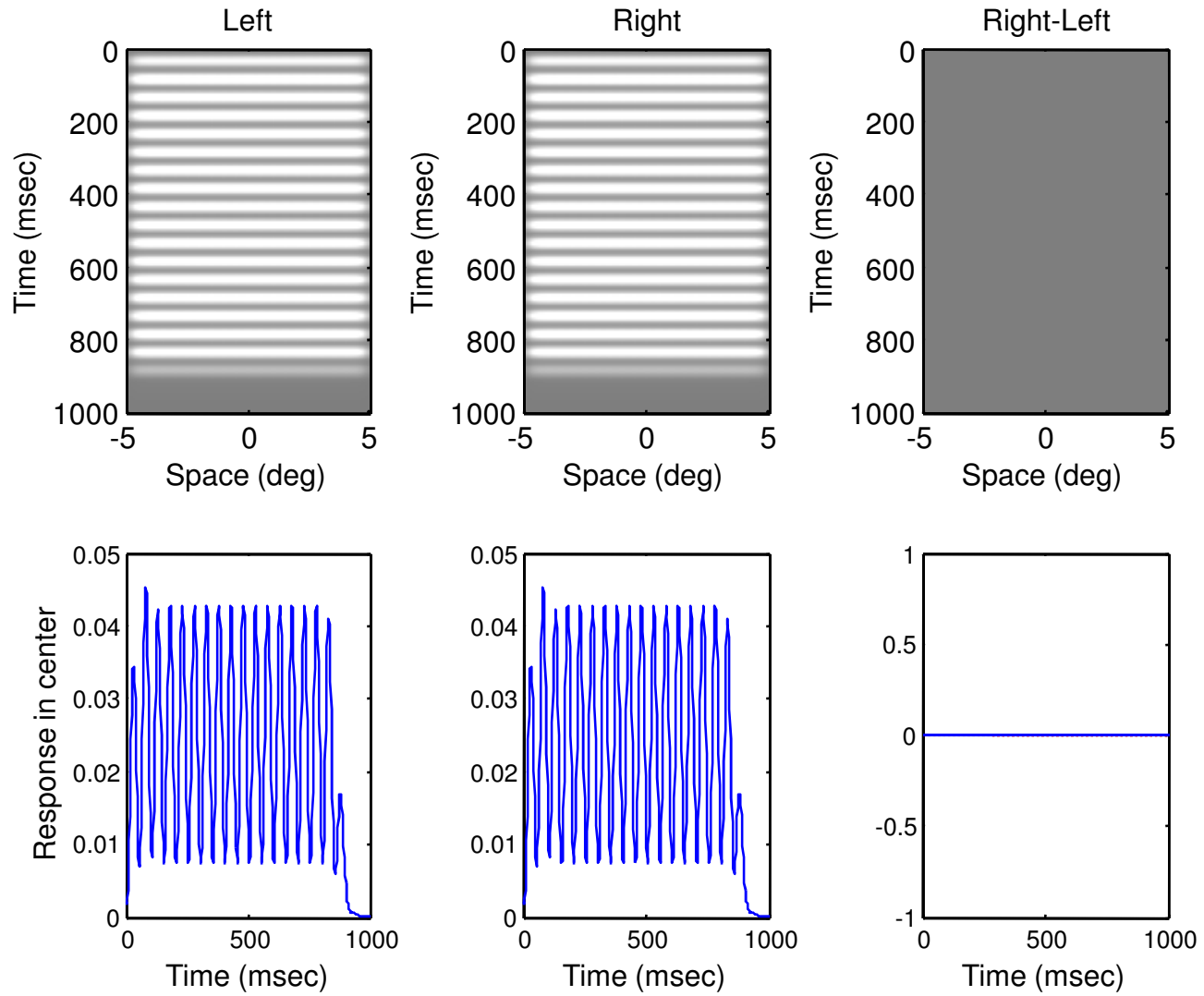
# Response of 'Energy mechanisms' to a sampled moving grating



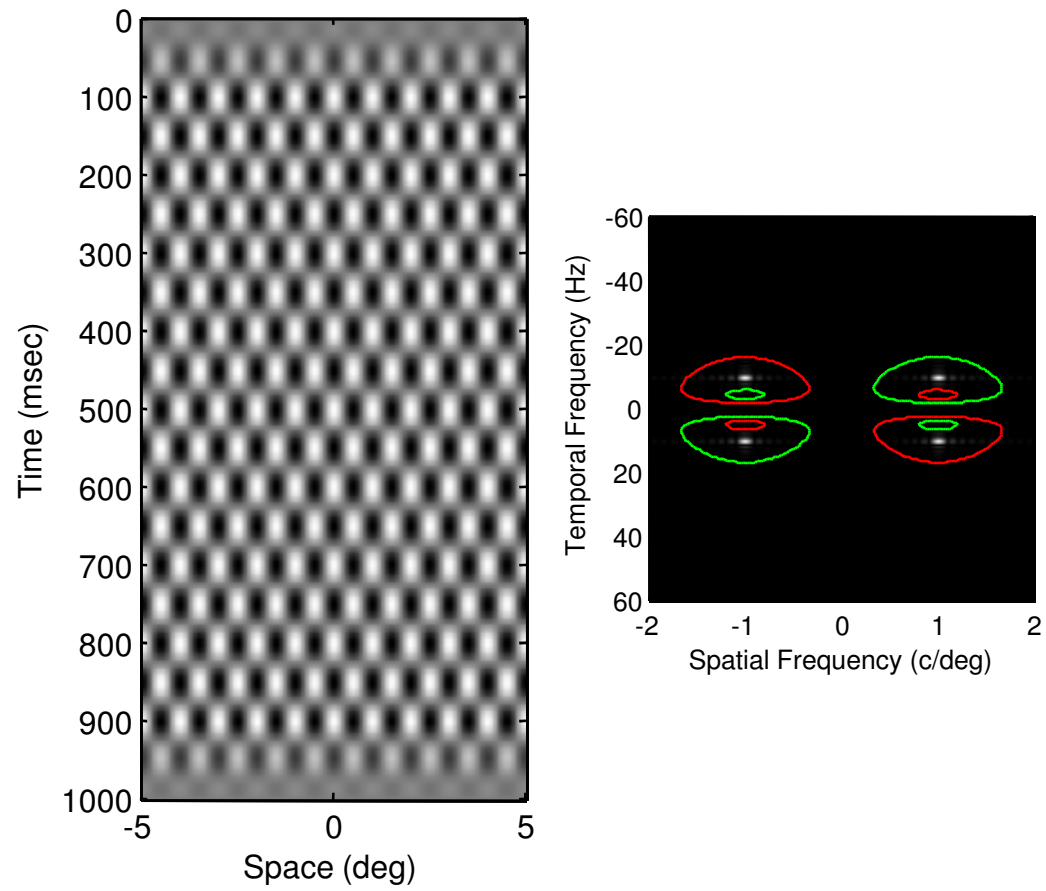
Response of 'Energy mechanisms' to a sampled moving grating

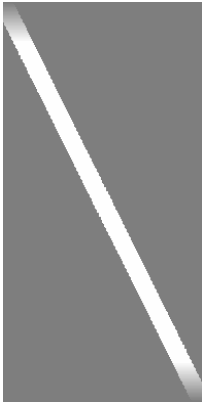


# Response of 'Energy mechanisms' to counterphase grating

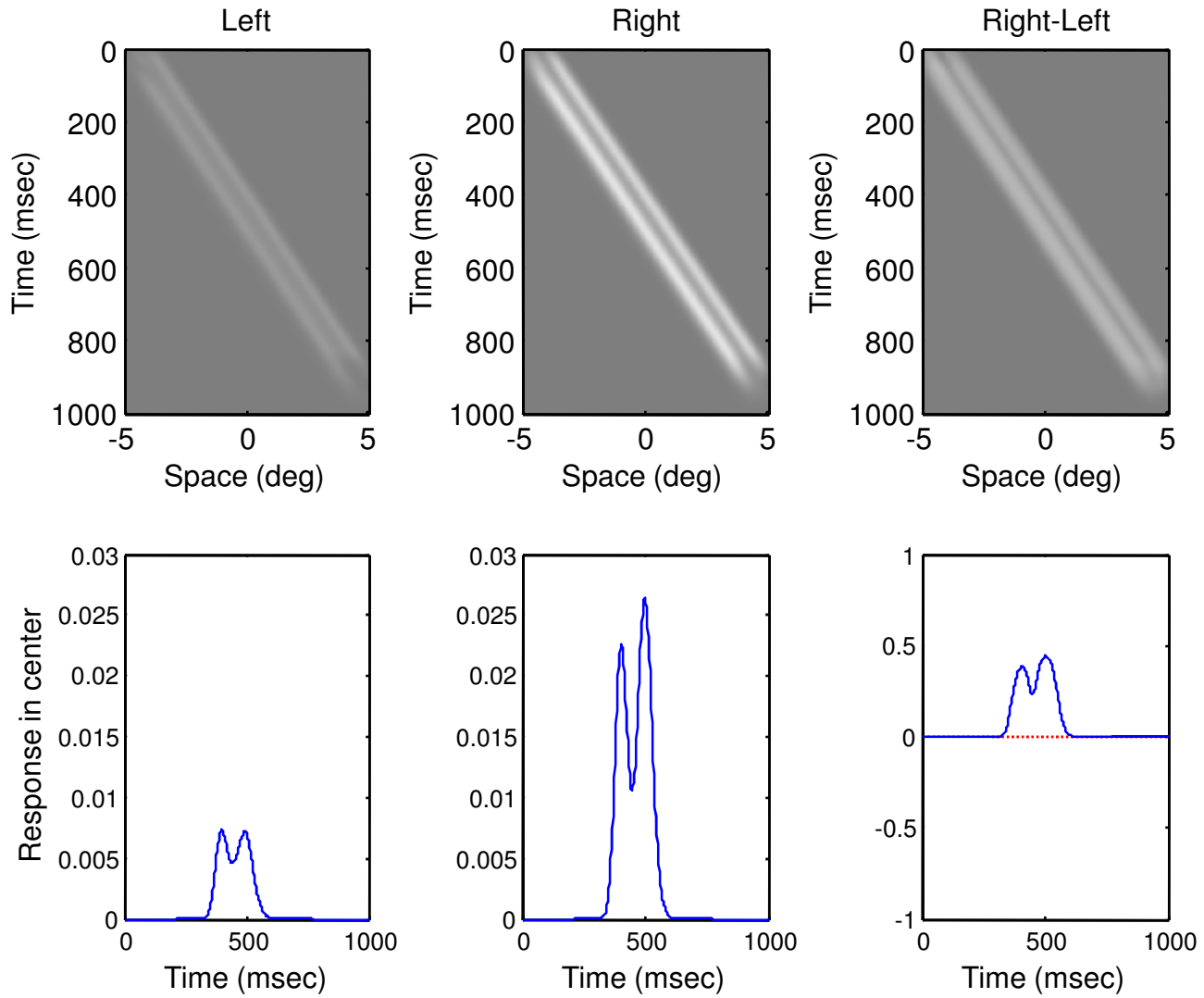


Response of 'Energy mechanisms' to counterphase grating

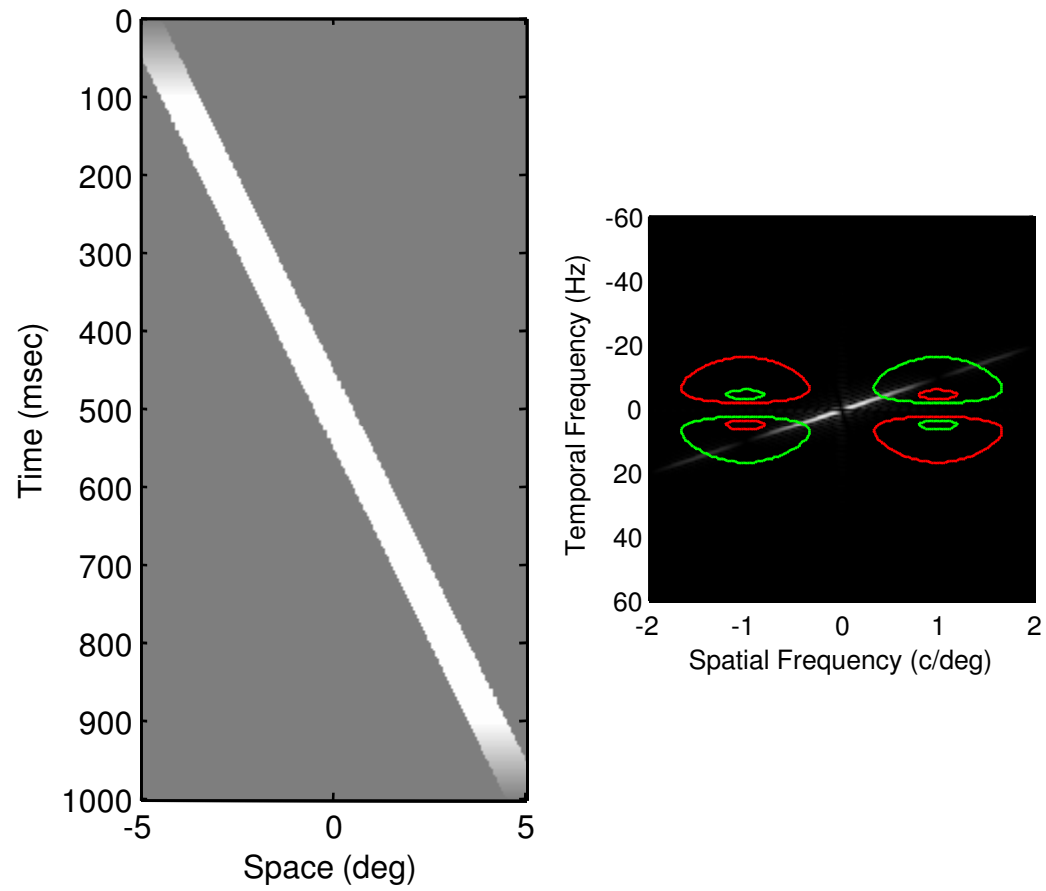


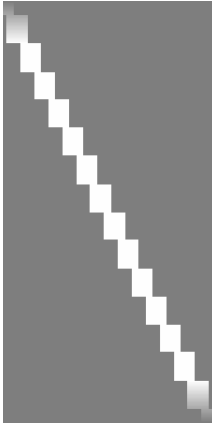


# Response of 'Energy mechanisms' to a smoothly moving bar

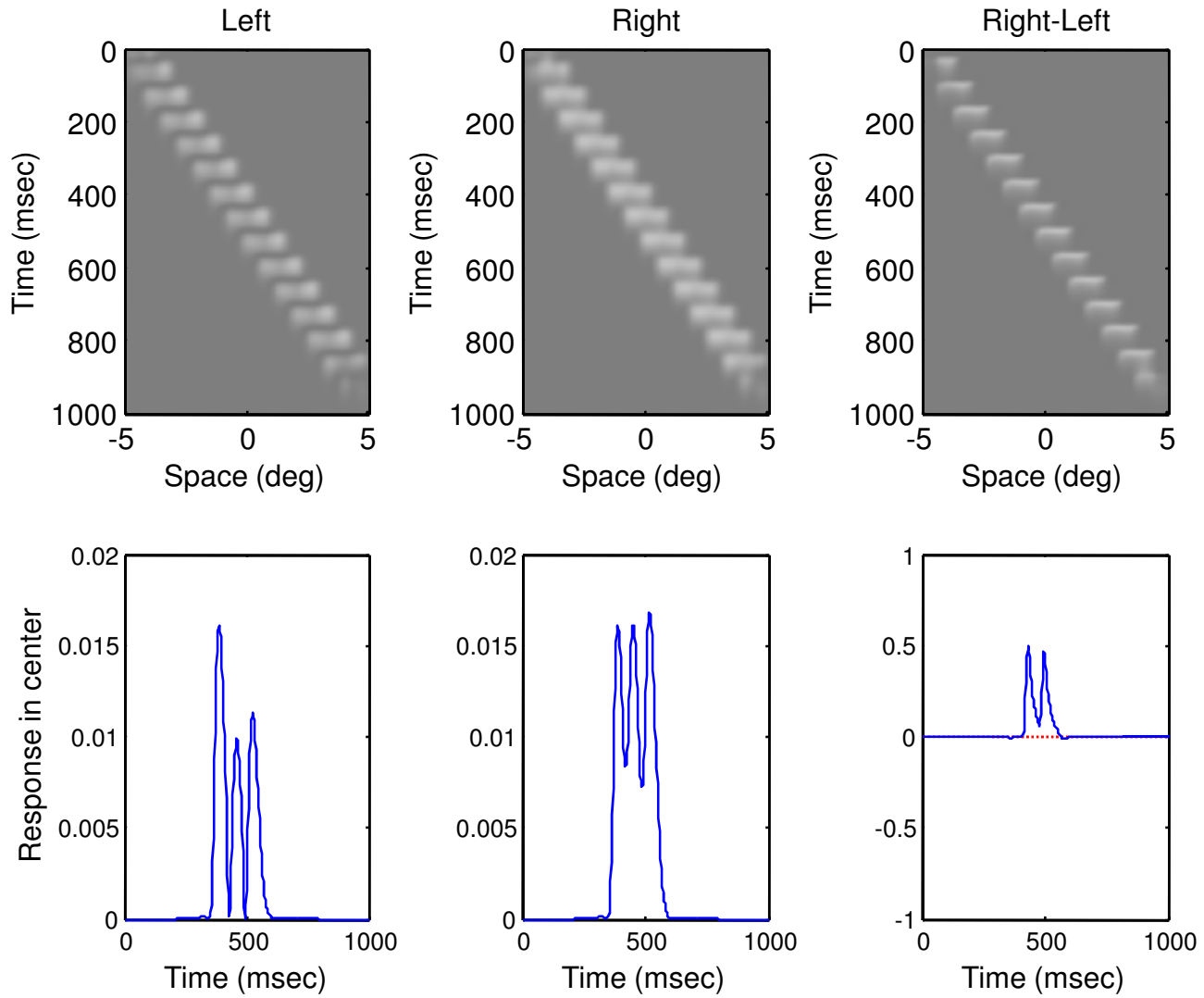


Response of 'Energy mechanisms' to a smoothly moving bar

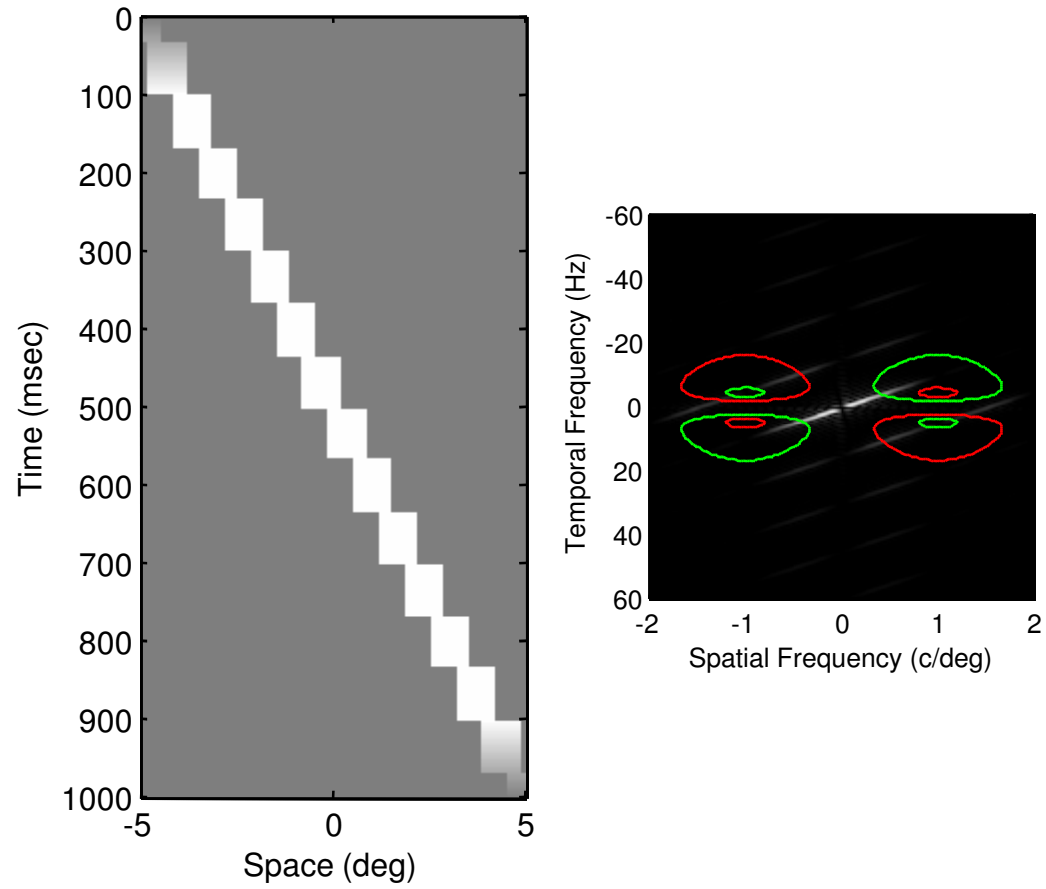


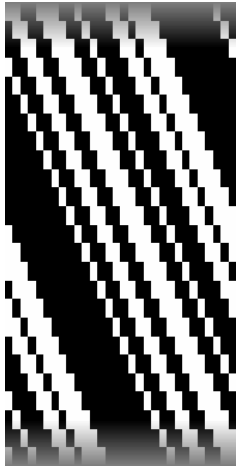


## Response of 'Energy mechanisms' to a sampled moving bar

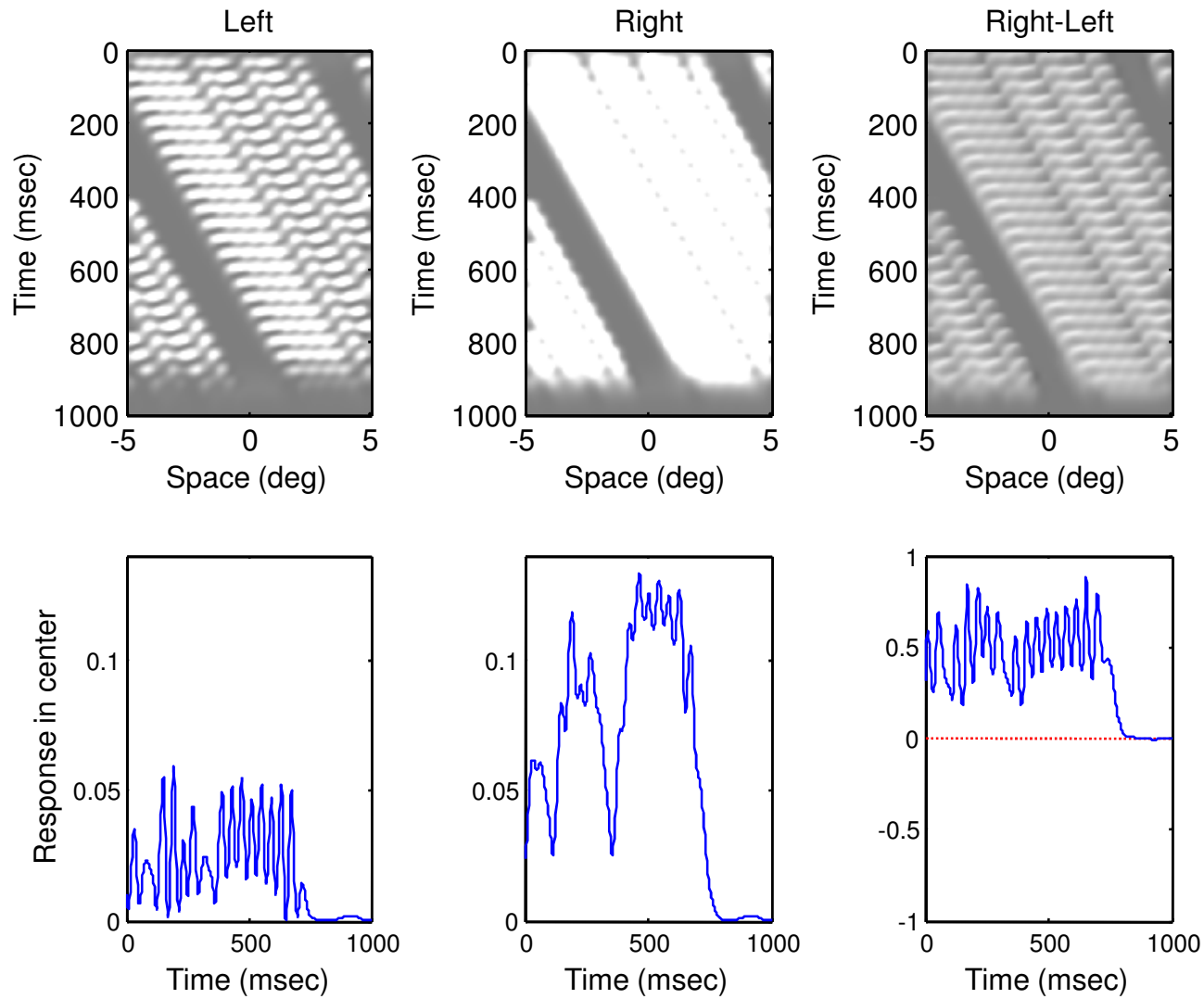


Response of 'Energy mechanisms' to a sampled moving bar

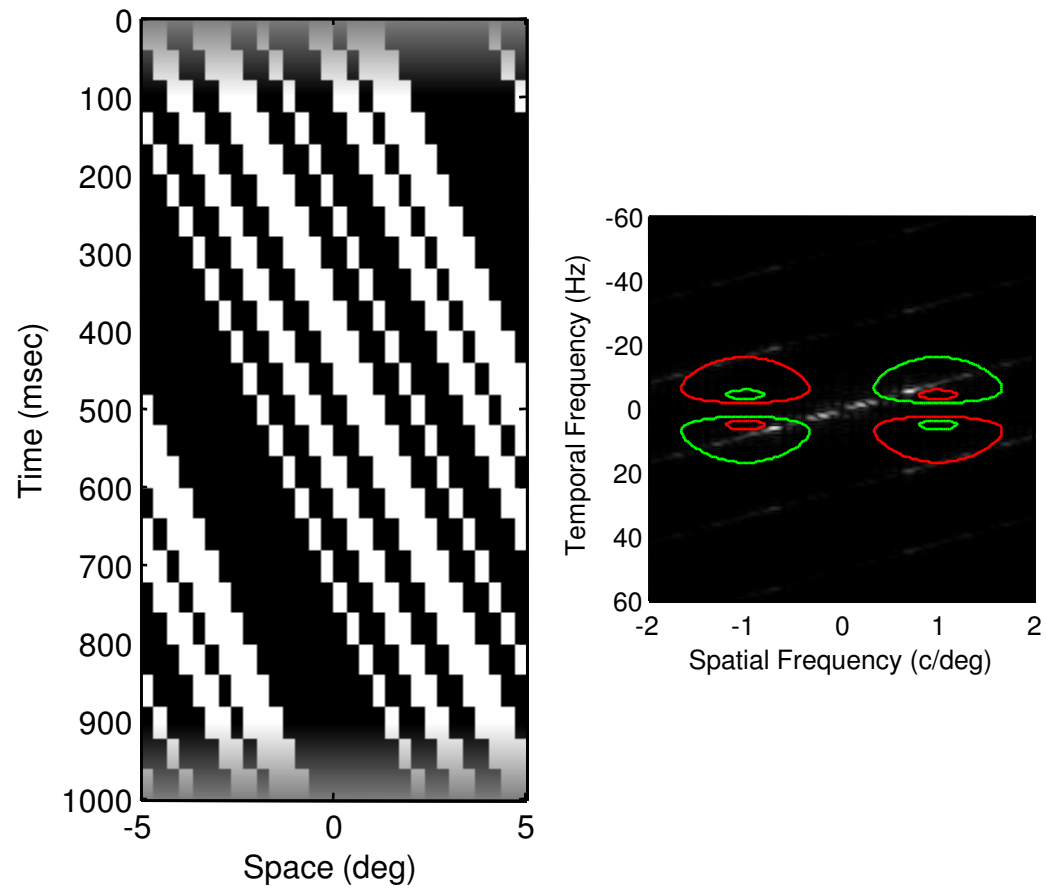


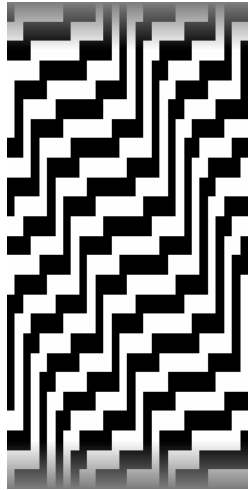


# Response of 'Energy mechanisms' to rightward moving noise

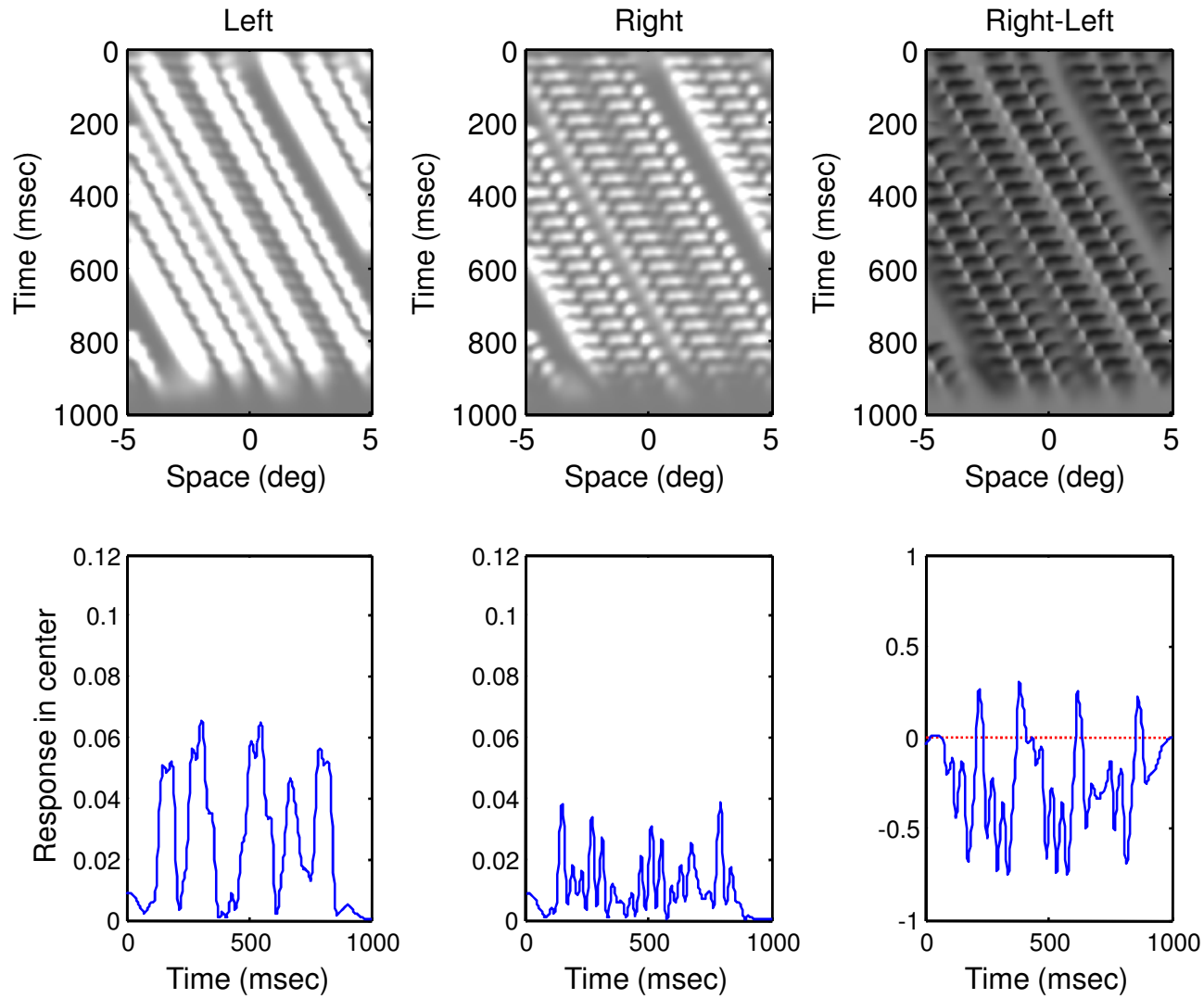


Response of 'Energy mechanisms' to rightward moving noise

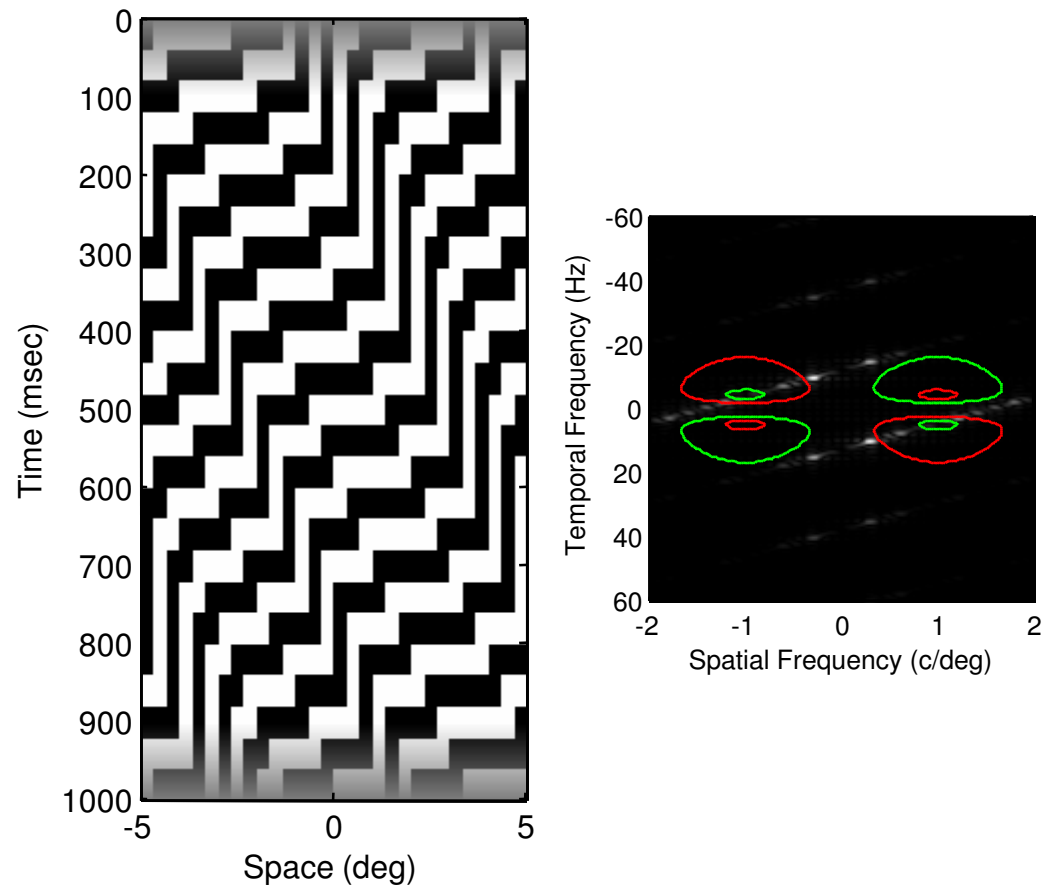


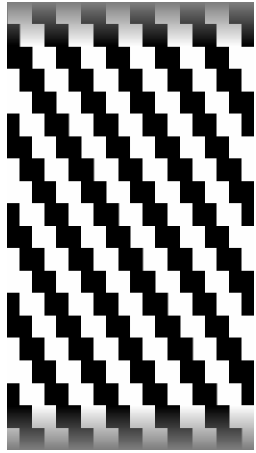


# Response of 'Energy mechanisms' to a rightward reverse phi stimulus

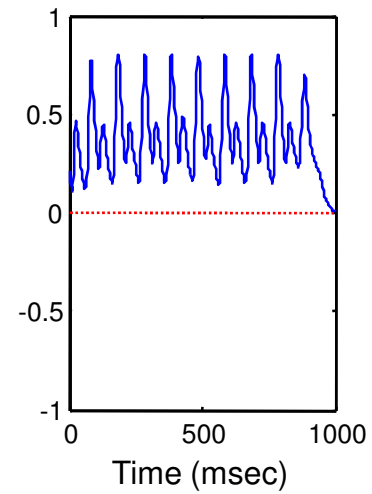
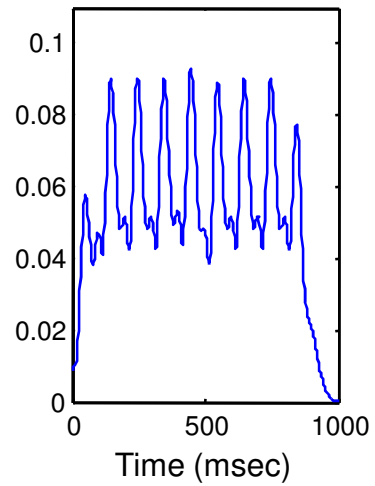
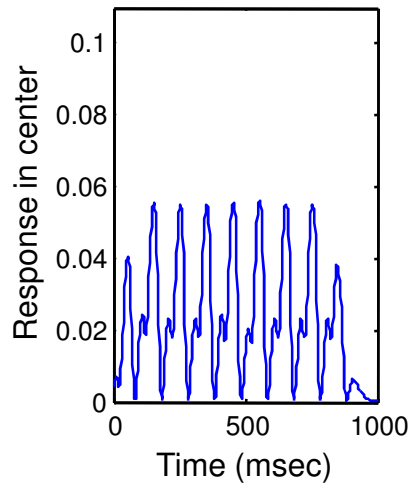
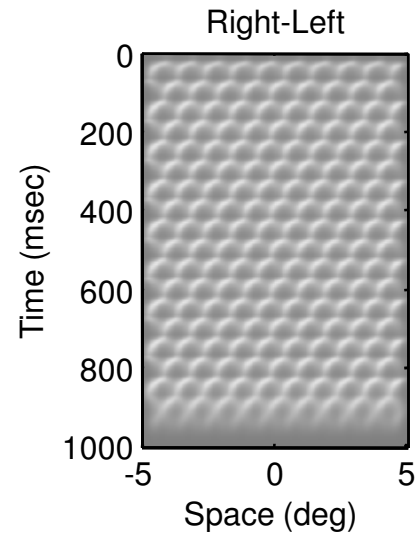
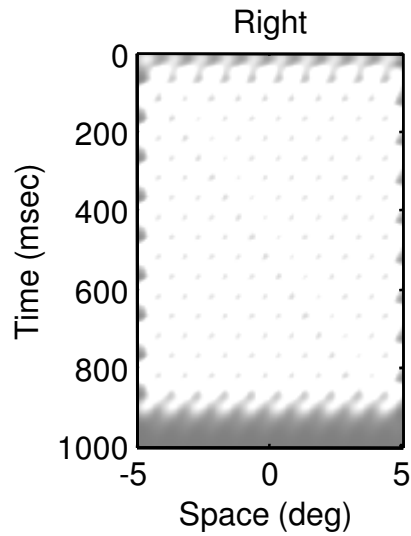
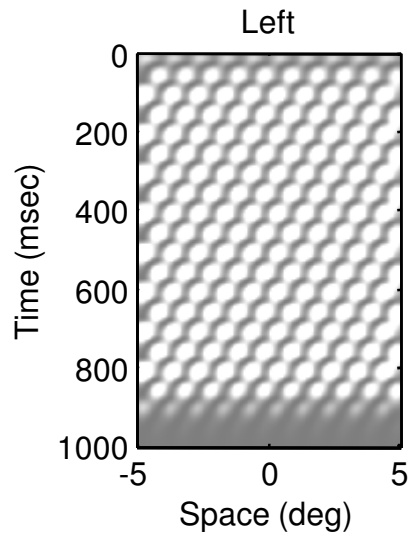


Response of 'Energy mechanisms' to a rightward reverse phi stimulus

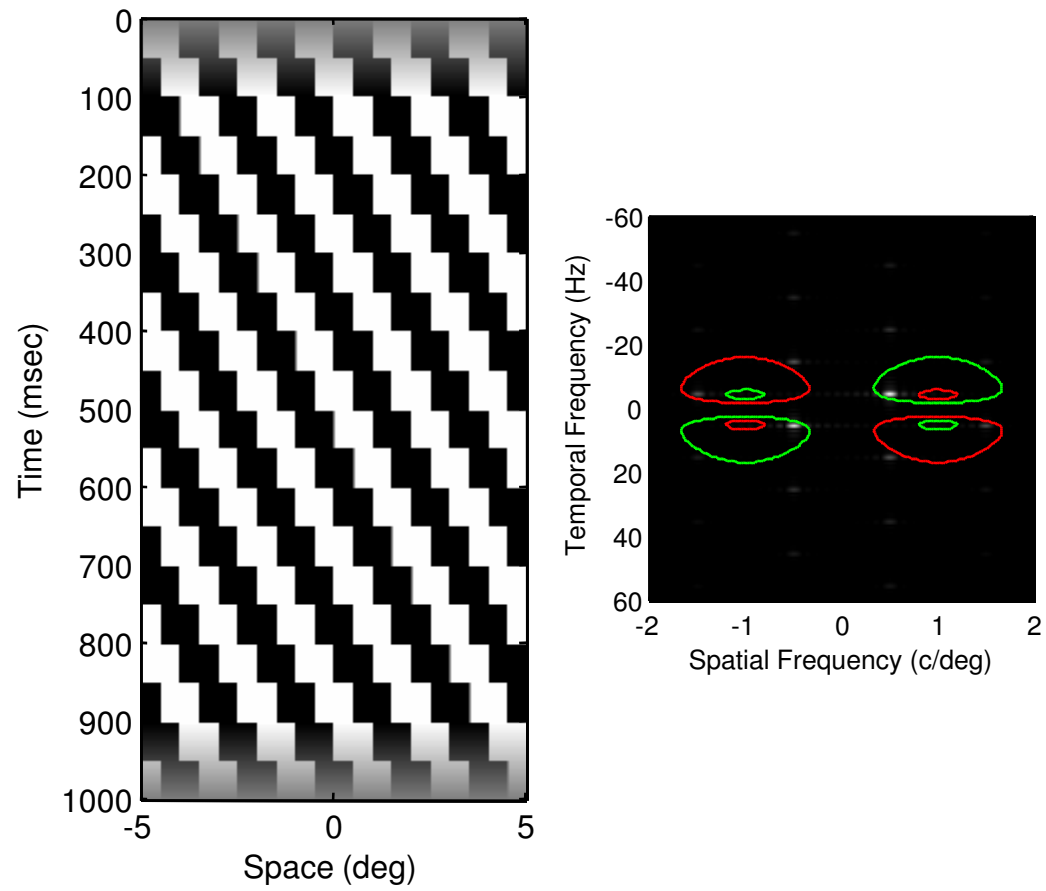


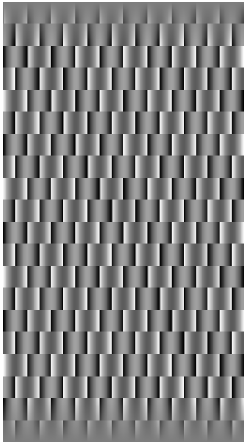


Response of 'Energy mechanisms' to a sampled rightward moving square wave

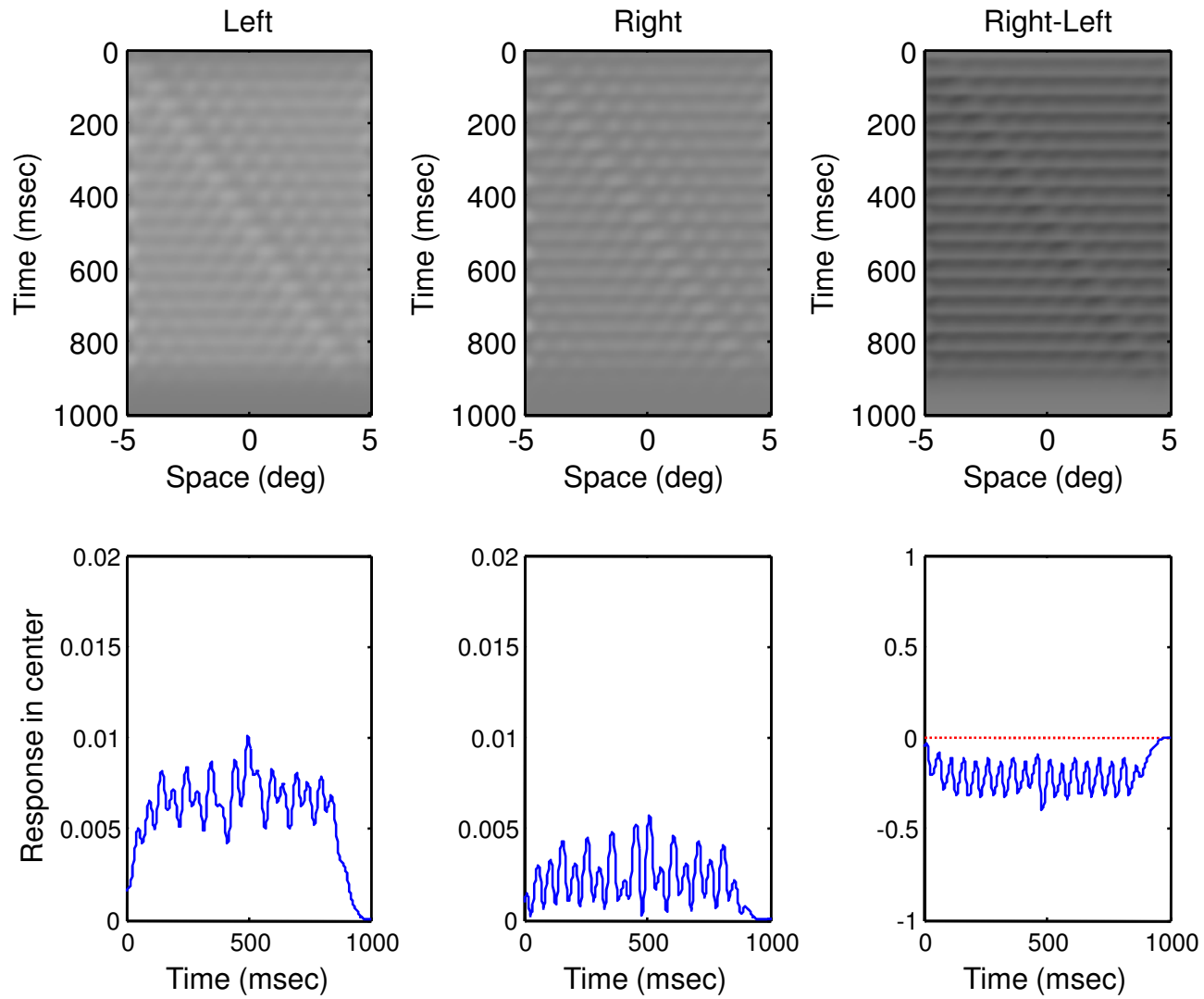


Response of 'Energy mechanisms' to a sampled rightward moving square wave

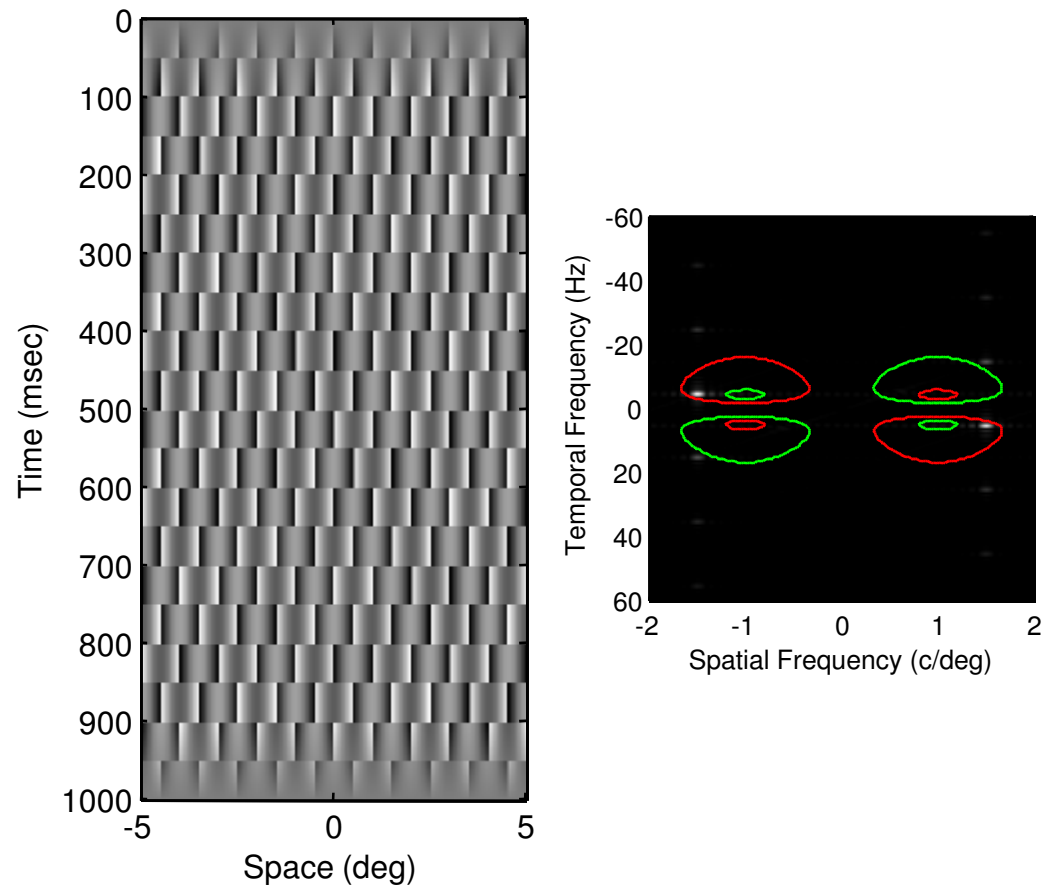


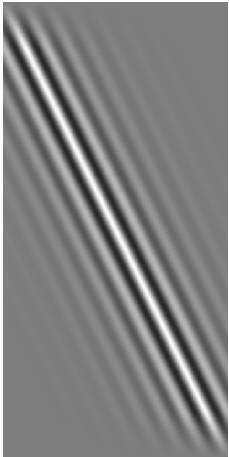


## Response of 'Energy mechanisms' to a 'fluted' square wave

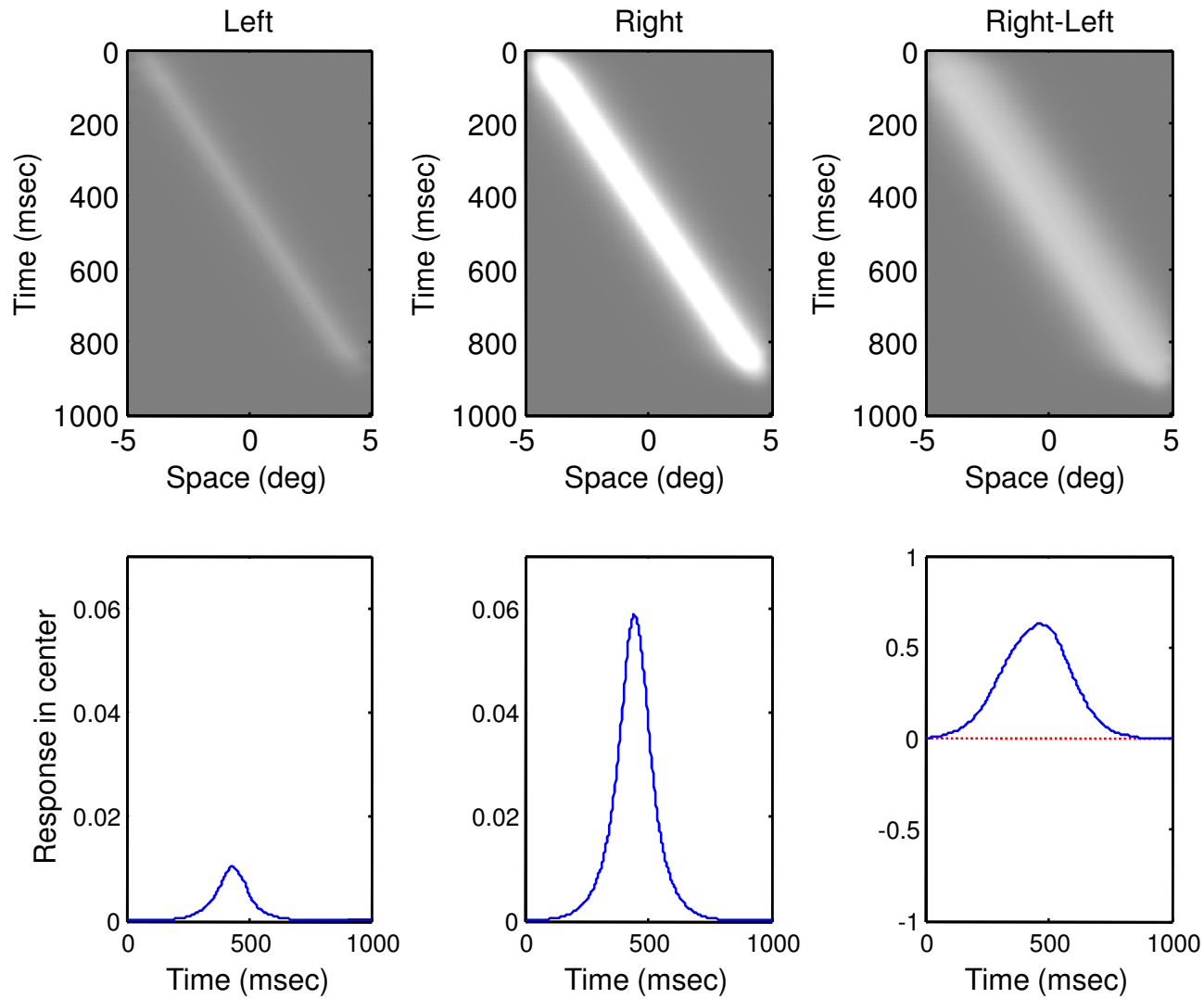


Response of 'Energy mechanisms' to a 'fluted' square wave

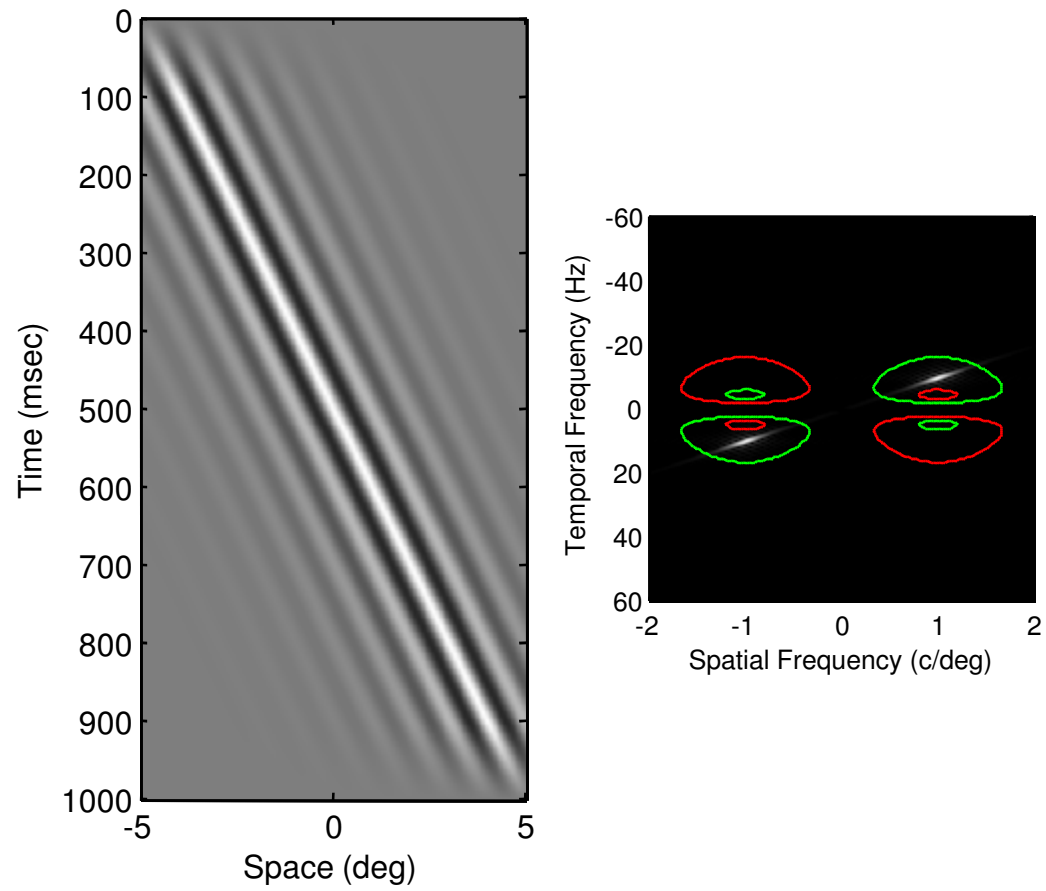


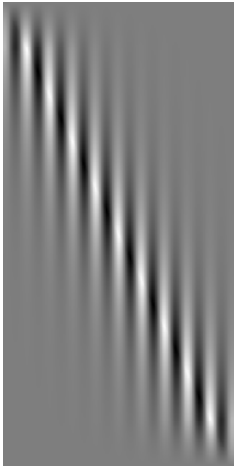


# Response of 'Energy mechanisms' to rightward first order motion

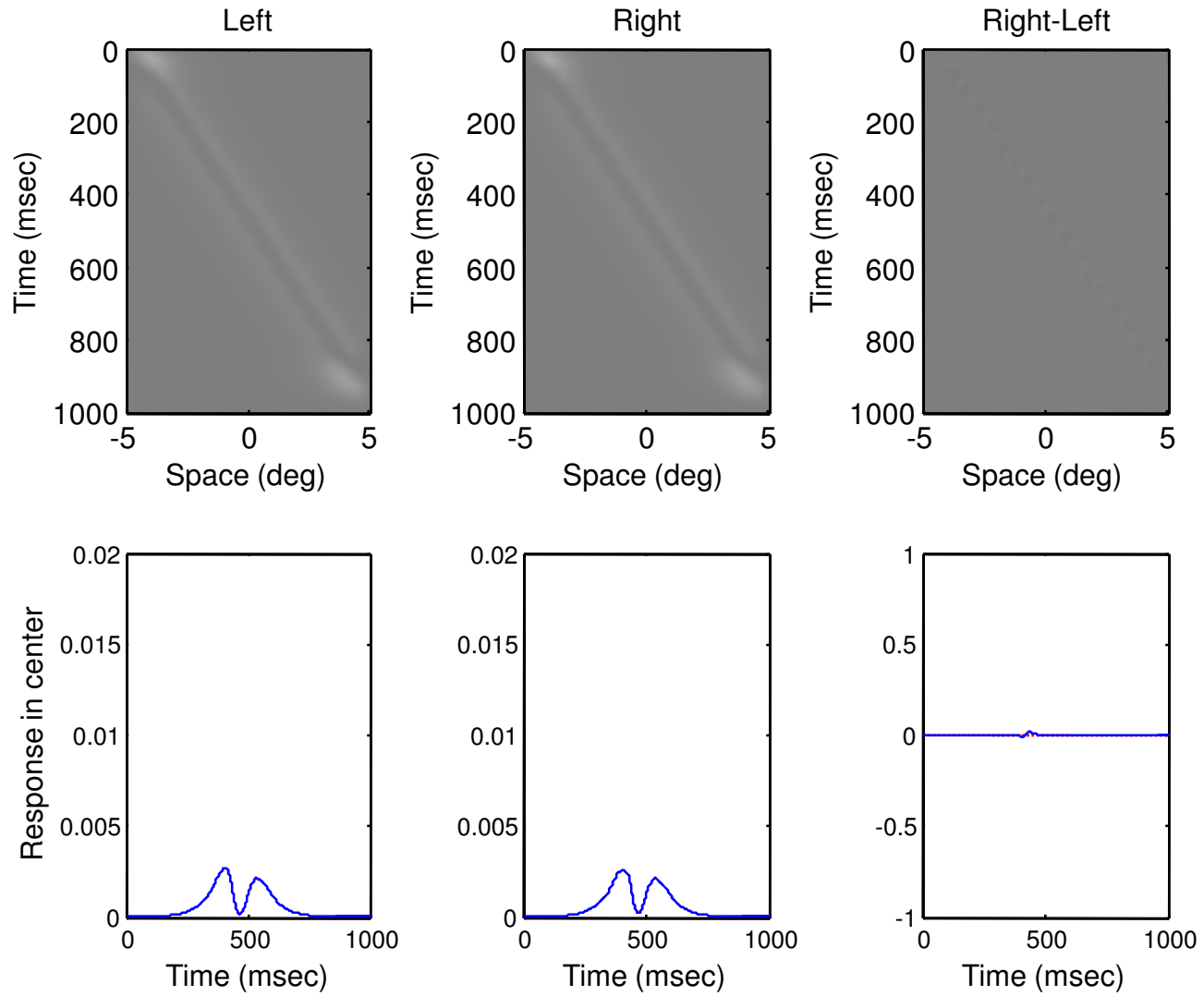


Response of 'Energy mechanisms' to rightward first order motion

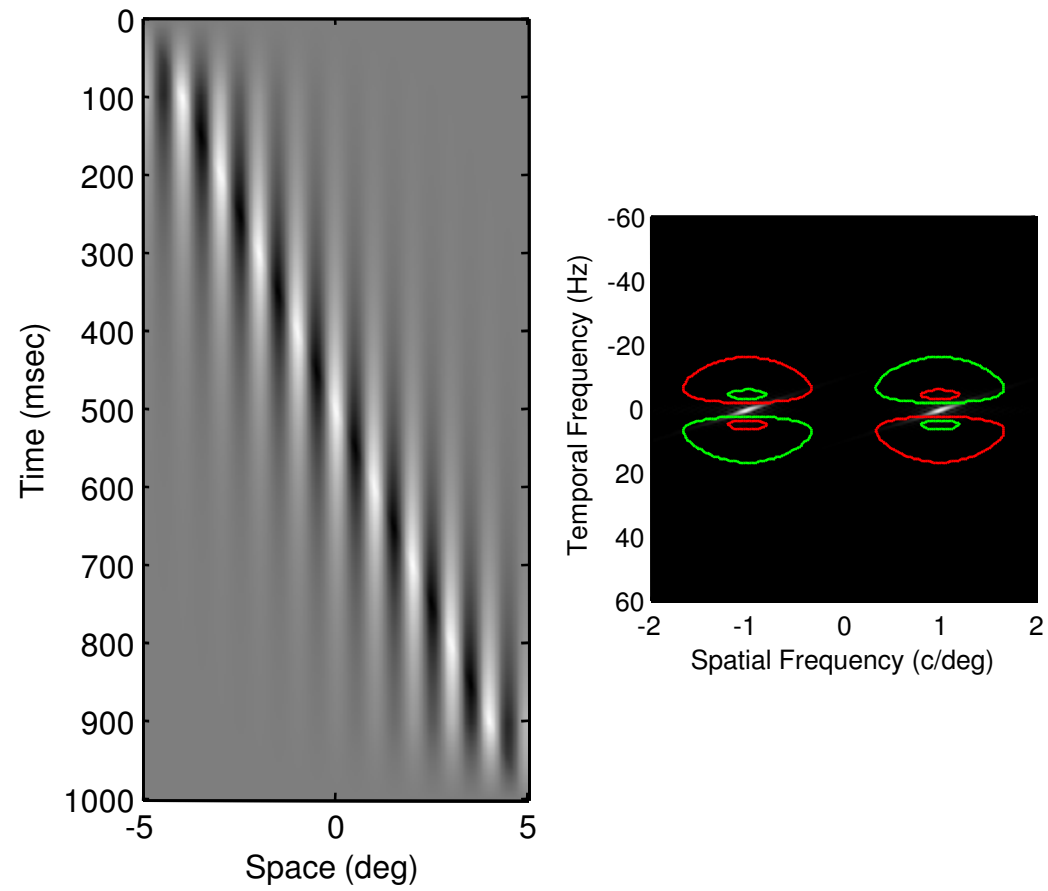


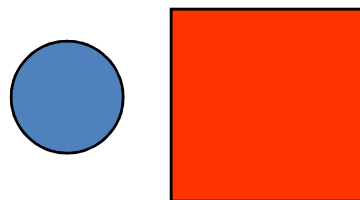


# Response of 'Energy mechanisms' to rightward second order motion

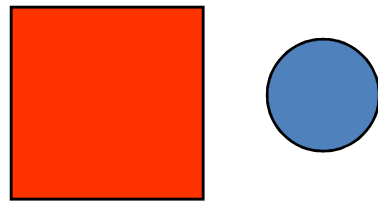


Response of 'Energy mechanisms' to rightward second order motion





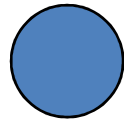
The box interrupts the apparent motion.



The box interrupts the apparent motion.

## Rules of apparent motion:

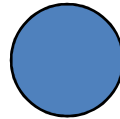
Objects should not change shape when they move.



Rather than a box turning in to a circle (shortest path), we see the box disappearing and the circle moving diagonally.

## Rules of apparent motion:

Objects should not change shape when they move.



Rather than a box turning in to a circle (shortest path), we see the box disappearing and the circle moving diagonally.