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Illusory reversed motion and discrete temporal sampling in vision

While doing some experiments measuring EEG responses to contrast modulated expanding rings, we noticed that in some conditions the rings appeared to contract. A fixed contrast bullseye pattern contracting steadily gave a percept of alternating contraction and expansion. We used a high frame rate and so the illusory reversed motion was not due to spatiotemporal aliasing (wagon wheel illusion). We tested two theories about the cause of the illusory motion. The "brainwave" theory posits that the illusory reversed motion is due to interference between the travelling waves of excitation over V1 which are a simple linear response to the travelling wave stimulus, and the non-linear waves of activation which normally spread over visual cortex (even to flashed stimuli in a fixed location). The "strobe-in-head" theory says that the reversed motion is due to discrete temporal sampling in the visual system. The results support the strobe-in-head theory.

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