

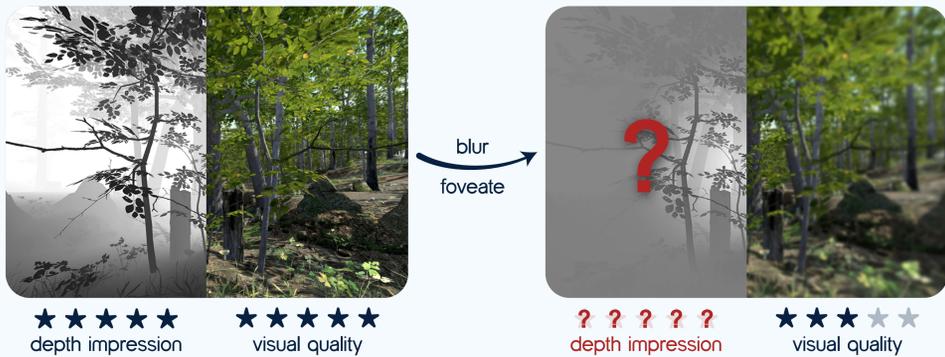
The Impact of Blur on Motion Parallax and Binocular Disparity



How does foveated rendering affect the perceived depth from motion parallax and binocular disparity?

Motivation

Previous studies indicate that foveation negatively affects visual characteristics including the perception of 3D layout and egomotion. Despite the importance of accurate depth cues for visual realism, the role of blur in depth perception has received limited investigation.



How can we measure motion parallax?

Psychovisual Experiment

We want to measure the effect of blur and eccentricity on the perceived depth from motion parallax in isolation.

Stimulus Design Requirements:

1. match the peak sensitivity of the human eye in all domains: texture and depth
2. suppress all other depth cues

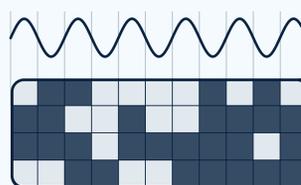
eccentricity



blur intensity to emulate foveation



luminance pattern scaled based on the CSF

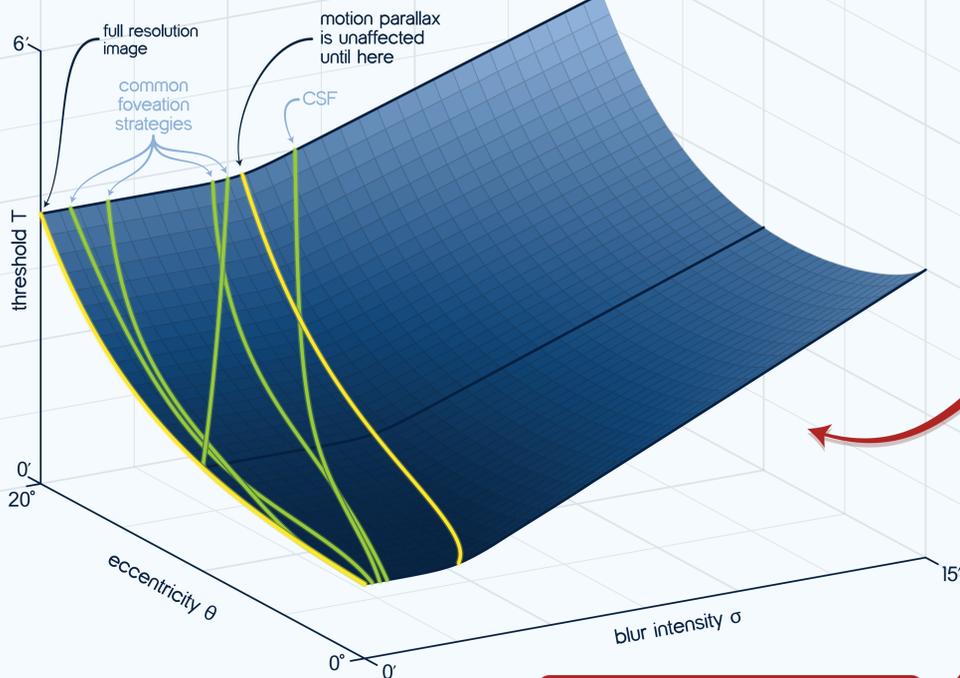


depth pattern scaled based on the DSF



What are the results of the experiment?

Motion Parallax

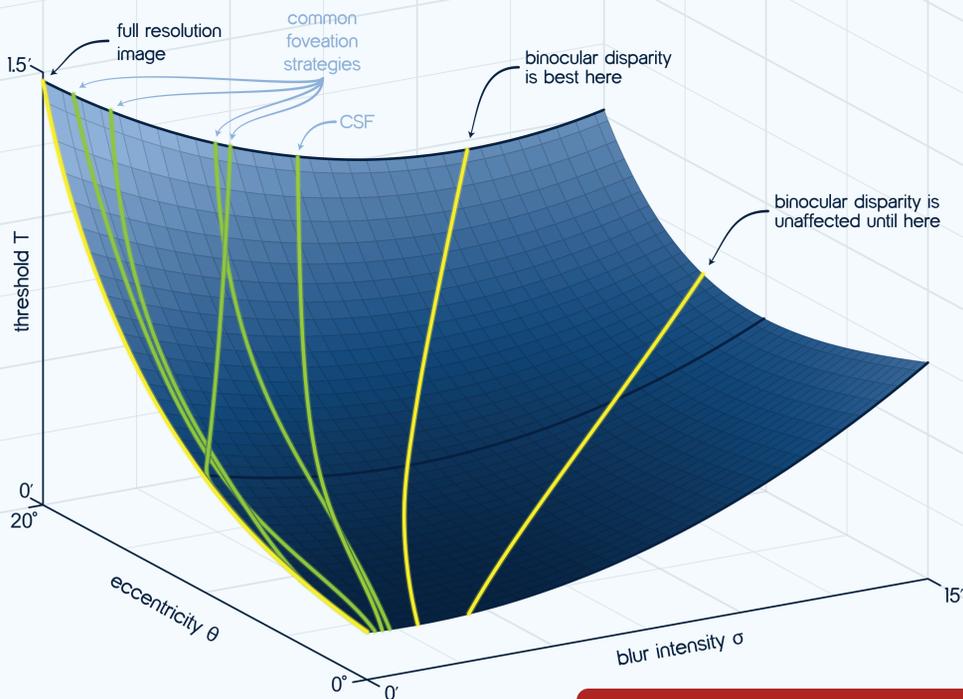


What about binocular disparity?

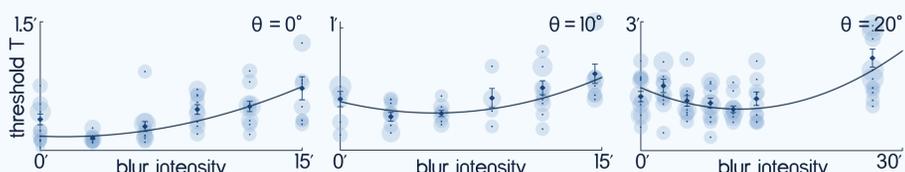
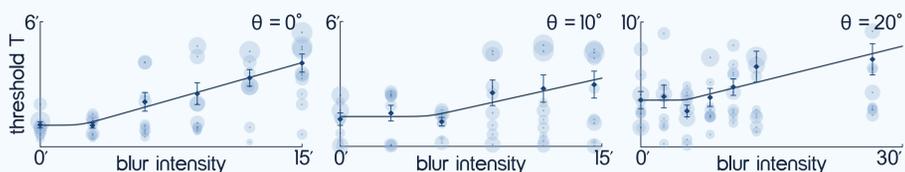
Binocular Disparity



SIGGRAPH 2025
Vancouver+ 10-14 August
S. Kergaßner, T. Tariq, and P. Didyk. Towards Understanding Depth Perception in Foveated Rendering



We examine 19 combinations of blur and eccentricity. We estimate the smallest resolvable relative depth using a threshold estimation procedure.



Key Findings

We can resolve around 4x finer depth differences from binocular disparity.

As soon as blur is visible, it impairs the depth we perceive from motion parallax.

Depth from binocular disparity is very resilient to strong blur.

lab website



my website



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