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## Motivation

The true vision for real-time VR is reproducing our visual reality in its entirety. Foveated rendering is a key enabling technique for that. However, it has been shown that foveation impairs visual qualities like perception of 3D layout, or egomotion. Another important aspect of visual realism is the correct reproduction of depth cues, but the effects of blur on depth perception remain largely unexplored.



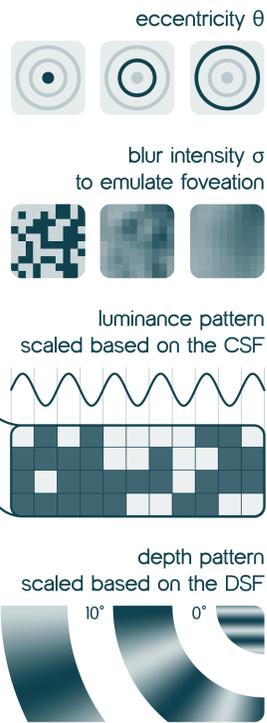
How can we measure stereoacuity?

## Designing the Psychovisual Experiment

We want to measure the effect of blur and eccentricity on stereoacuity in isolation.

Stimulus Design Requirements:

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

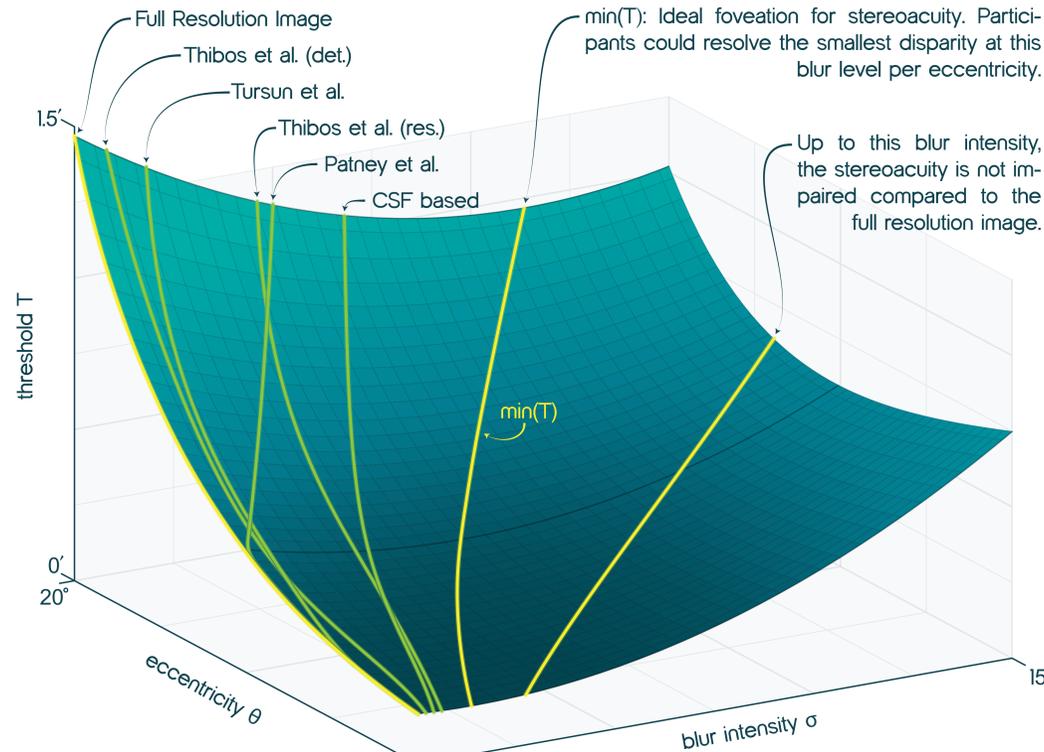


What are the results of the experiment?

**TLDR: Stereoacuity is remarkably resilient to strong peripheral blur.**

## Fitting our Perceptual Model

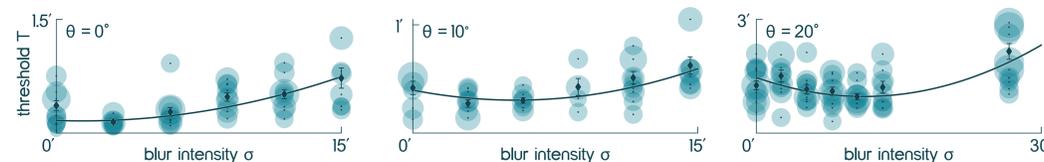
Do these findings hold for complex scenes?



To complete the model, we fit a surface through our measured thresholds.

Shouldn't the full resolution image yield the lowest thresholds?

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



## Validating on Natural Content

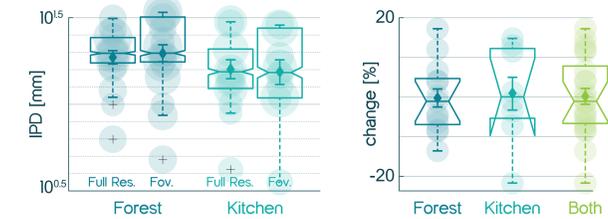
To verify our model, we want to reproduce our results on complex content. We blur natural scenes according to our ideal foveation intensities and measure the stereoacuity thresholds.



no foveation, blur intensity  $\sigma = 0$  for all eccentricities



strong foveation according to our model, blur intensity  $\sigma = \min(T)$  for all eccentricities



Stereoacuity was not impaired by our high levels of blur. However, we could not replicate an increase of stereoacuity, as we would have expected it from  $\min(T)$ .

## Explaining the Dip



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