The neural basis of the stereocontrast paradox
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Introduction:
- Stereocuity results better when both eyes are viewing low contrasts compare to a condition where contrast is increased in only one eye – a rare case when increasing contrast worsens human performances;
- This paradoxical effect only occurs for orientation-narrow-band stimuli (e.g. 1D patterns), but not for broadband stimuli (e.g. 2D patterns\textsuperscript{1,2,3,4}.
- We report the effect of interocular contrast differences on disparity-selective neurons in awake fixating macaques primary visual cortex (extracellular recordings).

Stimuli for 4 binocular contrast conditions:

- 1D patterns (random-line patterns/RLS)
- 2D patterns (random-dot patterns/RDS)

Presentation time: 500msec, for RLS at the preferred orientation. Disparity range chosen to include preferred disparity

- HH : high contrast (>99%) for both eyes
- LL : low contrast (20%) for both eyes
- HL : high contrast left, low contrast right
- LH : low contrast left, high contrast right

Experiment Aims:
- Measure the effect of interocular contrast differences in V1 disparity selective neurons;
- Identify the neural basis of the stereo-contrast paradox using RDS and RLS within the same neuronal population.

\begin{itemize}
\item \textit{Tuning Curves:}
RLS and RDS generally similar EXCEPT for far lower responses to RDS in LL condition. Amplitude disparity modulation quantifying by plotting LL, HL, LH condition against the reference one HH.
\item The slope of a type 2 regression reflects the relative amplitude.
RLS: similar relative amplitude for equal and unequal contrast (slopes for HL, LH just a little lower than for LL).
RDS: relative amplitude much lower for LL than for HL, LH.
\end{itemize}

Reference: