

Poster Session: Threshold versus intensity curves measured with a new high-brightness display system

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Journal of Vision September 2023, Vol.23, 71. doi:<https://doi.org/10.1167/jov.23.11.71>

Abstract

Classical threshold vs. intensity (tvi) curves were measured using optical systems and were generally limited to increment test stimuli and relatively simple spatial patterns. Modern displays provide more flexibility in terms of stimuli spatial profiles but are usually dim enough that there may be rod intrusion when measuring cone responses. Here we describe a high-brightness display system and present tvi's for increment and decrement achromatic tests. The system consists of a PROPixx three-chip DLP LED color projector (VPixx Technologies, Saint-Bruno, Canada) controlled via a Datapixx display driver, with 12-bit digital to analog conversion per RGB channel. Light from the projector is collected in a large diameter lens and focused on high gain rear projection screen. Retinal illuminance of the background may be varied in three ways: (a) varying the mean current supplied to the LEDs from the controller (adjustable in software); (b) using calibrated neutral density filters mounted near the eye; and (c) changing the midpoint of the RGB channels in software (e.g., making the white background as $R=G=B=0.1$ instead of 0.5). Method (c) is made easier by the fact that the PROPixx "gamma curve" is linear, which also means that no RGB bits are lost to gamma

correction. We will show thresholds for achromatic tests on a white background varying from 0.56 to 4.03 log trolands, with preliminary results suggesting differences in the tvi curves between the increment and decrement tests.

Footnotes

Funding: Funding: This work was supported by NSF BCS-1921771

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