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Color-Matching Anomaloscope with Improved Precision in the Determination of Color Acuity in Subjects

Inventors

Saraansh Saxena
Nathan Newman
Frank Wilczek
Walter Herbst
Deana McDonagh

Contact

Physical Sciences Team

Background

Anomaloscopes and the Ishihara test are used to determine a subject's type of color vision, such as normal vision, tritanopia, dichromacy, achromatopsia, and anomalous trichromacy. Printings of the Ishihara tests are used throughout the optometry and ophthalmology industries, while the anomaloscope instrument is owned by few (less than 5%) optometry and ophthalmology offices. This can be attributed to (a) the much greater cost of anomaloscopes, which can be several thousand dollars and (b) the limited additional information acquired by anomaloscopes, if any, over the inexpensive Ishihara tests.

Invention Description

Researchers at Arizona State University have developed an anomaloscope which can (a) quickly and efficiently characterize the type of a subject's color vision acuity (e.g. normal vision, dichromacy, achromatopsia, anomalous trichromacy) and (b) assess the subject's cone sensitivities at one or more discrete wavelengths, providing a quantitative description of the variation within the identified type of color vision acuity. This new anomaloscope is physically comprised of a bank of LED lights with several distinct monochromatic wavelengths in the visible spectral region. The examination process involves having the subject match one or more reference colors by adjusting the intensities of at least two other monochromatic LEDs.

Potential Applications

- Color vision testing
- Eye health

Benefits and Advantages

- Cost Effective – May be manufactured at a cost one order of magnitude less than competition
- Data Focused – Provides more information than competitive instruments,

including quantitative assessment of a subject's cone sensitivities

- Exact – Determines the quantitative variation within each type of identified color acuity, which is not possible with current methods

[Faculty Profile of Professor Nathan Newman](#)

[Faculty Profile of Nobel Laureate Professor Frank Wilczek](#)