P1 – 165 – C

ELECTRO-OPTIC SOLUTION FOR VISUAL ACUITY AND CONTRAST SENSITIVITY MODELLING

R. Paeglis *, M. Ozolinsh
Institute of Solid State Physics and Department of Optometry and Vision Science, University of Latvia

Vision research is a relevant field to apply physics of light scattering. Opacities in the human eye lens can lead to impaired visual acuity and contrast perception, and hinder medical tests. Interference images may be used instead of incoherent light in clinical tests, but their contrast can still be decreased by light scattering.

In PLZT electro-optic ceramics, applying the electric field can induce an effective light scattering that is similar to scattering in an opaque eye lens. A model eye is set which consists of a plano-convex lens (light refraction) and a PLZT ceramics plate (controllable light scattering). The images are formed on the "retinal"plane and are observed or captured by a CCD through a microscope. Incoherent and interference patterns are imaged to approximate for clinics. Light scattering and diminishing of contrast are observed, when the applied electric field increases over E=5-9 kV/cm.

To evaluate quality changes, Fourier transformation is applied to images, and the optical transfer and point-spread functions are obtained. Transfer functions for the model could provide an additional insight in the optical part of the contrast sensitivity changes.

* Corresponding author: e-mail: sf81003@lanet.lv