Contribution ID: **49** Type: **not specified**

Artificial model of human eye aberrations proceeded in real-time

Wednesday, 4 September 2013 14:00 (2 hours)

Abstract content
(Max 300 words)
Special Chars

Human eye is non-ideal optical system. Cornea, lens and vitreous body are sources of optical aberrations. There are several medical tasks where the precise measurements of aberrations is important, for example, excimer laser vision correction, clinical diagnosis of the retina etc.

In fact, real human eye aberrations are not static because of various factors, such as state changing of tear firm, fluctuations accommodations, etc.

By now many investigations aimed on high accuracy human eye modeling techniques exist. However, dynamics of phase distortions is not studied in these works.

In our work for human eye model reconstruction an open adaptive optical system including wavefront sensor (Shack-Hartmann type) and wavefront corrector (flexible mirror) was used. The principle of system working is following: we got the information about wavefront shape presented by vector of Zernike coefficients (from a standard aberrometer). As all known the basic aberrations of human eye are of course low-order aberrations like defocus, astigmatism, coma, spherical aberration. And thus it is suitable to use deformable mirror with modal response function of actuators in order to reproduce these low-order aberrations. So in our work we applied bimorph deformable mirror. This kind of wavefront corrector can easily reproduce first 15-25 Zernike polynomials. To model wavefront profile we simply calculate and apply control voltages to our bimorph mirror electrodes.

That need to be account during real-time reproduction of the artificial human eye wavefront. The time of deformable mirror response also has an influence on system dynamics.

In our case in experiment the frequency of aberrations modeling is similar to the human eye aberrations (5-25 Hz). So we are able to say that our model of phase distortions reconstruction is real-time.

Primary author: Ms LYLOVA, Anna (Student)

Co-author: Prof. KUDRYASHOV, Alexis (Head of laboratory)

Presenter: Ms LYLOVA, Anna (Student)

Track Classification: Poster Presentation