

Kolobrodov V.G., Tymchik G.S., Kuchugura I.O. Design of the multiorder intraocular lenses

**Abstract.** Intraocular lenses (IOLs) are used to replace the natural crystalline lens of the eye. Just few basic designs of IOLs are used clinically. Multiorder diffractive lenses (MODL) which operate simultaneously in several diffractive orders were proposed to decrease the chromatic aberration. Properties analysis of MODL showed a possibility to use them to develop new designs of IOLs. The purpose of this paper was to develop a new method of designing of multiorder intraocular lenses with decreased chromatic aberration. The theoretical research of the lens properties was carried out. The diffraction efficiency dependence with the change of wavelength was studied. A computer simulation of MODL in a schematic model of the human eye was carried out. It is found the capability of the multiorder diffractive lenses to focus polychromatic light into a segment on the optical axis with high diffraction efficiency. At each point of the segment is present each component of the spectral range, which will build a color image in combination. The paper describes the new design method of intraocular lenses with reduced chromaticism and with endless adaptation. An optical system of an eye with an intraocular lens that provides sharp vision of objects located at a distance of 700 mm to infinity is modeled.

**Keywords:** multiorder intraocular lens, diffraction efficiency, endless adaptation.

[Full article](#)