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(54) **DETERMINATION OF OCULAR REFRACTION FROM WAVEFRONT ABERRATION DATA AND DESIGN OF OPTIMUM CUSTOMIZED CORRECTION**

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(57) **ABSTRACT**

Ocular refraction is determined from wavefront aberration data, and an optimum customized correction is designed. The eye's wave aberration is measured by using a detector such as a Shack-Hartmann detector. From the aberration, an image metric is calculated, and the second-order aberrations which optimize that metric are determined. From that optimization, the refractive correction required for the eye is determined. The image metric is one of several metrics indicating the quality of the image on the retinal plane or a proxy for such a metric. The required refractive correction can be used to form a lens or to control eye surgery. If it is possible to detect more aberrations than can be corrected, those aberrations are corrected which most affect vision, or for which the eye's error tolerance is lowest.

WEYE

-4.553
-0.833
-0.312
0.095
0.165
-0.083
-0.335
-0.016
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+

CORRECTING LENS

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?

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WOPTIMUM

0.350
-0.550
0.250
0.095
0.165
-0.083
-0.335
-0.016
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SPHERE = 3.75 D
CYLINDER = -0.75 D x 120