



US006199986B1

(12) **United States Patent**
Williams et al.

(10) **Patent No.:** **US 6,199,986 B1**
(45) **Date of Patent:** **Mar. 13, 2001**

(54) **RAPID, AUTOMATIC MEASUREMENT OF THE EYE'S WAVE ABERRATION**

WO 98/27863 7/1998 (WO) .

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/421,892**

(22) Filed: **Oct. 21, 1999**

(51) Int. Cl.⁷ **A61B 3/10**

(52) U.S. Cl. **351/221**

(58) Field of Search 351/205, 211, 351/212, 219, 221, 246, 247; 600/108; 606/7, 10-17, 130; 607/88, 89; 128/898; 356/123

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(57) **ABSTRACT**

A wavefront aberration of an eye is determined, e.g., in real time. The eye is illuminated, and the light reflected from the retina is converted into spots with a device such as a Hartmann-Shack detector. The displacement of each spot from where it would be in the absence of aberration allows calculation of the aberration. Each spot is located by an iterative technique in which a corresponding centroid is located in a box drawn on the image data, a smaller box is defined around the centroid, the centroid is located in the smaller box, and so on. The wavefront aberration is calculated from the centroid locations by using a matrix in which unusable data can be eliminated simply by eliminating rows of the matrix. Aberrations for different pupil sizes are handled in data taken for a single pupil size by renormalization.

62 Claims, 11 Drawing Sheets

