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Refractive Error Evaluation in Eccentric Photorefracation K. BAKER, B. TAN, L. SHI, Y. CHEN, J.W.L. LEWIS, University of Tennessee Space Institute, Tullahoma, TN — Eccentric photorefraction (EPR) is a technique to measure eye refractive errors (RE) particularly in non-cooperative children. A camera and a decentered light source are used to illuminate eyes and photograph the reflex. Recently the National Eye Institute VIP study examined 10 methods to screen the crucial children eye disorders including RE. The 3 EPR based devices were found to have lower detection sensitivities. The deficiency is inherent in the current optical designs and a lack of knowledge of parameters that influence RE analysis. The new EPR experimental design includes multi-eccentric-meridian illuminations, pupil finding algorithm, and feedback loop data acquisition. NIR is used to prevent chromatic aberration. A novel integrated intensity analysis is developed to control multiple intraocular scattering/reflection. The RE is calculated from the 21 normalized related intensities of the 2-D array illuminations. Using computer eye modeling and simulations, error analysis is performed for monochromatic aberrations and eye orientation. Experimental data comparison is obtained from a physical model eye.

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