Monocular visual simulator for researching on visual optics

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Visual optics is a topic of rising importance since two decades ago due to its relationship with different branches of science such as biology, robotics, medicine, engineering, etcetera. However, in Colombia there is not a big number of research groups that work on this interesting topic. For this reason, since 2013, the Optics and Photonics Group (Grupo de Óptica y Fotónica - GOF) from Universidad de Antioquia in Medellin - Colombia started to consolidate a line of work that allows to study different aspects related to the optics of the eye. Along this time, some experiments have been developed mainly to test several suitable optical elements for correcting presbyopia. In these experiments it has been used the Monocular Visual Simulator experimental setup as the main tool of research [1,2]. This system allows to emulate different conditions on the eye and to measure important parameters of the visual system such as visual acuity. In this seminar, the features of these experiments are shown. First a simple experiment about measurement of chromatic aberration of the eye is descripted. After, some experiments that study the ability of a special optical element with extended depth of focus for correcting presbyopia are discussed. This element is the Light Sword Lens which had been studied in an extensive way with objective experiments and computational simulations [3], but its study in subjective experiments is very recent [1]. Finally, two interesting experiments that have been carried out to evaluate the optical quality of commercial glasses and motorcycle visor helmets in Medellin are shown. These experiments were made with undergraduate students from Universidad Antonio Nariño in Colombia.

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