Digital Optics for Immersive Displays

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24–25 April 2018
Strasbourg, France

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Photonics 21 (Germany)
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Comité National d’Optique et de Photonique (France)

Published by
SPIE

Volume 10676
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Near-eye display performance is usually summarized with a few simple metrics such as field of view, resolution, brightness, size, and weight, which are derived from the display industry. In practice, near-eye displays often suffer from image artifacts not captured in traditional display metrics. Optical architectures. Optics in smart glasses serve three main purposes: Collimation of light such that the image appears at a greater distance than it's physical distance. Magnification of the display image to make it appear larger than it's actual size. Relaying of light patterns to the viewers eyes. Distortion. There are two primary optical design systems, or architectures for AR and VR displays: pupil forming and non-pupil forming. Fully immersive These are standard fully immersive virtual reality displays. These stereoscopic displays are combined with sensors to track position and orientation. They completely block the user's view of the outside world like in the book Ready Player One. The mechanical feasibility of curved micro-displays will also be discussed, as well as the process to make a curved microdisplay, which is compatible with current mass-production CMOS displays. For OLED technology, the main resistance to curvature is the silicon substrate. The case for GaN technologies shows other mechanical limitations.