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Digital Holography in Optics: Techniques and Applications

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Message from the Guest Editor

Digital holography is an emerging imaging technique incorporating numerical wavefront reconstruction, a technique which uses a digital sensor array (typically a CCD/CMOS image sensor or a similar devices) for the acquisition and processing of holograms and records the optical wave diffracted by the object onto the image sensor. No refractive lens is used and the usual depth-of-field and working distance limitations are replaced by less restrictive boundaries tied to the laser source coherence length and to the pixel pitch and chip size of the image sensor. Digital holography extends the field of application of machine vision and optical metrology by allowing for the attainment of a large range of depths of focus, working distances, and spatial resolutions that are inaccessible to refractive imaging systems. Furthermore, the rapid advancement of optical sensing, display, and computing technologies holds great promise for the future development and application of digital holography in optics.

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