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Holographic Optical Elements Based on Edge-lit Holograms

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Abstract

A holographic optical element (HOE) simultaneously accompanied with light guiding and beam shaping function is implemented with edge-lit holograms in this study. This holographic optical element is generated in a polymer-dispersed-liquid-crystal (PDLC) film with 20 μ m thickness. In the holographic reconstruction process of the HOE, the wavefronts emitted from the light source will propagate to the HOE and a quasi collimation diffraction beam can be obtained from this device. We demonstrate two applications of edge-lit HOE in this study. One demonstration is a head-mounted display (HMD) system, and the other is an illumination device for display holograms.

Key words : Beam shaping; Edge-lit holograms; Holographic optical element;
Light illumination