GPC-enhanced read-out of holograms.

The Generalized Phase Contrast (GPC) method has been demonstrated to reshape light efficiently to match the input beam profile requirement of different illumination targets. A spatially coherent beam can be GPC-shaped into a variety of static and dynamic profiles to match e.g. fixed commercially available modulation systems or for more irregular and dynamic shapes such as found in advanced optogenetic light-excitations of neurons. In this work, we integrate a static GPC light shaper to illuminate a phase-only spatial light modulator encoding dynamic phase holograms. The GPC-enhanced phase-holograms are encoded to create reconfigurable spot arrays and arbitrary extended patterns. For a given laser power, our experimental results show a significant intensity gain in the resulting diffraction patterns when we illuminate the holograms with a GPC-shaped beam as compared to the more common practice of hard truncation. The phase flatness of the GPC-enhanced readout beam has also been investigated.

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