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Title:Photorefractive two-wave mixing for image amplification in digital holography

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Abstract:We use photorefractive two-wave mixing for coherent amplification of the object beam in digital holographic recording. Both amplitude and phase reconstruction benefit from the prior amplification as they have an increased SNR. We experimentally verify that the amplification process does not affect the phase of the wavefield. This allows for digital holographic phase analysis after amplification. As the grating formation in photorefractive crystals is just driven by coherent light, the crystal works as a coherence gate. Thus the proposed combination allows for applying digital holography for imaging through scattering media, after the image bearing light is coherence gated and filtered out of scattered background. We show experimental proof-of-principle results.

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