Influence of the absorber dimensions on wavefront shaping based on volumetric optoacoustic feedback.

Abstract:

The recently demonstrated control over light distribution through turbid media based on real-time three-dimensional optoacoustic feedback has offered promising prospects to interferometrically focus light within scattering objects. Nevertheless, the focusing capacity of the feedback-based approach is strongly conditioned by the number of optical modes (speckle grains) enclosed in the volume that can be resolved with the optoacoustic imaging system. In this Letter, we experimentally tested the light intensity enhancement achieved with optoacoustic feedback measurements from different sizes of absorbing microparticles. The importance of the obtained results is discussed in the context of potential signal enhancement at deep locations within a scattering medium where the effective speckle grain sizes approach the minimum values dictated by optical diffraction.

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