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Holographic elements for Fourier transform

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Abstract

Problems of designing the holographic Fourier transform elements are described. First, two different configurations for a Fourier transform setup are considered. The converging beam Fourier transform (CB-FT) is simpler than the conventional parallel beam Fourier transform (PB-FT) setup, and it appears that it should be preferred in ordinary cases. But the advantage of the conventional configuration is to make the Fourier plane free of the spherical factor. In order to obtain an exact Fourier transform, the design of holographic lens is described with respect to its optimization. A major problem is to eliminate possibly all aberrations, especially distortion for high values of spatial frequencies, threrefore we have shown the advantage of curved holographic element which could be applied to Fourier transform operation.

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