

Holographic beam shaping of partially coherent light: supplement

NICOLAS BARRÉ* AND ALEXANDER JESACHER 

Institute of Biomedical Physics, Medical University of Innsbruck, Müllerstraße 44, 6020 Innsbruck, Austria

**Corresponding author: nicolas.barre@i-med.ac.at*

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This supplementary document contains further information on the physical working principles of our approach.

1. VISUALIZATION OF MODE-DEPENDENT LIGHT SHAPING

Figure S1 illustrates how two axially separated phase patterns Φ_1 and Φ_2 perform mode-dependent light transformations and how the desired target intensity pattern (a square in this case) is built up from the entity of mode contributions. The first three image columns show the intensity distributions of three individual modes (denoted as "A", "B" and "C") in the planes of the phase masks and the target plane. It is clearly visible that the target plane intensity distributions of the modes vary strongly: each mode is uniquely modified by the phase masks. Nevertheless, the cumulative contribution of all 1600 modes results in a speckle-free square shape of high fidelity. The added intensity distributions of all modes are shown in the fourth column. The fifth column contains the phase patterns used for shaping the square.

We further provide a video file visualizing the intensity distributions of all 1600 modes (Media S1). Analogously to Fig. S1, the video shows three images per mode, representing the intensities in the planes of the phase masks and the target plane.

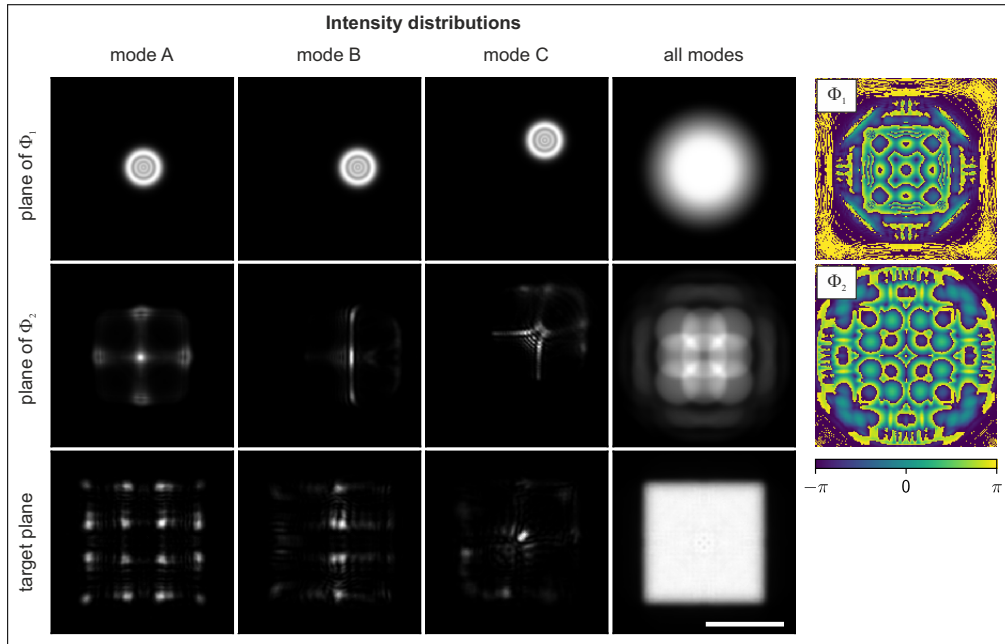


Fig. S1. Shaping arbitrary intensity patterns with partial coherent light. The figure illustrates how a user-defined intensity pattern (a square) is build up from the contributions of 1600 different spatial modes. The first three columns show the intensity distributions of three particular modes (denoted as "A", "B" and "C") in the planes of Φ_1 , Φ_2 and the target plane. Every mode is differently modified by the phase patterns, but their cumulative effect results in a speckle-free square. This is illustrated in the fourth column, which shows the total intensity of all modes. The scale bar measures 1 mm. The two colored images on the right represent the phase patterns used for shaping the square.