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Modal decomposition for wavefront reconstruction

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Abstract content
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We present a novel method for measuring the wavefront of laser beams based on modal decomposition using correlation filters. Accordingly, the beam under test is correlated with the modes encoded into the filter, which enables the reconstruction of the optical field in amplitude and phase and consequently the determination of Poynting vector and wavefront. The method is applied to aberrated free space Gaussian beams and beams emanating from optical fibers, for both, scalar and vector beams. Results are compared to those of a Shack-Hartmann wavefront sensor revealing excellent agreement, hence proving the high fidelity of wavefront reconstruction.

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