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Vector Optical Field Generator

The generation of arbitrary optical fields is of great interest in areas where exotic optical fields are desired, such as particle manipulation and beam shaping. In this work, an optical system that is capable of generating arbitrarily complex beam is proposed, built and tested for the first time to the best of our knowledge. Based on reflective, phase-only spatial light modulator, the Vector Optical Field Generator is capable of controlling all the aspects of light, including the phase, amplitude and polarization information spatially on a pixel by pixel basis. Various optical fields containing phase, amplitude or polarization modulation are generated and tested using Stokes parameter measurement. The system is expected to have promising potential as a novel and versatile beam generation system and may find applications in microscopy and lithography.

