USF Available Technologies

Technology Transfer Office

Measurement Apparatus of Wavefront and Polarization Profile of Vectorial Optical Fields

Researchers at the University of South Florida have devised a direct measurement method that is capable of characterizing fully polarized vector beams.

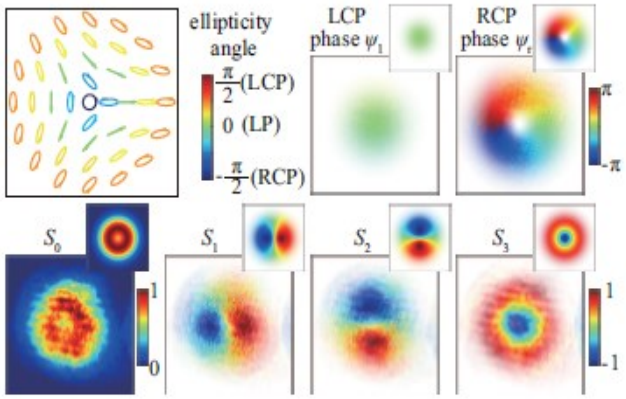
Polarization is one important property of light. This vector nature of light and its interactions with matter make many optical devices and optical system designs possible. Vector beams, characterized by their spatially-varying polarization states, have garnered tremendous popularity recently due to their potential applications in optical microscopy, optical metrology and optical communication. Over the past few years, many methods have been investigated to generate vector beams using e.g., spatial light modulators (SLM) and optical fibers. On the other hand, most studies characterize vector beams using imaging polarimetry, where intensity images are obtained of the beam after passing through polarization filtering. While such a method conveniently reveals the spatial polarization profile of vector beams, it does not provide any information about the relative phase between the fields at any two points across the beam. Hence, there is need for a direct measurement protocol that is capable of characterizing fully polarized vector beams.

Inventors at USF have developed a direct measurement method that is capable of characterizing the full transverse field profile of fully-polarized vector beams. The direct measurement process involves a separation of orthogonal polarization components, a weak polarization perturbation, and a polarization resolving imaging process. Polarization information provides a robust and versatile metrology tool for fundamental studies of vector beams and a wide spectrum of applications utilizing vector beams, including microscopy, surveillance, communication and imaging.

ADVANTAGES:

- **High data fidelity**
- **Versatile metrology tool**
- **Full characterization of vector beams**
- **Equally suited for classical and quantum regimes**

Capable of Measuring Fully-Polarized Vector Beam in a Single Shot



The Measured Phase of the Two Circular Polarization Components

Tech ID # 18A121

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