



Contribution ID: 214

Type: Oral Presentation

A beam quality measure for vector beams

Thursday, 7 July 2016 10:20 (20 minutes)

Abstract content (Max 300 words)
Formatting Special chars

Cylindrical vector (CV) beams are spatial modes of light with spatially variant polarization states in the transverse profile. Over the years, CV beams have found their way into plenty of applications ranging from material processing and lithography to electron acceleration and particle trapping.

Though qualitative measurements are routinely used to analyse CV beams, there is no quantitative measure of CV beam purity. Here, we introduce new measure, the vector quality factor (VQF), that maps the purity of CV beams to a scale ranging from 0 to 1. We demonstrate a simple optical setup to generate and detect CV beams using a birefringent phase plate known as a q-plate. Real time tomographic measurements are performed using principles of modal decomposition and demultiplexing. Real time measurements are encoded as a demultiplexing of the modal decomposition of the CV beam into its circular basis states. The measurements give a twelve on-axis intensity outputs represent full state tomography which used to evaluate the VQF of CV beams.

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yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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Session Classification: Photonics

Track Classification: Track C - Photonics