



Contribution ID: 235

Type: Oral Presentation

Comparison of phase-dependent only and complete Laguerre-Gaussian beams using modal decomposition

Thursday, 14 July 2011 08:15 (15 minutes)

Laguerre-Gaussian (LG) beams possess many interesting properties, one of which is that they carry orbital angular momentum, an extrinsic component of angular momentum, when the electric field or mode has an azimuthal angular dependence of $\exp(il\phi)$, where l is the azimuthal mode index. These beams are easily generated using spatial light modulators (SLMs), where a Gaussian beam incident on an SLM is shaped according to a predetermined phase pattern. For LG beams, this phase pattern has typically only included the azimuthally dependent phase component of the field, ignoring the amplitude and radial components present in the full LG expression. Although this approximation has yielded azimuthal modes which compare well with theory, it excites higher order transverse modes. We show both theoretically and experimentally, using a method of modal decomposition, that higher order transverse modes are excited. The results were compared to the full LG expression, where no higher order modes were seen. This is of particular interest regarding the orbital angular momentum carried by these beams.

Level (Hons, MSc, PhD, other)?

PhD

Consider for a student award (Yes / No)?

Yes

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

No

Primary author: Ms MCLAREN, Melanie (CSIR)

Co-authors: Prof. FORBES, Andrew (CSIR); Dr ROUX, Stef (CSIR)

Presenter: Ms MCLAREN, Melanie (CSIR)

Session Classification: LOS

Track Classification: Track C - Lasers, Optics and Spectroscopy