

Radial modes in phase-only twisted light beams

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ABSTRACT:

Beams carrying orbital angular momentum (OAM) are ubiquitous in many experiments carried out today and cover a wide range of research, from surface microstructure processing to optical tweezers and communications. It follows that these beams are a significant factor in the outcome of these research areas. They are often generated through the use of phase-only modulation with elements such as SLMs and q-plates due to the simplicity of the approach. Interesting consequences result from this generation principal which include the introduction of radial modes as they propagate. We experimentally demonstrate how this effects the distribution of power where a notable decrease in the desired fundamental mode power occurs with higher OAM beams in addition to an expansion in the power across these radial modes. This research additionally affirms their mathematical description as the recently introduced Hypergeometric-Gaussian beams.