

Intra-cavity generation of superpositions of Laguerre–Gaussian beams

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Abstract

In this paper we demonstrate experimentally the intra-cavity generation of a coherent superposition of Laguerre–Gaussian modes of zero radial order but opposite azimuthal order. The superposition is created with a simple intra-cavity stop that creates equal losses for the two azimuthal modes, and we show that by adjustment of the stop we can produce modes up to azimuthal order 8. The fact that we have a coherent superposition rather than an incoherent superposition is verified by intensity measurements, propagation measurements and a decomposition of the field by an inner product executed on a phase-only spatial light modulator. Such fields have relevance in quantum information and optical trapping.