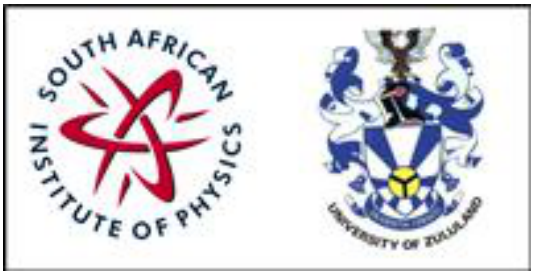

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Efficient sorting of Bessel beams

Tuesday, 9 July 2013 11:30 (20 minutes)

Abstract content
   (Max 300 words)

High order Bessel beams are characterized by the azimuthal mode index, ℓ and radial component, kr, as a result they carry orbital angular momentum (OAM) and their far-field forms an annular ring of radius, R .These beams form in a region where parallel plane waves interfere in a conical manner. A method of separating the azimuthal, ℓ and radial, kr components of the Bessel Beams using cylindrical lenses [1] and an efficient orbital angular momentum (OAM) sorter [2] optical system is illustrated here. A conformal mapping technique [2] was used to achieve the sorting of Bessel beams, where the annular ring (Fourier transform of a Bessel beam) was mapped to a linear phase variation along the horizontal direction. A series of cylindrical lenses simultaneously Fourier transformed the transverse momentum states and imaged the unraveled annular ring to a detector plane, where the position of the detected spot is dependent on the amount of OAM it carries and its radial wave vector.

[1] A. Dudlely, T. Mhlanga, M. Lavery, A. Mcdonald, F. Roux, M. Padgett, A. Forbes, "Efficient sorting of Bessel beams,"Opt.Express 21(1), 165-171, (2013)
[2]Gregorius C. G. Berkhout, Martin P. J. Lavery, Marco W. Beijersbergen, Miles J. Padgett, "Efficient sorting of angular momentum of light," *PhysRevLett.105 (16).153601 (2010)

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