

Quantum Physics

Continuous Variable Entanglement and Squeezing of Orbital Angular Momentum States

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We report the first experimental characterization of the first-order continuous variable orbital angular momentum states. Using a spatially non-degenerate optical parametric oscillator (OPO) we produce quadrature entanglement between the two first-order Laguerre-Gauss modes. The family of OAM modes is mapped on an orbital Poincare sphere, and the modes position on the sphere is spanned by the three orbital parameters. Using the non-degenerate OPO we produce squeezing of these parameters, and as an illustration, we reconstruct the "cigar-shaped" uncertainty volume on the orbital Poincare sphere.

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