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Bessel-Gaussian entanglement

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Abstract content
 (Max 300 words)

Quantum entanglement of Bessel-Gaussian (BG) modes in the orbital angular momentum (OAM) basis offers a number of advantages over the more commonly used Laguerre-Gaussian (LG) modes. Unlike the LG modes, the continuous scalable radial parameter of the BG modes, allows greater control over quantum state preparation, allows a greater number of OAM modes to be measured, thereby increasing the degree of entanglement of the measured quantum state. We demonstrate entanglement in terms of the BG modes and show that a greater number of OAM modes are measured than with the LG modes. Classically, another useful property enables the amplitude and phase of a BG beam to be reconstructed after encountering an obstruction. We demonstrate that the reconstruction property of BG modes can be observed in quantum entanglement by calculating the concurrence of the quantum state at different positions of the obstruction.

Apply to be
 considered for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

PhD

Main supervisor (name and email)
and his / her institution

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No

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