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Extracting Entangled Pulses from Continuous-Wave Photon Sources

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Squeezed light is a versatile resource for optical quantum computing, sensing, and communication. However, light sources usually require extensive and precise optimization for generating a pulse with the desired shape, resulting in inflexible state preparation. In our work, we address this problem by presenting a protocol for extracting pure squeezed states with arbitrary pulse shape by "cutting out"the desired output from a collection of squeezed modes. We achieve this by using the nullifier formalism to describe the state of the output modes, and show that selective heterodyne detections on temporal modes will cause the desired state to be disentangled from other, undesired modes. We find that using this method we are able to deterministically prepare single- and two-mode squeezed state in any shape from a continuum source, and projectively measure arbitrary states in any pulse onto the squeezed bases.

Keyword-1

Quantum Optics

Keyword-2

Quantum Information

Keyword-3

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