

Abstract Submitted  
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**Entropy of entanglement in continuous frequency space of the biphoton state from multiplexed cold atomic ensembles**<sup>1</sup> HSIANG-HUA JEN, Institute of Physics, Academia Sinica, Taiwan — We consider a scheme of multiplexed cold atomic ensembles that generate a frequency-entangled biphoton state with controllable entropy of entanglement. The biphoton state consists of a telecommunication photon (signal) immediately followed by an infrared one (idler) via four-wave mixing with two classical pump fields. Multiplexing the atomic ensembles with frequency and phase-shifted signal and idler emissions, we can manipulate and control the spectral property of the biphoton state. Mapping out the entropy of entanglement in the scheme provides the optimal configuration for entanglement resources. This paves the way for efficient long-distance quantum communication and for potentially useful multimode structures in quantum information processing.

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