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Noise-robust quantum LiDAR with temporal long single photon and phase-modulation technique

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Quantum LiDAR is a method that combines quantum light sources with LiDAR techniques, leveraging quantum characteristics for sensing applications. However, in practical scenarios, immense noise and low reflection rates often cause quantum light to be overwhelmed by classical light, reducing its efficiency. Inspired by the spread spectrum technique, we implement phase modulation at both the sender and receiver, which serves as an encoding and decoding scheme to effectively filter out unwanted noise. In this poster, we demonstrate the effectiveness of the LiDAR system by achieving a high signal-to-noise ratio in a noisy environment and analyze the impact of transmission rate variations on the target, highlighting its advantages and potential applications. We believe this technique has great potential to enhance the practical viability of quantum LiDAR and bring it closer to real-world conditions.

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