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**Entanglement verification with detection efficiency mismatch**

YANBAO ZHANG, NORBERT LÜTKENHAUS, Institute for Quantum Computing Department of Physics and Astronomy, University of Waterloo — Entanglement is a necessary condition for secure quantum key distribution (QKD). When there is an efficiency mismatch between various detectors used in the QKD system, it is still an open problem how to verify entanglement. Here we present a method to address this problem, given that the detection efficiency mismatch is characterized and known. The method works without assuming an upper bound on the number of photons going to each threshold detector. Our results suggest that the efficiency mismatch affects the ability to verify entanglement: the larger the efficiency mismatch is, the smaller the set of entangled states that can be verified becomes. When there is no mismatch, our method can verify entanglement even if the method based on squashing maps [PRL 101, 093601 (2008)] fails.

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