

Abstract Submitted  
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**Comparison between Two Practical Methods of Light Source Monitoring in Quantum Key Distribution<sup>1</sup>** GAN WANG, ZIYANG CHEN, Peking University, BINGJIE XU, Institute of Southwestern Communication, ZHENGYU LI, XIANG PENG, HONG GUO, Peking University — The practical security of a quantum key distribution (QKD) is a critical issue due to the loopholes opened by the imperfections of practical devices. The untrusted source problem is a fundamental issue that exists in almost every protocol, including the loss-tolerant protocol and the measurement-device-independent protocol. Two practical light source monitoring methods were proposed, i.e., two-threshold detector scheme and photon-number-resolving (PNR) detector scheme. In this work, we test the fluctuation level of different gain-switched pulsed lasers, i.e., the ratio between the standard deviation and the mean of the pulse energy (noted as  $\gamma$ ) changes from 1% to 7%. Moreover, we propose an improved practical PNR detector scheme, and discuss in what circumstances one should use which light source monitoring method, i.e., generally speaking when the fluctuation is large the PNR detector method performs better. This provides an instruction of selecting proper monitoring module for different practical systems.

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