

# Polarization-basis tracking scheme for quantum key distribution using revealed sifted key bits

Yu-Yang Ding, Wei Chen,\* Hua Chen, Chao Wang, Ya-Ping li,

Shuang Wang, Zhen-Qiang Yin, Guang-Can Guo, and Zheng-Fu Han

*Key Laboratory of Quantum Information, CAS, University of Science and Technology of China, Hefei 230026, China*

*Synergetic Innovation Center of Quantum Information and Quantum Physics,*

*University of Science and Technology of China, Hefei, Anhui 230026, China* \\

(Dated: July 16, 2017)

Calibration of the polarization basis between the transmitter and receiver is an important task in quantum key distribution. An continuously working polarization-basis tracking scheme will effectively promote the efficiency of the system and reduce the potential security risk when switching between the transmission and calibration modes. Here, we proposed a single-photon level continuously working polarization basis tracking scheme using only sifted key bits revealed during error correction procedure, without introducing additional reference light or interrupting the transmission of quantum signals. We applied the scheme to a polarization-encoding BB84 QKD system in a 50km fiber channel, and obtained an average quantum bit error rate of 2.32% and a standard derivation of 0.87% during 24 hours of continuous operation. The stable and relatively low QBER validates the effectiveness of the scheme.

---

\* Weich@ustc.edu.cn