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Experimental unconditionally secure bit commitment YANG LIU, YUAN CAO, University of Science and Technology of China, MARCOS CURTY, University of Vigo, SHENG-KAI LIAO, JIAN WANG, KE CUI, YU-HUAI LI, ZE-HONG LIN, QI-CHAO SUN, DONG-DONG LI, HONG-FEI ZHANG, YONG ZHAO, TENG-YUN CHEN, CHENG-ZHI PENG, QIANG ZHANG, University of Science and Technology of China, ADAN CABELLO, Universidad de Sevilla, JIAN-WEI PAN, University of Science and Technology of China — Quantum physics allows unconditionally secure communication between parties that trust each other. However, when they do not trust each other such as in the bit commitment, quantum physics is not enough to guarantee security. Only when relativistic causality constraints combined, the unconditional secure bit commitment becomes feasible. Here we experimentally implement a quantum bit commitment with relativistic constraints that offers unconditional security. The commitment is made through quantum measurements in two quantum key distribution systems in which the results are transmitted via free-space optical communication to two agents separated with more than 20 km. Bits are successfully committed with less than 5.68×10^{-2} cheating probability. This provides an experimental proof of unconditional secure bit commitment and demonstrates the feasibility of relativistic quantum communication.

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