Quantum cryptography keys for secure communication distributed 1,000 kilometers farther than previous attempts

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Jian-Wei Pan and colleagues circumvented the need for repeaters by using a satellite to establish a secure link between two ground stations on Earth, using entangled photons. Entangled photons are linked in such a way that, even when separated by long distances, outcomes of measurements of their quantum properties are perfectly correlated. Two telescopes, designed to receive such quantum signals, were built 1,120 kilometers apart in Delingha and Nanshan in China. Entangled photons produced by the Micius satellite are transmitted to the ground as the satellite passes over the stations. Although satellite-based entanglement distribution has been reported before, the authors have now increased their transmission efficiency and reduced error rates enough to use entanglement to transmit quantum keys. They show that the system produces a secure channel that is resistant to attacks.

The results represent a path toward entanglement-based global quantum networks, the authors conclude.


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