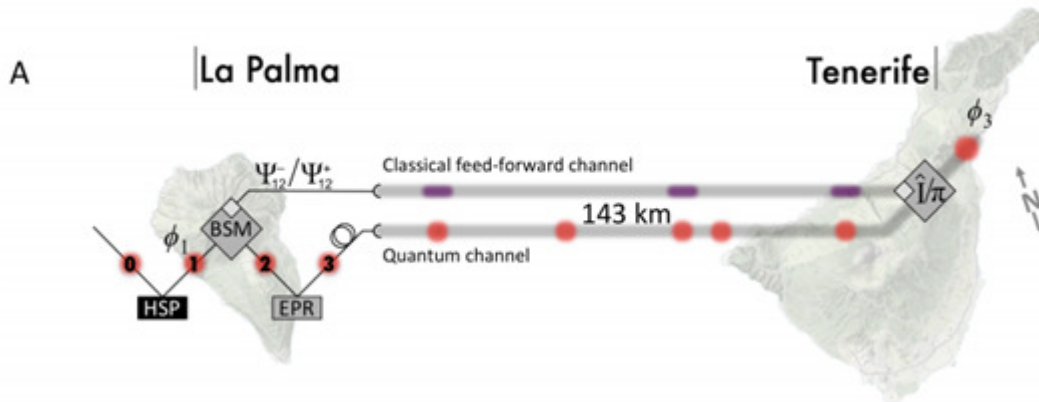


Major step achieved for future satellite-based quantum teleportation



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Quantum teleportation is a quintessential prerequisite of many quantum information processing protocols. By using quantum teleportation, one can circumvent the no-cloning theorem and faithfully transfer unknown quantum states to a party whose location is even unknown over arbitrary distances. Ever since the first experimental demonstrations of quantum teleportation of independent qubits and of squeezed states, researchers have progressively extended the communication distance in teleportation, usually without active feed-forward of the classical Bell-state measurement result which is an essential ingredient in future applications such as communication between quantum computers. Here they report the first long-distance quantum teleportation experiment with active feed-forward in real time. The experiment employed two optical links, quantum and classical, over 143 km free space between the two Islands. To achieve this, the experiment had to employ novel techniques such as a frequency-uncorrelated polarization-entangled photon pair source, ultra-low-noise single-photon detectors, and entanglement-assisted clock synchronization. The average teleported state fidelity was well beyond the classical limit of $2/3$. Furthermore, They confirmed the quality of the quantum teleportation procedure (without feed-forward) by complete quantum process tomography. Their experiment confirms the maturity and applicability of the involved technologies in real-world scenarios, and is a milestone towards future satellite-based quantum teleportation.

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