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Quantum teleportation from light beams to vibrational states of a macroscopic diamond.[1] PANYU HOU, YUANYUAN HUANG, XINXING YUAN, XIUYING CHANG, CHONG ZU, LI HE, IIIS, Tsinghua University, LUMING DUAN, IIIS, Tsinghua University,Department of Physics, University of Michigan, CENTER FOR QUANTUM INFORMATION, IIIS, TSINGHUA UNIVERSITY, BEIJING 100084, PR CHINA TEAM, DEPARTMENT OF PHYSICS, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN 48109, USA TEAM
— Quantum teleportation is an unusual disembodied form of quantum information transfer through pre-shared entanglement and classical communication, which has found important applications for realization of various quantum technologies. It is of both fundamental interest and practical importance to push quantum teleportation towards macroscopic objects. With the recent development of optomechanics, the vibration in solids, involving collective motion of trillions of atoms, gradually enters into the realm of quantum control. Built on the recent remarkable progress in optical control of motional states in diamond, we report an experimental demonstration of quantum teleportation from light beams to vibrational states of a macroscopic diamond under ambient conditions. Through quantum state tomography, we demonstrate an average teleportation fidelity $(90.6\pm1.0)\%, exceeding the classical limit of 2/3. The experiment pushes the target of quantum teleportation to$

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