Quantum Physics

Demonstration of Quadrature Squeezed Surface-Plasmons in a Gold Waveguide

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We report on the efficient generation, propagation, and re-emission of squeezed long-range surface-plasmon polaritons (SPPs) in a gold waveguide. Squeezed light is used to excite the non-classical SPPs and the re-emitted quantum state is fully quantum characterized by complete tomographic reconstruction of the density matrix. We find that the plasmon-assisted transmission of non-classical light in metallic waveguides can be described by a Hamiltonian analogue to a beam splitter. This result is explained theoretically.

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