

Abstract Submitted
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Construction of optimal witness for unknown two-qubit entanglement S.-S.B. LEE, Department of Physics, Korea Advanced Institute of Science and Technology, H.S. PARK, H. KIM, S.-K. CHOI, Korea Research Institute of Standards and Science, H.-S. SIM, Department of Physics, Korea Advanced Institute of Science and Technology — Whether entanglement in a state can be detected, distilled, and quantified without full state reconstruction is a fundamental open problem. We demonstrate a new scheme encompassing these three tasks for arbitrary two-qubit entanglement, by constructing the optimal entanglement witness for polarization-entangled mixed-state photon pairs without full state reconstruction. With better efficiency than quantum state tomography, the entanglement is maximally distilled by newly developed tunable polarization filters, and quantified by the expectation value of the witness, which equals the concurrence. This scheme is extendible to multiqubit Greenberger-Horne-Zeilinger entanglement. This work is to appear in Physical Review Letters.

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