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Entanglement certification from theory to experiment

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Abstract

Entanglement certification and certification of high efficiencies for ensuring the security of quantum communication, improving the sensitivity of sensing devices, and benchmarking devices for quantum computation and simulation.

Recent years have seen continuous progress in the development of tools for entanglement certification and an increase in control over a wide variety of experimental setups suitable for entanglement creation.

Tools for the development of entanglement witnesses have undergone a major independence and assumption-free certification.

Current challenges include the extension of well-understood methods for two qubits to many-body and/or high-dimensional quantum systems and their application in entanglement experiments with ions, atoms and photons.

An important focus of recent research has been the reduction in the number of measurements required for entanglement certification to cope with increasing system dimensions.

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