Advances in photonic quantum sensing

Quantum sensing has become a broad field. It is generally related with the idea of using quantum resources to boost the performance of a number of practical tasks, including the radar-like detection of faint objects, the readout of information from optical memories, and the optical resolution of extremely close point-like sources. Here, we first focus on the basic tools behind quantum sensing, discussing the most recent and general formulations for the problems of quantum parameter estimation and hypothesis testing. With this basic background in hand, we then review emerging applications of quantum sensing in the photonic regime both from a theoretical and experimental point of view. Besides the state of the art, we also discuss open problems and potential next steps.

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