

Hybrid Quantum Light Sources: Uniting Classical and Non-Classical Photons for Efficient Quantum Communication at Telecom Wavelengths

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Quantum communication holds the promise of revolutionizing secure data transmission, with quantum light sources playing a pivotal role in its realization. The introduction of the concept of hybrid quantum light sources, which merge classical and non-classical photon generation mechanisms to achieve efficient quantum communication at telecom wavelengths. By combining the advantages of classical and non-classical photon sources, such as high brightness and controllability with quantum coherence and entanglement, respectively, hybrid sources offer a versatile platform for quantum communication protocols. This contribution discusses the principles behind hybrid quantum light sources, their design considerations, and potential applications in quantum key distribution, quantum teleportation, and quantum networking. Furthermore, it explores recent advancements and challenges in realizing efficient hybrid sources tailored for telecom and near infrared wavelengths, highlighting their significance in advancing quantum communication technologies towards practical deployment.