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Robust quantum state transfer without impedance matching MENGZHEN ZHANG, CHANGLING ZOU, LIANG JIANG, Yale University — Quantum state transfer is essential for building scalable quantum networks. Utilizing the ability of transferring quantum states between different frequency domains, people can combine the advantages of microwave and optical quantum processing and communication units. Many protocols aimed at achieving perfect continuous variable quantum state transfer are based on impedance matching condition, which is not always available in practical experiments and is usually constrained by bandwidth of the device. We come up with a new perfect state transfer scheme without this limitation. By utilizing squeezed modes, homodyne measurement and feedforward, we show perfect quantum state transfer is almost always achievable for an arbitrary linear unitary transformation process. We find this protocol is robust against practical imperfections and can be applied to various kinds of bosonic coupling systems.

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