

Photonic platform for real-time quantum reservoir computing

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Quantum Reservoir Computing (QRC) is a promising field that aims to exploit the information processing capabilities of quantum systems to solve non-trivial temporal tasks. However, the stochastic nature of quantum measurements imposes some restrictions on QRC platforms, which makes it challenging to process information in real time. In this work, we propose a photonic platform suitable for real-time QRC. We generate a physical ensemble of reservoirs in the form of identical optical pulses recirculating through a closed optical fiber loop (quantum memory). We compare the performance of the platform in the infinite and finite ensemble regimes.

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- [1] Jorge García-Beni, Gian Luca Giorgi, Miguel C. Soriano and Roberta Zambrini. *Scalable photonic platform for real-time quantum reservoir computing*, arXiv.2207.14031 [quant-ph], 2023.

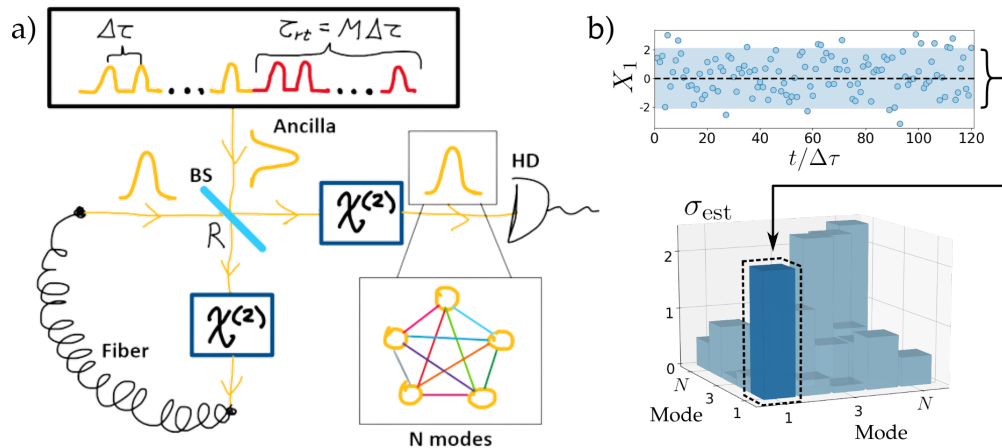


FIG. 1. **Scheme of the process:** (a) Schematical drawing of the proposed platform for quantum reservoir computing; (b) example of a series of the measured x -quadrature of the first mode for each ensemble pulse (horizontal axis) and a 3D representation of the estimated covariance matrix.