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Photonic quantum machine learning

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Abstract

After a brief overview of quantum photonic technology, I will present the recent demonstration of a deterministic time-reversal protocol for qubit evolutions by exploiting so-called quantum-switches that superimpose the order of quantum operations. Then I will show experimental results of reinforcement learning using a tunable photonic nanoprocessor, where the learning of the machine is enhanced with respect to classical architectures. In addition, I will discuss our development of a so-called quantum memristor for single photons. Such devices, which are capable of mimicking the behavior of neurons and synapses, are promising for quantum neural networks.