

Plenary Talk PV XIX Fri 9:45 RW 1
Quantum Photonics for Quantum Computing and Machine Learning — ●PHILIP WALTHER — University of Vienna, Faculty of Physics, Vienna Center for Quantum Science and Technology (VCQ), Vienna, Austria

After providing a brief overview of recent advancements in the generation and processing of multi-photon states, I will show the potential of photonic quantum machine learning. After presenting a quantum-enhanced reinforcement learning using a tunable integrated processor, I will discuss our development of a so-called quantum memristor for

single photons. These devices, which can mimic the behavior of neurons and synapses, hold great promise for the realization of quantum neural networks. I will also present how photonic processors can implementing quantum-enhanced kernels for machine learning tasks. At the end I will change topic by briefly discussing the flexibility of photonic systems for tasks that require non-standard quantum computer architectures; and potentially update about our ongoing experimental research aiming to explore the interface between quantum mechanics and general relativity by performing high-precision experiments using entangled photon states as probe.