

IQSE AMO QO Seminar Series

Tuesday, January 31st, 11:10 am ZOOM & IQSE
seminar room (MPHY 578)

Pizza will be served for IQSE members at 10:40 am. The talk will start around 11:10 am

Dr. Susanne Yelin

(Harvard University)

Brain-inspired quantum machine learning

ABOUT THE SPEAKER: Dr. Yelin is Professor in Residence at the Department of Physics at Harvard University and Professor at the Department of Physics at the University of Connecticut. Prof. Yelin's research interests are in theoretical quantum optics and quantum information science. Current research directions include quantum control of ultracold polar molecules, investigation of novel coherence-based optical elements, single-photon nonlinear optics using dipolar systems, coherent metamaterials and negative refractivity, coherent control in condensed matter systems, and superradiance.

EVENT DETAILS: Quantum neuromorphic computing (QNC) is a subfield of quantum machine learning (QML) that capitalizes on inherent system dynamics. As a result, QNC can run on contemporary, noisy quantum hardware and is poised to realize challenging algorithms in the near term. We show that a present-day programmable quantum simulator has all the features to allow the learning of several cognitive tasks such as multitasking, decision-making, and long-term memory by taking advantage of several key features of such a platform. One key element yet to be added to such modes is the characterization of the requisite dynamics for universal quantum neuromorphic computation. We address this issue by proposing a quantum perceptron, a simple mathematical model for a neuron that is the building block of various machine learning architectures and demonstrate that it can realize universal quantum computation. The effectiveness of this architecture can then also be shown by applying it to, e.g., calculating the inner products between quantum states, entanglement witnessing, and quantum metrology.

ZOOM information:

<https://tamu.zoom.us/j/98156251523?pwd=QVdSdGxtL1UyY0g1L083SU5QR0QrUT09>

Meeting ID: 981 5625 1523

Passcode: 297578

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