



HARVARD UNIVERSITY
17 Oxford Street
Cambridge, MA 02138

Mathematical Picture Language Seminar

Tuesday, November 5

9:30 a.m. Boston time

Jefferson 453

Steven Girvin

Yale Quantum Institute

Adventures in Phase Space: Non-commuting coordinates meet quantum control and quantum error correction

Abstract: Rapid advances in quantum computation are placing new demands on our ability to precisely control bosonic modes (quantum harmonic oscillators) for the purposes of quantum communication, computation, simulation, and error-correction. It turns out that with only classical control signals, it is not possible to achieve universal quantum control of a harmonic oscillator. I will describe new techniques being developed for universal control of hybrid systems consisting of harmonic oscillators coupled to either anharmonic oscillators or two-level qubits. Our newfound ability to 'sculpt' arbitrary quantum distributions in phase space benefits from beautiful pictures that provide us with intuition for using the non-commutativity of the phase space coordinates (position and momentum) for designing efficient control sequences and instruction set architectures.



Zoom QR Code & Link:

<https://harvard.zoom.us/j/779283357?pwd=MitXVm1pYUIJVzZqT3lwV2pCT1ZUQT09>

<https://mathpicture.fas.harvard.edu/seminar>