SPEAKER
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TITLE
"Quantum Measurements in Cavity Optomechanics"

ABSTRACT
Over the last several years, research in the field of cavity optomechanics has developed extraordinarily sensitive devices and clever measurement techniques to probe macroscopic mechanical systems in the quantum regime. If one observes carefully, the noise in optically detected mechanical resonators can reveal a remarkable tale of the fundamental quantum mechanics of measurement embodied by Heisenberg's microscope type physics. In this talk, I will review the basic consequences of quantum measurement backaction in the context of recent cavity optomechanics experiments ranging from nanoscale integrated photonic devices, to millimeter scale vibrating membranes, to extremely large interferometric gravitational wave observatories. I will then discuss how these effects are being harnessed for useful purposes. Examples include manipulating the quantum state of light with only a flexible mirror and using the size of quantum noise as a fundamental scale for metrology.