

**COUPLING MICROMECHANICAL OSCILLATORS TO HIGH-FINESSE
OPTICAL CAVITIES VIA RADIATION PRESSURE**

Jack Harris
YALE University, USA

Macroscopic mechanical objects couple to optical fields via radiation pressure. When this coupling is strong enough, the quantum fluctuations of the optical fields can influence the mechanical object. A classic example of this influence is the shot noise of the radiation pressure exerted on a mirror by a laser. Achieving such a strong optomechanical coupling is quite challenging in practice. The most promising route to date has been to couple sensitive micromechanical elements to high finesse optical cavities.

We have developed a novel technique for increasing this coupling, and demonstrate that it can be used to cool the Brownian motion of a micromechanical element from 300 K to below 300 mK. We will discuss the prospects for observing quantum effects in these devices.

This work was supported by NSF grant #055824