Applied Physics & OSA

Optics Seminar

Strong dispersive coupling between a high finesse cavity and a micromechanical object

Prof. Jack Harris

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Abstract:

Radiation pressure provides a unitary coupling between the electromagnetic field and the center-of-mass motion of macroscopic objects. This coupling provides a promising route towards seeing quantum phenomena on surprisingly large scales. Experimental progress in this area has been extremely rapid and the field now stands just at the edge of the quantum regime. I will describe a new type of optomechanical system that seems to resolve a number of the remaining technical and fundamental challenges. This system has already demonstrated laser cooling from room temperature to 7 mK, and allows us to realize a "position-squared" measurement – a key requirement for observing quantum jumps of a mechanical oscillator.

Brief Biography:

Jack Harris graduated in 1994 with an A.B. from Cornell University. His graduate work was carried out in David Awschalom's group at UCSB, and used sensitive micromechanical devices to study thermodynamic properties of quantum Hall systems. After graduating in 2000 he worked as a postodoc in the Harvard/MIT Center for Ultracold Atoms, developing new atom-trapping techniques under John Doyle and Wolfgang Ketterle. In 2004 he joined the Yale Physics and Applied Physics Departments. He conducts research on the interface of micromechanics, cavity quantum optics, and mesoscopic electronics.

Tuesday, January 22nd, 2008.
5:00pm-6:00pm.
Watson 104

Refreshments will be available in the Watson Lobby at 4:45pm