

Optomechanics: How Light Impacts Mechanics

Instructor:

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Description:

Optomechanical systems also offer one of the most sensitive methods for detecting mechanical motion using shifts in the optical resonance frequency of the optomechanical resonator. The MEMS community is familiar with white light interferometry (eg. Polytec) to observe and measure mechanical motion. Chip-scale optomechanics performs the same function with guided laser light with displacement sensitivity better than 10 attometer/rt.Hz.

The tutorial will begin with theory, design, fabrication and characterization of Optomechanical systems. It will then cover experimental progress to prepare quantum states of mechanical structures, and discuss applications such as Opto-Acoustic Oscillator (OAO) [1] and Cavity-enhanced Optomechanical Accelerometer (COMA) [2].

Biography:

Sunil received the B.S. and Ph.D. degrees from Berkeley in EECS in 1998 and 2004 respectively. In October 2004, he joined the faculty of Cornell, where he is presently an Associate Professor in Electrical Engineering. Sunil received the NSF CAREER Award in 2007 and the DARPA Young Faculty Award in 2008. His students have received the Best Student Paper Award at Ultrasonics 2009 and the Roger A. Haken Best Student Paper Award at IEDM 2007.

Sunil is co-founder of Silicon Clocks, which was acquired by Silicon Labs in April 2010. He is currently on industrial leave in Boston.

References:

[1] http://oxidemems.ece.cornell.edu/papers/MEMS2012_NitrideOMO.pdf

[2] http://oxidemems.ece.cornell.edu/papers/MEMS2012_ZCOMA.pdf