

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Dispersive optomechanical coupling between a SiN nanomechanical oscillator and evanescent fields of a silica optical resonator CHUNHUA DONG, THEIN HTAY OO, VICTOR FIORE, HAILIN WANG, Department of Physics and Oregon Center for Optics University of Oregon, Eugene, Oregon 97403, USA — Tensile stressed SiN nanostrings can feature a picogram effective mass and a mechanical Q-factor exceeding a million. These remarkable nanomechanical oscillators can be dispersively-coupled to an ultra-high finesse optical microresonator via its evanescent field [1]. This composite optomechanical system can potentially lead to a cooperativity that far exceeds that of monolithic optomechanical resonators. Here, we report an experimental study coupling a SiN nanostring to evanescent fields of a whispering gallery mode (WGM) in a silica microsphere. The slight deformation of the microsphere enables us to use free-space optical excitation to probe the optomechanical coupling. The dispersive coupling between a nanostring and the evanescent field of a WGM is generally expected to lead to a red shift in the resonance frequency of the WGM [1]. Our experiments, however, reveal a blue frequency shift of the WGM. Detailed experimental studies and possible physical mechanisms for the blue shift will be presented. 1. G. Anetsberger, et al, Nat. Phys. **5**, 909-914 (2009).

Chunhua Dong
Department of Physics and Oregon Center for Optics
University of Oregon, Eugene, Oregon 97403, USA

Date submitted: 28 Nov 2012

Electronic form version 1.4