Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Efficient and Sensitive Readout of Nanomechanical Resonator Arrays JARED HERTZBERG, PATRICK TRUITT, University of Maryland, K. C. SCHWAB, Laboratory for Physical Sciences — We have developed and demonstrated a simple and sensitive method to readout arrays of radio frequency nanomechanical resonators. The technique relies on an impedance-matching network to efficiently match a dc-voltage biased, capacitively coupled resonator to 50 ohms. We have fabricated and measured an array of 30, 10MHz resonators in this fashion, where groups of resonators may be selected for measurement by the application of the dc bias. The voltage applied to the gates also shifts the resonator frequency, revealing an interaction and frequency splitting between perpendicular, degenerate vibrational modes. This technique will find its utility in practical applications of nanomechanics as in ultra-sensitive mass or force detections, as well as in more fundamental studies involving quantum interaction and measurement with solid-state qubits.

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Date submitted: 03 Dec 2004 Electronic form version 1.4