

Abstract Submitted
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Field Emission from a Nanomechanical Pillar¹ HYUN KIM, HUA QIN, ROBERT BLICK, Laboratory for Molecular Scale Engineering, Electrical and Computer Engineering, University of Wisconsin-Madison, MICHAEL WEST-PHALL, LLOYD SMITH, Department of Chemistry, University of Wisconsin-Madison — We have measured the field emission in a nano-electromechanical structure in which a nanometre silicon pillar oscillates in between the source and drain electrodes. The device consists out of a mechanically flexible pillar with a length of some 200 nm and a diameter of some 50 nm and allows for mechanical resonant excitations at radio frequencies (10 ~ 1000 MHz) and mechanical clocking of the field emitted electrons. Operation of the device at room temperature in the frequency range of 300 ~ 400 MHz is presented. For AC and DC drive, the current shows a rich frequency dependent response. A modified Fowler-Nordheim field emission curve is observed and attributed to the effect of oscillating pillar excited by an alternating electric field.

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