Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Casimir force measurements between a sphere and a surface with high-aspect ratio, nanoscale channel arrays YILIANG BAO, HO BUN CHAN, University of Florida — The Casimir force is a quantum effect that strongly depends on the shape of the boundaries that confines the electromagnetic fields. So far the majority of experiments have concentrated on the simple arrangement of plate-sphere or two parallel plates. Demonstrating the strong shape dependence of the Casimir force would require other geometries with interactions that deviate significantly from the pair-wise summation of two-body potentials. Here we present measurements of the Casimir force between a gold-coated sphere and a silicon plate with an array of nanoscale, high-aspect-ratio rectangular trenches. A micromachined torsional oscillator acts as the force transducer which allows us to measure the interactions between the surfaces at high sensitivity. Channels with widths ranging from 200 nm to 500 nm and depth of 1 um are fabricated on a silicon substrate. We will compare the Casimir interaction between the sphere and these trench arrays with different aspect ratios. Such measurements might open up new possibilities to manipulate the Casimir force by tailoring the shape of the interacting surfaces.

Ho Bun Chan
University of Florida

Date submitted: 18 Nov 2006 Electronic form version 1.4