Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**Breaking Quantum Mirrors with Thermal Fluctuations**[1] IAN GOYETTE, DENNIS CLOUGHERTY, University of Vermont — We study ultracold atoms interacting with a surface at finite temperature. For the case where the surface is out of thermal equilibrium with the environment, the asymptotic form of the Casimir-Polder potential decays as an inverse square law and can be either attractive or repulsive, depending on the temperature difference. We analyze the effect of this interaction on the threshold law for quantum sticking, the probability that an atom will stick to the surface $s(E)$ as the incident energy tends to zero. We predict a new threshold law for neutral atoms interacting with a surface out of thermal equilibrium with its environment: $s(E) \sim E^{\gamma}$ as $E \to 0$ where $\gamma$ $(0 \leq \gamma \leq 1/2)$ depends on the strength of the non-equilibrium Casimir-Polder interaction which can be tuned with temperature.

[1]We gratefully acknowledge support by NSF under DMR-0814377.

Dennis Clougherty
University of Vermont

Date submitted: 18 Nov 2010 Electronic form version 1.4