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Thermal and dissipative effects in Casimir physics WOO-JOONG KIM, MICHAEL BROWN-HAYES, HAYDEN BROWNELL, Dartmouth College, DIEGO DALVIT, Los Alamos, FERNANDO LOMBARDO, FRANCISCO MAZZITELLI, ROBERTO ONOFRIO, Dartmouth College — We have developed an apparatus to assess the thermal effects in Casimir force measurement of a cylinder-plane geometry. Preliminary electrostatic calibrations imply sensitivity sufficient to observe the Casimir force with submicron separation between reflecting surfaces. Work is in progress to improve the sensitivity in order to distinguish the thermal contributions up to 3 microns separation. Another project currently underway at Dartmouth addresses an experimental strategy to verify the dynamical Casimir effect, a dissipative feature of motion in quantum vacuum. In this scheme, Casimir photons generated inside a high-Q cavity with one of the walls driven at GHz frequency [2] would stimulate superradiant emission from ultracold sodium atoms injected into the cavity. We are modeling this system in order to identify the signal features distinguishing Casimir induced superradiance from sodium superflourescence. [1] M. Brown-Hayes, D. A. R Dalvit, F. D. Mazzitelli, W. J. Kim, and R. Onofrio, Phys. Rev. A 72, 051102 (2005). [2] W. J. Kim, J. H. Brownell, and R. Onofrio, Phys. Rev. Lett. 96, 200402 (2006).

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