Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Michelson-Morley with a Birefringent Cavity FRANCISCO J. MONSALVE, MICHAEL HOHENSEE, HOLGER MÜLLER, Physics Department, University of California, Berkeley — We report on the progress of a birefringent cavity test of the isotropy of the speed of light. Previous experimental tests have constrained anisotropies in the speed of light at the level of parts in 10^{17} [1-2]. These experiments search for frame-dependent variations in the resonant frequencies of two orthogonally mounted optical cavities. Uncorrelated fluctuations in the cavity lengths are a significant challenge for such experiments. Our experiment uses a single dielectric-filled cavity, and measures the difference in the resonant frequency of two orthogonally polarized modes. Anisotropies in the speed of light will manifest as a frame-dependent strain on the dielectric [3-4], giving rise to a frame-dependent variation in the cavity birefringence. By making the length of each cavity mode identical, we expect that our experiment will be less sensitive to thermal cavity fluctuations.

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Date submitted: 31 Jan 2012 Electronic form version 1.4