Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

High Resolution Phase Velocity Measurements in Gases[1] E.M. CALLEJA, University of Florida, D.F. CARLSON, Stetson University, 421 N. Woodland Blvd. DeLand, FL 32723, S. QI, Barnard College, 3009 Broadway, New York, NY 10027, J. CANCINO, University of Florida, Y. LEE, Department of Physics, University of Florida, Gainesville, FL 32611-8440 — An acoustical path length modulation (PLM) method is currently being developed to measure phase velocity with a resolution of 1 ppm. Experimentally this is accomplished by forming a resonant cavity with a moving reflector attached to a piezoelectric bimorph. The change in the path length is determined by measuring capacitance between the (moving) electrode attached to the reflector and a fixed electrode. A 10 MHz x-cut quartz transducer generates the acoustical signal which is multiply reflected at the walls which define the cavity. The signal from the reflected wave is retrieved by the same transducer using a bridge type continuous wave spectrometer. This set up is essentially a Fabry-Perot interferometer for acoustical waves. Using the PLM method, it will be possible to measure the precursory affect of superfluid He^3 in the normal state, the so called fluctuation effect.

[1]This work is partially supported by the NSF through DMR-0139579 (REU Program for EMC, DFC, and SQ), DMR-0239483 (YL), and Alfred P. Sloan Research Fellowship (YL).

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Date submitted: 06 Jan 2005 Electronic form version 1.4