

Abstract Submitted  
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**Ultrasound pulse-echo setup for studying elastic properties of materials** OLEKSIY SVITELSKI, PETER CROSSMAN, SUSAN BROWN, DAVID LEE, Gordon College, Department of Physics, Wenham, MA 01984 — The ultrasound pulse-echo technique is an invaluable non-destructive tool for the scientific exploration of the elastic properties of materials. We recently proposed a new design for such an instrument based on commercially available, mass-produced microchips [1]. Our measurements on a sample ferroelectric crystal of  $\text{KTaNbO}_3$  demonstrate the superior performance of the instrument, achieving phase sensitivity of  $\sim 0.06$  degrees and amplitude sensitivity of  $\sim 0.05$  dB with an input signal S/N ratio of 3. We have since continued to refine this instruments capabilities through additional RF shielding and structural damping, and by the addition of static-discharge protection circuitry on the input. With these modifications, we hope to facilitate elasticity measurements in the presence of strong electric fields.

1. J. Grossmann, A. Suslov, G. Yong, L. Boatner, O. Svitelskiy, *Rev. Sci. Instr.*, v. 87, 044901 (2016).

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