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Designing and Building a Tabletop Molecular Acoustics Experiment ASHLEY HICKS, WILLIAM SLATON, University of Central Arkansas — This work describes the design, construction, and testing a project investigating the molecular absorption of sound in certain gases, including the development of a capacitance transducer. The transducer is based on designs presented in the literature, modified to work optimally in our system which consists of 4-inch diameter steel pipe. The experiments will be conducted at atmospheric pressure, eliminating design constraints involved when using high pressure gas. However, work done by Bass & Shields shows that to work in these experiments at atmospheric pressure, the transducer must have a frequency range of 1 kHz – 100 kHz. [J. Acoust. Soc. Am. Vol 62, p. 346-353, 1977] The basic concept of our transducer depends upon creating a parallel plate capacitor from metal that is flexible enough to move when a sound wave hits it. Our design utilizes 0.051 mm thickness aluminized Mylar film tensioned with a brass retaining ring over a brass backing plate with both secured to a Delrin plastic base for its electrically insulating properties. We will report on the transducer's performance and initial testing in a sound absorption experiment with carbon dioxide.

Ashley Hicks
University of Central Arkansas

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