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Measuring the Acoustic Impedance of Pipes and Musical Instruments HERBERT JAEGER, Department of Physics, Miami University — Using a small electret microphone and a piezo-buzzer we have constructed a simple impedance transducer to measure the input impedance of air columns, such as cylindrical pipes, as well as musical instruments. The input impedance of an air column is given as the ratio of the pressure to the volume flow of air at the input of the air column. The microphone serves as the pressure transducer, while the piezo-buzzer is controlled to provide a constant velocity amplitude. Therefore the microphone signal is proportional to the acoustical impedance and, if required, can be calibrated using a simple air column for which the impedance can be calculated. This impedance transducer is currently in use as demonstration equipment for a physical acoustics class. It is simple to use and robust, so that it is well-suited for an undergraduate introductory laboratory environment. This talk will discuss the function of the impedance transducer and show examples of the type of measurements that can be performed.

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