

Abstract Submitted
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Sound Speed and Chromatic Scales in Granular Materials SYDNEY BLUE, ELI OWENS, Presbyterian College — Granular materials are collections of athermal, macroscopic particles that behave unlike other more traditional materials. In particular, sound propagation through granular materials is not well understood. For this study, we send sound through a uniform, granular material composed of airsoft BB's. We then measure how the sound travels through the granular material with buried piezoelectric sensors. One important feature of a granular material is its sound speed; which we measure by sending a pulse of sound through the granular material and recording the time delay between two piezoelectric sensors separated by 10 cm. We are then able to measure the time of flight and the sound speed. We repeat these sound speed measurements for different particle configuration and find that the distribution of sound speeds is consistent with prior measurements of interparticle force, confirming that the speed of sound scales with interparticle force. Additionally, we investigate the material's response as we move through the musical chromatic scale. This work will lead to a better understanding of granular acoustics supporting the development of technology that utilizes granular acoustics for tasks such as non-destructive testing and probing of granular materials.

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