

# Acoustic emissions study of wave propagation through a chain of spherical balls in a copper waveguide

Stephen H. Pearson

NASA EPSCoR Space Grant, University of Vermont, 33 Colchester Ave., Burlington, Vermont 05405.

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A one dimensional chain of spherical balls is supported by a copper tube waveguide. Piezoelectric transducers located at either end of the tube secure the balls within the guide. A linear sine wave chirp signal is amplified and fed to one of the transducers; the second transducer acts as an acoustic emissions sensor. A cork, marble, neoprene and nitrile rubber ball are incorporated into the chain of steel balls to exhibit different acoustic material properties as the waveform propagates through the chain. A training matrix is created from a portion of the acoustic data; trials are grouped by incorporated ball type. The matrix is used to classify subsequent trials of identical compositions into groups.