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**Emergence of the collective-response of granular solid - liquid mixtures to wave- pulse excitations** HASSON M. TAVOSSO, Valdosta State University, Department of Physics — The phenomenon of emergence of new properties observed in the collection of solid particles in liquid, due to pulse-wave excitations, can be found in many macroscopic systems. In this paper the uniform mixtures of solid spherical grains in water were subjected to high intensity, 60-Volts amplitude, pulsed -Ultrasonic waves of 45 kHz peak frequency. The observed response of the mixture was imbedded in the modified transmitted pulse, and could be extracted and compared to that of a reference pulse. Analysis of the results, in the frequency and time domains, includes; Fast Fourier Transform, amplitude and phase changes, and frequency dependent attenuation. The experimental findings and numerical results show that, the response of the mixture can be made independent of the scale, up to relatively small scale. The findings also show that, several collective- response to elastic wave propagation in the crystalline solids at the atomic scale, such as; cut-off frequency, tunneling effect, and absorption and conduction bands, can also have analogous ones in intermediary, and equivalences in these relatively simple mixtures.

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