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Diffuse ultrasonic backscatter from cortical bone

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Diffuse ultrasonic backscatter techniques have been used primarily for characterization of microstructure in structural materials such as polycrystalline metals. Such measurements exploit the spatial variance of the signals from a modified pulse-echo technique. In this presentation, experiments are discussed using this technique on samples of porcine cortical bone at center frequencies of 15, 20, and 25 MHz. The time domain results obtained are analyzed with respect to a single-scattering model that includes statistical information about the microstructure. In addition, the model includes a rigorous description of the transducer beam pattern as it interacts with the liquid-sample. These results provide information regarding the ability of single-scattering models to capture the ultrasound propagation in such materials.