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Title:Modeling terahertz diffuse scattering from granular media using radiative transfer theory

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Abstract:Terahertz (THz) spectroscopy can potentially be used to probe and characterize inhomogeneous materials. However, identification of spectral features from diffuse scattering by inhomogeneous materials has not received much attention until now. In this paper, THz diffuse scattering from granular media is modeled by applying radiative transfer (RT) theory for the first time in THz sensing. The diffuse scattered field from compressed polyethylene (PE) pellets containing steel spheres was measured in both transmission and reflection modes using a THz time domain spectroscopy (THz-TDS) system. The RT model was validated by successfully reproducing qualitative features observed in experimental results. Diffuse intensity from granular media containing lactose was then simulated using RT theory. In the results, spectral features of lactose were observed in the diffuse intensity spectra from the granular media.

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