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Multiple Scattering of Terahertz Radiation in a Random Medium[1] KEVIN DOYLE, Trinity University, J. PEARCE, Z. JIAN, J. DEIBEL, D. MITTLEMAN, Rice U. — Terahertz (THz) radiation, radiation on the borderline between microwave and infrared, possesses some interesting properties that could lead to new biomedical imaging techniques. Unlike the typical optical pulse which contains several wavelengths, the THz pulse contains only one wavelength, allowing optical sensors to measure the electric field directly, rather than just the intensity, along with the phase information. Because of this, a thorough understanding of the statistics of THz scattering in a random medium could lead to imaging methods combining aspects of both optics and electronics. Using a sample cell of Teflon spheres as our random medium, the diffusive scattering of a THz pulse was measured. By plotting histograms of the electric field for different configurations of spheres at specific time intervals, it was found that the electric field measured at a certain time was random, but the range of possible values for the electric field changed with time according the photon time-of-flight distribution.

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