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Characterization of Biological Molecules with Time-Domain Terahertz Spectroscopy MEAGAN BECHEL, JASON DEIBEL, SABER HUSSIAN, STANLEY SMITH, SAYTA GANTI, MICHAEL MOULTON, DEPT. OF BIOMEDICAL ENGINEERING, THE OHIO STATE UNIVERSITY COLLABORATION, DEPT. OF PHYSICS, WRIGHT STATE UNIVERSITY COLLABORATION, DEPT. OF ELECTRICAL ENGINEERING, WRIGHT STATE UNIVERSITY COLLABORATION, 711 HUMAN PERFORMANCE WING, WRIGHT PATT AIR FORCE BASE REASEARCH LABS COLLABORATION, DEPT. OF MECHANICAL AND MATERIALS ENGINEERING, WRIGHT STATE UNIVERSITY COLLABORATION — Terahertz (THz) spectroscopy is distinctly appealing for characterization of biological molecules because many biological compounds have vibrational modes within the THz range. These vibrational modes often lead to a unique spectrum for each substance, allowing easy differentiation. The aim of this study is to utilize time-domain terahertz spectroscopy to calculate the frequency-dependent absorption coefficient and refractive index for several amino acids and proteins, including bovine and human serum albumin, glycine, and L- and D-histidine. The histidine study seeks to investigate the optical isomer differention capabilities of THz spectroscopy. It is also hoped that the characterization of proteins will lead to further studies examining the conformational changes related to disease detection.

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