

295. Title:Stratified media model for Terahertz reflectometry of the skin

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Abstract:Terahertz (THz) imaging has shown great potential as a tool for in vivo imaging of conditions which affect the hydration properties of the skin, including thermal burns, chemical irritation, and cancer. This work presents a composite model of skin based on hydration gradients measured in vivo by confocal Raman spectroscopy. Bruggeman mixing theory is used to compute the dielectric function profile of the skin model and stratified media calculations simulate the reflection spectrum of THz radiation from the skin. The reflected power in a skin reflectometry measurement is predicted to arise mostly from the hydration levels in the epidermis, where the optimal frequency band for imaging is found to be between 300 and 900 GHz. A THz reflectometry experiment is carried out on a drying polypropylene towel and the measured power trend is successfully simulated.