Abstract Submitted
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**Method to measure the dielectric constant and tangent loss of solids and liquids in the microwave region of the electromagnetic spectrum** GABRIEL JURADO, NHFML, Florida State University , THIERRY DUBROCA, JOHANNES MCKAY, NHFML, STEPHEN HILL, NHFML, Florida State University — There is a long standing interest in characterizing the dielectric properties of solids and liquids over the full breadth of the microwave spectrum. For example, various solvents are used in solution state Dynamic Nuclear Polarization (DNP) and the time scale of the experiment depends on the physical properties of the solvent, it is therefore relevant to have the properties of the solvents fully characterized. The ratio of transmitted power over incident power yields a relationship between frequency, index of refraction, tangent loss, and dielectric constant. A model was developed to evaluate the dielectric properties, $\epsilon$ and $tan\delta$, of a slab of Rexolite, Polypropylene, and Hexane using literature values for Teflon and Quartz. The ratio of transmitted power over incident power is plotted vs frequency and a differential evolution minimization technique best fits to the FFT of the raw data, and the appropriate values for $\epsilon$ and $tan\delta$ are extracted. The model and technique are demonstrated at (80-110)GHz for practical reasons however they can be used over various frequency ranges and for multiple layers of dielectric material. The model and experiment described reliably reproduced literature results for dielectric properties of solids and liquids.

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