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Millimeter Wave Spectroscopy for Breast Cancer Diagnostics and Detection KONSTANTIN KOROLEV, SHU CHEN, MOHAMMED AFSAR, Tufts University, Medford, MA 02155, STEPHEN NABER, Tufts Medical Center, Boston, MA 02111 — Broad-band millimeter wave transmittance measurements of normal and tumorous (cancerous) human breast tissue samples have been acquired *in–vitro* by employing a free-space, quasi-optical spectrometer. Freshly excised breast tissues were prepared and preserved in 10% neutral-buffered formalin solution before testing. Significant differences in the transmittance profiles have been found between the normal and tumorous tissues. It has been found that despite the inhomogeneity and variable structure and composition of each single tissue, the tumorous specimens consistently manifest much higher absorption level of millimeter wave radiation than the normal ones. It has been shown that free space, quasi-optical spectrometer is capable of contributing valuable insights into the dielectric properties of normal and tumorous human breast tissues and aiding in further developments of millimeter wave spectroscopy and mammography for the breast cancer diagnostics and detection.

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