

MATHEMATICAL MODELLING AND RECONSTRUCTION FOR TERAHERTZ TOMOGRAPHY DATA

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Terahertz imaging is a promising technique in particular in non-destructive testing consider the imaging problem of terahertz (THz). In contrast to X-ray scanners, Terahertz scanners are usually cheaper and can be safely operated in an industrial environment. Since typical polymers exhibit low absorption in a range of frequencies up to several THz, this type of radiation is a highly suitable candidate for performing non-destructive testing in a safe way. In the talk we present a nonlinear mathematical model describing a full THz tomography experiment, and consider linear approximations connecting THz tomography with standard computerized tomography and the Radon transform. Based on the derived models we propose different reconstruction approaches for solving the THz tomography problem, which we then compare on experimental data obtained from THz measurements of a plastic sample.