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# Characterization of composite materials via THz imaging

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Terahertz waves (1 THz = 1012 Hz) represent a new frontier of sensing technologies capable of providing sub-millimeter high resolution images of the inner features of investigated objects by means of non-destructive, contact-free and safe surveys [1]. THz waves are, indeed, non-ionizing radiations able to penetrate into non-metallic, optical opaque media and to visualize embedded objects with a significantly improved spatial resolution compared to the microwaves and millimeter signals.

However, the effectiveness of THz imaging depends on technological progress in terms of hardware devices and data processing approaches as well as on the peculiar features of the surveyed materials. Accordingly, performance analysis devoted to state advantages and limits of THz imaging is a common topic of the research activities.

In this frame, we performed an extensive measurement campaign on several samples of different composite materials having dissimilar thickness and inner features. Data were gathered by means of the Z-Omega Fiber-Coupled Terahertz Time Domain (FICO) system working in a high-speed reflection mode and were processed by using a properly designed data processing chain recently proposed in [2] and involving a noise filtering procedure based on the Singular Value Decomposition (SVD) of the data matrix. The obtained results, which will be presented in detail at the conference, allowed us to state the imaging capabilities offered by the adopted instrumentation and obtain valuable information on the surveyed specimens, such as the localization of inner defects non directly observable

REFERENCES

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