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Looking with Terahertz Eyes

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The Institute for Complex Systems, in collaboration with the University of Rome “Sapienza” and Tor Vergata and the University of Sussex (UK), has recently developed a THz spectroscopy laboratory aimed to academic and industrial research.

The access to the wide THz electromagnetic band (which lies between optical waves and microwaves in the electromagnetic spectrum) has been limited for a long time by the lack of cost-effective and practical intense sources. The recent development of technologies for broadband THz generation is changing this scenario allowing a rapidly evolving field in research, industry, and security applications.

Fingerprinting of spectroscopic lines in the THz region helps identifying chemical or biochemical molecules. Imaging with THz waves can be used for pharmaceutical, security, or identification of substances such as drugs, explosives or weapons. THz spectroscopy and imaging is used to quality control and optimization of industrial manufacturing processes.

As example, one can look for tiny variations or defects in polymer and plastic materials, characterize the quality and morphology of paper products, textiles and wood products.

Other examples span from measuring the thickness of coatings, non-destructive diagnostics for historical art conservation, and last but not the least, quality control of chocolate products with THz imaging.

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