Better remote-sensing explosive detectors: The beginning of the end of full-body scanners?

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Standing in a full-body scanner at an airport isn't fun, and the process adds time and stress to a journey. It also raises privacy concerns. Researchers now report in ACS' *The Journal of Physical Chemistry Letters* a more precise and direct method for using that "terahertz" (THz) technology to detect explosives from greater distances. The advance could ultimately lead to detectors that survey a wider area of an airport without the need for full-body scanners.

R. Kosloff and colleagues explain that using THz spectroscopy by itself is challenging for sensing far-away explosives. This technology uses beams of electromagnetic radiation that lie between microwaves, like those used in kitchen ovens, and the infrared rays used in TV remote controls. In addition to screening people for explosives, it is used at drug companies for quality-control purposes and, most recently, to study the layers of paint of ancient works of art. With recent advances, the technique is becoming a strong candidate for detecting substances from a distance. Other researchers have developed remote-sensing THz instruments, but they combine it with a second method to identify substances. Kosloff's group aimed to use THz directly to eventually develop even better remote sensors.

They developed a computational tool and used it to successfully identify two explosives, RDX and TATP, with THz data directly. RDX is a component of plastic explosives, and TATP is an explosive found in the

shoes of the "shoe bomber" in 2009. "The ability to perform experimentally and simulate multidimensional spectroscopy should significantly enhance the screening ability of THz spectroscopy," say the researchers.

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