

Using terahertz imaging to seek quirks in corks at NJIT

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As the holidays approach and you're buying wine, ever wonder what's really in a cork? Ask NJIT's John Federici, who has a new use for Terahertz imaging: searching for divots and cracks in wine corks to insure quality.

Using Federici's laboratory, which is devoted to sub-millimeter or Terahertz waves, the project, in collaboration with Amorim & Irmãos S.A. Portugal, the world's largest natural cork producer, and sponsored by QREN, a Portuguese national program for development and innovation, is focused on detecting defects such as cracks and voids in the cork.

THz-imaging is fast proving itself easier and better to use in non-destructive evaluation of objects because it can easily penetrate through most non-metallic materials and it can achieve better resolution than millimeter wave imaging.

"Terahertz imaging is an up-and-coming technology for quality control inspection of materials and components," Federici said. "THz imaging of corks can be simply viewed as analogous to imaging cavities in a tooth. In the case of cork, variations in the structure of the cork – a cavity – lead to contrast in the THz image."

For example, rather than classifying corks based on how they look on the outside, THz imaging will enable classification of corks based on their internal structure. Another advantage is that Terahertz imaging is safer to

use on people and products.

The research interests of Federici, a distinguished professor of physics at NJIT, span Terahertz or sub-millimeter wave imaging, spectroscopy, and sub-millimeter wireless communication to ink-jet printed sensors and devices.

Federici has been the lead writer on upwards of 70 publications in scholarly journals and holds 7 patents. His most recent patents emphasize Terahertz synthetic aperture imaging. Federici and his research team have received a U.S. Patent for a Terahertz imaging system and method. Since 1995, Terahertz imaging has grown in importance as new and sophisticated devices and equipment have empowered scientists to understand its potential.

Provided by New Jersey Institute of Technology

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