Terahertz Imaging And Spectroscopy: Applications To Defense And Security

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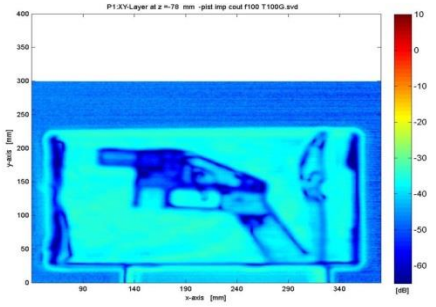
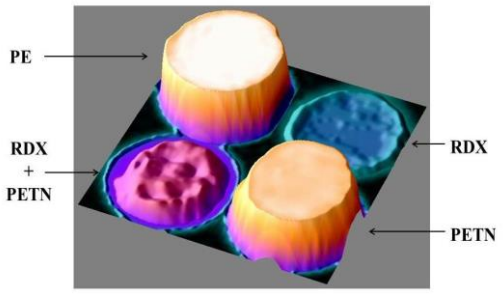
In the context of security in postal chain (Franco-German project), many fundamental concepts and techniques have been validated to lead to devices for THz imaging, THz spectroscopy and THz spectroscopic imaging. Guns, drugs, radioactive substances, liquid and solid explosives, have been transported through parcels and letters. And the fact that most of the packages are not opened through control, people think that controllers aren't able to detect those objects. But with the ability of terahertz waves to pass through plastic and paper, detecting this kind of object is now possible.

In our study, we work on two different aspects. The first is imaging of objects inside parcels. The second is spectroscopy and chemiometric analysis for different types of powder especially explosives. By mixing these two aspects, we obtain spctro-imaging method that allows us to have more information about the content of a parcel.



Nonmetallic gun and ceramic knife inside parcel at 100 GHz in transmission



Example of terahertz image at 1.6 THz in the case of four pellets: polyethylene (PE), pure RDX, pure PETN, and a mixture of RDX+PETN.

Acknowledgements: We would like to express sincere thankfulness to each of the persons who have permitted us to display some results of their work. We would also acknowledge financial support the Agence Nationale de la Recherche (ANR) for their support in the InPoSec project (www.inposec.org).