NEC’s Terahertz Imaging System

Transmission mode
Low-absorption sample

Reflection mode
Highly reflective sample
Image (Transmission)

Left: THz images of copper wire, Nylon string and human hair. Samples were put on the 0.2mm-thick polypropylene film. All samples were fixed with the plastic tape at the upper left corner.

Right: Visible image

Observation condition

Source
Type: QCL*
Frequency: 4.28 THz

Imager
Lock-in mode: ON
Lock-in Frequency: 3.75 Hz
Frame Integration: 16
Spatial Filter: 3X3

* QCL: Quantum Cascade Laser

Image (Transmission)

Left: THz images of metal clip in the envelope
Right: Visible image

<table>
<thead>
<tr>
<th>Observation condition</th>
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</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
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<tr>
<td>Type</td>
</tr>
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**Left:** THz images of human hair on the 0.5mm-thick flour. When the physical contrast between the material (food or its raw material) and the contaminant is small, the contaminant detection is generally hard.

**Right:** Visible image

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<tbody>
<tr>
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<td></td>
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<tr>
<td>Frequency</td>
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**Imager**

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T. Ishi et al., International Symposium on Frontiers in THz Technology (FTT 2012), Pos2.54 (2012).
Image (Transmission)

THz images of membrane of onion. THz wave is strongly absorbed by water, so the image shows water content distribution. As time passes, high transmittance area increases, which reflects the dry of the membrane.

(Lower right: Visible image)

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<td></td>
<td>Spatial Filter</td>
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Image (Transmission)

**Left**: THz images of drying of adhesive gel on the polypropylene film. The gel consists of 41% polyvinyl acetate and 59% water at the beginning.

**Right**: Visible image

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Image (Reflection)

**Left**: THz images of rust under HDPE plate. The sample simulates the coated steel plate. (Bottom: Schematic cross-section of sample)

**Center**: Visible image of steel plate surface

**Right**: Experimental configuration (Rust region under HDPE plate cannot be observed.)

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Interference pattern reduction using a new illumination method

When a sample is illuminated by a coherent light source like a QCL, the interference pattern is overlapped with the image (left). Newly developed illumination method can dramatically reduce the interference pattern, and provide clear image (right).

Would you like more information on how our imaging system can work?

Please Contact Us!

Operations Planning Office
Guidance and Electro-Optics Division
NEC Corporation
E-mail: window@geo.fc.nec.co.jp
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