

Terahertz (THz) Future Application Slides

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September 2019



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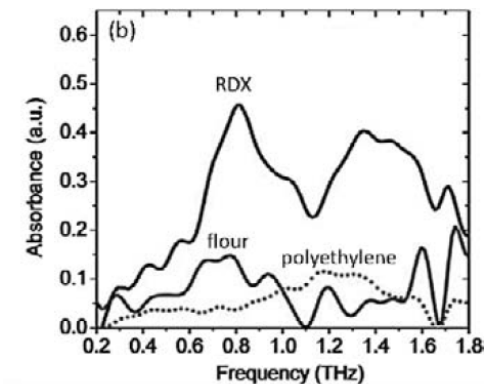
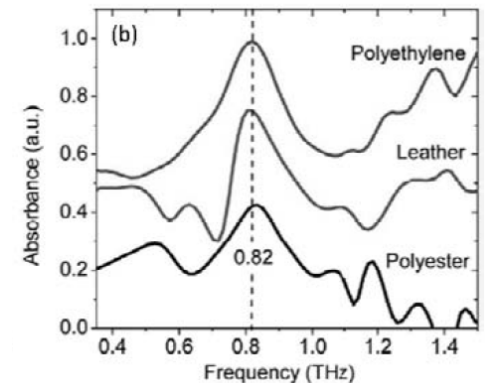
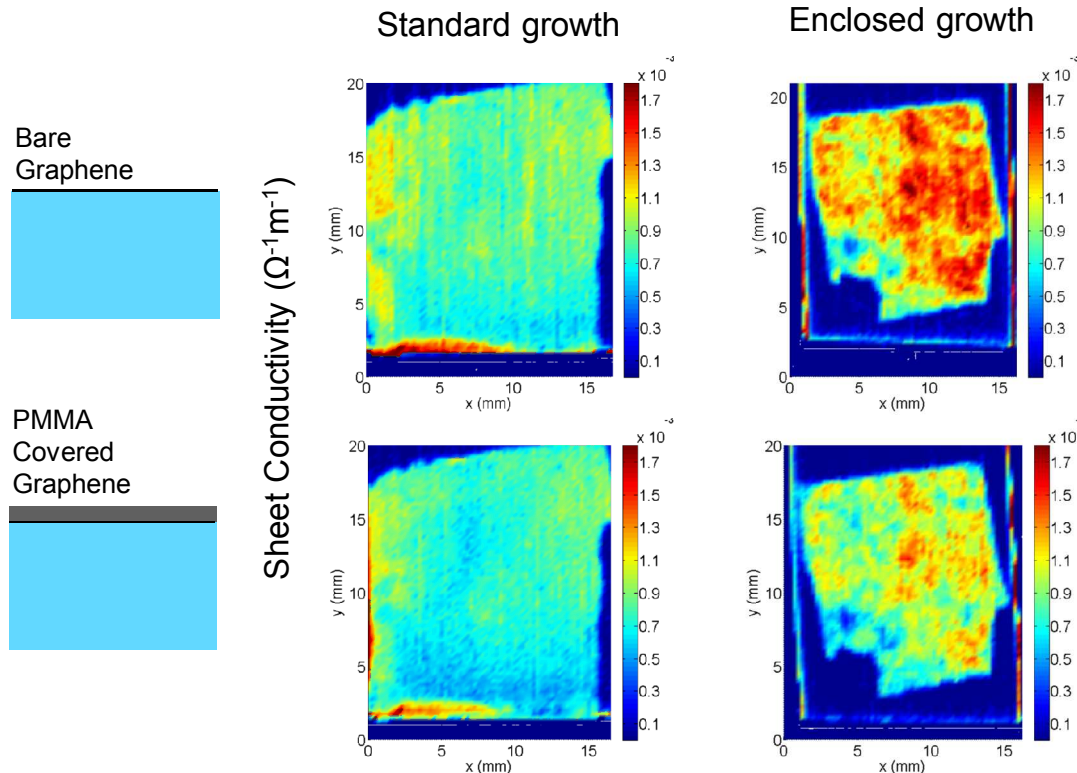
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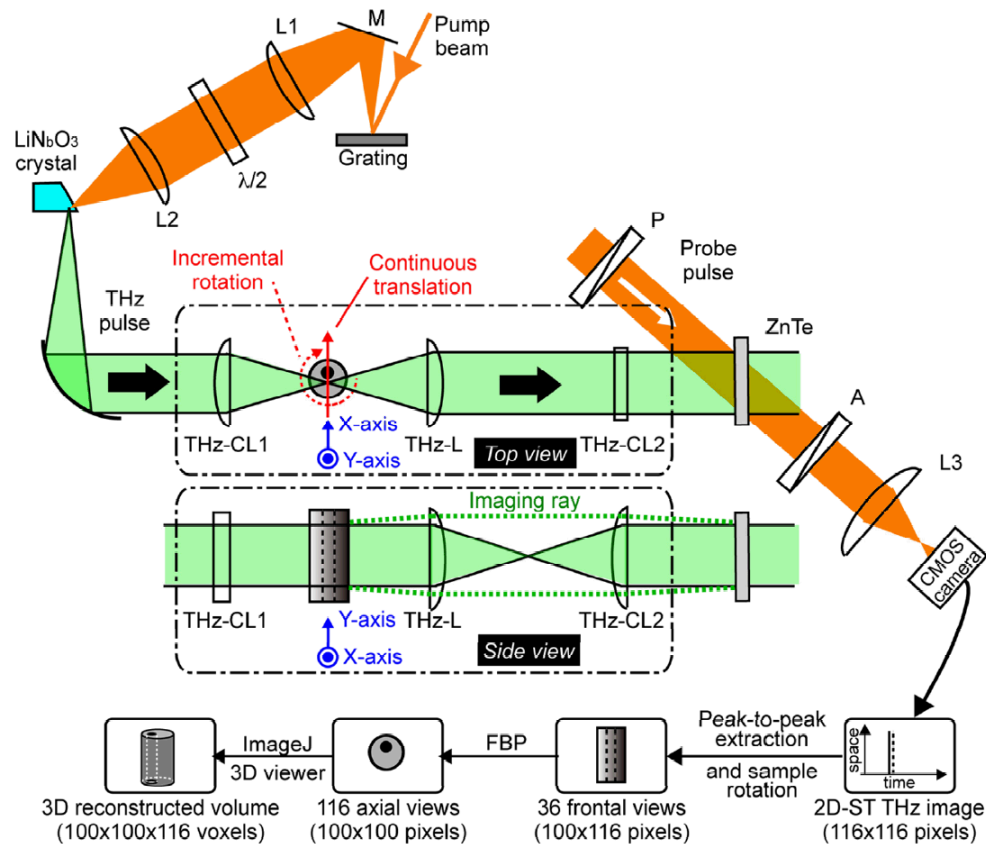
Future THz Applications

- Material Identification and Characterization
 - Unique Rotational and Vibrational Spectra
 - Possible for direct phonon excitation
 - Non-contact conductivity measurements



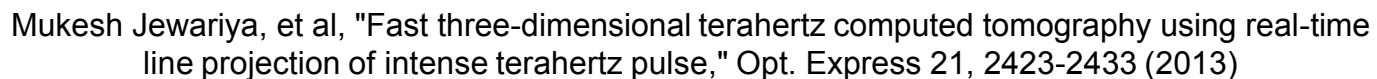
Future THz Applications

- Non-ionizing imaging
 - Computed tomography



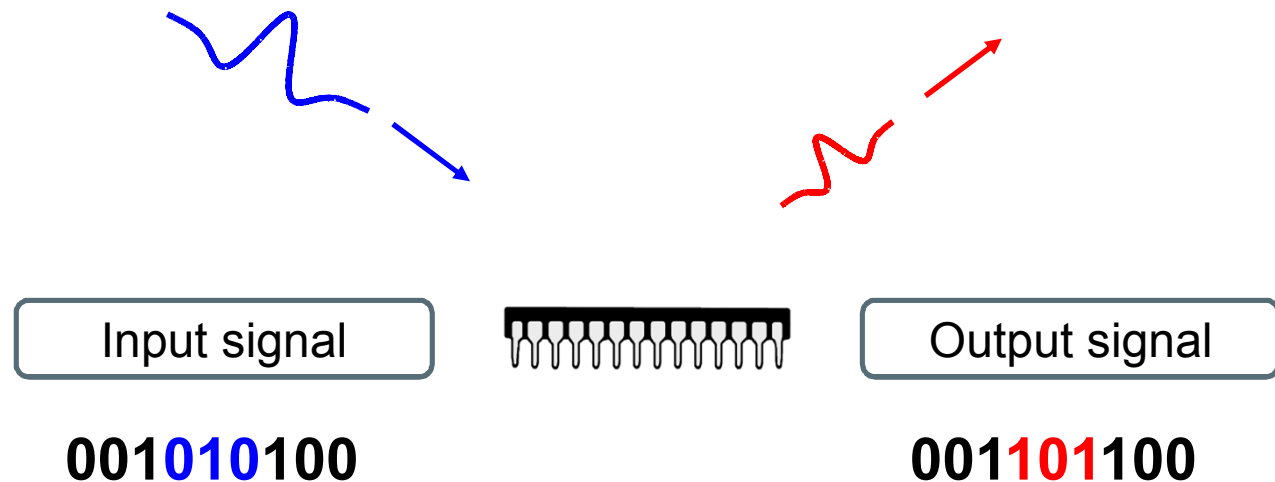
Mukesh Jewariya, et al, "Fast three-dimensional terahertz computed tomography using real-time line projection of intense terahertz pulse," Opt. Express 21, 2423-2433 (2013)

- Non-ionizing imaging
 - Computed tomography



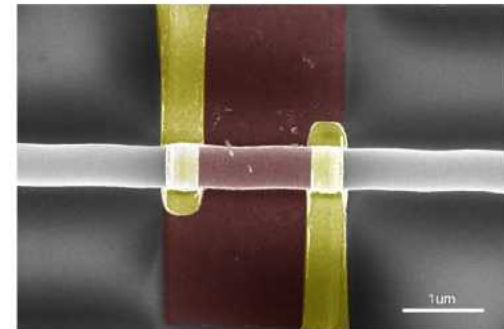
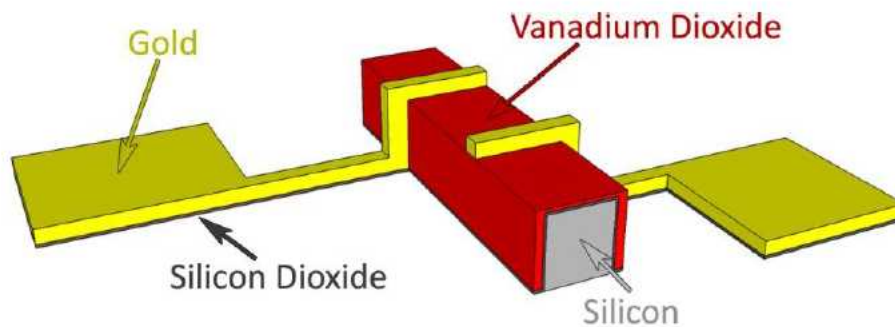
Future THz Applications

- High-Speed, Secure Wireless Communication
 - Bandwidth scales with frequency
 - Low photon energy makes it difficult to detect
 - Highly directional
- Cybersecurity
 - Side Channel Analysis
 - Functional Imaging
 - Code Injection



Future THz Applications

- Highspeed optical switching using metamaterials



P. Markov, et al, "Silicon-VO₂ hybrid electro-optic modulator," *CLEO: 2013*, San Jose, CA, 2013, pp. 1-2.

- Manipulation of entangled quantum systems
 - Nitrogen vacancy centers in diamond
 - Inorganic quantum well systems (GaAs/AlGaAs, etc)