Terahertz (THz) Future Application Slides

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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

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**Sheet Conductivity (Ω⁻¹·m⁻¹)**

**Bare Graphene**

**PMMA Covered Graphene**

**Standard growth**

**Enclosed growth**

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[Image of absorbance curves and conductivity visualizations]
Future THz Applications

- Non-ionizing imaging
- Computed tomography

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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

Input signal: 001010100
Output signal: 001101100
Future THz Applications

- Highspeed optical switching using metamaterials


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