

Single-shot terahertz spectroscopy with picosecond time resolution

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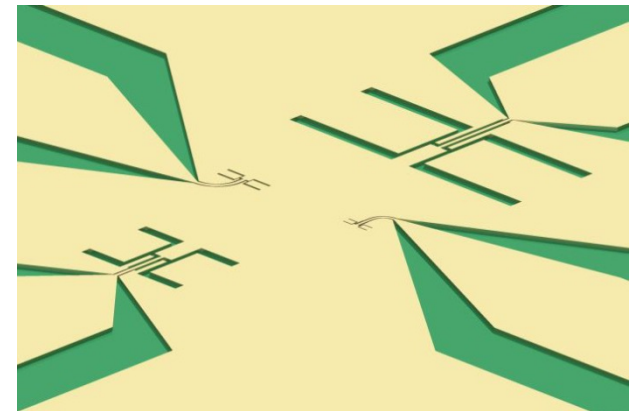
Motivation

- Superconducting $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ detectors
 - Ultrafast picosecond response time for THz frequencies
- Spectroscopy
 - Frequency resolution needed

⇒ Development of multipixel detector system

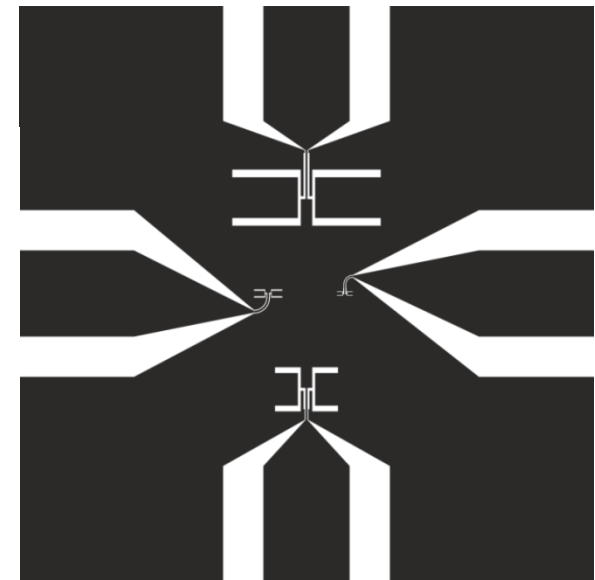
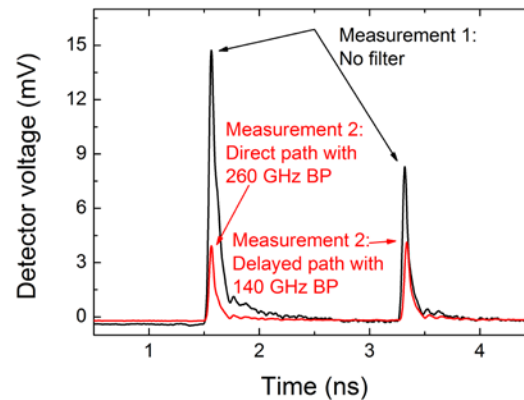
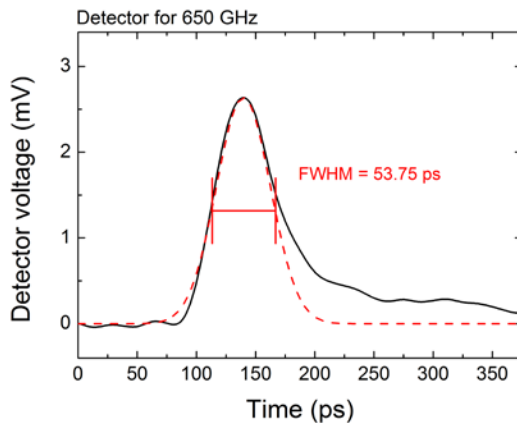
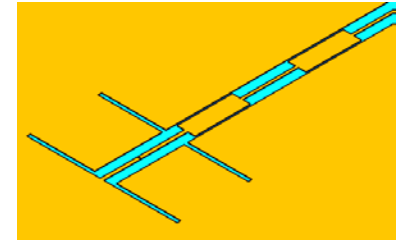
- One-shot measurement capability

- Application: Beam diagnostics
 - Analysis of CSR beam instabilities



Integrated array with four detectors

- Integrated planar array
 - Frequencies: 140 GHz, 350 GHz, 650 GHz, 1.02 THz
 - Narrowband double-slit antennas
- Measurement results
 - Continuous-wave sources (IMS THz Testbench)
 - Pulsed radiation (ANKA Synchrotron)



Outlook

- Detector system combining:
 - Picosecond response time
 - Frequency resolution

- Optimization of four-channel system
 - Broadband readout lines with ps-time resolution

