**High-speed and super-resolution terahertz imaging with a plasmonic photoconductive focal-plane array**

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The very rich information provided by terahertz time-domain imaging predestines various potential applications such as security screening, biomedical imaging, and non-destructive testing of industrial products. However, the slow imaging speed associated with the single-pixel architecture of the existing imaging systems has impeded their use in many practical applications. Here, we present a terahertz time-domain imaging system with a plasmonic photoconductive terahertz focal-plane array that can achieve very high imaging speed while offering excellent dynamic range and detection bandwidth across all pixels. We captured a terahertz video of a water flow at the frame rate of 16 fps. By adopting a convolutional deep neural network, we demonstrated pixel-super-resolution imaging of etched patterns in silicon substrates and achieved a 16-fold enhancement in the resolution with a total number of effective pixels more than 1-kilo pixels. Such terahertz imaging system can have direct impacts on many practical applications, e.g. the non-destructive quality assessment of battery electrodes during manufacturing.

A person in a blue suit

Description automatically generated **Short Bio:**

**Xurong Li** received his B.S. degree in Microelectronics from Peking University in 2016 and his M.S. and Ph.D. degrees in Electrical and Computer Engineering from University of California, Los Angeles in 2018 and 2022. He is currently a postdoctoral scholar at the University of California, Los Angeles.