

Metaimager: RF and millimeter wave imaging systems for security screening applications

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Speaker: Dr. Tomáš Zvolenský

Abstract: A simulation and design of a frequency diverse imaging system at K-band and W-band frequencies is presented and experimentally demonstrated. Imaging systems relying on frequency diversity combined with computational techniques offer several advantages compared to the SAR-like systems, or, phased array systems. Lack of need for expensive phase shifters or slow and bulky mechanical scanners render the frequency diverse system cheaper and faster offering compelling alternative to the state of the art devices. Challenges arising from shifting part of the imaging process to computational techniques and the lack of mechanical scanning, such as, precise antenna characterization, phase error sensitivity, computational demands, and speed of prototyping are addressed here.