

Physics & Astronomy Colloquium

Presents



Mona Jarrahi

Professor

University of California, Los Angeles

Thursday, April 22, 2021

4:10 pm via Zoom

Meet the speaker at 3:30 pm, join us in welcoming the speaker and for an informal chat!

“New Frontiers in Terahertz Technology”

Although unique potentials of terahertz waves for chemical identification, material characterization, biological sensing, and medical imaging have been recognized for quite a while, the relatively poor performance, higher costs, and bulky nature of current terahertz systems continue to impede their deployment in field settings. In this talk, I will describe some of our recent results on developing fundamentally new terahertz electronic/optoelectronic components and imaging/spectrometry architectures to mitigate performance limitations of existing terahertz systems. In specific, I will introduce new designs of high-performance photoconductive terahertz sources that utilize plasmonic antennas to offer terahertz radiation at record-high power levels of several milliwatts – demonstrating more than three orders of magnitude increase compared to the state of the art. I will describe that the unique capabilities of these plasmonic antennas can be further extended to develop terahertz detectors and heterodyne spectrometers with quantum-level sensitivities over a broad terahertz bandwidth at room temperatures, which has not been possible through existing technologies. To achieve this significant performance improvement, plasmonic antennas and device architectures are optimized for operation at telecommunication wavelengths, where very high power, narrow linewidth, wavelength tunable, compact and cost-effective optical sources are commercially available. Therefore, our results pave the way to compact and low-cost terahertz sources, detectors, and spectrometers that could offer numerous opportunities for e.g., medical imaging and diagnostics, atmospheric sensing, pharmaceutical quality control, and security screening systems. And finally, I will briefly highlight our research activities on development of new types of high-performance terahertz passive components (e.g., modulators, tunable filters, and beam deflectors) based on novel reconfigurable meta-films.

Host: WSU Chapter OSA-SPIE

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