

Materials Engineering Program
Texas Center for Superconductivity at the University of Houston
Center for Integrated Bio and Nano Systems

Terahertz Technologies and Applications: New Frontier or No Man's Land?

March 22, 2024

Face to Face Only: 1:00 – 2:00 pm

Houston Science Center (HSC), Rm 102

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Abstract:



The terahertz spectral region, between the microwave and the infrared, has for decades been a new frontier where great promises of new applications have rarely led to commercial products with wide public appeal. The absence of a “killer application” that demands terahertz solutions, coupled with the challenges of cost, fragility, atmospheric attenuation, and effective alternates in other spectral regions have limited the maturation of terahertz technologies. In this talk, I will explore possible killer applications that maintain interest in the terahertz frontier in three domains: spectroscopy, imaging, and communications. Specifically, I will survey research into (1) the use of gas phase rotational spectroscopy for novel laser sources and for remotely sensing airborne trace gases, (2) the use coherent terahertz techniques for mapping strain in opaque composite materials, and (3) the use of atmospheric attenuation to tune the propagation range of communication links.

Bio:

Dr. Henry Everitt is the Army's chief scientist for optical sciences, a senior executive who works for the Army Research Laboratory and has been deployed to Rice University since 2021. He is an experimental physicist specializing in condensed matter and gas phase molecular spectroscopy in the UV, Visible, IR, and Terahertz spectral regions. His research focuses on four areas: (1) ultrafast spectroscopy of wide bandgap semiconductors, (2) plasmonics and meta-optics for enhanced sensing, catalysis, and energetics, (3) gas phase molecular spectroscopy for sensing and lasing, and (4) terahertz technologies for imaging and communications. His degrees in chemical physics are from Duke University, and he has been elected fellow of the Optical Society of America, the American Physical Society, the American Association for the Advancement of Science, and the Army Research Laboratory.