Amirkabir University of Technology
Center of Excellence on
Radio Communication Systems

University of Tehran
Center of Excellence on
Applied Electromagnetic Systems

Workshop

Instrumentation and Measurement Techniques in Terahertz Frequency Range

Mohammad Neshat

School of Electrical and Computer Engineering, University of Tehran

mneshat@ut.ac.ir

Abstract: Terahertz technology is a fast-growing field that offers unique opportunities for a wide range of applications in imaging, spectroscopy, and sensing just to name a few. For many years, terahertz band or the so-called THz gap was not easily accessible due to the lack of suitable sources and detectors. In recent years however, there have been a number of dramatic technical advances such as the development of various techniques for generation, detection and manipulation of terahertz radiation. Following the advent of acceptable THz sources and detectors, several instrumentation and measurement techniques were adopted from other parts of the electromagnetic spectrum for THz range, or introduced for the first time specifically for this range of the spectrum.

In this workshop, we will first introduce the most common detectors in THz range that can be used for coherent or incoherent detection of THz radiation. The operation principle of various conventional measurement techniques will be explained in both time-domain and frequency domain, such as THz time-domain spectroscopy, ellipsometry and far-infrared (THz) Fourier transform spectroscopy. New techniques including scanning near-field microscopy in THz range will also be covered. Finally, the state-of-the-art instrumentation for different applications in THz imaging, spectroscopy and sensing will be reviewed.

Bio: Mohammad Neshat received the Ph.D. degree from the University of Waterloo, Waterloo, Canada in 2009 in the field of THz photonics. In 2010, he was a Postdoctoral Fellow with the Microwave and Terahertz Photonics Integrated System Laboratory (MISL), University of Waterloo, Canada. During 2011-2012, he was with the Physics & Astronomy Department at the Johns Hopkins University, USA, where he successfully developed the instrumentation for THz time-domain spectroscopic ellipsometry system with variable angle. In 2013, he joined the University of Tehran as an Assistant

Professor and founder of THz Photoelectronics Research Group. His current research interests are on Terahertz technology with over 50 publications, conference presentations and patents in the field.