Anis Rahman, J Biosens Bioelectron 2016, 7:3(Suppl)
http://dx.doi.org/10.4172/2155-6210.C1.030

6th International Conference and Exhibition on

Biosensors & Bioelectronics

September 22-23, 2016 Phoenix, USA

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A to Z of a terahertz spectroscopy and imaging experiment

Like all scientific experiments, investigations via terahertz spectroscopy and imaging would produce useful results when a set of strategy is established and planned. Because various kinds of samples may be characterized by terahertz approach, each sample needs to be strategized separately. In this tutorial, a general outline of the experimental approach will be presented. The front end software for experimental data acquisition and analysis will be discussed. The concept of reconstructive imaging will be outlined. The mechanism of defining a pixel and a voxel via reconstructive approach leading to higher resolution will be discussed. The Fourier transform spectroscopic analysis offers a selection of "data tapering windows" ("DTW") to minimize "spectral leakage." Practical examples of DTW based analysis will be presented. Sub-surface, non-destructive and non-contact terahertz imaging with nanometer resolution will also be outlined in terms of practical examples.

Biography

Anis Rahman is known for his work on Dendrimer based photonics and terahertz technology. Coined the term "Silicon for Photonics", his approach makes it possible to fabricate chip based components from dendrimer for sensing and terahertz generation. He proposed a new mechanism, "Dendrimer Dipole Excitation" (DDE) that generates continuous wave terahertz over a broad spectrum. Under his leadership, dendrimer technology received prestigious awards including the NASA Nanotech Brief's nano-50 award and CLEO/Laser Focus World's Innovation award (2011). He completed MS and PhD from Marquette University (Milwaukee, WI) and a Post-doctoral Research Position at Columbia University (NY). He has contributed more than 100 publications and conference presentations and has produced 12 patents. Currently he is the President and Chief Technology Officer of Applied Research & Photonics (ARP), a Harrisburg, PA based company. He is also the Chair-Elect of the Division of Small Chemical Businesses of the American Chemical Society.

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