

Tahsin AKALIN is an Assistant Professor at **IEMN** (Institute of Electronic, Microelectronic and Nanotechnology) and at the **University of Lille 1**, France (USTL / IUT-A) since 2004. He was born in 1975 and received his M.S and PhD degrees on Electronics in 1999 and 2002 from the University of Lille in France. During his thesis he has developed passive structures such as filters based on periodic structures (PBG). He has also been involved in the study of **directive antennas** with **EBG** superstrates. He has also designed the passive part of a power source at 300 GHz based on HBV (Heterostructure Barrier Varactor) diode. The conception of metamaterials with a negative index of refraction is one his research field. His research activities have also concerned the development of original BioMEMS for the characterization of living cell and neuronal entities by means of GHz and THz waves. He has developed high resolution BioMEMS with the use of original transmission lines at THz frequencies (Planar Goubau-Sommerfeld Lines). He is now involved in the study of **THz plasmonic** structures with the aim of applications for THz Near Field Microscopy and in the design and simulations of **THz antennas** which are combined with Quantum Cascade Lasers (QCL) to improve their power emission properties (beam-shaping and power level). He is co-author of more than 50 international communications with several invited papers and he is a **reviewer** for:

-**IEEE** (Institute of Electrical and Electronics Engineers) : **Trans. On MTT, TAP and AWPL**

-**AIP** (American Institute of Physics): **APL and JAP**

-**IOP** (Institute of Physics): Journal of Physics D: Applied Physics

He is the principal author of two books on THz waves and on THz and Optical Plasmonics which will be edited in 2010.

He is a **TPC member** of Asia Pacific Microwave Conference (IEEE-APMC) and of Meta'10 Conference. He is the **organizer and chairman of several special sessions** on THz plasmonics for international conferences. He is a member of **IEEE** and **EuMA**.

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"Terahertz and Optical Plasmonics: current and future applications"

Tahsin Akalin, IEMN, Lille 1 University, France

This talk is a survey of rapidly developing THz technology in three main applications:

- THz microscopy and imaging,
- THz spectroscopy (including biosensors),
- THz telecommunications.

These applications are possible thanks to the progress on sources, detectors and passive devices. For the **sources**, quantum cascade lasers (QCL), frequency multipliers and optoelectronic approach like photomixing at 800nm and 1.55 μ m will be highlighted. For the **detectors**, special interest is given to Schottky diodes. New promising concepts like recently demonstrated SPASER (Surface Plasmon Amplification by Stimulated Emission of Radiation) will be presented. An important part of this talk is dedicated to THz passive devices with classical but also plasmonic approaches like planar and non-planar **antennas, filters, Goubau-Sommerfeld waveguides, and focusing structures**. The different combinations of these fundamental bricks (at THz and optical frequencies) allow ambitious applications like recently demonstrated THz nanoscopy and THz imaging (in airport screening lines) which are proofs of the importance of THz technology for civil and security applications.