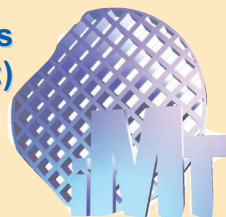


National Institute for Research and Developments in Microtechnologies (IMT-Bucharest)

126A, Erou Iancu Nicolae street, 077190, Bucharest, ROMANIA
Phone: +40-21-490.85.83; +40-21-490.82.12; +40-21-490.82.03; +40-21-490.84.12;
Fax: +40-21-490.82.38; +40-21-490.85.82; www.imt.ro.



Simulation, Modelling and Computer Aided Design Facilities

offer by IMT-Bucharest

Design and Simulation for micro- and nanosystems

Modelling/Simulation Services offered by IMT Bucharest; Consultancy and training and services for design and simulation of micro and nano-structures:

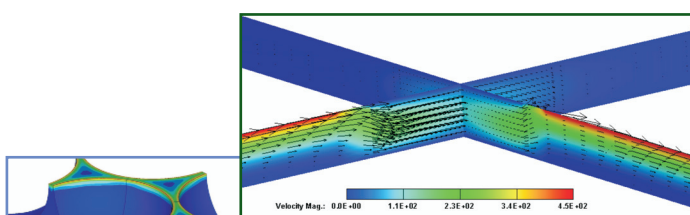
- ♦ Mask Design, Process Editor, 3D construction and mesh
- ♦ Modelling / optimization of technological process
- ♦ Simulation of MEMS: electrostatic, electroquasistatic, mechanical, thermo-mechanical, piezoelectric, piezoresistive, coupled electromechanical, electro-thermo-mechanical
- ♦ Simulation of Microfluidics: general flow, fluid mixing, thermal, electrokinetic, multi-species chemical, two-phase flow with droplet / bubble formation.
- ♦ Training and consultancy in design, modelling and simulation of micro and nanosystems and in using specific software packages.

Applications: microsensors, MEMS, microfluidic structures, biomedical devices.

Beneficiary: companies from micro bio and nanotechnologies domain; research centres from universities; research institutes, industry; PhD students.

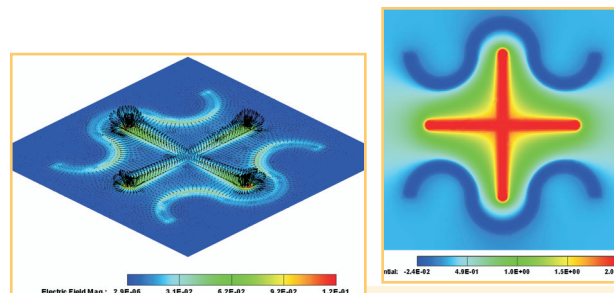
Software Facilities for microsystems modelling and simulation:

- ♦ **Coventorware 2006** – dedicated to design, modelling and simulation of MEMS and microfluidic structures
- ♦ **ANSYS 5.6** - Finite element method software
- ♦ **MatLab 7** - Mathematical software dedicated to technical computation
- ♦ Multiprocessor workstation;
- ♦ Training room equipped to computer network;



Flow profile in cross channels with electroosmotic actuation (COVENTORWARE)

Thermo-mechanical simulation of a biomedical structure (ANSYS)



Potential and electric field distribution on bottom surface of an ions separator (COVENTORWARE)

Regenerating rough surfaces from AFM images to CAD files (ANSYS compatible)

International Projects:

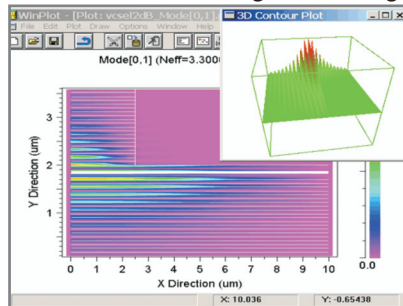
- ♦ **Lab-on-a-chip** implementation of production processes for new molecular imaging agents - **LAB-ON-CHIP**, Project European in FP6 (2005-2008)
- ♦ Design for Micro & Nano Manufacture **PATENT-DfMM**, Project European in FP6 (2004-2007).

IMT-Bucharest develop a strong collaboration with Politechnica University of Bucharest (UPB) to offer services in computer aided design of integrated circuits. **Example: REASON Project in FP5 - Research and Training Actions for System on raining Actions for System on Chip Design Chip Design.** The activities in this project were organized in 13 work packages, covering all important areas of microelectronic design.

Contact: Raluca Müller, e-mail: ralucam@imt.ro;
Phone: 021 490 82 12; Fax: 21 490 82 38;

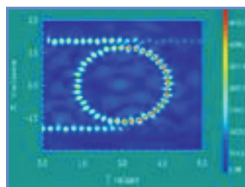
Services of passive and active microphotonic components design/simulation (Micro and nanophotonic Laboratory)

Simulation/modelling and design

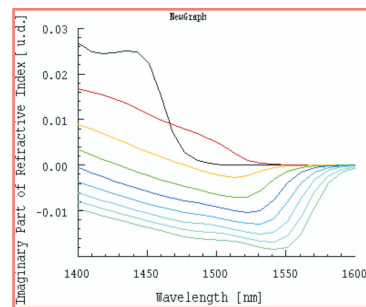


Castigul unei heterostructuri cu gropi cuantice multiple calculat cu *OptiHS*.

services of various devices and microoptical, photonic and advanced optoelectronic circuits and devices by using industrial standard commercial software products. Design and modelling complex photonic components and systems by combining commercial software products and software applications developed in IMT. Training activities in design and simulation of active and passive photonic components.



Simulation of radiation propagation in a microring resonator (*OptiFDTD*)



Modul optic al unei structuri active de tip VCSEL calculat cu *LaserMod*

Specific applications:

- ♦ Microoptical components: microlens and microlens systems, diffraction grating, diffractive optical elements.
- ♦ Photonic circuits and devices: waveguides, microring resonators, couplers.
- ♦ Multiplexing/demultiplexing devices, photonic crystals, metamaterials, plasmonic devices, nonlinear passive devices, integrated optics structures.

- ♦ Optoelectronic devices: lasers, optical modulators, logical gates, nonlinear active devices.

OptiFDTD 6.1™ (2006) and OptiBPM 8.1™ software for simulation/modelling of passive devices.

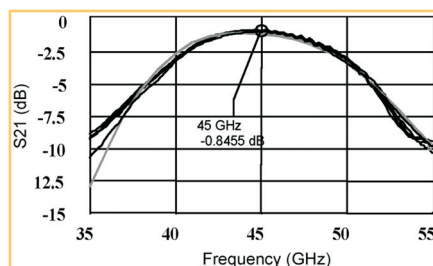
OptiHS and LaserMod software for simulation/modelling of active devices.

Contact: Ph.D. Cristian Kusko, e-mail: cristiank@imt.ro;

Microwave and millimeter wave circuits and microsystems design and modeling (RF-MEMS Laboratory)

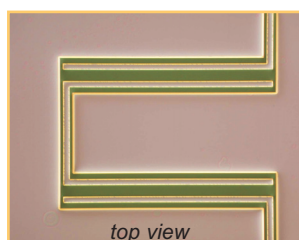
- ♦ Microwave and millimeter wave circuits and components modeling
- Micromachined circuits for microwave and millimeter wave design and electromagnetic modeling (inductors, capacitors, switches, filters, antennae, receiving modules etc)
- ♦ Master and PhD students training (from Romania and European countries) in electromagnetic modeling

Software: IE3D (Zealand Software Inc., Freemont) – based on method of moments; can be used for 3D modeling of the microwave and millimeter wave circuits. Circuit layout can be optimized.

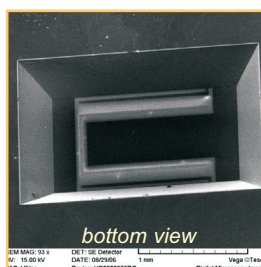


Return losses (S_{21}): simulated results (gray) and experimental results (black)

45GHz band pass filter manufactured by silicon micromachining

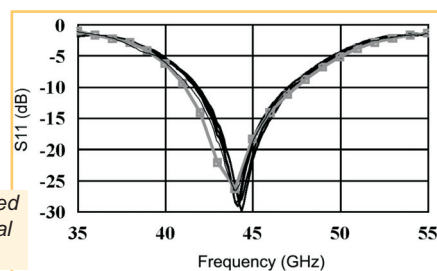


top view

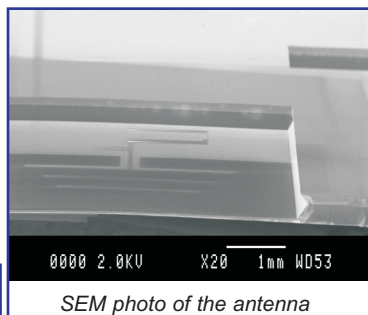


bottom view

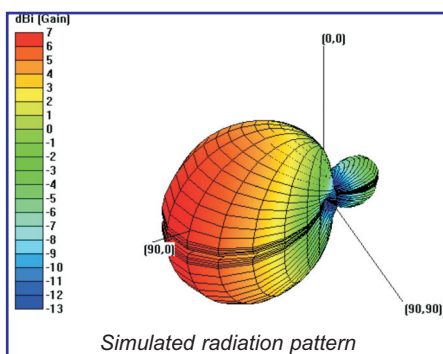
Insertion losses (S_{11}): simulated results (gray) and experimental results (black)



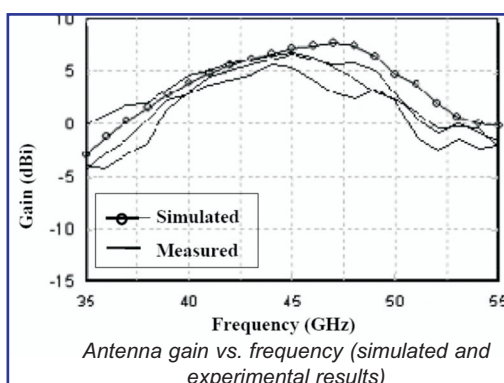
Yagi-Uda antenna supported on 1.5μm thin dielectric membrane manufactured using silicon micromachining



SEM photo of the antenna



Simulated radiation pattern



Antenna gain vs. frequency (simulated and experimental results)

Contact: Ph.D. Alexandru Müller, e-mail: alexm@imt.ro;

Contact Data: Tel: 490.82.12; Fax: 490.82.38; <http://www.imt.ro>