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INSTITUTE FOR SYSTEMS BASED ON OPTOELECTRONICS AND MICROTECHNOLOGY (ISOM)

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Organizations collaborating with ISOM

NATIONAL INSTITUTIONS

Acciona Solar
Centro Nacional de Microelectrónica - Instituto de Microelectrónica de Barcelona (IMB-CNM-CSIC)
Centro Nacional de Microelectrónica - Instituto de Microelectrónica de Madrid (IMM-CNM-CSIC)
Centro de Tecnología Nanofotónica de Valencia (Universidad Politécnica de Valencia)
CIDA (Centro de Investigaciones de la Armada)
CIEMAT (Centro de Investigaciones Energéticas y Medio Ambientales)
Fábrica Nacional de Moneda y Timbre (Real Casa de la Moneda)
INDRA Sistemas, S.A.
Instituto de Ciencias de Materiales de Madrid – CSIC
Instituto de Estructura de la Materia - Centro de Física *Miguel Antonio Catalán* - CSIC
INTA (Instituto Nacional de Tecnología Aeroespacial)
Universidad Autónoma de Madrid
Universidad Complutense de Madrid
Universidad de Málaga
Universidad de Oviedo
Universidad de Valencia
Universidad Rey Juan Carlos

INTERNATIONAL INSTITUTIONS

Centre de Recherche sur L'Hétéro-épitaxie et ses Applications, CRHEA-CNRS (Valbonne, France)
École Polytechnique Federale de Lausanne (Switzerland)
Ferdinand Braun Institut für Höchstfrequenztechnik, Berlin (Germany)
IAF Freiburg (Germany)
INTEC/IMEC (Leuven, Belgium)
IR-Nova (Sweden)
Massachusetts Institute of Technology, M.I.T (USA)
Northwestern University (USA)
Paul Drude Institut (Germany)
Technische Universiteit Eindhoven (Holland)
The University of Cambridge (United Kingdom)
The University of California, Santa Bárbara (USA)
The University of Sheffield (United Kingdom)
University Giessen (Germany)
University of Darmstadt (Germany)
Walter Schottky Institut - Technical University of Munich (Germany)

INSTITUTE FOR SYSTEMS BASED ON OPTOELECTRONICS AND MICROTECHNOLOGY (ISOM)



The Institute for Systems based on Optoelectronics and Microtechnology (ISOM) was founded in 2000 and it is assigned to Universidad Politécnica de Madrid (UPM). It is an interdepartmental research institute, located at the Higher Technical School of Telecommunication Engineering. It is made up of several research groups whose research works involve projects in the fields of optoelectronics and micro/nanotechnology.

ISOM comprises a total of 400 m² of clean room, 300 m² of laboratories for characterization, with centralized air conditioning, and 200 m² of laboratories for electronics and instrumentation. ISOM also includes a room for industrial cooperation and technology transfer, and an office for external service management.

In 2001, ISOM technology plant was recognized as Singular Scientific and Technological Infrastructure (Instalación Científica y Tecnológica Singular, ICTS) by the Ministry of Education and Science (MEC) and its main goal is to provide services in technology, processing and characterization to the European and Spanish scientific and technological communities.



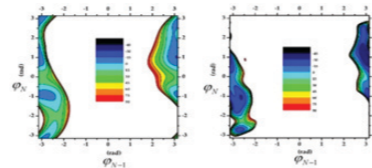
OPTICAL COMMUNICATIONS

- **Laser Diodes** for 0.9-1.3 μm (InGaAs/GaAs) and 1.3-1.55 μm (GaInNAs/GaAs).
- **RCLEDs** of 510-570 nm for transmissions through plastic optical fibers.
- **LEDs in VIS/UV** with III-V nitrides for displays and white indoor lighting.



MAGNETIC SENSORS AND SYSTEMS

- **Magnetic sensors:** for low magnetic fields: Flux-gate, piezoelectric-magnetostrictive, magneto-optical and magnetoresistive sensors.
- **Magnetic nanoparticles:** Deposited both by electrodeposition and by sputtering (better control of the composition). They are used in medical applications.
- **Spintronics:** This group has recently begun to develop devices based on spin-torque transfer.
- **Multisensors:** Ground-based aircraft control and guidance. Real-time monitoring of large electrical batteries state. Smart cards.

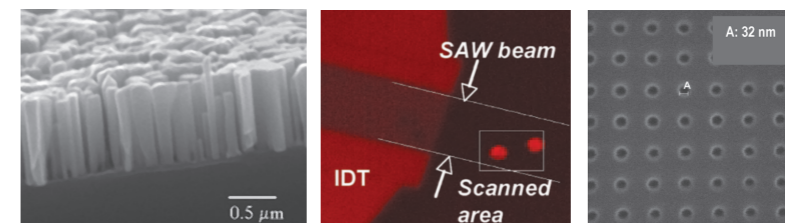


SIMULATION OF NON-METALLIC MATERIALS

- **Simulation of non-metallic materials** and complex fluids
- **Monte Carlo** and molecular dynamics.
- **Nanostructured materials** and adsorption.

MICROSYSTEMS AND NANOTECHNOLOGY

- **Semiconductors-Optoelectronics-MOEMS:** InGaAsN QDs and QWs, III-V nitride quantum discs and nanocolumns, single photon emitters (SPE).
- **Semiconductors-Nanoelectronics-MEMS:** AlGaIn/GaN HEMT transistors and AlGaIn/GaN SAW structures for high frequency and high power applications.
- **Magnetic Microsystems-MEMS:** magnetic multilayer structures, spintronics, magnetic nanoparticles, sensors.



SYSTEMS WITH OPTICAL SENSORS

- **UV and Vis tunable photodetection:**
 - UV-B solar radiation monitoring systems with III-V nitrides.
 - Integrated systems for Vis/UV fluorescence.
 - Fire detection systems from UV emissions
 - Biosensors based on AlInGaIn for water pollutant detection.
- **IR Multispectral photodetection:**
 - Multispectral integration of AlGaAs/GaAs QWIPs and associated electronics.
 - IR detection for environmental applications.
 - InGaAsN quantum dot photodetectors.
- **Integrated nanophotonics:**
 - Biochemical sensors and microring resonators.
 - On-chip optofluidic systems.

