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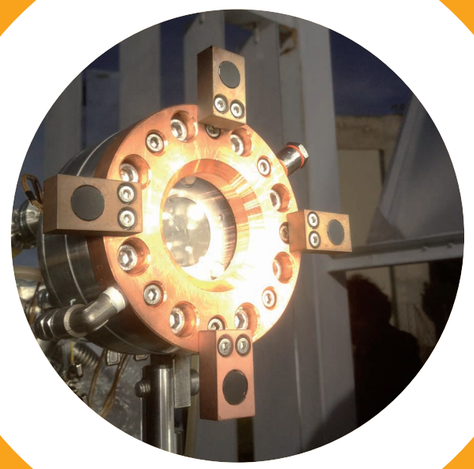


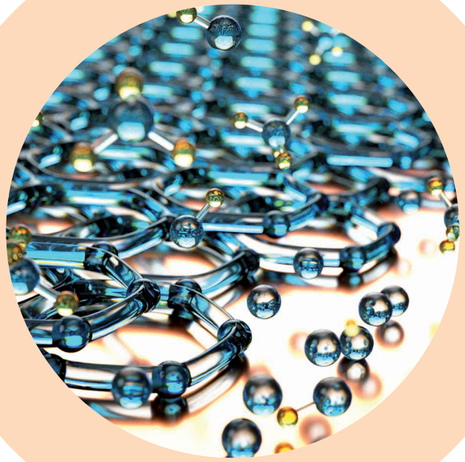
Scientific papers

The scientific production of DSFTM, assessed in terms of number of JCR papers, is very high. An analysis carried out by using the web search-engine Scopus (www.scopus.com), restricted to the CNR scientific production in the period 2009 to 2013, shows that "Physical Sciences" is the subject area with the largest number of papers (17.3% of the total CNR outputs), followed by "Materials Science" shared by DSFTM and DSCTM. In terms of citations and by restricting the analysis to the "Physical Sciences" subject area, more than 450 papers have been cited more than 30 times in the same period, and about 50 papers have exceed the threshold of 100 citations.

Coordination and participation in major research projects and other initiatives

The research activities of the Institutes of the Department of Physical Sciences and Technologies of Matter are well funded, through the participation and/or coordination of National and European Projects, and by research contracts on activities committed by Industry.

The DSFTM research Institutes are connected to extensive international networks of scientific collaborations thanks to the involvement in many European projects (about 80 of the E.U. VII Framework Programme). Jointly to DSCTM, DSFTM plays an important role in the "Graphene-Driven Revolutions in ICT and Beyond" (GRAPHENE) flagship, a scientific project that involves a broad European Scientific Community, aimed to the exploitation graphene and two-dimensional materials for innovative ICT applications. DSFTM is also involved in the "Human Brain" European flagship.



DSFTM

www.dsftm.cnr.it

DEPARTMENT OF PHYSICAL SCIENCES AND TECHNOLOGIES OF MATTER

IBF - Institute of Biophysics
IFN - Institute of Photonics and Nanotechnologies
IMM - Institute of Microelectronics and Microsystems
INO - National Institute of Optics
IOM - Institute of Materials
ISASI - Applied Sciences & Intelligent Systems
ISC - Institute for Complex Systems
ISM - Institute of Structure of Matter
NANO - Institute of Nanoscience
NANOTEC - Institute of Nanotechnology
SPIN - Institute of Superconductors, Oxides and other Innovative Materials and Devices

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Department of Physical Sciences and Technologies of Matter

Institutes | 11

Permanent employees | 1100, 650 of which are researchers and technologists

Patents | The Departments manages 122 patent families mainly related to inventions of advanced processes for telecommunication or semiconductor industries. Some products have a direct impact on our life, such as instruments for medical diagnostics or for food quality control.

Patent categories: photonics-optoelectronics, electronics, devices, ICT, nano, biotech, chem.

Spin-offs | The Departments has participated, between 2007 and 2012, at 116 patent families in the following areas:

- Micro and nanotechnologies for the production of nano-structured soft materials
- Tools for NanoImprinting Lithography with high throughputs
- Superconducting wires by magnesium diboride technology
- Design and development of instruments and technologies for measurments with LIDAR technology
- Design and development of methods and instruments for physical and chemical characterization of composite materials also derived from recycled materials and biomaterials
- Research in the field of nanotechnology, design and development of nanostructured thin films and nano powders applicable to sensor devices, electrochemistry and biotechnology sectors
- Internet and computers networks services, such as web marketing, digital Out-Of-Home market, digital signage, analytics and proof-of-performance measurements

Main research themes

INNOVATIVE MATERIALS

The activity is focused on the synthesis of nanostructures using semiconductor, oxide, organic, magnetic, superconductor, or hybrid materials, and includes the investigation of interface processes and dimensionality control. In this respect DSFTM is very active in the study of the properties and technological applications of two-dimensional atomic crystals such as functionalized graphene and silicene.

SENSORS AND DEVICES

The focus is on the development of micro- and nanostructured systems for energy conversion, digital processing of the information, advanced sensing (biosensors, optical fiber, magnetic sensors, sensors based on semiconductors or organic materials, etc.). Device prototypes are realized in a number of advanced processes infrastructures and pilot-lines, resulting in applications of high socio-economic impact (energy, health-care, ICT, etc.), thanks to the collaborations with Industries in the field of microelectronics and sensors.

LASER SYSTEMS, PHOTONIC DEVICES AND OPTICAL AND PLASMA TECHNOLOGIES

The Department has a strong expertise in the development of laser sources over all spectral regions and different regimes, from ultrastable lasers for metrological applications, to the ones used for the investigation of ultrafast chemical and physical phenomena.
The investigation of radiation-matter interaction spans from plasma production to the capability of controlling position of single atoms.

QUANTUM SCIENCE AND TECHNOLOGIES

The wide multidisciplinary expertise, from solid state to atomic gas, photon or polariton physics, gives DSFTM a leading role in the development of fully innovative technologies to be applied in the field of manipulation and information transfer. The quantum technologies developed by DSFTM aim to exploit the strong opportunities of the entanglement phenomenon and realize information processing devices with unbeatable features compare to conventional systems.

COMPLEX SYSTEMS, SOFT MATTER, BIOPHYSICS

The activity is focused on investigation properties of soft condensed matter, complex materials and biological systems, over all scale levels. This includes a wide class of materials whose deformation is strongly dependent on the absolute temperature or temperature fluctuations (colloids, viscoelastic fluids, macromolecular and cellular complexes, interconnected by communication networks at different levels, etc.)

ADVANCED INSTRUMENTATION AND NEW METHODS FOR MATTER'S INVESTIGATION

DSFTM is intensively committed in the design and realization of advanced instrumentation for extending the frontiers of knowledge in the field of matter's science. The acitivity aims to increase resolution of characterization techniques (energy, time, spatial resolutions, either for spectroscopy or microscopy techniques) for the matter's investigation under extreme conditions (high pressure, high magnetic and electrical fields, high temperatures) or for the analysis of innovative materials integrated in complex devices. The activity includes the development of new methodologies for advanced computing and modeling