

Monica De Seta is currently Associate Professor at the Roma Tre University where she is heading the Laboratory of Physics and Technology of Semiconductors of the Department of Sciences.

## **PROFESSIONAL EXPERIENCE**

2006-present Associate professor at the Department of Sciences of the Roma Tre University

1995-2006 Assistant professor at the Department of Physics of the Roma Tre University

2000 - 2001 Visiting researcher for 12 months at the Low Temperature Laboratory of the Balseiro Institute in S. Carlos de Bariloche (Argentina).

1995 European Community Post-doctoral Fellowship at the LURE Synchrotron Laboratories Orsay (Paris)  
Supervisor: Dott. Maria Carmen Asensio

1994 Post-Doctoral Research Fellowship of Consorzio INFN at the Physics Department of La Sapienza University of Rome (of National Institute of Condensed Matter ?)

1990 Research Fellowship of Consorzio INFN at the Physics Department of La Sapienza University of Rome (of National Institute of Condensed Matter ?)

## **ACADEMIC QUALIFICATIONS**

2016: ASN (National Scientific Qualification) for the role of Full Professor in Condensed Matter Physics sector 02/B1

1994 PHD in Physics at the La Sapienza University of Rome Dissertation: "Structural and electronic properties of alkali doped fullerides studied by photoelectron spectroscopies" Supervisor: Prof. F. Evangelisti

1988 Laurea degree with laude in Physics at the La Sapienza University of Rome.  
Dissertation: "Amorphous semiconductor multi-quantum well Structures" Supervisors: Prof. P. Fiorini and Prof. F. Evangelisti

## **INSTITUTIONAL ROLES**

2013-2018:

Coordinator of the of the Degree Course in Optics and Optometry of the Roma Tre University.  
Member of the Roma Tre Science Department Board and Budget Planning Commission.  
Coordinator of the Roma Tre Unit of the The National Consortium for the Physical Sciences of Matter (CNISM)

## **TECHING AND SUPERVISING**

Monica De Seta has been in charge of the following academic courses: Optics, Physics of Nanostructures, Condensed Matter Physics, Atomic and Molecular Physics. She has tutored and co-tutored students working on their BSc, MSc, and PhD thesis.

## **PROJECTS AND FUNDING**

**Project Coordinator** of LazioInnova- Progetti Gruppi di Ricerca 2020 –Project "TERALASER: Emittitore laser nel TeraHertz a base di Silicio" GeCoWEB n. A0375-2020-36579 Partners: Dep. of Sciences-Università di Roma Tre, Dep. of Physics- Sapienza Università di Roma. Total budget: € 149.606,10

**Project Coordinator** of the Horizon 2020 FET-Open -01-2016-20017 project "FLASH (Far-infrared Laser Assembled using Silicon Heterostructures)" G. A. N°766719.

Total budget 3.206.498,75; Roma Tre budget: 837.587,50

Partners: Università Roma Tre (Coordinator)- University of Glasgow (UK) - IHP Microelectronics (Ger) -ETH Zurich (Svi) - NextNano GmbH (Ger)

**Research Unit Coordinator** of PRIN 2005 project "Terahertz generation in unipolar Si-Ge heterostructures" (founded by MIUR). PI F. Beltram (Scuola Normale Superiore di Pisa).

Partners: Università Pisa (Coordinator), Università Roma Tre, Istituto Nazionale di Metodologie e Tecnologie per la Microelettronica – (CNR) Catania.

Total budget: 250.000 euro; Roma Tre budget: 58.600 euro

**Research Unit Coordinator** of the national project MADESS 1997 "Synthesis of SiC and Amorphous Carbon Thin Films for Applications in Microelectronics and Electron Emitters Devices" (founded by the National Council of Research of Italy, three years project)

## RESEARCH ACTIVITY

Monica De Seta's research activity has been focused in the field of the solid state physics giving innovative contributions in several areas such ultra-high vacuum semiconductor growth, scanning probes techniques, material characterisation with electron and optical spectroscopies, device fabrication.

From 2000 her main research topic concerns Ultra High Vacuum Chemical Vapour Deposition (UHV-CVD) of SiGe nanostructures (quantum wells and self assembled quantum dots) on Si(001) substrate and their morphological, structural and optical characterization. In the last period her research activity focused on intersubband transitions in sGe/SiGe multilayer on Si(001) well for the development of Si-based emitters operating in the THz range.

### Further research topics:

- *CVD growth of Graphene on Ge substrates*: study of the impact of growth temperature, CH<sub>4</sub> precursor flux and Ge substrate orientation on the quality of the graphene film
- *Superconductor vortices*: Plastic and elastic symmetry transformations of the vortex lattice induced by 2D pinning potential fabricated by means of electron beam lithography.
- *c-SiC/Si(100) heterostructure*: Study of the electronic and structural properties of samples grown using hydrocarbon or C<sub>60</sub> as precursors by means of Photoemission and Yield Spectroscopies, Reflection High Energy Electron Diffraction and Atomic Force Microscopy
- *C<sub>60</sub>-Semiconductors interaction*: study of the structural and electronic properties of C<sub>60</sub>/Si(100) and C<sub>60</sub>/Ge(111) interface by means of Photoemission and Angle Resolved Photoemission, Low Energy Electron Diffraction, Atomic Force Microscopy
- *Semiconductor surfaces*: study Ge(100) and Ge(111) high temperatures surface properties by means of

## Synchrotron Radiation Angle Resolved Photoemission Spectroscopy

- *Alkali doped Fullerides*: study of the electronic and structural properties of AnC60 fullerides by means of Photoemission and Yield spectroscopies. These techniques allowed to establish the metallic or insulator character of the different stable phases of these compounds.
- *Amorphous semiconductors*: growth by means PECVD and study of the electronic and structural properties a-Si<sub>1-x</sub>C<sub>x</sub>:H alloys by means of X-rays and UV Photoemission Spectroscopies, Electron Energy Loss Spectroscopy and Auger Spectroscopy; the quantum properties and the interface quality of the a-Si:H/a-Si<sub>1-x</sub>C<sub>x</sub>:H superstructures have been also investigated by means of optical absorption and electro-absorption measurements, photo-thermal deflection spectroscopies, conductivity and photoconductivity measurements.

### **INVITED TALK AT INTERNATIONAL CONFERENCES (LAST 5 YEARS)**

“SiGe heterostructures for THz QCLs: issues, progress, perspectives” IQCLSW2020 International Quantum Cascade Laser workshop online ETH Zurich (SVI) 2020

“Growth of Ge/SiGe Quantum Cascade Heterostructures” ISCS18 8th International Symposium on Control of Semiconductor Interfaces Sendai (Giappone) 2019 invited talk

“THz quantum cascade lasers based on silicon” E-MRS 2018 Fall Meeting (Varsavia) (Simposio U)

“Towards a THz quantum cascade laser based on silicon heterostructures” Semicon Nano 2017 Como (Italy)

### **TECHNICAL SKILLS AND EXPERTISE**

Epitaxy and Chemical Vapor Deposition for the semiconductor growth

Design, use, maintenance, and development of UHV equipment

UV and X-ray Photoelectron Spectroscopies

IR spectroscopy

Atomic Force Microscopy

Scanning Electron Microscopy

RHEED/LEED

Photoluminescence, Photoconductivity and Ellipsometry spectroscopies

Cryogenic techniques

Electron beam- lithography nano-fabrication

**PUBLICATIONS:** more than 100 articles in these research topics.