

## Curriculum Vitæ F. Arciprete

Fabrizio Arciprete is Senior Researcher at the Department of Physics, University of Rome Tor Vergata. In 1991 he graduated *cum laude* in Physics at the University of Rome Tor Vergata. He obtained his PhD in Physics in November 1995.

Between 1995 and 1999 he got several Post-Doc fellowships of the National Research Council (CNR) and the National Institute for the Physics of the Matter (INFM). In September 1999 he got the current position at the University of Rome "Tor Vergata.

From October to December 2014 he was Guest Scientist c/o Paul-Drude-Institut in Berlin in the Epitaxy group for: "*Growth of Sb<sub>2</sub>Te<sub>3</sub> on several substrates*".

F. Arciprete is lecturer of the course: "*Introduction to Crystal Growth*" for the Master programs in Physics and Material Science. Between 2009 and 2011, he gave the following series of lectures for the PhD School in Physics: "*Epitaxial Growth of Semiconductor Nanostructures*", "*Concepts in Crystal Growth: Molecular Beam Epitaxy*".

He was lecturer of the course: "*Surface Thermodynamics*", for the undergraduate program in Materials Science and teaching assistant for courses of "*Experimental Physics*", for the undergraduate program in Physics.

He is supervisor and co-supervisor for many students of the Bachelor and Master in Physics and Materials Science. Since March 2014 he is a member of the Committee for the PhD School in Physics, University of Rome Tor Vergata.

F. Arciprete is an expert of Molecular Beam Epitaxy (MBE), Scanning Probe Microscopy: STM (Scanning Tunneling Microscopy) and AFM (Atomic Force Microscopy); diffraction techniques: RHEED (Reflection High Energy Electron Diffraction) and LEED (Low Energy Electron Diffraction), photoemission spectroscopy (XPS and UPS), Reflectance Anisotropy Spectroscopy (RAS), Extended X-ray Absorption Fine Structure Spectroscopy (EXAFS). His main experimental realization consists of the design and development of a MBE growth system for III-V semiconductors, with the possibility to perform spectroscopic analysis *in situ* (XPS, UPS, LEED and HREELS).

The research activity of F. Arciprete has covered several topics:

- Normal state electronic properties of high-T<sub>c</sub> superconductors and their interfaces with metals by means of electron spectroscopies. Growth by Pulsed Laser Deposition of High-T<sub>c</sub> superconducting superlattices and their characterization by X-ray Absorption Spectroscopy (XAS) at the ESRF facility in Grenoble.
- Optical and electronic properties of semiconductor surfaces (GaAs and Si), both clean and after the evaporation of metals, by electron (XPS, UPS, and HREELS) and optical (RAS) spectroscopies.
- In recent years he has started a collaboration with the Max Planck Institute in Stuttgart (J.Honolka and K.Kern) and the STM group of CNR-ISM Institute of Rome (S. Colonna and F. Ronci), for the MBE growth and characterization of Diluted Magnetic Semiconductors (DMS), such as GaMnAs and InMnAs.
- Currently the main activity concerns the MBE growth and characterization, by AFM and STM, of the high lattice mismatched semiconductor heterostructure InAs/GaAs(001). The basic processes involved in the initial two-dimensional growth phase and in the 2D to 3D transition, typical of these systems, have been studied. Very recently, the strong influence of the As flux on the nucleation of InAs islands was demonstrated. This finding contradicts the minor role usually attributed to anions in the III-V molecular beam epitaxy and increases the fundamental understanding of nanocrystal growth in the III-V systems. He also addressed the problem of the selective nucleation of InAs Quantum Dots on GaAs, which is the ability to control the nucleation of islands in limited and

selected areas (few tens of nm) of the surface. In collaboration with the CNR-IFN Institute (E. Giovine and A. Gerardino) and the University of Florence (A. Vinattieri), the selective nucleation of single InAs quantum dots in nanometer-scale holes formed on a SiO<sub>2</sub>-masked GaAs substrate have been demonstrated, with observation of single dot photoluminescence emission.

- Very recently, he has been starting a collaboration with the Paul-Drude-Institute in Berlin for the growth and characterization of stacked sequences of 2D crystals based on the phase change material Sb(Ge)Te.

F. Arciprete has collaborations with various national and international institutions: Paul Drude Institute for Solid State Electronics; Max Planck Institute in Stuttgart (MPI) for the research on DMS, an application for a research project on this topic was presented with MPI under the Seventh Framework Programme of the EU; European Synchrotron Radiation Facility in Grenoble (France) for the activity on synchrotron radiation; Johannes Kepler Universitat in Linz (Austria); STM laboratory of CNR-ISM institute in Rome; Department of Physics of the University of Modena and Reggio Emilia (R. Magri) for the theoretical modeling of the heterostructures growth; Institute of Photonics and Nanotechnology (IFN) of CNR.

During his career F. Arciprete has participated in numerous research projects of MIUR (PRIN and FIRB), CNR, INFN and INFM.

Since 1992 he is associated to National Institute for Physics of Matter (INFM) and subsequently the National University Consortium for the Condensed Matter Physical Sciences (CNISM).

Since 2011 he is associated to the Institute of Structure of Matter (ISM) of CNR.

He is referee for international journals of the Elsevier Science and of the American Institute of Physics.

F. Arciprete has attended at many International Conferences and Workshops, with many oral presentation and invited seminars. He is author of more than 70 papers on high impact factor international journals.