

Curriculum prof. Sergio Valeri

Present position: Full Professor of Experimental Physics, Dip. di Scienze Fisiche Informatiche e Matematiche, University of Modena and Reggio Emilia.

Author or co-author of 239 papers on international referred scientific journals; author or co-author of 11 publications in books; invited lectures: 40;

h-index: 28; sum of times cited: 2878; average citations per item: 12,46 (source: Web of Science).

Supervisor of 36 master thesis and of 16 PhD thesis in Physics and Nanoscience.

Member of the Senato Accademico, University of Modena and Reggio Emilia

Associated to CNR, Institute CNR-Nano, Modena

Previous appointments

1978-1982: Lecturer of Physics, Faculty of Science, Univ. of Modena and Reggio Emilia.

1982-2002: Associate Professor of Structure of Matter, Faculty of Science, Univ. of Modena and Reggio Emilia.

2005-2007: Director, PhD School on Nano and Physical Science, Univ. of Modena and Reggio Emilia.

2006-2011: Director, Department of Physics, University of Modena and Reggio Emilia.

2012-2015: Director, Dept. of Scienze Fisiche, Informatiche, Matematiche, Univ. of Modena and Reggio Emilia.

Major collaborations

H.-J. Freund, Fritz-Haber Inst. Berlin; *R. Rüffer*, European Synchrotron Radiation Facility, Grenoble, France; *M. Reichling*, Univ. Osnabrück, Germany; *F. Boscherini*, Univ. Bologna, Italy; *J. Korecki*, AGH University of Sci. and Technol., Krakow, Poland; *J. Jupille*, CNRS-INS-Paris; *F. Netzer*, Karl-Franzens-Univ. Graz, Austria; *G. Pacchioni*, Università di Milano Bicocca, Italy; *N. Pugno*, Univ. Trento, and Fondazione Bruno Kessler, Trento, Italy.

Research activity

a) Research organization

Prof. Valeri was involved (for both science and management) in the set-up and development of :

- Laboratory for Electron Spectroscopy of Surfaces and Adsorbates in Modena (SESAMo),
 - INFM-CNR Nat. Res. Center on nanoStructures and bioSystems at Surfaces (S3), presently CNR-NANO-S3;
 - Tecnopole for Advanced Mechanics, Regione Emilia-Romagna and Univ. of Modena and Reggio Emilia.
- Prof. Valeri is Referee of several international scientific journals and of international and national projects.

b) Research projects

Prof. Valeri has been coordinator or research-group leader in several, competitive projects, including:

Microstructural characterisation (**CNR-MSTA project** 1991-1993); High current photoemission and bright injectors (**EC-HCM Network** 1995-1997); Surface Physics (**PRIN** 1997-1998); Growth of ultrathin films of transition metals and their oxides (**PRIN** 1999-2000); Electron correlation in free-standing 1D 3d metal systems self-assembled on oxide surfaces (**FIRB** 2001-2004); Growth and Supra- Organization of Transition and Noble Metal Nanoclusters (GSOMEN) (**FP6 STRP** 2005-2007); Thermal stability of exchange-spring planar magnetic nanostructures with perpendicular and lateral exchange coupling (**PRIN** 2008-2009); Reducible oxide chemistry, structure and functions”, **EU COST Action** CM1104; Nano-structured oxides: multi-functionality and applications (**FIRB** 2012-15).

Prof. Valeri was also in charge of a number of **applied and industrial research projects**, including:

Steel surface micro-nano texturing to reduce friction and wear in automotive components (Ferrari spa); Multicomponent nanoparticles for applications in ceramics (System SpA); Self-lubricating coatings for mechanical applications (Varvel SpA); Nanotechnologies for professional tool cases and bags materials (GT Line srl); Nanoadditives for improved tribological performances of liquid lubricants (Tec Star srl); “Innovative self-lubricant coatings for mechanical applications, developed through micro-nano additivation”, Call 2010 M.I.S.E.-ICE-CRUI; “Materials and surface treatments for metal components operating in aggressive environments” Call 2013-2015 FCRMo Applied Research for Innovation.

Prof. Valeri is presently involved as associated investigator in the project: NEWLI: “NEW LIght on transient states in condensed matter by advanced photon - electron spectroscopies” (PRIN 1015), and as principal investigator in the **FAR-Unimore project** “Innovative (oxide-based) materials and methods for fuel cell electrodes implementation”.

d) Present scientific activity:

Structure, morphology and reducibility of epitaxial cerium oxide ultrathin films and nanostructures,

Morphology, structure, stoichiometry and reducibility of metal-supported CeO₂ epitaxial ultrathin films.

Structural properties, morphology and reducibility of size-selected CeO_{2-x} nanoparticles.

Atomic scale structure, interactions and reduction of cerium oxide at the interface with Pt and Si surfaces.

Metal and metal-oxide nanoparticles on oxide surfaces

Structure, morphology and electronic properties of metal nanoparticles on the CeO₂ (111) surface

Steering the growth of metal clusters via interface interaction between a MgO thin film and metal supports.

Magnetic ordering, magnetic anisotropy and magnetic interactions in metal and metal-oxide nanoparticles.

Friction, wear and adhesion on solid surfaces at the micro and nano scale

Control of friction and wear processes at the multi-scale, and nanoscale friction of graphene.

Self-lubricant solid materials.

Surfaces functionalization.