CURRICULUM VITAE ALBERTO MARIA FELICE PALEARI

BRIEF SUMMARY

PRESENT POSITION	Place and date of birth: Monza (Italy), 1961 Position: Full Professor of EXPERIMENTAL PHYSICS OF MATTER Italian scientific category codes: 02/B1-Experimental physics of matter FIS/01-Experimental physics Department of MATERIALS SCIENCE - University of Milano-Bicocca Research activity: physical properties and optical/electric response of functional glass-based materials and nanostructured dielectrics
EDUCATION	**1986** - Degree in Physics - University of Milano - Thesis on magnetic point defects in silicon dioxides and related properties **1991** - PhD in Physics - University of Pavia – Thesis on electronic trapping properties in zirconium dioxide
ACADEMIC CAREER	**1992-1997** - Researcher – Department of Physics – University of Milano **1998-2001** - Researcher – Department of Materials Science – University of Milano-Bicocca **2001-2016** - Associate Professor - Department of Materials Science – University of Milano-Bicocca **2016**- - Full Professor – Department of Materials Science – University of Milano-Bicocca
INSTITUTIONAL POSITIONS	**2000-2002** – *Elected Member of Dept.Committee* –Materials Science Dept. **2006-2013** – *Responsible* for the Degree in Goldsmith Science & Technology **2013-2017** – *Programme Director of the Materials Science Teaching Board*, for the following Courses: • Degree in Materials Science • Degree in Optics and Optometry • Master's degree in Materials Science **2017-2020** – *Programme Director of the Materials Science Teaching Board*, for the following Courses: • Degree in Materials Science • International master's degree in Materials Science **2017-2019** *Delegate of the Rector* for relations with the Russian Federation **2017-2026** *Member of the Rectoral Committee* for the Musical Activities – Coordinator of the Orchestra of the University of Milano-Bicocca **2020-2026** *Coordinator* of the international master's degree in Materials Science and Nanotechnology
SCIENTIFIC MANAGEMENT	**2000-2012** - *Project-Leader* at HASYLAB Synchrotron Radiation Laboratory (DESY) in Hamburg, for high priority experiments on electronic excitation induced mechanisms in glass-based materials **1998-2004** – *Local Coordinator* in three National Projects (PRIN) on functional properties of silica-based materials **2005-2008** - *Coordinator* of the Inter-university network "Insulators" within the National Committee of the Consorzio Nazionale Interuniversitario per la Struttura della Materia (CNISM) **2007-2009** - *Principal Investigator* of project funded by Cariplo Foundation on Nanostructured Glass-based UV-LED **2011-2014** - *Director* of the P. D. Sarkisov International Laboratory for Glass-based Functional Materials - Mendeleev University, Mosca **2015-2023** – *Project Coordinator* - CAMBIO project - CREW-Codesign for Rehabilitation and Wellbeing, Fondazione Cariplo

2015-2027 - *Local Coordinator* of the European project IMAGINE I – IMAGINE IV - Development and implementation of EIT KIC Raw Materials Master Programs in Sustainable Materials

TEACHING

1992-2026 – Teaching activity at the Faculty of Science at UNIMI and at the School of Science at UNIMIB in courses of experimental physics, specifically Physics, Physics 2, Electromagnetism, Physics Lab 2, Spectroscopy 2, Physics of Dielectrics, Physics of Homogeneous and Nanostructured Dielectrics, Materials Spectroscopy and Microscopy, Lab of Advanced Tech, Physics of Crystals, Physics of Vision.
Member of the Council of Materials Science and Nanotechnology Doctorate.

REVIEWER ACTIVITY

Reviewer per numerose riviste scientifiche internazionali. In particolare:

- Nature Publishing Group	**Nature Commun.**
- Wiley	**Adv. Mater., Adv.Opt.Mater., Small**
- American Chemical Society	**ACS Appl. Mater. Interfaces**
- Royal Society of Chemistry	**J. Mater.C**
- American Physical Society	**Phys.Rev.Lett., PhysRev.B**
- Elsevier	**ActaMater. J.Non-Cryst.Sol. J.Lumin.**

Guest Editor for Elsevier and co-Chair of the 8th Int. Conference on SiO2

INVITED LECTURES

Invited lectures in conferences, workshops and meetings of institutions, such as the *Royal Physical Society,* the Italian Physics Society*,* the *NATO Advanced Study Institute,* on topics about photosensitivity and light-emission in nanostructured glass-based materials

AWARDS

1987 - Grant by SGS-microelectronics in the field of silicon dioxide
1988 - Grant by Enichem in the field of oxide superconductors
2010 – Award from the National Institute of Physics of Matter INFM for research and technological transfer in the field of nanostructured glass-based fuctional materials
2010 - Winner in the International competition for World's Leading Scientists for implementing advanced research project in Materials Science (Resolution n.220/10, Russian Federation)
2012 - Winner of the National Call for the Scientific Qualification as Full Professor in Experimental Physics of Matter

PUBLICATIONS

See the ORCID database **https://orcid.org/0000-0002-6590-9739**

RESEARCH

His research activity is now focused on the physical mechanisms responsible for optical and electrical properties in nanostructured glass-based and hybrid organic/inorganic materials. The research is mainly devoted to the effects of crystalline nanophases and light-emitting ions on the mechanisms responsible for luminescence, energy transfer, electrically driven light emission, and conductive plasticity.

During his previous scientific activity, he also studied point defects configurations in zirconium and silicon dioxides by means of optical and magnetic resonance spectroscopies, and crystal field effects and exchange interactions in transition metal oxides.

1989-1995 In the field of Zr/Y oxide-based materials, he carried out electron paramagnetic resonance (EPR) investigations on electron trap sites, bringing to the structural model of the T-center, which is still the basis of the current studies on the role of the anionic structural disorder and electronic trapping on the properties of zirconia-based materials. [Phys. Rev. B 40, 6518, (1989); Phys. Rev. B 44, 6858, (1991); Phys. Rev. B 49, 9182, (1994); Phys. Rev. B1 51, 15942, (1995)]

1992-2000 He extended his investigation to the class of materials belonging to Ni, Cu, and Mn mixed oxides, by means of EPR and magnetic susceptibility studies. In these systems, he succeeded to clarify the mechanisms responsible for the effects of stoichiometry on exchange interactions and magnetic ordered states. [Phys. Rev. B1 53, 703, (1996); J. Sol. St. Chem. 128, 80, (1997)]

1992-1995 He started to investigate silica-based materials with the aim of clarifying controversial interpretations of the optical properties arising from localized states. He contributed to identify the real structure of a few coordination defects in SiO2 (1992-1995). He identified EPR signals in irradiated quartz, whose interpretation gave the most detailed description till now of the local configuration on non-bonding oxygen in SiO2. [Phys. Rev. B 49, 9182, (1994), Phys. Rev. B1 52, 138, (1995)]

1995-1998 The previous studies were the basis for the investigation of the role of defect sites on the photorefractive properties of silica-based materials, with the activation of collaborations with industrials partners and a series of spectroscopic experiments by means of synchrotron radiation. He implemented a laboratory for the analysis of functional glasses by spectroscopic techniques, refractometry, and Raman analysis, together with an activity of production of new materials. In the meantime, he clarified some debated aspects on the role of Ge doping and native intrinsic defects on the optical activity related to the photosensitivity of Ge-doped silica materials [Phys. Rev. B, 54, 16637, (1996); Phys. Rev. B, 58, 3511, (1998); Phys. Rev. B, 57, 3718, (1998)]

1998-2002 In this period, particularly interesting results were found in Sn- and Ge-doped photorefractive glasses. Among these, it was identified for the first time the Sn-variant of E'-centre in SiO2. This result gave the tool for monitoring and clarifying some of the microscopic mechanisms responsible for the photosensitivity of Sn-doped silica. In oxygen vacancy free Ge-doped silica (produced by an original sol-gel route) he identified the electronic transitions of irradiation-induced Ge sites usually hidden by intense doping-induced oxygen-vacancy absorption bands. [Phys. Rev. B, 58, 9615, (1998); Phys. Rev. B, 60, 2429, (1999); J.Non-Cryst. Sol., 261, 1, (2000); Appl. Phys. Lett., 77, 3701, (2000); Phys. Rev. B, 64, 73102, (2001)]

2001-2006 Since 2001 the activity has been mainly focused to the investigation of nanostructured materials composed by crystalline nanophases in amorphous matrix, specifically in oxide-in-oxide systems, such as SnO2 nanocrystals in amorphous SiO2. The investigations mainly concerned the optical properties arising from quantum confinement of the electronic excitations and the confinement of excitation diffusion within the single nanoparticle, in undoped and rare earth doped materials. The results have been developed showing several interesting properties, such as photosensitivity arising from innovative nanoparticle-driven mechanisms, and sensitized rare earth emission through resonant energy transfer from the nanophase [Phys.Rev.Lett. 90, 055507, (2003); Appl.Phys.Lett. 88, 131912, (2006); Phys.Rev.B 73, 073406, (2006)]. Codoping with erbium ions has also been studied to partially reduce the interface defectiveness thus enabling free-exciton recombination [Appl.Phys.Lett. 89, 153126, (2006)].

2007-2011 In this period, it has been demonstrated the possibility to obtain nanostructured glass designed so as to simultaneously sustain electric currents and charge accumulation in connected but non-conductive branches of the percolation network, thus resulting in electrically tunable dielectric function [Adv. Funct. Mater.20, 3510, (2010)]. From these results

his research has been focused on the UV light emission through charge injection and transport in glass-based nanostructured materials. Specifically, the results gave the first demonstration of UV LED fabricated from fully inorganic oxide-in-oxide system [Nature Commun. 3, 690, (2012)]. In this period, his research has also regarded defective and porous silica, and high-density varieties of silicon dioxide.

2010-2020 In the field of nanostructured materials, he has collaborated with the Optoelectronic Research Centre of the University of Southampton, the London Centre for Nanotechnology at the University College of London, the Los Alamos National Laboratory, and the Mendeleev University of Chemical Technology of Russia, in Moscow, where he implemented the International Laboratory of Glass-based Functional Materials. In this field he is now studying structure and properties of gallium oxide nanophases in glass for applications in UV-visible converters (Nanoscale, 6, 1763, 2014), UV emitters (J. Mater. Chem. C, 3, 4380, 2015), and conductive oxide films with responsive memory (J. Mater. Chem. C, 7, 7768, 2019). His research also continues to include fundamental aspects in the field of localized states in dielectrics, as in diamond (Carbon 120, 294, 2017) and in silicon dioxide (Commun. Phys., DOI: 10.1038/s42005-018-0069-5, 2018), finding new properties of specific electronic states. More recently, the activity has also been focused on materials and technologies for biomedicine, developing hybrid polymeric materials for internal radiotherapy, diagnostic, biosensors, and devices for mobility disabilities (React. Funct. Polym. 215, 2025, 106382; Environ. Sci.: Nano, 2024, 11,4449).