

DICHIARAZIONI SOSTITUTIVE DI CERTIFICAZIONI

(art. 46 D.P.R. n. 445/2000)

DICHIARAZIONI SOSTITUTIVE DELL'ATTO DI NOTORIETÀ

(art. 47 D.P.R. n. 445/2000)

Il sottoscritto **PIERANTOZZI GIAN MARCO**

nato a _____ '1988

attualmente residente a _____

Indirizzo: _____

CAP: _____

Telefono: - _____

Visto il D.P.R. 28 dicembre 2000, n. 445 concernente "T.U. delle disposizioni legislative e regolamentari in materia di documentazione amministrativa" e successive modifiche ed integrazioni;

Vista la Legge 12 novembre 2011, n. 183 ed in particolare l'art. 15 concernente le nuove disposizioni in materia di certificati e dichiarazioni sostitutive¹;

Consapevole che, ai sensi dell'art.76 del DPR 445/2000, le dichiarazioni mendaci, la falsità negli atti e l'uso di atti falsi sono punite ai sensi del Codice penale e delle leggi speciali vigenti in materia, dichiara sotto la propria responsabilità:

**che quanto dichiarato nel seguente
curriculum vitae et studiorum
comprensivo delle informazioni
sulla produzione scientifica
corrisponde a verità**

¹ Ai sensi dell'art. 15, comma 1 della Legge 12/11/2011, n. 183 le certificazioni rilasciate dalla P.A. in ordine a stati, qualità personali e fatti sono valide e utilizzabili solo nei rapporti tra privati; nei rapporti con gli Organi della Pubblica Amministrazione e i gestori di pubblici servizi, i certificati sono sempre sostituiti dalle dichiarazioni sostitutive di certificazione o dall'atto di notorietà di cui agli artt. 46 e 47 del DPR 445/2000

CURRICULUM VITAE ET STUDIORUM

GIAN MARCO PIERANTOZZI

CURRENT POSITION

Fellowship from 07/11/17 Consiglio Nazionale delle Ricerche (CNR) -
to 06/11/19 Istituto Officina Materiali (IOM), Trieste

Analysis of electronic and magnetic properties of low-dimensionality systems (epitaxial oxides, metal-organic interfaces, supported nanoparticles), based on measurements of photoemission with electron analyzers and of spin polarization also time resolved in pump-probe mode
SPRINT-NFFA project
Bando IOM AR 011/2017 TS (Protocollo n. 2598 del 09/08/2017)

PREVIOUS POSITIONS

Fellowship from 22/02/17 Università degli Studi Roma Tre, Rome
to 22/10/17

Characterisation of a Multichannel electron analyser and its application to the study of metal-organic interfaces
at LASEC (LABoratorio di Spettroscopie Elettroniche e di Correlazione)
Rep. n. 23 - Prot. 233 del 27/01/2017 - Dipartimento di Scienze

EDUCATION

PhD 2014-2016 Università degli Studi Roma Tre, Rome

Scienze della Materia, Nanotecnologie e Sistemi Complessi (XXIX ciclo)
Thesis: *Electronic structure and morphology of CuPc thick films and monolayers on Al(100) and Au(110) surfaces*
at LASEC (LABoratorio di Spettroscopie Elettroniche e di Correlazione)
Supervisor: Prof. Alessandro Ruocco

Graduate Studies 2007-2013 Università degli Studi La Sapienza, Roma

Master degree in *Physics*
Thesis: *X-ray Absorption Spectroscopy at High Pressures on two Iron-based Superconductors*
at HPS (High Pressure Spectroscopy) group
Supervisors: Prof. Paolo Postorino and Prof. Nuarang Lal Saini

High School 2002-2007 Liceo Classico Francesco Stabili, Ascoli Piceno

High School specializing in Classical Studies

PARTICIPATION IN SCHOOLS, MEETINGS AND CONFERENCES

- Participation* *International School of Physics and Technology of Matter*
New frontiers in down-scaled materials and devices: realization and investigation by
advanced methods
 organised by CNR (Consiglio Nazionale delle Ricerche)
 15-20 September 2014
 Basiliani Resort Hotel - Otranto (LE), Italy
- Talk* COPPER-PHTALOCYANINE ON AL(100): A STUDY OF PROJECTED MOLECULAR
 ORBITALS THROUGH AUGER-PHOTOELECTRON COINCIDENCE SPECTROSCOPY
 (APECS)
FisMat - Italian National Conference on Condensed Matter Physics
 28 September - 2 October 2015
 University of Palermo - Palermo, Italy
- Poster* AUGER SPECTROSCOPY (IN SINGLE AND COINCIDENCE MODE) AS A TOOL FOR
 STUDYING ELECTRONIC PROPERTIES OF CuPc FILMS
 G. M. Pierantozzi, S. Vaidya, G. Di Filippo, R. Gotter, A. Ruocco, R. Bartynski
 and G. Stefani
ElCoGS - Electronic Correlation: from Gaseos to Solids
 8 - 9 June 2017
 University of Roma Tre - Roma, Italy
- Poster* A NOVEL HIGH REPETITION RATE HHG SOURCE FOR THE STUDY OF TIME-RESOLVED
 ELECTRONIC AND MAGNETIC STRUCTURE OF STRONGLY CORRELATED SYSTEMS
 G. M. Pierantozzi, R. Cucini, T. Pincelli, A. De Vita, F. Cilento, A. Fondacaro, D.
 Kopic, M. Oura, K. Tamasaku, F. Parmigiani, G. Panaccione and G. Rossi
The International School on Magnetism and Synchrotron Radiation
 7-12 October 2018
 Mittelwihl, France
- Talk* STRAIN-INDUCED COMPETING ELECTRONIC PHASES IN $\text{La}_x\text{Ca}_{1-x}\text{MnO}_3$ THIN
 FILMS
 G. M. Pierantozzi, A. Petrov, G. Vinai, F. Motti, R. Cucini, A. De Vita, T. Pincelli,
 A. Gessini, J. Fuji, M. Oura, V. Polewczyk, F. Offi, F. Borgatti, G. Rossi and G.
 Panaccione
New Generation of Strongly Correlated Electron Systems (NGSCES)
 2-6 September 2019
 Silvi (TE), Italy

PUBLICATIONS

- M. Bendele, C. Marini, B. Joseph, G. M. Pierantozzi, A. S. Caporale, A.
 Bianconi, E. Pomjakushina, K. Conder, A. Krzton-Maziopa, T. Irifune, T.
 Shinmei, S. Pascarelli, P. Dore, N. L. Saini, and P. Postorino
Interplay of electronic and lattice degrees of freedom in $\text{A}_{1-x}\text{Fe}_{2-y}\text{Se}_2$
superconductors under pressure, Physical Review B **88**, 180506(R) (2013)
 doi: <https://doi.org/10.1103/PhysRevB.88.180506>
- G. M. Pierantozzi, M. Sbroscia and A. Ruocco
Templating effect of the substrate on the structure of Cu-phthalocyanine thin film,
 Surface Science **669**, 176 (2018)
 doi: <https://doi.org/10.1016/j.susc.2017.12.003>
- A. Bellissimo, G. M. Pierantozzi, A. Ruocco, G. Stefani, O. Y. Ridzel, V.
 Atasauskas, W. S. M. Werner and M. Taborrelli
Secondary electron generation mechanism in carbon allotropes at low impact electron
energies, Journal of Electron Spectroscopies and Related Phenomena

in press (2019)
doi: <https://doi.org/10.1016/j.elspec.2019.07.004>

TEACHING ACTIVITY

- Tutorship*
- Physics (Mechanics and Electromagnetism)*
for students of the degree course in Geology
at Dipartimento di Scienze, Università degli Studi Roma Tre (2015)
- Physics (Mechanics and Electromagnetism)*
Mathematics (Calculus and Analysis)
for students of the degree course in Optics and Optometry
at Dipartimento di Scienze, Università degli Studi Roma Tre (2016)

SCIENTIFIC ADVISORY ACTIVITY

- Educational events*
- Active participation in *European Researchers' Night* 2014 and 2016
at Università degli Studi Roma Tre
- Active participation in *Occhi su Saturno* 2014 and *Occhi su Giove* 2016,
educational nights open to people
at Dipartimento di Fisica, Università degli Studi Roma Tre
- Membership*
- Member of *The Science Zone*, association promoting innovative education and
scientific activities for children, in schools and for individuals

TECHNICAL SKILLS

- Laboratory Skills*
- Handling Ultra-High Vacuum (UHV) apparatus (10^{-10} mbar)
- Basic tools in surface preparation in UHV (sputtering and annealing of metal
substrates, deposition of organic molecules or elemental metallic thin film)
- Optimizing and controlling electron optics
- High Pressure techniques with diamond anvil cells (knowledge obtained
during master thesis)
- Spectroscopic and
Diffraction
Techniques*
- Main knowledges:
- *Photoemission Spectroscopy*, both from core levels and valence band, including:
 - angle-resolved photoemission (ARPES)
 - spin polarization of valence band and secondary electrons
 - experiments in the time domain
 - hard x-ray *bulk* photoemission
 - *resonant* Photoemission
 - *X-ray Circular Magnetic Dichroism* (XMCD)
 - *Electron Energy Loss Spectroscopy* (EELS)
 - *Electron Coincidence Spectroscopy* (both Auger-Photoelectron coincidence and
 $e^- \rightarrow 2e^-$ experiment)
 - *Low Energy Electron Diffraction* (LEED)
- Other techniques:

- *Micro-Raman Spectroscopy and Extended Fine Structure X-Ray Absorption Spectroscopy (EXAFS)* - used during the work of master degree thesis
- *Photoelectron Spectroscopy* on insulating samples, with charge compensation by means of an electron gun working in *flood* conditions - used in an experiment on a silicon based polymer at the LASEC laboratory

Official Beamtimes at Large Facilities

at ID24 beamline, ESRF
X-ray absorption at Fe K edge on iron-selenium superconductors as a function of pressure (using diamond anvil cell)
 Technique: EXAFS
 Proposal SC 3612 - April 2013

at ALOISA beamline, ELETTRA
Local bonding of CuPc on the Al(100) and Au(110) surfaces: A comparison of strong and weak chemisorption
 Technique: Auger-Photoelectron Coincidence Spectroscopy
 Proposal 20140364 - August 2014

at ALOISA beamline, ELETTRA (as main proposer)
Intermolecular dynamic charge transfer in CuPc films
 Techniques: Resonant Photoemission and NEXAFS
 Proposal 20170310 - July 2017

at I09 beamline, Diamond Light Source
Origin, dimensionality and evolution of electron gas at surface of TiO₂ anatase thin films
 Techniques: ARPES, Resonant Photoemission
 Proposals SI16041-3 - March 2018 and SI16041-4 - May 2018

at BL19LXU beamline, Japan National Synchrotron (SPring-8)
Ultrafast dynamics of metallic hidden phases in manganite thin films
 Techniques: hard x-ray photoemission
 Proposal 2018A1278 - July 2018

at BL19LXU beamline, Japan National Synchrotron (SPring-8)
Sub-threshold dynamics of metallic hidden phases in LCMO
 Techniques: time resolved hard x-ray photoemission
 Proposal 2019A1560 - April 2019

at APE beamline, ELETTRA
Spin texture and metal/insulator character of the hidden phases in Ca-based manganite thin films
 Techniques: spin-resolved ARPES and x-ray Magnetic Circular Dichroism
 Proposal 20180553 - November 2018 and May 2019

COMPUTER SKILLS

Programming

C

Language studied during University studies at La Sapienza and exploited in bachelor's degree thesis

Labview

Language used in the LASEC group for controlling instruments and for data analysis. During my PhD I have used many routines previously written by members of the group; I have debugged or improved some of these existing programs; furthermore, I have written new routines within the framework of the commissioning of a new electron analyser with Multichannel Plate detector

LANGUAGES

Mother tongue Italian

Good knowledge of written and spoken English

RESEARCH INTERESTS

The *fil rouge* of my research activity has been the use and the knowledge of electronic spectroscopies, ranging from Electron Energy Loss Spectroscopy (EELS) to the various branches of Photoemission. Much part of my work has been devoted to the commissioning of new instrumentation related to electronic spectroscopies.

In particular, during my PhD at LASEC laboratory in Rome, I took part to the commissioning of an Hemispherical Electron Analyzer with Multi-Channel Plate Detector (field of view, energy and angle resolution and optimization of electron optics for different kinds of experiments), in the framework of SIMDALEE 2 project.

In parallel with this instrumental work, I also dedicated myself to exploit electronic spectroscopies for the research on materials, in the field of interfaces between organic molecules and metals. Organic molecules (in particular I dealt with Metal-Phthalocyanines) exhibit an energy gap in the visible region, which makes them suitable candidates for various applications in low cost opto-electronics. The interaction of molecules with substrates represents a wide and still open field: to this purpose, we have found that, depending on whether the film is grown onto gold or aluminum crystals, two different structures form, even at long distances from the interface (tens of nanometers); this result has been accomplished by means of a spectroscopic technique, EELS, taking advantage of the link between the crystal structure of the molecular assembly and the spectral composition of the main absorption line.

In the new position at IOM-CNR, my research topic has moved to highly correlated materials, in particular oxides with interesting surface properties (titanium dioxide) or whose magnetic properties are strongly linked to the transport ones (manganites).

While continuing the research of my group in these topics with the participation at beamtimes in large facilities, the most of my work in this first year in Trieste has been devoted to the implementation, optimization and characterization of the end-station of SPRINT laboratory, in the framework of NFFA project. This apparatus was born in order to study the time evolution of electronic and magnetic properties of correlated materials after a pump excitation. The perfect

tools for studying these properties are photoemission experiments, but in order to perform them in time resolved mode a compromise is needed between solid state lasers and Free Electron Laser facilities; indeed the former ones can have fast pulses and high repetition rate but their photon energy is too low to allow photoemission, while the latter ones have enough high photon energy but too low repetition rate and too much energy per pulse. SPRINT apparatus actually consists in a High-Harmonic-Generation (HHG) source with fast pulses (200 fs) at high repetition rate (hundreds of kHz) and photon energy of the order of tens of eV. The end-station is equipped with an hemispherical analyzer and a Mott detector, thus allowing the measurement of angle resolved photoemission and of spin polarization of secondary electrons.

F.to Gian Marco Pierantozzi

September 30, 2019