



Mario Agostino Rocca

Full professor

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Education and training

1985

Doctor Rerum Naturae

Investigation of Surface Phonon Spectra and their modification induced by gas adsorption - Summa cum laude

Technische Universitaet Aachen - Aachen - DE

1981

Laurea in Fisica

Studio della diffrazione di He da Ag(110) - 110

Università di Genova - Genova - IT

Academic experience

2001 - ONGOING

Full Professor in Condensed Matter Physics

University of Genoa - Genoa - IT

Leader of a Research Group in Surface Science Editor of Applied Surface Science deputy Director of the Department from 2002 to 2005

1992 - 2001

Associated Professor in General physics

University of Genoa - Genoa - IT

Research Group Leader

1984 - 1992

Assistant Professor in General physics

University of Genoa - Genoa - IT

Language skills

English

Proficient

German

Proficient

French

Independent

Teaching activity

teacher of the courses:

Surface Science and Restructuring at Surfaces

Introduction to Solid State

Fisica dello Stato Solido Avanzata

Postgraduate research and teaching activity

Supervision of PhD students, residents and post-doctoral fellows

PhD students:

1992-1994 Luca Vattuone: 'Dinamica dell'interazione O₂-Ag(110): coefficiente di cattura e dissociazione'

1993-1995 Francesco Buatier de Mongeot: 'Studio dell'interazione O₂/Ag(001)'

1999-2001 Letizia Savio: 'Studio della reattività chimica di superfici di ossidi'

2003-2006 Andrea Gerbi: 'Interazione gas-superficie con molecole allineate rotazionalmente'

2006-2009 Marco Smerieri: 'Studi STM di molecole dosate con fascio molecolare supersonico'

2014-2017 Angélique Lusuan: "Aminoacid deposition at surfaces"

Postdoctoral fellows

1994 Dr. Li Yibing (ICTP)

1995 Dr. A. Cupolillo (CNR fellowship)

1995/1997 Dr. F.Cemic and dr. U. Burghaus (EU, Human Capital and Mobility Programme)

1998 Dr. U. Burghaus (DFG fellowship)

1998 Dr. Luca Vattuone (INFM fellowship)

2002/2008 Dr. Letizia Savio (assegnista)

2007/2008 Dr. Tatyana Kravchuk (assegnista)

2007/2008 Dr. Giulia Giallombardo (INFM fellowship)

2007/2008 Dr. Vinay Venugopal (ICTP fellowship)

2010/2011 Dr. Robert Reichelt (DFG fellowship)

2011/2015 Dr. Jagriti Pal (ICTP fellowship and later assegnista di ricerca Univ. of Genoa)

PhD committees membership

PhD School of Physics

Research interests

My research interests are in experimental Surface Science.

My main results are on:

- 1) Surface Phonon Spectra;
- 2) Surface Plasmon and Acoustic Surface Plasmon dispersion;
- 3) Dynamics and stereodynamics of gas surface interaction and in simple chemical reactions;
- 4) Role of surface defects in gas-surface Interaction and simple chemical reactions;
- 5) Growth of ultrathin films of oxides and graphene;
- 6) Self assembly of aminoacids at surfaces.

I published more than 190 scientific papers in international journals, 35 of

which with high impact (>8, one on Nature).

Most recent publications:

ultime pubblicazioni:

- 194 Prominence of acoustic surface plasmons in hyperthermal gas energy transfer to metal surfaces**, G. Bracco, L. Vattuone, M. Smerieri, G. Carraro, L. Savio, G. Paolini, G. Benedek, P. M. Echenique, and **M. Rocca**, J. Phys. Chem. Lett. **12**, 9894-9898 (2021).
- 193 Graphene growth on Ni(111) by CO exposure at near ambient pressure**, R. Davì, G. Carraro, M. Stojkowska, M. Smerieri, L. Savio, M. Lewandowski, J.J. Gallet, F. Bournel, **M. Rocca** and L. Vattuone, Chem Phys. Lett. **774**, 138596 (2021).
- 192 Morphological characterization and electronic properties of pristine and oxygen-exposed graphene nanoribbons on Ag(110)**, J.E. Barcelon, M. Smerieri, G. Carraro, P. Wojciechowski, L. Vattuone, **M. Rocca**, S. Nappini, I. Pis, E. Magnano, F. Bondino, L. Vaghi, A. Papagni, and L. Savio, Phys. Chem. Chem. Phys. **23**, 7926-7937 DOI: 10.1039/d0cp04051g (2020).
- 191 Graphene**, A. Jorio, E. Avellar Soares, R. Paniago, **M. Rocca**, L. Vattuone, Springer Handbook of Surface Science, ISBN 978-3-030-46904-7 Chap **36**, 1171 (2020).
- 190 Surface Plasmons and Plasmonics**, **M. Rocca**, Springer Handbook of Surface Science, ISBN 978-3-030-46904-7 Chap **18**, 531 (2020).
- 189 Preface to the Springer Handbook of Surface Science**, editors **M. Rocca**, T.S. Rahman and L. Vattuone, ISBN 978-3-030-46904-7, page IX (2020).
- 188 Interface oxygen induced internal structures of ultrathin MgO islands grown on Ag(100)**, L. Savio, M. Smerieri, L. Vattuone, S. Tosoni, G. Pacchioni, **M. Rocca**, J. Phys. Chem. C **124**, 8834-8842 (2020).
- 187 Vibrational fingerprint of the catalytically-active FeO_{2-x} iron oxide phase on Pt(111)**, M. Stojkowska, R. Davì, G. Carraro, M. Smerieri, M. Lewandowski, **M. Rocca**, L. Vattuone, L. Savio, Applied Surface Science **512**, 145774 (2020).
- 186 2D Ni Nanoclusters on Ultrathin MgO/Ag(100)**, L. Savio, M. Smerieri, J. Pal, E. Celasco, **M. Rocca**, L. Vattuone, J. Phys. Chem. C **124**, 482-488 (2020).
- 185 “Deciphering complex features in STM images of O adatoms on Ag(110)”** T.B. Rawal, M. Smerieri, J. Pal, S. Hong, M. Alatalo, L. Savio, L. Vattuone, T.S. Rahman, **M. Rocca**, Phys. Rev. B **98**, 035405 (2018).
- 184 “Chemisorption of CO on n-doped Graphene on Ni(111)”**, G. Carraro, E. Celasco, M. Smerieri, L. Savio, G. Bracco, **M. Rocca**, L. Vattuone, Applied Surface Science **428**, 775 (2018).
- 183 “Adatom Extraction from Pristine Metal Terraces by Dissociative Oxygen Adsorption: Combined STM and Density Functional Theory Investigation of O/Ag(110)”** J. Pal, T.B. Rawal, M. Smerieri, S. Hong, M. Alatalo, L. Savio, L. Vattuone, T.S. Rahman, **M. Rocca**, Phys. Rev. Lett. **118**, 226101 (2017).
- 182 “Influence of growing conditions on the reactivity of Ni supported graphene towards CO”** E. Celasco, G. Carraro, M. Smerieri, L. Savio, **M. Rocca**, L. Vattuone, J. Chem. Phys. **146** 104704 (2017).
- 181 “Influence of defects on adsorption - model studies with stepped surfaces”** L. Vattuone, L. Savio, **M. Rocca**, In: Reedijk, J. (Ed.) Elsevier Reference Module in Chemistry, Molecular Sciences and Chemical

Engineering. Waltham, MA: Elsevier. 28-Aug-2017

doi:10.1016/B978-0-12-409547-2.11461-1.

180 “CO chemisorption at vacancies of supported graphene films: a candidate for a sensor”, E. Celasco, G. Carraro, A. Lusuan, M. Smerieri, J. Pal, **M. Rocca**, L. Savio, L. Vattuone, Phys. Chem. Chem. Phys 18, 18692-18696 (2016) DOI: 10.1039/C6CP02999J

179 “Comment on “Adsorption of hydrogen and hydrocarbon molecules on SiC(001)” by Pollmann et al. published on Surface Science Reports” E. Wimmer, E. Celasco, L. Vattuone, L. Savio, A. Tejada, M. Silly, M. D’Angelo, F. Sirotti, **M. Rocca**, A. Catellani, G. Galli, L. Douillard, F. Semond, V. Yu. Aristov, P. Soukiassian, Surf. Sci. **644**, L170 (2016)

178 “Preface: 17th International Conference on Solid Films and Surfaces (ICSFS)” C.A. Achete, C.M. Almeida, M. Cremona, **M. Rocca**, F. Stavale, IOP conference series: Materials Science and Engineering **76**, 011001 (2015)

177 “Spontaneous oxidation of Ni clusters on MgO Monolayers Induced by Segregation of Interfacial Oxygen.” M. Smerieri, J. Pal, L. Savio, L. Vattuone, R. Ferrando, S. Tosoni, L. Giordano, G. Pacchioni, **M. Rocca**, J. Phys. Chem Lett. **6**, 3104 (2015) + Supporting Information

176 “Sticking probability and reactivity of hyperthermal O₂ molecules impinging of CO precovered Pd(100): Effect of rotational states with K>1”, L. Vattuone, L. Savio, F. Pirani, **M. Rocca**, Topics in Catalysis **58**, 580 (2015)

175 “Phonons in thin oxide films” L. Vattuone, L. Savio, **M. Rocca** in “Oxide materials at the two dimensional Limit” A. Fortunelli and F. P. Netzer eds., Springer Verlag (2015)

174 “Enhanced chemical reactivity of pristine graphene strongly interacting with a metal substrate: chemisorbed CO on graphene/Ni(111)” M. Smerieri, E. Celasco, G. Carraro, A. Lusuan, J. Pal, G. Bracco, **M. Rocca**, L. Savio, L. Vattuone, Chem. Cat. Chem. **7**, 2328 (2015)

173 “How growing conditions and interfacial oxygen affect the final morphology of MgO/Ag(100) films” J. Pal, M. Smerieri, E. Celasco, L. Savio, L. Vattuone, R. Ferrando, S. Tosoni, L. Giordano, G. Pacchioni, **M. Rocca**, J. Phys. Chem. C **118**, 26091- 26102 (2014)

Editorial activity

1) Member of the referee board of the main journals of his research field: Nature, Nature Materials, Physical Review Letters, Physical Review B, Europhys. Lett., J. Chem. Phys., J. Phys. Chem., J. of Catalysis, J. Phys. Condensed Matter, Surface Science, Surface Science Letters, J. Electron Spectroscopy and Related Phenomena, European Journal of Physics, New Journal of Physics, Plasmonics.

2) Editor of the proceedings of Vibrations at Surfaces VII (special volume of Journal of Electron Spectroscopy and Related Phenomena, (64/65, 1993)) and of ECOSS XVI (special volume of Surface Science (377/379, 1997))

3) Since 2013 Editor of Surface Science Reports

4) Since 2014 Series Editor of the Springer Series in Surface Science

5) Since 2015 Editor of Applied Surface Science