

ALLEGATO B

UNIVERSITÀ DEGLI STUDI DI MILANO

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Codice concorso 4445

[Umberto De Giovannini] CURRICULUM VITAE

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	DE GIOVANNINI
NOME	UMBERTO
DATA DI NASCITA	09,09,1978

Curriculum dalla pagina seguente

Data

15/09/1978

Luogo

PALERMO

Umberto De Giovannini



PERSONAL INFORMATION

Family name, First name: De Giovannini, Umberto
Researcher unique identifier: 0000-0002-4899-1304 (ORCID)
Date of birth: September 9, 1978
Nationality: Italian
URL for website: www.mpsd.mpg.de/person/44457/2736

Abilitazione a Professore di seconda fascia settore 02/B2 (26/07/2017 – 26/07/2023)

EDUCATION

2008 Ph.D in physics, Department of Physics, University of Genoa, Italy
Thesis title: «*Interaction effects in parabolic quantum dots: the projected Hartree-Fock technique*». Thesis advisors: Prof. M. Sasseti and Prof. B. Kramer.
May – Jul 05 Visiting student, Physics Department of the University of Hamburg, Germany
Jan – Mar 05 Visiting student, Physics Department of the University of Hamburg, Germany
2004 Master degree in physics, Department of Physics, University of Genoa, Italy
Thesis title: «*Statistical learning and inverse problems* », advisors Prof. A. Verri and Dr. E. De Vito.
Final grade 110/110 *cum laude*.

CURRENT POSITIONS

2020 – Present Senior Research scientist, Ikerbasque, Basque Foundation for Science, San Sebastian, Spain.
2017 – Present Group leader, Max Plank Institute for the Structure and Dynamics of Matter, Hamburg, Germany.

PREVIOUS POSITIONS

2012 – 2017 Research scientist, Department of Materials Science, Faculty of Chemistry, University of the Basque Country UPV/EHU, San Sebastian, Spain
2010 – 2012 Postdoc Scholar, Department of Materials Science, Faculty of Chemistry, University of the Basque Country UPV/EHU, San Sebastian, Spain
2009 – 2010 Postdoc Scholar, School of Engineering & Science, Jacobs University, Bremen, Germany and Department of Physics, University of Genoa, Italy.
2008 – 2009 Postdoc Scholar, Department of Physics, University of Genoa, Italy.

FELLOWSHIPS

2010 – 2012 Fellowship for Postdoctoral researchers from the University of the Basque Country, Spain.
2009 – 2010 International Postdoctoral Exchange from the Angelo della Riccia foundation, Italy and Switzerland.
2005 – 2008 Fellowship for Graduate researchers from the University of Genova, Italy.

SUPERVISION OF GRAD STUDENTS AND POSTDOCTORAL FELLOWS

2017 – present 4 Postdocs, 2 PhD Students.
Max Plank Institute for the Structure and Dynamics of Matter, Hamburg, Germany.
2012 – 2017 2 Postdocs, 4 PhD Students.
University of the Basque Country, San Sebastian, Spain.

TEACHING ACTIVITIES

2018 Introductory course on DFT and TDDFT (6 hours), *Curso de verao Nanociencias e nanomateriais*, Campinas, Brazil.
2015 Tutorial on photoemission with TDDFT (4 hours), *School on New Computational Methods for Attosecond Molecular Processes*, Zaragoza, Spain.
2005 – 2007 Teaching assistant and tutoring (40 hours). Physics for engineers at Department of Engineering University of Genova, Italy.

MEMBERSHIP OF SCIENTIFIC SOCIETIES

2019 – present Member of the German Physical Society (DPG).
2010 – present Member of the European Theoretical Spectroscopy Facility (ETSF).

AWARDED GRANTS

2020 - 2023 EU MSCA-ITN-ETN action SMART-X (grant # 860553), PI share €252,8K (total awarded €3,930,264.72).



MAJOR COLLABORATIONS

Theorists

- **Dr. Hannes Hübener**, MPSD Hamburg
development of first principles Floquet theory and applications.
- **Prof. Noejung Park**, UNIST, Korea
out-of-equilibrium topological phases, theory development and applications.
- **Prof. Shunsuke A. Sato**, University of Tsukuba, Japan
development of models for ultrafast charge carrier dynamics in solids.
- **Prof. Leslie Greengard**, Simons Foundation and Courant institute, New York, USA.
development of a boundary-free time propagator for the TDDFT equations in presence of ionization.

Experimentalists

- **Prof. Dmitri Basov**, Columbia University, New York, USA
modeling strong field dressing in TMDs waveguide modes.
- **Prof. Francesca Calegari**, DESY and Hamburg University, Germany
modeling ultrafast correlation effects on fragmentation of DNA bases.
- **Prof. Jerome Faist**, ETH Zürich, Switzerland
design chiral cavities to realize the idea of symmetry broken materials in experiments.
- **Prof. Isabella Gierz**, University of Regensburg, Germany
modeling decoherence effects in Floquet dressed states observed with ARPES.
- **Prof. Nuh Gedik**, Massachusetts Institute of Technology, Boston, USA
modeling phonoriton (exciton-phonon-photon hybrid) signatures in ultrafast transient absorptions of TMDs.
- **Prof. Matthias Kling**, Ludwig-Maximilians University, Munich, Germany
modeling C_{60} plasmon resonance fingerprints in electron photoionization delays.
- **Prof. Jochen Küpper**, CFEL and Hamburg University, Germany
modeling strong field laser-induced electron diffraction in aligned molecules with the goal of observing chemical reactions in real time.
- **Prof. Matteo Lucchini**, Politecnico di Milano, Italy
modeling ultrafast transient reflectivity on MgF_2 and real-time Floquet dressing in photoelectron streaking of argon atoms.
- **Dr. Caterina Vozzi**, CNR-IFN, Institute for Photonics and Nanotechnologies, Milano, Italy
modeling topological signature in the HHG of Type II Weyl semimetal $MoTe_2$.
- **Dr. Hadas Soifer**, Tel Aviv University, Tel Aviv, Israel
FD-ARPES analysis of off-diagonal electron-phonon coupling in $FeSe$.

REVIEWING ACTIVITIES

- 2020** Reviewer for the Ministerio de Ciencia, Tecnología e Innovación Productiva Fondo para la Investigación Científica y Tecnológica (FONCYT), Argentina.
Activity: review application for grants in the area of chemical physics.
- 2019** Reviewer for the Department of Energy and Basic Science (DOE) of the United States of America.
Activity: review application for grants on Computational Materials Sciences under the DE-FOA-0002040 call.
- 2015 - 2018** Reviewer for the Spanish Supercomputing Network (RES) access committee, Barcelona Supercomputing Center (BSC).
Activity: review applications for computational resources on a quarterly basis.

Journal Reviewer (21 different journals in total): Nature, Nature communications, Nano Letters, Physical Review B, Physical Review Materials, Physical Review E, The Journal of Chemical Physics, The Journal of Physical Chemistry, Physics Letters A, Optics Letters, IOP Electronic Structure, Annalen der Physik, International Journal of Quantum Chemistry, Communications Physics, Journal of Physics: Condensed Matter, Materials Today Communications, Physical Review Research, Advances in Physics: X, NPJ Quantum Materials, J Phys B, Chemical Physics Letters.



INVITED TALKS AND SEMINARS

Invited (18)

- 2020 Dressing quantum materials with light: challenges and perspectives**, seminar, University of Palermo, host Prof. Francesco Ciccarello, Italy.
- 2019 Ultrafast photoelectron spectroscopy with TDDFT: state of the art and perspectives**, *CFEL MUSS Department seminar*, host Prof. Jochen Küpper, Hamburg, Germany.
- 2018 (2) Non-equilibrium dynamics of matter with TDDFT: dynamical control of material properties**, *Workshop Nanociencias e nanomateriais*, Campinas, Brazil; **Ab-initio photoelectrons spectroscopy with TDDFT: from finite to infinite systems**, seminar, ETH Zurich, host Prof. Ursula Keller, Zurich, Switzerland.
- 2017 Ab-initio time and spin resolved ARPES in real materials with TDDFT**, *X-UV Time Resolved Advanced Methods (XTRAM)*, Erice, Italy.
- 2016 (2) Ab-initio spin and time-resolved APRES in real materials with TDDFT: driving TMDs out of equilibrium**, *7th Workshop Time-Dependent Density-Functional Theory: Prospects and Applications*, Benasque, Spain; **Ab-initio photoelectron spectroscopy with TDDFT: from finite to extended systems**, seminar, CNR S3, host Prof. Stefano Corni, Modena, Italy.
- 2015 (3) Simulating photoelectron spectroscopy from finite to extended systems with TDDFT: challenges and perspectives**, *Theory days: Dynamics of irradiation*, Toulouse, France; **Ab-initio photoelectron spectroscopy with TDDFT: finite systems and beyond**, *Excited States: Electronic Structure and Dynamics*, Telluride, CO, USA; **Tutorial on Photoemission with TDDFT**, *School on New Computational Methods for Attosecond Molecular Processes*, Zaragoza, Spain.
- 2014 (5) Changing the color of atoms and molecules with light**, *8th RES User's Conference*, Santander, Spain; **Modeling photoelectron spectroscopy with TDDFT**, *11th World Congress on Computational Mechanics*, Barcelona, Spain; **Time resolved spectroscopies with time dependent density functional theory**, *1st Xlic COST meeting*, London, United Kingdom (2014); **Time resolved spectroscopies with TDDFT**, seminar, Université Paul Sabatier, host Prof. Eric Suraud, Toulouse, France; **Time-resolved photoelectron spectroscopy with TDDFT**, *6th Workshop Time-Dependent Density-Functional Theory: Prospects and Applications*, Benasque, Spain (2014).
- Before 2014 (4) seminars**: Università di Palermo, Italy (2013); Institut Lumière Matière, Lyon, France (2012); University of the Basque Country San Sebastian, Spain (2009); Jacobs University Bremen, Germany (2007).

Contributed (12)

FisMat2015, Palermo, Italy (2015); *PSI-K 2015 conference*, San Sebastian, Spain (2015); *Octopus developer meeting*, Jena, Germany, (2015); *Octopus developer meeting*, Lyon, France, (2012); *17th ETSF Workshop on Electronic Excitations Advanced Green function methods*, Coimbra, Portugal, (2012); *ETSF Young researcher's meeting 2011*, Naples, Italy, (2011); *ETSF Young researcher's meeting 2010*, Jyväskylä, Finland, (2010); *Nanoscale Devices for Environmental and Energy Applications*, San Sebastian, Spain, (2010); *Frontiers of Quantum and Mesoscopic Thermodynamics*, Prague, Czech Republic, (2008); *Sestri Levante 2008 Convegno Informale di Fisica Teorica*, Sestri Levante, Italy, (2008); *Electronic Properties of Two-dimensional Systems and Modulated Semiconductor Structures*, Genova, Italy, (2007); *Quantum Optics and Computation*, MCRTN, Riomaggiore, Italy (2006); *Quantum electromechanical systems*, Jyväskylä, Finland, (2006).



SELF-ASSESSMENT

- I am keen on method development and **multidisciplinary research**. I have developed the first **numerical method** to simulate photoelectron spectroscopy with TDDFT which remains the only technique available today to simulate strong field phenomena, such as laser-induced electron diffraction, in complex molecules (so far up to C₆₀) fully ab-initio – this technique is now emerging as a crucial tool in the research involving strong laser fields in **quantum chemistry**. I was among the pioneer developers of the real-space real-time TDDFT approach for solids implemented in the octopus code and the original developer of a technique capable to simulate ARPES from the flux of the time dependent ionization current which represents another achievement without equivalent in the **solid state** literature. Many of the works constituting the body of my research are based on these breakthroughs.
- While my expertise and publication record is largely on theory and numerical methods development, my work has always been motivated by the curiosity towards unsolved physical problems and inspired by the constant interaction with experimentalists. I have been **providing theoretical support for several groundbreaking experiments on ultrafast dynamics of solids and molecules under strong laser fields involving complex electron and lattice motion** (see *major collaborations*). In the last few years the trend of collaborations with experimentalists has been intensified as testified by the number of papers under review in major journals resulting from joint theory-experiment projects (1 nature, 2 nature physics).
- For the past 8 years, first in Spain (4y) and then in Germany (4y), I have been **leading** a group of 2 to 5 researchers. I have planned and coordinated the research activities in the lab performing the interviewing and hiring of postdocs, fellows and visiting students. I dedicate myself to create a lively, positive and productive environment.
- **The use of heavy ab-initio methods to simulate complex dynamics has been a constant trait of my research**. This has always been a deliberate, albeit expensive, choice motivated by the belief that high quality understanding can be achieved only when the hypotheses are tested against unbiased models involving the smallest number of free parameters possible and, ultimately, experiments. It has endowed me with a unique competitive advantage: interdisciplinary knowledge bridging together material science, quantum chemistry, ultrafast dynamics and heavy numerical tool development.

PUBLICATIONS

46 published papers (42 *without* my PhD supervisor): 43 in leading journals, including (impact factor in brackets - source Google Scholar) 4 Nature Communications [12.121], 3 Nano letters [12.344], 3 Phys. Rev. Lett. [8.385], 1 Phys. Rev. X [12.577], 1 Science Advances [13.116], 1 PNAS [9.412], 1 Nature Materials [38.663]; 3 book chapters; 1 review article.

None of the following publications are co-authored with my PhD supervisor (Maura Sassetti).

5 Most representative publications

These are not the most cited works but the ones judged as the most representative of my scientific profile.

- H. Hübener*, U. De Giovannini*, C. Schäfer, J. Andberger, M. Ruggenthaler, J. Faist, and A. Rubio, **Engineering quantum materials with chiral optical cavities**, *Nat. Mater.*, doi:10.1038/s41563-020-00801-7, (2020). (* = equal contribution)

In this paper we propose a novel approach that enable to realize proposals in the field Floquet engineering of materials as equilibriums states in quantum cavities. This works illustrates the direction of my present and future research.

- U. De Giovannini, H. Hübener, **Floquet analysis of excitations in materials**, *J. Phys. Mater*, **3**, 012001 (2019).

This invited review article covers a large part of our works on Floquet physics in materials and validates my position of expert in the field.

- U. De Giovannini, H. Hübener, S. A Sato, and A. Rubio, **Direct measurement of electron-phonon coupling with time-resolved ARPES** *Phys. Rev. Lett.*, in press, (2020).

This paper lays the foundations of a novel approach to measure electron-phonon coupling and was demonstrated with the TDDFT ARPES approach I developed.

- U. De Giovannini, H. Hübener, and A. Rubio, **A First-Principles Time-Dependent Density Functional Theory Framework for Spin and Time-Resolved Angular-Resolved Photoelectron Spectroscopy in Periodic Systems**, *J. Chem. Theory Comput.* **13**, 265 (2017).

This is the paper where the TDDFT ARPES approach I developed was first presented.

- A. Trabattini, J. Wiese, U. De Giovannini, J.-F. Olivieri, T. Mullins, J. Onvlee, S.-K. Son, B. Frusteri, A. Rubio, S. Trippel, and J. Küpper, **Setting the photoelectron clock through molecular alignment** *Nat. Commun.*, **11**, 2546 (2020).

This paper is the first outcome of a long-standing collaboration with the experimental group of J. Küpper on strong field physics in molecules. Here I was the lead theorist and employed the TDDFT technique that I first developed and I keep refining over the years.



FULL LIST OF PUBLICATIONS

Journals: (* = equal contribution)

- [P.43] «Engineering quantum materials with chiral optical cavities »
H. Hübener*, **U. De Giovannini***, C. Schäfer, J. Andberger, M. Ruggenthaler, J. Faist, and A. Rubio
Nat. Mater., doi:10.1038/s41563-020-00801-7, (2020) .
- [P.42] «How Circular Dichroism in time-and angle-resolved photoemission can be used to spectroscopically detect transient topological states in graphene »
M. Schüler, **U. De Giovannini**, H. Hübener, A. Rubio, M. A Sentef, T. P Devereaux, and P. Werner
Phys. Rev. X, in press, (2020) .
- [P.41] «Direct measurement of electron-phonon coupling with time-resolved ARPES »
U. De Giovannini, H. Hübener, S. A Sato, and A. Rubio
Phys. Rev. Lett., in press, (2020) .
- [P.40] «Floquet states in dissipative open quantum systems »
S. A Sato, **U. De Giovannini**, S. Aeschlimann, I. Gierz, H. Hübener, and A. Rubio
J. Phys. B: Atom. Mol. and Opt. Phys., <http://iopscience.iop.org/10.1088/1361-6455/abb127> (2020) .
- [P.39] «Light-Induced Renormalization of the Dirac Quasiparticles in the Nodal-Line Semimetal ZrSiSe »
G. Gatti, A. Crepaldi, M. Puppini, N. Tancogne-Dejean, L. Xian, **U. De Giovannini**, S. Roth, S. Polishchuk, Ph. Bugnon, A. Magrez, H. Berger, F. Frassetto, L. Poletto, L. Moreschini, S. Moser, A. Bostwick, E. Rotenberg, A. Rubio, M. Chergui, and M. Grioni
Phys. Rev. Lett., **125**, 076401 (2020) .
- [P.38] «Femtosecond exciton dynamics in WSe₂ optical waveguides »
A. J. Sternbach, S. Latini, S. Chae, H. Hübener, **U. De Giovannini**, Y. Shao, L. Xiong, Z. Sun, N. Shi, P. Kissin, G.-X. Ni, D. Rhodes, B. Kim, N. Yu, A. J. Millis, M. M. Fogler, P. J. Schuck, M. Lipson, X.-Y. Zhu, J. Hone, R. D. Averitt, A. Rubio, and D. N. Basov
Nat. Commun., **11**, 3567 (2020) .
- [P.37] «Setting the photoelectron clock through molecular alignment »
A. Trabatttoni, J. Wiese, **U. De Giovannini**, J.-F. Olivieri, T. Mullins, J. Onvlee, S.-K. Son, B. Frusteri, A. Rubio, S. Trippel, and J. Küpper
Nat. Commun., **11**, 2546 (2020) .
- [P.36] «Octopus, a computational framework for exploring light-driven phenomena and quantum dynamics in extended and finite systems »
N. Tancogne-Dejean, M. J. T. Oliveira, X. Andrade, H. Appel, C. H. Borca, G. L. Breton, F. Buchholz, A. Castro, S. Corni, A. A. Correa, **U. De Giovannini**, A. Delgado, F. G. Eich, J. Flick, G. Gil, A. Gomez, N. Helbig, H. Hübener, R. Jestädt, J. Jornet-Somoza, A. H. Larsen, I. V. Lebedeva, M. Lüders, M. A. L. Marques, S. T. Ohlmann, S. Pipolo, M. Rampp, C. A. Rozzi, D. A. Strubbe, S. A. Sato, C. Schäfer, I. Theophilou, A. Welden, and A. Rubio
J. Chem. Phys., **152**, 124119 (2020) .
- [P.35] «Local Berry curvature signatures in dichroic angle-resolved photoelectron spectroscopy »
M. Schüler*, **U. De Giovannini***, H. Hübener, A. Rubio, M. A. Sentef, P. Werner
Sci. Adv., **6**, eaay2730 (2020) .
- [P.34] «Floquet analysis of excitations in materials »
U. De Giovannini, H. Hübener
J. Phys. Mater, **3**, 012001 (2019), doi:10.1088/2515-7639/ab387b. .
- [P.33] «Light-induced anomalous Hall effect in massless Dirac fermion systems and topological insulators with dissipation »
S. A. Sato, P. Tang, M. A. Sentef, **U. De Giovannini**, H. Hübener, A. Rubio
New J. Phys., **21**, 093005 (2019), doi:10.1088/1367-2630/ab3acf .
- [P.32] «Microscopic theory for the light-induced anomalous Hall effect in graphene»
S. A Sato, J. W. McIver, M. Nuske, P. Tang, G. Jotzu, B. Schulte, H. Hübener, **U. De Giovannini**, L. Mathey, M. A Sentef, A. Cavalleri, A. Rubio
Phys. Rev. B **99**, 214302 (2019), doi:10.1103/PhysRevB.99.214302.
- [P.31] «Cavity Control of Excitons in Two-Dimensional Materials»
S. Latini, E. Ronca, **U. De Giovannini**, H. Hübener, A. Rubio
Nano Lett. **19**, 3473 (2019), doi:10.1021/acs.nanolett.9b00183.



- [P.30] «Unraveling materials Berry curvature and Chern numbers from real-time evolution of Bloch states»
D. Shin , S. A Sato , H. Hübener , **U. De Giovannini** , J. Kim , N. Park , A. Rubio
Proc. Nat. Acad. Sci. **88**, 201816904 (2019), doi:10.1073/pnas.1816904116.
- [P.29] «Multiple-orbital effects in laser-induced electron diffraction of aligned molecules»
F. Krećinić, P. Wopperer, B. Frusteri, F. Brauße, J.-G. Brisset, **U. De Giovannini**, A. Rubio, A. Rouzée,
and M. J. J. Vrakking
Phys. Rev. A **98**, 041401 (2018), doi:10.1103/PhysRevA.98.041401.
- [P.28] «Ab Initio Simulation of Attosecond Transient Absorption Spectroscopy in Two-Dimensional Materials»
S. A. Sato, H. Hübener, **U. De Giovannini**, A. Rubio
Appl. Sci. **8**, 1777 (2018), doi:10.3390/app8101777.
- [P.27] «First-principles simulations for attosecond photoelectron spectroscopy based on time-dependent density functional theory»
S. A. Sato, H. Hübener, A. Rubio, **U. De Giovannini**
Eur. Phys. J. B **91** (2018), doi:10.1140/epjb/e2018-90108-7.
- [P.26] «Phonon-driven spin-Floquet magneto-valleytronics in MoS₂»
D. Shin, H. Hübener, **U. De Giovannini**, H. Jin, A. Rubio, and N. Park
Nat. Commun. **9**, 638 (2018), doi:10.1021/acs.nanolett.7b05391.
- [P.25] «Phonon Driven Floquet Matter»
H. Hübener*, **U. De Giovannini***, and A. Rubio
Nano Lett. **18**, 1535 (2018), doi:10.1021/acs.nanolett.7b05391.
- [P.24] «TDDFT-Based Study on the Proton-DNA Collision»
R. Seraide, M. A. Bernal, G. Brunetto, **U. De Giovannini**, and A. Rubio
J. Phys. Chem. B **121**, 7276 (2017), doi:10.1021/acs.jpcc.7b04934.
- [P.23] «Efficient and accurate modeling of electron photoemission in nanostructures with TDDFT»
P. Wopperer, **U. De Giovannini**, and A. Rubio
Eur. Phys. J. B **90**, 51 (2017), doi:10.1140/epjb/e2017-70548-3.
- [P.22] «Creating stable Floquet-Weyl semimetals by laser-driving of 3D Dirac materials»
H. Hübener, M. A. Sentef, **U. De Giovannini**, A. F. Kemper, and A. Rubio
Nat. Commun. **8**, 13940 (2017).
- [P.21] «A First-Principles Time-Dependent Density Functional Theory Framework for Spin and Time-Resolved Angular-Resolved Photoelectron Spectroscopy in Periodic Systems»
U. De Giovannini, H. Hübener, and A. Rubio
J. Chem. Theory Comput. **13**, 265 (2017).
- [P.20] «Generation and Evolution of Spin-, Valley-, and Layer-Polarized Excited Carriers in Inversion-Symmetric WSe₂»
R. Bertoni, C. W. Nicholson, L. Waldecker, H. Hübener, C. Monney, **U. De Giovannini**, M. Puppin, M. Hoesch, E. Springate, R. T. Chapman, C. Cacho, M. Wolf, A. Rubio, and R. Ernstorfer,
Phys. Rev. Lett. **117**, 277201 (2016).
- [P.19] «Classical chaos and harmonic generation in laser driven nanorings»
G. Castiglia, Pietro Paolo Corso, D. Cricchio, **U. De Giovannini**, B. Frusteri, and E. Fiordilino
J. Phys. B: Atom. Mol. and Opt. Phys. **49**, 245601 (2016).
- [P.18] «Monitoring Electron-Photon Dressing in WSe₂»
U. De Giovannini, H. Hübener, and A. Rubio
Nano. Lett. **16**, 7993 (2016).
- [P.17] «Tailored pump-probe transient spectroscopy with time-dependent density-functional theory: controlling absorption spectra»
J. Walkenhorst, **U. De Giovannini**, A. Castro, and A. Rubio
Eur. Phys. J. B **89**: 128 (2016), doi:10.1140/epjb/e2016-70064-0.
- [P.16] «Laser driven structured quantum rings »
G. Castiglia, P. P. Corso, **U. De Giovannini**, E. Fiordilino, and B. Frusteri
J. Phys B: At. Mol. Opt. Phys. **48**, 115401 (2015).



- [P.15] «Real-space grids and the Octopus code as tools for the development of new simulation approaches for electronic systems »
X. Andrade, D. A. Strubbe, **U. De Giovannini**, A. H. Larsen, M. J. T. Oliveira, J. Alberdi-Rodriguez, A. Varas, I. Theophilou, N. Helbig, M. Verstraete, L. Stella, F. Nogueira, A. Aspuru-Guzik, A. Castro, M. A. L. Marques, and A. Rubio
Phys. Chem. Chem. Phys (2015), doi:10.1039/C5CP00351B .
- [P.14] «Modeling electron dynamics coupled to continuum states in finite volumes with absorbing boundaries »
U. De Giovannini, A. H. Larsen, and A. Rubio
Eur. Phys. J. B **88**: 56 (2015), doi:10.1140/epjb/e2015-50808-0.
- [P.13] «Time-Dependent Density-Functional Theory of Strong-Field Ionization of Atoms under Soft X-Rays »
A. Crawford Uranga, **U. De Giovannini**, E. Räsänen, M. J. T. Oliveira, D. J. Mowbray, G. M. Nikolopoulos, E. Karamatskos, D. Markellos, P. Lambropoulos, S. Kurth, and A. Rubio
Phys. Rev. A **90**, 033412 (2014).
- [P.12] «Modelling the effect of nuclear motion on the attosecond time-resolved photoelectron spectra of ethylene »
A. Crawford Uranga, **U. De Giovannini**, D. J. Mowbray, S. Kurth, and A. Rubio
J. Phys. B **47**, 124018 (2014).
- [P.11] «Stark Ionization of Atoms and Molecules within Density Functional Resonance Theory »
A. H. Larsen, **U. De Giovannini**, D. L. Whitenack, A. Rubio and A. Wasserman
J. Phys. Chem. Lett. **4**, 2734 (2013).
- [P.10] «Simulating pump-probe photo-electron and absorption spectroscopy on the attosecond time-scale with time-dependent density-functional theory »
U. De Giovannini, G. Brunetto, A. Castro, J. Walkenhorst and A. Rubio,
Chem. Phys. Chem. **14**, 1363 (2013).
- [P.9] «Ab-initio angle and energy resolved photoelectron spectroscopy with time-dependent density-functional theory »
U. De Giovannini, D. Varsano, M. A. L. Marques, H. Appel, E. K. U. Gross, and A. Rubio
Phys. Rev. A **85**, 062515 (2012).
- [P.8] «Attosecond control of dissociative ionization of O₂ molecules »
W. Siu, F. Kelkensberg, G. Gademann, A. Rouzée, P. Johnsson, D. Döwke, M. Lucchini, F. Calegari, **U. De Giovannini**, A. Rubio, R. R. Lucchese, H. Kono, F. Lépine, and M. J. J. Vrakking
Phys. Rev. A **84**, 063412 (2011).
- [P.7] «General Hartree-Fock method and symmetry breaking in quantum dots »
F. Cavaliere , **U. De Giovannini**
Physica E **42**, 606 (2010).
- [P.6] «Transport properties of quantum dots in the Wigner molecule regime »
F. Cavaliere , **U. De Giovannini**, M. Sassetti, and B. Kramer
New J. Phys **11**, 123004 (2009).
- [P.5] «Spin-projected unrestricted hartree-fock ground states for harmonic quantum dots »
U. De Giovannini, F. Cavaliere, R. Cenni, M. Sassetti and B. Kramer,
Phys. Rev. B **77**, 035325 (2008).
- [P.4] «Magnetic field dependence of quantum dot ground states »
F. Cavaliere, **U. De Giovannini**, R. Cenni, M. Sassetti and B. Kramer
Physica E **40**, 1427 (2008).
- [P.3] «Spin and rotational symmetries in unrestricted Hartree-Fock states of quantum dots »
U. De Giovannini, F. Cavaliere, R. Cenni, M. Sassetti and B. Kramer
New J. Phys. **9**, 93 (2007).
- [P.2] «Learning from examples as an inverse problem »
E. De Vito, L. Rosasco, A. Caponnetto, **U. De Giovannini** and F. Odone
Journal of Machine Learning Research **6**, 883 (2005).
- [P.1] «Learning, regularization and ill-posed inverse problems »
E. De Vito, L. Rosasco, A. Caponnetto, **U. De Giovannini** and F. Odone
Eighteenth Annual Conference on Neural Information Processing Systems (2004).



Book chapters:

- [B.3] «Pump-probe Photoelectron Spectra»
U. De Giovannini
"Handbook of Materials Modeling. Volume 1 Methods: Theory and Modeling", Springer, 1 – 19 (2018).
- [B.2] «Real-Time and Real-Space Time-Dependent Density-Functional Theory Approach to Attosecond Dynamics»
U. De Giovannini, and A. Castro
"Chemistry and Molecular Physics on the Attosecond Timescale. Theoretical Approaches", The Royal Society of Chemistry, 424-461 (2018), doi:10.1039/9781788012669-00424.
- [B.1] «Dynamical Processes in Open Quantum Systems from a TDDFT Perspective: Resonances and Electron Photoemission»
A. H. Larsen, **U. De Giovannini**, and A. Rubio
"Density-functional methods for excited states", *Topics in Current Chemistry*, Springer, **368**, 219-271 (2016).

Under review

- [U.5] «Strong chiral dichroism in above threshold ionization and ionization rates from locally chiral light »
O. Neufeld, H. Hübener, A. Rubio, **U. De Giovannini**
Sci. Adv. (2020) .
- [U.4] «Multiple mobile excitons manifested as sidebands in metallic phase of TaSe3 »
S. Nie, X. Gui, M. Naamneh, J. Jandke, C. Xi, J. Zhang, T. Shang, Y. Xiong, I. Kapon, N. Kumar, Y. Soh, D. Gosálbez-Martínez, O. Yazyev, W. Fan, H. Hübener, **U. De Giovannini**, N. Plumb, M. Radović, M. Sentef, W. Xie, Z. Wang, C. Mudry, M. Mueller, M. Shi
Nature (2020).
- [U.3] «Setting the clock of photoelectron emission through molecular alignment »
M. Lucchini, S. A. Sato, G. D. Lucarelli, B. Moio, G. Inzani, R. Borrego-Varillas, F. Frassetto, L. Poletto, H. Hübener, **U. De Giovannini**, A. Rubio, M. Nisoli
Nature Physics (2020)
arXiv:2006.16008 .
- [U.2] «Ultrafast laser-assisted stabilization of ionized adenine »
E. P. Mansson, S. Latini, F. Covito, V. Wanie, M. Galli, E. Perfetto, G. Stefanucci, H. Hübener, **U. De Giovannini**, M. C. Castrovilli, A. Trabattori, F. Frassetto, L. Poletto, J. Greenwood, F. Légaré, M. Nisoli, A. Rubio, and F. Calegari
Nature Physics (2020) .
- [U.1] «Floquet Engineering of Magnetism in Topological Insulator Thin Films »
X. Liu, P. Tang, H. Hübener, **U. De Giovannini**, W. Duan, A. Rubio
Phys. Rev. B (2019).



ELENCO TITOLI INVIATI AI FINI DELLA SELEZIONE

DICHIARAZIONE SOSTITUTIVA DI CERTIFICAZIONE

(Art. 46 del D.P.R. 28.12.2000, n. 445)

DICHIARAZIONE SOSTITUTIVA DELL'ATTO DI NOTORIETA'

(Art. 47 del D.P.R. 28.12.2000, n. 445)

Il sottoscritto UMBERTO DE GIOVANNINI, nato a GENOVA il 09/09/1978, residente in PALERMO via LAMPIONELLI 20 consapevole, ai sensi dell'art. 76 del D.P.R. 445/2000, che dichiarazioni mendaci, formazione o uso di atti falsi sono puniti ai sensi del codice penale e delle leggi speciali in materia,

DICHIARA

di essere in possesso dei seguenti titoli:

<i>Documentata attività di formazione o di ricerca presso qualificati istituti italiani o stranieri:</i>	
Analoghi contratti di ricercatore a tempo determinato, assegni di ricerca o borse post dottorato in atenei stranieri Dal 2018 ad oggi	Max Plank Institute for the Structure and Dynamics of Matter, Theory Department, Hamburg, Germany Posizione: group leader
Analoghi contratti di ricercatore a tempo determinato, assegni di ricerca o borse post dottorato in atenei stranieri Dal 2020 ad oggi	Ikerbasque, San Sebastian, Spain Posizione: senior research scientist
Analoghi contratti di ricercatore a tempo determinato, assegni di ricerca o borse post dottorato in atenei stranieri Dal 2012 al 2017	Department of Materials Science, Faculty of Chemistry, University of the Basque Country UPV/EHU, San Sebastian, Spain Posizione: research scientist
Borse post- dottorato ai sensi dell'art. 4 della Legge 30/11/1989, n. 398 Dal 2010 al 2012	Department of Materials Science, Faculty of Chemistry, University of the Basque Country UPV/EHU, San Sebastian, Spain Fondo: Basque Country Government Posizione: post-doc
Borse post- dottorato ai sensi dell'art. 4 della Legge 30/11/1989, n. 398 Dal 2009 al 2010	School of Engineering & Science, Jacobs University, Bremen, Germany and department of Physics, University of Genoa, Italy Fondo: Fondazione Angelo Della Riccia Posizione: postdoc



Attività didattica e tutoring a livello universitario in Italia o all'estero	1. Incarico di insegnamento come esercitatore in "Fisica Generale I", (20 ore) Corso di laurea in Ingegneria delle Telecomunicazioni, presso l'università di Genova. A.A.2005-2006 dal 01-11-2005 al 01-06-2006 2. Incarico di insegnamento come esercitatore in "Fisica Generale I", (20 ore) Corso di laurea in Ingegneria delle Telecomunicazioni, presso l'università di Genova. A.A.2006-2007 dal 01-11-2006 al 01-06-2007 3. Corso "Time-depentend density functional theory" (6 ore). "Curso de verao Nanociencias e nanomateriais", Gleb Wataghin Institute of Physics, Campinas, Brasile, dal 05-02-2018 al 09-02-2018' 4. Corso "School on New Computational Methods for Attosecond Molecular Processes" (4 ore). "Curso de verao Nanociencias e nanomateriais", Zaragoza, Spagna dal 05-02-2015 5. Co-supervisione tesi di Dottorato in Fisica di Jessica Walkenhorst "Analysis and Control of Transient Spectra Using Time-Dependent Density Functional Theory" presso la Universidad del País Vasco, San Sebastian, Spain. dal 01-01-2012 al 31-12-2016 6. Co-supervisione tesi di Dottorato in Fisica di Alison Crawford Uranga "Spectroscopic analysis of atoms and molecules" presso la Universidad del País Vasco, San Sebastian, Spain. dal 01-01-2013 al 31-12-2014 7. Co-supervisione tesi di Dottorato in Fisica di Lukas Windgatter presso il Max Plank Institute for the Structure and Dynamics of Matter, Amburgo Germania dal 01-06-2018 ad oggi 8. Supervisione tesi di Dottorato in Fisica di Mukhtar Lawan presso il Max Plank Institute for the Structure and Dynamics of Matter, Amburgo Germania dal 2020 ad oggi fondo: SMART-X ITN
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Realizzazione di attività progettuale	1. Responsabile del progetto "Effetti di correlazione elettroniche in strutture nanometriche" sovvenzionato dalla Fondazione Angelo Della Riccia, Italia. dal 01-01-2009 al 30-06-2009 2. Responsabile del progetto "Time-dependent electron transport in molecular junctions" sovvenzionato dalla Universidad del Pais Vasco EHU/UPV, Spagna. dal 01-02-2009 al 30-01-2011 3. Responsabile della linea di ricerca "Strong light-matter interactions and Optimal control Theory" presso il "Nano-Bio Spectroscopy Group" dell'Università dei paesi Baschi, Spagna. dal 28-03-2009 a 31-12-2016 4. Co-supervisione responsabile dell'attività di ricerca per la tesi di Dottorato in Fisica di Jessica Walkenhorst "Analysis and Control of Transient Spectra Using Time-Dependent Density Functional Theory" presso la Universidad del País Vasco, San Sebastian, Spain. dal 01-01-2012 al 31-12-2016 5. Co-supervisione responsabile dell'attività di ricerca per la tesi di Dottorato in Fisica di Aliso Crawford Uranga "Spectroscopic analysis of atoms and molecules" presso la Universidad del País Vasco, San Sebastian, Spain. dal 01-01-2013 al 31-12-2014 6. Co-supervisione responsabile dell'attività di ricerca per la tesi di Dottorato in Fisica di Lukas Windgatter presso il Max Plank Institute for the Structure and Dynamics of Matter, Amburgo Germania dal 01-06-2018 ad oggi 7. Gestione di un gruppo di ricerca composto da 2 postdoc e 1 dottorando presso il Max Plank Institute for the Structure and Dynamics of Matter, Amburgo Germania dal 01-01-2017 ad oggi 1. Responsabile di nodo per la rete Marie Curie International Training Network del progetto SMART-X. dal 01-01-2020 ad oggi
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<i>Organizzazione, direzione, coordinamento e partecipazione a gruppi di ricerca</i>	
Attività di organizzazione, direzione e coordinamento di gruppi di ricerca nazionali ed internazionali	2. Gestione di un gruppo di ricerca composto da 2 postdoc e 1 dottorando presso il Max Plank Institute for the Structure and Dynamics of Matter, Amburgo Germania Qualifica: group leader dal 01-01-2017 ad oggi 3. SMART-X, Marie Curie International Training Network Qualifica: Co-PI Budget: 3,930,264.72 € Attribuito al PI: 252.000 € dal 2020
Partecipazione a gruppi di ricerca nazionali ed internazionali	1. Partecipazione al progetto del ministero della ricerca dei Paesi Baschi "Grupos Consolidados: Simulación de Nanoestructuras, Biomoléculas y sistemas complejos de interés tecnológico" (IT-319-07): Responsabile: Angel Rubio, EHU/UPV, San Sebastian, Spain Qualifica: ricercatore. Decorrenza dal 01-01-2007 al 31-12-2012 dal 01-02-2010 al 31-12-2012 2. Partecipazione al progetto europeo ERC DYNAMO Advanced-grant (ERC-2010-AdG_20100224): Responsabile: Angel Rubio, EHU/UPV, San Sebastian, Spain. Qualifica: ricercatore. dal 01-04-2011 al 31-03-2016 3. Partecipazione al progetto del ministero della ricerca Basco "Grupos consolidados: Simulación de sistemas cuánticos nanoestructurados fuera del equilibrio" (IT578-13): Responsabile: Angel Rubio, EHU/UPV, San Sebastian, Spain Qualifica: ricercatore. Decorrenza dal 01-01-2013 al 31-12-2018 dal 01-01-2013 a 2017 4. Partecipazione al progetto europeo COST action XLIC: Chair of the Action: Prof Manuel ALCAMI, IMDEA Nanociencia, Madrid Spain Qualifica: ricercatore. dal 13-05-2013 al 13-05-2017 5. Partecipazione al progetto europeo CRONOS (280879-2 CRONOS CP-FP7): Coordinatore: Stefano SanVito, Trinity College Dublin, Ireland. Qualifica: ricercatore. dal 01-12-2013 al 31-05-2015

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	6. Partecipazione al progetto europeo ERC QSpec-NewMat Advanced-grant (ERC-2015-AdG-694097): Responsabile: Angel Rubio, EHU/UPV, San Sebastian, Spain Decorrenza dal 01-11-2016 al 01-11-2021 Qualifica: ricercatore. dal 01-11-2016 a oggi
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Relazioni a congressi e convegni	
1. Relatore “invitato” a congresso e convegno internazionale	Curso de verao Nanociencias e nanomateriais, Campinas, Brazil (2018)
2. Relatore “invitato” a congresso e convegno internazionale	<i>X-UV Time Resolved Advanced Methods (XTRAM)</i> , Erice, Italy (2017)
3. Relatore “invitato” a congresso e convegno nazionale	<i>7th Workshop Time-Dependent Density-Functional Theory: Prospects and Applications</i> , Benasque, Spain (2016);
4. Relatore “invitato” a congresso e convegno nazionale	<i>Theory days: Dynamics of irradiation</i> , Toulouse, France (2015)
5. Relatore “invitato” a congresso e convegno nazionale	<i>Excited States: Electronic Structure and Dynamics</i> , Telluride, CO, USA (2015)
6. Relatore “invitato” a congresso e convegno nazionale	<i>School on New Computational Methods for Attosecond Molecular Processes</i> , Zaragoza, Spain (2015)
7. Relatore “invitato” a congresso e convegno nazionale	<i>8th RES User's Conference</i> , Santander, Spain (2014)
8. Relatore “invitato” a congresso e convegno nazionale	<i>1th World Congress on Computational Mechanics</i> , Barcelona, Spain (2014)
9. Relatore “invitato” a congresso e convegno nazionale	<i>1st Xlic COST meeting</i> , London, United Kingdom (2014)
10. Relatore “invitato” a congresso e convegno nazionale	<i>6th Workshop Time-Dependent Density-Functional Theory: Prospects and Applications</i> , Benasque, Spain (2014)
1. Relatore a congresso e convegno internazionale e nazionale	<i>Octopus developer meeting</i> , Hamburg, Germany, (2019);
2. Relatore a congresso e convegno internazionale e nazionale	<i>FisMat2015</i> , Palermo, Italy (2015)
3. Relatore a congresso e convegno internazionale e nazionale	<i>PSI-K 2015 conference</i> , San Sebastian, Spain (2015)

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4. Relatore a congresso e convegno internazionale e nazionale	<i>Octopus developer meeting</i> , Jena, Germany, (2015);
5. Relatore a congresso e convegno internazionale e nazionale	<i>Octopus developer meeting</i> , Lyon, France, (2012)
6. Relatore a congresso e convegno internazionale e nazionale	<i>17th ETSF Workshop on Electronic Excitations Advanced Green function methods</i> , Coimbra, Portugal, (2012)
7. Relatore a congresso e convegno internazionale e nazionale	<i>ETSF Young researcher's meeting 2011</i> , Naples, Italy, (2011)
8. Relatore a congresso e convegno internazionale e nazionale	<i>ETSF Young researcher's meeting 2010</i> , Jyvaskyla, Finland, (2010)
9. Relatore a congresso e convegno internazionale e nazionale	<i>Nanoscale Devices for Environmental and Energy Applications</i> , San Sebastian, Spain, (2010)
10. Relatore a congresso e convegno internazionale e nazionale	<i>Frontiers of Quantum and Mesoscopic Thermodynamics</i> , Prague, Czech Republic, (2008)
11. Relatore a congresso e convegno internazionale e nazionale	<i>Sestri Levante 2008 Convegno Informale di Fisica Teorica</i> , Sestri Levante, Italy, (2008)
12. Relatore a congresso e convegno internazionale e nazionale	<i>Electronic Properties of Two-dimensional Systems and Modulated Semiconductor Structures</i> , Genova, Italy, (2007)
13. Relatore a congresso e convegno internazionale e nazionale	<i>Quantum Optics and Computation</i> , MCRTN ,Riomaggiore, Italy (2006)
14. Relatore a congresso e convegno internazionale e nazionale	<i>Quantum electromechanical systems</i> , Jyvaskyla, Finland, (2006)

Conoscenza lingue straniere	Inglese, Spagnolo, Francese
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Madrelingua	Italiana
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Il sottoscritto dichiara di essere informato, ai sensi del decreto legislativo 196/2003, che i dati sopra riportati verranno utilizzati nell'ambito del procedimento per il quale la presente dichiarazione viene resa.

PALERMO, 15/09/2020

Il dichiarante
