

# Curriculum vitae

## PERSONAL INFORMATION

Giuseppe Fisicaro



📍 [Redacted]  
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💬 Skype [Redacted]

Sex Male | Date of birth 2 May 1981 | Nationality Italian

## JOB APPLIED FOR

Physics researcher

## WORK EXPERIENCE

17/03/2014–Present

Post-doc researcher

Department of Physics - University of Basel  
Klingelbergstrasse 82, 4056 Basel (Switzerland)  
<https://comphys.unibas.ch/>

Post-doc researcher within the Swiss PASC project "ENVIRON: A Library for Complex Electrostatic Environments in Electronic-structure Simulations" currently covered at the Department of Physics, University of Basel within the Prof. Dr. Stefan Goedecker's group. The project is in collaboration with Prof. Dr. Nicola Marzari Theory and Simulation of Materials Institute of Materials EPFL, Lausanne and Prof. Dr. Juerg Hutter Physics Department University of Zurich.

We are developing *from scratch* an electrochemical library which will extend first-principle electronic-structure codes to complex-wet environments. The library is able to solve both the generalized Poisson and the Poisson-Boltzmann equations, allowing to handle both neutral and ionic solutions implicitly in DFT calculations.

Teaching: Assistant for the Computational Physics course.

Business or sector Fundamental research

13/10/2012–28/02/2014

Post-doc researcher

CNR-IMM  
Z.I. VIII strada, 5, 95121 Catania (Italy)  
<http://www.imm.cnr.it/>

Awarded of a research grant N° BS. IMM006/2012/CT, Prot. N° 0003890 23/07/2012 published on Italian G.U. N° 60 the 03/08/2012 "Formazione di esperti per la Progettazione, Realizzazione e Caratterizzazione di celle solari e sistemi concentratori" (PON01\_01725).

Simulation of dopant-defect evolution under thermal laser annealing processes both in solid and liquid phase.

Simulation of the feature profile evolution in plasma etch-dep processes. Development of kMC codes and physical models based on surface phenomena (neutral absorption, detachment, ion enhanced stitching and detachment, etc). Participation in projects: ENIAC Program Implementing Manufacturing science solutions to increase equipment productivity and fab performance (IMPROVE).

Study of light trapping and absorption in multilayer solar cells for photovoltaic applications by means of codes developed in matlab environment.

Development and implementation of a simulation method overcoming the limits of fluid-flow based approaches for dielectrophoretic device investigations. Development of a three dimensional Monte-Carlo-Poisson simulator for a colloidal system at a particle resolution. Investigation of circulation tumor cell trapping induced by dielectrophoretic forces in real devices by means of continuum models. Use of the Comsol platform.

Basilea, 20 Luglio 2018

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Page 1 / 5

**Business or sector** National Research Council - Microelectronic and Microsystems Institute

15/01/2012–12/10/2012 **Post-doc researcher**

CNR-IMM  
Z.I. VIII strada, 5, 95121 Catania (Italy)  
<http://www.imm.cnr.it/>

Awarded of a research grant N° BS IMM005/2011/CT prot. n. 0000106 12-01-2012 inside the European research project "Advanced Technology Modeling for Extra-Functionality Devices – Enlarged EU ATEMOX Grant Agreement N° 287669".

Investigation of system kinetics in extremely out-of-equilibrium conditions induced by laser irradiation by means of kinetic Monte Carlo simulations and continuum modeling. Study of defects evolution and dopant activation in silicon implanted substrates during thermal laser annealing processes. Study of stress effects induced by laser irradiation. Development *from scratch* of kMC codes as well as continuum models. Planning and coordination of experiments as well as drawing up of technical reports and regular publications. Participation in projects: European Seventh Framework Programme (FP7/2007-2013) under the grant agreement n. 258547 ATEMOX (Advanced Technology Modeling for Extra-Functionality Devices), in collaboration with several european partners.

**Business or sector** National Research Council - Microelectronic and Microsystems Institute

01/02/2011–31/05/2011 **Visiting PhD student**

Department of electronics, University of Valladolid, Valladolid (Spain)

Four months spent as visiting PhD student at the department of electronics at the University of Valladolid (Spain) under the supervision of Prof. Lourdes Pelaz. The collaboration has been focused on the theoretical characterization of dopant-defect system in implanted silicon under an ultra-fast heating process, i.e. laser irradiation. Development, implementation and calibration of a Partial Differential Equation model of dopant activation in silicon under laser treatment. Use of the SRIM code based on the Binary Collision Approximation. Implementation and calibration *from scratch* of a kinetic Monte Carlo code for dopant-defects in silicon under laser annealing.

01/01/2008–28/02/2014 **Wind Orchestra Conductor**

Associazione Musicale "V. Bellini", Buccheri (Sr) (Italy)

I covered the position of conductor and music director of the wind orchestra "V. Bellini" of Buccheri (Sr, Italy). In the same period I worked as a teacher of trombone and brass instruments in the same institution.

## EDUCATION AND TRAINING

01 November 2008–31 October  
2011

### Doctor of Philosophy in Physics

University of Catania - Department of Physics and Astronomy, Catania (Italy)

Viva voce defence on 01/02/2012.

Thesis on "Micro-structural modifications of semiconductor systems under irradiation: experiment, modeling and simulation analysis". Advisors Prof. G Piccitto (Department of Physics, University of Catania) and Dr. A. La Magna (CNR-IMM Catania).

Research on the micro-structural modifications of semiconductor systems during Laser Thermal Annealing processes. Post-implant kinetics of the defect-dopant system in the extremely far from the equilibrium conditions caused by laser irradiation both in the non-melting and melting regime. Accurate study of the feasibility of laser irradiation as a heat source for real patterned substrates for the case of SiGe and Ge based MOS devices. Developing of a continuum simulation code which simulates the interaction between the laser light and the transistor periodic structure in order to estimate the heat source as well as the heat diffusion, phase changes and material redistribution under irradiation.



Basilea, 20 Luglio 2018

- 01/01/2013–18/12/2013 **Qualification for teaching in secondary schools - Mathematics and Physics**  
University of Catania, Catania (Italy)  
Qualification for teaching in secondary schools Mathematics and Physics obtained after passing a public selection and an one year university course.
- 01/10/2000–14/07/2008 **Master's Degree in Physics**  
Department of Physics and Astronomy - University of Catania, Catania (Italy)  
Master's Degree in Physics - Top grade - Specialization in physics of condensed matter, semiconductor physics, theoretical and computational physics. Thesis "Evolution of defect-impurity systems in silicon under laser irradiation" supervisors Prof. G Piccitto (Department of Physics, University of Catania) and Dr. A. La Magna (CNR-IMM Catania).
- 01/10/1994–01/10/2000 **Master's Degree in Music - Trombone**  
Istituto Musicale Pareggiato "V. Bellini", Catania (Italy)

## PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	C1	B2	B2
German	A2	A2	A2	A2	A2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user  
Common European Framework of Reference for Languages

**Communication skills** Good communication skills gained through my experience as post-doc researcher.  
Excellent contact skills gained through my experience as post-doc researcher as well as music teacher and orchestra conductor.

## Organisational / managerial skills

Leadership, good organisational and team-leading skills gained as president, music director and orchestra conductor of the wind orchestra "V. Bellini" of Buccheri, Siracusa (Italy) responsible for a team of 35 people from January 2004 to present.

## Job-related skills

Considering the peculiarity of my research field which concerns theoretical investigation of Condensed Matter Physics by means of simulations and modelling, my principal attitude and skills focus on writing and developing *from scratch* codes and models, in particular the programming work is my favorite.

Moreover, my skills concern teaching or explaining in detail to individuals and group, sharing or communicating well in speech and writing with individuals and group, helping people network or make contact with each other, leading or directing or chairing a discussion with groups, mediate between parties help solve disputes with groups, producing, creating, formulating or devising original ideas or concepts.

Drawing up scientific and technical reports or regular publications in english. I am author of twenty-five publications published in several international journals (JCR). Among them Nano Letters, Physical Review Letters, Journal of Chemical Physics, Physical Review E, Applied Physics Letters, Applied Physics Express, Journal of Applied Physics, etc. I presented in the past years my work as oral presentations in several international conferences (APS March Meeting, Psi-k Conference, CECAM workshop, E-MRS Spring Meeting, SISPAD, LMP Conference, IIT held in France, Spain, Japan and United States).



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**Digital competence** All scientific activity has required an intensive use of the computer and related software. In particular the kMC codes (both for the dopant-defect system evolution under laser annealing and plasma etching simulation) were developed in the Fortran language. The code for the light trapping in a matlab environment. All the continuum models were implemented inside the Comsol software. During my master's degree and PhD period I attended several courses of C and C++ programming languages.

Excellent knowledge of the Fortran language. Excellent knowledge of the Comsol and Matlab software. Good knowledge of C and C++ programming language. Excellent knowledge of the Latex language and Word package, regularly writing reports and publications in Latex as well as in Word. Advanced use of Microsoft Windows OS. Excellent knowledge of Microsoft Office. Excellent knowledge of Montecarlo programs for ion implantation simulation (SRIM package). Excellent knowledge of data analysis programs (Origin pro).

## ADDITIONAL INFORMATION

**Projects** Swiss PASC project "ENVIRON:A Library for Complex Electrostatic Environments in Electronic-structure Simulations".

The computational study of chemical reactions in complex, wet environments is critical for applications in many fields, and of cross-disciplinary interest to physics, chemistry, materials science, chemical engineering, and biology. Driven by very recent advances and developments in this field, we propose to develop and distribute an open-source library of verified and validated electrochemical and solvation modules, able to run efficiently on advanced computing architectures, and interface it with some of the core electronic-structure codes developed or co-developed in Switzerland - namely ABINIT, BigDFT, CP2K, and Quantum ESPRESSO. Given its documented and open-source nature, it is also expected that such tool will become of wide use outside these communities, and be adopted by other public or distributed codes. The core objective of this library will be to describe complex electrostatic environments where an explicit solvent becomes implicit, with a position-dependent dielectric constant, or where mobile ions can shield the charge or multipoles of the system of interest; it will embed the quantum simulation engines into a robust and efficient Poisson-Boltzmann solver that has been extensively verified and validated.

**Projects** The study of defects evolution and dopant activation in silicon implanted substrates during thermal laser annealing processes by means of kinetic Monte Carlo simulations and continuum modeling as well as the study of stress effect induced by laser irradiation were carried out inside the European Seventh Framework Programme (FP7/2007-2013) under the grant agreement n. 258547 ATEMOX (Advanced Technology Modeling for Extra-Functionality Devices), in collaboration with several European partners.

FRENDTECH and ATOMICS with major contributions by the current partners, process simulation has been brought to a state which allows in industrial environments a sufficiently accurate simulation of doping profiles in advanced CMOS technologies. Important electrical characteristics of core CMOS devices can now be predicted from scratch or with a minimum calibration effort. However, concepts towards low-power electronics, smart power applications, CMOS image sensors, and CMOS derivatives providing extra functionalities are still not sufficiently supported by TCAD. This concerns especially the prediction of leakage currents in such or parasitic devices caused by electrically active defects that remain after processing, and alternative doping techniques like plasma immersion ion implantation, low-temperature implantation, diversified cocktail implants and laser annealing which are considered for low-leakage ultra shallow junctions. The lack of suitable models that can be used in the early stages of industrial R&D inhibits the necessary cost reduction in the development of devices for which Europe is still at the forefront. Funded within the ICT theme of the Seventh Framework Programme of the EC, the ATEMOX project develops the full set of missing models and implements and includes them into the Sentaurus TCAD platform of Synopsys so that they are of immediate value to the European semiconductor industry. The integrated models have been finally evaluated by STMicroelectronics with respect to industrial needs. To reach these ambitious goals, a consortium of European companies active in complementary fields of competence (STMicroelectronics: device manufacturing, Synopsys: TCAD software, Exico, IBS: equipment production, Procion, Semilab: characterization) and leading European research institutes (CNRS-LAAS/CEMES, CNR-IMM, ETH-Zurich, Fraunhofer-IISB, Univ. Newcastle) has been formed which, together, is well prepared to expertly cover all fields from experiment via characterization and modelling to simulation.

<http://www.atemox.eu/>



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A handwritten signature in black ink, appearing to read 'Giuseppe Fisicaro', with a long horizontal flourish extending to the right.

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# Scientific curriculum and list of publications

Giuseppe Fiscaro

## Scientific curriculum

The scientific curriculum of the applicant is documented by the list of publications on international journals (JCR), all submitted to review processes. The applicant published 32 papers (21 after PhD, 11 before PhD with most of them as first-author), attended 29 conferences (19 after PhD, 10 before PhD) and held 5 seminars at different institutions.

He got the Philosophiae Doctor degree in Physics cum laude at the Department of Physics, University of Catania in collaboration with the CNR-IMM of Catania the 01-02-2012 (viva voce defense). The title of the thesis was “Micro-structural modifications of semiconductor systems under irradiation: experiment, modeling and simulation analysis”, developed under the supervision of Prof. Dr. G Piccitto and Dr. A. La Magna. During his PhD period the applicant has strengthened his programming skills as well as experiment-simulation interfacing research work. He developed an atomistic kinetic Monte Carlo code for dopant-defects evolution during laser thermal annealing and a coupled Monte Carlo-Poisson method for the simulation of particle-particle effects in dielectrophoretic devices. These atomistic investigations have been extensively integrated with continuum mean field approaches, developing continuum reaction-diffusion models for the dopant-defects annealing process both in solid and liquid phase. The computational study has been coupled with target experiments, and the applicant participated in the planning of the whole experimental activity.

After his PhD, he has been Awarded of two research grants at the CNR-IMM in the field of process simulations of dopant-defects under laser annealing, plasma etching-deposition processes, light trapping and absorption in multilayer solar cells and Monte Carlo-Poisson simulator for colloidal systems, exploiting its atomistic and continuum modeling background.

In March 2014 he joined the Prof. Dr. Stefan Goedecker’s group in Basel as Post-doc researcher. He developed from scratch an electrochemical library which extends first-principle electronic-structure codes to complex-wet environments. The library is able to solve both the generalized Poisson and the Poisson-Boltzmann equations, allowing to handle implicitly both neutral and ionic solutions in DFT calculations. He developed, parametrized and tested an implicit solvation model named “soft-sphere”. Currently, he is applying *ab-initio* structure predictions and first-principle electronic-structure methodologies (DFT, DFTB+ and MD) to investigate various systems of interest in material science. He is also involved on the full extension of the BigDFT suite to non-orthorhombic cells. He has been assistant for several courses, like computational physics and electronic-structure calculations.

The following sections will be reported in the present document:

- Post-doc career;
- Publications on International Journals (JCR);
- Awards;
- Invited presentations;
- Attended conferences;
- Attended workshops;
- Teaching activities;
- Project participation.

## 1 Post-doc career

- Post-doc researcher within the Swiss PASC and MARVEL projects, currently covered at the Department of Physics, University of Basel from 17 March 2014 within the Prof. Dr. Stefan Goedecker's group.
- Post-doc researcher at Institute for Microelectronics and Microsystems CNR from 17 February 2014 to 16 Marzo 2014.
- Awarded of a research grant N° BS. IMM006/2012/CT, Prot. N° 0003890 23/07/2012 published on Italian G.U. N° 60 the 03/08/2012 "Formazione di esperti per la Progettazione, Realizzazione e Caratterizzazione di celle solari e sistemi concentratori" (PON01-01725) at the Institute of Microelectronic and Microelectric systems CNR, Catania Italy 13 October 2012 to 31 December 2013.
- Awarded of a research grant N° BS IMM005/2011/CT prot. n. 0000106 12-01-2012 inside the European research project "Advanced Technology Modeling for Extra-Functionality Devices – Enlarged EU ATEM0X Grant Agreement N° 287669" at the Institute of Microelectronic and Microelectric systems CNR, Catania Italy from 15-01-2012 to 12 October 2012.

## 2 Publications on International Journals (JCR)

- O. Andreussi and G. Fiscaro "Continuum Embeddings in Condensed-Matter Simulations" Review Article, accepted in International Journal of Quantum Chemistry (2018).
- G. Fiscaro, M. Sicher, M. Amsler, S. Saha, L. Genovese, and S. Goedecker "Surface reconstruction of fluorites in vacuum and aqueous environment" Phys. Rev. Materials **1**(3), 033609 (2017).
- G. Fiscaro, L. Genovese, O. Andreussi, S. Mandal, N.N. Nair, N. Marzari, and S. Goedecker "Soft-sphere continuum solvation in electronic-structure calculations" J. Chem. Theory Comput. **13**, 3829 (2017).
- S.F. Lombardo, S. Boninelli, F. Cristiano, G. Fiscaro, G. Fortunato, M.G. Grimaldi, G. Impellizzeri, M. Italia, A. Marino, R. Milazzo, E. Napolitani, V. Privitera, A. La Magna "Laser annealing in Si and Ge: Anomalous physical aspects and modeling approaches" Materials Science in Semiconductor Processing **62**, 80-91 (2017).
- G. Fiscaro, L. Genovese, O. Andreussi, N. Marzari, and S. Goedecker "A generalized Poisson and Poisson-Boltzmann solver for electrostatic environments" The Journal of chemical physics bf 144 (1), 014103 (2016).
- M. Camarda, S. Baldo, G. Fiscaro, R. Anzalone, S. Scalese, A. Alberti, F. La Via, A. La Magna, A. Ballo, G. Giustolisi, L. Minafra, F. Cammarata, V. Bravatà, G. Forte, G. Russo, and M. Gilardi "Study of the role of particle-particle dipole interaction in dielectrophoretic devices for biomarkers identification" Sensors 9-12 (2015).
- M. Camarda, G. Fiscaro, R. Anzalone, S. Scalese, A. Alberti, F. La Via, A. La Magna, A. Ballo, G. Giustolisi, L. Minafra, F. Cammarata, V. Bravatà, G. Forte, G. Russo, and M. Gilardi "Theoretical and experimental study of the role of cell-cell dipole interaction in dielectrophoretic devices: application to polynomial electrodes" Biomedical engineering online **13** (1), 71 (2014).
- F. Cristiano, Y. Qiu, E. Bedel-Pereira, K. Huet, F. Mazzamuto, G. Fiscaro, A. La Magna, M. Quillec, N. Cherkashin, H. Wang, S. Duguay, and D. Blavette "Extended defects in ion-implanted si during nanosecond laser annealing" 2014 Junction Technology (IWJT), International Workshop on, 1-6 (2014).
- Yang Qiu, Fuccio Cristiano, Karim Huet, Fulvio Mazzamuto, Giuseppe Fiscaro, Antonino La Magna, Maurice Quillec, Nikolay Cherkashin, Huiyuan Wang, Sébastien Duguay, and Didier Blavette, "Extended defects formation in nanosecond laser-annealed ion implanted silicon" Nano Letters **14**(4), 1769-1775 (2014).

- G. Impellizzeri, E. Napolitani, R. Milazzo, S. Boninelli, M. Cuscunà, G. Fiscaro, A. La Magna, G. Fortunato, F. Priolo, and V. Privitera, “Role of oxygen on the electrical activation of B in Ge by excimer laser annealing” *Physica Status Solidi (a)* **211**(1), 122-125 (2014).
- A. La Magna, G. Fiscaro, G. Nicotra, Y. Spiegel, and F. Torregrosa, “Atomic scale Monte Carlo simulations of BF<sub>3</sub> plasma immersion ion implantation in Si” *Physica Status Solidi (c)* (2014).
- M. Hackenberg, K. Huet, R. Negru, G. Fiscaro, A. La Magna, N. Taleb, M. Quillec, and P. Pichler, “Simulation of the boron build-up formation during melting laser thermal annealing” *Physica Status Solidi (c)* **11**(1), 89-92 (2014).
- R. Milazzo, E. Napolitani, G. Impellizzeri, G. Fiscaro, S. Boninelli, M. Cuscunà, D. De Salvador, M. Mastromatteo, M. Italia, A. La Magna, G. Fortunato, F. Priolo, V. Privitera, and A. Carnera “N-type doping of Ge by As implantation and excimer laser annealing” *Journal of Applied Physics* **115** (5), 053501 (2014).
- G. Fiscaro, L. Pelaz, M. Aboy, P. Lopez, M. Italia, K. Huet, F. Cristiano, Z. Essa, Q. Yang, E. Bedel-Pereira, M. Quillec, and A. La Magna, “Kinetic Monte Carlo simulations of the boron activation in implanted Si under Laser Thermal Annealing”, *Applied Physics Express* **7**(2), 021301 (2014).
- G. Fiscaro, and A. La Magna, Review article “Modeling of laser annealing” *Journal of Computational Electronics* **13**(1) 70-94 (2014).
- G. Fiscaro, L. Pelaz, M. Aboy, P. Lòpez, M. Italia, K. Huet, F. Cristiano, Z. Essa, Q. Yang, E. Bedel-Pereira, M. Hackenberg, P. Pichler, M. Quillec, N. Taleb, and A. La Magna “Dopant dynamics and defects evolution in implanted silicon under laser irradiations: a coupled continuum and Kinetic Monte Carlo approach” 18th International Conference on Simulation of Semiconductor Processes and Devices (SISPAD) 33-36 (2013).
- G. Impellizzeri, E. Napolitani, S. Boninelli, G. Fiscaro, M. Cuscunà, R. Milazzo, A. La Magna, G. Fortunato, F. Priolo, and V. Privitera “B-doping in Ge by excimer laser annealing” *J. Appl. Phys.* **113**, 113505 (2013).
- G. Fiscaro, K. Huet, R. Negru, M. Hackenberg, P. Pichler, N. Taleb, A. La Magna “Anomalous Impurity Segregation and Local Bonding Fluctuation in l-Si” *Phys. Rev. Lett.* **110**, 117801 (2013).
- G. Fiscaro, L. Pelaz, P. Lopez, M. Italia, K. Huet, J. Venturini, and A. La Magna “Kinetic Monte Carlo simulation of dopant-defect systems under submicrosecond laser thermal processes” *AIP Conference Proceedings* 1496 1 221-224 (2012).
- M. Hackenberg, P. Pichler, K. Huet, R. Negru, J. Venturini, G. Fiscaro, and A. La Magna “Modeling Boron Profiles After Pulsed Excimer Laser Annealing” *AIP Conference Proceedings* 1496 1 241-244 (2012).
- G. Fiscaro, L. Pelaz, P. Lopez, and A. La Magna “Kinetic Monte Carlo simulations for transient thermal fields: computational methodology and application to the sub-microsecond laser processes in implanted Silicon” *Physical Review E* **86**, 036705 (2012).
- A. La Magna, M. Camarda and I. Deretzis and G. Fiscaro and S. Coffa “Coupled Monte Carlo-Poisson method for the simulation of particle-particle effects in dielectrophoretic devices” *Applied Physics Letters* **100**(13), 134104 (2012).
- F. Ruffino, A. Pugliara, E. Carria, L. Romano, C. Bongiorno, G. Fiscaro, A. La Magna, C. Spinella, and M. G. Grimaldi, “Towards a laser fluence dependent nanostructuring of thin Au films on Si by nanosecond laser irradiation” *Applied Surface Science*, **258**(23), 9128-9137 (2012).
- G. Fiscaro, M. Italia, V. Privitera, G. Piccitto, L. Pelaz, P. Lopez, K. Huet, J. Venturini, and A. La Magna, “Dopant activation modeling in implanted Silicon under multi-pulsed excimer laser irradiation” *Proceedings of LPM2011 - the 12th International Symposium on Laser Precision Microfabrication* (2011).

- G. Fiscaro, M. Italia, V. Privitera, G. Piccitto, K. Huet, J. Venturini, and A. La Magna, “Solid phase phosphorous activation in implanted silicon by excimer laser irradiation”, *J. Appl. Phys.* **109**, 113513 (2011).
- G. Fiscaro, A. La Magna, G. Piccitto, and V. Privitera, “Laser annealing of SiGe and Ge based devices”, *Microelectron. Eng.* **88**, 488-491 (2011).
- G. Fiscaro, M. Italia, V. Privitera, G. Piccitto, K. Huet, J. Venturini, and A. La Magna, “Dopant activation and damage evolution in implanted silicon after excimer laser annealing”, *Phys. Status Solidi C* **8**(3), 940-943 (2011).
- G. Mannino, C. Spinella, R. Ruggeri, A. La Magna, G. Fiscaro, E. Fazio, F. Neri, and V. Privitera “Crystallization of implanted amorphous silicon during millisecond annealing by infrared laser irradiation” *Applied Physics Letters* **97**, 022107 (2010).
- K. Huet, G. Fiscaro, J. Venturini, H. Besaucèle and A. La Magna “Defect kinetics and dopant activation in sub- $\mu$ s laser thermal processes” *Applied Physics Letters* **95**, 231901 (2009).
- K. Huet, C. Boniface, G. Fiscaro, *et al.* “Experimental and Theoretical analysis of Dopant Activation in Thin Double Implanted Silicon by pulsed Excimer Laser Thermal Annealing” *Advanced Thermal Processing of Semiconductors*, 2009, Albany-NY.
- G. Fiscaro, *et al.* “Damage Evolution in Implanted Silicon by Pulsed Excimer Laser Annealing” *Advanced Thermal Processing of Semiconductors*, 2009, Albany-NY, pp.55-58.
- A. La Magna, G. Fiscaro, G. Mannino, V. Privitera, G. Piccitto, L. Vines, and B. G. Svensson “Thermal and non-thermal kinetics of defects and dopant in Si” *Advanced Thermal Proc. of Semiconductors*, (2008).
- A. La Magna, G. Fiscaro, G. Mannino, V. Privitera, G. Piccitto, B. G. Svensson, and L. Vines, “Defect and dopant kinetics in laser anneals of Si”, *Mater. Sci. Eng., B* **154-155**, 35-38 (2008).

**PhD Thesis:** G. Fiscaro “Micro-structural modifications of semiconductor systems under irradiation: experiment, modeling and simulation analysis”. Philosophiae Doctor degree in Physics cum laude at the Department of Physics, University of Catania. Viva voce defense 01-02-2012.

### 3 Awards

- “Seal of Excellence” from the European Commission - Research and Innovation - for the project proposal 799206, COMPWET “Complex wet environments effects on material properties at atomistic level” submitted under the Horizon 2020’s Marie Skłodowska-Curie actions call H2020-MSCA-IF-2017 of 14 September 2017. The Seal of Excellence is the high-quality label awarded to projects submitted to Horizon 2020 which were deemed to deserve funding but did not receive it due to budget limits (scored 85% or above). The Seal of Excellence is recognition that your project proposal was evaluated as excellent in a highly competitive evaluation process and is recommended for funding by other sources, since Horizon 2020 resources available for this specific call were already allocated following a competitive ranking. The certificate can be used to increase the visibility and reputation of the project proposal and possibly attract the interest of public or private investors.
- Best poster presentation “Soft-sphere continuum solvation in electronic structure calculations” on “Four Marvel Retreat” 07/09/2017, Lausanne, Switzerland.
- Eligible but non-winner (ranked seventh after all exams, 3rd August 2017) for the profile of permanent researcher - III professional level Notice of application 367.10 DSFTM IMM RIC, at the Institute for Microelectronics and Microsystems - Catania, member of the Department of Physical Sciences and Technologies of the matter of the National Research Council, whose notice was published in the Official Gazette of the Italian Republic - IV Special Series n. 24 on 25/03/2016.

Basilea, 20 Luglio 2018



## 4 Invited presentations

- “CECAM workshop: Liquid/solid interfaces from spectroscopy to simulations” 25-27/01/2016, Lausanne, Switzerland. Invited oral presentation: G. Fiscaro et al. “Complex wet-environments in electronic-structure calculations” (<https://www.cecarn.org/workshop-1-1168.html?aid=25039>).
- “Structure predictions and electronic-structure calculations in complex wet environments”, CNR-IMM Catania, Italy (04/08/2017).
- “A Generalized Poisson and Poisson-Boltzmann solver in wet-environments electronic-structure calculations”, CEA Grenoble, France ( September 2015).
- “Continuous modeling of dopant activation on laser irradiated silicon”, Department of Electronic University of Valladolid ( March 2011).
- “Kinetic of dopant-defect systems under laser irradiation”, CNR-IMM Catania (December 2010).
- “Continuum models for dopant-defect evolution during excimer laser annealing in Silicon and Germanium materials”, Department of Physics - University of Catania (July 2010).

## 5 Attended conferences

- “Four Marvel Retreat” 07/09/2017, Lausanne, Switzerland. Poster presentation: “Soft-sphere continuum solvation in electronic structure calculations”.
- “Coding Solvation Workshop” 23-25/08/2017, Livorno, Italy. Oral presentation: “Soft-sphere continuum solvation in electronic structure calculations”.
- “Platform for Advanced Scientific Computing PASC 2017 Conference” 26-28/06/2017, Lugano, Switzerland. Poster presentation: “Soft-sphere continuum solvation in electronic structure calculations”.
- “EMRS Spring Meeting Conference” 22-26/05/2017, Strasbourg, France. Poster presentation: “Complex wet-environments in electronic-structure calculations”.
- “Platform for Advanced Scientific Computing PASC 2016 Conference” 8-10/06/2016, EPFL (Lausanne), Switzerland. Poster presentation: “Complex wet-environments in electronic-structure calculations”
- “APS March Meeting” 14-18/03/2016, Baltimora (USA). Oral presentation: “Complex wet-environments in electronic-structure calculations”
- “Psi-k Conference 2015” 06-10/09/2015, Donostia/San Sebastian, Spain. Oral presentation: G. Fiscaro et al. “A Generalized Poisson and Poisson-Boltzmann solver in wet-environments electronic-structure calculations” Symposium Electrochemical Energy Storage and Conversion: Solid/Liquid Interfaces.
- “Second Marvel Retreat” 03-04/09/2015, Lausanne, Switzerland. Poster presentation: G. Fiscaro et al. “A solver for the Generalized Poisson equation in wet-environments electronic-structure calculations”.
- “Marvel Junior Retreat” 07-10/07/2015, Zurich, Switzerland. Oral presentation: G. Fiscaro et al. “A solver for the Generalized Poisson equation in wet-environments electronic-structure calculations”.
- “Platform for Advanced Scientific Computing PASC 2015 Conference” 1-3/06/2015, Zurich, Switzerland. Poster presentation: G. Fiscaro et al. “A solver for the Generalized Poisson equation in wet-environments electronic-structure calculations”.
- “ICTP Workshop on Advanced Quantum ESPRESSO Developer Training” 19-30/01/2015, Trieste, Italy. Poster: G. Fiscaro et al. “A generalized Poisson solver for complex electrostatic environments”.

- “ICTP International Workshop on Computational Physics and Materials Science: Total Energy and Force Methods” 15-17/01/2015, Trieste, Italy. Poster presentation: G. Fiscaro et al. “A generalized Poisson solver for complex electrostatic environments”.
- ICMR workshop on “Ab-initio description of charged systems and solid/liquid interfaces for semiconductors and electrochemistry”, 6-11/07/2014, Santa Barbara (CA), USA. Oral presentation: G. Fiscaro et al. “Particle-particle interaction and space-dependent effective dielectric constant in colloidal system”.
- “Platform for Advanced Scientific Computing PASC 2014 Conference” 2-3/06/2014, Zurich, Switzerland. Poster presentation: G. Fiscaro et al. “Particle-particle interaction and space-dependent effective dielectric constant in colloidal system”.
- “E-MRS 2013 Spring meeting” from 27 to 31 May 2013 Strasburgo (France). Two oral presentations: G. Fiscaro et al “Boron activation and defects dynamics in Si solid-phase during excimer laser annealing processes” and “Boron redistribution and activation in silicon liquid phase under excimer laser irradiation” Symposium K, Physics and technology of advanced extra functionality CMOS-based devices.
- “18th International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)” from 3 to 5 September 2013 Glasgow (Scotland). Oral presentation: G. Fiscaro et al. “Dopant dynamics and defects evolution in implanted silicon under laser irradiations: a coupled continuum and Kinetic Monte Carlo approach”.
- “E-MRS 2012 Spring meeting” from 14 to 18 May 2012 Strasburgo (France). Oral presentation: G. Fiscaro et al “Boron pile-up in implanted silicon induced by submicrosecond laser annealing”; Poster: “Kinetic Monte Carlo simulation of Phosphorous activation in implanted Silicon by submicrosecond laser thermal annealing” Symposium A, Advanced Silicon Materials Research for Electronic and Photovoltaic Applications III.
- “19th International Conference on Ion Implantation Technology” from 25 to 29 June 2012 Valladolid (Spain). Oral presentation: G. Fiscaro et al “Kinetic Monte Carlo simulation of dopant-defect systems under submicrosecond laser thermal processes”; Poster: “Dynamics of dopant redistribution in molten Silicon caused by laser irradiation”.
- “E-MRS 2011 Spring meeting IUMRS ICAM 2011 & E-MRS/MRS Bilateral conference on energy” from 9 to 13 May 2011 Nice (France). Oral presentation: G. Fiscaro et al “Excimer laser annealing of Phosphorous implanted Silicon: experimental analysis and modeling” Symposium J, Laser materials processing for micro and nano applications.
- “12th International Symposium on Laser Precision Microfabrication” Takamatsu (Japan) from 7 to 10 June 2011. Oral presentation: G. Fiscaro et al “Dopant activation modeling in implanted Silicon under multi-pulsed excimer laser irradiation” section Micromachining and Modification.
- “E-MRS 2010 Spring Meeting” from 7 to 11 June 2010 at the Congress Center-Place de Bordeaux, Wacken, Strasbourg, France. Two oral presentations: G. Fiscaro et al “Dopant activation and damage evolution in implanted Silicon after Excimer Laser Annealing” and Symposium I, Advanced silicon materials research for electronic and photovoltaic applications; G. Fiscaro et al “Laser annealing doping processes of SiGe and Ge based devices”. Symposium H, Post-Si CMOS electronic devices: the role of Ge and III-V materials.
- “XCVI Congress of the Italian Physics Society” 20-24/09/2010, Bologna. Oral presentation: G. Fiscaro et al “Dopant activation and damage evolution in implanted silicon by pulsed excimer laser annealing.” Section II, Material science.
- “17th IEEE International Conference on Advanced Thermal Processing of Semiconductors - RTP 2009” from 29 September to 2 October 2009 Marriott Hotel Albany-NY. Oral presentation: G. Fiscaro et al “Damage Evolution in Implanted Silicon by Pulsed Excimer Laser Annealing”.

Basilea, 20 Luglio 2018



## 6 Attended workshops

- “School of the 19th International Conference on Ion Implantation Technology”, from 21 to 23 June 2012 Valladolid (Spain).
- “Carbomat, international workshop on Carbon-based Low Dimensional Materials”, 5-7 December 2011, at the CNR-IMM Catania.
- “35th Workshop on Compound Semiconductor Devices and Integrated Circuits, WOCSDICE 2011”, from 29 May to 1 June 2011, at the CNR-IMM Catania.
- “Carbomat, international workshop on Carbon-based Low Dimensional Materials”, 6-8 October 2010, at the CNR-IMM Catania.
- “Challenges in Material Science”, 26 May 2010 Department of Physics - University of Catania.

## 7 Teaching activities

Teaching assistant for the following courses held at the Physics Department, University of Basel:

- Computational Physics, exercitation class and Fortran tutorial (from 01/10/2014 to 31/12/2014);
- Electronic-structure calculations, exercitation class (from 01/03/2015 to 31/04/2015);
- Global structure predictions, exercitation class (from 01/04/2015 to 30/04/2015);
- Computational Physics, exercitation class and Fortran tutorial (from 01/10/2015 to 31/12/2015);
- Global structure predictions, exercitation class (from 01/03/2016 to 30/03/2016);
- Computational Physics, exercitation class and Fortran tutorial (from 01/10/2016 to 31/12/2016);
- Computational Physics, exercitation class and Fortran tutorial (from 01/10/2017 to 31/12/2017);

## 8 Project participation

- Extension of the BigDFT package ([www.bigdft.org](http://www.bigdft.org)) to non-orthorhombic cells from 19 March 2017 to today.
- Participation as researcher to the Swiss NCCR MARVEL project (<http://nccr-marvel.ch>), which represents a centre on Computational Design and Discovery of Novel Materials, that has been created by the Swiss National Science Foundation in May 2014. The goal of the NCCR MARVEL is to radically transform and accelerate invention and discovery in science and technology, and especially to transform and accelerate the design and discovery of novel materials in order to achieve improved properties and performance, or to witness the emergence of original physical properties. We will achieve this goal by exploiting the predictive accuracy that quantum-mechanical simulations have now reached for realistic, complex systems, the treasure trove of ever-increasing computational power ideally suited to intrinsically parallel problems, and the powerful synergies arising with the computer science of heterogeneous data management, data mining, and machine learning. EPFL acts as the leading house, and it is directed by Nicola Marzari, but it involves 41 principal investigators across 12 Swiss Institutions: the two Federal Institutes of Technology in Lausanne and Zurich (EPFL and ETHZ), six universities in Basel, Bern, Fribourg, Geneva, Svizzera Italiana, and Zurich (UNIBAS, UNIBE, UNIFR, UNIGE, USI, UZH), the Swiss National Supercomputing Centre (CSCS), the research laboratories of IBM Zurich, the two federal research institutes, the Paul Scherrer Institute (PSI), and the Swiss Federal Laboratories for Materials Science and Technology (Empa). The applicant integrated his research in Basel to the various work-packages of the Marvel project.
- Participation as main researcher to the Swiss PASC project “ENVIRON: A Library for Complex Electrostatic Environments in Electronic-structure Simulations” at the Department of Physics, University of Basel from 17 March 2014. The project is in collaboration with Prof. Dr. Nicola Marzari Theory and Simulation of Materials Institute of Materials EPFL, Lausanne and Prof.

Dr. Juerg Hutter Physics Department University of Zurich. The applicant cared the development of a library to include complex wet environments in electronic-structure calculations. Development, parametrization and test of implicit solvation models for neutral and ionic solvents (<http://www.quantum-environment.org>).

- Participation as researcher to the research activity of the European Project “Advanced Technology Modeling for Extra-Functionality Devices – Enlarged EU ATEMox” Grant Agreement N 287669 from 15/01/2012 to 16/03/2014 (<https://www.atemox.eu>). To reach the ambitious goals, a consortium of European companies active in complementary fields of competence (STMicroelectronics: device manufacturing, Synopsys: TCAD software, Exico, IBS: equipment production, Procion, Semilab: characterization) and leading European research institutes (CNRS-LAAS/CEMES, CNR-IMM, ETH-Zurich, Fraunhofer-IISB, Univ. Newcastle) has been formed to expertly cover all fields from experiment via characterization and modelling to simulation as well as to ensure full coverage of the value chain. In particular, the applicant tackled the study of dopant-defects evolution during thermal laser annealing processes by means of continuum models and kinetic Monte Carlo simulations.

Basilea, 20 Luglio 2018

A handwritten signature in black ink, appearing to read "Giulio Fin". The signature is fluid and cursive, with a long horizontal stroke at the end.

Basilea, 20 Luglio 2018

FIRMA(\*\*)

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***(\*) 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***

**N.B:**

- 1) Datare e sottoscrivere tutte le pagine che compongono la dichiarazione.
- 2) Allegare alla dichiarazione la fotocopia di un documento di identità personale, in corso di validità.
- 3) Le informazioni fornite con la dichiarazione sostitutiva devono essere identificate correttamente con i singoli elementi di riferimento (esempio: data, protocollo, titolo pubblicazione ecc...).
- 4) Il CNR, ai sensi dell'art. 71 e per gli effetti degli artt. 75 e 76 del D.P.R. 445 del 28/12/2000 e successive modifiche ed integrazioni, effettua il controllo sulla veridicità delle dichiarazioni sostitutive.
- 5) La normativa sulle dichiarazioni sostitutive si applica ai cittadini italiani e dell'Unione Europea.
- 6) I cittadini di Stati non appartenenti all'Unione, regolarmente soggiornanti in Italia, possono utilizzare le dichiarazioni sostitutive di cui agli artt. 46 e 47 del D.P.R. 445 del 28.12.2000 limitatamente agli stati, alla qualità personali e ai fatti certificabili o attestabili da parte di soggetti pubblici italiani, fatte salve le speciali disposizioni contenute nelle leggi e nei regolamenti concernenti la disciplina dell'immigrazione e la condizione dello straniero. Al di fuori dei casi sopradetti, i cittadini di Stati non appartenenti all'Unione autorizzati a soggiornare nel territorio dello Stato possono utilizzare le dichiarazioni sostitutive nei casi in cui la produzione delle stesse avvenga in applicazione di convenzioni internazionali fra l'Italia e il Paese di provenienza del dichiarante.