Allegato B

D.R. n. 3472/2021 del 16.12.2021

STEFANO LUPI
Curriculum Vitae

Part I – General Information

Full Name	Stefano Lupi
Citizenship	Italian
Website	https://sites.google.com/uniroma1.it/sapienza-terahertz/home
Spoken Languages	Italian (mother language), English (fluent), French (fluent)

Part II – Education

Type	Year	Institution	Notes
University Graduation	1989	Sapienza University of Rome	110/110 cum Laude, Laurea Thesis: "Infrared Spectroscopy on the CD_4 Molecular Quantum Solid”;
Post-Graduate Studies	1989	Sapienza University of Rome	Six months post-graduate CNR fellowship on Spectroscopic Studies on Molecular Solids;
PhD in Physics	1990-1992	Sapienza University of Rome	PhD fellowship on " An Infrared Study of High-Tc Superconductors in their Normal Phase”, at the Department of Physics, Sapienza University of Rome;
Post-Doc Fellowship in the EU Research Program "Human Capital and Mobility"	1993-1995	LURE Laboratory, University of Paris-Sud, France;	Infrared Synchrotron Radiation Investigation of High-Tc Superconductors;
Post-Doc Fellowship	January 1996-June 1996	LURE Laboratory, University of Paris-sud, France;	Infrared Synchrotron radiation investigation on strongly correlated electronic systems;

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
1996	2004	Department of Physics, Sapienza University of Rome;	Permanent Researcher
2005	Now	Department of Physics, Sapienza University of Rome;	Permanent Associate Professor
2013	2027		National Scientific Qualification to Full Professor in Experimental Physics of Matter, SC 02/B1 ABILITAZIONI 2012, 2016

IIIB – Other Appointments

Start	End	Institution	Position
2021	2024	Hangzhou Dianzi University, Hangzhou, China	Distinguished Professor
2015	2017	MEPHI University Moscow;	Joint Associate Professor
February 2016	October 2016	Department of Physics, University Statale Milano;	Visiting Professor
June 2010	November 2010	Max Planck CFEL Laboratory, Hamburg University, Germany;	Visiting Professor
November 2009	March 2010	Elettra Sincrotrone Trieste	Visiting Professor
October 2001	March 2002	University of Paris-Sud, Paris, France;	Visiting Professor

Part IV – Scientific Responsabilities

1. **Principal Investigator** of the MUR PRIN Project “PHOtonics Terahertz devices based on tOpological materials (PHOTO)” (Sapienza University, CNR-IMM, Milano Bicocca University, L’Aquila University, Roma Tor Vergata University, 2022-2024);

2. **Principal Investigator** of the NATO for Peace international project: “SARS-CoV-2 Multi-Messenger Monitoring for Occupational Health & Safety-SARS 3M” (Sapienza University and Graz University, 2021-2023);

3. **Principal Investigator** of the national FISR Project “4M-SARS-CoV-2” (Sapienza University, Camerino University, Brescia University, 2021);

4. **Principal Investigator** of the international project “3-Dimensional Graphene: Applications in Catalysis, Photoacoustics and Plasmonics” of MAECI Italy-China scientific cooperation program (Sapienza University, Bejing Institute of Technology, Hefei University, 2018-2021);

5. **Principal Investigator** of the international project “Linear, non-linear, and time-resolved Terahertz spectroscopy using the latest radiation sources” of MAECI Italy-Japan scientific cooperation program (Sapienza University and Osaka University, 2017-2019);

6. **Principal Investigator** of the international project “Valutazione dell'effetto immunogenico di nanoparticelle superparamagnetiche (YFe2O3@Ag) come piattaforma per lo sviluppo e il controllo di adiuvanti nei vaccini” of CNR-NRC Italy-Egypt scientific cooperation program (CNR-IOM and Cairo University, 2018-2020);

7. **Principal Investigator** of Sapienza-Terahertz Laboratory (Frequency and Time Domain Terahertz Spectroscopy) at the Department of Physics, Sapienza University of Rome, Italy: https://sites.google.com/uniroma1.it/sapienza-terahertz/home;

8. **Principal Investigator** of WP13-Task2 “3D Graphene” of international project Graphene Flagship Core 2 (2018-2020);

9. **Principal Investigator** of the “Material Science” branch (CNR-IOM) of the SISSI Infrared and Terahertz beamline at the Elettra Synchrotron, Trieste, Italy (2004-Now);

10. **Principal Investigator** of the TERASPARC terahertz beamline at the SPARC_LAB LNF-INFN, Frascati, Italy (2010-Now)

11. **Co-Responsible** of the TERAFERMI terahertz beamline at FERMI@Elettra free electron laser, Trieste, Italy (2016-Now);

12. **Co-Responsible** of the Terahertz-Imaging Laboratory at Sapienza University (2020-Now);

Part V – Teaching experience

Part V A – Teaching experience at Sapienza

Since 1995, as a staff member of Sapienza University of Roma, I regularly taught many courses to student classes of Science Faculty. These are: Esperimentazione Fisica I (Physics Laboratory), Fisica I (Mechanics and Thermodynamics), Fisica Moderna (Modern Physics), Struttura della Materia (Structure of Matter), Spettroscopia e Nanofotonica (Spectroscopy and Nanophotonics), Ottica e Laboratorio (Optics and Laboratory), Istituzioni di Fisica della Materia (Physics of Matter). My typical teaching assignment has been **120 hours (12 CFU) per academic year** with an average number of students of about **100 per year**.
I have been (I am), **the supervisor of 33 Master Degree** and **17 Bachelor Degree** students. I have been (I am) the supervisor of **14 Ph.D. students** at Sapienza University and **11 Post-Doc** students among Sapienza, INFN and CNR. Most of the students who graduated or got a Ph.D. under my supervision are now working in many research institutions and universities, e.g. ETH-Zurich (Switzerland), Soleil-Paris (France), Mc-Gill University (Canada), EPFL-Lausanne (Switzerland), CIC-Nanogune (Spain), Elettra-Sincrotrone Trieste (Italy), Radboud University (Netherland), ALBA-Synchrotron (Spain), Stanford University (California-USA). Two of them are responsible (A. Perucchi and P. Di Pietro) of the THz Beamline at Elettra. G. Kamel is the responsible of the IR beamline at SESAME synchrotron in Jordan. D. Nicoletti is researcher at Hamburg University in Germany. O. Limaj is Project Advisor at European Research Council Executive Agency (ERCEA).

The details of the courses that I taught along the years, all given at “Sapienza”, are listed in the following table:

Year	Institution	Lecture/Course
Since 2005	Laurea Magistrale (LM) Fisica	Spectroscopy and Nanophotonics, 6 CFU
2021/2022	LM Matematica	Fisica Moderna, 6 CFU
2021/2022	LM Biologia Ambientale	Istituzioni di Fisica della Materia, 6 CFU
2020/2021	LM Biologia Ambientale	Istituzioni di Fisica della Materia, 6 CFU
2019/2020	Laurea Triennale (LT) Scienze della Terra	Meccanica e Termodinamica, 6 CFU
2018/2019	LT Scienze della Terra	Meccanica e Termodinamica, 6 CFU
2017/2018	LT Scienze della Terra	Meccanica e Termodinamica, 6 CFU
2015/2016	LT Fisica	Struttura della Materia, 6 CFU
2014/2015	LT Fisica	Struttura della Materia, 6 CFU
2013/2014	LT Fisica	Struttura della Materia, 6 CFU
2012/2013	LT Fisica	Struttura della Materia, 6 CFU
2011/2012	LT Fisica	Struttura della Materia, 6 CFU

2010/2011	LT Fisica	Ottica e Laboratorio, 6 CFU
2009/2012	LT Fisica	Ottica e Laboratorio, 6 CFU
2008/2009	LT Fisica	Ottica e Laboratorio, 6 CFU
2004/2008	LT Fisica	Laboratorio di Meccanica, 6 CFU
1999/2000	Laurea Quadriennale in Fisica	Esperimentazione Fisica I
Since 2010	PhD Lectures at Department of Physics	Spectroscopy on Exotic Electronic Materials;

Part V B – Abroad teaching experiences

Since 2021	Lectures at Hangzhou Dianzi University, Hangzhou, China;	Infrared and Raman Vibrational Spectroscopy;
Since 2007	Lectures in the International School of Synchrotron Radiation, Trieste, Italy;	Infrared Synchrotron Radiation: From the production to the use;
Since 2015	Lectures at MEPHI University, Moscow, Russia;	Infrared and Terahertz Spectroscopy on Strongly Correlated Electron Systems;
2000-2008	Lectures for the PhD in Physics, in the Department of Physics, Salerno University	Infrared and Terahertz Spectroscopy on Strongly Correlated Electron Systems;

Part VI – Student Tutoring

Post-Doc Students

1. Veronica Stopponi, CNR-IOM Beamline SISSI@Elettra;
2. Ziwen Xu, Physics Department, Sapienza University;
3. Salvatore Macis, Physics Department, Sapienza University;
4. Benjamin Briere, CNR-IOM Beamline SISSI@Elettra;
5. Federica Piccirilli, CNR-IOM Beamline SISSI@Elettra;
6. Sen Mou, INFN-Sezione Roma1;
7. Annalisa D'Arco, INFN-Sezione Roma1;
8. Francesco De Nicola, IIT, Graphene Flagship;
9. Flavio Giorgianni, INFN-Sezione Roma1;
10. Odeta Limaj, Physics Department, Sapienza University;
11. Andrea Perucchi: CNR-IOM Beamline SISSI@Elettra;

Ph.D. Students

1. Tiziana Mancini, Thesis: “Air-Pollution Tracking of VOCs and Pathogens for a Green Society”;
2. Luca Tomarchio, Thesis: “Linear and Non Linear Terahertz Spectroscopy on Topological Materials”;
3. Marte Autore, Thesis: “Terahertz and Infrared study of Topological Insulators”;
4. Fausto D'Apuzzo, Thesis: “Materials for Infrared and Terahertz Plasmonics”;
5. Maddalena Daniele, Thesis: “Infrared, Dynamic light Scattering and Rheology of Biocompatible Gels”;
6. Flavio Giorgianni, Thesis: “Developments of Advanced Terahertz Sources for Nonlinear and Time-Resolved Terahertz Spectroscopy”;
7. Odeta Limaj, Thesis: “Investigation of Terahertz and Mid-Infrared Metamaterials”;
8. Irene Lo Vecchio, Thesis: “Metal to Insulator Transitions in Strongly Correlated Oxides Investigated by Infrared and Angle Resolved Photoemission Spectroscopy”;
9. Gihan Khamel, Thesis: “Investigation of Structure-Function Relationship of Biomolecules, using Infrared Spectroscopy, Thermodynamics, Brewster angle Microscopy Analysis”;
10. Leonetta Baldassarre, Thesis: “Optical Properties of Vanadium Oxides”;
11. Paola Di Pietro, Thesis: “Optical properties of Bismuth-based Topological Insulators”;
12. Daniele Nicoletti, Thesis: “An Infrared Study of Metallic-Phase Instabilities Driven by Temperature and Doping in Superconducting Cuprates”;
13. Chiara Mirri, Thesis: “Exotic Superconductors: An Infrared Spectroscopy Study”;
14. Matteo Valentini, Thesis: “Infrared and Raman Spectroscopy of Cobaltites”;

Graduate Students (Laurea Thesis)

1. Sara Marcello, Thesis: “ Development of Didactic Experiences in Modern Physics”;
2. Sara Carbone, Thesis: “Vibrational Spectroscopy Study of Gems of the Leone XII Collection”;
3. Rosanna Mossetti, Thesis: “Conformation Studies of the Spike SARS Protein by Infrared Spectroscopy”;
4. Lorenzo Mosesso, Thesis: “Optical Properties of the Magnetic Topological Insulator MnBi2Te4”;
5. Francesco De Angelis, Thesis: “Optical Properties Under Pressure of Quasi-Crystals”;
6. Roxana Mihashi, Thesis: “Optical Properties of the Giant Refraction Perovskite KLTN”;
7. Maria Grazia Paolozzi, Thesis:” Superconducting Metamaterials with Amplified Magnetic Response”;
8. Gabriele Nistico’, Thesis: “ Frequency and Time-Resolved Optical Properties of MAPI Organic Perovskite”;
9. Eleonora Bonaventura, Thesis: “Optical Properties of Stanene”;
10. Marta Di Fabrizio, Thesis: “Biomedical Imaging by Terahertz Spectroscopy”;

11. Luca Tomarchio, Thesis: “Terahertz and Optical Properties of Weyl Materials”;

12. Fausto D'Apuzzo, Thesis: “Mid-infrared biosensing based on plasmonic devices”;

13. Stefania De Rosa, Thesis: “Optical spectra of silicene”;

14. Valeria Giliberti, Thesis: “Risposta elettromagnetica dai terahertz all’infrarosso di metamateriali innovativi”;

15. Flavio Giorgianni, Thesis: “Metamateriali superconduttori”;

16. Yan Huanyu, Thesis: “An apparatous for optical pump-terahertz probe spectroscopy”;

17. Irene Lo Vecchio, Thesis: “NMR and photoemission study of the electronic phase coexistence in V_2O_3 Mott-Hubbard insulator”;

18. Andrea Marchese, Thesis: “Optical and terahertz properties of Dirac materials”;

19. Mattia Rattà, Thesis: “Manipolazione della superconduttività nel FeSeTe con campi terahertz intensi”;

20. Andrea Rovere, Thesis: “Spettroscopia non lineare su Isolanti Topologici”;

21. Alba Piacenti, Thesis: “Plasmonic excitations in nanoporous graphene”;

22. Roberto Provenzano, Thesis: “infrared spectroscopy of microporous graphene”;

23. Giorgia Sparasassi, Thesis: “Study of the insulator to metal transition in thin films and single crystals of vanadium dioxide”;

24. Andrea Starace, Thesis: “Dispositivi plasmonici infrarossi con metalli convenzionali e non: il caso dell’Au e dell’ITO”;

25. Lorenzo Tenuzzo, Thesis: “Photoacoustic based graphene”;

26. Marta Autore Thesis: “Infrared spectroscopy of charge-ordered cuprates”;

27. Leonetta Baldassarre, Thesis: “Effetti dell’ordinamento di carica nella conducibilità infrarossa del cobaltato di sodio Na_xCoO_2”;

28. Elisa Borfecchia, Thesis: “Spettroscopia Infrarossa di catene artificiali di DNA”;

29. Paola Di Pietro, Thesis: “Proprietà ottiche del cuprato superconduttore $Sr_{2-x}CuO_2Cl_2$ nel limite di lacune diluite”;

30. Odeta Limaj, Thesis: “Proprietà ottiche del superconduttore ad alta temperatura di transizione $Bi_2Sr_{2-x}La_xCuO_6$”;

31. Daniele Nicoletti, Thesis: “Studio della transizione metallo-isolante negli ossidi di vanadio V_3O_5 e V_2O_3 mediante spettroscopia infrarossa”;

32. Francesco Vitucci, Thesis: “Transizioni isolante-metallo indotte dalla temperatura e dalla pressione in manganiti doppie”;

Undergraduate Students (Dissertazione Thesis)

1. Andrea Altamura, Dissertazione Thesis: “Produzione e uso della radiazione terahertz”;

2. Marco Campetella, Dissertazione Thesis: “Ottica con materiali ad indice di rifrazione negativo”;

3. Matteo Chiaverini, Dissertazione Thesis: “Proprietà infrarosse del diossido di vanadio”;
4. Fausto D'Apuzzo, Dissertazione Thesis: “Proprietà infrarosse di materiali plasmonici”;
5. Flavia D'Arpino, Dissertazione Thesis: “Materiali con indice di rifrazione negativo”;
6. Odeta Limaj, Dissertazione Thesis: “Ottica dei metamateriali”;
7. Irene Lo Vecchio, Dissertazione Thesis: “Ottica con metamateriali plasmonici”;
8. Daniele Nicoletti, Dissertazione Thesis: “Lo spettro infrarosso del cobaltato di sodio Na_xCoO_2”;
9. Gianluca Musarra, Dissertazione Thesis: “Al di là del limite di diffrazione”;
10. Andrea Petrella, Dissertazione Thesis: “L’effetto Fano”;
11. Mattia Rattà, Dissertazione Thesis: “Spettri di assorbimento IR di acidi verdi”;
12. Paolo Rissone, Dissertazione Thesis: “La fase di Berry”;
13. Nicola Parente, Dissertazione Thesis: “Aspetti di risonanza Fano in sistemi interagenti”;
14. Paolo Sciortino, Dissertazione Thesis: “Fisica dei metamateriali ottici”;
15. Laura Schade, Dissertazione Thesis: “La fase di Berry”;
16. Daniele Vannicola, Dissertazione Thesis: “Teoria ed esperimenti sull’indice di rifrazione negativo”;
17. Nicola Zilli, Dissertazione Thesis: “Proprietà infrarosse di materiali plasmonici”;

Part VII – Management Responsibilities at Sapienza and in other Research Institutions

I held various management responsibilities in my department and in other institutions throughout my career. For instance, **I was the director of the “Bruno Pontecorvo” didactic laboratory in the Department of Physics at Sapienza for six years**, contributing to a strong renovation of the didactic experiences. **I am also a member of boards of PhD in “Fisica degli Acceleratori” and in “Modelli Matematici per l'Ingegneria, Elettromagnetismo e Nanoscienze”**. Hereafter, a list of these management responsibilities is indicated.

1. President of Ph.D. final examination committee in Condensed Matter (Physics Department), Sapienza University (2021);
2. Member of Doctoral Commitee “Fisica degli Acceleratori” (2018-Now);
3. Member of Doctoral Commitee “Modelli Matematici per l'Ingegneria, Elettromagnetismo e Nanoscienze” (2010-Now);
4. Member of the Committee “24 CFU”, Scienze Matematiche, Fisiche, Naturali, Sapienza (Since 2021);
5. Member of the board of CIABC (Centro di Ricerca per le Scienze applicate alla Protezione dell’Ambiente e dei Beni Culturali) of Sapienza (since 2021);
6. Member of Committee of the Sapienza Science Faculty for the attribution of vacant teaching courses (2020, 2021);
7. Member of Committee ConScienze Price of Physics Department of Sapienza (2020);

8. Member of the PhD final-examination committee in Scienze della Terra, curriculum “Cultural Heritage”, Sapienza University (2017);
9. Director of the Didactic Laboratory of the Physics Department “ B. Pontecorvo” (2006-2011);
10. Member Physics Department Committee “Borse Perfezionamento Estero” (2012-2015);
11. Member Physics Department Committee “Studio-Lavoro” (2010-2013);
12. Member of exam commission for a technologist position INFN (2020);
13. President of the exam commission for a position of an INFN administrative assistant (2019 and 2021);
14. RUP (Responsabile Unico Procedura) of several administrative tenders for INFN and Elettra;

Part VIII – Reviewer Activity

1. Natural Sciences and Engineering Research Council of Canada;
2. Swiss National Science Foundation, Switzerland;
3. MIUR Reprise Projects, Italy;
4. Italy-France University, Galileo Project, France;
5. Gordon and Betty Moore Foundation, USA;
6. National Science Center, Poland;
7. German Research Foundation, Germany;
8. Reviewer of Nature, Nature Communications, Nature Physics, Phys. Rev. Letters, Phys. Rev. B, ACS Nano Letters, ACS Nano;

Part IX – Society Memberships, Awards and Honors

2021	**Award by the China National Science Foundation** “Overseas Talent Program” (3% of win rate). As a consequence I was appointed Distinguished Professor at Hangzhou Dianzi University, Hangzhou, China;
Since 2019	Member of the Scientific Committee of the IRMMW (International Conference on Infrared, Millimeter and Terahertz Waves) Conference;
Since 2018	Member of the Scientific Committee of the LEES (Low-Energy Electrodynamics of Solids) Conference;
Since 2012	Member of the Scientific Committee of the WIRMS (Infrared Microscopy and Spectroscopy with Accelerator Based Sources) Conference;
Since 2011	Member of the Scientific Committee of the SuperFox (Superconductivity and Functional Oxides) Conference;
Since 2020	Member of the Editorial Board of *Materials* - An open access Journal from MDPI;

2014-2017	Member of Proposal Committee “Matter & material properties: Structure, Organization Characterization, Elaboration” of Soleil Synchrotron;
2008-2010	Member of Council Committee of the CNR/INFM-COHERENTIA Research Institute

Part X – Organized Conferences

Along my carrier I organized several international conferences and workshops. Hereafter, I listed the main ones including two workshops to be held in 2022:

2022	**Chair**, Physics and Topology Workshop, Department of Physics, Sapienza University. To be held, September, 7-9, 2022;
2022	**Chair,** Terahertz Sapienza Workshop 2022, Department of Physics, Sapienza University. To be held, July, 4-5, 2022;
2021	**Chair**, Italy-China Bilateral Workshop on 3D Graphene, LNF-INF, MAECI and National Natural Chine Science Foundation, November, 25-26, 2021;
2021	**Co-Chair** EuPRAXIA@SPARC_LAB User Applications, LNF-INFN, October, 14-15, 2021, Frascati, Italy;
2019	**Chair** of the Terahertz Sapienza Workshop, December, 10-11, 2019, Rome, Italy;
2019	**Chair** of Terahertz Radiation Session, PIERS International Conference, June, 17-19, 2019, Rome, Italy;
2019	**Co-Chair** of the 3D-Graphene Workshop, LNF-INFN, October, 1-2, 2019, Frascati, Italy;
2018	**Chair** of the 13th edition of the International LEES Conference (Low Energy Electrodynamics of Solids) June, 24-29, 2018, Portonovo (Ancona), Italy;
2017	**Chair** of the Workshop TERADAYS. Applications of Terahertz Radiation in High-Energy Physics, April, 5-6, 2017, Rome, Italy;
2016	**Co-Chair** of the International Workshop SAFE (Smaller And FastEr: Infrared and Terahertz Spectral-Imaging at the Nanoscale with Synchrotron Radiation and Free Electron Laser Sources), December, 1-2, 2017, Trieste, Italy;
2014	**Chair** of the International Workshop SuperFox (Superconductivity and Functional Oxides), September, 24-26, 2014, Rome, Italy;
2013	**Co-Chair** of the China-Italy bilateral Workshop on new generation infrared sources, December, 13-14, 2013, Beijing (China);
2011	**Chair** of the 6th International Workshop on “Infrared Microscopy and Spectroscopy with Accelerator Based Sources (WIRMS-2011)”, September, 4-8, 2011, Trieste, Italy;
2004	**Co-Chair** of the International Workshop on “Infrared Microscopy and Spectroscopy with Advanced Light Sources”, October, 28-30 2004, Trieste, Italy;

Part XI – Funding Information as Principal Investigator (PI)

Since 2004, **I won as PI** different international and national scientific grants. Among them, I receive funding from MUR PRIN 2021 concerning a project for Terahertz devices based on Topological Material (803 k€). From **INFM/CNR and Elettra** for the building of the SISSI-Infrared/Terahertz Beamline (~1 M€), **MAECI Ministry of Foreign Affair:** Collaborative International Projects with Beijing University China (Production and Use of 3D Graphene Structures for Plasmonics, Photonics and Acoustic Applications), and Osaka University Japan (Development and Use of THz Radiation), funded with 197 and 121 k€, respectively), **Graphene Flagship** (funded with 110 k€ for Photoacoustic Applications of 3D Graphene), **NATO for Peace** Collaborative Project with Graz University (funded with 350 k€, for the development of Terahertz/Infrared Monitoring of Pathogens), **Istituto Nazionale Fisica Nucleare** (INFN) for several projects on Terahertz Radiation (funded overall with 1,210 M€). **CNR** in the framework of EUROFEL project (175 k€). I also won several projects by **Sapienza**. The full list of funded projects are listed in the following table (**Total funding as PI 4,414 M€)**:

Year	Title	Program	Grant Value
2022-2024	**Principal Investigator,** PHOtonics Terahertz devices based on tOpological materials (PHOTO)	PRIN MUR 2021	**803 k€ (256 k€ for Sapienza Unit)**
2021-2023	**Principal Investigator,** SARS-3M THz/IR Monitoring of Viruses	NATO for Peace	**350 k€ (250 k€ for Sapienza Unit)**
2021	**Principal Investigator**, 4M-SARS Cov-2, Virus Sensing	FISR MUR	**56 k€**
2022-2023	**Principal Investigator,** PbT (Plasma by Terahertz)	INFN Gruppo V Project	**43 k€ (2022)**
2021-2022	**Principal Investigator,** Linear and Non Linear Electromagnetic Properties of Weyl/Dirac Topological Materials	Sapienza Research Project	**37 k€ + 1 Post-Doc funding**
2018-2021	**Principal Investigator,** Tera (THz-ERA)	INFN Call Gruppo V	**634,5 k€**
2020-2022	**Co-Investigator,** Sapienza-Terahertz-Imaging	Sapienza University "Grandi Attrezzature"	**200 k€**
2018-2020	**Principal Investigator,** Graphene Photoacoustic	**Graphene Flagship** WP13-Core2	**110 k€**
2019-2021	**Principal Investigator,** 3-Dimensional Graphene: Applications in Catalysis, Photoacoustics and Plasmonics;	Ministry of Foreign Affair (MAECI) Executive Program of cooperation in the field of science and technology, Italy-China;	**197 k€**
2017-2019	**Principal Investigator**, Linear, non-linear, and time-resolved Terahertz spectroscopy using the latest radiation sources;	Ministry of Foreign Affair (MAECI) Executive Program of cooperation in the field of science and technology, Italy-Japan;	**121 k€**

2018-2020	**Principal Investigator**, THz&RD: Terahertz Research and Developments: Biomedicine Imaging with Terahertz Radiation;	INFN Gruppo V Project	**119,5 k€**
2018-2020	**Principal Investigator**, "Valutazione dell'effetto immunogenico di nanoparticelle superparamagnetiche (YFe2O3@Ag) come piattaforma per lo sviluppo e il controllo di adiuvanti nei vaccini"	CNR-NRC Executive Program of cooperation in the field of science and technology, Italy-Egypt	**15 k€**
2013-2021	**Principal Investigator**, Infrared and Terahertz Spectroscopy at the SISSI and TERAFERMI facilities;	EUROFEL-CNR Activities	**175 k€**
2013-2015	**Principal Investigator**, Terahertz Pump-Probe Spectroscopy: SL_FEMTOTERA	INFN Gruppo V Project	**250 k€**
2011-2013	**Principal Investigator,** Terahertz Ultrashort Electron Beam Diagnostic: TERASPARC	INFN Gruppo V Project	**163 k€**
2012	**Principal Investigator,** Fundamental properties and Applications of 2-Dimensional Dirac Electron Gases in Topological Insulators	Sapienza Research Project	**50 k€**
2009	**Principal Investigator**, Pump-Probe Terahertz Spectroscopy	Sapienza Research Project	**10 k€**
2007	**Principal Investigator,** Infrared Spectroscopy on materials of Physical, Geological, and Chemical interest at high-pressure	Sapienza Research Project "Grandi Attrezzature"	**60 k€**
2005	**Principal Investigator,** Metal-Insulator Transition in Cuprates	Sapienza Research Project	**20 k€**
2004	**Principal Investigator**, Developments of an Infrared Synchrotron Beamline at the Elettra Synchrotron, Trieste, Italy	Elettra Sincrotrone Trieste/CNR	**1 M€**

Part XII – Research Activities

I am the group leader of 2 laboratories located in two institutions:

- The Sapienza-Terahertz Laboratory at Physics Department of Sapienza University (consisting actually of 2 Associate Professors, 4 Post-Docs, 2 Ph.D. and several undergraduate students);
- The SISSI-Material Science beamline@Elettra with 1 CNR researcher and 1 Post-Doc;

SYNOPSIS

I am an experimental condensed matter physicist mainly working on photonics, plasmonic and spectroscopy in a broad spectral range from Terahertz (THz) to Ultraviolet (UV) both with frequency domain, time domain and pump-probe techniques.

1996: I joint the Infrared Spectroscopy Laboratory at Sapienza as a researcher mainly working on Molecular Crystals and High-Tc Superconductivity investigated by optical spectroscopy.
2004: My independent research activity started according to a proposal by Elettra Sincrotrone Trieste and INFM, to project and realize the **first national THz and IR synchrotron beamline at Elettra** [S. Lupi et al., Review of scientific instruments 74, 3934 (2003) and Journal of the Optical Society of America B: Optical Physics 24, 994 (2007)].
2006: The SISSI@Elettra (Synchrotron Infrared Source for Spectroscopy and Imaging) beamline was opened to external users.

After this fundamental achievement, my activity has been mainly focused on the THz and IR photonics, plasmonic and broad band optical spectroscopy on Quantum Materials both with synchrotron and laser-based sources. **In particular, I developed specific electromagnetic sources in the THz and IR spectral range**, for investigating the optical properties of Quantum Materials.

2010: **TERASPARC@SPARC/INFN** [M. Ferrario et al., Nuclear Instruments and Methods in Physics Research, Section B: Beam Interactions with Materials and Atoms, 309, 183 (2013)] was developed;
2016: TeraFermi@Elettra high-intensity beamline [S. Di Mitri et al., Scientific Reports **8**, 11661 (2018)], was developed in collaboration with Dr. A. Perucchi.

2018: I realized, in the framework of the TERA (THz-ERA) INFN Project, a high-intensity THz radiation source at Sapienza (**Sapienza-Terahertz Laboratory**) based on a Coherent-Legend laser amplifier (7 W, 1 KHz, 35 fs), **(**https://sites.google.com/uniroma1.it/sapienza-terahertz/home). **The TERA project concerns the development of an ultra-strong THz electric field (up to 50 MV/cm) for particle acceleration**. This source is also used for pump-probe experiments in condensed matter physics for investigating exotic low-energy excitations like Dirac electrons in Topological Insulators and graphene, High-Tc superconductors, strongly correlated electronic systems, plasmonic, metamaterials, and Biophysics. **Beyond TERA, the fruitful collaboration with INFN is witness by the several projects funded by INFN Gruppo V (see Part XI of CV).**

Further on, during my carrier, I was able to establish several collaborations in the roman research environment (Sapienza, INFN, CNR, INAIL, Roma2 and 3 Universities), in the Italian research environment (Elettra Sincrotrone Trieste, IIT, CNR-IOM, Politecnico Milano and Torino, Statale University of Milan), and with highly-reputed international institutions such as Princeton University USA; ALS Synchrotron USA; Soleil Synchrotrons France; Osaka University Japan; Beijing Institute of Technology China; Hefei University China; Graz University Austria; Rutgers the State University of New Jersey USA; Hanzhou Dianzi University China; as demonstrated by past and on-going collaborative projects, and published papers.

Hereafter you can find a detailed list of the main research activities I have implemented together with the related most meaningful outcomes and impacted results.

1. THz and IR Photonics

The use of THz (1 THz=300 um=4 meV) and IR (average wavelength of 10 um) radiation is of fundamental importance for photonics applications ranging from new sources, plasmonic, and frequency and time-resolved spectroscopy.

During my carrier I have developed several THz/IR innovative sources based both on laser and relativistic electrons. Among them, I would like to mention the SISSI beamline@Elettra that collects both standard and edge synchrotron radiation from a bending magnet, being one of the most performing THz/IR beamline in Europe.

I planned, mounted and characterized SISSI through a collaboration between ELETTRA-Sincrotrone Trieste, INFM/CNR and Sapienza University of Rome.

Currently **I am the group leader of the Material Science branch of the SISSI beamline at Elettra** with 1 CNR researcher and 1 post-doc.

SISSI allows spectroscopy and microspectroscopy measurements at the diffraction limit in the THz/IR range (**Papers 4 and 12**). Steady-state THz radiation is extremely important for investigating the low-energy excitations in many field of science like collective modes in macromolecules, coherent modes in superconductors, Charge-Density and Spin-Density Wave materials, and the superconducting gap in exotic superconductors.

Recently, **we have added** to the beamline a Nano-Spectroscopy facility based on Tip-Enhanced AFM scanning probe system funded by the Nanoscience Foundries and Fine Analysis (NFFA) Project and Elettra. **This experimental facility, unique in Italy, has a spatial resolution down to nearly 20 nm well beyond the diffraction of THz/IR radiation** [F. Piccirilli et al., Nanomaterials, 11, 1103 (2021)]. **This represents an innovative turning point in the nano science and nano technology.**

Furthermore, high-power sub-ps pulsed THz/IR radiation plays a fundamental role in pump-probe and non-linear experiments. Indeed, sub-ps THz pulses, being more selective than optical radiation, can be used for pumping resonantly low-energy modes and for studying their relaxation towards the equilibrium. At high-intensity this radiation may be used to modify the ground state of quantum systems, providing a coherent control of matter.

On this ground several projects have been developed. Herewith the detailed list:

a) **TERASPARC project** for extracting and using the THz radiation at the Free Electron Laser SPARC-INFN-Laboratory Nazionali Frascati (LNF) in Frascati, Italy. Through this project, within a collaboration between INFN and Sapienza, we produced 100 fs/25 uJ pulsed THz radiation. This THz source is strongly competitive in the international scenario and THz Pump-THz Probe experiments have been performed in topological materials (**Paper 9**). **I am in charge of the scientific activity on THz radiation at LNF-INFN Frascati, Italy.**
b) Currently **I am working on a new INFN project called SABINA at LNF,** funded by Regione Lazio

and concerning the development of a beamline at SPARC covering both the THz and IR spectral region (10-100 microns of wavelengths), with sub-ps pulses and fully polarized (from linear to circular) radiation.

SABINA will be opened to users in 2023.

c) A Terahertz project has been also proposed to the Fermi@Elettra free electron laser in 2010. This project concerned the development of a Terahertz beamline at the Fermi machine and it has been approved in 2013 and financed through a collaboration among MUR, CNR and ELETTRA. The THz beamline TERAFERMI emits THz pulses with a time duration of 50 fs, covering a spectral range up to 10 THz. The energy per pulse reached a value of 100 uJ, which corresponds to a THz electric field of about 10 MV/cm. The beamline has been opened to external users in January 2017. **I am the co-responsible of the scientific activity of the THz project at Fermi.**

2. THz Photonic applications in High-Energy Physics

a) **THz Acceleration: The TERA (THz-ERA) Project.**

Recently, through a competitive INFN Research CALL, I won a project for producing and using highly intense THz radiation for accelerating electrons. Indeed, the long wavelength of THz radiation (average wavelength 100 um) and the associated huge THz field (up to 50 MV/cm) provide the possibility to strongly increase the acceleration efficiency allowing shorter accelerators. This is very useful in many applications like biomedicine. This project has been financed with nearly 800 k€ in three years by INFN (634,5 k€ at Sapienza) and I founded the Sapienza-Terahertz Laboratory in Rome through a collaboration between Sapienza University and INFN. **I am the PI of this project and responsible of the Sapienza-Terahertz laboratory.**

b) **In 2021 INFN funded the Plasma by Terahertz project** for using THz radiation as real time diagnostic for plasma. This is particular timing in view of the EUPRAXIA research infrastructure facility that will be built at INFN-LNF in Frascati. Here, new plasma acceleration schemes will be developed for a Free-Electron Laser facility. The monitoring of the plasma density and temperature is mandatory in order to obtain a precise control of the acceleration parameters.

3. Plasmonic and Metamaterials

A major role in metal sub-wavelength optics is played by meta- and plasmonic-materials. These artificial systems can be fabricated by electron and optical lithography and show several properties like optical super-transmittance, localization of electromagnetic field on sub-wavelength spatial scales, strong dependence of optical response to a small variation of physical properties at interfaces. **I built a mid-IR plasmonic sensor** which is sensitive to femtomoles of organic molecules [Journal of Physical Chemistry C, 117, 19119 (2013)]. Furthermore, **I investigated** THz plasmonic materials in order to probe the collective modes of macromolecules. **I also studied** the THz plasmonic response of metamaterials based on unconventional metals like HCTS [ACS Photonics, 1, 570 (2014)] and Topological Insulators (**Paper 13**). **In this paper, in particular, I demonstrated for the first time the presence of Dirac plasmons.**

Moreover, **we are studying the 2Dimensional Electron Gas (2DEG)** forming at oxide interfaces. These gases could have interesting applications for tunable plasmonic (**Papers 11 and 14**). Another research regards the plasmonic absorption in three-dimensional nanoporous graphene (i.e. 3D networks based on high-quality 2D graphene), where a Nature Communications paper has been published at the beginning of 2017 (**Paper 6**). A patent has been also submitted on the use of the 3D graphene for photoacoustic and terahertz detector applications [**European Patent Nr. 16 189 004.1**], and **paper 5**.

4. The low-energy electrodynamics of Quantum Materials based on Dirac and Weyl electrons and their applications for non-linear terahertz optics, plasmonic, terahertz detectors and photoacoustic

Most materials in condensed matter physics are characterized by low-energy electronic excitations showing a quadratic energy/momentum dispersion (Schrodinger electrons). Just recently, electrons with a linear energy/momentum (relativistic) dispersion (massless Dirac carriers), have been discovered first in graphene, and after in Topological Insulators and Weyl systems, and their potentialities in the fields of plasmonic and photonics have been readily recognized, leading to different applications in active and tunable optical devices. **My recent research** concerns the applications of Dirac/Weyl electronic systems in terahertz optics in which we discovered a saturable absorption effect and tunable plasmon excitations in Topological Insulators (see **Papers 1, 3, 9, 13**). **In particular in the papers 1 and 9 I demonstrated for the first time, through several experiments, a non-linear optical behavior of topological materials with a strong harmonic generation in the THz range.**
The research on topological materials and their applications in THz photonic has been awarded by a PRIN MUR funding (2022-2024) and I am the PI of this project.

5. The optical, infrared and terahertz properties using conventional and synchrotron radiation of strongly correlated electronic materials as High-Tc superconductors (HCTS), transitional metal oxides (TMO) and 2D dimensional electron gases (2DEG)

Strongly correlated electronic materials (HCTS, TMO and 2DEG) represent one of the most important class of unconventional systems in Solid State Physics. Those systems are often characterized by a strong interplay of lattice, orbital, charge and spin degrees of freedom. Their similar energy scales determine competing ground states spanning from superconductivity, charge-ordering insulators, bad-metals etc. A transformation among those states can be obtained by changing external parameters like temperature T, pressure P and doping x and this often corresponds to an Insulator-to-Metal Transition (IMT).
In the High-Tc-Superconductor (HCTS), for instance, **I studied** the T *vs* doping x phase diagram both in $Nd_{2-x}Ce_xCuO_4$ electron-doped and in $La_{2-x}Sr_xCuO_4$ and $Bi_{2-x}La_xSrCuO_6$ hole-doped materials [Phys. Rev. Lett. 105, 077002 (2010)].
This investigation suggests that in the HCTS normal phase incoherent and coherent charge carriers coexist in the Cu-O planes. The strong electron correlation also influences at high-temperature the charge

electrodynamics. Here, we observed for the first time a strong renormalization of the Fermi-liquid and a tendency of reduction of quasi-particles coherence. Through the optical spectral weight dependences on T, we obtained a quantitative measurement of electronic correlation in many materials.
I have extended the frequency domain spectroscopic studies to the time domain showing the presence of two bosons in the superconducting glue through fs-based pump-probe spectroscopy (**Paper 7, 10**). THz spectroscopy provided the possibility to measure the Cooper gap and the superconducting properties in new superconductors like Cuprates, MgB_2, Boron-Doped Diamond [Phys. Rev. Lett. 97, 097002 (2006)], Pictines and K_3C_{60} (**Paper 8**).
Our measurements demonstrated, for instance, that diamond is a weak-coupling system showing a s-wave gap symmetry and in K_3C_{60} superconductivity can be enhanced by optically pumping specific phonon modes.

Another fruitful field of research concerns the **physics of Transition Metal Oxides and strongly correlated systems**.
On this ground, **I investigated** the IMT through a combination of different experimental techniques: Raman, Photoemission, Infrared, performed in extreme conditions High-Pressure/High-Low Temperature. In particular, **we revealed a metallic state induced in VO_2 above 30 GPa in its monoclinic phase (Paper 16) using the high-brilliance of synchrotron radiation at SISSI**.
In V_2O_3, which is a textbook example of Mott-Hubbard material, we observed for the first time a mesoscopic electronic phase separation across the IMT induced by pressure and temperature (Paper 15), and high THz electric field (Paper 2).

6. The infrared and terahertz investigation of materials with biophysical interest

The versatility of THz/IR spectroscopy can be fully understand when applied to biophysics systems. In this framework, **I have studied** Mid-IR spectra of monolayers and bilayers of binary mixing of phosfolipids in order to obtain information on the phase separation phenomena existing in these systems [Colloids Surf. B: Biointerfaces 64, 56 (2008)].
Moreover, **I have investigated** the modification of secondary structure in proteins attached to nanocarriers by infrared vibrational spectroscopy [Soft Matter 7, 2653 (2005).
I proposed a project for using THz and Near-IR radiation for biomedical imaging on skin-cancer (THz&RD). This project has been financed by INFN (see above).
In 2021 I won two different projects (NATO for Peace and FISR, see above) for monitoring through THz/IR radiation the presence of pathogens in air, like SARS-CoV-2 virus.

Part XIII – Summary of Scientific Achievements

The results of my research activity have been presented at **more than 100 international conferences and workshops** (both invited and contributed).
I am co-author of **301 publications (SCOPUS)** on peer reviewed journals, which received more than **5400 citations (SCOPUS)** for a **total IF of 965 (impact factor relative to the publication year)** and an **IF per paper of 3.2** and a **h-index=40 (SCOPUS)**.

The 3 most cited articles (papers 8,13,16, see below), received respectively 397, 255, 161 citations.

Over the last 15 years, I have published **226 papers (Scopus)** on peer reviewed journals, which received **4638 citations (SCOPUS)** for a **total IF of 789** and an **IF per paper of 3.5** and **a h-index=32 (SCOPUS)**.

Using Google Scholar, my total bibliometrics score results to be 6853 citations and h-index=44.

Total Scientific production (1989-2021)

Product type	Value	Data Base	Start	End
Peer Reviewed Papers	301	SCOPUS	1989	2021
Numbers of Talk in International Conferences/Workshops	2 Plenary+79 Invited+23 Contributed		1989	2021
Scientific Books	4	SCOPUS/WOS	1989	2021
Total Impact Factor TIF (1989-2021)	965			
Average Impact Factor= TIF/ #Paper	3.2			
Total Citations	5402	SCOPUS		
Average Citations/# Papers	17.95			
Hirsch h-index	40	SCOPUS		
Normalized h-index (*)	1.21=40/33 [33 resulting from 2021-1989)+1, 1989 being the year of the first publication			

(*) h index divided by the academic seniority. **Notice that my first paper has been published in 1989 during the Laurea period.**

Scientific production over last 15 years (2006-2021)

Product type	Value	Data Base
Peer Reviewed Papers	226	SCOPUS
Total Impact Factor TIF (2006-2021)	789	SCOPUS

Average Impact Factor = TIF/ # Papers	3.5	
Total Citations	4638	SCOPUS
Average Citations/Paper	20.5	
Hirsch h-index	32	SCOPUS
Normalized h-index	32/15=2.15	

Among my publications I can cite:

1 Nature;
1 Nature Nanotechnology;
2 Nature Physics;
6 Nature Communications;
1 Journal of Material Chemistry;
1 NPG Nature Asia Materials;
1 Advanced Functional Materials;
3 Nano Letters;
1 ACS Nano;
2 ACS Applied Materials and Interfaces;
20 Phys. Rev. Letters;
1 Applied Materials Today;
2 Nanoscale;
1 Advanced Optical Materials;
3 ACS Photonics;
9 Nature Scientific Reports;
44 Phys. Rev. B;

Invited Talks (2006-2021)

1. 12th International Hasselt Diamond Workshop, February 28-March 2, 2007, Hasselt University, Belgium, Synchrotron Infrared Experiments on Superconducting Diamond and related materials
2. SILS 2007, July, 6-8 2007, Camerino, Italy, Extraction of Coherent Synchrotron Radiation from a LINAC for Terahertz Spectroscopy
3. Synchrotron Radiation School 2007, Duino, Trieste, Italy, Infrared Synchrotron Radiation: Spectroscopy And Microscopy
4. LEES 2008, June 30 - July 4, 2008 Vancouver, Canada, Low-Energy Electrodynamics and Metal to Insulator Transition in strongly correlated Vanadium Oxides
5. SILS 2008, June 26-28, 2008, Palermo, Italy, How to produce broad-band *sub-ps* low-energy pulses at UV and X-Ray FELs?

6. META Conference, 2008, Growth and optical characterization of Metamaterials for THz applications
7. Synchrotron Radiation School 2009, Grado, Trieste, Italy, Infrared Synchrotron Radiation: Spectroscopy And Microscopy
8. SILS 2009, 24-26 June, 2009, Camerino, Italy, Infrared synchrotron radiation spectroscopy at high-pressure in exotic materials
9. CIMTEC 2010, June 6-18, 2010, Montecatini Terme, Italy, Terahertz Spectroscopy of Superconductors
10. ETACM Meeting 2010 October 6 – 8, 2010, Anacapri, Naples, Italy, Observing The Mott Transition In V_2O_3 at the Microscale
11. IRMMW-THz 2010, September 5-10 2010, Rome Italy, Production of High Power Terahertz Radiation through the Free-Electron Laser
12. LEES 2010, July 5-10, 2010, Switzerland, Low Energy Electrodynamics and Metal to Insulator Transition in V_2O_3
13. Synchrotron Radiation School 2011, Grado, Trieste, Italy, Infrared Synchrotron Radiation: Spectroscopy And Microscopy
14. LEES 2012, July 22-27, 2012, Napa Valley, California, USA, Optical Properties of Bismuth-based Topological Insulators
15. Workshop on High-Field THz Science, October 8-9, 2012, University of Pécs, Hungary, Linear and Pump-Probe applications of THz Spectroscopy: The case of Elettra, Bessy-II, and SPARC
16. ESCA 2012, 18 - 22 November 2012, Hurghada, Red Sea, Egypt, Raman and I. R. Characterizations of Protein and Bio-Molecular Materials
17. MAMA Conference, March 20-22, 2012, Vieste, Italy, Electronic Phase Separation and Metal-to-Insulator Transition in V2O3 Mott-Hubbard material
18. Synchrotron Radiation School 2013, Grado, Trieste, Italy, Infrared Synchrotron Radiation: Spectroscopy And Microscopy
19. FisMat 2013 9-13 September 2013, Milano, Italy, Plasmonics Excitations in Topological Insulators
20. MAMA Trend Conference, May 20-23, 2013, Sorrento, Italy, Plasmonic Excitations in the Topological Insulators
21. Italo/Chinese Bilateral Workshop, December 4-5, 2013, Beijing, China, Infrared and Terahertz steady-state and time-resolved experiments with Storage rings and Free Electron Lasers
22. SIF, September 24-26, 2013 Trieste, Italy, Linear and Pump-Probe Terahertz Spectroscopy: The case of Elettra and SPARC
23. TeraHertz Science and Technology 2014 EOS – EUROPEAN OPTICAL SOCIETY, May 11-14, 2014, Camogli, Italy, Terahertz Plasmonic Excitations in Topological Insulators
24. LEES 2014, June 29**-**July 4, 2014**,** Loire Valley, France**,** Plasmonic Excitations in Topological Insulators
25. Workshop Magnetism at Large Scale Facilities November 24-25, 2014 CNR Roma, Italy, Behavior of Dirac plasmons under a strong magnetic field in topological insulators
26. THz-Arte, December 2-3, 2014, Frascati-ENEA, Italy, Terahertz Bio-Sensing based on Extraodinary Trasmission Devices
27. 8th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics

Metamaterials 2014, 25-30 July, Copenhagen, Denmark, Terahertz Plasmonic Excitations in Bi_2Se_3 Topological Insulator

28. FisMat 2015, September 28 - October 2, 2015, Palermo, Italy, Dirac Plasmonic Excitations In Topological Insulators
29. THz Workshop, November 15-18, 2015, Mephi University, Russia, Terahertz Radiation for Frequency and Time-Resolved Spectroscopy at SPARC-LAB Facility
30. Nanoscience and Nanotechnology Conference, INFN-LNF September 28-October 2, 2015, Frascati, Rome, Italy, Low-Energy Excitations in Topological Insulators
31. NEEM 2015 Workshop, October 12-14, 2015, Rome, Italy, Plasmons in 3D Nanoporous Graphene
32. RAIN Conference, July 13-15, 2015, Rome CNR, Terahertz Spectroscopy and Imaging
33. SIF, October 27-30, 2015, Napoli, Italy, Insulator-to-Metal Transition and Magnetism in Oxides
34. Synchrotron Radiation School 2015, Grado, Trieste, Infrared Synchrotron Radiation: Spectroscopy And Microscopy
35. *ACSIN 2016* 13th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures. October 9-15, 2016, Frascati, Rome, Italy, Terahertz Optical Properties Of Topological Insulators
36. LEES 2016, May 29 - June 3, 2016, Japan, Non-Linear Terahertz Behavior of Bi_2Se_3 Topological Insulators
37. Ugo Fano Symposium, 19-21 October 2016, CNR-Rome, Italy, Fano Effects In Exotic Electronic Materials: From Light To Sound
38. SILS 2016, September 21-23, 2016, Bari, Italy, Highly-Intense and Sub-ps Linac-Based Terahertz Sources for Non-Linear and Pump-Probe Spectroscopy
39. SuperFox 2016, September 19-21, 2016, Politecnico Torino, Italy,3D Graphene
40. Advanced Accelerator & Radiation Physics Workshop, December 7-8, 2016 Moscow, Russia, Terahertz Radiation for Linear and Non-Linear Spectroscopy in Condensed Matter Physics
41. Synchrotron Radiation School 2017, Muggia, Trieste, Italy, Synchrotron and Free Electron Laser based Infrared and Terahertz Studies in Condensed Matter
42. Superfluctuations 2017, September 6–8, 2017, San Benedetto del Tronto, Italy, Non Linear Electrodynamics Response in Dirac Electron Materials
43. 21th International Conference on Solid State Ionics, June 18-23, 2017, Padova, Italy, Sound and Light in 3D Graphene
44. ICFO, January 18, 2017, Barcelona, Spain, Light and Sound in Three-Dimensional Graphene
45. CLEO 2018 San Jose Convention Center, San Jose, CA, USA, Dirac Plasmons in Topological Insulators
46. N2D Workshop July 30-August 3, 2018, San Sebastian, Spain, Dirac Plasmons in Topological Insulators and 3D Graphene
47. 3D Graphene Workshop, October 1-2, 2018, Sapienza University of Rome, Italy, Terahertz and Infrared Plasmonic Absorption of 3-Dimensional Nano Porous Graphene
48. Photonics North 2018, June 5-7, 2018 Montreal, Canada, Non Linear Electrodynamics Response in Dirac Electron Materials
49. EMN Conference, September 3-7, 2018 San Sebastian, Spain, Non-Linear Terahertz Properties of

Topological Insulators

50. Superfluctuations 2018, September 5–7, 2018, San Benedetto del Tronto, Italy, Non Linear Terahertz Response of Exotic Electronic Materials
51. Frontiers On Quantum Matter, June 11-15, 2018, Frascati, Rome, Italy, Linear and Non Linear Terahertz Photonics Based On Topological Matter
52. FisMat 2019, September 30-October 4, 2019, Catania, Italy, High Intensity Terahertz and Mid-Infrared Radiation: Opportunity for Condensed Matter Physics
53. META 2019 July 23 – 26, 2019, Lisbon, Portugal, Non Linear Single-Particle and Plasmonic Terahertz Properties of 3D Topological Insulators
54. Workshop for NSFC NSFC-MAECI, November 26, 2019 Beijing, China, Sound and Ligth in 3D Graphene
55. Synchrotron Radiation School 2019, Muggia, Trieste, Italy, Synchrotron and Free Electron Laser based Infrared and Terahertz Studies in Condensed Matter
56. SILS 2019, 9-11 September, 2019, Camerino, Italy, High-Intensity Terahertz and Mid-Infrared Radiation: Production and Opportunities in Condensed Matter Research;
57. SILS 2019 Workshop on Coherence, 9-11 September, 2019, Camerino, Italy Terahertz and Infrared Synchrotron Radiation: Coherence helps its use?
58. Superfluctuations 2019, September 2-4, 2019, University of Padova, Italy, Sound and Light in 3D Graphene
59. SuperFox 2020, February 10-12, 2020, Santa Margherita Ligure, Italy, Ultrafast Manipulation of Matter By Extreme Terahertz Fields
60. Frontiers in Quantum Materials for Quantum Computing, October 26-27, 2020, Russian Center for Science and Culture, Rome, Italy, Linear and Nonlinear terahertz photonics based on topological matter
61. APS Mid-Atlantic Conference, 4-6 December, 2020, online conference USA, Linear and Unlinear Terahertz Behavior of Topological Insulators Materials;
62. SPIE Photonic West, July 2021, Behavior of Topological Matter under Strong THz fields;

Part XIV- Patent

I have a patent (European Patent Nr. 16 189 004.1) on: "**Transducer for electromagnetic and thermo-acoustic wave based on three dimensional graphene structure"**

Part XV– Selected Publications

List of the publications selected for the evaluation.

1. Terahertz Tuning of Dirac Plasmons in Bi_2Se_3 Topological Insulator

P. Di Pietro, N. Adhlakha, Piccirilli, A. Di Gaspare, J. Moon, S. Oh, Di Mitri, S. Spampinati, A. Perucchi, S. Lupi
Physical Review Letters 124, 226403 (2020), DOI: 10.1103/PhysRevLett.124.226403
IF=9.161, Total Citations=4 (Scopus); 6 (Google Scholar)

2. Overcoming the thermal regime for the electric-field driven Mott transition in vanadium sesquioxide

F. Giorgianni, J. Sakai, and S. Lupi
Nature Communications 10, 1159 (2019), https://doi.org/10.1038/s41467-019-09137-6
IF=12.121, Total Citations=16 (Scopus); 26 (Google Scholar)

3. Optical Conductivity of Two-Dimensional Silicon: Evidence of Dirac Electrodynamics
C. Grazianetti, S. De Rosa, C. Martella, P. Targa, D. Codegoni, P. Gori, O. Pulci, A. Molle, and S. Lupi
Nano Lett. 18, 7124 (2018), DOI: 10.1021/acs.nanolett.8b03169
IF=12.279, Total Citations=23 (Scopus); 28 (Google Scholar)

4. Reshaping the phonon energy landscape of nanocrystals inside a terahertz plasmonic nanocavity
Xin Jin, A. Cerea, G. C. Messina, A.Rovere, R. Piccoli, F. De Donato, F. Palazon, A. Perucchi, P. Di Pietro, R. Morandotti, S. Lupi, F. De Angelis, M. Prato 2, A. Toma, and L. Razzari
Nature Communications 9, 763 (2018), DOI: 10.1038/s41467-018-03120
IF=11.178, Total Citations=19 (Scopus); 22 (Google Scholar)

5. High-Efficiency and Low Distortion Photoacoustic Effect in 3D Graphene Sponge
F. Giorgianni, C. Vicario, M. Shalaby, L. D. Tenuzzo, A. Marcelli, T. Zhang, K. Zhao, Y. Chen, C. Hauri, and S. Lupi
Adv. Funct. Mater., 28, 1702652 (2018), DOI: 10.1002/adfm.201702652
IF=15.621, Total Citations=20 (Scopus); 25 (Google Scholar)

6. Terahertz and mid-infrared plasmons in three-dimensional nanoporous graphene
F. D'Apuzzo, A. R. Piacenti, F. Giorgianni, M. Autore, M. Cestelli Guidi, Marcelli, U. Schade, Y. Ito, M. Chen, and S. Lupi
Nature Communications 8, 14885 (2017) DOI: 10.1038/ncomms14885
IF=12.353, Total Citations=37 (Scopus); 42 (Google Scholar)

7. Mottness at finite doping and charge instabilities in cuprates
S. Peli, S. Dal Conte, R. Comin, N. Nembrini, A. Ronchi, P. Abrami, F. Banfi, G. Ferrini, D. Brida, S. Lupi, M. Fabrizio, A. Damascelli, M. Capone, G. Cerullo and C. Giannetti
Nature Physics 13, 806 (2017), *DOI: 10.1038/NPHYS4112*
IF=22.727, Total Citations=14 (Scopus); 18 (Google Scholar)

8. Possible light-induced superconductivity in K_3C_{60} at high temperature
M. Mitrano, A. Cantaluppi, D. Nicoletti, S. Kaiser, A. Perucchi, S. Lupi, P. Di Pietro, D. Pontiroli, M. Riccò, S. R. Clark, D. Jaksch and A. Cavalleri,
Nature 530, 461 (2016), DOI:10.1038/nature16522
IF=40.137, Total Citations=397 (Scopus); 566 (Google Scholar)

9. Strong nonlinear terahertz response induced by Dirac surface states in Bi_2Se_3 topological insulator
F. Giorgianni, E. Chiadroni, A. Rovere, M. Cestelli-Guidi, A. Perucchi, M. Bellaveglia, M. Castellano, D. Di

Giovenale, G. Di Pirro, M. Ferrario, R. Pompili, C. Vaccarezza, F. Villa, A. Cianchi, A. Mostacci, M. Petrarca, M. Brahlek, N. Koirala, S. Oh and S. Lupi

Nature Communications 7, 11421 (2016), DOI: 10.1038/ncomms11421

IF=12.124, Total Citations=79 (Scopus); 94 (Google Scholar)

10. Snapshots of the retarded interaction of charge carriers with ultrafast fluctuations in cuprates

S. Dal Conte, L. Vidmar, D. Golež, M. Mierzejewski, G. Soavi, S. Peli, F. Banfi, G. Ferrini, R. Comin, B. M. Ludbrook, L. Chauviere, N. D. Zhigadlo, H. Eisaki, M. Greven, S. Lupi, A. Damascelli, D. Brida, M. Capone, J. Bonca, G. Cerullo and C. Giannetti

Nature Physics 11, 421 (2015), DOI:10.1038/nphys3265

IF=18.791, Total Citations=73 (Scopus); 102 (Google Scholar)

11. Spectral Weight Redistribution in $(LaNiO_3)_n/(LaMnO_3)_2$ Superlattices from Optical Spectroscopy

P. Di Pietro, J. Hoffman, A. Bhattacharya,2, S. Lupi, and A. Perucchi

Phys. Rev. Lett. 114, 156801 (2015), DOI: 10.1103/PhysRevLett.114.156801

IF=7.645, Total Citations=13 (Scopus); 12 (Google Scholar)

12. Squeezing terahertz light into nanovolumes: nanoantenna enhanced terahertz spectroscopy (NETS) of semiconductor quantum dots

A.Toma, S. Tuccio, M. Prato, F. De Donato, A. Perucchi, P. Di Pietro, S. Marras, C. Liberale, R. Proietti Zaccaria, F. De Angelis, L. Manna, S. Lupi, E. Di Fabrizio, L. Razzari

Nano Letters 15, 386, (2015), DOI: 10.1021/nl503705w

IF=13.779, Total Citations=76 (Scopus); 90 (Google Scholar)

13. Observation of Dirac plasmons in a topological insulator

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