Catia Milardi: Curriculum Vitae

Ott 1986	Laurea in Fisica, con lode, conseguita presso l'Università de L'Aquila, discutendo una tesi di laurea svolta presso il gruppo PULS dei LNF riguardante le proprietà strutturali dei microaggregati di Palladio studiati mediante spettroscopia EXAFS.
1986 – 1988	Insegnamento come supplente di elettrotecnica e meccanica (1986/87), e di elettronica (1987/88). Associazione al gruppo PULS dei LNF.
Set 1988	Conferimento di un contratto a tempo determinato, ai sensi dell'art. 36 della legge 70/75, nell'ambito del progetto LISA, successivamente rinnovato fino al 31 Agosto 1991 per il progetto DAΦNE.
Nov 1990	Assunzione a tempo indeterminato presso la Divisione Acceleratori dei LNF con il profilo di Tecnologo, in esito ad un concorso pubblico nazionale.
Mar 2002	Inquadramento nel profilo di I Ricercatore in esito ad un concorso pubblico nazionale.
2003	Responsabile dell'ottica del complesso di acceleratori di DAΦNE.
2004-2005	Cultore della materia per i corsi di Fisica Nucleare e Subnucleare II per la laurea specialistica in Fisica presso la Facoltà di Scienze M.F.N. dell'Università degli studi di Roma *La Sapienza*. Titolare per gli anni 2004-2005, 2005-2006 e 2006-2007 di un corso integrativo dal titolo *Fisica degli Acceleratori*, nell'ambito del corso di Fisica Nucleare e Subnucleare II.
Mar 06 – Nov 15	Responsabile del Funzionamento di DAΦNE.
Nov 2015	Responsabile Scientifico del complesso di acceleratori DAΦNE.

Frascati 20 Marzo 2017

STEFANO LUPI

Curriculum Vitae

Part I – General Information

Full Name	Stefano Lupi
Date of Birth	
Place of Birth	
Citizenship	Italian
Permanent Address	
Mobile Phone Number	
E-mail	stefano.lupi@uniroma1.it
Spoken Languages	Italian (mother language), English (fluent), French (fluent)

Part II – Education

Type	Year	Institution	Notes (Degree, Experience,…)
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 fellowship of GNSM-CNR for 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 of the University of Paris-sud, France;	Infrared Synchrotron radiation investigation of High-Tc Supercondutors;
Post-Doc fellowship	January 1996-June 1996	LURE laboratory of the 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	2018		National Scientific Qualification to Full Professor in Experimental Physics of Matter, 02/B1

IIIB – Other Appointments

Start	End	Institution	Position
2015	2017	MEPHI University Moscow;	Associate Professor
February 2016	October 2016	Department of Physics, University Statale Milano;	Visiting Professor
June 2010	October 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) Responsible of the TERALAB laboratory (Frequency and Time Domain Terahertz Spectroscopy) at the Department of Physics, Sapienza University of Rome, Italy;

2) Responsible of the “Material Science” branch line (CNR/Sapienza) of the SISSI infrared and terahertz beamline at the Elettra Synchrotron, Trieste, Italy;

3) Co-Responsible of the FEMTOTERA terahertz bemline at the SPARC_LAB LNF-INFN, Frascati, Italy;

4) Co-Responsible of the TERAFERMI terahertz beamline at FERMI@Elettra free electron laser, Trieste, Italy;

5) Since 2018 Responsible of the Gruppo-V INFN Call TERA for the development of a THz source for electron acceleration;

Part V –A Teaching experience at Sapienza

Year	Institution	Lecture/Course
Since 2005	Department of Physics, Sapienza University of Rome;	Spectroscopic Methods for Condensed Matter Physics;
Since 2016	Department of Scienze della Terra, Sapienza University of Rome;	Mechanics and Thermodynamics, Laurea Triennale;
Since 2010	PhD Lectures at Department of Physics, Sapienza University of Rome;	Spectroscopy on exotic electronic materials;
2011-2015	Department of Physics, Sapienza University of Rome;	Struttura della Materia, Laurea Triennale;
2008-2011	Department of Physics, Sapienza University of Rome;	Ottica e Laboratorio, Laurea Triennale;
2004-2008	Department of Physics, Sapienza University of Rome;	Laboratorio di Meccanica, Laurea Triennale;
1999-2000	Department of Physics, Sapienza University of Rome;	Esperimentazione Fisica II, Laurea quadriennale

Part V –B Abroad teaching experiences

Since 2007	Lectures in the International School of Synchrotron Radiation, Duino, 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

PhD Students

1) M. Autore, Thesis: “Terahertz and infrared study of Topological Insulators”;
2) F. D'Apuzzo, Thesis: “Materials for infrared and terahertz plasmonics”;
3) M. Daniele, Thesis: “Infrared, Dynamic light scattering and rheology of biocompatible gels”;
4) F. Giorgianni, Thesis: “Developments of advanced Terahertz sources for nonlinear and time-resolved terahertz spectroscopy”;
5) O. Limaj, Thesis: “Investigation of terahertz and mid-infrared metamaterials”;
6) I. Lo Vecchio, Thesis: “Metal to insulator transitions in strongly correlated oxides investigated by infrared and angle resolved photoemission spectroscopy”
7) G. Khamel (Bordi, Lupi), Thesis: “Investigation of structure-function relationship of biomolecules, using infrared spectroscopy, thermodynamics, Brewster angle microscopy analysis”;
8) L. Baldassarre (Calvani, Lupi), Thesis: “Optical properties of vanadium oxides”;
9) P. Di Pietro (Calvani, Lupi) “Optical properties of Bismuth-based Topological Insulators”;
10) D. Nicoletti (Calvani, Lupi), Thesis: “An infrared study of metallic-phase instabilities driven by temperature and doping in superconducting cuprates”;
11) C. Mirri (Calvani, Lupi), Thesis: “Exotic superconductors: an infrared spectroscopy study”;
12) M. Valentini (Lupi, Postorino), Thesis: “Infrared and Raman spectroscopy of cobaltites”;

Graduate Students (Laurea Thesis)

1) F. D'Apuzzo, Thesis: “Mid-infrared biosensing based on plasmonic devices”;
2) S. De Rosa, Thesis: “Optical spectra of silicene”;
3) V. Giliberti, Thesis: “Risposta elettromagnetica dai terahertz all’infrarosso di metamateriali innovativi”;
4) F. Giorgianni, Thesis: “Metamateriali superconduttori”;
5) Y. Huanyu, Thesis: “An apparatous for optical pump-terahertz probe spectroscopy”;
6) I. Lo Vecchio, Thesis: “NMR and photoemission study of the electronic phase coexistence in V_2O_3 Mott-Hubbard insulator”
7) A. Marchese, Thesis: “Optical and terahertz properties of Dirac materials”;
8) M. Rattà, Thesis: “Manipolazione della superconduttività nel FeSeTe con campi terahertz intensi”
9) A. Rovere, Thesis: “Spettroscopia non lineare su Isolanti Topologici”;
10) A. Piacenti, Thesis: “Plasmonic excitations in nanoporous graphene”;
11) R. Provenzano, Thesis: “infrared spectroscopy of microporous graphene”;
12) G. Sparasassi, Thesis: “Study of the insulator to metal transition in thin films and single crystals of vanadium dioxide”;
13) A. Starace, Thesis: “Dispositivi plasmonici infrarossi con metalli convenzionali e non: il caso dell’Au e dell’ITO”;
14) L. Tenuzzo, Thesis: “Photoacoustic based graphene”;
15) M. Autore (Calvani, Lupi), Thesis: “Infrared spectroscopy of charge-ordered cuprates”
16) L. Baldassarre (Calvani, Lupi), Thesis: “Effetti dell’ordinamento di carica nella conducibilità infrarossa del cobaltato di sodio Na_xCoO_2”;
17) A. Borfecchia (Lupi, Maselli), Thesis: “Spettroscopia Infrarossa di catene artificiali di DNA”;
18) P. Di Pietro (Calvani, Lupi), Thesis: “Proprietà ottiche del cuprato superconduttore $Sr_{2-x}CuO_2Cl_2$ nel limite di lacune diluite”;
19) O. Limaj, Thesis: “Proprietà ottiche del superconduttore ad alta temperatura di transizione Bi_2Sr_2 $_xLa_xCuO_6$”
20) D. Nicoletti (Calvani, Lupi), Thesis: “Studio della transizione metallo-isolante negli ossidi di vanadio V_3O_5 e V_2O_3 mediante spettroscopia infrarossa”;
21) M. Vitucci (Lupi, Nucara), Thesis: “Transizioni isolante-metallo indotte dalla temperatura e dalla pressione in manganiti doppie”;

Graduate Students (Dissertazione Thesis)

1) A. Altamura, Dissertazione Thesis: “Produzione e uso della radiazione terahertz”,
2) M. Campetella, Dissertazione Thesis: “Ottica con materiali ad indice di rifrazione negativo”;
3) M. Chiaverini, Dissertazione Thesis: “Proprietà infrarosse del diossido di vanadio”;
4) F. D'Apuzzo, Dissertazione Thesis: “Proprietà infrarosse di materiali plasmonici”;
5) F. D'Arpino, Dissertazione Thesis: “Materiali con indice di rifrazione negativo”;
6) O. Limaj, Dissertazione Thesis: “Ottica dei metamateriali”;
7) I. Lo Vecchio, Dissertazione Thesis: “Ottica con metamateriali plasmonici”;
8) D. Nicoletti, Dissertazione Thesis: “Lo spettro infrarosso del cobaltato di sodio Na_xCoO_2”
9) G. Musarra, Dissertazione Thesis: “Al di là del limite di diffrazione”;
10) A. Petrella, Dissertazione Thesis: “L’effetto Fano”;
11) M. Rattà, Dissertazione Thesis: “Spettri di assorbimento IR di acidi verdi”;
12) P. Rissone, Dissertazione Thesis: “La fase di Berry”;
13) N. Parente, Dissertazione Thesis: “Aspetti di risonanza Fano in sistemi interagenti”;
14) P. Sciortino, Dissertazione Thesis: “Fisica dei metamateriali ottici”;
15) L. Schade, Dissertazione Thesis: “La fase di Berry”;

16) D. Vannicola, Dissertazione Thesis: "Teoria ed esperimenti sull'indice di rifrazione negativo";
17) N. Zilli, Dissertazione Thesis: "Proprietà infrarosse di materiali plasmonici";

Part VII Department and Sapienza Responsabilities

1) Member of the PhD final-examination committee in Scienze della Terra, curriculum "Cultural Heritage", Sapienza University (2017);
2) Member of Doctoral Commitee "Modelli Matematici per l'Ingegneria, Elettromagnetismo e Nanoscienze" (2010-ora);
3) Responsible of the Didactic Laboratory of the Department of Physics B. Pontecorvo (2006-2011);
4) Member Department Committee "Borse Perfezionamento Estero" (2012-2015);
5) Member Department Committee "Studio-Lavoro" (2010-2013);

Part VIII - Society memberberships, Awards and Honors

Year	Title
Since 2011	Member of the Scientific Committee of the WIRMS (Infrared Microscopy and Spectroscopy with Accelerator Based Sources) workshop;
Since 2012	Member of the Scientific Committee of the SuperFox (Superconductivity and Functional Oxides) workshop;
Since 2014	Member of Proposal Committee "Matter & material properties: Structure, Organisation Characterisation, Elaboration" of Soleil Synchrotron;
2008-2010	Member of Council Committee of the CNR/INFM-COHERENTIA Research Institute

Part IX – Organized Conferences

2018	**Chair** of the 13th edition of the International LEES Conference (Low Energy Electrodynamics of Solids) to be held in Italy, June 2018;
2017	**Co-Chair** of the Workshop TERADAYS, on applications of terahertz radiation in High-Energy Physics, April 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 2017, Trieste, Italy;
2014	**Chair** of the International Workshop SuperFox (Superconductivity and Functional Oxides), September 2014, Rome, Italy;
2013	**Co-Chair** of the China-Italy bilateral Workshop on new generation infrared sources, December 2013, Beijing (China);
2011	**Chair** of the 6th International Workshop on "Infrared Microscopy and Spectroscopy with Accelerator Based Sources (WIRMS-2011)", September, 2011, Trieste, Italy;

2004	**Co-Chair** of the International Workshop on "Infrared Microscopy and Spectroscopy with Advanced Light Sources", October 2004, Trieste, Italy;

Part X - Funding Information as PI-principal investigator

Year	Title	Program	Grant value
2018-2020	TERA: A THz source for particle acceleration	INFN	850 k€
2018-2020	Photoacoustic based on 3D Graphene	Graphene Flagship	110 k€
2017-2019	Linear, non-linear, and time-resolved Terahertz spectroscopy using the latest radiation sources;	MAE Executive Program of cooperation in the field of science and technology, Italy-Japan;	90 k€
2017-2018	Terahertz Research and Developments: Biomedicine Imaging with Terahertz Radiation;	Gruppo-V INFN	100 k€
2013-2016	Infrared and terahertz Spectroscopy at the SISSI and TERAFERMI facilities;	EUROFEL-CNR Activities	150 k€
2013-2015	Terahertz Pump-Probe Spectroscopy: FEMTOTERA	Gruppo-V INFN	150 k€
2011-2013	Terahertz Ultrashort Electron Beam Diagnostic: TERASPARC	Gruppo-V INFN	150 k€
2012	Fundamental properties and Applications of 2-Dimensional Dirac Electron Gases in Topological Insulators	Progetto Ricerca Sapienza	50 k€
2009	Pump-Probe Terahertz Spectroscopy	Sapienza AST	10 k€
2007	Infrared Spectroscopy on materials of physical, geological, and chemical interest at high-pressure	Grandi e Medie Attrezzature	60 k€
2005	Metal-Insulator Transition in Cuprates	Ateneo Sapienza	20 k€
2004	Developments of an Infrared Synchrotron Beamline at the Elettra Synchrotron, Trieste, Italy	Elettra Sincrotrone/CNR	1 M€

Total funding as PI 2,680 M€

Part XI – Research Activities

The research activity developed in these years has been focalized on the exotic low-energy excitations in condensed matter physics ranging from Dirac electrons in Topological Insulators and graphene, High-Tc superconductors, strongly correlated electronic systems, plasmonics, metamaterials, and Biophysics.
Specific electromagnetic sources in the Terahertz (THz) and Infrared (IR) spectral range, have been built for investigating the optical properties of these system and, in the most of cases, those sources have been also open to external users.
In the following I will summarize my activities and the main achieved results.

1. The low-energy electrodynamics of exotic electronic materials based on Dirac and Weyl electrons and their applications for non-linear terahertz optics, plasmonics, terahertz detectors and photoacoustic.

Most of materials in condensed matter physics are characterized by low-energy electronic excitations showing a quadratic energy/momentum dispersion (Schrodinger electrons).
Only 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 plasmonics and photonics have been readily recognized, leading to different applications in active and tunable optical devices.

Our recent research concerns the applications of Dirac electronic systems in terahertz optics in which we discovered a saturable absorption effect and tunable plasmon excitations in Topological Insulators.
Another research regards the plasmonic absorption in three-dimensional nanoporous graphene, where a Nature Communications paper has been published at the beginning of 2017 [F. D'Apuzzo et al, Nature Communications]. A patent has been finally submitted on the use of the three-dimensional graphene for photoacoustic and terahertz detector applications [European Patent Nr. 16 189 004.1].

Stefano Lupi is the responsible of the laboratory TERALAB at the Department of Physics, Sapienza University, Rome, Italy.

2. 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 etc. A transformation among those states can be obtained by changing external parameters like temperature, pressure and doping and this often corresponds to a Metal-to-Insulator Transition (MIT).
As a MIT strongly affects the low-energy electrodynamics, spectroscopic measurements from THz to UV may furnish information about:

- The optical conductivity as a function of frequency;
- The spectral weight of the Cooper condensate;
- The charge-ordering gap;

- The phononic excitations;
- The bosonic glue in superconductors;
- The low-energy modes associated to charge-ordering, Spin-Density-Wave and Charge-Density-Wave instabilities;

In the HCTS, for instance, we 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. This investigation suggests that in the HCTS normal phase incoherent and coherent charge carriers coexist in the Cu-O planes. The strong 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.
Frequency domain spectroscopic studies have been also extended in the time domain showing the presence of two bosons in the superconducting glue through fs-based pump-probe spectroscopy.
A Nature Physics on pump-probe spectroscopy on cuprates has been accepted at the beginning of 2017.

THz spectroscopy provided the possibility to measure the Cooper gap and the superconducting properties in new superconductors like cuprates, MgB_2, boron-doped diamond, pictines and K_3C_{60}. 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, we investigated the MIT 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 15 GPa, in its monoclinic phase. In V_2O_3, we observed for the first time a mesoscopic electronic phase separation across the MIT induced by pressure and temperature.

3. Plasmonics and Metamaterials.

A major role in metal optics is played by meta and plasmonic materials. These artificial systems can be fabricated by electron lithography and show several properties like 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. We built-up a mid-IR plasmonic sensor which is sensitive to femtomoles of organic molecules. We also investigated THz plasmonic materials in order to probe the collective modes of macromolecules. We also studied the THz plasmonic response of metamaterials based on unconventional metals like HCTS and Topological Insulators, as their strong dependence on temperature and applied electric field, provides the possibility to modulate their plasmonic response. Moreover, we are studying the 2DEG forming at oxide interfaces. These gases could have interesting applications for tunable plasmonics.

4. The development of new sources and new instrumentations for infrared and terahertz spectroscopy.

Most of the low-energy excitations characterizing the ground states of exotic materials (see above) fall in the Terahertz and Infrared spectral range. Their spectroscopic investigation in frequency and time domain asks for new radiation sources providing high-brilliance, an improved temporal and spatial stability and a sub-ps time resolution.
In this regard, Infrared Synchrotron Radiation (IRSR) coupling high-brilliance with a large spectral

coverage has completely modified Infrared Spectroscopy and Microscopy, providing the possibility to perform previously unexplored experiments:

- Spectroscopy and Micro-Spectroscopy using diamond anvil cells for high-pressure experiments in the 10-100 GPa range;
- Micro-Chemical analysis of non-omogeneous systems;
- Spectroscopy of biological materials on the cellular spatial scales;
- Spectroscopy and spectromicroscopy on Geology and Cultural Heritage;

The SISSI beamline at ELETTRA, which collects both standard and edge radiation from a bending magnet, is one of the most performant infrared beamline in Europe. SISSI has been projected, mounted and characterized in the last years by S. Lupi through a collaboration between ELETTRA-Sincrotrone Trieste, INFM/CNR and University of Rome La Sapienza.
SISSI provides the possibility to perform spectroscopy and microspectroscopy measurements at the diffraction limit in the infrared range. The brilliance gain of SISSI has been used for reflectivity measurements at high pressure in diamond anvil cells and for infrared imaging in Biophysics. Recently, IRSR has been extended to low frequency in order to cover the THz region where a flux gain of about 4 order of magnitude with respect to conventional sources has been achieved. 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 and CDW/SDW materials, the superconducting gap in exotic superconductors, etc, etc (see above).

S. Lupi is responsible of the material science branch of the SISSI Infrared beamline at Trieste.

Recently high-power, sub-ps pulsed THz radiation has been realized to play a fundamental role in pump-probe and non-linear experiments. Indeed, sub-ps THz pulses can be used to a resonantly pumping of low-energy modes and studying their relaxation towards the equilibrium. At high-intensity, this radiation may be used to modify the ground state of systems, providing a pure quantum control of matter.
On this ground we started the FEMTOTERA project for extracting and using the THz radiation at the Free Electron Laser SPARC-INFN in Frascati, Italy. Through this project, within a collaboration between INFN and University of Rome La Sapienza, we produced 100 fs/25 microJoule pulsed THz radiation. This THz source is strongly competitive and THz Pump-THz Probe experiments have been performed and others are on going.

S. Lupi has in charge the scientific activity of the THz project in Frascati, Italy.

A new Terahertz project has been proposed to the Fermi@Elettra free electron laser in 2010. This project that concerns the development of a Terahertz beamline at the Fermi machine has been approved in 2013 and financed through a collaboration among 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 100 microJ, which corresponds to a THz electric field of about 10 MV/cm (the atomic electric field). The beamline has been open to external users in January 2017.
S. Lupi is co-responsible of the scientific activity of the THz project at Fermi.

5. The infrared and terahertz investigation of materials with biophysical interest;

We have been 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. Moreover, we have investigated the modification of enzyme secondary structure in proteins attached to nanocarriers. Recently, I proposed a project for using THz and Near-IR radiation for biomedical imaging on skin-cancer. This project has been financed by INFN (see above).

Part XII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [International]	245	SCOPUS	1988	2018
Numbers of Talk in International Conferences/Workshops	2 Plenary+49 Invited+14 Contributed		2007	2018
Book Chapter [scientific]	3	ISI+SCOPUS	1988	2018

Hirsch (H) index	32

Among them 1 Nature, 1 Nature Nanotechnology, 2 Nature Physics, 2 NanoLetters, 4 Nature Communications, 18 Phys. Rev. Lett., 4 Nature Scientific Report, 2 ACS Photonics, 2 Soft Matter, 35 Phys. Rev. B., 3 Book Chapters.

Part XIII- 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

ANDREA MOSTACCI
Curriculum Vitae

Place **Rome**
Date **22 May 2018**

Part I – General Information

Full Name	**Andrea Mostacci**
Place and date of Birth	
Passport Number	
Citizenship	Italian
Permanent Address	
Mobile Phone Number	
E-mail	Andrea.Mostacci@uniroma1.it
Spoken Languages	Italian (mother tongue), English, French (basic knowledge)

Part II – Education

Type	Year	Institution	Notes (Degree, Experience …)
University graduation	1997	Sapienza University of Rome	**Electronic Engineering** degree with a dissertation on "Coupling impedance of pumping holes for LHC beam pipe" - **110/110 cum laude**
Post-graduate studies	1997	European Scientific Institute, Archamps (France)	Joint Universities Accelerator School, Course on **Particle Accelerator Physics**
Post-graduate studies	1999	CERN Accelerator School, Bénodet (France)	Course on **General Accelerator Physics**, Intermediate Level
PhD	2001	Sapienza University of Rome	Applied Electromagnetism and Electro-Physical Science, XIII cycle. Thesis on "**Beam wall interaction in the LHC liner**"
Licensure	1997	Sapienza University of Rome	Licensure for the profession of engineer
Licensure	2013	MIUR Ministry of Education, University and Research	National Academic Qualification as Associate Professor 2012 in Area 02-A1 **Experimental Physics of Fundamental Interactions**
Licensure	2013	MIUR Ministry of Education, University and Research	National Academic Qualification as Associate Professor 2012 in Area 02-B3 **Applied Physics**

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
1/2018	Today	Sapienza University of Rome	**Associate Professor** at the Department of Basic and Applied Science for Engineering (SBAI)
11/2006	12/2017	Sapienza University of Rome	**Assistant Professor** at the Department of Basic and Applied Science for Engineering (SBAI), former Energetics Department
04/2006	10/2006	Sapienza University of Rome	**Researcher** on Accelerator Physics (Co.Co.Co.) at the Department of Basic and Applied Science for Engineering (SBAI), former Energetics Department
04/2002	03/2006	Sapienza University of Rome	**Researcher** on Experimental techniques for accelerators and particle physics (Assegno di Ricerca) at the Department of Basic and Applied Science for Engineering (SBAI), former Energetics Department
04/2008	06/2008	Sapienza University of Rome	Member of the "Research and cultural activity'' working group of the Faculty of Engineering
09/2015	09/2015	Sapienza University of Rome	**Member of the selection board** for the PhD in Accelerator Physics
		Sapienza University of Rome	**Supervisor** of theses in Electronic Engineering, Nuclear Engineering and **assistant supervisor of PhD thesis** in Applied Electromagnetism and Accelerator Physics
		Sapienza University of Rome	**Member of several boards for selection** of research and post-doc grants at the SBAI Department
2011	Today	Sapienza University of Rome	Member of the Professor Board of **Electronic Engineering**
2012	Today	Sapienza University of Rome	Member of the Professor Board of **Electrical Engineering**
2016	Today	Sapienza University of Rome	**Member of Professor Board of the PhD** in Sciences and Technologies for Complex Systems
2004	2009	Sapienza University of Rome	Member of the Professor Board of **Aerospace Engineering**

IIIB – Research Appointments

Coordination of national and international researcher teams

Start	End	Institution	Position
11/2015	Today	Sapienza, University of Rome	**Coordination of Work Package on "Accelerator prototyping and experiments at Test facilities"** (WP12) of the project "Compact European Plasma Accelerator with superior beam quality" (EUPRAXIA); Horizon 2020 grant agreement No 653782
01/2015	Today	INFN-Laboratori Nazionali di Frascati (LNF) Sapienza, University of Rome	**Coordination of diagnostics group** for the linear accelerator of the Compton Gamma Source being built in the Extreme Light Infrastructure for Nuclear Physics (ELI-NP), Magruele (Romania)
05/2002	Today	SBAI Department-Sapienza	**Coordination** of the activity in the **Accelerator Laboratory** (former Accelerator and Detector Lab. of the Energetic Dep.)
2012	2014	SBAI Department-Sapienza	**Coordination of the Work Package "Accelerators: Novel compact particle sources"** (WP6) of the project "Cluster of Research Infrastructures for Synergies in Physics" (CRISP) in the framework of FP7-INFRASTRUCTURES-2011-1
2006	2013	INFN-Laboratori Nazionali di Frascati (LNF)	**Coordination of the data analysis** of all the experiments executed on the SPARC photo injector at the LNF-INFN

Research activity in qualified international institutions

Start	End	Institution	Position
04/2014	07/2014	CERN-Geneva (CH)	**Visiting Scientist** (2 weeks)
07/2013	07/2013	CERN- Geneva (CH)	**Visiting Scientist** (1 month)
08/2002	08/2002	CERN- Geneva (CH)	**Visiting Scientist** (1 month)
05/2001	04/2002	CERN- Geneva (CH)	**Research Fellowship**

Research activity in qualified national institutions

Start	End	Institution	Position
2012	Today	INFN-Roma 1 Section	**Research appointment** renewed yearly on particle accelerators activities
2008	2011	INFN-Laboratori Nazionali di Frascati (LNF)	**Research appointment** renewed yearly on particle accelerators activities
1998	2007	INFN-Laboratori Nazionali di Frascati (LNF)	**Association appointment** renewed yearly on particle accelerators activities
		INFN-Laboratori Nazionali di Frascati (LNF)	**Member of various selection boards** for research and technologist in Accelerator Science

Integration in the Accelerator Physics international community

Start	End	Institution	Position
05/2014	Today	Sapienza, University of Rome	**Governing board of EuroGammaS**, the European Consortium for the delivery of a High Intensity Gamma Beam System to the Extreme Light Infrastructure for Nuclear Physics (ELI-NP)
2008	Today	American Physical Society	**Referee** of Physical Review - Accelerators and Beams (former PRST-AB)
2006	Today	Elsevier	**Referee** of Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment

IIIC – Other Appointments

Start	End	Institution	Position
06/1999	05/2001	CERN- Geneva (CH)	**Doctoral Student**
12/1997	07/1998	CERN- Geneva (CH)	**Technical Student**

Part IV – Teaching experience

IV A – Teaching experience at Sapienza University of Rome

Year	Faculty	Lecture/Course
From 2015-16 to Today	Electrical Engineering (Bachelor degree)	**Physics II** (9 CFU, about 80 students)
	Electronic Engineering (Master degree)	Multidisciplinary Electronic Laboratory (**RF measurement module**, 3 CFU, 40 students)
2014-15	Electrical Engineering (Bachelor degree)	**Physics II** (9 CFU, about 80 students)
	Electronic Engineering (Master degree)	Multidisciplinary Electronic Laboratory (**RF measurement module**, 3 CFU, 30 students)
2013-14	Electrical Engineering (Bachelor degree)	**Physics II** (9 CFU, about 40 students)
	Electronic Engineering (Master degree)	**High Frequency measurement laboratory** (6 CFU, module of the course High Frequency system, 5 students)
2012-13	Electrical Engineering (Bachelor degree)	**Physics II** (9 CFU, about 40 students)
	Electronic Engineering (Master degree)	**High Frequency measurement laboratory** (6 CFU, module of the course High Frequency system, 5 students)
2011-12	Electronic Engineering (Master degree)	**High Frequency measurement laboratory** (6 CFU, module of the course High Frequency system, 5 students)
2009-10	Mechanical Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (3 CFU, about 30 students)
2008-09	Aerospace Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (4 CFU, about 90 students)
2007-08	Aerospace Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (4 CFU, about 90 students)
	Clinical Engineering (Bachelor degree)	**Physics I** (5 CFU, about 80 students)
	Science for Engineering (Master Degree)	**Modern Physics Laboratory** (4 CFU, about 10 students)
2006-07	Aerospace Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (4 CFU, about 90 students)
	Science for Engineering (Master Degree)	**Modern Physics Laboratory** (4 CFU, about 10 students)
2005-06	Aerospace Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (60 hours, about 90 students)

2004-05	Aerospace Engineering (Bachelor degree)	**Laboratory of Experimental Physics** (60 hours, about 90 students)
2003-04	Environmental Engineering (Bachelor degree), Rieti site	**Physics II** (6 CFU, about 20 students)
2002-03	Transportation Engineering (Bachelor degree), Civitavecchia site	**Physics II** (6 CFU, about 10 students)
	Transportation Engineering (Bachelor degree), Civitavecchia site	**Physics I** (6 CFU, about 10 students)

IV B – International University level teaching experience

Year	Place	Lecture/Course
2017-2019	ESI course, Joint University Accelerator School, Archamps (France)	**Introduction to RF**
2014	Accelerator Laboratory, SBAI Department, Sapienza University	**RF measurements**, 1 week intensive course for CERN researchers

Part V - Society memberships, Awards and Honours

Year	Title
From 2013	**Member of SIF** (Italian Physical Society) and EPS (European Physical Society)
September 2014	**Notice for oral communication** at Annual Meeting of the Italian Physical Society: "**Comb beam for particle driven plasma based accelerators**".
May 2001 April 2002	Awarded of **Fellowship** by CERN, Geneva – CH
June 1999 April 2001	Awarded of **Doctoral Student grant** by CERN, Geneva – CH
December 1997 July1998	Awarded of **Technical Student grant** by CERN, Geneva – CH
January 1997	**Winner** (6th classified over 30 positions available) in the competition organized by the INFN for grants for undergraduates, for starting the research activity at the INFN – LNF.
June 2001	**APS/IEEE Student Travel Award** to join the Particle Accelerator Conference 2001, Chicago (USA).
June 2000	**Financial Support for Young Scientists** to join the European Particle Accelerator Conference 2000, Vienna.
March 2009	**Student Fellowship** to join the Particle Accelerator Conference 1999, New York (USA).

Invited Talks

Date	Conference	Title
11/2004	**Care-HHH Workshop** "Beam Dynamics in Future Hadron Colliders and Rapidly Cycling High-Intensity Synchrotrons", CERN, Geneva (Switzerland)	RF coupling impedance measurements versus simulations
06/2011	**China-Italy Bilateral Workshop** "New Advanced Coherent Light Sources'', Beejing (China)	SPARC/SPARX activity at LNF
09/2011	**International Particle Accelerator Conference** (IPAC 2011), San Sebastian (Spain)	Advanced Beam Manipulation Techniques at SPARC FEL Facility
10/2013	**International Seminar** "Advanced Accelerator and Radiation Physics", Adyge State University, Maykop (Russia)	Frontiers in modern accelerator physics
04/2014	**ICFA Workshop** on "Electromagnetic wake fields and impedances in particle accelerators'' Erice, Italy	History and development of bench measurement techniques for impedance evaluation
11/2014	1st Particle Accelerator Components Metrology and Alignment to the Nanometre scale (**PACMAN**) Workshop, CERN, Geneve (Switzerland)	Stretched wire measurements and impedance matching
04/2015	**Advances in X-ray Free-Electron Lasers Instrumentation**, SPIE Optics Optoelectronics, Prague (Czech Republic)	Operational experience on the generation and control of high brightness electron bunch trains at SPARC-LAB
11/2015	**EuCARD-2 XBEAM-XRING-XLINAC** Workshop "Beam Dynamics meets Diagnostics"	Measurements of small impedances
03/2016	**ICFA Workshop** "Physics and Applications of High Brightness Beams", Havana, Cuba	ELI: New frontiers of particle acceleration and radiation sources
08/2017	**IBIC 17** "International Beam Instrumentation Conference", Grand Rapids, USA	Overview of the Diagnostics of the ELI-NP Gamma Beam System: Challenges for the Electron-Photon Interaction Point Diagnostics
09/2017	**ICFA Workshop** on "Impedances and Beam Instabilities in Particle Accelerators", Benevento, Italy	Challenges and Pitfalls for impedance measurements in the lab

Paper awards

The series of Virtual Journals in the physical science are designed by American Institute of Physics and the American Physical Society to highlight papers considered relevant to Nanoscience and Nanotechnology, Ultrafast Science, Biophysics, Quantum Information and Superconductivity.
A publication of A. Mostacci has been selected for Virtual Journal of Ultrafast Science:

> M. Ferrario, **A. Mostacci**, et al., "**Direct measurement of the double emittance minimum in the beam dynamics of the SPARC high-brightness photoinjector**", selected for Virtual Journal of Ultrafast Science, **January 2008** Vol. 7, Issue 1 - High Field Physics.

Part VI - Funding Information

VI A – Grants as **Principal Investigator**

Year	Title	Program	Grant Value
2018	Fondo per il finanziamento delle attività base di ricerca	ANVUR-FABR	3k€
2018	Beam energy measurement in advanced linear particle accelerators for electrons	**Sapienza Research Projects** (Medium Size)	About 13k€
2017	Advanced beam position monitors for the Compton Gamma Source of the Extreme Light Infrastructure	**Sapienza Research Projects** (Medium Size)	About 38k€
2014-16	Plasma based acceleration at SPARC-LAB	**National Scientific Committee V** of INFN (research unit responsible)	About 40k€
2013-16	European FEL Design Study (EuroFEL project)	**National Scientific Committee V** of INFN (research unit responsible)	About 300k€
2012-15	Generation of high brightness electron beams from plasma-based accelerators	**FIRB**-Futuro in Ricerca 2012 (research unit responsible) RBFR12NK5K_002	About 180k€

VI B – Grants as **Investigator**

Year	Title	Program
11/2015	**EUPRAXIA** – Compact European Plasma Accelerator with superior beam quality	**Horizon 2020**
2013	Optimization of a plasma-based short pulse laser amplifier	**Sapienza** Research Projects
2012-14	Cluster of Research Infrastructures for Synergies in Physics (**CRISP** project)	**FP7**-INFRASTRUCTURES
2012	ELI-NP	MIUR-FOE-INFN
2012	EUROFEL	MIUR-FOE-INFN
2012	ELI-NP	MIUR-FOE
2010	Charged particle beams from laser-plasma sources for medical applications	**Sapienza** Research Projects
2008	Innovative nanomaterials and nanostructures for photo-emission and field emission based devices	**FIRB** – Futuro in Ricerca - MIUR
2006	SPARX (phase II)	**FIRB** - MIUR
2004	SPARX (phase I)	**FIRB** - MIUR
2002	SPARC	**FISR** - MIUR
Since 2001	Projects related to particle accelerator	**Sapienza** Research Projects
Since 2001	Projects related to particle accelerator	**National Scientific Committee V** of INFN
Since 2001	Projects related to particle accelerator	**New Techniques of Acceleration** NTA-INFN

Part VII – Research Activities

Keywords	Brief Description
Circular accelerators, Coupling impedance,	The electromagnetic interaction between the beam in a particle accelerator and its surrounding (beam pipe) in a circular accelerator is studied with the coupling impedance. Such interaction can lead to energy losses (longitudinal impedance) or transverse instability (transverse impedance). Applying Electromagnetic theory, A. Mostacci studied several potential impedance source relevant for modern particle accelerators.
LHC liner	The beam pipe foreseen for the Large Hadron Collider (LHC) is rather unconventional. To shield the magnets cold bore from the synchrotron radiation emitted by 7 TeV protons, a beam screen (the so called "liner") has been introduced practically along all the machine. The design of the liner is a compromise among the beam stability issues, the vacuum requirements, the heat load on the cold bore, the electron cloud effects and the realization constraints. Three main potential sources of beam energy losses in the actual LHC liner are important, namely the interaction with the pumping holes, the (saw tooth) surface corrugation and the effect of an azimuthally inhomogeneous metallic beam pipe.
LHC liner Pumping holes	The pumping slots in the beam screen couple the inside of the beam pipe with the external coaxial region, leading to RF power flow with possibly power dissipation on the cold bore. Interference effects between the slots have been studied in details [J75, J76] and analytical estimates for the power dissipated in the cold bore as a function of the slot dimensions (hole width and wall thickness) has been given [J74]. For the actual slots dimensions, the losses were still within the safe limits. Such studies are being revisited in the context the the Future Circular Collider (FCC) studies where the availability of analytical formulae can simplify the design phase.
LHC liner Surface roughness	The artificial roughness (saw tooth corrugation) of the surface foreseen in the final design of the LHC beam pipe allows the propagation of surface waves synchronous with the beam and thus potentially dangerous for its stability. Using a field matching technique and assuming a periodically rough surface, the frequency of such waves is found to be very high (out of the relevant bunch spectrum): it scales with the inverse of the square root of the depth of the corrugation, that is in the range of microns. The potential dangers have been investigated for the nominal LHC bunch intensity [J72, J73].
LHC liner azimuthally inhomogeneous metallic beam pipe	Based on the Green's function approach, the field excited by a beam traveling in a pipe whose resistivity varies with the azimuth (but is constant in the z-axis direction) can be found (semi)analytically for an ultra-relativistic beam by using some approximated boundary conditions (for conductors) [J67].

Impedance studies	Even at relatively low frequencies (in the MHz range) it was found that the image currents do not avoid the low conductivity region (as you would expect in the limit of static solutions), thus implying potentially high power losses due to the longitudinal weldings in the LHC beam screen. Infact, the inner part of the beam screen is covered with a layer of copper (very good conductor) but the weldings have approximately the resistivity of stainless steel (bad conductor) which gives a big contribution to the losses. Numerical studies using the conventional electromagnetic CAD code confirmed such a conclusion. A prototype has been designed and built to experimentally verify the azimuthal distribution of the image currents, through very accurate Q-factor measurements in a coaxial resonator. The measured data confirmed the theoretical predictions. The theoretical environment built to study the LHC liner impedance issues has been subsequently applied to similar problem to give estimations of the impedance contribution in more complicated devices [J42, J52, J61, J65] in order to explain unexpected phenomena (e.g. heat load) suffered by the beam, particularly relevant in cryogenic machines.
RF devices, bead pull measurement,	In the “Accelerators” laboratory at the SBAI department, A. Mostacci designed, built and maintained a test bench to measure electromagnetic field inside closed RF structures (so called “bead-pull” method). Several devices installed in SPARC, the high brightness LINear Accelerator (linac) of Laboratori Nazionali di Frascati (LNF), have been tested in the laboratory [J68, J69]. Those measurements were calibrated to measure not only the field shape, but also the accelerating efficiency of the structure. Typical RF devices measured are deflector [J64, S20], electron gun and accelerating sections [J62] in the 3 to 12 GHz frequency range. The tuning procedure for 6GHz accelerating structures [J39] built at LNF have been defined and applied for the first time in the previously discussed test bench [J33]. The laboratory is equipped also with codes for electromagnetic CAD used both for designing novel devices [J56, J66] and for validating measurements on prototypes. A. Mostacci studied also on the bead-pull measurement theory for non-conventional RF structures.
Coupling impedance, bench measurements, coaxial wire method	Bench measurements nowadays represent an important tool to estimate the coupling impedance of any particle accelerator device. The well-known technique based on the coaxial wire method allows to excite in the device under test a field like the one generated by an ultra-relativistic point charge. The field of a relativistic point charge in the free space (or in a perfectly conducting beam pipe) is a Transverse Electric Magnetic (TEM) wave, namely it has only components transverse to the propagation direction. The amplitude scales inversely with the distance from the propagation axis and phase velocity is equal to the speed of light. The fundamental mode of a coaxial wave guide is a TEM wave as well, with the same amplitude

	dependence and the same propagation constant. Therefore, the excitation due to a relativistic beam in a given Device Under Test (DUT) can be "simulated" by exciting a TEM field by means of a conductor placed along the axis of the structure. With the coaxial wire method, A. Mostacci measured the coupling impedance of many particle accelerator devices of interest of CERN machines such as LHC and its injectors [J71]. A. Mostacci also performed beam experiments at CERN to compare bench measurement with direct beam measurement on the same devices. The coaxial line approach has also been used to bench measured the effect of coating in the secondary emission yield, relevant for LHC electron cloud issues [J70]. More recently the new generation of LHC collimators has been bench measured in order to estimate the coupling impedance and look for possible trapped modes in the moving jaws [J3].
SPARC, machine measurements Physics of high brightness beam Free Electron Laser	Since 2006, A. Mostacci joined SPARC commissioning and operation. SPARC is a high brightness linear accelerator initially conceived to drive proof-of-principle experiments in the generation of radiation with Free Electron Laser (FEL). Nowadays the SPARC accelerator has been upgraded to SPARC_LAB [J37, S06] with the installation of multi TW class lasers, allowing world-class, ground breaking experiments in accelerator and plasma physics as well as interdisciplinary research [J31]. Following the time line of the SPARC_LAB upgrades, the activity can be roughly divided in research on physics of high brightness electron beams, on FEL innovative schemes, on the generation of THz radiation, on novel plasma-based particle acceleration techniques and on Compton effect based radiation sources. Concerning the physics of high brightness electron beam, SPARC measured for the first time the emittance oscillation of beams generated by RF photocathodes [J60, S18], assessing the working point used world-wide in all the FELs based on RF guns. Such result has been possible due to a carefully conducted experiments [J55, S16] and data analysis [J57, S17]. In order to longitudinally compress the electron beam (to increase the bunch current), SPARC introduced and demonstrated the low energy compression (namely "velocity bunching") properly tuning low energy focusing solenoids [J49, J54, S15], for the first time used there. Such velocity bunched beam exhibit non-negligible energy spread that must be considered in beam measurements [J47, S12] or exploited in to produce radiation [J53, S14] with non-conventional FEL configurations. SPARC high brightness beams are also used to propose and demonstrate novel concepts in beam diagnostics [J18, J20] or medical applications [J26] in electron based radiotherapy. SPARC contributed to develop and test innovative ideas on Free Electron Laser schemes which have been afterword applied in bigger FEL facilities; such results have possible also to extensive benchmarking of code against experiments [J51] and innovative diagnostics [J23]. For instance, SPARC

	introduced the undulator tapering to compensate energy spread [J45, S10, J53, S14] or demonstrated the generation of a super radiant pulse in the long radiator of a single stage cascaded FEL, by seeding the modulator with an external laser. Seeded FELs can operate either in the amplifier "direct seeding" scheme [J24, J48, S13], or in the high gain harmonic generation configuration [J44, S09], where the seed in a first undulator (modulator) is used to induce an energy-density modulation in the electron beam longitudinal phase space. This bunched beam then emits a higher order harmonics in a following undulator (radiator). This scheme can be repeated in a multiple stage cascade of modulators and radiators, extending the operation wavelength toward a range where seed sources are not available [J36, S05]. The versatility of the SPARC linac allowed also to send a train of bunches in the FEL undulator, resulting in a two colour FEL radiation [J32, S03], time modulated FEL radiation [J34, S04] and seeded two colours radiation [J21, S02]. Also, this scheme was pioneered at SPARC and it is now used in several other laboratories for pump-probe FEL experiments.
THz radiation	The generation of THz radiation at SPARC relies on the usage of sub-ps high brightness electron bunches when a broadband radiation is needed [J41], while longitudinally modulated electron beams allow for tunable narrow-band radiation [J22]. The generation is quite efficient since the velocity bunching imposes a longitudinal phase space distortion, leading to asymmetric current profiles with sharp rising charge distribution at the bunch head; therefore, high frequency (THz) radiation can be emitted if the bunch goes across a radiator (coherent transition radiation) [J17]. The resulting THz radiation is more intense than other sources and it has been used for advanced material studies [J16, S01].
Laser-plasma accelerators, CRISP project, FIRB project, Eupraxia project	Plasma-based accelerators represent the new frontier for the acceleration of high quality, i.e. high brightness, electron beams because of their capability to sustain extremely large accelerating gradients. In conventional Radio-Frequency (RF) linear accelerators, accelerating gradients are currently limited to ~100 MV/m, mainly due to breakdown occurring on the metallic walls of the devices. Ionized plasmas, however, can sustain electron plasma waves with electric fields three orders of magnitude higher than those achievable with actual RF technologies. Moreover, the accelerating field strength is tunable by adjusting the plasma density. Even though the principle of plasma-based acceleration has been proven by several groups, the so accelerated beams still suffer from large angular divergence, large energy spread [J40, S08], poor reproducibility, which prevent their use as an alternative to conventional RF accelerators which typically provide stable and high quality electron beams. A possible solution is to use innovative transport lines based on conventional technology, such quadrupole or solenoid based transport lines arranged in a clever way [J4, J46, S11]. Another approach towards plasma-accelerated high-brightness electron beams relies on the use of the plasma only as the active media, injecting electrons into a pre-formed

	plasma channel. A first scheme consists in injecting a witness electron bunch in a plasma where the plasma wave is excited by a high-power laser pulse, i.e. external injection in a Laser Wake Field Accelerator (LWFA) [J10, J27, J11]. The second scheme relies on the induction of coherent plasma oscillations with multiple electron bunches, that is a resonant Plasma Wake Field Accelerator (PWFA). Such idea relies on using a comb beam, i.e. a train of equidistant bunches, to increase the accelerating gradient. A scheme to produce comb-like beams was conceived at Laboratori Nazionali di Frascati and successfully tested at SPARC for the first time [J13, J25]. The additional benefit of resonant PWFA relies on the use of lower charge bunches in the train with respect to traditional PWFA, with the advantage of a better control of acceleration and transport [J6]. The proof of principle experiments of resonant wake field acceleration triggered improvements in the plasma generation schemes [J28], in active plasma lens for symmetric beam focusing [J2], in the SPARC synchronisation [J15], in standard bunch measurement [J8, J35] as well as in non-intercepting beam diagnostics [J29]; also, the betatron radiation emitted by electron moving in the plamsa channel can be used [J19]. Efforts are ongoing also in measurement the plasma channel properties with spectroscopic [J5, J9] and opto-acoustic [J14] methods. Moreover, to support the plasma source commissioning, simplified (but accurate) models are necessary to properly choose the machine working point. Those models, before being used, must be assessed against accurate Particle In Cell simulation [J30].
Compton Sources ELI-NP	High brightness linacs are used also in Gamma ray source based on Compton back scattering between electron and counter-propagating laser pulses. A possible design has been proposed in [J38, S07] investigating the bam dynamics as well as the issues due to the necessity of multi-bunch operation to increase the luminosity. A single bunch, proof of principle experiment has been done at SPARC_LAB [J12]. The Gamma Beam Source according to [J38, S07] is being built in Romania under the ELI-NP project supported by EU. One of the most relevant issues is the need of multi-bunch, high charge beams affecting the design and the operation of accelerating structures [J1] and diagnostics [J7].
Medical applications Hadroterapy, post-acceleration,	Hadroterapy protons are typically produced with Radio Frequency quadrupoles and then delivered to the patient with circular accelerators (even if recently hospital proton linacs are under construction). Few tens of MeV protons can also be produced with high energy laser pulse hitting a target; such scheme has interesting feature in terms of beam properties, versatility and compactness. In order to improve the beam properties up to medical requirements [J43, J50] proposed a post acceleration scheme based on modified hospital proton linac cavities.

Montecarlo, FLUKA	A. Mostacci has been involved in the design of particle detectors for biomedicine, joining the research on Treatment Planning Systems (TPS) for tumour hadroterapy with carbon ions [J59] using Monte Carlo techniques (FLUKA code, [J58]); he was involved in the FLUKA collaboration on the optics module in order to calibrate the simulations against measurements on Compton chamber for Single Photon Emission Computed Tomography [J63, S19].

Part VIII – Summary of Scientific Achievements

The scientific activity quality parameters computed on the whole scientific production are:

Product Type	Number	Data Base	Start	End
Papers (Journals and conferences)	193	SCOPUS	1997	2017

Total Citations	**1272** (SCOPUS)
Hirsch (H) index	**19** (SCOPUS)

Invited Review Papers

The **International Committee for Future Accelerators (ICFA)** is the reference international panel in accelerator physics and it is chaired by Yong Ho Chin, (KEK, Japan). The ICFA Beam Dynamics Newsletter of December 2016 collects 26 articles on the "Collective Effects in Particle Accelerators", edited by E. Métral (CERN, Switzerland); among them, **A. Mostacci wrote the review contribution on "Beam-Coupling Impedance and Wake Field – Bench Measurements".**

List of peer reviewed papers on international Journals (total number 81)

[J1]. L. Sabato, **A. Mostacci**, et al., *Effects of Correlations Between Particle Longitudinal Positions and Vertical Plane on Bunch Length Measurement: a case study on GBS Electron LINAC at ELI-NP*, accepted for publications in Meas. Sci. Technol. (**2017**).

[J2]. P.A. Walker, **A. Mostacci**, et al., *Horizon 2020 EuPRAXIA design study*, Phys.: Conf. Ser. 874, 012029 (2017).

[J3]. A. Marocchino, **A. Mostacci**, et al., *Experimental characterization of the effects induced by passive plasma lens on high brightness electron bunches*, Applied Physics Letters. (**2017**); doi: 10.1063/1.4999010.

[J4]. J. Zhu, **A. Mostacci**, et al., *Misalignment measurement of femtosecond electron bunches with THz repetition rate*, Phys. Rev. Accel. Beams (**2017**); doi: 10.1103/PhysRevAccelBeams.20.042801.

[J5]. L. Sabato, **A. Mostacci**, et al., *Effects of energy chirp on bunch length measurement in linear accelerator beams*, Meas. Sci. Technol. (**2017**); doi: 10.1088/1361-6501/aa6c8a.

[J6]. D. Alesini, **A. Mostacci**, et al, *Design of high gradient, high repetition rate damped C-band rf structures*, Phys. Rev. Accel. Beams (**2017**); doi: 10.1103/PhysRevAccelBeams.20.032004.

[J7]. R. Pompili, **A. Mostacci**, et al., *Experimental characterization of active plasma lensing for electron beams*, Applied Physics Letters (**2017**); doi: 10.1063/1.4977894.

[J8]. N. Biancacci, **A. Mostacci**, et al., *Impedance simulations and measurements on the LHC collimators with embedded beam position monitors*, Phys. Rev. ST Accel. Beams (**2017**); doi: 10.1103/PhysRevAccelBeams.20.011003.

[J9]. M. Scisciò, **A. Mostacci**, et al., *Parametric study of transport beam lines for electron beams accelerated by laser-plasma interaction*, Journal of Applied Physics (**2016**); doi: 10.1063/1.4942626.

[J10]. F. Filippi, **A. Mostacci**, et al., *Spectroscopic measurements of plasma emission light for plasma-based acceleration experiments*, Journal of Instrumentation (**2016**); doi: 10.1088/1748-0221/11/09/C09015.

[J11]. E. Chiadroni, **A. Mostacci**, et al., *Beam manipulation for resonant plasma wakefield acceleration*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2017.01.017

[J12]. M. Marongiu, **A. Mostacci**, et al., *Thermal behavior of the optical transition radiation screens for the ELI-NP Compton Gamma source*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.07.040.

[J13]. A. Cianchi, **A. Mostacci**, et al., *Transverse emittance diagnostics for high brightness electron beams*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.11.063

[J14]. F. Filippi, **A. Mostacci**, et al., *Plasma density characterization at SPARC_LAB through Stark broadening of Hydrogen spectral lines*, Nucl. Instrum. Methods Phys. Res. A (**2016)**; doi: 10.1016/j.nima.2016.02.071.

[J15]. A.R. Rossi, **A. Mostacci**, et al., *Stability study for matching in laser driven plasma acceleration*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.02.015

[J16]. F. Bisesto, **A. Mostacci**, et al., *Laser–capillary interaction for the EXIN project*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.01.037.

[J17]. C Vaccarezza, **A. Mostacci**, et al., *The SPARC_LAB Thomson source*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.01.089.

[J18]. R. Pompili, **A. Mostacci**, et al., *Beam manipulation with velocity bunching for PWFA applications*, Nucl. Instrum. Methods Phys. Res. A (**2016**); doi: 10.1016/j.nima.2016.01.061

[J19]. A. Biagioni, **A. Mostacci**, et al., *Electron density measurement in gas discharge plasmas by optical and acoustic methods*, Journal of Instrumentation (**2016**); doi: 10.1088/1748-0221/11/08/C08003.

[J20]. R. Pompili, **A. Mostacci**, et al., *Femtosecond timing-jitter between photo-cathode laser and ultra-short electron bunches by means of hybrid compression*, New Journal of Physics (**2016**); doi: 10.1088/1367-2630/18/8/083033.

[J21]. F. Giorgianni, **A. Mostacci**, et al., *Strong nonlinear terahertz response induced by Dirac surface states in Bi2Se3 topological insulator*, Nature Communications (**2016**); doi: 10.1038/ncomms11421.

[J22]. F. Giorgianni, **A. Mostacci**, et al., *Tailoring of highly intense THz radiation through high brightness electron beams longitudinal manipulation*, Applied Sciences (**2016**); doi: 10.3390/app6020056.

[J23]. A. Cianchi, **A. Mostacci**, et al., *Six-dimensional measurements of trains of high brightness electron bunches*, Phys. Rev. ST Accel. Beams (**2015**); doi: 10.1103 /PhysRevSTAB.18.082 804

[J24]. B. Paroli, **A. Mostacci**, et al., *Coherence properties and diagnostics of betatron radiation emitted by an externally-injected electron beam propagating in a plasma channel,* Nucl. Instr. and Methods in Physics Research B (**2015**); doi: 10.1016/j.nimb.2015.03.070.

[J25]. V. Shpakov, **A. Mostacci**, et al., *Pre-wave zone studies of Coherent Transition and Diffraction Radiation*, Nucl. Instr. and Methods in Physics Research B (**2015**); doi: 10.1016/j.nimb.2015.03.047.

[J26]. A. Petralia, **A. Mostacci**, et al., *Two-Color Radiation Generated in a Seeded Free-Electron Laser with Two Electron Beams*, Phys. Rev. Lett. (**2015**) doi: 10.1103/PhysRevLett. 115.014801

[J27]. B. Marchetti, **A. Mostacci**, et al., *Novel schemes for the optimization of the SPARC narrow band THz source*, Rev. Sci. Instrum. (**2015**); doi: 10.1063/1.4922882.

[J28]. M.D. Alaimo, **A. Mostacci**, et al, *Mapping the transverse coherence of the Self Amplified Spontaneous Emission of a Free-Electron Laser with the heterodyne speckle method*, Optics Express 22 (**2014**); doi: 10.1364/OE.22.030013.

[J29]. L. L. Lazzarino, **A. Mostacci**, et al, *Self-amplified spontaneous emission free electron laser devices and nonideal electron beam transport*, Phys. Rev. ST Accel. Beams 17 (**2014**); doi: 10.1103/PhysRevSTAB.17.110706.

[J30]. **A. Mostacci**, *Comb beam for particle-driven plasma-based accelerators*, IL NUOVO CIMENTO, 37C (**2014**); doi: 10.1393/ncc/i2014-11817-0.

[J31]. A. Subiel, **A. Mostacci**, et al, *Dosimetry of Very High Energy Electrons (VHEE) for radiotherapy applications*, Phys. Med. Biol. 59 (**2014**); doi:10.1088/0031-9155/59/19/5811.

[J32]. A.R. Rossi, **A. Mostacci**, et al, *The External-Injection experiment at the SPARC_LAB facility*, Nucl. Instrum. Methods Phys. Res., A (**2014**); doi:10.1016/j.nima.2013.10.063.

[J33]. M.P. Anania, **A. Mostacci**, et al, *Design of a plasma discharge circuit for particle wakefield acceleration*, Nucl. Instrum. Methods Phys. Res., A (**2014**); doi: 10.1016/j.nima.2013.10.053.

[J34]. R. Pompili, **A. Mostacci**, et al, *First single-shot and non-intercepting longitudinal bunch diagnostics for comb-like beam by means of Electro-Optic Sampling*, Nucl. Instrum. Methods Phys. Res. **A** (**2014**); doi: 10.1016/j.nima.2013.10.031.

[J35]. F. Massimo, **A. Mostacci**, et al, *Transformer Ratio Studies for Single Bunch Plasma Wakefield Acceleration*, Nucl. Instrum. Methods Phys. Res. **A** (**2014**); doi: 10.1016/j.nima.2013.10.046.

[J36]. M. Ferrario, **A. Mostacci**, et al, *IRIDE: Interdisciplinary research infrastructure based on dual electron linacs and lasers*, Nucl. Instrum. Methods Phys. Res. **A** (**2014**); doi: 10.1016/j.nima.2013.11.040.

[J37]. C. Ronsivalle, **A. Mostacci**, et al, *Large-bandwidth two-color free-electron laser driven by a comb-like electron beam*, New Journal of Physics (**2014**); doi: 10.1088/1367-2630/16/3/033018.

[J38]. D. Alesini, **A. Mostacci**, et al, *Tuning procedure for traveling wave structures and its application to the C-Band cavities for SPARC photo injector energy upgrade*, Journal of Instrumentation, (**2013**); doi:10.1088/1748-0221/8/10/P10010.

[J39]. V. Petrillo, **A. Mostacci**, et al, *Observation of time-domain modulation of free-electron-laser pulses by multipeaked electron-energy spectrum*, Phys. Rev. Lett. (**2013**); doi: 10.1103/ PhysRevLett.111.114802.

[J40]. A. Cianchi, **A. Mostacci**, et al, *Challenges in plasma and laser wakefield accelerated beams diagnostic*, Nucl. Instrum. Methods Phys. Res. **A** (**2013**); doi: 10.1016/j.nima.2012.12.012.

[J41]. L. Giannessi, **A. Mostacci**, et al, *Superradiant cascade in a Seeded Free-Electron Laser*, Phys. Rev. Lett. (**2013**); doi: 10.1103/PhysRevLett.110.044801.

[J42]. M. Ferrario, **A. Mostacci**, et al, *Sparc_Lab Present and Future*, Nucl. Instrum. Methods Phys. Res., **B** (**2013**); doi: 10.1016/j.nimb.2013.03.049.

[J43]. A. Bacci, **A. Mostacci**, et al, *Electron Linac design to drive bright Compton back-scattering gamma-ray sources*, J. Appl. Phys. (**2013**); doi:10.1063/1.4805071.

[J44]. D. Alesini, **A. Mostacci**, et al, *The C-band accelerating structures for SPARC photoinjector energy upgrade*, Journal of Instrumentation (**2013**); doi:10.1088/1748-0221/8/05/P05004.

[J45]. M. Migliorati, **A. Mostacci**, et al, *Intrinsic normalized emittance growth in laser-driven electron accelerators*, Phys. Rev. ST Accel. Beams (**2013**); doi:10.1103/PhysRevSTAB.16. 011302

[J46]. E. Chiadroni, **A. Mostacci**, et al, *The SPARC linear accelerator based terahertz source*, Applied Physics Letters (**2013**); doi: 10.1063/1.4794014.

[J47]. S. Casalbuoni, **A. Mostacci**, et al, *Beam heat load due to geometrical and resistive wall impedance in COLDDIAG,* Journal of Instrumentation (**2012**); doi: 10.1088/1748-0221/7/11/P11008.

[J48]. P. Antici, **A. Mostacci**, et al, *Sensitivity study of a compact accelerator for laser generated protons*, Journal of Plasma Physics (**2012**); doi:10.1017/S0022377812000414.

[J49]. L. Giannessi, **A. Mostacci**, et al, *High-Order-Harmonic Generation and Superradiance in a Seeded Free-Electron Laser*, Phys. Rev. Lett., (**2012**); doi: 10.1103/PhysRevLett.108.16 4801.

[J50]. G. Marcus, **A. Mostacci**, et al, *Time-Domain Measurement of a Self-Amplified Spontaneous Emission Free-Electron Laser with an Energy-Chirped Electron Beam and Undulator Tapering*, Applied Physics Letter (**2012**); doi: 10.1063/1.4754612.

[J51]. P. Antici, **A. Mostacci**, et al, *Laser-driven electron beamlines generated by coupling laser-plasma sources with conventional transport systems*, J. Appl. Phys. (**2012**); doi: 10.1063/1.4740456.

[J52]. **A. Mostacci**, et al, *Chromatic effects in quadrupole scan emittance measurements*, Phys. Rev. ST Accel. Beams (**2012**).

[J53]. M. Labat, **A. Mostacci**, et al, *High-Gain Harmonic-Generation FEL seeded by harmonics generated in gas*, Phys. Rev. Lett. (**2011**); doi: 10.1103/PhysRevLett.107.224801.

[J54]. D. Filippetto, **A. Mostacci**, et al, *Phase space analysis of velocity bunched beams*, Phys. Rev. ST Accel. Beams (**2011**); doi: 10.1103/PhysRevSTAB.14.092804.

[J55]. P. Antici, **A. Mostacci**, et al, *A Compact Post-Acceleration Scheme for Laser Generated Protons*, Physics of Plasmas (**2011**); doi: 10.1063/1.3574361.

[J56]. L. Giannessi, **A. Mostacci**, et al, *Self-amplified spontaneous emission for a single pass free-electron laser,* Phys. Rev. ST Accel. Beams **(2011**); doi: 10.1103/PhysRevSTAB.14 .060712.

[J57]. S. Casalbuoni, **A. Mostacci**, et al, *COLDDIAG: A Cold Vacuum Chamber for Diagnostics,* IEEE Trans. Appl. Supercon., **(2011**); doi:10.1109/TASC.2010.2096176

[J58]. L. Giannessi, **A. Mostacci**, et al, *Self Amplified Spontaneous Emission Free-Electron Laser with an Energy-chirped Electron beam and Undulator tapering*, Phys. Rev. Lett., (**2011**); doi: 10.1103/PhysRevLett.106.144801.

[J59]. M. Ferrario, **A. Mostacci**, et al, *Experimental demonstration of emittance compensation with velocity bunching*, Phys. Rev. Lett., (**2010**); doi: 10.1103/PhysRevLett.104.054801.

[J60]. A. Cianchi, **A. Mostacci**, et al, *High brightness electron beam emittance evolution measurements in an rf photoinjector*, Phys. Rev. ST Accel. Beams (**2008**); doi: 10.1103/PhysRevSTAB.11.032801.

[J61]. B. Spataro, **A. Mostacci**, et al., *A biperiodic X-band cavity for SPARC,* Nucl. Instrum. Methods Phys. Res., A **(2008**); doi: 10.1016/j.nima.2007.10.040.

[J62]. **A. Mostacci**, et al, *Analysis methodology of movable emittance-meter measurements for low energy electron beams*, Rev. Sci. Inst. (**2008**); doi: 10.1063/1.2835715.

[J63]. G. Battistoni, **A. Mostacci,** et al., *The FLUKA code and its use in hadron therapy*, Il Nuovo Cimento C, (**2008**): doi: 10.1393/ncc/i2008-10281-9.

[J64]. C. Agodi, **A. Mostacci,** et al., *The INFN TPS project*, Il Nuovo Cimento C, (**2008**): doi: 10.1393/ncc/i2008-10284-6.

[J65]. M. Ferrario, **A. Mostacci**, et al, *Direct measurement of double emittance minimum in the SPARC high brightness photoinjector,* (**2007**); doi: 10.1103/PhysRevLett.99.234801.

[J66]. **A. Mostacci**, et al., *Coupling impedance studies and power loss measurements of COLDEX upgraded vacuum chamber,* Nucl. Instrum. Methods Phys. Res (**2007**); doi: 10.1016/j.nima.2007.08.147.

[J67]. D. Alesini, **A. Mostacci**, et al., *Design and RF measurements of an X-band accelerating structure for the SPARC project*, International Journal of Modern Physics A, (**2007**); doi: 10.1142/S0217751X07037603.

[J68]. P. Sala, **A. Mostacci**, et al, *The physics of the FLUKA code: recent developments,* Advances in Space Research, (**2007**); doi: 10.1016/j.asr.2007.05.031.

[J69]. D. Alesini, **A. Mostacci**, et al., *RF deflector design and measurements for the longitudinal and transverse phase space characterization at SPARC,* Nucl. Instrum. Methods Phys. Res., A (**2006**): doi: 10.1016/j.nima.2006.07.050.

[J70]. B. Spataro, **A. Mostacci**, et al., *Impedances of the cold bore experiment, COLDEX, installed in the SPS machine,* Nucl. Instrum. Methods Phys. Res., A (**2006**); doi: 10.1016/j.nima.2006.03.038.

[J71]. D. Alesini, **A. Mostacci**, et al., *Design and RF measurements of an X-band accelerating structure for linearizing the longitudinal emittance at SPARC,* Nucl. Instrum. Methods Phys. (**2005**): doi: 10.1016/j.nima.2005.07.072.

[J72]. **A. Mostacci**, *Image currents in azimuthally inhomogeneous metallic beam pipes,* Phys. Rev. ST Accel. Beams (**2005**); doi: 10.1103/PhysRevSTAB.8.084402.

[J73]. D. Alesini, **A. Mostacci**, et al., *Status of the SPARC project*, Nucl. Instrum. Methods Phys. Res., A (**2004**); doi: 10.1016/j.nima.2004.04.107.

[J74]. C. Vacarezza, **A. Mostacci**, et al., *The SPARC/X SASE-FEL projects*, Laser and Particle Beams (**2004**); doi: 10.1017/S0263034604223199.

[J75]. U. Iriso, **A. Mostacci,** et al., *Traveling wave resonant ring for electron cloud studies,* Phys. Rev. ST Accel. Beams, (**2004**); doi: 10.1103/PhysRevSTAB.7.073501.

[J76]. B.Spataro, **A. Mostacci**, et al., *On trapped modes in the LHC recombination chambers: numerical and experimental results*, Nucl. Instrum. Methods Phys. Res., A (**2004**); doi: 10.1016/j.nima.2003.09.046.

[J77]. M. Angelici, **A. Mostacci**, et al., *Wakefields effects due to roughness in a circular pipe*, Nucl. Instrum. Methods Phys. Res., A (**2002**); doi: 10.1016/S0168-9002(02)00795-7.

[J78]. **A. Mostacci**, et al., *Wakefields due to surface waves in a beam pipe with a periodic rough surface*, Phys. Rev. Accel. Beams, (**2002**); doi: 10.1103/PhysRevSTAB.5.044401.

[J79]. **A. Mostacci**, et al., *Impedance and loss factor of a coaxial liner with many holes: effect of the attenuation*, Phys. Rev. Accel. Beams, (**1999**): doi: 10.1103/PhysRevSTAB.2.124401.

[J80]. S. De Santis, **A. Mostacci**, et al., *Analytical expressions for the coupling impedance of a long narrow slot in a coaxial beam pipe*, Phys. Rev. E (**1998**); doi: 10.1103/PhysRevE.58.6565.

[J81]. S. De Santis, **A. Mostacci,** et al., *Interference effects on the coupling impedance of many holes in a coaxial beam pipe*, Phys. Rev. E (**1997**); doi: 10.1103/PhysRevE.56.5990.

Part IX– Selected Publications (citations according to SCOPUS on 13/12/2017)

		IF	Citations
S01	Giorgianni, F., Chiadroni, E., Rovere, A., Cestelli-Guidi, M., Perucchi, A., Bellaveglia, M., Castellano, M., Di Giovenale, D., Di Pirro, G., Ferrario, M., Pompili, R., Vaccarezza, C., Villa, F., Cianchi, A., **Mostacci, A.**, Petrarca, M., Brahlek, M., Koirala, N., Oh, S., Lupi, S., **Strong nonlinear terahertz response induced by Dirac surface states in Bi2Se3 topological insulator**, Nature Communications (**2016**), DOI: 10.1038/ncomms11421	**11.3**	**10**
S02	Petrillo, V., Anania, M.P., Artioli, M., Bacci, A., Bellaveglia, M., Chiadroni, E., Cianchi, A., Ciocci, F., Dattoli, G., Di Giovenale, D., Di Pirro, G., Ferrario, M., Gatti, G., Giannessi, L., **Mostacci, A.**, Musumeci, P., Petralia, A., Pompili, R., Quattromini, M., Rau, J.V., Ronsivalle, C., Rossi, A.R., Sabia, E., Vaccarezza, C., Villa, F., **Observation of time-domain modulation of free-electron-laser pulses by multipeaked electron-energy spectrum** Physical Review Letters (**2013**), DOI: 10.1103/PhysRevLett.111.114802	**7.65**	**47**
S03	Ferrario, M., Alesini, D., Bacci, A., Bellaveglia, M., Boni, R., Boscolo, M., Castellano, M., Chiadroni, E., Cianchi, A., Cultrera, L., Di Pirro, G., Ficcadenti, L., Filippetto, D., Fusco, V., Gallo, A., Gatti, G., Giannessi, L., Labat, M., Marchetti, B., Marrelli, C., Migliorati, M., **Mostacci, A.**, Pace, E., Palumbo, L., Quattromini, M., Ronsivalle, C., Rossi, A.R., Rosenzweig, J., Serafini, L., Serluca, M., Spataro, B., Vaccarezza, C., Vicario, C., **Experimental demonstration of emittance compensation with velocity bunching** Physical Review Letters (**2010**), DOI: 10.1103/PhysRevLett.104.054801	**7,65**	**100**
S04	Ferrario, M., Alesini, D., Bacci, A., Bellaveglia, M., Boni, R., Boscolo, M., Castellano, M., Catani, L., Chiadroni, E., Cialdi, S., Cianchi, A., Clozza, A., Cultrera, L., Di Pirro, G., Drago, A., Esposito, A., Ficcadenti, L., Filippetto, D., Fusco, V., Gallo, A., Gatti, G., Ghigo, A., Giannessi, L., Ligi, C., Mattioli, M., Migliorati, M., **Mostacci, A.**, Musumeci, P., Pace, E., Palumbo, L., Pellegrino, L., Petrarca, M., Quattromini, M., Ricci, R., Ronsivalle, C., Rosenzweig, J., Rossi, A.R., Sanelli, C., Serafini, L., Serio, M., Sgamma, F., Spataro, B., Tazzioli, F., Tomassini, S., Vaccarezza, C., Vescovi, M., Vicario, C., **Direct measurement of the double mittance minimum in the beam dynamics of the sparc high-brightness photoinjector** Physical Review Letters (**2007**), DOI: 10.1103/PhysRevLett.99.234801	**7.65**	**52**