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**ADDRESS AND CONTACT INFORMATION**

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**CURRENT POSITIONS**

Research Director (Dirigente di Ricerca) at Istituto di Ottica (INO) - CNR, Pisa.

Head of the Pisa Unit of Istituto Nazionale di Ottica (<http://www.pi.ino.cnr.it/pisa/>) Research Director

Director of the Intense Laser irradiation Lab (<http://ilil.ino.it/>)

**Associate researcher (Associato) INFN** - Sezione di Pisa

**ABILITAZIONE SCIENTIFICA NAZIONALE**

[Abilitazione](#) a Professore Ordinario (1a fascia), Fisica Sperimentale della Materia (02/B1)

**MAIN NATIONAL AND INTERNATIONAL APPOINTMENTS**

> Head of the [Intense Laser Irradiation Laboratory \(ILIL\)](#) at *Istituto nazionale di Ottica* (INO-CNR) (2008 - current)

> Coordinator of Laser development for the [EuPRAXIA Infrastructure Design Study](#) (2014-2019)

> Chair of the [Beam Plasma and Inertial Fusion Section \(BPIF\)](#), Plasma Physics Division, European Physical Society (EPS) (2010-2012)

> Head of Unit (Responsabile di Commessa) [Fotonica degli Alti Campi](#), Progetto Ottica, Fotonica e Plasmi, Dipartimento Materiali e Dispositivi, CNR, (since 2006)

> Responsabile Scientifico Commissioning [Laboratorio FLAME](#), Laboratori Nazionali di Frascati, INFN, Frascati, Roma, Italy, (2008-2011)

> Coordinator of the Facility Design of the [High Power Laser Energy Research Infrastructure](#) (HiPER) (2008-2010);

> Member of the Project Management Committee of the [High Power Laser Energy Research Infrastructure](#) (HiPER) (2008-2010);

> Contact point for CNR within the Extreme Light Infrastructure (ELI), WP7B, Radiation Sources

> Member of the Commission on Plasma Physics of the International Union of Pure and Applied Physics (IUPAP) (2008-2011)

> Elected Member of BPIF Board - Plasma Physics Division of the European Physical Society (EPS) (2008-2011)

> *Outstanding Referee* of the American Physical Society (APS)

> Vice-chair of the Management Committee of the [COST Action MP0601 "SHORT WAVELENGTH LABORATORY SOURCES"](#) (2007 to 2010).

> Member of the Facility Access Panel of the [Central Laser Facility of the Science and Technology Facilities Council](#), UK (2009 - 2011).

> Member of the International Scientific Committee of the [Prague Asterix Laser \(PALS\)](#) of the Czech Academy of Science, Prague (2007 - 2010).

> Member of the International Scientific Committee of the [PETawatt Aquitaine Laser \(PETAL\)](#) of CEA/CSTA, Bordeaux (2007 - 2010).

> Member of the Core to Core Program on Ultrafast Intense Laser Science of the (JSPS) Japanese Society of the Promotion of Science (2006 - 2009).

**DEGREES**

1994: [Ph.D. and D.I.C](#) (Imperial College, University of London); Title: *Characterization of plasmas produced by nanosecond and picosecond laser plasmas.*

1994: [Laurea in Fisica](#) (Università di Pisa); Title: *A study of X-ray emission from laser produced plasmas* (Italian). ([pdf file](#))

**OTHER POSITIONS, SCHOLARSHIPS AND AWARDS:** EU Marie Curie Fellowship at Imperial College, London, UK, 1995 • Scholarship of the Italian Space Agency at IFAM-CNR, Pisa, 1994 • Scholarship of the National Research Council at Imperial College di London, UK, 1993-94 • Research Associate at Imperial College, London, UK, 1993 • Scholarship of the National Research Council at IFAM-CNR, Pisa, 1991-92 • Scholarship of the National Research Council at Imperial College di London, UK, 1991.

**MAIN RESEARCH FIELDS:** High Power Laser Interaction with Matter • X-Ray Emission From Laser Produced Plasmas – X and Gamma Ray Generation and Applications • High Energy Astrophysics.

**RESEARCH INTERESTS:** Ultra Short, Ultraintense Laser Plasma Interactions • E.m. wave propagation • Atomic physics of ionised species • Collective phenomena and instabilities • Inertial confinement fusion related studies • X-ray generation and characterisation • Particle acceleration in laser-matter interactions • X-ray and gamma ray optics.

### RESPONSABILITY OF RESEARCH PROJECTS

- > EU H2020 - Innovation Fostering in Accelerator Science and Technology ([I.FAST](#)), Task Leader on Laser Driver Development;
- > EU H2020 - Compact European Plasma Accelerator with Superior Beam Quality ([EuPRAXIA](#)), Research Infrastructures, Head of Laser Development;
- > Chair of the *Beam Plasma and Inertial Fusion Section* ([BPIF](#)), Plasma Physics Division, European Physical Society (EPS);
- > EU FP7 - High Power laser Energy Research Facility (HiPER), Research Infrastructures, Head of IPCF-CNR research unit;
- > INFN Commissione Nazionale V, Progetto FAST - Femtosecond timing and sync, Local Coordinator - Sez. Pisa;
- > EFS-COST Action MP0601 "Short Wavelength Laboratory Sources" (2007 to 2010), National representative;
- > MIUR-FISR- national project on *Compact Ultrafast X-ray Sources*, National Coordinator, 2003-2007,
- > EU FP5 European training network XPOSE, *X-ray probing of the structural evolution of matter*, Head of IPCF-CNR node, 2000-2004;
- > ASI Italian Space Agency, Laue-diffraction optics for gamma-ray astronomy, Scientist in charge of Pisa research unit, 2000-2001;
- > CNR institutional projects on *Physics of dense plasmas and X-ray sources*, Scientist in charge, 1997-2000;
- > CLAIRE International Project, A balloon borne Laue-diffraction Gamma-ray telescope, 1997-2000;
- > ASI project, The LAPEX Experiment, Scientist in charge, 1996-1997;

### OTHER RESEARCH PROJECTS

- > EC European training network GAUS-XRP II, Generation and application of ultrashort, laser-produced X-ray pulses, 1996-2000;
- > EC European training network SILASI, Superintense Laser Solid Interactions, 1996-2000;
- > EC European training network GAUS-XRP I, Generation and application of ultrashort, laser-produced X-ray pulses, 1993-1995;
- > CNR institutional projects on *High power density laser-matter interactions*, 1989-1996.

### CONFERENCES AND WORKSHOPS

More than 60 oral and invited presentations at international conferences and workshops.

### PUBLICATIONS

Author of more than 280 publications (Source ISI Web of Science) including more than 200 articles on **refereed** (JCR) journals (as of March 2021);  
H-Index: 40 (G. Scholar)  
H-Index: 34 (ISI WOS)

### SELECTED PUBLICATIONS ([follow this link for a full list of publications](#))

- L. A. Gizzi, L. Labate, F. Baffigi, F. Brandi, G. Bussolino, L. Fulgentini, P. Köster, and D. Palla, **Overview and specifications of laser and target areas at the Intense Laser Irradiation Laboratory**, High Power Laser Sci. and

Eng. **9**, e10 (2021).

- L. Labate, D. Palla, D. Panetta, F. Avella, F. Baffigi, F. Brandi, F. Di Martino, L. Fulgentini, A. Giulietti, P. Köster, D. Terzani, P. Tomassini, C. Traino, L. A. Gizzi, **Toward an effective use of laser-driven very high energy electrons for radiotherapy: Feasibility assessment of multi-field and intensity modulation irradiation schemes**, Scientific Reports **10**, 17307 (2020).
- L. A. Gizzi, G. Cristoforetti, F. Baffigi, F. Brandi, G. D'Arrigo, A. Fazzi, L. Fulgentini, D. Giove, P. Koester, L. Labate, G. Maero, D. Palla, M. Romé, M. Russo, D. Terzani, and P. Tomassini, **Intense proton acceleration in ultrarelativistic interaction with nanochannels**, Phys. Rev. Research **2**, 033451 (2020).
- P. Tomassini, D. Terzani, F. Baffigi, F. Brandi, L. Fulgentini, P. Koester, L. Labate, D. Palla and L. A. Gizzi, **High-quality 5 GeV electron bunches with resonant multi-pulse ionization injection**, Plasma Physics and Contr. Fusion, **62**, 014010 (2020).
- L.A. Gizzi, L. Labate, F. Baffigi, F. Brandi, G.C. Bussolino, L. Fulgentini, P. Koester, D. Palla, F. Rossi, **Laser-plasma acceleration of electrons for radiobiology and radiation sources**, Nuclear Instruments and Methods in Physics Research **B355**, 241–245 (2015).
- P. Ferrara, M. Ciofini, L. Esposito, J. Hostaša, L. Labate, A. Lapucci, A. Pirri, G. Toci, M. Vannini, and L. A. Gizzi, **3-D numerical simulation of Yb:YAG active slabs with longitudinal doping gradient for thermal load effects assessment**, Optics Express **22**, 5375–5386 (2014).
- G. Cristoforetti, E. Tognoni and L.A. Gizzi, **Thermodynamic equilibrium states in laser-induced plasmas: From the general case to laser-induced breakdown spectroscopy plasmas**, Spectrochimica Acta Part, B90, 22 (2013).
- G. Sarri, A. Macchi, C. A. Cecchetti, S. Kar, T. V. Liseykina, X.H. Yang, M.E. Dieckmann, J. Fuchs, M. Galimberti, L.A. Gizzi, R. Jung, I. Kourakis, J. Osterholz, F. Pegoraro, A.P.L. Robinson, L. Romagnani, O. Willi, M. Borghesi, **Dynamics of Self-Generated, Large Amplitude Magnetic Fields Following High-Intensity Laser Matter Interaction**, Phys. Rev. Letters, 109, 205002 (2012).
- L. A. Gizzi, S. Betti, E. Förster, D. Giulietti, S. Höfer, P. Köster, L. Labate, R. Löttsch, A. P. L. Robinson, and I. Uschmann, **Role of resistivity gradient in laser-driven ion acceleration** Phys. Review ST Acc. Beams, **14**, 011301 (2011). - F. Zamponi, A. Lübcke, T. Kämpfer, I. Uschmann, E. Förster, A. P. L. Robinson, A. Giulietti, P. Köster, L. Labate, T. Levato, and L.A. Gizzi, *Directional Bremsstrahlung from a Ti Laser-Produced X-Ray Source at Relativistic Intensities in the 3–12 keV Range*, Phys. Rev. Lett, 105, 085001 (2010).
- S. Betti, C. A. Cecchetti, E. Förster, A. Gamucci, A. Giulietti, D. Giulietti, T. Kämpfer, P. Köster, L. Labate, T. Levato, A. Lübcke, I. Uschmann, F. Zamponi, and L. A. Gizzi, *On the effect of rear-surface dielectric coatings on laser-driven proton acceleration*, Phys. Plasmas, **16**, 100701 (2009). ([PDF file](#))
- L.A. Gizzi, A. Bacci, S. Betti, C.A. Cecchetti, M. Ferrario, A. Gamucci, A. Giulietti, D. Giulietti, P. Koester, L. Labate, T. Levato, V. Petrillo, L. Serafini, P. Tomassini, C. Vaccarezza, *An integrated approach to ultraintense laser sciences: the PLASMON-X project*, [Europ. Phys. Journal](#) - Special Topics, **175**, 3-10 (2009). ([PDF file](#))
- L. A. Gizzi, S. Betti, M. Galimberti, A. Giulietti, D. Giulietti, L. Labate T. Levato, P. Tomassini, P. Monot, T. Ceccotti, P. De Oliveira, and Ph. Martin, *Tracking propagation of ultrashort intense laser pulses in gases via probing of ionization*, [Phys. Rev. E](#) **79**, 056405 (2009). ([PDF file](#))
- K. L. Lancaster, J. Pasley, J. S. Green, D. Batani, S. Baton, R. G. Evans, L. Gizzi, R. Heathcote, C. Hernandez Gomez, M. Koenig, P. Koester, A. Morace, I. Musgrave, P. A. Norreys, F. Perez, J. N. Waugh, and N. C. Woolsey Temperature profiles derived from transverse optical shadowgraphy in ultraintense laser plasma interactions at  $6 \times 10^{20} \text{ W cm}^{-2}$  [Phys. Plasmas](#) **16**, 056707 (2009). ([PDF file](#))
- A. Giulietti, N. Bourgeois, T. Ceccotti, X. Davoine, P. D'Oliveira, M. Galimberti, J. Galy, A. Gamucci, D. Giulietti, L.A. Gizzi, D.J. Hamilton, E. Lefebvre, L. Labate, J.R. Marquès, P. Monot, H. Popescu, F. Réau, G. Sarri, P. Tomassini, P. Martin Intense gamma-ray source in the Giant Dipole Resonance range driven by 10-TW laser pulses, [Phys. Rev. Lett.](#) **101**, 105002 (2008).
- S. Kar, M. Borghesi, C. A. Cecchetti, L. Romagnani, F. Ceccherini, T. V. Liseykina, Y A. Macchi, R. Jung, J. Osterholz, O. Willi, M. Galimberti, L.A. Gizzi, A. Schiavi, AND R. Heathcote, Ultrafast electric field dynamics in a laser-plasma channel , [New J. Phys.](#) **9**, 402 (2007).
- L.A. Gizzi, A. Giulietti, D. Giulietti, P. Koester, L. Labate, T. Levato, F. Zamponi, A. Luebcke, T. Kaempfer, I. Uschmann, E. Foerster, A. Antonicci, D. Batani, Observation of electron transport dynamics in high intensity laser interactions using multi-energy monochromatic X-ray imaging, [Plasma Phys. Control. Fusion](#) **49**, B221-B221 doi: 10.1088/0741-3335/49/12B/S19 (2007).
- L. Labate, A. Giulietti, D. Giulietti, P. Koester, T. Levato, L.A. Gizzi, F. Zamponi, A. Luebcke, T. Kaempfer, I. Uschmann, E. Foerster, Novel X-ray multi-spectral imaging of ultraintense laser plasmas by a single-photon CCD based pinhole camera , [Rev. Sci. Instrum.](#) **78**, 103506, (2007) ([PDF preprint](#))
- S. Atzeni, D. Batani, L.A. Gizzi, HiPER: un laser europeo per studi di fusione inerziale, Il Nuovo Saggiatore, **23**, (2007). ([PDF file](#))
- M. Galimberti, Probe transit effect in interferometry of fast moving samples, [J. Opt. Soc. Am. A](#) - Optics Image Science and Vision, **24**, 304-310 (2007).
- Borghesi M, Kar S, Romagnani L, Toncian T , Antici P , Audebert P , Brambrink E , Ceccherini F ,

Cecchetti CA , Fuchs J , Galimberti M , Gizzi LA , Grismayer T , Lyseikina T , Jung R , Macchi A , Mora P , Osterholtz J , Schiavi A (Schiavi, A.), Willi O, Impulsive electric fields driven by high-intensity laser matter interactions, *Laser Part. Beams*, **25**, 161-167 (2007). ([PDF file](#))

- L. Labate, M. Galimberti, A. Giulietti, D. Giulietti, P. Köster, P. Tomassini, L.A. Gizzi, Study of forward accelerated fast electrons in ultrashort Ti K $\alpha$  sources, *Appl. Phys. B* **86**, 229-233 (2007) ([PDF file](#)).
- G. Palladino, A. Basili, G. Di Cocco, T. Franceschini, G. Landini, S. Silvestri, A. barbini, M. Galimberti, L.A. Gizzi, Design of a high update-rate star sensor for arcsec-level attitude determination from balloon-borne X/gamma astronomy platforms, *Appl. Phys. B* **86**, 229-233 (2007) ([PDF file](#)).
- L.A. Gizzi, M. Galimberti, A. Giulietti, D. Giulietti, P. Köster, L. Labate, P. Tomassini, Ph. Martin, T. Ceccotti, P. D'Oliveira, P. Monot, *Femtosecond interferometry of propagation of a laminar ionization front in a gas*, *Phys. Rev. E* , 144609PRE, (2006).
- P. Tomassini, A. Giulietti, D. Giulietti, L.A. Gizzi, *Thomson Backscattering X-rays from ultrarelativistic electron bunches and temporally shaped laser pulses* *Appl. Phys. B* **80**, 419-436 (2005) ([PDF file](#))
- L. Labate, C.A. Cecchetti, M. Galimberti, A. Giulietti, D. Giulietti, L.A. Gizzi, *Detailed characterization of the early X-ray emission of a plasma produced by point-like laser irradiation of solid Al targets*, *Phys. Plasmas* **12**, 083101 (2005) ([PDF file](#))
- L.A. Gizzi, C.A. Cecchetti, M. Galimberti, A. Giulietti, D. Giulietti, P. Köster, L. Labate, S. Laville, P. Tomassini, *Soft laser-plasma X-ray sources for differential absorption imaging of tracing elements in thin samples*, *Laser Part. Beams* **22**, 367 (2004).
- L.A. Gizzi, C.A. Cecchetti, M. Galimberti, A. Giulietti, D. Giulietti, L. Labate, S. Laville, P. Tomassini, *Transient ionization in plasmas produced by point-like irradiation of solid Al targets* , *Phys. Plasmas* **10** 4601 (2003).<>
- L. Labate, M. Galimberti, A. Giulietti, D. Giulietti, L.A. Gizzi, P. Tomassini, G. Di Cocco, *A laser-plasma source for CCD calibration in the soft X-ray range*, *Nucl. Instr. and Meth. A*. **495**, 148 (2002).
- D. Giulietti, M. Galimberti, A. Giulietti, L.A. Gizzi and P. Tomassini, M. Borghesi, V. Malka and S. Fritzler, M. Pittman and K. Taphouc, *Production of ultra-collimated bunches of multi-MeV electrons by 35-fs laser pulses propagating in exploding-foil plasmas*, *Letter on Phys. Plasmas* **9**, 3655 (2002). ([PDF file](#))
- D. Giulietti, M. Galimberti, A. Giulietti, L. A. Gizzi, F. Balcou, A. Rousse, J. Ph. Rousseau, *High-energy electron beam production by femtosecond laser interactions with exploding-foil plasmas*, *Phys. Rev. E* **64**, 015402 (R) (2001). ([PDF file](#))
- L.A. Gizzi, A. Giulietti, O. Willi, D. Riley, *Soft-x-ray emission dynamics in picosecond laser-produced plasmas*, *Phys. Rev. E*, **62**, 2721 (2000).([PDF file](#))
- Leonida A. Gizzi, *Alla Scoperta di nuove Sorgenti di Radiazione X*, Rapporto Interno IFAM, 01-072000, 2000.([PDF file](#))
- A. Giulietti, A. Macchi, E. Schifano, V. Biancalana, C. Danson, D. Giulietti, L.A. Gizzi, O. Willi, *Stimulated Brillouin backscattering from underdense expanding plasmas in a regime of strong filamentation*, *Phys. Rev. E* **59**, 1038 (1999). ([PDF file](#))
- D. Teychenneé, A. Giulietti, D. Giulietti, L.A. Gizzi, *Magnetically Induced Optical Transparency of Overdense Plasmas Due to Ultrafast Ionisation*, *Phys. Rev. E* **58**, R1245 (1998).([PDF file](#))
- D. Giulietti and L.A. Gizzi, *X-ray emission from laser-produced plasmas*, *La Rivista del Nuovo Cimento* **21**, 1 (1998).
- D. Giulietti, L.A. Gizzi, A. Giulietti, A. Macchi, D. Teychenneé, P. Chessa, A. Rousse, G. Cheriaux, J.P. Chambaret, G. Darpentigny, *Observation of solid-density laminar plasma transparency to intense 30-femtosecond laser pulses*, *Phys. Rev. Lett.* **79**, 3194 (1997). ([PDF file](#))
- L.A. Gizzi, A. Giulietti, O. Willi, *Time-resolved, multiframe X-ray imaging of laser-produced Plasmas*, *J. X-ray Sci. Technol.* **7**, 186 (1997). ([PDF files](#))
- L.A. Gizzi, J.P. Chamberet, G. Cheriaux, P. Chessa, L. Gizzi, G. Darpentigny, A. Giulietti, D. Giulietti, A. Macchi, D. Teychenneé, *High Intensity Femtosecond Interactions with Thin Films*, *Proceedings of the 13th International Conference on Laser Interaction and Related Plasma Phenomena*, edited by H. Hora and G.H. Miley, Plenum Press, New York, Vol. **13** (1997).
- M. Borghesi, A.J. MacKinnon, L. Barringer, R. Gaillard, L.A. Gizzi, C. Meyer, O. Willi, *Relativistic channeling of a picosecond laser pulse in a near-critical preformed plasma*, *Phys. Rev. Lett.* **78**, 879 (1997). ([PDF file](#))
- L.A. Gizzi, D. Giulietti, A. Giulietti, P. Audebert, S. Bastiani, J.P. Geindre, A. Mysyrowicz, *Simultaneous measurements of hard X-rays and 2nd harmonic emission in fs laser-target interactions*, *Phys. Rev. Lett.* **76**, 2278 (1996). ([PDF file](#))
- T. Afshar-rad, L.A. Gizzi, M. Desselberger, O. Willi, *Effect of filamentation on Brillouin scattering in large underdense plasmas irradiated by incoherent laser light*, *Phys. Rev. Lett.* **75**, 4413 (1995). ([PDF](#) & [Erratum files](#))
- L.A. Gizzi, A.J. MacKinnon, D. Riley, S.M. Viana, O. Willi, *Measurements of thermal transport in plasmas produced by picosecond laser pulses*, *Laser Part. Beams*, **13**, 511 (1995).
- L.A. Gizzi , D. Giulietti, A. Giulietti, T. Afshar-Rad, V. Biancalana, P. Chessa, E. Schifano, S.M. Viana, O. Willi, *Characterisation of Laser Plasmas for Interaction Studies*, *Phys. Rev. E*, **49**, 5628 (1994). ([PDF](#) - [Erratum files](#))

- D.Riley, L.A.Gizzi, A.MacKinnon, S.M.Viana, O.Willi, *Absorption of High Contrast 12 ps UV Laser Pulses by solid targets*, Phys. Rev. E, **48**, 4855 (1993). ([PDF files](#))
- D.Riley, L.A.Gizzi, F.Y.Khattak, S.M.Viana, O.Willi, *Plasma Conditions Generated by Interaction of a High Brightness, Pre-pulse Free Raman Amplified KrF Laser Pulse with Solid Targets*, Phys. Rev. Lett. **69**, 3739 (1992). ([PDF files](#))
- M.Desselberger, L.A.Gizzi, V.Barrow, J.Edwards, F.Y.Khattak, S.M. Viana, O.Willi, R.Bann, C.N.Danson, *Generation of High Aspect Ratio Line Focus Using a Random Phase Plate*, Applied Optics, **31**, 3759 (1992).
- L.A.Gizzi, D.Batani, V.Biancalana, A.Giulietti, D.Giulietti, *X-Ray emission from Thin Foil Laser produced Plasmas*, Laser and Particle Beams, **10**, 65 (1992).
- T.Afshar-Rad, L.A.Gizzi, M.Desselberger, F.Khattak, O.Willi, A.Giulietti, *Evidence for Whole-Beam Self-Focusing of Induced Spatially Incoherent Laser Light in Large Underdense Plasmas*, Phys Rev.Lett. **68**, 942 (1992). ([PDF files](#))
- A.Giulietti, D.Giulietti, D.Batani, V.Biancalana, L.A.Gizzi, L.Nocera and E.Schifano, *Spectroscopic Evidence for Sum Frequency of Forward and Backscattered Light in Laser Plasmas*, Phys. Rev. Lett. **63**, 524 (1989). ([PDF files](#))

