

Curriculum vitae of Franco PRATI

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ORCID id: 0000-0003-3930-0564

2001 - Associate Professor at the University of Insubria
1998 – 2001 Assistant Professor at the University of Insubria
1996 – 1998 Assistant Professor at the University of Milan
1994 – 1996 Post-doc grant at the University of Milan
1989 – 1994 Several grants with INFN
1988 – 1989 Military service

Supervisor or co-supervisor of 33 theses at the Universities of Milan and Insubria

REVIEWING SERVICES

Reviewer for more than 20 journals. Outstanding Referee APS 2011.
Publons: top reviewer in physics 2018, top reviewer for physics and astronomy 2016

BOOK

Co-author of the book “Nonlinear Optical Systems”, L.A. Lugiato, F. Prati, and M. Brambilla
(Cambridge University Press, Cambridge, 2015)

BIBLIOGRAPHIC INDICATORS (September 19th, 2021)

111 papers on peer-reviewed journals, 5 chapters of books, 1 book

- **Web of Science** number of citations: 2768, h-index: 24
 - **Scopus** number of citations: 3203, h-index: 26
 - **Google Scholar** number of citations: 4178, h-index: 30
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FUNDING OBTAINED IN COMPETITIVE PROGRAMS

2002-2003 Formation and control of cavity solitons in semiconductor microresonators
Headed by: [REDACTED], supported by: Italian government (PRIN), Budget: 147.190 €

2000-2004 VCSELs for Information Society Technology Applications (VISTA)
Headed by: [REDACTED], supported by: E.U., budget: 1.450.000 €

2005-2008 Fundamentals, Functionalities and Applications of Cavity Solitons (FUNFACS)
Headed by: [REDACTED], supported by: E.U., budget: 2.646.600 €

2010-2014 Spatial soliton composites bridging PHOtorefractive and Cavity Optical Structures (PHOCOS) Headed by: [REDACTED], supported by: Italian government (FIRB), budget: 589.000 €

MAIN RESEARCH TOPICS AND RELATED PUBLICATIONS

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OPTICAL INSTABILITIES

- **Demonstration of the Bonifacio-Lugiato multimode instability of optical bistability**

Ségard B. et al., *Multimode instability in optical bistability*, Phys. Rev. A **39**, 703 (1989)

- **The multimode laser instability (Risken-Nummedal-Graham-Haken instability)**

Roldán E. et al., *Multilongitudinal mode emission in ring cavity class B lasers*, in *Trends in Spatiotemporal Dynamics in Lasers, Instabilities, Polarization Dynamics, and Spatial Structures*, ed. by Calderon O.J., Guerra J.M., pp. 1-80 (Kerala, Research Signpost, 2005)

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OPTICAL PATTERN FORMATION

- **Laser instabilities associated with transverse modes**

Lugiato L.A. et al., *Role of transverse effects in laser instabilities*, Phys. Rev. A **37**, 3847 (1988)

- **Symmetry breaking instability in a laser with cylindrical symmetry**

Lugiato L.A. et al., *Spontaneous breaking of the cylindrical symmetry in lasers*, Opt. Commun. **69**, 387 (1989)

- **Phase singularity crystals and optical vortices**

Brambilla M. et al., *Transverse laser patterns. I. Phase singularity crystals*, Phys. Rev. A **43**, 5090 (1991)

Brambilla M. et al., *Transverse laser patterns. II. Variational principle for pattern selection, spatial multistability, and laser hydrodynamics*, Phys. Rev. A **43**, 5114 (1991)

- **Spatio-temporal dynamics of lasers operating on few transverse modes:**

Brambilla M. et al., *Dynamical transverse laser patterns. I. Theory*, Phys. Rev. A **49**, 1427 (1994)

Coates A.B. et al., *Dynamical transverse laser patterns. II. Experiments*, Phys. Rev. A **49**, 1452 (1994)

- **Applications to information technology**

Brambilla M. et al., *The laser as nonlinear element for an optical associative memory*, Opt. Commun. **92**, 145 (1992)

Smith C.P. et al., *Low energy switching of laser doughnut modes and pattern recognition*, Opt. Commun. **102**, 505 (1993)

Prati F. et al., *Logic gates and optical switching with vertical-cavity surface-emitting lasers*, Phys. Rev. A **55**, 690 (1997)

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DYNAMICS OF LIGHT POLARIZATION IN VCSELS

- **Polarization switching according with the spin-flip-model (SFM)**

Martín-Regalado J. et al., *Polarization switching in quantum-well vertical-cavity surface-emitting lasers*, Opt. Lett. 21, 351 (1996)

Martín-Regalado J. et al., *Polarization properties of vertical-cavity surface-emitting lasers*, IEEE J. Quantum Elect. 33, 765 (1997)

Panjotov K. and Prati F., *Polarization Dynamics in VCSELs*, in *VCSELs - Fundamentals, Technology and Applications of Vertical-Cavity Surface-Emitting Lasers*, ed. by Michalzik R., pp. 181-231, (Berlin, Springer, 2013)

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DISSIPATIVE SPATIAL AND TEMPORAL STRUCTURES

- Cavity solitons in semiconductor amplifiers and lasers with optical injection

Brambilla M., *Spatial soliton pixels in semiconductor devices*, Phys. Rev. Lett. 79, 2042 (1997)

Spinelli L. et al., *Spatial solitons in semiconductor microcavities*, Phys. Rev. A 58, 2542 (1998)

Hachair X. et al., *Cavity solitons in a driven VCSEL above threshold*, IEEE J. Sel. Top. Quant. 12, 339 (2006)

- Cavity solitons in a semiconductor laser with saturable absorber (cavity soliton laser)

Bache M. et al., *Cavity soliton laser based on VCSEL with saturable absorber*, Appl. Phys. B 81, 913 (2005)

Prati F. et al., *Spontaneously moving solitons in a cavity soliton laser with circular section*, Eur. Phys. J. D 59, 73 (2010)

- Phase solitons in a laser with optical injection

Gustave F. et al. *Dissipative phase solitons in semiconductor lasers*, Phys. Rev. Lett. 115, 043902 (2015)

- Kerr solitons and frequency combs

Lugiato L.A. et al. *From the Lugiato–Lefever equation to microresonator-based soliton Kerr frequency combs*, Phil. Trans. R. Soc. A 376 20180113 (2018)

- Coherent master equation for laser modelocking

Perego A.M. et al. *Coherent master equation for laser modelocking*, Nat. Commun. 11, 1 (2020)

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OPTICAL METAMATERIALS

- Reconfigurable optical metamaterial for THz radiation

Rizza C. et al., *Terahertz optically tunable dielectric metamaterials without microfabrication*, Opt. Lett. 38, 1307 (2013)

- Reconfigurable optical metamaterial for microwave radiation

Rizza C. et al., *Reconfigurable photoinduced metamaterials in the microwave regime*, J. Phys. D 48, 135103 (2015)

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OPTICAL ROGUE WAVES

-Extreme events in a laser with saturable absorber

Rimoldi C. et al., *Spatiotemporal extreme events in a laser with a saturable absorber*, Phys. Rev. A 95, 023841 (2017)

-Extreme events in a laser with optical injection

Walczak P. et al., *Extreme events induced by collisions in a forced semiconductor laser*, Opt. Lett. 42, 3000 (2017)