

LIVIO GIANFRANI

CURRICULUM VITAE



PERSONAL INFORMATION

Name	LIVIO GIANFRANI
Affiliation	DIPARTIMENTO DI MATEMATICA E FISICA UNIVERSITÀ DEGLI STUDI DELLA CAMPANIA "LUIGI VANVITELLI" VIALE ABRAMO LINCOLN, 5, 81100 CASERTA, ITALIA
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Nationality	Italian
Date of birth	26 JULY 1966

ACADEMIC AND INSTITUTIONAL ACTIVITIES

- Since 2016 **Full Professor of Matter Physics** (SSD FIS/03 – Fisica della Materia) at the Department of Mathematics and Physics, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy
- Since 1996 **Founder and responsible** for the **AMP** (Atoms, Molecules and Precision measurements) **Laboratories** at Università degli Studi della Campania "Luigi Vanvitelli" (formerly, Second University of Naples)
- Since 2021 **Member of the EGAS Board** (European Group on Atomic Systems, <https://www.eps-egas.org/egas-board.html>)
- 2021 – 2023 **Member of the ASN** (Abilitazione Scientifica Nazionale) **Committee** for the academic qualification to Professor positions, competition area **02/B1**, Experimental Physics of Matter.
- 2019 – 2022 **Member** of the executive committee of the Department of Mathematics and Physics, Università degli Studi della Campania "Luigi Vanvitelli"
- 2015 – 2021 **President** of the Board of the Bachelor Program in Physics at Università degli Studi della Campania "Luigi Vanvitelli"
- Since 2023 **Responsible** of the Research Unit UniCampania within the **PNRR project ETIC**, Einstein Telescope Infrastructure Consortium.
- Since 2023 **Principal Investigator and National Coordinator of the PRIN project** (call 2022) entitled "METrology and Nonlinear optics for Precision muonic HYdrogen physicS (MENPHYS)"
- Since 2021 **Responsible** of the Research Unit UniCampania within the **European Project EMPIR-EURAMET** entitled "Metrology for trace water in ultra-pure process gases – PROMETH2O"
- 2017- 2020 **Principal Investigator and National Coordinator of the PRIN project** (call 2015) entitled "A new primary method of gas thermometry based upon Doppler-broadened mercury spectroscopy in the UV region"

• Since 2017	Member of the Board of the PhD Program in Mathematics, Physics and Applications to Engineering at Università degli Studi della Campania "Luigi Vanvitelli"
• 2014 – 2017	Member of the Board of the International PhD Program in Metrology (Cycles 30, 31 and 32), at Polytechnic of Torino
• 2005 – 2016	Coordinator del International PhD Program in Novel Physics Methodologies for Environmental Research (since 21st to 28th cycles) at Second University of Naples
• 2000 – 2016	Associate Professor of Experimental Physics (SSD FIS/01 – Fisica Sperimentale) at Second University of Naples
• 2012 – 2015	Department Research Delegate and Quality Contact Person at the Department of Mathematics and Physics, Second University of Naples
• 2016 – 2019	WP leader and Responsible of the Research Unit UniCampania within the European Project EMPIR-EURAMET entitled "InK#2 – Implementing the new kelvin"
• 2013 – 2015	Principal Investigator of the REG (Researcher Excellence Grant) Project, SIB01 REG4 InK, entitled: Comb-calibrated Doppler Broadening Thermometry, EURAMET-EMRP Call SI 2013
• 2012 – 2014	Principal Investigator of the REG (Researcher Excellence Grant) Project, SIB01 REG3 InK, entitled: Development, optimization and application of Doppler Broadening Thermometry for the implementation of the new Kelvin, EURAMET-EMRP Call SI 2012
• 2021	ANVUR Reviewer within the National process for the evaluation of the quality of the Research, VQR 2004-2010
• 2012	ANVUR Reviewer within the National process for the evaluation of the quality of the Research, VQR 2015-2019
• 2009 – 2012	Member of the executive committee of the Department of Environmental Sciences of the Second University of Naples
• 2009 – 2011	Member of the Executive Committee of the Second University of Naples for the Academic Internationalization
• 2007 – 2012	Member of the Executive Committee of the Second University of Naples for students' mobility and Erasmus Program
• 2008 – 2011	Member of the Executive Assembly of CNISM - National Consortium of Universities for Matter Physics
• 2005 – 2011	Coordinator of the Research Unit NAPOLI 2 of the CNISM - National Consortium of Universities for Matter Physics
• 2007 – 2008	Responsible of the research unit UniNA2 within the PRIN 2006 Project entitled "Spectroscopic determination of the Boltzmann constant", funded by the Italian Ministry for University and Research.
• 2005 – 2008	Co-responsible of the European Project ALICE (Advanced Laser techniques to Investigate Carbon isotopE discrimination during decomposition), within the FP6 Program "Marie-Curie Host Fellowship for Transfer of Knowledge", contract n. MTKD-CT-2004-014532
• 1997 – 2008	Responsible for the Physics Teaching Laboratory of the Department of Environmental Sciences of the Second University of Naples
• 1997 – 2001	Member of the executive committee of the Department of Environmental Sciences of the Second University of Naples
• 2021	Visiting Professor for two weeks at Sorbonne Paris North University, France
• 2012	Visiting Scientist for two weeks at IMRA America, Ann Arbor, Michigan, USA
• 2012	Visiting Professor for one month at Nicolaus Copernicus University in Torun, Poland
• 2002	Guest Researcher for two months with a NATO-NWO Fellowship for Senior Scientist, Center for Isotope Research, University of Groningen, Holland
• 1996 – 1997	Guest Researcher, NIST – National Institute for Standards and Technology, Time & Frequency Division, Boulder, Colorado, USA
• 1994 – 2000	Assistant Professor at the Faculty of Environmental Sciences (SSD B01A – Fisica Generale), Second University of Naples, Caserta
EDUCATION	
• 1993	PhD in Physics , University of Naples "Federico II"
• 1989	Degree in Physics (Laurea) "cum laude" from the University of Naples "Federico II"

SCIENTIFIC ACTIVITY

Products: 151

h-index: 33; Total number of citations: 3271; Number of citing articles: 1891

Livio Gianfrani coordinates the Atoms, Molecules and Precision Measurements Research Group. He has a long-standing experience of experimental research in: atomic, molecular and optical physics; light-matter interaction; development of spectroscopic methods for chemical and isotopic analysis; cavity-enhanced spectroscopy; fundamental metrology; fundamental tests and measurements; comb-calibrated spectroscopy. His most important achievements include: **Lamb-dip** cavity ring-down spectroscopy of weak acetylene lines; implementation of the **new kelvin** by means of Doppler broadening gas thermometry; QED tests in molecular **hydrogen**; spectroscopic determination of the **Boltzmann constant**; precision measurements of **line intensity factors** for greenhouse gases; experimental tests of **line shape** theories; development of laser spectroscopy for **stable isotope ratio analysis**; first extension of **NICE-OHMS** to the Doppler-limited regime; experimental test of the **symmetrization postulate** for spin-0 particles.

SELECTED PAPERS

- 1) A. Castrillo, E. Fasci, T. Furtenbacher, V. D'Agostino, M.A. Khan, S. Gravina, L. Gianfrani and A.G. Csaszar: "On the $^{12}\text{C}_2\text{H}_2$ near-infrared spectrum: absolute transition frequencies and an improved spectroscopic network at the kHz accuracy level", *Phys. Chem. Chem. Phys.* 25, 23614 (2023).
- 2) S. Gravina, C. Clivati, A. Castrillo, E. Fasci, N. A. Chishti, G. Galzerano, F. Levi, and L. Gianfrani: "Measurement of the mercury (6s6p) 3P^1 -state lifetime in the frequency domain from integrated absorbance data", *Physical Review Research* 4, 033240 (2022).
- 3) E. Fasci, S. Gravina, G. Porzio, A. Castrillo, and L. Gianfrani: "Lamb-dip cavity ring-down spectroscopy of acetylene at $1.4\ \mu\text{m}$ ", *New Journal of Physics* 23, 123023 (2021).
- 4) A. Castrillo, E. Fasci, H. Dinesan, S. Gravina, L. Moretti, and L. Gianfrani, "Optical determination of thermodynamic temperatures from a C_2H_2 line-doublet in the near infrared", *Physical Review Applied* 11, 064060 (2019).
- 5) E. Fasci, A. Castrillo, H. Dinesan, S. Gravina, L. Moretti, and L. Gianfrani, "Precision spectroscopy of HD at $1.38\ \mu\text{m}$ ", *Physical Review A* 98, 022516 (2018).
- 6) T. A. Odintsova, E. Fasci, L. Moretti, E. J. Zak, O. L. Polyansky, J. Tennyson, L. Gianfrani, and A. Castrillo, "Highly accurate intensity factors of pure CO_2 lines near $2\ \mu\text{m}$ ", *J. Chem. Phys.* 146, 244309 (2017).
- 7) L. Gianfrani, "Linking the thermodynamic temperature to an optical frequency: Recent advances in Doppler Broadening Thermometry", *Phil. Trans. R. Soc. A* 374: 20150047 1-23 (2016).
- 8) H. Dinesan, E. Fasci, A. Castrillo, and L. Gianfrani, "Absolute frequency stabilization of an extended-cavity diode laser by Noise-Immune Cavity-Enhanced Optical Heterodyne Molecular Spectroscopy", *Optics Letters* 39, 2198-2201 (2014).
- 9) L. Moretti, A. Castrillo, E. Fasci, M.D. De Vizia, G. Casa, G. Galzerano, A. Merlone, P. Laporta, L. Gianfrani, "Determination of the Boltzmann Constant by Means of Precision Measurements of H_2^{18}O Line Shapes at $1.39\ \mu\text{m}$ ", *Physical Review Letters*, vol. 111, 060803, 1-5 (2013).
- 10) M.D. De Vizia, A. Castrillo, E. Fasci, L. Moretti, F. Rohart, and L. Gianfrani, "Speed dependence of collision parameters in the H_2^{18}O near-IR spectrum: Experimental test of the quadratic approximation", *Physical Review A* 85, 062512 1-8 (2012).
- 11) M.D. De Vizia, F. Rohart, A. Castrillo, E. Fasci, L. Moretti, and L. Gianfrani: "Investigation on speed-dependent effects in the near-IR spectrum of self-colliding H_2^{18}O molecules", *Physical Review A* 83, 052506 (2011).
- 12) S. Bartalini, S. Borri, P. Cancio, A. Castrillo, I. Galli, G. Giusfredi, D. Mazzotti, L. Gianfrani, and P. De Natale: "Observing the intrinsic linewidth of a quantum-cascade laser: beyond the Schawlow-Townes limit", *Physical Review Letters* 104, 083904 (2010).
- 13) G. Casa, A. Castrillo, G. Galzerano, R. Wehr, A. Merlone, D. Di Serafino, P. Laporta, and L. Gianfrani: "Primary gas thermometry by means of laser absorption spectroscopy: Determination of the Boltzmann constant", *Physical Review Letters* 100, 200801 (2008).
- 14) E. Kerstel and L. Gianfrani: "Advances in Laser-based isotope ratio measurements: Selected applications", *Applied Physics B* 92, 439-449 (2008).
- 15) A. Castrillo, G. Casa and L. Gianfrani: "Oxygen isotope ratio measurements in CO_2 by means of a continuous-wave quantum cascade laser at $4.3\ \mu\text{m}$ ", *Optics Letters* 32, 3047-3049 (2007).
- 16) A. Castrillo, E. De Tommasi, L. Sirigu, J. Faist and L. Gianfrani: "Doppler-free saturated-absorption spectroscopy of CO_2 at $4.3\ \mu\text{m}$ by means of a distributed feedback quantum cascade laser", *Optics Letters* 31, 3040-3042 (2006).
- 17) L. Gianfrani, G. Gagliardi, M. van Burgel, and E.R.Th. Kerstel "Isotope analysis of water by means of near-infrared dual-wavelength diode laser spectroscopy", *Optics Express* 11, 1566-1576 (2003).
- 18) L. Gianfrani, G. Gagliardi, M. van Burgel, and E.R.Th. Kerstel "Isotope analysis of water by means of near-infrared dual-wavelength diode laser spectroscopy", *Optics Express* 11, 1566-1576 (2003).
- 19) L. Gianfrani, R.W. Fox, and L. Hollberg: "Cavity enhanced absorption spectroscopy of molecular oxygen", *J. Optical Society of America B* 16, 2247-2254 (1999).
- 20) M. de Angelis, G. Gagliardi, L. Gianfrani, and G.M. Tino: "Test of the symmetrization postulate for spin 0-particles", *Physical Review Letters* 76, 2840 (1996).