Antonio Castrillo was born in Naples on October 30, 1976. He received the degree in Physics (cum laude) on 2001 at the Università di Napoli “Federico II”. On September 2001 he got a three-years position at the Environmental Sciences Department of the Università della Campania “Luigi Vanvitelli” (formerly Seconda Università di Napoli), for the International PhD course “Implementation and Applications of Isotopic Methodologies in Environmental Sciences Research”. As winner of a scholarship of the NASA-Planetary Biology Internship Program, University of Massachusetts, in the period July 2003-September 2003, he has been guest researcher at the Ames Research Center of NASA (California, USA). On March 2005 Castrillo got the title of Philosophy Doctor (PhD), in Applied Physics, by submitting a thesis entitled "Metrology for the environment by means of near-infrared diode laser spectrometry: application to carbon dioxide". During his PhD, he developed new near-infrared laser-based methodologies enabling one to measure, with high-accuracy and high-precision, important CO_2 molecular parameters, CO_2 mixing ratios and $^{13}C/^{12}C$ abundance ratio. In the months of April and May 2005 he was a guest researcher at the European Laboratory for Nonlinear Spectroscopy (LENS) (Firenze, Italy). On September 2006 he got a one-year Post-Doc position, granted by the Consorzio Nazionale Interuniversitario Scienze Fisiche della Materia (CNISM). The topic of this research was: "Innovative methodologies for isotopic analysis by means of mid-infrared spectrometry using quantum cascade lasers: Application to the isotopes ^{16}O, ^{17}O and ^{18}O of atmospheric CO_2." Since October 2008, he got a stable position in Experimental Physics (as Assistant Professor until 2018, and after as Associate Professor) at the Department of Mathematics and Physics of the Università della Campania “Luigi Vanvitelli”.

His scientific activity concerns with atomic and molecular physics. In particular, his main field of interest is high-precision laser spectroscopy for investigations in Quantum Mechanics and Fundamental Metrology. Within the activities of the Atoms, Molecules and Precision measurements Group (AMP group, led by his colleague Prof. Livio Gianfrani), he was involved in several experiments, mainly focused on the following research topics:

1) Nonlinear spectroscopy for the investigation of molecular spectra;
2) Theoretical and experimental studies of speed-dependence and narrowing of molecular spectral profiles;
3) Laser-matter (in the gas phase) interaction in high-finesse optical cavity;
4) Frequency stabilization of semiconductor laser (diode and quantum cascade lasers);
5) Fundamental metrology (Doppler Broadening Thermometry on Atoms and Molecules, and Transitions’ frequency determinations);
6) Metrology for the environment (isotopic analysis, and amount of substance determinations);
7) Frequency-comb assisted molecular spectroscopy in the NIR and UV region.

In particular, he took care of high-resolution laser spectroscopic frequency-comb assisted experiments for applications to environmental sciences, with a particular reference to metrological aspects such as absolute determinations of molecular densities for atmospheric relevant gases and isotope ratio analysis, calibrated with respect to international standards. He was involved in experiments dealing with the determination of molecular parameters such as line intensity factors, broadening and narrowing coefficients. Recently, he focused his attention also on the theoretical and experimental analysis of CO_2, C_2H_2, HD, N_2O, and H_2O line-shapes, in the near-IR portion of the electromagnetic spectrum, using a variety of semiclassical models and paying a particular attention to the role of speed-dependence of relaxation rates. His scientific contribution was also crucial for the success of several experiments, still running in the Unicampania’s AMP laboratories, aimed to the spectroscopic determination of the Boltzmann constant based on Doppler Broadening Thermometry (DBT). Strictly linked to DBT and line shape studies, in the period 2001-2022, Castrillo has been co-author of several articles (in peer-reviewed international journals). Summarizing, he has gained a consolidated experimental expertise in the fields of: i) high-precision linear- and

nonlinear-spectroscopy, ii) frequency stabilization of semiconductor lasers, and iii) cavity-enhanced spectroscopic techniques, in particular with regard to Cavity-Ring Down Spectroscopy (CRDS) and Noise-Immune Cavity-Enhanced Optical Heterodyne Molecular Spectroscopy (NICE-OHMS), two ultra-sensitive laser-based techniques that Castrillo has successfully implemented in the near-infrared region for water vapor, acetylene, nitrous oxide, carbon dioxide, and hydrogen deuteride detection. On some of these subjects, he led National and European research projects. In particular, he acted as principal investigator for a National project (Futuro in Ricerca – FIRB2010) aimed to test the constancy of the proton-electron masses ratio. Moreover, he led an European project for the development of a reference method for water vapor mole fraction measurements based upon frequency-stabilized cavity ring-down spectroscopy, in the framework of the Joint Research Project "MeteoMet2, Metrology for Essential Climate Variables" founded by the European Association of National Metrology Institutes (EURAMET) consortium. In 2018, he got a 1-year National grant (FFABR), from the Ministero per l'Istruzione, l'Università e la Ricerca (MIUR), for his research activities.

Some of the experiments he performed were done in collaboration with national (LENS and INO-CNR in Firenze, INRIM in Torino, IFN-CNR and Politecnico di Milano) and international Institutes and Universities (Université de Lille 1, Université Paris 13, Universités Paris Est Crèteil and Université de Perpignan in France, National Physical Laboratory and University College of London in England).

Castrillo teaches Electromagnetism (for Bachelor students in Physics and Mathematics), and Quantum Electronics for Atomic Physics (for the Master of Science in Physics).

He regularly acts as referee for peer-reviewed international journals like "Nature Communications", "Photoacoustic", "Spectrochimica Acta A", "Sensors and Actuator B", "Applied Physics B", "Journal of Quantitative Spectroscopy and Radiative Transfer", "Optics Express", "Chinese Optics Letters", "Optics & Laser Technology", "Optics Letters", "Measurement Science and Technology", "Review of Scientific Instruments", "Science of the Total Environment", "Semiconductor Science & Technology", "Journal of Physical and Chemical Reference", "Remote Sensing", "Journal of the Optical Society of America B", "Isotopes in Environmental and Health Studies", "IEEE Instrumentation and Transactions on Measurement Journal", and "Applied Optics".

He was member of the Local Organizing Committee for the 25th International Conference on Spectral Line Shapes (ICSLS2022, 19-24 June 2022, Caserta, Italy).

Castrillo was Guest Editor for the IOP Publishing Journal "Journal of Physics: Conference Series" - Special Issue: "ICSLS2022 conference".

He has given several talks at national and international conferences. Castrillo has published, several papers on international journals with impact factor (ORCID code: 0000-0002-1253-9172). Suitable bibliometric indicators, referring to his global carrier, are (source SCOPUS, ID 12759729000):
i) Hirsch index: 26;
ii) Number of paper published on journals with impact factor: 86;
iii) Total number of citations: 1817;

List of the most relevant publications:

1. Castrillo, Antonio, Fasci, Eugenio, Furtenbacher, Tibor, D'Agostino, Vittorio, Khan, Muhammad A, Gravina, Stefania, Gianfrani, Livio, Császár, Attila G (2023). On the 12C2H2 near-infrared spectrum: absolute transition frequencies and an improved spectroscopic network at the kHz accuracy level. PHYSICAL CHEMISTRY CHEMICAL PHYSICS, vol. 23, p. 23614-23625, doi: 10.1039/d3cp01835k;
2. Fasci, Eugenio, Khan, Muhammad Asad, D'Agostino, Vittorio, Gravina, Stefania, Fernicola, Vito, Gianfrani, Livio, Castrillo, Antonio (2023). Water vapor concentration measurements in high purity gases by means of comb assisted cavity ring down spectroscopy. SENSORS AND ACTUATORS. A, PHYSICAL, vol. 362, doi: 10.1016/j.sna.2023.114632;
3. Gravina, S., Clivati, C., Castrillo, A., Fasci, E., Chishti, N. A., Galzerano, G., Levi, F., Gianfrani, L. (2022). Measurement of the mercury (6s6p)P13-state lifetime in the frequency domain from integrated absorbance data. PHYSICAL REVIEW RESEARCH, vol. 4, ISSN: 2643-1564, doi:10.1103/PhysRevResearch.4.033240;
4. Castrillo, Antonio, Fasci, Eugenio, Gianfrani, Livio (2021). Doppler-limited precision spectroscopy of HD at 1.4 μm: An improved determination of the R(1) center frequency. PHYSICAL REVIEW A, vol. 103, p. 1-6, ISSN: 2469-9926, doi: 10.1103/PhysRevA.103.022828;
5. Fasci, Eugenio, Gravina, Stefania, Porzio, Giuseppe, Castrillo, Antonio, Gianfrani, Livio (2021). Lamb-dip cavity ring-down spectroscopy of acetylene at 1.4 μm. NEW JOURNAL OF PHYSICS, vol. 23, p. 1-10, ISSN: 1367-2630, doi:10.1088/1367-2630/ac3b6e;
6. Odintsova, T. A., Fasci, E., Gravina, S., Gianfrani, L., Castrillo, A. (2020). Optical feedback laser absorption spectroscopy of N2O at 2 μm. JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER, vol. 254, p.1-10, ISSN: 0022-4073, doi: 10.1016/j.jqsrt.2020.107190;
7. Castrillo, Antonio, Fasci, Eugenio, Dinesan, Hemanth, Gravina, Stefania, Moretti, Luigi, Gianfrani, Livio (2019). Optical Determination of Thermodynamic Temperatures from a C2H2 Line-Doublet in the Near Infrared. PHYSICAL REVIEW APPLIED, vol. 11, ISSN: 2331-7019, doi: 10.1103/PhysRevApplied.11.064060;
8. Fasci, Eugenio, Castrillo, Antonio, Dinesan, Hemanth, Gravina, Stefania, Moretti, Luigi, Gianfrani, Livio (2018). Precision spectroscopy of HD at 1.38 μ m. PHYSICAL REVIEW A, vol. 98, p. 022516-1-022516-6, ISSN: 2469-9926, doi: 10.1103/PhysRevA.98.022516;
9. Fasci, Eugenio, Dinesan, Hemanth, Moretti, Luigi, Merlone, Andrea, Castrillo, Antonio, Gianfrani, Livio (2018). Dual-laser frequency-stabilized cavity ring-down spectroscopy for water vapor density measurements. METROLOGIA, vol. 55, p. 662-669, ISSN: 0026-1394, doi: 10.1088/1681-7575/aad15e;
10. Odintsova, T. A., Fasci, E., MORETTI, Luigi, Zak, E. J., Polyansky, O. L., Tennyson, J., GIANFRANI, Livio, CASTRILLO, Antonio (2017). Highly accurate intensity factors of pure CO2 lines near 2 μm. THE JOURNAL OF CHEMICAL PHYSICS, vol. 146, ISSN: 0021-9606, doi: 10.1063/1.4989925;
11. Fasci, E., Odintsova, T. A., CASTRILLO, Antonio, De Vizia, M. D., Merlone, A., Bertiglia, F., MORETTI, Luigi, GIANFRANI, Livio (2016). Dual-laser absorption spectroscopy of C2H2 at 1.4 μm. PHYSICAL REVIEW A, vol. 93, p. 0425131-0425139, ISSN: 2469-9926, doi: 10.1103/PhysRevA.93.042513;
12. Eugenio Fasci, Maria Domenica De Vizia, Andrea Merlone, MORETTI, Luigi, CASTRILLO, Antonio, GIANFRANI, Livio (2015). The Boltzmann constant from the H2(18)O vibration–rotation spectrum: complementary tests and revised uncertainty budget. METROLOGIA, vol. 52, p. S233-S241, ISSN: 0026-1394, doi: 10.1088/0026-1394/52/5/S233;
13. H. Dinesan, E. Fasci, A. D'Addio, CASTRILLO, Antonio, GIANFRANI, Livio (2015). Characterization of the frequency stability of an optical frequency standard at 1.39 μm based

upon noise-immune cavity-enhanced optical heterodyne molecular spectroscopy. OPTICS EXPRESS, vol. 23, p. 1757-1766, ISSN: 1094-4087, doi: 10.1364/OE.23.001757;
14. DE VIZIA MD, CASTRILLO, Antonio, FASCI E, AMODIO P, MORETTI, Luigi, GIANFRANI, Livio (2014). Experimental test of the quadratic approximation in the partially correlated speed-dependent hard-collision profile. PHYSICAL REVIEW A, vol. 90, p. 1-7, ISSN: 1050-2947, doi: 10.1103/PhysRevA.90.022503;
15. Dinesan H, Fasci E, CASTRILLO, Antonio, GIANFRANI, Livio (2014). Absolute frequency stabilization of an extended-cavity diode laser by means of noise-immune cavity-enhanced optical heterodyne molecular spectroscopy. OPTICS LETTERS, vol. 39, p. 2198-2201, ISSN: 0146-9592, doi: 10.1364/OL.39.002198;
16. MORETTI, Luigi, CASTRILLO, Antonio, Fasci E, De Vizia M. D, Casa G, Galzerano G, Merlone A, Laporta P, GIANFRANI, Livio (2013). Determination of the Boltzmann Constant by Means of Precision Measurements of H2(18)O Line Shapes at 1.39 micron. PHYSICAL REVIEW LETTERS, vol. 111, p. 1-5, ISSN: 0031-9007, doi: 10.1103/PhysRevLett.111.060803;
17. CASTRILLO, Antonio, Dinesan H, Casa G, Galzerano G, Laporta P, GIANFRANI, Livio (2012). Amount-ratio determinations of water isotopologues by dual-laser absorption spectrometry. PHYSICAL REVIEW A, vol. 86, p. 1-8, ISSN: 1050-2947, doi: 10.1103/PhysRevA.86.052515;
18. De Vizia MD, CASTRILLO, Antonio, Fasci E, MORETTI, Luigi, Rohart F, GIANFRANI, Livio (2012). Speed dependence of collision parameters in the H2O18 near-IR spectrum: Experimental test of the quadratic approximation. PHYSICAL REVIEW A, vol. 85, p. 062512-1-062512-8, ISSN: 1050-2947, doi: 10.1103/PhysRevA.85.062512;
19. CASTRILLO, Antonio, DE VIZIA M. D, MORETTI, Luigi, GALZERANO G, LAPORTA P, MERLONE A, GIANFRANI, Livio (2011). Doppler-width thermodynamic thermometry by means of line-absorbance analysis. PHYSICAL REVIEW A, vol. 84, p. 1-5, ISSN: 1050-2947, doi: 10.1103/PhysRevA.84.032510;
20. DE VIZIA M. D, ROHART F, CASTRILLO, Antonio, FASCI E, MORETTI, Luigi, GIANFRANI, Livio (2011). Speed-dependent effects in the near-infrared spectrum of self-colliding H218O molecules. PHYSICAL REVIEW A, vol. 83, p. 1-8, ISSN: 1050-2947, doi: 10.1103/PhysRevA.83.052506;
21. BARTALINI S., BORRI S., CANCIO P., CASTRILLO, Antonio, GALLI I., GIUSFREDI G., MAZZOTTI D., GIANFRANI, Livio, DE NATALE P. (2010). Observing the intrinsic linewidth of a quantum-cascade laser: beyond the Schawlow-Townes limit.. PHYSICAL REVIEW LETTERS, vol. 104, p. 83904, ISSN: 0031-9007, doi: 10.1103/PhysRevLett.104.083904;
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23. CASA, Giovanni, CASTRILLO, Antonio, Galzerano, G., Wehr, R., Merlone, A., DI SERAFINO, Daniela, Laporta, P., GIANFRANI, Livio (2008). Primary gas thermometry by means of laser-absorption spectroscopy: Determination of the Boltzmann constant. PHYSICAL REVIEW LETTERS, vol. 100, ISSN: 0031-9007, doi: 10.1103/PhysRevLett.100.200801.