Dr. Federico Pirzio

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Education

1997 High School Diploma from "Liceo Classico".

1997-2002 - Alumnus of "Almo Collegio Borromeo".

2003 Master Degree in Electronic Engineering from Università di Pavia.
Thesis: "Theoretical and experimental evaluation of the design parameters of a high-power diode-pumped solid-state laser".

2007 Ph.D. in Electronic, Electric and Computer Science Engineering from University of Pavia
Thesis: "Picosecond Mode-Locked laser sources for fundamental physics investigations".

Academic career

2007 Post doc fellow at the Physics Dept. of the University of Genova, IT.

2008-2011 Post doc fellow at the Electronics Department of the University of Pavia, IT.

2011- Assistant professor of Physics, University of Pavia (ERC sector: Lasers, ultra-short lasers and laser physics (PE2_11)).

2016- Head of Laser Source Laboratory of the University of Pavia, IT.

2017- Member of "Collegio Docenti" (Ph.D. Committee) of Ph.D. School in Electronics, Computer Science and Electrical Engineering, University of Pavia, IT.

2017- Italian National Scientific Qualification for Associate Professor (sector 02/B1, Experimental Physics of **Matter).**

2020- Associate Professor, University of Pavia (sector 02/B1, Experimental Physics of Matter).

Research Interests & topics

During my scientific career, I had the opportunity to intensively collaborate with Italian and international research groups and partners coming from both the academic and industrial world. This is confirmed by a significant number of joint publications with Italian and foreign co-authors affiliated both to prestigious Universities and research institutions and companies leader in the market of solid state lasers. My main research topics are the following:

Study and optimization of femtosecond lasers at 1 μm

Femtosecond (fs) laser sources operating at 1 μm wavelength are currently mostly employed as seeders for both solid-state and fiber amplifiers, or for direct applications such as terahertz pulse generation and detection and nonlinear microscopy. I spent a special effort in the design and development of fs-lasers based on active media that can be effectively diode-pumped, thus resulting in a significant reduction in cost, complexity and foot-print [16, 12, 10, 6]. A major part of the research has been devoted to the investigation of the potential of new wide-bandwidth laser materials. In case of Nd^{3+}-doping, I contributed to the demonstration of sub-fs pulse generation with disordered crystals [44, 41]. In the field of the more promising Yb^{3+}-doped materials, I carried out an extensive investigation, mainly in collaboration with the R&D group of Spectra Physics-Rankweil and the research group of the Physics Dept. of the University of Pisa led by Prof. M. Tonelli, aimed to explore the ultimate limit of achievable pulse duration with several among the most promising newly developed Yb^{3+}-doped crystals [59, 58, 56, 54-52, 50, 49, 34, 32, 20].

I also had the opportunity to investigate the potential of a new generation of ultrafast saturable absorbers based on nano-structured carbon materials, namely Graphene and Single-Walled Carbon Nanotubes (SWCNT). These new saturable absorbers represent a very attractive alternative to the state of the art constituted by SEmiconductor

Saturable Absorber Mirrors (SESAMs), mostly because of a significantly reduced price, dramatically extended functioning spectral region and similar ease of use [38, 37, 33, 27, 26, 19, 18].

Study and optimization of solid-state amplifiers for ultrafast laser pulses (ps and fs)

Industrial applications of solid-state lasers usually benefit from high pulse energy and high average power, which result in a reduction of material processing time and enable the excitement of special radiation/matter interactions only possible with extremely high pulse peak power. This results in an increasing demand for ultrafast amplifiers able to guarantee high efficiency, good preservation of the laser pulse quality (spectral purity, spatial purity, pulse duration), and finally a reasonable footprint to ease laser source integration in the engineered laser device. My research activity in this field led to the development and lab demonstration of original laser systems in MOPA (Master Oscillator Power Amplifier) configuration, operating at 1 μm wavelength, with picosecond pulse duration [42, 30, 29, 13, 9, 4, 2, B1]. I also contributed to the development of much more complex regenerative amplifiers for femtosecond lasers, in a strongly industry-oriented research campaign [55, 50, 48, 45, 40].

Nonlinear optics

A straightforward application of ultrafast lasers and high-energy/peak power pulsed lasers are nonlinear frequency conversion processes. In this area, my research activity was mainly focused on

- frequency conversion in the near and mid-infrared by means of parametric processes (optical parametric oscillation and amplification) in nonlinear crystals directly pumped at 1 μm [46, 36, 35, 33, 28, 24, 21];
- stimulated Raman scattering in solid-state materials (also aimed to ps pulse compression) [57, 51 ,47, 31].

Development of highly customized MOPA laser systems for special applications

During my career I have been involved, as laser sources specialist, in several research projects funded by Italian or European agencies, that required the development of complex and highly customized laser systems specifically designed to target fundamental or applied physics investigations [23, 22, 11, 9, 8, 5]. In these research activities, I exploited the wide experience in the development of picosecond laser sources [17, 15, 14, 7, 1], and amplification/nonlinear frequency conversion modules.

Study and development of innovative nanosecond lasers for industrial and aerospace applications

A research topic of relevant industrial interest is the development of innovative solutions for generation of sub-ns pulses in Q-switching regime or generation of high-spectral purity (Fourier-limited) nanosecond pulses for LIDAR applications. On these topics, I mainly collaborated with Bright Solutions S.r.l. [43, 30, 13, 3].

Commissions of trust

- Referee for research projects funded by Italian and French Minister of University and research.
- Referee for OSA (Optics Letters, Optics Express, JOSA B, Optical Materials Express), Springer (Applied Physics B) and Elsevier (Journal of Luminescence, Optics & Laser Technology, Optical Materials, Optics Communications).
- Member of the "International Travel Lecturer" program of Optical Society of America.
- **11/2016 - 10/2017** - Guest Editor of a Special Issue on "Solid state lasers materials, technology and applications" for *Applied Sciences,* MDPI
- **06/2018** – Associate Editor of OSA Applied Optics (Solid-state lasers, Ultrafast lasers, and Laser materials)
- **2022** – Member of the Scientific Board of 10th EPS Europhoton Conference – Solid state lasers
- **2023** – Member of the Committee of CLEO/Europe-EQEC 2023 – CA Solid state lasers
- **2024** – Chair of the Solid-state laser Committee of 10th EPS Europhoton Conference
- **2024** – Member of the Committee of CLEO/Europe-EQEC 2025 – CA Solid state lasers

Academic Teaching

From 2022 – Professor of Photonics - Bachelor degree in Electronic Engineering, (6 CFU)

From 2012 - Professor of Quantum Electronics - Master degree in Electronic Engineering, University of Pavia (6 CFU)

From 2015- Professor of Physics (module 1A, classical mechanics) - Bachelor degree in Civil Engineering, University of Pavia (6 CFU)

2011-2015 - Professor of Physics (module 2, Electricity and Magnetism) - Bachelor degree in Industrial Engineering, University of Pavia (6 CFU)

Other teaching and dissemination activities

2010 Member of the organizing committee of Laserfest-PV, a scientific dissemination initiative organized for the 50th anniversary of laser invention. This is the only Italian initiative that has been sponsored and funded by the LASERFEST Committee. The exhibition was visited by more that 3000 visitors over a two-weeks span (http://www.laserfest.org/events/ontheroad/pavia.cfm).

Publications in summary

- Co-Author of **79** papers on international peer-reviewed Journals.
- Co-Author of **53** conference papers (only international conferences, 4 *invited*).
- Total n° of citations **1485**, H-index **23** (source: Scopus)
- Co-Author of **2** chapters in books.

Peer-reviewed journals publications

79. R. Gotti, L. Carrà, S. Pizzurro, G. Piccinno, A. Agnesi, and F. Pirzio, "1 MW Peak-Power Mamyshev Oscillator Started by a Passively Q-Switched Microchip Laser", *Adv. Phot. Res*, (2024).
78. S. Dabbene, R. Gotti, D. Jedrzejczky, A. Heinrich, M. Messner, A. Agnesi, and **F. Pirzio**, "Compact all-solid-state femtosecond Yb amplifier using a high-brightness multi-watt tapered laser diode", *Opt. Comm.* 542, (2023).
77. S. Donati, R. Gotti, A. Agnesi, and **F. Pirzio**, "Self-mixing displacement measured by a two-color laser in 66 nm steps", *IEEE Trans. Instr. Meas.* 72, (2023).
76. Sukeert, S. Pizzurro, A. Esteban-Martin, R. Gotti, L. Carrà, G. Piccinno, A. Agnesi, **F. Pirzio**, S. Chaitanya Kumar, and M. Ebrahim-Zadeh, "Efficient femtosecond optical parametric generation in group-velocity-matched MgO:PPLN at 10 MHz", *Opt. Lett.* 48, (2023).
75. L. M. Molteni, J. Manzolli, **F. Pirzio**, A. Agnesi, G. Piccinno, P. Laporta, and G. Galzerano, "Versatile OSCAT time-domain THz spectrometer," *Opt. Express* 31, (2023).
74. S. Pizzurro, R. Gotti, L. Carrà, G. Piccinno, A. Agnesi, and **F. Pirzio**, "Femtosecond Mamyshev fiber oscillator started by a passively Q-switched microchip laser", *Opt. Lett.* 47 (2022).
73. S. Pizzurro, S. Jun, M. Tonelli, L. Carrà, G. Piccinno, A. Agnesi, and **F. Pirzio**, "1-mJ multi-kHz nanosecond pulses from a single-crystal Yb:$LiLuF_4$ amplifier seeded by a passively-Q-switched laser", *Opt. Laser Technol.*, 148 (2022).
72. L. M. Molteni, F. Canella, **F. Pirzio**, M. Betz, E. Vicentini, N. Coluccelli, G. Piccinno, A. Agnesi, P. Laporta, and G. Galzerano, "Low-noise Yb:CALGO optical frequency comb", *Opt. Express*, 29 (2021).
71. S. Pizzurro, **F. Pirzio**(*), S. Jun, A. Di Lieto, G. Piccinno, M. Tonelli, and A. Agnesi, "25 W continuous-wave Yb:$LiLuF_4$ single-crystal-fiber laser oscillator", *Opt. Comm.*, 500 (2021).
70. **F. Pirzio**(*), J. R. Negri, and A. Agnesi, "Femtosecond optical parametric oscillator with 3D-printed polymeric parts", *Opt. Laser Technol.*, 147 (2021).
69. F. Garrisi, F. A. Sabattoli, S. Sam, A. Barone, M. Previde Massara, **F. Pirzio**, F. Morichetti, A. Melloni, M. Liscidini, M. Galli, and D. Bajoni, "Electrically driven source of time-energy entangled photons based on a self-pumped silicon

microring resonator", *Opt. Lett.* 45 (2020).

68. L. M. Molteni, **F. Pirzio**, C. Manzoni, G. Galzerano, P. Laporta, and A. Agnesi "Few-optical-cycle pulse generation based on non-linear fiber compressor pumped by a low-energy Yb:CALGO ultrafast laser", *Opt. Express*, 28 (2020).
67. **F. Pirzio(*)**, J.R. Negri, S. Pizzurro, E. Piccinini, and A. Agnesi, "Assessment of broad usability of a simple analytic model for passively Q-switched lasers with Cr:YAG saturable absorbers", *J. Opt. Soc. Am. B*, 37 (2020).
66. F. Chiossi, C. Braggio, M. Aresti, G. Carugno, F. Quochi, A. Lai, **F. Pirzio**, and S. Vasiukov, "X-ray detection by direct modulation of losses in a laser cavity" *Appl. Phys. Lett.* 117 (2020).
65. **F. Pirzio(*)**, S. Jun, S. Tacchini, A. Di Lieto, G. Piccinno, M. Tonelli, and A. Agnesi, "Multi-Watt amplification in a birefringent Yb:$LiLuF_4$ single crystal fiber grown by micro-pulling-down," *Opt. Lett.* 17 (2019).
64. J.R. Negri, **F. Pirzio(*)**, and A. Agnesi, "Jitter investigation of narrow-bandwidth passively Q-switched Nd:YAG unidirectional ring laser," *Opt. Lett.* 44, p. 3094 (2019).
63. M. Previde Massara, F. A. Sabattoli, **F. Pirzio**, M. Galli, add D. Bajoni, "Four-wave mixing in a silicon microring resonator using a self-pumping geometry." *Appl. Phys. Lett.,* 113 (2018).
62. C.Braggio, G. Carugno, A. F. F. Borghesani, V. V. Dodonov, **F. Pirzio**, and G. Ruoso, "Genaration of microwave fields in cavities with laser-excited nonlinear media: competition between the second- and third-order optical nonlinearities," *J. Opt.* (2018).
61. J.R. Negri, **F. Pirzio(*)**, and A. Agnesi, "Passively Q-switched single-frequency Nd:YVO_4 ring laser with external feedback," *Opt. Express* 26, p. 11903 (2018).
60. F. D. Lelii, S. Jun, **F. Pirzio(*)**, G. Piccinno, M. Tonelli, and A. Agnesi, "Laser investigation of Yb:YLF crystals fabricated with micro-pulling-down technique',' *Appl. Opt.* 57, p. 2223 (2018).
59. H. Lin, G. Zhang, L. Zhang, Z. Lin, **F. Pirzio(*)**, A. Agnesi, V. Petrov, and W. Chen, "SESAM mode-locked Yb:GdYCOB femtosecond laser", *Opt. Mat. Express* 7, p. 3791 (2017).
58. H. Lin, G. Zhang, L. Zhang, Z. Lin, **F. Pirzio(*)**, A. Agnesi, V. Petrov, and W. Chen, "Continuous-wave and SESAM mode-locked femtosecond operation of a Yb:$MgWO_4$ laser", *Opt. Express* 25, p. 11827 (2017).
57. L. Fregnani, P. Farinello, **F. Pirzio(*)**, X. Zhang, V. Petrov, and A. Agnesi, "Threshold reduction and mode selection with uncoated Raman crystal acting as a low-finesse cavity", *Appl. Opt.* 56, p. 662 (2017).
56. H. Lin, **F. Pirzio(*)**, A. Volpi, G. Cittadino, A. Di Lieto, M. Tonelli, and A. Agnesi, "Crystal growth, spectroscopic characterization, and sub-100 femtosecond mode-locked operation of a Yb:$LiLuF_4$ laser", *J. Opt. Soc. Am. B* 33, p. 2350 (2016).
55. E. Caracciolo, **F. Pirzio**, M. Kemnitzer, M. Gorjan, A. Guandalini, F. Kienle, A. Agnesi, and J. Aus Der Au, "42 W femtosecond Yb:Lu_2O_3 regenerative amplifier", *Opt. Lett.* 41, p. 3395 (2016).
54. **F. Pirzio(*)**, L. Fregnani, A. Volpi, A. Di Lieto, M. Tonelli, and A. Agnesi, "87 fs pulse generation in a diode-pumped semiconductor saturable absorber mirror mode-locked Yb:YLF laser", *Appl. Opt.* 55, p. 4414 (2016).
53. **F. Pirzio(*)**, M. Kemnitzer, A. Guandalini, F. Kienle, S. Veronesi, M. Tonelli, J. Aus der Au, and A. Agnesi, "Ultrafast solid-state oscillators based on broadband, multisite Yb-doped crystals", *Opt. Express* 24, pp. 11782 (2016).
52. **F. Pirzio(*)**, S. D. Di Dio Cafiso, M. Kemnitzer, F. Kienle, A. Guandalini, J. Aus der Au, A. Agnesi, "65-fs Yb:CaF_2 laser mode-locked by SESAM", *J. Opt. Soc. Am. B* 32, p. 2321 (2015).
51. P. Farinello, **F. Pirzio(*)**, X. Zhang, V. Petrov, and A. Agnesi, "Efficient picosecond traveling-wave Raman conversion in a $SrWO_4$ Raman crystal pumped by multi-Watt MOPA lasers at 1064 nm", *Applied Phys. B* 120, p. 713, (2015).
50. **F. Pirzio(*)**, E. Caracciolo, M. Kemnitzer, A. Guandalini, F. Kienle, J. Aus der Au, and A. Agnesi, "Performance of Yb:Sc_2SiO_5 crystal in diode-pumped femtosecond oscillator and regenerative amplifier", *Opt. Express* 23, pp. 13115–13120, (2015).
49. **F. Pirzio(*)**, S. D. Di Dio Cafiso, M. Kemnitzer, A. Guandalini, F. Kienle, S. Veronesi, M. Tonelli, J. Aus der Au,

and A. Agnesi, "Sub-50-fs widely tunable Yb:$CaYAlO_4$ laser pumped by 400-mW single-mode fiber-coupled laser diode", *Opt. Express* 23, pp. 9790–9795, (2015).

48. E. Caracciolo, M. Kemnitzer, M. Rumpel, A. Guandalini, **F. Pirzio**, F. Kienle, T. Graf, M. Abdou Ahmed, J. Aus der Au, and A. Agnesi, "Single-grating-mirror intracavity stretcher design for chirped pulse regenerative amplification", *Opt. Letters* 40, pp. 1532–1535, (2015).
47. Y. Zhang, **F. Pirzio(*)**, A. Agnesi, X. Zhang, and V. Petrov "200 ps pulse generation at 1180 nm with a $SrWO_4$ Raman crystal pumped by a sub-nanosecond MOPA laser system", *Laser Physics Letters* 11, p. 115401, (2014).
46. R. Piccoli, **F. Pirzio**, A. Agnesi, V. Badikov, D. Badikov, G. Marchev, V. Panyutin, and V. Petrov, "Narrow bandwidth, picosecond, 1064 nm pumped optical parametric generator for the mid-IR based on $HgGa_2S_4$", *Opt. Letters* 38, pp. 4895–4898, (2014).
45. E. Caracciolo, M. Kemnitzer, A. Guandalini, **F. Pirzio**, A. Agnesi, and J. Aus der Au, "High pulse energy multiwatt Yb:$CaAlGdO_4$ and Yb:CaF_2 regenerative amplifiers", *Opt. Express* 22, pp. 19912–19918, (2014).
44. A. Agnesi, **F. Pirzio**, L. Tartara, E. Ugolotti, H. Zhang, J. Wang, H. Yu, and V. Petrov, "Tunable femtosecond laser based on the Nd^{3+}:$BaLaGa_3O_7$ disordered crystal", *Laser Physics Letters* 11, p. 035802, (2014).
43. A. Agnesi, L. Carrà, **F. Pirzio**, G. Reali, S. Veronesi, J. T. Thomas, M. Tonelli, J. Lid, Y. Pand, and J. Guo, "Ceramic Yb:YAG for multiwatt compact passively Q-switched lasers", *Optics Communications* 315, pp. 208–212, (2014).
42. A. Agnesi, L. Carrà, **F. Pirzio(*)**, R. Piccoli, and G. Reali, "Low repetition rate, hybrid fiber/solid-state, 1064 nm picosecond master oscillator power amplifier laser system", *J. Opt. Soc. Am. B*, 30, pp. 2960–2965, (2013).
41. A. Agnesi, **F. Pirzio**, L. Tartara, E. Ugolotti, H. Zhang, J. Wang, H. Yu, and V. Petrov, "378 fs pulse generation with Nd^{3+}:$SrLaGa_3O_7$ (Nd:SLG) disordered crystal", *Laser Physics Letters* 10, p. 105815, (2013).
40. E. Caracciolo, M. Kemnitzer, A. Guandalini, **F. Pirzio**, J. Aus der Au, and A. Agnesi, "28-W, 217 fs solid-state Yb:$CAlGdO_4$ regenerative amplifiers", *Opt. Letters* 38, pp. 4131 (2013).
39. G. Marchev, **F. Pirzio(*)**, R. Piccoli, A. Agnesi, G. Reali, P. G. Schunemann, K. T. Zawilski, A. Tyazhev, V. Petrov, "Narrow-bandwidth, ~100 ps seeded optical parametric generation in $CdSiP_2$ pumped by Raman-shifted pulses", *Opt. Letters* 38, pp. 3344–3346, (2013).
38. S. D. Di Dio Cafiso, E. Ugolotti, A. Schmidt, V. Petrov, U. Griebner, A. Agnesi, W. B. Cho, Y. G. Zhang, S. Y. Choi, F. Rotermund, G. Reali, **F. Pirzio**, "Sub-50-fs mode-locking of the Cr:YAG laser using SWCNT-SA", *Laser Physics Letters* 10, p. 085801, (2013).
37. S. D. Di Dio Cafiso, E. Ugolotti, A. Schmidt, V. Petrov, U. Griebner, A. Agnesi, W. B. Cho, B. H. Jung, F. Rotermund, S. Bae, B. H. Hong, G. Reali, **F. Pirzio**, "Sub-100-fs Cr:YAG laser mode-locked by monolayer graphene saturable absorber", *Opt. Letters* 38, pp.1745, (2013).
36. A. Tyazhev, **F. Pirzio(*)**, A. Agnesi, G. Reali, V. Petrov, G. Marchev, P. G. Schunemann, K. T. Zawilski, "Narrow-band, mid-infrared, seeded optical parametric generator based on non-critical $CdSiP_2$ pumped by 120-ps, single longitudinal mode 1064 nm pulses", *Applied Physics B* 112, pp 453–456, (2013).
35. G. Marchev, **F. Pirzio**, A. Agnesi, G. Reali, V. Petrov, A. Tyazhev, P. G. Schunemann, K. T. Zawilski, "1064 nm pumped $CdSiP_2$ optical parametric oscillator generating sub-300 ps pulses near 6.15 μm at 1-10 kHz repetition rates", *Optics Communications* 291, pp. 326–328, (2013).
34. A. Agnesi, A. Greborio, **F. Pirzio(*)**, E. Ugolotti, G. Reali, A. Guandalini, J. Aus der Au, "Diode-pumped passively mode-locked tunable Yb:CALGO solid-state laser", *J. Opt. Soc. Am. B* 30, pp. 1513–1516, (2013).
33. S. Ferrari, M. Bini, D. Capsoni, P. Galinetto, M. S. Grandi, U. Griebner, G. Steinmeyer, A. Agnesi, **F. Pirzio**, E. Ugolotti, G. Reali, and V. Massarotti, "Optimizing single-walled carbon nanotubes based saturable absorbers for ultrafast lasers", *Advanced Functional materials* 22, pp. 4369–4375, (2012).
32. A. Agnesi, A. Greborio, **F. Pirzio**, G. Reali, J. Aus der Au and A. Guandalini, "40-fs Yb^{3+}:$CaGdAlO_4$ laser pumped

by a singlemode 350-mW laser diode", *Opt. Express* 20, pp. 10077–10082, (2012).

31. A. Agnesi, E. Caracciolo, L. Carrà, **F. Pirzio** and G. Reali, "150-ps pulse Raman generator pumped by a 1-kHz sub-nanosecond passively Q-switched laser system", *Applied Physics B* 107, pp. 691–696, (2012).
30. A. Agnesi, L. Carrà, **F. Pirzio**, G. Reali "Low-power 100-ps microchip laser amplified by a two-stages Nd:YVO_4 amplifier module", *Applied Physics B* 109, pp. 659 - 662, (2012).
29. A. Agnesi, L. Carrà, R. Piccoli, **F. Pirzio**, G. Reali, "Nd:YVO_4 amplifier for ultrafast low-power lasers", *Optics Letters* 37, pp. 3612–3614, (2012).
28. G. Marchev, P. Dallocchio, **F. Pirzio**, A. Agnesi, G. Reali, V. Petrov, A. Tyazhev, V. Pasiskevicius, N. Thilmann, F. Laurell, "Sub-nanosecond, 1-10 kHz, low-threshold, non-critical OPOs based on periodically-poled KTP crystal pumped at 1064 nm", *Applied Physics B* 109, pp. 211–214, (2012).
27. A. Agnesi, G. Greborio, **F. Pirzio(*)**, E. Ugolotti, G. Reali, S.Y. Choi, F. Rotermund, U. Griebner and V. Petrov, "Femtosecond Nd:Glass Lasers Pumped by Single-Mode Laser Diodes and Mode Locked With Carbon Nanotube or Semiconductor Saturable Absorber Mirrors", *IEEE Journal of Selected Topics in Quantum Electronics* 18, pp. 74–80, (2012).
26. A. Agnesi, **F. Pirzio(*)**, E. Ugolotti, S.Y. Choi, D. Yeom and F. Rotermund, "Femtosecond single-mode diode-pumped Cr:LiSAF laser mode-locked with single-walled carbon nanotubes", *Optics Communications* 285, pp. 742–745, (2012).
25. S. Veronesi, Y. Z. Zhang, M. Tonelli, A. Agnesi, A. Greborio, **F. Pirzio**, G. Reali, "Spectroscopy and efficient laser emission of Yb^{3+}: LuAG single crystal grown by μ-PD", *Optics Communications* 285, pp. 315–321, (2012).
24. G. Marchev, **F. Pirzio**, R. Piccoli, A. Agnesi, G. Reali, P. Schunemann, K. Zawilski, A. Tyazhev, V. Petrov, "Narrow-bandwidth, mid-infrared, seeded optical parametric generation in 90° phase-matched $CdSiP_2$ crystal pumped by diffraction limited 500-ps pulses at 1064 nm", *Opt. Letters* 37, p. 3219-3221 (2012).
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18. A. Agnesi, A. Greborio, **F. Pirzio(*)**, G. Reali, S. Y. Choi, F. Rotermund, U. Griebner, and V. Petrov, "99 fs Nd:glass laser mode-locked with carbon nanotube saturable absorber mirror", *Applied Physics Express* 3, pp. 112702-1–112702-3, (2010).
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15. A. Agnesi, **F. Pirzio**, G. Reali, A. Arcangeli, M. Tonelli, Z. Jia, X. Tao, "Multi-wavelength Nd:GAGG picosecond laser", *Optical Materials* 32, pp. 1130–1133, (2010).

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Pavia (IT), November 28th, 2022