



Federico Pirzio

Curriculum Vitae

Education and work Experience

- Oct 2011– **Assistant professor of Physics**, *University of Pavia*, Dipartimento di Ingegneria Industriale e dell'Informazione.
- Nov 2006–Set 2011 **Post Doc Fellow**, *University of Pavia*, Dipartimento di Ingegneria Elettronica.
- Oct 2003– **PhD in Electronic Engineering and Computer Science (XIX ciclo)**, *University of Pavia*, Dipartimento di Ingegneria Elettronica, Thesis: "*Picosecond mode-locked laser sources for fundamental physics investigations*".
- Oct 2006
- Mar 2003 **Master Degree in Electronic Engineering**, Thesis: "*Valutazione teorica e sperimentale dei parametri di progetto di un laser di elevata potenza a stato solido pompato a diodi*".

Scientific activity

Since 2002 I do research in the field of diode pumped solid state lasers. I study the design and numerical modeling of diode pumped solid state lasers sources and laser systems in every functioning regime (continuous wave, nanosecond and sub-nanosecond Q-Switching regime, picosecond and femtosecond mode-locked regime). I have also interests in the field of nonlinear optics, in particular in designing nonlinear frequency up and down conversion stages based respectively on harmonic and parametric generation. I actively worked in the realization of several highly customized laser systems for fundamental and applied research, in the contest of national and international research projects. I co-authored more than 50 papers in the field of laser physics published in highly rated, international peer-reviewed journals. I also contributed for two chapter in books and more than 40 presentation at international conferences and congresses. A list of my recent publication is attached to this cv.

Teaching

In the period 2004-2011 I served as teaching assistant for Physics courses at the Engineering Faculty and gave seminars in the courses of Photonics and Nonlinear Optics. I also have been responsible for special seminars and practical laboratory activities for the courses of Physics I in the period 2006-2009.

Since the Academic year 2011-2012 I had the responsibility of lecturing Physics courses at the Engineering Faculty bot in the Bachelor and Master degree programs. Namely:

A.A. Physics 1 for Bachelor Degree in Ingegneria Civile ed Ambientale (6CFU); Quantum Electronics (6 CFU) for Master Degree in Electronics Engineering

A.A. Physics 1 for Bachelor Degree in Ingegneria Civile ed Ambientale (6CFU); Quantum Electronics (6 CFU) for Master Degree in Electronics Engineering

A.A. Physics 2 for Bachelor Degree in Ingegneria Industriale (6CFU); Quantum Electronics (6 CFU) for Master Degree in Electronics Engineering

A.A. Physics 2 for Bachelor Degree in Ingegneria Industriale (6CFU); Quantum Electronics (6 CFU) for Master Degree in Electronics Engineering

A.A. Physics 2 for Bachelor Degree in Ingegneria Industriale (6CFU); Quantum Electronics (6 CFU) for Master Degree in Electronics Engineering

A.A. Physics 2 for Bachelor Degree in Ingegneria Industriale (6CFU)
2011-2012

A list of my recent publications on peer-reviewed Int. Journals

1. 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:MgWO₄ laser", *Opt. Express* 25, p. 11827 (2017).
2. 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).
3. 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:LiLuF₄ laser", *J. Opt. Soc. Am. B* 33, p. 2350 (2016).
4. E. Caracciolo, **F. Pirzio**, M. Kemnitzer, M. Gorjan, A. Guandalini, F. Kienle, A. Agnesi, and J. Aus Der Au, "42 W femtosecond Yb:Lu₂O₃ regenerative amplifier", *Opt. Lett.* 41, p. 3395 (2016).
5. **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).
6. **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).
7. **F. Pirzio**, S. D. Di Dio Cafiso, M. Kemnitzer, F. Kienle, A. Guandalini, J. Aus der Au, A. Agnesi, "65-fs Yb:CaF₂ laser mode-locked by SESAM", *J. Opt. Soc. Am. B* 32, p. 2321 (2015).
8. P. Farinello, **F. Pirzio**, X. Zhang, V. Petrov, and A. Agnesi, "Efficient picosecond travelling-Wave Raman conversion in a SrWO₄ Raman crystal pumped by multi-Watt MOPA lasers at 1064 nm", *Applied Phys. B*, 120, p. 713, (2015).
9. **F. Pirzio**, E. Caracciolo, M. Kemnitzer, A. Guandalini, F. Kienle, J. Aus der Au, and A. Agnesi, "Performance of Yb:Sc₂SiO₅ crystal in diode-pumped femtosecond oscillator and regenerative amplifier", *Optics Express*, 23, pp. 13115–13120, (2015).
10. **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:CaYAIO₄ laser pumped by 400-mW single-mode fiber-coupled laser diode", *Optics Express*, 23, pp. 9790–9795, (2015).
11. 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

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- chirped pulse regenerative amplification”, *Optics Letters*, 40, pp. 1532–1535, (2015).
12. Y. Zhang, **F. Pirzio**, A. Agnesi, X. Zhang, and V. Petrov “200 ps pulse generation at 1180 nm with a SrWO₄ Raman crystal pumped by a sub-nanosecond MOPA laser system”, *Laser Physics Letters*, 11, p. 115401, (2014).
 13. 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 HgGa₂S₄”, *Optics Letters*, 38, pp. 4895–4898, (2014).
 14. E. Caracciolo, M. Kemnitzner, A. Guandalini, **F. Pirzio**, A. Agnesi, and J. Aus der Au, “High pulse energy multiwatt Yb:CaAlGdO₄ and Yb:CaF₂ regenerative amplifiers”, *Optics Express*, 22, pp. 19912–19918, (2014).
 15. A. Agnesi, **F. Pirzio**, L. Tartara, E. Ugolotti, H. Zhang, J. Wang, H. Yu, and V. Petrov, “Tunable femtosecond laser based on the Nd³⁺:BaLaGa₃O₇ disordered crystal”, *Laser Physics Letters*, 11, p. 035802, (2014).
 16. 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)
 17. 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”, *Journal of the Optical Society of America. B*, 30, pp. 2960–2965, (2013).
 18. A. Agnesi, **F. Pirzio**, L. Tartara, E. Ugolotti, H. Zhang, J. Wang, H. Yu, and V. Petrov, “378 fs pulse generation with Nd³⁺:SrLaGa₃O₇ (Nd:SLG) disordered crystal”, *Laser Physics Letters*, 10, p. 105815, (2013).
 19. E. Caracciolo, M. Kemnitzner, A. Guandalini, **F. Pirzio**, J. Aus der Au, and A. Agnesi, “28-W, 217 fs solid-state Yb:CaAlGdO₄ regenerative amplifiers”, *Optics Letters*, 38, pp. 4131–4133, (2013).
 20. 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 CdSiP₂ pumped by Raman-shifted pulses”, *Optics Letters*, 38, pp. 3344–3346, (2013).
 21. 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).
 22. 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** (In corso di stampa/deposito). “Sub-100-fs Cr:YAG laser mode-locked by monolayer graphene saturable absorber”, *Optics Letters*, 38, pp.1745–1747, (2013).
 23. 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 CdSiP₂ pumped by 120-ps, single longitudinal mode 1064 nm pulses”, *Applied Physics B*, 112, pp 453–456, (2013).
 24. G. Marchev, **F. Pirzio**, A. Agnesi, G. Reali, V. Petrov, A. Tyazhev, P. G. Schunemann, K. T. Zawilski, “1064 nm pumped CdSiP₂ 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).
 25. 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”, *Journal of the Optical Society of America. B*, 30, pp. 1513–1516, (2013).
 26. 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).
27. A. Agnesi, A. Greborio, **F. Pirzio**, G. Reali, J. Aus der Au and A. Guandalini, “40-fs $\text{Yb}^{3+}:\text{CaGdAlO}_4$ laser pumped by a singlemode 350-mW laser diode”, *Optics Express*, 20, pp. 10077–10082, (2012).
 28. 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).
 29. A. Agnesi, L. Carrà, **F. Pirzio**, G. Reali “Low-power 100-ps microchip laser amplified by a two-stages $\text{Nd}:\text{YVO}_4$ amplifier module”, *Applied Physics B*, 109, pp. 659 - 662, (2012).
 30. A. Agnesi, L. Carrà, R. Piccoli, **F. Pirzio**, G. Reali, “ $\text{Nd}:\text{YVO}_4$ amplifier for ultrafast low-power lasers”, *Optics Letters*, 37, pp. 3612–3614, (2012).
 31. G. Marchev, P. Dallochio, **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).
 32. 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* 2011, 18, pp. 74–80, (2012).
 33. A. Agnesi, **F. Pirzio**, E. Ugolotti, S.Y. Choi, D. Yeom and F. Rotermund, “Femtosecond single-mode diode-pumped $\text{Cr}:\text{LiSAF}$ laser mode-locked with single-walled carbon nanotubes”, *Optics Communications*, 285, pp. 742–745, (2012).
 34. S. Veronesi, Y. Z. Zhang, M. Tonelli, A. Agnesi, A. Greborio, **F. Pirzio**, G. Reali, “Spectroscopy and efficient laser emission of $\text{Yb}^{3+}:\text{LuAG}$ single crystal grown by $\mu\text{-PD}$ ”, *Optics Communications*, 285, pp. 315–321, (2012).