Antonio Gianfrate

Curriculum Vitae

Education

2011–2015 **Master Studies in Condensed Matter Physics**, *University of Pisa*, Pisa, Italy,
Final mark:*105/110*.
Title of the graduation thesis: *Study of the characteristics of amplification of Tm and Tm-Ho doped fluorides for passive Q-switching applications.*
Supervisors: *Prof. Mauro Tonelli & Dott. Uwe Griebner* .

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2006–2011 **Bachelor Studies in Physics**, *University of Pisa*, Pisa, Italy,
Final mark:*107/110*.
Title of the graduation thesis: *Spectroscopic characterization of Yb-Er doped $NaYF_4$ nanoroads* .

Master thesis summary

The great interest for diode pumped solids state laser sources (DPSSL), in the near- and mid-infrared is principally related to the absorption spectrum of water. The latter shows strong absorption for wavelength longer then 1.6 μm, making these sources suitable for a wide range of medical applications. Moreover, they are used in LIDAR devices and as laser sources for OPOs.
Fluorides are widely used as crystal hosts in gain media REs based systems thanks to their low phonon energy. In this work I focus on Tm:BaY_2F_8 (BYF) and Tm-Ho:$YLiF_4$ (YLF) crystals. Passive Q-switching technique, simply obtained by intra-cavity insertion of a saturable absorber, allow us to obtain short pulses (tens of ns) and high peak power (up to tens of kW) in a very compact all optical setup. The saturable absorbers, used in this work, are ZnS and ZnSe doped with Chromium 2+ ions. The laser crystals have been tested in different configurations and in combination with different absorbers in order to maximize the peak pulse and minimize the pulse duration.
With these measures we demonstrated with Tm-Ho:YLF for the first time sub μs pulse operation at a room temperature (40 ps of pulse duration).

Awards

2013 from May to October
Erasmus Placement Scholarship at Max-Born-Institut betreibt Forschung auf dem Gebiet der Nichtlinearen Optik und Kurzzeitspektroskopie, Max-Born-Straße 2a, 12489 Berlin, Germany.

2016 from March
Fellowship "Polaritonic Devices "at CNR Nanotec,via Monteroni, 73100 Lecce, Italy

Computer skills

Deep knowledge of different operative systems: Ubuntu systems, Microsoft Windows.
Knowledge of different scientific software Mathematica, Matlab, Origin, Gnuplot .
Skills in programming with C, Python, Bash.
Knowledge of program of scientific writing LaTeX.

Languages

Italian **Mothertongue**
English **Intermediate**

Pubblications

2014 *Generation of 40 ns laser pulses by a diode-pumped passively Q-switched Tm,Ho:YLF laser.*
B. Oreshkov, A. Gianfrate, S. Veronesi, V. Petrov, U. Griebner, H. Yu,I. Buchvarov, D. Parisi and M Tonelli.
Laser Phys. Lett. 11 (2014) 115801 .

2017 *Exciton Polariton X-Waves.*
A. Gianfrate, L. Dominici, O. Voronych, M. Matuszewski, M. Stobinska, D. Ballarini, M. De Giorgi, G. Gigli, and D. Sanvitto.
In submission.

2017 *Rabi-orbit coupling of polariton quantum vortices and swirling photonic pulses.*
L. Dominici, D. Colas, A. Gianfrate, C. Sanchez Munoz, D. Ballarini, M. De Giorgi, G. Gigli, F. P. Laussy, and D. Sanvitto.
In submission.

2017 *Non linear vortex interaction in exciton polariton superfluid.*
L. Dominici, A. Gianfrate, R. Carettero, D. Ballarini, M. De Giorgi, G. Gigli, F. P. Laussy, and D. Sanvitto.
In submission.

Interests

- Tecnology
- Readings
- Sport
- Informatics