



Newsletter



May 2018

AFLASER

Advanced fibre laser and coherent source as tools for society, manufacturing and lifescience

Dear Reader,

Welcome to our third COST Action Newsletter!

In the Year 4 of our Action we will have two meetings: Topical meeting and Annual conference. We are going to have the WG3 topical meeting in Milan, Italy 11-12 June and the meeting will be focused on BioPhotonics and Cultural Heritage applications. The Annual Conference and MC meeting take place in Valencia, Spain, 24-26 October. We will come back to you with more information and call for abstracts soon!

The new conference at SPIE Photonics Europe 2018, 22-26 May, based on our Action topic, "Fiber Lasers and Glass Photonics: Materials through Applications" was a very successful event and we will cover it in the next edition. This conference will be held again in 2020 and will provide a multidisciplinary forum for our research community. We would like to kindly remind you about the tools we have to support the members of the Action: Short Term Scientific Missions & Conference Grants for ICT partners. If you require any further information, feel free to contact us.

Meanwhile, we share with you the news from the Winter School in Lausanne and present the second STSM story.

Lidia Zur, Dissemination Manager & Stefano Taccheo, Action Chair

Winter school on fiber lasers – 2018

Together with COST action MP1401 the optical fiber device group (H.G. Limberger) from École Polytechnique Fédérale de Lausanne (EPFL) organized a winter school on Fiber Lasers & Optical Fiber Technology February 13-16, 2018 at EPFL in Lausanne, Switzerland. Thirty five participants from 15 different European countries including 5 participants from EPFL participated in the winter school. The winter school was open for early career investigators (ECI), PhD and master students. As women were present in all categories the proportion of women was 31 %.

The objective of the winter school was to provide a large overview about materials, fiber lasers and devices from basics to Mid-IR lasers and applications. Tuesday through Thursday, 3 hours-lectures have been organized, Friday the students had a lab experience throughout the day, and Saturday a ski excursion took place. All lectures addressed first important basics, followed by state of the art, and recent advance in the field.



Winter school participant, Dmytro Suslov during the ski excursion. Fot. S. Basu.

We started the lecturing with glasses, modeling of fiber lasers, and spectroscopy of active ions followed by waveguides, and Bragg grating (FBG) fiber lasers, Mid-infrared (MIR) fiber lasers, and finally their possible biological and medical applications: From photonic glasses over waveguides to MID-IR fiber lasers applications. A poster session was organized Tuesday late afternoon where all participants presented their poster and discussed with their peers their research subjects.

To prepare the lab experience we included a course on laser safety on Thursday. For the lab experience on Friday we separated the participants in 5 groups each attending two of the subjects organized by EPFL laboratories: FBG fabrication and spectral characterization as well as FBG strain and temperature characterization, Tm-doped fiber Laser, experiment on laser safety, and EDFA amplifier and Er³⁺-fiber laser. The official program of the winter school ended with a closing ceremony Friday late afternoon where the participants received their attendance certificate. Despite the blizzard and the resulting low visibility, a few participants from the COST winter school braved the slopes of Leysin after the school. In the morning, the slopes had nice fresh snow and were almost empty. However, the soft snow became so thick in the afternoon that the skis did not move anymore. Thus most participants retired in the beautiful mountaintop restaurant for the rest of the day.

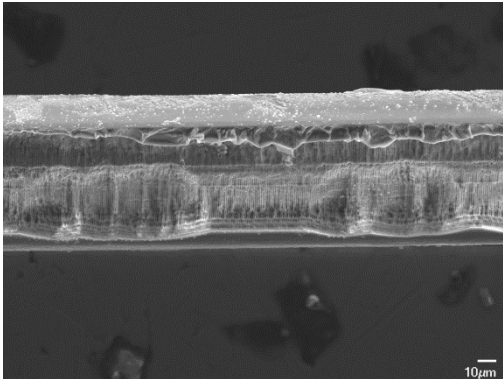
Hans G. Limberger

STSM stories – part II

I am a Post-Doc researcher in the MAterials for Photonics and Sensing group at the Institute of Materials Physics and Engineering (IMPE) of the Department of Applied Science and Technology (DISAT), Politecnico di Torino, Italy. The STSM carried out within the framework of the activities of WG1 of the COST Action MP1401 gave me the excellent opportunity to visit the Institute of Electronic Structure and Laser (IESL) of the Foundation for Research and Technology - Hellas (FORTH), Heraklion, Crete, Greece, and to establish a fruitful collaboration between my research group and the group coordinated by Dr. Stavros Pissadakis. The STSM was implemented from 8th to 18th November 2015.

The research I performed at FORTH-IESL was devoted on the inscription and characterization of Bragg grating reflectors in a single-mode bioresorbable phosphate glass optical fiber using deep UV laser sources radiation (193 nm excimer laser). Standard and tilted Bragg gratings were successfully inscribed and fully characterized, together with complementary work on critical handling, splicing and desorption experiments.

This study paves the way toward optical fiber sensors that can be safely inserted into the human body, being able to degrade in physiological conditions once their functionality has expired.



Side-view of the bioresorbable fiber Bragg grating immersed in physiological solution for up to 56 h.



A beautiful twilight view of the Heraklion harbor.

The collaboration between the two institutions is still ongoing and aims at performing systematic new experiments to better understand how the fiber composition and ultraviolet laser irradiation conditions affect the dissolution rate of the bioresorbable fiber Bragg gratings.

The results of my STSM have been presented at the conferences “Bragg Gratings, Photosensitivity and Poling in Glass Waveguides (BGPP) 2016” in Sydney, Australia, and “International Conference on Transparent Optical Networks (ICTON) 2016” in Trento, Italy and have been recently published in the paper “Bioresorbable optical fiber Bragg gratings,” *Opt. Lett.* **43**, 4, 671-674 (2018) by D. Pugliese *et al.* Noteworthy, on 5th February 2018 the research work has been also object of an Optical Society of America (OSA) News Release.

Diego Pugliese

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