PhotonHub Experience Centre

Course

Handle and use pulsed Lasers for additive fabrication

Course Provider

LP3 laboratory

CNRS – Aix-Marseille University

France

Course Overview

Among additive manufacturing techniques, laser-induced forward transfer (LIFT) addresses the challenges of digital printing of materials in solid or liquid phase with very high resolution. The main fields of applications are printed electronics, organic electronics and tissue engineering, and as a general perspective, this laser-based technique is appealed to become a key technology for 3D digital nanomanufacturing.

This 1-day training course thus provides a unique opportunity to get familiar with LIFT laser additive fabrication and its driving and control knobs. After recalling basics of laser handling and manipulation, the course briefly exposes the principle of this laser-based technology and its pros and cons versus other digital printing technologies. The attendee is further immersed in an hands-on learning experience, in which step-by-step he/she will progress under the guidance of an expert trainer to the final demonstration of digital printing of a pixel of matter.

This unique industry ‘hands-on’ training program provides attendees with access to state-of-the-art laser facilities and workstation equipment, with dedicated tutorials and mentoring for technical experts.

Target Audience

The course is ideally suited to those planning to learn and get familiar with an advanced laser additive fabrication techniques with potential applications in 3D digital printing and manufacturing. Basic knowledge in Optics and Physics is desirable but not mandatory.

Expected Outcomes

1) Learn about laser operation of short pulse laser
2) Learn and use an advanced home-made laser workstation
3) Learn LIFT laser-based technique, a game-changer for 3D digital printing
4) Fabricate materials and components with controlled resolution and morphology

Course Details

Additive laser fabrication at the micro-scale (hands-on)

09:00

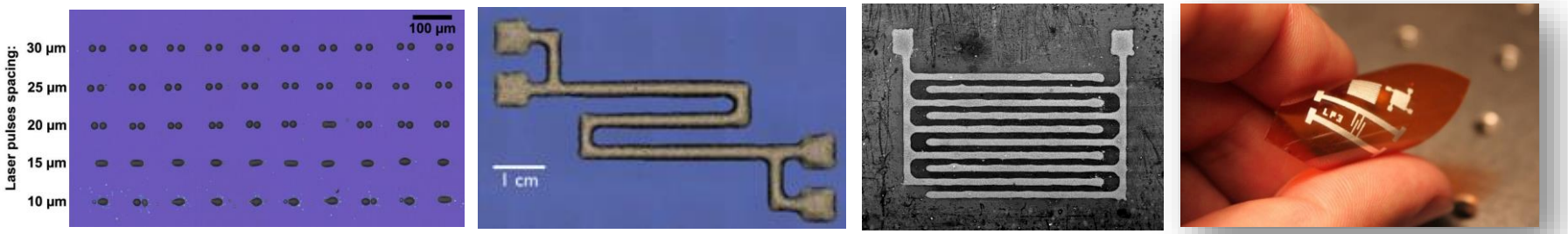
17:00

Equipment used: **Femtosecond and/or picosecond lasers, 3D micrometric positioning stages, optical and/or confocal microscope**

Details:

One of the biggest challenges in microscale additive manufacturing is the production of three-dimensional, microscale (metal) parts with a high enough throughput to be relevant for commercial applications. Here, we first introduce the laser-based workstation and then focus on the printing of metal nanoparticles pastes and inks. During the training, each step of the process will be demonstrated: donor preparation, elaboration of the design to be printed and relevant laser alignment, and the actual printing on various types of materials. Finally optical characterization of the printed sample will be performed.

Training Duration: 6 Hours



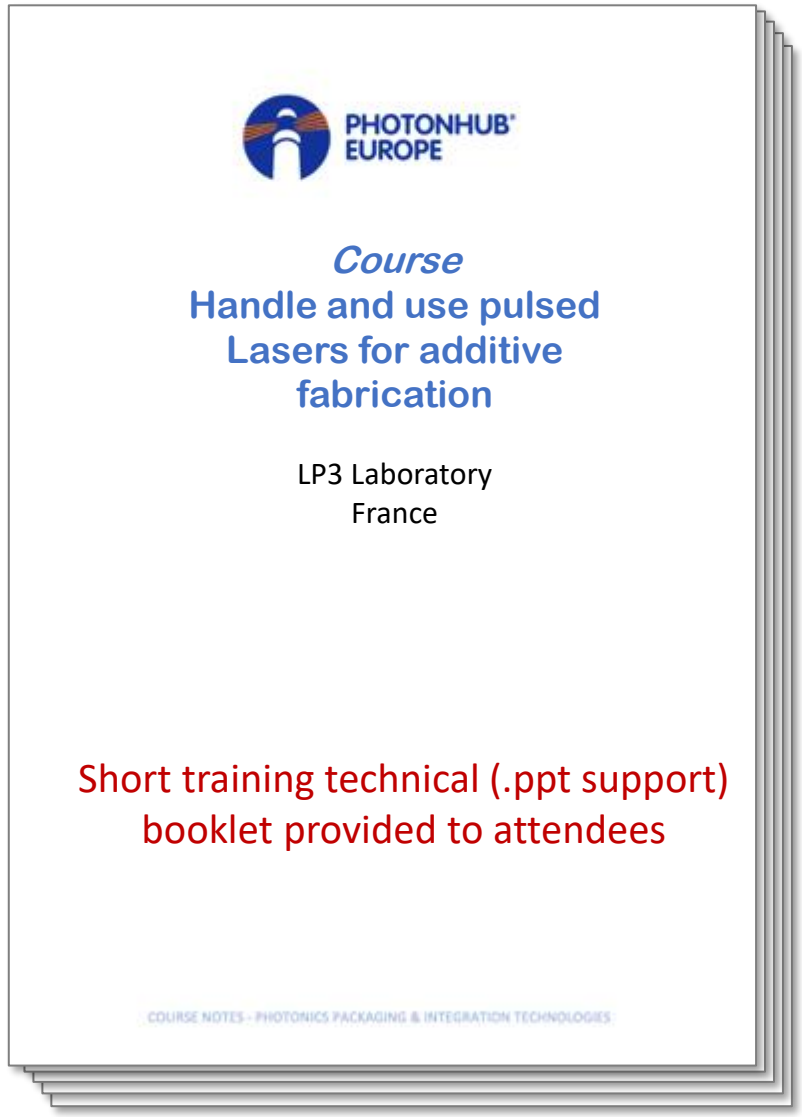
1-day Course Schedule

Time	Training Activity
09:00 – 10:30	Course overview and Tutorials on laser safety, manipulation and laser-induced forward transfer (lectures)
10:30 – 12:00	Demo 1: Prepare the sample and learn how to operate the laser workstation (hands-on)
12:00 – 14:00	Lunch break and LP3 laboratory visit
14:00 – 16:30	Demo 2: Additive laser fabrication at the micro-scale (hands-on)
16:30 – 17:00	Final debriefing, Questions and Answers (hands-on)

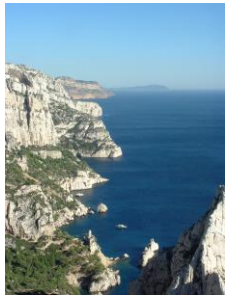
Course Supervision and Material (technical hand-outs)

An experienced training staff at your service:

- *Dr. A.P. Alloncle (coordinator)*
- *Dr. A. Casanova*
- *Dr. C. Constantinescu*



Course Location, Schedule & Cost



- LP3 laboratory, Marseille – Luminy, France
- Course Schedule (2 sessions per year – exact dates to be confirmed)
- Number of people (Groups of 3/4 people per course)
- Course Cost (500 Euros per person, includes catering and project consumables)

Further Information

- patricia.alloncle@univ-amu.fr
- www.photonhub.eu/euphotonicsacademy

Keywords

Additive fabrication, Laser printing, solid, liquid and viscous Materials, Optical measurements and diagnostics

Relevant Technology & Application Domain

Technology: Industry 4.0-Based Optical Manufacturing, Polymer-based Components and Large Area Organic Flexible Photonics

Application: Relevant to all application domains, especially in Industry and Biomedical