HiLASE Centre
Institute of Physics of the CAS
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HiLASE Centre is pleased to invite you to attend the seminar:

How to print nano and micro-materials.

Laser-Induced Forward-Transfer at HiLASE

Nathan Goodfriend

HiLASE Centre IoP

Assembling and creating structures on the micro and nano scale is a sizable challenge. The materials must be precisely positioned in a clean and non-destructive method. In this seminar, I will cover the non-contact method of Laser-induced forward-transfer and the branches I have explored at HiLASE. This will stretch from generation and printing of gold Nano droplets to structure preserving methods for two dimensional nanomaterials, culminating in a description of a pending patent for bringing this to industry.

I will introduce you to the basics of laser-induced forward-transfer (LIFT) as an additive printing methodology for nano-obejcts through research conducted in collaboration with Kyoto University. Here we took the LIFT technique and utilized two time separated pulses, with the initial pulse below any modification threshold, we achieved highly consistent and morphologically controlled gold droplet generation and printing.
Following this introduction to the technique, we will look at an additional component of this method where a dynamic release layer is introduced, often known as blister-based or blister-actuated LIFT. This enables preservation of the physical and chemical structure of the materials to be assembled. We have shown, in collaboration with Nagoya University and the University of Edinburgh, how to use this methodology in order to deposit materials down to subnanomater scale with single atom thicknesses. Specifically we'll demonstrate transfer of nanoscale conductors, insulators and semi-conductors, such as graphene, hexagonal boron nitride and transition metal dichalcogenides respectively.
HiLASE's mission statement is to bring super lasers into the real world and through their help we have a submitted patent for this technique, and I will share the methods and uses of this new device. I will illustrate the technological necessities and methods for orientation and layer controlled assembly of these two dimensional structures for incorporation into nano-technology, in a more scalable and repeatable fashion.

We shall finalize the seminar by introducing the directions we aim for HiLASE's role in future implementation of lasers for 2D material generation, assembly and functionalization.

When: Tuesday, **09/11/2021 at 14:00**

Where: Seminar room (Perla), HiLASE Centre

TEAMING FOR SUCCESS

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