# Post-doc position at LP3 on Laser Induced Plasma Spectroscopy to control laser ablation on organic electronic devices.

**Context: LP3 is part of a European project entitled ALABO for "Advanced Laser Ablation on Barrier films for Organic and large area electronic devices"** ***(H2020 project agreement No 644026. Project duration: 01.01.2015 - 31.12.2017).*** The overall objective of this project is developing organic electronic building elements on flexible substrates with monolithically integrated barrier foils as substrate. This topic is one of the keys for enhancing both the performance of TOLAE components and addresses some of the main technology barriers of TOLAE: lifetime and cost-performance-ratio. Organic photovoltaic (OPV) modules have been chosen as test objects for a scalable and general approach suitable also for other TOLAE devices. Monolithical integration of barrier foils means in this case that the full device is made immediately on top of ultra-barrier coated plastic foil, which further is coated with a transparent electrode. This leads to significant cost reduction, which is one of the key needs for wider use of TOLAE devices (http://www.alabo.eu).

**Main ALABO objectives:**

- Investigate the principles and to develop a solution for **direct laser scribing on ultra-barrier foil without barrier degradation,**
- Accelerated techniques for **ultra-barrier measurement** considering adequate requirements regarding sensitivity, including the comparison of different techniques and standardization efforts,
- Study and develop fast online analysis for **process control** and quality assurance.
- investigate strategies and techniques to **upscale laser scribe processes to the demand of large volume roll-to-roll production.**

In the frame of this program and in collaboration with academic in industrial partners LP3 Laboratory will develop a **real time control setup of selective ablation** of multilayer materials in order to control laser scribing process and to help the machine operator to fix the laser parameters for each new bench of stacks to preserve the functionalities of the different layers. The approach is based on Laser Induced Emission Spectroscopy (LIBS) and emission spectroscopy of the plasma plume induced by the laser source used for selective ablation will be implemented. Each layer presents a characteristic emission spectrum of the material layer composition. These spectra will be analysed in real time in order to stop the laser ablation process when the scribing process will reach the required layer. This would give insight how far the selectivity between different materials could be control by LIBS technique and how far this online control diagnostic could be adapted to very high velocity laser scribing processing control.

**For this project LP3 offers a post-doc position up to 32 months (initially 12 months renewable – ~ 2400 €/month).** The candidate should have a strong experience in spectroscopy and plasma physics and ideally also a background in laser ablation and optics. He/her should have experimental skills and the ability to work collaboratively as a team is critical. He/her is dynamic, a self-starter and is able to communicate verbally and in writing in English. At last the candidate will have to spend some time (2 to 4 months) in Germany to work in collaboration with an industrial partner.

**The Lasers, Plasmas and Photonic Processes (LP3)** laboratory is a CNRS/Aix-Marseille Univ. joint research unit (UMR7341). About thirty five peoples are working at LP3 on laser-matter interaction and the development of related photonic processes. The main applications are related to microelectronics (silicon and organic), photovoltaic, optical devices, medical and sensing. The research activities are divided in five transversal research operations: 1) Laser, Optics and Matter, 2) Laser and Plasmas, 3) Laser and Nano-/Micro-Electronics, 4) Laser and Biophotonics and 5) Laser, Energy and Environment. LP3 has a large set of pulsed laser sources, from ns to fs, and from UV to near IR. It is also equipped for in situ (high speed imaging, spectroscopy …) and ex-situ (SEM, AFM, confocal and optical microscopes, ellipsometer, SNOM-RAMAN …) characterization of laser matter interaction, plasmas and samples. These equipments allow LP3 researchers to perform complete studies from optimized laser source development to matter processing, sensing or imaging technologies. For more details, please visit www.lp3.univ-mrs.fr.

**Contact** : Dr. Marc Sentis : Sentis@LP3.univ-mrs.fr