

## INTERNSHIP OFFER

**Type:** Payed Master's internship

**Starting date:** February 2022

**Duration:** 6 months

**Place:** IREPA LASER

**Date:** December 5, 2022

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### Background:

Glasses are highly resistant materials used in a wide range of key applications from glass-ceramic plates to MEOMS encapsulation. Their assembly is usually done by bonding or by thermal processes (anodic discharge, brazing, etc.). However, for some applications these techniques have restrictive limits. Polymer adhesives do not withstand high temperatures and thermal processes are not suitable for making precise welds on small dimensions. When two thermally welded materials are dissimilar, a difference in thermal expansion is often a cause of failure. In this context, welding by femtosecond pulse lasers, depositing just the required energy at the good place, without adding material is very promising green technology [1, 2]. IREPA LASER has performed several works in this matter and now wishes to deep his expertise and aim to develop a laser welding process for glass-to-glass and glass-to-metal that is compatible with current industrial requirements: precise, fast, robust, tight, without microcracks, with high tensile strength and capable of withstanding high temperatures or a large number of thermal cycles.

### The job:

The successful candidate will experimentally contribute to all steps of femtosecond laser welding (sample preparation, welding and quality check) in cutting edge facilities. He/she will contribute to the state of the art of laser welding technology in a wide number of different materials. In addition, the candidate will also develop new devices for sample preparation. The devices and processes will be adapted to current industrial quality standards. His/her main task will consist in:

1. Atending to regular project meetings
2. Dessign and manufacture of contact/monitor devices
3. Operation of cutting-edge laser processing setups
4. Perform optical characterization of samples
5. Writing of final report

### The company:

Irepa Laser is a cooperative society with 40 years' experience in laser processing of materials. It provides industrial solutions to clients by adapting state of the art laser technology into production needs. Its goal is the research and development of laser processing as a green technology adapted to industrial needs meeting all European standards of excellence. It is based in the Grand Est region, specifically in Alsace. Their facilities at Ilkirch campus include high technology laser with powers ranging from 10W to 6kW that are used with diverse multi axes platforms, robotic arms and micromachining stations. In addition, the company possess characterization and analysis tools for materials.

### The candidate:

The successful highly motivated candidate must:

1. Be cursing master studies
2. Have a photonics or material science background
3. Be resolute and having a problem-solving nature
4. Experience in optical design
5. Experience in solid works can be considered a plus
6. Fluency in French is considered an advantage

### Contact:

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### References

- [1] M. Gstalter, G. Chabrol, A. Bahouka, L. Serreau, J-L. Heitz, G. Taupier, K-D. Dorkenoo, J-L. Rehspringer, and S. Lecler. Stress-induced birefringence control in femtosecond laser glass welding. *Applied Physics A*, 123(11), October 2017.
- [2] Marion Gstalter, Grégoire Chabrol, Armel Bahouka, Kokou-Dodzi Dorkenoo, Jean-Luc Rehspringer, and Sylvain Lecler. Long focal length high repetition rate femtosecond laser glass welding. *Appl. Opt.*, 58(32):8858–8864, Nov 2019.