



The **French-German Research Institute of Saint-Louis (ISL)** situated in the border triangle of Germany, France and Switzerland is an internationally renowned research institute belonging to a global industrial and economic network.

The spectrum of our core activities comprises a variety of topics: aerodynamics, energetic and advanced materials, lasers and electromagnetic technologies, protection, security and situational awareness. Our activities are related to both basic and applied research.

ISL is offering a **PhD Position**

Research Field: Laser and electromagnetic technologies

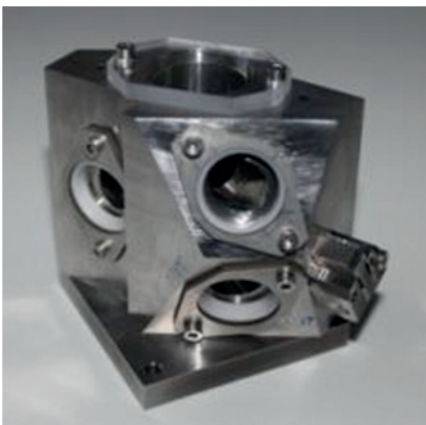
Investigation of OPO cavities for high average power in the mid infrared

Topic description

Demonstration of optical parametric oscillators (OPOs) delivering tens of watts of average power are seldom and rely mostly on powerful but extremely complex pump sources based on MOPA (Master Oscillator Power Amplifier) architectures and also on optical parametric oscillator cavities that are complex and therefore not reliable for real systems. To realize a simple, efficient 2-5 μm mid-infrared source delivering tens of watts, novel OPO architectures and pump sources have to be designed, simulated and experimentally validated.

References

- C. KIELECK et al., 6.5W ZnGeP₂ OPO directly pumped by a Q-switched Tm³⁺-doped single-oscillator fiber laser, Opt. Lett. 40, 1101-1104, 2015
- M. EICHHORN, M. SCHELLHORN et al., High-pulse-energy mid-infrared fractional-image-rotation-enhancement ZnGeP₂ optical parametric oscillator, Opt. Lett. 41, 2596-2599, 2016



Job Description/Objectives

The aim of this work is to explore new OPO architectures:

- Theoretical and experimental analysis of current ISL OPO architectures and their limits in terms of power scaling,
- Measurement of non linear crystal parameters related to thermo-optic coefficients,
- Based on those data, simulation of cavities and thermal lensing effects on beam quality,
- Design of new OPO cavities,
- Experimental realization and characterization.

You will work in a group of 15 researchers, PhD candidates and engineers in the field of development of new laser sources, including new lasing materials (holmium, thulium, erbium), nonlinear crystals such as zinc germanium phosphide (ZGP), doped fibers, non-planar optical parametric oscillators (OPOs) and innovative diode pumping schemes for lasers from 1.6 μm to beyond 5 μm .

Candidate Profile

Qualified diploma or master's degree in photonics or laser physics.

