



TITLE: Study of choc waves propagation by optical sensing using optical feedback interferometry

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Location: LAAS-CNRS, Toulouse INP-ENSEEIH, 2 rue Charles Camichel 31071 Toulouse

Duration: 6 month. Starting date February-March 2021

Context: OASIS (Optical and Smart Integrated Sensors) is a research team at the LAAS-CNRS laboratory in Toulouse. It is a worldwide leader for designing laser sensors based on the optical feedback interferometry (OFI) phenomenon. These sensors allow a large number of measurements (velocity, distance, displacement, etc...) with a simple and compact optical system. Recent developments in electronics, signal processing and optics, pave the way for new applications to be explored in the pressure sensing in the acoustic domain but also in larger pressure range such as those observed in explosions.

The CEA (Commissariat à l'Énergie Atomique et aux Énergies Alternatives) is one the most important research center in France. The Gramat site is the reference for defense in vulnerability of systems and infrastructures.

In the frame of the common laboratory LICUR between the LAAS-CNRS and the CEA-Gramat, performances of the the optical feedback sensor for the observation of choc waves are evaluated.

The purpose of these internship is the improvement and the operation of a dedicated experimental setup for detonac (science of explosives). In particular, aspects related to the sensor sensitivity, analysis of measured data and possibles improvement in the sensing method shall be treated.

Candidate profile: The candidate to be recruited shall meet at least one the 3 curriculum listed below:

- optoelectronics/electronics: good knowledge of the laser principle, handling of lase diodes and photodetectors. Advanced skills in acquisition of high-frequency signals.
- signal processing: advanced skills in digital processing of signals, improvement of signal-to-noise ratio, time-frequency analysis, pattern recognition.
- fundamental physics: thermodynamic, fluid mechanics, optics,...

Salary: 577€ / month