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**

Keywords: Laser ignition, Combustion

Study of conditions leading to a safe, controlled and reliable ignition of low vulnerability propellants

Context

In order to overcome safety issues, new type of propellants known as low vulnerability propellants are being developed. These innovative propellants are intended to replace the ones that are currently in use. Insensitive propellants are designed to withstand external stimuli and avoid unwanted ignition triggers but consequently appear to be less sensitive to standard ignition systems. They feature complex decomposition processes which involve a lot of different kind of physical, thermal, and chemical phenomena. To properly master the ignition of such propellants, it appears essential to study the whole decomposition process including preliminary pyrolysis and combustion.

Based on previous results on this topic, the goal of this PhD is to enhance the understanding of insensitive propellants ignition. This involves manufacturing different formulation of laboratory propellants and investigate their ignition parameters with a laser system. The experimental results intend to highlight the influence of the propellant composition regarding different parameters such as maximal overpressure, ignition delay time or ignition probability. The experimental investigation also includes fast camera recording the ignition and combustion of propellants, using image processing to obtain the solid regression velocity and combustion temperature (two color pyrometry). Collected experimental data will provide input and validation targets for simulations of these propellants' combustion.

Candidate profile

- Master's degree in combustion or chemistry
- Experience handling laser is advantageous
- Excellent command of English in speaking and writing
- Personal initiative, reliability, teamwork and communication skills

Benefits

- Ph.D. degree in the field of energetic materials
- Multi-disciplinary experience
- Working in an international environment
- Competitive salary

Localization

The project is carried out in cooperation between the French-German Research Institute of Saint-Louis (ISL), the University of Orléans and PRISME laboratory in Bourges.

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