

CONTRACTS DOCTORAUX 2025

Titre du projet de thèse : Hollow-core fibers for MHz trains of sub-3 fs optical waveforms

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Résumé du projet de thèse (en 20 lignes maximum) :

The project that we propose is about the development of an ultra-stable source of sub-cycle near-infrared waveforms and femtosecond ultraviolet pulses at unprecedented repetition rates (>10 MHz) and its characterization. The source will consist of gas-filled HC-PCFs pumped by a high-peak-power laser oscillator delivering sub-50 fs pulses. Soliton dynamics in the system will be exploited to generate sub 3 fs optical waveforms with frequency components spanning from the deep ultraviolet (UV) to the infrared. Their duration will be preserved by delivering the fibre output to a vacuum chamber, where the waveforms will be characterized via field-resolved techniques and used for further experiments. The source stability will be assessed by characterizing the amplitude and phase noise and ensured by minimizing the ionization of the gas filling the fibre. A region of experimental parameters for which high stability can be obtained will be delimited and gas-mixtures will be explored to extend such region. The developed source will provide ultrashort waveforms covering an ultra-broadband spectral region and at unprecedentedly high repetition rates, will pave the way to unique and wavelength tunable frequency combs for UV dual-comb spectrometers and will enhance the signal-to-noise ratio in light-matter interaction studies enable new measurements in attoscience.

Date de recrutement envisagée : 01/09/2025

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Remarques/commentaires supplémentaires :