Laboratoire Temps-Fréquence
Institut de Physique
Avenue de Bellevaux 51
2000 Neuchâtel - Switzerland

PhD position in
nonlinear nanophotonics

At the Time-Frequency Laboratory of the University of Neuchâtel, we are pioneering research in novel ultrafast lasers, stable frequency combs, and nonlinear optical systems for spectroscopic applications. Collaborating closely with ETH Zurich, Stanford University, and industry partners, we are exploring innovative methods to achieve stable optical frequency combs using commercial or custom-developed solid-state lasers, quantum cascade lasers, and nanophotonic devices**. We are seeking several PhD students to advance the boundaries of nonlinear nanophotonic circuits and their applications.** The research focus will be tailored to the candidate's background and interests within the general framework of the project.

Position Overview

The Time-Frequency Laboratory at the University of Neuchâtel is seeking talented and motivated PhD students to push the boundaries of optical frequency combs and integrated nanophotonics. Our group has recently made significant strides in developing novel nonlinear optical sources based on nanophotonic devices[1,2]. Progress in nanophotonic platforms has led to a new class of nonlinear devices that significantly reduce power requirements while offering new control mechanisms for nonlinear processes[3]. Integrated devices combine these advantages, enabling unprecedented control over nonlinear phenomena at low power levels and fostering the development of new techniques.

The open position involves advancing our research in nonlinear nanophotonics using the thin-film lithium niobate platform. The candidate will gain expertise in designing integrated photonic circuits and conducting experiments, including creating nano-waveguides and characterizing nonlinear phenomena, supported by advanced numerical simulations. Additionally, the candidate will have the opportunity to contribute to device fabrication and spend part of their PhD at our partner lab at Stanford University, California. This position offers a unique opportunity to gain extensive hands-on experience in the complete process of photonic circuit development, from numerical simulations and design to experimental verification.

More PhD positions are available; if interested, please contact us for more information.

Position Details

- **Starting Date:** Immediately available
- **Duration:** 4 years
- **Location:** Neuchâtel, Switzerland, with potential missions to other European or US labs for collaborative work
- **Environment:** Neuchâtel is in the French-speaking part of Switzerland, between Lake Neuchâtel and the Jura Mountains, offering an ideal setting for both outdoor and city activities.
- **Salary:** Competitive annual income starting from 60,000 CHF, with annual increases

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Information and Requirements

The Time and Frequency Laboratory offers an international, collaborative environment. Fluency in English is required, and knowledge of French is advantageous but not mandatory. Candidates should be enthusiastic about research and able to work independently and in a team. Minor teaching duties accompany the research responsibilities.

Requirements:

- Master's degree in physics or related engineering disciplines
- Background in experimental and/or theoretical work, ideally with knowledge of laser physics, laser engineering, nonlinear optics, or electronics
- Proficiency in programming (e.g., Python, Matlab)

Application

Interested candidates should submit the following:

- Curriculum vitae
- Motivation letter (1 page maximum)
- Master's degree transcript
- Brief summary of the Master's thesis or internship
- Contact information for two or more references (recommendation letters are encouraged)

Please, send your application to secretariat.physique at unine.ch with the subject line "PhD Application Nanophotonics". For any questions, feel free to reach out via the same email. We look forward to hearing from you.

1. Hamrouni, M. *et al.* Efficient parametric down-conversion by gain-trapped solitons. *Optica* **11**, 315 (2024).
2. Hamrouni, M. *et al.* Picojoule-level supercontinuum generation in thin-film lithium niobate on sapphire. *Opt. Express* **32**, 12004–12011 (2024).
3. Jankowski, M. *et al.* Ultrabroadband nonlinear optics in nanophotonic periodically poled lithium niobate waveguides. *Optica* **7**, 40 (2020).