

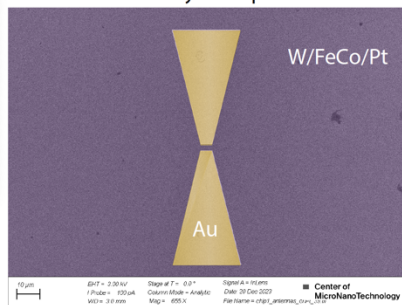
**Job title**PhD. Student position in *Integrated photonic-spintronic devices***Your mission**

The Hybrid Photonics Laboratory at EPFL is seeking for talented and motivated candidates to work in the field of Integrated Photonics for generation of high-quality electronic signals at elevated frequencies beyond 100 GHz. This is a collaborative project with IEMN Lille as part of a Swiss-French collaborative project.

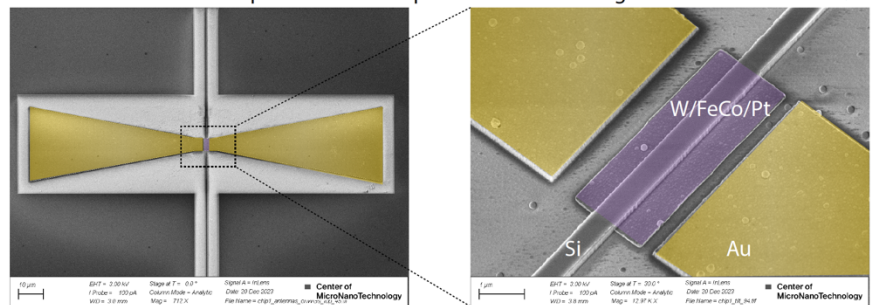
High-end microwave instrumentation is at the core of communications, computing, metrology, sensing or ranging. Yet, it relies on the availability of broadband tunable, narrow linewidth, and bright microwave sources that can be used to excite a high-frequency circuit or to detect its response via heterodyne techniques.

You will research hybrid photonic-spintronic chips on silicon nitride, an offering integrated photonic platform providing ultra low-loss, negligible two-photon absorption, high optical nonlinearity, possibilities to engineer both positive and negative group velocity dispersion through waveguide design and high-Finesse optical resonators, with the aim to develop compact and efficient sources of pulsed and continuous wave terahertz radiation in the band from 100 GHz to 10 THz.

antenna on bare layer of spintronic emitter



spintronic emitter patch on silicon waveguide



As a successful candidate of a dynamic team, you will shape the future of photonics-based millimeterwave-optical technology in our young and dynamic lab. You will develop first-of-their kind hybrid platforms that enable complex high-frequency operations directly inside miniaturized photonic chips.

You will kick off diverse aspects of the experimental effort: technical (setting up an optical measurement setup design, including design of high-frequency electronics and custom-tailored mechanical components) and conceptual (develop the theory of millimeterwave/terahertz generation inside photonic chips). In the lab, you will learn about integrated and free-space quantum optical technologies and engineering, and nonlinear optics. You will contribute to the automatization of measurement routines, comprehensive characterisation of fabricated samples and to bridging the area of microwave/terahertz-optical science and technology with the most modern integrated photonic techniques.

**Main duties and responsibilities include**

- Develop miniaturised millimeterwave/terahertz oscillator and apply them to photonic circuits, together with their driving software/hardware, automatize measurement procedures.
- Simulate optical and mmW/THz properties using simulations software such as COMSOL or CST.
- Characterize samples in the lab.
- Model experimental data from first principles using Matlab/Python codes.
- Write scientific publications, file patents, disseminate work at national and international conferences.
- Maintain collaborations and deliver periodic reports that describe your progress within the project.

### Your profile

- Physics background, strong interest in high-frequency electronics and integrated photonics, nonlinear optics, high-frequency electronics, metrology and/or electro-optic transduction are mandatory. Prior experience in any of these fields is a plus, but not mandatory. More important is the interest to learn and drive this field as a young scientist in a world-wide research community.
- Knowledgeable in (or interest to learn) Python, Matlab, Labview, Inventor, Illustrator, CST Microwave studio and Comsol.
- Enjoy thinking about difficult problems and solving them step by step.
- Hands-on attitude and an interest for taking on new challenges are mandatory for this group. In return, you get to witness setting up experiments from scratch!
- Enjoy collaborations with various other scientific groups, take on a leading junior role in international teams.

### We offer

- A unique opportunity to contribute and take on entirely new avenues in the field of quantum photonics in a young and dynamic team.
- Excellent infrastructure through the [cleanroom at EPFL](#), the Lausanne center for ultrafast science, and the Quantum Science Center at EPFL
- Competitive salary, coverage of conference costs, a dynamic and inspiring scientific community.

**Start date :**

1. **September 2025 or later**

**Work rate :**

100%

**Duration :**

*(si CDD)*

**Contact :** *(optional / warning : it may trigger a high number of contacts as well as job applications sent outside the e-Recruitment platform)*

To apply for this position, please send your CV and transcript of records (Bachelor and Master) to Prof. Cristina Benea-Chelmsu at [cristina.benea@epfl.ch](mailto:cristina.benea@epfl.ch). The position will remain open until filled, and we'll start revising applications from 01.04.2025. It is highly indicated that you write a short statement (max. one page) where you outline why you want to join this group, what your specific interests are, how your skills can contribute to the mission of the lab and how you think you can advance in your own academic/scholarly pursuit while being a part of the Hybrid Photonics Laboratory. PhD. Candidates will need to apply/have applied to the Doctoral School at EPFL (if needed, details will be provided after a successful candidate was selected). Learn more about us at our [EPFL](#) website.