

PhD position in Medical Imaging using chip-scale Optical Frequency Combs (Zeiss AG collaboration project).

The “**Laboratory of Photonics and Quantum Measurement**” (k-lab.epfl.ch) led by Professor **Tobias J. Kippenberg** at the Swiss Federal Institute of Technology Lausanne (Ecole Polytechnique Fédérale de Lausanne, **EPFL**) in Switzerland is currently recruiting for doctoral candidates in the field of optical microresonators based frequency combs for medical imaging applications.

Our laboratory has developed and invented a new method to create **chip-scale optical frequency-combs** using optical micro cavities^{1,2}. Frequency combs are of widespread interest for atomic clocks, spectroscopy, sensing, high capacity telecommunications as well as the calibration of astrophysical spectrometers. We have developed a new way to generate frequency combs using parametric interactions in high Q resonators on photonic chips³. Such soliton Kerr frequency combs offer revolutionary advances, such as unprecedented repetition rate, fully monolithic integration and broad bandwidth. Such photonic chip-scale combs have already been employed in spectroscopy, coherent telecommunications and frequency metrology.

The present position is for a joint project with Zeiss AG, a worldwide leader in the development and employment of Optical Coherence Tomography (OCT) for medical imaging. The aim of the project is to demonstrate the use of chip-scale optical frequency combs for medical imaging, specifically medical OCT and will be carried out in collaboration with Zeiss and other academic laboratories specialized in biomedical imaging. The applicant is expected to possess a strong background in Physics, Photonics or related areas, and is expected to work at the interface of nonlinear photonics, frequency metrology and biomedical imaging and to develop a proof of concept experiment that demonstrates a compact, novel source of biomedical imaging based on photonic chip-scale frequency combs. The long-term aim of the project is the actual employment of the method in a clinical setting.

Being one of the two Swiss Federal Institutes, EPFL is known for its high international reputation and unique geographical location. Access to large scale 1500 square meter cleanroom facilities for nano-fabrication is available <http://cmi.epfl.ch/in>. EPFL campus in Lausanne is only a few steps from Lake Geneva and the Swiss Alps. The position is for a full time graduate research assistantship, including a full time salary and social employer charges. We explicitly encourage female researchers to apply.

Interested applicants should contact Prof. Dr. Tobias J. Kippenberg via email (tobias.kippenberg@epfl.ch) and include CV, university transcripts and letter of motivation as a single PDF file. Applications should also be sent separately to Kathleen.Vionnet@epfl.ch

More information on our research is available under klab.epfl.ch

You can visit our lab us on Flickr:

<https://www.flickr.com/photos/128145967@N04/15834230065/>

Selected papers:

1. Kippenberg, T. J., Holzwarth, R. & Diddams, S. A. Microresonator-Based Optical Frequency Combs. *Science* **332**, 555–559 (2011).
2. Del’Haye, P. *et al.* Optical frequency comb generation from a monolithic microresonator. *Nature* **450**, 1214–1217 (2007).
3. Brasch, V. *et al.* Photonic chip-based optical frequency comb using soliton Cherenkov radiation. *Science* aad4811 (2015). doi:10.1126/science.aad4811