Joint Ph.D. position between EPFL and IBM Research on Microresonator Frequency Combs

Project description

Within the framework of the Marie Skłodowska-Curie European Training Network “MICROCOMB: Applications and Fundamentals of Microresonator Frequency Combs”, the Laboratory of Photonics and Quantum Measurements at the EPFL (Swiss Federal Institute of Technology in Lausanne) led by Tobias Kippenberg is offering a joint PhD position between EPFL and IBM Research in Rüschlikon, near Zurich. Our goal is to advance and utilize a new platform based on gallium phosphide (GaP) for ultra-efficient nonlinear optics in photonics integrated circuits.

The specific aim of the project is to design and fabricate new nanoresonator geometries comprising photonic crystals cavities. The implementation of advanced dispersion-engineering techniques, such as chirped photonics crystals, will allow the realization of broadband light sources for applications in optical communications and related technologies. In addition, GaP, due to its infrared transparency, provides a promising opportunity to extend microcomb technology into the molecular fingerprint region.

As the project is joint between two institutions, the Ph.D. student is expected to spend a substantial fraction of time working in the Quantum Technologies group at IBM Research GmbH (http://www.zurich.ibm.com/) mentored by Dr. Paul Seidler, where access is provided to world-leading cleanroom facilities and expertise in nanofabrication of photonic devices. The linear and nonlinear characterization of the fabricated devices, including the soliton generation experiments, will be conducted with the research group of Prof. Tobias J. Kippenberg at the École Polytechnique Fédérale de Lausanne (http://k-lab.epfl.ch). Prof. Kippenberg will also serve as the official Ph.D. advisor. The experiments are at the interface of nanophysics and quantum optics, closely linking experiment and theory. The Ph.D. student will thus acquire broad knowledge in several fields of research and a range of experimental techniques.

The successful candidate will enjoy an internationally competitive salary and work with collaborative and creative groups in an exclusive research environment. The position is available immediately.

Requirements

- A master’s degree in engineering or physics
- An outstanding academic record
- Willingness to spend a substantial portion of time at IBM Research – Zurich (up to 30%)
- Good communication and English language skills (French and/or German beneficial but not required).
Applications are open to both EU and non-EU nationals. The rules for this position require that the candidate has not resided or carried out his/her main activity (work, studies, etc.) in Switzerland for more than 12 months during the last three years. Preference will be given to applicants with at least one publication in a peer-reviewed journal. Previous research experience in optics, numerical simulation or nanoscale fabrication would be beneficial.

We offer
The position provides an excellent international working environment with access to world-class facilities. The Ph.D. student will participate in all training activities of the Marie Curie network, which includes complementary skills on patenting, innovation transfer, and public presentation as well as writing for scientific outreach. There will also be technical workshops on finite-element simulation, lab courses, transferable-skills workshops, and network conferences. EPFL is only a few steps from Lake Geneva as is the IBM laboratory from the Lake of Zurich, and one can quickly reach the Swiss Alps from either location. The position is a full-time graduate research assistantship at the EPFL (typically 4 years), including a full-time salary and employer benefits. Optional participation in intensive French language courses is offered and paid by the employer.

Diversity
EPFL and IBM are both committed to diversity in the workplace. We offer an open, multicultural environment. Excellent, flexible working arrangements enable both women and men to strike the desired balance between their professional development and their personal lives.

How to apply
Please send in a single PDF file: motivation letter, curriculum vitae, transcripts of undergraduate and graduate education, and contact information for at least two references to Tobias J. Kippenberg (tobias.kippenberg@epfl.ch).