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“High peak power pulses and solitons in quantum cascade laser combs”

Jérôme FAIST

Institute for Quantum Electronics, ETH Zurich, Switzerland
e-mail: jerome.faist@phys.ethz.ch

Thanks to progress in Quantum cascade laser combs, mid-infrared dual comb spectroscopy has recently achieved very short time resolution (10 fs) and very high accuracy (1m Absorbance), as well as high resolution (~3MHz) measurements over a full bandwidth of 55cm⁻¹ with an acquisition time of only 120ms.

To further improve the performance of these spectrometers, we will discuss improvement of the QCL comb laser sources using ring QCLs and RF injection in specially designed devices. We demonstrated recently sub-picosecond pulses with high peak powers, in the range of watts. We also recently showed that ring QCLs can emit temporal solitons.



Jérôme Faist was born in Switzerland and obtained his Ph.D. in Physics in 1989 from the Swiss Institute of Technology in Lausanne. He then worked successively at IBM Rueschlikon (89-91) and Bell Laboratories (91-97). He was nominated full professor in the physics institute of the University of Neuchâtel (1997) and then full professor in the ETH Zurich (2007).

His key contribution to the development of the quantum cascade laser was recognized by a number of awards. His present interests include the development of mid-infrared and terahertz quantum cascade lasers and frequency combs and the physics of strong light-matter coupling Terahertz metamaterial resonators.

