Master Thesis:

Photonic Analog-to-Digital Conversion using chip-scale soliton frequency comb

Karlsruhe Institute of Technology

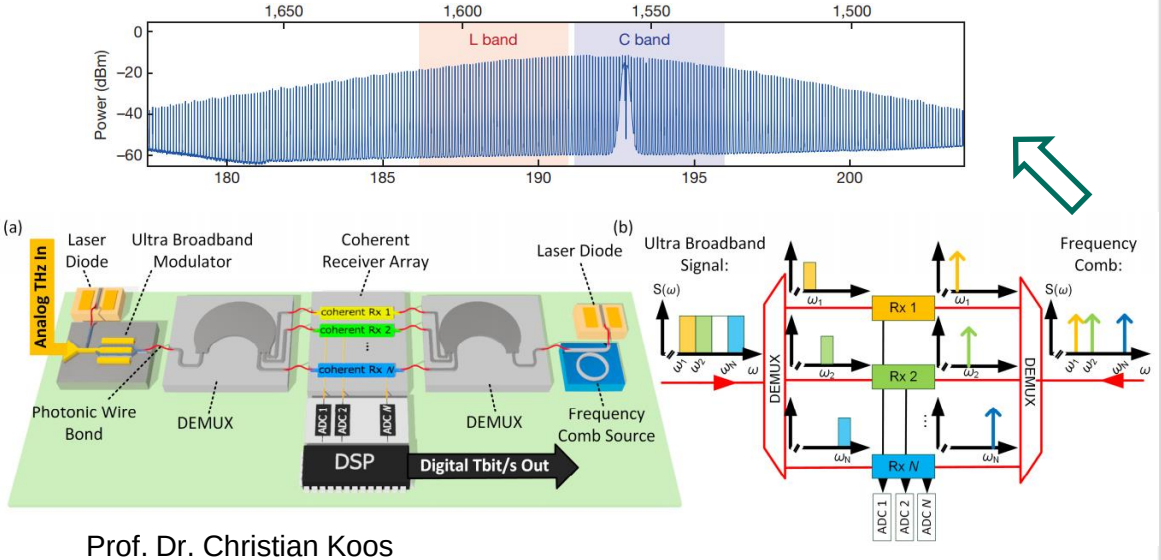
Chip-scale soliton frequency comb has been demonstrated as a revolutionary tool in the field of metrology, spectroscopy and optical communications [1-3], and it can also be potentially used in ultra-fast analogue-to-digital conversion [4-5].

Benefit from the figure of merit of optical frequency combs, this thesis aims at exploring and demonstrating a novel concept for high-speed real-rime analogue-to-digital conversion of ultra-broadband waveforms that can overcome the limitations of state-of-the-art electronic and photonic ADCs. You will gain experience not only with most advanced high-speed electronic devices but also with novel chip-level components.

You will be supervised by one or more PhD candidates, which allows you to advance fast during your thesis. It also potentially leads to co-authoring a conference or journal publication.

Your tasks:

- Implement signal reconstruction algorithm with MATLAB
- Investigate the effects of phase noise and optical signal-to-noise ratio (OSNR)
- Design and build experimental setups for demonstrations



For detailed information contact:

MSc. Dengyang Fang
dengyang.fang@kit.edu

MSc. Daniel Drayß
daniel.drayss@kit.edu

Prof. Dr. Christian Koos
Christian.koos@kit.edu

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[3] Marin-Palomo, Pablo, et al. *Nature* 546.7657 (2017)
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[5] Valley, George C., *Optics express* 15.5 (2007)