Technische Universität Darmstadt

Institut für Mikrowellentechnik und Photonik

Department of Photonics and Optical Communication

Mohammadreza Malekizandi

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Department of Photonics

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Director of Institute: Prof. Dr.-Ing. Franko Küppers
Guest Professor: Prof. Dr. Ivan B. Djordjevic
Emeritus Professor: Prof. Dr.-Ing. Peter Meißner

Groups :

❖ Tunable VCSEL

- High speed MEMS VCSELs
- Tunable Filters
- Tunable THz generation

❖ Optical Communication

- Orthogonal Frequency Division Multiplexing (OFDM)
- Passive Optical Networks (PON)
- Optical Encryption
- Radio over Fiber

Department of Photonics

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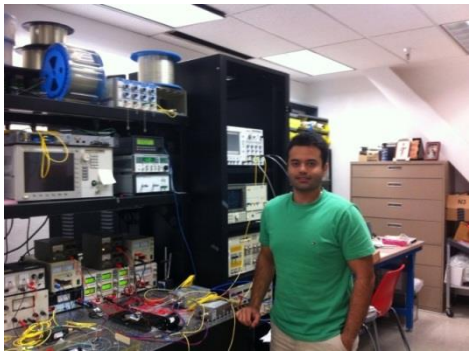
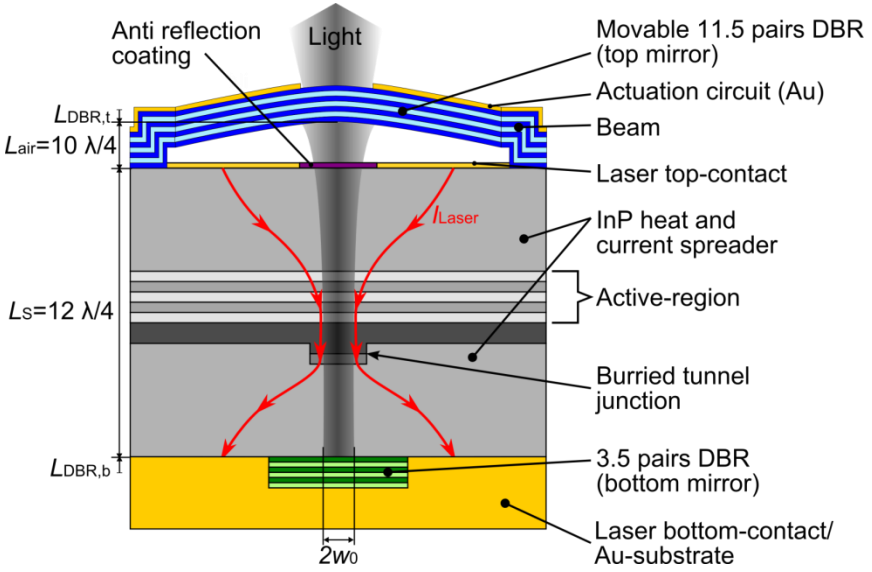
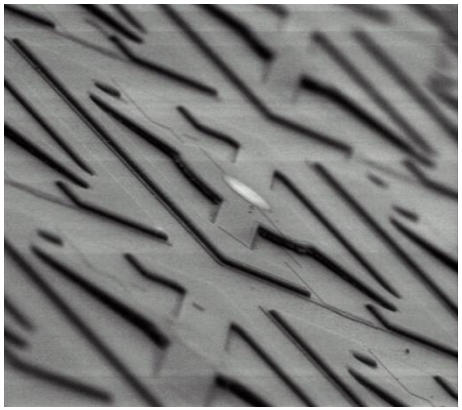
Student exchange with:
University of Arizona
Colombia University
Universidad Carlos III de Madrid

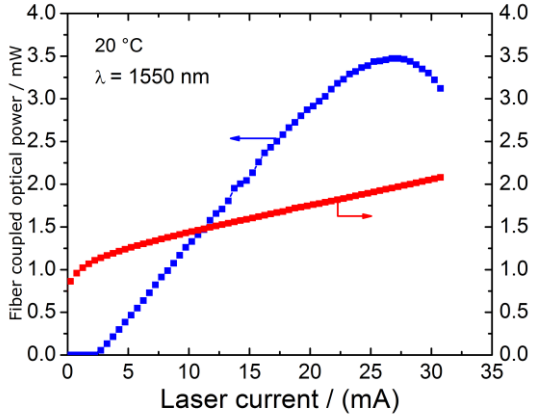
- One student from University of Arizona
- Two students from Colombia University
- One student from Universidad Carlos III de Madrid
- Three students from TUDarmstadt

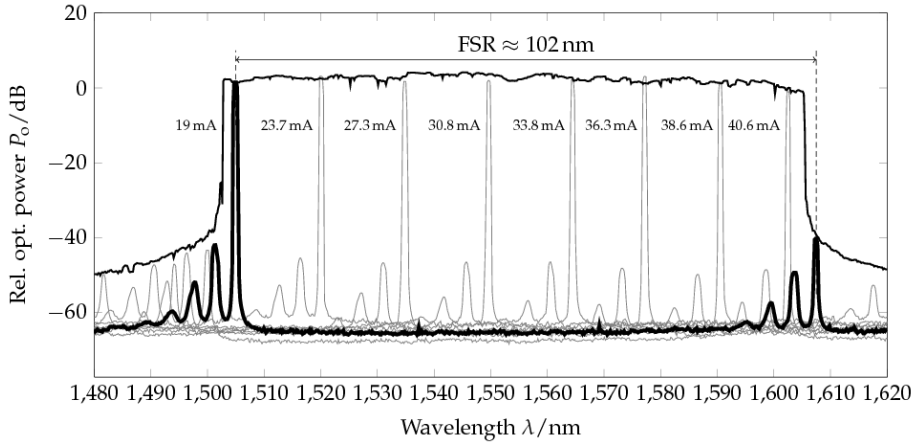


MEMS Tunable VCSEL

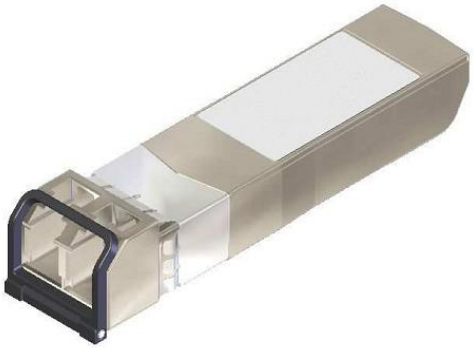




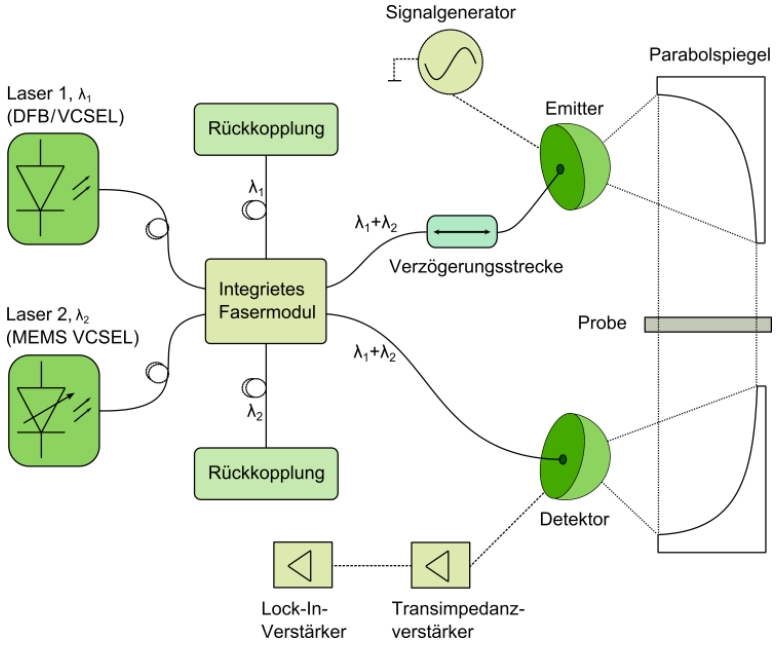




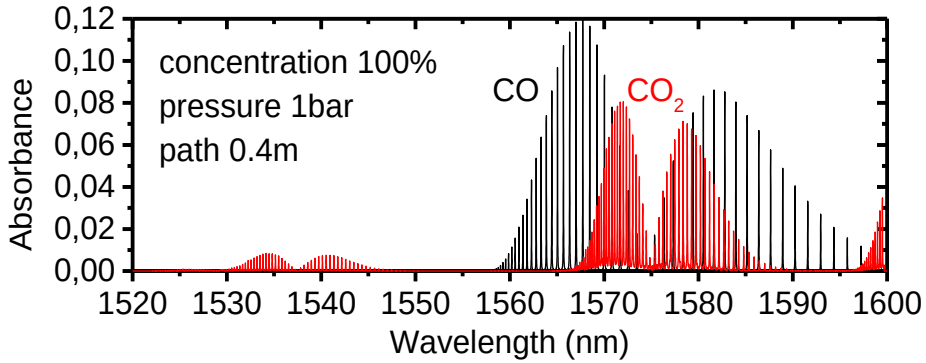
MEMS Tunable VCSEL Aplications



VCSEL based high speed (10 Gbps) SFP+ Module



VCSEL based tunable THz signal generation



Gas Spectroscopy in the range of 1550 nm and 2000 nm

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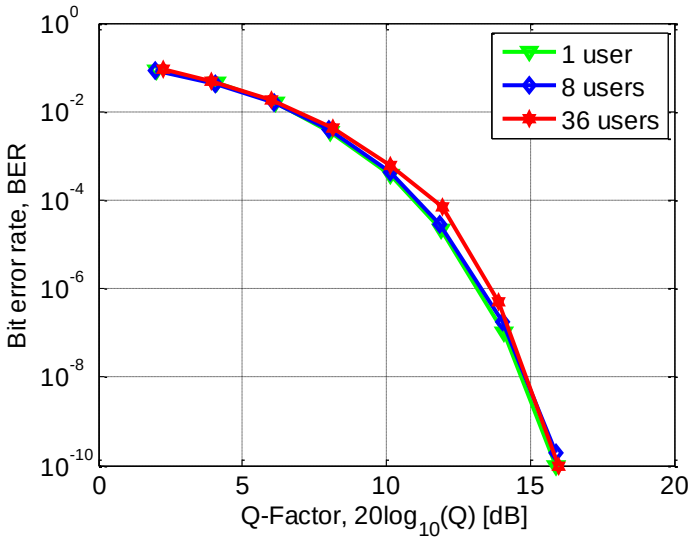
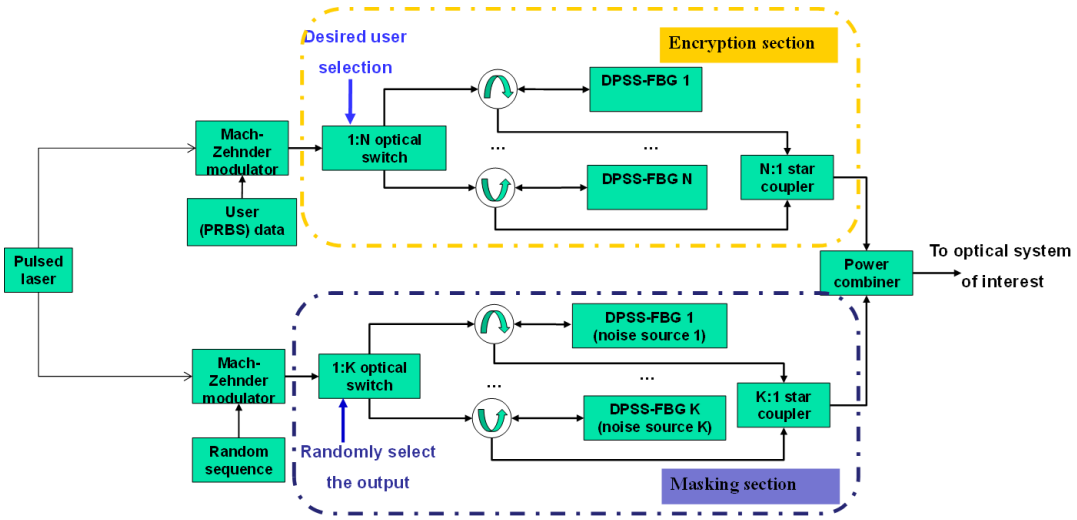
Fiber Bragg Gratings and Their Applications in All-Optical Encryption, OCDMA, and Optical Steganography



BER performance of proposed OCDMA system for different number of users. The laser pulse width is set to 1 ps and data rate to 10 Gb/s



Encoder scheme of Fiber Bragg gratings based Encoder

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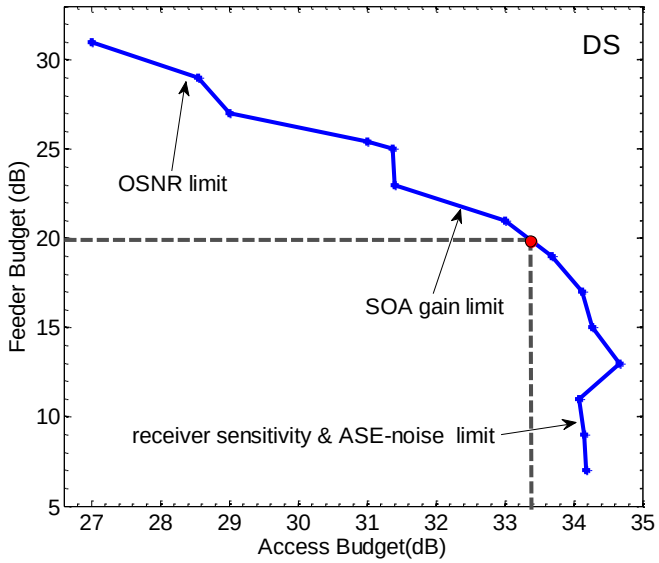
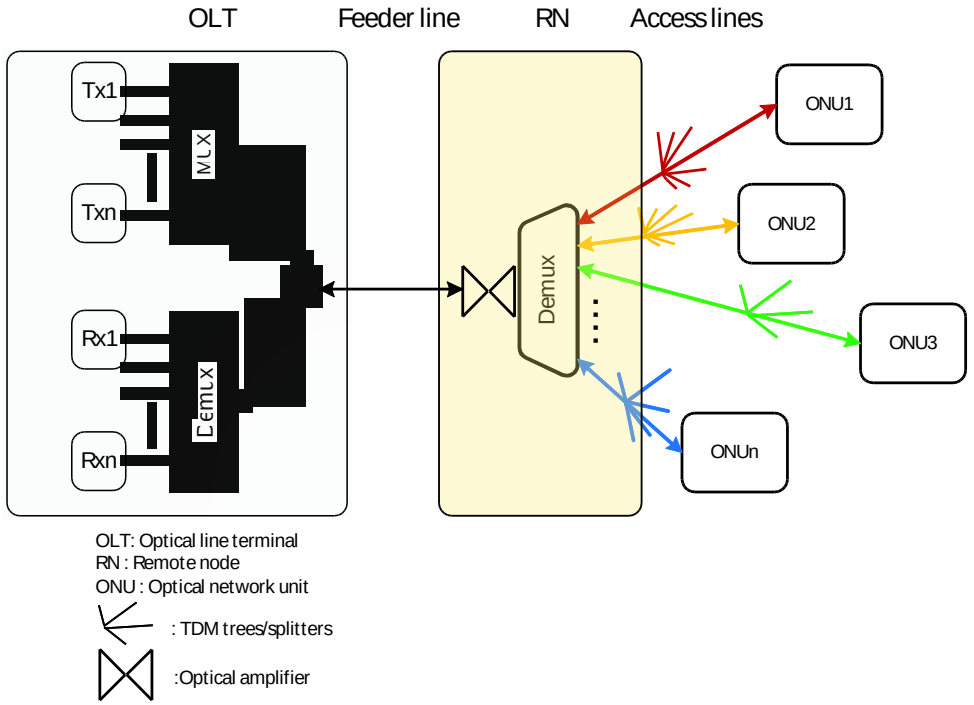
Power budget extension in future optical access networks



33.4 dB access budget can serve up to 256 customers



Hybrid WDM/TDM PON architecture

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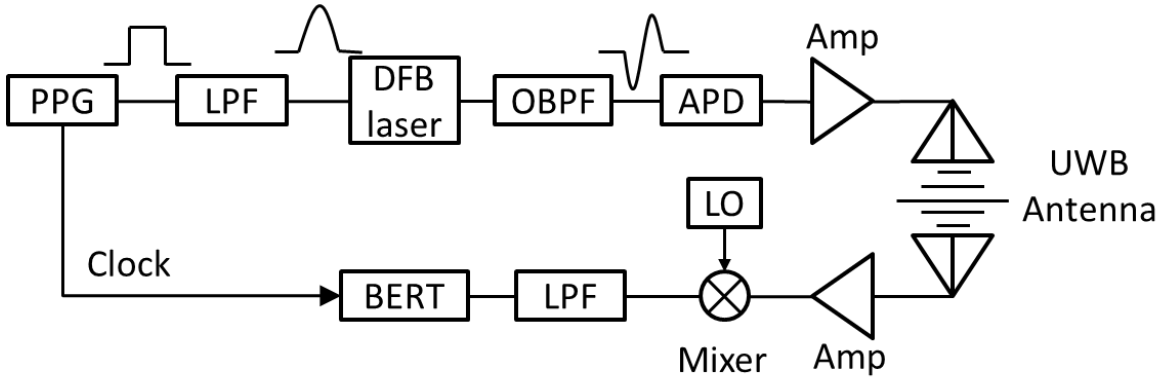
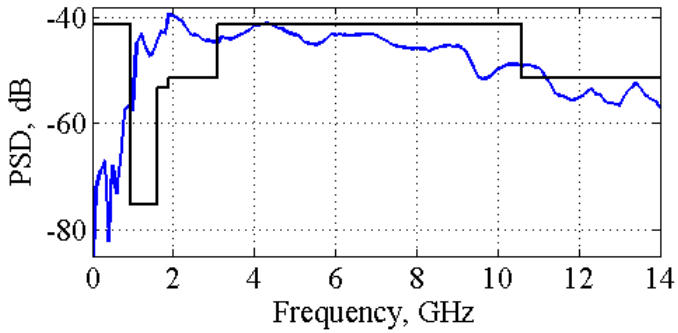
Optically UWB pulse generation for RoF





S_{21} of UWB antenna

Used UWB spiral antenna

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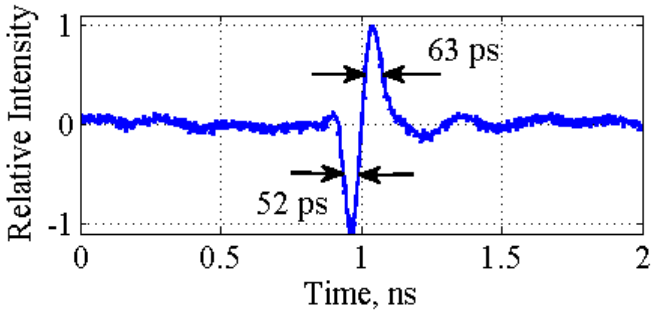
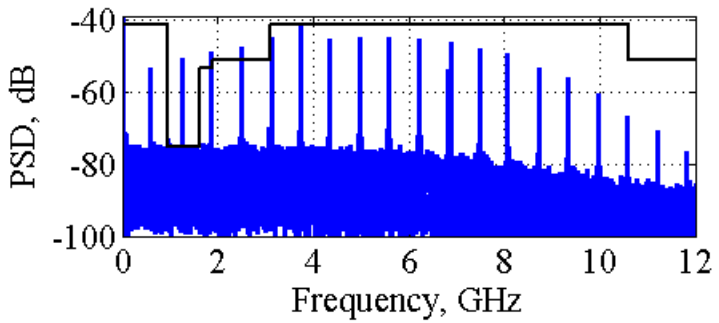
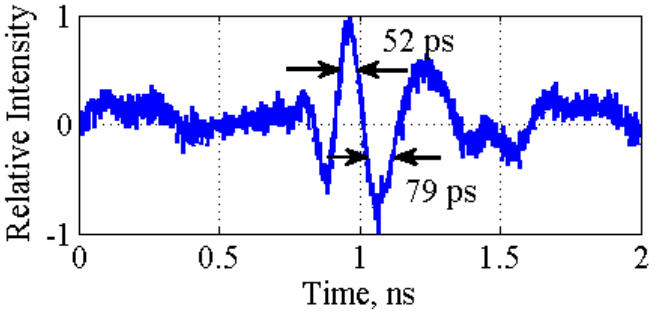
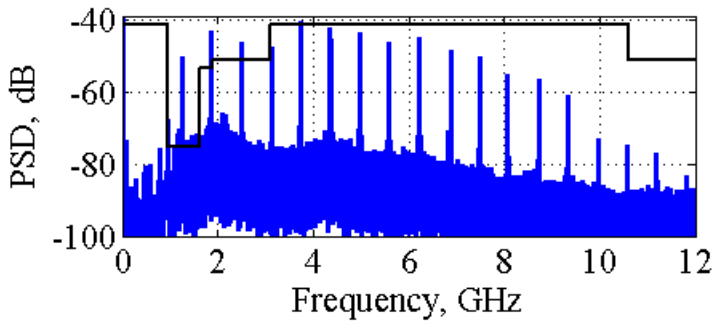




First order Gaussian derivative pulse and spectrum





Received pulse and spectrum after wireless transmission

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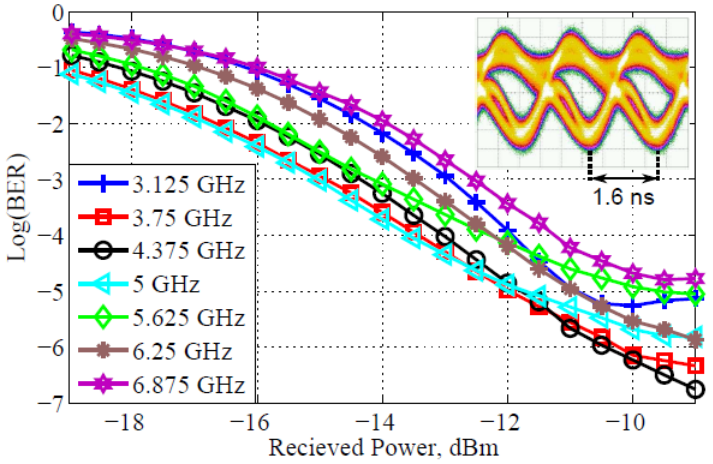
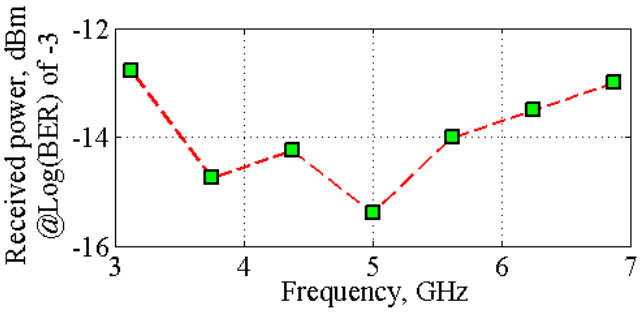
$$F = \max_{\tau} \left| \frac{\int_{-\infty}^{+\infty} f(t) s_R(t+\tau) \mathrm{d}t}{\sqrt{\int_{-\infty}^{+\infty} f^2(t) \mathrm{d}t \int_{-\infty}^{+\infty} s_R^2(t) \mathrm{d}t}} \right|$$

	After APD	Monocycle	Doublet	3rd order
After APD	1	0.9643	0.7676	0.8717
After antenna	0.6655	0.6602	0.7098	0.7524

Fidelity for measured and theoretical pulses





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Thank you for your attention