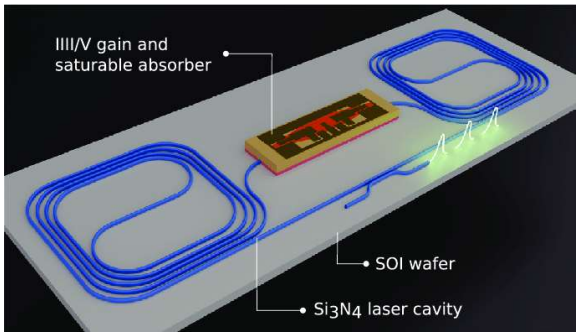
Heterogeneous III/V-on-silicon-nitride modelocked lasers

Mode-locked lasers have applications in LIDAR , spectroscopic sensing , and optical communication [3], among others. Yet, many systems still rely on fiber or solid-state bulk lasers. On-chip solutions are desired to reduce the cost and footprint of these systems and enable their widespread use. Electrically pumped on-chip mode-locked lasers have been demonstrated in monolithic III-V and heterogeneous III-V-on-silicon platforms. To realize low-noise, narrow-linewidth on-chip mode-locked lasers, one typically relies on the use of extended passive waveguide cavities. Heterogeneous III-V-on-silicon and monolithic InP-based extended-cavity mode-locked lasers have been reported, yet with limited on-chip pulse energies (≤ 0.6 pJ). Their performance in terms of pulse energy and noise is limited by two-photon and the associated free-carrier absorption, and the relatively high waveguide loss.

In the seminar, we will show III-V-on-silicon-nitride electrically pumped mode-locked laser technology enabling high pulse energy and low noise. Special focus will be given to the integration technique that is used: micro-transfer printing. This technique allows next to the integration of the amplifier for the co-integration of high speed lithium niobite modulators, high speed photo-detectors and so on



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