## Master Thesis: Quasi-CW SiNOH Lasers



The silicon nitride  $(Si_3N_4)$  platform offers low-loss waveguides over a wide frequency range from visible to infrared frequencies, which renders it particularly suitable for a wide variety of passive photonic integrated components. Recently, a cost-efficient light source, integrated on the  $Si_3N_4$ -platform, was developed at IPQ, i.e.,  $Si_3N_4$ -organic hybrid (SiNOH) laser [1]. SiNOH lasers consist of  $Si_3N_4$  waveguides, cladded with a light-emitting organic dye material. Due to the long lifetime of excited triplet states of the dye, the laser can only operate at low repetition rates. The goal of this thesis is to increase the repetition rate towards continuous wave (CW) operation by modifying the waveguide resonator design and the pumping technique.

## Your tasks:

- Investigation of current SiNOH laser approaches
- Development, fabrication and measurement of new laser approaches
- Modifying the measurement setup to match the new pumping approach

## For detailed information contact:

M.Sc. Alexander Kotz	
alexander.kotz@kit.edu	
Tel. 0721-608-47170	

Prof. Dr. Christian Koos christian.koos@kit.edu Tel. 0721-608-42481



Fig. 1: SiNOH laser with spiral-shaped resonator [1]

Kohler *et al.*, "Lasing in Si<sub>3</sub>N<sub>4</sub>-organic hybrid (SiNOH) waveguides," Opt. Express, vol. 28, no. 4, pp. 5085-5104, Feb, 2020, doi: https://doi.org/10.1364/OE.381572.



