



Location: **III-V Lab, 1, avenue Augustin Fresnel - 91767 Palaiseau cedex – France**

Local contact: **DUPORT François**

Phone: **+33 (0)1 69 41 58 10** Fax: **+33 (0)1 69 41 57 38**

Email: **Francois.DUPORT@3-5lab.fr**

Internship 2016-2017 (6 months)

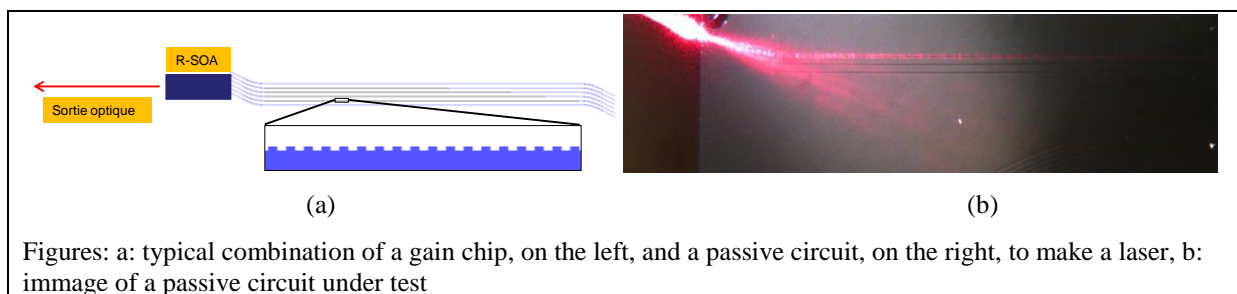
Low loss silicon nitride waveguides for high performance hybrid lasers

Scientific project:

Silica waveguides on silicon exhibit very low losses and enable the fabrication of long optical delay lines, very high quality factor optical resonators in a compact chip. This is foreseen as a solution to integrate very narrow linewidth lasers, high purity filters in the optical domain that can be used for microwave photonic systems.

At III-V Lab we are designing, fabricating and characterizing this type of devices. This requires developing specific building blocks targeting the implementation of very narrow linewidth lasers for LIDAR systems and opto-electronic oscillators for the generation of very narrow linewidth tuneable RF signal.

The work required during the internship will be to simulate optical behaviour of the passive circuits, measure the actual performances of the optical circuits and find ways to propose solutions to improve the circuits in terms of fabrication and design to overcome the limitations.



Figures: a: typical combination of a gain chip, on the left, and a passive circuit, on the right, to make a laser, b: image of a passive circuit under test

Methods and techniques:

The internship will benefit from the work that has been done in a currently running PhD work.

The work will require some bibliographic work to evaluate the proposed fabrication solution in regard of the targeted performances. The trainee will have to evaluate the designs using modelling and simulation tools.

A big part of the work will be on the characterization of the optical circuits in terms of guiding properties, filtering properties.

In order to get narrow linewidth lasers, the passive optical circuits have to be coupled to gain chips. The student will have to implement and test this hybrid integration on a laboratory level.

Possibility to go on with a PhD: This work will be followed by a PhD on tuneable laser for LIDAR systems included in current research projects.

Research fields :	Master of Science that may correspond to the subject (not exhaustive):
Experiment Characterization Modelling	Optic et Photonic Solid state physics Optic and Microwaves Light and matter