



Institut Supérieur de l'Aéronautique et de l'Espace

RESEARCH MASTER INTERNSHIP

Department of Electronics, Optronics and Signals

Supervisor :

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INTERNSHIP DESCRIPTION

Domain : Optoelectronics

Title : **VCSEL DIGITAL MODULATION FOR HIGH DATA RATE FIBER LINK**

To satisfy the rise of the bandwidth in the high speed data communications as well as the inexpensive design constraints, the utilization of the vertical-cavity surface-emitting laser diode (VCSEL) became predominant. Indeed, the numerous advantages of this component make the VCSEL technology suitable for the high data rate link and in various application fields (laser mice, high-density optical disks, display systems, ...).

Generally, the performance of this device is not entirely used because, on one hand, many constraints due to the integration and, on the other hand, many physical parameters due to the VCSEL transient response for a digital modulation limit the operation. Thus, a physics-electrical model of the VCSEL including the signal and noise behaviour and its experimental validation is of great interest.

The internship will take place into two parts. After a theoretical study of the diode laser transient response, the internee will simulate the VCSEL response driven by various digital signals through the rate equations resolution. The relative intensity noise is also studied by using the previous research of the laboratory. The second part of the work consists of validating the model by analogical and numerical measurement on a VCSEL chip (to reduce parasitics effects).

This work could be extending into a Ph.D.

100 % Theoretical Research

100 % Applied Research

100 % Experimental Research

Possibility to go on a Ph.D.:

Yes

No

APPLICANT PROFILE

Knowledge and required level:

Master of research or equivalent grade

Optoelectronics and Microwave

Langages/Systèmes : Matlab

Applications should be sent by e-mail to the supervisor.