



UNIVERSITÀ  
DI TORINO

Tesi presso Lumibird Photonics  
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I corsi di *Fisica dello Stato solido* e *Fisica dei Laser* sono da considerarsi propedeutici agli argomenti della tesi



The Specialist in Laser Technologies

Claudio Coriasso  
R&D Manager  
Laser Diodes

Lumibird Photonics Italia Srl  
Via G. Schiaparelli, 12 - 10148 Torino (TO) - Italy

**LUMIBIRD**  
MORE THAN LASERS

**MEDICAL systems**

**PHOTONICS**

**LIDAR systems**

Expert in innovative medical technology benefiting health care professionals and patients

Fiber lasers & fiber amplifiers

Solid-state & dye lasers

Laser diodes, diode modules & components

Laser rangefinders for military applications

Doppler wind LIDAR systems for remote sensing

Time of Flight LIDAR for harsh environments

Photonic solutions for time-of-flight LIDAR & telemetry

Brands: ELLEX, QUANTEL MEDICAL, OPTOTEK MEDICAL

Applications: Diagnosis & treatment of - cataract - glaucoma - dry eye

Treatment of - diabetic retinopathy - Age-related Macular Degeneration (AMD)

**LUMIBIRD**  
MEDICAL

Global solutions in ophthalmology

**Lasers**

Integre pro scan (MultiSpot)

Easyret (MultiSpot SubLiminal)

Tango Reflex Neo (Nd:YAG/SLT)

Vitra 810 (810 nm)

OptoSLT nano (Nd:YAG/SLT)

Optimis Fusion + Vitra 2 (YAG/SLT/532 nm)

**Dry eye**

CStim (I.P.L system) (Ocular surface analyser)

LacryDiag

**Ultrasound**

ABSolu (A/B/S/UBM)

Brands: ELLEX, QUANTEL MEDICAL, OPTOTEK MEDICAL

Applications: Diagnosis & treatment of - cataract - glaucoma - dry eye

Treatment of - diabetic retinopathy - Age-related Macular Degeneration (AMD)

**PHOTONICS**

**Fiber lasers & fiber amplifiers**  
A full range of OEM and scientific fiber lasers / fiber amplifiers - CW & pulsed

Benchtop Instrumentation

PGFL (Pulsed Green Fiber Laser)

PEFL-EOLA (Pulsed Erbium Fiber Laser, long pulse)

PYFL-PICO (Pulsed Ytterbium Fiber Laser, picosecond pulse)

PEFL-KULT (Pulsed Erbium Fiber Laser, ultra compact)

CVFL-GIGA (CW Visible Fiber Laser, GHz linewidth)

Main Applications: LIDAR, Wind sensing, 3D scanning, Automotive (ADAS & robotaxi), Bio & medical, Atom cooling, Range-finding, Remote sensing, Telecommunications, Space & defense

**PHOTONICS**

**Solid-state & dye lasers & rangefinders**  
Pushlamp-pumped Nd:YAG | Diode-pumped Nd:YAG & Erbium Glass

EverGreen (Double pulse)

Ultra & CFR

Falcon

Viron

Shrike

Centurion+

Merion C

Merion MW

Peacock (OPO)

Q-scan (Dye)

ODIPRO (rangefinder)

VIDAR (rangefinder)

Main Applications: LIDAR, Velocimetry, Spectroscopy, Photoacoustic imaging, Ti:Sa or OPO pumping, Semiconductor processing, Flat panel repair, Remote sensing, Industrial process control, Defense

**PHOTONICS**

**Laser diodes & components** ITAR free  
Expertise - Reliability - Customization - Space qualification on request

QCW laser diode stacks

Diode modules

HF-APF (Fiber-coupled QCW diode stacks)

UCH (High-grade fiber coupled multimode diodes)

Small, medium & large

Components

APD (Avalanche photodiodes)

Diode pumping modules

Main Applications: Space & defense, DPSS laser pumping, ADAS, Flash & 3D LIDAR, Photoacoustic imaging, Ultrasound generation, Active imaging

**LIDAR systems**

**Doppler & time of flight LiDARs, laser range finders**  
Proven solutions for remote operations

Doppler LIDAR

Time of Flight LIDAR

Laser rangefinders

Brands: HaloPhotonics, OPAL, SensUp

Main Applications: Wind energy, Climate monitoring, Meteorology, Aviation safety, Environmental safety, Defense (direct energy weapon), 3D mapping, Topography, Robotics, Autonomous systems

The Lumibird-Convergent High Power Laser Diode

Wire bonds

Laser facet

Optical waveguide (edge)

Laser diode chip

Laser beam

Chip on Carrier

QCW

Active layer

coating

### MSc Thesis proposal on the development of high-brightness laser diodes

The proposed MSc thesis concerns the development of high-brightness laser diodes for optical pumping or direct-laser applications. High brightness is achieved by optimizing both the emitted optical power and the optical beam quality, defined with the  $M^2$  or BPP (Beam Product Parameter) values.

During the thesis, laser diodes prototypes designed and fabricated will be experimentally investigated and next-generation prototypes will be optimized and developed through device modelling based on experimental results.

Simulations are mainly based on the beam propagation method while experimental characterizations are mainly based on the LIV,  $M^2$ , near field and far field measurements.

The MSc thesis is expected to last nine months, full time, at Lumibird Photonics Italia in Torino.

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