Brian Sinquin / Ph.D in photonics

Looking for a postdoctoral position

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WORK EXPERIENCE

Ph.D (defended the 14/12/2023)
2020 – 2023
INSA, Univ. Rennes, Institut FOTON UMR 6082 Équipe DOP — Rennes, France

Direct-modulation optoelectronic oscillator. Microwave synthesis and short optical pulses generation | tel-04461814v1

Supervisor: **Pr. Marco Romanelli** (marco.romanelli@univ-rennes.fr)

- Realisation and optimisation of a direct-modulation **OEO** (OptoElectronic Oscillator) showing a very low phase noise 10 GHz microwave siqnal (single and dual loop architectures).
- Design and realization of optical pulse compression in optical fibers (dispersion, Kerr non-linearity), generation of very low jitter picosecond pulses at a rate of 10 GHz.
- Photonics (OSA, Auto-correlateur, RIN) and microwave (ESA, VNA, phase-noise, amplifiers, RF filters) characterizations in collaboration with the technical support team (engineers in optics, electronics).
- Novel, accurate and simple method for the measurement of the linewidth enhancement factor (complex field reconstruction by interferometry).
- Numerical simulation of a laser signal (amplitude and phase) and its nonlinear propagation in an optical fiber.
- Laser wavelength locking (DFB and free space) using the PDH and Tilt-locking techniques on ULE cavities, application to new OEO architectures.

2nd year Master internship
february – july 2020
SensUp (by Lumibird) — Lannion, France

Caraterization and optimisation of a heterodyne fiber LiDAR

Supervisor : **Gildas Gueguen** (ggueguen@sensup-tech.com)

- Caracterization of a fiber LiDAR system (fibers, amplifiers, laser, photodiodes).
- Numerical simulation (Matlab) of atmospheric optical propagation (Gaussian beams) and signal analysis.
- Softwave development, signal sampling and analysis (Qt/C++) for real-time wind speed (Doppler effect, heterodyne detection) cartography (1D).

1st year Master internship
april – june 2019
OPTIMAG (Université de Bretagne Occidentale) — Brest, France

Ultra-fast measurement of optical activity by swept-wavelength polarimetry

Supervisor : **Matthieu Dubreuil** (matthieu.dubreuil@univ-brest.fr)

- Modelization of a polarimetric setup (Jones formalism and Fourier analysis) which spectrally encodes the optical activity of a sample (chiral) using a swept-wavelength laser source.
- Numerical simulation of the system (Mathematica) : sensibility to alignement errors and to noise sources.

EDUCATION

Master of Science in Photonics
2019 – 2020
Université de Bretagne Occidentale, Université de Rennes — Brest–Rennes

- Integrated optics
- LASERs & Telecommunication
- Optical propagation & Scattering media
- Bibliographic project : Supercontinuum generation in micro-structured optical fibers

With high honors–**head of the class**

1st year MSc in fundamental physics and applications
2018 – 2019
Université de Bretagne Occidentale — Brest

- Signal theory
- Nonlinear & anisotropic optics
- Statistical physics
- Condensed matter

With honours–**head of the class**

Bachelor of physics
2015 – 2018
Université de Bretagne Occidentale — Brest

With highest honors–**head of the class**

SKILLS

Science

- Laser's physics
- Nonlinear optics
- Microwave photonics
- Dynamical systems
- Experimental techniques
- Signal theory and analysis

Computing

- Coding & Simulation
  Julia | Python | Matlab | C/C++
- Softwares
  LabView

Languages

- English (Fluent)
- French (Native)
- Breton (Bilingual)

SCIENTIFIC ACTIVITY

Publications

- 2 published articles (first author)

Communications

- 6 orals (3 internationals / 3 nationals)
- 3 posters

ACADEMIC ACTIVITY

Teaching

- 58 h (Bachelor & Master degree)

Supervising

- 4 internships and projects (Bachelor & Master degree)

PEER REVIEWED JOURNAL PUBLICATIONS

- Brian Sinquin et al. “Low Phase Noise Direct-Modulation Optoelectronic Oscillator”. In: *Journal of Lightwave Technology* 39.24 (2021), pp. 7788–7793. DOI: 10.1109/JLT.2021.3111703
- Brian Sinquin and Marco Romanelli. “Determination of the linewidth enhancement factor of semiconductor lasers by complete optical field reconstruction”. In: *Opt. Lett.* 48.4 (2023), pp. 863–866. DOI: 10.1364/OL.483776

PEER REVIEWED INTERNATIONAL CONFERENCES

CLEO® /Europe-EQEC 2021
Conference on Lasers and Electro-Optics
21–25 june 2021
Visioconference

- Brian Sinquin et al. “Low phase noise microwave generation from a direct-modulation optoelectronic oscillator (DM-OEO)”. in: *2021 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC)*. 2021, pp. 1–1. DOI: 10.1109/CLEO/Europe-EQEC52157.2021.9542636

15 minutes talk / visioconference (COVID)

CLEO® /Europe-EQEC 2023
Conference on Lasers and Electro-Optics
26–30 june 2023
Munich – Germany

- Brian Sinquin et al. “Direct-Modulation Optoelectronic Oscillator for Optical Frequency Comb and Pulse Generation”. In: *2023 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC)*. 2023, pp. 1–1. DOI: 10.1109/CLEO/Europe-EQEC57999.2023.10231990

15 minutes talk

CLEO® /Europe-EQEC 2023
Conference on Lasers and Electro-Optics
26–30 june 2023
Munich – Germany

- Brian Sinquin and Marco Romanelli. “Accurate Measurement of the Linewidth Enhancement Factor of Semiconductor Lasers by a Simple Technique”. In: *2023 Conference on Lasers and Electro-Optics Europe & European Quantum Electronics Conference (CLEO/Europe-EQEC)*. 2023, pp. 1–1. DOI: 10.1109/CLEO/Europe-EQEC57999.2023.10231566

15 minutes talk

NATIONAL CONFERENCES (FRENCH)

Journée du Club Optique Micro-ondes 2021
Société Française d’Optique
4 june 2021
Visioconference

Signaux Opto-RF très bas bruit de phase et instabilités dynamiques d’un OEO à modulation directe

15 minutes talk / visioconference (COVID) | hal-03285993

OPTIQUE Dijon 2021
Société Française d’Optique
5–9 july 2021
Dijon – France

Oscillateur Opto-Électronique à modulation directe de faible bruit de phase

A poster was presented during this conference | hal-03284744

OPTIQUE Nice 2022
Société Française d’Optique
4–8 july 2022
Nice – France

Génération de peignes de fréquence et d’impulsions dans un Oscillateur Opto-Électronique à modulation directe

15 minutes talk | hal-03988116

Journée du Club Optique Micro-ondes 2022
Société Française d’Optique
13 june 2022
Besançon – France

Oscillateur optoélectronique (OEO) générant des peignes de fréquences et des trains d’impulsions optiques

A poster was presented during this conference | hal-03986413

Journée du Club Optique Micro-ondes 2023
Société Française d’Optique
19 june 2023
Visioconference

Direct-Modulation OEO for Optical Pulses and Frequency combs generation

A poster was presented during this online conference | hal-04133619

OTHER SCIENTIFIC COMMUNICATIONS

Antennes et circuits: des micro-ondes aux ondes millimétriques et THz
GDR Ondes 2021
18 march 2021
Visioconference

Low phase noise direct-modulation Optoelectronic Oscillator
15 minutes talk / visioconference (COVID) | https://www.youtube.com/watch?v=NiCSm7F7ba8

TEACHING EXPERIENCE

Université de Rennes 1
UFR SPM
2020–2022
Rennes – France

- **Practical Work** - Geometrical Optics **(1st year Physics Bachelor)** – 16h
- **Tutorial class** - Electromagnetism **(2nd year Physics Bachelor)** – 18h
- **Tutorial class** - Signals and systems theory for the physician **(3rd year Physics Bachelor)** – 20h
- **Practical Work** - LASER **(1st year Physics Master)** – 4h

SUPERVISING

1st year Master internship
1 month and a half
2021
Rennes – France
Laser semiconducteur stabilisé sur cavité Fabry-Perot : applications à une nouvelle architecture d'OEO

2nd year Master project
3 month
2022
Rennes – France
Oscillateur Optoélectronique avec source laser stabilisée par Tilt-Locking

1st year Master intership
1 month and a half
2022
Rennes – France
Laser semiconducteur stabilisé sur cavité ULE compacte: application à de nouvelles architectures d'OEO

3rd year Bachelor internship
1 month and a half
2023
Rennes – France
Oscillateur Optoélectronique à modulation directe