

PERSONAL INFORMATION

Wasyhun Asefa Gemechu



WORK EXPERIENCE

01/06/2023-present

SAPIENZA UNIVERSITÀ DI ROMA**Position: Postdoctoral Researcher****Research subject:** “Tweezer ottico basato sulla propagazione di luce in fibra multimodale.”**Supervisors:** Prof. Stefan WABNITZ

Activity: We conducted experimental work to demonstrate numerous nonlinear phenomena in multimode fibers. Our study delves into the thermodynamic aspects of light propagation in graded-index (GRIN) multimode fibers (MMFs) using various pulse durations through the cutback method. Additionally, we showcased second-harmonic generation (SHG) via optical poling in GRIN-MMFs. Moreover, we plan to undertake beam-by-beam cleaning, calorimetry studies by splicing GRIN-MMFs from different manufacturers, Rainbow spiral emission, optical tweezers, multiphoton nonlinear microscopy, visible up-conversion luminescence, and mode-locked fiber laser experiments.

01/06/2019-30/05/2020

Università di Brescia

01/12/2021-30/05/2023

Position: Postdoctoral Researcher**Research subject:** “*Second-harmonic generation (SHG) in optical fibers.*”**Supervisors:** Prof. Umberto MINONI, Prof. Daniele MODOTTO

Activity: We conducted experimental work demonstrating second-harmonic generation in commercially available germanium-doped silica fibers. Our study investigates Ge-doped commercial fibers, including Corning HI980, Thorlabs 980HP, and others, to showcase their second-harmonic generation (SHG) capability. Additionally, our innovative approach of splicing poled short fiber segments has resulted in enhanced SHG efficiency. The study will be complemented by numerical simulations in Comsol and Matlab to characterize the fiber modes and pulse evolution using the coupled nonlinear Schrödinger equation (CNLSE).

01/12/2020 – 30/10/2021

Ethiopian Space Science and technology Institute**Position: Researcher****Research subject:** Communication Satellite Design

Activity : Design a 6000 kg communication satellite with a lifespan of 15 years for television and telecommunications, operating in C-, Ku-, and Ka-bands. The project also included establishing a ground receiving station in Entoto in collaboration with French companies. Additionally, channel modeling and security measures were designed during this project. Furthermore, I held a teaching position in a Machine Learning course focused on Satellite Image Analysis.

01/07/2008 – 31/09/2008

GCS Ethiopia**Position: Graduating internship****Research subject:** Networking and Server Training**Supervisors:** Mr. Fikiru Tefera, Mr. Abdrazak

Activity : Study and design a 3-layer cisco campus network using Cisco products and Microsoft servers. In addition, I participated in designing, configuring, and implementing Hawassa University's five-campus WAN network with an optical fiber backbone.

01/07/2008 – 31/09/2008

ETV, Ethiopia**Position: Graduating internship****Research subject:** Television and Radio broadcasting Training**Supervisors:** Mr. Dereje Degefa

Activity : Study television transmission schemes and equipment in the VHF and UHF bands, as well as radio broadcasting in the FM, AM, and SW bands.

EDUCATION AND TRAINING

01/11/2015-01/04/2019

Università degli Studi di Brescia, Brescia, Italy

PhD, Information engineering.

April 01, 2019.


Telecom Paristech, Paris, France

PhD, Communication & Electronics.

April 01, 2019

Dissertation: “Comparison of Nonlinear Frequency Division Multiplexing and OFDM for Optical fiber transmissions.”

Supervisor: Prof. Stefan WABNITZ, Prof. Costantino DE ANGELIS (UniBs)Prof. Yves JAOUËN, Dr. Mansoor I. YOUSEFI (TPT)

Wasyhun Asefa Gemechu


01/09/2011-18/03/2015

Università degli Studi di Brescia, Brescia, Italy

MSc, Telecommunication engineering.

March 18, 2015.

Thesis: “Nonlinearity Compensation for Long-haul OFDM Transmission.”

Supervisor: Prof. Stefan WABNITZ, Prof. Costantino DE ANGELIS (UniBs)

04/09/2005-15/07/2009

Hawassa University, Hawassa, Ethiopia

BSc, Electrical engineering.

July 15, 2009.

Thesis: “Unified Communication Design for Hawassa University”

PERSONAL SKILLS

Mother tongue(s) Amharic

English

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
Excellent	Excellent	Excellent	Excellent	Excellent

Job-related skills

- Skill in constructing optical experimental setups.
- Working experience with single-mode and multimode fibers.
- Second Harmonic Generation (SHG) via optical poling, supercontinuum generation.

Computer skills

MS Office package, data processing (Matlab, Python, OriginPro, C++ basics), and COMSOL.

Other skills

- Photography and photoshop.

ADDITIONAL INFORMATION

Publications

1. **Wasyhun A. Gemechu**, Mengdi Song, Y. Jaou“en, Stefan Wabnitz, and Mansoor I. Yousefi, “*Comparison of the Nonlinear Frequency Division Multiplexing and OFDM in Experiment,*” in 43rd European Conference on Optical Communications (ECOC) (2017), paper W.3.C.4.
2. Tao Gui, **Wasyhun A. Gemechu**, Jan-Willem Goossens, Mengdi Song, Stefan Wabnitz, Hartmut Hafermann, Alan Pak Tao Lau, Mansoor I. Yousefi, and Yves Jaou“en “*Polarization-Division-Multiplexed Nonlinear Frequency Division Multiplexing,*” CLEO-US (2018) [invited paper].

3. **Wasyhun A. Gemechu**, Tao Gui, Jan-Willem Goossens, Mengdi Song, Stefan Wabnitz, Hartmut Hafermann, Alan Pak Tao Lau, Mansoor I. Yousefi, and Yves Jaouën "*Dual Polarization Nonlinear Frequency Division Multiplexing Transmission*," PTL (2018).
4. **Wasyhun A. Gemechu**, Umberto Minoni, Daniele Modotto, Alessandro Tonello, and Vincent Couderc "*Second Harmonic Generation in Spliced Poled Fibers*," CLEO-EU (2021).
5. **Wasyhun A. Gemechu**, Umberto Minoni, Daniele Modotto, Alessandro Tonello, and Vincent Couderc "*Polarization dependent second-harmonic generation in cascaded optically poled fibers*," Photorefractive Photonics and Beyond 2022 (PR'22), Monastier di Treviso, Italy.
6. **Wasyhun A. Gemechu**, Umberto Minoni, Daniele Modotto, Alessandro Tonello, and Vincent Couderc "*Efficient second harmonic generation through cascaded optically poled fibers*", Optics Letters 48 (3), 668-671 (2023).
7. **Wasyhun A. Gemechu**, Umberto Minoni, Daniele Modotto, Patrice Duport, Alessandro Tonello, and Vincent Couderc "*Survey of second harmonic generation in commercial germanium-doped fibers*", JOSA B 41 (1), 296-304 (2024).
8. **Wasyhun A. Gemechu**, F. Mangini, M. Ferraro, M. Zitelli, Y. Sun, M. Gervaziev, D.S. Kharenko, S. Babin, V. Couderc, F. Frezza, and S. Wabnitz "*Measuring the optical entropy of highly multimode beams in nonlinear optical fibers*", CLEO (2024).
9. Mario Ferraro, Fabio Mangini, Raffaele Filosa, Vincent Couderc, Yifan Sun, Pedro Parra-Rivas, **Wasyhun A. Gemechu**, Grzegorz Stepniowski, Adam Filipkowski, Ryszard Buczynski, and Stefan Wabnitz "*Observation of visible up-conversion luminescence of soft glass multimode fibers*", MDPI Fibers, Vol.12, Issue 2, pp. 15 (2024).
10. F. Mangini⁺, M. Ferraro⁺, **Wasyhun A. Gemechu⁺**, Y. Sun, M. Gervaziev, D.S. Kharenko, S. Babin, V. Couderc, F. Frezza, and S. Wabnitz "*On the Maximization of Entropy in the Process of Thermalization of Highly Multimode Nonlinear Beams*", OL (2024).

- [11]. F. Mangini⁺, M. Ferraro⁺, **Wasyhun A. Gemechu⁺**, Y. Sun, V. Couderc, F. Frezza, and S. Wabnitz "*Optical Entropy Maximization Leads to Spatial Beam Self-Cleaning in Multimode GRIN Fibers*", ICTON (2024).
- [12]. Mario Ferraro, Fabio Mangini, Raffaele Filosa, Pedro Parra-Rivas, Yifan Sun, **Wasyhun A. Gemechu**, Alessandro Falaschi, Grzegorz Stepniowski, Adam Filipkowski, Ryszard Buczynski, Vincent Couderc, and Stefan Wabnitz "*Observation of visible up-conversion luminescence of soft glass multimode fibers*", Nonlinear Photonics (NP) conference (2024).
- [13] **Wasyhun A. Gemechu**, M. Ferraro, D. Modotto, U. Minoni, S. Wabnitz and F. Mangini, "*Direct Gaussian to high-order Laguerre-Gauss beam shaping in GRIN multimode fiber*", "IPC-Rome (2024) (submitted).
- [14] F. Mangini⁺, M. Ferraro⁺, **Wasyhun A. Gemechu⁺**, Y. Sun, V. Couderc, and S. Wabnitz "*Optical entropy growth accompanies beam clean-up in multimode fibers*", AES (2024).
- [15] K. M. Tesfaye, W. A. Gemechu, U. Minoni, A. Tonello, V. Couderc, F. Mangini, D. Modotto, "*Limitations of Second-Harmonic Generation Efficiency in Spliced Optical Fibers*," RINEM (2024) (submitted).

References

Prof. Stefan Wabnitz

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Presentations
Projects
Conferences
Seminars
Honours and awards
Memberships

Prof. Daniele MODOTTO

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25123 Brescia, Italia

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Prof. Umberto MINONI

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25123 Brescia, Italia

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Prof. Yves Jaouen

Télécom Paris, Institut Polytechnique de Paris

Email: yves.jaouen@telecom-paris.fr

Honours and awards	Sapienza Università di Roma Postdoc scholarship	2023-2024.
	Università di Brescia Postdoc scholarship	2019-2023.
	Aston University, Marie Skłodowska-Curie Actions	2020-2021.
	Università di Brescia PhD study scholarship	2015-2018.
	Università di Brescia M.Sc. study scholarship	2011-2014.