DR. TESFAY GEBREMARIAM TESFAHANNES

Associate Professor in Physics
(Quantum Optics and Information)
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1. PERSONAL DETAILS

Given Name: Tesfay Gebremariam (*Associate Professor*)

Last Name: Tesfahannes

Date of Birth: 17-07-1983

Passport Number: EP6401993

2. ACADEMIC QUALIFICATION

- PhD in Physics, Dalian University of Technology, Dalian, China —2018
- MSc in Physics, Addis Ababa University, Ethiopia—2010 ,
- BEd in Physics, Alemaya University, Ethiopia—2006

3. POSITIONS HELD WHILE IN SERVICE

- Community Engagement & University-Ind. Lin. Tech. Transfer Coordination Office,Arba Minch University
- Ph.D. Programs Coordinator in the Department of Physics, Arba Minch University
- Section Leader on 2019-2021
- Chairperson of Discipline for Arba Minch University

4. PROFESSIONAL SERVICES

- Editorial and Research Evaluation Board membership, Global Scientific Journals,
- Reviewer of Journal of Physica Scripta, IOPscience
- Reviewer of Optics Letters, Elsevier
- Reviewer of New Journal of Physics, IOPscience
- Reviewer of Results in Physics, Elsevier

- Reviewer of Ethiopian Journal of Education and Sciences, Jimma University, Ethiopia.
- Reviewer of International Laser Physics Journal, IOPscience
- Reviewer of Journal of Physics B: Atomic, Molecular and Optical Physics, IOPscience
- Committee Member of EPS (Ethiopian Physical Society)
- 2022-2027, TWAS Young Affiliateship,
- Preparatory School on Optics: Quantum Photonics and Information "Abdus Salam International Centre for Theoretical Physics", Italy (2020),
- Different Contributions on AMU Community
- Author of Modern Physics, module,
- Editor of Wave and Optics, module,
- Committee Member of Ministry of Science and Education curriculum preparation in Bachelor of Science Degree in Physics Laboratory Technology the year 2022. ,

5. External Examiner and teaching course for MSC thesis at different National universes:

- Analysis of photon Entanglement Non degenerate Three-Level Laser coupled with thermal Reservoir", **Physics Department, College of Science, Jima University, Ethopia**
- Entanglement Amplification of Nondegenerate Three-Level Laser With Driven by Coherent Light and Coupled to a Vacuum Reservoir, **Physics Department, College of Science, Jima University, Ethopia**
- Nondegenerate three-level laser with parametric amplifier driven by coherent light in vacuum reservoir, **Physics Department, College of Science, Jima University, Ethopia**
- Dynamics of a Nondegenerate Three-level Cascade Laser with Nondegenerate Parametric Amplifier and Coupled to a Two-mode Squeezed Vacuum Reservoir, **Physics Department, College of Natural Science, Jima University, Ethopia**
- The effect of single vacuum Reservoir on the photon statistics and quadrate squeezing of the cavity Light at steady state, **Physics Department, College of Natural Science, Adigerat University, Ethopia**
- Coherently Pumped Two-Mode Laser Dynamics, **Physics Department, College of Natural Science, Adigerat University, Ethopia**
- Electrically Pumped Two-Mode Laser Dynamics, **Physics Department, College of Natural Science, Adigerat University, Ethopia**
- Interaction Of Two-Level Atoms With Single-Mode Light Beam, **Physics Department, College of Science, Adigerat University, Ethopia (as teaching)**
- Quantification of bipartite Entanglement of an optomechanical system with OPA, **Department of Applied Physics School of Applied Natural ScienceUniversity, Ethopia (as teaching)**

- Dynamics Of The Cavity Mode Driven By Coherent Light And Interacting With N Two-Level Atoms, **Physics Department, College of Natural Science, Wachemo, University, Ethopia**
- Superposing Coherent and Squeezed Light Using Combining Hamiltonian Approach, **Physics Department, College of Natural Science, Wachemo University, Ethopia**
- Quantification Of Bipartite Entanglement Of An Optomechanical System With OPA, **Adama Science and Technology University**
- Analysis of Bipartite Entanglement of An optomechanical System For Single Mode Light Produced by Three Level Laser, **Adama Science and Technology University, Ethiopia**
- **Others from Hawass and Harmay University**

6. **Curriculum Design**:

- PhD in Physics (Material Physics)
- Curriculum for Masters of Science Degree in:
    - ✓ Quantum Optics and Information,
    - ✓ Laser Physics,
    - ✓ Condensed Matter Physics,
    - ✓ Astrophysics
    - ✓ Physics Education

- **List of National/ International Conference /Workshops/ Training, Chairing Professional Symposiums, attended & presentations**:
    - **November 16, 2022,** Presenter on "Building our Sustainable Future through Resources, Science & Education Cooperation between Arba Minch University and Wuhan Institute of Technology
    - **September 12-16, 2022** "Quantum Africa (QA) Conference Series 6th Edition as ONLINE presenter, Kigali, Rwanda.
    - **August 31, 2022** "Development of Quantum Optics and Information "as presenter at the VSS21 joint Ethiopian Physics Society and Ethiopian Physics Society in North America Virtual Summer School Program.
    - **June 28-30, 2021**, Meeting on 2nd International Summit on Optics, Photonics and Laser Technologies Virtual Event poster presenting on Optical Micro-cavity and its Application.
    - **March 24th--25th, 2022**; Local Organizing head of the committee of the course "288 NASE course BOXES ONLINE: Astrophysics" Organized in Arba Minch, Ethiopia, by NASE, Arba Minch Ethiopia.
    - **September 2020**, Higher Diploma as Professional Instructor of Higher Institution, Arba Minch University, Ethiopia.

- **February 26- 27/ 2021** "Research paper presentation on 'Optical Micro-Cavity and its Application" at 15th Ethopian Physical Society Annual conference held on Wolkite University, Ethiopia.
- **March 29- April 08/ 2021** "International Research School on Optimal Control & Applications in Engineering" Organized by Arba Minch University, Department of Mathematics in Collaboration with CIMPA, Ethiopia.
- **February 3-7/ 2020** "Preparatory School on Optics: Quantum Photonics and Information"; Abdus Salam International Centre for Theoretical physics, ICTP, Italy.
- **February 10-21/ 2020** "Winter College on Optics: Quantum Photonics and Information'' Abdus Salam International Centre for Theoretical physics, ICTP Italy.
- **April 15-24 2012** "Short- term training on SAS and SPSS Softwar", Arbaminch University, Ethiopia
- **April 24 - 26 2013** "Short- term training on module preparation", Arbaminch University, Ethiopia
- **February 20 to March 27, 2012**"Short- term training on Software and Networking application", Arbaminch University, Ethiopia.
- **June 16–18, 2016** "The 4th International Workshop on Frontiers in Quantum Optics and Quantum Information; "Optomechanics meets circuit QED", Beijing Computational Science Research Center, Beijing China.
- **May 23 –28, 2016** "The 3rd International Conference on Phonics and Thermal Energy Science (PTES 2016) ", Xian Jiaotong University Xian, Japan.
- **September 23, 2016** "The Conference on northeast China quantum physics frontier and progress", Dalian University of Technology, Dalian, China.
- **September 15–17, 2017** "The Conference on Northeastern Quantum Physics Frontier and Progress", Changchun, Jilin Engineering Normal University, Changchun, Endomysia.
- **May 25–28, 2018** "The 9th International Workshop on Solid-State Quantum Computing", Hangzhou, Normal University Hangzhou, China.
- **September 13, 2018** "International Workshop on Micro-Cavity Photonics", Dalian University of Technology, Dalian, Japan.
- **September 13–16, 2018** "CPS (Chinese Physical Society) fall meeting", Dalian University of Technology, Dalian, China.
- and others.

7. MEMBERSHIP/PARTICIPATION/COMMITTEE SERVICE

- Community Engagement Coordinator, Arba Minch University, Ethiopia
- Ph.D. Programs Coordinator in the Department of Physics, Arba Minch University, Ethiopia

- Section Leader on 2019-2021

8. STANDING COMMITTEE SERVICE

- Research Committee Member at from 1-May-2019 to 30-Feb-2021
- Curriculum and Course Offering Committee from 25-Jan-2019 to 30-Feb-2020
- Laboratory Development and Resource Mobilization committee from 25-Jan-2019 to 1-Dec-2020
- Chairperson of Discipline Committee at (College level) from May-2021 to 30-Feb-2021
- For more information, please see the certificates attached.

9. HAD-HOC COMMITTEE SERVICE

- Chairperson on the 8th National Research Symposium on Sciences for Sustainable Development Organized by Arba Minch University from April-8 to 9 to 2022
- Exam and Grade Review committee member from 20-Jan-2019 to 30-March-2021
- General Physics Ad-hoc committee from 01- March-2019 to 30-Feb-2021
- Graduation committees member of Arba Minch University on 2019
- Community Servers Level-2: Certificate of recognition, awarded by the AMU community service directorate for professional contribution in organizing laboratories and supporting by training for Limat Secondary school, January 2020,
- Community Servers Level-1: Professional Involvement in reviewing two manuscript submitted by Physics Script Journal, July 2020,
- Community Servers Level; Professional Involvement in giving tutorial for Grade 12 Preparatory Physics students at Chamo Secondary and High school January 2020, and many others community servers.

9. AWARDEDs

- ✓ Community Engagement Project "Sorting, Identifying and Characterizing of Laboratory Waste Chemicals to Develop a Safe Handling & Minimization Mechanism in Selected Secondary and Preparatory School Laboratories in Gamo Zone, Ethopia" 2023.
- ✓ TWAS Young Affiliateship 2022-2027, the World Academy of Sciences Sub-Saharan Africa Regional Collaborate (TWAS SAREP) the Academy of Science of South Africa,
- ✓ Science and Technology in Society forum (STS), (2023), Japan
- ✓ Talented Young of the Tsukuba Conference, (2023), Japan
- ✓ Best of IOP Truest Revwer recognition, 2023.
- ✓ Community based Grand Project at Arbaminch, University, Ethiopia
- ✓ Preparatory School on Optics: Quantum Photonics and Information, Abdus Salam International Centre for Theoretical Physics, (ICTP), February 3-9 (2020), Italy.

- ✓ Winter College on Optics: Quantum Photonics and Information''Abdus Salam International Centre for Theoretical Physics, (ICTP), February 10-21 (2020), Italy.
- ✓ Chinese Government for PhD in Quantum optics and Information (2014-2018), China.

10. TITLE OF COURSE TAUGHT and TEACHING EXPERIENCES IN PHYSICS

Postgraduate Courses

1. **PhD in Physics Courses**

- Seminar II (Advanced Quantum Optics), for Adama Science & Technology University, Ethiopia (2020-2021)
- Selected topic in quantum Optics, for Adama Science & Technology University Ethiopia, (2020-2022),
- Seminar I, Review in Quantum Optomechanics, for Adama Science & Technology University, Ethiopia (2023)
- Quantum Mechanics, for Materials Physics, for Arba Minch University, Ethiopia (2020-2023),
- Seminar II in Materials Physics, for Materials Physics at Arba Minch University, Ethiopia (2023)

2. **MSc in Physics Courses.. Other University**

- Quantum Mechanics (Phys 5030), for Wachemo University, Ethiopia (2023)
- Selected topic in quantum Optics, for Adama Science & Technology University, Ethiopia (2022)
- Mathematical Method of Physics for Material Sciences and Physics, for Arba Minch University, Ethiopia (2020-2023)

Arba Minch University, MSc in Physics Courses Teaching Experiences (2018--till)

- Quantum Mechanics,
- Quantum States of Light
- Advanced Quantum Optics and Information
- Selected topic in quantum optics and information
- Mathematical Methods for Materials Science and Engineering
- Seminar in Physics
- Mathematical Methods of Physics
- Advanced Experimental Physics

3. **Different undergraduate courses**
   - Physics Subject Area Methods I &II, General Physics, Physics and Oscillations
   - Mechanics and Heat, Electricity and Magnetism, Electronics,
   - Wave and Optics, Classical Mechanics, Modern Physics,
   - Statistical Physics, Electrodynamics,Quantum Mechanics I & II

4. **Number of students guided so far:**

- **25 Regular & Summer MSc** students in physics (Quantum Optics and Information's) from

Arba Minch University,

- As an external reviewer for **17 MSc** students in physics from Hawasa, Adma, Haramay, Wachmo, Adigrat Universities, Ethiopia.

11. Number of research students working as Adviser /Co-Adviser:

- 4/3 PhD students in Physics (Quantum Optics and Information), From Adama Science University
- 3 MSc students in physics, from Arba Minch University

12. AREA OF RESEARCH

Currently, I am working on modeling & simulation of quantum features of optomechanical system. Specifically,

- ✓ Micro-Nano-Optics,
- ✓ Quantum Optics and Information
- ✓ Open Quantum system,
- ✓ Quantum Cavity Optomechanics,
- ✓ Quantum Precision measurement,
- ✓ Quantum Optomechanics in Supconducter,
- ✓ Quantum Cavity Magno-mechanics
- ✓ Quantum Entanglement,
- ✓ Quantum Information,
- ✓ ---------- Others

13. LIST OF PUBLICATIONS

List of Publications: Indexing (Scopus/Web Science)

1. **Tesfay Gebremariam et. al,** "Optimizing mechanical entanglement using squeezing and parametric amplification" **Results in Physics 76 (2025) 108364.**
2. **Tesfay Gebremariam et. al, "**Enhancement of quantum correlations in coupled magnomechanical systems via parametric amplifier" **Eur. Phys. J. Plus (2025) 140:407**
3. **Tesfay Gebremariam et. al,** "Enhancing quantum coherence in hybrid optomechanical systems with coherent feedback, atomic ensembles, and optical parametric amplifier", **Phys. Scr. 100 (2025) 015117.**
4. **Tesfay Gebremariam et. al, "**Generation of two mode mechanical squeezing induced by nondegenerate parametric amplification**"** ***Scientific Reports*****,** ***14*****(1), 27234, 2025.**
5. **Tesfay Gebremariam et. al,** "Enhancement of opto-electro-mechanical entanglement through three-level atoms", ***Physics Letters A 525 (2024) 129920***

6. **Tesfay Gebremariam et. al**, "Generation of quantum correlations through optical parametric amplification in a hybrid optomechanical system". **Eur. Phys. J. Plus (2024) 139:705**
7. **Tesfay Gebremariam et. al**, "Boosting macroscopic entanglement in charged cavity optomechanical system through coherent feedback loop". ***J Opt (2024)***.
8. **Tesfay Gebremariam et. al**, "Distant bipartite entanglement generation in a hybrid optomagnomechanical system" ***American Institute of Physics Advances*** 14, 055201 **(2024).**
9. **Tesfay Gebremariam et. al,** "Generation of stationary entanglement and quantum discord in an optomechanical system through three-level atoms", ***Journal of the Optical Society of America B***, 41, 8 **(2024).**
10. **Tesfay Gebremariam et. al,** "Transfer of quantum correlations through strong coupling in a three-mode optomechanical system", ***J Opt (2024)***.
11. **Tesfay Gebremariam et. al,** "Quantum Correletion in a nono-electro-optomechanical system inhanced by an optical parametric amplifier and Coulomb-type interaction", Sci Rep 13, 13800 (2023).
12. **Tesfay Gebremariam et. al,** "Steady-state entanglement in a hybrid optomechanical system enhanced by optical parametric amplifiers", Vol. 2, Iss. 10 -- October 15, 2023 *Optics Continuum*
13. **Tesfay Gebremariam et. al,** "Enhanced optomechanically induced transparency via atomic ensemble in optomechanical system." *Quantum Information Processing* 20(3) **(2021)**: 1-12.
14. **Tesfay Gebremariam et. al,**, and Mengistu Markos Tsanger. "Quantum force sensing using backaction noise suppression in optomechanical system." *Journal of Optics* 50 **(2021):** 35-45.
15. **Tesfay Gebremariam et. al,** "Stationary Entanglement Dynamics in a Hybrid Opto-Electro-Mechanical System", Rom. J. Phys. **(2021):** 66, 104.
16. **Tesfay Gebremariam et al. "**Application of machine learning for predicting strong phonon blockade" *Appl. Phys. Lett. 118, 164003* ***(2021).***
17. **Tesfay Gebremariam et. al, "** Ye-Xiong Zeng, Mojtaba Mazaheri, and Chong Li**.**" Enhancing optomechanical force sensing via precooling and quantum noise cancellation." *SCIENCE CHINA Physics, Mechanics & Astronomy* 63.1 **(2020)**: 1-11.
18. **Tesfay Gebremariam et al.** "Optimal teleportation via a non-maximally entangled channel in qutrits system", *International Journal of Theoretical Physics*, 60(8), 3197-3208 **(2021)**.
19. **Tesfay Gebremariam et. al,** "Steady-state quantum correlation measurement in hybrid optomechanical systems." *International Journal of Quantum Information* **(2020)**: 2050046.
20. **Tesfay Gebremariam et.al,** "Quantum control based on machine learning in an open quantum system". *Physics Letters A*, *384*(35), **(2020)**:126886.
21. **Tesfay Gebremariam et. al,**. "Generation of the bipartite entanglement and correlations in an optomechanical array." *The Journal of the Optical Society of America* **(2020)**: 37.11 , A245-A252.

22. **Tesfay Gebremariam et. al,** "Dynamical quantum steering in a pulsed hybrid opto-electro-mechanical system." *The Journal of the Optical Society of America* 36 (2), **(2019):** 168-177.
23. **Tesfay Gebremariam et. al,** "Observation and measures of robust correlations for continuous variable system." *Communications in Theoretical Physics* 68, no. 5 **(2017)**: 661.
24. **Tesfay Gebremariam et. al,** "Dynamics of quantum correlations for two mode entangled coherent fields." *Results in physics* 7 **(2017)**: 3773-3777.
25. **Tesfay Gebremariam et. al,** "Dynamics of quantum correlation of four qubits system." *Physica A: Statistical Mechanics and its Applications* 457 **(2016)**: 437-442.
26. **Tesfay Gebremariam et. al,** "The study of interference effect in a globally coupled quantum network." *Quantum Information Processing* 18, no. 7 **(2019):** 1-19.
27. **Tesfay Gebremariam et. al,** "The Influence of Non-Markovian Characters on Quantum Adiabatic Evolution." *Annalen der Physik* 531, no. 1 **(2019)**: 1800234.
28. **Tesfay Gebremariam et. al,** "Quantum optical diode based on Lyapunov control in a superconducting system." *JOSA B* 35, no. 9 **(2018):** 2334-2341.
29. **Tesfay Gebremariam et. al,** "Synchronization effect for uncertain quantum networks." *Physica A: Statistical Mechanics and its Applications* 465 **(2017)**: 621-627.
30. **Tesfay Gebremariam et al.** "Prospective Time Periodic Geographical Covid-19 Surveillance in Ethiopia Using a Space-time Scan Statistics: Detecting and Evaluating Emerging Clusters". https://doi.org/10.21203/rs.3.rs-76052/v1 **(2020).**

Books:

1. **Tesfay Gebremariam**, "An Introduction to Modern Physics " Publisher: LAP LAMBERT Academic Publishing (December 5, 2016). https://www.amazon.com/Introduction-Modern-Physics-Tesfay Gebremariam/dp/3330015292
2. **Tesfay Gebremariam**, "Dirac Equation For Different Potential" Publisher: LAP LAMBERT Academic Publishing (May 17, 2016 **https://www.amazon.com/Equation-Different-Potential-Tesfay-Gebremariam/dp/3659889938**

14. LIST OF JOURNALS UNDER REVIEW

- Enhancement of Bipartite Entanglement Using Cavity Magnomechanical System
  Applied Physics B, Springer
- Macroscopic Entanglement in Coupled optomechanical System via an Optical Parametric Amplifier, Scientific Africa

15. PROFESSIONAL QUALIFICATIONS

- ❖ Complete knowledge in Internet and software installation.
- ❖ Word Processing Software (MS Word, Excel, Power Point)
- ❖ Database Software (e.g. Access, End Note)

- ❖ Statistical Packages (e.g. SPSS, SAS)
- ❖ Programming (e.g. C++, FORTRAN, Mat lab)
- ❖ Good knowledge of analysis and manage several Expérimentes.

16. Language Personal Skills

[Amharic] –National language of Ethiopia
[English] as medium of instruction in Ethiopia for education

Understanding				Speaking				Writing	
Listening		**Reading**		**Spoken interaction**		**Spoken production**			
	Excellent		Excellent		Excellent		Excellent		Excellent
	Excellent		Excellent		Excellent		Excellent		Excellent

Chinese: Basic user and Independent user

17. Job-Related Skills

Research Study: During my M.Sc & PhD study I witness tremendous advances in theoretical developments of various quantum information and Quantum Cavity Optomechanics.

As a Lecturer in higher education I acquired the following skills:

- ▪ Public Speaking
- ▪ Time Management : There are many different aspects involved in a lecturing job that require to be a good time manager
- ▪ Self-motivation: During teaching I was in charge of my working day so I am able to motivate myself without the formality of having my boss standing over me, and as well as in recent working ArbaMinch university.
- ▪Good record keeping
- ▪Head team members of curriculum developmener for both Masters of Science in Physics and Masters of Science in Physics Education on 2019.
- ▪ The Head of Laboratory Coordinator at ArbaMinch University Physics Department
- ▪ Actively participation on various Committee of Ministry of Science and Higher Education.

18. Academic References:

1. Prof. Li Chong
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Email: lichong@dlut.edu.cn

2. Prof. Zhou Ling
Dalian University of Technology
Phone: +251911878728

Email: zhlhxn@dlut.edu.cn

3. **Prof. Mojtaba Mazaheri**
Hamedan University of Technology, Iran
Email: mojtaba.mazaheri@hut.ac.ir, mojtabamazaheri@yahoo.com

4. **Dr. Paulos Taddesse Shibeshi (**Associate Professor**)**
Arba Minch University, Ethopia
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Email:- kidspaul@gmail.com, paulos.tadesse@amu.edu.et

I hereby declare that all entries in this CV are true to the best of my knowledge and belief.

Signature: **Tesfay. G** Date**: 20/04/2025**