

# SALEM HEGAZY

## Associate Professor,

Cairo University, National Institute of Laser Enhanced Sciences (NILES)

## Adjunct Associate Professor & Director of Quantum Communication Lab (part time)

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## PERSONAL

Nationality: Egyptian

Place of Birth: Cairo, Egypt

Year of Birth: 1980

Family Status: Married, with three children

## SELECTED HONORS & AWARDS

- **ASRT Award for Organizations and Individuals (Shorouk Academy Award for Scientific and Technological Innovation),** 2021  
جائزة اكااديمية البحث العلمي هيئات وافراد (جائزة اكااديمية الشروق للإبداع العلمي والتكنولوجي)  
Presented by The Academy of Scientific Research and Technology (ASRT) and Shorouk Academy, in the Field of Electronics Engineering and its Applications.
- **State Encouragement Award in Physical Engineering Sciences,** 2019  
جائزة الدولة التشجيعية في العلوم الهندسية (فيزياء هندسية)  
Prestigious award presented by Egyptian government to researchers under 40 years.
- **Encouragement Award in Engineering Sciences, Cairo University,** 2018  
جائزة جامعة القاهرة التشجيعية في العلوم الهندسية  
Presented by Cairo University to distinguished scholars under 40 years.
- **Shield of Physics Department, درع قسم الفيزياء,** 2018  
Presented by the Topical Society of Laser Sciences, Cairo University.
- **Obada Prize for best presented research, جائزة د/ عبد الشافي عبادة لأفضل بحث مقدم,** 2019  
Presented by Natural Science Publishing Corp.
- **Teaching Assistant Excellence Award, المدرس المساعد المثالي,** 2011  
Presented by Cairo University.

## ACADEMIC DEGREES

### Ph.D. in Quantum Optics and Quantum Information

**Dissertation title:** “Quantum Entanglement Sources: Optimization, Novelty, and Applications in Optical Communications”

**Joint Supervision Scheme:** University of Central Florida, CREOL: College of Optics and Photonics & Cairo University, NILES: National Institute of Laser Enhanced Sciences (2014–2017)

#### National Advisors

- Prof. Yahia A. Badr (Cairo University, NILES)
- Prof. Jala El-Azab (Cairo University, NILES)
- Prof. Salah S. A. Obayya (Zewail City of Science and Technology, CPSM)

#### International Advisor

- Prof. Bahaa E. A. Saleh (University of Central Florida, CREOL)

### Ph.D. Publications

- 7 Journal Papers published in : Scientific Reports, Journal of Optical Society of America B, IEEE Journal of Quantum Electronics, Applied Optics, Optics Communications, Optical Engineering.
- 6 Conference Papers: 1 CLEO (Talk), 3 SPIE (Two Talks, one Poster), META (Poster), ACES (Poster).
- 1 US Patent, USPTO (2018)
- 1 Provisional US Patent application, submitted in 2017

**M.Sc. : Thesis title:** “Free-Space Communication Using Entangled Photons”  
Cairo University (2006–2011)

#### M.Sc. Advisors:

- Prof. Lotfia Elnadi
- Prof. Mohy Saad Mansour

### Bachelor of Electronics & Communications Engineering (83.45%, Hons.)

Cairo University, Faculty of Engineering (June 2002)

## ACADEMIC POSITIONS

- **Acting Chairman, Engineering Applications of Laser Department**, National Institute of Laser Enhanced Sciences, Cairo University, February 28th, 2023 – present
- **Research Associate and Founding Director of Quantum Communication Laboratory (part time)**, Center for Photonics and Smart Materials, Zewail City of Science and Technology, 2023 – present
- **Adjunct Faculty member**, Zewail City of Science and Technology, 2018 – present

- **Associate Professor (Scientific-Excellence promotion on June 28th, 2022)**, Cairo University, 2022 – present
- **Post-Doctoral Researcher**, Zewail City of Science and Technology, 2017-2022
- **Founding Director Photonic Entanglement Laboratory**, National Institute of Laser Enhanced Sciences, Cairo University, 2011 – present
- **Assistant Professor**, Cairo University, 2017-2022
- **Doctoral Research Scholar**, CREOL: College of Optics & Photonics, University of Central Florida, 2016-2017
- **Doctoral Research Assistant**, Zewail City of Science and Technology, 2012-2016
- **Teaching assistant**, Cairo University, 2011-2016
- **Demonstrator**, Cairo University, 2006-2011
- **Pre-Master Visiting Scholar**, Laboratoire Kastler Brossel (LKB), Ecole Normale Supérieure (ENS), Paris VI, France, 2006

## SCHOLARSHIPS

- **Postdoctoral Fellowship at** Center for Photonics and Smart Materials (CPSM), Zewail City for Science and Technology, Advisor: Prof. Salah Obayya. 2017-2020
- **Doctoral Scholarship:** CREOL, The College of Optics & Photonics, University of Central Florida, Orlando, Florida, USA, Quantum Optics Group, Advisor: Prof. Bahaa E. A. Saleh. 2016-2017
- **Research Fellowship at** Center for Photonics and Smart Materials (CPSM), Zewail City for Science and Technology, Advisor: Prof. Salah Obayya. 2013-2016
- **Premaster Scholarship:** Laboratoire Kastler Brossel (LKB), École Normale Supérieure, Paris, France, Advisor: Prof. Elisabeth Giacobino, Prof. Alberto Bramati. 2006

## RESEARCH INTERESTS

- **Quantum Photonics : Design and Modelling of quantum photonic circuits**
- **Quantum Encryption : Practical Security of Quantum Key Distribution (QKD)**  
QKD Systems immune against practical and field attacks – Quantum random number generation
- **Quantum Computing**  
Optical quantum computation – Quantum algorithms
- **Quantum Entanglement**

Generation of high-flux and high-purity entangled photon pairs

- **Information Security**

Optical chaos encryption and optical image encryption for enhancing information security.

- **Highly Dense Optical Communications**

Hybrid optical communication systems that leverage different degrees of freedom of light.

## AWARDED GRANTS

- **Grant ID:** BS- 48352, **Project title:** “Quantum-photonic characterization platform for optical quantum-information systems”, Science, Technology & Innovation Funding Authority (STDF), **Role: PI**, 2.3 M. EGP (~45,000 \$) 2024-2027
- **Grant ID:** 5283, **Project title:** “Tomographic measurements for quantum-photonic systems and stochastic quantum channels”, JESOR Program, Academy of Scientific Research and Technology (ASRT), **Role: PI**, 980,000 EGP (~60,000 \$) 2020-2024
- **Grant ID:** CFP153, **Project title:** “Low cost/complexity equalization system for enhancing the capacity and reach of multimode optical fibers”, Information Technology Industry Development Agency (ITIDA), **Role: Co-PI**, 190,000 EGP (~15,000 \$) 2019-2020
- **Grant ID:** CFP134, **Project title:** “Photonic superlattice for generating and engineering hyperentangled photons: Core of quantum computation and encryption systems”, Information Technology Industry Development Agency (ITIDA), **Role: PI**, 130,000 EGP (~10,000 \$) 2018-2019
- **Grant ID:** CFP94, **Project title:** “Enhanced Source of Entangled Photons for applications in Quantum Encryption”, Information Technology Industry Development Agency (ITIDA), **Role: Co-PI**, 130,000 EGP (~10,000 \$) 2015-2016
- **Grant ID:** CFP4, **Project title:** “Photonic Energy-aware Communication Network (PEACE)”, National Telecom Regulatory Authority (NTRA), **Role: Research Team member**, 1.5 M. EGP (~100,000 \$) 2015-2017

## INTERNATIONAL SCIENTIFIC COLLABORATION

I am honored to successfully establish a long-term research cooperation with the Quantum Optics Group led by Prof. Bahaa E. A. Saleh at CREOL, College of Optics and Photonics, University of Central Florida. This cooperation includes:

- **Research articles:** We have collaborated in several research papers with a focus on quantum communication and entanglement.
- **Patents:** We have co-invented two international patents that showcase our innovative contributions in the areas of quantum communication and quantum optics.

- **Securing research funds:** We have successfully secured funding for three collaborative research projects. These projects were granted by STDF (2024-2027), ASRT-JESOR (2020-2023) and ITIDA-ITAC program (2018-2019). This have enabled us to conduct cutting-edge research and make substantial scientific progress.

## ACADEMIC PROFILE

- H-index : 15 (Google Scholar), 14 (Scopus)
- Citations : 413 (Google Scholar), 374 (Scopus)
- Patents & Patent Applications : 4
- Journal Publications: 23 ; Sum of Impact Factors: 86.2 ; Average impact factor: 3.92
- International Conference papers: 27
- Invited Talks: 12
- Scientific Societies Membership: 5
- Editorial Boards Membership: 2

## PATENTS DISCLOSURES

1. **Salem F. Hegazy** & Bahaa E. A. Saleh, “Quantum Key Distribution System to Overcome Intercept-Resend and Detector-Control Quantum Hacking” Patent US 11,962,690, 2024 ; US 20240039712A1, 2024. (PCT International Classes: H04L9/08; H04L9/00)  
<https://patents.google.com/patent/US11962690B2>  
<https://patents.google.com/patent/US20240039712A1/en>  
<https://ucf.flintbox.com/technologies/59EA93F9864D4B47A02110CBB0B10CD5>
2. **Salem F. Hegazy**, Mohammed Zidan, Mahmoud AbdelAty, Salah S. A. Obayya, “Quantum Random Access Memory,” Provisional Egyptian Patent # 2021/677, 2021.
3. Ahmed E. Morra, Hossam M. Shalaby, Salah S. A. Obayya, **Salem F. Hegazy**, “Hybrid Direct-Detection Differential Phase Shift Keying-Multipulse Pulse Position Modulation Techniques for Optical Communication Systems,” Patent US 20180069636A1, 2018.  
<https://patents.google.com/patent/US20180069636A1/en>
4. **Salem F. Hegazy**, Salah S. A. Obayya & Bahaa E. A Saleh, “Superlattice structure for generation of hyperentangled photons, methods, and applications” Provisional US Patent # 62/489,044, 2017.  
[https://scholar.cu.edu.eg/?q=hegazy/files/cfilingack29007788\\_deposit-2\\_-\\_provisional\\_us\\_patent\\_62489044\\_sign-redacted.pdf](https://scholar.cu.edu.eg/?q=hegazy/files/cfilingack29007788_deposit-2_-_provisional_us_patent_62489044_sign-redacted.pdf)

## JOURNAL PUBLICATIONS

1. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh, "Programmable Broadband Polarization-Preserving Optical Delay Line with Faraday Mirrors." *Journal of Lightwave Technology*, 42(9), 2024.  
<https://doi.org/10.1109/JLT.2024.3355491> (IF: 4.7)
2. M. G. Abdelfattah, **S. F. Hegazy**, S. S. A. Obayya, “Optical essential secret image sharing using unequal modulus decomposition and gyration transform,” *Optical and Quantum Electronics*, 56(1), p.107, 2024. <https://doi.org/10.1007/s11082-023-05639-2> (IF: 3)

3. M. Zidan, **S. F. Hegazy**, M. Abdel-Aty, S. S. A. Obayya, "Rapid Solution of Logical Equivalence Problems by Quantum-Computation Algorithm," *Applied Soft Computing*, 132, 109844, 2023. <https://doi.org/10.1016/j.asoc.2022.109844> (IF: 8.7)
4. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh, "Randomized ancillary qubit overcomes detector-control and intercept-resend hacking of quantum key distribution," *Journal of Lightwave Technology*, 40(21), 2022. <https://doi.org/10.1109/JLT.2022.3198108> (IF: 4.7)
5. R. El-Bashar, M. Hussein, **S. F. Hegazy**, Y. Badr, B. M. A. Rahman, K. T. V. Grattan, M. F. O. Hameed, S. S. A. Obayya, "Electrical performance of efficient quad-crescent-shaped Si nanowire solar cell." *Scientific Reports*, 12, 48 (2022). <https://doi.org/10.1038/s41598-021-03597-x> (IF: 4.6)
6. M. Abdelfattah, **S. F. Hegazy**, N. F. Areed, S. S. A. Obayya, "Optical cryptosystem for visually meaningful encrypted images based on gyrator transform and Hénon map." *Optical and Quantum Electronics*, 54, 113 (2022). <https://doi.org/10.1007/s11082-021-03469-8> (IF: 3)
7. Y. Gamal, B. M. Younis, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed, S. S. A. Obayya, "Highly Sensitive Multi-Functional Plasmonic Biosensor Based on Dual Core Photonic Crystal Fiber," *IEEE Sensors Journal* 22(7), 6731-6738 (2022). <https://doi.org/10.1109/JSEN.2022.3150904> (IF: 4.3)
8. K. A. Said, **S. F. Hegazy**, S. S. A. Obayya, "Basis expansion model for tracking and equalizing rapidly varying multimode fiber channels." *Optical Fiber Technology*, 67, 102695 (2021). <https://doi.org/10.1016/j.yofte.2021.102695> (IF: 2.7)
9. R. El-Bashar, M. Hussein, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed & S. S. A. Obayya, "Analysis of Highly Efficient Quad-Crescent-Shaped Si Nanowires Solar Cell," *Optics Express*, 29(9), 13641-13656 (2021). <https://doi.org/10.1364/OE.417652> (IF: 3.8)
10. Y. Gamal, B. M. Younis, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed & S. S. A. Obayya, "Highly efficient modified dual D-shaped PCF polarization filter," *Optical Fiber Technology*, 62, 102459 (2021). <https://doi.org/10.1016/j.yofte.2021.102459> (IF: 2.7)
11. D. S. Salem, **S. F. Hegazy**, S. S. A. Obayya, "Nanogold-loaded chitosan nanocomposites for pH/light-responsive drug release and synergistic chemo-photothermal cancer therapy" *Colloid and Interface Science Communications*, 41, 100361 (2021). <https://doi.org/10.1016/j.colcom.2021.100361> (IF: 4.5)
12. **S. F. Hegazy**, S. S. A. Obayya, "Extended Source of Indistinguishable Polarization-entangled Photons over Wide Angles of Emission," *Applied Physics Letters*, 117 (24), 244003 (2020). <https://doi.org/10.1063/5.0022646> (IF: 4)
13. M. Abdelfattah, **S. F. Hegazy**, N. F. Areed, S. S. A. Obayya, "Compact Optical Asymmetric Cryptosystem Based on Unequal Modulus Decomposition of Multiple Color Images," *Optics and Lasers in Engineering*, 129, 106063 (2020). <https://doi.org/10.1016/j.optlaseng.2020.106063> (IF: 4.6)

14. A. E. Al-Fiqi, H. Khallaf, **S. F. Hegazy**, A. Elsonbaty, H. Shalaby, S. S. A. Obayya, “Chaotic Polarization-Assisted LDPSK-MPPM Modulation for Free-Space Optical Communications,” *IEEE Transactions on Wireless Communications*, 18(9), 4225 – 4237 (2019).  
<https://doi.org/10.1109/TWC.2019.2920970> (IF: 10.4)
15. A. Elsonbaty, **S. F. Hegazy**, S. S. A. Obayya, “Simultaneous concealment of time delay signature in chaotic nanolaser with hybrid feedback,” *Optics and Lasers in Engineering*, 107, 342–351 (2018).  
<https://doi.org/10.1016/j.optlaseng.2018.03.027> (IF: 4.6)
16. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh, “Orthogonal quasi-phase-matched superlattice for generation of hyperentangled photons,” *Scientific Reports*, 7, 4169 (2017).  
<https://doi.org/10.1038/s41598-017-03023-1> (IF: 4.6)
17. **S. F. Hegazy**, Y. A. Badr, S. S. A. Obayya, “Relative-phase and time-delay maps all over the emission cone of hyperentangled photon source,” *Optical Engineering*, 56(2), 026114-026114 (2017).  
<https://doi.org/10.1117/1.OE.56.2.026114> (IF: 1.3)
18. A. E. Al-Fiqi, A. E. Morra, **S. F. Hegazy**, H. M. Shalaby, S. S. A. Obayya, K. Kazutoshi, “Performance Evaluation of Hybrid DPSK-MPPM Techniques in Long-Haul Optical Transmission,” *Applied Optics*, 55.21: 5614-5622 (2016). <https://doi.org/10.1364/AO.55.005614> (IF: 1.9)
19. A. Elsonbaty, **S. F. Hegazy**, S. S. A. Obayya “Numerical analysis of ultrafast physical random number generator using dual-channel optical chaos,” *Optical Engineering*, 55(9), 094105-094105 (2016).  
<https://doi.org/10.1117/1.OE.55.9.094105> (IF: 1.3)
20. A. Elsonbaty., **S. F. Hegazy**, S. S. A. Obayya “Simultaneous Suppression of Time-Delay Signature in Intensity and Phase of Dual-Channel Chaos Communication,” *IEEE Journal of Quantum Electronics*, 51(9), 1-9 (2015). <https://doi.org/10.1109/JQE.2015.2466176> (IF: 2.5)
21. A. E., Morra, H. M. Shalaby, **S. F. Hegazy**, S. S. A. Obayya “Hybrid direct-detection differential phase shift keying-multipulse pulse position modulation techniques for optical communication systems,” *Optics Communications*, 357, 86-94 (2015).  
<https://doi.org/10.1016/j.optcom.2015.08.081> (IF: 2.4)
22. **S. F. Hegazy**, S. S. A. Obayya “Tunable spatial–spectral phase compensation of type-I (ooe) hyperentangled photons,” *Journal of Optical Society of America B*, 32(3), 445-450 (2015).  
<https://doi.org/10.1364/JOSAB.32.000445> (IF: 1.9)

## Journal Papers in Review

**S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh, “Concurrent quantum-state transfer and stochastic-channel sniff “ submitted to *Optics Express*

M. G. Abdelfattah, **S. F. Hegazy**, S. S. A. Obayya, “Asymmetric Optical Cryptosystem with Secret-Key Sharing Based on Coherent Superposition and Normalized Decomposition” submitted to *Optical and Quantum Electronics*.

## INTERNATIONAL CONFERENCE PAPERS

1. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Dispersiveness of Faraday Mirrors Used to Compensate Random Polarization Distortion is Mitigated by the Randomness Itself,” *CLEO: Conference on Lasers and Electro-Optics, Quantum Key Distribution (QKD) II and Deployed Quantum Systems session (North Carolina, USA, May 2024)*.
2. Sondos Elsehimy, Khaled Khallaf, Hussein Kotb, **S. F. Hegazy**, Haitham Omran “Automated Quantum State Tomography of Four Bell States Generated by Compact SPDC Source,” *Optica Quantum 2.0 conference (Rotterdam, Netherlands, June 2024)*.
3. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Randomized gateway disables intercept-resend hacking of quantum key distribution,” *QCRYPT: Annual conference on quantum cryptography (Taipei, Taiwan, 2022)*.
4. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Polarization-randomized gateway against detector-blinding hacks of quantum key distribution,” *NUSOD: 22nd International Conference on Numerical Simulation of Optoelectronic Devices (Torino, Italy, 2022)*.
5. R. El-Bashar, M. Hussein, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed, S. S. A. Obayya “Efficient silicon nanowires solar cell,” *ACES: International Applied Computational Electromagnetics Society Symposium, (USA, 2021)*.
6. Y. Gamal, B. M. Younis, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed, S. S. A. Obayya, “Highly sensitive plasmonic PCF biosensor,” *ACES: International Applied Computational Electromagnetics Society Symposium (USA, 2021)*.
7. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Concurrent quantum-state transfer and stochastic-channel sniffing,” *CLEO: Conference on Lasers and Electro-Optics, Quantum Key Distribution (QKD) II and Deployed Quantum Systems session (San Jose, USA, 2020)*.
8. H. Garaelnaby, **S. F. Hegazy**, S. Hasab Elnaby “Parallel preparation of a set of arbitrary path-polarization hyperentangled states,” *Proc. SPIE 10933, Advances in Photonics of Quantum Computing, Memory, and Communication XII (Strasbourg, 2019)*.
9. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Transmission of polarization quantum state through a fiber-optic channel by swapped time-bin state,” *Proc. SPIE, Quantum Technologies (Strasbourg, 2018)*.
10. **S. F. Hegazy**, S. S. A. Obayya “Tunable spatial compensation for polarization entangled photons”, *Proc. SPIE, Nonlinear Optics and its applications (Strasbourg, 2018)*.
11. A. Elsonbaty, **S. F. Hegazy**, S. S. A. Obayya “Suppressed time delay signature in chaotic nanolasers with hybrid feedback”, *Proc. SPIE, Semiconductor Lasers and Laser Dynamics (Strasbourg, 2018)*.
12. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Hyperentangled Photons Generation Using Crossed Quasi-Phase-Matched Superlattice,” *CLEO: Conference on Lasers and Electro-Optics (San Jose, USA, 2017)*.



13. A. Elsonbaty, **S. F. Hegazy**, S. S. A. Obayya “Time Delay Signature of Chaotic Nanolasers and its Concealment”. *IEEE ACES: International Applied Computational Electromagnetics Society Symposium (Italy, 2017)*
14. **S. F. Hegazy**, A. E. Morra, S. S. Obayya, “Encoding M classical bits in the relative arrival time of dense-coded photons”. *Proc. SPIE, Quantum Optics*, pp. 99000L-99000L (Brussels, 2016).
15. **S. F. Hegazy**, J. El-Azab, Y. A. Badr, S. S. Obayya “Accurate relative-phase and time-delay maps all over the emission cone of hyperentangled photon source”. *Proc. SPIE, Nonlinear Optics and its applications*, pp. 98940Y-98940Y (Brussels, 2016).
16. **S. F. Hegazy**, J. El-Azab, Y. A. Badr, S. S. Obayya, “Optimal Ultra-wide Spatial-Spectral Windows for Hyperentangled Two-photon Emission.” *META: Conference on Metamaterials, Photonic Crystals and Plasmonics (Malaga, Spain, 2016)*.
17. A. E. Morra, **S. F. Hegazy**, A. Elsonbaty, S. S. Obayya, “Chaotic DPSK-MPPM Modulation Technique for a Physically Secure and Highly Robust Optical Communication System”. *IEEE ACES: International Applied Computational Electromagnetics Society Symposium (Honolulu, USA, 2016)*.
18. A. Elsonbaty, **S. F. Hegazy**, S. S. A. Obayya “A new technique for ultrafast physical random number generation using optical chaos”. *Proc. SPIE, Semiconductor Lasers and Laser Dynamics*, pp. 98921P-98921P (Brussels, 2016).

## NATIONAL CONFERENCE PAPERS

19. R. El-Bashar, M. Hussein, **S. F. Hegazy**, Y. Badr, M. F. O. Hameed, S. S. A. Obayya “Highly Efficient Crescent-Shaped Si Nanowire Solar Cells” *ICLA10: The 10th International Conference on Laser Applications: (Cairo 2019)*.
20. H. Garaelnaby, **S. F. Hegazy**, S. Hasab Elnaby “Setting Up Temporal and Spatial Compensation for High-fidelity / High-brightness Type-I Entangled Photons Source” *ICLA10: The 10th International Conference on Laser Applications (Cairo 2019)*. **[Best-poster Award]**
21. Y. Gamal, M. F. O. Hameed, Y. Badr, **S. F. Hegazy**, S. S. A. Obayya “Highly Efficient Modified D-shaped PCF Polarization Filter” *ICLA10: The 10th International Conference on Laser Applications (Cairo 2019)*.
22. **S. F. Hegazy**, S. S. A. Obayya, B. E. A. Saleh “Production of high fidelity hyperentangled photons using femtosecond laser pump”, *8th International Conference Mathematics and Information Sciences (Cairo 2019)* **[Obada Prize 2019, best presented research]**.
23. **S. F. Hegazy**, J. El-Azab, Y. A. Badr, S. S. Obayya “How to Optimally Detect Hyperentangled Photons”, *INCORE2016 : International Conference on Renewable Energy (Sharm El-Sheikh 2016)*.
24. **S. F. Hegazy**, J. El-Azab, Y. A. Badr, S. S. Obayya “How to Optimally Collect Hyperentangled photons,” *MTPR : 5th International Conference on Modern Trends in Physics Research (Aswan, 2014)*.

25. **S. F. Hegazy**, M. S. Mansour, L. El-Nadi “Enhanced Type-I Polarization-Entangled Photons Using CW Diode Laser,” *Proc. MTPR-10, WSPC, 9910, 211–220 (Sharm El-Sheikh, 2013)*. [**Best-poster Award**]
26. **S. F. Hegazy**, M. S. Mansour, L. El-Nadi “Spatial Decoherence of the Two-crystal Entangled Photons”, *HONET '10 : 10th International Symposium on High Capacity Optical Networks and Enabling Technologies, (Cairo 2010)*.
27. **S. F. Hegazy**, M. S. Mansour, L. El-Nadi “Efficient Generation and post-detection technique of Entangled Photons”, *ICLA6 : 6<sup>th</sup> International Conference on Laser Science and Applications (Cairo 2007)*. [**Best-poster Award**]

## INVITED TALKS & CONTRIBUTIONS TO PROFESSIONAL COMMUNITY SERVICE

1. Talk title: “*Qubits of Light*” hosted by the Physics Club, Zewail University of Science and Technology.
2. Talk title: “*Photons from Optical Modes to Communicating Qubits*” hosted by the Centre for Theoretical Physics (CTP), the British University in Egypt (Nov. 2024).  
[https://ctp.bue.edu.eg/NewsPanel\\_37.html](https://ctp.bue.edu.eg/NewsPanel_37.html)
3. Talk title: “*Photon flying Qubits : Singles & Entangled*” Hosted by Laboratoire Interdisciplinaire de l'Université Française d'Égypte (UFEID Lab), Université Française d'Égypte (Sept. 2024).  
[https://www.linkedin.com/posts/sherinmoussa\\_starting-our-first-research-lab-seminar-for-activity-7246138667075817472-6H\\_y?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/sherinmoussa_starting-our-first-research-lab-seminar-for-activity-7246138667075817472-6H_y?utm_source=share&utm_medium=member_desktop)
4. Talk title: “*Quantum Encryption: Communication Security in the Quantum Computing Era (Hardware approach)*” in the workshop “*The Quantum Revolution: A Journey from Theory to Possibility of Application in Egypt*” hosted by “مجلس الوزراء – مركز المعلومات ودعم اتخاذ القرار” (July 2024).  
<https://gate.ahram.org.eg/News/4904382.aspx>
5. Talk title: “*Quantum key distribution: practical aspects*” in the global event “World Quantum Day” (Apr. 2023). (Talk record: <https://www.youtube.com/watch?v=OzsVt7xasgY>)
6. Talk title: “*Photonic Entanglement*” in the conference “3rd international conference in Materials Science and engineering” hosted by: Faculty of Engineering, Benha University (Mar. 2023).

7. Talk title: ***“Practical security of quantum key distribution”*** in the GUC-Ulm Quantum Technologies School and Workshop hosted by: DAAD : GUC, Faculty of Information Engineering and Technology, German University in Cairo (Nov. 2022).  
  
[https://www.guc.edu.eg/en/home/news/news\\_details.aspx?newsID=1709](https://www.guc.edu.eg/en/home/news/news_details.aspx?newsID=1709)
8. Talk title: ***“Photonic Entangled Qubits”*** in the GUC-Ulm Quantum Technologies School and Workshop hosted by: DAAD : GUC , Faculty of Information Engineering and Technology, German University in Cairo (Nov. 2022).  
  
[https://www.guc.edu.eg/en/home/news/news\\_details.aspx?newsID=1709](https://www.guc.edu.eg/en/home/news/news_details.aspx?newsID=1709)
9. Talk title: ***“Inviting Photonics Folks to Photonic Qubits : Optical Processing of Quantum Information”*** Hosted by: Electronics and communications Department, Faculty of Engineering, Ain Shams University (Sept. 2022).
10. Talk title: ***“Advances in Quantum Photonics”*** Hosted by: IEEE Chapter workshop, “New Frontiers in Photonics Technology”, Zewail City of Science and technology (2019).
11. Talk title: ***“Production of high fidelity hyperentangled photons using femtosecond laser pump”*** Hosted by “Topical Society of Laser Science workshop”, (Central Library, Cairo university, 2018).
12. Talk title: ***“Nobel Prize in Physics 2018”*** Hosted by: Science market #02, Cairo University, June 2018.

## PROFESSIONAL SOCIETIES AFFILIATIONS

- IEEE, Institute of Electrical and Electronics Engineers, IEEE Member # 95806874  
<https://ieeexplore.ieee.org/author/37085547843>
- Optica (formerly Optical Society of America, OSA), OPTICA Member # 1112467
- SPIE, International Society of Optics and Photonics, SPIE ID: 3719979  
<https://spie.org/profile/Salem.Hegazy-275654?SSO=1>
- Egyptian Society of Optical Science and Applications
- Topical Society of Laser Sciences

## CONTRIBUTIONS TO SCIENTIFIC COMMUNITY

### ✓ **Journal Editorial Activities:**

- **Editorial board member** for Academia Quantum (ISSN: 3064-979X),  
<https://www.academia.edu/journals/academia-quantum/about/editorial-board>
- **Associate Editor** for Journal of Laser Science and Applications (ISSN: 1687-8892),  
<https://jlsa.journals.ekb.eg/>

### ✓ **Journal Reviewer Activities**

#### **Selected Journals:**

- Journal of Advanced Research, Elsevier
- Optics and Lasers in Engineering, Elsevier
- IEEE Photonics Technology Letters
- Applied Physics Letters, AIP
- Optical Engineering, SPIE
- Optical and Quantum Electronics, SpringerNature
- Optics Express, Optica

### ✓ **Reviewer Activities for funded research projects**

- ITIDA: Information Technology Industry Development Agency [two research proposals]
- NTRA: National Telecom Regulatory Authority (NTRA) [one research proposal]
- STDF: Science and Technology Development Fund [one research proposal]

### ✓ **TPC Member**

- IEEE international Conference on Electrical engineering 2024 (14th ICEENG 2024)

### ✓ **Symposium Co-Organizer**

in 6<sup>th</sup> International Conference on Laser Science and Applications (ICLA6), 2007.

### ✓ **Member of the organizing committee**

of “the 8th International Conference of Laser Applications” March 13-17, 2011, Cairo.

### ✓ **Member of the academic advising team** in the National Institute of Laser Enhanced Sciences, Cairo University, Giza, Cairo, Egypt (2018-2019).

## **COURSES TAUGHT**

- Optics & Photonics (Undergraduate course, Zewail University)
- Lasers & Optical Coherence (Undergraduate course, Zewail University)
- Optoelectronics (Undergraduate course, Université Française d'Égypte)
- Quantum computation and Quantum information-I (Undergraduate course, Zewail University)
- Quantum computation and Quantum information-II (Undergraduate course, Zewail University)
- Quantum computer programming (Undergraduate course, Zewail University)
- Modern Physics Lab (Undergraduate course, Zewail University)
- Waves and Optics Lab (Undergraduate course, Zewail University)
- Graduation Projects (17 Undergraduate Senior-level students, Zewail University)
- Laser Physics II (Postgraduate course, Cairo University)
- Quantum Photonics (Postgraduate course, Cairo University)
- Nonlinear Optics (Postgraduate course, Cairo University)
- Optical instrumentation (Postgraduate course, Cairo University)
- Semiconductor Physics (Postgraduate course, Cairo University)
- Laser Lab (Postgraduate course, Cairo University)

## **PROFESSIONAL CERTIFICATIONS**

- Project Management Fundamentals, 2008.
- Cisco Certified Network Associate (CCNA), 2006.
- Cisco Certified Network Professional (CCNP), 2008.

## **LANGUAGES**

- English
- Arabic

## **SOFTWARE SKILLS AND COMPETENCES**

- MATLAB
- Mathematica
- Labview
- Lumerical
- Verilog