Hichem Eleuch

Emails: hichem.el-euch@uphf.fr
heleuch@fulbrightmail.org
hichemeleuch@yahoo.fr

Contact Number: +33 769370032

Research Interests: Quantum Physics, Quantum Science and Technology, Quantum Optics, Quantum Systems and Com

Education

Sept 1995 - June 1998 — **PhD** in Quantum Physics. ***Kastler Brossel Laboratory****
***Ecole Normale Supérieure* (ENS) (Paris Sciences et Lettres University) /**
University Pierre and Marie Curie (Sorbonne University) Paris, France
Title: Theoretical study of quantum fluctuations in emitted light from semiconductor microcavities.
Supervisors: Prof. Elisabeth Giacobino and Prof. Claude Fabre

Sept 1995 — Equivalence of DEA (Master Degree) in Quantum Physics
***Ecole Normale Supérieure* (ENS)**

1989 - 1995 — **Diploma**, Electrical Engineering and Information Technology (equivalent to Master Degree)
***Technical University of Munich,* Germany**
Title of the Diploma Thesis (Diplomarbeit = Master Thesis): Electromagnetically induced transparency due to Laser driven three-level atoms.
Supervisors: Prof. Peter Russer (***Technical University of Munich***)
Prof. Axel Schenzle (***Ludwig Maximilian University and Max Planck Institute for Quantum Optics***)

Additional Qualifications:

June 2004 — **Habilitation:** Fluctuations, correlations, and non-linearities in quantum optics and applications

*The Kastler Brossel laboratory is home to three Nobel Prize laureates in Physics, namely:
Serge Haroche (2012), Claude Cohen-Tannoudji (1997) and Alfred Kastler (1966).
The Nobel Laureate of Physics 2022, Alain Aspect has also worked as a Researcher for several years at this Lab.

Professional Experience

Jan 2025 -	**Professor–Chair of Excellence in Quantum Information and Artificial Intelligence**, Université Polytechnique Hauts-de-France, Valenciennes, France
Sep 2020 - Dec 2025	**Full Professor**, University of Sharjah, Sharjah, UAE
Feb 2025 -	Research Affiliate, New York University Abu Dhabi, UAE
Sep 2022 - Present	PI of the Research Group: Quantum Information, Quantum Simulation, and Quantum Processing
Jan 2018 - Aug 2020	**Full Professor**, Abu Dhabi University, Abu Dhabi, UAE
Aug 2017 - Jan 2018	Visiting Full Professor, Abu Dhabi University, Abu Dhabi, UAE
Jan 2010 - Present	**Full Professor**, University of Carthage
May 2016 - Aug 2017	TEES Research Associate Professor, Institute of Quantum Science and Engineering ***Texas A&M University***, College Station, Texas, USA
Oct 2013 - Mar 2016	Visiting Professor, Department of Physics, ***McGill University***, Montreal, Canada
Nov 2014 - Aug 2015	Invited Researcher, Department of Physics, ***University of Montreal***, Canada
Jul 2012 - Jul 2013	Invited Researcher, Research Group of **Prof. Gilles Brassard** (Quantum Inf. Processing), ***University of Montreal***, Canada
Jun 2011 - Jun 2012	Guest Scientist, ***Max Planck Institute for the Physics of Complex Systems*** Dresden, Germany
Sep 2008 - Sep 2010	Researcher, Institute for Quantum Studies/Institute of Quantum Science and Engineering, (Research Group of **Prof. M. O. Scully, *Texas A&M University***, College Station & Visiting Scientist, ***Princeton University***, Princeton, New Jersey, USA
Jan - Apr 2008	**Fulbright Scholarship**, Institute for Quantum Studies, ***Texas A&M University***, College Station, Texas, Research group of **Prof. M. O. Scully**
Sep 2004 - Jan 2010	Associate Professor, University of Carthage. National Institute of Applied Sciences and Technology, Tunis, Tunisia (Institut National des Sciences appliquées et de Technologie, INSAT)
Nov 2006 - 2007	**Scientific Consultant** at the **National Center for Nuclear Sciences and Technologies**, Tunis, Tunisia (Centre National des Sciences et Technologies Nucléaires **CNSTN**).
Jan - Apr 2006	Visiting Scientist, Quantum Optics research group of **Prof. H. Carmichael**, **University of Auckland**, Auckland, New Zealand
2003 - 2006	Associate Researcher, **National Center for Nuclear Sciences and Technologies** Tunis, Tunisia
1999 - 2004	Assistant Professor INSAT, University of Carthage
1998 - 1999	Adjunct - Assistant Professor INSAT, University of Carthage
1998 - 2002	Adjunct - Assistant Professor Ecole Polytechnique (EPT) Tunis, Tunisia
2001 - 2003	Adjunct - Assistant Professor Institute of Higher Studies Tunis, Sousse and Sfax, Tunisia (L'Institut des Hautes Etudes, IHE)
2001 - 2003	Adjunct - Assistant Professor, Faculty of Economic Science and Management Sfax, Tunisia (Faculté des Sciences Economiques et de Gestion, FSEG)
1995 - 1997	Adjunct - Lecturer, University of Cergy-Pontoise, Paris, France

Awards and Honors

2025-	**Fellow of The World Academy of Sciences (TWAS).**
2024	**Abdul Hameed Shoman Prize in Science (Quantum Physics) for Arab Researchers**
2024-	Selected Member of the African Academy of Sciences (AAS) - Mentorship Scheme
2023-	Member of the Governing Council of the Arab Physical Society (ArPS)
2023	Excellence Award, Arab Physical Society
2021-	**Member of the Mohammed bin Rashid Academy of Scientists, UAE**
2021-	Member of Sigma Xi, The Scientific Research Honor Society, USA.
2019-	Fellow of the African Academy of Sciences
2019-2020	Research Award, Abu Dhabi University, UAE
2018	Research Fellow Award, Abu Dhabi University, UAE
June 2011 - 2012	**Guest Scientist, Max Planck Institute for the Physics of Complex Systems**, Germany
Jan - Apr 2008	**Fulbright Visiting Scholar** *Council for International Exchange of Scholars and United States Department of State, USA*
2006 - 2013	Regular Associate Member, International Center of Theoretical Physics Trieste, Italy
Sep 1995 - Jul 1998	Laureate Fellowship for PhD, *Ministry of Research and Higher Education of Tunisia*
Sep 1989 - Jun 1995	Laureate Fellowship for engineer studies (+1 year German Language) DAAD (*Germany*) and *Ministry of Research and Higher Education of Tunisia*

Research Indicators

- Over 300 publications in peer-reviewed journals (see the list of publications below)
- More than 60 invited talks
- Participated in more than 70 international conferences
- 21 US Patents granted, and more than 20 US patents filed (in review process).
  https://patents.justia.com/inventor/hichem-el-euch
- H-factor: 45 (Web of Science), 47 (Scopus), 50 (Google Scholar).
- Total received funds in the last 10 years: More than 1.25 million euros.
- Erdős number: 4
  https://mathscinet.ams.org/mathscinet/freetools/collab-dist?source=867311&target=189017
- Among the top 2 % scientists in the field of general physics (Stanford University's List) for both the career-long and single years (2019 & 2020 & 2021 & 2022 & 2023 & 2024) rankings.
  https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/3
  https://drive.google.com/file/d/1bUJrvurVVBbxSl9eFZRSHFif7tt30-5U/view
  https://data.mendeley.com/datasets/btchxktzyw/2
  https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/7 https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/8/files/7e1d15e5-b97
- Ranked among the top 0.5 % of scholars in the past five years (ScholarGPS).
  https://scholargps.com/search.php?type=profile&year=2022&expert_search=true&p=31&ranking_duration=LAST_5_YEARS&expertise=Physics&e_ref=b62e26d4e73047c3a2b2#620

Patents

1. Frequency-Tunable Quantum Microwave to Optical Conversion System, M. Qasymeh and H. El Euch.
   Patent No: US 10,824,048 B2. Date of the Patent Publication: Nov. 3, 2020.
   (Supported by TAKAMUL for patent filling, Abu Dhabi Department of Economic Development, 50 000 AED).

2. Continuation of the patent 1: Frequency-Tunable Quantum Microwave to Optical Conversion System,
   M. Qasymeh and H. El Euch.
   Patent No: US 11,294,259 B2. Date of the Patent Publication: April. 5, 2022.

3. Wideband Graphene-Based Electro-Optic Entangler, M. Qasymeh, and H. El Euch
Patent No: US 11,048,107 B2. Date of the Patent Publication: June. 29, 2021.

4. Quantum Random Access Memory, H. El Euch, M. Zidan, M. Abdel-Aty, A. H. Abdel-Aty, A. Khalil
Patent No: US 11,093,850 B1. Date of Publication: August 17, 2021.

5. Graphene Multi-Layered Structure for ultra-sensitive microphotonic devices with microvolts inputs, M. Qasymeh and *H. El Euch*, Patent No: US 11,314,144 B2. Date of Publication: April 26, 2022.

6. Optically Activated Graphene-Based Microwave Field Squeezer, M. Qasymeh and H. El Euch
Patent No: US 11,320,719 B2. Date of the Patent Publication: May. 3, 2022.

7. Continuation of the patent 3: Wideband Graphene-Based Electro-Optic Entangler, M. Qasymeh and H. El Euch.
Patent No: US 11,513,376 B2. Date of the Patent Publication: November 29, 2022.

8. Continuation of the patents 3 and 7: Wideband Graphene-Based Electro-Optic Entangler, M. Qasymeh and H. El Euch, Patent No: US 11,513,377 B2. Date of the Patent Publication: November 29, 2022.

9. Quantum Random Access Memory system, H. El Euch, M. Zidan, M. Abdel-Aty, and A. H. Abdel-Aty, A. Khalil
Patent No: US 11,651,266 B2. Date of Publication: May 16, 2023.

10. Frequency-Tunable Quantum Microwave to Optical Conversion Process,
M. Qasymeh and H. El Euch.
Patent No: US 11,675,246 B2. Date of the Patent Publication: June 13, 2023.

11. Continuation of the patents 1 and 2: Frequency-Tunable Quantum Microwave to Optical Conversion System,
M. Qasymeh and H. El Euch.
Patent No: US 11,679,982 B2. Date of the Patent Publication: June 20, 2023.

12. Continuation of the patents 3,7 and 8: Wideband Graphene-Based Electro-Optic Entangler
M. Qasymeh and H. El Euch
Patent No: US 11,803,070 B2. Date of the Patent Publication: October 31, 2023.

13. System for Coherent Microwave Transmission Using a Non-Refrigerated Waveguide
M. Qasymeh and H. El Euch
Patent No: US 11,837,769 B2. Date of the Patent Publication: December 5, 2023.

14. Continuation of the patents 3,7,8 and 12: Wideband Graphene-Based Electro-Optic Entangler
M. Qasymeh and H. El Euch
Patent No: US 11,921,364 B2. Date of the Patent Publication: March 5, 2024

15. Versatile quantum microwave to optical conversion process
M. Qasymeh and H. El Euch
Patent No: US 12,055,837 B2. Date of the Patent Publication: August 6, 2024

16. Tunable Quantum Microwave to Optical Conversion System
M. Qasymeh and H. El Euch
Patent No: US 12,092,942 B2. Date of the Patent Publication: September 17, 2024

17. Optical Activated Graphene-Based Microwave Field Squeezer System
M. Qasymeh and H. El Euch
Patent No: US 12,105,399 B2. Date of the Patent Publication: October 1, 2024

18. Quantum Teleportation Network Using a System of Electronically Enabled Graphene Waveguides
M. Qasymeh, M. Asjad and H. El Euch
Patent No: US 12,149,292 B2. Date of the Patent Publication: November 19, 2024

19. Optically Activated Graphene-Based Microwave Field Squeezer
M. Qasymeh, and H. El Euch
Patent No: US 12,235,564 B2. Date of the Patent Publication: February 25, 2025

20. Quantum Consensus Protocol for Managing Quantum Blockchains
H. El Euch, M. Zidan, M. Qasymeh, and A. Khalil
Patent No: US 12,445,276 B2. Date of Patent: Oct. 14, 2025

21. Real-Time Quantum Random Access Memory
H. El Euch, M. Zidan, A. H. Abdel-Aty, M. Abdel-Aty, and A. Khalil
Patent No:12,493,808 B2. Date of Publication: Dec. 9, 2025

Reviewer

- Nature Communications
- Scientific Reports; Communications Physics
- MITACS (Canadian Funding Agency); Austrian Science Fund (FWF)
- Dutch Research Council (NWO) [Netherlands]
- Physical Review Letters; Physical Review A
- Physical Review B; Physical Review Applied
- Physical Review Research
- Academia Quantum (Senior Editor)
- Annals of Physics; Nanomaterials
- Optics Express; Physics Letters A
- Photonics (Topical Advisory Panel Member)
- Proceedings of the Royal Society A; Journal of the Optical Society of America B; Optics Letters
- Laser Physics Letters; Laser Physics; Solid State Communications; Sensors; European Journal of Physics D
- Optics Communications; Journal of Modern Physics; European Physical Journal Plus; Journal of Applied Physics
- Fortschritte der Physik - Progress of Physics; Optics & Laser Technology; Physica A; Physica E
- Molecular Physics; Frontiers of Physics; Canadian Journal of Physics; Few-Body Systems
- International Journal of Theoretical Physics; Energies; Chaos, Solitons & Fractals; Energy Reports
- International Journal of Modern Physics B; Results in Physics; Invited Editor for Frontiers in Physics special issue
- Entropy; Invited Guest Editor for the Special Issue on" Coherence in Open Quantum Systems", Entropy
- Modern Physics Letters B; Invited editor for Computer Communications special issue
- International Journal of Quantum Information; Guest editor for Applied Sciences special issue
- Chinese Physics B; Crystal; Journal of Low Temperature Physics
- Optical Review; Invited Guest Editor for Special Issue "Chaos, Disorder and Quantum Entanglement" (Entropy)
- Optik; Acta Physica Polonica B; International Journal of Nanoscience; Journal of Communication
- Nuclear Science and Techniques; Neural Computing and Applications
- Open Physics; Asian Journal of Spectroscopy; Information; SETIT-IEEE Conferences
- Mathematical Reviews (American Mathematical Society); Zentral Blatt MATH
- AIMS Mathematics; Journal of Mathematical Physics; Mathematics; Axioms
- Applied Mathematics and Computation; Mathematical and Computational Applications
- Numerical Methods for Partial Differential Equations; Fractal and Fractional
- Neuronal Computing and Applications; Applied Mathematics & Information Sciences
- Journal of Number Theory; Journal of Nonlinear Mathematical Physics

Grants Received in the Last 12 Years

- 2025-2028, Euro-Tell 2025 project, "Quantum Learning and Large Language Models (LLMs): Towards a New Approach for Personalized Medicine in the Prevention of Chronic Diseases", Université Polytechnique Hauts-de-France, 400 000 Euro, (Associate Member).

- 2026-2028, Abu Dhabi University, " Fractional Quantum Calculus: Revealing Nonlinear Memory in Quantum and PV Systems" 45 000 AED (Co-PI).

- 2025-2026, University of Sharjah, (Operational Grant) Quantum Information, Quantum Simulation, and Quantum Processing Research Group 80 000 AED (PI).

- 2024-2025, University of Sharjah, (Operational Grant) Quantum Information, Quantum Simulation, and Quantum Processing Research Group 85 000 AED (PI).

- 2024-2026 Target Research Fund, "*Controlling the quantum-memory-assisted entropic uncertainty relation via reservoir engineering*" University of Sharjah, 200 000 AED (PI).

- 2023-2025, Competitive Research Fund, University of Sharjah, "*Semiconductor cavity QED non-classical phenomena in ultrastrong coupling regime*", 120 000 AED (PI).

- 2023-2024, University of Sharjah, (Operational Grant) Quantum Information, Quantum Simulation, and Quantum Processing Research Group 80 000 AED (PI).

- 2023-2024, Targeted Research Fund, Sharjah University, "*Dynamics of quantum correlations in two interacting Tavis-Cummings atoms (qubits) in a radiation field coupled to dissipative thermal environments*", 200 000 AED (Co-Pi).

- 2021-2024, Fundamental Research Grant Scheme (FRGS), Ministry of Higher Education, Malaysia, "*Theory for Entanglement in a Quad Guided Waves Quantum Coupler with Kerr Nonlinearity.*", 120 000 RM (Collaborator).

- 2022-2024, Competitive Research Fund, Sharjah University, "*Novel devices based on nonlinear and quantum effects in graphene layers*", 42000 AED (PI).

- 2023-2024 "*Exact solutions of the Bloch equations: the generalized q-deformed hyperbolic cosine function*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 37 000 AED (Co-Pi).

- 2022-2023 "*Analysis of a multi-level atom by deriving exact solutions for the Bloch Equations: Pulse Shape Investigation*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (Co-Pi).

- 2022-2023, University of Sharjah, (Operational Grant) Quantum Information, Quantum Simulation, and Quantum Processing Research Group 100,000 AED (PI).

- 2020-2023, Abu Dhabi Award for Research Excellence 2019, "*AARE19-062 Graphene-Based Modulator for Passive Transmission and White Light Communications*", 985 000 AED (PI until August 2020 and then became a CO-Pi due to my move to the University of Sharjah).

- 2022-2023, Funding from Umm Al-Qura University Saudi Arabia, "*Quantum Characteristics of some solid-state systems: New proposal of information and energy storage*", 100 000 SAR (Consultant).

- 2021-2022, International Partnership Research Grant Program, Funding from Prince Sattam Bin Abdulaziz University Saudi Arabia, "*Quantum Information of Some Natural and Artificial Atoms.*", 110 000 SAR (Consultant).

- 2022 "*Quantum Switches Based on Electrically Activated Graphene Multilayers*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (Co-Pi).

- 2022 "*Analysis of a multi-level atom by deriving exact solutions for the Bloch Equations: Pulse Shape Investigation*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (Co-Pi).

- 2021-2022, "Renewable Energy Transfer and Quantum Correlations in Realistic Quantum Confined Systems", funding from King Abdulaziz University, SA; 100 000 SAR (Co-Pi).

- 2021 "*Atomic population inversion in a two-level atom for shaped and chirped laser pulses*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 40 000 AED (Co-Pi).

- 2020 "*Quantum sensor: Detecting topological edge states with the dynamics of a qubit*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (PI).

- 2020 "*Design of Optimal Quantum Circuits*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (PI).

- 2019 Funding from TAKAMUL for patent filling, Department of Economic Development, Abu Dhabi, 50 000 AED.

- 2020 "*Experimental Realization of Microwave and Photonic Quantum Entanglement*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 50 000 AED (Co-PI).

- 2020 "*Analytic Solutions of Solitary Waves in Three-Level Unbalanced Dense Media*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (Co-PI).

- 2020 International Partnership Research Grant, Funding from Prince Sattam Bin Abdulaziz University Saudi Arabia; 110 000 SAR (Co-PI).

- 2019 "*Quantum correlations and coherence in a driven two-qubit system in non-Markovian environment*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (PI).

- 2019 "*Exceptional points and non-linearity in open quantum systems*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (PI).

- 2019 "*Analytical solutions to the Schrödinger equation with a short-range potential and applications to nuclear science*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 25 000 AED (Co-PI).

- 2018 "*Planetary exploration Physical conditions and simulations*" Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (PI).

- 2018 "*Dynamics in terahertz semiconductor microcavity quantum noise spectra*" . Funding from the Office of Research & Sponsored Programs, Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (PI).

- 2018 "*Using Quantum Algorithms to Solve Travelling Salesman Problem*" Funding from The Office of Research & Sponsored Programs (Center of Excellence), Abu Dhabi University, Abu Dhabi, UAE; 35 000 AED (Co-PI).

- 2018 "*Q-deformed function, q-calculus, quantum asymmetries, and their applications*" Funding from the Office of Research & Sponsored Programs (Faculty Research Incentive Grant), Abu Dhabi University, Abu Dhabi, UAE; 20 000 AED (Co-PI).

- 2018 "*Novel Graphene-Based Information Transmission Systems*" Funding from The Office of Research & Sponsored Programs (Center of Excellence), Abu Dhabi University, Abu Dhabi, UAE; 40 000 AED (Co-PI).

- 2016-2018 Funding from King Fahd University of Petroleum and Minerals, Saudi Arabia; 135 000 SAR (Scientific Consultant).

- 2016 "*New Quantum Correlations and Novel Quantum Models"* Funding from University Prince Sattam Bin Abdulaziz University, Saudi Arabia; 100 000 SAR (Co-PI).

- 2015 Funding from INTRIQ(Institut Transdisciplinaire d'Information Quantique: Transdisciplinary Institute for Quantum Information, Quebec, Canada): 36 000 CA$ (PI).

- 2014 Funding from Prince Sattam Bin Abdulaziz University Saudi Arabia; 50 000 SAR (Co-PI).

- 2014 Funding from INTRIQ (Canada): 9 000 CA$ (Co-PI).

Collaborators, Last 10 Years **(Selected list)**

- M. O. Scully, Texas A&M University and Princeton University
- I. Rotter, Max Planck Institute for the Physics of Complex Systems
- M. Hilke, McGill University
- V. Hussein, University of Montreal
- R. Mackenzie, University of Montreal
- Y. V. Rostovtsev, North Texas University
- S. Suckewer, Princeton University
- P. K. Jha, University of Berkely
- C .H. R. Ooi, University of Malaya, Kuala Lumpur
- S. Das, Niels Bohr Institute
- H. R. Jauslin, S. Guerin, University of Bourgogne
- A. Prasad, University of Delhi
- H. Bahlouli, King Fahd University of Petroleum and Minerals

MS and Ph.D. Dissertations Supervised and Post-docs Monitored

Post-docs

- Abdul Basit Abdul Hai (Sept 2023-Present)
- Mohammed Zidan (June 2020-Present)
- Amjad Sohail Shah (March 2023-March 2024)
- Muzzamal Iqbal Shaukat (July 2020-August 2022)
- Jitendra Verma (January-March 2022)
- Ali Homid (September-December 2020)
- Muhammed Asjad (January 2021-February 2022)

PhD Theses

- Muhammad AbuGhanem (Ain Shams University, Cairo (Egypt), expected date of the thesis defense: 2025)
- Houssem Jabri, 2008 (Associate Professor at University of Jendouba, Tunisia)
- Arbi Mejri, 2014 (Researcher at National Center for Nuclear Sciences and Technologies, Tunisia)
- M. Ali Amdouni, 2016 (Lecturer at Preparatory Engineering Institute, Bizerte, Tunisia)

Masters Theses

- Firoz Abdul Aziz Chogle, 2025
- Khalil Ben Fredj, 2008 (Medical Physicist at Hospital Ennasr, Tunis)
- Ghassen Dridi, 2007 (Postdoc at Ecole Polytechnique, Paris)
- Imen Hassini, 2007 (Teacher at Secondary School Beja, Tunisia)
- Arbi Mejri, 2007 (Radiation Security Engineer at National Center for Nuclear Sciences and Technologies, Tunisia
- Riadh Rebhi, 2004 (Research Fellow at Center for Quantum Technologies, National University of Singapore)
- Nidhal Fraj, 2004
- Slim Ben Othman, 2004 (Assistant at University El Manar, Tunisia)
- Jamel Jouini, 2003
- Houchem Jabri, 2002 (Associate Professor at University of Jendouba, Tunisia)
- Nader Rachid, 2001 (Assistant Professor at University of Carthage, Tunisia)
- Belhassen Chamkhi Attaya, 2000 (Consultant Core Network at Telefónica Germany)
- Samia Hadded, 1999 (Assistant Professor at University of Carthage, Tunisia)

Institute of Quantum Science and Engineering (Texas A&M University)

(Monitored) May 2016 - Aug 2017

- Tuguldur Begzjav (Ph.D. student at Texas A&M University, College Station, Texas)
- Han Cai (Ph.D. student at Texas A&M University, College Station, Texas)
- Sheng-Wen Li (Post-doc researcher at Texas A&M University, College Station, Texas)
- Reed Nessler (Post-doc researcher at Texas A&M University, College Station, Texas)

Department of Mathematics (University of Montreal) Sep 2012 - Jun 2013

Masters Thesis Monitored

- Anaelle Hertz (Currently a Ph.D. student at Centre for Quantum Information and Communication, École Polytechnique, Université Libre de Bruxelles, Bruxelles, Belgium)

Institute of Quantum Science and Engineering (Texas A&M University) Sep 2008 - Aug 2010

PhD Theses Monitored

- Pankaj Jha (Currently a Postdoc at the University of California, Berkeley)
- Eyob Sete (Currently a Senior Research Scientist Rigetti Quantum Computing, Berkeley, California)
- Dong Sun (Currently a Research Fellow at Nanyang Technological University, Singapore)
- Luqi Yuan (Currently a Postdoc at Stanford University, California)

Postdoc Monitored Jan - Aug 2010

- Sumanta Das (Currently an Assistant Professor at Niels Bohr Institute, Copenhagen University)

Membership in Scientific Committees

2025-	Expert, UAE Research Map
2025 -	**Fellow of The World Academy of Sciences (TWAS)**
2025 -	Judge in QInnovision World Challenge, Quantum Innovation Summit 2025, (Dubai, February)
2024 -	Selected Member of the African Academy of Sciences (AAS) - Mentorship Scheme
2023 -	Member of the Governing Council of the Arab Physical Society (ArPS)
2022 -	PI of the Research Group: Quantum Information, Quantum Simulation, and Quantum Processing
2021 -	**Member of the Mohammed bin Rashid Academy of Scientists, UAE**
2021 -	Member of Sigma Xi, The Scientific Research Honor Society, USA.
2019 -	**Fellow of the African Academy of Sciences**
2019-	Member of the American Physical Society (APS)
2019 - 2020	Member in National Committee for EmSAT Physics, Ministry of Education, UAE
2016 - 2017	Member in Program Committee for Quantum Africa 4
2006 - 2013	Regular Associate Member, Abdus Salem International Centre of Theoretical Physics Trieste, Italy
Nov 2006 - 2007	**Scientific Consultant**, National Center for Nuclear Sciences and Technologies, (Tunis, Tunisia)
	(Centre National des Sciences et Technologies Nucléaires (CNSTN))
Jan 2003 - Nov 2006	Associate Researcher to the National Center for Nuclear Sciences and Technologies (Tunis, Tunisia)
May 2005 - Sep 2008	University board member representative of Associate and Full Professors
	Member of the internal committee for educational new reform for Bachelor-Master-PhD studies
	Member of the internal committee for research
	University of Carthage, Tunisia

Pedagogical Materials

I published three manuals (internal publications) for the 1^{st} year students at INSAT:

- Course of Electricity for 1^{st} year in Chemistry and Biology
- Course of Mechanics for 1^{st} year in Chemistry and Biology
- Course of Optics for 1^{st} year in Mathematics-physics

Teaching Experience

Graduate Level Courses:

Sept-Dec 2024	Methods of Mathematical Physics University of Sharjah
Sept-Dec 2023	Quantum Optics and Photonics University of Sharjah
Sept-Dec 2022	Methods of Mathematical Physics University of Sharjah
Sept-Dec 2012	Fundamental concepts of photonics (For Graduates and Undergraduates) Ecole Polytechnique, Montreal
March 2012	Stochastic Differential Equations and Integral Equations Master of Finance, IHEC, Sfax/Tunisia
2004 - 2008	Quantum Mechanics, Master of Measurement and Instrumentation INSAT, University of Carthage, Tunisia
2001 - 2003	Variation Calculus (Modeling and Optimization), Master of Operational Research FSEG, Tunisia
2000 - 2001	Laser Physics and Applications, DEA (=Master) Measurement and Instrumentation INSAT, University of Carthage
	Quantum Mechanics, DEA (=Master) Measurement and Instrumentation INSAT, University of Carthage
2001 - 2004	Quantum Mechanics, Master of Measurement and Instrumentation, INSAT, University of Carthage
2001 - 2002	Invited Course Seminar: Differential Equations and Stochastic Differential Equations for Researchers in the field of Finance FSEG, Tunisia
2002 - 2003	Differential Equations and Stochastic Differential Equations Master of Finance IHE, Tunisia
2000 - 2008	Laser and Optronics 5^{th} year Measurement and Instrumentation engineering INSAT, University of Carthage

Undergraduate Level Courses:

Feb - Apr 2006 (12 Lectures)	Basic Concepts in Physics University of Auckland, New Zealand
2022- 2025	Physics 1 University of Sharjah
Sept-Dec 2025	Mathematical Physics 1 University of Sharjah
2021 -2023	Quantum Mechanics 1 University of Sharjah
2021- 2025	Quantum Mechanics 2 University of Sharjah
2020 -2022	Remedial Physics University of Sharjah
2017 - 2020	Physics 102 (Mechanics) 1^{st} year engineering, Abu Dhabi University, UAE Physics 201 (Electricity and Magnetism) 1^{st} year engineering, Abu Dhabi University, UAE
1998 - 2008	Physics I (Electricity) 1^{st} year Chemistry and Biology (CBA), INSAT, University of Carthage
1998 - 2008	Physics II (Mechanics) CBA, INSAT, University of Carthage
1998 - 2001	Optics 1^{st} year Mathematics-Physics (MPI), INSAT, University of Carthage
1999 - 2008	Laboratory course: Physics I CBA, INSAT, University of Carthage
1998 - 2002	TD (=Recitation/Tutorial) Waves and Fields 3^{rd} year Engineering Ecole Polytechnique (EPT) Tunis, Tunisia
1998 - 2001	TD Quantum Mechanics and Statistical Physics 3^{rd} year Engineering Ecole Polytechnique (EPT) Tunis, Tunisia
1999 - 2000	TD Semiconductors 3^{rd} year Engineering Ecole Polytechnique (EPT) Tunis, Tunisia
1999 - 2004	Laboratory course: Physics II CBA, INSAT, University of Carthage
1995 - 1997	Laboratory courses: Mechanics and Electricity 1^{st} Year DEUG, University of Cergy Pontoise, France

List of Publications

Papers in Quantum Sciences and Quantum Technology

1. **Bistability of Exciton–Photon Microcavities in the Ultrastrong-Coupling Regime**
R. Aljasmi, H. Sati,*H. Eleuch*
Chaos, Solitons and Fractals 208, 118218 (2026)

2. **Quantum Metrology of Accelerated Atoms in Spacetime with Reflective Boundaries**
K. Berrada,*H. Eleuch*
Quantum Information Processing 25, 176 (2026)

3. **Suppression of the entropic uncertainty bound via engineering the initial phases of the bath modes**
A. Basit, H. Ali, G. Xianlong, P-B. Li, *H. Eleuch*, G. Sadiek
Journal of Physics A 59, 095302 (2026)

4. **A New Characterization and Estimation Framework for the Gamma-Lindley Quantum Distribution and Applications in q-Schrödinger Equation**
I. Bouzida, M. Zitouni, *H. Eleuch*
J. Math. Computer Sci. 48, 288 (2026)

5. **A quantum entanglement-based algorithm for discriminating non-orthogonal qubits**
M. Zidan, M. N. El-Qersh, M. Abdel-Aty, M. Qasymeh, *H. Eleuch*
AEJ 112, 339 (2025)

6. **Statistical properties and quantum nature of light in optical cavities combining second and third-order nonlinearities**
H Jabri, and *H. Eleuch*
Chaos, Solitons & Fractals 199 116915 (2025)

7. **Comments on "Quantum Adder for Superposition States"**
M. Zidan, A. M. Eisa, M. Qasymeh, *H. Eleuch*
International Journal of Theoretical Physics 64, 156 (2025)

8. **Long-time preservation of correlations through the interactions among cavities as engineered environments**
K. Berrada, *H. Eleuch*
Quantum Information Processing 24, 218 (2025)

9. **Quantum correlations and parameter estimation for two superconducting qubits interacting with a quantized field**
K. Berrada, S. Abdel-Khalek, M. Algarni and *H. Eleuch*
Scientific Reports 14, 26846 (2024).

10. **Full Quantum Tomography Study of Google's Sycamore Gate on IBM's Quantum Computers**
M. AbuGhanem and *H. Eleuch*
EPJ Quantum Technology 11, 36 (2024).

11. **Chaos and regularities in cavity assisted two-channel nonlinear coupler**
F. Chogle, S. S. Varghese, A-B M. A. Ibrahim, A. Prasad and *H. Eleuch*
Chaos, Solitons and Fractals 189, 115650 (2024).

12. **Interplay between non-equilibrium and non-Markovianity in controlling the entropic uncertainty bound**
Abdul Basit, Hamad Ali,Gao Xianlong, Peng-Bo Li, Gehad Sadiek, and *Hichem Eleuch*
Physical Review A 110, 012429 (2024).

13. **Nonclassical light in a three-waveguide coupler with second-order nonlinearity**
Mohd Syafiq M. Hanapi, Abdel-Baset M. A. Ibrahim1, Rafael Julius, Pankaj K. Choudhury, and *Hichem Eleuch*
EPJ Quantum Technology 11, 51 (2024).

14. **NISQ Computers: A Path to Quantum Supremacy**
M. AbuGhanem, and *H. Eleuch*
IEEE Access 12, 102941 (2024).

15. **Q-Map: Quantum Circuit Implementation of Boolean Functions**
H. Hajjdiab, A. Khalil and *H. Eleuch*
Physica Scripta 99, 085127 (2024).

16. **Exploring optical tomography dynamics for a dissipative coherent cavity in interaction with two-level atomic system**
A.-B.A. Mohamed, T.A. Alrebdi, F. Alkallas, A-H Abdel-Aty, and *H. Eleuch*
Results in Physics 61, 107755 (2024).

17. **Optical Tomography and Coherence of a Cavity Interacting with Two Time-dependent Position Qubits**
A.-B.A. Mohamed,, and *H. Eleuch*
Physica Scripta 99, 105101 (2024).

18. **Interaction of a four-level atom with a quantized field in the presence of a nonlinear Kerr medium**
K. Berrada, S. Almalki, S. Abdel-Khalek and *H. Eleuch*
Scientific Reports 14, 1141 (2024).

19. **Light squeezing enhancement by coupling nonlinear optical cavities**
H. Jabri and *H. Eleuch*
Scientific Reports 14, 7753 (2024).

20. **Quantum steering and coherence evolution of two atoms under noisy environments**
K. Berrada, A. Sabik and *H. Eleuch*
Results in Physics 58, 107426 (2024).

21. **Boundary-induced topological transition in an open SSH model**
A. Bissonnette, N. Delnour, A. Mckenna,*H. Eleuch*, M. Hilke, and R. MacKenzie
Physical Review B 109, 075106 (2024).

22. **Phase characterization and exraction of new forms of solitons for the (3+1)-dimensional q-deformed Sinh-Gordon equation**
H. I. Alrebdi, N. Raza, F. Salmanb , N. A. M. Alsaif, A-H Abdel-Aty, and*H. Eleuch.*
JTUSCI 18, 2321647 (2024).

23. **Two-qubit Entangling Gates for Superconducting Quantum Computers**
M. AbuGhanem, and *Hichem Eleuch*
Results in Physics 56, 107236 (2024).

24. **Nonlocal correlations dynamics of two-qubit Heisenberg XYZ states with influence of intrinsic decoherence and y-component of Dzyaloshinskii-Moriya interaction**
N. Al-Harbi, A-H Abdel-Aty, A.-B.A. Mohamed, and *H. Eleuch*
Alexandria Engineering Journal 88, 126 (2024).

25. **EPR steering and parameter estimation in the context of dephasing of two interacting qubits**
K. Berrada, O. Aldaghri, A. Sabik and *H. Eleuch*
Results in Physics 60, 107689 (2024).

26. **New solutions for the generalized q-deformed sinh-Gordon equation with q-calculus**
K. K. Ali, K. R. Raslan, A.S. Shehata, W. Albalawi, A. H. Abdel-Aty, and *H. Eleuch*
Results in Physics 60, 107649 (2024).

27. **Exploring quasi-probability Husimi-distributions in nonlinear two trapped-ion qubits: intrinsic decoherence effects**
Laila A. Al-Essa, A. Y. AL-Rezami, F. M. Aldosari, A.-B.A. Mohamed, and *H. Eleuch*
Optical and Quantum Electronics 56, 604 (2024).

28. **Investigation of complex hyperbolic and periodic wave structures to a new form of the q-deformed Sinh-Gordon equation with fractional temporal evolution**
A-H. Abdel-Aty, S. Arshed, N. Raza, T. A. Alrebdi4, K. S. Nisar, and *H. Eleuch*
AIP Advances 14, 025231 (2024).

29. **Quantum memory and entanglement dynamics induced by interactions of two moving atoms with a coherent cavity**
A.-B. A. Mohamed, F. M. Aldosari, S. M. Younis and *H. Eleuch*
Chaos, Solitons & Fractals 177, 114213 (2023).

30. **Optical bistability and multistability with coupled quantum wells in the presence of second-and third-order nonlinearities**
H. Jabri and *H. Eleuch*
Chaos, Solitons & Fractals 177, 114270 (2023).

31. **Quantum teleportation and dynamics of quantum coherence and metrological non-classical correlations for open two-qubit systems**
Y. Dakir, A. Slaoui, A-B A. Mohamed, R. A. Laamara and *Hichem Eleuch*
Scientific Reports 13, 20526 (2023).

32. **Entanglement and quantum steering in a hybrid quadpartite system**
Amjad Sohail, Montasir Qasymeh, and *Hichem Eleuch*
Physical Review Applied 20, 054062 (2023).

33. **System of a six-level atom interacting with a quantized field in the existence of time-varying coupling**
M. Algarni, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Results in Physics 45, 106233 (2023).

34. **Wigner quasi-probability distribution of a resonator coherent field interacting with a flux qubit via two-photon coupling**
L. A. Al-essa, W. F. Alfwzan, F. M. Aldosari, A.-B. A. Mohamed, and *H. Eleuch*
Results in Physics 55, 107155 (2023).

35. **Entanglement and coherence in a system of two atoms in the presence of Kerr medium and field dissipation**
K. Berrada, S. Abdel-Khalek, A. Alkaoud, and *H. Eleuch*
Results in Physics 44, 106172 (2023).

36. **Analytical solutions for a new form of the generalized q-deformed Sinh-Gordon equation:** $\frac{\partial^2 u}{\partial z \partial \zeta} = e^{\alpha u}[sinh_q(u^\gamma)]^p - \delta$.
K. K. Ali, H. I. Alrebdi, N. A. Alsaif, A-H Abdel-Aty,, and *H. Eleuch*
Symmetry 15, 470 (2023).

37. **Thermal Fisher and Wigner–Yanase information correlations in two-qubit Heisenberg XYZ chain**
A-H Abdel-Aty, A.-B. A. Mohamed, N. Al-Harbi and *H. Eleuch*
Results in Physics 50, 106564 (2023).

38. **Exact Solutions of the Bloch Equations to the Asymmetric Hyperbolic Cosine Pulse with Chirped Frequency**
S. Grira, N. Boutabba and *H. Eleuch*
Mathematics 11, 2159 (2023).

39. **Novel Entropic Dynamics of Donor-Acceptor Quantum Dot System**
D. A. M. Abo-Kahla, M.H. Raddadi, A.-H. Abdel-Aty, M. Abdel-Aty, and *H. Eleuch*
Results in Physics 50, 106527 (2023).

40. **Dynamics of two-qubit quantum nonlocality in a Heisenberg chain model with the intrinsic decoherence**
A.-B. A. Mohamed, F. M. Aldosari, and *H. Eleuch*
Optical and Quantum Electronics 55, 284(2023).

41. **The analysis of bifurcation, quasi-periodic and solitons patterns to the new form of the generalized q-deformed Sinh-Gordon equation**
S. S. Kazmi, A. Jhangeer, N. Raza, H. I. Alrebdi, A-H Abdel-Aty, and *H. Eleuch*
Symmetry 15, 1324 (2023).

42. **Dynamics of quantum-memory assisted entropic uncertainty of a two-spin Heisenberg XXX model under the intrinsic decoherence effect**
A.-B. A. Mohamed, F. M. Aldosari, A. Ur Rahman and *H. Eleuch*
Physica Scripta 98, 065110 (2023).

43. **Two-qubit-Heisenberg local quantum Fisher information dynamics induced by intrinsic decoherence model**
A.-B. A. Mohamed, F. M. Aldosari, and *H. Eleuch*
Results in Physics 49, 106470 (2023).

44. **Einstein-Podolsky-Rosen steering and coherence in structured environments**
K.Berrada, and *H. Eleuch*
Laser Physics Letters 20, 085201 (2023).

45. **Scanning qubit probe of edge states in a topological insulator**
N. Delnour, A. Bissonnette, *H. Eleuch*, R. MacKenzie, and M. Hilke
Physics Letters A 466, 128716 (2023).

46. **Quantum coherence and nonlocality of two qubits in the presence of a common dephasing environment**
K.Berrada, and *H. Eleuch*
Results in Physics 51, 106666 (2023).

47. **Photon-added deformed spin coherent states and bipartite entanglement**
K.Berrada, and *H. Eleuch*
Results in Physics 51, 106705 (2023).

48. **Squeezed vacuum interaction with an optomechanical cavity containing a quantum well**
H. Jabri, and *H. Eleuch*
Scientific Reports 12, 3658 (2022).

49. **Non-local Correlation Dynamics in Two-Dimensional Graphene**
A. B. A. Mohamed,A-H Abdel-Aty, M. Qasymeh, and *H. Eleuch*
Scientific Reports 12, 3581 (2022).

50. **Analysis of a Q-Deformed Hyperbolic Short Laser Pulse in a Multi-Level Atomic System**
N. Boutabba, S. Grira and *H. Eleuch*
Scientific Reports 12, 9308 (2022).

51. **Spatial Solitons in an Electrically Driven Graphene Multilayer Medium**
M. I. Shaukat, M. Qasymeh, and *H. Eleuch*
Scientific Reports 12, 10931 (2022).

52. **High-Fidelity Quantum Information Transmission Using a Room-Temperature Nonrefrigerated Lossy Microwave Waveguide**
M. Qasymeh, and *H. Eleuch*
Scientific Reports 12, 16352 (2022).

53. **Optical Tomography Dynamics Induced by Qubit-Resonator Interaction Under Intrinsic Decoherence**
A.-B. A. Mohamed, and *H. Eleuch*
Scientific Reports 12, 17162 (2022).

54. **A Local Area Quantum Teleportation Network Based on an Array of Electrically Activated Graphene Waveguides**
M. Asjad, M. Qasymeh, and *H. Eleuch*
Optics Express 30, 21016 (2022).

55. **Generation And Robustness of Quantum Memory Assisted Entropic Uncertainty And Uncertainty Induced Non-Locality Of Two Nitrogen-Vacancy Centers Coupled By Open Two Nanocavities**
A-H Abdel-Aty, A. B. A. Mohamed, A . Ur Rahman and *H. Eleuch*
Fractals 30, 2240185 (2022).

56. **Quantum Coherence and Total Phase in Semiconductor Microcavities for Multi-Photon Excitation**
A. S. Altowyan, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Nanomaterials 12, 2671 (2022).

57. **Entanglement and Fisher information for a two-atom system interacting with deformed fields in correlated two-mode states**
K. Berrada, S. Abdel-Khalek, E. M. Khalil, and *H. Eleuch*
Chaos, Solitons and Fractals 164, 112621 (2022).

58. **Enhanced unconventional photon blockade effect in one- and two-qubit cavities interacting with nonclassical light**
H. Jabri, and *H. Eleuch*
Physical Review A 106, 023704 (2022).

59. **Universal quantum computation with symmetric qubit clusters coupled to an environment**
Christian Boudreault, *H. Eleuch*, Michael Hilke, and Richard Mackenzie
Physical Review A 106, 062610 (2022).

60. **Dynamics of Two-Magnon Coupled to an Open Microwave Cavity: Local Quantum Fisher- and Local Skew-Information Coherence**
A.-B. A. Mohamed, and *H. Eleuch*
EPJ Plus 137, 853 (2022).

61. **Thermal local Fisher information and quantum uncertainty in Heisenberg model**
A.-B. A. Mohamed, and *H. Eleuch*
Physica Scripta 97, 095105 (2022).

62. **Two-magnon non-locality and coherence induced by an open microwave cavity: Generation and robustness**
A.-B. A. Mohamed, and *H. Eleuch*
Annalen der Physics 534, 2200184 (2022).

63. **Two-qubit Fisher information and Jensen-Shannon nonlocality dynamics induced by a coherent cavity under dipole, intensity-dependent, and decoherence couplings**
A.-B. A. Mohamed, and *H. Eleuch*
Results in Physics 41, 105916 (2022).

64. **New soliton solutions for the conformal time derivative q-deformed physical model**
K. K. Ali, A-H Abdel-Aty, and *H. Eleuch*
Results in Physics 42, 105993 (2022).

65. **Quantum memory and coherence dynamics of two dipole-coupled qubits interacting with two cavity fields under decoherence effect**
A.-B. A. Mohamed, A.-H. Abdel-Aty, and *H. Eleuch*
Results in Physics 41, 105924 (2022).

66. **Parity deformed Tavis-Cummings model: Entanglement, parameter estimation and statistical properties**
M. Algarni, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Mathematics 10, 3051 (2022).

67. **A variety of new explicit analytical soliton solutions of q-Deformed Sinh-Gordon in (2+1) dimensions**
H. I. Alrebdi, N. Raza, S. Arshed, A. R. Butt, A. H. Abdel-Aty, C. Cesarano, and *H. Eleuch*
Symmetry 14, 242 (2022)

68. **Entanglement and Fisher information for atoms-field system in the presence of negative binomial states**
Kamal Berrada, Mariam Algarni, Sayed Abdel-Khalek and *H. Eleuch*
Entropy 24, 1817 (2022)

69. **Exact solutions of the Bloch equations of a Two-Level Atom Driven by the Generalized Double exponential Quotient pulses with dephasing**
S. Grira, N. Boutabba, and *H. Eleuch*
Mathematics 10, 2105 (2022).

70. **Abundant new optical soliton Solutions related to q-Deformed Sinh-Gordon model using two innovative integration architectures**
N. Raza, S. Arshed, A-H Abdel-Aty, and *H. Eleuch*
Results in Physics 35, 105358 (2022).

71. **Effect of relativistic motion on superconducting quantum bits under decoherence**
M. S. Al-Ghamdi, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Results in Physics 38, 105402 (2022).

72. **Robust thermal correlations induced by spin-orbit interactions**
A. N. Khedr, A. H. Homid and A.-B. A. Mohamed, A.-H. Abdel-Aty,*H. Eleuch*, M. Tammam, and M. Abdel-Aty,
Results in Physics 38, 105619 (2022).

73. **Coupled Optical Solitons in Microwave-Assisted Plasmonic Graphene Waveguides**
M. Qasymeh, M. I. Shaukat, and *H. Eleuch*
IEEE Photonics Technology Letters 34, 513 (2022).

74. **Nonlocality Dynamics Induced by a Lamb–Dicke Nonlinearity in Two dipole-Coupled Trapped Ions under Intrinsic Decoherence**
A-H Abdel-Aty, A. B. A. Mohamed, and *H. Eleuch*
Fractals 30, 2240045 (2022).

75. **New Numerical Approach of Solving Highly Nonlinear Fractional Partial Differential Equations via Fractional Novel Analytical Method**
M. Sultana, U. Arshad, A-H Abdel-Aty, Ali Akgül, M. Mahmoud, and *H. Eleuch*
Fractal and Fractional 6, 512 (2022).

76. **Temporal quantum memory and non-locality of two trapped ions induced by an intrinsic decoherence model: Entropic uncertainty, trace norm nonlocality and entanglement**
A. B. A. Mohamed, A . Ur Rahman and *H. Eleuch*
Symmetry 14, 648 (2022).

77. **Thermal Fisher information and entropy squeezing for superconducting qubits**
Z.M.H. El-Qahtani, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Results in Physics 39, 105639 (2022).

78. **Three-level atom–field in the context of time-dependent coupling and power-lower potentials**
M. Algarni, K. Berrada, S. Abdel-Khalek, and *H. Eleuch*
Results in Physics 43, 106089 (2022).

79. **Measurement Uncertainty, Purity and Entanglement Dynamics of Maximally Entangled Two Qubits Spatially with Isolated Cavities: Intrinsic Decoherence Effect**
A. B. A. Mohamed, A . Ur Rahman and *H. Eleuch*
Entropy 24, 545 (2022).

80. **Highlighting a common confusion on the computation of capacitance of electrochemical energy storage devices**
Anis Allagui, Ahmed Elwakil, and *H. Eleuch*
The Journal of Physical Chemistry C 125, 9591 (2021).

81. **Tripartite entropic uncertainty relation under phase decoherence**
R. A. Abdelghany, A.-B. A. Mohamed, M. Tammam, Watson Kuo, and *H. Eleuch*
Scientific Reports 11, 11830 (2021). [Collection 08 December 2022, Editor's choice: quantum entanglement.]

82. **Efficient Quantum Gates and Algorithms in an Engineered Optical Lattice**
A. H. Homid, M. Abdel-Aty, M. Qasymeh and *H. Eleuch*
Scientific Reports 11, 15402 (2021).

83. **Continuous-variable quantum teleportation using a microwave-enabled plasmonic graphene waveguide**
M. Asjad, M. Qasymeh and *H. Eleuch*
Physical Review Applied 16, 034046 (2021).

84. **Einstein-Podolsky-Rosen steering for Mixed Entangled Coherent States**
S. Abdel-Khalek, K. Berrada, M. Algarni, and *H. Eleuch*
Entropy 23, 1442 (2021).

85. **A Novel Efficient Quantum Random Access Memory**
M. Zidan, A. H. Abdel-Aty, A. Khalil, M. Abdel-Aty and *H. Eleuch*
IEEE Access 9, 151775 (2021)

86. **Entropic uncertainty for two coupled dipole spins using quantum memory under the Dzyaloshinskii-Moriya interaction**
Ahmad. N. Khedr, A.-B. A. Mohamed, Abdel-Haleem Abdel-Aty, M. Tammam, M. Abdel-Aty, and *H. Eleuch*
Entropy 23, 1595 (2021).

87. **Quantum coherence induced by a flux qubit coupled by a resonator coherent field through a two-photon interaction**
A.-B. A. Mohamed, H. A. Hessian, F. S. Al-Duais, and *H. Eleuch*
Physica Scripta 96, 125120 (2021).

88. **Quantum Coherence of Atoms with Dipole–Dipole Interaction and Collective Damping in the Presence of an Optical Field**
M. Algarni, K. Berrada, S. Abdel-Khalek and *H. Eleuch*
Symmetry 13, 2327 (2021).

89. **Coherence trapping in open two-qubit dynamics**
M. Algarni, K. Berrada, S. Abdel-Khalek and *H. Eleuch*
Symmetry 13, 2445 (2021).

90. **Local two-atom correlations induced by a two-mode cavity under nonlinear media: quantum uncertainty and quantum Fisher information**
A.-B. A. Mohamed, E. M. Khalil, Nasser Metwally, and *H. Eleuch*
Results in Physics 31, 104975 (2021)

91. **Fisher and skew information correlations of two coupled trapped ions: Intrinsic decoherence and Lamb-Dicke nonlinearity**
A.-B. A. Mohamed, A. Farouk, M. F. Yassen, and *H. Eleuch*
Symmetry 13, 2243 (2021).

92. **Wigner Function Non-Classicality Induced in a Charge Qubit Interacting with a Dissipative Field Cavity**
A.-B. A. Mohamed, E. M. Khalil, A. Y. AL-Rezami and *H. Eleuch*
Symmetry 13, 802 (2021)

93. **Quantumness measures for a system of two qubits interacting with a field in the presence of the time-dependent interaction and Kerr medium**
Sayed Abdel-Khalek, Kamal Berrada, Eied. M. Khalil, A.-S. F. Obada, Esraa Reda, and *H. Eleuch*
Entropy 23, 635 (2021).

94. **Atomic Population Inversion in a Two-Level Atom for Shaped and Chirped Laser Pulses: Exact Solutions of Bloch Equations with Dephasing**
S. Grira, N. Boutabba, and *H. Eleuch*
Results in Physics 26, 104419 (2021).

95. **Unconventional photon blockade in quantum-well microcavities with squeezed light**
H. Jabri and *H. Eleuch*
Physica Status Solidi B 258, 2100094 (2021).

96. **Dynamics of two coupled qubits in a two-mode cavity through four-photon processes: Nonclassical properties under intrinsic decoherence**
A.-B. A. Mohamed, E. M. Khalil, and *H. Eleuch*
Solid State Communications 336, 114383 (2021).

97. **The Quantum Kerr Nonlinear Coupler: The Analytical Versus Phase-Space Method**
Mohd-Syafiq M. Hanapi, Abdel-Baset M. A. Ibrahim, Rafael Julius, and *H. Eleuch*
Canadian Journal of Physics 99, 832 (2021).

98. **Entanglement dynamics induced by a squeezed coherent cavity coupled nonlinearly with a qubit and filled with a Kerr-like medium**
A.-B. A. Mohamed, and *H. Eleuch*
Entropy 23, 496 (2021).

99. **Analysis of the Quantum Algorithm based on Entanglement Measure for Classifying Boolean Multivariate Function into Novel Hidden Classes: Revisited**
M. Zidan, S. Aldulaimi and *H. Eleuch*
Appl. Math. Inf. Sci. 15, 643 (2021).

100. **Atomic population inversion and absorption-dispersion spectra driven by modified double-exponential quotient pulses in three-level atom**
N. Boutabba, S. Grira and *H. Eleuch*
Results in Physics 24, 104108 (2021).

101. **Tavis-Cummings model with moving atoms**
Kamal Berrada, Sayed Abdel-Khalek, Eied M. Khalil,*Hichem Eleuch*, Abdel-Shafy F Obada, and Esraa Reda
Entropy 23, 452 (2021).

102. **Dynamics of nonclassical properties of a Su(3)-system interacting with two open parametric amplifier modes**
A.-B. A. Mohamed, H. A. Hessian, A.-S. F. Obada and *H. Eleuch*
JOSA B 38, 1556 (2021).

103. **Optical tomography dynamic for time-dependent coherent states generated by an open qubit-cavity system**
A.-B. A. Mohamed, E. M. Khalil, M. M. Selim and *H. Eleuch*
Results in Physics 22, 103940 (2021).

104. **Two-qubit local Fisher information correlation beyond entanglement in a nonlinear generalized cavity with an intrinsic decoherence**
A.-B. A. Mohamed, E. M. Khalil and *H. Eleuch*
Entropy 23, 311 (2021).

105. **Accurate novel explicit complex wave solutions of the (2+1)–dimensional Chiral nonlinear Schrödinger equation**
B. Alshahrani, H. A. Yakout, Mostafa M. A. Khater, Abdel-Haleem Abdel-Atyd, Emad E. Mahmoud, Dumitru Baleanu, and *H. Eleuch*
Results in Physics 23, 104019 (2021).

106. **Dephasing Process of a Single Atom Interacting with a Two-Mode Field**
E. M. Khalil, K. Berrada, S. Abdel-Khalek, Beida Alsubei and *H. Eleuch*
Entropy 23, 252 (2021).

107. **Quantum Fisher information and Bures distance correlations of coupled two charge-qubits inside a coherent cavity with the intrinsic decoherence**
A.-B. A. Mohamed, E. M. Khalil, M. Selim and *H. Eleuch*
Symmetry 13, 352 (2021).

108. **Analysis of voltage and current flow of electrical transmission lines through mZK equation**
M. A. Akbar, Md. A. Kayum, M. S. Osman, A. H. Abdel-Aty, and *H. Eleuch*
Results in Physics 20, 103696 (2021).

109. **Long-time protection of correlations and coherence in squeezed thermal bath**
K. Berrada and *H. Eleuch*
Chaos, Solitons & Fractals 143, 110501 (2021).

110. **Dynamics of trace distance and Bures correlations in a three-qubit XY chain: Intrinsic noise model**
A-H. Abdel-Aty, A. B. A. Mohamed, and *H. Eleuch*
Physica E 128, 114529 (2021).

111. **Detecting topological edge states with the dynamics of a qubit**
M. Zaimi, C. Boudreault, N. Baspin, *H. Eleuch*, R. MacKenzie, and M. Hilke
Physics Letters A 388, 127035 (2021).

112. **Einstein-Podolsky-Rosen steering and nonlocality in quantum dot systems**
K. Berrada,and *Hichem Eleuch*
Physica E, 126 114412 (2021).

113. **Non-Classical Computing Problems: Toward Novel Type of Quantum Computing Problems**
M. Zidan, M. Abdel-Aty, *Hichem Eleuch*, Abdel-shafi Obada
Results in Physics 21, 103536 (2021)

114. **Bures and Trace-Distance Correlations of Quantum Wells in Open Microcavities Linked by an Optical Waveguide**
A.-B. A. Mohamed, M. Abdel-Aty, and *H. Eleuch*
Optik 225, 165744 (2021).

115. **Optical Kerr nonlinearity in quantum-well microcavities: From polariton to dipolariton**
H. Jabri and *H. Eleuch*
Phys. Rev. A 102, 063713 (2020).

116. **Interaction of a dipolariton system with squeezed light from a parametric down-conversion process**
H. Jabri and *H. Eleuch*
Phys. Rev. A 101, 053819 (2020).

117. **Correlation Dynamics of Nitrogen-Vacancy Centers Located in Crystal Cavities**
A-H Abdel-Aty, H. Kadry, A.-B. A. Mohamedand *H. Eleuch*
Scientific Reports 10, 16640 (2020).

118. **Hybrid Two-Mode Squeezing of Microwave and Optical Fields Using Optically Pumped Graphene Layers**
M. Qasymeh and *H. Eleuch*
Scientific Reports 10, 16676 (2020).

119. **Quasi-probability information in a coupled two-qubit system interacting non-linearly with a coherent cavity under intrinsic decoherence**
A. B. A. Mohamed, and *H. Eleuch*
Scientific Reports 10, 13240 (2020).

120. **Nonclassical effects for a qubit coupled to a coherent two-mode cavity with intrinsic decoherence**
Abdel-Baset A. Mohamed, E. M. Khalil, A.-S. F. Obada, *Hichem Eleuch*, Abdel-shafi Obada
Results in Physics 19, 103370 (2020).

121. **Quantum correlations of two-qubit beyond entanglement in two lossy cavities linked by a waveguide**
A. B. A. Mohamed, H. A. Hessian and *H. Eleuch*
Chaos, Solitons & Fractals 135, 109773 (2020).

122. **Entanglement of Microwave and Optical Fields using Electrical Capacitor Loaded with Plasmonic Graphene Waveguide**
M. Qasymeh and *H. Eleuch*
IEEE Photonics 12, 7500212 (2020).

123. **On the interaction between (low & high) frequency of (ion-acoustic & Langmuir) waves in plasma via some recent computational schemes**
M. M. A. Khather, R. A. M. Attia, E. E. Mahmoud, A. H. Abdel-Aty, K. H. Abualnaja, A.B.A Mohamed and *H. Eleuch*
Results in Physics 19, 103684 (2020).

124. **Robustness of Generated Geometric Phase of Quantum Wells in Two Open Waveguide-Coupled Optical Cavities**
A.-B. A. Mohamed, A. Farouk, A.-H. Abdel-Aty, and *H. Eleuch*
IEEE Access 8, 158745 (2020).

125. **Quantum effects in two-qubit systems interacting with two-mode fields: Dissipation and dipole-dipole interplay effects**
Mostafa Khater, Abdel-Baset A. Mohamed, *Hichem Eleuch*, Abdel-shafi Obada
Results in Physics 17, 103019 (2020).

126. **Quantum control of an optically dense atomic medium: pulse shaping in a V-type three-level system**
N. Boutabba and *Hichem Eleuch*
Results in Physics 19, 103421 (2020).

127. **On the New Explicit Solutions of the Fractional Nonlinear Spacetime Nuclear Model**
Abdel-Haleem Abdel-Aty, Mostafa M.A. Khater, Raghda A.M. Attia, M. Abdel-Aty, and *H. Eleuch*
Fractals 28, 2040035 (2020).

128. **New approach to approximate the solution for the system of fractional order Volterra integro-differential equations**
Muhammad Akbar, Rashid Nawaz, Sumbal Ahsan, K.S.Nisar, Abdel-Haleem Abdel-Aty, and *H. Eleuch*
Results in Physics 19, 103453 (2020).

129. **Quasi-Probability Husimi-Distribution Information and Squeezing in a Qubit-System Interacting with a Two-Mode Parametric Amplifier cavity**
E. M. Khalil, Abdel-Baset Mohamed, A.-S. F. Obada, and *H. Eleuch*
Mathematics 8, 1830 (2020).

130. **Magnus expansion applied to a dissipative driven two-level system**
T. Begzjav, *H. Eleuch*
Results in Physics 17, 103098 (2020).

131. **Exact Traveling and nano-solitons wave solutions of the ionic waves propagating along microtubules in living cells**
Abdel-Haleem Abdel-Aty, Mostafa M.A. Khater, Raghda A. M. Attia, *Hichem Eleuch*
Mathematics 8, 697 (2020).

132. **Dynamics of Coupled Two Qubits Interacting with Two-Photon Transitions via a Nondegenerate Parametric Amplifier: Non-local Correlations under intrinsic decoherence**
A.-B. A. Mohamed, A. Farouk, M. F. Yassen, and *H. Eleuch*
JOSA B, 37 3435 (2020).

133. **Nonlinear dynamics in a dipolariton cavity with a squeezed vacuum**
H. Jabri, and *H. Eleuch*
J. Opt. Soc. Am. B 37, A9 (2020).

134. **Generation of quantum coherence in two-qubit cavity system: Qubit-dipole coupling and decoherence effects**
A. B. Mohamed, H. Hessian, and *H. Eleuch*
Physica Scripta 95, 075104 (2020).

135. **Nonclassical Effects Based on Husimi Distributions in Two Open Cavities Linked by an Optical Waveguide**
A. B. Mohamed, and *H. Eleuch*
Entropy 22, 767 (2020).

136. **Exactly Solvable New Classes of potentials with Finite Discrete Energies**
J. Benbourenane and *Hichem Eleuch*
Results in Physics 17, 103034 (2020).

137. **Analytical and semi-analytical ample solutions of the higher-order nonlinear Schrödinger equation with the non-Kerr nonlinear term**
Mostafa Khater, Raghda Attia, Abdel-Haleem Abdel-Aty, M. Abdou, *Hichem Eleuch*, Dianchen Lu
Results in Physics 16, 103000(2020).

138. **Quantum correlation via skew information and Bell function beyond entanglement in a two-qubit Heisenberg XYZ model: Effect of the phase damping**
A.-B. A. Mohamed, Ahmed Farouk, M. F. Yassen, *Hichem Eleuch*
Applied Sciences 10, 3782 (2020).

139. **Quantum correlations and coherence in a driven two-qubit system under non-Markovian dissipative effect**
K. Berrada, B. Raffah, *Hichem Eleuch*
Results in Physics 17, 103083 (2020).

140. **Quantum Dilation and Erosion**
Shi-Yuan Ma, Ashraf Khalil, Hassan Hajjdiab, *Hichem Eleuch*
Applied Sciences 10, 4040 (2020).

141. **Entanglement control of two-level atoms in dissipative cavities**
Reyad Salah, Ahmed M. Farouk , Ahmed Farouk, M. Abdel-Aty, *Hichem Eleuch*, A.-S. F. Obada
Applied Sciences 10, 1510 (2020).

142. **Gain in Single and paired parametric oscillators**
R. Nessler, *H. Eleuch*, W. P. Schleich, and M. O. Scully
J. Mod. Opt. 67, 1 (2020).

143. **Single- and Compound-Mode Squeezing in Nonlinear Coupler with Frequency Mismatch**
Rafael Julius, Mansoor Zahirzai, Abdel-Baset M. A. Ibrahim, *Hichem Eleuch* and Pankaj K. Choudhury
Journal of Electromagnetic Waves and Applications 34, 301 (2020).

144. ***Quantum dynamics of a qutrit in a cavity filled with Kerr-like medium and intrinsic noise***
A.-B. A. Mohamed, M. M. Elkhateeb, M. Hashem, A.-S. F. Obada, *H. Eleuch*
Modern Physics Letters A, 2050287 (2020).

145. **Graphene-based layered structure for quantum microwave signal up-conversion to the optical domain**
M. Qasymeh and *H. Eleuch*
Optical and Quantum Electronics 52, 80 (2020).

146. **Dielectric Surface Coated with Thin Partially-Reflecting Mirror – A Revisit to Fresnel Laws**
Abdel-Baset M.A.I Brahim, *H. Eleuch*, P. K. Choudhuryd, M. Kamil Abd-Rahman
Optik 207, 164423 (2020).

147. **Dynamics of a dissipative two-qubit system interacting non-linearly with a generalized field: Entanglement and mixedness**
A.-B. A. Mohamed, H. A. Hessian, and *Hichem Eleuch*
Optik 202, 163500 (2020).

148. **Quantum plasmonic control of trions in a picocavity with monolayer WS_2**
Zhe He, Zehua Han, Jiangtan Yuan, Alexander M. Sinyukov, *Hichem Eleuch*, Chao Niu, Zhenrong Zhang, Jun Lou, Jonathan Hu, Dmitri V. Voronine, and Marlan O. Scully
Science Advances 5, EAAU8763 (2019).

149. **Non-locality Correlation in Two Driven Qubits Inside an Open Coherent cavity: Trace Norm Distance and the Maximum Bell Function**
A-B Mohammad, *H. Eleuch*, and C. H. R. Ooi
Scientific Reports 9, 19632 (2019).

150. **Quantum Microwave-to-Optical Conversion in electrically driven Multilayer Graphene**
M. Qasymeh and *H. Eleuch*
Optics Express 27, 5945 (2019).

151. **Noncommutative deformed cat states under decoherence**
K. Berrada, and *H. Eleuch*
Phys. Rev. D 100, 016020 (2019).

152. **Trace-Norm Correlation Beyond Entanglement in InAs Nanowire System With Spin-Orbit Interaction and External Electric Field**
A.-B. A. Mohamed, A. H. Homid, M. Abdel-Aty, and *H. Eleuch*
JOSA B 36, 926 (2019).

153. **Skew information correlations beyond entanglement in dissipative two Su(2)-systems**
A.-B. A. Mohamed, and *H. Eleuch*
Results in Physics 15, 102614 (2019).

154. **Quantum coherence and entanglement partitions for two driven quantum dots inside a coherent microcavity**
A.-B. A. Mohamed, *H. Eleuch*, and C. H. R. Ooi
Physics Letters A 383, 125905 (2019).

155. **Robust correlations in a dissipative two qubit-system interacting with two coupled fields in a non-degenerate parametric amplifier**
A.-B. A. Mohamed, H. A. Hessian, and *H. Eleuch*
Quantum Information Processing 18, 327 (2019).

156. **Perfect squeezing of terahertz light by two quantum wells using a squeezed vacuum reservoir**
H. Jabri and *H. Eleuch*
JOSA B Vol. 36, C1 (2019)

157. **Analytical Analysis of Soliton Propagation in Microcavity Wires**
U. Al Khawaja, *H. Eleuch*, H. Bahlouli
Results in Physics 12, 471 (2019).

158. **Enhancing the generated stable correlation in a dissipative system of two coupled qubits inside a coherent cavity via their dipole-dipole interplay**
A.-B. A. Mohamed, H. M. Hashem and *H. Eleuch*
Entropy 21, 672 (2019).

159. **A Quantum Algorithm Based on Entanglement Measure Classifying Boolean Multivariate function into Novel Hidden Classes**
M. Zidan, A-H Abdel-Aty, D. N. Manh, A. S. A. Mohamed, Y. Al-Sbou, *H. Eleuch*, M. Abdel-Aty
Results in Physics 15, 102549 (2019).

160. **Dynamics of Skew-information and Bell's Inequality Correlations for two Coupled Dipole Qubits with 2-Photon Transition**
A.-B. A. Mohamed, *H. Eleuch*
International Journal of Theoretical Physics 58, 1698 (2019).

161. **Coherence and squeezing of a two-level system with a phase jump**
K. Berrada and *H. Eleuch*
Laser Physics 29, 075203 (2019).

162. **Interaction between two two-level atoms coupled to N-level quantum system**
A.-S. F. Obada, A. F. Al Naime, E. M. Khalil, S. Abdel-Khalek, and *H. Eleuch*
Optical and Quantum Electronics 51, 259 (2019).

163. **Effect of dissipation and dipole–dipole interplay on Hilbert–Schmidt distance and Bell's inequality correlations of two qubits interacting with two-mode cavity field**
A.-B. A. Mohamed, *H. Eleuch*
Physica Scripta 94, 045102 (2019).

164. **Influence of the coupling between two qubits in an open coherent cavity: Nonclassical information via quasi-probability distributions**
A.-B. A. Mohamed, *H. Eleuch*, and A.-.S F. Obada
Entropy 21, 1137 (2019).

165. **Sub-Poissonian Photon Squeezing and Entanglement in Optical Chain Second Harmonic Generation**
Abdel-Baset Ibrahim, Rafael Julius, *Hichem Eleuch*, Pankaj K Choudhury
Journal of Modern Optics 66, 1129 (2019).

166. **Quantum states generation in multichannel directional coupler with second-order nonlinearity**
R. Julius, A.-B.M.A. Ibrahim, *H. Eleuch* and P.K. Choudhury
Optik 186, 212 (2019).

167. **Quantum Classification Algorithm based on Competitive Learning Neural Network and Entanglement Measure**
Mohammed Zidan, Abdel-Haleem Abdel-Aty, Mahmoud El-shafei, Marwa Feraig, Yazeed Al-Sbou, *Hichem Eleuch*, Mahmoud Abdel-Aty
Applied Sciences 9, 1277 (2019).

168. **Analytical Solution of the Position Dependent Mass Schrödinger Equation with a Hyperbolic Tangent Potential**
A. Karab, *Hichem Eleuch*
International Journal of Applied Mathematics 32, 357 (2019).

169. **Soliton pair propagation in three-level unbalanced medium**
S. Grira, *Hichem Eleuch*
Appl. Math. Inf. Sci. 13, 885 (2019).

170. **Quantum Correlation and Non-classical Properties in Semiconductor Microcavities for Multi-Photon Excitation**
Abdel-Khalek, K. Berrada and *Hichem Eleuch*
International Journal of Quantum Information 17, 1950047 (2019).

171. **One Dimensional Localization for Arbitrary Disorder Correlations**
H. Eleuch, M. Hilke
EPJB 92, 269 (2019).

172. **Quantum Noise and Squeezed Light by Dipolaritons in the Nonlinear Regime**
H. Jabri, and *H. Eleuch*
Annalen der Physik 1900253 (2019).
Inside Front Cover of the December Volume.

173. **Non-Classical Correlations Beyond Bell's Inequality Violation in Qubit-Pairs with an Intrinsic Noise**
A.-B. A. Mohamed, and *H. Eleuch*
Results in Physics 15, 102780 (2019).

174. **Dynamical Controls for Improving Quantum Search Algorithm Through Flux Qubits System**
A. H. Homid, M. Abdel-Aty, T. El-Shahat, *H. Eleuch*, A.-S. F. Obada
Fortschritte der Physik-Progress in Physics 66, 1700080 (2018).

175. **Dynamics in terahertz semiconductor microcavity: quantum noise spectra**
H. Jabri and *H. Eleuch*
J. Opt. 20, 055201 (2018).

176. **Generation and robustness of bipartite non-classical correlations in two nonlinear microcavities coupled by an optical fiber**
A.-B. A. Mohamed, *H. Eleuch*
JOSA B 35, 47 (2018).

177. **Stationary quantum correlation and coherence of two-mode Kerr nonlinear coupler interdicting with Su(2)-system under intrinsic damping**
A.-B. A. Mohamed, *H. Eleuch*
J. Mod optics 65, 2213 (2018).

178. **Quantum Fluctuations Inside a Microcavity with a Pair of Quantum Wells: Linear Regime**
H. Jabri and *H. Eleuch*
JOSA B 35, 2317 (2018)

179. **ERS approximation for solving Schrödinger's equation and applications**
H. Eleuch and M. Hilke
Results in Physics 11, 1044 (2018).

180. **Critical points in two-channel quantum systems**
H. Eleuch, Ingrid Rotter
EPJD 72, 138 (2018).

181. **Quantum quantifiers of Raman photon pairs with relativistic motion**
S. Abdel-Khalek, K. Berrada, *H. Eleuch*
Optical and Quantum Electronics 50, 151 (2018).

182. **Measure of non-Gaussianity for photon-added nonlinear coherent states**
K. Berrada, *H. Eleuch*
International Journal of Geometric Methods in Modern Physics, 15, 1850158 (2018).

183. **Some analytical solitary wave solutions for the generalized q-deformed Sinh-Gordon Equation**
H. Eleuch
Advances in Mathematical Physics 5242757 (2018)

184. **Loss, Gain and singular points in Open Quantum Systems**
H. Eleuch, I. Rotter
Advances in Mathematical Physics, 3653851 (2018).

185. **Quantum correlations in non-Markovian open quantum systems at different ranges of temperature**
K. Berrada and *H. Eleuch*
Laser Physics 28, 085201 (2018).

186. **On the Non-Classical Dynamics of Cavity-Assisted Four-Channel Nonlinear Coupler**
R. Julius, A-B. M. A. Ibrahim, P. K. Choudhury and *H. Eleuch*
Chinese Physics B 27, 114206 (2018).

187. **Magnus expansion method for two-level atom interacting with few-cycle pulse**
T. Begzjav, J. Ben-Benjamin, *H. Eleuch*, R. Nessler, Y. Rostovtsev, and G. Shchedrin
J. Mod. Opt. 65, 1378 (2018).

188. **Rabi oscillations produced by adiabatic pulse due to initial atomic coherence**
A. Svidzinsky, *H. Eleuch* and M. O. Scully
Optics Letters 42, 65 (2017).

189. **Resonances in open quantum systems**
H. Eleuch and I. Rotter
Phys. Rev. A 95, 022117 (2017).

190. **Gain and loss in open quantum systems**
H. Eleuch and Ingrid Rotter
Phys. Rev. E 95, 062109 (2017).

191. **Anderson Localization for Very Strong Speckle Disorder**
M. Hilke and *H. Eleuch*
Annalen der Physik 529, 1600347 (2017).

192. **Laser Control of Giant Optical Absorption and Gain in Quantum Plasmonic Particles**
C. H. R. Ooi, E. A. Sete and *H. Eleuch*
JOSA B 34, 1234 (2017).

193. **Probing Anderson localization using the dynamics of a qubit**
H. Eleuch, M. Hilke, and R. MacKenzie
Phys. Rev. A 95, 062114 (2017).

194. **Coherence and information dynamics of a Λ-type three-level atom interacting with a damped cavity field**
A.-B. A. Mohamed, *H. Eleuch*
Eur. Phys. J. Plus 132, 75 (2017).

195. **Stationary phase-space information in a qubit interacting non-linearly with a lossy single-mode field in the off-resonant case**
A.-B. A. Mohamed, *H. Eleuch* and H.A. Hessian
Optical and Quantum Electronics 49, 84 (2017).

196. **Quantum correlations control for two semiconductor microcavities connected by an optical fiber**
A.-B. A. Mohamed and *H. Eleuch*
Physica Scripta 92, 065101 (2017)

197. **Reply to the Comment by Alexander Moroz**
H. Eleuch and Y. V. Rostovtsev
EPL 117, 40002 (2017).

198. **Quantum preservation of the measurements precision using ultra-short strong pulses in exact analytical solution**
K. Berrada, *H. Eleuch*
Laser Phys. Lett. 14, 095203 (2017)

199. **Chiral spin flipping gate implemented in IBM Quantum Experience**
Shi-Yuan Ma, Sheng-Wen Li, Han Cai, Da-Wei Wang and *Hichem Eleuch*
Appl. Math. Inf. Sci. 11, 1519 (2017)

200. **Clustering of exceptional points and dynamical phase transitions**
H. Eleuch, I. Rotter
Phys. Rev. A 93, 042116 (2016).

201. **Exact solutions of the position-dependent-effective mass Schrödinger equation**
M. Sebawe Abdalla, *H. Eleuch*
AIP Advances 6, 055011 (2016).

202. **Higher order nonclassicality from nonlinear coherent states for models with quadratic energy spectrum**
A. Hertz, S. Dey, V. Hussin, *H Eleuch*
Symmetry 8, 36 (2016).

203. **Sudden death and rebirth of entanglement for different dimensional systems driven by a classical random external field**
N Metwally, *H Eleuch*, A S Obada
Laser Physics Letters 13, 105206 (2016).

204. **Wehrl Information and Mixedness of a Cooper-pair Box Coupled to a Cavity in a Thermal Reservoir**
A. B. A. Mohamed, *H. Eleuch*
J. Kor. Phys. Soc. 68, 513 (2016).

205. **Entanglement and mixedness of a superconducting qubit coupled to an open superconducting cavity**
A.-B. A. Mohamed and *H. Eleuch*
Journal of Russian Laser Research 37, 353 (2016).

206. **High-efficiency quantum state transfer and quantum memory using a mechanical oscillator**
E. A. Sete, *H. Eleuch*
Phys. Rev. A 91, 032309 (2015).

207. **Anomalous optical bistability and robust entanglement of mechanical oscillators using two-photon coherence**
E. A. Sete, *H. Eleuch*
J. Opt. Soc. Am B 32, 971 (2015).

208. **Localization and delocalization for strong disorder in one-dimensional continuous potentials**
H. Eleuch and M. Hilke
New J. Phys. 17, 083061 (2015).

209. **Entanglement between exciton and mechanical modes via dissipation-induced coupling**
E. A. Sete, *H. Eleuch*, C. H. R. Ooi
Phys. Rev. A 92, 033843 (2015).

210. **Consideration of geometric phase and population transfer without using rotating-wave approximation**
K. Berrada and *H. Eleuch*
Laser Phys. 25, 025201 (2015).

211. **Effect of the time-dependent coupling on a superconducting qubit-field system under decoherence: Entanglement and Wherl entropy**
S. Abdel-Khalek, K. Berrada and *H. Eleuch*
Annals of Physics 361, 247 (2015).

212. **Nearby states in non-Hermitian quantum systems I: Two states**
H. Eleuch and I. Rotter
Eur. Phys. J. D 69, 229 (2015)

213. **Nearby states in non-Hermitian quantum systems II: Three and more states**
H. Eleuch and I. Rotter
Eur. Phys. J. D 69, 230 (2015)

214. **Non-classical effects in cavity QED containing a nonlinear optical medium and a quantum well: Entanglement and non-Gaussanity**
A.-B. A. Mohamed and *H. Eleuch*
Eur. Phys. J. D 69, 191 (2015).

215. **Open quantum systems with loss and gain**
H. Eleuch and I. Rotter
International Journal of Theoretical Physics: 54, 3877 (2015).

216. **Geometric phase in cavity QED containing a nonlinear optical medium and a quantum well**
A.-B. A. Mohamed and *H. Eleuch*
J. Mod. Opt 62, 1630 (2015).

217. **Quantum control of the geometric phase in exact analytical solution using ultra-short strong pulses**
K. Berrada and *H. Eleuch*
Laser Phys. 25, 105201 (2015).

218. **An Empirical Model for Predicting Harwell Dose Variation During Gamma Process Interruption Using Experimental Design**
A. Mejri, K. Farah, F. Hosni, A. H. Hamzaoui and *H. Eleuch*
MAPAN-Journal of Metrology Society of India 30, 85 (2015).

219. **Strong squeezing and robust entanglement in cavity electromechanics**
E. A. Sete, *H. Eleuch*
Phys. Rev. A 89, 013841 (2014).

220. **Open quantum systems and Dicke superradiance**
H. Eleuch and I. Rotter
Eur. Phys. J. D 68, 74 (2014).

221. **Ultra-short strong excitation of two-level systems**
Pankaj K. Jha, Hichem Eleuch and Fabio Grazioso
Opt. Comm. 331, 198 (2014).

222. **Light-to-matter entanglement transfer in optomechanics**
Eyob A. Sete, *H. Eleuch* and C.H. Raymond Ooi
J. Opt. Soc. Am B 31, 2821 (2014).

223. **Information under Lorentz transformation**
N. Metwally, *H. Eleuch* and M. Abdel-Aty
Commun. Theor. Phys. 61, 32 (2014).

224. **Exact analytic solutions of the Schrödinger equations for some modified q-deformed potentials**
M. Sebawe Abdalla, *H. Eleuch*,
J. Appl. Phys. 115, 234906 (2014)

225. **Engineering Geometric Phase in Semiconductor Microcavities**
S. Abdel-Khalek, K. Berrada, *H. Eleuch*, and M. Abdel-Aty
Physica E 64, 112 (2014).

226. **M-Flip Concurrence in the Framework of Multipartite Spin Coherent States**
A. Chafik, K. Berrada, *H. Eleuch*, and M. Abdel-Aty
Journal of Computational and Theoretical Nanoscience 11, 2091 (2014).

227. **Exceptional points in open and PT-symmetric systems**
H. Eleuch and I. Rotter
Acta Polytechnica 54, 106 (2014).

228. **Regularity and Chaos in the Hydrogen Atom Highly Excited with a Strong Magnetic Field,**
M. Amdouni and *H. Eleuch*
Mathematical Problems in Engineering, 957652 (2014).

229. **Width bifurcation and dynamical phase transitions in open quantum systems**
H. Eleuch and I. Rotter
Phys. Rev. E 87, 052136 (2013).

230. **Enhancement of photon intensity in forced coupled quantum wells inside a semiconductor microcavity**
Hichem Eleuch, Awadhesh Prasad, and Ingrid Rotter
Phys. Rev. E 87, 022916 (2013).

231. **Avoided level crossings in open quantum systems**
H. Eleuch and I. Rotter
Fortschritte der Physik - Progress of Physics 61, 194 (2013).

232. **Beam Splitting and Entanglement Generation: Excited Coherent States**
K. Berrada, S. Abdel-Khalek, *H. Eleuch* and Y. Hassouni
Quantum Information Processing 12, 69 (2013).

233. **Exact Analytical Solutions of the Wave Function for Some q-deformed Potentials**
M. Sebawe Abdalla, *H. Eleuch* and T. Barakat
Reports on Mathematical Physics 71, 217 (2013).

234. **Slowing light control for a soliton-pair**
N. Boutabba and *H. Eleuch*
Appl. Math. Inf. Sci. 7, 1505 (2013).

235. **A Fast Converging Method for Generating Solutions to the Ricatti Equation**
H. Eleuch, H. Bahlouli, Y. Rostovtsev
Applied Mathematics and Computation 222, 548 (2013).

236. **Effects of an environment on a cavity quantum electrodynamics system controlled by bichromatic adiabatic passage**
H. Eleuch, S. Guérin, and H. R. Jauslin
Physical Review A 85, 013830 (2012).
Selected in Virtual Journal of Laser, January (2012).

237. **Controllable nonlinear effects in optomechanical resonator containing a quantum well**
E. A. Sete and *H. Eleuch*
Phys. Rev. A 85, 043824 (2012).

238. **Using quantum coherence to generate a gain in the XUV and X-Ray: Gain swept superradiance and lasing without inversion** (Invited paper)
Eyob A. Sete, A. A. Svidzinsky, Y. V. Rostovtsev, *H. Eleuch*, P.K. Jha, S. Suckewer, M. O. Scully
IEEE Journal of Selected Topics in Quantum Electronics 18, 541 (2012).

239. **Chaos and Regularity in Semiconductor Microcavities**
H. Eleuch and A. Prasad
Phys. Lett. A 376, 1970 (2012).

240. **Analytical approach to 1D bound state problems**
M. Sindelka, *H. Eleuch* and Y. Rostovtsev
Eur. Phys. J. D 66, 224 (2012).

241. **Analytical Solutions to the Dirac equation in 1+1 Space-Time Dimension**
H. Eleuch, A. D. Alhaidari and H. Bahlouli
Appl. Math. Inf. Sci. 6, 149 (2012).

242. **Analytical Solution to the Dirac equation in 3+1 Space-Time Dimensions**
H. Eleuch and H. Bahlouli
Appl. Math. Inf. Sci. 6, 153 (2012).

243. **Soliton-pair propagation under thermal bath effect**
N. Boutabba and *H. Eleuch*
Math. Model. Nat. Phenom. 7, 32 (2012).

244. **Quantum treatment of atom field interaction via the quadratic invariant**
M.S. Abdalla, *H. Eleuch* and J. Peřina
JOSA B 29, 719 (2012).

245. **Analytical Solution to position-dependent mass for 3D-Schrödinger equation**
H. Eleuch, Pankaj K. Jha and Yuri V. Rostovtsev
Math. Sci. Lett. 1, 1 (2012).

246. **Bipartite Entanglement of Nonlinear Quantum Systems in the Context of the q-Heisenberg Weyl Algebra**
K. Berrada, M. El Baz, *H. Eleuch* and Y. Hassouni
Quantum Information Processing 11, 351 (2012).

247. **An Approach for Using of Poly Glycolic Acid (PGA) in Reference Standard Dosimetry: PGA/ESR Dosimetry System Response Curve and Post Irradiation Stability**
Arbi Mejri, Haikel Jelassi, Khaled Farah, Ahmad Hichem Hamzaoui, *Hichem Eleuch*
World Journal of Nuclear Science and Technology, 2, 73 (2012).

248. **Nonlocal correlations for manifold quantum systems: Entanglement of two-spin states**
K. Berrada, A. Mohammadzade, S. Abdel-Khalek, *H. Eleuch* and S. Salimi
Physica E 45, 21 (2012).

249. **An Attempt For Application of γ-Irradiated Poly Glycolic Acid (PGA) As New Solid State/ESR Dosimetry System**
A. Mejri, H. Jelassi, K. Farah, A. H. Hamzaoui, *H. Eleuch*
Research&Review in Polymer 3, 79 (2012).

250. **External field effect on quantum features of radiation emitted by a quantum well in a microcavity**
Eyob A. Sete and Sumanta Das and *H. Eleuch*
Phys. Rev. A 83, 023822 (2011).

251. **Semiconductor cavity QED with squeezed light: Nonlinear regime**
Eyob A. Sete, *H. Eleuch*, and Sumanta Das
Phys. Rev. A 84, 053817 (2011).

252. **Influence of Relativistic Terms in the Spectra of Hydrogen Atom Highly Excited in an External Strong Magnetic Field**
M. A. Amdouni and *H. Eleuch*
Appl. Math. Inf. Sci. 5, 307 (2011).

253. **Analytical solution to position-dependent mass Schrödinger equation**
Pankaj K. Jha, Hichem Eleuch and Yuri V. Rostovtsev
Journal of Modern Optics 58, 652 (2011).

254. **Analytical Solution for the One-dimensional Scattering Problem**
H. Eleuch, Y. V. Rostovtsev and M. Sebawe Abdalla
Optics Communications 284, 5457 (2011).

255. **Multi-particle entanglement of charge qubits coupled to a nanoresonator**
M. Abdel-Aty, J. Larson, *H. Eleuch*, A.-S.F. Obada
Physica E 43, 1625 (2011).

256. **Asymtotic Dynamics of Quantum Discord in Open Quantum Systems**
K. Berrada, *H. Eleuch* and Y. Hassouni
J. Phys. B: At. Mol. Opt. Phys. 44, 145503 (2011).

257. **Bunching and Antibunching in Cavity QED**
H. Jabri and *H. Eleuch*
Commun. Theor. Phys. 56, 134 (2011).

258. **Entanglement Sudden Death and Sudden Birth in Semiconductor Microcavities**
S. Abdel-Khalek, Sh. Barzanjeh and *H. Eleuch*
International Journal of Theoretical Physics 50, 2939 (2011).

259. **Degree of Entanglement and violation of bell inequality by two-spin-1/2 states**
K. Berrada, Y. Hassouni and *H. Eleuch*
Commun. Theor. Phys. 56, 679 (2011).

260. **Autocorrelation function for a two-level atom "with counter-rotating terms"**
H. Eleuch, Y. V. Rostovtsev and M. Sebawe Abdalla
Journal of Russian Laser Research 32, 269 (2011).

261. **Dynamics of Wehrl entropy of a degenerate two-photon process with a nonlinear medium**
S. Abdel-Khalek, K. Berrada, *H. Eleuch* and M. Abdel-Aty
Optical and Quantum Electronics 42, 887 (2011).

262. **Soliton Propagation in Three-Level Atomic System Under Detuned Excitation**
Nadia Boutabba and *Hichem Eleuch*
Book Chapter in Perspectives in Optics Research, p19-30 (2011).

263. **Interaction of a quantum well with squeezed light: Quantum statistical properties**
Eyob A. Sete and *H. Eleuch*
Phys. Rev. A 82, 043810 (2010).

264. **New analytical Solution of Schrödinger Equation**
H. Eleuch, Y. V. Rostovtsev, M. O. Scully
EPL 89, 50004 (2010).
Highlighted in Physics Week, May 4, page 502 (2010).

265. **Analytical Solution to Sine-Gordon Equation**
H. Eleuch and Y. V. Rostovtsev
J. Math. Phys. 51, 093515 (2010).

266. **Coherent control of atomic excitation using off-resonant strong few-cycle pulses**
Pankaj K. Jha, *Hichem Eleuch* and Yuri V. Rostovtsev
Phys. Rev. A 82, 045805 (2010)
Selected in Virtual Journal of Ultrafast Science, Vol. 9, Issue 11 (2010).

267. **Analytical Solution for 3D Stationary Schrödinger Equation: Implementation of Huygens' Principle for Matter Waves.**
H. Eleuch and Y. V. Rostovtsev
Journal of Modern Optics 57, 1877 (2010).
Highlighted in Science Letter, 28 Dec. 2010: 3732.

268. **Correlated spontaneous emission on the Danube**
E. A. Sete, A. Svidzinsky, *H. Eleuch*, R. D. Nevels and M. O. Scully
Journal of Modern Optics 57, 1311 (2010).

269. **Dynamics of atoms interacting with off-resonant strong laser pulses**
Y. V. Rostovstev and *H. Eleuch*
Journal of Modern Optics. 57, 1882 (2010).

270. **Autocorrelation function of a microcavity-emitting field in the non-linear regime**
H. Eleuch and N. Rachid
Eur. Phys. J. D. 57, 259 (2010).

271. **Entanglement and autocorrelation function in semiconductor microcavities**
H. Eleuch
International Journal of Modern Physics B 24, 5653 (2010).

272. **Dynamical behavior of entanglement in semiconductor microcavities**
Sh. Barzanjeh and *H. Eleuch*
Physica E 42, 2091 (2010).

273. **Concurrence in the framework of coherent states**
Kamal Berrada, Abderrahim Chafik, *Hichem Eleuch* and Yassine Hassouni
Quantum Inf. Process. 9, 13 (2010).

274. **A Comparative Study of Negativity And Concurrence Based on Spin Coherent States**
K. Berrada , M. El Baz, *H. Eleuch* and Y. Hassouni
International Journal of Modern Physics C 21, 291 (2010).

275. **Entropy squeezing of a three-level atom interacting with a cavity field**
M. M. Nassar, *H. Eleuch*, M. Abdel-Aty and A.-S. F. Obada
Journal of Atomic and Molecular Sciences. 1, 54 (2010).

276. **Magnetoresistance of ultrathin Co/Au(111) multilayers**.
F. Trigui, *H. Eleuch* and Z. Fakhfakh
Book Chapter: Theoretical and Experimental Studies of Magnetic Materials Including Rare-Earth Nitrides, Semimagnetic Semiconductors, Perovskites Maganites and Metallic Multilayers and Films, Transworld Research Work, p 141-182 (2010).

277. **Solitons in 3-level atomic system**
Nadia Boutabba and *Hichem Eleuch*
Chapter in Horizons in World Physics (book and e-book). Volume 273, p 433-449, (2010).

278. **Ultrafast stimulated Raman parallel adiabatic passage by shaped pulses**
G. Dridi, S. Guérin, V. Hakobyan, H.R Jauslin and *H. Eleuch Phys. Rev A* 80, 043408 (2009).
Selected in: Virtual Journal of Quantum Information, Vol. 9, Nr 10 (2009).
and in Virt. J. Ultrafast Sci. / Volume 8 / Issue 11 (2009).

279. **Excitation of atomic coherence using off-resonant strong laser pulses**
Y. Rostovstev, *H. Eleuch*, A. Svidzinsky, H. Li, V. Sautenkov and M. O. Scully
Phys. Rev. A. 79, 063833 (2009).
Selected in Virtual Journal of Ultrafast Science, Vol. 8, Issue 7 (2009).

280. **Thermal bath effect on soliton propagation in three-level atomic system**
N .Boutabba, *H. Eleuch* and H. Bouchriha
Synthetic Metals 159, 1239 (2009).

281. **Entanglement of Two-qubit Nonorthogonal States**
K. Berrada, A. Chafik, *H. Eleuch* and Y. Hassouni
International Journal of Modern Physics B 23, 2021 (2009).

282. **Quantum trajectories and autocorrelation function in a semiconductor microcavity.**
H. Eleuch
Applied Mathematics & Information Science 3, 185 (2009).

283. **Noise spectra of a microcavity-emitting field in the linear regime**
H. Eleuch
Eur. Phys. J. D 49, 391 (2008).

284. **Photon statistics of light in semiconductor microcavities**
H. Eleuch
J. Phys. B 41, 055502 (2008).

285. **Autocorrelation function of a microcavity-emitting field in the linear regime**
H. Eleuch
Eur. Phys. J. D 48, 139 (2008).

286. **Application of commercial glass in gamma radiation processing**
A. Mejri, K. Farah, *H. Eleuch* and H. Ben Ouada
Radiation Measurements 43, 1372 (2008).

287. **Rydberg atoms and autocorrelation function**
H. Eleuch and T.Djerad
Book Chapter: Laser, Optics and Electro-Optics Research Trends, p247-267 (2007).

288. **Soliton propagation in three-level atomic system under detuned excitation**
N. Boutabba and *H. Eleuch*
Journal of Optics Research, Vol. 10 Issue $\frac{1}{2}$, 51 (2007).

289. **Lifetimes of highly excited atomic states**
H.Jabri, *H.Eleuch*, T.Djerad
Physica scripta 73, 397 (2006).

290. **Lifetimes of atomic Rydberg states by autocorrelation function**
H. Jabri, *H. Eleuch*, T. Djerad
Laser Phys. Lett. 2, 253 (2005).

291. **Quantum Model of emission in weakly non-ideal plasma**
H. Eleuch, N. Ben Nessib and R. Bennaceur
Eur. Phys. J. D 29, 391 (2004).

292. **Nonlinear dissipations and the quantum noise of light in semiconductor microcavities**
H. Eleuch and R. Bennaceur
J. Opt B: Quantum and Semiclassical Optics. 6, 189 (2004).

293. **Optical bistability in semiconductor microcavities**
A. Baas, J. Ph. Karr, *H. Eleuch* and E. Giacobino
Phys. Rev. A 69, 023809 (2004).
Selected in Virtual Journal of Nanoscale Science & Technology, Vol. 9, Issue 8 (2004).

294. **Soliton propagation in an absorbing three-level atomic system**
Hichem Eleuch, Dominique Elser et Raouf Bennaceur
Laser Phys. Lett. 1, 391 (2004).

295. **An Optical Soliton Pair Among Absorbing Three-Level Atoms**
Hichem Eleuch and Raouf Bennaceur
J. Opt. A: Pure Appl. Opt. 5, 528 (2003).

296. **Quantum optical effects in semiconductor microcavities**
E.Giacobino, J.PH.Karrr,G.Messin and *H.Eleuch*
C. R. Physique 3, 41 (2002).

297. **Squeezed states and quantum noise of light in semiconductor microcavities**
G. Messin, J. Ph. Karr, *H. Eleuch*, J. M. Courty and E. Giacobino
J. Phys.: Condens. Matter 11, 6069 (1999).

298. **Cavity QED effects in semiconductor microcavity**
H.Eleuch, J.M.Courty, G.Messin, C.Fabre and E.Giacobino
J. Opt. B : Quantum Semiclass. Optics 1, 1 (1999).

299. **Effets d'électrodynamique quantique dans des microcavités semi-conductrices**
H.Eleuch, ,G.Messin, C.Bogen, J.M.Courty, C.Fabre and E.Giacobino
Anales de Physique Fr. 23, 213 (1998).

Papers in Complex Systems

300. **Pricing of European Currency Options Considering the Dynamic Information Costs**
Wael Dammak, Salah BEN HAMAD, Christian de Peretti and *Hichem Eleuch*
Global Finance Journal 58, 100897 (2023).

301. **The effect of market sentiment and information asymmetry on option pricing**
Imen ZGHAL, Salah BEN HAMAD, Haitham Nobanee and *Hichem Eleuch*
North American Journal of Economics and Finance 54 , 101235 (2020).

302. **Impact of Corruption on Economic Development: Case of Tunisia**
A. Zouaoui, A. Al Qudah, C. El Aoun, M. Ben Arab and *H. Eleuch*
Applied Mathematics & Information Science 12, 461 (2018).

303. **Alpha Model: A Mathematical Modeling Approach Applied to an Air Quality Monitoring Network**
C. El Aoun, N. Boutabba and *H. Eleuch*
Applied Mathematics & Information Science 9, 27 (2015).

304. **Correlation function and business cycle turning points: A comparison with Markov switching Approach.**
L. Medhioub and *H. Eleuch*
Applied Mathematics & Information Science 7, 449 (2013).

305. **Rt-Dbp: a multi-criteria priority assignment scheme for real-time tasks scheduling**
L. Baccouche and *H. Eleuch*
Applied Mathematics & Information Science 6, 383 (2012).

306. **Reasoning by Analogy Using Coulomb's Law (RAUCL) Model in Multi-Criteria Negotiation**
Chokri El Aoun, *Hichem Eleuch*, Hella Ben Ayed, Esma Aïmeur and Farouk Kamoun
Book Chapter (book and e-book): On the Borders of Complexity, 1-20 (2012).

307. **Study of key pre-distribution schemes in wireless sensor networks: Case of BROSK (use of WSNet)**
A.Jemai, A.Mastouri and *H.Eleuch*
Applied Mathematics & Information Science 5, 655 (2011).

308. **The ICT's Acceptance: Analytical Framework and Empirical Example**
Jamel Choukir, Mouna Baccour Hentati, Bilel Bellaj and *Hichem Eleuch*
Book Chapter in Computer Networks, Policies and Applications, 167-180 (2011).

309. **An adaptive model for predicting of global, direct and diffuse hourly solar irradiance**
A. Mellit, *H. Eleuch*, M. Benghanem, C. Elaoun and A. Massi Pavan
Energy Conversion and Management 51, 771 (2010).

310. **New Approach of Case-Based Reasoning**
Chokri El Aoun, *Hichem Eleuch*, Hella Ben Ayed, and Esma Aïmeur
Book Chapter in (book and e-book) Case-Based Reasoning: Processes, Suitability and Applications, 141-162 (2010).

311. **Filtering of cardiac and power line in surface respiratory EMG signal.**
S.Yacoub, K. Raoof and *H. Eleuch*
Applied Mathematics & Information Science 4, 365 (2010).

312. **Long Run Performance Following Seasoned Equity Offering on Tunisian Stock Market: Cumulative Prospect Preference Approach.**
Dorsaf BEN AISSIA, Slaheddine HALLARA and *Hichem ELEUCH*
International Research Journal of Finance and Economics Issue 34, 83 (2009).

313. **Reasoning by Analogy Using Coulomb's law (RAUCL) Model in Multi-Criteria Negotiation**
Chokri El Aoun, *Hichem Eleuch*, Hella Ben Ayed, Esma Aïmeur, and Farouk Kamoun
Chaos and Complexity Letters, Vol 4, Iss 1, 3 (2009).

314. **New Approach of Case-Based Reasoning**
Chokri El Aoun, *Hichem Eleuch*, Hella Ben Ayed,and Esma Aïmeur
Chaos and Complexity Letters, Vol 4, Iss 1, 35 (2009).

315. **Options Assessments and Risk Management in Presence of the imperfections**
Saleh Ben Hamed and *Hichem Eleuch*
JIFE 2, 77 (2008).

316. **Options Pricing in Presence of Dynamical Imperfections**
Saleh Ben Hamed and *Hichem Eleuch*
China Finance Rev. 2, 121 (2008) (English version).
China Finance Rev. 2, 43 (2008) (Chinese version).

317. **The ICT's Acceptance: Analytical Framework and Empirical Example**
Jamel Choukir, Mouna Baccour Hentati, Bilel Bellaj and *Hichem Eleuch*
Internet Journal 2, 1 (2008).

318. **Analogy in Making Predictions**
Chokri El Aoun, *Hichem Eleuch*, Esma Aïmeur, Hella Ben Ayed, and Farouk Kamoun
Journal of Decision Systems 16/3, 393 (2007).

Conference Papers

319. **Quantum Algorithm for Handling Large-Scale Image Data in Quantum Random Access Memory**
M. Qasymeh, A. M. Eisa, M. Zidan, M. A. I. Shoman, and H. Eleuch, Proc. 2025 Photonics & Electromagnetics Research Symposium - Spring (PIERS-Spring), Abu Dhabi, UAE, (2025), pp. 1-10. doi: 10.1109/PIERS-Spring66516.2025.11276512.

320. **Architecture Schema for Bulk Qubits Teleportation using the Fastest Quantum Random Access Memory**
M. Zidan, H. Eleuch, M. Qasymeh, 4D - Internet of Things, Smart Spaces, and Next Generation Networks and Systems, pages 155-166, 25th International Conference, NEW2AN 2025, Abu Dhabi 2025. doi: $10.1007/983 - 3 - 032 - 19978 - 2_12$.

321. **Edge States and Their Cousins in an Open SSH Model**
Alexei Bissonnette, Nicolas Delnour, Andrew Mckenna, Hichem Eleuch, Michael Hilke, and Richard MacKenzie
Proceedings of Gravity, Strings and Fields, GSF 2023, CRM Series in Mathematical Physics
editors: M. Paranjape, D. Carney, BH. Lee, T. Lee, p 107–117 (2025). ISBN 978-3-031-91266-5

322. **Circuit Implementation of Shor's Algorithm for the Factorization of Small Integers in Qiskit**
Iheb E. Gharbi, Amor Gueddana, Hichem Eleuch, and Vasudevan Lakshminarayanan
PROCEEDINGS VOLUME 13148 OPTICAL ENGINEERING + APPLICATIONS
Quantum Communications and Quantum Imaging XXII, San Diego, California, United States, 18-23 AUGUST 2024
Proc. of SPIE Vol. 13148 131480G (2024).

323. **Optical Teleportation Using Electro-Optic Plasmonic Graphene Waveguide**
M. Qasmehy, M. Asjad, H. Eleuch
Proceedings CLEO: Laser Science to Photonics Applications, JTu3A.14 (2022).
May 2022, San Jose, California, USA.

324. **The analysis of the atomic population inversion under a few cycle strong shaped laser with a double exponential wave form**
N. Boutabba, S. Grira, and H. Eleuch
in Frontiers in Optics + Laser Science 2021, C. Mazzali, T. (T.-C.) Poon, R. Averitt, and R. Kaindl, eds., Technical Digest Series (Optica Publishing Group, 2021), paper JTh5A.145

325. **Qubits as Edge State Detectors: Illustration Using the SSH Model**
M. Zaimi, C. Boudreault, N. Baspin, H. Eleuch, R. MacKenzie, M. Hilke
Bulgarian Journal of Physics 48, 174 (2021).
CRM Series in Mathematical Physics: Quantum Theory and Symmetries
Proceedings of the 11th International Symposium, Montréal, Canada, p 631–641 (2021).

326. **Electro-Optic Two-Mode Squeezing using Graphene Periodic Layers**
M. Qasmehy, H. Eleuch
Proceedings CLEO: Conference on Lasers and Electro-Optics, paper JTu3A.99 (2021).
May 2022, San Jose, California, USA.

327. **Graphene-Based Electro-Optic Entangler**
M. Qasmehy, H. Eleuch
Proceedings CLEO: QELS_Fundamental Science, Washington, DC, United States (2020)

328. **Quantum States in Nonlinear Coupler with Frequency Mismatch**
M. Zahirzai, R. Julius, A.-B.M.A. Ibrahim, *H. Eleuch*, and P.K. Choudhury ,
Proceedings JSAP-OSA Joint Symposia 2019, 21p-E214-3 (2019).
JSAP-OSA Joint Symposia 2019.
September 2019, Hokkaido, Japan.

329. **Solitary waves propagation in Three-Level Atomic Media**
S. Grira, H. Eleuch,
Journal of Physics: Conference Series 1411, 012018 (2019).
ICEMP 2019
International Conference on Engineering, Mathematics, and Physics
July 2019, Ningbo, China.

330. **The q-Derivative and Differential Equation**
H. Acka, J. Benbourenane, *H. Eleuch*,
J. Phys.: Conf. Ser. 1411 012002 (2019).
ICEMP 2019
International Conference on Engineering, Mathematics, and Physics
July 2019, Ningbo, China.

331. **Quantum noise and squeezed light by dipolaritons in the nonlinear regime**
H. Eleuch, H. Jabri
Conference paper in
VII International Conference "Frontiers of Nonlinear Physics",
June-July 2019, Nizhny Novgorod, Russia

332. **Graphene Multilayers for Quantum Microwave Signal Up-Conversion to the Optical Domain**
Montasir Qasymeh, Hichem Eleuch
Conference paper IEEE, NUSOD 2019, 157-158. Numerical Simulation of Optoelectronic Devices (NUSOD), 19th International Conference,
July 2019, Ottawa, Canada.

333. **Probing Anderson Localization Using the Dynamics of a Qubit**
Hichem Eleuch, Michael Hilke and Richard MacKenzie
Springer Proceedings in Mathematics and Statistics
263: Quantum Theory and Symmetries with Lie Theory and Its Applications in Physics, Volume 1, p321-329 (2018)
QTS-X/LT-XII, Varna, Bulgaria, June 2017

334. **Experimental demonstration of Rabi Oscillations produced by adiabatic pulse due to initial atomic coherence**
Z. Yi, X. Zhao, Z. Wang, T. Peng, A. A. Svidzinsky, H. Eleuch, and M. O. Scully
Conference on Lasers and Electro-Optics, (Optical Society of America, 2018), paper FM4H.4.

335. **Statistical Properties of a Raman Three-level Atom Interacting with a Cavity Field**
AHM Ahmed, LY Cheong, N. Zakaria, N. Metwally and *H. Eleuch*.
INTERNATIONAL CONFERENCE ON FUNDAMENTAL AND APPLIED SCIENCES 2012 (ICFAS2012)
Book Series: AIP Conference Proceedings, Volume: 1482 Pages: 373-375 (2012).

336. **Lasing without Inversion in He-like Boron: Transient Response**
E. A. Sete, A. A. Svidzinsky, Y. V. Rostovtsev, *H. Eleuch*, P. K. Jha, S. Suckewer, and M. O. Scully
American Physical Society, Joint Fall 2011 Meeting of the Texas Sections of the APS

337. **Le Raisonnement á Base de Cas Appliqué á la Négociation Electronique**
Chokri El Aoun, Hella Ben Ayed, *Hichem Eleuch*, Esma Aïmeur and Farouk Kamoun
5th International Conference for Sciences of Electronics, Technology of Information and Telecommunications (SETIT-IEEE) Hammamet, Tunisia, March 22-26, 2009.

338. **Generation of Maximal Coherence in a Two-Level System via Breaking Adiabaticity**
Yuri Rostovstev, *Hichem Eleuch*, Anatoly Svidinsky and Marlan O; Scully.
Frontiers in Optics, Rochester, October 2008.

339. **The Reasoning by Analogy in Negotiation**
Chokri El Aoun, *Hichem Eleuch*, Hella Ben Ayed, Esma Aïmeur and Farouk Kamoun
(SETIT-IEEE) Hammamet, Tunisia, March 25-29, 2007.

340. **An Electric Physics-Based Strategy For Multicriterion Negotiation**
Chokri El Aoun, Hella Ben Ayed, *Hichem Eleuch*, Esma Aïmeur and Farouk Kamoun
Seventh International on Electronic Commerce Research, Dallas - USA, June10-13, 2004.

341. **Modèle Electrique Non Linéaire Des Cellules Solaires**
M.Abdelkarim, *Hichem Eleuch* et M.Fathallah
(SETIT-IEEE) Sousse, Tunisia, March 15-20, 2004.

342. **An Electric Physics-Based Approach for Stock Exchange Prediction**
Chokri El Aoun, Hella Ben Ayed, Esma Aïmeur, Farouk Kamoun and *Hichem Eleuch*
Sixth International on Electronic Commerce Research, Dallas, USA, October 23 - 26, 2003.

343. **Zero inflation and interest credit and opportunity (Zico) with stochastic returns and continuous time modeling**
Fathi Abid and *Hichem Eleuch*
Global Business & Economics Review - Anthology 2002, 371 (2002)

Invited Talks for Conferences, Workshops, and Seminars

- Information quantique : Vers la prochaine révolution numérique [Quantum Information: Toward the Next Digital Revolution] (Public Lecture)
Faculty of Sciences of Sfax, University of Sfax, Tunisia, May 2026.
- ERS method and Applications
New York University Abu Dhabi, Center for Quantum and Topological Systems, January 2026.
- Quantum Information – The New Frontier (Keynote Speaker)
SmartTech 2025, Tunis, Tunisia, December 2025.
- New Generation of Quantum Computer Based on Quansistors: A Blueprint
Quantum Winter School, Khalifa University, December 2025.
- Quantum Information and Quantum Computing
Higher Colleges of Technology, Sharjah, November 2025.
- A Conceptual Overview of Quantum Physics and Quantum Information (Public Lecture)
Public Lecture Abdul Hameed Shoman Foundation, Amman, Jordan, (Online) September 2025.
- Beyond The Qubit: Blue Print of A Quantum Computer With Quansistors,
Quantum Summit 2, Dubai, February 2025.
- Quantum Information: The Next Frontier of Computation,
OPTIMISTIC TUNISIA, A GLOBAL WEBINAR, (Public Lecture), January 2025.
- A new concept of a quantum computer based on quansistors,
MENA Quantum New York University Abu Dhabi November 2024.
- What is quantum in quantum finance?
(Keynote speaker), Quantum Finance, Exploring the frontier between Quantum Physics and Quantum Computing, Tunisian-International Conference on Economics, Finance and Accounting (TICEFA 2024), May 2024.
- High fidelity quantum computer with quantum dots: A blueprint concept
(distinguished speaker) for the European Photonics Industry Consortium (EPIC) delegation visit to the UAE, February 2024.
- Universal Quantum Computation Using Symmetrical Ququarts
January 2024, Seminar of Quantum Information and Quantum Computing Group, Arabic Physical Society
- Conceptual Basis of Quantum Mechanics and Applications (Public Lecture),
November 2023, Shaikh Ebrahim Bin Mohammed Al Khalifa Center for Culture and Research, Kingdom of Bahrain
- Blueprint for a High-Fidelity Quantum Computer
November 2023, Department of Physics, University of Bahrain, Kingdom of Bahrain
- High fidelity quantum computer with quantum dots: A blueprint concept,
October 2023, International Conference on Laser Physics, Photonics and Applications, October 2023, Hurghada, Egypt
- High-fidelity universal quantum computation with symmetric qubit clusters,
May 2023, Quantum Colloquium at New York University Abu Dhabi
- Conceptual Basis of Quantum Mechanics,
February 2023, ArPS Workshop on Physics Education For High School and University Instructors, Zewail University, Egypt
- ERS method and Applications
December 2021, Khalifa University, UAE

- Applications of ERS and Supersymmetry for Generating Analytical Solutions of the Schrödinger equations
  December 2020, New York University at Abu Dhabi, UAE
- Analytical solutions of the Schrödinger equation
  November 2020, Sharjah University, Department of Applied Physics and Astronomy, UAE
- Exact spectra of harmonic-like potentials
  January 2020, IQSE, Texas A&M University, College Station, TX, USA
- Harmonic-like Potentials: New classes of potentials with exact eigenergies and eigenfunctions.
  The Winter Colloquium on the Physics of Quantum Electronics 2020.
  January 2020, Snow Bird, Utah, USA
- ERS-method, analytical solutions for the Schrödinger equation and applications in random media.
  December 2019, American University of Sharjah, Sharjah, UAE.
- Robust squeezing by dipolaritons in double quantum wells microcavity
  VII International Conference "Frontiers of Nonlinear Physics",
  June-July 2019, Nizhny Novgorod, Russia
- Black Holes: The Fascinating Journey from Predicting them to Seeing them.
  April 2019, Abu Dhabi University, Abu Dhabi, UAE.
- ERS Method, Analytical Solutions of the Schrödinger Equation and
  Application for the Wave Propagation in Random Media
  February 2019, Department of Physics, University of North Texas, Denton, Texas, USA.
- Non-Hermitian Formalism, width bifurcation and dynamical phase transition in open quantum systems
  The Winter Colloquium on the Physics of Quantum Electronics 2019.
  January 2019, Snow Bird, Utah, USA
- Non-Hermitian Formalism in Open Quantum Systems
  TAMU-PQE Follow-on Workshop on Black Hole, Nonequilibrium Physics and Quantum Computing.
  January 2019, College Station, Texas
- Quantum Computing Technologies for the Future Mars Missions
  One-Day MiniSymposium on Mars
  November 2017, United Arab Emirates University, Al Ain, UAE.
- Analytical solutions from two-level system to Anderson localization
  TAMU-Princeton-Baylor Summer Symposium on Quantum Science and Engineering
  Casper, Wyoming, July 2017.
- Analytical Methods for Schrödinger Equation and Application to Random Media
  Princeton-TAMU Symposium on Quantum Physics and Engineering, Princeton University,
  Princeton, New Jersey, June 2017.
- Analytical Methods for Studying the dynamics of the two-level system
  Quantum Africa 4, Tunis, Tunisia, May 2017.
- The ERS Method and its applications: From for Schrödinger Equations to Anderson Localization.
  Faculty of Mathematical, Physical and Natural Sciences of Tunis
  Tunisia, May 2017.
- Physical Models and Applications in Finance.
  Colloque International Financement Et Gestion Des Risques Des Projets
  Innovants et Clusters Industriels, Hammet, Tunisia, May 2017.
- Analytical Methods for Schrödinger Equation:
  From Two-Level System to Anderson Localization.
  AMO-CM Seminar.
  College Station, Texas, February 2017.
- Hamiltonian for Raman Scattering via Canonical X-Form
  Mini Seminar on Raman Scattering: Fundamental and Applications
  Baylor University, Waco, Texas, February 2017.
- Magnus expansion method for a two-level system interacting with a few-cycle TAMU-PQE Follow-on Workshop
  College Station, Texas, January 2017.
- Population transfer and pulse propagation in atomic media (Plenary speaker)
  The Third International Conference on Research to Applications & Markets, Nanosciences session
  Hammet, Tunisia, September 2016
- Research at the Institute of Quantum Science and Engineering
  Faculty of Mathematical, Physical and Natural Sciences of Tunis
  Tunisia, September 2016

- Canonical Transformation of Raman Transitions
  TAMU-Princeton-Baylor Summer Symposium, Quantum Biophotonics,
  Casper, Wyoming, July 2016.
- Anderson Localization for strong disorder: Analytical results
  Institute for Quantum Science and Engineering, Physics department, Texas A&M University
  March 2016
- Entanglement, quantum state transfer, and quantum memory in nanoresonators
  The 5th International Conference on Mathematics and Information Sciences, Zewail City of Science and Technology, Egypt, February 2016.
- Entanglement, nonlinearity and quantum state transfer in nanoresonators
  Department of Physics
  Concordia University, March 2015.
- Analytical solution to the Schrödinger equation and the ERS method
  Montreal Joint High Energy Physics Seminars
  Université de Montréal, May 2013.
- Analytical solution to the Schrödinger equation and the ERS (Eleuch-Rostovtsev-Scully) method
  Department of Physics
  McGill University, November 2012.
- ERS-method and analytical solutions for Schrödinger and Dirac equations.
  Department of Mathematics and Statistics.
  Concordia University, June 2012.
- Alpha-Model and predictions.
  Max Planck Institute for the Physics of Complex Systems, Dresden.
  February 2012
- Strong fields and photon statistics
  Technical University of Dresden, November 2011.
- Analytical Solution to Position Dependent Mass for 3D-Schrödinger Equation
  The 2nd International Conference Mathematics & Information science
  Sohag, Egypt, September 2011.
- Geometric Phase in Semiconductor Microcavities
  The 2nd International Conference Mathematics & Information science
  Sohag, Egypt, September 2011.
- Analytical Solution to the 3+1 Dirac Equation
  The 2nd International Conference Mathematics & Information science
  Sohag, Egypt, September 2011.
- Analytical solution to the Schrödinger equation.
  Max Planck Institute for the Physics of Complex Systems, Dresden.
  August 2011.
- Alpha-model for prevision
  July 2012, Max Planck Institute for the Physics of Complex Systems, Dresden.
- Attosecond Physics: An atom interacting with ultra-short pulse
  King Fahd University of Petroleum & Minerals
  February 2011.
- Some analytical solutions to fundamental equations in physics
  in King Abdulaziz City for Science and Technology.
  Riyadh, January 2011.
- Analytical Solution for 3D Stationary Schrödinger Equation: Implementation of Huygens's Principle for Matter Waves.
  Summer School on Quantum Science and Engineering
  Casper, Wyoming, July 2010.
- Analytical Solutions of the Schrödinger Equation
  TAMU Physics of Quantum Electronics Workshop
  College Station, Texas, January 2010.
- Analytical Solutions to the Schrödinger Equation in Time and Space
  Physics of Quantum Electronics Workshop (40), Snowbird
  Snowbird, January 2010.
- Excitation of atomic coherence using off-resonant laser pulses
  TAMU/Princeton Workshop on Quantum Science and Engineering
  Jackson Hole, WY, August 2009.

- Analytic Solution to the Schrödinger's Equation
  TAMU Physics of Quantum Electronics Workshop, Texas
  Texas, January 2009.
- The Photon sheds light on quantum: The Lamb Shift in single Photon Dicke Super-radiance
  SPIE conference San Jose, California [On behalf of Prof. M. O. Scully
  January 2009.
- XUV coherent Super-radiance (Atto-second Nonlinear optics)
  SPIE conference San Jose, California [On behalf of Prof. M. O. Scully
  January 2009.
- Excitation of atomic coherence using off-resonant laser physics
  Physics of Quantum Electronics Workshop, Snowbird
  January 2009.

Patents

1. **Frequency-Tunable Quantum Microwave to Optical Conversion System**
   M. Qasymeh and *H. El Euch*
   Patent No: US 10,824,048 B2. Date of Patent: Nov. 3, 2020. (Supported by TAKAMUL for patent filling, Abu Dhabi Department of Economic Development, 50 000 AED).
2. **Continuation of the patent 1: Frequency-Tunable Quantum Microwave to Optical Conversion System**
   M. Qasymeh and *H. El Euch*
   Patent No: US 11,294,259 B2. Date of the Patent Publication: April. 5, 2022.
3. **Wideband Graphene-Based Electro-Optic Entangler**
   M. Qasymeh and *H. El Euch*
   Patent No: US 11,048,107 B2. Date of Patent: June. 29, 2021.
4. **Quantum Random Access Memory**
   H. El Euch, M. Zidan, M. Abdel-Aty, and A. H. Abdel-Aty, A. Khalil
   Patent No: US 11,093,850 B1. Date of Publication: August 17, 2021.
5. **Graphene Multi-Layered Structure for ultra-sensitive microphotonic devices with microvolts inputs**
   M. Qasymeh and *H. El Euch*
   Patent No: US 11,314,144 B2. Date of Publication: April 26, 2022.
6. **Optically Activated Graphene-Based Microwave Field Squeezer**
   M. Qasymeh and *H. El Euch*
   Patent No: US 11,320,719 B2. Date of the Patent Publication: May. 3, 2022.
7. **Continuation of the patent 3: Wideband Graphene-Based Electro-Optic Entangler**
   M. Qasymeh and *H. El Euch*
   Patent No: US 11,513,376 B2. Date of the Patent Publication: November 29, 2022.
8. **Continuation of the patents 3 and 7: Wideband Graphene-Based Electro-Optic Entangler**
   M. Qasymeh and *H. El Euch*,
   Patent No: US 11,513,377 B2. Date of the Patent Publication: November 29, 2022.
9. **Quantum Random Access Memory system**
   H. El Euch, M. Zidan, M. Abdel-Aty, and A. H. Abdel-Aty, A. Khalil
   Patent No: US 11,651,266 B2. Date of Publication: May 16, 2023.
10. **Frequency-Tunable Quantum Microwave to Optical Conversion Process**
    M. Qasymeh and *H. El Euch.*
    Patent No: US 11,675,246 B2. Date of the Patent Publication: June 13, 2023.
11. **Continuation of the patents 1 and 2: Frequency-Tunable Quantum Microwave to Optical Conversion System**
    M. Qasymeh and H. El Euch.
    Patent No: US 11,679,982 B2. Date of the Patent Publication: June 20, 2023.
12. **Continuation of the patents 3,7 and 8: Wideband Graphene-Based Electro-Optic Entangler**
    M. Qasymeh and *H. El Euch*
    Patent No: US 11,803,070 B2. Date of the Patent Publication: October 31, 2023.
13. **System for Coherent Microwave Transmission Using a Non-Refrigerated Waveguide**
    M. Qasymeh and H. El Euch
    Patent No: US 11,837,769 B2. Date of the Patent Publication: December 5, 2023.
14. **Continuation of the patents 3,7,8 and 12: Wideband Graphene-Based Electro-Optic Entangler**
    M. Qasymeh and H. El Euch
    Patent No: US 11,921,364 B2. Date of the Patent Publication: March 5, 2024.

15. **Versatile quantum microwave to optical conversion process**
M. Qasymeh and H. El Euch
Patent No: US 12,055,837 B2. Date of the Patent Publication: August 6, 2024.

16. **Tunable Quantum Microwave to Optical Conversion System**
M. Qasymeh and H. El Euch
Patent No: US 12,092,942 B2. Date of the Patent Publication: September 17, 2024.

17. **Optical Activated Graphene-Based Microwave Field Squeezer System**
M. Qasymeh and H. El Euch
Patent No: US 12,105,399 B2. Date of the Patent Publication: October 1, 2024.

18. **Quantum Teleportation Network a System of Electronically Enabled Graphene Waveguides**
M. Qasymeh, M. Asjad and H. El Euch
Patent No: US 12,149,292 B2. Date of the Patent Publication: November 19, 2024.

19. **Optically Activated Graphene-Based Microwave Field Squeezer**
M. Qasymeh, and H. El Euch
Patent No: US 12,235,564 B2. Date of the Patent Publication: February 25, 2025.

20. **Quantum Consensus Protocol for Managing Quantum Blockchains**
H. El Euch, M. Zidan, M. Qasymeh, and A. Khalil
Patent no: US 12,445,276 B2. Date of Patent: Oct. 14, 2025.

21. **Real-Time Quantum Random Access Memory**
H. El Euch, M. Zidan, A. H. Abdel-Aty, M. Abdel-Aty, and A. Khalil
Patent No:12,493,808 B2. Date of Publication: Dec. 9, 2025.