

Abdelrahman Mohamed Ghanim

Assistant Professor at *Physics Department, Faculty of Science, Ain Shams University, Cairo, Egypt*



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Work Address (Mailing Address) Department of Physics, Faculty of Science, Ain Shams University, 11566, Abbassia, Cairo, Egypt
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Personal Details:

Date of Birth: June 26, 1989
Gender: Male
Nationality: Egyptian
Marital Status: single

Work History:

- **Lecturer** at the *Physics department. Faculty of Science, Ain Shams University, Egypt* from 2021 till now.
- **Lecturer** at the *Physics department. Faculty of Engineering, Misr International University, Egypt* from January 2022 till 2024.
- **Teaching Assistant** at the *Physics department. Faculty of Science, Ain Shams University, Egypt* from 2017 to 2021.
- **Demonstrator** at the *Physics department. Faculty of Science, Ain Shams University, Egypt* from 2013 to 2017

Education:

2017-2021 **Ph.D. in industrial and Information Engineering from Perugia University, Italy (Jointly degree cooperation Funded by TAMURA company)**
-Thesis Title: "Theoretical and experimental analysis of magnetic components"

The work focuses on

- Work included predicting magnetic properties of electrical steels and simulating electrical machines.
- Core loss determination involved **Finite Element method (FEM)** simulation with post-processing.
- Comprehensive **FEM model in MATLAB** used for the active portion of the transformer.

Specialization Computational Electromagnetics / Computational Physics / FEM method / Magnetic materials / MATLAB

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- 2017-2020 Ph.D. Courses**
-Courses: Electronics, systems, and methodologies for experimental analysis, Bitcoins Blockchain Distributed Ledger Technologies, and Smart Contracts, Magnetic Materials: Modeling, Properties, and Applications
- 2014-2017 M.Sc. in Physics -Thesis Title:** "Design, Simulation, and Characterization of tunable directive nanoantennas"
- 2012-2013 Pre-M.Sc. Courses in Physics** *Physics Department, Faculty of Science, Ain Shams University, Cairo, Egypt.*
-Courses: Advanced Quantum Mechanics, Advanced Electrodynamics, Statistical Physics, Computational Physics, Mathematical Physics, Telecommunication and Electronics, Advanced Electronic Circuits, Computational Systems in Electronics, Microwaves, Solid State Electronics.
- 2006-2010 B.Sc. in Physics Electronics** *Physics Department, Faculty of Science, Ain Shams Univ., Cairo, Egypt.*
-Overall Grade: Very Good (Ranked 1st among electronics students in the department of physics)

Teaching Experience:

Fall 2013 to Spring 2017 (Demonstrator & Lecturer):

- Physics lab at the Physics Department, Faculty of Science, Ain Shams University.
 - Responsibilities: included explaining experiments, teaching theory and problems, identifying potential Physics majors and students with difficulties, and taking notes.
- Conducted problem sessions for undergraduate students in electric circuits, telecommunication, and electronics courses.

From 2021 to the present (Assistant Professor):

Undergraduate Courses

- Phys 101 (Electricity & Magnetism) in the mathematics program, at the Faculty of Science, Ain Shams University.
- Phys 101 (Electricity, Magnetism, Optics) course in the Microbiology program, at the Faculty of Science, Ain Shams University.
- Phys (1) (classical mechanics, Electricity and properties of matter) course in the Physics Department, at the Misr International University (MIU).
- Computational Physics course in the physics program, at the Faculty of Science, Ain Shams University.
- Computational Physics course in the physics/computer program, at the Faculty of Science, Ain Shams University.

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- Computational Physics course in the biophysics program, at the Faculty of Science, Ain Shams University.
- Programming language course in the physics/chemistry program, at the Faculty of Science, Ain Shams University.
- Electric Circuits course in the Chemistry program, at the Faculty of Science, Ain Shams University.
- Introduction to Electric Circuits course in the physics-computer program, at the Faculty of Science, Ain Shams University.
- Electronic devices and measurements course in the Physics Program, at the Faculty of Science, Ain Shams University.
- Introduction to Electronics course in the Physics/Chemistry program, at the Faculty of Science, Ain Shams University.
- Radio Frequency (RF) Electronics course in the Physics Program, at the Faculty of Science, Ain Shams University.

Postgraduate Courses

- Computer Science and its application in Biophysics in the Biophysics master's degree program, at the Faculty of Science, Ain Shams University.
- Radio Frequency (RF) Electronics course in the Physics master's degree program, at the Faculty of Science, Ain Shams University.
- Electric Circuits course in analytical chemistry diploma, at the Faculty of Science, Ain Shams University.

Quality Experience

- In charge of preparing the criterion of faculty members for faculty members in the Physics program, Physics/Chemistry program, and Biophysics program, including:

- Document qualifications, experience, and expertise of faculty members.
- Track performance indicators to measure adequacy and efficiency.
- Developing Capabilities and Skills
- Motivation and Accountability
- Recognize and reward achievements and contributions.
- Evaluation Mechanisms and Criteria
- Conduct surveys or feedback sessions to assess satisfaction levels.

- Assistant to the coordinator of the Physics-computer Program for quality at the Physics department, Faculty of Science, Ain Shams University, Egypt

- Create a folder structure: Organize the quality files into folders based on categories such as documents, reports, data, and specifications.
- Document the program specifications: Write a detailed document outlining the program's specifications, including its purpose, features, functionality, input/output requirements, and technical details.
- Include Matrices, diagrams, or flowcharts: Use diagrams or flowcharts to visually

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represent the program's structure, processes, and interactions.

- Review and update: Regularly review and update the quality files and program specifications to reflect any changes or improvements.

- Coordinator of the E-learning unit at the Faculty of Science, Ain Shams University, Egypt from 2021 to 2022.

Master and Ph.D. Thesis Supervision

- Ph.D. thesis in The Physics Department entitled “Lab-on-chip Performance Characterizations of Sensor-Devices”.
- Master thesis in The Physics Department entitled “On-chip Optimum Performance and Characterization for Nanoantenna”.
- Master thesis in The Physics Department entitled “Enhancing the performance of metasurface-based plasmonic sensors”.
- Ph.D. thesis in The Physics Department entitled “Enhancing the performance of metasurface-based plasmonic sensors” Lab-on-chip Performance Characterizations of Sensor-Devices”.

Honors and Awards:

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|-------------|---|
| 2025 | International Publication award , Faculty of Science, Ain Shams University, Cairo, Egypt. |
| 2021 | International Publication award , Faculty of Science, Ain Shams University, Cairo, Egypt. |
| 2017 | Ph.D. Scholarship from Industrial and Information Engineering Department, Faculty of Engineering, Perugia University, Perugia, Italy . |
| 2016 | 3 months scholarship from the international organization CERN: “Upgrade of resistive plate chamber”, CERN, Switzerland . |
| 2010 | Award for the Best Academic Performance Among Physics Majors in Electronics , <i>from the Faculty of Science, Ain Shams University, Cairo, Egypt.</i> |

Academic Training:

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|-------------|---|
| 2024 | Quality Assurance workshop, Ain Shams University, Cairo, Egypt. |
| 2023 | Thermoluminescence (TL) Phenomenon: Theory and Applications Workshop, Ain Shams University, Cairo, Egypt. |
| 2021 | Center of Development and Training, “The organization of a scientific conference”, Ain Shams University, Cairo, Egypt. |
| 2021 | Center of Development and Training, “Credit hours”, Ain Shams University, Cairo, Egypt . |
| 2021 | Center of development and training, “The E-learning with Moodle”, Ain Shams University, Cairo, Egypt . |
| 2021 | Center of Development and Training, “Writing your thesis with MS Office”, Ain Shams University, Cairo, Egypt . |
| 2021 | Center of development and training, “Applications of Microsoft Office 365”, Ain Shams University, Cairo, Egypt . |
| 2021 | Center of development and training, “Efficient teaching”, Ain Shams University, Cairo, Egypt . |
| 2019 | Gasparini PhD school, “Modeling, Simulation and Optimization of Circuits and Systems for Photovoltaic Applications, <i>University of Salerno, Viterbo, Italy</i> |

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- 2018** ET PhD summer school, "From graph theory to signal processing on graphs", *La Sapienza University, Rome, Italy*
- 2018** Summer Course, "Power electronics and applications", *Rome Tre University, Rome, Italy.*
- 2018** Gasparini PhD school, Numerical electromagnetics, *Naples University, Naples, Italy.*
- 2017** The high-performance computer training course at the Physics department, *Ain Shams University, Cairo, Egypt.*
- 2016** Research Assistant at RPC Lab, CMS group, **CERN, Switzerland.**
- 2015** FDTD and Lumerical software training, *Zewail City for Science and Technology, Cairo, Egypt.*
- 2015** Research management module", DAAD Cairo, **Cairo, Egypt.**
- 2014** International Publications Course, *Faculty and Leadership Development Center (FLDC), Ain Shams University, Cairo, Egypt.*
- 2010** LAN and Network lab, *Information Technology and Telecom Center (ITTC), Ain Shams University, Cairo, Egypt.*
- 2010** Printed circuit boards and ORCAD Design and Layout, *Information Technology and Telecom Center (ITTC), Ain Shams University, Cairo, Egypt.*
- 2009** MATLAB Introduction and Programming, *Information Technology and Telecom Center (ITTC), Ain Shams University, Cairo, Egypt.*

Research Experience

- **Researcher** at Photonics Group, *Physics Department, American University in Cairo (AUC), Egypt, from January 2022 till now.*
- **Researcher** at the *Physics department. Faculty of Science, Ain Shams University, Egypt from 2013 till now.*
- **Research Assistant** at *RPC Lab, CERN, Switzerland from 9/2016 to 12/2016.*
- **Research Assistant** at *Center of Photons and Smart Materials, Zewailcity of Science and Technology, Cairo, Egypt from 1/4/2015 to 1/9/2017.*

Citations and H-index

Citation N. 201

H-index (Google) 8 (<https://scholar.google.com/citations?user=6Qkw5hIAAAAJ&hl=en>)

H-index (Scopus) 7

ORC ID <https://orcid.org/0000-0002-3284-1387>

Reviewer of International Journals:

- Journal of Applied Optics, Optica publishing group

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List of Publications:

- Sayed, M., Maher, A., **Ghanim, A.M.**, Yahia, A., Presto, A.A. and Mohamed, A.S., 2025. Highly sensitive all-silicon plasmonic metasurface for CO₂ detection applications. *Optics Express*, 33(16), pp.34783-34799.
- Shafaay, Amira, **Abdelrahman M. Ghanim**, and Mohamed A. Swillam. "Design considerations of highly sensitive dual resonance metasurface grating biosensor." *Applied Optics* 64, no. 9 (2025): C137-C147.
- Alsayed, A.E., **Ghanim, A.M.**, Yahia, A. and Swillam, M.A., 2025, March. Design of ultrasensitive plasmonic multilayer structure in gas-sensing applications. In *Optical Sensing and Precision Metrology* (Vol. 13380, pp. 91-94). SPIE.
- Shafaay, A., **Ghanim, A.M.** and Swillam, M.A., 2025, March. Design and analysis of optofluidic metasurface for glucose detection. In *Integrated Optics: Devices, Materials, and Technologies XXIX* (Vol. 13369, pp. 258-261). SPIE.
- Sanad, S., **Ghanim, A.M.** and Swillam, M.A., 2024, September. Enhanced Light Harvesting in PTB7: PC71BM Organic Solar Cells Using Plasmonic Nanostructures. In *Frontiers in Optics* (pp. JD4A-111). Optica Publishing Group.
- Sanad, S., **Ghanim, A.M.** and Swillam, M.A., 2024, September. Enhanced Light Harvesting in PTB7: PC71BM Organic Solar Cells Using Plasmonic Nanostructures. In *Frontiers in Optics* (pp. JD4A-111). Optica Publishing Group.
- Aziz, Christen, Muhammad A. Othman, Aya Amer, **AbdelRahman M. Ghanim**, and Mohamed A. Swillam. "Fabrication of crystalline silicon nanowires coated with graphene from graphene oxide on amorphous silicon substrate using excimer laser." *Heliyon* 10, no. 13 (2024).
- Sanad, S., **Ghanim, A.M.**, Gad, N., El-Aasser, M., Yahia, A. and Swillam, M.A., 2024. Broadband PM6Y6 coreshell hybrid composites for photocurrent improvement and light trapping. *Scientific Reports*, 14(1), p.13578.
- Sayed, M., Maher, A., **Ghanim, A.M.**, Yahia, A. and Swillam, M.A., 2024, March. High sensitivity meta-surface plasmonic sensor. In *Silicon Photonics XIX* (Vol. 12891, pp. 173-176). SPIE.
- Atyia, A.H.S. and **Ghanim, A.M.**, 2024. Limitations of Jiles–Atherton models to study the effect of hysteresis in electrical steels under different excitation regimes. *COMPEL-The international journal for computation and mathematics in electrical and electronic engineering*, 43(1), pp.66-79.
- Cardelli, E., Faba, A., Laudani, A., Quondam Antonio, S. and **Ghanim, A.M.**, 2023. Comparison between different models of magnetic hysteresis in the solution of the TEAM 32 problem. *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields*, 36(6), p.e3103.
- Ali, A.M., **Ghanim, A.M.**, Othman, M. and Swillam, M.A., 2023. All silicon MIR super absorber using fractal metasurfaces. *Scientific Reports*, 13(1), p.15545.
- Sanad, S., **Ghanim, A.M.**, Gad, N., El-Aasser, M.A., Yahia, A. and Swillam, M.A., 2023, June. Enhanced light harvesting in PM6: Y6 organic solar cells using plasmonic nanostructures. In *Smart Materials for Opto-Electronic Applications* (Vol. 12584, pp. 133-

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137). SPIE.

- Saad, H.A., **Ghanim, A.M.** and Swillam, M.A., 2023, May. Highly doped silicon plasmonic infrared nanoantennas for energy harvesting applications. In Integrated Optics: Design, Devices, Systems and Applications VII (Vol. 12575, pp. 9-13). SPIE.
- Alsayed, A.E., **Ghanim, A.M.**, Yahia, A. and Swillam, M.A., 2023, May. Design of highly sensitive plasmonic nanoantenna mid-IR gas sensor. In Integrated Optics: Design, Devices, Systems and Applications VII (Vol. 12575, pp. 80-84). SPIE.
- Shafaay, A., **Ghanim, A.M.**, Kreta, A. and Swillam, M.A., 2023, May. Optofluidic sensor for measuring water salinity. In Optical Sensors 2023 (Vol. 12572, pp. 299-302). SPIE.
- **Ghanim, A.M.**, Yossry, A. and Swillam, M.A., 2023, May. Mid-infrared localized surface plasmon resonances in silicon-dioxide nanoantennas for ozone detection. In Integrated Optics: Design, Devices, Systems and Applications VII (Vol. 12575, pp. 116-120). SPIE.
- Alsayed, A.E., **Ghanim, A.M.**, Yahia, A. and Swillam, M.A., 2023. Giant localized electromagnetic field of highly doped silicon plasmonic nanoantennas. Scientific Reports, 13(1), p.5793.
- Ali, A.M., **Ghanim, A.M.**, Othman, M.A. and Swillam, M.A., 2023, March. Silicon-based, fractal metamaterial structure for IR broadband absorption. In Silicon Photonics XVIII (Vol. 12426, pp. 173-178). SPIE.
- Alsayed, A.E., **Ghanim, A.M.**, Yahia, A. and Swillam, M.A., 2022, September. Silicon-based plasmonic nanoantennas at mid-infrared for gas sensing applications. In 2022 International Conference on Numerical Simulation of Optoelectronic Devices (NUSOD) (pp. 145-146). IEEE.
- **Ghanim, A.M.**, Alsayed, A.E., Yahia, A. and Swillam, M.A., 2022, May. Dielectric Nanoantennas–Enhanced Localized Surface Plasmon Resonance for Sensing Applications. In 2022 Photonics North (PN) (pp. 1-1). IEEE.
- Antonio, S.Q., **Ghanim, A.M.**, Faba, A. and Laudani, A., 2021. Numerical simulations of vector hysteresis processes via the Preisach model and the Energy Based Model: An application to Fe-Si laminated alloys. Journal of Magnetism and Magnetic Materials, 539, p.168372.
- Rehab Hemdan and Ashraf Yahia **AbdelRahman M Ghanim**, Mohamed Hussien, Compact Super-Directive Yagi-Uda Antenna Based on Parabolic-Shaped Reflector for Wireless Communications, VIBGYOR, 2020.
- Antonio, S.Q., Fulginei, F.R., Rimal, H.P. and **Ghanim, A.M.**, 2020, June. On the use of feedforward neural networks to simulate magnetic hysteresis in electrical steels. In 2020 IEEE 20th Mediterranean Electrotechnical Conference (MELECON) (pp. 119-124). IEEE.
- **Ghanim, A.R.M.** and Rimal, H., 2020, June. Efficient and robust modeling of vector magnetic hysteresis: an engineering approach. In 2020 IEEE 20th Mediterranean Electrotechnical Conference (MELECON) (pp. 114-118). IEEE.
- Rimal, H.P., **Ghanim, A.M.**, Antonio, S.Q., Lozito, G.M., Faba, A. and Cardelli, E., 2020. Modelling of dynamic losses in soft ferrite cores. Physica B: Condensed Matter, 579, p.411811.
- Antonio, S.Q., LoZito, G.M., **Ghanim, A.M.**, Laudani, A., Rimal, H., Faba, A., Chilosi, F.

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and Cardelli, E., 2020. Analytical formulation to estimate the dynamic energy loss in electrical steels: Effectiveness and limitations. *Physica B: Condensed Matter*, 579, p.411899.

- Rimal, H.P., **Ghanim, A.M.**, Antonio, S.Q., Faba, A. and Cardelli, E., 2019, November. Time domain modelling of soft ferrite inductors for power converters applications. In 2019 26th IEEE International Conference on Electronics, Circuits and Systems (ICECS) (pp. 847-850). IEEE.
- **Ghanim, A.M.**, Rimal, H.P. and Cutugno, F., 2019, September. Dynamic losses prediction in NOG electrical steels for electrical machines. In 2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI) (pp. 415-420). IEEE.
- Rimal, H.P., Antonio, S.Q. and **Ghanim, A.M.**, 2019, September. Preisach model identification for the prediction of static hysteresis loops in ferrite cores. In 2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI) (pp. 194-197). IEEE.
- Rimal, H.P., Antonio, S.Q., **Ghanim, A.M.** and Cutugno, F., 2019, September. Characterization of soft ferrite cores in power electronic applications. In 2019 IEEE 5th International forum on Research and Technology for Society and Industry (RTSI) (pp. 411-414). IEEE.
- **Ghanim, A.M.**, Hussein, M., Hameed, M.F.O. and Obayya, S.S.A., 2018. Design considerations of super-directive nanoantennas for core-shell nanowires. *JOSA B*, 35(1), pp.182-188.
- **Ghanim, A.M.**, Hussein, M., Hameed, M.F.O., Yahia, A. and Obayya, S.S., 2016. Highly directive hybrid Yagi-Uda nanoantenna for radiation emission enhancement. *IEEE Photonics Journal*, 8(5), pp.1-12.
- **AbdelRahman M. Ghanim**, MOHAMED HUSSEIN, MOHAMED FARHAT. O. HAMEED, Novel Design of High Directivity Hybrid Yagi-Uda Antenna, The 4th Advanced Electromagnetics Symposium Conference, Spain, 2016.

Conferences:

- Integrated Optics: Devices, Materials, and Technologies XXIX, San Francisco, California, United States, 2025
- Optical Sensing and Precision Metrology, San Francisco, California, United States, 2025
- Laser Science 2024, Denver, Colorado United States, 2024
- SPIE Optics + Optoelectronics (EOO23), 2024
- SPIE Optics + Optoelectronics (EOO23), 2023
- NUSOD 22nd International Conference, Politecnico di Torino, Italy, 2022
- Photonic north conference, 2022, Niagra, Canada
- 20th Mediterranean Electrotechnical Conference (MELECON), Palermo, Italy, 2020"online"
- 12th International Symposium on Hysteresis Modeling and Micromagnetics (HMM2019) in Crete, Greece

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- 22nd International Conference on the Computation of Electromagnetic Fields, Paris, France
- The 4th Advanced Electromagnetics Symposium Conference, Spain, 2016

Computer Skills:

Working knowledge of:

- MATLAB
- Microwave CST
- Lumerical FDTD
- ORCAD
- Computer Hardware & Microsoft Office
- Multisim
- Pspice

Languages:

Arabic: Fluent (mother tongue)

English: Very Good

Italian: Moderate

References:

Name: Ashraf Yahia

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