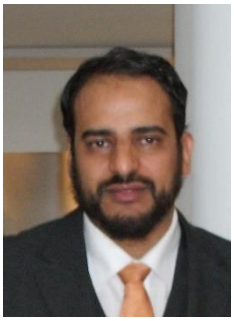

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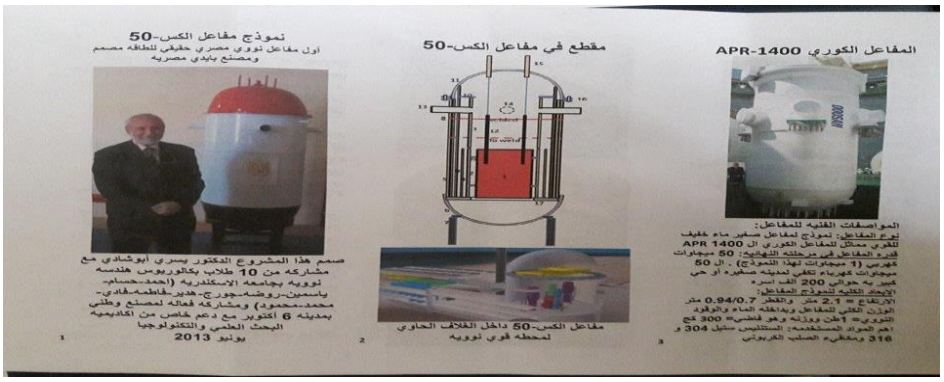
Summary

I am a passionate professional with strong collaborative skills and a proven ability to explain fundamental physics principles to science and engineering students. I have extensive experience in this field, which simplifies science learning and allows young university graduates to expand and develop their knowledge and skills in applied fields by strengthening the link between industry and universities. My professional background makes me an ideal candidate for this opportunity. As a physicist and academic innovator, I specialize in translating advanced scientific theories into practical solutions in sectors such as agriculture, energy, and education. My work bridges the gap between complex analytical modeling, such as solving partial differential equations, applying the finite element method (FEM), and analyzing electromagnetic energy flow, and practical applications like plasma seed processing and sustainable resource recovery. Through my leadership at Ain Shams University and my active participation in the EU-funded Pythagoras Project, I am committed to modernizing science education and aligning it with digital transformation and industry needs across the Mediterranean region. I have successfully addressed the problem of solid waste disposal, such as tires. The project was presented to the Egyptian government and received approval from the relevant authorities. Two billion Egyptian pounds were allocated for its implementation in four Egyptian governorates. In addition, I developed an innovative seed treatment method for the agricultural sector to cultivate strategic crops such as wheat and corn in saline soils. The experiment was successful, with production increases ranging from 40% to 50%, as documented in published research. We are currently seeking financial support from the Egyptian government to implement the experiment on a large scale and achieve food and animal security in Egypt, building on the success of our innovative approach. Finally, I lead multidisciplinary initiatives, ensuring that all research is innovative, industry-ready, and socially impactful.

Research and development (R&D)

1. **Hybrid Renewable Energy Model Design (2013)**: Developed a hybrid model combining solar cells and wind energy, significantly enhancing electrical output and contributing to sustainable energy solutions. This project involved international research collaborations and advanced modeling techniques.
2. **Designed a prototype baby fission reactor for submarine applications:** Co-designed and developed a compact fission reactor for submarine propulsion in collaboration with Prof. Yosery Abo Shady. The project integrated advanced plasma technology to improve material strength and safety, resulting in a highly innovative solution for military applications.



3. **Innovation of a new plasma jet system for cancer treatments (2015):** Led the development of a novel plasma jet system aimed at non-invasive cancer therapies, providing a promising alternative to traditional treatment methods with the potential for reduced side effects and improved patient outcomes.

4. **Fuels from Waste Tires Pyrolysis – Patent - (2019):** Patented an innovative method for converting used tires into biofuels, promoting environmental sustainability through utilizing waste materials and synthesizing eco-friendly catalysts. This technology has been recognized for its potential to address global waste management challenges.

5. **Innovative Methods to Enhance Wheat Growth in Saline Soils – (Cooperation STDF with KAUST) (2020):** In collaboration with KAUST, developed eco-friendly plasma seed treatments to boost wheat growth in saline soils, aligning with global sustainability goals. This interdisciplinary approach addresses the critical challenge of agricultural productivity in arid regions.

6. **Consultancy for the Ministry of Environment in Egypt:** Successfully led the implementation of sustainable solid waste disposal projects across several Egyptian governorates, earning government approval and financial support due to the significant environmental and social impact.

EDUCATION

09/2009-05/2013	**Ruhr-Universität Bochum** **Lehrstuhl für Theoretische Elektrotechnik** **Degree:** Doctor of Engineering in Plasma Technology **Thesis Title**: Plasma Boundary Sheath as a Nonlinear Element
10/2001-09/2008	**Ain Shams University (ASU), Cairo. Egypt** **Department of Physics at Faculty of Science** **Degree:** Master of Science **Major:** Physics **Thesis Title:** Minimizing Energy Losses in a Plasma-Filled Waveguide.
10/1998-10/2000	**Ain Shams University (ASU), Cairo. Egypt** **Faculty of Science** **Department of Physics** Master courses in Theoretical Physics
10/1994-10/1998	**Ain Shams University (ASU), Cairo. Egypt** **Degree:** Bachelor of Science **Major:** Physics **Graduation Project Title:** Improving the Shielding in Nuclear Reactor by adding Lead to the concrete
10/1988-05/1994	**Ibn Khaldon High School, Cairo, Egypt** **Major:** Math and Science **Grade:** Very Good (82%)

TEACHING EXPERIENCE

09/1998 – 09/2003	Department of Physics in Ain Shams University **Job Title:** Demonstrator **Job Description:** Supervising freshmen and sophomore students in physics laboratory to implement basic physics experiments in electricity, magnetism, optics, material science, waves, electric circuits, and thermodynamics.
09/2003 – 12/2007	Department of Physics in Ain Shams University **Job Title:** Teaching Assistant **Job Description:** Supervising junior and senior students in physics laboratory to implement advanced physics experiments in laser, advanced optics, analog and digital electronics, microwave, and thermo-optics.
01/2010 – 03/2013	**Lehrstuhl für Theoretische Elektrotechnik at RUB (DE)** **Job Title:** Assistant Instructor **Job Description:** Supervising discussion for senior and

graduate students in plasma physics at TET institute.

05/2014

Department of Physics in Ain Shams University (EG)
Job Description: Supervising undergraduate student in graduation research project
Project Title: Wireless Power Transfer

03/2015

Higher Education Channel in Egyptian Radio and Television
Job Title: Lecturer
Job Description: Introducing basics principles of physics to the public with a focus on undergraduate students in science engineering, computer science, and medicine.
List of Lectures:

1. Coloumbs Law
2. Gauss Law
3. Electric Potential
4. Introduction to Magnetism
5. Magnetic Field
6. Magnetic Induction and Farady Effect

06/2016

Department of Mechanics at Faculty of Engineering (Mataria) in Helwan University
Job Description: Supervising undergraduate student in graduation research project
Project Title: Waste Tire Pyrolysis Recycling

SCIENTIFIC PROJECTS

1/1/2024	**Co/PI of Ain Shams University Funded Research Projects 2024, Title:** Raising the productivity of wheat and yellow maize grown under sandy soils conditions using precise agricultural practices.
1/1/2023	**PI of PYTHAGORAS: ERASMUS-EDU-2022-CBHE (Capacity building in the field of higher education). Topic:** ERASMUS-EDU-2022-CBHE-STRAND-2**. Type of Action:** ERASMUS-LS. Proposal number: SEP-210827388**. Proposal acronym:** GREENING
8/2020	**Co/PI of the project of STDF, Title: "**Exploiting **Plasma** as a Recent Technology for Enhancing Productivity and Quality of Some Cultivated Crops in Salt–Affected Soils in Egypt**"**
4/2019	**Co/PI of accepted project of STDF, Title: "**Hydrocracking of tier pyrolytic oil to biofuels and supercapacitor**"**
2/2018	**The yield of purified waste tires pyrolysis** Consultant for integrated solid waste management in cooperation with the Ministry of Environment
05/2015	**Collaboration between ASU (EG) and STDF** A New Paradigm Shift in Cancer Therapy using the effect of Plasma Jet

TECHNICAL REPORTS

09/2014	Plasma Boundary Sheath Publisher: **Ruhr-Universität Bochum** **Lehrstuhl für Theoretische Elektrotechnik**
06/2013	Plasma Field Publisher: **Ruhr-Universität Bochum** **Lehrstuhl für Theoretische Elektrotechnik**

Research Interests

- Renewable Energy: Solar Cells, Wireless Power Transfer
- Sustainable Agriculture: Advanced Plasma Technologies, Saline Land Cultivation
- Environmental Physics: Recycle Solid and Agricultural Waste Management, Pyrolysis Technology
- Designed a new prototype baby fission reactor with new active materials
- Cancer Therapy: Physics-Based Non-Invasive Treatments.

Detailed Contributions to Development

- Agricultural Sustainability: Spearheaded the integration of plasma technologies into Egyptian agriculture, increasing crop productivity in saline soils. Your research has directly contributed to solving national food security challenges, positioning Egypt as a leader in sustainable agriculture.

- Environmental Solutions: Developed innovative pyrolysis technologies that converted waste tires into biofuels, significantly reducing environmental waste. These contributions were not only academic but also practical, directly benefiting industries and municipalities.

- Cancer Therapy Innovation: Pioneered the application of plasma jets in non-invasive cancer treatments, working with medical professionals to explore new, less harmful ways of treating cancerous tissues. This work has the potential to redefine medical treatment approaches.

- Educational Leadership: Through the PYTHAGORAS project, you transformed STEM education by integrating cutting-edge physics into agricultural practices, creating a unique interdisciplinary approach that prepares the next generation of scientists and engineers.

COMPUTER SKILLS

Numerical Tools:	Mathematica
Programming Languages:	Fortran, and Python
Operating Systems:	Windows, Linux, and iOS
Software:	MS-Office (ICDL), LaTex, Origin, and Video Editing

SPOKEN LANGUAGES

Arabic	Mother Tongue
English	Very Good
Dutch	Good (Deutschintensivkurs, Ägypten, Mittelstufe I).

PUBLICATIONS

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1. HS Saudy, M Fawzy, WR Abd El-Momen, M Mubarak, Elgendy, Abdelfattah T. Potentiality of non-thermal plasma as an innovative technique for ameliorating wheat productivity under saline soil conditions, Egyptian Journal of Agronomy, **2025**
2. Abdelfattah T Elgendy, et al, Utilization of plasma as an ameliorator for forage productivity and in vitro traits of cowpea cultivated in salty soil, Scientific Reports 15 (1), 1-17, **2025**
3. BM Alotaibi, HA Al-Yousef, A Atta, SA Rizk, AT Elgendy Synthesis, structural characterization and optical studies of Fe2O3 nanoparticles based polymeric materials for flexible electronic devices. Digest Journal of Nanomaterials & Biostructures (DJNB) 19 (2). **2024**
4. BMM Alotaibi, HAA Al-Yousef, a atta, S Rizk, AT Elgendy, Influence of TiO2 Nanoparticles on Enhancing the Properties Activity of Organic Polymeric Materials for Industrial Applications, ECS Journal of Solid State Science and Technology. **2024**
5. AT Elgendy, H Elsaid, SA Rizk, HS Saudy, N Wehbe, MB Hassine,...etal. Low-Pressure Plasma as a Seed Coat to Enhance the Growth of Wheat Seedlings for Obtaining Future Outcomes Under Salinity Conditions,Research Square Platform LLC. **2023**
6. Badriah Alotaibi, Sameh A. Rizk, Haifa A. Alyousef, Ali Atta, Abdelfattah T. Elgendy, Green synthesis of aryl-(4-oxo-1,2-dihydroquinazolin-4-ylmethylene) pyrazole-TiO2 nanoparticles as dyes removable for waste-water treatment, Appl Organomet Chem, Wiley. https://doi.org/10.1002/aoc.7307. 2023
7. A. T. Elgendy, NM Basfer, N Al-Harbi, A collisional global sheath–Bulk model of argon plasma for semiconductor scale manufacturing,Alexandria Engineering Journal, Volume 67, 15 March **2023**, Pages 437-446
8. Elgendy, A. T., Haifa A. Alyousef, and Kamal M. Ahmed. "New achievement of the global sheath-bulk model for the collisionless radio-frequency using in scale industries." Heliyon (**2022**): e12264.
9. El-Deeb, Zahraa M., Wael A. Aboutaleb, Abdelghaffar S. Dhmees, Ahmed MA El Naggar, Kareem Emara, Abdelfattah T. Elgendy, and Awad I. Ahmed. "Bio-fuels production through waste tires pyrolytic oil upgrading over Ni-W/zeolite composites derived from blast furnace slag." International Journal of Energy Research (**2022**).
10. Abdel-Raouf, Mohamed Assaad, Abdelfattah T. Elgendy, and Amr Abd Al-Rahman Youssef. "Plasmas Created in the Interaction of Antiprotons with Atomic and Ionized Hydrogen Isotopes. Suggested Fuels for Space Engines." Journal of High Energy Physics, Gravitation and Cosmology 8.1 (2021): 14-24.
11. Abdel-Raouf, Mohamed Assaad, Abdelfattah T. Elgendy, and Amr Abd Al-Rahman Youssef. "Cold Fusion Based on Matter-Antimatter Plasma Formed in Molecular Crystals." Journal of High Energy Physics, Gravitation and Cosmology 8.1 (2021): 56-66.
12. Abdelfattah T. Elgendy, M. Fawzy, H. Saudy Treatment of plasma jet for highly saline wells in an attempt to break this high degree of salinity and be suitable for agricultural use, ***Journal of Plasma Sources Science and Technology***, Personal communication, **2022**
13. Abdelfattah T. Elgendy, A Global Study of Classification Collisional & Collisional-less Bohm Velocity of Plasma Boundary Sheath Using Step Model, ***Physics Letters A***, Personal communication, **2021**
14. A. T. Elgendy, "A Global Model of the Collisional Plasma Boundary Sheath Using Step Model," IEEE Trans. Plasma Sci., 2021
15. S. A. Rizk, M. A. El-Hashash, A. A. Youssef, and A. T. Elgendy, "A green microwave

method for synthesizing a more stable phthalazin-1-ol isomer as a good anticancer reagent using chemical plasma organic reactions," Heliyon, vol. 7, no. 3, **2021.**

16. S. A. El-Tantawy, S. Ali Shan, N. Akhtar, and A. T. Elgendy, "Impact of electron trapping in degenerate quantum plasma on the ion-acoustic breathers and super freak waves," Chaos, Solitons and Fractals, vol. 113**, 2018**, doi: 10.1016/j.chaos.2018.04.037.
17. S. K. Attia, A. T. Elgendy, and S. A. Rizk, "Efficient green synthesis of antioxidant azacoumarin dye bearing spiro-pyrrolidine for enhancing electro-optical properties of perovskite solar cells," J. Mol. Struct., vol. 1184, **2019,** doi: 10.1016/j.molstruc.**2019.**02.042.
18. S. A. El-Tantawy, A. T. Elgendy, and S. Ismail, "Cylindrical freak waves in a non-Maxwellian dusty bulk-sheath plasma: An approximate solution for the cylindrical nonlinear Schrödinger equation," Phys. Lett. Sect. A Gen. At. Solid State Phys., vol. 381, no. 40, 2017, doi: 10.1016/j.physleta.**2017.**08.054.
19. A. T. El-gendy, A. A. Youssef, and S. A. Rizk, "Which energetically favorable sustainable synthesis of 4-amino-8-azacoumarin ester or 4-hydroxy-3-cyano derivative based on new exact kinetic Arrhenius and DFT stimulation," J. Iran. Chem. Soc., vol. 17, no. 5, pp. 1001–1011, **2020.**
20. A. A. et al. Elgendy, A.E.T., Abdel-Aty, AH., Youssef, "Exact solution of Arrhenius equation for non-isothermal kinetics at constant heating rate and n-th order of reaction," J. Math. Chem., doi: https://doi.org/10.1007/s10910-019-01056-7.**2019**
21. A. T. Elgendy, "Plasma boundary of nonlinear sheath dynamics for arbitrary waveforms in capacitive discharge," in Journal of Physics: Conference Series, **2019**, vol. 1253, no. 1, doi: 10.1088/1742-6596/1253/1/012010
22. **Study the effect of non-thermal atmospheric plasma jet of helium on normal and metastatic breast cell lines (**Has been selected as one of the best poster from Alexander von Humboldt workshop in Port Said**) 07/01/ 2015**
23. **E. Elgendy**, H. Hatefinia, T. Hemke, M. Shihab, A. Wollny, D. Eremin, T. Mussenbrock, and R.P. Brinkmann, 'An algebraic sheath model for all current wave forms and all levels of collisionality' http://arxiv.org/abs/1306.1664/ **2013**
24. J. Trieschmann, M. Shihab, D. Szeremley, **A. E. Elgendy**, S. Gallian, D. Eremin, R. P. Brinkmann, and T. Mussenbrock, "Ion energy distribution functions behind the sheaths of magnetized and nonmagnetized radio frequency discharges," Journal of Physics D: Applied Physics, vol. **46**, no. **8**, p. 084016, **2013.**
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27. Ein algebraisches Randschichtmodell . Homayoun Hatefinia, Abd Elfattah Elgendy, Ralf Peter Brinkmann - PT 15, Stuttgart, Germany, 28.02-02.03 **2011**
28. Current-voltage characteristics of nonharmonically modulated plasma boundary sheath Abd Elfattah Elgendy, Ralf Peter Brinkmann, Homayoun Hatefinia - DPG Frühjahrstagung ,Kiel, Germany, 28-31 March **2011**
29. Charge-Voltage characteristics of nonharmonically modulated plasma boundary sheaths Abd Elfattah Elgendy, Denis Eremin, Thomas Mussenbrock, Ralf Peter Brinkmann - Proceedings of the 30th International Conference on Phenomena in Ionized Gases (ICPIG), Belfast, Northern Ireland (**2011**)
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