


Curriculum Vitae

NAME (First, Middle, Last)	Hesham, Fares Ahmed, Hassan	
GENDER	Male	
NATIONALITY	Egyptian	
PLACE OF BIRTH	Cairo, Egypt	
DATE OF BIRTH	20/May/1978	
CURRENT POSITION	1- Associate professor at Physics Department, Faculty of Science, Assiut University, Assiut, Egypt . 2- Post-doc at INFN-LNF (Italy)	
FIELDS OF INTEREST	Free-electron lasers, Compton scattering, Synchrotron radiation, Betatron radiation in plasma, Accelerators	
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RESEARCHGATE	https://www.researchgate.net/profile/Hesham_Fares	

DEGREES (MAJOR)

	[Date of graduation] (month/year)	[Name of Institute]
Doctor	September/2010	Kanazawa University, [Kanazawa, Japan]
Master	July/2005	Assiut University, [Assiut, Egypt]
Bachelor	June/1999	Assiut University, [Assiut, Egypt]
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EMPLOYMENT

[Dates of employment] (m/y - m/y)	[Position & Name of Institute]
April/2017 – Till now	Assiut University, [Assiut, Egypt] Position: Associate professor (Physics Department)
December/2015 – Till now	Istituto nazionale di fisica nucleare (INFN), [Roma, Italy] Position: Researcher Fellow (National Laboratory of Frascati (LNF))
May/2015 – Nov/2015	Strathclyde University, [Scotland, UK] Position: Researcher Fellow (Physics Department)
April/2013 – March/2014	Kanazawa University, [Kanazawa, Japan] Position: Visiting Researcher at Graduate School of Natural Science and Technology, Faculty of Engineering (Quantum Optics Laboratory)
July/2012 – April/2013	Kanazawa University, [Kanazawa, Japan] Position: Visiting Researcher at Div. of Mathematics and Physical science, Faculty of Science (Experimental Physics Basic Research Laboratory)
October/2010 – July/2012	Kanazawa University, [Kanazawa, Japan] Position: Visiting Researcher at Graduate School of Natural Science and Technology, Faculty of Engineering (Quantum Optics Laboratory)
Sep/2005 – June /2011	Assiut University, [Assiut, Egypt] Position: Assistant Lecturer (Physics Department)
February/2001 – Sep/2005	Assiut University, [Assiut, Egypt] Position: Instructor (Physics Department)

EXPERTS AND TRAINING

- **Analyzing the electrons-laser interactions in free-space and plasma** in different schemes of interaction using different classical and quantum mechanical approaches.
- **Training:**
 - “Particle Accelerator School” held at Fuji (Japan), Oct. 2013
 - “Erice school-workshop (Trend in free-electron laser physics)” held at Erice-Sicily (Italy), May 2016.

ACHIEVEMENTS IN MY Ph.D

- 1- During my Ph.D, **my research group succeeded to demonstrate the first operation of the Cherenkov free-electron laser (CFEL) with a compact size in the optical regime**, which could afford voltages as low as a few tens of kilovolts and electron beam currents as low as a few hundreds of micro-amperes.
- 2- In my Ph.D research, theoretical and experimental investigations on the CFELs were achieved. In the theoretical part, we proposed new theoretical analyses that cover all the spectral range of the emitted radiation. **Firstly, a unified analysis was developed basing on the classical approaches to describe both spontaneous and stimulation operations in the CFELs.** These analyses should be applied typically in to the microwave region. **Secondly, we applied quantum mechanical approaches** to develop a generalized theory on CFEL as an amplifier covering the whole spectrum range from the microwave to the optical regions.

GRANTS

- 1- **Private Japanese Government Scholarship (Monbukagakusho) (2006 – 2010)** as a researcher student (1 year) and a Ph. D student (3 years) at laboratory of optical communication, Graduate School of Natural Science and Technology, Kanazawa University, Japan.
- 2- **Newton-Musharafa Grant (May 2015 – Nov. 2015)**, postdoctoral fellow at Physics Department of Strathclyde University, Scotland, UK.
- 3- **National Institute of Nuclear Physics Grant (Dec. 2015 – Dec. 2017)**, Postdoctoral fellow at National Laboratory of Frascati (INFN-LNF), Roma, Italy.

PROJECTS

- Principle investigator (PI) for INFN-ASRT joint project titled **“THz Radiation for medical and other applications in Egypt, Italy and beyond”** and funded by the Academy of Scientific Research & Technology (ASRT-Egypt) and INFN- Italy.
- The period of project:** Dec 2015 till Dec 2017.

TEACHING EXPERIENCE, AS AN INSTRUCTOR AT DEPARTMENT OF PHYSICS, ASSIUT UNIV., EGYPT (2001- 2005).

- **Taught Undergraduate labs:** (Electricity Labs, Properties of Matter labs, Electronics labs, Optics labs, Electronics Labs, and Nuclear labs)
- **Assisted in courses’ teaching for undergraduates:** (Classical Mechanics, Electromagnetic Theory, Thermodynamics, and Quantum Mechanics).

TEACHING EXPERIENCE, AS A LECTURER AT DEPARTMENT OF PHYSICS, ASSIUT UNIV., EGYPT (APRIL 2014- MAY 2015).

- **Teach the following courses:**
 - (i) Quantum mechanics (for 3rd grade students).
 - (ii) Electrodynamics (for 3rd grade students).
 - (iii) General Physics (for 1st grade students).

JOURNALS REFEREE

- Referee for the **Journal of Physics of Plasmas.**
- Referee for **Physics Letters A.**
- Referee for **Applied Physics Letters.**

AWARDS

- 1- **“Best Student Paper Award”**, in the 8th International Conference on Numerical Simulation of Optoelectronics Devices, Nottingham, UK, 1-4 Sep (2008).
- 2- **“Best International Student Paper Award”**, in the 32th International Symposium on Optical Communications 2009, Chiba, Japan, 10-12 Aug (2009).

List of Publications

(A) Journal Publications:

- 1- Y. Kuwamura, M. Yamada, R. Okamoto, T. Kanai, and **H. Fares**, "Optical emission from a high-refractive-index waveguide excited by a traveling electron beam", J. Appl. Phys. **104**, 103105-103114 (2008).
- 2- **H. Fares**, M. Yamada, Y. Kuwamura, I. Matsumoto, and T. Kanai, "Characterization of Optical Emission Mechanism Utilizing Traveling Electron Beam on a Waveguide", IEEE J. of Quantum Electron. **46**, 981-990 (2010).
- 3- **H. Fares**, M. Yamada, and Y. Kuwamura, "Current Excitation Model for Cerenkov Lasers with a Planar Waveguide", Jpn. J. Appl. Phys. **49**, 96402-96409 (2010).
- 4- **H. Fares** and M. Yamada, "Analysis of saturation phenomena in Cerenkov free-electron lasers with a planar waveguide", Phys. Plasmas **18**, 93106-93114 (2011).

* **EDITOR has selected this paper for the October 2011 issue of Virtual Journal of Ultrafast Science.**

- 5- **H. Fares** and M. Yamada, "Quantum characteristics of stimulated Cerenkov radiation in dielectric-lined waveguide operating at optical wavelengths", Nucl. Instrum. Methods. Phys. Res. A **659**, 519-524 (2011).
- 6- **H. Fares**, "Unified analysis for calculating the amplification gain of Cerenkov laser in the single-particle and collective regimes", Phys. Plasmas, **19**, 043106-043110 (2012).
- 7- **H. Fares**, "On the small-signal theory of stimulated Cerenkov Emission in dielectric-lined waveguides", Phys. Plasmas, **19**, 053109-053114 (2012).

* **EDITOR has selected this paper for the June 2012 issue of Virtual Journal of Ultrafast Science.**

- 8- **H. Fares**, "Small-signal gain of Cerenkov radiation generated by hot electrons in the collective regime", Nucl. Instrum. Methods. Phys. Res. A, **690**, 111-116 (2012).
- 9- M. Yamada and **H. Fares**, "Criterion of applicable models for planar type Cerenkov laser based on quantum mechanical treatments", Nucl. Instrum. Methods. Phys. Res. A, **709**, 108-119 (2013).
- 10- **H. Fares**, M. Yamada, and K. Ohmi, "Quantum mechanical analysis of the Compton scattering based on electron wave model", IEEE J. of Quantum Electron, **49**, 970-981 (2013).
- 11- **H. Fares**, "Space-charge effects and gain in Cerenkov free-electron lasers", Nucl. Instrum. Methods. Phys. Res. A, **773**, 154-163 (2015).
- 12- **H. Fares** and M. Yamada, "A quantum mechanical analysis of Smith-Purcell free-electron lasers", Nucl. Instrum. Methods. Phys. Res. A, **785**, 143-152 (2015).
- 13- R. Bonifacio and **H. Fares** "A fully quantum theory of high-gain free-electron laser", Europhysics Letters (EPL), **115**, 34004-34006 (2016).
- 14- R. Bonifacio, **H. Fares**, M. Ferrario, B. W. J. McNeil, and G. R. M. Robb "Design of sub-Angstrom compact free-electron laser source", Optics Communications, **382**, 58-63 (2017).
- 15- V. Shpakov, E. Chiadroni, A. Curcio, **H. Fares**, M. Ferrario, A. Marocchino, V. Petrillo, A.R. Rossi, S. Romeo, "Study of the beam tolerance for plasma based ion channel lasers", Nucl. Instrum. Methods. Phys. Res. A, **402**, 384-387 (2017).

- 16- **H. Fares** and E. Chiadroni, "Unified analysis for calculating the incoherent spontaneous emission of cooperative radiations", CHIN. PHYS. LETT. **34**, no. 11, 114101-114104 (2017).

- 17- **H. Fares**, M. Yamada, E. Chiadroni, M. Ferrario, "Quantum-mechanical analysis of low gain free-electron laser oscillators", Nucl. Instrum. Methods. Phys. Res. A, **under review**.

- 18- **H. Fares**, N. Piovella, and G. R. M. Robb, "The detrimental effect of spontaneous emission in quantum free electron lasers: a discrete Wigner model", Physics of Plasmas, **under review**.
- 19- **H. Fares**, N. Piovella, and G. R. M. Robb, "Density matrix approach for quantum free-electron lasers ", Proceeding of 3rd European Advanced Accelerator Concepts Workshop (EAAC) in Nucl. Instrum. Methods. Phys. Res. A, **in preparation**.

(B) International Conference (Peer-reviewed papers):

- 1- Y. Kuwamura, M. Yamada, R. Okamoto, T. Kanai and **H. Fares**, "Observation of optical Emission from High Refractive Index Waveguide Excited by Traveling Electron Beam", Proc. Int. CLEO/QELS 2008, San Jose (USA), CMK7, May, 2008.
- 2- **H. Fares**, M. Yamada, Y. Kuwamura and M. Asada, "Two models for electro-magnetic wave amplifier by utilizing traveling electron beam", Proc. Int. NUSOD Conf., Nottingham (UK), pp. 47-48 (2008).
- 3- **H. Fares**, Y. Kuwamura, and M. Yamada, "Classical and quantum mechanical analyses on electromagnetic wave emissions in the planar cherenkov free electron laser", Proc. 1st Int. Particle Accelerator Conf., Kyoto, pp. 2197-2199 (2010). <http://www.JACoW.org>.
- 4- K. Ohmi, S. Kamada, and **H. Fares**, "Coherent Thomson Scattering using beam echo", in Proc. 4th int. particle accelerator conf. (IPAC13), Shanghai China, 2013, TUPME013.
- 5- **H. Fares**, M. Yamada, and K. Ohmi, "A quantum mechanical analysis of free-electron lasers based on electron wave representation", in Proc. MJIIT-JUC Joint International Symposium (MJJIS) Tokai, Japan, 2013.
- 6- **H. Fares**, M. P. Anania, F. G. Bisesto, R. Bonifacio, and M. Ferrario "Design of compact sub-Angstrom free-electron laser source", School-Workshop "Trends in Free Electron Laser Physics", Erice (Italy), 2016.
- 7- **H. Fares**, N. Piovella, and G. R. M. Robb, "Density matrix approach for quantum free-electron lasers ", 3rd European Advanced Accelerator Concepts Workshop (EAAC), La Biodola, Isola d'Elba (Italy), 2017.

(C) Some Presentations in various Conferences and meetings:

- 1- **H. Fares**, M. Yamada, Y. Kuwamura, and M. Asada, Lasers and Quantum Electronics (LQE) Conf., Tokyo, May (2008).
- 2- **H. Fares**, M. Yamada, and Y. Kuwamura, JSAP the 56th Spring Meeting (annual Meeting), Tsukuba, March (2009).
- 3- **H. Fares**, T. Kanai, I. Matsumoto, Y. Kuwamura and M. Yamada, Lasers and Quantum Electronics (LQE) Conf., Kanazawa, May (2009).
- 4- **H. Fares**, T. Kanai, I. Matsumoto, Y. Kuwamura and M. Yamada, The 32th International Symposium on Optical Communications 2009, Chiba, Tokyo, Aug (2009).
- 5- **H. Fares**, M. Yamada, and Y. Kuwamura, JSAP the 57th Spring Meeting (annual Meeting), Kanagawa, March (2010).
- 6- **H. Fares**, M. Yamada, and Y. Kuwamura, Lasers and Quantum Electronics (LQE) Conf., Fukui, May (2010).
- 7- **H. Fares**, M. Yamada, and K. Ohmi, "A Quantum Mechanical Analysis of Undulator Free-Electron Lasers Based on Electron Wave Model", KEK Accelerator Meeting, Tsukuba, July (2013).