

Curriculum Vitae

A) Personal Data

Name: Hassan Fathy El-Nashar
Date of Birth: 23/11/1964
Nationality: Egyptian
Marital Status: Married
Languages: Arabic and English
Present Position: Assistant Professor

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B) Education

Period	Degree	Institute
1982-1986	B.Sc. in Physics	Faculty of Science, Ain Shams University, Cairo, Egypt.
1989-1991	M.Sc. in Optics and Spectroscopy.	Faculty of Science, Ain Shams University, Cairo, Egypt.
1992-1993	Diploma in Condensed Matter Physics	ICTP, Trieste, Italy.

1995-1997	Ph.D. in Condensed Matter Physics	Joint Program between ICTP, Trieste, Italy and Faculty of Science, Ain Shams University, Cairo, Egypt.
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Thesis

Thesis	Title	Advisor
M.Sc. 1991	Studies on Multi-Pass Interferometers	Prof. M. Medhat
Diploma (ICTP) 1993	Surface Growth Models	-Prof. Hilda A. Cerdeira -Prof. Wei Wang
Ph.D. 1997	Ballistic-Like Depositions of Particles on a Substrate as a Model for Surface Growth substrate as surface growth model	-Prof. Hilda A. Cerdeira -Prof. M. Shalaby

C) Academic Positions

From - To	Position	Institute
1986 - 1991	Demonstrator Duty: Teaching in physics laboratories to undergraduate students- Attending courses for pre master degree - Carrying out a research for M.Sc thesis.	Department of Physics, Faculty of Science, Ain Shams University, Cairo, Egypt.
1991 - 1997	Assistant Lecturer Duty: Teaching in physics laboratories to undergraduate students- Assisting other M.Sc students - Carrying out research for Ph.D degree	Department of Physics, Faculty of Science, Ain Shams University, Cairo, Egypt.
1997 - present	Assistant Professor Duty: Teaching undergraduate and graduate courses in Physics in my department, in other	Department of Physics, Faculty of Science, Ain Shams

	faculties and universities - Assisting graduate students either for M.Sc or Ph.D. - Carrying out research.	University, Cairo, Egypt.
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D) Teaching Experience

I was engaged in teaching the following courses:

- 1- All levels of Experimental Physics, Ain Shams University, Cairo, Egypt, 1986 -
 - First year laboratory: experiments cover fundamentals of physics; mechanics, heat, electricity, optics and properties of matter.
 - Second year laboratory: experiments cover physical optics, thermodynamics, electric circuits, elementary electronics and modern physics
 - Third year laboratory: experiments cover solid state physics, electronics, modern physics, physical optics and spectroscopy.
 - Fourth year laboratory: experiments cover advanced electronics and digital electronics, and advanced optics and spectroscopy.

- 2- Computer Languages (FORTRAN, C, PASCAL, BASIC) and The Use of Computer Applications (applications related to office automation), Computer Center, Ain Shams University, Cairo, Egypt, 1989 - 1998

- 3- Course in Heat and Thermodynamics, University of Science and Technology, 6th Oct., Giza, Egypt, 1996-1997.

- 4- Course in Electric Circuits with Engineering Applications, University of Science and Technology, 6th Oct., Giza, Egypt 1996-1997.

- 5- Graduate Course in Computational Physics, Ain Shams University, Cairo, Egypt, 1997 - 1998.

- 6- Undergraduate Course in Statistical Mechanics, Ain Shams University, Cairo, Egypt, 1997 - 1998
- 7- Graduate Course in Statistical Mechanics, Ain Shams University, Cairo, Egypt, 1997 - 1998
- 8- Undergraduate Course in Electrodynamics, Ain Shams University, Cairo, Egypt, 1998-1999.
- 9- Graduate Course in Computer and Statistics, Banha University, Egypt, 1998-1999.
- 10- Graduate Course in Scientific Computing, Faculty of Girls, Ain Shams University, Egypt, 1999.
- 11- Undergraduate Course in Computational Techniques, Faculty of Girls, Ain Shams University, Egypt, 1999.
- 12- Undergraduate Course in Modern Physics, Military Technical College, Cairo, Egypt, 1999
- 13- Course on "Nonlinear Dynamics and Chaos", ICTP Diploma Programme in Condensed Matter Physics, I.C.T.P, Trieste, Italy, 2001-2002.
- 14- Course on "Modern Physics and Elementary Quantum Mechanics", 2nd year students, Biophysics sector, Faculty of Science, Ain Shams University, Feb.- June 2002.
- 15- Course on "Electromagnetism", Undergraduate level students, Biophysics sector, Faculty of Science, Ain Shams University, 2002/2003.
- 16- Course on "Computer Science and its applications in Physics", Undergraduate level Students (B.Sc. year), Faculty of Science, Ain Shams University, 2002/2003.
- 17- Course on "Heat and Thermodynamics", 2nd year students, Faculty of Education, Alkharj, Saudi Arabia, 2003/2004.

- 18- Course on "Electrodynamics", 3rd year students, Faculty of Education, Alkharj, Saudi Aarabia, 2003/2004.
- 19- Course on "Quantum Mechanics", 3rd year students, Faculty of Education, Alkharj, Saudi Aarabia, 2003/2004.
- 20- Course on "Geometrical and Physical Optics", 2nd year students, Faculty of Education, Alkharj, Saudi Aarabia, 2003/2004.
- 21- Course on "Electronics", 3rd year students, Faculty of Education, Alkharj, Saudi Aarabia, 2003/2004.
- 22- Course on "General Physics", 1st year students, Faculty of Education, Alkharj, Saudi Aarabia, 2003/2004.

E) Experience in Non-Academic and Private Work

Period of Work	Institute/Company	Duties
1996-1999	Computer Network unit, Faculty of Science, Ain Shams University, Cairo, Egypt.	Constructing a LAN of computers inside the faculty which is connected to the WAN of the university - Administrating the LAN under the supervision of the vice dean of the faculty.
1989-1998	Computer Center, Ain Shams University, Cairo, Egypt.	Teaching several private courses in computer - constructing the computer network and organizing it- Assisting in the process of office automation inside the university.
1997-1999	Visualization Techniques in	Using the computer simulations and

	Teaching; In co-operation with UNESCO office Cairo, Egypt	multimedia tools to simplify concepts of physics for the undergraduate students.
1998-1999 2002-2003	Scientific consultant of the AGR (Arabian Group Representatives) company, Dokki, Cairo, Egypt. (Leybold dealer in Egypt)	Investigation of different bids for a highly technological scientific instruments for educational and scientific research purposes
Starting Feb. 2002	Scientific and Marketing consultant for ISI Company, 6 th Oct. City, Giza, Egypt. (Dealer for Ciba, Bayer, and other medical products companies.	Distributing Masterbatches for textiles and fibers, diagnostic reagents and medical equipments)

F) Scientific Awards

Selected to be an Associate Scientist to the Condensed Matter Physics Group, ICTP, Trieste, Italy, for Scientific research and teaching, part time within (2003-2008).

G) Research

During the last 10 years I was interested in the following research areas:

- i- Optics and Spectroscopy
- ii- Nonequilibrium Statistical Physics
- iii- Computational Physics and Computer Modeling
- iv- Nonlinear Dynamics and Chaos

1- Keywords for Current Research Interests

- Interferometry; multipass interferometer; aberrations
- Nonequilibrium Statistical Physics; surface growth models and kinetic roughening.

- Nonlinear Dynamics and Chaos; synchronization of chaotic oscillators, spatio-temporal chaos and coupled map lattices.

2- Present Research Outlines

a- Multi-pass Interferometry

This is an experimental-field of research and it is carried out in collaboration with professors M. Medhat and S. Y. El-Zayat at the Optics and Spectroscopy lab., Faculty of Science, Ain Shams University (Egypt). We use multi-pass interferometers to obtain better resolution and accurate measurements. We have made some progress in our work and we have devised some new techniques, which will help us to describe the characteristics of the interference fringes formed due to our experiments. We will also apply these techniques to study the features of surface topography, aberrations, and optical performance of the optical systems.

References :

- M. Medhat, Hassan F. El-Nashar, "Multipass wedge interferometer for increased spatial fringe frequency", Optik, 107 (1998) 149-154.
- M. Medhat, Hassan F. El-Nashar, "Double-pass wedge interferometer for increased contrast", Optik, 106 (1997) 96-102.
- M. Medhat, Hassan F. El-Nashar, N. Barakat, "Fizeau reflection fringes formed on high-order planes of localization", Optik, 104 (1997) 43-49.

b- Surface Growth Models and Nonequilibrium Statistical Physics

The current research in this area is carried out by using the Monte Carlo simulation technique. We are interested in studying the growth kinetics and surface roughening using some growth models like random deposition model and ballistic deposition model. The study deals with deposition models for binary systems using the dynamical scaling concepts. These models capture the basic features of the real growth processes such as deposition, overhang/voids, surface relaxation and evaporation. The growth of two or more species is common in the modern technology. Therefore, the study of such kind of problems has a great interest not only because of its importance in

technology but also due to its relevance in understanding non-equilibrium statistical mechanics. In addition, it is interesting since the growth process may belong to a new universality class. The deposition of binary species has been studied rarely. The kinetic roughening originated in these models and the understanding of such kind of growth is still at an early stage. The aim is to reach finally to a better understanding of the kinetic roughening and whether the models for binary systems belong to a new universality class or lie in the known universalities. Also, there are attempts to include the essential parameters of the MBE growth into models of binary systems. We are also interested in finding an answer for the following questions: "does evaporation (re-emission of species from the surface after deposition) is relevant process to be included or not? And does the diffusion length (due to surface relaxation on the surface) have an effect on the surface morphology or stability of the surface?"

References :

1. H. F. El-Nashar, W. Wang, H. A. Cerdeira, J. Phys. Cond. Matt. 8, 3271, 1996.
2. H. F. El-Nashar, W. Wang, H. A. Cerdeira, Phys. Rev. E. 58, 4461, 1998.
3. H. F. El-Nashar, H. A. Cerdeira, Phys. Rev. E. 60, 1262, 1999.
4. M. Kotrla, F. Slanina and M. Predota, Phys. Rev. B. 58, 10003, 1998.
5. S. Das Sarma, P. Punyindu, Surf. Sci., 424, L339, 1999.
6. J. Villain, J. Phys. I, 1, 19, 1991.
7. D. Wolf, J. Villain, Europhys. Lett., 13, 389, 1990.
8. S. Das. Sarma, P. Tamboreenea, Phys. Rev. Lett., 66, 325, 1991.
9. Z. W. Lai, S. Das. Sarma, Phys. Rev. Lett., 66, 2348, 1991.
10. ICTP Preprint No.IC 2002010 "EFFECT OF EVAPORATION ON THE GROWTH KINETICS IN A MODEL FOR TWO SPECIES" by Hassan F. El-Nashar
11. ICTP Preprint No.IC2000129 "SURFACE GROWTH MODELS FOR MORE THAN ONE SPECIES: A REVIEW by Hassan F. El-Nashar

c- Spatio-Temporal Chaos

The study in this field concerned with the network of chaotic elements distributed on a lattice of 1-, 2- and 3-dimensions. We investigate such a system by the coupled map lattices in order to see the effect of random coupling between elements on the spatio-temporal distribution. The coupled map lattices is a model that enables studying the essential features of the spatio-temporal chaos, pattern formation in biology and several engineering areas including computer networks and communications. Therefore it is of importance to see the effect of disordered coupling in the formation of clusters where the disorder can be fixed or stochastic in time. Since it is known that in these systems there are two conflicting trends, the turbulent due to the chaotic nature of each element and the coherent due to the average coupling.

References :

- 1-Dokhane, Diploma Thesis, ICTP, Trieste, Italy, 1999. (unpublished)
- 2-K. Kaneko, Prog. Theor. Phys. 72, 480, (1984); 74, 1033 (1985).
- 3-K. Kaneko, Physica D 34, (1989); D 37, 60, (1989) .
- 4-K. Kaneko, Physica D 41, 137, 1990.

d- Synchronization of Chaotic Oscillators

The work is in the direction of the statistics of the synchronization of coupled oscillators. The rich collective behaviours of these systems such as mutual entrainment, self-synchronization is observed in many fields. We study the N coupled oscillators in several dimensions. We are interested in the characteristic features of the motions of individual oscillators, synchronization and desynchronization under the influence of different coupling strengths. In addition, we are also interested with coupled oscillators either in a ring or in a chain of fixed ends. Several features have been observed (power law behaviour) and many questions are raised which have to be answered in future work. In addition we have interested also in the investigation of the effect of time and phase delays on the phases and amplitudes of oscillators (amplitude death).

References :

- 1- Kuramoto, Y. "Chemical Oscillations, Waves and Turbulences" (Springer-Verlag, Berlin), 1984..
- 2- Zhigang Zheng, Gang Hu, Bambi Hu, Phys. Rev. Lett. 81, 5318, 1998.
- 3- ICTP Preprint No.IC2002009 "NONLOCAL SYNCHRONIZATION IN NEAREST NEIGHBOUR COUPLED OSCILLATORS" by Hassan F. El-Nashar, Ahmed S. Elgazzar and Hilda A. Cerdeira, IJB&C, Dec. 2002.
- 4- Hassan F. El-Nashar, "Phase correlation and clustering of a nearest neighbour coupled oscillators system", to appear in IJB&C and ICTP Preprint 2002.
- 5- S. H. Strogatz, Physica D 143, 1 (2000) and references therein.
- 6- Meng Zhan, Zhi-gang Zheng, Gang Hu, Xi-hong Peng, Phys. Rev. E 62, 3552 (2000).
- 7- Zhigang Zheng, Bambi Hu and Gang Hu, Phys. Rev. E 62, 402 (2000).
- 8- K. Otsuka, "Nonlinear Dynamics in Optical Complex Systems" (Kluwer, Dordrecht, 2000).
- 9- Wiessenfeld, K., Colet, P. and Strogatz, S. H., Phys. Rev. Lett. 76, (1996) 404-407.
- 10-R. A. Oliva and S. H. Strogatz, Int. J. B&C, 11 (2001) 2359-2374.
- 11-Strogatz SH, NATURE 394 (6691): 316-317 JUL 23 1998
- 12-Efta Yudiarsah "Search for patterns in coupled chaotic oscillators", ICTP Diploma, Sept. 2002, unpublished.

3- Scientific Visits to International Institutes

July 2002-Sept.2002	International Centre for Theoretical Physics, Trieste, Italy
Oct.2001-Feb.2002	International Centre for Theoretical Physics, Trieste, Italy

Feb.2000-Sep.2001	Max Planck Institute for the Physics of Complex Systems, Dresden, Germany
May 99-Dec 99	International Centre for Theoretical Physics, Trieste, Italy
June 98-Sep 98	International Centre for Theoretical Physics, Trieste, Italy
Dec 96-Mar 97	Yarmouk University, Irbid, Jordan
Mar 96-Dec 96	International Centre for Theoretical Physics, Trieste, Italy
Oct 93-Mar 94	International Centre for Theoretical Physics, Trieste, Italy

4- Invited Talks

- 1- Presented a talk at the "Condensed Matter Physics Group", The International Centre for Theoretical Physics, Trieste, Italy, Nov. 2001.
- 2- Invited by the academy of science, Praha, (Presented a talk) Czech Republic, May 2001.
- 3- Invited talk in Max-Planck-Inst./Dresden, Dec. 1999.
- 4- Invited talk in Max-Planck-Inst./Golm, Dec. 1999.
- 5- Invited lecture in the workshop on "Web Enabling: Technologies and Authoring Tools", I.C.T.P, Trieste, Italy, Nov. 1999.
- 6- Contribution in the workshop on "second meeting of the consortium in embedment of recent telematics technology in the teaching of university physics" University of Ismailia, Egypt, 30 April - 3 May. 1999.

- 7- Contribution in the workshop on "embedment of recent telematics technology in the teaching of university physics" University of Ismailia, Egypt, 1-5 Nov. 1998.
- 8- Invited for three lectures at the workshop on "use of computers and multimedia technology in teaching physics and chemistry". University of Aden, Aden, Yemen, May 1998.
- 9- Two contributed talks on "Scientific Computations" at the international conference on "computer science and its applications". Cairo, Egypt, May 1997.
- 10- Talk at the "Condensed Matter Physics Group", The International Centre for Theoretical Physics, Trieste, Italy, January 1994.

6- Research Work in progress

- 1- "Universality, Stability and Surface Diffusion length in a deposition model for two species", in progress, Hassan F. El-Nashar
- 2- "Minimal coupling in frequency synchronization of coupled oscillators system" in progress, Hassan F. El-Nashar, Ahmed S. Elgazzar, Hilda A. Cerdeira.
- 3- "Synchronization of Randomly Coupled Map Lattices", in progress, A. Dokhane, Hassan F. El-Nashar and Hilda A. Cerdeira.
- 4- "Synchronization of coupled oscillator systems", A tutorial review in progress (invited for Int. J. Bifurc. & Chaos), Hilda A. Cerdeira, Hassan F. El-Nashar and Y. Zhang.

7- Publications

- 1- Hassan F. El-Nashar, Ying Zhang, Hilda A. Cerdeira and Fuwape Ibiyinka A, "Synchronization in a chain of nearest neighbors coupled oscillators with fixed ends", Chaos, 13, Dec. (2003), 1216-1225.

- 2- Hassan F. El-Nashar, "phase correlation and clustering of a nearest neighbor coupled oscillators", to appear in Int. J. of Bifurcation & Chaos, 13, Nov. (2003), 3473-3481.
- 3- Hassan F. El-Nashar, "Effect of evaporation on the growth kinetics in a model for two species", to appear in the Egyptian Journal of Solids, (2003).
- 4- Hassan F. El-Nashar, "Interplay between deposition, overhang, evaporation and surface diffusion in surface growth model", Egyptian Journal of Solids, 25, 191 (2002).
- 5- Hassan F. El-Nashar, "Surface Growth Models for Two Species" submitted to the Egyptian Journal of Solids.
- 6- Hassan F. El-Nashar, "Power law behavior of synchronized coupled oscillators", submitted to chaos, solitons and fractals.
- 7- Hassan F. El-Nashar, Ahmed S. Elgazzar, Hilda A. Cerdeira, "Nonlocal synchronization in nearest neighbor coupled oscillators", Int. J. of Bifurcation & Chaos, 12, 2945, (2002).
- 8- Hassan F. El-Nashar, Hilda A. Cerdeira, "Growth kinetics in two species surface growth model", Phys. Rev. E, 61 (2000) 6149-6155.
- 9- Hassan F. El-Nashar, Hilda A. Cerdeira, "A discrete surface-growth model in 2+1 dimensions for two components", Physica A, 283 (2000) 6-10.
- 10- Hassan F. El-Nashar, Hilda A. Cerdeira, "Growth kinetics and morphology of a ballistic deposition model that incorporates surface diffusion for two species", Phys. Rev. E, 60 (1999) 1262 - 1268.
- 11- Hassan F. El-Nashar, Wei Wang, Hilda A. Cerdeira, "Ballistic deposition model for multiple species", Phys. Rev. E, 58 (1998) 4461-4467.
- 12- Hassan F. El-Nashar, Hilda A. Cerdeira, "Random deposition model for two species", Surface Science, 415 (1998) 1-10.

- 13- M. Medhat, Hassan F. El-Nashar, "Multipass wedge interferometer for increased spatial fringe frequency", *Optik*, 107 (1998) 149-154.
- 14- M. Medhat, Hassan F. El-Nashar, N. Barakat, "Fizeau reflection fringes formed on high-order planes of localization", *Optik*, 104 (1997) 43-49.
- 15- M. Medhat, Hassan F. El-Nashar, "Double-pass wedge interferometer for increased contrast", *Optik*, 106 (1997) 96-102.
- 16- Hassan F. El-Nashar, Wei Wang, Hilda A. Cerdeira, "Ballistic deposition model for multiple species with next-nearest-neighbor interactions in (2+1)-dimensions", *Surf. Sci.*, 39 (1997) 1-10.
- 17- Hassan F. El-Nashar, Wei Wang, Hilda A. Cerdeira, "Surface growth-kinetics and morphological structural transition in a (2+1)-dimensional deposition model", *J. Phys. Cond. Matt.*, 8 (1996) 3271-3283.

5- Workshops, Schools and Conferences

- 1- The XXIII Conference on Solid State Science and Workshop on Physics and application potential of fundamental Ceramics thin films (sept.-Oct. 2002), Sharm El-Sheekh, Egypt.
- 2- SCHOOL ON "STATISTICAL PHYSICS, PROBABILITY THEORY AND COMPUTATIONAL COMPLEXITY" followed by CONFERENCE ON "TYPICAL-CASE COMPLEXITY, RANDOMNESS AND ANALYSIS OF SEARCH ALGORITHMS", Aug.-Sept. 2002, ICTP, Trieste, Italy.
- 3- School and Conference on Spatiotemporal Chaos (8-19) July 2002, ICTP, Trieste, Italy.
- 4- European Dynamics Days, Dresden, Germany, summer 2001.
- 5- Workshop on, "Using Mathematical Modeling and Computer Simulation to Improve Cancer Therapy", 18-25 June 2000, Course, France.

- 6- Workshop on, "Disordered and Complex Systems", 11-16 June 2000, London, UK.
- 7- Workshop on "SYMPOSIUM ON SYNCHRONIZATION OF CHAOTIC SYSTEMS", 3-5 July 2000, Trieste, Italy.
- 8- "SCHOOL ON DATA AND MULTIMEDIA COMMUNICATIONS USING TERRESTRIAL AND SATELLITE RADIO LINKS", Trieste, Italy., 7-26 Feb. 2000.
- 9- Workshop on "Statistical Physics", Nordita, Copenhagen, Denmark, 1999.
- 10- Summer-College on "Statistical Mechanics", Trieste, Italy, July-August 1997.
- 11- College on "Microprocessor based-real-time Technique in Physics", Trieste, Italy, February-March 1997.
- 12- Spring-College on "Condensed Matter: Disorder, Chaos, Complex Systems", Trieste, Italy, June 1996.
- 13- College on "Biophysics", Trieste, Italy, March 1996.
- 14- Adriatico research conference "Mesoscopic Phenomena in Complex Quantum Systems", Trieste, Italy, 11/6/96-14/6/96.
- 15- Workshop on "Structure of Thin Films", Ain Shams University, Cairo, Egypt 1995.
- 16- Attended several lectures on "Infrared spectroscopy, Theory and Techniques", AUC, Cairo, 1995.
- 17- Workshop on "Laser Spectroscopy", Cairo, Egypt, 1995.
- 18- 3rd conference on "Photochemistry and Solar Energy", Cairo, Egypt, 1995.
- 19- School on "The Use of Synchrotron Radiation in Science", Trieste, Italy, Nov. 1993.
- 20- Miniworkshop on "Nonlinearity: Chaos in Mesoscopic Systems", Trieste, Italy, 26/7/93-6/8/93

8- Scientific Referee for International Journals

- Referee for Phys. Rev. E. since 2000.
- Referee for Int. J. Bifurc. & Chaos since 2001

9- Books

A multimedia book "Simphy": Visualization of Introductory Physics on Computer

A. H. Moussa, Ali El-Naem, Hassan F. El-Nashar.

In cooperation with UNESCO regional office Cairo, Egypt.

H) Consultation Visits

Leybold didactic GMBH, Postf. 1365 - D-50330 Huerth, Leybold Strasse 1, Germany, Oct.1999.

(This visit was devoted to investigate a bid from Leybold in a tender for delivering equipments to the ministry of education in Egypt.)

I) References

1- Professor Hilda A. Cerdeira, CMP group, I.C.T.P, P.O.Box 586, 34100-Trieste, Italy.(cerdeira@ictp.trieste.it)

2- Professor Subodh Shenoy, CMP group, I.C.T.P, P.O.Box 586, 34100-Trieste, Italy.(shenoy@ictp.trieste.it)

3- Professor Konstantin Lukin, Head. Lab. Nonlinear Dynamics of Electronic Systems, Institute of Radiophysics and Electroics, National Academy of Sciences of Ukraine, 12 Acad. Proskura St., 310085 Kharkov, Ukraine. (lukin@ire.kharkov.ua)

4- Professor Wang Wei, Director, Institute of Biophysics, Nanjing University, 22 Hankou Road, Nanjing 210093, China. (wangwei@netra.nju.edu.cn).

5- Professor M. Medhat, Physics Department, Faculty of Science, Ain Shams University, Cairo 11566, Egypt.