

Curriculum Vitae/ Khaled Barakat



Personal data

Name: Khaled Mahmoud M. Barakat

Place of work: Department of physics, Palestine Technical University –Kadoorie, Tulkarm.

Specialization: M.Sc. and Ph.D. in Theoretical Physics – Many Body Theories.

Place of Birth: Broqin - Salfeet

Nationality: Palestinian

Present Address: College of Arts and Sciences,
Department of Physics – Palestine Technical University- Kadoorie
P. O. Box (7) - Tulkarm- Palestine
Internal: 1603

Mobile: 00970 - 598 183 492

E-mail: k.barakat@ptuk.edu.ps

Languages: Arabic, English, German

Education

B.Sc. in Physics, very good, An-Najah National-University, Nablus, West bank, 1988

M.Sc. in Physics, Excellent, University of Jordan, Amman, Jordan, 1995

Title of Master thesis: "The Effective Interaction and Some Sound

Phenomena in Dilute Neutral Fermi Systems", Advisor: Prof. Dr. Humam Ghassib.

10/1996 DAAD-Scholarship for Ph.D. Study in Germany.

10/1996-3/1997 German-language course at Goethe-Institute, Bremen, Germany.

SS 1997-10/1998 Fulfillment of the Ph.D. requirements for the institute of theoretical Physics including **entrance exam** and **advanced courses** in:
Classical physics, Quantum physics, Statistical physics, many-body methods, and Electrodynamics, and **finally the main-diploma exam**,
Note: 1.3 = Excellent.

WS1998-SS2002 Ph.D. in theoretical physics, Institute for Theoretical Physics, University of Cologne, Advisor: Prof. Dr. Manfred L. Ristig.

Dissertation title: "Microstructure of the quantum O (2) Lattice Model".

Employment

1989 and 1995/96 Physics and science teacher at Palestinian schools (Zeta, Salfeet and Broqin-West bank).

1990-1994 Teaching assistant at the physics department, University of Jordan, Amman.

1998-2002 Co-worker of Prof. Ristig group, assistance include manipulation of papers including scientific checking, theory, and computer-program's calculation.
In addition, co-worker for the Prof.' lectures and second examiner for the Diploma-

exam students.

- 9/2002-9/2003 Postdoctoral work at Max-Planck Institute, Dresden, Germany.
2003-2005 Part time employment at Alquds-open and An najah-national universities.
2007- WS2009 Part time employment at Palestine polytechnic university, Hebron.
Since 9/2009 Associate Professor at Palestine technical university-Kadoorie, Tulkarm.

Special interest:

- (1) Theory of Quantum fluids, including superconductivity, superfluidity, and phase transitions.
- (2) CBF-theory of interacting systems (including optical lattices) and spin systems.
- (3) Many particle theories including Bose and Fermi systems, nuclear matter (condensed matter theories).
- (4) Non-linear sigma O (N) model, BCS and pairing theory ... etc.

Publication:

- (1) M.L.Ristig, K. Abu Qasem, D.J.J.Farnell and K.E. Kuerten, "Quantum Phase Transition ", Proceedings Inter- national Workshop, Varna, 2001.
- (2) M.L.Ristig, K. Abu Qasem, D.J.J.Farnell and K.E. Kuerten, "Quantum Phase Transition in Spin-Lattice Systems", BgNS Transitions, V.7, No. 1, pp.145-154 (2002).
- (3) Khaled Abu qasem, "Microstructure of the quantum O (2) Lattice Model", Doctoral Thesis, University of Cologne.
- (4) M.L.Ristig, K. Abu Qasem," Microscopic Analysis of the O (2) Model for Josephson Junction Arrays", in: Similarity and Diversity, eds. D. L. Morabito and Y. Okkamura.
- (5) Khaled Abu Qasem and M. L. Ristig, "Ground State Properties of the O (2) Model in Two Dimensions: a Correlated Basis Function Approach", Phys. Rev. B70, 085106, 2004.

Participations in Seminars Research Activities:

- (1) Co-worker seminar of the working group of my Ph.D. advisor Prof. Manfred L. Ristig, Institute für theoretische Physik, Universitaet zu Köln.
- (2) The big physical colloquium, Institut für Theoretische Physik, Universitaet zu Köln.
- (3) European Summer School on Microscopic Quantum Many-Body Theories and their Applications (Valencia, Spain, 8-19 September 1997)
- (4) WE (Wilhelm and Else)-Heraeus Seminar on Scientific Application of Neural Nets (Physikzentrum Bad Honnef, Germany, 11-13 May, 1998)
- (5) WE (Wilhelm and Else)-Heraeus Seminar on Microscopic Theories of Phase Transitions: Quantum versus Thermal Fluctuations (Physikzentrum Bad Honnef, Germany, 13-15 December, 1998)
- (6) WE (Wilhelm and Else)-Heraeus Seminar on Particle Scattering, X-ray Diffraction, and Microstructure of Solids and Liquids (Physikzentrum Bad Honnef, Germany, 28-30 May, 2001).
- (7) Palestinian Conference on Modern Trends in Mathematics and Physics, 28-30 July 2008, Birzeit University, Palestine.
- (8) The First International Palestinian Conference on Nanotechnology in Advanced Materials and Devices.(held in coordination between Illinois State university, An-Najah University and Palestine Technical University-Kadoorie), March,26- 28/2012.

(9) The First Palestinian international Conference Peaceful Uses of Atomic Energy. Palestine Technical University- Tulkarm- Palestine. 19- 20/2/2017.

Teaching and Research Activities:

Teaching: [Courses names and No. are displayed down]

General Physics 1+2, Modern Physics, Classical Physics 1+2, Quantum physics 1+2, Statistical Physics 1+2, Mathematical physics 1+2, Electromagnetic theory 1+2, Nuclear physics, Advanced physics Labs., Solid state physics , Methods of Scientific Research , and Research projects for undergraduate.

Professional Activities:

1-Head of the Physics Dep., 1/9/2012- 1/9/2014

2- Member of the Council of College of Arts and Sciences, PTUK, 2009-2011, 2012-2014

3- Courses Description Committee member, for the Dep. of Physics and general cultural courses, PTUK, 2010- 2014.

Research Potential:

During academic teaching yours I have supervised more than 10 researches at the undergraduate level (list will be available on a separate page) but some of them me be extended to a full research projects: to mention is detecting relativity by gamma ray scattering, tunneling mechanism of neutrons at constant magnetic field, the QHE, and others. These will be posted and available in a separate page as a "pdf" files. On "Moodle page" a complete summary of lecture notes and problems for physics courses was accessible for the sections with pwd. Login each semester.

Research Projects:

- (1) Mean-Field theoretic approach of the O(2) Model in 3D lattice (completed)
- (2) CBF-Theory of the O(2) Model on a 3D lattice systems.[needs numerical solution]
- (3) Effect of correlation in the Lieb–Liniger model.
- (4) Energy and Distribution Functions in the 1D Ultracold Bose Systems
- (5) Microscopic CBF-Theory of the O (4) non-linear Sigma Model.
- (6) Pairing energy in correlated Bose systems.
- (7) Distribution functions and other properties of clod fermions and Bosons.
- (8) Quantum dots in 2D & 3D, correlations and fluctuations.
- (9) The problem of cooper pairing.
- (10) The Properties of the O (2) Model at Finite Temperatures.

Future Plan

- (1) Update lecture notes for students in the form of notes and assignments.
- (2)Continue my research in the fields mentioned above, to publish results in the form of articles and papers, and try to establish a "Theoretical physic lab" supplied with a good scientific computing machines, in order to complete scientific computing machinery belonging to various field in theoretical physics and establishes a ground for cooperative researches with our other interested members and colloquies form our university and others.

Important Courses/Dep. Of Phys. /PTUK

General Physics I (Phys. 15020101), General Physics II (Phys. 15020102), General Physics Lab 1 Phys. (15020105) , General Physics Lab 2 Phys. (15020106), Classical Mechanics I (Phys. 15020301), Classical Mechanics II (Phys. 15020302), Mathematical Physics I (Phys. 15020211), Mathematical Physics II (Phys. 15020411), Quantum Mechanics I (Phys. 15020352), Quantum Mechanics II (Phys. 15020353), Electromagnetic Theory I (Phys. 15020341), Electromagnetic Theory II (Phys. 15020342), Methods of scientific research (Phys. 15020480), Modern Physics (Phys. 15020251), Nuclear Phys. I (Phys. 15020471), Stat. Phys (15020401), Solid state phys. (15020461), Atomic and Molecular phys. (15020472), Advanced Phys Labs 1+2+3 (15020227, 15020327, 15020356), Research Project (Phys. 15020481).

Researches/ Undergraduate:

1	A Quantum Behavior Particle Scattering by a Potential Square Barrier or Well , and Quantum	Dalya al- Qub .	داليا باسل القب
2	Gamma Ray Interactions and Compton Scattering	Atheer Samaha	أثير سماحة
3	Nuclear Magnetic Resonance	Nadar Ganem	ندر جودت غانم
4	Some Properties of Ising Model of Magnetism	Doaa' Shayeb	دعاء فوزي شايب
5	Optical Fibers	Ruba Jadallah	ربي توفيق جاد الله
6	Ground State Properties of Bose Hubbard Model	Wajeeha Abu Sa`diya	وجيهة أبو سعديه
7	Ultra- Battery for Hybrid Electric Vehicle's	Ouf Qatu	عوف عبد الرحمن قطو
8	Blue InGaN Light Emitting Diode	Ali Qatu	علي القطو
9	Quantum Hall Effect	Haneen Takatk	حنين طقاطقه
10	Solar Wind	Motaz Bzour	معتز بزور
11	Bose Einstein Condensation	Ehab Ghazy Rouzaiqat	ايهاب رزيقات
12	Sky is blue and Sunset is Reddish	Amro Jada	عمرو جدع
13	Approximate solution of the one band Fermi Hubbard Model	Rawnaq Abu Sa`diya	رونق ابو سعديه
14	Superconductivity	Sara yaseen	سارة ياسين
15	Scanning Electron Microscopy	Israa Ghozeh	اسراء حكمت غزة
16	Variational Method	Manal Aqtash	منال اقطش

17	Doppler Effect	Basil Ghazal	باسل غزال
18	Variational Method Applied to He Atom	Besan Fuad	بيسان فؤاد

Research Proposal (2018/2020):

Khaled M. Barakat

Department of physics, Palestine Technical University -Kadoorie

Specialization: (M.Sc. and Ph.D.) Theoretical Physics – Many Body Theories

Theoretical research projects:

(1) Mean-Field theoretic approach of the O (2) Model in 3D lattice

(to be published)

(2) CBF-Theory of the O (2) Model on a 3D lattice systems. [will be finalized]

(3) Correlations in 1D Ultracold Bose Systems. [numerical results obtained will be published soon]

[4] Non-linear sigma (chiral) Model: Mean Field Analysis. [Theoretical part done]

(4) Influence of correlation in Fermi-Hubbard Model [in preparation]

(5) Pairing Energy of correlated pairs in Bose systems [in preparation]

(6) Quantum dots in 2D & 3D, correlations and fluctuations. [in preparation]

(7) Particle distribution functions in optical lattices.

Future Plan

Continue my research in the fields mentioned above, to publish results in the form of articles and papers, and may be helpful if there will be a “Theoretical physic lab” supplied with a good scientific computing machines, in order to complete scientific computing machinery belonging to various field in theoretical physics and establishes a ground for cooperative researches with our other interested members and colloquies form our university and others.

Experimental Research Projects: [Needs Financial Support]

(1) Magnetic monopoles.

(2) Special relativity

(3) Magnetic dipole moment.

(4) Time Dilation experimental demonstration.

(5) Pure Quantum bits