

# Curriculum Vitae

Gehad K Sadiek

## Research Interests

Condensed matter Physics, strongly correlated electron systems, quantum entanglement and decoherence in nonlinear quantum systems, quantum computing and quantum information processing, Open quantum systems, quantum phase transitions and critical phenomena and electron transportation in mesoscopic systems.

## Education

**Doctorate of Philosophy, Physics**, December 2002

[Purdue University](#), West Lafayette, IN, USA

**Master of Science, Physics**, May 2000

[Purdue University](#), West Lafayette, IN, USA

**ICTP Condensed Matter Diploma**, August 1995

[International Center for Theoretical Physics](#), ICTP, Trieste, Italy

**Master of Science, Physics**, August 1994

[Ain Shams University](#), Cairo, Egypt

**Bachelor of Science, Physics**, May 1988

[Ain Shams University](#), Cairo, Egypt

## Theses

- G. Sadiek (2002), *Decoherence in Nonlinear quantum systems*, Ph. D. thesis, under supervision of Prof. S. Khlebnikov (Purdue University, West Lafayette, Indiana, USA).
- G. Sadiek (1995), *Isotope effect on exchange in antiferromagnetic insulators*, ICTP Diploma thesis, under supervision of Prof. R. Hlubina (ICTP, Trieste, Italy).
- G. Sadiek (1994), *Investigation of Resonance in inelastic collision of Positron with Alkali atoms using the method of complex coordinates*, M.S. thesis, under supervision of Prof. M.A. Abdel-Raouf (Ain Shams University, Cairo, Egypt).

## Professional Experience

- **Associate Professor**, Department of Applied Physics, College of Science, University of Sharjah, Sharjah, UAE (September 2014 – ...).
- **Associate Professor**, Physics Department, College of Science, King Saud University, Riyadh, Saudi Arabia (January 2011 – August 2014).
- **Assistant Professor**, Physics Department, College of Science, King Saud University, Riyadh, Saudi Arabia (September 2004 – January 2011).
- **Assistant Professor**, Physics Department, Faculty of Science, Ain Shams University, Cairo, Egypt (January 2004 – September 2004).
- **Visiting faculty**, Physics Department and Chemistry Department, Purdue University (December 2002 – January 2004).
- **Visiting faculty**, Physics Department, Purdue University (every summer semester since July 2004 till now).
- **Teaching Assistant**, Physics Department, Purdue University (1997-2002).
- **Physics Instructor**, Physics department, Ain Shams University (1990-1994)- (1995-1997).
- **Participant**, Condensed Matter Diploma Program, International Center for Theoretical Physics, Trieste, Italy (1994 – 1995).

## Awards and Honors

- Purdue Research Foundation (PRF) distinguished graduate fellowship, Purdue University (2000-2002).
- One of the top ten teaching assistants during my Ph.D. years according to the classification of the Physics Department, Purdue University.
- Elected member of the faculty-graduate committee, Physics Department, Purdue University (2001-2002).
- President of the Egyptian Students Association in North America (2000-2001).
- ICTP Diploma fellowship, International Center for Theoretical Physics (Trieste, Italy) (1994-1995).

## Graduate Students Supervision

- **Bedoor Alkurttass**, 2007-2010, “Dynamics of Quantum Entanglement of anisotropic Heisenberg XY Spin Chain in an External Magnetic Field.”
- **Nourah Elanazy**, 2008-2011, “Electron transport properties in coupled quantum dots in the Kondo regime.”
- **Elham Alzefary**, 2010-2013, “Entanglement of a Two-Qubit With anisotropic Heisenberg XYZ Exchange interaction coupled to a dissipative environment.”

- **Arwa Bahlouly**, 2012-2015, “Application of finite size scaling to quantum mechanical systems at critical points.”
- **Samaher Almalky**, 2013-2016, “Dynamics of spin systems coupled to a dissipative environment.”
- **Wiam Aldrees**, 2013-2017, “Dynamics of a two-qubit system coupled to a radiation field.”
- **Habiba Almutari**, 2014-2017, “Investigating quench dynamics in Heisenberg spin systems with long range interactions.”

## Recent Funded Proposals

- “Entanglement and Decoherence in Quantum Computing Systems”  
Saudi National Plan for Science and Technology, 900,000 SR,  
1/4/2012 - 30/3/2015.  
PI: Gehad Sadiek
- “Investigation of quantum phase transition in Heisenberg spin systems using finite size scaling”  
Vice chancellor office of research and graduate studies, University of Sharjah (20,000 AED),  
1/3/2015 – 30/8/2016.  
PI: Gehad Sadiek
- “Dynamics of quantum entanglement in Heisenberg spin systems coupled to a dissipative environment”  
Deanship of research and graduate studies, University of Sharjah (80,000 AED),  
1/11/2016 – 31/10/2019.  
PI: Gehad Sadiek
- “Quantum control of interacting two-level quantum systems using a quantized radiation field”  
Deanship of research and graduate studies, University of Sharjah (80,000 AED),  
1/11/2017 – 31/10/2019.  
PI: Gehad Sadiek

## Journals Reviewer

- Physics Letters A
- IEEE Transactions on Magnetics
- Applied Optics
- Journal of Optical Society of America B (OSAB)

## Recent Conferences

- The American Physical Society March meeting 2019, Boston, Massachusetts, USA. March 4-8, 2019, "A solution ansatz for Lindblad master equation with a dynamical system theory approach."
- The American Physical Society March meeting 2018, Los Angeles, California, USA. March 5-9, 2018, "Population inversion and entanglement dynamics of two coupled qubits in cavity QED."
- The American Physical Society March meeting 2017, New Orleans, Louisiana, USA. March 12 - 17, 2017, "Entanglement control in two interacting qubits coupled to a radiation field."
- Frontiers in Theoretical and Applied Physics 2017, AUS, Sharjah, UAE. February 22 - 25, 2017, "Impurity effect on entanglement dynamics in one-dimensional Ising system coupled to a dissipative environment."
- The American Physical Society March meeting 2016, Baltimore convention center, Baltimore, Maryland, USA. March 14 - 18, 2016, "Entanglement dynamics in Heisenberg spin systems coupled to a dissipative environment."
- The American Physical Society March meeting 2014, Colorado Convention Center, Denver, Colorado, USA. March 3 - 7, 2014, "Splitting time dependence in Lindblad master equation."
- Collaborative Conference on Materials Research (CCMR) 2013 meeting, Jeju, South Korea, 25–29 June 2013, "Robustness of thermal entanglement in quantum spin systems."
- Quantum Interfaces: Integrating Light, Atoms and Solid-State Devices, AIP Conference, Chicheley Hall, Milton Keynes, UK, 14–15 May 2012, "Entanglement and ergodicity control in two-dimensional spin systems using impurities and anisotropy."
- The International Conference on Quantum Information and Computation, Nordic Institute for Theoretical Physics (NORDITA), Stockholm, Sweden, October 4 - 8, 2010, "Entanglement in an Infinite Ising Spin Chain with a time Dependent Coupling in an External Time-Varying Magnetic Field."

## Publications

- E. I. Lashin and **Gehad Sadiék**, “An ansatz for the solution of Lindblad master equation with dynamical system theory implementation.” (Under review for publication)
- **Gehad Sadiék**, Wiam AlDrees and Sebawe Abdullah, “Manipulating entanglement sudden death in two coupled two-level atoms interacting off-resonance with a radiation field: an exact treatment,” [Optics Express 27, 33799 \(2019\)](#), [arXiv:1911.08208](#).
- **Gehad Sadiék** and Habiba Al-mutari, “Ergodicity variation in a long range interacting one-dimensional Ising spin system subject to a time-varying magnetic field.” [J. Phys.: Conf. Series 1253 \(2019\) 012009](#).
- **Gehad Sadiék**, “Impurity effect on entanglement asymptotic state in one-dimensional Ising system coupled to a dissipative environment,” [J. Phys.: Conf. Series 869 \(2017\) 012022](#).
- **Gehad Sadiék**, and Samaher Almalki, “Entanglement dynamics in Heisenberg spin chains coupled to a dissipative environment at finite temperature,” [Phys. Rev. A 94, 012341 \(2016\)](#), [arXiv:1604.02689](#).
- E. I. Lashin, **Gehad Sadiék**, Sebawe Abdullah and Elham Aldefeery, “Two driven coupled qubits in a time-varying magnetic field: exact and approximate solutions,” [Appl. Math. Inf. Sci. 8, No. 3, 1-14 \(2014\)](#).[arXiv:1312.6883](#).
- **Gehad Sadiék**, Gehad Sadiék and Sabre Kais, “Persistence of entanglement in thermal states of spin systems” [J. Phys. B: At. Mol. Opt. Phys. 46 245501 \(2013\)](#), [arXiv:1301.0122\[quant-ph\]](#).
- **Gehad Sadiék**, Qing Xu, and Sabre Kais, “Dynamics of entanglement in one and two-dimensional spin systems,” review chapter in *Quantum Information and Computation for Chemistry: Advances in Chemical Physics*, Volume 154, 443-501 (2013). <http://arxiv.org/abs/1304.5569>.
- **Gehad Sadiék**, Qing Xu, and Sabre Kais, “Tuning entanglement and ergodicity in two-dimensional spin system using impurities and anisotropy,” [Phys. Rev. A 85, 042313 \(2012\)](#), [arXiv: quant-ph/1204.0759](#).
- Bedoor Alkurtass, **Gehad Sadiék**, and Sabre Kais, “Entanglement dynamics of one-dimensional driven spin systems in time-varying magnetic fields,” [Phys. Rev. A 84, 022314 \(2011\)](#), [arXiv: quant-ph/1104.3521](#).

- Qing Xu, **Gehad Sadiék** and Sabre Kais, "*Dynamics of entanglement in a two-dimensional spin system*," [Phys. Rev. A 83, 062312 \(2011\)](#), [arXiv: quant-ph/1101.5784v1](#). (2011).
- **Gehad Sadiék**, "*Dynamics of thermal entanglement of anisotropically coupled two-qubit system in a time-dependent magnetic field*," [NuovoCimento B 125, 1529 \(2010\)](#).
- **Gehad Sadiék**, Bedoor Alkurtass, and Omar Aldossary, "*Entanglement in a time-dependent coupled XY spin chain in an external magnetic field*," [Phys. Rev. A82, 052337 \(2010\)](#), [arXiv: quant-ph/1009.0648](#).
- **G. Sadiék**, E. I. Lashin and M. Sebawe Abdullah, "*Dynamics of Entanglement of a two-qubit system with anisotropic XYZ exchange coupling in a non-uniform external magnetic field*," [Physica B404, 1719 \(2009\)](#).
- **G. Sadiék**, Z. Huang, Omar Aldossary and Sabre Kais, "*Nuclear-induced time evolution of entanglement of two-electron spins in a coupled quantum dot*," *Mol. Phys.* **106**, 1777 (2008), [arXiv:cond-mat/0703054](#).
- M. Sebawe Abdullah, E. I. Lashin and **G. Sadiék**, "*Entropy and variance squeezing for time-dependent two coupled atoms in an external magnetic field*," [J. Phys. B 41, 015502 \(2008\)](#).
- Z. Huang, **G. Sadiék**, S. Kais, "*Time evolution of a single spin in homogeneously coupled to an interacting spin environment*," [J. Chem. Phys. 124, 144513 \(2006\)](#).
- S. Khlebnikov and **G. Sadiék**, "*Decoherence by a nonlinear environment: canonical vs. microcanonical case*," [Phys. Rev. A 66, 032312 \(2002\)](#), [arXiv:quant-ph/0202125](#).
- M. Crogan, S. Khlebnikov and **G. Sadiék**, "*Controlled transfer of quantum amplitude via modulation of a potential barrier: numerical study in a model of SQUID*," *Supercond. Sci. and Technol.* **15**, 8 (2002), [arXiv:quant-ph/0105038](#).
- R. Hlubina and **G. Sadiék**, "*Isotope effect on exchange in antiferromagnetic insulators*," [Phys. Rev. B 55, 2733 \(1997\)](#).

### **Publications (under preparation):**

- **Gehad Sadiék** and Samaher Almalky, "*Spin relaxation in two-dimensional spin lattice coupled to a dissipative environment*."

- **Gehad Sadiek** and Habiba Almutary, "Quench dynamics in Heisenberg spin systems with long range interactions in the presence of a dissipative environment."

## **Professional Organizations**

- Member of the American Physical Society ([APS](#)).