

**Curriculum Vitae**  
**Zahra Shaterzadeh-Yazdi**

**Professional Address**

**Institute for Quantum Information Science**  
**University of Calgary**  
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**Home Address**

**Unit 105, 3420, 50th St, NW**  
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**EDUCATION:**

**PhD. Student**, University of Calgary, Alberta, Canada May 2007 – Present  
(PhD candidate since August 2009)

- **GPA: 3.95 out of 4**
- Supervisor: Dr. Barry. C. Sanders.

**MSc. degree**, University of Calgary, Alberta, Canada January 2005 - May 2007

- **GPA: 4 out of 4.**
- Thesis title: “Characterization of Multipartite Squeezed States by  $SU(1,1)$  Symmetry”
- Supervisor: Prof. Barry. C. Sanders.

Accepted in **Masters Program in Physics**, Polytechnic (Amir Kabir) University, Tehran, Iran,  
September 2003

- **Ranked 123**, between **more than 2000 participants**, at the Iranian national Graduate entrance exam

**BSc. degree in Applied Physics**, Ferdowsi University, Mashhad, Iran,  
September 1999 - July 2003

- GPA: 16.08 out of 20
- **B.SC. project** about **Quarks** (in Farsi)
- Supervisor: Prof. Mohammad E. Zomorrodian

## CURRENT RESEARCH:

- Quantum computing realization with Dangling bond (DB) pairs on a Hydrogen-terminated Si (100) surface (this is an empirical research project)
  - Demonstrating the existence of DB charge qubit and a universal set of gates
  - Theoretically characterizing DB-charge qubit dynamics
  - Devising a feasible scheme for experimental characterization of a fast DB charge qubit dynamics
  - Characterizing coupled DB pairs coherence and bonding on Si surfaces using *ab initio* density functional theory technique
  - Designing an architecture for a scalable circuit quantum computing with DB charge qubits
- Major points of my MSc thesis:
  - (2,3) threshold continuous variable quantum state sharing (CV QSS) scheme using quantum operator description of the system
  - Developing a scheme for CV QSS that works for arbitrary input state and for more players
  - Multimode realization of SU (1, 1) Lie algebra

## RESEARCH INTERESTS:

I am interested in most of the specialized fields of Physics specially the following ones:

Quantum computation, Quantum information science, Quantum optics, Nanotechnology, Surface Science, Solid State Physics, and Condensed Matter.

My PhD research project is an empirical work, which brings together and ties between the theoretical knowledge of Quantum Information and Computation Science and the experimental knowledge of Nanotechnology and Surface Science.

## PUBLICATIONS:

Z. Shaterzadeh-Yazdi, J. Mutus, L. Livadaru, M. Taucer, R. A. Wolkow, and B. C. Sanders, *On measuring coherence in coupled Dangling-Bond dynamics*, in progress, to be submitted to Physical Review letters.

L. Livadaru, P. Xue, Z. Shaterzadeh-Yazdi, G. A. DiLabio, J. Mutus, J. L. Pitters, B. C. Sanders and R. A. Wolkow, *Dangling-bond charge qubit on a silicon surface*, New Journal of Physics **12**(8): 083018 (15 pp.), 9 August 2010, arXiv.org:0910.1797, **Chosen for IOP Select**.

Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *SU(1,1) symmetry of multimode squeezed states*, Journal of Physics A: Mathematical and General, **41**(5): 055309 (11 pp.), 23 January 2008, arXiv.org:0710.3205.

Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *Three-mode squeezing:  $SU(1,1)$  symmetry* (invited), 7 June 2007, Proceedings of SPIE: Noise and Fluctuations in Photonics, Quantum Optics, and Communications 6603: 660317 (11 pp.), La Pietra Conference Center, Florence, Italy, 20 May 2007 - 24 May 2007, Published by SPIE Publications, Bellingham, United States of America (ISBN 978-0-8194-6740-9)

Z. Shaterzadeh-Yazdi, *Characterization of Multipartite Squeezed States by  $SU(1,1)$  Symmetry* (MSc Thesis), 2007. University of Calgary. Supervisor: Prof. Barry C. Sanders

Z. Shaterzadeh-Yazdi, *Quarks* (BSc research project), 2003. Ferdowsi University of Mashhad, Supervisor: Prof. Mohammad E. Zomorrodian

## PRESENTATIONS:

11 Jun 2012, Z. Shaterzadeh-Yazdi, M. Taucer, J. Mutus, L. Livadaru, R. A. Wolkow and B. C. Sanders, On measuring dangling bond charge qubit dynamics (contributed), Canadian Association of Physicists Congress (CAP Congress 2012), Calgary, Alberta, 10 Jun 2012 - 14 Jun 2012

1 May 2012, Z. Shaterzadeh-Yazdi, Marco Taucer, J. Mutus, L. Livadaru, R. A. Wolkow and B. C. Sanders, On measuring dangling bond charge qubit dynamics (contributed), AITF Quantum Information Science@University of Calgary, University of Calgary, 1 May 2012 - 1 May 2012

29 Aug 2011, Z. Shaterzadeh-Yazdi and B. C. Sanders, Characterization of dangling-bond charge-qubit dynamics (**Poster, winner of the AITF student poster competition award**), 2011 Techn Futures Summit, <http://www.albertatechfutures.ca/Events/PastEvents/2011TechFuturesSummit.aspx>, Banff, Alberta, Canada, 28 Aug 2011 - 30 Aug 2011

6 Jul 2011, Z. Shaterzadeh-Yazdi and B. C. Sanders, On measuring dangling-bond charge-qubit dynamics (Poster), <http://www.iqis.org/events/quantumnano2011/>, Alberta Quantum-Nano Workshop (sponsored by Alberta Innovates Technology Futures), Red Deer, Alberta, Canada

2 May 2011, Z. Shaterzadeh-Yazdi and B. C. Sanders, On measuring dangling-bond charge-qubit dynamics (contributed), <http://www.icssur2011.ufscar.br/>, 12th International Conference on Squeezed States and Uncertainty Relations (ICSSUR), Foz do Iguaçu, Brazil, 2 May 2011 - 6 May 2011

27 Apr 2011, Z. Shaterzadeh-Yazdi and B. C. Sanders, On measuring dangling-bond charge-qubit dynamics (seminar), University of Calgary, Canada

5 Apr 2011, Z. Shaterzadeh-Yazdi and B. C. Sanders, On measuring dangling-bond charge-qubit dynamics (poster), CIFAR Quantum Physics Winterschool & Discussion, Whistler, British Columbia, Canada, 03 Apr 2011 – 07 Apr 2011

23 Jul 2010, B. C. Sanders, L. Livadaru, P. Xue, Z. Shaterzadeh-Yazdi, G. A. DiLabio, J. Mutus, J. L. Pitters and R. A. Wolkow, *Dangling-bond charge qubit on a silicon surface* (invited), 10th International Conference on Quantum Communication, Measurement and Computation (QCMC2010), Brisbane, Australia, 19 Jul 2010 - 23 Jul 2010

12 Jul 2010, Z. Shaterzadeh-Yazdi, L. Livadaru, P. Xue, G. A. DiLabio, J. Mutus, J. L. Pitters, B. C. Sanders and R. A. Wolkow, *Dangling-Bond charge qubit* (contributed), Canadian Quantum Information Students' Conference (CQISC 2010), University of Calgary, Calgary, Alberta, 12 Jul 2010 - 16 Jul 2010

1 Jun 2010, Z. Shaterzadeh-Yazdi, L. Livadaru, P. Xue, G. A. DiLabio, J. Mutus, J. L. Pitters, B. C. Sanders and R. A. Wolkow, *Dangling-Bond charge qubit* (contributed), iCORE Quantum Information Science Mini-Conference, University of Calgary, 1 Jun 2010 - 1 Jun 2010

3 May 2010, Z. Shaterzadeh-Yazdi, L. Livadaru, P. Xue, G. A. DiLabio, J. Mutus, J. L. Pitters, B. C. Sanders and R. A. Wolkow, *Dangling-bond charge qubit* (invited), 2nd Nanoelectronics Meeting, QuantumWorks 2010, Université de Sherbrooke, Québec, 3 May 2010 - 3 May 2010

16 Mar 2010, Z. Shaterzadeh-Yazdi and B. C. Sanders, *Extended Hubbard model simulations of charge-qubit circuits: from idealism to realism*, L26.00012, Bulletin of the American Physical Society **55**(2):, APS March Meeting 2010 (APS March 2010), Portland, Oregon, 15 Mar 2010 - 19 Mar 2010. (<http://meetings.aps.org/link/BAPS.2010.MAR.L26.12>)

21 Aug 2009, Z. Shaterzadeh-Yazdi, P. Xue, B. C. Sanders, L. Livadaru, J. L. Pitters, G. A. DiLabio and R. A. Wolkow, *Quantum computing with dangling bond pairs on a silicon surface* (poster), 2009 iCORE Banff Informatics Summit (iCORE Summit 2009), Banff, Canada, 20 Aug 2009 - 22 Aug 2009

19 Aug 2009, Z. Shaterzadeh-Yazdi, *Quantum computing with dangling bond pairs on a Si surface* (seminar), University of Calgary, Institute for Quantum Information Science

19 Jul 2009, B. C. Sanders, P. Xue, Z. Shaterzadeh-Yazdi, J. L. Pitters, G. A. DiLabio, L. Livadaru and R. A. Wolkow, *Quantum computing with dangling bonds on a silicon surface* (invited), International Conference on Quantum Foundation and Technology: Frontier and Future (ICQFT '2009), Shanghai, P. R. China, 17 Jul 2009 - 22 Jul 2009

25 Jun 2009, Z. Shaterzadeh-Yazdi, P. Xue, B. C. Sanders, L. Livadaru, J. L. Pitters, G. A. DiLabio and R. A. Wolkow, *Quantum computing with dangling bond pairs on a Si surface* (contributed), Alberta Quantum and Nano-Optics 2009 Annual Meeting, University of Calgary, Canada, 24 Jun 2009 - 27 Jun 2009

28 May 2009, Z. Shaterzadeh-Yazdi, P. Xue, B. C. Sanders, L. Livadaru, J. L. Pitters, G. A. DiLabio and R. A. Wolkow, *Quantum Computing with Dangling Bond pairs on a Silicon Surface* (contributed), iCORE Quantum Information Science @ University of Calgary Mini-Conference, University of Calgary, 28 May 2009 - 28 May 2009

18 Sep 2008, Z. Shaterzadeh-Yazdi, P. Xue, B. C. Sanders, J. L. Pitters, G. A. DiLabio, L. Livadaru and R. A. Wolkow, *Quantum computing with dangling bonds on a silicon surface* (poster), International Iran Summer School on Quantum Information (IISSQI 2008), Kish, Iran, 13 Sep 2008 - 27 Sep 2008

9 Sep 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *Multi-partite squeezed states and  $SU(1,1)$  symmetry* (contributed), International Iran Conference on Quantum Information (IICQI 2007), Kish Island, Iran, 7 Sep 2007 - 10 Sep 2007

4 Sep 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *Multipartite squeezed states as  $SU(1,1)$  coherent states* (poster), Photons, Atoms and Qubits Conference 2007 (PAQ07), London, United Kingdom, 2 Sep 2007 - 5 Sep 2007

19 Jun 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *A new approach to mutlipartite squeezed states* (contributed), TU-P1-5, Physics in Canada 63(2):p. 102, CAP Congress 2007 (CAPC 2007), Saskatoon, Canada, 17 Jun 2007 - 20 Jun 2007

8 Jun 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *Multipartite squeezed states as  $SU(1, 1)$  coherent states* (contributed), Q6.00008 , The 38th Meeting Division of Atomic, Molecular, and Optical Physics Meeting of the Division of Atomic, Molecular and Optical Physics (DAMOP 2007), Calgary, Canada, 5 Jun 2007 - 9 Jun 2007

23 May 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *Multi-partite entangled Gaussian states and su (1,1) symmetry (invited)*, Noise and Fluctuations in Photonics, Quantum Optics, and Communications (SPIE 2007), La Pietra Conference Center, Florence, Italy, 20 May 2007 - 24 May 2007

8 Mar 2007, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *The su (1,1) symmetry of tripartite entangled Gaussian states*, W33.00003, 2007 APS March Meeting (APS 2007), Denver, United States of America, 5 Mar 2007 - 9 Mar 2007.  
(<http://meetings.aps.org/link/BAPS.2007.MAR.W33.3>)

14 Aug 2006, Z. Shaterzadeh-Yazdi, *Tripartite continuous variable entangled states*, The Third Annual Canadian Quantum Information Students' Conference (CQISC 2006), University of Calgary, Canada, 14 Aug 2006 - 18 Aug 2006

25 Jul 2006, Z. Shaterzadeh-Yazdi, P. S. Turner and B. C. Sanders, *A three boson su(1,1) realisation for linear optical quantum information* (seminar), University of Toronto, Department of Physics

## **EMPLOYMENT:**

Graduate Teaching Assistantship, Department of Physics and Astronomy, University of Calgary, Alberta, Canada including:

- Implementation of Quantum Information – Phys677 Winter-2012  
(I had a partial teaching for the duration of one week, and covered semiconductor quantum computation. Furthermore, I was in charge of preparing assignments and final exam question about this part of the course)
- Mechanics – Phys221/211 Fall-2011
- Electricity and Magnetism – Phys259 Winter-2011
- Acoustics, Optics, Radiation Thermodynamic – Phys369 Fall-2010
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2010
- Acoustics, Optics, Radiation Thermodynamic – Phys369 Fall-2009
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2009
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2008

- Mechanics – Phys221 Fall-2007
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2007
- Mechanics – Phys221 Fall-2006
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2006
- Optics & Electromagnetism – Phys323 Fall-2005
- Intro. Electromagnetic and Thermodynamic – Phys223 Winter-2005

Graduate Research Assistantship, Department of Physics and Astronomy, University of Calgary, Alberta, Canada including:

- Characterization of dangling-bond charge-qubit dynamics on Si surfaces  
May 2007 – Present
- Characterization of multipartite squeezed states by  $SU(1,1)$  symmetry  
Spring & Summer 2007
- Continuous variable quantum state sharing  
Spring & Summer 2006
- Intracavity laser absorption spectroscopy  
& nonlinearity problem in generators  
Spring & Summer 2005

Tutorial (private) for four years in the fields of Physics, and Mathematics, Iran

### **ACADEMIC MEMBERSHIP:**

- A member of Canadian Association of Physicists Feb 2012- 2013
- A member of American Physical Society April 2007- 2009
- An active member of Science Association of Ferdowsi University of Mashhad,  
Department of Physics, Mashhad, Iran 1999-2002
- A member of Iranian Physics Association 1999-2003

### **OTHER ACADEMIC TRAININGS:**

- University Teaching Certificate Program (UTC), the Learning Commons, University of Calgary, Alberta, Canada September 2006 - Present
- Instructional Skills Workshop (ISW), the Learning Commons, University of Calgary, Alberta, Canada May 15 - June 01, 2006

### **SCHOLARSHIPS AND AWARDS:**

- AITF graduate student poster competition award August - 2011
- Queen Elizabeth II award June - 2010
- A tuition fee waiver scholarship May - 2008
- A tuition fee waiver scholarship May - 2007
- A Faculty of Graduate Studies Award February - 2007
- One full Graduate Research Scholarship(GRS) February - 2006

- Graduate Assistantship Teaching awards (GAT) September 2005 - Present
- Graduate Assistantship Trust (GATr) May-August 2005/2006
- An awarded scholarship as waived international student differential tuition fee-January 2005 - Present

## **VOLUNTEER ACVTIVITIES:**

<b>Volunteer Contribution</b>	<b>Description</b>
Journal Referee since 2008	Referee for “Journal of Physics A: Mathematical and General”, 2008-present
Journal Referee since 2009	Referee for “Canadian Journal of Physics”, 2009-present
GSA (Graduate Studies Association) awards committee member - Apr. 2011	Evaluator for teaching and supervisory award
GSA awards committee member - Feb. 2011	Evaluator for individual/family/differential fees bursaries
Active member of Thaqaalayn Muslim Association (TMA) at the U of C since 2010	Actively involved in constitution of TMA association, and also one of the main organizers of Arbaeen Events 2010 and 2011, and the invited speaker for Arbaeen Event 2012
Student-Judge at GSA-Conference (held by Graduate Student Association of University of Calgary) - 2010	Judged students’ presentation
Student-Judge at GSA-Conference-2009	Judged students’ presentation
Organizational volunteer at GSA-Conference - 2009	Involved in helping students’ registration
Organizing committee member for IICQI2010 (International Iran Conference on Quantum Information 2010)	Administrating role, such as inviting the speakers, being in contact with committee members, keeping the webmaster as well as the program committee members updated about the decisions and changes made in program
Organizing committee member for IISSQI2008 (International Iran Summer School on Quantum Information 2008)	Webmaster, and communication facilitator between international students and the invited speakers

## **LANGUAGES:**

**Persian:** Advance (Motherhood language)

**English:** Excellent (fluent)

**French:** Intermediate

**Arabic:** Intermediate

## **OTHER SKILLS:**

- Skilled in **Microsoft Office** (PowerPoint, Word, Excel).
- Skilled in using **Latex**, i.e. a document preparation system for the TEX typesetting program.
- Experienced and work comfortably with **Mathematica** and **Linux operating system**.
- Familiar with **Matlab**, and (a little bit) **C++**.

## **TRIPS:**

I have visited the following countries:

Andorra, Brazil, Belgium, Canada, France, Germany, Greece, Italy, Luxemburg, Netherlands, Portugal, Saudi Arabia, Spain, Swiss, Syria, Turkey, United Kingdom, United States of America