

Personal Info

Dr. Alexander Ako Khajetoorians
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Germany
email: akhajeto@physnet.uni-hamburg.de
Birthdate: 18.12.1980 in Newport Beach, California, USA
Citizenship: USA (Permanent German Resident)



Employment History

- (08.2013): Emmy Noether group leader
- (2008-2013) Subgroup Leader: Group of Prof. Roland Wiesendanger; Institute of Applied Physics, University of Hamburg; Post-doctoral Researcher from 2008-2010
 - Funded by "FURORE" ERC Advanced Grant, Participant in Sonderforschungsbereich (SFB) 508 & 668 projects, and Excellence Initiative of the Free and Hanseatic City of Hamburg
- (2008) Post-doctoral Researcher: Group of Prof. Chih-Kang Shih; Department of Physics, University of Texas, Austin
- (2006-2008) NSF-IGERT Trainee: Group of Prof. Chih-Kang Shih; Department of Physics, University of Texas, Austin
 - Participated in the Center for Nano and Molecular Science and Technology Graduate Portfolio program, helped initiate the IGERT program in "Atomic and Molecular Imaging of Interfaces," participated in NSF-FRG collaboration between UT Austin, UT Knoxville, and Oak Ridge National Laboratory
- (2004-2006) Research Assistant: Group of Prof. Chih-Kang Shih; Department of Physics, University of Texas, Austin
 - Participated in collaborations with International SEMATECH and Freescale Semiconductors (Tempe, AZ) to extend nano-scale semiconductor metrology to address new age devices
- (2002-2004) Teaching Assistant: Department of Physics, University of Texas, Austin
- (2000-2002) Research Student: Group of Prof. Mike Crommie; Department of Physics, University of California, Berkeley

Graduate Education

- (2002-2008) Ph. D. Physics: "Alkali adsorbates on quantum thin metal films," Department of Physics, University of Texas at Austin; Supervisor: Prof. Chih-Kang Shih
- (2008) Graduate Portfolio Certificate: Center for Nano and Molecular Science and Technology (CNM)

Undergraduate Education

- (1998-2002) Bachelors of Arts in Physics: University of California, Berkeley
- (1998-2002) Bachelors of Arts in Applied Mathematics: University of California, Berkeley

High School

- (1998) High School Diploma: Laguna Beach High School

External Projects

- SPP1666 "Topological Insulators" (July 2013)
- SFB668-B4: project leader in third funding period (starting 2014)
- **Emmy Noether DFG group (August 2013); Budget 1.8 million €**

Supervised Students

- PhD Students: 5
- Master Students: 1
- Bachelor Students: 2

Teaching Experience

- (2002-2003) Laboratory physics for medical students I; University of Texas, Austin
- (2003): Laboratory physics for medical students II; University of Texas, Austin
- (2002-2003): Department tutor for physics students; University of Texas, Austin
- (2006-2008): Graduate school curriculum design (NSF-IGERT) and student representative; University of Texas, Austin

Awards & Recognitions

- **(2012) DPG: Gerhard Ertl Prize**
- (2008) 1st Place/Best Spring Dissertation Presentation: CNM Portfolio Program
- (2006-2008) National Science Foundation "IGERT" Traineeship (fellowship)
- (2004) CNM Nano-night Best Poster Presentation Award
- (2002) Dean's Scholar Award: College of Natural Sciences

Full Publication Record (**Highlights**); *Corresponding Author

1. *A. A. Khajetoorians, T.Schlenk, B. Schweflinghaus, M. dos Santos Dias, M. Steinbrecher, M. Bouhassoune, S. Lounis, J. Wiebe, R. Wiesendanger, "Spin excitations of individual Fe atoms on Pt(111): impact of the site-dependent giant substrate polarization," *Phys. Rev. Lett.*, **111**, 157204 (2013)
2. *T. Schlenk, M. Bianchi, M. Koleini, A. Eich, O. Pietzsch, T. O. Wehling, T. Frauenheim, A. Balatsky, J.-L. Mi, B. B. Iversen, J. Wiebe, A. A. Khajetoorians, Ph. Hofmann, R. Wiesendanger, "Controllable magnetic doping of the surface state of a topological insulator," *Phys. Rev. Lett.*, **110**, 126804 (2013)
3. *A.A. Khajetoorians, B. Baxevanis, Chr. Hübner, T. Schlenk, S. Krause, T.O. Wehling, S. Lounis, A. Lichtenstein, D. Pfannkuche, J. Wiebe, R. Wiesendanger, "Current-driven spin dynamics of artificially constructed quantum magnets," *Science*, **339**, 55 (2013)
4. M. Bianchi, R. Hatch, Z. Li, P. Hofmann, F. Song, J.-L. Mi, B. Iversen, Z. Abd El-Fattah, P. Löptien, L. Zhou, A.A. Khajetoorians, J. Wiebe, R. Wiesendanger, J. Wells, "Robust Surface Doping of Bi₂Se₃ by Rb Intercalation" *ACS Nano*, **6**, 7009, (2012)
5. A.A. Khajetoorians, J. Wiebe, B. Chilian, S. Lounis, S. Blügel, R. Wiesendanger, "Atom-by-atom engineering and magnetometry of tailored nanomagnets," *Nature Phys.*, **8**, 497, (2012)

6. *J. Honolka, A.A. Khajetoorians, V. Sessi, T.O. Wehling, S. Stepanow, J.-L. Mi, B.B. Iversen, T. Schlenk, J. Wiebe, N.B. Brookes, A.I. Lichtenstein, Ph. Hofmann, K. Kern, R. Wiesendanger, "In-Plane Magnetic Anisotropy of Fe atoms on Bi₂Se₃(111)," *Phys. Rev. Lett*, **108**, 256811 (2012)
7. S.V. Eremeev, G. Landolt, T.V. Menshchikova, B. Slomski, Y.M. Koroteev, Z.S. Aliev, M.B. Babanly, J. Henk, A. Ernst, L. Patthey, A. Eich, A.A. Khajetoorians, J. Hagemeyer, O. Pietzsch, J. Wiebe, R. Wiesendanger, P.M. Echenique, S.S. Tsirkin, I.R. Amiraslanov, J.H. Dil, E.V. Chulkov, "Atom-specific spin mapping and buried topological states in a homological series of topological insulators," *Nature Comm.*, **3**, 1638 (2012)
8. B. Chilian, A.A. Khajetoorians, S. Lounis, A.T. Costa, D.L. Mills, J. Wiebe, R. Wiesendanger, "Anomalously large g -factor of a single Fe atom adsorbed on a metal substrate," *Phys. Rev. B*, **84**, 212401 (2011)
9. J. Kim, A.A. Khajetoorians, W. Zhu, Z. Zhang, C.-K. Shih, "Atomic scale control of catalytic process in oxidation of Pb thin films," *Surface Science*, **606**, 450 (2012)
10. A.A. Khajetoorians, B. Chilian, J. Wiebe, R. Wiesendanger, "Realizing All-Spin Based Logic Operations Atom by Atom," *Science*, **332**, 1062 (2011)
11. B. Chilian, A.A. Khajetoorians, J. Wiebe, R. Wiesendanger, "Experimental variation and theoretical analysis of the inelastic contribution to atomic spin excitation spectroscopy," *Phys. Rev. B*, **83**, 195431 (2011)
12. J. Wiebe, A.A. Khajetoorians, R. Wiesendanger, "Logik aus atomaren Spins," *Physik in unserer Zeit*, **42**, 162 (2011);
13. A.A. Khajetoorians, S. Lounis, B. Chilian, A.T. Costa, L. Zhou, D.L. Mills, J. Wiebe, R. Wiesendanger, "Itinerant nature of atom-magnetization excitation by tunneling electrons," *Phys. Rev. Lett.*, **106**, 037205 (2011)
14. A.A. Khajetoorians, A. Kubetzka, "STM hits the fast lane," *Nature Nanotechnology*, **5**, 830 (2010)
15. A.A. Khajetoorians, B. Chilian, J. Wiebe, S. Schuwalow, F. Lechermann, R. Wiesendanger, "Detecting excitation and magnetization of individual dopants in a semiconductor," *Nature*, **467**, 1084 (2010)
16. A.A. Khajetoorians, G.A. Fiete, C.-K. Shih, "Visualizing quantum well state perturbations of metallic thin films near stacking fault defects," *Phys. Rev. B*, **81**, 041413 (2010)
17. A.A. Khajetoorians, W. Zhu, J. Kim, S.Y. Qin, H. Eisele, Z.Y. Zhang, C.-K. Shih, "Adsorbate-induced restructuring of Pb mesas grown on vicinal Si(111) in the quantum regime," *Phys. Rev. B*, **80**, 245426 (2009)
18. A.A. Khajetoorians, J. Li, C.-K. Shih, X.-D. Wang, D. Garcia-Gutierrez, M. Jose-Yacamán, D. Pham, H. Celio, A. Diebold, "Dopant characterization of fin field-effect transistor structures using scanning capacitance microscopy," *J. Appl. Phys.*, **101**, 034505 (2007)
19. D.I. Garcia-Gutierrez, M. Jose-Yacamán, A.A. Khajetoorians, C.-K. Shih, X.-D. Wang, D. Pham, H. Celio, A. Diebold, "Study of two-dimensional B doping profile in Si fin field-effect transistor structures by high angle annular dark field in scanning transmission electron microscopy mode," *J. Vac. & Sci. Tech. B*, **24**, 730 (2006)
20. H.-K. Lyeo, A.A. Khajetoorians, L. Shi, K.P. Pipe, R.J. Ram, A. Shakouri, C.-K. Shih, "Profiling the thermoelectric power of semiconductor junctions with nanometer resolution," *Science*, **303**, 816 (2004)

Invited Conference/Symposium Contributions

1. Heraeus Seminar, Bad Honnef, "Interactions with the Nanoworld: Local Probes with High Time, Energy and Force Resolution" (2013)
2. ACSIN-12/ICSPM21, Tsukuba, Japan, (2013)

3. Heraeus Seminar, Bad Honnef, "Electron Transport through Atoms, Molecules and Nanowires: Advances in Experiment and Theory" (2013)
4. IVC-19, ICN+T, Paris, France, (2013)
5. Otto Stern Symposium, Hamburg, (2013)
6. DPG Spring Meeting, Regensburg, (2013)
7. MMM Conference, Chicago, USA, (2013)
8. Fabrication and Properties of Nanostructures, Alicante, Spain, (2012)
9. SPS'12 & SPSTM-4, Timmendorfer Strand, Germany, (2012)
10. DPG Spring Meeting, Berlin (2012)
11. "Spin-dynamics and Kondo effects in STM," Hamburg, (2011)
12. International Workshop on "Ultrafast Dynamics at the Atomic Scale," Hamburg (2011)
13. APS March Meeting, Dallas, USA (2011)
14. Workshop on Quantum Spintronics, Maratea, Italy (2010)
15. International Conference on the Physics of Semiconductors, Seoul, S. Korea, (2010)
16. European Symposium on Nanospintronics Hamburg, (2010)

Invited External Seminars

1. (2014) Innsbruck University, Host: Prof. Rainer Blatt
2. (2014) Münster University, Host: Dr. Daniel Wegner
3. (2013) Tokyo University, Host: Prof. Yasuo Yoshida
4. (2013) Max Planck Institute for Chemical Physics of Solids, Host: Dr. Steffen Wirth
5. (2013) Max Planck Institute for Solid State Research, Stuttgart, Host: Prof. Klaus Kern, Dr. Christian Ast
6. (2013) IPCMS, University of Strasbourg, Host: Dr. Mircea Rastei
7. (2013) Department of Physics, TU Delft, Host: Dr. Sander Otte
8. (2013) IMM, Radboud University, Nijmegen, Host: Prof. Theo Rasing
9. (2012) Department of Physics, Göttingen University, Host: Dr. Martin Wenderoth
10. (2012) Department of Physics, Bielefeld University, Host: Prof. Jürgen Schnack
11. (2012) Institute for Experimental and Applied Physics, Regensburg University, Host: Prof. Franz Gießibl
12. (2012) Department of Physics, Massachusetts Institute of Technology; Host: Prof. Young Lee
13. (2011) Niels Bohr Institute, University of Copenhagen; Host: Prof. Jens Paaske
14. (2011) IBM Almaden Research Center, Almaden, California; Host: Dr. Andreas Heinrich & Dr. Dan Rugar
15. (2010) University of California, Berkeley; Host: Prof. Mike Crommie
16. (2010) UAB Bellaterra, Barcelona; Host: Dr. Nicolás Lorente
17. (2010) University of California, Irvine; Hosts: Prof. Doug Mills/Prof. Wilson Ho
18. (2008) Universität Regensburg, Institut für Experimentelle und Angewandte Physik; Host: Prof. Jascha Repp
19. (2008) Christian-Albrechts-Universität, Institut für Experimentelle und Angewandte Physik, Kiel; Host: Prof. Richard Berndt
20. (2008) Universität Hamburg, Institut für Angewandte Physik; Host: Prof. Roland Wiesendanger
21. (2008) Paul Drude Institut, Berlin; Host: Dr. Stefan Fölsch
22. (2007) Freie Universität, Fachbereich Physik, Berlin; Host: Prof. Nacho Pascual

Non-invited Conference Contributions

1. ICN+T (2012) Paris: "Atom-by-atom engineering and magnetometry of tailored nanomagnets"

2. ICN+T (2012) Paris: ``Current driven spin dynamics of artificially constructed quantum magnets''
3. APS March Meeting (2012) Boston: ``Atom-by-atom engineering and magnetometry of tailored nanomagnets''
4. DPG Spring Meeting (2011) Dresden: ``Realizing spin-based logic atom by atom''
5. DPG Spring Meeting (2010) Regensburg: ``Observation of spin excitation by inelastic tunneling spectroscopy of Fe atoms on a semiconductor surface''
6. APS March Meeting (2010) Portland: ``Probing spin states of single atom quantum magnets embedded in a semiconductor''
7. APS March Meeting (2008) New Orleans: ``Tuning Surface Energy Landscapes of Quantum Metal Thin Films using Alkali Adsorbates''
8. DPG Spring Meeting (2008) Berlin: ``Tuning Surface Energy Landscapes of Quantum Metal Thin Films using Alkali Adsorbates''
9. AVS International Symposium (2007) Seattle: ``Tuning Surface Energy Landscapes of Quantum Metal Thin Films using Alkali Adsorbates''
10. APS March Meeting (2007) Denver: ``STM investigation of quantum size effect on adsorption and reactivity of different gases and alkali metals on thin Pb films''
11. APS March Meeting (2006) Baltimore: ``High Resolution 2D Dopant Profiling of FinFET Structures and Silicon-based Devices using Scanning Probe Microscopies''
12. PCSI Conference (2006) Cocoa Beach: ``Nano-Schottky junction characterization of semiconductors using nano-contact''
13. AVS International Symposium (2005) Boston: ``High Resolution 2D Dopant Profiling of FinFET Structures and Silicon-based Devices using Scanning Probe Microscopies''
14. APS March Meeting (2005) Los Angeles: ``High Resolution 2D Dopant Profiling of FinFET Structures and Silicon-based Devices using Scanning Probe Microscopies''
15. ULSI (2005) Richardson: ``2D Dopant profiling of FinFET devices using Scanning Capacitance Microscopy''
16. SPRING conference (2004) Richardson: ``Profiling the Thermoelectric Power with Nanometer Resolution using SThEM''
17. APS March Meeting (2004) Montreal: ``Characterization of Schottky Junctions of Nanometer Size''

Press

- (26.07.2013) Hamburger Abendblatt, "1,8 Millionen Euro für Hamburger Nachwuchsforscher"
- (05.01.2013) Hamburger Abendblatt, "Hamburger konstruieren kleinsten Datenspeicher der Welt"
- (30.04.2012) Article in *Pro-Physik*, "Lego mit atomaren Magneten"
- (05.04.2012) Hamburger Abendblatt, "Hamburger Physiker für Spintronik-Bauteil geehrt"
- (27.05.2011) Perspective Article in *Science*, "A Logical Use for Atoms"
- (10.05.2011) Hamburger Abendblatt, Hamburger wollen Computer-Chips 500-mal schneller machen
- (06.05.2011) Deutschlandfunk (Radio), "Rechnen mit Dominoeffekt"
- (06.05.2011) Article in *Pro-Physik*, "Das kleinste "Oder" der Welt"

Languages

- English (native)
- German (C1)
- Spanish (B2)