

Alexander M. Finkel'stein

Department of Physics at the Texas A&M University,
College Station, Texas, USA

Employment:

2008-present: Professor of Physics at the Texas A&M University (TAMU), USA.

1995-2010: Charles and David Wolfson Chair of Theoretical Physics, the Weizmann Institute of Science, Israel.

1992-2010: Professor of Physics at the Weizmann Institute of Science, Israel.

1972-1992: Research Fellow at the Landau Institute for Theoretical Physics, Russia.

Professional Degrees:

Doctor of Science Degree in Physics and Mathematics,

Landau Institute for Theoretical Physics, 1988.

Thesis: *Electron-Electron Interactions in Disordered and Low- Dimensional Conductors.*

Ph.D. in Physics and Mathematics,

Landau Institute for Theoretical Physics, 1973.

Thesis: *Decay of Metastable Crystals by Quantum Tunneling - Quantum Nucleation.*

M.Sc. with Honor in Physics,

Moscow Institute for Physics and Technology (MPhTI), 1969.

Thesis: *Vortex Lattices in Liquid Helium and Superconductors.*

Research Interests:

Disordered Conductors,

Low-Dimensional and Strongly Correlated Electron Systems,

Electron Systems near Quantum Critical Points,

Thermal and thermoelectric transport,

Fundamentals of Spintronic Devices.

Major Contributions:

- quantum tunneling in condensed systems;
- non-perturbative analysis of the electron-electron interactions in disordered conductors;
- scaling analysis of the metal - insulator transition;
- suppression of superconductivity in amorphous films and wires;
- transmutation of a nonmagnetic ion into a magnetic center;
- fundamentals of the Fermi-Liquid theory.

Teaching Activity at the TA&M University:

“PHYSICS 208: Electricity and Magnetism”, “PHYSICS 617: Solid State Physics”, “PHYS 689: Topics on the Condensed Matter Physics”, QUANTUM THEORY OF SOLIDS - PHYS 631.

Mentoring:

(a partial list of my students and postdocs)

Dr. Yuval Oreg, former graduate student, got PhD in 1997, then a postdoc at Harvard, currently Professor at the Weizmann Institute of Science;

Dr. S. H. Curnoe, former postdoc, now Associate Professor at MUN, Canada;

Dr. Eugene Kanzieper, former postdoc, currently Associate Professor at Holon Academic Institute of Technology;

Dr. Alex Punnoose, Associate Professor at City College of CUNY;

Dr. Maxim Khodas, former graduate student, got PhD in 2005, then the Goldhaber Postdoctoral Fellow at the Brookhaven National Laboratory; Associate Professor at the Jerusalem University;

Dr. Georg Schwiete, former postdoc, currently Research Associate at Mainz;

Dr. Karen Michaeli, former graduate student, got PhD in 2010, then a Pappalardo Postdoctoral Fellow at MIT, now Assistant Professor at the Weizmann Institute of Science;

Konstantin Tikhonov, PhD student at TA&MU;

Wei Zhao, PhD student at TA&MU.

Visiting Positions:

Nov 2013-May 2014: A. von Humboldt Award, Karlsruhe Institute of Technology, Germany.

Oct –Dec 2005: Visiting Scientist at the Argonne National Laboratory, IL, USA.

Oct –Nov 2003: Visiting Scientist at the Argonne National Laboratory, IL, USA.

June 2003: Visiting Researcher at the Bell Laboratories, Lucent, NJ, USA.

Apr-May 2003: Visiting Researcher at the Rutgers University, NJ, USA.

Jan-Mar 2003: Visiting Physicist at the Brookhaven National Laboratory, NY, USA.

Oct 1998-Feb 1999: Visiting Professor at the University of Wisconsin, Madison, USA.

Feb-Mar 1996: Tokyo University, JSPS Fellow.

July-Aug 1995: Cambridge-Weizmann Fellow at the Cavendish Laboratory, UK.

Jan-Feb 1994: Visiting Researcher at the Rutgers University.

Nov 1991-Apr 1992: Visiting Professor at the Weizmann Institute of Science, Rehovot, Israel.

Apr 1990-Aug 1990: Visiting Researcher at the Institute for Scientific Interchange, Torino, Italy.

Invited Reviews:

A review chapter “Disordered Electron Liquid with Interactions” in the book “50 Years of Anderson Localization” ed. by Elihu Abrahams, World Scientific 2010. reprinted in IJMPB; Journal reference: International Journal of Modern Physics B 24, 1855-1894 (2010)

The original studies on disordered conductors were reviewed in *“Electron Liquid in Disordered Conductors”*, Soviet Scientific Reviews/ Section A, Physics Reviews, Vol. **14**, part 2, 1990.

Invited review on the *“Suppression of superconductivity in homogenously disordered systems”*, Physica B **197**, 636-648 (1994).

Synergetic Activities:

Co-organizer of the International Winter School and Workshop on “*Spin physics and topological effects in cold atoms, condensed matter, and beyond*” at the Texas A&M University, 2011.

Co-organizer of the Research Workshop: “*Random Matrices Integrability: from theory to applications*” 2009.

Co-organizer of the Condensed Matter Physics Seminar at the Texas A&M University (since 2008).

Chair of the “*Thursday Seminars*” on the Condensed Matter Physics at the Weizmann Institute, since 1993 till 2007.

Co-organizer of the Arkady Aronov Memorial Symposium, 1995.

Chairman of the International Winter School on “*Highly Correlated Electron Systems*” 1997.

Recent Research Grants:

TA&MU – Weizmann Institute Research Grant, 2012-2014;

NSF grant, 2010-2014 “Thermoelectric and thermal transport in disordered and strongly correlated electron systems”;

Norman Hackerman Advanced Research Program (NHARP), 2010-2012;

United States-Israel Binational Science Foundation (BSF), 09/2007-08/2010;

German-Israel Foundation (GIF), 01/2007-12/2009).

Awards:

1993: The Barecha Fund Award (to most prominent scientists immigrated to Israel from the former USSR).

1995: The Charles and David Wolfson Chair of Theoretical Physics.

1996: The Fellowship (Senior) of the Japanese Society of Promotion of Science.

2011: The Humboldt Senior Scientist Award.

2014: Fellow of the American Physical Society

Invited Talks and Lectures (partial list);

International Conference: SUPERSTRIPES-2014, July 2014, Erice.

Focus workshop: “Recent Progress and Perspectives in Scaling, Multifractality, Interactions, and Topological Effects Near Anderson Transitions” March 2014, Max-Planck Institute, Dresden.

International Conference on “Disorder and correlations in quantum systems” 2013, Rome.

International workshop “Mathematics and Physics of Disordered Systems (Follow-up Meeting),” Isaac Newton Institute for Mathematical Sciences, September 2012, Cambridge.

Advanced Research Workshop «Meso-2012»: “Non-equilibrium and coherent phenomena at nanoscale,” June 2012, Chernogolovka, Russia.

Summer School on “Nanophysics and Nanoelectronics” June 2012, Chernogolovka, Russia.

International Workshop “Electronic Correlations and Disorder in Quantum Matter,” April 2012, Karlsruhe, Germany.

International Conference on “Strongly Correlated and Disordered Systems,” Indian Institute of Science (IISc.), December 2011, Bangalore, India.

International Conference “APCTP Conference on Localization 2011” POSCO International Center, POSTECH, August 2011, Pohang, South Korea.

Symposium: “50 years of the Gor’kov Equation” National High Magnetic Laboratory, December 2010, Tallahassee, Florida, USA.

MRSEC workshop: “TRANSPORT IN NANOENGINEERED MATERIALS”, September 2010, Chicago, USA.

Advanced Workshop “Anderson Localization, Nonlinearity and Turbulence: a Cross-Fertilization,” August 2010 (ICTP, Trieste) Italy.

Summer School on “Actual Problems in Condensed Matter Physics” Russia, July 2010.

International Workshop on “Fundamentals of electronic nanosystems” Nano-Piter-2010; June – July 2010, St. Petersburg, Russia.

International Workshop on “Quantum Transport in Electronic Nanosystems” in memory of Albert Schmid and Arkady Aronov September, 2009, Karlsruhe, Germany.

International Workshop on “Low-D Quantum Condensed Matter” Amsterdam University, Amsterdam, July 2009.

Advance Research Workshop “Meso-09” Chernogolovka, Russia, June 2009.

International Conference on “Perspective of the Mesoscopic Physics” Rehovot, Israel, May 2009.

Landau Memorial Conference (Landau-100) “Advances in Theoretical Physics” Chernogolovka, Russia, 2008.

International Workshop “Conductor-Insulator Quantum Phase Transitions”, Columbus, Ohio, USA, January 2008.

International Workshop “Disorder in Condensed Matter and Cold Atoms” Lorentz Center, Leiden, September 2007.

Summer School on “New Directions in Condensed Matter Physics” Chernogolovka, Russia, 2007.

International Conference on “Coherence and Decoherence” Universita' di Roma "La Sapienza" Rome, July 2007.

International Workshop on “Low-D Quantum Condensed Matter” Amsterdam University, Amsterdam, July 2007.

A. I. Larkin Memorial Conference, Chernogolovka, Russia, June 2007.

International Conference on “Fluctuations & Phase Transitions in Superconductors” Nazareth, Israel, June 2007.

Symposium on Statistical Physics, University of Texas A&M, College Station, USA, January 2007.

International Argonne Fall Workshop on Nanophysics VI: *Nanoscale Superconductivity and Magnetism* Argonne, USA, 2006.

International Workshop Meso06: *Mesoscopic and strongly correlated electron systems – 4; Nanoscale superconductivity and magnetism* Chernogolovka, Russia, 2006.

International Workshop: *Quantum Coherence, Noise and Decoherence in Nanostructures* (decons 06) Dresden, 2006.

International Conference “*Frontiers of Condensed Matter Theory*” Theoretical Physics Institute, University of Minnesota, May 2006.

International Argonne Fall Workshops on Nanophysics V, Argonne, USA, 2005.

NATO Advanced Research Workshop on “*Concepts in Electron Correlation*” Hvar, Croatia, 2005.

International Conference on “*Physical Phenomena at High Magnetic Fields-V*” PPHMF-V, Tallahassee, USA, 2005.

International Workshop “*Low-D Quantum Condensed Matter 2005*” Amsterdam, 2005.

International Conference on “*Fundamentals of Electronic NanoSystems*” St. Petersburg, Russia, 2005.

International Conference on Theoretical Physics (TD-70), Moscow, Russia, 2005.

International Workshops on “*Electron Properties of Nanoscale Systems*” Argonne, USA, 2004 and 2003.

International Workshop on “*Field Theory Methods in Correlated Nanoscale Systems*” Upton, New York, USA, 2003.

International Workshop on “*Progress in Condensed Matter Theory*” Dresden, 2002.

NATO Advanced Research Workshop on “*Concepts in Electron Correlation*” Hvar, Croatia, 2002.

Summer School on “*New Directions in Mesoscopics (towards Nanoscience)*” Erice, Italy, 2002.

Patent: *Device and method for manipulating direction of current carriers.*

Patent No.: US 7,820,998 B2. Date of Patent: Oct. 26, 2010.

PCT Publication No.: WO 2005/065037; published on July 21, 2005.