

CURRICULUM VITAE

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PERSONAL INFORMATION

Birthdate: February 24, 1959.
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EDUCATION

Ph.D. Physics, Moscow State University, Moscow, USSR
Advisor: Prof. M.I. Kaganov
Degree conferred: April, 1985.

M.Sc Physics, Moscow State University, Moscow, USSR
Degree conferred: January, 1982.

RESEARCH EXPERIENCE

7/00 to present

Professor: Department of Physics, University of Wisconsin-Madison, Madison WI

Quantum-critical superconductivity.

Theory of the pseudogap in the cuprates.

Theory of the neutron resonance in the cuprates.

Transport properties of cuprate superconductors.

Fluctuation effects in the double-exchange model for manganites.

Singular corrections to the Fermi liquid theory.

7/97 to present

Associate Professor: Department of Physics, University of Wisconsin-Madison, Madison WI

Theory of the normal state in cuprates.

Study of the superconducting and pseudogap behavior in underdoped cuprates.

A global phase diagram of cuprates

Raman scattering in the superconducting and pseudogap phases.

Quantum critical phenomena in cuprates

The relation between photoemission, Raman and neutron data in cuprates.

Study of a tunneling in cuprates.

Optical properties of cuprates.

9/93 to 7/97

Assistant Professor: Department of Physics, University of Wisconsin-Madison, Madison WI

Study of the Spin-Echo decay rate in La_2CuO_4 .

Theory of magnetic fluctuations in nearly-critical frustrated antiferromagnets.

Analysis of the magnetic phases of the Hubbard model away from half-filling.

Study of Raman scattering in the insulating phase of high- T_c materials.

Scaling in nearly antiferromagnetic Fermi liquids.

Binding of spinons in CP^{N-1} models of quantum antiferromagnets.

Spin fluctuations and Raman scattering in two-layer systems

Fermi Surface evolution with doping in Mott-Hubbard systems.

Thermal crossovers in underdoped cuprates

Possible violation of the Luttinger theorem in strongly correlated electron systems.

Study of the shadow bands in optimally doped cuprates
Study of the leading edge gap in underdoped cuprates

9/92 to 8/93

Research Associate: Department of Physics, Yale University, New Haven, CT

Study of the low-temperature properties of two-dimensional antiferromagnets by means of $1/N$ expansion.

Analysis of quantum tunneling in kagome antiferromagnets.

Theory of a superfluid transition in surface 3He .

9/90 to 8/92

Research Associate: Department of Physics, University of Illinois at Urbana-Champaign, 1110 W. Green Street, Urbana, IL, USA.

Study of the Kohn-Luttinger effect in 2D Fermi systems with repulsive interactions.

Investigation of the "order from disorder" phenomena in kagome antiferromagnets.

Study of the magnetic instabilities in the 2D Hubbard model at low doping.

Derivation of Hydrodynamics for two-dimensional Heisenberg magnets and calculation of the magnetic contribution to the spin-lattice relaxation rate.

Theory of d-wave pairing in the 2D Hubbard model at low and moderate fillings.

Investigation of the possibility for pairing in cuprate superconductors due to the exchange of incommensurate spin fluctuations.

Theory of the p-wave pairing in a polarized Fermi gas with repulsion.

Analytical investigation of the chiral, nematic and dimer states in one-dimensional $S=1/2$ frustrated Heisenberg magnets.

Renormalization Group study of a two-step ordering transition in twisted magnets.

Investigation of the role of quantum fluctuations in 2D frustrated antiferromagnets.

Analytical investigation of the phase diagram of frustrated Heisenberg antiferromagnets with cyclic exchange interaction.

Study of the stability of the dimerized phase in $S=1/2$ frustrated quantum antiferromagnets by means of bosonization approach referenced to the dimerized state.

Investigation of the excitations in one-dimensional spin $S=1$ Heisenberg antiferromagnets with $S=1/2$ impurities.

1/90 to 3/90

Visiting Scientist: Department of Physics, University of Florence, Florence, Italy
Analytical investigation of the spontaneous dimerization phenomenon in quantum spin chains and the Renormalization Group study of the critical theory at the boundaries of the dimerized phases.

1/88 to 9/90

Senior Research Scientist: Theoretical Department, P.L. Kapitza Institute for Physical Problems, Academy of Sciences of the USSR, 117334, ul. Kosygina 2, Moscow, USSR
Theory of quantum ferrimagnets
Theory of spin reorientation and ESR spectra in triangular antiferromagnets, which was confirmed by the experiments on $CsNiCl_3$ and $CsMnBr_3$.
Theory of a superfluid transition in a weakly nonideal Fermi-gas with repulsive interactions.
Investigation of pairing instabilities in dense electron systems.
Theory of magnetic fluctuations in spin nematics.
Investigation of the "order from disorder" phenomenon in quantum triangular antiferromagnets and the explanation of the measured plateau on the magnetization curve in C_6Eu .
Study of the ESR resonance and noncollinear spin ordering in quasi-2D ferromagnet $(CH_3NH_3)_2CuCl_4$.
Derivation of the bosonization procedure for $S=1/2$ one-dimensional antiferromagnet which accounts for both transverse and longitudinal fluctuations of the order parameter.

4/85 to 1/88

Research Scientist: Theoretical Department, P.L. Kapitza Institute for Physical Problems, Academy of Sciences of the USSR, 117334, ul. Kosygina 2, Moscow, USSR.
Two-loop Renormalization Group theory for the coupling constant in one-dimensional antiferromagnets and the derivation of the topological θ term in the long-wavelength action which is responsible for the difference between integer and half-integer spins.
Renormalization group study of the interactions between low-energy magnetic fluctuations in 2D Heisenberg magnets.
Theory of low-temperature properties of the Heisenberg and XY-like magnets with arbitrary spin.
Theory of the two-magnon bound states spectrum in generalized ferromagnetic chains.

4/80 to 4/85

Graduate Student: Department of Physics, Moscow State University and P.L. Kapitza Institute for Physical Problems.

Theory of surface magnetic transitions in semi-bounded samples and plates.

Renormalization Group Study of the quantum phase transitions in spin systems with a two-component order parameter.

Theory of electromagnetic wave emission in the parametric excitations of magnons in antiferromagnets and the explanation of the experimental data for $FeBO_3$.

TEACHING EXPERIENCE

9/93 to present

Professor: University of Madison-Wisconsin, Madison WI.

Statistical Physics, Advanced Solid State Physics, Many body problems in Solid State physics, Classical Electrodynamics, Mechanics.

9/86-5/89

Lecturer in Physics: Moscow State University, Moscow, USSR.

Quantum Mechanics

Solid State Theory

Phase Transitions and Critical Phenomena

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCS

Denis I. Golosov, M.Sc. from Moscow State University, Moscow, USSR.

Degree conferred 1/89

Published 3 papers with me

Svetlana I. Abarzhi, M.Sc. from Moscow

Physical Technical Institute

Degree conferred 2/90

Published 2 papers with me

Dirk Morr, UW- Madison (student)
Thesis title: Magnetic and electronic properties of underdoped cuprates
Degree conferred, 6/97
Published 10 papers with me. Currently on faculty in UIC.

Karen Musaelian, UW-Madison (postdoc, 1994-1996)
Published 5 research papers with me.
Moved to the Wall Street.

Nic Shannon, UW-Madison (postdoc with me and Prof. Joynt, 1997-1999)
Wrote 2 research papers with me. Currently a postdoc at Dresden.

Artem Abanov, UW-Madison (current 1998-2001)
Published 10 papers with me. Currently Oppenheimer fellow at LANL.

Alexandr Donkov, UW-Madison (current student)
Evelina Tsoncheva, UW-Madison (current student)
Pavle Juranic, UW-Madison (current student)

GRANTS

1. Collaborative NATO grant, Jan. 1996 - Dec. 1998.
2. NSF individual research grant DMR 9629839, Sept. 1996 - Aug. 2000.
3. NSF individual research grant DMR 9979749, Nov. 1999 - Oct. 2003. 3. NSF MRSEC research grant, Sept. 1996 - Sept. 2000.
4. Collaborative BSF grant, Jan. 2001- Dec. 2003.
5. Vilas associate grant, July 2002-July 2004.

AWARDS

1. Sloan Fellowship, Sept. 1995 - Sept. 1997.
2. Distinguished M.Sc. dissertation award, Moscow State University, 1/1982.
3. First prize of the Kapitza Institute for Physical Problems for the best work in theory in 1988, 2/1989.
4. First prize of the Kapitza Institute for Physical Problems for the best work in theory in 1989, 2/1990.

INVITED CONFERENCE TALKS

1. All-Russian Conference on Magnetism, Tula, USSR, 1987; Kalinin, USSR, 1989.
2. All-Russian Conference of Low-Temperature Physics, Donetsk, USSR, 1990.
3. International Conference on Magnetic Properties of Solids, Dresden, Germany, 1987.
4. International Conference on the Selected Topics in Condensed Matter Theory, Budapest, Hungary, 1988.
5. French-Soviet Conference on Low Temperature Physics, Grenoble, France, 1989.
6. Nordita-Soviet Conference on Condensed Matter Theory, Moscow, 1989.
7. Soviet-German Conference on Condensed Matter Theory, Moscow, 1989.
8. Adriatico Research Conference on Strongly Correlated Electron Systems, Trieste, Italy, 1988; 1992; 1994; 1995; 1997; 1998; 1999
9. All-Italian Conference on Condensed Matter Physics, Trento, Italy, 1990.
10. International Conference on the Theory of Physical Phenomena at High Magnetic Fields, Tallahassee, Florida, 1991.
11. Aspen Winter Conference on Condensed Matter Physics, Aspen, CO (1994).
12. Summer Workshop on High Temperature Superconductivity, Kingston, Canada (1994).
13. Mid-West Solid State Theory Symposium, Columbia, MO (1994).
14. Symposium on '45 years of Many-body theory', Los Alamos, NM (1995).
15. March Meeting of the American Physical Society, St. Louis, (1996) (invited talk).
16. Aspen Summer Conference on spin fluctuations, Aspen, CO (1996).
17. International Conference on high- T_c superconductivity, Berlin, Germany (1996).
18. Mid-West Solid State Theory Symposium, Urbana, IL (1996).
19. Symposium on pseudogap in underdoped cuprates, Argonne, IL (1997).
20. Microsymposium on spin fluctuations in cuprates, Los Alamos, NM (1997).
21. Aspen Summer Conference on quantum phase transitions, Aspen, CO (1997).
22. International workshop on strongly correlated electron systems, Seoul, Korea (1997).
23. International conference on new mechanisms for high- T_c superconductivity, New Orleans, (1998).
24. March Meeting of the American Physical Society, Los Angeles, (1998) (invited talk)
25. International Conference on high-temperature superconductivity, Chernogolovka, Russia, (1998).
26. International conference on strongly correlated electron systems, Paris, France, (1998).
27. Aspen Summer Conference on superconductivity, Aspen, CO (1998).
28. International conference on novel transition metal compounds, Dresden, Germany (1998).
29. International Summer School on strongly correlated electron systems, Madrid,

Spain (1999).

30. International Conference on new theoretical methods for strongly correlated electron systems, Montreal Canada (1999).
31. International Conference on low-temperature physics (LT22), Helsinki, Finland (1999).
32. International Conference on Quantum Magnetism, Santa Barbara, CA (1999).
33. International Conference on strongly correlated electron systems, Oxford, England (2000).
34. Gordon Conference on Superconductivity, Ventura Ca (2000).
35. Workshop on strongly correlated electron systems, Gainesville, FL (2000).
36. Trieste conference on high temperature superconductivity, Trieste, Italy (2000).
37. Aspen Winter conference on superconductivity, Aspen, CO (2001).
38. "Kleinfest" research conference, Urbana, IL (2000).
39. International conference on novel superconductors, Chicago, IL (2001).
40. Trieste conference on low-dimensional fermionic systems, Trieste, Italy (2001).
41. International workshop on strongly correlated electron systems, Leiden, The Netherlands, (2001).
42. International conference on unconventional superconductors, Santa Fe, NM (2001).
43. International workshop on new emergent collective behavior, Los Alamos, NM (2001).
44. Trieste conference on novel materials, Trieste, Italy (2002).
45. International workshop on strange metals, Brasilia, Brazil (2002).
46. International workshop on 1-1-5 materials, Santa Fe, NM (2002).
47. International conference on the spectroscopy of novel superconductors, Brookhaven National Lab., NY (2002).
48. International conference on quantum critical phenomenon, Bled, Slovenia (2002).

Besides, I delivered a large number of invited talks at the Universities and Research Centers in the USA, Canada, Australia, Japan, Korea, England, France, Italy, Israel, Germany, Netherlands, Hungary, Bulgaria and Russia.

PUBLICATIONS

108 research papers and 9 review articles.