

NAME: Alexander M. Gabovich

DATE OF BIRTH: 1946, March 7

PLACE OF BIRTH: Kiev, Ukraine

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### **GRADUATE EDUCATION AND QUALIFICATION:**

Graduated from high school in Kiev in 1964. Graduated cum laude from the Physical Department of Kiev State University in 1969. Majored in theoretical physics, with emphasis on the nuclear physics. Master's thesis: " On quasielastic scattering of ultrarelativistic electrons by light nuclei with knocking out of nucleons", supervised by Prof. V.K.Tartakovskii.

### **POSTGRADUATE EDUCATION AND QUALIFICATION:**

Received the PhD in Physics and Mathematics from the Institute of Physics of the Ukrainian National Academy of Sciences in 1976. PhD thesis: "Superconductivity and magnetism in multicomponent systems", Supervisor Prof. E.A.Pashitskii.

Received the Doctor's degree in Physics and Mathematics from the Institute of Low Temperature Physics and Engineering of the Ukrainian National Academy of Sciences in 1990. Doctor's thesis: "Theory of superconductivity and normal state electron properties in systems with nonlocal dielectric response and low dimensionality".

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**Languages:** Ukrainian, Russian, English, Polish

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### **RESEARCH ACTIVITIES:**

On the research staff at the Institute of Physics of the Ukrainian National Academy of Sciences (NAS) since 1971.

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### **OFFICIAL POSITIONS:**

21 June 1991 - until now, Leading Research Associate of Crystal Physics Department

15 February 1982 - 21 June 1991, Senior Research Associate of Crystal Physics Department

26 May 1975 - 15 February 1982, Junior Research Associate of Crystal Physics Department

2 August 1971 - 26 May 1975, Engineer of Crystal Physics Department.

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**RESEARCH FIELD:**

Theoretical description of superconducting mechanisms.

Superconductivity criteria.

Theory of coexisting s-wave and d-wave superconductivity and charge- (or spin-) density waves.

Investigation of glass-like phenomena in superconducting granular systems.

Self-consistent theory of superconducting transitions in the presence of the inelastic electron scattering.

Theory of low-temperature superconducting properties in mesoscopically-nonhomogeneous compounds.

Nonstationary Josephson and quasiparticle tunnel currents between metals with charge- (or spin-) density waves.

Theory of Coulomb interaction in three-layer systems.

Dynamic and static image forces in three-layer systems.

Electron tunneling theory taking into account the non-adiabaticity of electrode response.

Theoretical investigation of image force contribution into interface tension for electrochemical systems.

Philosophy of science.

Structure of the scientific institutions in Ukraine.

Teaching of physics at secondary schools.

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**TUTORIAL EXPERIENCE:**

Professor of Physics at International Solomon University, Kiev (1993-1994).

Professor of Physics at the State Technical University (KPI), Kiev (2013-until now).

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**Grants:**

1. Soros Foundation (1992)
2. American Physical Society(1993)
3. INTAS-94-3862 "Transport properties of mesoscopic systems" (1994-1996)
4. NATO Expert visit grant (1997)
5. Kasa Mianowskiego (2001)
6. Kasa Mianowskiego (2003)
7. NATO-PST.CLG.979446 (2003-2005)
8. Grant of the Japan Society for the Promotion of Science (2003): FY2003 JSPS Invitation Fellowship  
Program for Research in Japan (Short-Term). Fellow's ID No. S-03204
9. Kasa Mianowskiego (2005)
10. Kasa Mianowskiego (2007)
11. Grant of the Japan Society for the Promotion of Science (2007): FF2/64 JSPS Invitation Fellowship  
Program for Research in Japan (Short-Term). Fellow's ID No. S-07042
12. Two-month-visit Grant of the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (2008)
13. One-and-a-half-month-visit Grant of the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (2009)
14. Joint Ukrainian-Polish program (2009-2011)
15. Kasa Mianowskiego (2009)
16. One-and-a-half-month-visit Grant of the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (2010)
17. Joint Ukrainian-Polish program (2012-2014)
18. Joint Ukrainian-Polish program (2015-2017)

And many individual grants to attend scientific conferences.

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**Membership:** Ukrainian Physical Society from 1993 (N 1001065),  
American Physical Society from 1996 (M60025923)  
Ukrainian Scientific Club from 2007

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#### **INTERNATIONAL ADVISORY BOARDS:**

8th EUROPEAN CONFERENCE ON APPLIED SUPERCONDUCTIVITY EUCAS'07, Brussels  
16-20 September 2007  
Low Temperature Physics journal (Kharkov, Ukraine), from 2013

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#### **PARTICIPATION AT CONFERENCES:**

Some results were presented at 19 conferences in the USSR  
as well as at the following international conferences (during  
last years):

1. International Conference on Superconductivity, 1990, 10-14  
January, Bangalore, India.
2. "High temperature superconductivity and localization phenome-

na", 1991, 11-15 May, Moscow, Russia.

3. 14-th General Conference GCMD-14 of Condensed Matter Division of the European Physical Society, 1994, 28-31 March, Madrid, Spain.

4. 4-th International Conference on Materials and Mechanisms of Superconductivity. High-temperature superconductors, 1994, 5-9 July, Grenoble, France.

5. 2-nd International Symposium on High-Tc Superconductivity and Tunneling Phenomena, 1994, 3-6 September, Donetsk, Ukraine.

6. 2-nd International Conference on Point-Contact Spectroscopy, 1995, 7-10 June, Nijmegen, the Netherlands.

7. 15-th General Conference of the Condensed Matter Division, 1996, 22-25 April, Baveno-Stresa, Lago-Maggiore, Italy.

8. Adriatico Research Conference "Tunneling and its Implications", 1996, 30 July-2 August, Trieste, Italy.

9. Adriatico Research Conference and NATO Advanced Research Workshop on "Fluctuation Phenomena in High Temperature Superconductors", 1996, 5 August-8 August, Trieste, Italy.

10. 21st International conference on Low Temperature Physics, 1996, 8-14 August, Prague, Czech Republic.

11. Workshop on Condensed Matter Physics. Subsection: Mesoscopic Physics, 1997, 14 July-25 July, Trieste, Italy.

12. Gordon Research Conferences: Dynamics at Surfaces, 1997, 10 August-15 August, Andover, NH, USA.

13. 17th European Conference on Surface Science (ECOSS-17), 1997, 16-19 September, Enschede, the Netherlands.

14. NATO Advanced Research Workshop on SYMMETRY AND PAIRING IN SUPERCONDUCTORS, 1998, 28 April - 2 May, Yalta, Ukraine.

15. The International Conference on Strongly Correlated Electron Systems, 1998, July 15- July 18, Paris, France.

16. 17th General Conference of the Condensed Matter Division, European Physical Society, 1998, 25-29 August, Grenoble, France.

17. NATO Advanced Study Institute: Material Science, Fundamental Properties and Future Electronic Applications of High-Tc Superconductors, 1998, 14-25 September, Albena, Bulgaria.

18. First Euroconference on Anomalous Complex Superconductors ACS'98, 1998, 26 September- 3 October, Aghia Pelagia, Crete, Greece.

19. Memorial Symposium in Honour of Academician A. A. Smirnov "Order in Metals and Alloys", 1998, 16-19 November, Kiev, Ukraine.
20. Low Temperature Conference N 31, 1998, 2-3 December, Moscow, Russia.
21. The International Conference on Strongly Correlated Electron Systems (SCES'99), 1999, 24-28 August, Nagano, Japan.
22. EUCAS'99 Satellite Conference and NATO Advanced Research Workshop SMART-99 (ionic, organic, electronic, Superconducting and magnetic Materials: Advances and Research Technologies) / SUPERMAT'99 (SUPERMATerials), 1999, 19-23 September, Giens Peninsula - Hyeres, France.
23. XII Trilateral German-Russian-Ukrainian Seminar on High-Temperature Superconductivity, 1999, 25-29 October, Kiev, Ukraine.
24. The First Cracow-Clausthal Workshop on Tunnelling Effect and Other Fundamental Problems of Quantum Physics, 1999, 22-28 November, Cracow, Poland.
25. 18th General Conference of the Condensed Matter Division of the European Physical Society, 2000, 13-17 March, Montreux, Switzerland.
26. International Symposium on Physics in Local Lattice Distortions, 2000, 23-26 July, Ibaraki, Japan.
27. XIV Trilateral German-Russian-Ukrainian Seminar on High-Temperature Superconductivity, 2001, 27 May - 1 June, Moscow, Russia.
28. NATO Advanced Research Workshop on New Trends in Superconductivity, 2001, 16-20 September, Yalta, Ukraine.
29. 19th General Conference of the European Physical Society Condensed Matter Division held jointly with CMMP 2002 - Condensed Matter and Material Physics, 2002, 7-11 April, Brighton, United Kingdom.
30. III International Workshop on Disordered Systems (IWDS3), 2002, 25-30 August, Puebla, Mexico.
31. VIII International Conference on Crystal Chemistry of Intermetallic Compounds, 2002, 25-28 September, Lviv, Ukraine.
32. International Workshop on the Bogoliubov-de Gennes Equations to Superfluids, 2003, 30 May - 1 June, Bristol, United Kingdom.
33. 12-th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques, 2003, 21 July - 25 July, Eindhoven, the Netherlands.

34. NATO Advanced Research Workshop (PST.ARW.979961) on Physics of Spin in Solids: Materials, Methods & Applications, 2003, 15 October - 19 October, Baku, Azerbaijan.
35. CMD20 - the 20th General Conference of the Condensed Matter Division of the European Physical Society, 2004, 19-23 July, Prague, Czech Republic.
36. The international conference on strongly correlated electron systems. SCES'04, 2004, 26-30 July, Karlsruhe, Germany.
37. 2004 Gordon Research Conference on Superconductivity , 2004, 19 September - 24 September, Oxford, United Kingdom.
38. First International Conference "Fundamental Problems of High-Temperature Superconductivity" (FPS'04), 2004, 18 October - 22 October, Moscow-Zvenigorod, Russia.
39. The 17th International Symposium on Superconductivity (ISS-2004), 2004, 23 November - 25 November, Niigata, Japan.
40. The International Conference on Strongly Correlated Electron Systems (SCES'05), 2005, 26-30 July, Vienna, Austria.
41. The XI Krajowa Szkola Nadprzewodnictwa, 2005, 25-29 September, Kazimierz Dolny, Poland.
42. 18th International Symposium on Superconductivity, 2005, 24-26 October, Tsukuba, Japan.
43. M2S-HTSC VIII - 8th International Conference on Materials and Mechanisms of Superconductivity – High Temperature Superconductors, 2006, 9 - 14 July, Dresden, Germany.
44. The 6th International Meeting on Information Display and the International Display Manufacturing Conference (IMID/IDMC 2006), 2006, 22-25 August, EXCO, Daegu Exhibition and Convention Center, Daegu, Korea.
45. Gordon Research Conference on Magnetic Nanostructures, 2006, 3 September - 8 September, Oxford, United Kingdom.
46. ESF Research Conference on Solid/Fluid Interfaces, 2006, 9 September - 14 September Obergurgl, near Innsbruck, Austria.
47. The XII Krajowa Szkola Nadprzewodnictwa, 2006, 14 - 18 September, Ustron, Poland.
48. IX Annual Fulbright Conference "Ethical standards in Education and Science", 2006, 6 October -8 October, Kiev, Ukraine.

49. Second International Conference "Fundamental Problems of High-Temperature Superconductivity", FPS'06, Zvenigorod, Russia, 2006, 9 October - 13 October, Moscow, Russia.
50. 20th International Symposium on Superconductivity ISS2007, 5 November- 7 November 2007, Tsukuba, Japan.
51. 13 Krajowa Szkoła Nadprzewodnictwa „Nadprzewodnictwo, uporządkowanie spinowe i ładunkowe”, 6-10 listopada 2007, Ładek Zdrój, Poland.
52. X Annual Fulbright Conference "Ukrainian project in XXI Century", 2006, 19 October -208 October, Kiev, Ukraine.
53. LT-25 Conference, 2008, 6-13 August 2008, Amsterdam, The Netherlands.
54. 22nd General Conference of the Condensed Matter Division of the European Physical Society, 2008, 25-29 August, Rome, Italy.
55. 9th International Conference on Materials and Mechanisms of Superconductivity (M<sup>2</sup>S-IX), 2009, 7-12 September, Tokyo, Japan.
56. 22th International Symposium on Superconductivity ISS2007, 2 November- 4 November 2009, Tsukuba, Japan.
57. International Symposium devoted to the 80th anniversary of Academician O.O.Chuiko "Modern problems of surface chemistry and physics", 18 - 21 May 2010, Kiev, Ukraine.
58. 3rd International Symposium on Structure-Property Relationships in Solid State Materials, 27.06.10 - 02.07.10, Stuttgart, Germany.
59. 23rd International Liquid Crystal Conference (ILCC 2010), 11.07.10 - 16.07.10, Krakow, Poland.
60. 23rd General Conference of the Condensed Matter Division of the European Physical Society, 30.08.10 - 03.09.10, Warsaw, Poland.
61. International Conference: 100 Anniversary of Vasilij Vasilievich Nalimov, 09.11.10-10.11.10, Moscow, Russia.
62. 477th Heraeus-Seminar "Unconventional Superconductivity", 11.04.11-13.04.11, Bad Honnef, Germany.
63. Advanced Workshop on Non-Standard Superfluids and Insulators, 18.07.11 - 22.07.11, Miramare, Trieste, Italy.
64. European Conference on Surface Science -- ECOSS-28, 28.08.11 - 02.09.11, Wrocław, Poland.
65. Fourth International Conference "Fundamental Problems of High-Temperature Superconductivity", FPS'11, Moscow-Zvenigorod, Russia, 3 October - 7 October 2011 (Moscow, Russia, 2011), FIAN, pp. 90-91.

66. 2012 International Conference on Nanoscience and Technology (ICN+T 2012), 23.07.12 - 27.07.12, Sorbonne, Paris, France.
67. School and Workshop on Innovations in Strongly Correlated Electronic Systems, 6.08.12 - 17.08.12, Miramare, Trieste, Italy.
68. Second Joint Ukrainian-Russian Seminar Physics of Superconducting Heterostructures, 17.09.12-19.09.12, Kiev, Ukraine.
69. Electronic Structure & Electronic Spectroscopies. V. V. Nemoshkalenko Memorial Conference and Workshop, ES&ES, May 20-23, 2013, Kyiv, Ukraine.
70. EUCAS-2013, 16.09.13 - 19.09.13, Genova, Italy.
71. Trilateral (German-Russian-Ukrainian) Workshop on Hot Topics in HTSC: Fe-Based Superconductors, 29.09.13 - 02.10.13, Moscow-Zvenigorod, Russia.
72. NS<sup>2</sup>-2013, 21.11.13 - 22.11.13, Tokyo, Japan.
73. International Conference on Computational Science and Technology ICSST 15.05.14 - 16.05.14, Warsaw, Poland.
74. International research and practice conference: Nanotechnology and Nanomaterials (NANO-2014) 27.08.14 – 30.08.14, Lviv, Ukraine
75. III International Workshop on Point-Contact Spectroscopy (PCS-2014), 08-11 September, 2014, Kharkiv, Ukraine.
76. V International Symposium on Strong Nonlinear Vibronic and Electronic Interactions in Solids, 29.04.15 - 04.05.2015, Tartu, Estonia.
77. 4th International Symposium on Energy Challenges and Mechanics (ECM4)- working on small scales, 11.08.2015 - 13.08.2015, Aberdeen, Scotland, UK.
78. 28th International Symposium on Superconductivity, ISS 2015, 16.11.2015 - 18.11.2015, Tokyo, Japan.
79. International conference "The philosophy of dialogue and mutual understanding in the construction of the European and World communities", 22.06.2016 - 24.06.2016, Lviv, Ukraine.
80. The 23rd International Symposium of the Jahn-Teller Effect, 27.08.16 - 01.09.2016, Tartu, Estonia.

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#### **INTERNATIONAL COLLABORATION AND SCIENTIFIC SIGNIFICANCE:**

Fruitful collaboration with the Hiroshima University (Japan) and Institute of Physics of the Polish Academy of sciences (Warsaw, Poland) were established. Scores of papers on superconductivity were published in the influential international journals. The studies were intended to understand the physics of various superconductors. The emphasis was made on the competition between superconductivity and other electron spectrum instabilities. Josephson current have also been intensively studied. This work is important from the fundamental point of view and extremely significant for the search for new superconductors suitable for strong-current and weak-current



applications. Earlier, a Soviet Union Invention certificate was obtained on the new application of superconducting weak-link granular medium samples. Our group published the reviews on our research and the experimental situation that are frequently cited as reference points in the field of charge-density-wave superconductors.

The results were internationally recognized and hundreds of references to the publications were made in the most prestigious journals.

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