

Alexey Ustinov

Professor of Experimental Physics
Karlsruhe Institute of Technology

Biography

1984: M.S. in physics, Moscow University of Physics and Technology
1987: Ph.D. in physics, Institute of Solid State Physics, RAS
1995: Dr.Sci. in physics, Institute of Solid State Physics, RAS

Positions

since 2008 professor (W3), Experimental Physics
Karlsruhe Institute of Technology, Germany
1996-2008 professor (C3) of Experimental Physics
University of Erlangen-Nürnberg, Germany
1993-1996 guest researcher, researcher
Research Centre Jülich, Germany
1984-1992 PhD student, junior researcher, researcher
Institute of Solid State Physics, Chernogolovka
Russian Academy of Sciences

Research visits, sabbaticals, collaborations

Oct. 1989 – Sept. 1991 University of Tübingen, Germany
Oct. 1991 – Sept. 1992 Technical University of Denmark, Denmark
Oct. 1992 – June 1993 University of Rome Tor Vergata, Italy
Aug. 2005 – Jan. 2006 University of California, Berkeley, USA
Jan. 2006 – Mar. 2006 NTT Basic Research Laboratory, Atsugi, Japan
Dec. 2011 – Feb. 2022 National University of Science
and Technology MISiS, Moscow, Russia
Dec. 2011 – Feb. 2022 Russian Quantum Center, Moscow, Russia

Teaching

Lecture courses (in English, German, and Russian) on general physics, electromagnetics, solid state physics, superconducting electronics, superconductivity, quantum information processing with solid-state qubits, etc.

Scientific interests

Superconductivity, Josephson junctions and arrays, macroscopic quantum coherence, quantum information processing, superconducting qubits, solitons in Josephson transmission lines, microwave spectroscopy, mm- and sub-mm experiments with superconductors

Funding	Recipient of over 20 research grants from German Science Foundation (DFG), German Ministry of Science and Education (BMBF), Volkswagen Foundation, European Union, Google, and other sources.
Scientific school	Supervised 42 PhD students, 18 post docs and numerous undergraduate student projects. Most successful pupils are Andreas Wallraff (professor at ETH Zürich), Edward Goldobin (senior researcher, Univ. Tübingen), Kirill Fedorov (group leader, WMI München), Juergen Lisenfeld (group leader, KIT), Stefano Poletto (Rigetti).
Publications	Over 300 papers in refereed journals, of which 2 in Science, 10 in Nature group, 20 in Physical Review Letters, and over 80 in Physical Review. In total over 8000 citations, h-index 48 (WoS).
Invited talks	Over 80 invited talks at various international conferences.
Referee	Referee in Science, Nature, Nature Physics, Physical Review Letters, Physical Review, Europhysics Letters, Applied Physics Letters, etc. Reviewer for German Science Foundation (DFG), research programs of EU, national research programs of USA, Israel, Finland, Belgium, Austria, Sweden, Switzerland.
Awards	1989: Alexander von Humboldt Fellowship (Germany) 1998: Stefanos Pnevmatikos International Award for Research in Nonlinear Science (FORTH Foundation) 2011: Mega-Grant Award of the Russian Government (ca. 3.7M€) 2018: Google Research Award 2022: ERC Advanced Grant (ca. 2.7M€)
Languages	English, German, Russian
Personal information	Citizenship: Russia 3 children (born 1986, 1988, and 2017) Hobby: sailing, skiing, climbing, mountaineering

Alexey Ustinov, 07.10.2024

15 most important publications

1. P. Binder, D. Abraimov, A. V. Ustinov, S. Flach, Y. Zolotaryuk, *Observation of breathers in Josephson ladders*, Phys. Rev. Lett. **84**, 745 (2000)
2. A. Wallraff, A. Lukaschenko, J. Lisenfeld, A. Kemp, M. V. Fistul, Y. Koval and A. V. Ustinov, *Quantum dynamics of a single vortex*, Nature **425**, 155 (2003)
3. T. Hime, P. A. Reichardt, B. L. T. Plourde, T. L. Robertson, C.-E. Wu, A. V. Ustinov, and John Clarke, *Solid state qubits with current-controlled coupling*, Science **314**, 1427 (2006)
4. A. K. Feofanov, V. A. Oboznov, V. V. Bol'ginov, J. Lisenfeld, S. Poletto, V. V. Ryazanov, A. N. Rossolenko, M. Khabipov, D. Balashov, A. B. Zorin, P. N. Dmitriev, V. P. Koshelets, and A. V. Ustinov, *Implementation of superconductor-ferromagnet-superconductor π -shifters in superconducting digital and quantum circuits*, Nature Phys. **6**, 593 (2010)
5. M. Jerger, S. Poletto, P. Macha, U. Huebner, E. Il'ichev, A. V. Ustinov, *Frequency division multiplexing readout and simultaneous manipulation of an array of flux qubits*, Appl. Phys. Lett. **101**, 042604 (2012)
6. G. J. Grabovskij, T. Peichel, J. Lisenfeld, G. Weiss, and A. V. Ustinov, *Strain tuning of individual atomic tunneling systems detected by a superconducting qubit*, Science **338**, 232 (2012)
7. P. Macha, G. Oelsner, J.-M. Reiner, M. Marthaler, S. Andre, G. Schoen, U. Huebner, H.-G. Meyer, E. Il'ichev and A. V. Ustinov, *Implementation of a quantum metamaterial using superconducting qubits*, Nature Commun. **5**, 5146 (2014).
8. J. Lisenfeld, G. J. Grabovskij, C. Müller, J. H. Cole, G. Weiss, and A. V. Ustinov, *Observation of directly interacting coherent two-level systems in an amorphous material*, Nature Commun. **6**, 6182 (2015).
9. J. Braumüller, M. Marthaler, A. Schneider, A. Stehli, H. Rotzinger, M. Weides, and A. V. Ustinov, *Analog quantum simulation of the Rabi model in the ultra-strong coupling regime*, Nature Commun. **8**, 779 (2017).
10. K. V. Shulga, E. Il'ichev, M. V. Fistul, I. S. Besedin, S. Butz, O. V. Astaev, U. Hübner, and A. V. Ustinov. *Magnetically induced transparency of a quantum metamaterial composed of twin flux qubits*. Nature Commun. **9**, 150 (2018).
11. J. Lisenfeld, A. Bilmes, A. Megrant, R. Barends, J. Kelly, P. Klimov, G. Weiss, J.M. Martinis, and A.V. Ustinov. *Electric field spectroscopy of material defects in transmon qubits*. npj Quantum Inf. **5**, 105 (2019).
12. J. N. Voss, Ya. Schön, M. Wildermuth, D. Dorer, J. H. Cole, H. Rotzinger, and A. V. Ustinov. *Eliminating quantum phase slips in superconducting nanowires*. ACS Nano **15**, 4108 (2021).
13. G. P. Fedorov, S. V. Remizov, D. S. Shapiro, W. V. Pogosov, E. Egorova, I. Tsitsilin, M. Andronik, A. A. Dobronosova, I. A. Rodionov, O. V. Astafiev, and A. V. Ustinov. *Photon transport in a Bose-Hubbard chain of superconducting artificial atoms*. Phys. Rev. Lett. **126**, 180503 (2021).
14. J.D. Brehm, A. Stehli, A.N. Poddubny, O. Sander, H. Rotzinger, and A.V. Ustinov, *Slowing down light in a qubit metamaterial*. Appl. Phys. Lett. **121**, 204001 (2022).
15. J. Lisenfeld, A. Bilmes, and A.V. Ustinov, *Enhancing the coherence of superconducting quantum bits with electric fields*. npj Quantum Inf. **9**, 8 (2023).

