

CURRICULUM VITAE OF YURI ORLOV

- 1924 Born 13 August.
- 1947 Graduated from high school after 6-year interruption for war service, mostly as factory worker making T-34 tanks, then as artillery officer in Red Army.
- 1952 Graduated from Physical-Technical Institute; student of Kapitsa, Landau, Budker, Berestetsky.
- 1953-56 Research, Theoretical Department, ITEP, Moscow. Worked on design of ITEP proton-synchrotron, developing theory of non-linear betatron oscillations and betatron and synchro-betatron resonances. First time Hamiltonian approach was used in this area.
- 1956 Fired by order of Politburo after pro-democracy speech at ITEP. Ph.D defense and publication blocked for 2 1/2 years, and a job in Moscow for 16 yrs.
- 1958 First Ph.D, Yerevan Physics Institute, Armenia.
- 1956-72 Yerevan Physics Institute. Theoretical design of Yerevan electron-synchrotron. Published papers on quantum radiation damping and excitation, spin resonances and spin depolarization, etc. Became chief of laboratory of electro-magnetic interaction.
- 1963 Second Ph.D, Budker Institute of Nuclear Physics, Novosibirsk.
- 1963-64 Parallel work at Budker Institute, Novosibirsk.
- 1967 Proposed a 100x100 GeV electron-positron collider (an idea not accepted at the time).
- 1968 Elected Corresponding Member of Armenian Academy of Sciences (but secretly expelled after arrest, 1979).
- 1970 Professor, Yerevan Physics Institute.
- 1972 Moved back to Moscow. Forbidden to work at ITEP and Moscow University.
- 1972-73 Research, Institute of Terrestrial Magnetism and Dissemination of Radio Waves, Moscow region.
- 1973 Founding member, Soviet chapter of Amnesty International. Wrote "Letter

to Brezhnev," a defense of Andrei Sakharov and general criticism of Soviet regime, with demands for political and economic reforms (including glasnost). Fired, and after 1973 never had a scientific job again in the USSR.

- 1973-77 Private tutoring.
- 1976 Founded first Helsinki Watch Group, Moscow. Helped establish Lithuanian, Ukrainian and Georgian Helsinki Groups. In February, 1977 arrested by KGB.
- 1977-84 KGB prison, labor camp.
- 1984-86 Siberian exile.
- 1986 In October, stripped of USSR citizenship and deported to US.
- 1987-08 Senior Scientist, Cornell University, Newman Laboratory of Nuclear Studies.
- 1987— Member, Muon g-2 Collaboration based in Brookhaven National Laboratory and now Fermilab.
- 1988-89 Visiting scientist, CERN.
- 1993 American citizenship.
- 1998-15 Member, EDM Collaboration based in Brookhaven National Laboratory. (Consultant, 1998-2009.)
- 2008-15 Professor of Physics and Government, Cornell University.
- 2015— Professor of Physics Emeritus, Cornell University.
- 2015— Member, Juelich EDM Collaboration (JEDI).

Publications

Until 1977 arrest, authored or co-authored 50+ scientific articles in leading journals and conference proceedings, and about 40 human rights documents and appeals. (Almost all documents of the Soviet Helsinki groups became official documents of the U.S. Congressional Commission on Security and Cooperation in Europe, which published them in 1986.)

While in labor camp, wrote and smuggled out 3 scientific papers and several human rights appeals, and co-authored with 5 fellow prisoners a document on the situation of prisoners and forced laborers in the USSR, all published in the West.

Since 1986 expulsion from the USSR, has authored or co-authored numerous scientific papers and technical reports and written several human rights and political articles, as well as the autobiographical memoir Dangerous Thoughts (1991), published in the US, Russia, Germany, France and Ukraine.

Organizations

Member, American Academy of Arts and Sciences

Fellow, American Physical Society

Foreign member, National Academy of Sciences of Armenia

Honorary chair, Moscow Helsinki Group

President, Friends of the Helsinki Movement Foundation

Member, advisory committee, Human Rights Watch/Asia; member, Committee of 100 for Tibet

Former: Member, Moscow Helsinki Group (current Russian law bars foreign members); advisory board, Human Rights Watch/Helsinki; APS Committee on International Freedom of Scientists; former Human Rights Watch Academic Freedom Committee. Honorary chair, former International Helsinki Federation. Founding member (with Fang Lizhi, Liu Binyan and Robert Bernstein) of former Committee to End the Chinese Gulag.

Awards

Several honorary degrees (including Uppsala University) and human rights awards, including the Carter-Menil Human Rights Prize; the Human Rights Award of the International League of Human Rights; and the American Physical Society Nicholson Medal and Andrei Sakharov Prize.

YURI F. ORLOV

Professor Emeritus of Physics
Cornell University, Ithaca, NY 14853

PHYSICS PUBLICATIONS, REPORTS, E-PRINTS AND PROPOSALS

Russian works that have not been translated into English are preceded by an asterisk; translations of the titles are in square brackets. Muon (g-2) Collaboration and EDM Collaboration publications are a selection.

Publications

2018

151. with G. Guidoboni *et al.* (JEDI Collaboration), Connection between zero chromaticity and long in-plane polarization lifetime in a magnetic storage ring. Phys. Rev. Accel. Beams **21**, 024201 (2018).

2016

150. with V. Anastassopoulos *et al.* A Storage Ring Experiment to Detect a Proton Electric Dipole Moment. Rev. Sci. Instrum. **87**, 115116 (2016).

149. with G. Guidoboni *et al.* (JEDI Collaboration), How to reach a thousand-second in-plane polarization lifetime with 0.97–GeV/c deuterons in a storage ring. Phys. Rev. Lett. **117**, 054801 (2016).

2015

148. with E. M. Metodiev *et al.*, Analytical Benchmarks for Precision Particle Tracking in Electric and Magnetic Rings. Nucl. Instr. Meth. **A797**, 311-318 (2015).

2013

147. William M. Morse, Yuri F. Orlov and Yannis K. Semertzidis, rf Wien filter in an electric dipole moment storage ring: The "partially frozen spin" effect. Phys. Rev. ST Accel. Beams **16**, 114001 (2013).

2012

146. Yuri Orlov, Eanna Flanagan and Yannis Semertzidis, Spin rotation by Earth's gravitational field in a "frozen-spin" ring. Phys. Lett. **A376**, No. 45, 2822-2829 (2012).

2010

145. Yuri F. Orlov, "Robinson's Sum Rule" Revisited. *Phys. Rev. ST Accel. Beams* **13**, 024901 (2010).

2009

144. with F. Lin *et al.*, Study by spin tracking of a storage ring for deuteron electric dipole momentum. In D.G. Crabb *et al.*, eds., *Proceedings of the 18th annual spin physics symposium (SPIN 2008), Charlottesville, VA., 6-11 October 2008*. AIP Conf. Proc. **1149**, 777-780 (2009).

143. with F. Lin *et al.*, Overview of (some) computational approaches in spin studies. *Proceedings of the 10th International Computational Accelerator Physics Conference (ICAP09)*, San Francisco, CA, 31 August-4 September, 2009.
<http://epaper.kek.jp/ICAP2009/papers/mo4iopk04.pdf>

142. with G.W. Bennett *et al.* (Muon g-2 Collaboration), An improved limit on the muon electric dipole moment. *Phys. Rev. D* **80**, 052008, 1-18 (2009).

2008

141. with G.W. Bennett *et al.* (Muon g-2 Collaboration), Search for Lorentz and CPT violation effects in muon spin precession. *Phys. Rev. Lett.* **100**, 091602 (2008).

140. Yuri F. Orlov, A method to remove synchrotron frequency from the spectrum of momentum-forced radial oscillations. *Nucl. Instr. Meth.* **A587**, 1-6 (2008).

2007

139. with G.W. Bennett *et al.* (Muon g-2 Collaboration), Statistical equations and methods applied to the precision muon (g-2) experiment at BNL. *Nucl. Instr. Meth.* **A579**, 1096-1116 (2007).

2006

138. Yuri F. Orlov, Spin resonance conditions for intrinsic and induced electric dipole moments of a spin-1 particle. *Phys. Lett.* **A357**, No. 2, 120-124 (2006).

137. Yuri F. Orlov, William M. Morse and Yannis K. Semertzidis, Resonance method of electric-dipole-moment measurements in storage rings. *Phys. Rev. Lett.* **96**, 214802 (2006).

136. with G.W. Bennett *et al.* (Muon g-2 Collaboration), Final report of the muon E821 anomalous magnetic moment measurement at BNL. *Phys. Rev. D* **73**, 072003 (2006).

2005

135. Yuri F. Orlov (for the Storage Ring EDM Collaboration), Resonance method of EDM measurements in storage rings. In D. Chiladze, A. Kacharava, H. Stroeher, eds., *Proceedings of STORI '05. 6th International Conference on Nuclear Physics at Storage Rings, Jülich-Bonn, Germany, 23-26 May 2005*. Schriften des Forschungszentrums Jülich: Materie und Material **30**, 223-226 (2005).

2004

134. with G.W. Bennett *et al.* (Muon g-2 Collaboration), Measurement of the negative muon anomalous magnetic moment to 0.7 ppm. *Phys. Rev. Lett.* **92**, 161802 (2004).

133. F.J.M. Farley, K. Jungmann, J. P. Miller, W.M. Morse, Y.F. Orlov, Y.K. Semertzidis, A. Silenko, and E. J. Stephenson, A new method of measuring electric dipole moments in storage rings. *Phys. Rev. Lett.* **93**, 052001 (2004).

132. with P. Shagin *et al.* (E821 Collaboration), Recent results of muon g-2 Collaboration. 32nd SLAC Summer Institute on Particle Physics (SSI 2004): Nature's Greatest Puzzles, Menlo Park, CA, 2-13 August 2004. eConfCO40802:TUT007 (2004).

131. with J.P. Miller *et al.* (EDM Collaboration), A new experiment to measure the muon electric dipole moment. In *Intersections of Particle and Nuclear Physics. Proceedings of the 8th Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2003), New York, New York, 19-24 May 2003* (New York, 2003), pp. 196-199. *AIP Conf. Proc.* **698**, 196-199 (2004).

130. with Y.K. Semertzidis *et al.* (EDM Collaboration), A new method for a sensitive deuteron EDM experiment. In *Intersections of Particle and Nuclear Physics. Proceedings of the 8th Conference on the Intersections of Particle and Nuclear Physics (CIPANP 2003), New York, New York, 19-24 May 2003* (New York, 2003), pp. 200-204. *AIP Conf. Proc.* **698**, 200-204 (2004).

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129. Yuri F. Orlov, Quantumlike computation and "thinking" based on classical oscillators. In *Technical Proceedings of the NSTI Nanotechnology Conference and Trade Show, San Francisco, CA, 24-26 February 2003* (NSTI, CD-ROM), Vol. 1, Ch. 5.

128. with Y.K. Semertzidis *et al.*, The Brookhaven muon (g-2) storage ring high voltage quadrupoles. *Nucl. Instr. Meth.* **A503**, 458-484 (2003).

127. with Y.K. Semertzidis *et al.* (Muon g-2 Collaboration), Measurement of the muon anomalous magnetic moment to 0.7 ppm. *Nucl. Phys. B Proc. Suppl.* **117**, 373-384 (2003).

126. with David W. Hertzog *et al.* (Muon g-2 Collaboration), The muon anomalous magnetic moment and the standard model. *Nucl. Phys.* **A721**, 161-170 (2003). [Presented at the 16th International Conference on Particles and Nuclei (PANIC 02), Osaka, Japan, 30 September-4 October 2002.]

125. with E.P. Sichtermann *et al.* (Muon g-2 Collaboration), New results from the muon g-2 experiment. In Y.I. Makdisi *et al.*, eds., *Spin 2002: Proceedings of the 15th international spin physics symposium, Upton, NY, 9-14 September 2002*, AIP Conf. Proc. **675**, 13-22 (2003).

124. with B.L. Roberts *et al.* (Muon g-2 Collaboration), Measurement of the muon (g-2) value. *Proceedings of the 7th International Workshop on Tau Lepton Physics*, Santa Cruz, CA, 10-13 September 2002. Nucl. Phys. B (Proc. Suppl.) **123**, 214-218 (2003).

123. with M. Deile *et al.* (Muon g-2 Collaboration), News from the muon (g-2) experiment at BNL. In *Application of Quantum Field Theory to Phenomenology. Proceedings of 6th International Symposium on Radiative Corrections: Application of Quantum Field Theory to Phenomenology (RADCOR 2002) and 6th Zeuthen Workshop on Elementary Particle Theory (Loops and Legs in Quantum Field Theory)*, Kloster Banz, Germany, 8-13 September 2002 (Staffelstein, 2002), pp. 215-219. Nucl. Phys. B Proc. Suppl. **116**, 215-219 (2003).

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122. Yuri F. Orlov, Quantumlike bits and logic gates based on classical oscillators. Phys. Rev. **A66**, 052324 (2002).

121. Yuri F. Orlov, Classical counterexamples to Bell's inequalities, Phys. Rev. **A65**, 042106, 1-7 (2002)

120. Yuri Orlov, Cenap S. Ozben and Yannis K. Semertzidis, Muon revolution frequency distribution from a partial-time Fourier transform of the g-2 signal in the muon g-2 experiment. Nucl. Instr. Meth. **A482**, 767-775 (2002).

119. with G.W. Bennett *et al.* (Muon g-2 Collaboration), Measurement of the positive muon anomalous magnetic moment to 0.7 ppm. Phys. Rev. Lett. **89**, 101804 (2002).

118. with S. Redin *et al.* (Muon g-2 Collaboration). Recent results and current status of the muon g-2 experiment at BNL. Can. J. Phys. **80**, 1355-1364 (2002).

117. with C. S. Ozben *et al.* (Muon g-2 Collaboration), Precision measurement of the anomalous magnetic moment of the muon. In *Proceedings of the 30th SLAC Summer Institute on Particle Physics: Secrets of the B Meson (SSI 2002)*, SLAC, Menlo Park, CA, 5-16 August 2002, pp. 464-479.

116. with M. Deile *et al.* (Muon g-2 Collaboration), Testing CPT and Lorentz invariance with the anomalous spin precession of the muon. In *Proceedings of the Second Meeting on CPT and Lorentz Symmetry, Bloomington, Indiana, 15-18 August 2001* (World Scientific, 2002). arXiv:hep-ex/0110044v1.

115. with J.P. Miller *et al.* (Muon g-2 Collaboration), The muon anomaly: experiment and theory. In J. Lee-Franzoni, F. Bossi, and P. Franzini, eds., *Lepton and Photon Interactions at High Energies. Proceedings of the 20th International Symposium on Lepton and Photon Interactions at High Energies (LP 01)*, Rome, Italy, 23-28 July 2001 (World Scientific, Singapore, 2002), pp. 408-425 and Int. J. Mod. Phys. **A17**, 3318-3335 (2002).

114. with P.T. Debevec *et al.* (Muon g-2 Collaboration), Recent results from the BNL g-2 experiment. Nucl. Phys. B Proc. Suppl. **111**, 200-205 (2002).

113. with V.W. Hughes *et al.* (Muon g-2 Collaboration), Muon g-2 experiment at Brookhaven National Laboratory. Nucl. Phys. B Proc. Suppl. **105**, 156-159 (2002).

112. with E.P. Sichtermann *et al.* (Muon g-2 Collaboration), Precision measurement of the muon anomalous magnetic moment. In *Cosmology and Elementary Particle Physics* (Fort Lauderdale, 2001), pp. 210-219. AIP Conf. Proc. **624**, 210-219 (2002).

111. with I.B. Logashenko *et al.* (Muon g-2 Collaboration), Results from the muon g-2 experiment. In *Supersymmetry and Unification of Fundamental interactions. Proceedings of the 9th International Conference on Supersymmetry and Unification of Fundamental Interactions (SUSY01), Dubna, Russia, 11-17 June 2001* (World Scientific, 2002), pp. 3-11.

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110. Yuri F. Orlov, Snapshots from the 1950's. In M. Shifman, ed., *At the frontier of particle physics: Handbook of QCD. Boris Ioffe Festschrift*, vol. 1 (World Scientific, 2001), pp. 65-78.

109. with V.W. Hughes *et al.* (Muon g-2 Collaboration), The muon anomalous magnetic moment. In E. Arimondo *et al.*, eds., *Atomic Physics 17: XVII International Conference on Atomic Physics (ICAP 2000) Florence, Italy, 4-9 June, 2000*. AIP Conf. Proc. **551**, 221-237 (2001).

108. with G.T. Danby *et al.* (Muon g-2 Collaboration), The Brookhaven muon storage ring magnet. Nucl. Instr. Meth. **A457** (2001) 151-174.

107. with H.N. Brown *et al.* (Muon g-2 Collaboration), Precise measurement of the positive muon anomalous magnetic moment, Phys. Rev. Lett. **86**, 2227-2231 (12 March 2001).

106. with H.N. Brown *et al.* (Muon g-2 Collaboration), A precise measurement of the anomalous magnetic moment of the muon. In T. Ohshima and A.I. Sanda, eds., *Proceedings of the 4th International Workshop on B Physics and CP Violation (BCP4), Ise-Shima, Japan, 19-23 February 2001* (World Scientific, 2001), pp. 48-53.

105. with O. Rind *et al.*, (Muon g-2 Collaboration), Precision measurement of muon g-2 at BNL. In *Proceedings of the 2001 e+e- Physics at Intermediate Energies Workshop, Stanford, California, 30 April-2 May 2001* (Stanford, 2001), pp. 9-15. arXiv:hep-ex/0106101v1.

104. with B. Lee Roberts *et al.* (Muon g-2 Collaboration), Recent progress on the BNL muon (g-2) experiment. In F. Costantini, G. Isidori and M. Sozzi, eds., *Proceedings of KAON 2001: International Conference on CP Violation, Pisa, Italy 12-17 June 2001*, Frascati Physics Series, Vol. 26 (Istituto Naz. Fis. Nucl., Frascati, Italy, 2001).

103. with C.S. Ozben *et al.* (Muon g-2 Collaboration), Muon g-2 experiment at Brookhaven National Laboratory. Int. J. Mod. Phys. **A16**, Suppl. 1A, 287-291 (2001); *Proceedings of XXI*

- Physics in Collision Conference, Seoul, Korea, 28-30 June, 2001* (Seoul, 2001);
Proceedings of the Workshop on the Spin Structure of the Proton and Polarized Collider Physics, Trento, Italy, 23-28 July 2001 (Trento, 2001), pp. 156-159.
102. with I. Logashenko *et al.* (Muon g-2 Collaboration), A new precise measurement of g-2 of muon. In *High Energy Physics. Proceedings of the International Europhysics Conference on High-Energy Physics (HEP 2001), Budapest, Hungary, 12-18 July 2001* (Budapest, 2001), p. 108.
101. with H.N. Brown *et al.* (Muon g-2 Collaboration), Precision measurement of muon g-2 and accelerator related issues. In *2nd Asian Particle Accelerator Conference. Proceedings of the 2nd Asian Particle Accelerator Conference, Beijing, China, 17-21 September 2001* (Institute of High Energy Physics, Beijing, 2001), pp. 862-866.
100. with P.T. Debevec *et al.* (Muon-2 Collaboration), Recent results from the BNL g-2 experiment. In *Frontiers in Flavor Physics, Proceedings of the 5th KEK Topical Conference: Frontiers in Flavor Physics (KEKTC5) Tsukuba, Ibaraki, Japan, 20-22 November 2001* (Tsukuba, 2001), pp. 200-205. S. Hashimoto and T.K. Komatsubara, eds., *Frontiers in Flavor Physics, Proceedings of the 5th KEK Topical Conference: Frontiers in Flavor Physics (KEKTC5) Tsukuba, Ibaraki, Japan, 20-22 November 2001* (Amsterdam: North-Holland, 2002), pp. 200-205. Nucl. Phys. Proc. Suppl. **111**, 200-205 (2002).
99. with Y.K. Semertzidis *et al.* (EDM Collaboration), Sensitive search for a permanent muon electric dipole moment. In Y. Kuno and T. Yokoi, eds., *Proceedings of the International Workshop on High Intensity Muon Sources. KEK, Japan, 1-4 December 1999* (World Scientific, Singapore, 2001), pp. 81-97. arXiv:hep-ph/0012087v1.
98. with Y.K. Semertzidis *et al.*, A sensitive search for a muon electric dipole moment. Int. J. Mod. Phys. A**16**, Suppl. 1B, 690-693 (2001); AIP Conf. Proc. **564**, 263-268 (2001).
97. with Y.K. Semertzidis *et al.* (EDM Collaboration), A sensitive search for a muon electric dipole moment. In *Quantum Electrodynamics and Physics of the Vacuum. Proceedings of the 2nd Workshop on Frontier Tests of Quantum Electrodynamics and Physics of the Vacuum (QED 2000). Trieste, Italy, 5-11 October 2000* (Trieste, 2000), 263-268. Int. J. Mod. Phys. A**16**, Suppl. 1B, 690-694 (2001).

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96. with H.N. Brown *et al.* (Muon g-2 Collaboration), Improved measurement of the positive muon anomalous magnetic moment, Phys. Rev. D**62**, 091101 (2000).
95. with C.J.G. Onderwater *et al.* (BNL-E821 Collaboration), Recent results on the muon anomalous magnetic moment from BNL E821. In Zohreh Parsa and William J. Marciano, eds., *Intersections of Particle and Nuclear Physics. Proceedings of the 7th Conference on Intersections between Particle and Nuclear Physics (CIPANP 2000) Quebec City, Canada, 22-28 May 2000*. AIP Conf. Proc. **549**, 917-919 (2000).

94. with R. Prigl *et al.* (Muon g-2 Collaboration) Status of the BNL muon (g-2) experiment. In *Proceedings of RADCOR2000, the 5th International Symposium on Radiative Corrections, Carmel (USA), 11-15 September, 2000*. arXiv:hep-ex/0101042v1.

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91. Yuri F. Orlov, Complementary histories and collapse into the past in standard quantum mechanics. *Int. J. Mod. Phys. B***13**, No. 20, 2629-2636 (1999).

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89. Yuri Orlov, Spin and beam dynamics. In K. Jungmann, H.-J. Kluge, I.B. Khriplovich, eds., *Proceedings of the Workshop on Nuclear Electric Dipole Moment Searches, GSI, Darmstadt, Germany, 9-10 November 1999*.

88. Yu. F. Orlov (for the Muon g-2 Collaboration), Spin and beam dynamics in the muon g-2 storage ring—systematic errors. In N.E. Tyurin *et al.*, eds., *Proceedings of the 13th International Symposium on High Energy Spin Physics, Protvino, Russia, 8-12 September 1998* (World Scientific, Singapore, 1999), pp. 509-511.

87. with R. Prigl *et al.* (Muon g-2 Collaboration), Status of the BNL muon (g-2) experiment. *IEEE Transactions on Instrumentation and Measurement* **48**, 182-185 (1999).

86. with R.M. Carey *et al.* (Muon g-2 Collaboration), New measurement of the anomalous magnetic moment of the positive muon. *Phys. Rev. Lett.* **82**, 1632-1635 (1999).

85. with L. Nodulman *et al.* (Muon g-2 Collaboration), Status of the new muon (g-2) experiment. In *Weak Interactions and Neutrinos. Proceedings of the 17th International Workshop on Weak Interactions and Neutrinos (WIN 90), Cape Town, South Africa, 24-30 January 1999* (Cape Town, 1999), pp. 28-32.

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1997

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1994

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1993

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1992

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1990

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