

Joel S. FELDMAN

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Education	B. Sc. University of Toronto 1970 A.M. Harvard University 1971 Ph.D. Harvard University 1974		
Thesis title	The $\lambda\phi_3^4$ Field Theory in a Finite Volume		
Thesis supervisor	Arthur Jaffe		
Employment	Research fellow	Harvard University	1974-75
Record	Moore Instructor	Massachusetts Institute of Technology	1975-77
	Asst. Professor	University of British Columbia	1977-1982
	Assoc. Professor	University of British Columbia	1982-1987
	Full Professor	University of British Columbia	1987-2020
	Emeritus Professor	University of British Columbia	2020-present

Selected academic awards and distinctions

Woodrow Wilson Fellowship
UBC Killam Research Prize, 1989/90/91
Fellow of the Royal Society of Canada, 1990–present
John L. Synge Award, Royal Society of Canada, 1996
Aisenstadt Chair Lectureship, CRM, 1999/2000
Jeffery–Williams Prize, Canadian Mathematical Society, 2004
Faculty of Science Achievement Award for Teaching, 2003/04
CRM–Fields–PIMS Prize, 2007
CAP–CRM Prize in Theoretical and Mathematical Physics, 2007
UBC Killam Teaching Prize, 2006/07
Fields Institute Fellow, 2007–present
Jacob Biely Faculty Research Prize, 2014
Fellow of the Canadian Mathematical Society, 2019–present

Selected professional service and experience

Visiting professor, Ecole Polytechnique, Paris 1983–84
Visiting professor, ETH, Zürich, Jan–July 1987
Organizer, Conference on Mathematical Quantum Field Theory and Related Topics,
Sept. 1–5 1987, CRM Université de Montréal.
Organizer, Semester on Mathematical Quantum Field Theory, Sept. 1–Dec. 15 1987,
CRM Université de Montréal.
Member, Advisory Committee, 1988 IAMP Congress, Swansea, Wales.
Organizer, special session on Constructive Quantum Field Theory, 1988 IAMP Congress,
Swansea, Wales.
Associate editor, Reviews in Mathematical Physics (1989–present)
Associate editor, Canadian Journal of Mathematics (1994–1998)
Associate editor, Canadian Mathematical Bulletin (1994–1998)
Associate editor, Mathematical Physics Electronic Journal (1995–2009)
Session chairman, ICM-90, Kyoto, Japan.
Nachdiplom lecturer, ETH Zürich, 1991–92
Invited participant, Les aspects de la physique de la matière condensée, Institut des Hautes Etudes
Scientifique, Bures-sur-Yvette, May 1993.

Chairman, organizing committee, CMS Annual Seminar, “Mathematical Quantum Theory”, Vancouver, August 4–14, 1993.
 Member, International Advisory Committee, CRM-CAP Summer School, “Particles and Fields '94”, Banff, Canada.
 Member, Research Committee, Canadian Mathematical Society (1994–1998)
 Member, Grant Selection Committee in Mathematics, Natural Sciences and Engineering Research Council (1996–98)
 Member, Scientific Advisory Panel, Fields Institute (1996–2000)
 Editor, CRM Series in Mathematical Physics (1998–present)
 Associate editor, Comptes rendus Mathématiques de l'Académie des Sciences / Mathematical reports of the Academy of Science
 Chair, Doctoral Prize Selection Committee, Canadian Mathematical Society (1996–1997)
 Member, PiMS Postdoctoral Fellowship Selection Committee (1997)
 Editor, Annales Henri Poincaré (2000–present)
 Member, College of Reviewers for the Canada Research Chairs (CRC) Program (2001–present)
 Member, CRM–CAP Prize jury (2001–2003, 2011–2014)
 Chair, CRM–CAP Prize jury (2002–2003)
 Member, Fields Institute Editorial Board (Feb 1, 2004– Dec 31, 2006)
 Editor, Journal of Mathematical Physics (2005–2010)
 Organizer, Oberwolfach Workshop ”Renormalization Group”, March 13-19, 2011.
 Core Member, Section 11 (Mathematical Physics) selection panel for ICM 2014.
 Member, local organizing committee of the International Congress of Mathematical Physics, Montreal July 23-28, 2018

Selected Invited Lectures

International Colloquium on Mathematical Methods of Quantum Field Theory, Marseille, 1975.
 International School of Mathematical Physics, Erice, Sicily, 1975.
 Les Houches XLIII: Critical Phenomena , Random Systems, Gauge Theories, Les Houches, France, 1984.
 Principal speaker, Summer Meeting of the CMS, St. John's Nfld, 1986.
 Quarante deuxième rencontre entre physiciens théoriciens et mathématiciens, Strasbourg, 1986.
 26th Internationale Universitätswochen für Kernphysik, Schladming, Austria, 1987.
 IAMP Congress, Swansea, Wales, 1988.
 International Congress of Mathematicians, Kyoto, Japan, 1990.
 Université de Lausanne/Ecole Polytechnique Fédérale de Lausanne - December 10, 1991
 The State of Matter, July 30-August 1, 1992. Copenhagen
 Minicourse speaker, CMS Annual Seminar, “Mathematical Quantum Theory”, Vancouver, August 1993.
 Workshop “Constructive Results in Field Theory, Statistical Mechanics and Solid State Physics”, Ecole Polytechnique, Palaiseau, France , July 25-27, 1994
 Meeting “Mathematische Aspekte der Quantentheorie großer Systeme”, Oberwolfach, Germany, June 19-25, 1994
 CRM-CAP Summer School “Particles and Fields” Banff, Alberta, August 16-24, 1994
 Plenary speaker, 50th anniversary meeting of the CMS, Toronto, Ontario, June 4-8, 1995
 Plenary speaker, XIIth International Congress on Mathematical Physics, Brisbane, Australia, July 1997.
 CMS Winter Meeting, Victoria, December 1997
 Minicourse speaker, Monte Verità Rigorous Renormalization Conference, Switzerland, July 1998
 Plenary speaker, CRM Workshop ”Nonlinear dynamics and renormalization group”, August 1999.
 Aisenstadt Chair Lectureship, CRM, 1999–2000.
 Plenary speaker, Second Pacific Rim Conference on Mathematics, Taipei, Taiwan, January 2001.
 Meeting “Renormalization Group”, Oberwolfach, Germany, June 9-15, 2002 (two talks).
 Invited speaker, XIVth International Congress on Mathematical Physics, Lisbon, Portugal, July 2003.
 Jeffery–Williams Prize Lecture, Halifax, June, 2004.

CRM–Fields–PIMS Prize Lectures, Toronto, April, 2007, Montreal, October 2007, Vancouver, November, 2007.
 Invited speaker, Analysis and Stochastics in Quantum Many-Body Systems, MPI, Leipzig, May 2007.
 CAP-CRM Prize Lecture, 2007 Canadian Association of Physicists Congress, Saskatoon, June 2007.
 Invited session speaker, 2007 Canadian Association of Physicists Congress, Saskatoon, June 2007.
 CAP-CRM Prize Lecture, Montreal, October 2007.
 Andrejewski Lectureship, Universität Leipzig, June 2008.
 Invited main speaker, Constructive and Multiscale Methods in Quantum Theory, Universitaet Heidelberg, July 28–30, 2009.
 Invited speaker, Workshop on New Directions in Quantum Theory, Pauli Center for Theoretical Studies, Zurich, July 29-30, 2010.
 Invited minicourse speaker, Quantum Theory from Small to Large Scales, Ecole de Physique des Houches, Les Houches, France, August 2-27, 2010.
 Invited speaker, “Constructive Field Theory: from Condensed Matter to Quantum Gravity”, Institut Henri Poincaré, Paris 25-27 November 2015.
 Invited speaker, Oberwolfach Workshop “The Renormalization Group”, Germany, May 22-28, 2016.

Selected Publications

1. The Wightman Axioms and the Mass Gap for Weakly Coupled $(\phi^4)_3$ Quantum Field Theories, Ann. Physics **97**(1976), 80-135. (with K. Osterwalder)
2. Legendre Transforms and r-Particle Irreducibility in Quantum Field Theory: The Formalism for $r=1,2$, Ann. Phys. (N.Y.) **137**(1981), 146-209. (with A. Cooper and L. Rosen)
3. The Second Legendre Transform for the Weakly Coupled $P(\phi)_2$ Model, J. Math. Phys. **23**(1982), 1899-1916. (with A. Cooper and L. Rosen)
4. Bounds on Completely Convergent Euclidean Feynman Graphs, Commun. Math. Phys. **98** (1985), 273-288. (with J. Magnen, V. Rivasseau and R. Sénéor)
5. Bounds on Renormalized Feynman Graphs, Commun. Math. Phys. **100** (1985), 23-55. (with J. Magnen, V. Rivasseau and R. Sénéor)
6. A Renormalizable Field Theory: The Massive Gross-Neveu Model in Two Dimensions, Commun. Math. Phys. **103** (1986), 67-103. (with J. Magnen, V. Rivasseau and R. Sénéor)
7. Construction and Borel Summability of Infrared Φ_4^4 by a Phase Space Expansion, Commun. Math. Phys. **109** (1987), 437-480. (with J. Magnen, V. Rivasseau and R. Sénéor)
8. On the Large Order Behaviour of Φ_4^4 , Commun. Math. Phys. **116** (1988), 215-233. (with F. David and V. Rivasseau)
9. The Perturbatively Stable Spectrum of a Periodic Schrödinger Operator, Invent. math. **100** (1990) 259-300. (with H. Knörrer and E. Trubowitz)
10. Introduction to Constructive Quantum Field Theory, in *Proceedings of the International Congress of Mathematicians*, Kyoto, Japan, ed. H. Araki (1990) 1335-1341.
11. Perturbatively Unstable Eigenvalues of a Periodic Schrödinger Operator, Commentarii Mathematici Helvetici, **66** (1991) 557-579. (with H. Knörrer and E. Trubowitz)
12. The Flow of an Electron-Phonon System to the Superconducting State, Helvetica Physica Acta, **64** (1991) 214-357. (with E. Trubowitz)
13. There is No Two-dimensional Analogue of the Lamé Equation, Mathematische Annalen, **294** (1992) 295-324. (with H. Knörrer and E. Trubowitz)
14. An Infinite Volume Expansion for Many Fermion Green’s Functions, Helvetica Physica Acta, **65** (1992) 679-721. (with J. Magnen, V. Rivasseau and E. Trubowitz)

15. Renormalization in Classical Mechanics and Many Body Quantum Field Theory, *Journal d'Analyse Mathématique*, **58**(1992) 213-247. (with E. Trubowitz)
16. Two Dimensional Many Fermion Systems as Vector Models, *Europhysics Letters*, **24** (1993) 521-526 (with J. Magnen, V. Rivasseau and E. Trubowitz).
17. An Intrinsic $1/N$ Expansion for Many Fermion Systems, *Europhysics Letters*, **24** (1993) 437-442 (with J. Magnen, V. Rivasseau and E. Trubowitz).
18. Are There Two Dimensional Fermi Liquids? in *Proceedings of the XIth International Congress of Mathematical Physics*, D. Iagolnitzer ed., 440-444 (1995). (with H. Knörrer, D. Lehmann and E. Trubowitz)
19. Perturbation Theory around Non-nested Fermi Surfaces, I: Keeping the Fermi Surface Fixed, *Journal of Statistical Physics*, **84** (1996) 1209-1336. (with M. Salmhofer and E. Trubowitz)
20. Superconductivity in a Repulsive Model, *Helvetica Physica Acta*, **70** (1997) 154-191. (with H. Knörrer, R. Sinclair and E. Trubowitz)
21. An Improved Moser-Aubin-Onofri Inequality for Radially Symmetric Functions on S^2 , *Calculus of Variations and Partial Differential Equations*, **6**, 95-104 (1998). (with R. Froese, N. Ghoussoub and C. Gui)
22. Evaluation of fermion loops by higher residues, in *Singularities, Festband in honour of Prof. E. Brieskorn's 60th birthday*, *Progress in Mathematics* **162** (1998) 361-398. (with H. Knörrer, R. Sinclair and E. Trubowitz)
23. The Temperature Zero Limit, *Journal of Statistical Physics*, **94** (1999), 113-157. (with H. Knörrer, M. Salmhofer and E. Trubowitz)
24. A Nonperturbative Representation for Fermionic Correlation Functions, *Communications in Mathematical Physics*, **195**, 465-493 (1998). (with H. Knörrer and E. Trubowitz)
25. Regularity of Interacting Nonspherical Fermi Surfaces: The Full Self-Energy, *Communications on Pure and Applied Mathematics*, **LII**, 273-324 (1999). (with M. Salmhofer and E. Trubowitz)
26. Asymmetric Fermi Surfaces for Magnetic Schrödinger Operators, *Communications in Partial Differential Equations* **25** (2000), 319-336. (with H. Knörrer and E. Trubowitz)
27. An inversion theorem in Fermi surface theory, *Communications on Pure and Applied Mathematics*, **LIII**, 1350-1389 (2000). (with M. Salmhofer and E. Trubowitz)
28. Single Scale Analysis of Many Fermion Systems, Part 1: Insulators, *Reviews in Mathematical Physics*, **15** (2003), 949-994. (with H. Knörrer and E. Trubowitz)
29. Single Scale Analysis of Many Fermion Systems, Part 4: Sector Counting, *Reviews in Mathematical Physics*, **15** (2003), 1121-1169. (with H. Knörrer and E. Trubowitz)
30. A Two Dimensional Fermi Liquid, Part 1: Overview, *Commun. Math. Phys.* **247** (2004), 1-47. (with H. Knörrer and E. Trubowitz)
31. A Two Dimensional Fermi Liquid, Part 3: The Fermi Surface, *Commun. Math. Phys.* **247** (2004), 113-177. (with H. Knörrer and E. Trubowitz)
32. Particle-Hole Ladders, *Commun. Math. Phys.* **247** (2004), 179-194. (with H. Knörrer and E. Trubowitz)
33. Convergence of Perturbation Expansions in Fermionic Models, Part I: Nonperturbative bounds, *Commun. Math. Phys.* **247** (2004), 195-242. (with H. Knörrer and E. Trubowitz)
34. Convergence of Perturbation Expansions in Fermionic Models, Part II: Overlapping loops, *Commun. Math. Phys.* **247** (2004), 243-319. (with H. Knörrer and E. Trubowitz)
35. A Proof of Luttinger's Theorem, *Europhysics Letters* **72** (2005), 49-54. (with A. Praz, H. Knörrer and E. Trubowitz)

36. Singular Fermi Surfaces I. General Power Counting and Higher Dimensional Cases, *Reviews in Mathematical Physics* **20** (2008), 233–274. (with M. Salmhofer)
37. Singular Fermi Surfaces II. The Two-Dimensional Case, *Reviews in Mathematical Physics* **20** (2008), 275–334. (with M. Salmhofer)
38. A Functional Integral Representation for Many Boson Systems I: The Partition Function, *Annales Institut Poincaré* **9** (2008), 1229–1273. (with T. Balaban, H. Knörrer and E. Trubowitz)
39. Power Series Representations for Bosonic Effective Actions, *Journal of Statistical Physics* **134** (2009), 839–857. (with T. Balaban, H. Knörrer and E. Trubowitz)
40. Power Series Representations for Complex Bosonic Effective Actions I: A Small Field Renormalization Group Step, *Journal of Mathematical Physics* **51** (2010), 053305 (30 pages). (with T. Balaban, H. Knörrer and E. Trubowitz)
41. Power Series Representations for Complex Bosonic Effective Actions. II: A Small Field Renormalization Group Flow, *Journal of Mathematical Physics* **51** (2010), 053306 (20 pages). (with T. Balaban, H. Knörrer and E. Trubowitz)
42. The Temporal Ultraviolet Limit for Complex Bosonic Many-body Models, *Annales Institut Poincaré* **11** (2010), 151–350. DOI: 10.1007/s00023-010-0028-5 (with T. Balaban, H. Knörrer and E. Trubowitz)
43. Complex Bosonic Many-body Models: Overview of the Small Field Parabolic Flow, *Annales Institut Poincaré* **18** (2017), 2873–2903. arXiv:1609.00968 (with T. Balaban, H. Knörrer and E. Trubowitz)
44. The Small Field Parabolic Flow for Bosonic Many-body Models: Part 1 — Main Results and Algebra, *Annales Institut Poincaré* **20** (2019), 1–62. DOI 10.1007/s00023-018-0750-y arXiv:1609.01745, (with T. Balaban, H. Knörrer and E. Trubowitz)
45. The Small Field Parabolic Flow for Bosonic Many-body Models: Part 2 — Fluctuation Integral and Renormalization, *Annales Institut Poincaré* **20** (2019), 63–124. DOI 10.1007/s00023-018-0748-5 arXiv:1609.01746, (with T. Balaban, H. Knörrer and E. Trubowitz)
46. The Small Field Parabolic Flow for Bosonic Many-body Models: Part 4 - Background and Critical Field Estimates arXiv:1609.01748, 43 pages (with T. Balaban, H. Knörrer and E. Trubowitz)
47. Operators for Parabolic Block Spin Transformations, arXiv:1609.00971, 64 pages (with T. Balaban, H. Knörrer and E. Trubowitz)
48. Bloch Theory for Periodic Block Spin Transformations, arXiv:1609.00964, 21 pages (with T. Balaban, H. Knörrer and E. Trubowitz)
49. The Algebra of Block Spin Renormalization Group Transformations arXiv:1609.00966, 18 pages (with T. Balaban, H. Knörrer and E. Trubowitz)
50. Power Series Representations for Complex Bosonic Effective Actions. III. Substitution and Fixed Point Equations, *Annales Institut Poincaré Comb. Phys. Interact.* **6** (2019), 43–71. DOI 10.4171/AIHPD/64 arXiv:1609.00961. (with T. Balaban, H. Knörrer and E. Trubowitz)

Books

51. QED: A Proof of Renormalizability, *Springer Lecture Notes in Physics* **312**(1988), 176 pages. (with T. Hurd, L. Rosen and J. Wright)
52. *Mathematical Quantum Field Theory and Related Topics - Montreal 1987*, CMS Conference Series (of the AMS) **9**(1988). (edited with L. Rosen)
53. *Mathematical Quantum Theory I: Field Theory and Many-Body Theory*, CRM Proceedings & Lecture Notes **7** (1994). (edited with R. Froese and L. Rosen)
54. *Fermionic Functional Integrals and the Renormalization Group*, CRM Monograph Series of the American Mathematical Society, **16** (2002), 105 pages. (with H. Knörrer and E. Trubowitz).

55. Riemann Surfaces of Infinite Genus, CRM Monograph Series of the American Mathematical Society, **20** (2003), 296 pages. (with H. Knörrer and E. Trubowitz)

Most of my publications since 1992 are available at <http://www.math.ubc.ca/~feldman/>