

CURRICULUM VITAE
ALLAN H. MACDONALD

Full name: Allan Hugh MacDonald

Date and place of birth: December 1, 1951
Antigonish, Nova Scotia, Canada

Citizenships: Canadian and American

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Title: Sid W. Richardson Foundation
Regents Chair

Field of Specialization: Condensed Matter Theory

Employment:

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|-------------------------------|----------------------------------------------------------------------------------|
| September 1973 -- April 1978 | Ph.D. Student University of Toronto |
| May 1978 -- October 1980 | Research Associate --- National Research Council |
| November 1980 -- June 1982 | Assistant Research Officer -- National Research Council of Canada |
| August 1982 -- August 1987 | Associate Research Officer --- National Research Council of Canada |
| September 1987 -- August 1992 | Professor of Physics --- Indiana University |
| September 1992 -- August 2000 | Distinguished Professor of Physics --- Indiana University |
| September 2000 -- present | Sid W. Richardson Foundation Regents Chair --- The University of Texas at Austin |

Professional Activities:

1985-1986

Deputy Chair, Condensed Matter Division, Canadian Association of Physicists

1986-1987

Chair, Condensed Matter Division, Canadian Association of Physicists

1987-1988

Past Chair, Condensed Matter Division, Canadian Association of Physicists

1988-1992

Consultant for the Max Plank Institute for Solid State Research, Stuttgart

1990-1993

Member of the μ SR Experiment Evaluation Committee for TRIUMF

1993-1996

Chair of the μ SR Experiment Evaluation Committee for TRIUMF

1990

Editorial Board of Solid State Communications

1993

Member of Buckley Prize Committee for the American Physical Society

1994

Chair of the Buckley Prize Committee for the American Physical Society

1994

Divisional Associate Editor for Physical Review Letters

1995-1999

Member, Executive Committee, DCMP, American Physical Society

1997

Guest expert for European Science Foundation Meeting on the scientific case for the European Large Magnetic Field Facility (ELMF)

1997

Member of evaluation panel for a proposed high continuous magnetic field facility at Nijmegen for the Foundation for Fundamental Research on Matter (Netherlands)

1997

Member of NSF CAREER proposal review panel

1998

Member of NRC Subpanel for NIST Center for Neutron Research

Research Interests and Highlights:

My primary research interests center on the influence of electron-electron interactions on the electronic properties of metals and semiconductors. My research is driven, for the most part, by experiment rather than by theoretical technique. My technical interests cover a broad swath within the condensed matter theory subfield, ranging from pragmatic techniques for electronic structure calculations on the more traditional side to the more trendy field theoretical approaches. In the following paragraph, I briefly summarize the topics on which I have worked.

My Ph.D. thesis research, performed under the supervision of S. H. Vosko at the University of Toronto, was part of a body of work in the late 1970's which demonstrated the power of spin-density-functional based approximations in describing many ground state properties of metallic magnets. One aspect of my thesis work was a relativistic generalization of the Hohenberg-Kohn-Sham density functional theory, reported in a paper ([11]) which is still regularly cited. My postdoctoral research work, performed at the laboratories of the National Research Council of Canada and motivated in part by experimental work in that lab, centered on the lattice dynamics and transport properties of metals. This work brought our understanding of carrier-carrier scattering effects in simple metals to a quantitative level for the first time and identified ([20]) phonon-mediated scattering as a dominant process in many metals. The work on transport theory in metals led to an interest in the quantum Hall effect, a transport anomaly which occurs in degenerate two-dimensional semiconductor systems in strong magnetic fields. My first work in this area ([48]) was carried out while visiting with Maurice Rice at the ETH in Zurich. It focused on some perplexing questions concerning the spatial distribution of current in the quantum Hall regime which subsequently received a great deal of attention. The following summer, while working at the physics center in Trieste in collaboration with Pavel Streda, I wrote an early paper ([61]) on the relationship between the Kubo formula description of the integer quantum Hall effect, which was being developed by Streda, Thouless, and others, and the edge state picture, being developed by Laughlin, Halperin and others.

By this time my primary interest had shifted from transport theory to the many-body physics problem underlying the fractional quantum Hall effect, namely the problem of interacting electrons in a macroscopically degenerate Landau level which can be tackled only with non-perturbative techniques. Working with Steve Girvin and Phil Platzman in Aspen in 1984, I employed a sum rule approach ([79]) similar to that used by Feynman for liquid Helium to address the collective excitations of fractional Hall states. In collaboration with Mark Rasolt ([84]), I used a similar approach to look at Goldstone modes in the broken symmetry states which frequently arise in the fractional Hall regime when the electrons possess additional degrees of freedom. Steve Girvin and I pointed out ([92]) an unusual long-range-order property in Laughlin's quantum Hall states. This paper was the harbinger of Chern-Simons field theory approaches to fractional Hall effect theory. In 1990 I proposed ([111]), on the basis of microscopic considerations, that the description of the low energy physics of fractional Hall edge required, in general, multi-branch one-

dimensional Fermion models. This year also marked a return to my interest in broken symmetries in fractional Hall systems with additional degrees of freedom. I pointed out that ([122]) that double-layer quantum Hall systems could have a broken symmetry in their ground state like that in easy plane ferromagnets and estimated the phase boundary which delimited the stability region of the broken symmetry states. More recent work on this topic ([190]) has focused on the properties of these states when a magnetic field is applied in the plane of the 2D electron layers. With René Côté I developed ([130]) techniques, originally applied to the Wigner crystal state, which enabled accurate calculations of physical properties of electronic states in the quantum Hall regime with broken translational symmetry. These techniques have provided the backbone for a series of recent calculations ([199]) of the properties of skyrmion crystal states in quantum Hall ferromagnets.

In recent years, a smaller fraction of my research effort has been devoted to the fractional quantum Hall effect. In collaboration with students at Indiana University, I have completed work on the vortex-lattice melting transition ([173]), and on microscopic properties of the mixed state of type-II superconductors. I maintain an interest in the properties of two-dimensional electronic systems, in both zero field and strong field limits. I have also returned to the subject of my thesis research, metallic magnetism. I am particularly interested in the transport properties of metallic magnets, and at present, especially the properties of magnetic tunnel junctions.

The numbers above refer to the publication list below.

Conferences and Symposia Organized:

International Conference on Transport in Metals, Ottawa, 1981
(Member of Local Organizing Committee)

Fall Symposium of the Canadian Association of Physicists, Ottawa, 1985 (Director)

Summer Workshop on the Physics of Artificially Structured Materials, Kingston,
1986 (Director)

NATO ASI on Quantum Wells and Superlattices, Banff, 1987
(Member of Organizing Committee)

7th International Conference on Electronic Properties of Two Dimensional Systems,
New Mexico, 1987 (International Advisory Committee)

Aspen Workshop on Quantum Transport in Restricted Geometries, Aspen,
Colorado, 1990 (Co-organizer)

9th International Conference on Electronic Properties of Two-Dimensional
Systems, Newport RI, June 1993 (Program Committee)

11th International Conference on Semiconductors in a Magnetic Field, Boston MA,
August 1994 (Program Committee)

10th International Conference on Electronic Properties of Two-Dimensional
Systems, Nottingham UK, June 1995 (International Advisory Committee)

Aspen Winter Conference on Condensed Matter, January 1997, Aspen Colorado

13th International Conference on Semiconductors in a Magnetic Field, Nijmegen,
The Netherlands, August 1998 (International Advisory Committee)

Institute for Theoretical Physics program on “Interaction and Disorder in Quantum
Hall and Mesoscopic Systems,” August to December 1998

Scholarships and Honors:

President's Scholarship, St. Francis Xavier University, 1969–1973

Governor-General's Medal, St. Francis Xavier University, 1973
(Highest academic standing in graduating class)

NSERC 1967 Science Scholarship, University of Toronto, 1973–1977

Herzberg Medal, 1987 (Awarded by the Canadian Association of Physicists)

Fellow of the American Physical Society, 1989

Invited Talks at Conferences and Workshops

1. "Electron-electron Interactions in Simple-metals and Transition-metals," International Conference on Transport in Metals, Ottawa, 1981.
2. "Relativistic Effects in Metals," NATO ASI on Relativistic Effects in Atoms, Molecules, and Solids, Vancouver, 1981.
3. "The Quantum Hall Effect," Workshop in Condensed Matter Physics, International Center for Theoretical Physics, Trieste, Italy, 1983.
4. "Classical Plasmas, Quantum Fluids and the Fractional Quantum Hall Effect," Canadian Association of Physicists Congress, Fredericton, 1985.
5. "The Fractional Quantum Hall Effect," Gordon Research Conference on Disordered Materials, Wolfboro, N.H., 1986.
6. "The Fractional Quantum Hall Effect," 5th International Conference on Progress in Many-Body Theories, Oulu, Finland, 1987.
7. "Electrons in Strong Magnetic Fields," Canadian Association of Physicists Congress, Toronto, 1987.
8. "Fibonacci Superlattices," NATO ASI on Interfaces, Superlattices and Quantum Wells, Banff, Alberta, 1987.
9. "Landauer Formulas and the Quantum Hall Effect," Workshop on Quantum Electrical Engineering, Minnesota, October 1988.
10. "The Quantum Hall Effect," Solid State Physics Conference, Santiago, Chile, January 1989.
11. "Off-Diagonal Long Range Order in the Quantum Hall Effect," March Meeting of the American Physical Society, St. Louis, 1989.
12. "Fractional Hall Effect in Multi-Component Systems," Eighth International Conference on the Electronic Properties of Two-Dimensional Systems, Grenoble, 1989.
13. "The Quantum Hall Effects," NATO ASI on Quantum Coherence in Mesoscopic Systems, Les Arcs France, April 1990.
14. "Half the Story," Yale 2D Mini, Yale University, October 1990.
15. "The 2D Wigner Crystal," Midwest Solid State Theory Meeting, Northwestern University, October 1990.

16. "Many-Body Physics in a Strong Magnetic Field," Solid State Physics Conference, Santiago, Chile, January 1991.
17. "Many-Body Physics in a Strong Magnetic Field," Many-Body Workshop, International Center for Condensed Matter Physics, Brazilia, Brazil, January 1991.
18. "Edge Electronic Structure in the Fractional Hall Regime," Workshop on Mesoscopic Physics, Institute for Theoretical Physics, Santa Barbara, California, May 1991.
19. "The Quantum Hall Effects," Gordon Godfrey Workshop on Condensed Matter Physics, University of New South Wales, Sydney Australia, July 1991.
20. "Facts and Fantasies in FQHE Theory," Nanostructures Workshop, National Research Council of Canada, Ottawa, Canada, August 1991.
21. "Facts and Fantasies in FQHE Theory," International Conference on Physics in Two Dimensions, Neuchatel, Switzerland, August 1991.
22. "Electron Liquids and Solids in Very Strong Magnetic Fields," Mauterndorf Winterschool, Mauterndorf Austria, February 1992.
23. "Edge Electronic Structure in the Fractional Hall Regime," Max Planck -- Chernagolovka Joint Workshop on Solid State Physics, Schloss Ringburg, Germany, May 1992.
24. "The Fractional Quantum Hall Effect," China Center for Advanced Science and Technology Summer School in Condensed Matter Physics, Beijing China, June 1992.
25. "Photoluminescence in the Fractional Hall Regime," Gordon Godfrey Workshop on Condensed Matter Physics, Sydney Australia, July 1992.
26. "Superconductivity in Extremely Strong Magnetic Fields," Argonne Workshop on Superconductivity, Argonne, August 1992.
27. "Lectures on the Quantum Hall Effect," Australian National University Physics Summer School: Modern Perspectives in Many-Body Physics, Canberra, Australia, 11-29 January 1993.
28. "Do Superconductors Superconduct?" Atlantic Undergraduate Physics Conference, Antigonish Nova Scotia, February 1993.
29. "Magnetoplasmons, Magnetorotons, and Magnetoexcitons," March Meeting of the American Physical Society, Seattle, March 1993.

30. "Coherent Interlayer Tunneling in Double-Layer Quantum Hall Systems," International Workshop on Magnetotransport in Structured Inversion Layers, Bad Lauterberg, Germany, June 1993.
31. "Vortex-lattice Melting," MISCON Workshop on Type-II Superconductivity, Notre Dame University, July 1993.
32. "Spontaneous Interlayer Coherence in Double-Layer Systems," Workshop to Commemorate the 30th Anniversary of Solid State Communications, Oxford University, September 1993.
33. "One and One-half: Frontiers in FQHE Theory," 4th ISSP International Symposium: Frontiers in High Magnetic Fields, Tokyo, November 1993.
34. "Commensurate-Incommensurate Phase Transitions in Double-Layer Quantum Hall Systems," ENFISOL-4, Santiago Chile, January 1994.
35. "Spontaneous Interlayer Coherence in Double-Layer Quantum-Hall Systems," Workshop on Half-Filled Landau Levels, University of Minnesota, April 1994.
36. "Introduction to the Quantum Hall Effect," Four lectures during the Spring College on Condensed Matter Physics, International Center for Theoretical Physics, Trieste, Italy, May 1994.
37. "Introduction to the Quantum Hall Effect," Five lectures during the Les Houches Summer School on Mesoscopic Physics, Les Houches, France, July 1994.
38. "Spontaneous Interlayer Coherence in Double-Layer Quantum Hall Systems," Technion Advanced Research Workshop on Free Electrons in Nanostructures, Nof Ginosar, Israel, October 1994.
39. "Some Recent Results in Fractional Quantum Hall Effect Theory," Three Lectures at the Winter School on Recent Developments in Quantum Many-Body Physics, Bangalore, India, January 1995.
40. "Novel Physics in Double-Layer Quantum Hall Systems," Workshop on Novel Physics in Low-Dimensional Electron Systems, Madras, India, January 1995.
41. "Current Problems in the Theory of The Fractional Quantum Hall Effect," Three Lectures at the Brazilian Workshop on Semiconductor Physics, Rio de Janeiro, Brazil, July 1995.
42. "Quantum Hall Ferromagnetism," Workshop on Quantum Transport Theory and Quantum Chaos, Erwin Schroedinger Institute, Vienna, Austria, August 1995.

43. "Current Problems in the Theory of The Fractional Quantum Hall Effect," Four lectures at the NATO ASI on Transport in Submicron Semiconductor Structures, Bad Lauterberg, Germany, August 1995.
44. "Skyrme Crystals," Workshop on New Developments in the Quantum Hall Effect, Minneapolis MN, May 1996.
45. "Excitonic Bose Condensation in 2D Electron-Hole Double-Layer Systems," Nobel Symposium "Heterostructures in Semiconductors," Arild, Sweden, June 1996.
46. "Excitonic Bose Condensation in 2D Electron-Hole Double-Layer Systems," ECAMI Workshop, Ottawa, June 1996.
47. "2D to 2D Tunneling," Workshop on 2D Electron Systems, Pisa Italy, June 1996.
48. "Excitonic Bose Condensation in 2D Electron-Hole Double-Layer Systems," Low-Dimensional Electron System Workshop, Trieste, Italy, July 1996.
49. "Skyrme Crystals in Quantum Hall Ferromagnets," International Conference on High Magnetic Fields in Semiconductor Physics, Wurzburg, Germany, July 1996.
50. "Vortex Solids and Vortex Fluids in the Lowest Landau Level Approximation," Workshop on Fluctuation Phenomena in High Temperature Superconductors, Trieste, Italy, August 1996.
51. "Three Lectures on the Fractional Quantum Hall Effect," French "GDR" school, Aussois, France, June 1997.
52. "Strong Correlations in a Landau Band: The Fractional Quantum Hall Effect and Beyond," Asia Pacific Center for Theoretical Physics Summer School on Strong Correlation and High Temperature Superconductivity, Seoul, Korea, June 1997.
53. "Strong Correlations in Electronic Systems," Ninth International Conference on Recent Progress in Many-Body Theories, Sydney Australia, July 1997.
54. "Excitonic Condensates in Electron-Hole Double Layers," European Physical Society General Meeting, Leuven, Belgium, August 1997.
55. "Pseudospin Anisotropy and Hysterisis in Quantum Hall Ferromagnets," XXII Condensed Matter Theories Workshop, Nashville, Tennessee, June 1998.
56. "Pseudospin Anisotropy and Hysterisis in Quantum Hall Ferromagnets," INFM Workshop on Semiconductor Nanostructures, Pisa, Italy, June 1998.
57. "Weak Disorder in Strongly Interacting 2D Electron Systems," CECAM Workshop on Coupled 2D Electron Layers, Torino, Italy, June 1998.

58. "Pseudospin Anisotropy and Hysterisis in Quantum Hall Ferromagnets," INFM Annual Meeting, Rimini, Italy, June 1998.
59. "Spin-Dependent Tunneling in Metals and Semiconductors," APS March Meeting, Atlanta, March 1999.
60. "Quantum Hall Stripe State Physics," Workshop on New Developments in the Quantum Hall Effect, University of Minnesota, May 1999.
61. "Spin-dependent Transport in Metals and Semiconductors," Sitges Conference on Statistical and Dynamic Aspects of Mesoscopic Systems, Sitges, Spain, June 1999.
62. "Optical Properties of Quantum Hall Ferromagnets," NATO ARW on Optical Properties of Semiconductor Nanostructures, Ustron-Jaszowiec, Poland, June 1999.
63. Lectures on Quantum Hall Ferromagnets, Winter School J.J. Giambiagi, Physics Department, University of Buenos Aires, Argentina, July 1999.
64. "Quantum Hall Stripe State Physics," Workshop on Interactions and Quantum Transport of Lower Dimensional Systems, Hamburg, Germany, July 1999.
65. "Quantum Hall Stripe State Physics," Conference on Quantum Phases in Electron Systems of Low Dimensions, Trieste, Italy, July 1999.
66. Lectures on Quantum Hall Ferromagnets, School on Exotic States in Quantum Nanostructures, London, England, August 1999.
67. "Quantum Hall Stripe State Physics," Trends in Condensed Matter Physics (A Celebration of the 65th Birthday of David Thouless), Seattle, Washington, September 1999.
68. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," 1st Washington Spintronics Conference, Washington DC, July 2000.
69. "de-Haas van Aalphen Oscillations in the Mixed State," Boulder Summer School in Condensed Matter Physics, Boulder, Colorado, July 2000.
70. "Quantum Description of Ferromagnetic Metal Nanoparticles," Spintronics Workshop, Cortona, Italy, July 2000.
71. "Superfluid properties of quantum Hall ferromagnets," Conference on Semiconductors in Strong Magnetic Fields, Matsue, Japan, September 2000.
72. "Quantum Description of Ferromagnetic Metal Nanoparticles," Nanophysics Workshop, Ascona, Switzerland, October 2000.

73. "Superfluid Properties of Quantum Hall Ferromagnets," Low Dimensional Electron Workshop, Tokyo, Japan, February 2001.
74. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Advanced Research Workshop, Queenstown, New Zealand, February 2001.
75. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Low Dimensional Electron Workshop, Seoul, Korea, February 2001.
76. "Quantum Description of Ferromagnetic Metal Nanoparticles," Nanoscience Workshop, National Center of Nanoscience, Beijing, China, June 2001.
77. "Quantum Description of Ferromagnetic Metal Nanoparticles," Nanoscience Workshop, University of Science & Technology, Hefei, China, June 2001.
78. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Semiconductor Physics Workshop, Janczowic, Poland, June 2001.
79. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Workshop on Quantum Materials, Hamburg, Germany, June 2001.
80. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Future of Microelectronics Workshop, Ile de Bendor, France, June 2001.
81. " $\text{III}_{1-x}\text{Mn}_x\text{V}$ Ferromagnetism: Semiconductor Spintronics," Washington Spintronics Workshop, Washington, August 2001.
82. "Charge Fluctuations in Quantum Hall Bilayers and Underdoped Cuprates," Strongly Correlated Electron Workshop, Ann Arbor, Michigan, August 2001.
83. "Quantum Description of Ferromagnetic Metal Nanoparticles," Nanoscience Workshop, Institute for Theoretical Physics, Santa Barbara, California, August 2001.
84. "Charge Fluctuations in Quantum Hall Bilayers and Underdoped Cuprates," Correlated Electron Workshop, Kashiwa, Japan, October 2001.
85. "Quantum Hall Quantum Bits," Decoherence Mechanism Workshop, Austin, Texas, October 2001.
86. "Ferromagnetic Semiconductors," Nanophase Materials Science Workshop, Oak Ridge, Tennessee, October 2001.

87. "Ferromagnetism and Superfluidity in Bilayer QH Systems," International Symposium: Quantum-Hall-Effect and Heterostructures, University of Würzburg, Germany, December 2001.
88. "Ferromagnetism in Diluted Magnetic Semiconductors and Transition Metal Ferromagnets," National Science Foundation US-Italy Conference, Washington, D.C., March 2002.
89. "Ferromagnetic Semiconductors," DARPA SPINS Workshop, Vanderbilt University, Nashville, Tennessee, February 2002.
90. "Spintronics in Quantum Hall Ferromagnets," Workshop on Spins and Interactions in Mesoscopic Systems, Minneapolis, Minnesota, May 2002.
91. "Ferromagnetism in Magnetically Doped Semiconductors," Nanostructures and Quantum Phenomena Workshop, Beijing, China, June 2002.
92. "Spintronics in Quantum Hall Ferromagnets," Quantum Phenomena Workshop, Xian, China, June 2002.
93. "Ferromagnetic Semiconductors," Gordon Research Conference on Magnetic Nanostructures, Colby College, Waterville, Maine, June 2002.
94. "Spintronics," New Directions in Mesoscopics NATO Advanced Study Institute, Erice, Sicily, July 2002.
95. "Spintronics in Quantum Hall Ferromagnets," Nanophase Workshop, Erice, Sicily, July 2002.
96. "Spintronics in Quantum Hall Ferromagnets," Plenary Lecture at the International Conference on the Physics of Semiconductors, Scotland, August 2002.
97. "Spintronics in Quantum Hall Ferromagnets," International Conference on Low Temperature Physics, Hiroshima, Japan, August 2002.
98. "Spintronics in Semiconductors" a series of 3 lectures, DARPA, Ft. Lauderdale, FL., Sept. 2002
99. "Magnetic Semiconductors" (LEES) Low Energy Electrodynamics in Solids, New York, NY, Oct. 2002.
100. "Weak-Coupling Theory of Underdoped Cuprates", Aspen Winter Conference, Buffalo, NY, Feb. 2003.
101. "Weak-Coupling Theory of Underdoped Cuprates", Canadian Institute of Advanced Research, Spring Workshop, Vancouver, Canada, May 2003.

102. “The Bosan FQHE:Rapidly Rotating Cold Atoms” Collective Transport in Bilayer Quantum Hall Systems, University of Pisa, Pisa, IT, June 2003.
103. “Ferromagnetism in Diluted Magnetic Semiconductors”, High Magnetic Field Lab, Grenoble, France, June, 2003.
104. “Phenomenological Models of DMS Ferromagnetism”, CECAM Workshop on Ferromagnetic Semiconductors, Lyon, France, June 2003.
105. “The Bosan FQHE: Rapidly Rotating Cold Atoms”, University of Kalshure, Germany. June 2003.
106. “The Bosan FQHE: Rapidly Rotating Cold Atoms”, International Conference on the Quantum-Hall Effect, Past, Present and Future, Stuttgart, Germany, July 2003.
107. “Spintronics in Semiconductors” a series of 3 lectures, Boulder Condensed Matter Physics School, Boulder, CO, July 2003
108. “Collective Transport in Bilayer Quantum Hall Systems”, 15th International Conferences on Electronic Properties of Two-Dimensional Electron Systems, Nara, Japan, July 2003.

Seminars and Colloquia

1. "Relativistic Density Functional Formalism,"
National Research Council, Ottawa, February 1978.
2. "Relativistic Density Functional Formalism,"
Argonne National Labs., Argonne, Ill., January 1979.
3. "Electron-Electron Scattering in Metals,"
Dalhousie University, Halifax, N.S., January 1980.
4. "Electron-Electron Scattering in Metals,"
St. Francis Xavier University, Antigonish, N.S., January 1980.
5. "Electron-Electron Scattering in Metals,"
Queen's University, Kingston, Ont., February 1980.
6. "Umklapp Electron-Electron Scattering in the Alkali Metals,"
University of Ottawa, Ottawa, September 1980.
7. "Susceptibility Anisotropy in Transition-Metal Dichalcogenides,"
Michigan State University, East Lansing, Mich., November 1980.
8. "Alkali Metal Quasiparticle Dynamics,"
National Research Council, Ottawa, November 1980.
9. "Umklapp Electron-Electron Scattering in the Alkali Metals,"
University of Alberta, Edmonton, January 1981.
10. "Susceptibility Anisotropy in Transition Metal Dichalcogenides,"
University of Alberta, Edmonton, January 1981.
11. "Susceptibility Anisotropy in Transition Metal Dichalcogenides,"
Simon Fraser University, Edmonton, January 1981.
12. "Point Contact Spectroscopy,"
Oak Ridge National Lab., Oak Ridge, Tenn., October 1981.
13. "Point Contact Spectroscopy,"
University of Toronto, Toronto, November 1981.
14. "Point Contact Spectroscopy,"
Max-Planck Institut, Stuttgart, FRG, November 1982.
15. "Quantum Hall Effect in a Periodic Potential,"
University of Geneva, Geneva, Switzerland, February 1983.

16. "Quantum Hall Effect in a Periodic Potential,"
Imperial College, London, England, May 1983.
17. "Quantum Hall Effect in a Periodic Potential,"
University of Bristol, Bristol, England, May 1983.
18. "Quantum Hall Effect in a Periodic Potential,"
Daresbury National Lab., Daresbury, England, May 1983.
19. "Quantum Hall Effect in a Periodic Potential,"
Cambridge University, Cambridge, England, May 1983.
20. "Quantum Hall Effect in a Periodic Potential,"
Free University of Amsterdam, Amsterdam, May 1983.
21. "Quantum Hall Effect in a Periodic Potential,"
E.T.H. Zurich, Zurich, Switzerland, June 1983.
22. "Edge States and the Quantum Hall Effect,"
Dalhousie University, Halifax, N.S., October 1983.
23. "Edge States and the Quantum Hall Effect,"
St. Francis Xavier University, Antigonish, N.S., October 1983.
24. "Edge States and the Quantum Hall Effect,"
University of Sherbrooke, Sherbrooke, P.Q., February 1984.
25. "Edge States and the Quantum Hall Effect,"
McGill University, Montreal, P.Q., February 1984.
26. "The Fractional Quantum Hall Effect,"
University of Toronto, Toronto, October 1984.
27. "The Fractional Quantum Hall Effect,"
Cornell University, Ithaca, NY, October 1984.
28. "The Fractional Quantum Hall Effect,"
McMaster University, Hamilton, November 1984.
29. "The Fractional Quantum Hall Effect,"
University of Illinois, Urbana, Ill., February 1985.
30. "The Fractional Quantum Hall Effect,"
IBM T.J. Watson Research Center, Yorktown Heights, NY, March 1985.

31. "The Fractional Quantum Hall Effect,"
Max-Planck Institute, Grenoble, France, May 1985.
32. "The Fractional Quantum Hall Effect,"
L'Ecole Normale Superieure, Paris, France, May 1985.
33. "The Fractional Quantum Hall Effect,"
University of Manitoba, Winnipeg, Manitoba, October 1985.
34. "The Fractional Quantum Hall Effect,"
Memorial University of Newfoundland, St. John's, Newfoundland, October 1985.
35. "The Fractional Quantum Hall Effect,"
Queen's University, Kingston, Ontario, November 1985.
36. "The Fractional Quantum Hall Effect,"
University of Hong Kong, Hong Kong, February 1986.
37. "The Fractional Quantum Hall Effect,"
University of Kyushu, Fukuoka, Japan, February 1986.
38. "Collective Excitations in the Fractional Quantum Hall Effect,"
Research Institute for Iron, Steel and Other Metals, Sendai, Japan, March 1986.
39. "The Fractional Quantum Hall Effect,"
Tohoku University, Sendai, Japan, March 1986.
40. "Collective Excitations in the Fractional Quantum Hall Effect," Institute for
Solid State Physics, Tokyo, Japan, March 1986.
41. "The Fractional Quantum Hall Effect,"
Electrotechnical Institute, Tsukuba, Japan, March 1986.
42. "Density-wave Instabilities and Thermoelectric Parameters in the Alkali
Metals,"
National Bureau of Standards, Washington, DC, April 1986.
43. "Collective Excitations in the Fractional Quantum Hall Effect,"
Brown University, Providence, RI, April 1986.
44. "Fractional Quantum Hall Effect,"
SUNY at Buffalo, October 1986.

45. "Fractional Quantum Hall Effect,"
University of Western Ontario, London, October 1986.
46. "Fractional Quantum Hall Effect,"
University of Florida, January 1987.
47. "Fractional Quantum Hall Effect,"
MPI fur Festkorperforschung, Stuttgart FRG, January 1987.
48. "Raman Scattering in Fibonacci Superlattices,"
MPI fur Festkorperforschung, Stuttgart FRG, January 1987.
49. "ODLRO and the Fractional Quantum Hall Effect,"
ETH-Zurich, Switzerland, January 1987.
50. "Fractional Quantum Hall Effect,"
Ottawa, February 1987.
51. "Raman Scattering in Fibonacci Superlattices,"
University of California at Davis, Davis CA, February 1987.
52. "Raman Scattering in Fibonacci Superlattices,"
Indiana University, Bloomington IN, February 1987.
53. "Raman Scattering in Fibonacci Superlattices,"
Waterloo University, March 1987.
54. "Raman Scattering in Fibonacci Superlattices,"
University of Alberta, Edmonton Alberta, April 1987.
55. "The Fractional Quantum Hall Effect,"
University of Toronto, October 1987.
56. "The Fractional Quantum Hall Effect,"
University of Kentucky, November 1987.
57. "Fractional Quantum Hall Effect,"
Oak Ridge National Lab, November 1987.
58. "The Two-Component Fractional Quantum Hall Effect,"
University of Michigan, February 1988.
59. "The Two-Component Fractional Quantum Hall Effect,"
University of Illinois, April 1988.

60. "The Two-Component Fractional Quantum Hall Effect,"
MPI fur Festkorperforschung, Stuttgart FRG, June 1988.
61. "ODLRO in the FQHE and Quantum Spin Systems,"
MPI fur Festkorperforschung, Stuttgart FRG, June 1988.
62. "The Quantum Hall Effect,"
Oulu, Finland, June, 1988.
63. "Landauer Formulas and the Quantum Hall Effect,"
National Research Council, Ottawa, Canada, October 1988.
64. "Landauer Formulas and the Quantum Hall Effect,"
Argonne National Lab, January 1989.
65. "Landauer Formulas and the Quantum Hall Effect,"
IBM T.J. Watson Labs, February 1989.
66. "Landauer Formulas and the Quantum Hall Effect,"
Indiana University, February 1989.
67. "The Quantum Hall Effect,"
IUPUI, April 1989.
68. "The Fractional Hall Effect in Two-Layer and Multilayer Systems,"
University of Minnesota, April 1989.
69. "The Quantum Hall Effect,"
Indiana State University, April 1989.
70. "The Fractional Hall Effect in Two-Layer and Multilayer Systems,"
Ohio State University, April 1989.
71. "The Fractional Hall Effect in Two-Layer and Multilayer Systems,"
AT&T Bell Labs, June 1989.
72. "t/U Expansion of the Hubbard Model,"
MPI fur Festkorperforschung, Stuttgart FRG, July 1989.
73. "The Fractional Hall Effect,"
University of Hamburg, Hamburg FRG, July 1989
74. "Edge Magnetoplasmons in the Quantum Hall Regime,"
Yale University, November, 1989.

75. "Edge Magnetoplasmons in the Quantum Hall Regime," AT&T Bell Labs, Holmdel NJ, January 1990.
76. "Edge Magnetoplasmons in the Quantum Hall Regime," MPIF, Stuttgart FRG, May 1990.
77. "Photoluminescence in the fractional quantum Hall regime," MPIF, Stuttgart FRG, June 1990.
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97. "Magnetic Oscillations in Fractional Hall Dots,"
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122. "Vortices in s-wave and d-wave superconductors," University of British Columbia, Vancouver, December 1994.
123. "Spontaneous Interlayer Coherence in Double-Layer Quantum-Hall Systems," University of Minnesota, Minneapolis, December 1994.
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128. "Spontaneous Interlayer Coherence in Double-Layer Quantum Hall Systems," Universidad Autonoma de Madrid, Madrid, Spain, May 1995.
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132. "Is there Off-Diagonal-Long-Range-Order in the Mixed State of a Type-II Superconductor," MISCON group meeting, Columbia Missouri, July 1995.
133. "Skyrmions without Sigma Models," Indiana University, September 1995.
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Seagate Recording Heads, Minneapolis, May 1999.
170. "New Surprises in Quantum Hall Physics,"
Brown University, Providence, Rhode Island, September 1999.
171. "Superfluid Properties of Quantum Hall Ferromagnets,"
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