

Alexander Seidel

April, 2024

Personal facts :

Alexander Seidel
Physics Department, CB 1105
Washington University
1 Brookings Drive
St. Louis, MO 63130-4899, USA
Phone:(314) 935-8933
Fax: (314) 935-6219
Office: 355 Compton

Education:

2003 PhD in Physics received from MIT in September 2003,
Thesis Advisor: Prof. Patrick A. Lee

1997 Vordiplom (=Intermediate Diploma) in physics
University of Bayreuth, Germany

1994-1995 Military Service

Employment:

July 2022– :
Professor, Department of Physics,
Washington University in St Louis

Jan 2015-June 2015:
Guest Scientist,
Max Planck Institute for Complex Systems, Dresden, Germany

July 2013-June 2022:

Associate Professor, Department of Physics,
Washington University in St Louis

2008-2013 Assistant Professor, Department of Physics,
Washington University in St Louis

2006-2007 Postdoctoral Associate at the National High Magnetic
Field Laboratory, Tallahassee

2003-2006 Postdoctoral Fellow at U.C. Berkeley/LBNL,
since September 2003, working in Prof. Dung-Hai Lee's group

1999-2003 Research Assistant, MIT Condensed Matter Theory Group
Advisor: Prof. Patrick Lee

Scholarships and Awards:

2024 Outstanding Faculty Award, Washington University in St. Louis

2022, Oct-Dec
Visiting Professor, TUM Global Visiting Professor Program

1994-2001 Scholar of the Studienstiftung des Deutschen Volkes
(German National Scholarship Foundation)

Grants:

2020-2023 *Microscopic Theories of Quantum Matter*, National Science Foundation,
DMR Grant No. 2029401, 12/01/20-11/30/24, \$315,000

2012-2015 *Properties of topologically ordered matter*, National Science Foundation,
DMR Grant No. 1206781, 09/01/12-08/31/15, \$300,000

2009-2012 *Properties of topologically ordered matter*, National Science Foundation,
DMR Grant No. 0907793, 07/19/09-07/18/12, \$240,000

2007 I2CAM Travel Award, \$1,500

As Co-PI:

2024-2025 Speed Award, *First Steps towards Multiscale AI for Discovery in Complex Quantum Materials and Technologies*, Washington University in St. Louis, 06/01/2024 - 05/31/2025, \$49,831 (PI: Zohar Nussinov)

2021-2025 *Imaging Goggles for Fluorescence-Guided Surgery*, National Institutes of Health, 04/01/2021 - 03/31/2025, \$2,205,566 (PI: Samuel Achilefu)

2010-2011 *Theory of Topological Optical One-Way Waveguides*, Center For Materials Innovation, 08/31/10 – 08/31/11, \$49727.77, Co-PI with Jung-Tsung Shen

2009-2010 *A Controlled Study of Frustrated Magnetism in Layered Triangular Antiferromagnets*, Center For Materials Innovation, 08/31/09 – 08/31/10, \$38,220, Co-PI with S. Solin and Z. Nussinov

2008-2009 *A Controlled Study of Frustrated Magnetism in Layered Triangular Antiferromagnets*, Center For Materials Innovation, 08/31/08-08/31/09, \$30,000, Co-PI with S. Solin and Z. Nussinov

Research interests:

strongly correlated electron systems
topological phases
fractional quantum Hall effect
frustrated quantum magnetism
physics in reduced dimensions
topology and geometry in condensed matter physics

anyons
flat band solids
fractional Chern insulators
bosonization
entanglement in condensed matter
exactly solvable model systems

Synergistic activities:

Refereeing

npj Quantum Materials
Communications Physics (Nature)
Physical Review Letters
Physical Review B
Europhysics Letters
Journal of Statistical Mechanics
New Journal of Physics
The National Science Foundation
Foundation for Fundamental Research on Matter (Netherlands)
Oxford University Press, the International Center for Advanced
Renewable Energy and Sustainability
Journal of Physics: Conference Series
Journal of Physics B: Atomic, Molecular and Optical Physics;

Editorial work

(2017-present)

Frontiers in Physics (impact factor: 2.638), Review Editor

(2021-2023)

Symmetry (impact factor: 2.713), Guest Editor
Special issue: "*Symmetry and Quantum Orders*"

Organizing

(2021)

Summer Colloquium Series on
“Thermalization and Equilibration Dynamics In Quantum and Classical Many-Body Systems”
co-organizer: Alioscia Hama, UMB

Diversity Outreach

(2016-2018)

Co-organizer and of a post-baccalaureate program in Mathematics, Physics, and Earth and Planetary Sciences at Washington University in St. Louis, aiming to increase the enrollment of traditionally underrepresented and underserved minorities in STEM areas at Washington University and elsewhere

(2016-present)

Mentor at the National Mentoring Community program of the American Physical Society

WashU Community Activities

(2018-present)

Coach for the annual William Lowell Putnam Mathematical Competition

Key Departmental Roles

(2018-present)

Chair of the Physics Graduate Admissions Committee

(2011-present)

Member of the Chair’s Advisory/Executive Committee

Center Memberships

(2019-present)

Center for Quantum Sensors, WashU

Other Memberships

(2003-present)

American Physics Society

Graduate students supervised:

John Flavin (PhD 2012 → SADAR 3D → WashU Neuroinformatics

→ The Climate Corporation)

Julia Wildeboer (PhD 2013 → NHMFL → U Kentucky → ASU → Iowa State U)

Zhenyu Zhou (PhD 2013 → George Mason University)

Amila Weerasinghe (PhD 2016 → Genome Project, WashU)

Li Chen (PhD 2016 → NHMFL/FSU → Hubei Normal U (Associate Professor))

Tahereh Mazaheri (switched to computational physics)

Sumanta Bandyopadhyay (PhD 2019 → NORDITA, Stockholm)

Matheus Schossler (PhD 2023 → Charter Communications)

Joseph Cruise (current)

Undergraduate students supervised:

Bohan Lu Summer 2018, Delos Fellow

went on to physics grad school at Freie Universität Berlin

Jack Pitts Graduated 2010 with Senior Thesis supervised by me,

went on to physics grad school at UC Riverside

High school students supervised:

Seema Patil (Cancer Vision Goggle Programming project in collaboration with

Sam Achilefu group at WashU Optical Radiology Lab, Summer 2017,

now an undergraduate at Yale)

Department and University Service:

- (2023-present) Director of Graduate Studies
- (2018-2022) Graduate Admissions Committee (chair)
- (2018-present) Putnam Committee (member, Math Department)
- (2018-present) Organizer of the Condensed Matter/Materials/
Biophysics seminar series
- (2017-present) Physics Department Executive Committee (member)
- (2011 - 2023) Graduate Studies Committee (member)
- (2017-2019) Faculty Library Committee (member, Washington University)
- (2017-2018) Graduate Admissions Committee (member)
- (2018) Nuclear Theory Search Committee (member)
- (2016-2018) Physics Coordinator of the Joint Post-Baccalaureate program
in Math, Physics, and EPS
- (2012-2013) Condensed matter experiment search committee
- (2011-2017) Recruiting Committee (chair)
- (2009-2012) Undergraduate curriculum committee (member)
- (2011-2017) Chair's Advisory Committee (member)
- (2009) Condensed matter theory search committee
- (2009-2013) Colloquium Committee (member)

Classes taught:

- 549 Solid State Physics I, Fall 2008, Washington University
- 550 Solid State Physics II, Spring 2009, Washington University
- 217 Introduction to Quantum Physics I, Fall 2009, Washington University
- 318 Introduction to Quantum Physics II, Spring 2010, Washington University
- 217 Introduction to Quantum Physics I, Fall 2010, Washington University
- 318 Introduction to Quantum Physics II, Spring 2011, Washington University
- 217 Introduction to Quantum Physics I, Fall 2011, Washington University
- 318 Introduction to Quantum Physics II, Spring 2012, Washington University
- 217 Introduction to Quantum Physics I, Fall 2012, Washington University
- 198 Physics II, Spring 2013, Washington University
- 217 Introduction to Quantum Physics I, Fall 2013, Washington University
- 198 Physics II, Spring 2014, Washington University
- 117 General Physics I, Fall 2014, Washington University
- 523 Quantum Mechanics I, Fall 2015, Washington University

198 Physics II, Spring 2016, Washington University
523 Quantum Mechanics I, Fall 2016, Washington University
198 Physics II, Spring 2017, Washington University
523 Quantum Mechanics I, Fall 2017, Washington University
318 Introduction to Quantum Physics II, Spring 2018, Washington University
501 Theoretical Physics, Fall 2018, Washington University
502 Theoretical Physics, Spring 2019, Washington University
501 Theoretical Physics, Fall 2019, Washington University
502 Theoretical Physics, Spring 2020, Washington University
501 Theoretical Physics, Fall 2020, Washington University
502 Theoretical Physics, Spring 2021, Washington University
501 Theoretical Physics, Fall 2021, Washington University
502 Theoretical Physics, Spring 2022, Washington University
501 Theoretical Physics, Fall 2023, Washington University
502 Theoretical Physics, Spring 2024, Washington University

Publications

- [1] Joseph R. Cruise , Alexander Seidel, Erik Henriksen, and Giovanni Vignale
Observability of cyclotron resonance in the hydrodynamic regime of bilayer graphene
arXiv:2402.02231, under review at PRB

- [2] B. Jordan Russell, Matheus Schossler, Jesse Balgley, Yashika Kapoor, T. Taniguchi,
K. Watanabe, Alexander Seidel, Yafis Barlas, and Erik A. Henriksen
Infrared spectroscopy of phase transitions in the lowest Landau levels of bilayer graphene
arXiv:2312.02489 , under review at PRL

- [3] Matheus Schossler, Li Chen, and Alexander Seidel
Linking infinite bond-dimension matrix product states with frustration-free Hamiltonians
Phys. Rev. B 109, 085106 (2024)

- [4] Ken K. W. Ma, Oguz Türker, Alexander Seidel, and Kun Yang
Competing phases and intertwined orders in coupled wires near the self-dual point
Phys. Rev. B 108, 245138 (2023)

- [5] Fanmao Zhang, Matheus Schossler, Alexander Seidel, and Li Chen

- From frustration-free parent Hamiltonians to off-diagonal long-range order: Moore-Read and related states in second quantization*
Phys. Rev. B 108, 075142 (2023)
- [6] Joseph R. Cruise and Alexander Seidel
Sequencing the Entangled DNA of Fractional Quantum Hall Fluids
Symmetry **2023**, 15(2), 303
- [7] Mostafa Tanhayi Ahari, Sumanta Bandyopadhyay, Zohar Nussinov, Alexander Seidel, Gerardo Ortiz
Partons as unique ground states of quantum Hall parent Hamiltonians: The case of Fibonacci anyons
SciPost Phys. 15, 043 (2023)
- [8] Matheus Schossler, Sumanta Bandyopadhyay, Alexander Seidel
The inner workings of fractional quantum Hall parent Hamiltonians: An MPS point of view
Phys. Rev. B 105, 155124 (2022)
- [9] Arkadiusz Bochniak, Zohar Nussinov, Alexander Seidel, Gerardo Ortiz
Exact Operator Fractionalization and Edge Physics in the Lowest-Landau-Level
Communications Physics 5, 171 (2022)
- [10] Julia Wildeboer, Alexander Seidel, N. S. Srivatsa, Anne E. B. Nielsen, Onur Erten
Topological Quantum Many-Body Scars in Quantum Dimer Models on the Kagome Lattice
Phys. Rev. B 104, L121103 (2021)
- [11] N. S. Srivatsa, Julia Wildeboer, Alexander Seidel, Anne E. B. Nielsen
Quantum many-body scars with chiral topological order in 2D and critical properties in 1D
Phys. Rev. B 102, 235106 (2020)
- [12] Julia Wildeboer, Zohar Nussinov, Alexander Seidel
Exact Solution and Correlations of a Quantum Dimer Model on the Checkerboard Lattice
Phys. Rev. B 102, 020401 (2020)

- [13] Duanwen Shen, Baogang Xu, Kexian Liang , Rui Tang, Gail P. Sudlow, Christopher Egbulefu, Kevin Guo, Avik Som, Rebecca Gilson, Dolonchampa Maji, Suman Mondal, LeMoyne Habimana-Griffin, and Walter J. Akers, Shunqiang Li, Yang Liu, Sharon Bloch, Sid Kurkure, Zohar Nussinov, Alexander Seidel, Shaw-Wei D. Tsen, and Samuel Achilefu
Selective imaging of solid tumours via the calcium-dependent high-affinity binding of a cyclic octapeptide to phosphorylated Annexin A2
Nature Biomedical Engineering 4, 298 (2020)
- [14] Sumanta Bandyopadhyay, Gerardo Ortiz, Zohar Nussinov, Alexander Seidel
Local two-body parent Hamiltonians for the entire Jain sequence
Phys. Rev. Lett. 124, 196803 (2020)
- [15] Julia Wildeboer, Alexander Seidel
Entanglement studies of resonating valence bonds on the frustrated square lattice
Phys. Rev. B 101, 224406 (2020)
- [16] Hao Wang, Alexander Seidel, Kun Yang, Fu-Chun Zhang
Interlayer correlated fractional quantum Hall state in the $\nu = 4/5$ bilayer system
Phys. Rev. B 100, 245122 (2019)
- [17] Li Chen, Sumanta Bandyopadhyay, Kun Yang, Alexander Seidel
Composite fermions in Fock space: Operator algebra, recursion relations, and order parameters
Phys. Rev. B 100, 045136 (2019)
- [18] Sumanta Bandyopadhyay, Li Chen, Mostafa Tanhayi Ahari, Gerardo Ortiz, Zohar Nussinov, Alexander Seidel
Entangled Pauli Principles: the DNA of Quantum Hall Fluids
Phys. Rev. B 98, 161118(R) (2018)
- [19] Hong-Chen Jiang, Zi-Xiang Li, Alexander Seidel, Dung-Hai Lee
Symmetry protected topological Luttinger liquids and the phase transition between them
Science Bulletin 63, 753 (2018)

- [20] Li Chen, Sumanta Bandyopadhyay, Alexander Seidel
The Jain-2/5 parent Hamiltonian: structure of zero modes, dominance patterns, and zero mode generators
Phys. Rev. B 95, 195169 (2017)
- [21] J. Wildeboer, A. Seidel, R. G. Melko
Entanglement Entropy and Topological Order in Resonating Valence-Bond Quantum Spin Liquids
Phys. Rev. B 95, 100402 (2017)
- [22] A. Weerasinghe, T. Mazaheri, A. Seidel
Bounds for low-energy spectral properties of center-of-mass conserving positive two-body interactions
Phys. Rev. B 93, 155135 (2016)
- [23] M. Pouranvari, K. Yang, A. Seidel
Effect of Single Impurity on Free Fermion Entanglement Entropy
Phys. Rev. B 91, 075115 (2015)
- [24] T. Mazaheri, G. Ortiz, Z. Nussinov, A. Seidel
Zero modes, Bosonization and Topological Quantum Order: The Laughlin State in Second Quantization
Phys. Rev. B 91, 085115 (2015)
- [25] L. Chen, A. Seidel
Algebraic approach to the study of zero modes of Haldane pseudopotentials
Phys. Rev. B 91, 085103 (2015)
- [26] A. Weerasinghe, A. Seidel
Thin torus perturbative analysis of elementary excitations in the Gaffnian and Haldane-Rezayi quantum Hall states
Phys. Rev. B 90, 125146 (2014)
- [27] L. Chen, T. Mazaheri, A. Seidel, X. Tang (*alphabetic order*)
The impossibility of exactly flat non-trivial Chern bands in strictly local periodic tight binding models
J. Phys. A: Math. Theor. 47 (2014) 152001

- [28] Z. Zhou, J. Wildeboer, A. Seidel
Ground state uniqueness of the twelve site RVB spin-liquid parent Hamiltonian on the kagome lattice
Phys. Rev. B 89, 035123 (2014)
- [29] G. Ortiz, Z. Nussinov, J. Dukelsky, A. Seidel
Repulsive Interactions in Quantum Hall Systems as a Pairing Problem
Phys. Rev. B 88, 165303 (2013)
- [30] Z. Zhou, Z. Nussinov, A. Seidel
Heat equation approach to geometric changes of the torus Laughlin-state
Phys. Rev. B 87, 115103 (2013)
- [31] S. Chakrabarty, V. Dobrosavljevic, A. Seidel, Z. Nussinov
Universality of modulation length (and time) exponents
Phys. Rev. E 86, 041132 (2012)
- [32] J. Wildeboer, A. Seidel
Correlation functions in $SU(2)$ invariant RVB spin liquids on non-bipartite lattices
Phys. Rev. Lett. 109, 147208 (2012)
- [33] J. Flavin, R. Thomale, A. Seidel
Gaffnian holonomy through the coherent state method
Phys. Rev. B 86, 125316 (2012)
- [34] Z. Zhou, O. Vafek, A. Seidel
Geometric phases of d -wave vortices in a model of lattice fermions
Phys. Rev. B 86, 020505(R) (2012)
- [35] W. Ding, A. Seidel, K. Yang
Entanglement Entropy of Fermi Liquids via Multi-dimensional Bosonization
Phys. Rev. X 2, 011012 (2012)
- [36] J. Flavin, A. Seidel
Abelian and non-Abelian statistics in the coherent state representation
Phys. Rev. X 1, 021015 (2011)
- [37] Z. Hao, Y. Wan, I. Rousochatzakis, J. Wildeboer, A. Seidel, F. Mila, O. Tchernyshyov

- Destruction of valence-bond order in a $S = 1/2$ sawtooth chain with a Dzyaloshinskii-Moriya term*
 Phys.Rev. B 84, 094452 (2011)
- [38] A. Seidel, K. Yang
Gapless excitations in the Haldane-Rezayi state: The thin torus limit
 Phys. Rev. B 84, 085122 (2011)
- [39] J. S. Wildeboer, A. Seidel
Linear independence of nearest neighbor valence bond states on several 2D lattices
 Phys. Rev. B 83, 184430 (2011)
- [40] Jian Wu, Julia S. Wildeboer, Fletcher Werner, Alexander Seidel, Z. Nussinov, S. A. Solin
Spin glassiness and power law scaling in a quasi-triangular spin-1/2 compound
 Europhys. Lett. 93, 67001, (2011)
- [41] R. Thomale, A. Seidel
A minimal model of quantized conductance in interacting ballistic quantum wires
 Phys. Rev. B 83, 115330 (2011)
- [42] A. Seidel
S-duality constraints on 1D patterns associated with fractional quantum Hall states
 Phys. Rev. Lett. 105, 026802 (2010)
- [43] A. Seidel, K. Yang
Momentum resolved tunneling into the Pfaffian and anti-Pfaffian edge
 Phys. Rev. B 80, 241309(R) (2009)
- [44] A. Seidel
Linear independence of the nearest neighbor valence bond states on the kagome lattice and construction of an $SU(2)$ -invariant spin-1/2-Hamiltonian with a Sutherland-Rokhsar-Kivelson quantum liquid ground state
 Phys. Rev. B 80, 165131 (2009)
- [45] A. Seidel
Pfaffian Statistics through adiabatic transport in the 1D coherent state representation
 Phys. Rev. Lett. 101, 196802 (2008)

- [46] A. Seidel, K. Yang
Halperin (m, m', n) bilayer quantum Hall states on thin cylinders
Phys. Rev. Lett. 101, 036804 (2008)
- [47] A. Seidel, D.-H. Lee
Domain wall type defects as anyons in phase space
Phys. Rev. B **76**, 155101 (2007)
- [48] T. C. Ribeiro, A. Seidel, J. H. Han, D.-H. Lee
The Electronic States of Two Oppositely doped Mott Insulator Bilayers
Europhys. Lett. **76**, 891, (2006)
- [49] A. Seidel, D.-H. Lee
Abelian and Non-abelian Hall Liquids and Charge Density Wave: Quantum Number Fractionalization in One and Two Dimensions
Phys. Rev. Lett. **97**, 056804 (2006)
- [50] H. C. Fu, A. Seidel, J. Clarke, D.-H. Lee
Stabilizing Superconductivity in Nanowires by Coupling to Dissipative Environments
Phys. Rev. Lett. **96**, 157005 (2006)
- [51] A. Seidel, Henry Fu, D.-H. Lee, J.M. Leinaas, J.E. Moore
Incompressible Quantum Liquids and New Conservation Laws
Phys. Rev. Lett. **95**, 266405 (2005)
- [52] A. Seidel, H.-H. Lin, D.-H. Lee
Phonons in Hubbard ladders studied within the framework of the one-loop renormalization group
Phys. Rev. B **71**, 220501(R) (2005)
- [53] A. Seidel, D.-H. Lee
The Luther-Emery liquid: Spin gap and anomalous flux period
Phys. Rev. B **71**, 045113 (2005)
- [54] A. Seidel, D.-H. Lee
Flux period, spin gap, and pairing in the one-dimensional t-J-J'-model
Phys. Rev. Lett. **93**, 046401 (2004)

- [55] P. Lemmens, K.Y. Choi, G. Caimi, L. Degiorgi, N.N. Kovaleva, A. Seidel, F.C. Chou
Giant phonon softening in the pseudo-gap phase of the quantum spin system TiOCl
Phys. Rev. B **70**, 134429 (2004)
- [56] A. Seidel, P. A. Lee
Lightly doped dimerized spin chain in the one-dimensional t-J-J' model
Phys. Rev. B **69**, 094419 (2004)
- [57] A. Seidel, C. A. Marianetti, F. C. Chou, G. Ceder, P. A. Lee
S=1/2 chains and spin-Peierls transition in TiOCl,
Phys. Rev. B **67**, 020405(R) (2003)

Invited Talks:

University of Oxford
Condensed Matter Seminar
Oxford, UK, May 10, 2023
Entangled Pauli Principles

Hubei Normal University
Condensed Matter Seminar
Hubei, China, April 11, 2023
Entangled Pauli Principles

Technical University of Munich
Condensed Matter Seminar
Garching, Germany October 19, 2022
Entangled Pauli Principles

The University of Duisburg-Essen
Theorie-Kolloquium
Duisburg, Germany (via Zoom), July 24, 2022
Entangled Pauli Principles

The University of Chicago
Kadanoff Seminar
Chicago, IL (via Zoom), December 14, 2020

Entangled Pauli Principles

Saint Louis University
Physics Colloquium
Saint Louis, MO, February 21, 2020
The Hidden Orders of Matter

Illinois State University
Physics Colloquium
Normal, IL, November 12, 2019
The Hidden Orders of Matter

The University of Texas at Dallas
Physics Colloquium
Richardson, TX, October 2, 2019
The Hidden Orders of Matter

Renmin University
Condensed Matter Seminar
Beijing, China, June 26, 2019
Entangled Pauli Principles: The DNA of Fractional Quantum Hall Fluids

Pennsylvania State University
Condensed Matter Seminar
State College, PA, March 20, 2019
Composite Fermions in Fock space: Parent Hamiltonians

Truman State University
Physics Colloquium
Kirksville, MO, November 28, 2018
Hidden Order in Topological Phases: Entangled Pauli Principles

Kavli Institute for Theoretical Sciences
KITS mini-workshop on Fractional Quantum Hall States and
Topological Quantum Computation
Beijing, China, July 5, 2018
Entangled Pauli Principles: The DNA of Fractional Quantum Hall Fluids

University of Innsbruck
Condensed matter seminar
Innsbruck, Austria, June 14, 2018
Entangled Pauli Principles: The DNA of Fractional Quantum Hall Fluids

Technical University of Munich
Condensed matter seminar
Garching, June 11, 2018
Entangled Pauli Principles: The DNA of Fractional Quantum Hall Fluids

University of Cologne
Condensed matter seminar
Cologne, June 8, 2018
Entangled Pauli Principles: The DNA of Fractional Quantum Hall Fluids

Washington University in St. Louis
Saturday Science Public Lectures
St. Louis, MO, April 21, 2018
Topological phases of matter

University of Illinois at Urbana-Champaign,
Condensed matter seminar
Urbana, IL, October 26, 2017
SU(2)-invariant topological quantum spin liquids

University of Kentucky
Lecture Mini-Series (2 lectures)
Lexington, KY, April 18-19, 2017
Coherent states and braiding statistics in Abelian and Non-Abelian quantum Hall States

University of Kentucky
Condensed Matter Seminar
Lexington, KY, April 18, 2017
Parent Hamiltonians and correlation functions for the nearest neighbor resonating valence bond state on the kagome lattice

Florida State University

Physics Colloquium
Tallahassee, FL, March 9, 2017
Topological quantum spin liquids

Washington University in St. Louis
Saturday Science Public Lectures
St. Louis, MO, November 19, 2016
Quantum meets Classical: The Superconducting State

University of California at Berkeley
Lee group research forum
Berkeley, CA, November 2, 2016
Factorization of the wave function in 1d ladder systems

Nanjing University
Condensed Matter Blackboard Seminar
Nanjiang, China, June 21, 2016
Flat Chern Bands: Topology vs. Geometry in Tight Binding Models

Nanjing University
Condensed Matter Seminar
Nanjiang, China, June 21, 2016
Quantum Hall Hamiltonians as frustration free lattice models

Zhejiang University
Condensed Matter Seminar
Hangzhou, China, June 20, 2016
Quantum Hall Hamiltonians as frustration free lattice models

Indiana University Bloomington
Condensed Matter Seminar
Bloomington, IN, April 8, 2016
Quantum Hall Hamiltonians as frustration free lattice models

Max Planck Institute for the Physics of Complex Systems
Condensed Matter Seminar
Dresden, Germany, February 5, 2015
Quantum Hall Hamiltonians as frustration free lattice models

National High Magnetic Field Laboratory
Condensed Matter Seminar
Tallahassee, FL, December 5, 2014
Quantum Hall states from frustration free lattice models

Indiana University-Purdue University Indianapolis
Physics Colloquium
Indianapolis, IN, April 3rd 2014
Topological quantum spin liquids

Universität Innsbruck
Condensed matter seminar
Innsbruck, Austria, August 1, 2013
Parent Hamiltonians and correlation functions for the nearest neighbor resonating valence bond state on the Kagomelattice

Max Planck Institut für Physik komplexer Systeme
Condensed matter seminar
Dresden, Germany, July 15, 2013
Parent Hamiltonians and correlation functions for the nearest neighbor resonating valence bond state on the Kagome lattice

Simons Center for Geometry and Physics
Condensed matter seminar
Stony Brook, NY, June 5, 2013
Parent Hamiltonians and correlation functions for the nearest neighbor resonating valence bond state on the Kagomelattice

Washington University in St. Louis
Colloquium
St. Louis, September 19, 2012
A short history of symmetry breaking in quantum antiferromagnets

Nordita Program on Topological States of Matter:
Insulators, Superconductors, and Quantum Hall Liquids
Stockholm, August 15, 2012
Heat equation approach to geometric changes in the torus Laughlin-state

RWTH Aachen University
Condensed Matter/Quantum Information Seminar
Aachen, Germany, July 19, 2012
The bare essentials of topological orders in fractional quantum Hall liquids

Ohio State University
Condensed Matter Theory Seminar
Columbus, OH, February 6, 2012
The bare essentials of topological orders in fractional quantum Hall liquids

Florida State University
Physics Colloquium
Tallahassee, FL, January 12, 2012
The bare essentials of topological orders in fractional quantum Hall liquids

University of Cincinnati
CinciNNI Tristate Meeting
Cincinnati, OH, November 19, 2011
The bare essentials of topological orders in fractional quantum Hall liquids

University of Cincinnati
Condensed Matter Seminar
Cincinnati, OH, November 18, 2011
Entanglement Entropy of Fermi Liquids via Multi-dimensional Bosonization

Washington University in St. Louis
Public Saturday Lecture
St. Louis, MO, October 15, 2011
 h – the constant that quantized the world

University of Florida
Condensed Matter Seminar
Gainesville, FL, September 12, 2011
The bare essentials of topological orders in fractional quantum Hall liquids

Fudan University
Condensed Matter Seminar

Shanghai, China, July 25, 2011
The bare essentials of topological orders in fractional quantum Hall liquids

Zhejiang University
Condensed Matter Seminar
Hangzhou, China, June 29, 2011
Gapless excitations in the Haldane Rezayi state: The thin torus limit

Zhejiang University
Condensed Matter Seminar
Hangzhou, China, June 28, 2011
The bare essentials of topological orders in fractional quantum Hall liquids

Northwestern University
Condensed Matter Seminar
Evanston, IL, February 17, 2011
The bare essentials of topological orders in fractional quantum Hall liquids

UC Berkeley
Quantum Materials Seminar,
Berkeley, CA, May 4, 2010
An RVB Hamiltonian for the kagome lattice

National High Magnetic Field Laboratory
Condensed Matter Seminar
Tallahassee, FL, January 15, 2010
An RVB Hamiltonian for the kagome lattice

University of Kentucky
Physics Colloquium
Lexington, KY, October 16, 2009
The bare essentials of topological orders in fractional quantum Hall liquids

Johns Hopkins University
Condensed Matter Seminar
Baltimore, MA, December 2, 2009
An RVB Hamiltonian for the kagome lattice

Blackboard Seminar at the Nordita Program on Quantum Hall Physics –
Novel systems and applications, Stockholm, August 24, 2009
*The nitty-gritty details of deriving Pfaffian statistics through the 1D coherent
state representation*

Nordita Program on Quantum Hall Physics – Novel systems and
applications, Stockholm, August 18, 2009
Braiding Statistics through the 1D Coherent State Representation

KITP Program for Low Dimensional Electron Systems,
Santa Barbara, CA, June 9, 2009
*Valence Bond States on the Kagome Lattice:
Linear Independence and RVB-Hamiltonian*

University of Illinois at Urbana-Champaign,
Condensed matter seminar
Urbana, IL, April 6, 2009
Quantum Hall states out of charge density waves

KITP conference on New Directions in Low Dimensional Electron Systems,
Santa Barbara, CA, February 24, 2009
Pfaffian Statistics through the 1D Coherent State Representation

University of Ulm
Theoretical Colloquium
Ulm, Germany, January 15, 2009
Quantum Hall states out of charge-density waves

Indiana University Bloomington
LENS Seminar
Bloomington, IN, November 10, 2008
Quantum Hall states out of charge-density waves

National High Magnetic Field Laboratory
Condensed Matter Theory Blackboard Seminar
Tallahassee, FL, November 14, 2007
*An organization principle for abelian and non-abelian
quasi-particles in fractional quantum Hall states*

Nanjing University
Condensed Matter Seminar
Nanjing, China, July 16, 2007
*Abelian and non-abelian quasi-particles as domain
wall type defects*

Kavli Institute for Theoretical Physics in China (KITPC)
talk given at Workshop on Quantum Phases of Matter
Beijing, China, June 18, 2007
*Abelian and non-abelian quasi-particles as domain
wall type defects*

Louisiana State University
General Physics Seminar
Baton Rouge, LA, March 12, 2007
A Unifying Perspective on Charge Fractionalization

University of Virginia
Condensed Matter Seminar
Charlottesville, VA, February 19, 2007
A Unifying Perspective on Charge Fractionalization

Washington University in St Louis
Physics Colloquium
St. Louis, MO, January 31, 2007
A Unified View on Charge Fractionalization

National High Magnetic Field Laboratory
Condensed Matter Seminar
Tallahassee, FL, September 8, 2006
Fractionalization narrowly explained

University of California at Berkeley
Quantum Materials Seminar
Berkeley, CA, August 10, 2006
Fractionalization narrowly explained

McMaster University
Physics Colloquium
Hamilton, Ontario, February 15, 2006
Incompressible Quantum Liquids and Conservation Laws

National Tsing Hua University, Taiwan
Mini-Workshop on Topological Aspects of Condensed Matter Physics,
Hsinchu, Taiwan, September 12, 2005
Incompressible Quantum Liquids and Conservation Laws

University of California at Santa Cruz
Physics Colloquium
Santa Cruz, CA, May 5, 2005
How to avoid classical order in quantum matter

ICTP Trieste
Conference on Higher Dimensional Quantum Hall Effect,
Chern-Simons Theory, and Non-Commutative Geometry
in Condensed Matter Physics and Field Theory
Trieste, Italy, March 4, 2005
Classical order, topological order and duality

University of California at Santa Cruz
Condensed Matter Seminar
Santa Cruz, CA, February 4, 2005
Classical order, topological order and duality

Columbia University
Condensed Matter Seminar
New York, NY, February 27, 2003
Doped dimerized spin chains: Another path to superconductivity

Stanford University
Condensed Matter Seminar
Stanford, CA, January 28, 2003
Doped dimerized spin chains: Another path to superconductivity

University of California at Berkeley

Condensed Matter Theory Seminar Berkeley, CA, January 27, 2003
Doped dimerized spin chains: Another path to superconductivity

Kavli Institute for Theoretical Physics
Condensed Matter Seminar
Santa Barbara, CA, January 23, 2003
Doped dimerized spin chains: Another path to superconductivity

Princeton University
Condensed Matter Seminar
Princeton, NY, January 20, 2003
Doped dimerized spin chains: Another path to superconductivity