

**NAME**

Adrian Esteban Feiguin

**ADDRESS**

Northeastern University  
Physics Department  
119 Dana Research Building

**PHONE**

work: (617) 373-2925  
cell: (301) 977-9957

**A. Education:**

- 2000            PhD, Physics, Universidad Nacional de Rosario, Argentina.  
                  Title of PhD Thesis: “Numerical studies of electronic and magnetic systems in low dimensions”
- 1994            Licenciado (Diploma), Physics, Universidad Nacional de Rosario, Argentina.  
                  Title of Diploma Thesis: “Spin-Peierls dimerization and frustration in two-dimensional antiferromagnets”

**B. Employment history:**

- (2018-Present) Associate Professor, Physics Department, Northeastern University.  
(2012-2018)    Assistant Professor, Physics Department, Northeastern University.  
(2009-2012)    Assistant Professor, Department of Physics and Astronomy, University of Wyoming.  
(2007-2009)    Research Associate, Department of Physics, University of Maryland, College Park, MD.  
(2005-2007)    Postdoctoral Researcher, Microsoft Corp., University of California, Santa Barbara.  
(2002-2005)    Postdoctoral Researcher, Department of Physics and Astronomy, University of California, Irvine, CA.  
(2000-2002)    Postdoctoral Researcher, National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL.  
(1998-1999)    Lecturer, School of Engineering and Exact Sciences, Universidad Nacional de Rosario, Argentina.

**C. Current Research Areas:**

Condensed Matter; computational studies of strongly correlated quantum systems (**see research statement appended to this document**).

Specifically:

- Exotic phases of matter of quantum origin: quantum magnetism, superconductivity.
- Quantum transport and non-equilibrium physics.
- Many-body physics in quantum dots and molecular devices.
- Spintronics and quantum control
- Cold atomic systems in optical lattices.
- Excitonics: charge dynamics and non-linear optical properties of strongly correlated materials for light harvesting applications.

**D. Career Research Performance Metrics:**

- ISI Web of Science H-index: 31 (01/2019)
- Google Scholar H-index: 34 (01/2019)
- Total number of publications: 99 peer reviewed papers (including 2 under review; 4 articles in conference proceedings), and 4 chapters in books.

**Highlights:**

- 24 Phys. Rev. Lett.
- 1 Applied Phys. Lett.
- 1 Science
- 2 Nature Communications
- 1 Proc. Natl. Acad. Sci.
- 3 Editor's suggestions in APS journals.
- Publications since joining NU in Sept. 2012: 39 peer reviewed (including 2 under review) and 2 invited chapters in books.
- 55 invited talks at universities, summer schools, and international conferences since joining NU in Jan. 2012.
- Funding and awards:
  - NSF CAREER Award. Title: "Transport and non-equilibrium physics in strongly correlated systems". Period: 2010-2015. Budget: \$460,000. Role: Sole PI.
  - DOE-BES: "Time-dependent phenomena in correlated materials". Period: 2015-2018. Budget: \$390,000. Role: Sole PI.
  - NSF-DMR: "Spin fluctuations, pairing, and meso-scale phase segregation in models of strongly correlated electrons". Budget: \$360,000, Period: 06/01/2018-05/31/2021 (3 years).
  - Department of Energy, QIS: "Design, Control, and Application of next generation qubits". Budget: \$415,000. Period: 08/01/2018-07/31/2021 (3 years). Role: Co-PI. Joint grant with A. Bansil (PI-NU), C. Chamon (BU), E. Mucciolo (UCF), Liang Fu (MIT), Qimin Yan (Temple). Total Budget: (\$3.5M)

**F. Professional Service:**

- Nominated for Member-at-Large, Executive Committee for the Division of Condensed Matter Physics of the American Physical Society (upcoming APS elections, 2017).
- Member of the program committee for the organization of the 2018 March Meeting of the American Physical Society, Division of Computational Physics (DCOMP).
- Thesis reviewer, University of Hamburg and U. of Hannover, Germany (2017).
- Proposal reviewer for the National Science Foundation (NSF), U.S. Dept. of Energy (DOE), Polish National Science Foundation (OSF), German Science Foundation (DFG), Austrian Science Fund (FWF), Argentina Office of Science and Technology, Israel Science Foundation, National Research Council of Canada.
- Panel reviewer for various agencies (NSF, German Science Foundation (DFG)).
- Referee for APS (American Physical Society) journals, New Journal of Physics, and Nature Communications, among others (More details below).
- Member of the Editorial Board, Frontiers in Physics.

- Conference co-organizer: “Emergent phenomena in the dynamics of quantum matter: disorder, quenches, simulations and experiments”, CUNY Graduate Center, New York City (April 2014).
- Member of the local organizing committee and co-chair of the Quantum Many-Body division committee: The XXVI IUPAP Conference on Computational Physics, Boston (Sept. 2014).

- Consultant for Microsoft Research.

#### **G. Teaching and Mentoring Activities Since Joining NU**

- Supervising Ph.D students:
  - Mohammad Soltanieh-ha (obtained his PhD in 2015)
  - Chun Yang (obtained his PhD in 2018)
  - Andrew Allerdt (obtained his PhD in 2017)
  - Douglas Hendry
  - Luhang Yang
  - A. Matyushov (co-advised with Prof. Sun, COE, Dept. of Electrical and Computer Engineering).
- Supervising undergraduate students:
  - Marco Muzio, Coop student (2013)
  - Trithep Devakul, Honors students (2014)
  - Michael Plessner, independent studies (2016)
  - Malik Maricar, independent studies (2016-17)
  - Abigail Timmel, research fellowship for undergraduate women in physics (2017)
  - Christina Nguyen, Coop research internship (2017-2018)
  - Kevin Wu, Coop research internship (2018)
  - Patrick Hanbury, undergraduate research internship (2018)
- Graduated two Ph.D students (M. Soltanieh-ha in Spring of 2015 and A. Allerdt in Fall of 2017).
- Hosted and mentored a visiting Masters student (Marius Fischer) from the Condensed Matter group at Ludwig Maximilian University (Munich, Germany) for a period of 6 months in 2014.
- Taught undergraduate “PHYS 3601: Classical Dynamics” (Spring of 2013, Spring 2014, Spring 2015, Spring 2016), “PHYS 1145: Physics 1 for Life Sciences” (Fall 2014), and “PHYS 7321: Computational Physics” (Fall 2015, Fall 2016, Fall 2017), “PHYS 3602: Electricity and Magnetism” (Spring 2017, Spring 2018).
- Volunteered and coordinated “PHYS 7210: Intro to Physics Research” (Journal Club), Spring and Fall of 2013, and Spring 2014.
- Served as member of PhD committees of the following graduate students: Zheng Ma (2013), Badih Assaf (2014), Fangze Liu (2015), Michelle Jamer (2015), Anthony Vargas (2016), Pradeep Waduge (2017), Peter Mistark (2017), Baokai Wang (ongoing), Younggil Song (2018), Ian J. MacDonald (2018 - Engineering), Dan Rubin (2018), Gregory Stephen (ongoing), Longhai Lai (ongoing)

#### **H. Department/College/University Service**

##### ***At Northeastern:***

- Tenure and Promotion Committee, College of Science (2019-2021).
- Elected representative of the condensed matter theory group of the Physics Department

Executive Committee (2017).

- Served in the committee to develop a Field Theory graduate course in the Physics Department, chaired by J. Halverson (2017).
- Served in the Physics Department CMT Faculty Search Committee (2016).
- Member of the College of Science Council (Fall 2016).
- Served at the Outstanding Graduate Student Award Selection Committee for the COS (2016).
- Co-organized the Physics Department Journal Club (2014-2015).
- Coordinated the Condensed Matter Seminar series (2012-present).
- Member of the Colloquium committee (2014-2019).
- Member of the Graduate Awards Committee, College of Science (2015).
- Tutored students as part of the “Qualifying Exam” tutoring summer program (Summer 2013, 2014, and 2015).
- Participated in the phonathon as part of the recruiting efforts.
- Successfully contributed to the recruitment of 2 NUSP (University Scholars Program) physics students: Ian Tornquist and Felipe Castellano-Macias (2015).
- Member of the Physics Department’s Graduate Committee (2014-2017, 2019-present).
- Participated of the 2016 Young Scholars Program.

***Prior to Joining Northeastern:***

- Member of the Ph.D Exam Committee, 2009-2010 (University of Wyoming).
- Member of the Faculty Search Committee, 2011 (University of Wyoming).

**I. Awards and Nominations**

- 2015 - Nominated to the university-wide “Excellence in Teaching” award (Northeastern university).
- 2010 - NSF CAREER Award for the proposal: “Transport and Non-Equilibrium Physics in Strongly Correlated Systems”.
- 2005 - Ramon y Cajal Award from the Government of Spain (5 year fellowship, declined).
- 1999 - Postdoctoral Fellowship from Fundacion Antorchas, Argentina.
- 1994 - Doctoral Fellow, National Research Council of Argentina. (CONICET)

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## RESEARCH AND SCHOLARSHIP

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### Section I: Research Funding

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#### A. Current and pending external funding

- NSF-DMR: “Spin fluctuations, pairing, and meso-scale phase segregation in models of strongly correlated electrons”. Budget: \$360,000, Period: 06/01/2018-05/31/2021 (3 years).
- Department of Energy, Basic Energy Sciences: “Time-dependent phenomena in correlated materials”. Budget: \$415,000. Period: 08/01/2018-07/31/2021 (3 years). Role: Sole PI.

- Department of Energy, QIS: “Design, Control, and Application of next generation qubits”. Budget: \$415,000. Period: 08/01/2018-07/31/2021 (3 years). Role: Co-PI. Joint grant with A. Bansil (PI-NU), C. Chamon (BU), E. Mucciolo (UCF), Liang Fu (MIT), Qimin Yan (Temple). Total Budget: (\$3.5M)

### *B. Previous funding*

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- Department of Energy, Basic Energy Sciences: “Time-dependent phenomena in correlated materials”. Budget: \$390,000. Period: 08/01/2015-07/31/2018 (3 years). Role: Sole PI.
- NSF CAREER Award. Proposal title: “Transport and non-equilibrium physics in strongly correlated systems”. Budget: \$460,000. Period: 06/01/2010 – 05/31/2015 (5 years). Role: Sole PI.
- Institute for Complex Adaptive Matter (ICAM) Workshop Funding Application. Title: “Emergent phenomena in the dynamics of quantum matter: disorder, quenches, simulations and experiments”. \$20,000. Workshop hosted at the CUNY (City Univ. of New York) Graduate Center, New York (2014).
- School of Energy Resources at the University of Wyoming: Support for a two-year Graduate Assistantship to pay for one student to study: “Understanding optical properties of light-harvesting materials including correlation effects” (2012).

### *C. Previous Submissions (not funded)*

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1. National Science Foundation DMREF: “Designing cheap bi-functional catalysis for oxygen reduction and evolution”. Budget: \$1.6M. Period: 2016-2019. Role: Co-PI
2. DOE Computational Materials Sciences (Solicitation DE-FOA-0001276): “CORRELPACK: A software package for the simulation of correlated electronic materials”. Budget: \$10M (NU share: \$1.9M, AF share: \$722,000). Period: 10/01/2015-09/30/2019 (4 years). Role: Co-PI.
3. NSF-DMR: “Spin and charge dynamics in correlated materials”. Budget: \$546,000. Period: 05/01/2016-04/30/2019. Role: Sole-PI (2015)
4. Letter of intent for the Simons Foundation. Program: “Simons Collaborations in Mathematics and the Physical Sciences”. International collaboration (2015).
5. NSF-DMR: “Spin and charge dynamics in correlated materials”. Dates: 06/01/2015-05/31/2018. Budget: \$558,000. Role: Sole-PI (2014)
6. NSF-DMR: MRSEC proposal to create the Northeastern University Center for Hybrid Functional Materials: IRG-1 – Multiscale Design and Synthesis of Hybrid Electromagnetic Materials. Role: Core participant (2014).
7. ICAM: Mentor driven ICAM Postdoctoral Fellowship to hire a postdoc for 2 years. Title: “Novel topological states of matter”. Role: Primary mentor. Budget: \$60,000 (2014).
8. NSF NRT-DESE: “Extended scale computations at the Nano-bio interface”. Budget: 3.0M. Role: Co-PI (2014).
9. Department of Energy, BES: “Toward a first principles understanding of correlation effects: from molecular devices to solar cells”. Budget: \$450,000 (3 years). Role: Sole PI (2013).

## Section II: Publications and Products

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### A. Publications/Products since joining NEU

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#### A1. Peer-reviewed Journal Articles

(\*) Corresponding author (#) advised graduate student or postdoc

1. “Qubit-photon corner states in all dimensions”  
Adrian E. Feiguin, Juan Jose Garcia-Ripoll and Alejandro Gonzalez-Tudela(\*)  
Phys. Rev. Research (under review)
2. “Many-body effects in porphyrin-like transition metal complexes embedded in graphene”  
Andrew Allerdt, Hasnain Hafiz, Bernardo Barbiellini, Arun Bansil, Adrian E. Feiguin  
Phys. Rev. B (under review)
3. “Quantum liquid with strong orbital fluctuations: the case of the pyroxene family”  
A. Feiguin, A. M. Tsvelik(\*), Weiguo Yin, E. S. Bozin  
Phys. Rev. Lett. **123**, 237204 (2019).
4. “A machine learning approach to dynamical properties of quantum many-body systems”  
Douglas Hendry(#), Adrian E. Feiguin(\*)  
Phys. Rev. B **100**, 245123 (2019).
5. “Time and momentum-resolved tunneling spectroscopy of pump-driven non-thermal excitations in Mott insulators”  
Krissia Zawadzki (#,\*), Adrian Feiguin.  
Phys. Rev. B **100**, 195124 (2019).
6. “The spectral function of Mott-insulating Hubbard ladders: From fractionalized excitations to coherent quasi-particles”  
Chun Yang (#), Adrian E. Feiguin (\*)  
Phys. Rev. B **99**, 235117 (2019)
7. “Kondo effect in a two-dimensional topological insulator: exact results for adatom impurities”  
A. Allerdt (#), A. E. Feiguin, G. Martins (\*)  
Journal of Physics and Chemistry of Solids **128**, 202 (2019).
8. “Spinon Confinement and a new Longitudinal Mode: Coupled Spin Chains in  $\text{Yb}_2\text{Pt}_2\text{Pb}$ ”  
W. J. Gannon (\*), L. S. Wu, I. A. Zaliznyak, A. E. Feiguin, A. M. Tsvelik, F. Demmel, Y. Qiu, J. R. D. Copley, and M. C. Aronson  
Nature Communications, **10**, 1123 (2019)
9. “Excitonic density-waves, bi-excitons and orbital selective pairing in two-orbital correlated chains”  
Chun Yang(#) and A. E. Feiguin (\*)  
Phys. Rev. B **035128** (2018).
10. “A numerically exact approach to quantum impurity problems in realistic geometries”  
A. Allerdt(#) and A. E. Feiguin(\*)  
Frontiers in Physics **7**, 67 (2019).
11. “Finite temperature dynamics of the Mott insulating Hubbard chain”  
A. Nocera, F. H. L. Essler, and A. E. Feiguin(\*)  
Phys. Rev. B **97** 045146 (2018)
12. “Unconventional quantum phases in a free radical magnet”

- Andrés Saúl, Nicolas Gauthier, Reza Moosavi Askari, Michel Côté, Thierry Maris, Christian Reber, Anthony Lannes, Dominique Luneau, Michael Nicklas, Elizabeth Lauren Green, Jochen Wosnitza, Andrea Daniele Bianchi, Adrian Feiguin (\*)  
Phys. Rev. B **97**, 064414 (2018).
13. “Spin-1 two-impurity Kondo problem on a lattice”  
A. Allerdt(#), R. Zitko, and A. E. Feiguin(\*)  
Phys. Rev. B **97**, 045103 (2018)
  14. “Efficiency of fermionic quantum distillation”  
J. Herbrych, A. E. Feiguin, E. Dagotto, and F. Heidrich-Meisner (\*)  
Phys. Rev. A **96**, 033617 (2017).
  15. “Photoinduced Hund excitons in the breakdown of a two-orbital Mott insulator”  
Julian Rincon(\*), E. Dagotto, A. E. Feiguin  
Phys. Rev. B. **97**, 235104 (2018).
  16. “Chiral liquid phase of simple quantum magnets”  
Zhentao Wang(\*), Adrian E. Feiguin, Wei Zhu, Oleg A. Starykh, Andrey V. Chubukov, and Cristian D. Batista  
Phys. Rev. B **96**, 184409 (2017) – **Editor’s suggestion.**
  17. “Non-perturbative effects and indirect exchange interaction between quantum impurities on metallic (111) surfaces”  
A. Allerdt(#), R. Zitko, and A. E. Feiguin(\*)  
Phys. Rev. B **95**, 235416 (2017).
  18. “Coupled spin-1/2 ladders as microscopic models for non-Abelian chiral spin liquids”  
Po-Hao Huang, Jyong-Hao Chen, A. E. Feiguin, C. Chamon, C. Mudry(\*).  
Phys. Rev. B **95**, 144413 (2017).
  19. “Spatial structure of correlations around a magnetic impurity at the edge of a two-dimensional topological insulator”  
A. Allerdt(#), A. E. Feiguin, G. B. Martins(\*)  
Phys. Rev. B **96**, 035109 (2017).
  20. “Unconventional pairing phases in a monochromatically tilted optical lattice”  
A. Nocera(#), A. Polkovnikov, A. E. Feiguin(\*)  
Phys. Rev. A **95**, 023601 (2017).
  21. “Unveiling the internal entanglement structure of the Kondo singlet”  
C. Yang(#), A. E. Feiguin(\*).  
Phys. Rev. B **95**, 115106 (2017).
  22. “Competition between Kondo effect and RKKY physics in graphene magnetism”  
A. Allerdt(#), A. E. Feiguin(\*), S. Das Sarma.  
Phys. Rev. B **95**, 104402 (2017).
  23. “Spectral function of the 2D Hubbard model: a density matrix renormalization group plus cluster perturbation theory study”  
C. Yang(#) and A. E. Feiguin(\*)  
Phys Rev. B **93**, 081107(R) (2016) (Rapid Comm.)
  24. “Crystallization of Spin Superlattices with Pressure and Field in a Layered Magnet”  
S. Haravifard(\*), D. Graf, A.E. Feiguin, C.D. Batista, J.C. Lang, D.M. Silevitch, G. Srajer, B.D. Gaulin, H.A. Dabkowska, T.F. Rosenbaum.  
Nature Communications **7**, 11956 (2016).
  25. “Three-dimensional Gross-Pitaevskii solitary waves in optical lattices: stabilization using

- the artificial quartic kinetic energy induced by lattice shaking”  
M. Olshanii(\*), S. Choi, V. Dunjko, A. E. Feiguin, H. Perrin, J. Ruhl, D. Aveline  
Phys. Lett. A, **380**, 177 (2016).
26. “Suppressing Spectral Diffusion of the Emitted Photons with Optical Pulses”  
H. F. Fotso, A. E. Feiguin, D. D. Awschalom, and V. V. Dobrovitski(\*)  
Phys. Rev. Lett. **116**, 033603 (2016).
  27. “Kondo versus indirect exchange: the role of the lattice and the actual range of RKKY interactions in real materials”  
Andrew Allerdts(#), C. A. Busser, G. B. Martins, and A. E. Feiguin(\*)  
Phys. Rev. B **91**, 085101 (2015).
  28. “Anyonic Liquids in Nearly Saturated Spin Chains”  
Armin Rahmani(\*), Adrian E. Feiguin, Cristian D. Batista  
Phys. Rev. Lett. **113**, 267201 (2014).
  29. “Interplay of charge, spin and lattice degrees of freedom in the spectral properties of the one-dimensional Hubbard-Holstein model”  
Nocera(\*#), M. Soltanieh-ha(#), C.A. Perroni, V. Cataudella, A. E. Feiguin  
Phys. Rev. B **90**, 195134 (2014).
  30. Reply to “Comment on Exotic Paired States with Anisotropic Spin-Dependent Fermi Surfaces” by Simone Chiesa and George Batrouni.  
Adrian E. Feiguin(\*) and Matthew P.A. Fisher.  
Phys. Rev. Lett. **113**, 019602 (2014).
  31. “Spectral function of the  $U \rightarrow \infty$  one-dimensional Hubbard model at finite temperature and the crossover to the spin-incoherent regime”  
Mohammad Soltanieh-ha(#) and Adrian E. Feiguin(\*).  
Phys. Rev. B **90**, 165145 (2014).
  32. “Photoexcitation of electronic instabilities in one-dimensional charge-transfer systems”  
Julián Rincón(\*), K. A. Al-Hassanieh, A. E. Feiguin, and E. Dagotto.  
Phys. Rev. B **90**, 155112 (2014).
  33. “Spin filtering in a double quantum dot device: Numerical renormalization group study of the internal structure of the Kondo state”  
E. Vernek, C. A. Busser, E. V. Anda, A. E. Feiguin, G. B. Martins(\*).  
Appl. Phys. Lett. **104**, 132401 (2014).
  34. “Lanczos transformation for quantum impurity problems in d-dimensional lattices: application to graphene nanoribbons”  
C.A. Busser, G. B. Martins, A. E. Feiguin(\*).  
Phys. Rev. B **88**, 245113 (2013).
  35. “Relaxation towards negative temperatures in bosonic systems: generalized Gibbs ensembles and beyond integrability”  
Stephan Mandt(\*), Adrian E. Feiguin, Salvatore R. Manmana  
Phys. Rev. A **88**, 043643 (2013).
  36. “An exact real-space renormalization method and applications”  
Adrian E. Feiguin, Rolando D. Somma, Cristian D. Batista(\*).  
Phys. Rev. B. **88**, 075145 (2013).
  37. “One-dimensional itinerant interacting non-Abelian anyons”  
Didier Poilblanc, Adrian Feiguin, Matthias Troyer, Eddy Ardonne, Parsa Bonderson(\*)  
Phys. Rev. B. **87**, 085106 (2013).



38. “Field-induced quantum soliton lattice in a frustrated two-leg spin-1/2 ladder”  
F. Casola(\*), T. Shiroka, A. Feiguin, S. Wang, M. S. Grbic, M. Horvatic, S. Kramer, S. Mukhopadhyay, C. Berthier, H.-R. Ott, H. M. Ronnow, Ch. Ruegg, J. Mesot  
Phys. Rev. Lett. **110**, 187201 (2013).
39. “Class of variational ansatz for the spin-incoherent ground state of a Luttinger liquid coupled to a spin bath”  
M. Soltanichah(†) and A. E. Feiguin(\*)  
Phys. Rev. B **86**, 215120 (2012).
40. “Dimensional crossover of spin chains in a transverse staggered field: An NMR study”  
F. Casola(\*), T. Shiroka, V. Glazkov, A. Feiguin, G. Dhalenne, A. Revcolevschi, A. Zheludev, H.-R. Ott, and J. Mesot  
Phys. Rev. B **86**, 165111 (2012).

## A2. Invited Book Chapters

1. “The density matrix renormalization group”,  
Adrian E. Feiguin.  
Published in “Strongly correlated systems: Numerical methods”, A. Avella and F. Mancini (Eds.), Springer Series in Solid State Science vol. 176, Springer Science and Business Media (2013).
2. “The time-dependent density matrix renormalization group”,  
Adrian E. Feiguin.  
Published in “Strongly correlated systems: Numerical methods”, A. Avella and F. Mancini (Eds.), Springer Series in Solid State Science vol. 176, Page 31, Springer Science and Business Media (2013).

## A3. Non-peer reviewed

1. “Hermitian and non-Hermitian thermal Hamiltonians”  
Adrian E. Feiguin(\*), Israel Klich  
arXiv:1308.0756.

## B. Publications/Products before joining NU

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### B1. Peer-reviewed Journals

1. “Junctions of multiple quantum wires with different Luttinger parameters”  
Chang-Yu Hou, Armin Rahmani, Adrian E. Feiguin, Claudio Chamon  
Phys. Rev. B **86** (2012).
2. “Electrostatic control over polarized currents through spin-orbital Kondo effect”  
Carlos A. Busser, Adrian E. Feiguin, George B. Martins  
Phys. Rev. B **85**, 241310(R) (2012). Rapid Comm.- **Editor’s suggestion.**
3. “Dimer, trimer and FFLO liquids in mass- and spin-imbalanced trapped binary mixtures in one dimension”  
M. Dalmonte, K. Dieckmann, T. Roscilde, C. Hartl, A. E. Feiguin, U. Schollwöck, F. Heidrich-Meisner  
Phys. Rev. A **85**, 063608 (2012).

4. "Designing a symmetry protected molecular device"  
C. A. Busser and A. E. Feiguin.  
Phys. Rev. B **86**, 165410 (2012).
5. "Magnetostriiction and magnetic texture to 100.75 Tesla in frustrated  $\text{SrCu}_2(\text{BO}_3)_2$ "  
Marcelo Jaime, Ramzy Daou, Scott Crooker, Dagmar F. Weickert, Atsuko Uchida, Adrian Feiguin, Cristian D. Batista, H. Dabkowska and B. Gaulin  
Proc. Natl. Acad. Sci. U.S.A., **109**, 12404-12407 (2012).
6. "A general method for calculating the universal conductance of strongly-correlated junctions of multiple quantum wires"  
Armin Rahmani, Chang-Yu Hou, Adrian Feiguin, Masaki Oshikawa, Claudio Chamon and Ian Affleck  
Phys. Rev. B **85**, 045120 (2012).
7. "Novel Polaron State for Single Impurity in a Bosonic Mott Insulator"  
Yasuyuki Kato, Khaled Al-Hassanieh, A. E. Feiguin, Eddy Thimmemans, and C. D. Batista  
Europhysics Letters, **98** (2012) 46003
8. "Numerical evidence for a  $p_x$ - $i p_y$  paired fractional quantum Hall state at  $\nu=12/5$ "  
Parsa Bonderson, A. E. Feiguin, Gunnar Moller, and J. K. Slingerland.  
Phys. Rev. Lett. **108**, 136806 (2012).
9. "SU(N) magnetism in chains of ultracold alkaline earth atoms: Mott transitions and quantum correlations"  
Salvatore R. Manmana, Kaden R. A. Hazzard, Gang Chen, Adrian E. Feiguin, and Ana Maria Rey.  
Phys. Rev. A. **64**, 043601 (2011)
10. "Reducing entanglement with symmetries: application to persistent currents in impurity problems"  
A. E. Feiguin, C. A. Busser  
Phys. Rev. B **84**, 115403 (2011).
11. "The ALPS project release 2.0: Open source software for strongly correlated systems"  
B. Bauer, L. D. Carr, H.G. Evertz, A. Feiguin, J. Freire, S. Fuchs, L. Gamper, J. Gukelberger, E. Gull, S. Guertler, A. Hehn, R. Igarashi, S.V. Isakov, D. Koop, P.N. Ma, P. Mates, H. Matsuo, O. Parcollet, G. Pawłowski, J.D. Picon, L. Pollet, E. Santos, V.W. Scarola, U. Schollwock, C. Silva, B. Surer, S. Todo, S. Trebst, M. Troyer, M.L. Wall, P. Werner, S. Wessel  
J. Stat. Mech. (2011) P05001.
12. "Transport in carbon nanotubes: Two-level SU(2) regime reveals subtle competition between Kondo and intermediate valence states"  
C. A. B  sser, E. Vernek, P. Orellana, G. A. Lara, E. H. Kim, A. E. Feiguin, E. V. Anda, and G. B. Martins  
Phys. Rev. B **83**, 125404 (2011).
13. "Exotic paired phases in ladders with spin-dependent hopping"  
Adrian E. Feiguin, Matthew P. A. Fisher  
Phys. Rev. B. **83**, 115104 (2011).
14. "Spin-incoherent behavior in the ground state of strongly correlated systems"  
Adrian E. Feiguin, Gregory A. Fiete  
Phys. Rev. Lett. **106**, 186802 (2011).

15. "Numerical Calculation of the Neutral Fermion Gap at  $\nu=5/2$ "  
 Parsa Bonderson, Adrian E. Feiguin, Chetan Nayak  
 Phys. Rev. Lett. **106** 186802 (2011).
16. "How to find conductance tensors of quantum multi-wire junctions through static calculations: application to an interacting Y-junction"  
 Armin Rahmani, Chang-Yu Hou, Adrian Feiguin, Claudio Chamon, and Ian Affleck  
 Phys. Rev. Lett. **105**, 226803 (2010).
17. "Non-equilibrium electronic transport in a one-dimensional Mott insulator"  
 F. Heidrich-Meisner, I. Gonzalez, K.A. Al-Hassanieh, A.E. Feiguin, M.J. Rozenberg, E. Dagotto  
 Phys. Rev. B. **82**, 205110 (2010).
18. "Phase separation of trapped spin-imbalanced Fermi gases in one-dimensional optical lattices"  
 F. Heidrich-Meisner, G. Orso, A. Feiguin  
 Phys. Rev. A. **81**, 053602 (2010).
19. "Real-time dynamics of particle-hole excitations in Mott insulator-metal junctions"  
 Luis G. G. V. Dias da Silva, Khaled A. Al-Hassanieh, Adrian E. Feiguin, Fernando A. Reboredo, and Elbio Dagotto  
 Phys. Rev. B **81**, 125113 (2010).
20. "The BCS-BEC crossover and the disappearance of FFLO-correlations in a spin-imbalanced, one-dimensional Fermi gas"  
 F. Heidrich-Meisner, A.E. Feiguin, U. Schollwoeck, W. Zwerger  
 Phys. Rev. A **81**, 023629 (2010).
21. "Spectral properties of a spin incoherent Luttinger liquid"  
 A. E. Feiguin and G. Fiete  
 Phys. Rev. B **81**, 075108 (2010). **Editor's suggestion.**
22. "Decay of Rabi oscillations by dipolar-coupled dynamical spin environments"  
 V. V. Dobrovitski, A. E. Feiguin, R. Hanson, D. D. Awschalom  
 Phys. Rev. Lett. **102**, 237601 (2009).
23. "Exotic paired states with anisotropic spin-dependent Fermi surfaces"  
 A. E. Feiguin and M. P. A. Fisher  
 Phys. Rev. Lett. **103**, 025303 (2009).
24. "Real-time simulations of nonequilibrium transport in the single-impurity Anderson model"  
 F. Heidrich-Meisner, A.E. Feiguin, E. Dagotto  
 Phys. Rev. B. **79**, 235336 (2009).
25. "Quantum distillation: dynamical generation of low-entropy states of strongly correlated fermions in an optical lattice"  
 F. Heidrich-Meisner, S. R. Manmana, M. Rigol, A. Muramatsu, A. E. Feiguin, and E. Dagotto.  
 Phys. Rev. A **80**, 041603R (2009). Rapid Comm.
26. "Spin polarization of the  $\nu=5/2$  quantum Hall state"  
 A. E. Feiguin, E. Rezayi, Kun Yang, C. Nayak, S. Das Sarma.  
 Phys. Rev. B. **79**, 115322 (2009).
27. "Spectral properties of a partially spin-polarized one-dimensional Hubbard/Luttinger superfluid"

- A. E. Feiguin, David. A. Huse  
Phys. Rev. B **79**, 100507(R) (2009).
28. “Pair correlations of a spin-imbalanced Fermi gas on two-leg ladders”  
A. E. Feiguin, F. Heidrich-Meisner  
Phys. Rev. Lett. **102**, 076403 (2009).
  29. “Transport through quantum dots: A combined DMRG and cluster-embedding study”  
F. Heidrich-Meisner, G.B. Martins, K.A. Al-Hassanieh, A.E. Feiguin, G. Chiappe,  
E.V. Anda, E. Dagotto  
Eur. Phys. J. B **67**, 527 (2009).
  30. “Topological confinement and superconductivity”  
K.A. Al-Hassanieh, C. D. Batista, P. Segupta, and A. E. Feiguin.  
Phys. Rev. B **80**, 115116 (2009).
  31. “ Non-equilibrium transport through a point contact in the  $\nu=5/2$  non-Abelian quantum Hall state”  
Adrian Feiguin, Paul Fendley, Matthew P.A. Fisher, Chetan Nayak  
Phys. Rev. Lett. **101**, 236801 (2008).
  32. “Transport properties and Kondo correlations in nanostructures: the time-dependent DMRG method applied to quantum dots coupled to Wilson chains”  
Luis G.G.V. Dias da Silva, F. Heidrich-Meisner, A. E. Feiguin, C. A. Busser,  
G. B. Martins, E. V. Anda, and E. Dagotto  
Phys. Rev. B **78**, 195317 (2008).
  33. “Decoherence dynamics of a single spin versus spin ensemble”  
V.V. Dobrovitski, A.E. Feiguin, D.D. Awschalom, R. Hanson  
Phys. Rev. B **77**, 245212 (2008)
  34. “Ground-state reference systems for expanding correlated fermions in one dimension”  
F. Heidrich-Meisner, M. Rigol, A. Muramatsu, A. E. Feiguin, and E. Dagotto  
Phys. Rev. A **78**, 013620 (2008)
  35. “Collective states of interacting anyons in topological quantum liquids”  
S. Trebst, E. Ardonne, A. E. Feiguin, D. A. Huse, A. W. W. Ludwig, M. Troyer  
Phys. Rev. Lett. **101**, 050401 (2008)
  36. “Dynamics of a single spin interacting with an adjustable spin bath”  
R. Hanson, V.V. Dobrovitski, A.E. Feiguin, O. Gywat and D.D. Awschalom  
Science 18 April 2008 320: 352-355.
  37. “Excitons in the one-dimensional Hubbard model: a real-time study”  
K.A. Al-Hassanieh, F. Reboredo, A.E. Feiguin, I.Gonzalez, and E. Dagotto  
Phys. Rev. Lett. **100**, 166403 (2008)
  38. “Spin polaron in the  $J_1$ - $J_2$  Heisenberg model”  
I.J. Hamad, A.E. Trumper, A.E. Feiguin, L.O Manuel  
Phys. Rev. B **77**, 014410 (2008).
  39. “Pairing states of a polarized Fermi gas trapped in a one-dimensional optical lattice”  
A. E. Feiguin, F. Heidrich-Meisner  
Phys. Rev. B **76**, 220508(R) (2007).
  40. “Density Matrix Renormalization Group study of incompressible fractional quantum Hall states”  
A. E. Feiguin, E. Rezayi, C. Nayak, S. Das Sarma  
Phys. Rev. Lett. **100**, 166803 (2008).

41. "Probing the pairing symmetry and pair charge stiffness of doped  $t$ - $J$  ladders"  
A. E. Feiguin, S. R. White, D. J. Scalapino, and I. Affleck  
Phys. Rev. Lett. **101**, 217001 (2008).
42. "Interacting anyons in topological quantum fluids: The golden chain"  
A. E. Feiguin, S. Trebst, A. W. W. Ludwig, M. Troyer, A. Kitaev, Z. Wang,  
and M. Freedman  
Phys. Rev. Lett. **98**, 160409 (2007).
43. "Universal emergence of the one-third plateau in the magnetization process of frustrated  
quantum spin- $S$  chains"  
F. Heidrich-Meisner, I. A. Sergienko, A. E. Feiguin, and E. Dagotto.  
Phys. Rev. B **75**, 064413 (2007).
44. "Cooper-pair transport through a Hubbard chain sandwiched between two  
superconductors: Density matrix renormalization group calculations"  
A. E. Feiguin, Steven R. White, and D.J. Scalapino  
Phys. Rev. B. **75**, 024505 (2007).
45. "Adaptive time-dependent density-matrix renormalization-group technique for  
calculating the conductance of strongly correlated nanostructures"  
K. A. Al-Hassanieh, A. E. Feiguin, J. A. Riera, C. A. Büsler, and E. Dagotto  
Phys. Rev. B **73**, 195304 (2006).
46. "Finite-temperature density matrix renormalization using an enlarged Hilbert space"  
A. E. Feiguin and S. R. White  
Phys. Rev. B **72**, 220401 (2005).
47. "Time-step targeting methods for real-time dynamics using the density matrix  
renormalization group"  
A. E. Feiguin and S. R. White  
Phys. Rev. B **72**, 020404 (2005).
48. "Real time evolution using the density matrix renormalization group"  
Steven R. White and Adrian E. Feiguin  
Phys. Rev. Lett. **93**, 076401 (2004).
49. "Anisotropy-induced ordering in the quantum  $J_1$ - $J_2$  antiferromagnet"  
T. Roscilde, A. E. Feiguin, A. L. Chernyshev, S. Liu, and S. Haas  
Phys. Rev. Lett. **93**, 017503 (2004).
50. "Unveiling New Magnetic Phases of Undoped and Doped Manganites"  
T. Hotta, M. Moraghebi, A. Feiguin, A. Moreo, S. Yunoki, and E. Dagotto  
Phys. Rev. Lett. **90**, 247203 (2003).
51. "The spectral function for Mott insulating surfaces"  
L. O. Manuel, C. J. Gazza, A. E. Feiguin and A. E. Trumper  
J. Phys.: Condens. Matter **15** 2435-2440 (2003).
52. "Stripes induced by orbital ordering in layered manganites"  
T. Hotta, A. Feiguin, and E. Dagotto  
Phys. Rev. Lett. **86**, 4922 (2001).
53. "Resistivity of mixed-phase manganites"  
M. Mayr, A. Moreo, Jose A. Verges, J. Arispe, A. Feiguin, and E. Dagotto,  
Phys. Rev. Lett. **86**, 135 (2001).
54. "Doped stripes in models for the cuprates emerging from the one-hole properties of the  
insulator"

- G. Martins, C. Gazza, J. C. Xavier, A. Feiguin, and E. Dagotto,  
Phys. Rev. Lett. **84**, 5844 (2000).
55. “Giant cluster coexistence in doped manganites and other compounds”  
A. Moreo, M. Mayr, A. Feiguin, S. Yunoki and E. Dagotto,  
Phys. Rev. Lett. **84**, 5568 (2000).
  56. “Influence of finite Hund rules and charge transfer on properties of Haldane systems”  
A.E. Feiguin, L. Arrachea, and A.A. Aligia.  
Phys. Rev. **B 59**, 9916 (1999).
  57. “Numerical study of the incommensurate phase in spin-Peierls systems”  
A.E. Feiguin, J. Riera, A. Dobry, and H.A. Ceccatto.  
Phys. Rev **B 56**, 14607 (1997).
  58. “The Hubbard model on a non-bipartite lattice: A slave-boson study”  
A.E. Feiguin, C.J. Gazza, A.E. Trumper, H.A. Ceccatto.  
J. Phys: Condensed Matter, **9**, L27 (1996).
  59. “Spin stiffness of frustrated Heisenberg antiferromagnets: Finite size scaling”  
A.E. Feiguin, C.J. Gazza, A.E. Trumper, H.A. Ceccatto.  
Phys. Rev. **B 52**, 15043 (1995).
  60. “Spin-Peierls dimerization and frustration in two-dimensional antiferromagnets”  
A.E. Feiguin, C.J. Gazza, A.E. Trumper, and H.A. Ceccatto.  
J. Phys.: Condensed Matter **6**, L503 (1994).

## B2. Invited Book Chapters

1. “BCS-BEC crossover and unconventional superfluid order in one dimension”  
A.E. Feiguin, F. Heidrich-Meisner, G. Orso, and W. Zwerger.  
Review chapter in the book: Lecture Notes in Physics vol. 826, Page 503. “BCS-BEC crossover and the Unitary Fermi Gas” edited by W. Zwerger, Springer (2012).
2. “Monte Carlo simulations and application to Manganite models”. Chapter written in collaboration with Elbio Dagotto and G. Alvarez as part of the book “Nanoscale Phase Separation and Colossal Magnetoresistance. The Physics of Manganites and Related Compounds”, Springer Series in Solid-State Sciences, Vol. 136 (2002) Author: Elbio Dagotto.

## B3. Peer-reviewed Proceedings

1. “The density matrix renormalization group method and its time-dependent variants”  
Adrian E. Feiguin  
“Lectures in the physics of strongly correlated systems XV”, AIP Conf. Proceedings **1419**, 5 (2011).
2. “Finite-size scaling analysis of spin correlations and fluctuations of two quantum dots in a T-shape geometry”  
F. Heidrich-Meisner, G.B. Martins, K.A. Al-Hassanieh, A.E. Feiguin, E. Dagotto  
Physica B **403**, 1544 (2008). Proceedings of SCES 2007.
3. “The ALPS project release 1.3: open source software for strongly correlated systems”  
A.F. Albuquerque, et al. (ALPS Collaboration)  
Journal of Magnetism and Magnetic Materials, **310**, 1187 (2007).
4. “Theory of manganites: the key role of phase segregation”  
E. Dagotto, A. Feiguin and A. Moreo

Published as part of the book "Open problems in strongly correlated electron systems", Editors: J. Bonca, P. Prelovsek, A. Ramsak, A. Sarkar. NATO Science Series: B Physics (Springer), Pg. 217 (2001).

### Section III: Invited Talks and other presentations

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#### A. Invited talks since Joining Northeastern

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##### A1. Invited talks at national/international conferences

1. "Time and momentum resolved tunneling spectroscopy applied to non-equilibrium phenomena in correlated systems", International Conference on Superconductivity and Electron Correlation, October 2019, Odessa, Ukraine.
2. "Competition between screening and indirect exchange: effects of geometry and dimensionality", July 2018, Centro de Ciencias, Bensasque, Spain.
3. "The DMRG as a solver for cluster perturbation theory", Oct. 2017, Center for Computational Materials Sciences 2017 Fall Workshop, Brookhaven National Lab.
4. "Spectral properties of a low-dimensional extended Hubbard model with long-range antiferromagnetism", Workshop: Quantum Dynamics and Response", March 2017, University of Tokyo, Japan.
5. "Entanglement, and the DMRG as an efficient real frequency solver for DMFT". Nov. 2016, Center for Computational Materials Sciences 2016 Fall Workshop, Brookhaven National Lab.
6. "Unveiling the entanglement structure of the Kondo singlet", Oct. 2016, Workshop: Entanglement and Dynamical Systems. Simons Center for Geometry and Physics, Stony Brook, NY.
7. "Spectral signatures of spin-charge separation and long-range order in the 2D Hubbard model: a CPT+DMRG study", 11<sup>th</sup> International Conference on New Theories, Discoveries, Applications of Superconductors and Related Materials (New3SC-11), Sept. 2016, Bled, Slovenia.
8. "DMRG studies of the Shastry-Sutherland material  $\text{SrCu}_2(\text{BO}_3)_2$  under high-pressure and high-fields", Workshop: Recent progress in low-dimensional quantum magnetism, Sept 2016, EPFL, Lausanne, Switzerland.
9. "Thermal and pump-driven dynamical behavior of a spin-full Mott insulator", Department of Energy PI meeting, Aug. 2016, Washington DC.
10. "Thermal and pump-driven dynamical behavior of a spin-full Mott insulator", Quantum non-equilibrium phenomena workshop, June 2016, International Institute of Physics, Natal, Brazil.
11. "Non-perturbative nature of the magnetic exchange between ad-atoms on substrates" SPICE workshop: "Magnetic adatoms as building blocks for quantum magnetism" August 2015, Institute of Physics, Mainz, Germany.
12. "Time-dependent DMRG as a solver for cluster perturbation theory (CPT)", Workshop and symposium on DMRG technique for strongly correlated systems in physics and chemistry, June 2015, International Institute of Physics, Natal, Brazil.
13. "Exploring non-equilibrium dynamics in strongly correlated systems"; invited talk at the Meeting of the Brazilian Physical Society, May 2015, Foz do Iguazu, Brazil.
14. "Anomalous pump-driven spectral weight transfer and spin-charge separation in 1D Mott insulators", Conference: "Dynamics of Quantum Many-body Systems", Dec. 2014,

Krvavec, Slovenia.

15. “Anomalous pump-driven spectral weight transfer and spin-charge separation in 1D Mott insulators”. Workshop: “Quantum Spin Dynamics: From Exotic Excitations to Novel Transport and Non- Equilibrium Phenomena”, Aug 2014, Max Plank Institute MIPKs, Dresden, Germany.
16. “Hermitian, and non-Hermitian thermal Hamiltonians”. Workshop: “Nonlinear Physics at the Nanoscale: A Cross-Fertilization on Stochastic Methods”, May 2014, Max Plank Institute MIPKs, Dresden, Germany.
17. Discussion panelist, “Field Theoretic Computer Simulations for Particle Physics and Condensed Matter”. May 2014, Boston University.
18. “Thermal density matrices as ground states of quantum Hamiltonians”. Workshop: “Frontiers of quantum condensed matter physics: light, matter and unusual devices out of equilibrium”, Mar 2013, CUNY, New York City.
19. “Hermitian and non-Hermitian thermal Hamiltonians”. June 2013, Aspen Center for Physics.
20. “Thermal density matrices as ground states of quantum Hamiltonians”. Conference: “Physics at the falls: Recent Progress in Nonequilibrium Quantum Many-Body Theory”, Mar 2013, Buffalo, NY.
21. “The time-dependent density-matrix renormalization group method”. DMRG101, Winter School, Dec 2012, Taiwan National University, Taipei.

#### A2. Invited seminars/colloquia

1. “Time and momentum resolved tunneling spectroscopy applied to non-equilibrium phenomena in correlated systems “, Dec. 2019, Instituto de Fisica Rosario, Argentina.
2. “Time and momentum resolved tunneling spectroscopy applied to non-equilibrium phenomena in correlated systems “, Nov. 2019, UMass Lowell.
3. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles “, Dec. 2018, La Sapienza, Rome, Italy.
4. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles “, Dec. 2018, Universidad Complutense Madrid, Spain.
5. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles “, Nov. 2018, Oxford, UK.
6. “Competition between screening and indirect exchange: effects of geometry and dimensionality”, Nov. 2018, Univ. of Cologne, Germany.
7. “Competition between screening and indirect exchange: effects of geometry and dimensionality”, Nov. 2018, Instituto de Ciencias de Materials de Madrid, Spain.
8. “Competition between screening and indirect exchange: effects of geometry and dimensionality”, Oct. 2018, Univ. of Seville, Spain.
9. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles “, Oct. 2018, SISSA, Trieste, Italy.
10. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles “, Oct. 2018, Josef Stefan Institute, Ljubljana, Slovenia.
11. “Spin incoherent behavior in strongly correlated low dimensional systems”, Nov 2017, ITAMP seminar, Harvard.
12. “Numerical studies of the magnetic phase diagram of the Shastry-Sutherland material  $\text{SrCu}_2(\text{BO}_3)_2$  and the free radical magnet NIT-2Py”, April 2017, University of Montreal,



Canada, Physics Dept. seminar.

13. "Building and understanding magnetic nano-structures, one atom at a time", Jan. 2017, National High Magnetic Field Laboratory, Florida State University, Tallahassee, Florida, Theory group seminar.
14. "Building and understanding magnetic nano-structures, one atom at a time", Nov. 2016, Brown University, Physics Dept. seminar.
15. "Building and understanding magnetic nano-structures, one atom at a time", April 2016, University of Delaware, Physics Dept. seminar.
16. "Building and understanding magnetic nano-structures, one atom at a time", April 2016, U. Mass Amherst, Condensed Matter seminar.
17. "Spin incoherent behavior in strongly correlated low dimensional systems", Mar. 2016, C.N.Yang Institute for Theoretical Physics, Stony Brook.
18. "Building and understanding magnetic nano-structures, one atom at a time", Feb. 2016, Boston University, Condensed Matter seminar.
19. "Building and understanding magnetic nano-structures, one atom at a time", Dec. 2015, Instituto de Fisica Rosario, Argentina.
20. "Equilibrium density matrices as ground states of frustration-free Hamiltonians", Oct. 2015, iQuISE seminar, MIT.
21. "Building and understanding magnetic nano-structures, one atom at a time", Oct. 2015, Physics Dept. Colloquium, Duke University.
22. "Building and understanding magnetic nano-structures, one atom at a time", Sept. 2015, Physics Dept. Colloquium, University of Virginia.
23. "The density matrix renormalization group method and its time dependent variants". Greater Boston Area Theoretical Chemistry Lecture Series, which is run jointly by BU, Harvard, and MIT, April 2015, Harvard University.
24. "Anomalous pump-driven spectral weight transfer and spin-charge separation in 1D Mott insulators", Dec. 2014, Ludwig-Maximilians Univ. (LMU), Munich, Germany.
25. "Breaking an Electron: Spin Incoherent Behavior in Strongly Correlated Low Dimensional Systems", Sept. 2014, Physics Colloquium, Michigan State University, East Lansing.
26. "Spin incoherent behavior in strongly correlated low dimensional systems", May 2014, AMO seminar, MIT.
27. "Breaking an Electron: Spin Incoherent Behavior in Strongly Correlated Low Dimensional Systems", Mar 2014, Physics Dept. Colloquium, University of Florida, Gainesville.
28. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", Dec. 2014, Instituto de Física, Universidad Nacional de Rosario, Argentina.
29. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", May 2013, Rice University, Houston, TX.
30. "Breaking an Electron: Spin Incoherent Behavior in Strongly Correlated Low Dimensional Systems", Mar 2013, UMass Boston.
31. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", Jan 2013, Boston University.
32. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", Dec 2012, Harvard University.

33. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", Nov 2012, University of Virginia.
34. "Breaking an Electron: Spin Incoherent Behavior in Strongly Correlated Low Dimensional Systems", Nov 2012, Univ. of Vermont.

## *B. Invited talks prior to joining Northeastern*

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### *B1. Invited talks at national/international conferences*

1. "Real-time dynamics of strongly correlated systems with the density-matrix renormalization group", Jan 2012, Condensed-matter winter school, International Non-Equilibrium School (INES2011), Mohanpur Campus of IISER Kolkata, India.
2. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", Nov. 2011, 16th International Conference on Recent Progress in Many-Body Theories, Bariloche, Argentina.
3. "Real-time dynamics of strongly correlated systems with the density-matrix renormalization group", Sept 2011, Quantum Quenches and Strongly Correlated Physics. Montauk, New York.
4. "Toward a unified description of spin incoherent behavior at zero and finite temperatures", July 2011, Workshop on Synergies between Field Theory and Exact Computational Methods in Strongly Correlated Quantum Matter, International Centre for Theoretical Physics (ICTP), Trieste, Italy.
5. "Knotts with circuits: What symmetries teach us about entanglement, and transport", May 2011, Workshop on Topological Order and Quantum Computation, Moorea, French Polynesia.
6. "Pairing states of a one-dimensional spin imbalanced Fermi gas across a Feshbach resonance", **invited talk at the APS March Meeting**, March 2011, Dallas.
7. "Density Matrix Renormalization Group Study of Incompressible Fractional Quantum Hall states", June 2009, EPQHS3 conference (Emergent Phenomena in Quantum Hall Systems), Lucca, Italy.
8. "Spectral properties of strongly correlated system at finite temperature using the time-dependent density matrix renormalization group method", October 2010, International Workshop on New Development of Numerical Simulations in Low-Dimensional Quantum Systems: From Density Matrix Renormalization Group to Tensor Network Formulations. Yukawa Institute for Theoretical Physics (YITP), Kyoto University, Japan.
9. "Spin-incoherent behavior in the ground state of strongly correlated systems", Aug. 2010, International Workshop on Density-matrix Renormalization Group and Other Advances on Numerical Renormalization Group Methods. Renmin University, Beijing, China.
10. "The density matrix renormalization group: past, present, future", May 2009, Moorea, French Polynesia.
11. "Ground state properties of Fractional Quantum Hall states in the second Landau Level", **invited talk at the APS March Meeting**, Mar 2009, Pittsburgh.
12. "DMRG studies of FQH states in the second Landau level", Dec 2008, Microsoft Station Q Fall Meeting, KITP, University of California, Santa Barbara.
13. "Density Matrix Renormalization Group study of Fractional Quantum Hall states", Dec 2006, Kavli Institute for Theoretical Physics.
14. "On adaptive time-dependent DMRG based on Runge-Kutta methods", **invited talk at the APS March Meeting**, Mar 2005, Los Angeles.

15. “Recent developments and applications of the time-dependent density matrix renormalization group”, Oct 2004, second CSULA/USC mini-workshop on numerical and experimental studies in condensed matter physics. California State University, L.A.

## B2. Invited seminars/colloquia

1. “Using symmetries to understand molecular devices and magnetic ad-atoms on substrates”, May 2012, UC Berkeley.
2. “Real-time dynamics of strongly correlated systems with the density-matrix renormalization group”, May 2012, UC Berkeley.
3. “Exotic paired states in spin-imbalanced Fermi gases”, Apr 2012, Los Alamos National Laboratory.
4. “Breaking an Electron: Spin Incoherent Behavior in Strongly Correlated Low Dimensional Systems”, Apr 2012, Northeastern University, Boston.
5. “Using symmetries to understand (and design) molecular devices”, Nov 2011, University of Texas, Austin.
6. “Designing a symmetry protected molecular device”, July 2011, Ludwig-Maximilians-Universitat, Munich, Germany.
7. “Toward a unified description of spin incoherent behavior at zero and finite temperatures”, July 2011, Paul Scherrer Institut (PSI), Zurich, Switzerland.
8. “Exotic paired states in spin-imbalanced Fermi gases”, April 2011, Condensed Matter Colloquium, University of Utah, Salt Lake City.
9. “Breaking an electron: Spin incoherent behavior in strongly correlated low dimensional systems”, January 2011, Condensed Matter Colloquium, Ohio State University, Columbus.
10. “Spectral properties of spin-incoherent Luttinger liquids”, April 2010, SUNY Buffalo.
11. “Exotic paired states in cold atomic Fermi gases”, November 2009, Colorado State University, Fort Collins.
12. “Spectral properties of spin-incoherent Luttinger liquids”, September 2009, University of Colorado, Boulder.
13. “Spectral properties of spin-incoherent Luttinger liquids”, July 2009, Instituto de Ciencias Fotonicas (ICFO), Barcelona, Spain.
14. “Spectral properties of spin-incoherent Luttinger liquids”, June 2009, Ludwig-Maximilians Universitat, Munich, Germany.
15. “Real-time dynamics of strongly interacting quantum systems”, Feb 2009, Boston University.
16. “Real-time dynamics of strongly interacting quantum systems”, Feb 2009, Boston University.
17. “Coherent dynamics of a single spin in diamond”, Dec 2008, University of Wyoming.
18. “Pairing states of a polarized Fermi gas trapped in a one-dimensional optical lattice”, Aug 2008, PUC University, Rio de Janeiro, Brazil.
19. “Spin-incoherent behavior in one-dimensional interacting systems”, June 2008, California Institute of technology.
20. “Spin-incoherent behavior in one-dimensional interacting systems”, May 2008, University of California, Santa Barbara.
21. “Density Matrix Renormalization Group Study of Incompressible Fractional Quantum Hall States”, May 2008, University of California, Santa Cruz.

22. “Incompressible Fractional Quantum Hall states in the second Landau level”, Sept 2007, University of Maryland, College Park.
23. “Simulating quantum systems with the time-dependent density matrix renormalization group”, Feb 2005, Oregon State University, Corvallis, Oregon.
24. “Simulating quantum systems with the time-dependent density matrix renormalization group”, Feb 2005, Virginia Commonwealth University, Richmond, Virginia.
25. “Simulating quantum systems with the time-dependent density matrix renormalization group”, Nov 2004, Quantum Lunch Seminar at the Quantum Information Research Institute. Los Alamos National Laboratory.
26. “Real time evolution using the density matrix renormalization group”, Mar 2003, Condensed Matter group seminar, University of Southern California.
27. “Application of the density matrix renormalization group to strongly correlated electron problems”, Jan 2003, Physics Department Colloquium, California State University, Los Angeles.

### *C. Contributed talks/posters since joining Northeastern*

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#### *C1. Poster presentations*

1. “Time-dependent phenomena in correlated materials”, A. E. Feiguin, DOE-PI meeting, Aug. 2018, Washington, DC.
2. “Non-equilibrium quantum dynamics with the time-dependent density matrix renormalization group”, A. E. Feiguin. Sept. 2015, NSF Cyberbridges workshop, Arlington, VA.
3. “Non-equilibrium quantum dynamics with the time-dependent density matrix renormalization group”, A. E. Feiguin. July 2015, NSF Cyberbridges workshop, Arlington, VA.
4. “Non-equilibrium quantum dynamics with the time-dependent density matrix renormalization group”, A. E. Feiguin. July 2013, NSF Cyberbridges workshop, Arlington, VA.

#### *C2. Posters presented as co-author*

1. “Magnetic Phases of the Shastry-Sutherland Model using Projected Entangled Simplex States”, Trithep Devakul, and A. E. Feiguin, 2014 APS March meeting, Denver, Colorado.
2. “Spin decoherence of mobile impurity in a one dimensional spin bath”, Trithep Devakul and A. E. Feiguin, 2015 APS March Meeting, San Antonio, Texas.

#### *C3. Contributed talks*

1. “Majorana modes as electrical switches: computing the conductance of a junction between a Topological superconductor and a multi-channel Luttinger liquid”, A. Nocera, A. Rahmani, A. Feiguin, M. Franz, I. Affleck, 2019 APS March Meeting, Boston.
2. “A machine learning approach to excited states of quantum many-body systems”, D. Hendry, A. Feiguin, 2019 APS March Meeting, Boston.
3. “The spectral function of Mott-insulating Hubbard ladders: From fractional excitations to coherent quasi-particles”, A. Feiguin, C. Yang, 2019 APS March Meeting, Boston.
4. “Evidence of Bose-Einstein condensation in a quantum magnet formed by free radical tetramers”, Andres Saul, Nicolas Gauthier, Reza Moosavi Askari, Michel Côté, Thierry

- Maris, Christian Reber, Anthony Lannes, Dominique Luneau, Michael Nicklas, Elizabeth Lauren Green, Jochen Wosnitza, Andrea Daniele Bianchi, Adrian Feiguin, 2018 APS March Meeting, Los Angeles, California.
5. “Coupled spin-1/2 ladders as microscopic models for non-Abelian chiral spin liquids”, Po-Hao Huang, Jyong-Hao Chen, A. E. Feiguin, C. Chamon, C. Mudry, 2017 APS March Meeting, New Orleans.
  6. “The Effects of Kondo Physics on Surface State Mediated Exchange Interactions”, A. Allerdt and A. E. Feiguin, 2017 APS March Meeting, New Orleans.
  7. “Chiral phase near quantum critical point”, Zhentao Wang, Adrian E. Feiguin, Wei Zhu, Oleg A. Starykh, Andrey V. Chubukov, and Cristian D. Batista, 2017 APS March Meeting, New Orleans.
  8. “Restoring photon indistinguishability via pulse and continuous wave control of solid-state quantum emitters”, H. Fotso, A. E. Feiguin, D. Awschalom, V. Dobrovitski, 2016 APS March Meeting, Baltimore, Maryland.
  9. “Competition between Kondo and RKKY physics at the bulk and edges of graphene and other 2D materials” A. Allerdt, A. E. Feiguin, 2016 APS March meeting, Baltimore, Maryland.
  10. “The entanglement structure of the Kondo singlet in energy space”, C. Yang and A. E. Feiguin, 2016 APS March Meeting, Baltimore, Maryland.
  11. “Magnetic phase diagram of the spatially anisotropic spin-1/2 zig-zag ladder”, M. Soltanieh-ha, A. E. Feiguin, 2015 APS March Meeting, San Antonio, Texas.
  12. “Multipulse dynamical decoupling-like protocol for controlling the light emission line of a two-level system”, Herbert F. Fotso, Adrian Feiguin, Viatcheslav Dobrovitski, 2015 APS March Meeting, San Antonio, Texas.
  13. “Photodynamics of optical excitations in one-dimensional models for organic salts”, J. Rincon, K. Al-Hassanieh, A. E. Feiguin, E. Dagotto, 2015 APS March Meeting, San Antonio, Texas.
  14. “Controlling the condensate in driven optical lattices”, A. Nocera, A. E. Feiguin, 2015 APS March Meeting, San Antonio, Texas.
  15. “Kondo versus indirect exchange: the role of the lattice and the actual range of RKKY interactions in real materials”, A. Allerdt, A. E. Feiguin, C. A. Busser, G. B. Martins, 2015 APS March Meeting, San Antonio, Texas.
  16. “The density matrix renormalization group as a solver for cluster perturbation theory”, C. Yang, A. E. Feiguin, 2015 APS March Meeting, San Antonio, Texas.
  17. “Relaxation towards negative absolute temperature states”, S. Mandt, A. E. Feiguin, S. Manmana, 2014 APS March Meeting, Denver, Colorado.
  18. “Understanding the interplay between charge, spin and phonons in the spectral properties of the 1D Hubbard-Holstein model”, M. Soltanieh-ha, A. E. Feiguin, 2014 APS March Meeting, Denver, Colorado.
  19. “Phase diagram of a one-dimensional spin-full Bose-Fermi mixture at large boson densities”, A. Nocera, R. Lutchyn, A. E. Feiguin, 2014 APS March Meeting, Denver, Colorado.
  20. “Toward a unified description of spin incoherent behavior at zero and finite temperatures”, M. Soltanieh-ha, A. E. Feiguin, 2013 APS March Meeting, Baltimore, Maryland.

#### *D. Participation in conferences/workshops*

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- 2019 – “Electron correlations in superconductors and nanostructures”, Odessa, Ukraine.
- 2019 – “Quantum Information”, Centro de Ciencias Pedro Pascual, Benasque, Spain.
- 2019 – March Meeting of the American Physical Society, Boston, USA.
- 2018 – “Quantum information: implementations”, Centro de Ciencias Pedro Pascual, Benasque, Spain.
- 2018 – “ICAM Workshop on non-thermal quantum matter”, Boston University.
- 2018 – March Meeting of the American Physical Society, Los Angeles, USA.
- 2018 – “Frontiers in Many-Body Physics: Memorial for Lev Gorkov”, National High Magnetic Field Lab., Tallahassee, Florida.
- 2017 - Center for Computational Materials Sciences Fall Workshop, Brookhaven National Lab.
- 2017 - Gordon Conference: “Superconductivity”. Waterville Valley, New Hampshire.
- 2017 - Workshop: Quantum Dynamics and Response. University of Tokyo, Japan.
- 2016 - Workshop: Entanglement and Dynamical Systems. Simons Center for Geometry and Physics, Stony Brook, NY.
- 2016 - Center for Computational Materials Sciences Fall Workshop, Brookhaven National Lab.
- 2016 - 11<sup>th</sup> International Conference on New Theories, Discoveries, Applications of Superconductors and Related Materials (New3SC-11), Bled, Slovenia.
- 2016 - Workshop: Recent progress in low-dimensional quantum magnetism, EPFL, Lausanne, Switzerland.
- 2016 - Dept. of Energy PI meeting, Washington DC.
- 2016 - Workshop: Entanglement in quantum matter, Aspen Center for Physics.
- 2015 - Workshop: Quantum non-equilibrium phenomena, International Institute of Physics, Natal, Brazil.
- 2015 - SPICE workshop: "Magnetic adatoms as building blocks for quantum magnetism" Institute of Physics, Mainz, Germany.
- 2015 – “Symposium on DMRG Technique for Strongly Correlated Systems in Physics and Chemistry”, at the International Institute of Physics, Natal, Brazil.
- 2015 – “Meeting of the Brazilian Physical Society”, Foz do Iguazu, Brazil.
- 2014 – “Dynamics of Quantum Many-body Systems”, Krvavec, Slovenia.
- 2014 – “XXVI IUPAP Conference on Computational Physics”, Boston University.
- 2014 – “Quantum Spin Dynamics: From Exotic Excitations to Novel Transport and Non-Equilibrium Phenomena” Max Planck Institute (MPIPKS), Dresden, Germany.
- 2014 – “Nonlinear Physics at the Nanoscale: A Cross-Fertilization on Stochastic Methods”, Max Planck Institute (MPIPKS), Dresden, Germany.
- 2014 – “Field Theoretic Computer Simulations for Particle Physics and Condensed Matter”, Boston University.
- 2014 - Cyberbridges 2014. NSF workshop. Arlington, VA.
- 2014 – “Emergent Phenomena in the Dynamics of Quantum Matter: Disorder, Quenches, Simulations and Experiments”, CUNY, New York.
- 2013 - CIAM workshop on “Many-body phenomena in nanostructured materials”, Universidade Federal Fluminense, Niteroi, Brazil.
- 2013 - Cyberbridges 2013. NSF workshop. Arlington, VA.

- 2013 - Disorder, Dynamics, Frustration and Topology in Quantum Condensed Matter, Aspen Center for Physics.
- 2013 - Physics at the falls: Recent Progress in Nonequilibrium Quantum Many-Body Theory, Buffalo, NY.
- 2013 - Frontiers of quantum condensed matter physics: light, matter and unusual devices out of equilibrium, CUNY, New York City.
- 2013 - Workshop: An open world of physics: A celebration of Sankar Das Sarma's research career on his 60th birthday, UMD College Park.
- 2013 - APS March Meeting, Baltimore, USA.
- 2012 - Workshop: Frustrated magnetism and quantum spin liquids, KITP, Santa Barbara.
- 2012 - Workshop: Quantum dynamics in far from equilibrium thermally isolated systems, KITP, Santa Barbara.
- 2012 - Conference: Quantum dynamics in far from equilibrium thermally isolated systems, KITP, Santa Barbara.
- 2012 - Condensed-matter winter school, International Non-Equilibrium School (INES2011), Mohanpur Campus of IISER Kolkata, India.
- 2011 - 16th International Conference on Recent Progress in Many-Body Theories, Bariloche, Argentina.
- 2011 - Quantum Quenches and Strongly Correlated Physics. Montauk, New York.
- 2011 - Workshop on Synergies between Field Theory and Exact Computational Methods in Strongly Correlated Quantum Matter. International Centre for Theoretical Physics (ICTP), Trieste, Italy.
- 2011 - International Workshop on "Topological Order and Quantum Computation", May 2011 at the Richard B. Gump South Pacific Research Station, Moorea, French Polynesia.
- 2011 - APS March Meeting, Dallas, USA.
- 2010 - International Workshop on New Development of Numerical Simulations in Low-Dimensional Quantum Systems: From Density Matrix Renormalization Group to Tensor Network Formulations. Yukawa Institute for Theoretical Physics (YITP), Kyoto University, Japan.
- 2010 - International Workshop on Density-matrix Renormalization Group and Other Advances on Numerical Renormalization Group Methods. Renmin University, Beijing, China.
- 2010 - International Workshop on "Topological Order and Quantum Computation", May 31 to June 6, 2010 at the Richard B. Gump South Pacific Research Station, Moorea, French Polynesia.
- 2010 - 49th Summer Program of the Aspen Center for Physics.
- 2010 - APS March Meeting, Portland, USA.
- 2009 - Emergent Phenomena in Quantum Hall Systems (EPQHS3), Lucca, Italy.
- 2009 - The next generation of quantum simulations. Moorea, French Polynesia.
- 2009 - APS March Meeting, Pittsburgh, USA.
- 2009 - Low Dimensional Electron Systems. KITP, UCSB, USA.
- 2009 - New Directions in Low-Dimensional Electron Systems (Conference). Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2008 - Quantum Spin Hall Effect and Topological Insulators. Kavli Institute for



Theoretical Physics, UC Santa Barbara, USA.

- 2008 - California Condensed Matter Theory Meeting. University of California, Riverside.
- 2008 - Topological Phases in Condensed Matter. Institute for Condensed Matter Theory, University of Illinois at Urbana-Champaign.
- 2008 - Quantum Magnetism 2008. University of Minnesota.
- 2007 - Moments and multiplets in Mott materials. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2007 - 46th Summer program at the Aspen Center for Physics: Topological Quantum Computation. Aspen, USA.
- 2007 - Fourth International School and Conference on Spintronics and Quantum Information Technology (SPINTECH IV). Maui, Hawaii, USA.
- 2007 - Strongly Correlated Phases in Condensed Matter and Degenerate Atomic Systems. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2007 - APS March Meeting, Denver, USA.
- 2006 - Fractional Quantum Hall Effect and topological phases of matter. Station Q Fall meeting. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2006 - Topological phases and quantum computation. Workshop and conference. Kavli Institute for Theoretical Physics, UC Santa Barbara, USA.
- 2006 - APS March Meeting, Baltimore, USA.
- 2005 - APS March Meeting, Los Angeles, USA.
- 2004 - APS March Meeting, Montreal, Canada.
- 2003 - APS March Meeting, Austin, USA.
- 2002 - APS March Meeting, Indianapolis, USA.
- 2001 - APS March Meeting, Seattle, USA.
- 1998 - X Workshop on Open Problems in Strongly Correlated Electron Systems. International Centre for Theoretical Physics (ICTP), Trieste, Italy.
- 1996 - Workshop on Strong Electron Correlation. International Centre for Theoretical Physics (ICTP), Trieste, Italy.

#### *E. Press Releases, News highlights*

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1. “Diamond ‘Spin-Bath’ Gives Crystal View of Quantum Ripples”. Scientific American, March 20 (2008).
2. “Physicists learn how quantum mechanical states break down”. Science Daily (<http://www.sciencedaily.com/releases/2008/03/080320173602.htm>)
3. “Physicists discover how fundamental particles lose track of quantum mechanical properties”. Physorg, March 2008. <http://www.physorg.com/news124636936.html>
4. “Physicists Show How Fundamental Particles Lose Quantum Mechanical Properties Through Environmental Interactions”. AZoNano. <http://www.azonano.com/news.asp?newsID=6086>
5. “The equivalent of a new quantum liquid?” Physorg, May 2004. <http://www.physorg.com/news97494826.html>

#### *Section IV: Research Group*

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#### *A. Supported Postdocs*

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- Krissia Zawadski (2019-present)
- Alberto Nocera (2013-2015, currently Postdoctoral Researcher at Oak Ridge National Lab.).
- Carlos Busser (prior to joining NU 2010-2012, moved as Postdoctoral Researcher to Ludwig-Maximilians University, Munich, Germany)

#### *B. Supervised Graduate Students*

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- Mohammad Soltanieh-ha (since 2011, obtained his PhD in 2015)
- Chun Yang (started in 2013, obtained his PhD in 2018)
- Andrew Allerdts (started in 2013, obtained his PhD in 2017)
- Douglas Hendry (started in 2017)
- Luhang Yang (started in 2018)

#### *C. Theses Produced*

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- “Interplay between charge, spin, and phonons in low dimensional strongly interacting systems”, Mohammad Soltanieh-ha (2015)
- “A Non-Perturbative Treatment of Quantum Impurity Problems in Real Lattices”, Andrew Allerdts (2017)
- “Correlation effects in low dimensional quantum systems: from ladders to 2D materials”, Chun Yang (2018)

#### *D. Undergraduate Coop and Honors students*

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- Marco Muzio (2013), coop internship.
- Trithep Devakul (2014), Honors project. Recipient of the Lawrence Research Fellowship.
- Michael Plessner (2016), independent studies.
- Malik Malicar (2017), independent studies.
- Abigail Timmel (2017), research fellowship for undergraduate women in physics.
- Christina Nguyen (2017-2018), coop research internship.
- Kevin Wu (2018), coop research internship.
- Patrick Hanbury (2018), undergraduate research internship.

#### *E. Hosted visitors*

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##### *E1. Extended stays*

- Prof. Carlos Bolech, University of Cincinnati. Sabbatical stay (2017-2018).
- Prof. Cyrus Hirjibehedin, University College London. On sabbatical at NU (2016-2017).
- Dr. Fabian Heidrich-Meisner (Ludwig Maximilians Univ., Munich, Germany) (2013, 1 week)
- Prof. Karen Hallberg (Bariloche, Argentina) (2013, 1 week)
- Prof. Edson Vernek (Uberlandia, Brazil) (2013, 1 week)
- Prof. George Martins (Oakland, USA) (2013, 1 week)
- Dr. C. A. Busser (LMU, Munich, Germany) (2013, 1 week)

- Dr. Miles Stoudenmire (Perimeter Institute, Canada) – Taught 3 lectures for grad. students (Dec. 2012, 1 week)

## E2. Seminar speakers

- Dr. Attila Szabo, Cambridge, UK (2019)
- Prof. Claudio Chamon, Boston University (2018)
- Prof. Anatoli Polkovnikov, Boston University (2018)
- Prof. Eugene Demler, Harvard (2018)
- Prof. Tigran Sedrakyan, U. Mass. Amherst (2017)
- Dr. Stefanos Kourtis, Boston University (2017)
- Prof. Daniel Podolsky, Technion, Israel (2017)
- Prof. Carlos Bolech, Cincinnatti (2017)
- Prof. Eugene Demler, Harvard (2017)
- Dr. Salvatore Manmana, Goettingen (2017)
- Prof. Sylvain Capponi, Toulouse (2017)
- Prof. Fernando Sols, Universidad Complutense, Madrid (2017)
- Prof. B. Marston, Brown U. (2016)
- Salvatore Manmana, Goettingen (2016)
- Prof. Jay Sau, Maryland, College Park (2016).
- Prof. Xi Lin, Boston Univ. (2015)
- Prof. Ying-Jer Kao, Taiwan National University (2015).
- Prof. Anatoli Polkovnikov, Boston Univ. (2015)
- Dr. Olga Goulko, U. Mass Amherst (2015)
- Prof. Christopher Landee, Clark Univ. (2015)
- Prof. Garnet Chan, Princeton (2014)
- Prof. Martin Zwierlein, MIT (2014)
- Prof. Branislav Nikolic, Delaware (2014)
- Dr. Lev Vidmar, LMU Munich (2014)
- Prof. Ami Katz, Boston Univ. (2014)
- Prof. Markus Greiner, Harvard (2014)
- Prof. Alan Aspuru-Guzik, Harvard (2013)
- Prof. Subir Sachdev, Harvard (2013)
- Prof. Jong Han, SUNY Buffalo (2013)
- Prof. Maxim Olchanii, U. Mass Boston (2013)

## Section V: External Scholarly Activities

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### A. Conferences/Workshop organization

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#### A1. At Northeastern

1. Member of the program committee for the organization of the 2018 March Meeting of the American Physical Society, Division of Computational Physics (DCOMP).
2. Member of local organizing committee and co-chair of Quantum-Many Body division: “XXVI IUPAP Conference on Computational Physics”, Sept 2014, Boston.

3. Co-organizer: "Emergent phenomena in the dynamics of quantum matter: disorder, quenches, simulations and experiments", April 2014, CUNY Graduate Center, New York City.
4. Co-organizer: "Physics at the falls: Recent Progress in Nonequilibrium Quantum Many-Body Theory", May 2013, Buffalo, NY.

#### A2. Prior to joining Northeastern

5. Co-organizer: "ALPS/ANDES School of on Numerical Methods for Many-Body Theories", December 2011, Bariloche, Argentina.  
[http://fisica.cab.cnea.gov.ar/mbt16/index.php/ANDES/ALPS School on Numerical Methods for ManyBody Theories](http://fisica.cab.cnea.gov.ar/mbt16/index.php/ANDES/ALPS%20School%20on%20Numerical%20Methods%20for%20ManyBody%20Theories)
6. Co-organizer: "International Workshop on Topological Order and Quantum Computation", May 31 to June 6, 2010 at the Richard B. Gump South Pacific Research Station, Moorea, French Polynesia. About 20 participants. Organized with P. Bonderson (Microsoft Station Q) and K. Shtengel (UC Riverside).  
<http://physics.ucr.edu/~shtengel/Moorea2010/>

#### B. Professional Services

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- Consulting for Microsoft Research (since 2010).

### TEACHING

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#### Section I: Courses Taught/Teaching

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##### A. At Northeastern

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- PHYS 7321: Computational Physics; Fall 2019.
- PHYS 3602: Electricity and Magnetism; Spring 2019.
- Pedagogical 2-hour lecture geared toward graduate students on "Computational methods to solve quantum many body problems", Nov. 2016.
- PHYS 3602: Electricity and Magnetism; Spring 2018.
- PHYS 7321: Computational Physics; Fall 2017. Class Size: 14.
- PHYS 3602: Electricity and Magnetism; Spring 2017. Class Size: 42. Trace participation: 35. Overall Instructor Evaluation: 4.5
- PHYS 7321: Computational Physics; Fall 2016. Class Size: 17. Trace participation: 17 Overall Instructor Evaluation: 4.1
- PHYS 3601: Classical Dynamics; Spring 2016. Class size: 24 students. Trace participation: 21. Overall Instructor Evaluation 4.5
- PHYS7321: Computational Physics; Fall 2015. Class Size: 9. Trace participation: 9. Overall Instructor Evaluation: 4.5
- PHYS 3601: Classical Dynamics; Spring 2015. Class size: 23 students. Trace participation 19. Overall Instructor Evaluation 4.7
- PHYS 1145: Physics 1 for Life Sciences; Fall 2014. Class size: 86 Students. Trace participation 72. Overall Instructor Evaluation 4.0
- PHYS 3601: Classical Dynamics; Spring 2014. Class size: 11 students. Trace participation: 6. Overall Instructor Evaluation 4.0

- PHYS 3601: Classical Dynamics; Spring 2013. Class size: 15 students. Trace participation: 4. Overall Instructor Evaluation: 4.3
- PHYS 7210: Intro to Physics Research (Journal Club); Spring 2014. Class size: 13. Trace participation: 6. Overall instructor evaluation: 4.0
- PHYS 7210: Intro to Physics Research (Journal Club); Spring 2013. Class size: 17. Trace participation: 5. Overall Instructor Evaluation: 5.0

#### *B. Prior to Joining Northeastern*

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- Developed and taught the course: “Mathematical and computational methods in physics”, Dept. of Physics and Astronomy, University of Wyoming, Spring 2011.
- Developed and taught the course: “Modern computational methods in solids”, Dept. of Physics and Astronomy, University of Wyoming. Fall 2009, Spring 2012.
- Taught the course: “Engineering Physics II”, Dept. of Physics and Astronomy, University of Wyoming. Spring 2010, Fall 2010, Fall 2011.
- Lecturer, Department of Physics and Astronomy, University of California at Irvine. Computational Physics for senior undergraduates, Spring 2004.

#### *Section II: Undergraduate Research*

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- 2013 - Co-sponsored a Coop with the Physics Dept. at NU. Undergraduate student Marco Muzio has developed a Monte Carlo algorithm for systems of quantum fermions interacting with classical spins (the so-called spin-fermion model) to understand the physics of the material EuO, which has applications in magnetic recording and memories. He is currently pursuing his Ph.D at New York University (NYU).
- 2014 - Mentored and advised student Trithip Devakul as part of his Honors research. Devakul has worked on algorithm to study frustrated quantum magnets, and decoherence of NV centers in diamond. He is currently pursuing his Ph.D at Princeton.
- 2016 - Micheal Plesser conducted numerical simulations of an Ising-like chain to describe the energy landscape of proteins.
- 2017 - Malik Maricar continues the work of Marco Muzio as part of his independent studies under my supervision.
- 2017 - Abbigail Timmel is starting a project to develop an algorithm to study quantum magnets in the thermodynamic limit using matrix product states.

#### *Section III: Outreach*

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##### *A. At Northeastern*

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- 2016 Young Scholars Program. Pedagogical presentations directed toward high-school students. Topic: “The spooky quantum world, and quantum computers”

##### *B. Lectures at national and international graduate schools*

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###### *B1. At Northeastern*

1. “The density matrix renormalization group and matrix product states”, Jan 2018, “Winter theory school: Quantum Information Meets Many-body Physics: Entanglement, Thermalization and Chaos”, National High Magnetic Field Laboratory, Tallahassee, Florida.

2. "The time-dependent DMRG and applications", June 2015, "Workshop and symposium on DMRG technique for strongly correlated systems in physics and chemistry", International Institute of Physics, Natal, Brazil. 1.5-hour lecture.
3. "The density matrix renormalization group method and its time dependent variants", April 2015, Greater Boston Area Theoretical Chemistry Lecture Series (run jointly by BU, Harvard, and MIT) Harvard University. 3-hour lecture.

## B2. Prior to joining Northeastern

4. "The time-dependent density-matrix renormalization group method", Dec 2012, DMRG101, Winter School, Taiwan National University, Taipei. 2-hour lecture.
5. "The time-dependent density-matrix renormalization group method", Jan 2012, Condensed matter winter school, International Non-Equilibrium School (INES2011), Mohanpur Campus of IISER Kolkata, India. 2-hour lecture.
6. "The Density Matrix Renormalization Group", Dec 2011, ALPS/ANDES School on Numerical Methods for Many-Body Theories. Bariloche, Argentina. 2-hour lecture.
7. "The density matrix renormalization group and its time dependent variants", October 2010, XV Training Course in the Physics of Strongly Correlated Systems. International Institute for Advanced Scientific Studies (IIASS), Vietri sul Mare (Salerno), Italy. Four 2-hour lectures plus two hands-on practice sessions.
8. "The time-dependent density matrix renormalization group and its applications", June 2010, Boulder Summer School for Condensed Matter and Materials Physics: "Computational and Conceptual Approaches to Quantum Many-Body Systems", University of Colorado, Boulder. 2-hour lecture.

## C. Schools Organized

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1. "ALPS/ANDES School of on Numerical Methods for Many-Body Theories", December 2011, Bariloche, Argentina. A summer school on computational techniques in Condensed Matter Physics for graduate students. (Co-organizer)

## D. Lectures Organized

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1. "Many body physics with Matrix Product States", by Miles Stoudenmire (Perimeter, Canada), Dec. 2012, NU Physics Dept. A series of three 2-hr. lectures directed to graduates students at the Physics Dept.
2. "The Density Matrix Renormalization Group Method", 2-hr. lecture for graduate students at NU.

## E. Teleteaching

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1. "Simulations of quantum many body systems", A Ph.D level three-semester course shared by teleteaching among several international institutions, including ETH Zurich, ECS Paris, UCSB, LMU Munich, Max Planck Inst. Dresden. Delivered three 2-hr. lectures. (<http://wiki.phys.ethz.ch/quantumsimulations/>).

## F. Educational Software

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- **ALPS DMRG Project:** The ALPS project (Algorithms and Libraries for Physics Simulations) is an open source effort aiming at providing high-end simulation codes for strongly correlated quantum mechanical systems as well as C++ libraries for simplifying the development of such code. ALPS strives to increase software reuse in the physics community. I am the lead developer of the ALPS Density Matrix Renormalization Group project, which is currently being used by a large number of researchers and students at all levels, as well as the design of supporting documentation and tutorials. My duties also include technical support through the ALPS mailing list. I have also organized an international ALPS school in Argentina to train young scientists.
- **SciGraphica** (<http://scigraphica.sourceforge.net>) I created this software application for scientific graphics and data analysis. It features spreadsheets and interactive plots in a user-friendly graphic interface. It has been programmed from scratch using C and the GTK and GtkExtra toolkits. The spreadsheets evaluate expressions in Python, and the plots generate publication quality PostScript output. It has a native file format in XML and it is enhanced under GNOME. The project is open-source and continuously augmented in functionality by many users throughout the world. It is becoming very popular in the scientific community, and it is included in most of the Linux/BSD distributions. Moreover, SciGraphica is being used at places like Siemens, and Nasa (see for instance, the Shuttle Radar Topography Mission at <http://www.jpl.nasa.gov/srtm/>), and for ocean modeling (<http://www.mi.uib.no/BOM/>)

#### *G. Educational Aid Development*

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- PHYS7321 Computational Physics On-line lectures: Developed a series of on-line tutorials using Python and Jupyter Notebooks, to be extended with video for on-line teaching. <http://www.github.com/afeiguin/comp-phys>

#### SERVICE ACTIVITIES

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##### Section I: Departmental

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- Member of the Physics Department's Graduate Committee (2019-).
- Member of the Colloquium committee representing condensed matter theory.
- Elected representative of the condensed matter theory group of the Physics Department Executive Committee (2017).
- Served in the committee to develop a Field Theory graduate course in the Physics Department (chaired by J. Halverson).
- Served in the Physics Department CMT Faculty Search Committee (2016).
- Member of the Colloquium committee representing condensed matter theory.
- Tutored students as part of the "Qualifying Exam" tutoring summer program (Summer 2013, 2014, 2015, and 2016).
- Member of the Physics Department's Graduate Committee (2014-2016).
- Coordinated the Condensed Matter Seminar Series (2012-present).
- Graded Qualifying Exams (2013, 2015, 2016).
- Co-organized the Physics Department Journal Club (Fall and Spring 2013, Spring 2014).
- Colloquium and Society of Physics Students Committees (Fall and Spring 2013, and 2014).

- Served as member of Ph.D committees of the following graduate students: Zheng Ma (2013), Badih Assaf (2014), Fangze Liu (2015), Michelle Jamer (2015), Anthony Vargas (2016), Pradeep Waduge (2017), Peter Mistark (2017), Baokai Wang (ongoing), Younggil Song (2018), Ian J. MacDonald (2018 - Engineering), Dan Rubin (2018), Gregory Stephen (ongoing), Longhai Lai(ongoing)
- Hosted speakers and organized Condensed Matter seminars.

## Section II: College/University level:

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- Member of the College of Science Tenure and Promotion Committee representing the Physics Department (2019-2021)
- Member of the College of Science Council (Fall 2016).
- Participated in the phonathon as part of the recruiting efforts (Spring 2013, 2014, 2015).
- Successfully contributed to the recruitment of two NUSP (University Scholars Program) physics students (Ian Tornquist and Felipe Castellano-Macias) (2015).
- Participated of the 2016 Young Scholars Program.
- Served at the Outstanding Graduate Student Award Selection Committee for the COS (2016).

## Section III: Public/Community

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- Review Editor of the Editorial Board of Condensed Matter Physics, Frontiers in Physics (since 2018).
- Nominated for Member-at-Large, Executive Committee for the Division of Condensed Matter Physics of the American Physical Society (upcoming APS elections, 2017).
- Member of the Program Committee, 2018 March Meeting of the American Physical Society (APS), Division of Computational Physics (DCOMP).
- Thesis reviewer, University of Hamburg and U. of Hannover, Germany (2017).
- Proposal reviewer for the Polish National Science Foundation (2 proposals in 2016, 2 in 2018).
- Panel and proposal reviewer for the National Science Foundation (NSF), since 2010. (8 proposals in 2015, 3 in 2016, 10 in 2017, 1 in 2018, 6 in 2019)
- Proposal reviewer for the U.S. Department of Energy (4 proposals in 2018, 3 in 2019).
- Panel and proposal reviewer for the German Science Foundation (DFG), 2015. (3 proposals in 2015, 1 in 2016, 1 in 2018)
- Proposal reviewer for the Erwin Schrödinger Program, Austrian Science Fund (FWF). (1 proposal in 2015, 1 in 2016)
- Proposal reviewer for the Israel Science Foundation. (1 proposal)
- Proposal reviewer for the Argentinian Office of Science (4 proposals).
- Proposal reviewer for the National Research Council of Canada (1 proposal in 2020)
- Serviced as Judge of the Boston BPS Citywide Science Fair (2014, 2015, 2016, 2017, 2018).
- Awarded “Elsevier Recognized Reviewer” status (2013).
- Referee of manuscripts for APS journals.
- Referee of manuscripts for J. of Stat. Mech.: Theory and Exp. (JSTAT).
- Referee of manuscripts for J. of Phys.: Condensed Matter.
- Referee of manuscripts for Int. J. Mod. Phys. B.
- Referee of manuscripts for Nature Communications.



- Referee of manuscripts for the New Journal of Physics.
- Referee of manuscripts for Europhys. Letters
- Referee of manuscripts for the European Physical Journal (EPJ)
- Referee of manuscripts for Computer Physics Communications.
- Referee of manuscripts for Modern Physics Letters B.
- Referee of manuscripts for Annals of Physics.
- Referee of manuscripts for J. Phys. Journals
- Referee of manuscripts for Journal of Chemical Theory and Computation.
- Referee of manuscripts for Papers in Physics.
- Referee of manuscripts for SciPost Physics.
- Referee of manuscripts for Physics Letters A.

#### Section IV. Service Activities Prior to Joining NU

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- Graduate Exam Committee, Dept. of Physics and Astronomy, University of Wyoming, 2009-2010.
- Faculty Search Committee, Dept. of Physics and Astronomy, University of Wyoming, 2011