Lea Ferreira dos Santos

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RESEARCH INTERESTS: many-body quantum systems, non-equilibrium quantum dynamics, thermalization, quantum chaos, spin systems, many-body localization, quantum phase transition, Kerr parametric oscillators, quantum control, decoherence, quantum-classical correspondence.

EDUCATION:

1997 - 2000	**Degree: PhD in Theoretical Physics** University of São Paulo Thesis advisor: Professor Carlos O. Escobar, title: "Aspects of Foundations of Quantum Mechanics: Stochastic Processes and Analogy with Turbulence".
1995 - 1996	**PhD Student** Auckland University, Department of Physics Research performed with Professor Dan Walls: light scattering from Bose Einstein condensates.
1992 - 1994	**Degree: MSc in Theoretical Physics** University of São Paulo Thesis advisor: Professor Carlos O. Escobar, title: "Studies of Dissipative Effects in the Quantum Limit of Weber Antennas".
1988 - 1991	**Degree: BSc in Physics** University of São Paulo

ACADEMIC POSITIONS:

2022 -	**Professor** (Associate Department Head for Administration 2023-present) University of Connecticut, Department of Physics
2014 - 2022	**Professor** (Chair 2016-2022) Yeshiva University, Department of Physics
2013 - 2014	**Associate Professor** Yeshiva University, Department of Physics
2007 - 2013	**Assistant Professor** Yeshiva University, Department of Physics
2004 - 2007	**Research Associate** Dartmouth College, Department of Physics Research performed with Professor Lorenza Viola
2002 - 2004	**Research Associate** Michigan State University, Department of Physics Research performed with Professor Mark I Dykman
2000 - 2001	**Postdoctoral Fellow** Yale University, Department of Physics Research performed with Professor Dimitri Kusnezov

EDITORIAL BOARDS:

2021 -	Physical Review E
2020 - 2021	New Journal of Physics

FEDERAL GRANTS:

NSF (2021-2024)	"CCI Phase I: NSF Center for Quantum Dynamics on Modular Quantum Devices" (CHE - 2124511)
NSF (2020-2024)	"Nonequilibrium Quantum Matter: Timescales and Self-Averaging" (DMR - 1936006)
NSF (2017-2020)	"Physics of Interacting Quantum Systems with Phase Transitions" (DMR - 1603418)
NSF (2012-2017)	"CAREER: Studies of Dynamics and Control of Quantum Many-Body Systems Far from Equilibrium" (DMR-1147430)
NSF (2012-2017)	"KI-net: kinetic description of emerging challenges in multiscale problems of natural sciences" (DMS-1107444) Research Network Proposal
Research Corporation (2009-2010)	Cottrell College Science Award: Transport Properties and Control in Low-Dimensional Quantum Many-Body Systems

INTERNAL GRANTS:

Quantum-CT Effort 2024	UConn Innovations in Quantum STEM Education (OVPR Research Development and the Quantum-CT effort)
CLAS 2023	Research and Academic Experiences for Women's College Students in Physics and Quantum Sciences (CLAS Funding for Diversity, Equity, and Inclusion Initiatives)

AWARDS and HONORS:

2021	Simons Fellow in Theoretical Physics
2017	Outstanding Referee for the American Physical Society
2015	Cottrell Scholar
2015	Sabbatical at the ITAMP, Harvard
2012-2017	NSF CAREER Award
2010	Dean Karen Bacon Award for an Outstanding Junior Faculty Member
2009-2012	KITP Scholar
2009-2010	Cottrell College Science Award
2008	Member of the U.S. delegation to the "3rd IUPAP International Conference on Women in Physics"
2000-2001	Fellowship for postdoctoral position at Yale University: Fundação de Amparo à Pesquisa do Estado de São Paulo – FAPESP.
1997-2000	Fellowship for PhD program: Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq.
1995-1996	New Zealand Official Development Assistance (NZODA) Study Award for PhD program at Auckland University.

RESEARCH MENTORSHIP

Postdoctoral fellows:

- Isaías Vallejo (2023-present)
- Jorge Chávez Carlos (2022-present)
- Miguel Ángel Prado Reynoso (2022-2024). Physics Professor at the Rey Juan Carlos University in Madrid, Spain.
- Talía L. M. Lezama (2021-2023). Postdoctoral Research at the Technische Universität Dresden, Germany.
- Mauro Schiulaz (2018-2019). Editor for Physical Review X.
- Marco Távora (2015 - 2016). Co-founder of a consulting company.
- Eduardo Jonathan Torres Herrera (2012 - 2014). Physics Professor at the Benemérita Universidad Autónoma de Puebla, Mexico.
- Manan Vyas (2013). Physics Professor at the Universidad Nacional Autónoma de México, Mexico.

Graduate students:

- Sriram Chelakkara Lakshmanan (2024 - present)

[PhD student]

- Bidhi Vijaywargia (2024 - present)

[PhD student]

- Edson Signor (2024 - present)

[PhD student]

- Cameron Cianci (2023 - 2025)

[master student]

- Adway Kumar Das (2023 - 2024)

[visiting Fulbright Fellow]

- David Zarate-Herrada (2020 - 2025)

[co-advised with Jonathan Torres-Herrera, BUAP, Mexico.]

- Guy Zisling (2019 - 2021)

[co-advised with Yevgeny Bar Lev, Ben Gurion, Israel.]

- David Villaseñor (2019 - 2022)

[co-advised with Jorge Hirsch, UNAM, Mexico.]

- Karin Wittmann Wilsmann (2018 - current)

[co-advised with Angela Foerster, UFRGS, Brazil.]

- Jorge Chávez-Carlos (2016 - 2019)

[co-advised with Jorge Hirsch, UNAM, Mexico.]

- Mohamad Nikman (2016 - 2018)

[co-advised with David Cory, University of Waterloo, Canada.]

Undergraduate students: *43 students: 2 female undergraduates from Smith College, 2 female undergraduates from UConn, 5 males undergraduates from UConn, 24 female undergraduates from Stern College, 1 female undergraduate from Ben Gurion University, 1 female undergraduate from Dartmouth College, 4 male students from Yeshiva College, 1 male student from the Indian Institute of Technology Kanpur, 1 male student from the UNAM, 1 male student from Queens College.*

KRESSEL SCHOLARS & HONOR THESES:

1. Tamar Leiser (2021-2022) [physical science major, 1 publication, March Meeting, 2022]
2. Jonathan Karp (2015-2017) [physics major, 1 publication, March Meeting, 2017]
3. Davida Kollmar (2012-2013) [physics major, 2 publications, March Meeting, 2013]
4. Kira Joel (2012-2013) [physics major, 1 publication, March Meeting, 2013]
5. Aviva Gubin (2011-2012) [physics major, 1 publication, March Meeting, 2012]

HONOR THESES:

6. Chemda Wiener (2020-2021) [computer science major, March Meeting, 2021]
7. Miriam Baitner (2019-2020) [physical science major, March Meeting, 2020]
8. Tamar Felman (2016-2017) [physical science major]
9. Elisheva Elbaz (2015-2016) [pre-engineering major]
10. Ayelet Friedman (2012-2013) [math major]
11. Julie Dinerman (2009-2010) [physics/math major, 1 publication, March Meeting, 2010]
12. Shoshana Gilbert (2009-2010) [biology major]

SUMMER & LONG-TERM STUDENTS:

13. Devesh Karthik (2024-2025) [physics major]
14. Elic Wu (2024) [physics major]
15. Jackson Alfano (2024) [physics major]
16. Aaron Beisaw (2023-2024) [physics major, UConn, March Meeting, 2024]
17. Asmaa Zoheiri (2023) [physics major, Smith College]
18. Allison Brand (2023) [physics major, Smith College]
19. Alondra Munoz-Escobedo [math major, UConn]
20. Jose Cevallos (2022-2023) [physics engineering major, UConn]
21. David Menezes (2022-2023) [physics major, UConn]
22. Brooke Thibodeau (2022-2024) [physics engineering, UConn, March Meeting, 2024]
23. David Roth (2022) [physics major]
24. Naava Wasserman (2022) [physical science major]
25. Yael Lebel (2021) [physics major, 1 publication, Ben Gurion University]
26. Leon Alper (2021) [physics major, March Meeting, 2022]
27. Eliana Feifel (2019, 2020) [math major, March Meeting, 2021]
28. Jechiel Van Dijk (2020) [physics major]
29. Saúl Pilatowsky-Cameo (2019-2020) [physics major, UNAM, talk in Prague]
30. Bar Alluf (2018-2019) [physics major]
31. Aviva Shooman (2018) [pre-engineering, March Meeting & Scientista Symposium, 2019]
32. Shira Siegel (2017-2018) [physical science major]

33. Connie H. Jiang (2015) [physics, Dartmouth College]
34. Yonina Loskove (2015) [biology major]
35. Ajesh Kumar (2015) [physics, Indian Institute of Technology Kanpur]
36. Rebecca Peyser (2013-2014) [pre-engineering]
37. Judy Alper (2013) [physics major]
38. Aviva Schiffmiller (2010) [biology major]
39. Rebecca Segal (2009) [physics major]
40. Frieda Dukesz (2008-2009) [chemistry major, 1 publication, March Meeting, 2009]
41. Robin F. Burger (2008) [biology major]
42. Marina Zilbergerts (2008) [biology major, 1 publication]
43. Davida Cohen (2008) [biology major]

High school students: *(2 female students)*

1. Elisheva Sprung (2013). She later studied engineering at Stony Brook University.
2. Zoe Rothstein (2012). She later became a computer science student at the MIT.

TEACHING EXPERIENCE:

UCONN

Many-Body Quantum Dynamics	New proposed course with syllabus under evaluation. Students learn how to write computer codes to analyze the spectrum, structure of the eigenstates, and dynamics of many-body quantum models used to represent various existing quantum simulators.
Quantum Mechanics 1	Lectures: 3hrs/week and 2hrs/week problem-solving sessions.

YESHIVA UNIVERSITY

2 undergraduate courses per semester (7-8 hours/week)

Introductory Physics I and II & General Physics I and II	These courses have a high percentage of pre-med students. After every 10-20 minutes of theory, there are assessing problems solved individually or in groups. Student-student interaction is motivated. Demonstrations, short videos, curiosities about the scientists involved in the subject studied and their historical moments are presented.
Modern Physics	Quantum mechanics and special relativity are put in historical context. There are movies, games, and various activities that stress student-student interaction. Notions of computational methods are introduced and some of the assignments are solved numerically.
Computational Methods in Scientific Research	This course was designed for science, math, and pre-engineering students. It is entirely hands-on. Students learn how to program, get and analyze data, visualize results with graphics and animations.
Quantum Mechanics	Students solve assignments that include analytical and numerical problems.
Solid State Physics	Students are introduced to notions of condensed matter physics, they solve numerical assignments, and choose a topic for a 20-minute oral presentation.

COMMITTEE SERVICES and SYNERGISTIC ACTIVITIES:

EXTERNAL:

- Referee for Science, Science Advances, Nature Physics, Nature Communication, Communications Physics, Physical Review Letters, Physical Review A, B, E, and X, New Journal of Physics, Annals of Physics, Annalen der Physik, Europhysics Letters, Journal of Optics B, Physics Letters A, Journal of Physics A, Journal of Physics B, Physica Scripta, Philosophical Magazine, Chaos, Journal of Statistical Mechanics, Journal of Statistical Physics, American Journal of Physics, Quantum Information Processing, Foundations of Physics, Proceedings of the Royal Society, SciPost Physics, Entropy.
- Referee/Panelist for the National Science Foundation, Research Corporation, Department of Energy, German Research Foundation, the Netherlands Organization for Scientific Research, Austrian Academy of Sciences, Israel Science Foundation, Swiss National Science Foundation, British Royal Society, Science Foundation Ireland (2024).
- Simons Investigators Review Committee.
- Member of the American Physical Society (APS), ANACAPA Society, Brazilian Society of Physics (SBF).
- APS Metropolis Award Selection Committee.
- Meetings of the ANACAPA Society, which promotes research in physics at primarily undergraduate institutions.
- American Physical Society LeRoy Apker Award selection committee for outstanding research by undergraduates (2011-2013).
- Evaluated project of scientific development for university in the Amazon Region in Brazil; Tutorials about many-body quantum dynamics in South Africa, Turkey, Mexico, and France.
- Chair of the Nominating Committee of the Forum of Physics and Society of the American Physical Society (2010, 2013); Member-at-Large of the Executive Committee of the Forum of Physics and Society of the American Physical Society (2010-2012).
- Scientific committee of summer school in Turkey (2014, 2016)
- Organizer of workshops in Brazil (2008, 2016), South Korea (2018), Simons Center at Stony Brook (2019, 2024), Mexico (2019, 2021, 2022, 2023), UConn (2022), KITP (2023), Quantum Thermodynamics Conference (QTD 2023), Salamanca, Spain IWDS (2024).
- Tenure Evaluations (Dartmouth College 2023, Hebrew University 2024)
- PhD thesis committees in Australia, Brazil, France, India, Italy, Mexico, Spain.

INTERNAL:

UConn

- APS CU*IP 2025 at UCONN (2024-2025)
- Graduate Admission Committee (Spring 2024).
- Search Committee for a faculty in Nuclear Physics (Spring 2024).
- Associate Department Head for Administration (Fall 2023 – present)

- Faculty Promotion Committee (2023, 2024)
- Open House (2023).
- Search Committee for a faculty in AMO (Spring 2023).
- Talk at Smith College to recruit students (2023).
- Talk at the Stars event, an outreach initiative at UConn that seeks to recruit and retain undergraduate students from historically disadvantaged/excluded groups in physics (Nov/02, 2022).

Yeshiva University

- Efforts to expand the Computer Science Department. Physics Colloquium.
- Executive Committee of the Division of Natural Sciences and Mathematics.
- Academic Standards Committee for Stern College for Women.
- Organizer of open houses and major fairs. Interviewer for the Honors Program.
- Expansion of the physics section of the library. Advisor of pre-engineering students.
- Curriculum development. Restructuring of the Physics, Physical Science, and Pre-Engineering majors.
- Assessment Statements and Rubrics for the Physics Department.
- Sunday of hands on Science: taught computational tools to visiting high school students.
- Physics Club at Stern College. Student Science Club Speakers Budget Committee.
- Events about computer languages for science, math and computer science students at Stern College for Women.

WOMEN IN PHYSICS:

- Participated on the 2023 Faculty Women of Color in the Academy (FWCA) conference, Arlington, Virginia (April 20-23, 2023).
- Research projects with 30 female undergraduates and 2 female high school students.
- Mentored 4 students from the Jewish Foundation for the Education of Women (JFEW) fellowship.
- Visited high schools for girls to talk about careers in physics. Prepared presentations on "Why study physics" for Open Houses and Major Fairs at Stern College for Women.
- Supported 10 female undergraduate students to give oral presentations at the APS March Meetings. Helped student with application for child-care support from the APS.
- Sent students to the APS Conferences for Undergraduate Women in Physics.
- Obtained the NSF Travel Grant for Women Speakers that covers the expenses of female professors who give talks at Stern College for Women.
- Organized recruiting visits of chairs from research universities to talk at Stern College for Women.
- Wrote article "*Science for All"* which appeared in the Gazette - the Newsletter of the Committee on the Status of Women in Physics of the American Physical Society (2009).
- Co-authored the U.S. delegation paper "*Women in Physics in the United States"* for the proceedings of the 3rd IUPAP International Conference on Women in Physics (2008).

PUBLICATIONS

[**h-index 50**: Google Scholar]

2025

132) Adway K Das, A Ghosh, Lea F Santos
Spectral form factor and energy correlations in banded random matrices
arXiv:2502.02648

131) Ignacio García-Mata, Miguel A Prado Reynoso, Rodrigo G Cortiñas, Jorge Chávez-Carlos, Victor S Batista, Lea F Santos, Diego A Wisniacki
Chaos destroys the excited state quantum phase transition of the Kerr parametric oscillator
arXiv:2408.00934 [accepted Physical Review A (L)]

130) Jorge Chávez-Carlos, Daniela Garrido-Ramírez, AJ Carmona, Victor S Batista, Francisco Pérez-Bernal, Carlos A Trallero-Herrero, MA Bastarrachea-Magnani, Lea F Santos
Quantum sensing in Kerr parametric oscillators
arXiv:2407.14590

129) F Borgonovi, FM Izrailev, Lea F Santos
Quantum-Classical Correspondence for the Relaxation Dynamics of Many-Body Spin Systems: Linear Chaos and Diffusion in the Energy Shell
arXiv: 2307.05681

128) David Villaseñor, Saúl Pilatowsky-Cameo, Jorge Chávez-Carlos, Miguel A. Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F. Santos, Jorge G. Hirsch
Classical and Quantum Properties of the Spin-Boson Dicke Model: Chaos, Localization, and Scarring
arXiv:2405.20381 (Physics Reports)

127) Yuchen Wang, Cameron Cianci, Irma Avdic, Rishab Dutta, Samuel Warren, Brandon Allen, Nam P Vu, Lea F Santos, Victor S Batista, David A Mazziotti
Characterizing conical intersections of nucleobases on quantum computers
Journal of Chemical Theory and Computation **21**, 1213 (2025)

126) Adway Kumar Das, Patrick Pinney, David A. Zarate-Herrada, Saúl Pilatowsky-Cameo, Apollonas S. Matsoukas-Roubeas, Delmar G. A. Cabral, Cameron Cianci, Victor S. Batista, Adolfo del Campo, E. Jonathan Torres-Herrera, Lea F. Santos
Proposal for many-body quantum chaos detection
Physical Review Research **7**, 013181 (2025)

125) J Chávez-Carlos, RG Cortiñas, MAP Reynoso, I García-Mata, VS Batista, Francisco Pérez-Bernal, Diego A Wisniacki, Lea F Santos
Driving superconducting qubits into chaos
Quantum Science and Technology **10**, 015039 (2025)

2024

124) Miguel A Prado Reynoso, Edson M Signor, Sandra D Prado, Lea F Santos
Effects of stickiness on the quantum states of strongly chaotic open systems
Physical Review E **110**, L062201 (2024)

123) David Villaseñor, Lea F Santos, Pablo Barberis-Blostein
Breakdown of the quantum distinction of regular and chaotic classical dynamics in dissipative systems
Physical Review Letters **133**, 240404 (2024)

122) Isaías Vallejo-Fabila, Adway Kumar-Das, David A Zarate-Herrada, Apollonas S Matsoukas-Roubeas, E Jonathan Torres-Herrera, Lea F Santos
Reducing dynamical fluctuations and enforcing self-averaging by opening many-body quantum systems
Physical Review B **110**, 075138 (2024)
121) Delmar GA Cabral, Pouya Khazaei, Brandon C Allen, Pablo E Videla, Max Schäfer, Rodrigo G Cortiñas, Alejandro Cros Carrillo de Albornoz, Jorge Chávez-Carlos, Lea F Santos, Eitan Geva, Victor S Batista
A Roadmap for Simulating Chemical Dynamics on a Parametrically Driven Bosonic Quantum Device
The Journal of Physical Chemistry Letters **15**, 12042 (2024)
120) Cameron Cianci, Lea F. Santos, Victor S. Batista
Subspace-Search Quantum Imaginary Time Evolution for Excited State Computations
Journal of Chemical Theory and Computation **20**, 8940 (2024)
119) Rishab Dutta, Delmar GA Cabral, Ningyi Lyu, Nam P Vu, Yuchen Wang, Brandon Allen, Xiaohan Dan, Rodrigo G Cortiñas, Pouya Khazaei, Scott E Smart, Scott Nie, Michel H Devoret, David A Mazziotti, Prineha Narang, Chen Wang, James D Whitfield, Angela K Wilson, Heidi P Hendrickson, Daniel A Lidar, Francisco Pérez-Bernal, Lea F Santos, Sabre Kais, Eitan Geva, Victor S Batista
Simulating Chemistry on Bosonic Quantum Devices
Journal of Chemical Theory and Computation **20**, 6426 (2024)
118) J Khalouf-Rivera, Q Wang, LF Santos, JE Ramos, M Carvajal, F. Pérez-Bernal
Degeneracy in excited state quantum phase transitions of two-level bosonic models and its influence on system dynamics
Physical Review A **109**, 062219 (2024)
117) I García-Mata, RG Cortiñas, X Xiao, J Chávez-Carlos, VS Batista, Lea F Santos, Diego A Wisniacki
Effective versus Floquet theory for the Kerr parametric oscillator
Quantum **8**, 1298 (2024)
116) MA Bastarrachea-Magnani, D Villaseñor, Jorge Chávez-Carlos, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Quantum multifractality as a probe of phase space in the Dicke model
Physical Review E **109**, 034202 (2024)

2023

115) F Iachello, RG Cortiñas, F Pérez-Bernal, LF Santos
Symmetries of the squeeze-driven Kerr oscillator
Journal of Physics A **56**, 495305 (2023)
114) Talía Lezama, Y. Bar Lev, Lea F Santos
Temporal fluctuations of correlators in integrable and chaotic quantum systems
SciPost Physics **15**, 244 (2023)
113) AS Matsoukas-Roubeas, M Beau, Lea F Santos, A del Campo
Unitarity breaking in self-averaging spectral form factors
Physical Review A **108**, 062201 (2023)
112) P Das, DS Bhakuni, Lea F Santos, A Sharma
Periodically and quasiperiodically driven-anisotropic Dicke model
Physical Review A **108**, 063716 (2023)

111) MA Prado Reynoso, DJ Nader, J Chávez-Carlos, BE Ordaz-Mendoza, Rodrigo G Cortiñas, Victor S Batista, S Lerma-Hernández, Francisco Pérez-Bernal, Lea F Santos
Quantum tunneling and level crossings in the squeeze-driven Kerr oscillator
Physical Review A **108**, 033709 (2023)
110) A. L. M. Southier, Lea F. Santos, P. H. Souto Ribeiro, and A. D. Ribeiro
Identifying primes from entanglement dynamics
Physical Review A **108**, 042404 (2023)
109) DA Zarate-Herrada, Lea F Santos, EJ Torres-Herrera
Generalized Survival Probability
Entropy **25**, 205 (2023)
108) Luis Benet, Fausto Borgonovi, Felix M. Izrailev, Lea F. Santos
Quantum-classical correspondence of strongly chaotic many-body spin models
Physical Review B **107**, 155143 (2023)
107) V Balachandran, Lea F Santos, M Rigol, D Poletti
Effect of symmetries in out-of-time ordered correlators in interacting integrable and nonintegrable many-body quantum systems
Physical Review B **107**, 235421 (2023)
106) Jorge Chávez-Carlos, Talía LM Lezama, Rodrigo G Cortiñas, Jayameenakshi Venkatraman, Michel H Devoret, Victor S Batista, Francisco Pérez-Bernal, Lea F Santos
Spectral kissing and its dynamical consequences in the squeezed Kerr-nonlinear oscillator
npj Quantum Information **9**, 76 (2023)
105) Yael Lebel, Lea F Santos, Yevgeny Bar Lev
Chaos enhancement in large-spin chains
SciPost Phys. **15**, 022 (2023)
104) David Villaseñor, Saúl Pilatowsky-Cameo, Miguel A Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Chaos and Thermalization in the Spin-Boson Dicke Model
Entropy **25**, 8 (2023)

2022

103) Wouter Buijsman, Talía L. M. Lezama, Tamar Leiser, Lea F. Santos
Ground-state energy distribution of disordered many-body quantum systems
Physical Review E **106**, 054144 (2022)
102) Karin Wittmann W, E.R. Castro, A. Foerster, Lea F Santos
Interacting bosons in a triple well: Preface of many-body quantum chaos
Physical Review E **105**, 034204 (2022)
101) Saúl Pilatowsky-Cameo, David Villaseñor, Miguel A. Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F. Santos, Jorge G. Hirsch,
Identification of quantum scars via phase-space localization measures,
Quantum **6**, 644 (2022)
100) Y Liu, Lea F Santos, E Prodan
Topological Gaps in Quasi-Periodic Spin Chains: A Numerical and K-Theoretic Analysis
Physical Review B **105**, 035115 (2022)

2021

99) ER Castro, J Chávez-Carlos, I Roditi, Lea F Santos, JG Hirsch
Quantum-classical correspondence of a system of interacting bosons in a triple-well potential
Quantum **5**, 563 (2021)

98) Devendra Singh Bhakuni, Lea F. Santos, and Yevgeny Bar Lev
Heating suppression by long-range interactions in periodically driven spin chains
Physical Review B **104**, L140301 (2021)
97) Thomás Fogarty, Miguel Angel Garcia-March, Lea F. Santos, N.L. Harshman
Probing the edge between integrability and quantum chaos in interacting few-atom systems
Quantum **5**, 486 (2021)
96) TLM Lezama, EJ Torres-Herrera, F Pérez-Bernal, YB Lev, Lea F Santos
Equilibration time in many-body quantum systems
Physical Review B **104**, 085117 (2021)
95) A Solórzano, Lea F Santos, EJ Torres-Herrera
Multifractality and self-averaging at the many-body localization transition
Physical Review Research **3**, L032030 (2021)
94) G Zisling, Lea F Santos, YB Lev
How many particles make up a chaotic many-body quantum system?
SciPost Physics **10**, 088 (2021)
93) S Pilatowsky-Cameo, D Villaseñor, MA Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Ubiquitous quantum scarring does not prevent ergodicity
Nature Communications **12**, 852 (2021)
92) M Niknam, Lea F Santos, DG Cory
Experimental Detection of the Correlation Rényi Entropy in the Central Spin Model
Physical Review Letters **27**, 080401 (2021)
91) S Pilatowsky-Cameo, D Villaseñor, MA Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Quantum scarring in a spin-boson system: fundamental families of periodic orbits
New Journal of Physics, **23** 033045 (2021)

2020

90) EJ Torres-Herrera, I Vallejo-Fabila, AJ Martínez-Mendoza, Lea F Santos
Self-averaging in many-body quantum systems out of equilibrium: Time dependence of distributions
Physical Review E **102**, 062126 (2020)
89) Lea F Santos, F Pérez-Bernal, EJ Torres-Herrera
Speck of chaos
Physical Review Research **2**, 043034 (2020)
88) EJ Torres-Herrera, G De Tomasi, M Schiulaz, F Pérez-Bernal, LF Santos
Self-averaging in many-body quantum systems out of equilibrium: Approach to the localized phase
Physical Review B **102**, 094310 (2020).
87) M Schiulaz, EJ Torres-Herrera, F Pérez-Bernal, LF Santos
Self-averaging in many-body quantum systems out of equilibrium: Chaotic Systems
Physical Review B **101**, 174312 (2020).
86) D Villasenor, S Pilatowsky-Cameo, MA Bastarrachea-Magnani, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Quantum vs classical dynamics in a spin-boson system: manifestations of spectral correlations and scarring
New Journal of Physics **22**, 063036 (2020)

85) EJ Torres-Herrera, LF Santos
Dynamical Detection of Level Repulsion in the One-Particle Aubry-André Model
Condensed Matter 5, 7 (2020) [in memory of Shmuel Fishman]
84) S Pilatowsky-Cameo, J Chávez-Carlos, MA Bastarrachea-Magnani, Pavel Stránský, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch
Positive quantum Lyapunov exponents in experimental systems with a regular classical limit
Physical Review E 101, 010202 (R) (2020)
83) M Niknam, LF Santos, DG Cory
Sensitivity of quantum information to environment perturbations measured with a nonlocal out-of-time-order correlation function,
Physical Review R **2**, 013200 (2020)

2019

82) J Khalouf-Rivera, M Carvajal, LF Santos, F Pérez-Bernal
Calculation of Transition State Energies in the HCN–HNC Isomerization with an Algebraic Model
The Journal of Physical Chemistry A **123**, 9544 (2019)
81) EJ Torres-Herrera, JA Méndez-Bermúdez, LF Santos
Level repulsion and dynamics in the finite one-dimensional Anderson model
Physical Review E 100, 022142 (2019)
80) S Lerma-Hernández, D Villaseñor, MA Bastarrachea-Magnani, EJ Torres-Herrera, LF Santos, JG Hirsch
Dynamical signatures of quantum chaos and relaxation time scales in a spin-boson system
Physical Review E **100**, 012218 (2019)
79) F Borgonovi, FM Izrailev, LF Santos,
Timescales in the quench dynamics of many-body quantum systems: Participation ratio vs out-of-time ordered correlator,
Physical Review E **99**, 052143 (2019)
78) M. Schiulaz, E. J. Torres-Herrera, L. F. Santos,
Thouless and relaxation time scales in many-body quantum systems,
Physical Review B **99**, 174313 (2019)
77) J Chávez-Carlos, B López-del-Carpio, MA Bastarrachea-Magnani, Pavel Stránský, Sergio Lerma-Hernández, Lea F Santos, Jorge G Hirsch,
Quantum and classical Lyapunov exponents in atom-field interaction systems
Physical Review Letters **122**, 024101 (2019)
76) F. Borgonovi, F. M. Izrailev, L. F. Santos,
Exponentially fast dynamics in chaotic many-body systems
Physical Review E **99**, 010101 (R) (2019)
75) E. J. Torres-Herrera, L. F. Santos,
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Book Chapter: *"Nonequilibrium many-body quantum dynamics: from full random matrices to real systems",*
[https://arxiv.org/abs/1803.06012]
in **Thermodynamics in the Quantum Regime - Fundamental Aspects and New Directions**
Editors Felix Binder, Luis A. Correa, Christian Gogolin, Janet Anders, and Gerardo Adesso
1) L. F. Santos and E. J. Torres-Herrera
Book Chapter: *"Nonequilibrium quantum dynamics of many-body systems",*
[https://arxiv.org/abs/1706.02031]
in **Chaotic, Fractional, and Complex Dynamics: New Insights and Perspectives**
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PROCEEDINGS:

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PATENT

Attorney Docket No. 047162-7510P1 (02295)
ARTICLES AND METHODS FOR SINGLE-TRANSMON PARAMETRIC SIMULATION OF QUANTUM CHEMICAL DOUBLE WELLS

INVITED TALKS SINCE 2016

(For earlier talks see webpage https://lea-santos.scholar.uconn.edu/talks00/talks/)

2025

*) Program “Quantum Many-Body Dynamics: Thermalization and its Violations” ICTP-SAIFR in São Paulo, Brazil between (Sep/15-19, 2025).
*) Symposium Quantum Thermalization, Göttingen, Germany (Sept/8-12, 2025)
*) Quantum Chaos 2025 - International Conference (Aug/17-22, 2025)
*) Conference: Long-range interactions and dynamics in complex quantum systems, NORDITA, Stockholm, Sweden (Jul/23-25, 2025)
*) Seventh Conference on NUCLEI and MESOSCOPIC Physics (NMP25), East Lansing, Michigan (May/13-15, 2025)
*) Quantum Science Generation (QSG) workshop, Trento, Italy (May/5-9, 2025)
*) Joint March Meeting and April Meeting, Anaheim, CA (Mar/16-21, 2025)
*) Universidad Autonoma Metropolitana, Mexico (Jan/22-24, 2025)

2024

*) Universidad Complutense de Madrid, Spain (Oct/28, 2024)

*) School on Classical and Quantum Long-range Interacting systems at Tata Institute of Fundamental Research, Mumbai, India (Sep/23-27, 2024).
*) IQuS workshop on Entanglement in Quantum Many-Body Systems, Seattle WA (Sep/9-13, 2024)
*) Workshop on Non-Stationary Systems, Brasília, Brazil (Aug/26-30, 2024)
*) Dynamics Days Europe 2024, Bremen, Germany (Jul/29-Aug/02, 2024) [talk given by postdoc Jorge Chávez-Carlos]
*) Meeting on Complex Systems & Stochastic Processes, Guadalajara, Mexico (Jul/1-5, 2024)
*) International Workshop on Disordered Systems (IWDS 2024) Salamanca, Spain (Jun/17-21, 2024)
*) Workshop "Nonequilibrium physics: Spinor BECs and beyond", University of Oklahoma (May 30/31, 2024)
*) Connecticut Symposium on Microelectronics & Optoelectronics, Southern Connecticut University (Feb/28, 2024).
*) Stability of Quantum Matter in and out of Equilibrium at Various Scales, ICTS, Bengaluru, India (Jan/15-26, 2024)

2023
*) Periodically and quasi-periodically driven complex systems, ICTS Bengaluru, India (Jun/12-22, 2023)
*) Dynamical Foundations of Many-Body Quantum Chaos, Institut Pascal, Université Paris-Saclay, France (Mar/13-24, 2023)
*) Smith College, Northampton, MA (Feb/10, 2023)
*) Universidad de Xalapa, Xalapa, Mexico (Jan/18-22, 2023)
*) Lectures at the Nordita Winter 2023 School on Dynamics of Open Classical and Quantum systems, Stockholm, Sweden (Jan/16-27, 2023)

2022
*) ITAMP, Harvard University, Cambridge, MA (Dec/08, 2022)
*) CUNY Graduate Center, New York City, NY, USA (Nov/15, 2022)
*) New York Institute of Technology, New York City, NY, USA (Nov/10, 2022)
*) University of Connecticut, Storrs, CT, USA (Oct/24, 2022)
*) Federal University of Parana, Brazil (Sep/15, 2022)
*) CCI Quantum Computing Workshop
(Yale University, New Haven, CT, Aug/27, 2022)
*) FQMT 2022: Frontiers of Quantum and Mesoscopic Thermodynamics
(Prague, Czech Republic, Aug/01-06, 2022)
*) International Conference on Strongly Correlated Electron Systems 2022 (SCES 2022)
(Amsterdam, Netherlands, July/24-29, 2022).
*) 10th International Workshop on Quantum Phase Transitions in Nuclei and Many-Body Systems: QPTn-10
(Dubrovnik, Croatia, July/11-15, 2022)
*) Workshop: Out-of-equilibrium and collective dynamics of quantum many-body systems (Zurich, Switzerland, Jun/27-Jul/01, 2022)
*) University of Bielefeld, Bielefeld, Germany (May/19, 2022)
*) Seminar at NORDITA, Sweden (April/12, 2022)
*) University of Connecticut, Storrs, CT (Mar/24, 2022)
*) QPequi Talks (Federal University of Goiás, Brazil, Feb/10, 2022)
*) Cross-Disciplinary Approaches to Non-Equilibrium Systems Seminar Series, UT
(King's College London, England, Feb/02, 2022)
*) University of Utah, Salt Lake City, UT (Jan/27, 2022)

2021
*) Sherbrooke University, Sherbrooke, Canada (Dec/01, 2021)
*) University of New Mexico, Albuquerque NM (Oct/21, 2021)

*) PROTOC 21: Probing Complex Quantum Dynamics through Out-of-time-ordered Correlators (Oct/11-15, 2021)
*) Online: QDT 2021: Quantum Thermodynamics Conference (Oct/04-08, 2021)
*) KITP (Santa Barbara, CA, Sep/05-17, 2021)
*) Wesleyan University (Middletown, CT, Sep/09, 2021)
*) Online: 2nd International Summer School on Advanced Quantum Mechanics (Prague, Czech Republic, Sep/2-11, 2021)
*) Online: FQMT 2021: Frontiers of Quantum and Mesoscopic Thermodynamics (Jul/18-24, 2021)
*) Online: University of Luxembourg (Luxembourg, Jun/29, 2021)
*) Online: Les Houches School in Computational Physics: "Dynamics of Complex Systems, from Theory to Computation" (April/12-23, 2021)
*) Online: Perimeter Institute (Waterloo, Canada, Mar/24, 2021)
*) Online: Jozef Stefan Institute and the Department of Physics of the University of Ljubljana (Mar/23, 2021)
*) Online: Ben Gurion University (Israel, Mar/22, 2021)
*) Online: Emory University (Atlanta, Feb/17, 2021)
*) Online: Instituto Técnico de Lisboa (Lisbon, Portugal, Feb/ 2021)
*) Online: The Royal Society (London, UK, Feb/8-11, 2021)
*) Online Workshop Ergodicity and chaos in many-body systems (UNAM, Mexico, Feb/4-7, 2021)
*) Online: Universität Bielefeld (Germany, Jan/14, 2021)

2020
*) Online: Federal University of Rio Grande do Norte, Brazil (Dec/10, 2020)
*) Online: Wesleyan University, USA (Dec/02, 2020)
*) Online workshop on Chaos in many-body quantum systems, The Graduate Center of CUNY (Oct/02, 2020)
*) Online colloquium at the Federal University of São Carlos, Brazil (Sep/15, 2020)
*) Online: QChaos 2020 (Aug/13, 2020)
*) Online Workshop on Transport in 1d quantum-lattice models (Jul/10, 2020)
*) Colloquium at Emory University (Atlanta, GA, USA, Feb/18, 2020)
*) Workshop: Equilibration and Thermalization in Finite Quantum Systems (UNAM, Mexico, Jan/20-25, 2020)

2019
*) Workshop on Fluid phases of matter: From electron liquids to active matter (CUNY, USA, Dec/11-13, 2019)
*) Seminar at the University of Utah (Salt Lake City, UT, USA, Dec/03, 2019)
*) Thermalization, Many-Body-Localization and Generalized Hydrodynamics (ICTS, Bengaluru, India, Nov/11-29)
*) Universality and ergodicity in quantum many-body systems (Simons Center, Stony Brook, NY, USA Aug/26-Oct/18, 2019)
*) Conference: Out-of-equilibrium systems with long-range interactions (Natal, Brazil, Jul/15-19, 2019)
*) FQMT 2019: Frontiers of Quantum and Mesoscopic Thermodynamics (Prague, Czech Republic, Jul 15-19, 2019)
*) Summer Program: Active and Driven Matter: Connecting Quantum and Classical Systems (Aspen, CO, USA, Jun/09-30, 2019)
*) Workshop on "Quantum Dynamics and Control beyond Simple Models and Approximations (CUNY Graduate Center, NY, May/10, 2019)

*) Seminar at Northeastern University
(Boston, MA, USA, Apr/03, 2019)
*) II Workshop on Quantum Information and Thermodynamics
(Natal, Brazil, Mar/11-22, 2019)
*) Winter Program: 'Many-Body Quantum Chaos'
(Aspen, CO, USA, Mar/10-15, 2019)
*) Conference on Nonequilibrium and transport in many-body systems
(Rehovot, Israel, Jan/20-24, 2019)
*) Workshop: Equilibration and Thermalization in Finite Quantum Systems
(UNAM, Mexico, Jan/15-18, 2019)

2018
*) Seminar at the National High Magnetic Field Laboratory
(Florida State University, Dec/07, 2018)
*) Workshop Ergodicity Breaking in Many-Body Systems
(Natal, Brazil, Nov/12-23, 2018)
*) Colloquium at CCNY
(New York, NY, Oct/31, 2018)
*) Random Matrices, Integrability and Complex Systems
(Yad Hashmona, Israel, Oct/03-08, 2018)
*) Workshop Out-of-equilibrium dynamics in many-body systems
(Osnabrück, Germany, Sep/24-26, 2018)
*) The Dynamics of Quantum Information Program,
(Santa Barbara, California, Sep/10-21, 2018)
*) International Workshop Disordered Systems: From Localization to Thermalization and Topology
(Daejeon, South Korea, Sep/03-07, 2018) [Organizer]
*) ICMP2018: XIX International Congress on Mathematical Physics
(Montreal, Canada, Jul/22-28, 2018) [selected contribution]
*) Conference “Boris Chirikov, a pioneer of dynamical chaos”
(Cuernavaca, Mexico, Jun/11-15, 2018)
*) Workshop Quantum Phase Transitions in Nuclei and Many-body Systems
(Padova, Italy, May/22-25, 2018)
*) Xi'an Jiatong University
(Xi'an, China, May/03-09, 2018)
*) Workshop on Chaos and Dynamics in Correlated Quantum Matter
(Dresden, Germany, Mar/19-23, 2018)
*) Workshop on Quantum Many-Body Systems Far From Equilibrium
(Stellenbosch, South Africa, Mar/12-16, 2018)
*) Workshop: Equilibration and Thermalization in Finite Quantum Systems
(Mexico City, Mexico, Jan/15-19, 2018)

2017
*) Workshop: Progress in quantum collective phenomena - from MBL to black holes
(Simons Center, Stony Brook, NY, Nov/13-17, 2017)
*) Workshop “Quantum Thermodynamics”
(ITAMP, Harvard University, Cambridge, MA, Oct/30-Nov/01, 2017)
*) Workshop: Topological Dynamics: Quantum and Classical
(NJIT, Newark, NJ, Nov/06-08, 2017)
*) Workshop: Wonders of Broken Integrability
(Simons Center, Stony Brook, NY, Oct/02-06, 2017)
*) Quantum Innovators

(Waterloo, Canada, Oct/2-5, 2017)
*) 2nd Brazilian Meeting on Statistical Mechanics
(Ilheus, Bahia, Brazil, Sep/17-20, 2017) [Plenary talk]
*) Open Quantum Systems
(Bengaluru, India, Jul/17-28, 2017)
*) FQMT 2017: Frontiers of Quantum and Mesoscopic Thermodynamics
(Prague, Czech Republic, Jul 09-15, 2017)
*) NMP17: Nuclei and Mesoscopic Physics 2017 Conference
(East Lansing MI, USA, Mar 06-10, 2017)
*) The Royal Society (London, UK, Feb/6-7, 2017)
*) Universidad Autónoma de Mexico (Mexico City, Mexico, Jan/23, 2017)

2016
*) Benemérita Universidad Autónoma de Puebla
(Puebla, Mexico, Sep/30, 2016)
*) University of Waterloo
(Waterloo, Canada Aug/31, 2016)
*) University of Heidelberg
(Heidelberg, Germany, Jul/05-07, 2016)
*) 10th International Workshop on Disordered System (IWDS10)
(Brescia, Italy, Jun/27-Jul/01, 2016)
*) Workshop: Quantum non-equilibrium phenomena
[Organizer]
(International Institute of Physics, Natal, Brazil, Jun/06-18, 2016)
*) Workshop: Quantum Phase Transitions in Nuclei (QPTn)
(Prague, Czech Republic, Jun/6-9, 2016)
*) 6th International Conference on Nonlinear Science and Complexity
(São José dos Campos, Brazil, May/16-20, 2016) [Plenary Talk]
*) UMass- Boston (Boston, USA, Mar/30, 2016)