# Rubén Seoane Souto


PERSONAL INFORMATION

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Researcher ID: N-8483-2016


ACADEMIC POSITIONS

**Junior group leader – CAM talento fellow** 4/2023 to present
Materials Science Institute of Madrid (ICMM) ,
Spanish Research Council (CSIC)

**Marie Curie research fellow** 1/2023 to 3/2023
Department of theoretical condensed matter physics,
Universidad Autónoma de Madrid

**Postdoctoral researcher** 11/2022 to 12/2022
Center for Quantum Devices, Niels Bohr Institute
University of Copenhagen

**Researcher** 11/2020 to 10/2022
Solid state division and Nanolund, Lund university,
Visiting researcher at Center for Quantum Devices
University of Copenhagen

**Posdoctoral researcher** 11/2018 to 10/2020
Solid state division and Nanolund, Lund university,
Visiting researcher at Center for Quantum Devices
University of Copenhagen

**Adjunct professor** (during the Ph.D. studies) 10/2016-10/2018
Department of theoretical condensed matter physics,
Universidad Autónoma de Madrid

**Doctoral student** 1/2013-10/2016
Department of theoretical condensed matter physics,
Condensed matter Physics center (IFIMAC)
Universidad Autónoma de Madrid
Supervisors: Prof. Alfredo Levy Yeyati and Prof. Álvaro Martín-Rodero

RESEARCH VISITS

**Laboratoire Ondes et Matiere d'Aquitaine,** CNRS 4/2016-7/2016
Université de Bordeaux
Supervisor: Dr. Rémi Avriller

EDUCATION

**Universidad Autónoma de Madrid**, Madrid, Spain

Ph.D., Condensed matter physics, nanophysics and biophysics, 15/6/2018

Thesis title: *Quench dynamics in interacting and superconducting nanojunctions.*
Supervisors: Prof. Alfredo Levy Yeyati and Prof. Álvaro Martín Rodero

Master's degree, Master in condensed matter physics and nanotechnology, 7/2013

Master thesis: *Electronic transport through molecular transistors in the polaronic regime*
Supervisors: Prof. Alfredo Levy Yeyati, Prof. Álvaro Martín Rodero and Prof. Rosa C. Monreal

**Universidad Complutense de Madrid**, Madrid, Spain

Extended Bachelor in Physics (5 years degree), 7/2012

- Undergraduate thesis: *Strong coupling correlation functions and semiclassical strings*
- Supervisor: Rafael Hernández Redondo, Ph.D.
- Topic: String theory

RESEARCH INTERESTS

- Quantum transport
- Topological states of matter
- Mesoscopic superconductivity
- Quantum technologies

REFEREED JOURNAL PUBLICATIONS

Articles as first author or equal contribution to first are highlighted in yellow, and articles as corresponding author appear with *.

1. A. Tsintzis, **R. Seoane Souto**, K. Flensberg, J. Danon, and M. Leijnse. *Roadmap towards Majorana qubits and nonabelian physics in quantum dot-based minimal Kitaev chains*. arXiv:2306.16289. (Equal author contribution with first). Accepted in Phys Rev. X Quantum

2. D. Razmadze, **R. Seoane Souto**, E. C. T. O' Farrell, P. Krogstrup, M. Leijnse, C. M. Marcus, and S. Vaitiekenas. *Supercurrent transport through 1e-periodic full-shell Coulomb islands*. arXiv:2308.10006 (2023). Accepted in Phys. Rev. B as a letter.

3. M. Valentini, O. Sagi, L. Baghumyan, T. de Gijsel, J. Jung, S. Calcaterra, A. Ballabio, J. Aguilera Servin, K. Aggarwal, M. Janik, T. Adletzberger, **R. Seoane Souto**, M. Leijnse, J. Danon, C. Schrade, E. Bakkers, D. Chrastina, G. Isella, G. Katsaros. *Parity-conserving Cooper-pair transport and ideal superconducting diode in planar Germanium*. Nature Commun. **15**, 169 (2024).

4. **R. Seoane Souto***, A. Tsintzis, M. Leijnse, and J. Danon. *Probing Majorana localization in minimal Kitaev chains through a quantum dot*. Phys. Rev. Research **5**, 043182 (2023).

5. R. Debbarma, A. Tsintzis, M. Aspegren, **R. Seoane Souto**, S. Lehmann, K. Dick, M. Leijnse, and C. Thelander, *Josephson junction $\pi$-0 transition induced by orbital hybridization in a double quantum dot*. Phys. Rev. Lett. **131**, 256001 (2023).

6. S. Chakraborty, D. Nikolić, **R. Seoane Souto**, W. Belzig, and J. C. Cuevas. *DC Josephson effect between two Yu-Shiba-Rusinov bound states*. Phys. Rev. B **108**, 094518 (2023).

7. A. Maiani, K. Flensberg, M. Leijnse, C. Schrade, S. Vaitiekėnas, and **R. Seoane Souto***. *Nonsinusoidal current-phase relations in semiconductor-superconductor-ferromagnetic insulator devices*. Phys. Rev. B **107**, 245415 (2023).

8. D. Razmadze, **R. Seoane Souto**, L. Galletti, A. Maiani, Y. Liu, P. Krogstrup, C. Schrade, A. Gyenis, C. M. Marcus, and S. Vaitiekėnas. *Supercurrent reversal in ferromagnetic hybrid nanowire Josephson junctions* Phys. Rev. B **107**, L081301 (2023). (Equal author contribution with first)

9. **R. Seoane Souto***, M. Leijnse, and C. Schrade, *The Josephson diode effect in supercurrent interferometers* Phys. Rev. Lett. **129**, 267702 (2022).
**Selected as best article by GEFES** (Spanish Physical Society)

10. **R. Seoane Souto***, M. M. Wauters, K. Flensberg, M. Leijnse, and M. Burrello, *Multiterminal transport spectroscopy of subgap states in Coulomb-blockaded superconductors* Phys. Rev. B **106**, 235425 (2022).

11. A. Tsintzis, **R. Seoane Souto**, and M. Leijnse. *Creating and detecting poor man's Majorana bound states in interacting quantum dots*. Phys. Rev. B **106**, L201404 (2022)

12. M. Nitsch, **R. Seoane Souto**, and M. Leijnse. *Interference and parity blockade in transport through a Majorana box*. Phys. Rev. B **106**, L201305 (2022)

13. S. D. Escribano, A. Maiani, M. Leijnse, K. Flensberg, Y. Oreg, A. Levy Yeyati, E. Prada, and **R. Seoane Souto***. *Semiconductor-ferromagnet-superconductor planar heterostructures for 1D topological superconductivity*. NPJ Quantum Mater. **7**, 81 (2022)

14. **R. Seoane Souto*** and M. Leijnse. *Fusion rules in a Majorana single-charge transistor*. SciPost Phys. **12**, 161 (2022)

15. S. Krøjer, **R. Seoane Souto***, and K. Flensberg. *Demonstrating Majorana nonabelian exchange using fast adiabatic charge-transfer*. Phys. Rev. B **105**, 045425 (2022)

16. S. Vaitiekėnas, **R. Seoane Souto**, Y. Liu, P. Krogstrup, K. Flensberg, M. Leijnse, C. M. Marcus. *Evidence for spin-polarized bound states in semiconductor – superconductor – ferromagnetic-insulator islands*. Phys. Rev. B **105**, L041304 (2022)

17. **R. Seoane Souto***, A. E. Feiguin, A. Martín-Rodero, and A. Levy Yeyati. *Transient dynamics of a magnetic impurity coupled to superconducting electrodes: exact numerics versus perturbation theory*. Phys. Rev. B **104**, 214506 (2021)

18. D. Kuzmanovski , **R. Seoane Souto**, and A. V. Balatsky. *Persistent current noise in narrow Josephson junctions*. Phys. Rev. B **104**, L100505 (2021)

19. A. Maiani, **R. Seoane Souto***, M. Leijnse, and K. Flensberg. *Topological superconductivity in semiconductor-superconductor-magnetic insulator heterostructures*. Phys. Rev. B **103**, 104508 (2021)

20. **R. Seoane Souto***, D. Kuzmanovski, and A. V. Balatsky. *Signatures of odd-frequency pairing in the Josephson junction current noise*. Phys. Rev. Research **2**, 043193 (2020)

21. D. Kuzmanovski, **R. Seoane Souto**, and A. V. Balatsky. *Odd-frequency superconductivity near a magnetic impurity in a conventional superconductor*. Phys. Rev. B **101**, 094505 (2020)

22. **R. Seoane Souto***, K. Flensberg, and M. Leijnse. *Timescales for charge transfer based operations on Majorana systems*. Phys. Rev. B **101**, 081407 (Rapid communication) (2020)

23. R. Avriller, **R. Seoane Souto**, A. Martín-Rodero, and A. Levy Yeyati. *Build-up of Vibron-Mediated Electron Correlations in Molecular Junctions*. Phys. Rev. B **99**, 121403 (Rapid communication) (2019)

24. **R. Seoane Souto***, R. Avriller, A. Levy Yeyati, and A. Martín-Rodero. *Transient dynamics in interacting nanojunctions within self-consistent perturbation theory'*. New J. Phys. **20**, 083039 (2018)

25. **R. Seoane Souto**, A. Martín-Rodero, and A. Levy Yeyati. *Quench dynamics in superconducting nanojunctions: Metastability and dynamical Yang-Lee zeros*. Phys. Rev. B **96**, 165444 (2017)

26. **R. Seoane Souto***, A. Martín-Rodero, and A. Levy Yeyati. *Analysis of universality in transient dynamics of coherent electronic transport*. Fortschr. Phys. **65**, 1600062 (2017)

27. **R. Seoane Souto***, A. Martín-Rodero, and A. Levy Yeyati. *Andreev Bound States Formation and Quasiparticle Trapping in Quench Dynamics Revealed by Time-Dependent Counting Statistics*. Phys. Rev. Lett. **117**, 267701 (2016)

28. **R. Seoane Souto**, R. Avriller, R. C. Monreal, A. Martín-Rodero, and A. Levy Yeyati. *Transient dynamics and waiting time distribution of molecular junctions in the polaronic regime*. Phys. Rev. B **92**, 125435 (2015)

29. **R. Seoane Souto**, A. Levy Yeyati, A. Martín-Rodero, R. C. Monreal, *Dressed tunneling approximation for electronic transport through molecular transistors*. Phys. Rev. B **89**, 085412 (2014)

PREPRINTS

1. **R. Seoane Souto***, M. Leijnse, C. Schrade, M. Valentini, G. Katsaros, and J. Danon. *Tuning the Josephson diode response with an ac current*. arXiv:2312.09204 (2023).

2. D. Kuzmanovski, **R. Seoane Souto**, P. J. Wong, and A. V. Balatsky. *Mobile Topological Su-Schrieffer-Heeger Soliton in a Josephson Metamaterial*. arXiv:2312.03456 (2023).

3. D. M. Pino, **R. Seoane Souto**, and R. Aguado. *Minimal Kitaev-transmon qubit based on double quantum dots.* arXiv:2309.12313 (2023).

4. M. Nitsch, **R. Seoane Souto**, S. Matern, and M. Leijnse. *Transport-based fusion that distinguishes between Majorana and Andreev bound states.* arXiv:2309.11328 (2023).

5. M. Geier, **R. Seoane Souto**, J. Schulenborg, S. Asaad, M. Leijnse, and K. Flensberg. *A fermion-parity qubit in a proximitized double quantum dot.* arXiv:2307.05678 (2023).

REFEREE ACTIVITIES

Regular referee of journals of the American Physical Society, including Physical Review Letters, Physical Review B and Physical Review Research. Referee Springer Nature journals, including Nature Physics, Communications Physics, and Scientific Reports.

MONOGRAPHS

*Quench dynamics in interacting and superconducting nanojunctions.* 2020
Springer Thesis series recognizing outstanding Ph.D. research. ISBN: 978-3-030-36594-3

PATENTS

Improved plano-convex lens projector, ES2570808B1 5/2016
Participation on the invention and design: 50%

GRANTS AND FELLOWSHIPS

## Fellowships

- *Nanoscale superconductors meet quantum technologies* 04/2023 - 03/2028
  Comunidad de Madrid Talento program. Budget 337,500 €(200 k€to begin my own group)
- *Dynamics, transport, and non-local properties of topological superconductors* 01/2023 - 01/2025
  Marie Skłodowska-Curie Grant Agreement No. 10103324: Budget 125,192 €
  Top 2% applicant.
- *Dynamics, transport, and non-local properties of topological superconductors* 01/2023 - 01/2026
  Vieira y Clavijo Junior fellowship: Budget 112,828 € (*Declined*)

## Grants as principal investigator

- *Nanoscale superconductors meet quantum technologies* 1/2023 - 12/2025
  Spanish Research Agency: Budget 30,000 €
- *Andreev bound states in the continuum* 1/2022 - 12/2022
  Nanolund seedling project: Budget 100,000 SEK (9,693 €)
- *Transport signatures of odd-frequency superconductivity in nanostructures* 1/2020 - 12/2020
  Nanolund seedling project: Budget 100,000 SEK (9,693 €)

## Student grants

- Predoctoral grant from the national research agency 1/2013 - 10/2016
  21,500€ per year, including tuition fee (total 92,750 €)
  Department of theoretical condensed matter physics
  Universidad Autónoma de Madrid
  Supervisors: Prof. Alfredo Levy Yeyati and Prof. Álvaro Martín-Rodero
- M.Sc. studentship (4,000 €) 1/2013 - 10/2016
  Master's degree in condensed matter physics and nanotechnology
  Universidad Autónoma de Madrid
- Summer research fellowship from the Ignacio Cirac program chair (2700€) 7/2012 - 9/2012
  Quantum photonics with solids and atoms group
  Institute of photonic sciences (ICFO)
  Supervisor: Prof. Hugues de Riedmatten
- Spanish undergraduate research fellowship (2,700 €) 1/2012 - 7/2012
  Theoretical physics department II, Universidad Complutense de Madrid
  Supervisor: Dr. Rafael Hernández Redondo

## Travel grants

- Lindau Nobel Laureate meeting, Lindau (Germany).
  Granted by Ragnar Söderberg and Lindau Nobel Laureate Meeting foundations, 5500 €
- Workshop in bound states in superconductors and interfaces, Dresden (Germany)
  Granted by Lunds Tekniska Högskola, 8664 SEK (861 €)

- International school and symposium on nanoscale transport and photonics.
  Granted by Nippon Telegraph and Telephone Corporation, 2600 €

**Access to high-performance computational facilities** granted by the Spanish supercomputing network

- *Coherent control of Andreev bound states in superconducting quantum dots* 11/2016 - 4/2017
  Estimated cost: 2571.75 €
  Responsible of the project proposal, intermediate reports and justification.
- *Transient transport properties of superconducting quantum dots* 11/2015 - 11/2016
  Estimated cost: 4572.00 €
  Responsible of the project proposal, intermediate reports and justification.
- *Theoretical study of Majorana single-charge transistor using numerical renormalization group* 7/2015 - 11/2015
  Estimated cost: 3817.62 €
  Responsible of the project proposal, intermediate reports and justification.

PARTICIPATION IN FUNDED PROJECTS

*Foundations of nonlocal and nonabelian condensed-matter systems.* 11/2020 to present
Coordinator: Prof. Karsten Flensberg. P.I. at Lund university: Prof. Martin Leijnse
ERC Synergy grant. Budget: 9,975,273 €

*2D hybrid materials as a platform for topological quantum computing.* 11/2018 to 10/2020
Coordinator: Prof. Klaus Ensslin. P.I. at Lund university: Prof. Martin Leijnse
Quantera project. Budget: 1,047,258 €

*Dynamics, superconductivity and topology in hybrid nanostructures.* 1/2017 - 10/2018
Principal investigator: Prof. Alfredo Levy Yeyati.
Granted by MINECO, FIS2017-84860-R. Budget: 157,300 €

*Interactions, topology and non-stationary effects in quantum transport.* 1/2014 - 1/2018
Principal investigator: Prof. Alfredo Levy Yeyati.
Granted by MINECO, FIS2014-55486-P. Budget: 48,400 €

*Correlated electrons in hybrid nanostructures: from transport properties to quantum information processing.* 12/2013 - 12/2014
Principal investigator: Prof. Alfredo Levy Yeyati.
Granted by MINECO, FIS2011-26516. Budget: 47,000 €

AWARDS AND DISTINCTIONS

- Best article award for *The Josephson diode effect in supercurrent interferometers*, Phys. Rev. Lett. **129**, 267702 (2022). 6/2023
  Awarded by GEFES (Spanish Physical Society)
- Junior Scientist Ideas Award 3/2022
  Awarded by Nanolund
- Seal of Excellence Certificate delivered by the European Commission 3/2021
  For the project proposal: *Simulating transport and dynamics of non-local and non-abelian quasiparticles* (STONNES)
  Horizon 2020' s Marie Skłodowska-Curie actions call H2020-MSCA-IF-2020.
- Best question award 12/2020
  SPICE-Workshop Coherent order and transport in spin-active systems. Cash prize 50 €.
- Junior Scientist Ideas Award 4/2020
  Awarded by Nanolund
- Seal of Excellence Certificate delivered by the European Commission 3/2020
  For the project proposal: *Dynamical aspects of Majorana fermions out-of-equilibrium: non-local properties and quantum operations* (DYNAMO)
  Horizon 2020' s Marie Skłodowska-Curie actions call H2020-MSCA-IF-2019.
- Springer Thesis award for outstanding Ph.D. research 8/2019
  Invitation to publish doctoral thesis in Springer Theses series. Cash prize 500 €.

**Student awards**

- Young researcher $1^{st}$ prize in material science 12/2017

Awarded by Instituto Nicolás Cabrera. Cash prize 400 €.

- Best student poster award 8/2016
  Awarded by the International Union of pure and applied Physics.
  33rd international conference on the physics of semiconductors, Beijing.
  Cash prize 2,500 ¥.
- Young researcher $2^{nd}$ prize in material science 12/2015
  Awarded by Instituto Nicolás Cabrera. Cash prize 100 €.

SUPERVISION EXPERIENCE

### Master theses direction

- Jakob Westerberg, *Theory of Time-Dependent Transport and Levitons in Nanowires* 23/4/2021
  Solid State Division, Lund University
  Co-directed with M. Leijnse
- Svend K. Møller, *Detecting Majorana Bound States.* 27/8/2020
  Center for Quantum Devices, Copenhagen University
  Co-directed with K. Flensberg

### Bachelor theses direction

- Adrien Delpoux, *Tight-Binding models of Nanowires.* 4/6/2020
  Université Toulouse III, Paul Sabatier
  Co-directed with A. Tsintzis and M. Leijnse

TEACHING EXPERIENCE

Lund university.

- Theory of superconductivity, course for Ph.D. students. 6/12/2019
  Guest lecture on topological superconductivity and Majorana fermions.

Universidad Autónoma de Madrid. Average evaluation 4.5/5 in internal performance assessments

- Experimental Techniques: Optics and Thermodynamics. Courses: 2016-2018
  Third year course of the physics degree.
  Responsible of the weekly practices, holding office hours and grading reports.
- Physics I. Courses: 2015-2018
  Introductory Physics course for chemical engineers: Mechanics and thermodynamics
  Responsible of the weekly homework sessions, holding office hours and grading problem sets.
- Laboratory of general physics. Courses: 2014-2017
  Introductory Physics course, chemical degree.
  Responsible of the weekly practices, holding office hours and grading reports.

PRESENTATIONS

### Invited speaker

1. *Tunable supercurrent diode effect in interferometers.* 20/6/2023
   NanoSeries2023. Madrid (Spain)
2. *Superconductor-semiconductor hybrid devices for quantum science and technology* 20/3/2023
   International meeting on superconducting quantum materials and nanodevices. Budba (Montenegro)
3. *Superconductor-semiconductor hybrid devices for quantum science and technology* 18/11/2022
   Modern Aspects in Quantum Materials and Quantum Technology. Greifswald (Germany)
4. *Magnetism and spin-polarized bound states in semiconductor-superconductor-ferromagnetic wires* 14/10/2022
   Northern Lights conference: Magnetism, Topology, and Superconductivity. Reykjavik (Iceland)
5. *Super-semi-ferro as a new platform for quantum technologies* 11/10/2022
   Nanolund annual meeting. Lund (Sweden)
6. *Spin-polarized bound states in semicondutor-superconductor-ferromagnetic platforms* 18/1/2022
   Young investigators online workshop on unconventional superconductivity. online
7. *Time scales for charge-transfer based operations on Majorana systems* 9/9/2019
   Q Rob workshop. Microsoft, Redmond (USA)

## Oral presentations

1. *Poor man's Majorana states in quantum dot systems.* 12/6/2023
   Bound states in superconducting devices. Budapest (Hungary)
2. *Fine-tuned Majorana states in quantum dot systems.* 25/5/2023
   Quantum Matter International Conference. Madrid (Spain)
3. *Andreev bound states in the continuum* 11/10/2022
   Nanolund annual meeting. Lund (Sweden)
4. *Magnetism and spin-polarized bound states in superconductor-ferromagnetic wires* 22/8/2022
   29th Meeting of the European Physical society, condensed matter division. Manchester (UK)
5. *Majorana fusion rules in a single-charge topological transistor* 15/3/2022
   APS March meeting Chicago (USA)
6. *Charge-transfer based operations on Majorana systems* 15/12/2021
   722. WE-Heraeus-Seminar Online
7. *Charge-transfer based operations revealing non-abelian statistics of Majorana states* 15/3/2021
   APS March meeting Online
8. *Odd frequency superconductivity in quantum dot systems.* 28/9/2020
   Nanolund annual meeting Lund (Sweden)
9. *Revealing non-abelian statistics of Majorana states using charge-transfer operations.* 2/9/2020
   Meeting of the European Physical society, condensed matter division, GEFES Online
10. *Time scales for charge-transfer based operations on Majorana systems.* 22/11/2019
    Entangled states of matter, CRC183 Berlin (Germany).
11. *Time scales for charge-transfer based operations on Majorana systems.* 9/9/2019
    Q–Rob workshop at Microsoft headquarters Redmond (USA).
12. *Quench Dynamics in superconducting nanojunctions: metastability and dynamical phase transitions.* 10/4/2019
    Dresden (Germany)
    Workshop on Bound states in superconductors and interfaces
13. *Quench dynamics in superconducting nanojunctions.* 15/11/2017
    International school and symposium on nanoscale transport and photonics Atsugi (Japan)
14. *Quench dynamics in superconducting nanojunctions: metastability and dynamical Yang-Lee zeros.* 2/8/2017
    Nanophysics, from fundamental to applications: reloaded Quy Nhơn
15. *Quench dynamics and counting statistics in interacting nanojunctions: quasi-particles trapping.* 20/9/2016
    $10^{th}$ RES (national supercomputing network) conference León (Spain)
16. *Electronic Time Dependent Counting Statistics in interacting Nanojunctions.* 11/4/2016
    Nonequilibrium condensed matter and biological system Madrid (Spain)
17. *Non-stationary and noise properties of molecular junctions in the polaronic regime.* 19/12/2015
    Nicolás Cabrera Young Research Meeting Miraflores (Spain)

## Poster presentations

1. *Magnetism and spin-polarized bound states in semiconductor-superconductor-ferromagnet wires.* 30/05/2022
   Novel Quantum Phases in Superconducting Heterostructures Bad Honnef
2. *Optimal manipultion of Majorana bound states using quantum dots.* 12/1/2021
   Advances in Scalable Hardware Platforms for Quantum Computing Online
3. *Time scales for charge-transfer based operations on Majorana systems.* 6/11/2019
   Quantum life workshop Copenhagen (Denmark).
4. *Time scales of charge transfer based operations of a topological qubit.* 22/7/2019
   Summer School Nanotechnology meets Quantum Information Donostia (Spain).
5. *Quench dynamics in superconducting nanojuncions: Andreev bound states formation and dynamical phase transitions.* 30/6/2019 - 5/7/2019
   Poster displayed during the Lindau Nobel Laureate meeting Lindau (Germany).

6. *Quench dynamics in superconducting nanojuncions.* 25/7/2018
   International Conference on Superlattices, Nanostructures and Nanodevices.
7. *Self-consistent dynamics in interacting nanojunctions: the fate of bistability.* 25/7/2018
   International Conference on Superlattices, Nanostructures and Nanodevices Madrid (Spain)
8. *Transient dynamics and Full Counting statistics in superconducting nanojunctions.* 2/8/2015
   $33^{rd}$ International Conference on the Physics of Semiconductors Beijing (China)
   **Best poster award**
9. *Non-stationary transport properties of molecular junctions in the polaronic regime.* 30/7/2015
   Frontiers of Quantum and Mesoscopic Thermodynamics Prague (Czech Republic)
10. *Non-stationary transport properties of molecular junctions in the polaronic regime.* 3/6/2015
    Nano Electromechanical Systems and beyond Bordeaux (France)

## Seminars

1. *Poor man's Majorana in double dots* 20/3/2023
   Nordita, Stockholm (Sweden)
2. *Super-semi-ferro as a platform for quantum science and technology* 7/3/2023
   Autonomous University of Madrid (Spain)
3. *Superconductor-semiconductor hybrids for quantum science and technology* 21/2/2023
   Spanish Research Council (Spain)
4. *Supercurrent reversal in semiconductor-superconductor-ferromagnetic wires* 21/9/2022
   Nordita, Stockholm (Sweden)
5. *Spin-polarized bound states in semiconductor-superconductor-ferromagnetic wires* 20/9/2022
   University of Copenhagen (Denmark)
6. *The Josephson diode effect in supercurrent interferometers* 17/5/2022
   Virtual Science Forum (Online)
7. *Fusion rules in a Majorana single-charge transistor* 13/1/2022
   University of Copenhagen (Denmark)
8. *Quantum transport in topological superconductors: role of non-abelian quasiparticles* 16/6/2021
   Aachen University (Germany)
9. *Dynamics of magnetic impurities coupled to superconductors.* 12/5/2021
   Niels Bohr institute, University of Copenhagen (Denmark)
10. *Spin-polarized bound states in semiconductor-superconductor-ferromagnetic islands* 16/2/2021
    Autonomous University of Madrid (Spain)
11. *Time scales for charge-transfer based operations on Majorana systems* 23/6/2020
    Nordita, Stockholm (Sweden)
12. *Odd-frequency superconductivity close to magnetic impurities* 27/5/2020
    Lund university (Sweden)
13. *Odd-frequency superconductivity close to magnetic impurities* 17/4/2020
    Lund university (Sweden)
14. *Time scales for charge-transfer based operations on Majorana systems* 30/10/2019
    Niels Bohr institute, University of Copenhagen (Denmark).
15. *Quench dynamics in interacting and superconducting nanojunctions* 10/4/2019
    Nordita, Stockholm (Sweden)
16. *Counting statistics reveal quasiparticle trapping in superconducting nanojunctions* 30/1/2019
    Niels Bohr institute, University of Copenhagen (Denmark)
17. *Counting statistics revealing dynamical phase transitions.* 16/11/2018
    Lund university (Sweden)
18. *Quench dynamics in interacting and superconducting nanojunctions* 25/7/2018
    Lund university (Sweden)
19. *Quench dynamics in interacting and superconducting nanojunctions* 9/7/2018
    Würzburg university (Germany)

20. *Counting statistics in superconducting nanojunctions* 13/12/2017
Autonomous University of Madrid (Spain)

21. *Electronic time dependent counting statistics in interacting nanojunctions* 27/472016
Autonomous University of Madrid (Spain)

22. *Inelastic effects in transport through molecular junctions* 11/3/2015
Autonomous University of Madrid (Spain)

## Public engagement in science

- Open session of the CIVIS assembly, hybrid, Marseille (France). 27/1/2023
  Presentation about: *Non-local states for quantum technologies*
- Farad student job fair, Lund (Sweden). 28/1/2020
- Forskar Grand Prix, Helsinborg (Sweden). 26/9/2019
  Short presentation to a young audience of about 200 high school students

INTERNATIONAL SCHOOLS

- Nanotechnology meets Quantum Information, San Sebastián. 22-26/7/2019
- Quantum transport in topological materials, Madrid. 4-8/9/2017
- Capri spring school on transport in nanostructures, Capri. 8-12/4/2013