Samuel Díaz Escribano

PhD student in Physics at UAM

Phone number [redacted]

E-Mail samuel.diazes@gmail.com

ORCID 0000-0002-3985-0470

Webpage www.samueldescribano.com

Career

03/2018-Now

PhD in Condensed Matter Physics

Universidad Autónoma de Madrid

- Funded by the National Spanish FPI program linked to the I+D project “Estados Colectivos en Materia de Baja Dimensionalidad”.
- Thesis entitled “Towards a realistic modeling of semiconductor-superconductor heterostructures: Topological superconductors, Majorana nanowires and other related heterostructures”.
- Research stay at Weizmann Institute from November 2021 to May 2022. Supervisor: Yuval Oreg.

12/2017-03/2018

Research Assistant

Universidad Autónoma de Madrid

- Project “Visualizing, understanding and controlling Andreev Bound States down to atomic scale”, funded by IFIMAC.

09/2016-06/2017

Master’s degree in Condensed Matter Physics

Universidad Autónoma de Madrid

- Major: Nanophysics. Average mark: 9.5.
- Master thesis “Theoretical and computational simulation of the interaction between a Majorana wire and its electrostatic environment”. Advisors: Elsa Prada and Alfredo Levy Yeyati. Mark: MH-10.

09/2012-06/2016

Bachelor’s degree in physics

Universidad Autónoma de Madrid

- Major: Condensed Matter Physics. Average mark: 7.54.
- Bachelor thesis “Quantum transport of excitons through polaritons”. Advisors: Esteban Moreno and Johannes Feist. Mark: 9.4.

Publications

02/2022

Vortex-induced pairing suppression and near-zero modes in quantum dots coupled to full-shell nanowires

Samuel D. Escribano, Alfredo Levy Yeyati, Ramón Aguado, Elsa Prada and Pablo San-Jose, *Phys. Rev. B* **105**, 045418 (2022).

07/2021

Tunable proximity effects and topological superconductivity in ferromagnetic hybrid nanowires

Samuel D. Escribano, Alfredo Levy Yeyati, Yuval Oreg and Elsa Prada, *Phys. Rev. B* **104**, L041404 (2021).

08/2020

Improved effective equation for the Rashba spin-orbit coupling in semiconductor nanowires

Samuel D. Escribano, Alfredo Levy Yeyati and Elsa Prada, *Phys. Rev. Research* **2**, 033264 (2020) .

07/2019

Effects of the electrostatic environment on superlattice Majorana nanowires

Samuel D. Escribano, Alfredo Levy Yeyati, Yuval Oreg and Elsa Prada, *Phys. Rev. B* **100**, 045301.

08/2018 **Interaction-induced zero-energy pinning and quantum dot formation in Majorana nanowires**
Samuel D. Escribano, Alfredo Levy Yeyati and Elsa Prada, *Beilstein J. Nanotechnol.* **9**, 2171.

Conference contributions

06/2021 **CMD 29: Bound states in hybrid superconductor nanostructures**
Online (28th-29th June)
International mini-colloquium organized by the European Physics Society (EPS). Oral contribution entitled "Fluxoid antipairing effect and zero energy pinning in non-topological QD/full-shell hybrid nanowires".

06/2021 **TopoSuper2021 Emergent Topological Superconductivity**
Online (9th June)
International conference organized (online) by the NANOCOHYBRI COST Action 16218 at Aalto. Two poster contributions entitled "Majorana Bound States in Semiconductor/Ferromagnetic insulator/Superconductor nanowire heterostructures" and "Improved effective equation for the Rashba spin-orbit coupling in semiconductor nanowires".

03/2021 **March meeting 2021**
Online (15th-19th March)
International conference organized by the American Physics Society (APS). Oral and poster contributions entitled "Topological superconductivity in ferromagnetic hybrid nanowires" and "Improved effective equation for the Rashba spin-orbit coupling in semiconductor nanowires", correspondingly.

01/2021 **XXIII Young Researches Meeting**
Online (28th January)
Young researchers annual meeting of Material Science organized by The Nicolás Cabrera Institute. Oral contribution entitled "Tunable proximity effects and topological superconductivity in ferromagnetic hybrid nanowires".

09/2020 **GEFES-CMD 2020**
Online (31th August-4th September)
International conference organized The Royal Spanish Physics Society (RSEF) together with the European Physics Society (EPS). Two oral contributions entitled "Majorana Bound States in Semiconductor/Ferromagnetic insulator/Superconductor nanowire heterostructures" and "Improved effective equation for the Rashba spin-orbit coupling in semiconductor nanowires".

12/2019 **XXII Young Researchers Meeting**
Miraflores de la sierra (19th December)
Young researchers annual meeting of Material Science organized by The Nicolás Cabrera Institute. Poster contribution entitled “Improved effective equation for the Rashba spin-orbit coupling in semiconducting nanowires”.

12/2019 **Frontiers of Quantum Matter**
Rehovot, Israel (9th-19th December)
International workshop about nobel quantum phenomena organized by The Weizmann Institute of Science. Poster contribution entitled“Improved effective equation for the Rashba spin-orbit coupling in semiconducting nanowires”.

07/2019 **Quantum Designer Physics II**
San Sebastián (1st-4th July)
International workshop about novel quantum phsyics organized by The Donostia International Physics Center (DIPC). Two poster contributions entitled “Spin-Orbit coupling in Rashba nanowires: modelling and behaviour” and “Effects of the electrostatic environment on Majorana superlattice nanowires”.

05/2019 **XIV Capri Spring School on Transport in Nanostructures**
Capri, Italy (5th-12th May)
International school about transport in nanostructures and quantum materials. Poster contribution entitled "Effects of the electrostatic environment on Majorana superlattice nanowires".

12/2018 **XXI Young Researchers Meeting**
Miraflores de la sierra (20th December)
Young researchers annual meeting of Material Science organized by The Nicolás Cabrera Institute. Poster contribution entitled "Conditions for stable Majorana bound states in superlattice nanowires".

07/2018 **Quantum Designer Physics I**
San Sebastián (16th-19th July)
International workshop about novel quantum phsyics organized by The Donostia International Physics Center (DIPC). Poster contribution entitled "Conditions for stable Majorana bound states in superlattice nanowires".

01/2018 **X GEFES Meeting**
Valencia (23th-26th January)
Biannual conference on Solid state Physics organized by The Royal Spanish Physics Society (RSEF). Poster contribution entitled "Effects of the electrostatic environment in Majorana nanowires".

12/2017 **XX Young Researchers Meeting**
Miraflores de la sierra (15th December)
Young researchers annual meeting of Material Science organized by The Nicolás Cabrera Institute. Oral contribution entitled "Effects of the electrostatic environment in Majorana nanowires".

09/2017 **Quantum transport in topological materials**
Miraflores de la sierra (4th-8th September)
XXIV *International Summer school* about quantum transport organized by The Nicolás Cabrera Institute. Poster contribution entitled "Effects of the electrostatic environment in Majorana nanowires".

Other courses

09/2019 **Emergence of Quantum Phases in Novel Materials V**
Instituto de Ciencia de los Materiales (ICMM-CSIC) (16th-20th September)
Postgraduate course on Novel Phases in Quantum Materials.

09/2019-10/2019 **Introduction to Quantum computation**
Universidad Autónoma de Madrid (30th September-30th October)
Introductory course to Quantum Computation organized by IBM at UAM.

10/2018-05/2019 **Metodologías y problemas contemporáneos de la investigación científica**
Universidad Autónoma de Madrid (2nd February-7th May)
Posgraduate course on Methodologies and Problems in Modern Research.

09/2017 **Emergence of Quantum Phases in Novel Materials IV**
Instituto de Ciencia de los Materiales (11th-15th of September)
Postgraduate course on Novel Phases in Quantum Materials.

09/2008-05/2016 **Professional Grade in Music**
Professional Conservatory of music, Alcalá de Henares (2008-2016)
Major: Piano interpretation and composition.

Skills

Languages

Spanish: Native

English: C1 (CAE)

Programming languages

Python	●●●●○	Matlab	●●●●○	C++	●●○○○
Mathematica	●●●○○	HTML	●●●●○		

Teaching experience

Physics labs.	40 hours

Software

2018

MajoranaNanowires: Quantum Simulation Package

Numerical package for Python to model and simulate Majorana nanowire devices and other related semiconductor/superconductor heterostructures. Published in Github with an Open Access license.

Other merits

2012

Honorable mention in High School

Public High School Cardenal Cisneros

Reward: fellowship for university courses.