

Carlos Payá – Curriculum Vitae

Full Name	Carlos Payá Herrero	Email	carlos.paya@csic.es
Birthdate	20 th January 1999	Website	carlosp24.github.io
Birthplace	Madrid, Spain	ORCID	0000-0001-5709-2290
Nationality	Spanish	Github	Carlosp24
Latest update	December 30, 2023		

Personal Profile

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Education

2023-Present	PhD in Condensed Matter Physics - Universidad Autónoma de Madrid, Madrid, Spain
	<i>Tentative completion date</i> February 2027
	<i>Topic</i> <i>Topological superconductors with hybrid materials: full-shell Majorana nanowires</i>
	<i>Supervisors</i> Elsa Prada and Ramón Aguado
2021-2022	Master in Physics of Condensed Matter - Universidad Autónoma de Madrid, Madrid, Spain
	<i>Grade</i> 9.45/10
	<i>Master's Thesis</i> <i>Topological phase and Majorana zero modes in full-shell nanowires</i>
	<i>Supervisor</i> Elsa Prada
2017-2021	Bachelor in Physics - Universidad Autónoma de Madrid, Madrid, Spain
	<i>Grade</i> 8.44/10
	<i>Bachelor's Thesis</i> <i>Josephson junctions based on full-shell Majorana nanowires</i>
	<i>Supervisor</i> Elsa Prada

Employment History

March 2023 - Present Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain

PhD Candidate, FPI grant

Theory of Quantum Materials and Solid State Quantum Technologies group.

Nov 2021 - Sep 2022 Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain

Research Assistant

Theory of Quantum Materials and Solid State Quantum Technologies group.

Publications

Preprints

- [2] **C. Payá**, S. D. Escribano, A. Vezzosi, F. Peñaranda, R. Aguado, P. San-Jose, and E. Prada. *Phenomenology of Majorana zero modes in full-shell hybrid nanowires*. Dec. 2023. arXiv: 2312.11613 [cond-mat.mes-hall]. URL: <https://arxiv.org/abs/2312.11613>.

Journals

- [1] P. San-Jose, C. Payá, C. M. Marcus, S. Vaitiekenas, and E. Prada. *Theory of Caroli-de Gennes-Matricon analogs in full-shell hybrid nanowires*. In: *Phys. Rev. B* 107 (15 Apr. 2023), p. 155423. doi: 10.1103/PhysRevB.107.155423. URL: <https://link.aps.org/doi/10.1103/PhysRevB.107.155423>.

Conferences

Poster contributions

- [6] **Sept. 2023.** “Emergence of Quantum Phases in Novel Materials” (Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain). Poster title: *Majorana zero modes in full-shell hybrid nanowires*. URL: https://carlosp24.github.io/files/Poster2023_09.pdf.
- [5] **June 2023.** “Bound States in Superconducting Nanodevices” (TopSquad and AndQC collaborations, Budapest, Hungary). Poster title: *Theory of Caroli-de Gennes-Matricon analogs in full-shell hybrid nanowires*. URL: https://carlosp24.github.io/files/Poster2023_04.pdf.
- [4] **May 2023.** “QuantumMatter 2023” (Phantoms Foundation, Madrid, Spain). Poster title: *Theory of Caroli-de Gennes-Matricon analogs in full-shell hybrid nanowires*. URL: https://carlosp24.github.io/files/Poster2023_04.pdf.
- [3] **May 2023.** “YouMat2023” (Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain). Poster title: *Theory of Caroli-de Gennes-Matricon analogs in full-shell hybrid nanowires*. URL: https://carlosp24.github.io/files/Poster2023_04.pdf.
- [2] **July 2022.** “Frontiers in Condensed Matter Physics” (Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark). Poster title: *Theory of Caroli-de Gennes-Matricon analogs in full-shell hybrid nanowires*. URL: https://carlosp24.github.io/files/Poster2023_04.pdf.

Attended

- [1] **Sept. 2021.** “Emergence of Quantum Phases in Novel Materials” (Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain).

Outreach

March 2023 - ICMM Superconductivity Outreach Team

Present *Lecturer and workshopper*

Regular activities: monthly talks and demonstrations for high-school students.

Events

- [4] **Nov. 2023.** “Semana de la Ciencia (Science Week)” (CSIC, Madrid, Spain). Role: *workshopper*. URL: <https://www.semanadelaciencia.csic.es/>.
- [3] **Sept. 2023.** “European Researchers’ Night 2023” (Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain). Role: *workshopper*. URL: <https://lanochedelosinvestigadores.es/>.
- [2] **June 2023.** “Ciencia en la Calle” (Casa de la Ciencia, Ciudad Real, Spain). Role: *workshopper*. URL: <https://casadelaciencia.es/>.
- [1] **Sept. 2022.** “European Researchers’ Nigth” (Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain). Role: *logistics*. URL: <https://lanochedelosinvestigadores.es/>.

Funding

Student grants

- [3] *PhD Grant* at ICMM (CSIC) (AEI, PRE2022-101362 for the period 2023-2027). Amount: 111.758,00 € (including salary, tuition fees and a foreign research stay).

Participation in funded projects

- [2] *Correlations, Superconductivity and Topology in Quantum Materials and Technologies* at ICMM (CSIC) (AEI, PID2021-125343NB-I00 for the period 2022-2025). Principal investigators: Ramón Aguado and Elena Bascones.
- [1] *Topology and Correlations in Quantum Materials and Solid State Quantum Technologies* at ICMM (CSIC) (AEI, PGC2018-097018-B-I00 for the period 2021-2022). Principal investigators: María José Calderón and Ramón Aguado.

- **Programming Languages**

Ruby - MRI 1.8.7, 1.9.2

ASP.NET, C#, VB.NET

PHP

Java/Scala

- **Web Development**

HTML5, CSS3/SASS, JavaScript/CoffeeScript/jQuery

Ruby on Rails v3.1

Test:Unit, RSpec, Cucumber, Selenium - automated testing frameworks

Apache/Nginx Web Servers

- **Miscellaneous**

Microsoft SQL Server 2000/2005 - database architecture and administration

Transact-SQL - data definition and manipulation

SQL Profiler - performance tuning and debugging

MySQL Server

CVS, DARCS, git - source version control

Interests

- **Badminton, Tennis, Running, Cycling, Sailing**
- **Travelling**
- **Creative Writing**
- **Photography**
- **Car Mechanics**

Referees

Name	Bill Lumbergh
Company	Initech Inc.
Position	Vice President
Contact	bill@initech.com

Name	Michael "Big Mike" Tucker
Company	Burbank Buy More
Position	Store Manager
Contact	mike@buymore.com