

Carlos Payá – Curriculum Vitae

Full Name	Carlos Payá Herrero	Email	carlos.paya@csic.es
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Latest update	June 12, 2025		

Personal Profile

I am a PhD candidate at the QUDYMA and Q4Q research groups at ICMM-CSIC, Madrid, under the supervision of Elsa Prada and Ramón Aguado. My research focuses on the theoretical study of topological superconductors with hybrid materials, with special emphasis on full-shell nanowires. I am particularly interested in the topological properties of superconducting materials and their potential applications in quantum computing.

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 Condensed Matter Physics - 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
	<i>PhD Candidate, FPI grant</i>

Quantum Dynamics of Materials (QUDYMA)
and Quantum Materials for Quantum Technologies (Q4Q) groups.

April - July 2025	Niels Bohr Institute, University of Copenhagen, Denmark
	<i>Visiting PhD candidate</i> Karsten Flensberg's group.

Nov 2021 - Sep 2022	Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain
	<i>Research Assistant</i> Theory of Quantum Materials and Solid State Quantum Technologies group.

Publications

Conferences

Teaching

Supervised students

Sep 2024 - César Robles - Bachelor's Thesis

June 2025 *Main supervisor: Elsa Prada*

Title: *Quasi-Majoranas in inhomogeneous full-shell hybrid nanowires*

Outreach

March 2023 - ICMM Superconductivity Outreach Team

Present *Lecturer and workshopper*

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

Funding

Skills

Languages

Spanish	Native
English	Fluent
French	Fluent

Programming

OS

MacOs, Linux (Debian and Ubuntu), Windows

Programming Languages

Python (advanced), Julia (advanced), C/C++ (basic), MySQL (basic)

Web Development

HTML5, CSS, JavaScript (basic)

Scientific computing

Mathematica (advanced), Quantica (Julia package, advanced), Numpy, Scipy

Miscellaneous

Makie (Julia package, advanced), matplotlib, Git, L^AT_EX, Office