

María Hita Pérez

Ph.D. Candidate at QUINFOG (IFF-CSIC)

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Areas of interest:

Quantum Computing, Quantum Hardware, Superconducting Circuits,
Quantum Chaos, Quantum Mechanics.

Work Experience: Grants, Contracts and Projects

- Oct. 2020 – **Research Assistant**, Quantum Information and Foundations Group, Instituto de Física Fundamental, Consejo Superior de Investigaciones Científicas (IFF-CSIC).
Now Working on the design and modelization of new superconducting circuits for quantum optimizers and quantum computers within AVaQus project.
- March 2019 – **Master's Thesis**, Instituto de Estructura de la Materia, Consejo Superior de Investigaciones Científicas (IEM-CSIC).
Sept. 2019 *Project:* Research work on spectral statistics of quantum systems with intermediate dynamics between regularity and chaos.
- Dec. 2018 – **UCM Student Collaboration Scholarship**, Quantum, Thermal and Electronic Physics Department, Universidad Complutense de Madrid (UCM).
June 2019 *Project:* Introduction to Nuclear Physics Research.

Education

- Oct. 2020 – **PhD. Program in Physics**, Universidad Complutense de Madrid.
Now Design and modelization new superconducting circuits for quantum technologies.
In QUINFOG at Instituto de Física Fundamental (CSIC).
- Oct. 2018 – **MSc. Nuclear Physics**, Universidad Complutense de Madrid*, 60 ECTS.
Sept. 2019 *Thesis:* Study of short range correlations in incomplete spectra of quantum chaotic and intermediate systems.
In collaboration with Instituto de Estructura de la Materia (CSIC) and Nuclear Physics Group (UCM).
- Sept. 2014 – **BSc. Physics, Fundamental Physics**, Universidad Complutense de Madrid, 240 ECTS.
June 2018 *Thesis:* Quantum Chaos and Random Matrices.
- Sept. 2012 – **Spanish Baccalaureate Diploma, Science and Technology Baccalaureate**, Colegio Madres Concepcionistas de Madrid.
June 2014

Awards

- Aug. 2020 **Best Academic Record in a Nuclear Master 2018-2019**, Sociedad Nuclear Española.
Awarded to the best academic records in masters degrees with nuclear content in Spain, 2018-2019.
- Oct. 2018 **Beca Excelencia UCM**, Universidad Complutense de Madrid.
Awarded to students with good academic record as recognition and support for the start of official master's degree studies at Universidad Complutense de Madrid.
- June 2014 **Matrícula de Honor en Bachillerato**, Ministerio de Educación, Gobierno de España.
Awarded to the best academic record in each Spanish Baccalaureate class.

Peer Review Papers

Bound States in the Continuum in a Fluxonium Qutrit, M. Hita-Pérez, P. A. Orellana, J. J. García-Ripoll, M. Pino, Phys. Rev. A **106**, 062602 (2022).

Ultrastrong Capacitive Coupling of Flux Qubits, M. Hita-Pérez, J. Jaumà, M. Pino, J. J. García-Ripoll, Phys. Rev. Applied **17**, 014028 (2022).

*Master in collaboration with Universidad Autónoma de Madrid, Universidad de Salamanca, Universidad de Sevilla, Universidad de Barcelona, Universidad de Granada.

Three-Josephson Junctions Flux Qubit Couplings, M. Hita-Pérez, J. Jaumà, M. Pino, J. J. García-Ripoll, *Appl. Phys. Lett.* **119**, 222601 (2021).

Management

Currently **Organizing member of the Ph.D. and Young Scientist Quantum Technologies Network (PYSQT)**.

PYSQT is an initiative of the Quantum Information Network in Spain (RITCE) aimed at promoting online and in-person activities where early stage scientists, such as PhD students and young postdocs, can meet and discuss about their work, www.ritce2020.hbar.es/pysqt. Our main activity is the organization of monthly PYSQT's seminars, www.youtube.com/@pysqt2393.

Oct. 2020 – **Coordinator of the CSIC's Doctoral Students Network at IFF-CSIC.**

Apr. 2023 The CSIC's Doctoral Students Network is an independent association created by doctoral students for doctoral students with the aim of bringing together people linked to the CSIC during their doctorate and two years after, www.reddoctorandoscsic.wordpress.com (site in Spanish).

Conference Organization

- **Quantum Technologies for Young Researchers Workshop (QUTYR)**, 04-07 July 2023, Madrid (Spain). *Event webpage:* www.benasque.org/2023qtyr.
- **I PhD Day Campus Serrano**, 07 June 2023, Madrid (Spain).

Seminars and Congress

- 20 Apr. 2022 *Bound State in the Continuum in a Fluxonium Qutrit*, oral contribution, **Spring School on Superconducting Qubit Technology**, Benasque (Spain).
- 23 Aug. 2022 *Quasi-Bound State in the Continuum in a Heavy Fluxonium Qutrit*, oral contribution, **Condensed Matter Division Conference by Institute of Physics CMD-29**, Manchester (United Kingdom).
- 28 June 2022 *Designing Superconducting Circuit Architectures for Adiabatic Quantum Computation*, seminar, **Seminar session at Universitat Autònoma de Barcelona (UAB)**, Barcelona (Spain).
- 21 June 2022 *Coupling 3-Josephson junctions flux qubits for Non-stoquastic Adiabatic Quantum Computation*, oral contribution, **ICTP Conference on Adiabatic Quantum Computation / Quantum Annealing (hosting AQC 2022)**, Trieste (Italy).
- 23 May. 2022 *Coupling 3-Josephson junctions flux qubits for Adiabatic Quantum Computation*, oral contribution, **Quantum Information in Spain ICE-7**, Granada (Spain).
- 29 Mar. 2022 *3-Josephson Junctions Flux Qubit Couplings for Adiabatic Quantum Computation*, seminar, **Seminar session at Universidad de Salamanca (USAL)**, Salamanca (Spain).
- 17 Mar. 2022 *Ultrastrong Capacitive and Inductive Coupling of Flux Qubits*, oral contribution, **American Physical Society March Meeting 2022**, Chicago (USA).
- 02 Dec. 2021 *3-Josephson Junctions Flux Qubit Couplings for Adiabatic Quantum Computation*, oral contribution, **Jornadas de Doctorandos de Invierno UCM**, online event.
- 23 Nov. 2021 *3-Josephson Junctions Flux Qubit Couplings for Quantum Computation*, oral contribution, **Quantum International Conference-Imaginenano 2021**, Bilbao (Spain).
- 24 June 2021 *3-Josephson Junctions Flux Qubit Couplings and Non-Stoquasticity*, poster contribution, **Adiabatic Quantum Computing Conference 2021**, online event.

Dissemination Activities

- *Apreniendo Computación Cuántica, jugando con Qiskit Blocks*, informative workshop session for highschool students.

Semana de la Ciencia y la Tecnología en el CSIC: Colegio Ntra. Sra. del Carmen (Madrid, Spain, 10 Nov. 2021).

Catálogo de Conferencias Científicas del CSIC: IES Juan Bautista Monegro (Torrejón de Ardoz, Madrid, Spain, 23 Mar. 2023), IES San Nicasio (Leganés, Madrid, Spain, 16 Jan. 2023), Instituto Valdecás (Madrid, Spain, 15 Jun. 2022), Colegio Nazaret Oporto (Madrid, Spain, 06 Apr. 2022), Colegio Veracruz (Galapagar, Madrid, Spain, 10 Feb. 2022), IES Guadarrama (Guadarrama, Madrid, Spain, 19 Nov. 2021).

- *Ciencia en el bar*, informative science pub quiz.

Semana de la Ciencia y la Tecnología en el CSIC: The Beer Temple (Madrid, Spain, 10 Nov. 2022).

- *Cuántica, ¿y eso qué significa?*, informative talk.

Semana de la Ciencia y la Tecnología en el CSIC: Instituto de Física Fundamental (Madrid, Spain, 10 Nov. 2021).

Catálogo de Conferencias Científicas del CSIC: Instituto Valdecás (Madrid, Spain, 04 Apr. 2022), Colegio San Gabriel (Madrid, Spain, 16 Feb. 2022), IES María Zambrano (Leganés, Madrid, Spain, 20 Dec. 2021).

*All information related to these activities can be found at www.quinfog.hbar.es.

Courses

- Apr. 2023 **Spring School on Superconducting Qubit Technology**, *Ten-days Spring School*, organized by Institut de Física d'Altes Energies, Universitat Autònoma de Barcelona (IFAE-UAB).
- Sept. 2021 **Tensor Network based approaches to Quantum Many-Body Systems**, *One-week Summer School*, organized by Institut de Ciències del Cosmos, Universitat de Barcelona (ICCUB-UB).
- Sept. 2020 **Summer School on Quantum Computing: Software for Near Term Quantum Devices**, *One-week Online Summer School*, organized by Menéndez-Pelayo International University.

Skills

Operating Systems: Ubuntu Linux, Windows.

Scientific Software: MATLAB, Maple, SciDaVis, Mathematica.

Programming Languages: Python.

Office Software: L^AT_EX, LibreOffice, Microsoft Office.

Languages: Spanish (mother tongue), English (upper intermediate), French (basic knowledge).

Other Information and Interests

- Currently **Volunteer at Asociación Grupo Scout Nuria**, as secretary and monitor of children and youngsters from 7 to 19 years old, www.gruposcoutnuria.com (site in Spanish).
- Currently **Volunteer at Aventura Quetzal**, helping in the organization of the various events and activities that this association of former Ruta Quetzal expeditionaries promotes, www.aventuraquetzal.com (site in Spanish).
- Jan.–June 2021 **Volunteer at Cruz Roja Juventud**, within the school success program that provides support and tutoring to children in vulnerable situation.
- 2015–2020 **Working as Artistic Skating Trainer**, in multiple schools and clubs all around Madrid.
- July–Aug. 2015 **Ruta Inti: “Cervantes y la cuna de la cultura occidental”**, social, cultural and adventure program for young people from all over the world, www.rutainti.com (site in Spanish).
- 2004–2019 **Piano Lessons**, Municipal Arts School of Villanueva del Pardillo.
- 2004–2014 **Musical Theory Lessons**, Municipal Arts School of Villanueva del Pardillo.
- Sporadically **Private tutor**, physics, chemistry and mathematics for high school students; and science, language, and mathematics for elementary school students.
- Sporadically **Volunteer in Charity Projects**, including helping, supporting and assisting at residences for elderly people and children with Down syndrome.