# Isaac Jesán Velázquez Reséndiz

Nationality: Mexican
Academic position: Research assistant at Institute for Theoretical Physics (IFT UAM-CSIC), Spain
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## Academic profile

Physicist and engineer with a focus on quantum error correction and open quantum systems. My research interests range from the development of fault-tolerant quantum computing to quantum information theory. My goal is to contribute to the advancement of quantum technologies through theoretical and experimental research, while actively engaging in teaching, collaboration, and scientific dissemination.

## Scientific interests

- Quantum error correction and fault-tolerant quantum computing
- Surface codes
- Light-matter interactions
- Open quantum systems
- Quantum field theory
- Quantum information theory

## Studies

- **Physics Institute, UNAM, Mexico**
  *Master on physics (9.84/10), Dr. Yuri G. Rubo, Honors distinction, August 2023 - August 2025*
- **Renewable Energies Institute, UNAM, Mexico**
  *Renewable energy engineering (9.25/10), Dr. Yuri G. Rubo, Honors distinction, 2018 - 2023*
- **Jaen University, Spain**
  *Exchange semester, January - June 2022*
- **Quilmes National University, Argentine**
  *Research internship, Dr. Santiago Manuel Garrido's group, June - August 2019*

## Articles

- **I. Jesán Velázquez-Reséndiz** and Yuri G. Rubo, Polarization dynamics of trapped polariton condensates with $\mathcal{PT}$-symmetry *Phys. Rev. B 109, 085312 (2024)*

## Distinctions and Funding

- Master's scholarship: CONAHCYT (August 2023 - September 2025)
- Quantum Excellence Certificate.- IBM Quantum, 2024 Qiskit Global Summer School: The Path to Utility
- Quantum Excellence Certificate.- IBM, Quantum, 2022 Qiskit Global Summer School: Quantum Machine Learning
- Quantum Excellence Certificate.- IBM Quantum, 2021 Qiskit Global Summer School: Quantum Simulation

## Experience

- **MODULARIS, OPE03595 (IFT UAM-CSIC)**: Modular Logical Qubits, Dr. Alejandro Bermúdez Carballo, *Research assistant: Development of fault-tolerant logical qubits in a trapped-ion architecture using surface-code–based protocols*, (September 2025 - Present)
- **PAPIIT IN108524 (UNAM)**: Quantum theory of polaritonic condensation and its applications, Dr. Yuri G. Rubo, *Research assistant: Theoretical and numerical analysis of the quantum properties of a polaritonic condensate through the Lindblad master equation formalism*, (2023 - 2025)
- **PAPIIT 106320 (UNAM)**: Polaritonic condensates for quantum simulation and computing, Dr. Yuri G. Rubo, *Research assistant: Theoretical analysis of the dynamics of a polaritonic Bose-Hubbard dimer with $\mathcal{PT}$-symmetry*, (2020 - 2022)
- **PAPIME PE110319 (UNAM)**: Prototype design and Manual of experimental activities for the LIER, Dr. Jorge Alejandro Wong Loya, *Research assistant: Construction and calibration of over 50 type T thermocouples and writing laboratory manuals for permeability and heat transfer experiments*, (2019 - 2021)
- **CUAM Morelos**: Research Congress CUAM-AcMor, *Reviewer of high school projects with technological and social impact in the community of Morelos*, (May 2019)
- **Renewable Energies Institute, UNAM**: National Congress of Renewable Energies Students, *Staff*, (November 2018)

## Teaching

- **Electricity and Magnetism**
  *Teaching assistant: Renewable energy engineering, 2025-2*
- **Classical Electrodynamics Propaedeutic**
  *Teaching assistant: Admission to the Postgraduate Degree in Physical Sciences, 2024-2*
- **Electricity and Magnetism**
  *Teaching assistant: Renewable energy engineering, 2024-1*
- **Electricity and Magnetism**
  *Teaching assistant: Renewable energy engineering, 2023-2*

## Conferences and Posters

- Conferences
  - Etic Tlahuilli: Polariton School, *Polarization dynamics of trapped polariton condensates with $\mathcal{PT}-$ symmetry*, Physics Institute, UNAM, Mexico, June 2024
  - Morelos Science Student Seminar, *The rise of quantum computing*, Institute of Physical Sciences, UNAM, Mexico, April 2023
  - Thesis in short, *Quantum to the rescue*, Renewable Energies Institute, UNAM, Mexico, October 2022
- Posters
  - National Physics Congress, Mexican Physics Society, Mexico, October 2024
  - XIX PCF-UNAM Student Congress, Physics Institute, UNAM, Mexico, December 2023
  - Etic Tlahuilli: Polariton Meeting, Physics Institute, UNAM, Mexico, November 2023

## Languages

- Spanish: Native
- English: Advanced (C1-TOEFL)
- French: Intermediate (B1)

## Technical skills

- Numerical simulations of open quantum systems and realistic noise models
- Quantum error correction and fault-tolerant quantum computing (surface codes, decoders)
- Scientific programming in Python (numpy, qutip, qiskit, stim, pytorch) and Mathematica
- Collaborative development using Git and GitHub

## Science dissemination

- The money that does not exist: Cryptocurrencies and renewable energies (in Spanish)

## Soft skills

- Team work
- Persistence and perseverance
- Adaptability
- Fast learner and autodidact
- Honest
- Solidarity
- Passionate
- Respectful