UNIVERSIDAD AUTÓNOMA DE MADRID

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- **Faculty of Sciences**

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- **Quatto / Scientists in charge**

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Alicia Palacios Cañas

alicia.palacios@uam.es

Useful Links

| CampuS

Atosur Grupos de investigación | UAM

https://quatto.eu/

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Home Institution

UNIVERSIDAD AUTÓNOMA DE MADRID

The **Universidad Autónoma de Madrid (UAM)** was founded in **1968** with the aim of offering modern, high-quality education while promoting research and university autonomy. Its **main campus in Cantoblanco**, in northern Madrid, and the **Faculty of Medicine** located next to La Paz University Hospital form its academic structure. Recognized as a **Campus of International Excellence**, UAM has established itself as one of Spain's most prestigious universities, noted for its academic excellence, international outlook, and commitment to sustainability and equality

Useful Links

https://www.uam.es/

https://www.uam.es/ciencias

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Group Leader

Fernando Martín García

Fernando Martín García is a chemist and theoretical physicist, Full Professor of Physical Chemistry at the Autonomous University of Madrid (UAM) and Scientific Director at IMDEA Nanoscience. He earned his degree in Chemistry in 1984 and in Physics in 1986, both from UAM, where he also obtained his Ph.D. in 1986, receiving the Extraordinary Doctorate Award.

He carried out postdoctoral research stays at the University of Bordeaux I, Université de Paris VI, and the University of Chicago.

His research focuses on **attochemistry**, an emerging field that studies the ultrafast motion of electrons and nuclei (on femto- and attosecond timescales) in molecules using ultrashort laser pulses, as well as photoionization/photoexcitation processes and theoretical modeling of materials and nanostructures.

He has received numerous awards, including the **Rey Juan Carlos I National Research Award** (2000), the **Spanish Royal Society of Chemistry Award in Physical Chemistry** (2010), an **ERC Advanced Grant** (XCHEM Project, 2011), the **Jaime I Award for Basic Research** (2017) and an ERC Synergy Grant TOMATTO (2021).

He was also awarded an honorary doctorate by the University of Stockholm in 2021 and with the **Miguel Catalán Medal** in 2023 for his outstanding work in atomic and molecular physics.

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Useful Links

http://campusys.es/

http://nanociencia.imdea.org/home-en/people/item/fernando-martin-garcia

Group Leader

Alicia Palacios Cañas

Alicia Palacios Cañas is a chemist specialized in atomic and molecular physics, with a strong background in theoretical chemistry, computational modeling, and supercomputing.
She earned her degree in Chemistry and obtained her Ph.D. in Theoretical and Computational Chemistry at the Autonomous University of Madrid (UAM) in 2006, receiving the Extraordinary Doctorate Award. After completing her Ph.D., she carried out a postdoctoral stay at the Lawrence Berkeley National Laboratory (2006–2009) and additional research stays at Université Bordeaux I.
At UAM, she is an Associate Professor in the Department of Chemistry. Her research focuses on *ab initio* calculations to describe time-dependent processes occurring in atoms and molecules exposed to ultrashort and intense laser pulses, on femto- and attosecond timescales.
She has led and participated in numerous national and international projects and has received several recognitions, including the **Mildred Dresselhaus Junior Award (2018)** for her contributions to theoretical and computational chemistry. She has also held institutional leadership roles, serving as Vice President and, in 2022, President of the Executive Committee of the Atomic and Molecular Physics Division of the European Physical Society.

Useful Links
https://aliciapalacios.es/

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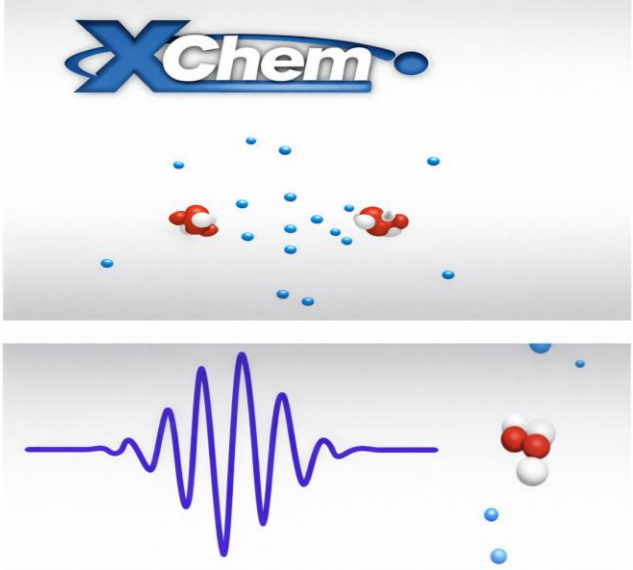
Research Training Modules



Within the Network, UAM will have two PhD students to develop the following research lines:

- **"Identifying new strategies for controlling entanglement and decoherence in molecular photoionization."**

This project aims to study this problem in greater depth through advances in Attosecond Science and computational modeling support. Following the research lines of the group led by Fernando Martín García, the goal is to carry out theoretical predictions and interpretations to improve and propose new mechanisms of entanglement in molecular systems. This will be made possible by employing advanced computational tools, which will enable a better understanding of processes occurring at this scale.

- **"Electronic correlation investigated by sculpted attosecond waveforms."**

This project will be developed within a young research team led by Alicia Palacios Cañas. The research aims to study, through a theoretical-experimental collaboration, the induction and manipulation of Rabi oscillations on the attosecond timescale. Atomic systems will be explored, involving doubly excited states—states where electronic correlation terms dominate the observed dynamics—and whose observation requires current laser technology. The project will also investigate the application of these models to molecular systems. Additionally, different shapes of the incident light waveforms will be explored to determine new control strategies based on experimentally generated light sources.

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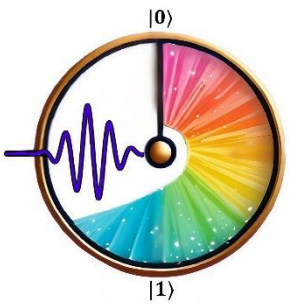

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Useful Links

https://youtu.be/WCHZl2gIXAI

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Scientific courses of the Chemistry Department

Master Studies in
Theoretical Chemistry and Computational Modelling

The Master in Theoretical Chemistry and Computational Modeling is a program with a national scope, with the participation of 14 Spanish universities, and an international dimension, with the collaboration of several European universities, within the framework of the Erasmus Mundus program.

The first year begins with a two-week course, during which students' knowledge of Linux programming and software applied to theoretical chemistry is balanced.

During the month of January, a three-week course will be offered at one of the program's partner universities, organized on a rotating basis. Elective courses are generally offered as intensive one-week courses.

The second year begins with an intensive, rotating international course in collaboration with both the Spanish and European universities involved.

During the second semester, students will participate in a three-month research stay, the results of which will be presented in their master Thesis.

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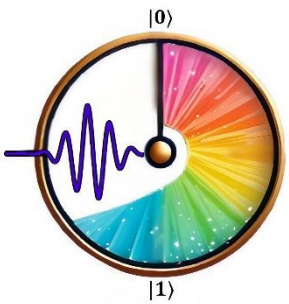

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Useful Links

Master's Degree in Theoretical Chemistry and Computational Modeling | UAM

Scientific courses of the Chemistry Department

TCCM

The Doctorate Programme in Theoretical Chemistry and Computational Modeling is an opportunity to develop an original research project with the most cutting-edge methods offered by quantum chemistry to delve into scientific problems in chemistry, physics, materials science, nanoscience and biochemistry.

Computational modeling at the molecular level has been established as a tool that covers, in a transversal way, many areas of knowledge, from biochemistry to new materials, going through all the disciplines of chemistry and emerging areas such as nanoscience. It also allows for finding interpretations of complex problems using the most modern computational tools.

We offer an Inter-university programme coordinated by UAM, and where different groups of excellence throughout the Spanish territory participate in 13 Spanish Universities The doctoral thesis can be carried out both in the development of new methodologies or in their application to different problems. As part of their training, all doctoral students will receive a broad overview of the possible applications of Theoretical Chemistry in different areas and the different existing modeling techniques.

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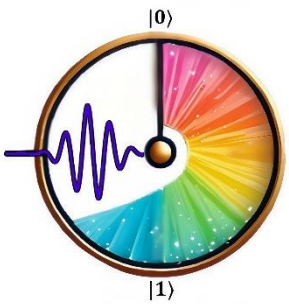

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Useful Links

UAM - Escuela de Doctorado - Doctoral Programme in Theoretical Chemistry and Computational Modelling

Life in Madrid

Studying and living in **Madrid** offers a rich academic and cultural experience. The city is home to some of **Spain's top universities**, such as the Autonomous University of Madrid, the Complutense University, and the Polytechnic University, attracting thousands of national and international students each year. In addition to its strong educational offerings, Madrid stands out for its **multicultural environment**, **vibrant social life**, and **excellent public transportation system**, which makes it easy to move around the city. Living in Madrid also means enjoying a wide range of **cultural, sports, and leisure activities**, along with delicious cuisine and pleasant weather for most of the year. Although the **cost of living** can be somewhat high, the quality of education, professional opportunities, and lifestyle make Madrid an ideal place to study and grow both personally and academically.

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