

RESEARCH ASSISTANT 2020

UNIVERSIDAD AUTÓNOMA DE MADRID, DEPARTAMENTO DE QUÍMICA

DETAILS OF THE POSITION:

We are looking for talented and motivated young people, keen to get involved in research activities in collaboration with international groups in "Ultrafast science". The contract will be supervised by Antonio Picón from the Department of Chemistry (<http://campusys.qui.uam.es/>) of the Autonomous University of Madrid (UAM, Spain). The hired person will participate and help in the development of numerical tools that model ultrafast spectroscopy experiments.

Duration and starting date: The contract should start in **April 2021**, it will be a 2-years contract, subject to positive evaluations

Salary: 16.764€ per year (gross salary per month 1.397€, 12 months)

RESEARCH PROJECTS:

Real-time chemical bond studies in X-ray Free Electron Lasers (XFELs)

The XFELs are advanced research centers that produce laser beams with wavelengths comprised in the X rays. These powerful beams allow spectroscopy with unprecedented spatial (atomic) and temporal (allowing to follow the movement of electron density) resolution. Electrons are the smallest entities that compose the structure of matter and form chemical bonds. In our group, we participate in cutting-edge studies in XFELs, giving theoretical support and also developing numerical tools to simulate the dynamics in systems of biological and catalytic interest. We have recently participated in the first study that extends "X-ray photoelectron spectroscopy" (XPS, founded by the Nobel laureate Kai Siegbahn) to the ultrafast regime, allowing to follow changes in chemical bonds in real time.

Studies of the optical properties of two-dimensional materials

The ability to follow electrons in real time between the valence and conduction band states provides the basis for the development of modern materials with optical functionality. Future studies based on ultrafast X-ray absorption techniques, as short as a few attoseconds (10^{-18} s), are essential to understand the optical response of materials, response that can be as fast as few femtoseconds (10^{-15} s), scale in which the electron-electron and electron-phonon interactions play an important role. In our group, we are developing a new numerical code that allows us to simulate efficiently these experiments using high-performance computational resources.

More information: picongroup.wordpress.com

ESSENTIAL CRITERIA:

- **Graduate in Physics, Chemistry, or related discipline**
- The applicant must be registered in the [Sistema Nacional de Garantía Juvenil](#) by 26th February 2021
- The applicant must not have been employed by the UAM since 10th July 2020

DESIRABLE CRITERIA:

- Knowledge and previous experience in: computer programming, Linux, and/or Python
- Attendance to Theoretical and Computational Chemistry courses
- A high level of English proficiency

APPLICATION:

Interested applicants can contact Antonio Picón at atto2d@uam.es for more information.