

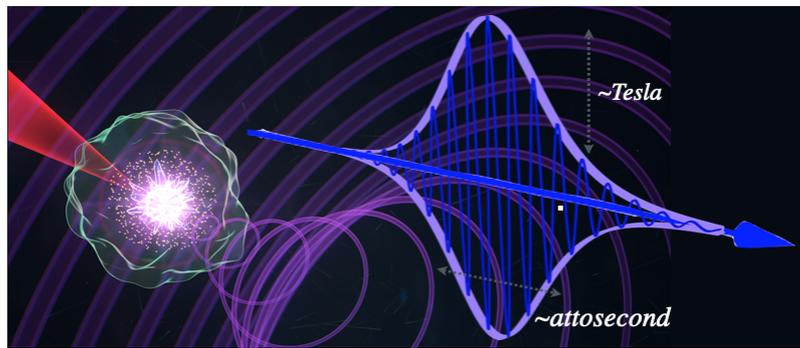


## PhD Student Position on Theory of Structured Attosecond Pulses

The University of Salamanca invites application for a 3,5-year PhD Student position to obtain a PhD degree in Physics, starting in January 2022. The position is part of the project ATTOSTRUCTURA, “Structured attosecond pulses for ultrafast nanoscience”, funded by the European Research Council (ERC) under the European Union’s Horizon 2020 research and innovation program (grant agreement No. 851201), supervised by Dr. Carlos Hernández-García, and with a duration of 5 years.

Application deadline: November 20th 2022.

Complete information at: <https://sede.usal.es/tablon/anuncio/4691/>



### Theory of Structured Attosecond Pulses

The PhD candidate will enroll the project “Structured attosecond pulses for ultrafast nanoscience” at the Laser Applications and Photonics Research group (ALF-USAL) at University of Salamanca (<https://laser.usal.es/alf/en/home/>). The candidate will find a dynamic and international working environment, and will enrol in the theoretical group. ALF-USAL is an interdisciplinary Optics research group with expertise in both theory (strong-field physics, nonlinear optics, ultrafast phenomena, attosecond science) and experiments (ultrashort pulse characterization, pulse shaping, photonic crystals, ultrashort micro-machining). The candidate will explore the generation and ultrashort structured pulses and their application in ultrafast magnetism, an emerging field that is opening exciting scenarios in laser-matter interaction at the most fundamental level, merging the fields of Optics and Magnetism.

Some of the recent results have been published in high impact factor scientific journals:

- [“Generation of extreme-ultraviolet beams with time-varying orbital angular momentum”](#), L Rego, K M Dorney, N J Brooks, Q Nguyen, C-T Liao, J San Román, D E Couch, Allison Liu, E Pisanty, M Lewenstein, L Plaja, H C Kapteyn, M M Murnane, C Hernández-García, **Science** **364**, eaaw9486 (2019). *Highlighted in the media:*
  - [Physicists discover croissant-shaped twists of light](#). National Geographic (USA)
  - [Twisted light gains angular momentum through ‘self-torque’](#). PhysicsWorld (UK)
  - [Descubierta una nueva propiedad de la luz](#). El País (Spain)
  - [Físicos españoles descubren una nueva propiedad de la luz](#). El Mundo (Spain)
- [“Controlling the polarization and vortex charge of attosecond high-harmonic beams via simultaneous spin-orbit momentum conservation”](#), K M Dorney, L Rego, N Brooks, J San Román, C-T Liao, J L Ellis, D Zusin, C Gentry, Q Nguyen, J M Shaw, A Picón, L Plaja, H C Kapteyn, M M Murnane, C Hernández-García, **Nature Photonics** **13**, 123–130 (2019).



- [“Ultraintense femtosecond magnetic nanoprobles induced by azimuthally polarized laser beams”](#), M Blanco, F Cambronero, M T Flores-Arias, E Conejero Jarque, L Plaja, C Hernández-García, **ACS Photonics** **6**, 38–42 (2019).

The candidate will explore the application of ultrashort structured pulses in ultrafast magnetism, an emerging field that is opening exciting scenarios in laser-matter interaction at the most fundamental level, merging the fields of Optics and Magnetism.

#### ESSENTIAL REQUIREMENTS

- University degree in Physics.
- Master program, Physics-related.
- Advanced level of English: higher than B2 according to the Common European Framework of Reference for Languages or equivalent.
- Candidates should be able to demonstrate a promising track record of achievements appropriate to their career stage.

#### CONDITIONS OF CONTRACT

- Type of contract:
  - o PhD contract.
  - o Limited to 3,5 years, until the end of the project. Contract to be renewed annually.
  - o Full-time employee (37,5 hours a week)
- Economic compensation:
  - o Gross salary of:
    - 1.300 €/month (14 salaries), during the first and second years.
    - 1.384 €/month (14 salaries), during the third year.
    - 1.702 €/month (14 salaries), during the fourth year.
- Research Project:
  - o ATTOSTRUCTURA, “Structured attosecond pulses for ultrafast nanoscience”, funded by the European Research Council (ERC)
- Workplace:
  - o Laser Applications and Photonics Research group (ALF-USAL) at University of Salamanca (<https://laser.usal.es/alf/en/home/>), Spain.
- Estimated starting date: January 2022.

#### JOB FUNCTIONS

- Development of theoretical methods to describe the generation of femtosecond and attosecond structured laser pulses, using state-of-the-art high-performance computing techniques.
- Theoretical studies of the manipulation of magnetic properties, using structured laser pulses at the femtosecond and attosecond timescales.
- Exploration of theoretical models for the non-paraxial description of structured attosecond beams, and their interaction with single atoms and solid systems.

#### APPLICATION

- Application period: from November 1<sup>st</sup> to November 20<sup>th</sup> 2021.
- Interested candidates can consult the detailed information of the call, and the submission process on the website of the University of Salamanca (<https://sede.usal.es/tablon/anuncio/4691/>)

#### SELECTION PROCESS

The selection process is governed by the principles of publicity, equality, merit, and ability, constituting the effect one selecting body composed of representatives of the group of research of USAL.



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Details of the selection process can be consulted on the call document, available at the University of Salamanca website (<https://sede.usal.es/tablon/anuncio/4691/>)

#### SELECTION COMMISSION

The selection commission will be made up by Dr. Carlos Hernández-García, and two members of the research team Laser Applications and Photonics Research group (ALF-USAL) at University of Salamanca.