

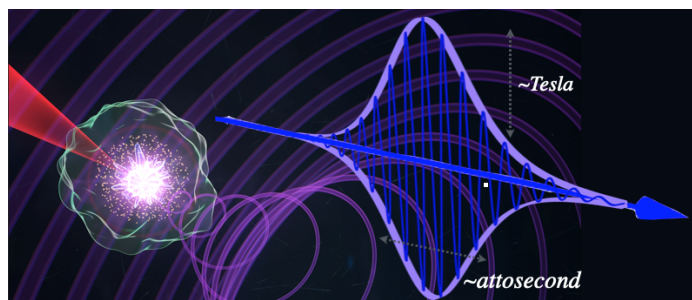


Post-Doc Position on Theory of Structured Attosecond Pulses Applied to Ultrafast Magnetism

The University of Salamanca (Spain) invites applications for a **2-years postdoc position** starting in September 2023. 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.

Application deadline: **May 20th 2023**.

Complete information at: <https://euraxess.ec.europa.eu/jobs/97493>



The postdoctoral researcher will enrol 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/>). 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). 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 nanoprobe induced by azimuthally polarized laser beams”](#), M Blanco, F Cambroner, M T Flores-Arias, E Conejero Jarque, L Plaja, C Hernández-García, **ACS Photonics** **6**, 38–42 (2019)
- [“Extreme-Ultraviolet Vector-Vortex Beams from High Harmonic Generation”](#), Alba de las Heras, Alok P. Pandey, Julio San Román, Javier Serrano, Elsa Baynard, Guillaume Dovillaire, Moana Pittman, Charles Durfee, Luis Plaja, Sophie Kazamias, Olivier Guilbaud, Carlos Hernández-García, **Optica** **9**, 71-79 (2022).
- [“Necklace-structured high harmonic generation for low-divergence, soft X-ray harmonic combs with tunable line spacing”](#), Laura Rego, Nathan J. Brooks, Quynh L. D. Nguyen, Julio San Román, Iona Binnie, Luis Plaja, Henry C. Kapteyn, Margaret M. Murnane, Carlos Hernández-García, **Science Advances** **8**, eabj7380 (2022).



Job Profile

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. The candidate will count not only with the collaboration of the theory research team at ALF-USAL (Dr. Luis Plaja, Dr. Julio San Román, Dr. Enrique Conejero and Dr. Carlos Hernández-García), but also with the collaboration of the research group on simulation of magnetic nanostructures SINAMAG at USAL, in particular with Prof. Luis López-Díaz and Dr. Rocío Yanes.

Successful candidates will have the possibility to consolidate their own independent research lines and to promote collaborative research among the following research lines:

- Development of theoretical simulations of strong-field laser-matter interactions.
- Development of theoretical models to describe the interaction of ultrafast structured laser pulses with gases and solids.
- Implementation of high-performance computing simulations of strong-field laser-matter interaction.
- Theoretical study of the ultrafast generation of magnetic textures (such as skyrmionic structures or vortices) using structured laser pulses.

Responsibilities

- To develop and implement theoretical models of laser-matter interaction along the described research lines.
- To conduct independent research as well as in collaboration with other members of the group.
- Co-advise undergraduate and Master students at University of Salamanca.

Candidate Requirements

- Ph.D. in Physics, Chemistry or related Engineering degree, at the date of recruitment, with experience in theoretical Atomic, Molecular and Optical Physics, Photonics, Magnetism and/or Condensed matter physics.
- Advanced skills in developing and implementing theoretical simulations of strong field laser-matter interaction, ultrafast magnetism and/or condensed matter physics.
- Demonstrable team working skills.
- Advanced level of English.
- Candidates should be able to demonstrate a promising track record of achievements appropriate to their research field and career stage. CVs will be evaluated taking into account the overall track record of the researcher in relation to their level of experience.

Benefits

- Dynamic and international working environment.
- Training and access to a wide range of scientific facilities.
- Soft skills training.
- Employment conditions:
 - o Two-years full-time employment contract.
 - o Gross salary of 2.750 €/month.
 - o Starting date: September 2023.
- Research Project: ATTOSTRUCTURA, "Structured attosecond pulses for ultrafast nanoscience", funded by the European Research Council (ERC)
- Workplace: Laser Applications and Photonics Research group (ALF-USAL) at University of Salamanca (<https://laser.usal.es/alf/en/home/>), Spain.

Application deadline: May 20th, 2023

Interested candidates should send a CV (maximum 4 pages), a personal statement with scientific interests and reasons for applying, two recommendation letters to Dr. Carlos Hernández-García (alf@usal.es). For further information and inquiries please see this link (<https://euraxess.ec.europa.eu/jobs/97493>) or contact Dr. Carlos Hernández-García at (alf@usal.es)

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. The selection process will consist of two phases:

1. Analysis phase and curricular value of all nominations received, classified on the basis of better adaptation of the Curriculum vitae to the profile established and compliance with the requirements.
2. Personal interview: the three candidates with the highest scores in the Phase 1 will be selected for a personal interview.

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