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## Attosecond Structured Light

The development of structured ultrafast laser sources is a key ingredient to advance our knowledge about the fundamental dynamics of electronic and spin processes in matter. It is widely recognized the relevance of ultrafast sources structured in their spin angular momentum (associated to the polarization of light) and orbital angular momentum (associated with the transverse phase profile, or vorticity of a light beam) to study chiral systems and magnetic materials in their fundamental temporal and spatial scales. In the last decade, the possibility to generate structured ultrafast laser pulses in the shortest time scales known, as attosecond pulses, has triggered substantial developments in nonlinear optics. In particular, thanks to the highly nonlinear process of high harmonic generation (HHG), where an intense infrared driving beam is up converted into the EUV extreme-ultraviolet (EUV)/soft x-rays, structured attosecond pulses can be nowadays obtained. In this talk we will review several works that have boosted the field of attosecond structured pulses during the last decade. We will focus not only in the ability to tailor the angular momentum properties of EUV/soft x-ray pulses, but also on how through the angular momentum of the infrared driving beam we can harness the spatiotemporal properties of the attosecond pulses being emitted.

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**Short bio:**

Associate Professor at Universidad de Salamanca (Spain). He obtained his PhD in Physics in 2013. After a Marie Skłodowska Curie postdoctoral stay at JILA, University of Colorado at Boulder (USA), he returned to Universidad de Salamanca where he leads the Unit on Structured Light and Matter (LUMES) and the ERC Starting Grant project ATTOSTRUCTURA. His work focuses on the generation and applications of structured laser pulses, with durations in the attosecond timescale. Together with his colleagues and collaborators, he has designed theoretical tools to understand and combine quantum simulations with highly non-linear strong-field processes. Recipient of the Fresnel Prize 2019, the RSEF-BBVA 2019 Prize for young physics researchers, the IUPAP Young Scientist Prize 2021, and the ICO Prize 2023.